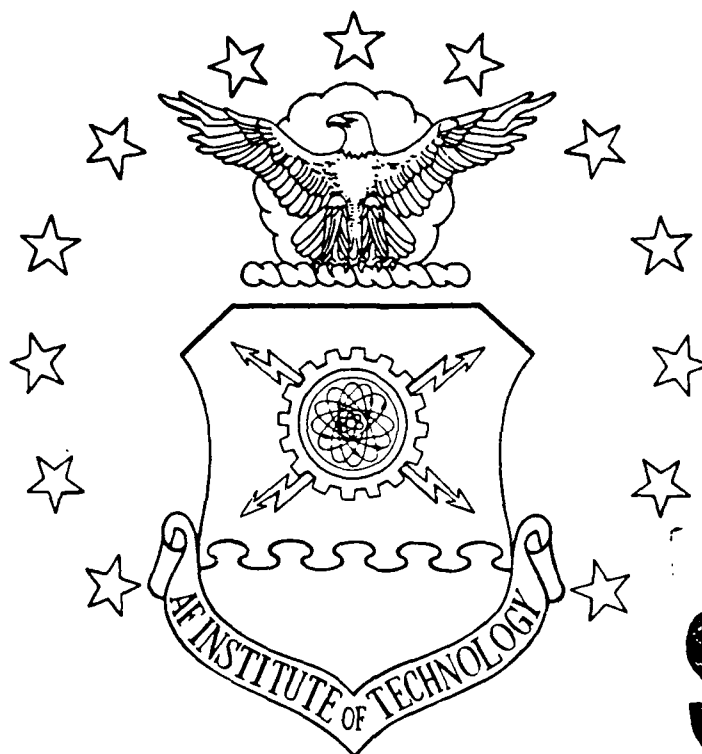


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REFINEMENT OF THE AIR FORCE SYSTEMS COMMAND

PRODUCTION RATE MODEL

THESIS

Keith K. Agena  
Captain, USAF

AFIT/GCA/LSQ/89S-1

DEPARTMENT OF THE AIR FORCE  
AIR UNIVERSITY  
**AIR FORCE INSTITUTE OF TECHNOLOGY**

Wright-Patterson Air Force Base, Ohio

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AFIT/GCA/LSQ/89S-1

REFINEMENT OF THE AIR FORCE SYSTEMS COMMAND  
PRODUCTION RATE MODEL

THESIS

Presented to the Faculty of the School of Systems and Logistics  
of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science in Cost Analysis

Keith K. Agena, B.A.

Captain, USAF

September 1989

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## Preface

The purpose of this study was to refine the Air Force Systems Command (AFSC) Production Rate Model that was developed in 1984 by The Analytic Sciences Corporation (TASC). The research analyzed several new alternative model formulations in an effort to derive better weapon system production estimates.

My interest in this area goes back to my experiences as a weapon systems cost analyst, often wondering about the accuracy of my estimates in light of constant production rate changes and tradeoff analyses. This thesis is a result of my efforts to perhaps build upon a concept I wish I had found out about earlier in my career.

I am deeply indebted to my faculty advisor, Mr. Richard L. Murphy. His patience and understanding in support of my efforts are deeply appreciated. Without his knowledgeable explanations of the production rate modeling issue, statistical analysis techniques, and SAS programming, I would still be in the library or on the computer terminal.

Most importantly, I wish to thank my wife Vicki for a being a shoulder to lean on during my bouts with writer's cramp. Without her loving support and an occasional push in the back, my completion of this thesis would not have been possible.

Keith K. Agena, Captain, USAF

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Abstract

The purpose of this study was to refine the Air Force Systems Command (AFSC) Production Rate Model that was developed in 1984 by The Analytic Sciences Corporation (TASC). In 1985, under an AFSC sponsored thesis, USAF Captain Hugh Bolton addressed various shortcomings in the TASC formulation. Bolton also investigated two alternative formulations and discovered that both models provided better estimates overall than the basic learning curve model and the TASC formulation. Further evaluation of the characteristics of these two alternatives was, however, beyond the scope of his research.

The current effort analyzed several modifications to Bolton's original alternatives in an effort to derive better results. To accomplish this, four research objectives were established.

- The first objective was to develop alternative formulations by expanding and/or altering TASC's and Bolton's formulations. These models should preserve the logic of the original formulations.
- The second objective was to compare the results between TASC's and Bolton's model formulations and the new alternative model formulations to determine which alternatives performed better and under what circumstances.
- The third objective was: (1) to investigate if statistical relationships exist for individual variables, (2) to determine which variables appear significant for different weapon systems, and (3) to identify any patterns that may exist in the occurrence of those variables.

The research was successful in evaluating these objectives. The modified formulations developed in this research effort outperformed the existing TASC and Bolton formulations. It was recommended that AFSC incorporate the new modified formulations into its Production Rate Model.

## REFINEMENT OF THE AIR FORCE SYSTEMS COMMAND PRODUCTION RATE MODEL

### I. Introduction

The goal of this thesis is to refine the Air Force Systems Command (AFSC) Production Rate Model by evaluating new formulations of the model in an attempt to improve on the existing formulation. If no one formulation provides consistently better estimates across all weapon systems, the thesis will also attempt to identify the conditions under which a competing alternative outperforms its competitors. Successful accomplishment of these objectives should enhance the ability of the AFSC Production Rate Model to predict weapon system production costs.

#### General Issue

Many of the "most serious and vexing problems in the Department of Defense's (DOD) ability to purchase weapon systems are the consequence of a mismatch between the needs of today's defense buyers and an obsolescent production culture" (5:11). It is very unusual for today's weapon systems to display a stable production rate in the midst of constant trade-offs between congressional pressures, affordable program budgets and technological innovations (5:11).

While the DOD seeks to develop and update defense systems which embody superior technology to respond to new threats, investment and support costs must remain affordable. Weapon system costs are difficult to control, however, when Congress and the DOD requires the flexibility

to change production rates and the size of annual buys yearly and more often. (5:11)

As a direct consequence, the procurement environment in which the DOD bases its decisions is very different from earlier decades when weapon system unit costs were lower and designs were simpler. The quantity of weapons system purchases vary annually in response to fluctuations in the Defense budget due to changing national objectives. Therefore, in response to control the defense budget, Congress or the DOD frequently change the programmed buy schedules during the "planning years before the contracts are let or subsequently during the lifetime of the production contracts" (5:11).

Unfortunately, fluctuating annual production quantities translate to inefficient production rates which do not allow defense contractors to produce at maximum efficiency. According to Captain Hugh Bolton, a way to achieve some measure of cost stability is to produce weapon systems at efficient and economic production rates. He cites Mr. David Acker's belief that "producing a defense system at an economic production rate can provide a financial savings, decrease the production time for the system, and decrease the time to complete deployment of the system." (3:2)

Presently, Department of Defense cost analysts use "learning curve" equations to develop weapon system production estimates in this dynamic acquisition environment. Unfortunately, the analysts' ability to accurately estimate the true cost of fluctuating programs is hampered by the learning curve's insensitivity to trade-off decisions (16:213). The real limitation of the basic learning curve is its inability to model

production policy changes that influence production rate (16:213). This means that when production policies are subject to frequent change, the basic learning curve may not provide the best predictions.

The production rate of today's and tomorrow's weapons systems no longer display an even production rate over time. Instead, production rates are "typically ragged, rising or falling sharply in response to changing perceptions of need" rather than "rising smoothly to full rate, remaining there for a number of years, and then gracefully phasing down" (5:11). This hampers the cost analyst's ability to reliably estimate weapon system production costs.

Womer notes that:

Congressional concern and the need for better planning capabilities provide the impetus for new research in this area. The approach favored by the Department of Defense is one of estimating parametric cost equations which attempt to model cost as a function of only a few aircraft design and performance characteristics. These models often yield useful planning estimates, but Large and Gillespie show that the models may produce estimates that can be off by as much as 100 percent. The real limitation of these models is their inability to consider production policy changes which may occur prior to or during the life of a program. (16:213)

Therefore, refinement of the learning curve equation must be accomplished to capture the effects of an inconsistent procurement policy that influence production rate. As Bolton states, DOD decision makers need an analytical tool which allows them to perform tradeoffs quickly and accurately. The tools "must measure the cost impact of program schedule changes which equate directly to increases or decreases in annual production rates" to develop more accurate cost estimates. (3:2)



### Specific Issue

The Air Force Systems Command Production Rate Model was developed by The Analytic Sciences Corporation (TASC) as an estimating tool for generating rough order of magnitude estimates among various production schedules for different weapon systems. The TASC model attempted to address the basic unit learning curve's inability to capture the effects of production rate changes. Bolton's thesis evaluated this model and determined that it was appropriate for its original purpose of generating budgetary estimates. However, refinements were required to address potentially erroneous assumptions made by the model prior to its use as a valid estimating tool. (3:43-44)

Bolton further showed that two alternative models he developed with the assistance of Mr. Richard L. Murphy, Assistant Professor of Quantitative Management Techniques at the Air Force Institute of Technology, gave better overall results than the basic learning curve equation and the TASC model formulation used in the Production Rate Model. A discussion of Bolton's alternative formulations will be covered in the literature review. Also, there was some evidence that one alternative provided more accurate estimates for certain types of weapon system programs. An investigation for the possible explanation of this finding was, however, beyond the scope of the intended research. (3:44)

Therefore, this thesis attempts to refine the AFSC Production Rate Model by investigating alternative model formulations which might better represent the cost/quantity/rate relationships described by TASC.

### Research Objectives

In order to logically investigate the specific issue, the following research objectives have been established:

A. The first objective is to develop alternative formulations by expanding and/or altering TASC's and Bolton's formulations. These models should preserve the logic of the original formulations.

B. The second objective is to compare the results between TASC'S and Bolton's model formulations and the new alternative model formulations to determine which alternatives performed better and under what circumstances.

C. The third objective is: (1) to investigate if statistical relationships exist for individual variables, (2) to determine which variables appear significant for different weapon systems, and (3) to identify any patterns that may exist in the occurrence of those variables.

### Scope of the Research

The scope of this research is limited to the evaluation of alternative models that have the same basic form as the TASC model or Bolton's quadratic formulations. The new alternatives differ in that they incorporate different sets of variables into the existing equation's structure. References made to other research in the production rate area provides a background upon which this research can be evaluated.

The findings of this thesis are based on the TASC data set provided in the TASC Production Rate Model Report (15). The data set includes

the recurring unit cost of various weapon systems adjusted for inflation. The process of eliminating the effects of inflation will normally introduce some measurement error into the data. Furthermore, the methodology employed by TASC to convert the Then-Year dollar budgetary estimates to constant Base-Year 1984 dollar estimates is not provided in the TASC documentation and therefore, could not be evaluated.

Finally, a cursory understanding of non-linear regression techniques and integral calculus is required to understand the derivation and solution of the various formulations. A formal treatment of these two subjects is not provided in this thesis. The explanation of basic concepts used in developing the results are provided at an overview level. References are provided which detail the in-depth treatment required to solve for the various alternative formulations.

## II. Literature Review

### Background

Various authors have sometimes referred to the learning curve and related concepts by other names such as the progress curve, the improvement curve, and the experience curve (18:303). The term learning curve will be used in this section.

First documented by T. P. Wright in 1936 (17:122-128), the learning curve suggests that as the quantity of units manufactured doubles, the number of direct labor hours it takes to produce an individual unit decreases at a constant percentage or uniform rate. (18:302)

Academics and practitioners have developed numerous variations of the curve since then; however, the log-linear form of the unit learning curve remains as the most common type used by government and industry (1:Chap 7,8-10).

The equation of the unit learning curve formulation is:

$$Z = A * X^b * E \quad (1)$$

where     $Z$  = Direct labor hours to produce the  $X$ th unit  
           $A$  = Theoretical first unit cost parameter  
           $x$  = The sequential unit number or  $X$ th unit  
           $b$  = Parameter related to the rate of learning  
           $E$  = Error term

The unit learning curve slope is expressed in terms of a doubling of quantity. The rate parameter  $b$  can be expressed as:

$$b = \ln s / \ln 2 \quad (2)$$

where  $s$  = slope of the learning curve. For example, a unit curve having a slope of .80, or 80%, will have a learning curve parameter of

$\ln(.80)/\ln 2 = -.223144/.693147 = -0.321928$ . An 80% learning curve slope means that unit 2 will cost 80 percent of unit 1, unit 4 will cost 80 percent of unit 2, unit 42 will cost 80 percent of unit 21, and so on for any doubling of units. (3:10)

According to Bolton, "it is fairly well accepted within the Defense Department that varying the rate at which a manufacturer produces a product will have an impact on the per unit cost" (3:3). The primary factor which impacts unit costs is the relationship between the production rate and the production capacity of the manufacturer. This relationship also depends on the ability of the manufacturer to change his existing production capability through significant capital investments in anticipation of expected production quantities. (3:4)

Unfortunately, the basic learning curve formulation does not capture the effects of either of these two production factors. Numerous formulations to account for the cost impact of production rate, however, have been proposed over the last two decades.

According to Lt Col William Cheney, Orsini (1970) experimented with the incorporation of production rate as both an additive and multiplicative term in addition to the basic unit learning curve equation and reportedly obtained better statistical results than with the basic unit curve. Fazio and Russell (1974) and Large et al. (1974) found, however, that the influence of production rate on cost cannot be predicted with confidence and that each case must be examined individually. Cheney's own work showed that cumulative quantity, delivery lead time, and maximum delivery rate were highly significant variables. These variables had the greatest explanatory effect in a

step-wise linear regression analysis he conducted in an effort to identify production parameter variables which reduced the standard error of the estimate. (4:73,173-179)

Dr. Larry L. Smith (1976) and John C. Bemis (1981) incorporated a parameter for production rate directly into the unit curve formulation. The formulation was:

$$Z = A * X^b * Y^c \quad (3)$$

where     Y = Production rate  
          c = Parameter related to the rate of production  
          Z,A,X = As defined in equation 1.

Although the model fit some data sets rather well, there were several problems with using this log-linear based approach involving multicollinearity and the use of estimated lot plot points. (3:14-16)

Robert M. Berg, Richard L. Dennis, and James M. Jondrow (1986) suggested that the problems of estimating using the log-linear approach could be avoided by first converting equation 3 into an integral form. By setting the total cost of the lot equal to an integral with the first and last units of the lot as the bounds of integration, the total cost of the lot could then be solved through a complex iterative technique using non-linear regression. Using this technique, the residual sum of squares term was significantly reduced compared to the results obtained by the log-linear approach for the same data. A limitation of this approach, however, was that the properties of the estimators were unknown unless the size of the data set was large. (2:12-13)

The complex iterative technique used by Berg, Dennis, and Jondrow capitalized on the fact that non-linear regression models reduced the problem of multicollinearity in the variables (3:45). The technique

uses direct search methods to compute the model parameters. These include the Gauss-Newton method and the Marquardt algorithm (8:76-78). For a detailed explanation and demonstration of nonlinear regression techniques, refer to Gallant (7) (8), Neeley (11) and Neter (12).

#### TASC Model

The TASC model formulation is currently used in the Air Force Systems Command Production Rate Model. In order to understand the TASC concept of how production rate affects the learning curve slope, it is important to understand the nature of long-run and short-run production cost curves.

Short-run Cost Curve. The short-run cost curve assumes that the plant and equipment available to a manufacturer is relatively fixed. There is an optimal rate of production at which unit costs will be at their minimum. If the production rate is either greater or less than this optimal rate, unit costs will increase. A manufacturer who produces at a rate other than the optimal rate is not being inefficient. He is merely operating at a production rate other than the optimal rate for which the plant and equipment were designed and as a result, incurs a higher production cost. Inefficient production/cost points lie above the short-run cost curve. (10)

Long-run Cost Curve. The long-run cost curve assumes that the manufacturer is able to change his plant and equipment to minimize his cost for an anticipated rate of production. In other words, for any given rate of production there exists a plant that is able to produce that output at the lowest unit cost. Furthermore, this plant will have

its own short-run cost curve. In fact, the surface of the long-run cost curve is generated by connecting the minimum cost points of all possible short run cost curves (9:191-192). Both the short and long-run cost curves have a shape similar to a "bathtub." For this reason, they are frequently referred to as bathtub curves. (10)

The shape of the long-run cost curve implies that there is one configuration of plant and equipment with an optimal rate of production that equates to the absolute minimum unit production costs (9:191-192). If minimizing unit production costs was the sole goal of an enterprise, this is the configuration and production rate they would select. However, for every possible production rate there is a plant configuration that minimizes unit production costs (9:199-201). The particular configuration of plant and equipment selected by a manufacturer depends on his perception of what the production rate will be over the long-run curve (9:191-192). Unfortunately, a manufacturer cannot make large scale changes to this plant and equipment to accommodate short-run fluctuations in production rates. This means that when short-run fluctuations in production rates occur, manufacturers will frequently find themselves producing at other than the optimal rate of production regardless of the particular configuration of plant and equipment they select. (10)

Figure 1 is a graphic representation of the bathtub curve effect that shows various short-run curves for plants of varying sizes, levels of facility capability, capital investment, manpower availability and anticipated production output as specified by the government for a typical weapon system program. (14:8-10)



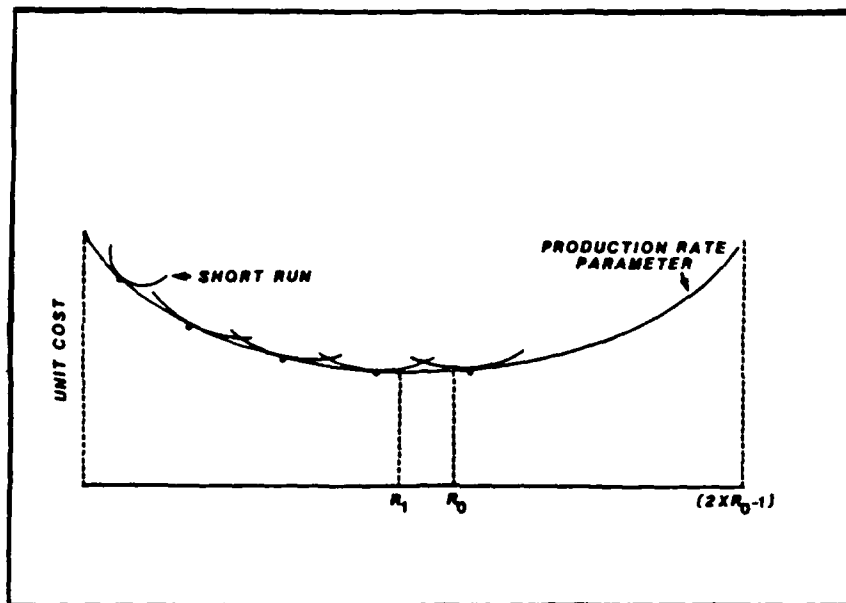


Figure 1. "Bathtub" Shaped Average Cost Curve (14:8)

The TASC concept of production costs seems to mix the long run and short run cost curves. TASC seems to assume that all long run adjustments are made prior to and in anticipation of expected procurements. Production begins with a plant and equipment that has been configured for a particular procurement quantity. Furthermore, TASC assumes that each manufacturer equates his optimal rate of production to the maximum planned rate of production. Finally, TASC seems to assume that once a production decision is made, further adjustments are no longer possible. Their concept of the relationship between unit costs and production rates is a short run concept where the existing plant and equipment is always optimized for the maximum planned production rate. As a result of these assumptions, all actual production rates are either at or below the optimal production rate. Since actual experience has indicated that actual production rates tend

to be less than planned production rates, manufacturers that behave according to the TASC assumptions would never produce at rates greater than the optimum rate. (10)

In addition, TASC assumes that the short run curve is symmetrical about the optimal rate of production ( $R_0$ ) (3:18-19). Equal deviations in production below and above  $R_0$  have the same cost impact. Since TASC assumes that actual production rates are always less than optimal rates, this assumption of symmetry has no impact on the methodology used to estimate the parameters of their model. However, the assumption is necessary if the model is to be used to estimate production costs for production rates above  $R_0$ . (10)

A graphic representation of the intended concept is provided in Figure 2. The unit cost and cumulative quantity plane represents the basic learning curve as presented in equation 1. The inclusion of the production rate plane represents incorporation of the production rate parameter ( $Y$ ). As the cumulative quantity doubles, unit costs decrease at some constant percentage as long as the production rate remains constant. Equation 3 says that unit costs increase whenever the production rate deviates from the optimal production rate. This behavior is reflected by the parabola which rises from the optimal production rate. Therefore, a manufacturer could incur an increase in unit costs even though he has increased the cumulative quantity produced. The surface initialization point (SIP) is similar in concept to the typical first unit cost or "A" in the basic learning curve equation (14:12). The difference is that the SIP assumes a different value depending upon the slope of the production rate curve (14:12).

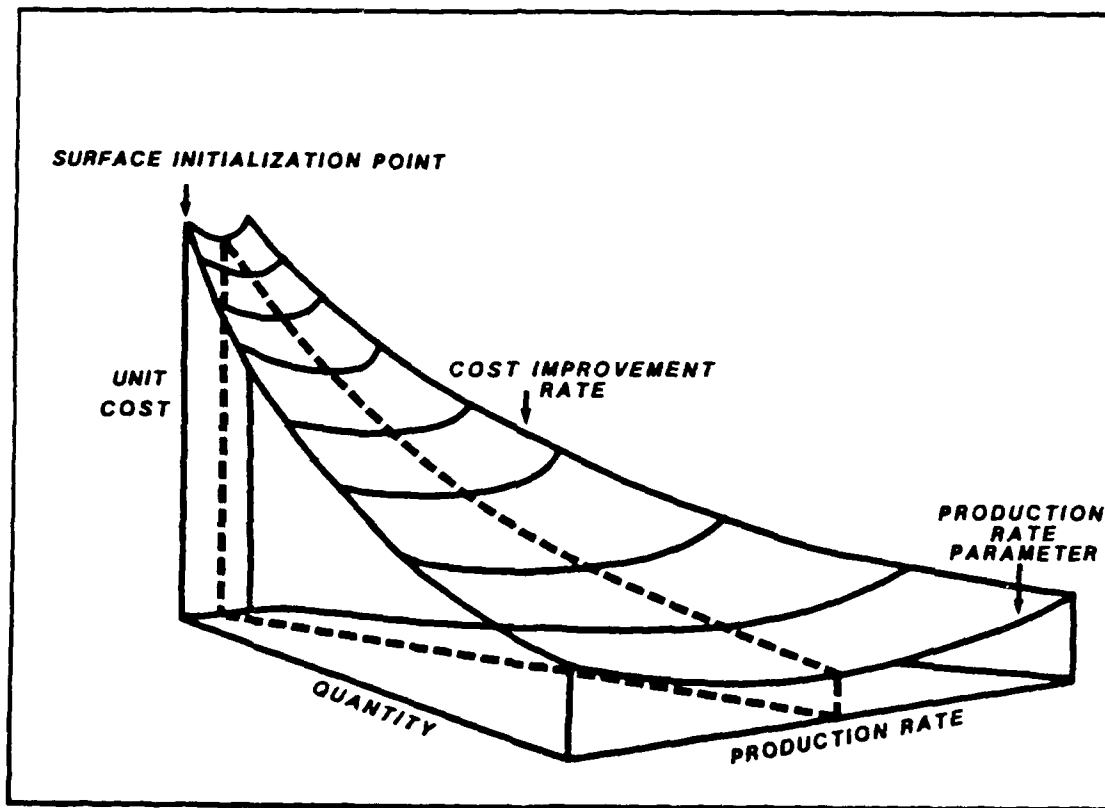


Figure 2. The  $Z = A \cdot X^b \cdot Y^c$  Model Formulation (14:2)

According to Murphy, the TASC equation is not capable of producing the relationship depicted in Figure 2. A particular weakness of the model is that it will not provide an empirical determination of the value of  $R_0$ . This is undoubtedly the motivation behind the assumptions made by TASC to justify their model formulation. (10)

In conclusion, even though the TASC model is based on some very constraining and questionable assumptions, it still serves as the basis for the Production Rate Model.

TASC Formulation. The TASC formulation is the same as Smith's equation (3). The difference is that TASC uses the non-linear method to calculate the model parameters. The model formulation is:

$$Z = A * X^b * Y^c \quad (4)$$

where

Z = Cost of unit X  
 A = Surface Initialization Point related to the first unit cost  
 X = Cumulative quantity  
 b = Unknown parameter related to the rate of learning  
 Y = Production rate (Annual Buy schedules serve as a proxy)  
 c = Unknown parameter related to the rate of production

Source: (3:14)

TASC solves this equation by first estimating the total cost for each lot by integrating over the total number of units as shown:

$$TC_1' = \int_{Xl_1}^{Xu_1} A X^{b-1} Y_1^c dx = (A/(b+1)) [Xu_1^{(b+1)} - Xl_1^{(b+1)}] [Y_1^c] \quad (5)$$

where

TC<sub>1</sub>' = Estimated total cost of lot i  
 Y<sub>1</sub> = Production rate for lot i  
 Xl<sub>1</sub> = Cumulative quantity through lot i-1  
 Xu<sub>1</sub> = Cumulative quantity through lot i  
 A = Surface Initialization point related to the first unit cost  
 b = Unknown parameter related to the rate of learning  
 c = Unknown parameter related to the production rate

Source: (3:18-20)

The TC, Y, Xl and Xu variables are already known for each lot. The SAS procedure then solves for the unknown parameters A, b, and c using the Marquardt algorithm. The SAS programs used to solve TASC's model and the following alternative models are outlined in Appendix C of Bolton's thesis (3:C1-C6).

### Bolton's Alternative One Formulation

Bolton's first alternative formulation (Alt 1) adds an additional variable to the TASC model formulation. The variable captures the effect of a change in production rate from one lot to the next. Bolton states that this variable is as important in explaining the cost impact of production rate as the production rate itself (3:26). He feels that when the production rate moves from a low rate to a high rate or from a high rate to a low rate, it has an impact "on the efficiency of the production process which would not be captured by looking at production rate alone" (3:26).

According to Bolton, this formulation reverts back to the TASC form if the production rate between lots is stable. The drawback is that this model is based on the same set of assumptions logic as the TASC formulations and subject to the same criticism. (3:38)

The alternative one formulation is shown below.

$$Z = A * X^b * Y^c * R^d \quad (6)$$

where

- R = Ratio of the rate in lot i to the rate in lot i-1
- d = Unknown production ratio parameter
- X,Y = Variables as defined in equation 4.
- A,b,c = Unknown model parameters as defined in equation 4.

Bolton uses the TASC approach to solve this model. He solves this model by converting equation 6 from a formulation that reflects unit cost to one that reflects total cost. He sets the total cost of the lot (TC) equal to an integral form and solves for this value over the upper and lower bounds of integration by the number of units as shown on the following page:

$$TC_1 = \int_{Xl_1}^{Xu_1} AX^b Y_1^c R_1^d dX = [A/(b+1)] [Xu_1^{(b+1)} - Xl_1^{(b+1)}] [Y_1^c R_1^d] \quad (7)$$

where the variables and unknown parameters are as defined in equations 4 and 5. The SAS non-linear regression procedure then solves for the model parameters using the Marquardt algorithm. (3:18-20,26)

#### Bolton's Alternative Two Formulation

Bolton's Alternative Two (Alt 2) was formulated to solve directly for the optimal rate of production. As noted earlier, TASC's formulation models only the left hand side of the parabola in Figure 1. Bolton overcomes this deficiency by including a quadratic function expressed as a function of the production rate (Y) to solve directly for  $R_0$ 's optimal value. (3:26)

The alternative two formulation is shown below:

$$Z = A * X^{(b + c*Y + d*Y^2)} \quad (8)$$

where

$b, c, d$  = Quadratic model parameters ( $d > 0$ )

$X, Y$  = Variables as defined in equation 4.

$A$  = Unknown parameter as defined in equation 4.

The quadratic model parameters solve directly for the optimal rate of production. The constraint that "d" must be positive is necessary for this quadratic to have a minimum. Notice that the parameters  $b, c$ , and  $d$  are associated with different terms in this equation than in previous equations. As before, Bolton solves this model by first integrating the total cost of the lot by the number of units as shown on the following page:

$$TC_1' = \int_{Xl_1}^{Xu_1} \lambda X^{(b+cY_1+dY_1^2)} dx$$

$$TC_1' = \lambda / (b+cY_1 + dY_1^2 + 1) [Xu_1(b+cY_1+dY_1^2+1) - Xl_1(b+cY_1+dY_1^2+1)] \quad (9)$$

where the unknown parameters b,c,d are defined in equation 8 and the remaining variables and parameter  $\lambda$  are as defined in equations 4 and 5. (3:39)

According to Bolton, as long as the parameter value associated with the quadratic term is significant, "the formulation will produce an optimum production rate,  $R_0$ , at which unit costs will decline along the steepest possible learning curve slope" (3:27). If the production rate changes from  $R_0$  in either direction, "the slope of the learning curve becomes less steep, which means a slower rate of learning" (3:27). If the parameters c and d are not statistically significant, the formulation reverts back to the standard unit learning curve formulation (3:26-27,40).

### Conclusion

Bolton concluded that based on a residual sum of squares comparison for each weapon system, both the Alt 1 and Alt 2 model formulations consistently provided more accurate estimates than both the basic unit learning curve equation and the TASC formulation. In addition, although Alt 1 provided better results than Alt 2 on an overall basis, the results suggested that Alt 2 provided more accurate estimates than Alt 1

for certain types of weapon systems. This assertion was not investigated, however, as it was beyond the scope of his research.

(3:43-44)

Bolton's final recommendation was that Air Force Systems Command adopt Alt 1 as the new production rate model formulation based on its overall performance in reducing the residual sum of squares error term.

(3:44)



### III. Methodology

#### Research Objective One

- The first objective is to develop alternative formulations by expanding and/or altering TASC's and Bolton's formulations. These models should preserve the logic of the original formulations.

Background. Bolton's alternative formulations identified two variables to account for the variations in production rate. These were defined as production rate (Y) and ratio of the production rate from lot 1 to lot i-1 (R). Since the scope of this research is limited to an analysis of variables or equation structures that Bolton had previously identified, no new variables will be introduced in this research. Therefore, the goal of this objective is to modify either the TASC formulation or the existing Bolton formulations in an effort to find alternative formulations. (3:26-27)

Procedure. First, the TASC formulation was expanded to incorporate the ratio (R) variable as a quadratic exponent of the production rate. It was envisioned that inclusion of the ratio variable as a quadratic exponent would capture the effect of changing rates of production and lead to calculation of the optimal ratio of production. This expanded formulation was called Modified Alternative One (Mod Alt 1). The expanded model is presented below:

#### Modified Alternative One:

$$Z = A * X^b * Y^{(C + dR + eR^2)} \quad (10)$$

where

Z = Cost of unit X

A = Surface Initialization Point related to the first unit cost

X = Cumulative quantity

b = Unknown parameter related to the rate of learning

Y = Production rate (Annual Buy schedules serve as a proxy)

$R$  = (Ratio of the rate in lot  $i$  to the rate in lot  $i-1$ )  
 $c, d, e$  = Unknown quadratic parameters related to  $R$

Second, Bolton's Alt 2 was modified by expanding the exponent of  $X$  to include the production ratio ( $M$ ) as a quadratic function in addition to the production rate variable ( $Y$ ). This allowed for calculation of both the optimal rate of production and the optimal ratio of production. By setting  $M$  equal to the ratio of production ( $R$ ) minus one, the equation reverts to Bolton's Alt 2 when the production rate is stable. For example, in the event that there is no change from lot  $i$  to lot  $i-1$ , the value for  $R$  is one. The production ratio equals zero ( $M = 1$  minus 1), the quadratic function for production ratio drops out, and the equation reverts back to Bolton's Alt 2. This alternative formulation was called Modified Alternative Two (Mod Alt 2). The expanded model is presented below:

Modified Alternative Two:

$$Z = A * X^{(b + cY + dY^2 + eM + fM^2)} \quad (11)$$

where

$Z$  = Cost of unit  $X$   
 $A$  = Surface Initialization Point related to the first unit cost  
 $X$  = Cumulative quantity  
 $Y$  = Production rate (Annual Buy schedules serve as a proxy)  
 $M$  = (Ratio of the rate in lot  $i$  to the rate in lot  $i-1$ ) - 1  
 $b, c, d, e, f$  = Unknown quadratic parameters related to  $Y$  and  $R$

Bolton's Alt 2 expressed the exponent of  $X$  as a quadratic function of the production rate ( $Y$ ). Mod Alt 2 expresses the exponent of  $X$  as a quadratic function of both the production rate ( $R$ ) and the production ratio ( $M$ ). A final alternative model was formulated by expressing the exponent of  $X$  as a quadratic function of the production ratio ( $R$ ) only without reference to the production rate. This model assumes that

changes cost are affected by changes in the rate of production and not the level of production. This alternative formulation was called Modified Alternative Three (Mod Alt 3). The expanded model is presented below:

Modified Alternative Three:

$$Z = A * X(b + cR + dR^2) \quad (12)$$

where

Z = Cost of unit X

A = Surface Initialization Point related to the first unit cost

X = Cumulative quantity

R = (Ratio of the rate in lot i to the rate in lot i-1)

b,c,d = Unknown quadratic parameters related to R

In conclusion, three modified formulations were identified as potential candidates for evaluation and comparison against the TASC and Bolton formulations. The methodology for calculating and analyzing the modified formulations are discussed in the next section.

#### Research Objective Two

- The second objective is to compare the results between TASC'S and Bolton's model formulations and the new alternative model formulations to determine which alternatives performed better and under what circumstances.

Background. A drawback to using non-linear regression is that methods of analyzing the model are limited to that of comparison. In non-linear regression, the usual tests such as the F-ratio and t-test are not appropriate indicators of model fit and specification. Although these test statistics may be calculated, exact conclusions for specification and fit at any level cannot be drawn due to violations of assumptions usually made in linear regression about the normal distribution of the parameter values. Because the nature of the

parameter distributions in non-linear regression may not be assumed to be normal, the inferences made from the test statistics are not valid. (6:484)

In view of this fact, the only valid criteria for comparison among the selected "modified" alternatives in comparison to Bolton's alternatives is the residual sum of squares term for each weapon system on a case-by-case basis. The residual sum of squares is a term that measures the observed vertical deviation of the dependent variable from the fitted regression line (12:44). Since this vertical deviation represents the error in the estimate when compared to actual costs, a measure of comparison based on these vertical deviations seems reasonable.

Procedure. First, a SAS non-linear regression program was written for the basic learning curve equation in equation 1. The results from the non-linear regression of this equation could then be directly compared against the modified equations. In Bolton's thesis, the non-linear alternative results were compared against the linear results of the basic learning curve. This comparison was not an equivalent one as the effects of the log-linear transformation of the basic learning curve showed up in the residual sum of squares results.

Second, SAS non-linear regression programs for each of the selected "modified" alternatives were developed and regressed against the entire TASC data set.

Third, the results for each modified alternative were tabulated and compared to the TASC, Basic Learning Curve and original Bolton formulations. If a modified alternative consistently yielded the lowest

sum of squared residuals value for each of the weapon systems, then that alternative was considered the superior technique and recommended for immediate incorporation into the AFSC Production Rate Model. If the analysis showed no one alternative to be superior, then the circumstances under which each alternative appeared to perform best were considered and general guidelines for their use were suggested. If none of the modified formulations produced better results, then Bolton's recommendation was left unchanged.

### Research Objective Three

- The third objective is: (1) to investigate if statistical relationships exist for individual variables, (2) to determine which variables appear significant for different weapon systems, and (3) to identify any patterns that may exist in the occurrence of those variables.

Background. Non-linear regression does not allow for testing the statistical significance of individual variables except as an asymptotic property. Therefore, even when the reduction in the sum of squares seemed to strongly indicate that one formulation is more significant than another, the significance or insignificance of individual variables in the equation remained an unresolved issue.

Procedure. First, Bolton's alternative formulations and the three modified alternatives were transformed from their non-linear form into their log-linear components. This transformation permitted use of the SAS stepwise regression procedure to identify the most significant variables within each modified formulation. The transformed models are shown on the next page:

Alt 1:

$$\ln Z = \ln A + b(\ln X) + c(\ln Y) + d(\ln R) \quad (13)$$

where the variables are as defined in equation 6.

Alt 2:

$$\ln Z = \ln A + b(\ln X) + cY(\ln X) + dY^2(\ln X) \quad (14)$$

where the variables are as defined in equation 8.

Modified Alt 1:

$$\ln Z = \ln A + b(\ln X) + c(\ln Y) + dR(\ln Y) + eR^2(\ln Y) \quad (15)$$

where the variables are as defined in equation 10.

Modified Alt 2:

$$\ln Z = \ln A + b(\ln X) + cY(\ln X) + dY^2(\ln X) + eR(\ln X) + fR^2(\ln X) \quad (16)$$

where the variables are as defined in equation 11.

Modified Alt 3:

$$\ln Z = \ln A + B(\ln X) + cR(\ln X) + DR^2(\ln X) \quad (17)$$

where the variables are as defined in equation 12.

In order to correctly perform the stepwise regression, Z had to be redefined to represent the lot average cost since the TASC data set does not contain unit values. This meant that X had to be defined to represent the unit that cost the same as the average cost for the lot. Unfortunately, X cannot be determined without knowing the slope of the learning curve. The solution was to use a rule of thumb to calculate the lot plot points. See the discussion in Appendix A for the calculation rules used to compute the rule of thumb plot points. Appendix B contains the SAS programs used in this analysis.

The results of the SAS stepwise regression runs were then analyzed to determine the frequency with which the variables appeared significant in each formulation. Both the variables and the parameter values were analyzed to determine whether or not a pattern existed within each weapon system type by model formulation.

#### IV. Findings

This chapter summarizes the results and analysis in the investigation of additional alternative formulations for the AFSC production rate model.

##### Research Objective One

- The first objective is to develop alternative formulations by expanding and/or altering TASC's and Bolton's formulations. These models should preserve the logic of the original formulations.

The three modified formulations were solved by first integrating the total cost of the lot 1 over the number of units in the lot and then creating SAS non-linear regression programs that used the Marquardt algorithm to solve for the unknown model parameters. The SAS programs are provided in Appendix B. The modified alternative formulations and the integration results are provided below:

Modified Alternative One:

$$Z = A * X^b * Y(c + dR + eR^2) \quad (10)$$

The integration result was:

$$TC_1' = \int_{Xl_1}^{Xu_1} AX^b Y(c + dR + eR^2) dx$$

$$TC_1' = AY_1 (c + dR + eR^2) / (b+1) (Xu_1^{(b+1)} - Xl_1^{(b+1)}) \quad (18)$$

where the variables and unknown parameters are as defined in equation 10.



Modified Alternative Two:

$$Z = A * X^{(b + cY + dY^2 + eM + fM^2)} \quad (11)$$

The integration result was:

$$TC_1' = \int_{X1_1}^{Xu_1} AX^{(b + cY_1 + dY_1^2 + eM_1 + fM_1^2)} dx$$

$$TC_1' = A / (b + cY_1 + dY_1^2 + eM_1 + fM_1^2 + 1) (Xu_1 (b + cY_1 + dY_1^2 + eM_1 + fM_1^2 + 1) - X1_1 (b + cY_1 + dY_1^2 + eM_1 + fM_1^2 + 1)) \quad (19)$$

where the variables and unknown parameters are as defined in equation 11.

Modified Alternative Three:

$$Z = A * X^{(b + cR + dR^2)} \quad (12)$$

The integration result was:

$$TC_1' = \int_{X1_1}^{Xu_1} AX^{(b + cR_1 + dR_1^2)} dx$$

$$TC_1' = A / (b + cR_1 + dR_1^2 + 1) (Xu_1 (b + cR_1 + dR_1^2 + 1) - X1_1 (b + cR_1 + dR_1^2 + 1)) \quad (20)$$

where the variables and unknown quadratic parameters are as defined in equation 12.

Tables 1 through 5 provide the parameter estimates obtained by weapon system for each formulation. These tables are provided in the following pages:

TABLE 1  
WEAPON SYSTEM PARAMETER COMPARISON  
ALTERNATIVE 1

| <u>TYPE</u> | <u>PROGRAM</u> | <u>B</u>      | <u>C</u> | <u>D</u> |
|-------------|----------------|---------------|----------|----------|
| BOMBERS     | B-1B           | -.1806        | -.1507   | .0332    |
|             | B-52           | -.2067        | -.0764   | -.1161   |
|             | B-58           | -----N/A----- |          |          |
| FIGHTERS    | A-10           | .0355         | -.2467   | .0056    |
|             | F-100          | -.2024        | .0536    | -.0573   |
|             | F-101          | -.2990        | .1312    | -.0754   |
|             | F-102          | -.4562        | .1997    | -.0492   |
|             | F-106          | -----N/A----- |          |          |
|             | F-15A/B        | -.1294        | .0151    | .0192    |
|             | F-15C/D        | -.0807        | -.3832   | .3985    |
|             | F-15E          | .0480         | -.6597   | .2407    |
|             | F-16A/B        | -.2159        | .0885    | .3464    |
|             | F-16E          | .0383         | -.2735   | .2952    |
| ELECTRONIC  | ARC-109V       | 1.7835        | -1.7352  | 1.2660   |
|             | ARC-54         | -.1504        | .1061    | -.0408   |
|             | ASN-63         | -.2226        | -.2341   | .1081    |
|             | ASN-70         | .0025         | -.0421   | .0503    |
|             | ASN-99         | .0339         | -.3199   | .1800    |
|             | ASN-108        | -.2392        | .2790    | -.1480   |
|             | ASQ-133        | -.1049        | -.1204   | .0469    |
|             | ASW-32         | .2965         | -.5865   | .6544    |
|             | CP-1035N       | -.1233        | .2703    | -.3533   |
|             | JTIDS          | -.2056        | -.0160   | -.0590   |
|             | LANT(NAV)      | -.1134        | -.0061   | .0015    |
|             | LANT(TAR)      | -.1050        | -.0049   | .0023    |
|             | LANT(REC)      | -.1434        | .0023    | -.0028   |
| HELICOPTER  | HH-52          | -.3877        | -.6510   | .2866    |
|             | CH-46          | -.1202        | -.2384   | -.0105   |
|             | H-53           | -.1349        | -.0003   | -.0142   |
|             | CH-47          | -.0390        | -.3183   | .0975    |
|             | H-54           | -.0569        | -.2188   | .0107    |
|             | HH-60D         | -.0543        | -.0450   | -.0125   |
|             | SH-3           | -.1706        | .0985    | .0255    |
| ARMAMENT    | LLLGB          | -.1692        | -.0042   | -.0013   |
|             | CEM            | -.3398        | .2121    | -.1542   |
|             | GBU-15         | -.2477        | .5233    | -.1385   |
| MISSILE     | AMRAAM         | -.3439        | -.0092   | -.0257   |
|             | HARM           | -.1851        | -.0845   | -.0229   |
|             | IIR            | -.1486        | -.1285   | -.0497   |
|             | AIM7F(R)       | -.3452        | -.0895   | -.0968   |
|             | AIM7F(GD)      | -.4472        | .0217    | -.0614   |

Source (3:D55-D74)

**TABLE 2**  
**WEAPON SYSTEM PARAMETER COMPARISON**  
**ALTERNATIVE 2**

| <u>TYPE</u> | <u>PROGRAM</u> | <u>B</u> | <u>C</u> | <u>D</u> |
|-------------|----------------|----------|----------|----------|
| BOMBERS     | B-1B           | -.2347   | -.0016   | .0000    |
|             | B-52           | -.0759   | -.0019   | .0000    |
|             | B-58           | 2.1100   | -.0163   | .0029    |
| FIGHTERS    | A-10           | .0969    | -.0014   | .0000    |
|             | F-100          | -.0022   | -.0005   | .0000    |
|             | F-101          | -.2622   | .0001    | -.0000   |
|             | F-102          | -.4703   | .0005    | -.0000   |
|             | F-106          | -.2431   | -.0046   | .0000    |
|             | F-15A/B        | -.1242   | -.0008   | .0000    |
|             | F-15C/D        | .6322    | -.0109   | .0000    |
|             | F-15E          | .3989    | -.0083   | .0000    |
|             | F-16A/B        | -.8475   | .0075    | -.0000   |
|             | F-16E          | -1.8332  | .0199    | -.0000   |
| ELECTRONIC  | ARC-109V       | .7989    | -.0076   | .0000    |
|             | ARC-54         | -.1907   | .0001    | -.0000   |
|             | ASN-63         | .1866    | -.0001   | -.0000   |
|             | ASN-70         | .0403    | -.0004   | .0000    |
|             | ASN-99         | .1454    | -.0003   | .0000    |
|             | ASN-108        | .0545    | -.0009   | .0000    |
|             | ASQ-133        | -.0719   | -.0019   | .0000    |
|             | ASW-32         | -.2392   | .0005    | .0000    |
|             | CP-1035N       | -.3488   | .0115    | -.0000   |
|             | JTIDS          | -.0077   | -.0052   | .0000    |
|             | LANT(NAV)      | -.1091   | -.0000   | .0000    |
|             | LANT(TAR)      | -.1012   | -.0000   | .0000    |
|             | LANT(REC)      | -.2419   | .0021    | -.0000   |
| HELICOPTER  | HH-52          | .0522    | -.0194   | .0006    |
|             | CH-46          | -.0967   | -.0009   | .0000    |
|             | H-53           | -.1091   | -.0007   | .0000    |
|             | CH-47          | -.0364   | -.0015   | .0000    |
|             | H-54           | -.1021   | .0079    | -.0002   |
|             | HH-60D         | -.4634   | .0260    | -.0004   |
|             | SH-3           | -.1386   | -.0015   | .0000    |
| ARMAMENT    | LLLGB          | -.1621   | -.0000   | .0000    |
|             | CEM            | -.2708   | .0000    | -.0000   |
| MISSILE     | GBU-15         | -.1049   | -.0003   | .0000    |
|             | AMRAAM         | -.3450   | -.0000   | .0000    |
|             | HARM           | -.1688   | -.0000   | .0000    |
|             | IIR            | -.0977   | -.0000   | .0000    |
|             | AIM7F(R)       | -.3173   | -.0000   | .0000    |
|             | AIM7F(GD)      | -.4571   | .0000    | -.0000   |

Source (3:D73-D95)

TABLE 3

**WEAPON SYSTEM PARAMETER COMPARISON  
MODIFIED ALTERNATIVE 1**

| <u>TYPE</u> | <u>PROGRAM</u> | <u>B</u>      | <u>C</u> | <u>D</u> | <u>E</u> |
|-------------|----------------|---------------|----------|----------|----------|
| BOMBERS     | B-1B           | -.1207        | -1.2592  | .0172    | -.0016   |
|             | B-52           | -.1979        | -1.0896  | -.0093   | -.0044   |
|             | B-58           | -.3797        | .4179    | -.8730   | .2762    |
| FIGHTERS    | A-10           | .0516         | -1.2789  | .0152    | -.0023   |
|             | F-100          | -.3846        | -.3478   | -.2745   | .0109    |
|             | F-101          | -.2826        | .9207    | -.1012   | .0227    |
|             | F-102          | -.5904        | -.2580   | -.0105   | -.0039   |
|             | F-106          | -.5381        | -.1000   | -.2431   | .0406    |
|             | F-15A/B        | -.1492        | -.9314   | -.0087   | .0019    |
|             | F-15C/D        | -.0754        | -1.4984  | .1672    | -.0319   |
|             | F-15E          | -----N/A----- |          |          |          |
|             | F-16A/B        | -----N/A----- |          |          |          |
|             | F-16E          | -----N/A----- |          |          |          |
| ELECTRONIC  | ARC-109V       | -.5732        | -.0544   | -.1365   | .0180    |
|             | ARC-54         | -----N/A----- |          |          |          |
|             | ASN-63         | -.0884        | -1.1732  | .0865    | -.0324   |
|             | ASN-70         | -.0496        | -1.0721  | .0092    | .0025    |
|             | ASN-99         | .0102         | -1.6121  | .2108    | -.0524   |
|             | ASN-108        | -.4176        | -.3241   | -.1278   | .0240    |
|             | ASQ-133        | -.0859        | -1.2165  | .0657    | -.0128   |
|             | ASW-32         | .8025         | -4.6111  | 1.8433   | -.5587   |
|             | CP-1035N       | -.1243        | -.7330   | .0186    | -.0295   |
|             | JTIDS          | -----N/A----- |          |          |          |
|             | LANT(NAV)      | -.1135        | -1.0013  | -.0002   | .0001    |
|             | LANT(TAR)      | -.1052        | -.9969   | -.0002   | .0000    |
|             | LANT(REC)      | -.0880        | -1.2815  | .1382    | -.0383   |
| HELICOPTER  | HH-52          | -.3644        | -1.7932  | .3831    | -.1582   |
|             | CH-46          | -.1091        | -1.2527  | -.0337   | .0121    |
|             | H-53           | -.1564        | -.9879   | .0103    | -.0008   |
|             | CH-47          | -.0467        | -1.4014  | .1115    | -.0322   |
|             | H-54           | -.2368        | -.5215   | -.3659   | .0693    |
|             | HH-60D         | -.2499        | -.5810   | -.1169   | .0112    |
|             | SH-3           | -.1688        | -1.0530  | .1097    | -.0316   |
| ARMAMENT    | LLGB           | -----N/A----- |          |          |          |
|             | CEM            | -----N/A----- |          |          |          |
| MISSILE     | GBU-15         | -.2109        | -.6307   | .0137    | -.0040   |
|             | AMRAAM         | -.3533        | -.9827   | -.0080   | .0010    |
|             | HARM           | -.1713        | -1.1188  | .0035    | -.0017   |
|             | IIR            | -----N/A----- |          |          |          |
|             | AIM7F(R)       | -.3271        | -1.1410  | .0140    | -.0069   |
|             | AIM7F(GD)      | -.4108        | -1.0006  | -.0117   | .0020    |

TABLE 4

WEAPON SYSTEM PARAMETER COMPARISON  
MODIFIED ALTERNATIVE 2

| <u>TYPE</u> | <u>PROGRAM</u> | <u>B</u> | <u>C</u> | <u>D</u> | <u>E</u> | <u>F</u> |
|-------------|----------------|----------|----------|----------|----------|----------|
| BOMBERS     | B-1B           | -.2627   | -.0067   | -.0001   | .0003    | -.0000   |
|             | B-52           | -.1422   | -.0214   | .0040    | -.0016   | .0000    |
|             | B-58           | .4285    | .0188    | .4028    | -.0038   | -.0003   |
| FIGHTERS    | A-10           | .0649    | -.0043   | .0004    | -.0009   | .0000    |
|             | F-100          | N/A      |          |          |          |          |
|             | F-101          | -.1262   | .0033    | -.0223   | -.0018   | .0000    |
|             | F-102          | N/A      |          |          |          |          |
|             | F-106          | .0833    | .0950    | .0260    | -.0072   | .0000    |
|             | F-15A/B        | -.1111   | .0057    | -.0012   | -.0010   | .0000    |
|             | F-15C/D        | .7189    | -.0170   | .1002    | -.0083   | .0000    |
|             | F-15E          | .3233    | .1000    | .0273    | .0004    | -.0000   |
|             | F-16A/B        | N/A      |          |          |          |          |
|             | F-16E          | -4.3335  | -.1650   | .4009    | .0489    | -.0001   |
| ELECTRONIC  | ARC-109V       | -.1148   | -.0278   | .0062    | -.0000   | .0000    |
|             | ARC-54         | N/A      |          |          |          |          |
|             | ASN-63         | -.2133   | .0285    | -.0182   | -.0003   | .0000    |
|             | ASN-70         | .0948    | .0232    | .0238    | -.0002   | .0000    |
|             | ASN-99         | .1820    | .0693    | -.0363   | -.0011   | .0000    |
|             | ASN-108        | -.1229   | -.0226   | .0065    | -.0000   | .0000    |
|             | ASQ-133        | .0157    | .1149    | -.0421   | .0000    | -.0000   |
|             | ASW-32         | 3.4025   | 1.6793   | -1.6572  | -.0744   | .0004    |
|             | CP-1035N       | -.1845   | .1531    | -.2041   | .0052    | -.0000   |
|             | JTIDS          | -.3744   | -.2036   | .2806    | .0014    | .0000    |
|             | LANT(NAV)      | -.1365   | -.0014   | .0004    | .0003    | -.0000   |
|             | LANT(TAR)      | -.2012   | -.0047   | .0015    | .0014    | -.0000   |
|             | LANT(REC)      | -.0435   | .0438    | -.0258   | -.0001   | -.0000   |
| HELICOPTER  | HH-52          | N/A      |          |          |          |          |
|             | CH-46          | -.1623   | -.0367   | -.0074   | -.0014   | .0000    |
|             | H-53           | -.0890   | .0223    | -.0017   | -.0035   | .0000    |
|             | CH-47          | -.0114   | .0248    | -.0281   | -.0017   | .0000    |
|             | H-54           | -.1152   | .0673    | -.0295   | .0127    | -.0005   |
|             | HH-60D         | -.0214   | .0146    | -.0026   | -.0012   | -.0000   |
|             | SH-3           | -.0557   | .0226    | -.0025   | -.0038   | .0000    |
| ARMAMENT    | LLGB           | N/A      |          |          |          |          |
|             | CEM            | N/A      |          |          |          |          |
| MISSILE     | GBU-15         | -.0972   | .0159    | -.0046   | -.0002   | .0000    |
|             | AMRAAM         | N/A      |          |          |          |          |
|             | HARM           | N/A      |          |          |          |          |
|             | IIR            | N/A      |          |          |          |          |
|             | AIM7F(R)       | N/A      |          |          |          |          |
|             | AIM7F(GD)      | N/A      |          |          |          |          |

TABLE 5

WEAPON SYSTEM PARAMETER COMPARISON  
MODIFIED ALTERNATIVE 3

| <u>TYPE</u> | <u>PROGRAM</u> | <u>B</u> | <u>C</u> | <u>D</u> |
|-------------|----------------|----------|----------|----------|
| BOMBERS     | B-1B           | -.3170   | .0100    | -.0023   |
|             | B-52           | -.2192   | -.0293   | .0014    |
|             | B-58           | .1019    | -.6367   | .2367    |
| FIGHTERS    | A-10           | -.0492   | -.0731   | .0113    |
|             | F-100          | -.1103   | -.1199   | .0047    |
|             | F-101          | -.2147   | -.0764   | .0175    |
|             | F-102          | -.3859   | -.0125   | .0034    |
|             | F-106          | -.3855   | -.1277   | .0277    |
|             | F-15A/B        | -.1321   | .0051    | -.0005   |
|             | F-15C/D        | -.2234   | .5284    | -.2230   |
|             | F-15E          | -.5854   | .9111    | -.3897   |
|             | F-16A/B        | -.2748   | .0763    | -.0035   |
|             | F-16E          | -.2620   | .4134    | -.1586   |
| ELECTRONIC  | ARC-109V       | .1184    | -.0275   | .0105    |
|             | ARC-54         | -.1100   | .0032    | -.0003   |
|             | ASN-63         | .0110    | .0542    | -.0237   |
|             | ASN-70         | .0322    | .0003    | .0350    |
|             | ASN-99         | -.0524   | .0555    | -.0044   |
|             | ASN-108        | .0143    | -.0341   | .0122    |
|             | ASQ-133        | -.1710   | .0144    | -.0033   |
|             | ASW-32         | -.5831   | .6240    | -.2020   |
|             | CP-1035N       | -.1133   | .1630    | -.0722   |
|             | JTIDS          | -.1878   | -.0266   | .0057    |
|             | LANT(NAV)      | -.1133   | -.0004   | .0001    |
|             | LANT(TAR)      | -.1050   | -.0002   | .0000    |
|             | LANT(REC)      | -.1481   | .0081    | -.0025   |
| HELICOPTER  | HH-52          | -.3389   | .3010    | -.1606   |
|             | CH-46          | -.2009   | -.1048   | -.0074   |
|             | H-53           | -.1463   | .0022    | -.0002   |
|             | CH-47          | -.1952   | .0334    | -.0185   |
|             | H-54           | -.0427   | -.1451   | .0270    |
|             | HH-60D         | -.0652   | -.0159   | .0013    |
|             | SH-3           | -.2225   | .0798    | -.0227   |
| ARMAMENT    | LLGB           | -.1720   | .0011    | -.0004   |
|             | CEM            | -.1953   | .0042    | -.0015   |
|             | GBU-15         | -.0477   | .0411    | -.0069   |
| MISSILE     | AMRAAM         | -.3430   | -.0063   | .0007    |
|             | HARM           | -.2195   | -.0173   | .0029    |
|             | IIR            | -.2178   | -.0277   | .0044    |
|             | AIM7F(R)       | -.3803   | -.0075   | -.0018   |
|             | AIM7F(GD)      | -.4021   | -.0157   | .0028    |

### Research Objective Two

- The second objective is to compare the results between TASC'S and Bolton's model formulations and the new alternative model formulations to determine which alternatives performed better and under what circumstances.

The three modified formulations were compared with the TASC and Bolton formulations to determine the formulation which yielded the lowest residual sum of squares term. The results of each SAS non-linear regression computer run is summarized in Table 6, the Residual Sum of Squares Summary.

A brief explanation of the symbols used is presented here. The "\*" indicates that no value was calculated for that weapon system using that alternative because of the inadequate number of observations in the data. The N/A indicates that no result was generated, either because the equation did not converge within 100 iterations or because the values calculated for a certain parameter or partial derivative in the equation exceeded the capacity of the SAS non-linear procedure. The bold italicized numbers for each weapon system indicates the lowest residual sum of squares value among the various formulations for that particular program. The LC column produces the results of the basic learning curve equation computed by the non-linear regression procedure in SAS.

Table 6 is presented on the following page. Note that the sum of squares results for the TASC, Alt 1 and Alt 2 values are from Table II in Bolton's thesis (5:41).

TABLE 6

## RESIDUAL SUM OF SQUARES SUMMARY

| <u>PROGRAM</u>     | <u>LC</u> | <u>TASC</u> | <u>ALT1</u> | <u>ALT2</u> | <u>MALT1</u> | <u>MALT2</u> | <u>MALT3</u> |
|--------------------|-----------|-------------|-------------|-------------|--------------|--------------|--------------|
| <b>BOMBERS</b>     |           |             |             |             |              |              |              |
| B-1B               | 18733     | 12451       | 10352       | 5950        | *            | *            | 11308        |
| B-52               | 2783352   | 2448210     | 2325494     | 2001295     | 2212807      | 1887607      | 2390182      |
| B-58               | 579983    | 483386      | N/A         | *           | *            | *            | *            |
| <b>FIGHTERS</b>    |           |             |             |             |              |              |              |
| A-10               | 43551     | 8904        | 8877        | 9102        | 8637         | 8685         | 18338        |
| F-100              | 41205     | 40716       | 29188       | 37852       | *            | N/A          | 17252        |
| F-101              | 25862     | 23846       | 18336       | 20329       | 8620         | *            | 13086        |
| F-102              | 9600      | 608         | *           | *           | *            | *            | N/A          |
| F-106              | 48383     | 47059       | N/A         | *           | *            | *            | *            |
| F-15 A/B           | 7010      | 6603        | 5678        | 507         | 4843         | *            | 5368         |
| F-15 C/D           | 85507     | 51443       | 10637       | 17138       | 10329        | 445          | 35208        |
| F-15 E             | 34783     | 26000       | 18494       | 25909       | N/A          | 7456         | 31440        |
| F-16 A/B           | 102620    | 85449       | 74316       | 77043       | N/A          | N/A          | 71871        |
| F-16 E             | 348137    | 347668      | 307960      | 114552      | N/A          | 160          | 318515       |
| <b>ELECTRONIC</b>  |           |             |             |             |              |              |              |
| ARC-109V           | .094      | .093        | .035        | .023        | *            | *            | .017         |
| ARC-54             | 6.143     | 6.611       | 1.131       | 1.309       | N/A          | N/A          | 2.680        |
| ASN-63             | 33.199    | 32.441      | 20.407      | 16.450      | 11.127       | 7.382        | 14.268       |
| ASN-70             | .018      | .018        | .003        | .003        | .01          | .001         | .010         |
| ASN-99             | 10.397    | 4.405       | 2.648       | 3.468       | 1.300        | .360         | 5.800        |
| ASN-108            | .795      | .795        | .369        | .243        | *            | *            | .183         |
| ASQ-133            | 3.279     | 3.015       | 2.499       | 1.989       | 1.950        | *            | 3.101        |
| ASW-32             | 6.760     | 7.707       | 3.940       | 3.695       | .210         | *            | 3.237        |
| CP-1035N           | 1.220     | .901        | .444        | .159        | .438         | *            | .471         |
| JTIDS              | .494      | .123        | .013        | .185        | N/A          | *            | .014         |
| LANT (NAV)         | .167      | .042        | .027        | .016        | .030         | .005         | .006         |
| LANT (TAR)         | .155      | .099        | .081        | .060        | .030         | .014         | .036         |
| LANT (REC)         | 1.062     | 1.585       | 1.054       | .654        | *            | *            | .890         |
| <b>HELICOPTERS</b> |           |             |             |             |              |              |              |
| HH-52              | 3.0       | 2.9         | .1          | .3          | .01          | N/A          | 1.2          |
| CH-46              | 5976.7    | 1218.9      | 1216.0      | 2709.0      | 1067.0       | 1792.0       | 2075.0       |
| H-53               | 179.1     | 177.4       | 121.0       | 141.0       | 74.0         | 16.0         | 92.0         |
| CH-47              | 11714.8   | 5154.1      | 4513.0      | 7158.0      | 3543.0       | 5670.0       | 8860.0       |
| H-54               | 226.7     | 125.5       | 125.0       | 70.0        | *            | *            | 65.0         |
| HH-60D             | 15.4      | 2.1         | *           | *           | *            | *            | *            |
| SH-3               | 402.6     | 289.9       | 285.0       | 200.0       | 189.0        | 121.0        | 239.0        |
| <b>ARMAMENT</b>    |           |             |             |             |              |              |              |
| LLGB               | 7.6       | 7.4         | 7.4         | 5.8         | N/A          | N/A          | 7.1          |
| CEM                | 851       | 647         | 361         | 172         | N/A          | N/A          | 508          |
| GBU-15             | 246       | 148         | 120         | 74          | 50           | 21           | 102          |
| <b>MISSILES</b>    |           |             |             |             |              |              |              |
| AMRAAM             | 1764      | 1658        | 1425        | 1635        | 1362         | N/A          | 1385         |
| HARM               | 2088      | 399         | 364         | 760         | 241          | N/A          | 884          |
| IIR                | 6291      | 3385        | 3347        | 3898        | N/A          | N/A          | 4088         |
| AIM7F(R)           | 386       | 250         | 156         | 339         | 91           | N/A          | 135          |
| AIM7F(GD)          | 87        | 85          | 73          | 74          | 83           | N/A          | 84           |



An analysis of Table 6 indicated the following:

- All of the formulations yielded better results than the LC formulation for almost every weapon system. This fact indicates that the inclusion of the production rate (Y), or the production ratio (R or M), or both helped to explain more of the variability in costs than quantity (X) alone was capable of explaining.

- It was impossible to estimate the parameters of Mod Alt 1 and Mod Alt 2 in a number of cases due to a loss of degrees of freedom. These two models have the largest number of parameters, and estimates cannot be obtained when the data set contains fewer observations than the number of parameters to be estimated.

- Mod Alt 1 and Mod Alt 2 also produced a large number of cases in which the equation did not converge within 100 iterations or the parameter estimates were in excess of the SAS procedure capability. Note that in Modified Alt 2, no results were calculated at all for any missile programs.

- Bolton's two alternatives performed better than the TASC formulation in every case. However, at least one modified alternative was able to perform better than either of Bolton's two formulations in 27 of 37 cases. Mod Alt 2 performed better in more cases than any other alternative, with Mod Alt 1 following close behind. Mod Alt 1 and Mod Alt 2 together performed better than any other alternative in over half the cases. In a comparison of Bolton's two alternatives and the three modified alternatives, the results for the number of times that a particular formulation yielded the lowest residual sum of squares value was:

|           |   |          |
|-----------|---|----------|
| Alt 1     | - | 4 times  |
| Alt 2     | - | 6 times  |
| Mod Alt 1 | - | 10 times |
| Mod Alt 2 | - | 12 times |
| Mod Alt 3 | - | 5 times  |

These results do not include the B-52, F-102, F-106, and the HH-60D programs since parameter estimates could not be generated for these programs for any of the alternative formulations.

- Mod Alt 1 is a modification of the TASC formulation, and in every case where the two alternatives could be compared, Mod Alt 1 produced a small sum of squares.

- Mod Alt 2 is an expansion of Bolton's Alt 2. Therefore, Mod Alt 2 should produce a smaller sum of squares. The magnitude of the reduction in the sum of squares could not be evaluated for statistical significance. Nevertheless, in almost all cases where the two alternatives could be compared, the reduction in the sum of squares was in excess of 50%. Adding the production ratio to Bolton's Alt 2 does appear to further explain the variability in the cost of weapon system.

- Mod Alt 3, substitutes production ratio for production rate in Bolton's Alt 2. It is interesting to note that while Mod Alt 3 produced the smallest sum of squares in only five cases, this modification produced a smaller sum of squares than Bolton's Alt 2 in 15 cases where the two alternatives could be compared. It appears that in many cases, production ratio has a greater impact on costs than production rate.

- In a head to head comparison between the two most successful alternatives, Mod Alt 1 and Mod Alt 2, the results were almost equal. However, in seven of the ten cases where Mod Alt 1 provided the smallest sum of squares, the parameters of Mod Alt 2 could not be estimated. Modified Alt 1 performed better for helicopter and missile programs. Modified Alt 2 performed better for bomber, electronic, and armament programs. The two formulations were tied in the fighter category. Interestingly, these results are very similar to Bolton's findings (5:42). These patterns may be the result of some inherent characteristic of the production process for these systems, or it could be due to the differences in production policies followed for different groups of systems.

In view of these findings, there is no conclusive evidence that one superior formulation exists. Although the modified equations perform very well, a pattern exists within weapon system type that favors one formulation over the other. This pattern is consistent with Bolton's findings. If there is a sufficient basis for estimating the parameters of Mod Alt 2, it appears that this may be the better formulation since it incorporates both the production rate and the production ratio. If a reduced model is to be used, Mod Alt 1 appears to be the better choice. It appears that almost any alternative would be better than the current TASC formulation.

Every modified alternative formulation seemed to work well for some systems. Therefore, this thesis recommends that the AFSC production rate model should be modified to incorporate all three modified formulations. The user should have the ability to select from among the model formulations the best one that describes his/her particular program.

### Research Objective Three

- The third objective is: (1) to investigate if statistical relationships exist for individual variables, (2) to determine which variables appear significant for different weapon systems, and (3) to identify any patterns that may exist in the occurrence of those variables.

The stepwise regression procedure outlined in Appendix B was used to identify the significant variables. In the stepwise regression procedure, variables are allowed to enter the regression equation if the partial F-test indicates that they are significant at the 85 percent level. Depending on the model specification, more than one variable was allowed to enter the regression equation. For a detailed discussion on the stepwise regression procedure, refer to the SAS Statistics Manual (13:214-220).

As noted earlier, the stepwise regression was performed on a log-linear transformation of non-linear equations. The complete SAS computer output for the stepwise regression for each formulation may be found in Appendix C.

The results displayed in Table 7 are a summary of the stepwise regression results and provide a breakout of variable occurrence frequency by model formulation. If a model formulation did not contain a particular variable in its equation, it is indicated by a dashed line. The variables in Table 7 are presented as they appear in the original formulations and not as log-linear transforms. The total eligible program line reflects the number of weapon systems out of a total of 41 programs in which that particular formulation yielded at least one significant variable.

TABLE 7

VARIABLE FREQUENCY BY FORMULATION  
(In Number of Occurrences)

| <u>VARIABLE</u>         | <u>ALT1</u> | <u>ALT2</u> | <u>MOD ALT1</u> | <u>MOD ALT2</u> | <u>MOD ALT3</u> |
|-------------------------|-------------|-------------|-----------------|-----------------|-----------------|
| X                       | 29          | 31          | 27              | 32              | 34              |
| Y                       | 15          | 9           | 16              | 5               | ----            |
| Y <sup>2</sup>          | ----        | 8           | ----            | 7               | ----            |
| R                       | 8           | ----        | 6               | 8               | 8               |
| R <sup>2</sup>          | ----        | ----        | 6               | 5               | 3               |
| Total Eligible Programs | 38          | 37          | 38              | 38              | 35              |

It is apparent that the cumulative quantity (X) appeared as the most significant variable in every formulation. When Y and Y<sup>2</sup> are both present in a formulation, their frequency of occurrences are nearly equal, and the same is true for R and R<sup>2</sup>. Y and Y<sup>2</sup> together occur more frequently in Alt 2 than R and R<sup>2</sup> together do in Mod Alt 3. Every variable appears to play some significant role in the formulation in which it occurs.

Table 8 provides a listing of the most significant variable combinations by model formulation. The variable combinations that are in bold italicized print indicate those combinations in a particular model formulation that yielded the lowest residual sum of squares results for that weapon system program. Although variables showed up significant for the B-52, F-102, F-106, and the HH-60D programs, no parameter estimates were generated for these programs (see Table 6). Therefore, no variables are italicized for those weapon systems. The "NONE" indicates that no variables met the entrance threshold, therefore yielding no significant variables.

TABLE 8

## VARIABLE COMBINATIONS BY WEAPON SYSTEM

|                    | <u>ALT1</u> | <u>ALT2</u>        | <u>MOD ALT1</u>    | <u>MOD ALT2</u>                   | <u>MOD ALT3</u>    |
|--------------------|-------------|--------------------|--------------------|-----------------------------------|--------------------|
| <b>BOMBERS</b>     |             |                    |                    |                                   |                    |
| B-1B               | X Y         | X                  | X Y                | X                                 | X                  |
| B-52               | X           | X                  | X                  | X                                 | X                  |
| B-58               | NONE        | NONE               | NONE               | NONE                              | NONE               |
| <b>FIGHTERS</b>    |             |                    |                    |                                   |                    |
| A-10               | Y           | Y                  | Y                  | X                                 | NONE               |
| F-100              | X           | X                  | X                  | X                                 | X                  |
| F-101              | X           | X                  | X                  | X                                 | X                  |
| F-102              | X           | X Y Y <sup>2</sup> | X Y R <sup>2</sup> | X Y <sup>2</sup> R                | X                  |
| F-106              | X           | X                  | X                  | X                                 | X                  |
| F-15A/B            | X           | X                  | X                  | X                                 | X                  |
| F-15C/D            | Y R         | Y <sup>2</sup>     | Y R                | X Y Y <sup>2</sup> R <sup>2</sup> | R                  |
| F-15E              | Y           | Y <sup>2</sup>     | Y                  | Y <sup>2</sup>                    | X                  |
| F-16A/B            | X           | X                  | R                  | R                                 | X                  |
| F-16E              | NONE        | NONE               | NONE               | NONE                              | NONE               |
| <b>ELECTRONIC</b>  |             |                    |                    |                                   |                    |
| ARC-109V           | Y           | X                  | Y                  | X                                 | X                  |
| ARC-54             | X           | X                  | X                  | X                                 | X                  |
| ASN-63             | NONE        | NONE               | NONE               | NONE                              | NONE               |
| ASN-70             | Y           | Y Y <sup>2</sup>   | Y                  | Y Y <sup>2</sup>                  | NONE               |
| ASN-99             | Y R         | X Y <sup>2</sup>   | Y R                | X Y <sup>2</sup>                  | X                  |
| ASN-108            | X           | X                  | X                  | X                                 | X                  |
| ASQ-133            | X           | Y Y <sup>2</sup>   | X                  | X Y <sup>2</sup>                  | X                  |
| ASW-32             | X           | X                  | X                  | X                                 | X                  |
| CP-1035N           | R           | NONE               | R <sup>2</sup>     | R <sup>2</sup>                    | NONE               |
| JTIDS              | X R         | X                  | X R                | X R                               | X R                |
| LTN(NAV)           | X           | X Y                | X                  | X Y                               | X                  |
| LTN(TAR)           | X Y R       | X Y                | X R <sup>2</sup>   | X R <sup>2</sup>                  | X R <sup>2</sup>   |
| LTN(REC)           | X           | X                  | X                  | X                                 | X                  |
| <b>HELICOPTERS</b> |             |                    |                    |                                   |                    |
| HH-52              | X           | X                  | R <sup>2</sup>     | R R <sup>2</sup>                  | X                  |
| CH-46              | X Y         | X                  | X Y                | X R                               | X R                |
| H-53               | X           | X                  | X                  | X                                 | X                  |
| CH-47              | X Y         | X Y Y <sup>2</sup> | X Y                | X Y Y <sup>2</sup>                | X R                |
| H-54               | X           | X                  | X                  | X                                 | X                  |
| HH-60D             | X Y R       | X                  | X Y R              | X                                 | X                  |
| SH-3               | X           | X                  | X                  | X                                 | X                  |
| <b>ARMAMENT</b>    |             |                    |                    |                                   |                    |
| LLGB               | X           | X                  | X                  | X                                 | X                  |
| CEM                | Y           | X Y Y <sup>2</sup> | Y R <sup>2</sup>   | X R <sup>2</sup>                  | X R                |
| GBU-15             | Y           | Y Y <sup>2</sup>   | Y                  | Y Y <sup>2</sup>                  | X                  |
| <b>MISSILES</b>    |             |                    |                    |                                   |                    |
| AMRAAM             | X           | X                  | X                  | X                                 | X                  |
| HARM               | X Y         | X                  | X Y                | X R R <sup>2</sup>                | X R R <sup>2</sup> |
| IIR                | X R         | X                  | X Y R              | X R R <sup>2</sup>                | X R R <sup>2</sup> |
| AIM7F(R)           | X Y         | X                  | X Y R <sup>2</sup> | X R                               | X                  |
| AIM7F(GD)          | X R         | X                  | X                  | X                                 | X R                |

An analysis of Table 8 yielded the following results:

- In Alt 1, different variable combinations occurred in each weapon system group. Except for inclusion of the X variable in various combinations, no combination was dominant in any of the weapon system types.

- In Alt 2, the  $Y Y^2$  combination occurred in almost every weapon system type. The only variable pattern occurred in the missile and helicopter program types in which the single X variable was almost exclusively dominant.

- In Mod Alt 1, different variable combination occurred in each weapon system group. The X Y combination occurred in almost every missile program.

- In Mod Alt 2, the  $Y Y^2$  and  $R R^2$  combinations occurred in different weapon system types. The only variable pattern occurred in the missile programs where the X R combination was rather dominant.

- In Mod Alt 3, two patterns were identified. For fighter, bomber, electronic and helicopter programs, the single X variable occurred almost exclusively. For missile programs, the X R combination was heavily favored.

In these findings, the missile program type seemed to be the only group which consistently yielded a distinct pattern of variable combinations for all model formulations. In general, no pattern existed for the other weapon system types across the different model formulations. Therefore, no guidelines were developed to explain why one alternative model performed better for certain weapon system types than other formulations.

Table 9 provides a summary of variable combinations by formulation. The table shows the number of times a particular variable combination turned up significant for each model formulation. The total multivariate line shows the total number of multivariate combinations that occurred in each formulation. The total eligible program line reflects the number of weapon systems out of a total of 41 programs in

which that particular formulation yielded at least one significant variable. The asterisk identifies those variable combinations that were not possible in that particular model formulation.

TABLE 9  
VARIABLE COMBINATIONS BY FORMULATION

| <u>Combination</u>              | <u>Alt 1</u> | <u>Alt 2</u> | <u>Mod Alt 1</u> | <u>Mod Alt2</u> | <u>Mod Alt 3</u> |
|---------------------------------|--------------|--------------|------------------|-----------------|------------------|
| X                               | 19           | 25           | 17               | 19              | 26               |
| Y or $Y^2$                      | 6            | 3            | 5                | 1               | *                |
| R or $R^2$                      | 1            | *            | 3                | 2               | 1                |
| X Y                             | 5            | 2            | 4                | 1               | *                |
| X $Y^2$                         | *            | 1            | *                | 2               | *                |
| X R                             | 3            | *            | 1                | 4               | 5                |
| X $R^2$                         | *            | *            | 1                | 1               | 1                |
| Y R                             | 2            | *            | 2                | 0               | *                |
| Y $R^2$                         | *            | *            | 1                | 0               | *                |
| Y $Y^2$                         | *            | 3            | *                | 2               | *                |
| R $R^2$                         | *            | *            | 0                | 1               | 0                |
| X Y R                           | 2            | *            | 2                | 0               | *                |
| X $Y^2$ R                       | *            | *            | *                | 1               | *                |
| X Y $R^2$                       | *            | *            | 2                | 0               | *                |
| X Y $Y^2$                       | *            | 3            | *                | 1               | *                |
| X R $R^2$                       | *            | *            | 0                | 2               | 2                |
| X Y $Y^2$ $R^2$                 | *            | *            | *                | 1               | *                |
| Total Multivariate Combinations | 12           | 9            | 13               | 16              | 8                |
| Total Eligible Programs         | 38           | 37           | 38               | 38              | 35               |

Analysis of Table 9 showed that multivariate combinations accounted for less than half of the total eligible programs in each formulation. Not surprisingly, the most multivariate combinations occurred in the formulations with a large number of parameters in their equations. Surprisingly, the single X variable combination was the dominant form in all of the model formulations. This means that all model formulations essentially reverted back to a model structure in which cumulative

quantity (X) was the only significant term. In some cases, this structure was the basic learning curve formulation. However, the results did indicate that the presence of the other variables did enable the formulation to explain more of the variability in cost.

Also, each model formulation seemed to favor either production rate (Y) or production ratio (R) in those equations where both variables were present. Alt 1 and Mod Alt 1 favored production rate while Mod Alt 2 and Mod Alt 3 preferred production ratio.

The results in Table 10 provide a summary of the frequency of occurrence for each variable combination that yielded the lowest residual sum of squares result. Interestingly, certain significant variable combinations yielded the best results in different model formulations.

TABLE 10

LOWEST SUM OF THE SQUARED RESIDUAL VALUE BY VARIABLE COMBINATION  
(In Number of Occurrences)

| <u>VARIABLE COMBINATION</u>       | <u># OF OCCURRENCES</u> |
|-----------------------------------|-------------------------|
| X                                 | 17                      |
| Y                                 | 1                       |
| Y <sup>2</sup>                    | 1                       |
| R                                 | 0                       |
| R <sup>2</sup>                    | 1                       |
| X Y                               | 4                       |
| X Y <sup>2</sup>                  | 1                       |
| X R                               | 3                       |
| X R <sup>2</sup>                  | 1                       |
| Y Y <sup>2</sup>                  | 2                       |
| R R <sup>2</sup>                  | 0                       |
| X Y Y <sup>2</sup>                | 1                       |
| X Y R <sup>2</sup>                | 1                       |
| X Y Y <sup>2</sup> R <sup>2</sup> | 1                       |
| NONE                              | 3                       |
| <hr/>                             |                         |
| Total Eligible Programs           | 37                      |



Analysis of Table 10 provided insight into those combinations that not only occurred frequently, but also gave the lowest residual sum of squares results. This seemed to put the analysis into a more meaningful perspective. Table 10 showed that the single X variable combination not only occurred the most times, but also yielded the most "lowest residual sum of squares" results. Interestingly, different model formulations incorporating this variable make up 17 occurrences out of the 37 programs.

In addition, analysis of the quadratic terms that allowed calculation of either the optimal rate or ratio of production yielded a surprising result. It seems that solving for the optimal rate of production is important as the  $Y Y^2$  combination yielded the best results twice. On the other hand, the  $R R^2$  combination never yielded the lowest residual sum of squares result. Therefore, it seems that solving for the optimal ratio of production was less important than solving for the optimal rate of production. Interestingly, three programs had the lowest residual sum of squares where no variables turned up significant.

In conclusion, the results of this objective show that the cumulative quantity variable (X) is extremely significant in explaining the variability of weapon system costs. Also, inclusion of either production rate (Y) or production ratio (R), while not always significant, combined with X to yield results that were superior to the basic learning curve. Finally, the findings show that solving for the optimal rate of production is indeed worthwhile and that formulations that incorporate this approach should be included in the Production Rate Model.

## V. Conclusion

The cost estimating profession's need for tools that generate credible production estimates in today's dynamic acquisition environment requires a constant search for better methods and procedures. The AFSC Production Rate Model's effort to capture rapid changes in production rates or buy quantities is a step in that direction. Refinement of the Production Rate Model to improve its performance was the objective of this thesis effort.

### Summary of Results

This thesis showed that as a result of the formulations developed by TASC and Bolton, the inclusion of production rate and production ratio yielded results which were significant from a statistical and logical viewpoint. Furthermore, the effort to refine the AFSC Production Rate Model has succeeded.

Three modified formulations were developed in this effort. The TASC and Bolton formulations were modified to include quadratic expressions incorporating production rate and/or production ratio in the equations. The Modified Alt 1 equation took the production ratio variable and made it a quadratic function of the production rate in the TASC formulation. The Modified Alt 2 equation added a quadratic function to solve for the optimal ratio of production in addition to the optimal rate of production in Bolton's Alt 2 formulation. The Modified Alt 3 formulation took the Bolton Alt 2 model structure and substituted production ratio for production rate. Based on the residual sum of

squares comparison, these three modified formulations outperformed TASC's and Bolton's original models.

Unfortunately, there was no conclusive evidence to support the existence of a superior formulation. Although the three modified equations performed very well, some limitations on their potential use were discussed. These included non-calculation of the model parameters due to a loss of degrees of freedom and non-convergence of the unknown model parameters within the specified number of iterations. The limitations precluded recommending any modified alternative as a singular replacement formulation for all programs, even though their performance in reducing the residual sum of squares was outstanding.

The Modified Alt 2 formulation turned out to be the best performer, although it suffered from the limitations discussed in the previous section. Although the Modified Alt 3 formulation did not consistently perform better than the Modified Alt 1 or Modified Alt 2 formulation, in direct comparison it did not suffer from the same limitations. Compared with Bolton's Alt 1 and Alt 2, however, Mod Alt 3 yielded slightly better results. All three modified formulations surpassed the basic learning curve and TASC formulation in performance.

In addition, the findings of research objective three showed that solving for the optimal ratio of production was not as significant as originally thought. The findings did indicate, however, that the inclusion of cumulative quantity (X) and either production rate (Y) or production ratio (R), while not always significant, yielded results that were superior to the basic learning curve and the TASC formulation. The findings showed that solving for the optimal rate of production was

statistically meaningful and that the bathtub curve was a valid and logical concept.

Therefore, it was recommended that the three modified alternative formulations be incorporated into the AFSC Production Rate model instead of the TASC model formulation. The user should be given the option to determine the formulation that best fits his/her weapon system program.

#### Research Limitations

The research in this thesis was subject to several limitations. First, due to the non-linear procedure, statistical tests which are normally used to determine model specification and measurement were not applicable. Therefore, the ability to test parameter significance or model fit was extremely difficult. However, the findings obtained in the log-linear analysis supported the logic behind the model concept, so the results obtained in this research should be valid.

Second, the empirical relationship between production rate and production ratio was not investigated. The results appear to be reasonable based on a mere residual sum of squares comparison and the use of annual buy schedules as a proxy for production rate as done in Bolton's thesis. However, because a sensitivity analysis, the model's stability or performance using different evaluation criteria or some other measure of production rate (besides the proxy "annual buy quantity" used in this evaluation) may yield different results.

Third, since the exact empirical relationships between production rate and production ratio were not found, the value for either the optimal rate of production or optimal ratio of production was not

calculated. If this relationship can be empirically determined, tables for the various parameters according to the optimal values may be developed.

Finally, as Bolton states, "the research is limited in that the effects of production rate changes still cannot be separated from the effects of learning because of collinearity in the data" (3:45). Although the non-linear regression technique reduces the effects of multicollinearity, they do not eliminate the problem.

#### Recommendations for Future Research

Obviously, the recommendations for future research begin with investigating the research limitations encountered in this effort. Therefore, the first area of research is to determine the sensitivity of the recommended modified formulations. The relationship between production rate and production ratio has a definite influence on the model's ability to predict cost. Performing a sensitivity analysis by varying the input variables according to different scales or measures would enable one to determine the stability of the recommended formulation. In any case, the stability or instability of the modified alternative formulations may or may not change the recommendations made in this thesis.

The second area of research would be to refine the TASC data base by including actual contract data where applicable and updating the budgetary estimates for current on-going programs. The modified formulations' predictive ability could be tested by taking the refined data base and analyzing it with the SAS programs developed for each

modified formulation. Successful results would help to validate the models being recommended in this thesis.

Finally, further investigation of weapon system cost behavior due to the effect of changes in production rate should be attempted by future researchers. Other factors which influence production rate should be empirically defined and incorporated in model formulations to further refine the Production Rate Model. Each advancement in the cost estimating profession allows the development of new concepts and techniques that refine the methodology used to estimate weapon system production costs.

## Appendix A: TASC Data Set

The data used in this thesis was extracted from the AFSC Production Rate Model Data Handbook (15). As discussed in chapter three, rule of thumb lot plot point (LPP) values for each program were calculated and included in the data set. The lot plot points were generated according to the following criteria:

For Lot 1 Only:

If Lot Quantity  $\geq 10$ ,  $LPP = \text{Lot Quantity} / 3$ .

Otherwise  $LPP = \text{Lot Quantity} / 2$ .

For all subsequent Lots:

$LPP = \text{Lot Quantity} / 2$ .

The data set is provided in the following tables:

### A.1 - Bomber Aircraft Programs

Table A.1.1

#### B-1B Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1982               | 1          | 1               | 535.8                      | .5         |
| 1983               | 2          | 7               | 260.3                      | 4.5        |
| 1984               | 3          | 10              | 200.5                      | 13.0       |
| 1985               | 4          | 34              | 142.0                      | 35.0       |
| 1986               | 5          | 48              | 111.3                      | 76.0       |

Table A.1.2

#### B-52 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1952               | 1          | 20              | 112.5                      | 6.67       |
| 1953               | 2          | 43              | 37.0                       | 41.50      |
| 1954               | 3          | 25              | 28.6                       | 75.50      |
| 1955               | 4          | 77              | 32.3                       | 126.50     |
| 1956               | 5          | 133             | 23.4                       | 231.50     |
| 1957               | 6          | 202             | 28.4                       | 399.00     |
| 1958               | 7          | 101             | 27.3                       | 550.50     |
| 1959               | 8          | 39              | 27.3                       | 620.50     |
| 1960               | 9          | 62              | 35.4                       | 671.00     |
| 1961               | 10         | 40              | 35.0                       | 722.00     |

Table A.1.3

B-58 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1958               | 1          | 17              | 93.86                      | 5.67       |
| 1959               | 2          | 36              | 80.26                      | 35.00      |
| 1960               | 3          | 20              | 73.16                      | 63.00      |
| 1961               | 4          | 30              | 36.56                      | 88.00      |

A.2 - Fighter Aircraft Programs

Table A.2.1

A-10 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1975               | 1          | 22              | 12.37                      | 7.33       |
| 1976               | 2          | 53              | 9.16                       | 48.50      |
| 1977               | 3          | 20              | 8.2                        | 85.00      |
| 1977               | 4          | 100             | 8.2                        | 145.00     |
| 1978               | 5          | 144             | 7.82                       | 267.00     |
| 1979               | 6          | 144             | 7.59                       | 411.00     |
| 1980               | 7          | 144             | 7.82                       | 555.00     |
| 1981               | 8          | 60              | 10.18                      | 657.00     |
| 1982               | 9          | 20              | 13.64                      | 697.00     |

Table A.2.2

F-100 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1952               | 1          | 23              | 6.51                       | 7.67       |
| 1953               | 2          | 545             | 3.45                       | 295.50     |
| 1954               | 3          | 593             | 3.08                       | 864.50     |
| 1955               | 4          | 559             | 3.10                       | 1440.50    |
| 1956               | 5          | 557             | 2.50                       | 1998.50    |

Table A.2.3

F-101 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1954               | 1          | 31              | 16.85                      | 10.33      |
| 1955               | 2          | 84              | 7.58                       | 73.00      |
| 1956               | 3          | 309             | 6.91                       | 269.50     |
| 1957               | 4          | 206             | 5.76                       | 527.00     |
| 1958               | 5          | 84              | 5.27                       | 672.00     |
| 1959               | 6          | 93              | 5.22                       | 760.50     |



Table A.2.4

F-102 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1954               | 1          | 37              | 11.66                      | 12.33      |
| 1955               | 2          | 108             | 5.17                       | 91.00      |
| 1956               | 3          | 562             | 3.5                        | 426.00     |
| 1957               | 4          | 140             | 2.21                       | 777.00     |

Table A.2.5

F-106 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1956               | 1          | 42              | 34.19                      | 14.0       |
| 1957               | 2          | 88              | 10.54                      | 86.0       |
| 1958               | 3          | 45              | 11.64                      | 152.5      |
| 1959               | 4          | 165             | 7.59                       | 257.5      |

Table A.2.6

F-15A/B Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1973               | 1          | 30              | 25.597                     | 10         |
| 1974               | 2          | 62              | 19.556                     | 61         |
| 1975               | 3          | 72              | 17.183                     | 128        |
| 1976               | 4          | 108             | 17.126                     | 218        |
| 1977               | 5          | 24              | 16.021                     | 284        |
| 1977               | 6          | 108             | 16.272                     | 350        |

Table A.2.7

F-15C/D Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1978               | 1          | 97              | 17.249                     | 32.33      |
| 1979               | 2          | 78              | 15.588                     | 136.00     |
| 1980               | 3          | 60              | 15.508                     | 205.00     |
| 1981               | 4          | 42              | 17.665                     | 256.00     |
| 1982               | 5          | 36              | 19.943                     | 295.00     |
| 1983               | 6          | 39              | 19.308                     | 332.50     |
| 1984               | 7          | 36              | 21.954                     | 370.00     |
| 1985               | 8          | 48              | 21.017                     | 412.00     |

Table A.2.8

F-15E Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1986               | 1          | 60              | 20.544                     | 20         |
| 1987               | 2          | 72              | 19.203                     | 96         |
| 1988               | 3          | 96              | 17.608                     | 180        |
| 1989               | 4          | 96              | 16.175                     | 276        |
| 1990               | 5          | 96              | 16.041                     | 372        |
| 1991               | 6          | 96              | 17.927                     | 468        |

Table A.2.9

F-16A/B Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1978               | 1          | 105             | 10.14                      | 35.0       |
| 1979               | 2          | 145             | 7.74                       | 177.5      |
| 1980               | 3          | 175             | 8.04                       | 337.5      |
| 1981               | 4          | 180             | 5.05                       | 515.0      |
| 1982               | 5          | 120             | 5.13                       | 665.0      |

Table A.2.10

F-16E Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1983               | 1          | 120             | 9.86                       | 40         |
| 1984               | 2          | 144             | 10.58                      | 192        |
| 1985               | 3          | 150             | 14.55                      | 339        |
| 1986               | 4          | 216             | 11.93                      | 522        |
| 1987               | 5          | 216             | 11.28                      | 738        |
| 1988               | 6          | 216             | 11.02                      | 954        |
| 1989               | 7          | 216             | 10.88                      | 1170       |
| 1990               | 8          | 216             | 10.69                      | 1386       |
| 1991               | 9          | 216             | 10.61                      | 1602       |
| 1992               | 10         | 216             | 10.54                      | 1818       |

A.3 - Electronics Programs

Table A.3.1

ARC-109V Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1972               | 1          | 4               | .0487                      | 2.0        |
| 1973               | 2          | 24              | .0393                      | 16.0       |
| 1974               | 3          | 79              | .0285                      | 67.5       |
| 1975               | 4          | 226             | .0313                      | 220.0      |
| 1976               | 5          | 108             | .0303                      | 387.0      |

Table A.3.2

ARC-54 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1964               | 1          | 900             | .0210                      | 300.0      |
| 1964               | 2          | 853             | .0165                      | 1326.5     |
| 1965               | 3          | 1381            | .0164                      | 2443.5     |
| 1966               | 4          | 1160            | .0145                      | 3714.0     |
| 1966               | 5          | 300             | .0144                      | 4444.0     |
| 1966               | 6          | 3103            | .0139                      | 6145.5     |
| 1966               | 7          | 2650            | .0143                      | 9022.0     |

Table A.3.3

ASN-63 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1966               | 1          | 781             | .1866                      | 260.33     |
| 1967               | 2          | 149             | .1744                      | 855.50     |
| 1968               | 3          | 287             | .1769                      | 1073.50    |
| 1969               | 4          | 141             | .1817                      | 1287.50    |
| 1970               | 5          | 92              | .1772                      | 1404.00    |
| 1971               | 6          | 135             | .2189                      | 1517.50    |
| 1972               | 7          | 108             | .1911                      | 1639.00    |
| 1973               | 8          | 158             | .1917                      | 1772.00    |
| 1974               | 9          | 36              | .2005                      | 1869.00    |
| 1975               | 10         | 36              | .2145                      | 1905.00    |

Table A.3.4

ASN-70 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1966               | 1          | 152             | .0350                      | 50.67      |
| 1967               | 2          | 250             | .0353                      | 277.00     |
| 1968               | 3          | 81              | .0342                      | 442.50     |
| 1969               | 4          | 58              | .0356                      | 512.00     |
| 1970               | 5          | 26              | .0370                      | 554.00     |
| 1971               | 6          | 8               | .0399                      | 571.00     |
| 1972               | 7          | 8               | .0370                      | 579.00     |
| 1973               | 8          | 11              | .0427                      | 588.50     |

Table A.3.5

ASN-99 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1968               | 1          | 157             | .0464                      | 52.33      |
| 1969               | 2          | 196             | .0404                      | 255.00     |
| 1970               | 3          | 185             | .0413                      | 445.50     |
| 1971               | 4          | 243             | .0433                      | 659.50     |
| 1972               | 5          | 24              | .0570                      | 793.00     |
| 1973               | 6          | 72              | .0624                      | 841.00     |
| 1974               | 7          | 56              | .0635                      | 905.00     |
| 1975               | 8          | 117             | .0684                      | 991.50     |

Table A.3.6

CP-1035N Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1970               | 1          | 12              | .1248                      | 4          |
| 1971               | 2          | 26              | .0903                      | 25         |
| 1972               | 3          | 48              | .1236                      | 62         |
| 1973               | 4          | 48              | .1287                      | 110        |
| 1974               | 5          | 50              | .1310                      | 159        |
| 1975               | 6          | 80              | .1154                      | 224        |

Table A.3.7

LANTIRN (Nav Pod) Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1985               | 1          | 4               | 1.75                       | 2          |
| 1986               | 2          | 34              | 1.3199                     | 21         |
| 1987               | 3          | 138             | 1.0761                     | 107        |
| 1988               | 4          | 144             | .9679                      | 248        |
| 1989               | 5          | 144             | .9184                      | 392        |
| 1990               | 6          | 144             | .8854                      | 536        |
| 1991               | 7          | 116             | .8643                      | 666        |

Table A.3.8

LANTIRN (Target Pod) Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1985               | 1          | 4               | 1.4375                     | 2          |
| 1986               | 2          | 34              | 1.1286                     | 21         |
| 1987               | 3          | 128             | .9375                      | 102        |
| 1988               | 4          | 144             | .8490                      | 238        |
| 1989               | 5          | 144             | .8081                      | 382        |
| 1990               | 6          | 144             | .7795                      | 526        |
| 1991               | 7          | 116             | .7619                      | 656        |

Table A.3.9

LANTIRN (Target Recognizer) Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1988               | 1          | 79              | .4383                      | 26.33      |
| 1989               | 2          | 192             | .3353                      | 175.00     |
| 1990               | 3          | 192             | .2975                      | 367.00     |
| 1991               | 4          | 192             | .2865                      | 559.00     |
| 1992               | 5          | 65              | .2693                      | 687.50     |

Table A.3.10

ASQ-133 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1970               | 1          | 14              | .5856                      | 4.67       |
| 1971               | 2          | 19              | .5862                      | 23.50      |
| 1972               | 3          | 68              | .4255                      | 67.00      |
| 1973               | 4          | 67              | .3828                      | 134.50     |
| 1974               | 5          | 81              | .3535                      | 208.50     |
| 1975               | 6          | 58              | .3355                      | 278.00     |

Table A.3.11

ASN-108 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1972               | 1          | 8               | .1373                      | 4.0        |
| 1973               | 2          | 31              | .1048                      | 23.5       |
| 1974               | 3          | 77              | .0874                      | 77.5       |
| 1975               | 4          | 216             | .0943                      | 224.0      |
| 1976               | 5          | 108             | .0872                      | 386.0      |

Table A.3.12

ASW-32 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1970               | 1          | 12              | .2338                      | 4          |
| 1971               | 2          | 26              | .1643                      | 25         |
| 1972               | 3          | 48              | .1524                      | 62         |
| 1973               | 4          | 48              | .0974                      | 110        |
| 1974               | 5          | 50              | .1441                      | 159        |
| 1975               | 6          | 80              | .1518                      | 224        |

Table A.3.13

JTIDS Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1986               | 1          | 45              | .4068                      | 15.0       |
| 1987               | 2          | 76              | .2764                      | 83.0       |
| 1988               | 3          | 77              | .2466                      | 159.5      |
| 1989               | 4          | 72              | .2308                      | 234.0      |
| 1990               | 5          | 57              | .2205                      | 298.5      |

A.4 - Helicopter Programs

Table A.4.1

HH-52 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1963               | 1          | 28              | 1.577                      | 9.33       |
| 1964               | 2          | 15              | 1.104                      | 35.50      |
| 1965               | 3          | 17              | 1.085                      | 51.50      |
| 1966               | 4          | 15              | 1.012                      | 67.50      |
| 1967               | 5          | 12              | 1.041                      | 81.00      |
| 1968               | 6          | 12              | 1.055                      | 93.00      |

Table A.4.2

CH-46 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1965               | 1          | 14              | 7.541                      | 4.67       |
| 1966               | 2          | 36              | 3.898                      | 32.00      |
| 1967               | 3          | 60              | 2.766                      | 80.00      |
| 1968               | 4          | 85              | 2.419                      | 152.50     |
| 1969               | 5          | 199             | 1.986                      | 294.50     |
| 1970               | 6          | 92              | 2.236                      | 440.00     |
| 1971               | 7          | 90              | 2.370                      | 531.00     |
| 1972               | 8          | 48              | 2.547                      | 600.00     |

Table A.4.3

H-53 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1965               | 1          | 10              | 6.752                      | 3.33       |
| 1966               | 2          | 131             | 4.264                      | 75.50      |
| 1967               | 3          | 140             | 3.762                      | 211.00     |
| 1968               | 4          | 12              | 3.382                      | 287.00     |
| 1969               | 5          | 30              | 3.341                      | 308.00     |
| 1970               | 6          | 8               | 3.154                      | 327.00     |
| 1971               | 7          | 30              | 3.685                      | 346.00     |
| 1972               | 8          | 6               | 3.947                      | 364.00     |

Table A.4.4

CH-47 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1962               | 1          | 18              | 6.181                      | 6.0        |
| 1963               | 2          | 24              | 5.226                      | 30.0       |
| 1964               | 3          | 24              | 4.559                      | 54.0       |
| 1965               | 4          | 60              | 3.459                      | 96.0       |
| 1966               | 5          | 72              | 2.760                      | 162.0      |
| 1967               | 6          | 160             | 2.307                      | 278.0      |
| 1968               | 7          | 84              | 2.313                      | 400.0      |
| 1969               | 8          | 143             | 2.695                      | 513.5      |
| 1970               | 9          | 45              | 3.463                      | 607.5      |
| 1971               | 10         | 36              | 3.085                      | 648.0      |
| 1972               | 11         | 12              | 3.671                      | 672.0      |
| 1973               | 12         | 12              | 3.852                      | 684.0      |

Table A.4.5

H-54 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1964               | 1          | 6               | 5.248                      | 3.0        |
| 1967               | 2          | 24              | 3.388                      | 18.0       |
| 1968               | 3          | 30              | 2.801                      | 45.0       |
| 1969               | 4          | 23              | 3.402                      | 71.5       |
| 1970               | 5          | 6               | 3.083                      | 86.0       |

Table A.4.6

HH-60D Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1986               | 1          | 3               | 9.2                        | 1.5        |
| 1987               | 2          | 25              | 7.1                        | 15.5       |
| 1988               | 3          | 35              | 6.7                        | 45.0       |
| 1989               | 4          | 29              | 6.6                        | 77.5       |

Table A.4.7

SH-3 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1960               | 1          | 20              | 3.327                      | 6.67       |
| 1961               | 2          | 49              | 2.480                      | 44.50      |
| 1962               | 3          | 71              | 2.319                      | 104.50     |
| 1963               | 4          | 45              | 1.811                      | 162.50     |
| 1964               | 5          | 36              | 1.870                      | 203.00     |
| 1965               | 6          | 36              | 1.589                      | 239.00     |
| 1966               | 7          | 30              | 1.703                      | 272.00     |
| 1967               | 8          | 48              | 1.930                      | 311.00     |
| 1970               | 9          | 15              | 2.144                      | 342.50     |

A.5 - Tactical Armament Programs

Table A.5.1

Low Level Laser Guided Bomb (LLLGB) Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1983               | 1          | 1600            | .0275                      | 533.33     |
| 1984               | 2          | 2950            | .0206                      | 3075.00    |
| 1985               | 3          | 3740            | .0189                      | 6420.00    |
| 1986               | 4          | 8980            | .0162                      | 12780.00   |
| 1987               | 5          | 9620            | .0147                      | 22080.00   |
| 1988               | 6          | 14400           | .0137                      | 34090.00   |
| 1989               | 7          | 15600           | .0129                      | 49090.00   |
| 1990               | 8          | 15600           | .0123                      | 64690.00   |
| 1991               | 9          | 15600           | .0118                      | 80290.00   |
| 1992               | 10         | 11910           | .0115                      | 94045.00   |

Table A.5.2

Combined Effect Munitions (CEM) Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1983               | 1          | 172             | .06924                     | 57.33      |
| 1984               | 2          | 1260            | .03038                     | 802.00     |
| 1985               | 3          | 6125            | .01988                     | 4494.50    |
| 1986               | 4          | 14220           | .01765                     | 14667.00   |
| 1987               | 5          | 28450           | .01619                     | 36002.00   |
| 1988               | 6          | 35020           | .01401                     | 67737.00   |
| 1989               | 7          | 48910           | .01258                     | 109702.00  |
| 1990               | 8          | 37509           | .01181                     | 152911.50  |



Table A.5.3

GBU-15 Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1980               | 1          | 40              | .1975                      | 13.33      |
| 1981               | 2          | 65              | .2000                      | 72.50      |
| 1982               | 3          | 340             | .1439                      | 275.00     |
| 1983               | 4          | 250             | .1483                      | 570.00     |
| 1984               | 5          | 320             | .1308                      | 855.00     |
| 1985               | 6          | 600             | .1718                      | 1315.00    |
| 1986               | 7          | 600             | .1539                      | 1915.00    |
| 1987               | 8          | 600             | .1483                      | 2515.00    |
| 1988               | 9          | 600             | .1420                      | 3115.00    |

A.6 - Tactical Missile Programs

Table A.6.1

AMRAAM Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1985               | 1          | 194             | 1.233                      | 64.67      |
| 1986               | 2          | 1057            | .512                       | 722.50     |
| 1987               | 3          | 1964            | .342                       | 2233.00    |
| 1988               | 4          | 2996            | .257                       | 4713.00    |
| 1989               | 5          | 2900            | .232                       | 7661.00    |
| 1990               | 6          | 2900            | .194                       | 10561.00   |
| 1991               | 7          | 2900            | .182                       | 13461.00   |
| 1992               | 8          | 3000            | .170                       | 16411.00   |
| 1993               | 9          | 3000            | .158                       | 19411.00   |
| 1994               | 10         | 3763            | .155                       | 22792.50   |

Table A.6.2

HARM Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1981               | 1          | 80              | .809                       | 26.67      |
| 1982               | 2          | 236             | .517                       | 198.00     |
| 1983               | 3          | 396             | .400                       | 514.00     |
| 1984               | 4          | 687             | .314                       | 1055.50    |
| 1985               | 5          | 1745            | .249                       | 2271.50    |
| 1986               | 6          | 2468            | .223                       | 4378.00    |
| 1987               | 7          | 2119            | .208                       | 6671.50    |
| 1988               | 8          | 2132            | .197                       | 8797.00    |
| 1989               | 9          | 3000            | .184                       | 11363.00   |
| 1990               | 10         | 3000            | .177                       | 14363.00   |
| 1991               | 11         | 1098            | .196                       | 16412.00   |

Table A.6.3

IIR Maverick Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1982               | 1          | 200             | .309                       | 66.66      |
| 1983               | 2          | 900             | .135                       | 650.00     |
| 1984               | 3          | 2600            | .083                       | 2400.00    |
| 1985               | 4          | 5729            | .082                       | 6564.50    |
| 1986               | 5          | 9000            | .062                       | 13929.00   |
| 1987               | 6          | 12000           | .057                       | 24429.00   |
| 1988               | 7          | 12000           | .055                       | 36429.00   |
| 1989               | 8          | 12000           | .053                       | 48429.00   |
| 1990               | 9          | 6235            | .057                       | 57546.50   |

Table A.6.4

AIM-7F (Raytheon) Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1972               | 1          | 100             | .741                       | 33.33      |
| 1973               | 2          | 225             | .378                       | 212.50     |
| 1975               | 3          | 600             | .199                       | 625.00     |
| 1976               | 4          | 800             | .169                       | 1325.00    |
| 1977               | 5          | 1100            | .134                       | 2075.00    |
| 1978               | 6          | 1400            | .116                       | 3525.00    |
| 1979               | 7          | 900             | .111                       | 4675.00    |
| 1980               | 8          | 1144            | .095                       | 5697.00    |

Table A.6.5

AIM-7F (General Dynamics) Cost/Quantity Data

| <u>Fiscal Year</u> | <u>Lot</u> | <u>Quantity</u> | <u>Recurring Unit Cost</u> | <u>LPP</u> |
|--------------------|------------|-----------------|----------------------------|------------|
| 1975               | 1          | 15              | 1.551                      | 5          |
| 1976               | 2          | 70              | .379                       | 50         |
| 1977               | 3          | 210             | .228                       | 190        |
| 1978               | 4          | 210             | .195                       | 400        |
| 1979               | 5          | 750             | .130                       | 880        |
| 1980               | 6          | 1310            | .090                       | 1910       |

## Appendix B: SAS Computer Programs

This section provides the SAS programs used to run the stepwise regression procedure and the non-linear regression procedure. For a detailed description of specific program steps, consult the SAS User's Guide: Statistics (SAS) (13).

### B.1 - Alt 1 Stepwise Regression

This program was used to run the stepwise regression procedure for the Alt 1 formulation.

```
OPTIONS LINESIZE = 80;
DATA INPM;
  INFILE INPM;
INPUT SYS $ LOT QTY AUC MID;
  RATE = QTY;
  RATIO = (QTY/LAG1(QTY));
  IF LOT = 1 THEN RATIO = 1;
  YT = LOG(AUC);
  Z1 = LOG(MID);
  Z2 = LOG(RATE);
  Z3 = LOG(RATIO);
PROC SORT DATA = INPM;
  BY SYS;
PROC STEPWISE;
  BY SYS;
MODEL YT = Z1 Z2 Z3/DETAILS;
```

### B.2 - Alt 2 Stepwise Regression

This program was used to run the stepwise regression procedure for the Alt 2 formulation.

```
OPTIONS LINESIZE = 80;
DATA INPM;
  INFILE INPM;
INPUT SYS $ LOT QTY AUC MID;
  RATE = QTY;
  RATIO = (QTY/LAG1(QTY));
  IF LOT = 1 THEN RATIO = 1;
  YT = LOG(AUC);
  Z1 = LOG(MID);
```

```

      Z2 = RATE * LOG(MID);
      Z3 = RATE**2 * LOG(MID);
PROC SORT DATA = INPM;
  BY SYS;
PROC STEPWISE;
  BY SYS;
MODEL YT = Z1 Z2 Z3/DETAILS;

```

### B.3 - Modified Alt 1 Stepwise Regression

This program was used to run the stepwise regression procedure for the Modified Alt 1 formulation.

```

OPTIONS LINESIZE = 80;
DATA INPM;
  INFILE INPM;
INPUT SYS $ LOT QTY AUC MID;
  RATE = QTY;
  RATIO = (QTY/LAG1(QTY)) - 1;
  IF LOT = 1 THEN RATIO = 1;
  YT = LOG(AUC);
  Z1 = LOG(MID);
  Z2 = LOG(QTY);
  Z3 = RATIO * Z2;
  Z4 = RATIO**2 * Z2;
PROC SORT DATA = INPM;
  BY SYS;
PROC STEPWISE;
  BY SYS;
MODEL YT = Z1 Z2 Z3 Z4/DETAILS;

```

### B.4 - Modified Alt 2 Stepwise Regression

This program was used to run the stepwise regression procedure for the Modified Alt 2 formulation.

```

OPTIONS LINESIZE = 80;
DATA INPM;
  INFILE INPM;
INPUT SYS $ LOT QTY AUC MID;
  RATE = QTY;
  RATIO = (QTY/LAG1(QTY)) - 1;
  IF LOT=1 THEN RATIO = 1;
  YT = LOG(AUC);
  Z1 = LOG(MID);
  Z2 = RATE * Z1;
  Z3 = RATE**2 * Z1;
  Z4 = RATIO * Z1;

```

```

      Z5 = RATIO**2 * Z1;
PROC SORT DATA = INPM;
  BY SYS;
PROC STEPWISE;
  BY SYS;
MODEL YT = Z1 Z2 Z3 Z4 Z5/DETAILS;

```

#### B.5 - Modified Alt 3 Stepwise Regression

This program was used to run the stepwise regression procedure for the Modified Alt 3 formulation.

```

OPTIONS LINESIZE = 80;
DATA INPM;
  INFILE INPM;
INPUT SYS $ LOT QTY AUC MID;
  RATE = QTY;
  RATIO = (QTY/LAG1(QTY));
IF LOT = 1 THEN RATIO = 1;
  YT = LOG(AUC);
  Z1 = LOG(MID);
  Z2 = RATIO * Z1;
  Z3 = RATIO**2 * Z1;
PROC SORT DATA = INPM;
  BY SYS;
PROC STEPWISE;
  BY SYS;
MODEL YT = Z1 Z2 Z3 /DETAILS;

```

#### B.6 Modified Alt 1 Non-linear Regression

This program was used to run the non-linear regression procedure for the Modified Alt 1 formulation.

```

OPTIONS LINESIZE = 80;
DATA INP;
  INFILE INP;
INPUT SYS $ LOT QTY AUC;
RETAIN XL 0 XU 0;
  IF LOT = 1 THEN XU = 0;
  IF LOT > 0 THEN XU = QTY;
  XL = XU - QTY;
  IF LOT = 1 THEN XL = .0000001;
  R = (QTY/LAG1(QTY));
  IF LOT = 1 THEN R = 1;
  YI = QTY;
  TCA = QTY*AUC;
PROC SORT DATA = INP;

```

```

BY SYS;
PROC NLIN DATA = INP
METHOD = MARQUARDT
MAXITER = 100
CONVERGE = .000000000000000001;
PARMS A = 1
      B = 0
      C = 0
      D = 0
      E = 0;
F1 = (C + (D*R) + (E*R**2) + 1);
F2 = (XU**(B+1)) - (XL**(B+1));
MODEL TCA = ((A*YI**F1)/(B+1))*F2;
DER.A = ((YI**F1)/(B+1))*F2;
DER.B = ((XU**(B+1)*LOG(XU)) - (XL**(B+1)*LOG(XL)))*A*YI**F1/(B+1) -
        ((A*YI**F1*(XU**(B+1) - XL**(B+1)))/(B+1)**2);
DER.C = (A*YI**F1*LOG(YI)/(B+1))*(XU**(B+1) - XL**(B+1));
DER.D = (A*YI**F1*LOG(YI)*R/(B+1))*(XU**(B+1) - XL**(B+1));
DER.E = ((A*YI**F1*LOG(YI)*R**2)/(B+1))*(XU**(B+1) - XL**(B+1));
BY SYS;
OUTPUT OUT = NOUT
PARMS = A0 B0 C0 D0 E0
PREDICTED = TCP
RESIDUAL = RES;
DATA OUT2;
SET NOUT;
UCP = TCP/QTY;
DIF = AUC - UCP;
PCT = 100 * DIF/AUC;
PROC PRINT DATA =OUT2;
VAR LOT XL XU YI R AUC UCP DIF PCT ;
BY SYS;

```

### B.7 - Modified Alt 2 Non-linear Regression

This program was used to run the non-linear regression procedure for the Modified Alt 2 formulation.

```

OPTIONS LINESIZE = 80;
DATA INP;
  INFILE INP;
INPUT SYS $ LOT QTY AUC;
RETAIN XL 0 XU 0 VI 0;
  IF LOT = 1 THEN XU = 0;
  IF LOT > 0 THEN XU = QTY;
  YI = QTY;
  XL =XU - QTY;
  IF LOT = 1 THEN XL = .0000001;
  R = (QTY/LAG1(QTY)) - 1;
  IF LOT = 1 THEN R = 1;

```

```

      TCA = QTY*AUC;
PROC SORT DATA = INP;
  BY SYS;
PROC NLIN DATA = INP
  METHOD = MARQUARDT
  MAXITER = 100
  CONVERGE = .000000000000000001;
  PARS A = 1
        B = 0
        C = 0
        D = 0
        E = 0
        F = 0;
  F1 = (B + (C*R) + (E*YI) + (F*YI**2) + (D*R**2) + 1);
  F2 = (XU**F1-XL**F1);
MODEL TCA= (A/F1)*F2;
  DER.A = (1/F1)*F2;
  DER.B = ((A/F1)*XU**F1*LOG(XU)) - ((A/F1**2)*XU**F1) -
          ((A/F1)*XL**F1*LOG(XL)) + ((A/F1**2)*XL**F1);
  DER.C = ((A/F1)*XU**F1*LOG(XU)*R) - ((A/F1**2)*XU**F1*R) -
          ((A/F1)*XL**F1*LOG(XL)*R) + ((A/F1**2)*XL**F1*R);
  DER.D= ((A/F1)*XU**F1*LOG(XU)*R**2) - ((A/F1**2)*R**2*XU**F1) -
          ((A/F1)*XL**F1*LOG(XL)*R**2) + ((A/F1**2)*R**2*XL**F1);
  DER.E = ((A/F1)*XU**F1*LOG(XU)*YI) - ((A/F1**2)*XU**F1*YI) -
          ((A/F1)*XL**F1*LOG(XL)*YI) + ((A/F1**2)*XL**F1*YI);
  DER.F = ((A/F1)*XU**F1*LOG(XU)*YI**2) - ((A/F1**2)*XU**F1*YI**2) -
          ((A/F1)*XL**F1*LOG(XL)*YI**2) + ((A/F1**2)*XL**F1*YI**2);
  BY SYS;
  OUTPUT OUT = NOUT
  PARS = A0 B0 C0 D0 E0 F0
  PREDICTED = TCP
  RESIDUAL = RES;
  DATA OUT2;
  SET NOUT;
  UCP = TCP/QTY;
  DIF = AUC - UCP;
  PCT = 100 * DIF/AUC;
PROC PRINT DATA = OUT2;
  VAR LOT XL XU YI R AUC UCP DIF PCT ;
  BY SYS;

```

### B.8 - Modified Alt 3 Non-linear Regression

This program was used to run the non-linear regression procedure for the Modified Alt 3 formulation.

```

OPTIONS LINESIZE = 80;
DATA INP;
  INFILE INP;
INPUT SYS $ LOT QTY AUC;

```

```

RETAIN XL 0 XU 0 VI 0;
  IF LOT = 1 THEN XU = 0;
  IF LOT > 0 THEN XU + QTY;
    XL = XU - QTY;
  IF LOT = 1 THEN XL = .0000001;
    R = (QTY/LAG1(QTY));
  IF LOT = 1 THEN R = 1;
    TCA = QTY * AUC;
PROC SORT DATA = INP;
  BY SYS;
PROC NLIN DATA = INP
  METHOD = MARQUARDT
  MAXITER = 100
  CONVERGE = .00000000000000001;
  PARMS A = 1
        B = 0
        C = 0
        D = 0;
    F1 = (B + (C*R) + (D*R**2) + 1);
    F2 = (XU**F1-XL**F1);
MODEL TCA= (A/F1)*F2;
  DER.A = (1/F1)*F2;
  DER.B = ((A/F1)*XU**F1*LOG(XU)) - ((A/F1**2)*XU**F1) -
    ((A/F1)*XL**F1*LOG(XL)) + ((A/F1**2)*XL**F1);
  DER.C = ((A/F1)*XU**F1*LOG(XU)*R) - ((A/F1**2)*XU**F1*R) -
    ((A/F1)*XL**F1*LOG(XL)*R) + ((A/F1**2)*XL**F1*R);
  DER.D = ((A/F1)*XU**F1*LOG(XU)*R**2) - ((A/F1**2)*R**2*XU**F1) -
    ((A/F1)*XL**F1*LOG(XL)*R**2) + ((A/F1**2)*R**2*XL**F1);
  BY SYS;
  OUTPUT OUT = NOUT
  PARMS = A0 B0 C0 D0
  PREDICTED = TCP
  RESIDUAL = RES;
  DATA OUT2;
  SET NOUT;
    UCP = TCP/QTY;
    DIF = AUC - UCP;
    PCT = 100 * DIF/AUC;
PROC PRINT DATA = OUT2;
  VAR LOT XL XU R AUC UCP DIF PCT ;
  BY SYS;

```

### B.9 - Basic Learning Curve Non-linear Regression

This program was used to run the non-linear regression procedure for the Basic Learning Curve formulation.

```

OPTIONS LINESIZE = 80;
DATA INP;
  INFILE INP;

```



```

INPUT SYS $ LOT QTY AUC;
RETAIN XL 0 XU 0 VI 0;
  IF LOT = 1 THEN XU = 0;
  IF LOT > 0 THEN XU + QTY;
    XL = XU - QTY;
  IF LOT = 1 THEN XL = .0000001;
    TCA = QTY * AUC;
PROC SORT DATA = INP;
  BY SYS;
PROC NLIN DATA = INP
  METHOD = MARQUARDT
  MAXITER = 100
  CONVERGE = .000000000000000001;
  PARS A = 1
    B = 0;
    F1 = (B + 1);
    F2 = (XU**F1-XL**F1);
MODEL TCA= (A/F1)*F2;
  DER.A = (1/F1)*F2;
  DER.B = ((A/F1)*XU**F1*LOG(XU)) - ((A/F1**2)*XU**F1) -
    ((A/F1)*XL**F1*LOG(XL)) + ((A/F1**2)*XL**F1);
  BY SYS;
  OUTPUT OUT = NOUT
  PARS = A0 B0 C0 D0
  PREDICTED = TCP
  RESIDUAL = RES;
  DATA OUT2;
  SET NOUT;
    UCP = TCP/QTY;
    DIF = AUC - UCP;
    PCT = 100 * DIF/AUC;
PROC PRINT DATA = OUT2;
  VAR LOT XL XU AUC UCP DIF PCT ;
  BY SYS;

```

## Appendix C: SAS Computer Output Summary

This appendix contains the summary results of the SAS computer runs. The results are summarized by model formulation and program type.

### C.1 - Alternative One Stepwise Regression

This section contains the summary results produced by the stepwise procedure in SAS. The SAS program used to produce this run was discussed in Appendix B.1.

#### C.1.1 - Bomber Aircraft Programs

-----SYS=B-1B-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 2  | 1.47983409     | 0.73991705  | 2237.75 | 0.0004 |
| ERROR      | 2  | 0.00066131     | 0.00033065  |         |        |
| TOTAL      | 4  | 1.48049540     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 6.12415495  |            |            |       |        |
| Z1        | -0.22731519 | 0.03635445 | 0.01292749 | 39.10 | 0.0246 |
| Z2        | -0.10701422 | 0.04649846 | 0.00175137 | 5.30  | 0.1480 |

| STEP | VARIABLE<br>ENTERED | REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|---------------------|---------|--------------|-----------------|---------------|---------|
| 1    | Z1                  |         | 1            | 0.9984          | 0.9984        | 2.80967 |
| 2    | Z2                  |         | 2            | 0.0012          | 0.9996        | 2.04422 |

| STEP | VARIABLE<br>ENTERED | REMOVED | F         | PROB>F |
|------|---------------------|---------|-----------|--------|
| 1    | Z1                  |         | 1837.8954 | 0.0001 |
| 2    | Z2                  |         | 5.2967    | 0.1480 |

-----SYS=B-52-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.98951441     | 0.98951441  | 10.54 | 0.0118 |
| ERROR      | 8  | 0.75101711     | 0.09387714  |       |        |
| TOTAL      | 9  | 1.74053152     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.66879195  |            |            |       |        |
| Z1        | -0.21690646 | 0.06680998 | 0.98951441 | 10.54 | 0.0118 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |        |
|------|----------|---------|---------|--------|--------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2   |
| 1    | Z1       |         | 1       | 0.5685 | 0.5685 |

-----SYS=B-58-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

### C.1.2 - Fighter Aircraft Programs

-----SYS=A-10-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.20697599     | 0.20697599  | 8.93 | 0.0203 |
| ERROR      | 7  | 0.16217060     | 0.02316723  |      |        |
| TOTAL      | 8  | 0.36914658     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | 2.98062538  |            |            |      |        |
| Z2        | -0.18585056 | 0.06217860 | 0.20697599 | 8.93 | 0.0203 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |        |
|------|----------|---------|---------|--------|--------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2   |
| 1    | Z2       |         | 1       | 0.5607 | 0.5607 |

-----SYS=F-100-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.51333658     | 0.51333658  | 95.15 | 0.0023 |
| ERROR      | 3  | 0.01618481     | 0.00539494  |       |        |
| TOTAL      | 4  | 0.52952138     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.18648143  |            |            |       |        |
| Z1        | -0.15830979 | 0.01622930 | 0.51333658 | 95.15 | 0.0023 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |        |
|------|----------|---------|---------|--------|--------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2   |
| 1    | Z1       |         | 1       | 0.9694 | 0.9694 |

-----SYS=F-101-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.92472428     | 0.92472428  | 69.59 | 0.0011 |
| ERROR      | 4  | 0.05315185     | 0.01328796  |       |        |
| TOTAL      | 5  | 0.97787613     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.32628329  |            |            |       |        |
| Z1        | -0.25635237 | 0.03072985 | 0.92472428 | 69.59 | 0.0011 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z1       |         | 1            | 0.9456          | 0.9456        | 0.69892 |

-----SYS=F-102-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 1.45937506     | 1.45937506  | 94.06 | 0.0105 |
| ERROR      | 2  | 0.03103201     | 0.01551601  |       |        |
| TOTAL      | 3  | 1.49040707     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.39652787  |            |            |       |        |
| Z1        | -0.37709990 | 0.03888328 | 1.45937506 | 94.06 | 0.0105 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.9792          | 0.9792        | .    |

-----SYS=F-106-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 1.19964727     | 1.19964727  | 30.66 | 0.0311 |
| ERROR      | 2  | 0.07824803     | 0.03912402  |       |        |
| TOTAL      | 3  | 1.27789530     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.79595764  |            |            |       |        |
| Z1        | -0.49884822 | 0.09008726 | 1.19964727 | 30.66 | 0.0311 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.9388          | 0.9388        | .    |

-----SYS=F-15AB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.15260233     | 0.15260233  | 146.05 | 0.0003 |
| ERROR      | 4  | 0.00417943     | 0.00104486  |        |        |
| TOTAL      | 5  | 0.15678176     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 3.52762254  |            |            |        |        |
| Z1        | -0.13148161 | 0.01087959 | 0.15260233 | 146.05 | 0.0003 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z1       |         | 1            | 0.9733          | 0.9733        | 0.53578 |

-----SYS=F-15CD-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 0.09702437     | 0.04851218  | 10.44 | 0.0164 |
| ERROR      | 5  | 0.02322933     | 0.00464587  |       |        |
| TOTAL      | 7  | 0.12025370     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.88769141  |            |            |       |        |
| Z2        | -0.24027715 | 0.06904562 | 0.05626255 | 12.11 | 0.0177 |
| Z3        | 0.35007163  | 0.12433319 | 0.03683040 | 7.93  | 0.0373 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z2       |         | 0.5006  | 0.5006 | 10.6870 |
| 2    | Z3       |         | 0.3063  | 0.8068 | 3.6805  |

| STEP | VARIABLE | F       | PROB>F |
|------|----------|---------|--------|
|      | ENTERED  | REMOVED |        |
| 1    | Z2       | 6.0134  | 0.0496 |
| 2    | Z3       | 7.9276  | 0.0373 |

-----SYS=F-15E-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.03658110     | 0.03658110  | 14.86 | 0.0182 |
| ERROR      | 4  | 0.00984798     | 0.00246199  |       |        |
| TOTAL      | 5  | 0.04642908     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.74308354  |            |            |       |        |
| Z2        | -0.41938638 | 0.10880016 | 0.03658110 | 14.86 | 0.0182 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z2       |         | 0.7879  | 0.7879 | 0.62789 |

-----SYS=F-16AB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.28836638     | 0.28836638  | 10.64 | 0.0471 |
| ERROR      | 3  | 0.08130971     | 0.02710324  |       |        |
| TOTAL      | 4  | 0.36967609     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.18677898  |            |            |       |        |
| Z1        | -0.22828275 | 0.06998603 | 0.28836638 | 10.64 | 0.0471 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.7801  | 0.7801 | 0.44534 |

-----SYS=F-16E-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

C.1.3 - Electronics Programs

-----SYS=ARC-109V-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.16857539     | 0.16857539  | 17.20 | 0.0255 |
| ERROR      | 3  | 0.02940906     | 0.00980302  |       |        |
| TOTAL      | 4  | 0.19798445     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -2.85965214 |            |            |       |        |
| Z2        | -0.13022074 | 0.03140241 | 0.16857539 | 17.20 | 0.0255 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z2       |         | 0.8515  | 0.8515 | 0.06968 |

-----SYS=ARC-54-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.11782452     | 0.11782452  | 69.37 | 0.0004 |
| ERROR      | 5  | 0.00849241     | 0.00169848  |       |        |
| TOTAL      | 6  | 0.12631693     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -3.18672110 |            |            |       |        |
| Z1        | -0.12274020 | 0.01473668 | 0.11782452 | 69.37 | 0.0004 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9328  | 0.9328 | 2.66282 |

-----SYS=ASN-63-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

-----SYS=ASN-70-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.02259868     | 0.02259868  | 8.17 | 0.0289 |
| ERROR      | 6  | 0.01660517     | 0.00276753  |      |        |
| TOTAL      | 7  | 0.03920385     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -3.14533001 |            |            |      |        |
| Z2        | -0.04210252 | 0.01473373 | 0.02259868 | 8.17 | 0.0289 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z2       |         | 1            | 0.5764  | 0.5764 | 1.19724 |

-----SYS=ASN-99-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 0.25772544     | 0.12886272  | 10.36 | 0.0167 |
| ERROR      | 5  | 0.06217734     | 0.01243547  |       |        |
| TOTAL      | 7  | 0.31990278     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -1.47293904 |            |            |       |        |
| Z2        | -0.31785019 | 0.06985813 | 0.25743834 | 20.70 | 0.0061 |
| Z3        | 0.16225714  | 0.05367918 | 0.11362084 | 9.14  | 0.0293 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z2       |         | 1            | 0.4505  | 0.4505 | 8.07121 |
| 2    | Z3       |         | 2            | 0.3552  | 0.8056 | 2.26942 |

| STEP | VARIABLE |         | F      | PROB>F |
|------|----------|---------|--------|--------|
|      | ENTERED  | REMOVED |        |        |
| 1    | Z2       |         | 4.9183 | 0.0684 |
| 2    | Z3       |         | 9.1368 | 0.0293 |

-----SYS=ASN-108-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.11931741     | 0.11931741  | 15.24 | 0.0298 |
| ERROR      | 3  | 0.02348470     | 0.00782823  |       |        |
| TOTAL      | 4  | 0.14280211     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -1.91448159 |            |            |       |        |
| Z1        | -0.09411975 | 0.02410798 | 0.11931741 | 15.24 | 0.0298 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z1       |         | 1            | 0.8355  | 0.8355 | 0.87287 |

-----SYS=ASQ-133-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.27102133     | 0.27102133  | 32.26 | 0.0047 |
| ERROR      | 4  | 0.03360165     | 0.00840041  |       |        |
| TOTAL      | 5  | 0.30462298     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -0.21450800 |            |            |       |        |
| Z1        | -0.15053337 | 0.02650217 | 0.27102133 | 32.26 | 0.0047 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z1       |         | 1            | 0.8897  | 0.8897 | 4.46246 |

-----SYS=ASW-32-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.21856871     | 0.21856871  | 5.03 | 0.0883 |
| ERROR      | 4  | 0.17379957     | 0.04344989  |      |        |
| TOTAL      | 5  | 0.39236828     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -1.32228292 |            |            |      |        |
| Z1        | -0.14043494 | 0.06261459 | 0.21856871 | 5.03 | 0.0883 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z1       |         | 1            | 0.5570  | 0.5570 | 0.21113 |

-----SYS=CP-1035N-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.05792215     | 0.05792215  | 6.11 | 0.0688 |
| ERROR      | 4  | 0.03789921     | 0.00947480  |      |        |
| TOTAL      | 5  | 0.09582136     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -2.03789151 |            |            |      |        |
| Z3        | -0.31162836 | 0.12603747 | 0.05792215 | 6.11 | 0.0688 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z3       |         | 1            | 0.6045  | 0.6045 | 3.10786 |

-----SYS=JTIDS-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 2  | 0.24230749     | 0.12115375  | 5290.21 | 0.0002 |
| ERROR      | 2  | 0.00004580     | 0.00002290  |         |        |
| TOTAL      | 4  | 0.24235329     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | -0.33401008 |            |            |         |        |
| Z1        | -0.20897458 | 0.00209788 | 0.22724228 | 9922.59 | 0.0001 |
| Z3        | -0.05562741 | 0.00885443 | 0.00090390 | 39.47   | 0.0244 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z1       |         | 1            | 0.9961  | 0.9961 | 23.9601 |
| 2    | Z3       |         | 2            | 0.0037  | 0.9998 | 2.2038  |



|      |  | VARIABLE |         | F        | PROB>F |
|------|--|----------|---------|----------|--------|
| STEP |  | ENTERED  | REMOVED |          |        |
| 1    |  | Z1       |         | 762.5651 | 0.0001 |
| 2    |  | Z3       |         | 39.4690  | 0.0244 |

-----SYS=LANNAV-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 1  | 0.40052225     | 0.40052225  | 40204.49 | 0.0001 |
| ERROR      | 5  | 0.00004981     | 0.00000996  |          |        |
| TOTAL      | 6  | 0.40057206     |             |          |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F        | PROB>F |
|-----------|-------------|------------|------------|----------|--------|
| INTERCEPT | 0.64554446  |            |            |          |        |
| Z1        | -0.12220077 | 0.00060945 | 0.40052225 | 40204.49 | 0.0001 |

|      |  | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P)    |
|------|--|----------|---------|--------|---------|--------|---------|
| STEP |  | ENTERED  | REMOVED | IN     | R**2    | R**2   |         |
| 1    |  | Z1       |         | 1      | 0.9999  | 0.9999 | 137.757 |

-----SYS=LANTARP-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 3  | 0.32598971     | 0.10866324  | 52951.22 | 0.0001 |
| ERROR      | 3  | 0.00000616     | 0.00000205  |          |        |
| TOTAL      | 6  | 0.32599587     |             |          |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 0.44676552  |            |            |         |        |
| Z1        | -0.10450506 | 0.00138309 | 0.01171607 | 5709.20 | 0.0001 |
| Z2        | -0.00808155 | 0.00204500 | 0.00003205 | 15.62   | 0.0289 |
| Z3        | 0.00942504  | 0.00105858 | 0.00016268 | 79.27   | 0.0030 |

|      |  | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P)    |
|------|--|----------|---------|--------|---------|--------|---------|
| STEP |  | ENTERED  | REMOVED | IN     | R**2    | R**2   |         |
| 1    |  | Z1       |         | 1      | 0.9994  | 0.9994 | 96.9632 |
| 2    |  | Z3       |         | 2      | 0.0005  | 0.9999 | 17.6171 |
| 3    |  | Z2       |         | 3      | 0.0001  | 1.0000 | 4.0000  |

|      |  | VARIABLE |         | F         | PROB>F |
|------|--|----------|---------|-----------|--------|
| STEP |  | ENTERED  | REMOVED |           |        |
| 1    |  | Z1       |         | 7940.7559 | 0.0001 |
| 2    |  | Z3       |         | 17.4777   | 0.0139 |
| 3    |  | Z2       |         | 15.6171   | 0.0289 |

-----SYS=LANTREC-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.14785176     | 0.14785176  | 758.78 | 0.0001 |
| ERROR      | 3  | 0.00058456     | 0.00019485  |        |        |
| TOTAL      | 4  | 0.14843632     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -0.34649331 |            |            |        |        |
| Z1        | -0.14556527 | 0.00528443 | 0.14785176 | 758.78 | 0.0001 |

| STEP | VARIABLE<br>ENTERED | REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|---------------------|---------|--------------|-----------------|---------------|---------|
| 1    | Z1                  |         | 1            | 0.9961          | 0.9961        | 0.94033 |

#### C.1.4 - Helicopter Programs

-----SYS=HH-52-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.12412828     | 0.12412828  | 38.92 | 0.0034 |
| ERROR      | 4  | 0.01275667     | 0.00318917  |       |        |
| TOTAL      | 5  | 0.13688495     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 0.83324089  |            |            |       |        |
| Z1        | -0.18605919 | 0.02982321 | 0.12412828 | 38.92 | 0.0034 |

| STEP | VARIABLE<br>ENTERED | REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|---------------------|---------|--------------|-----------------|---------------|---------|
| 1    | Z1                  |         | 1            | 0.9068          | 0.9068        | 25.0699 |

-----SYS=CH-46-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 1.26216747     | 0.63108374  | 75.38 | 0.0002 |
| ERROR      | 5  | 0.04186031     | 0.00837206  |       |        |
| TOTAL      | 7  | 1.30402778     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.91405691  |            |            |       |        |
| Z1        | -0.12800003 | 0.03385284 | 0.11969126 | 14.30 | 0.0129 |
| Z2        | -0.29649699 | 0.07233527 | 0.14066073 | 16.80 | 0.0094 |

| STEP | VARIABLE<br>ENTERED | REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|---------------------|---------|--------------|-----------------|---------------|---------|
| 1    | Z2                  |         | 1            | 0.8761          | 0.8761        | 13.5478 |
| 2    | Z1                  |         | 2            | 0.0918          | 0.9679        | 2.5469  |

| STEP | VARIABLE<br>ENTERED | REMOVED | F       | PROB>F |
|------|---------------------|---------|---------|--------|
| 1    | Z2                  |         | 42.4314 | 0.0006 |
| 2    | Z1                  |         | 14.2965 | 0.0129 |

-----SYS=H-53-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.36413891     | 0.36413891  | 56.37 | 0.0003 |
| ERROR      | 6  | 0.03876051     | 0.00646008  |       |        |
| TOTAL      | 7  | 0.40289942     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.07266030  |            |            |       |        |
| Z1        | -0.14183982 | 0.01889225 | 0.36413891 | 56.37 | 0.0003 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9038  | 0.9038 | 0.13053 |

-----SYS=CH-47-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 0.95253232     | 0.47626616  | 43.60 | 0.0001 |
| ERROR      | 9  | 0.09832239     | 0.01092471  |       |        |
| TOTAL      | 11 | 1.05085471     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.68400939  |            |            |       |        |
| Z1        | -0.11827591 | 0.02135363 | 0.33516543 | 30.68 | 0.0004 |
| Z2        | -0.22206813 | 0.03636441 | 0.40740777 | 37.29 | 0.0002 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z2       |         | 0.5875  | 0.5875 | 27.3173 |
| 2    | Z1       |         | 0.3189  | 0.9064 | 2.0106  |

| STEP | VARIABLE | F       | PROB>F |
|------|----------|---------|--------|
|      | ENTERED  | REMOVED |        |
| 1    | Z2       | 14.2419 | 0.0036 |
| 2    | Z1       | 30.6796 | 0.0004 |

-----SYS=H-54-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.18000333     | 0.18000333  | 10.45 | 0.0481 |
| ERROR      | 3  | 0.05167528     | 0.01722509  |       |        |
| TOTAL      | 4  | 0.23167861     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.76204133  |            |            |       |        |
| Z1        | -0.15447484 | 0.04778574 | 0.18000333 | 10.45 | 0.0481 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.7770  | 0.7770 | 0.76561 |

-----SYS=HH-60D-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 3  | 0.07173034     | 0.02391011  | 99999.99 | 0.0001 |
| ERROR      | 0  | 0.00000000     | 0.00000000  |          |        |
| TOTAL      | 3  | 0.07173034     |             |          |        |

|           | B VALUE     | STD ERROR | TYPE II SS | F        | PROB>F |
|-----------|-------------|-----------|------------|----------|--------|
| INTERCEPT | 2.29791868  |           |            |          |        |
| Z1        | -0.05518571 | 0         | 0.00051405 | 99999.99 | 0.0001 |
| Z2        | -0.05128225 | 0         | 0.00017748 | 99999.99 | 0.0001 |
| Z3        | -0.01013906 | 0         | 0.00005455 | 99999.99 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z2       |         | 0.9785  | 0.9785 | .    |
| 2    | Z1       |         | 0.0207  | 0.9992 | .    |
| 3    | Z3       |         | 0.0008  | 1.0000 | .    |

| STEP | VARIABLE | F       | PROB>F    |
|------|----------|---------|-----------|
|      | ENTERED  | REMOVED |           |
| 1    | Z2       |         | 91.1672   |
| 2    | Z1       |         | 27.2272   |
| 3    | Z3       |         | 9999.9999 |

-----SYS=SH-3-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.32143167     | 0.32143167  | 24.60 | 0.0016 |
| ERROR      | 7  | 0.09147543     | 0.01306792  |       |        |
| TOTAL      | 8  | 0.41290709     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.49416647  |            |            |       |        |
| Z1        | -0.15806200 | 0.03187031 | 0.32143167 | 24.60 | 0.0016 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.7785  | 0.7785 | 0.32533 |

#### C.1.5 - Tactical Armament Programs

-----SYS=LLLGB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 0.71772163     | 0.71772163  | 3753.30 | 0.0001 |
| ERROR      | 8  | 0.00152979     | 0.00019122  |         |        |
| TOTAL      | 9  | 0.71925142     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | -2.51061063 |            |            |         |        |
| Z1        | -0.17034813 | 0.00278055 | 0.71772163 | 3753.30 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z1       |         | 1       | 0.9979 | 0.9979  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 1.86619 |

-----SYS=CEM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 2.32168009     | 2.32168009  | 186.61 | 0.0001 |
| ERROR      | 6  | 0.07464916     | 0.01244153  |        |        |
| TOTAL      | 7  | 2.39632925     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -1.29953645 |            |            |        |        |
| Z2        | -0.28820070 | 0.02109748 | 2.32168009 | 186.61 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z2       |         | 1       | 0.9688 | 0.9688  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 19.5040 |

-----SYS=GBU-15-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.09760238     | 0.09760238  | 8.61 | 0.0219 |
| ERROR      | 7  | 0.07931718     | 0.01133103  |      |        |
| TOTAL      | 8  | 0.17691956     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -1.23612677 |            |            |      |        |
| Z2        | -0.10838260 | 0.03692870 | 0.09760238 | 8.61 | 0.0219 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z2       |         | 1       | 0.5517 | 0.5517  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 0.04778 |

#### C.1.6 - Tactical Missile Programs

-----SYS=AMRAAM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 3.86655114     | 3.86655114  | 7317.93 | 0.0001 |
| ERROR      | 8  | 0.00422694     | 0.00052837  |         |        |
| TOTAL      | 9  | 3.87077808     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 1.68243228  |            |            |         |        |
| Z1        | -0.35610306 | 0.00416276 | 3.86655114 | 7317.93 | 0.0001 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z1       |         | 1            | 0.9989  | 0.9989 | 0.66469 |

-----SYS=HARM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 2  | 2.42845988     | 1.21422994  | 2171.92 | 0.0001 |
| ERROR      | 8  | 0.00447246     | 0.00055906  |         |        |
| TOTAL      | 10 | 2.43293234     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 0.93266880  |            |            |        |        |
| Z1        | -0.16383163 | 0.01057877 | 0.13408539 | 239.84 | 0.0001 |
| Z2        | -0.13846115 | 0.01818247 | 0.03241955 | 57.99  | 0.0001 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z1       |         | 1            | 0.9848  | 0.9848 | 50.7702 |
| 2    | Z2       |         | 2            | 0.0133  | 0.9982 | 2.0036  |

| STEP | VARIABLE | F        | PROB>F |
|------|----------|----------|--------|
| 1    | Z1       | 584.5267 | 0.0001 |
| 2    | Z2       | 57.9896  | 0.0001 |

-----SYS=IIR-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 2  | 2.66443838     | 1.33221919  | 216.95 | 0.0001 |
| ERROR      | 6  | 0.03684343     | 0.00614057  |        |        |
| TOTAL      | 8  | 2.70128181     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -0.01993208 |            |            |        |        |
| Z1        | -0.27368702 | 0.01359177 | 2.48980270 | 405.47 | 0.0001 |
| Z3        | -0.19600006 | 0.04731759 | 0.10536003 | 17.16  | 0.0061 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z2       |         | 1            | 0.9569  | 0.9569 | 12.9577 |
| 2    | Z1       |         | 2            | 0.0142  | 0.9711 | 9.0447  |
| 3    | Z3       |         | 3            | 0.0169  | 0.9880 | 4.0000  |
| 4    |          | Z2      | 2            | 0.0016  | 0.9864 | 2.6876  |

| STEP | VARIABLE | F        | PROB>F |
|------|----------|----------|--------|
| 1    | Z2       | 155.5503 | 0.0001 |
| 2    | Z1       | 2.9455   | 0.1369 |
| 3    | Z3       | 7.0447   | 0.0452 |
| 4    | Z2       | 0.6876   | 0.4447 |

-----SYS=AIM7F-R-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 2  | 3.46010800     | 1.73005400  | 584.48 | 0.0001 |
| ERROR      | 5  | 0.01479983     | 0.00295997  |        |        |
| TOTAL      | 7  | 3.47490783     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.70702999  |            |            |       |        |
| Z1        | -0.28922188 | 0.04392532 | 0.12832732 | 43.35 | 0.0012 |
| Z2        | -0.21517373 | 0.08426409 | 0.01930102 | 6.52  | 0.0510 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9902  | 0.9902 | 6.43688 |
| 2    | Z2       |         | 0.0056  | 0.9957 | 2.52962 |

| STEP | VARIABLE | F       | PROB>F   |
|------|----------|---------|----------|
|      | ENTERED  | REMOVED |          |
| 1    | Z1       |         | 605.4055 |
| 2    | Z2       |         | 6.5207   |

-----SYS=AIM7F-GD-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 2  | 5.01319984     | 2.50659992  | 307.99 | 0.0003 |
| ERROR      | 5  | 0.02441606     | 0.00813869  |        |        |
| TOTAL      | 7  | 5.03761591     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 1.11510720  |            |            |        |        |
| Z1        | -0.45127619 | 0.01913489 | 4.52675705 | 556.20 | 0.0002 |
| Z3        | -0.16801516 | 0.06242494 | 0.05895695 | 7.24   | 0.0743 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9834  | 0.9834 | 8.45841 |
| 2    | Z3       |         | 0.0117  | 0.9952 | 3.06278 |

## C.2 - Alternative Two Stepwise Regression

This section contains the summary results produced by the stepwise regression procedure in SAS. The SAS program used to produce this run was discussed in Appendix B.2.

### C.2.1 - Bomber Aircraft Programs

-----SYS=B-1B-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 1.47808272     | 1.47808272  | 1837.90 | 0.0001 |
| ERROR      | 3  | 0.00241268     | 0.00080423  |         |        |
| TOTAL      | 4  | 1.48049540     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 6.06180789  |            |            |         |        |
| Z1        | -0.31029881 | 0.00723802 | 1.47808272 | 1837.90 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9984  | 0.9984 | 0.06309 |

-----SYS=B-52-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.98951441     | 0.98951441  | 10.54 | 0.0118 |
| ERROR      | 8  | 0.75101711     | 0.09387714  |       |        |
| TOTAL      | 9  | 1.74053152     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.66879195  |            |            |       |        |
| Z1        | -0.21690646 | 0.06680998 | 0.98951441 | 10.54 | 0.0118 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.5685  | 0.5685 | 0.39006 |

-----SYS=B-58-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

### C.2.2 - Fighter Aircraft Programs

-----SYS=A-10-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.18748236     | 0.18748236  | 7.22 | 0.0312 |
| ERROR      | 7  | 0.18166422     | 0.02595203  |      |        |
| TOTAL      | 8  | 0.36914658     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | 2.41566916  |            |            |      |        |
| Z2        | -0.00043912 | 0.00016338 | 0.18748236 | 7.22 | 0.0312 |



| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z2       |         | 1      | 0.5079  | 0.5079 | 0.74678 |

-----SYS=F-100-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.51333658     | 0.51333658  | 95.15 | 0.0023 |
| ERROR      | 3  | 0.01618481     | 0.00539494  |       |        |
| TOTAL      | 4  | 0.52952138     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.18648143  |            |            |       |        |
| Z1        | -0.15830979 | 0.01622930 | 0.51333658 | 95.15 | 0.0023 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.9694  | 0.9694 | 0.11265 |

-----SYS=F-101-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.92472428     | 0.92472428  | 69.59 | 0.0011 |
| ERROR      | 4  | 0.05315185     | 0.01328796  |       |        |
| TOTAL      | 5  | 0.97787613     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.32628329  |            |            |       |        |
| Z1        | -0.25635237 | 0.03072985 | 0.92472428 | 69.59 | 0.0011 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.9456  | 0.9456 | 0.15794 |

-----SYS=F-102-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 3  | 1.49040707     | 0.49680236  | 99999.99 | 0.0001 |
| ERROR      | 0  | 0.00000000     | 0.00000000  |          |        |
| TOTAL      | 3  | 1.49040707     |             |          |        |

|           | B VALUE     | STD ERROR | TYPE II SS | F        | PROB>F |
|-----------|-------------|-----------|------------|----------|--------|
| INTERCEPT | 3.05172818  |           |            |          |        |
| Z1        | -0.18951594 | 0         | 0.00004665 | 99999.99 | 0.0001 |
| Z2        | -0.00136208 | 0         | 0.00006041 | 99999.99 | 0.0001 |
| Z3        | 0.00000208  | 0         | 0.00006824 | 99999.99 | 0.0001 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.9792          | 0.9792        | .    |
| 2    | Z3       |         | 2            | 0.0208          | 1.0000        | .    |
| 3    | Z2       |         | 3            | 0.0000          | 1.0000        | .    |

| STEP | VARIABLE |         | F         | PROB>F |
|------|----------|---------|-----------|--------|
|      | ENTERED  | REMOVED |           |        |
| 1    | Z1       |         | 94.0561   | 0.0105 |
| 2    | Z3       |         | 512.6888  | 0.0281 |
| 3    | Z2       |         | 9999.9999 | 0.0001 |

-----SYS=F-106-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 1.19964727     | 1.19964727  | 30.66 | 0.0311 |
| ERROR      | 2  | 0.07824803     | 0.03912402  |       |        |
| TOTAL      | 3  | 1.27789530     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.79595764  |            |            |       |        |
| Z1        | -0.49884822 | 0.09008726 | 1.19964727 | 30.66 | 0.0311 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.9388          | 0.9388        | .    |

-----SYS=F-15AB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.15260233     | 0.15260233  | 146.05 | 0.0003 |
| ERROR      | 4  | 0.00417943     | 0.00104486  |        |        |
| TOTAL      | 5  | 0.15678176     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 3.52762254  |            |            |        |        |
| Z1        | -0.13148161 | 0.01087959 | 0.15260233 | 146.05 | 0.0003 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z1       |         | 1            | 0.9733          | 0.9733        | 22.1078 |

-----SYS=F-15CD-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.06585355     | 0.06585355  | 7.26 | 0.0358 |
| ERROR      | 6  | 0.05440015     | 0.00906669  |      |        |
| TOTAL      | 7  | 0.12025370     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | 3.31595564  |            |            |      |        |
| Z2        | -0.00146562 | 0.00054382 | 0.06585355 | 7.26 | 0.0358 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z2       |         | 1      | 0.5476  | 0.5476 | 4.60580 |

-----SYS=F-15E-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.03589868     | 0.03589868  | 13.64 | 0.0210 |
| ERROR      | 4  | 0.01053040     | 0.00263260  |       |        |
| TOTAL      | 5  | 0.04642908     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.06410108  |            |            |       |        |
| Z3        | -0.00000446 | 0.00000121 | 0.03589868 | 13.64 | 0.0210 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z3       |         | 1      | 0.7732  | 0.7732 | 0.15050 |

-----SYS=F-16AB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.28836638     | 0.28836638  | 10.64 | 0.0471 |
| ERROR      | 3  | 0.08130971     | 0.02710324  |       |        |
| TOTAL      | 4  | 0.36967609     |             |       |        |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.7801  | 0.7801 | 0.42225 |

-----SYS=F-16E-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

### C.2.3 - Electronics Programs

-----SYS=ARC-109V-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.16351455     | 0.16351455  | 14.23 | 0.0326 |
| ERROR      | 3  | 0.03446990     | 0.01148997  |       |        |
| TOTAL      | 4  | 0.19798445     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -2.99345507 |            |            |       |        |
| Z1        | -0.09510960 | 0.02521190 | 0.16351455 | 14.23 | 0.0326 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.8259  | 0.8259 | 0.14665 |

-----SYS=ARC-54-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.11782452     | 0.11782452  | 69.37 | 0.0004 |
| ERROR      | 5  | 0.00849241     | 0.00169848  |       |        |
| TOTAL      | 6  | 0.12631693     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -3.18672110 |            |            |       |        |
| Z1        | -0.12274020 | 0.01473668 | 0.11782452 | 69.37 | 0.0004 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z1       |         | 1       | 0.9328 | 0.9328  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 1.18511 |

-----SYS=ASN-63-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

-----SYS=ASN-70-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 2  | 0.02702549     | 0.01351275  | 5.55 | 0.0538 |
| ERROR      | 5  | 0.01217836     | 0.00243567  |      |        |
| TOTAL      | 7  | 0.03920385     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -3.20442829 |            |            |      |        |
| Z2        | -0.00046417 | 0.00015919 | 0.02070889 | 8.50 | 0.0332 |
| Z3        | 0.00000146  | 0.00000061 | 0.01411101 | 5.79 | 0.0611 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z2       |         | 1       | 0.3294 | 0.3294  |
| 2    | Z3       |         | 2       | 0.3599 | 0.6894  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 4.65112 |
|      |          |         |         |        | 2.00757 |

| STEP | VARIABLE | F      | PROB>F |
|------|----------|--------|--------|
|      | ENTERED  |        |        |
| 1    | Z2       | 2.9475 | 0.1368 |
| 2    | Z3       | 5.7935 | 0.0611 |

-----SYS=ASN-99-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 2  | 0.24600823     | 0.12300412  | 8.32 | 0.0256 |
| ERROR      | 5  | 0.07389455     | 0.01477891  |      |        |
| TOTAL      | 7  | 0.31990278     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -3.44823854 |            |            |      |        |
| Z1        | 0.10330948  | 0.04664951 | 0.07248174 | 4.90 | 0.0777 |
| Z3        | -0.00000112 | 0.00000036 | 0.14281158 | 9.66 | 0.0266 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z3       |         | 1            | 0.5424          | 0.5424        | 4.71978 |
| 2    | Z1       |         | 2            | 0.2266          | 0.7690        | 2.40197 |

| STEP | VARIABLE |         | F      | PROB>F |
|------|----------|---------|--------|--------|
|      | ENTERED  | REMOVED |        |        |
| 1    | Z3       |         | 7.1129 | 0.0372 |
| 2    | Z1       |         | 4.9044 | 0.0777 |

-----SYS=ASN-108-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.11931741     | 0.11931741  | 15.24 | 0.0298 |
| ERROR      | 3  | 0.02348470     | 0.00782823  |       |        |
| TOTAL      | 4  | 0.14280211     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -1.91448159 |            |            |       |        |
| Z1        | -0.09411975 | 0.02410798 | 0.11931741 | 15.24 | 0.0298 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z1       |         | 1            | 0.8355          | 0.8355        | 1.14818 |

-----SYS=ASQ-133-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 0.29373628     | 0.14686814  | 40.47 | 0.0068 |
| ERROR      | 3  | 0.01088670     | 0.00362890  |       |        |
| TOTAL      | 5  | 0.30462298     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -0.41860430 |            |            |       |        |
| Z2        | -0.00317744 | 0.00084376 | 0.05146323 | 14.18 | 0.0328 |
| Z3        | 0.00002187  | 0.00001040 | 0.01605538 | 4.42  | 0.1262 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z2       |         | 1            | 0.9116          | 0.9116        | 3.29289 |
| 2    | Z3       |         | 2            | 0.0527          | 0.9643        | 2.13874 |

| STEP | VARIABLE |         | F       | PROB>F |
|------|----------|---------|---------|--------|
|      | ENTERED  | REMOVED |         |        |
| 1    | Z2       |         | 41.2264 | 0.0030 |
| 2    | Z3       |         | 4.4243  | 0.1262 |

-----SYS=ASW-32-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.21856871     | 0.21856871  | 5.03 | 0.0883 |
| ERROR      | 4  | 0.17379957     | 0.04344989  |      |        |
| TOTAL      | 5  | 0.39236828     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -1.32228292 |            |            |      |        |
| Z1        | -0.14043494 | 0.06261459 | 0.21856871 | 5.03 | 0.0883 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z1       |         | 1       | 0.5570 | 0.5570  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 1.15295 |

-----SYS=CP-1035N-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

-----SYS=JTIDS-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.24140359     | 0.24140359  | 762.57 | 0.0001 |
| ERROR      | 3  | 0.00094970     | 0.00031657  |        |        |
| TOTAL      | 4  | 0.24235329     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -0.35560158 |            |            |        |        |
| Z1        | -0.20491481 | 0.00742053 | 0.24140359 | 762.57 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z1       |         | 1       | 0.9961 | 0.9961  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 1.48010 |

-----SYS=LANNAV-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 2  | 0.40055971     | 0.20027985  | 64829.71 | 0.0001 |
| ERROR      | 4  | 0.00001236     | 0.00000309  |          |        |
| TOTAL      | 6  | 0.40057206     |             |          |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F        | PROB>F |
|-----------|-------------|------------|------------|----------|--------|
| INTERCEPT | 0.64140172  |            |            |          |        |
| Z1        | -0.11867768 | 0.00106724 | 0.03820152 | 12365.66 | 0.0001 |
| Z2        | -0.00002120 | 0.00000609 | 0.00003745 | 12.12    | 0.0253 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z1       |         | 1       | 0.9999 | 0.9999  |
| 2    | Z2       |         | 2       | 0.0001 | 1.0000  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 9.21020 |
|      |          |         |         |        | 2.02917 |

| STEP | VARIABLE | F         | PROB>F |
|------|----------|-----------|--------|
|      | ENTERED  | REMOVED   |        |
| 1    | Z1       | 9999.9999 | 0.0001 |
| 2    | Z2       | 12.1235   | 0.0253 |

-----SYS=LANTARP-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 2  | 0.32593843     | 0.16296922  | 11350.17 | 0.0001 |
| ERROR      | 4  | 0.00005743     | 0.00001436  |          |        |
| TOTAL      | 6  | 0.32599587     |             |          |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 0.43759694  |            |            |         |        |
| Z1        | -0.10357037 | 0.00235097 | 0.02786640 | 1940.79 | 0.0001 |
| Z2        | -0.00004311 | 0.00001344 | 0.00014771 | 10.29   | 0.0327 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9994  | 0.9994 | 15.4321 |
| 2    | Z2       |         | 0.0005  | 0.9998 | 4.1605  |

| STEP | VARIABLE | F         | PROB>F |
|------|----------|-----------|--------|
|      | ENTERED  | REMOVED   |        |
| 1    | Z1       | 7940.7559 | 0.0001 |
| 2    | Z2       | 10.2871   | 0.0327 |

-----SYS=LANTREC-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.14785176     | 0.14785176  | 758.78 | 0.0001 |
| ERROR      | 3  | 0.00058456     | 0.00019485  |        |        |
| TOTAL      | 4  | 0.14843632     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -0.34649331 |            |            |        |        |
| Z1        | -0.14556527 | 0.00528443 | 0.14785176 | 758.78 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9961  | 0.9961 | 1.41027 |

#### C.2.4 - Helicopter Programs

-----SYS=HH-52-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.12412828     | 0.12412828  | 38.92 | 0.0034 |
| ERROR      | 4  | 0.01275667     | 0.00318917  |       |        |
| TOTAL      | 5  | 0.13688495     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 0.83324089  |            |            |       |        |
| Z1        | -0.18605919 | 0.02982321 | 0.12412828 | 38.92 | 0.0034 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.9068  | 0.9068 | 21.4655 |

-----SYS=CH-46-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 1.12150675     | 1.12150675  | 36.87 | 0.0009 |
| ERROR      | 6  | 0.18252104     | 0.03042017  |       |        |
| TOTAL      | 7  | 1.30402778     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.22820194  |            |            |       |        |
| Z1        | -0.23817890 | 0.03922683 | 1.12150675 | 36.87 | 0.0009 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.8600  | 0.8600 | 1.90826 |

-----SYS=H-53-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.36413891     | 0.36413891  | 56.37 | 0.0003 |
| ERROR      | 6  | 0.03876051     | 0.00646008  |       |        |
| TOTAL      | 7  | 0.40289942     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.07266030  |            |            |       |        |
| Z1        | -0.14183982 | 0.01889225 | 0.36413891 | 56.37 | 0.0003 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.9038  | 0.9038 | 0.03386 |

-----SYS=CH-47-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 3  | 0.94598510     | 0.31532837  | 24.05 | 0.0002 |
| ERROR      | 8  | 0.10486961     | 0.01310870  |       |        |
| TOTAL      | 11 | 1.05085471     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.98150621  |            |            |       |        |
| Z1        | -0.07590720 | 0.02686504 | 0.10465273 | 7.98  | 0.0223 |
| Z2        | -0.00176284 | 0.00051800 | 0.15182170 | 11.58 | 0.0093 |
| Z3        | 0.00000688  | 0.00000302 | 0.06788950 | 5.18  | 0.0524 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z2       |         | 1      | 0.6285  | 0.6285 | 21.7774 |
| 2    | Z1       |         | 2      | 0.2071  | 0.8356 | 7.1790  |
| 3    | Z3       |         | 3      | 0.0646  | 0.9002 | 4.0000  |



| STEP | VARIABLE |         | F       | PROB>F |
|------|----------|---------|---------|--------|
|      | ENTERED  | REMOVED |         |        |
| 1    | Z2       |         | 16.9213 | 0.0021 |
| 2    | Z1       |         | 11.3352 | 0.0083 |
| 3    | Z3       |         | 5.1790  | 0.0524 |

-----SYS=H-54-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.18000333     | 0.18000333  | 10.45 | 0.0481 |
| ERROR      | 3  | 0.05167528     | 0.01722509  |       |        |
| TOTAL      | 4  | 0.23167861     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.76204133  |            |            |       |        |
| Z1        | -0.15447484 | 0.04778574 | 0.18000333 | 10.45 | 0.0481 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   |         |
| 1    | Z1       |         | 1      | 0.7770  | 0.7770 | 1.50618 |

-----SYS=HH-60D-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.06912153     | 0.06912153  | 52.99 | 0.0184 |
| ERROR      | 2  | 0.00260882     | 0.00130441  |       |        |
| TOTAL      | 3  | 0.07173034     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.23770674  |            |            |       |        |
| Z1        | -0.08690880 | 0.01193889 | 0.06912153 | 52.99 | 0.0184 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P) |
|------|----------|---------|--------|---------|--------|------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   |      |
| 1    | Z1       |         | 1      | 0.9636  | 0.9636 | .    |

-----SYS=SH-3-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.32143167     | 0.32143167  | 24.60 | 0.0016 |
| ERROR      | 7  | 0.09147543     | 0.01306792  |       |        |
| TOTAL      | 8  | 0.41290709     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.49416647  |            |            |       |        |
| Z1        | -0.15806200 | 0.03187031 | 0.32143167 | 24.60 | 0.0016 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   |         |
| 1    | Z1       |         | 1      | 0.7785  | 0.7785 | 6.18436 |

# C.2.5 - Tactical Armament Programs

-----SYS=LLLGB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 0.71772163     | 0.71772163  | 3753.30 | 0.0001 |
| ERROR      | 8  | 0.00152979     | 0.00019122  |         |        |
| TOTAL      | 9  | 0.71925142     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | -2.51061063 |            |            |         |        |
| Z1        | -0.17034813 | 0.00278055 | 0.71772163 | 3753.30 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9979  | 0.9979 | 5.09779 |

-----SYS=CEM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 3  | 2.39311941     | 0.79770647  | 994.08 | 0.0001 |
| ERROR      | 4  | 0.00320984     | 0.00080246  |        |        |
| TOTAL      | 7  | 2.39632925     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -1.41663745 |            |            |        |        |
| Z1        | -0.31206595 | 0.01131836 | 0.61002677 | 760.20 | 0.0001 |
| Z2        | 0.00000296  | 0.00000037 | 0.04990959 | 62.20  | 0.0014 |
| Z3        | -0.00000000 | 0.00000000 | 0.02968677 | 36.99  | 0.0037 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9671  | 0.9671 | 94.1097 |
| 2    | Z2       |         | 0.0191  | 0.9863 | 38.9947 |
| 3    | Z3       |         | 0.0124  | 0.9987 | 4.0000  |

| STEP    | VARIABLE | F        | PROB>F |
|---------|----------|----------|--------|
| ENTERED | REMOVED  |          |        |
| 1       | Z1       | 176.6261 | 0.0001 |
| 2       | Z2       | 6.9661   | 0.0460 |
| 3       | Z3       | 36.9947  | 0.0037 |

-----SYS=GBU-15-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 0.15959725     | 0.07979863  | 27.64 | 0.0009 |
| ERROR      | 6  | 0.01732231     | 0.00288705  |       |        |
| TOTAL      | 8  | 0.17691956     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -1.54399316 |            |            |       |        |
| Z2        | -0.00037584 | 0.00005466 | 0.13651261 | 47.28 | 0.0005 |
| Z3        | 0.00000051  | 0.00000008 | 0.11268652 | 39.03 | 0.0008 |

| STEP | VARIABLE<br>ENTERED | REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|---------------------|---------|--------------|-----------------|---------------|---------|
| 1    | Z1                  |         | 1            | 0.5313          | 0.5313        | 19.9435 |
| 2    | Z3                  |         | 2            | 0.2023          | 0.7336        | 11.1799 |
| 3    | Z2                  |         | 3            | 0.1725          | 0.9060        | 4.0000  |
| 4    |                     | Z1      | 2            | 0.0040          | 0.9021        | 2.2107  |

| STEP | VARIABLE<br>ENTERED | REMOVED | F      | PROB>F |
|------|---------------------|---------|--------|--------|
| 1    | Z1                  |         | 7.9351 | 0.0259 |
| 2    | Z3                  |         | 4.5544 | 0.0768 |
| 3    | Z2                  |         | 9.1799 | 0.0291 |
| 4    |                     | Z1      | 0.2107 | 0.6655 |

#### C.2.6 - Tactical Missile Programs

-----SYS=AMRAAM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 3.86655114     | 3.86655114  | 7317.93 | 0.0001 |
| ERROR      | 8  | 0.00422694     | 0.00052837  |         |        |
| TOTAL      | 9  | 3.87077808     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 1.68243228  |            |            |         |        |
| Z1        | -0.35610306 | 0.00416276 | 3.86655114 | 7317.93 | 0.0001 |

| STEP | VARIABLE<br>ENTERED | REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|---------------------|---------|--------------|-----------------|---------------|---------|
| 1    | Z1                  |         | 1            | 0.9989          | 0.9989        | 1.62694 |

-----SYS=HARM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 2.39604033     | 2.39604033  | 584.53 | 0.0001 |
| ERROR      | 9  | 0.03689201     | 0.00409911  |        |        |
| TOTAL      | 10 | 2.43293234     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 0.55630848  |            |            |        |        |
| Z1        | -0.23942286 | 0.00990292 | 2.39604033 | 584.53 | 0.0001 |

| STEP | VARIABLE<br>ENTERED | REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|---------------------|---------|--------------|-----------------|---------------|---------|
| 1    | Z1                  |         | 1            | 0.9848          | 0.9848        | 5.08763 |

-----SYS=IIR-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 2.55907835     | 2.55907835  | 125.97 | 0.0001 |
| ERROR      | 7  | 0.14220346     | 0.02031478  |        |        |
| TOTAL      | 8  | 2.70128181     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -0.31423346 |            |            |        |        |
| Z1        | -0.24873883 | 0.02216194 | 2.55907835 | 125.97 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9474  | 0.9474 | 0.61507 |

-----SYS=AIM7F-R-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 3.44080698     | 3.44080698  | 605.41 | 0.0001 |
| ERROR      | 6  | 0.03410085     | 0.00568347  |        |        |
| TOTAL      | 7  | 3.47490783     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 1.07890599  |            |            |        |        |
| Z1        | -0.39736762 | 0.01614988 | 3.44080698 | 605.41 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9902  | 0.9902 | 1.66043 |

-----SYS=AIM7F-GD-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 4.95424289     | 4.95424289  | 237.69 | 0.0001 |
| ERROR      | 4  | 0.08337301     | 0.02084325  |        |        |
| TOTAL      | 5  | 5.03761591     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 1.04508899  |            |            |        |        |
| Z1        | -0.46191702 | 0.02996112 | 4.95424289 | 237.69 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9834  | 0.9834 | 0.65336 |

### C.3 - Modified Alternative One Stepwise Regression

This section contains the summary results produced by the stepwise regression procedure in SAS. The SAS program used to produce this run was discussed in Appendix B.3.

#### C.3.1 - Bomber Aircraft Programs

-----SYS=B-1B-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 2  | 1.47983409     | 0.73991705  | 2237.75 | 0.0004 |
| ERROR      | 2  | 0.00066131     | 0.00033065  |         |        |
| TOTAL      | 4  | 1.48049540     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 6.12415495  |            |            |       |        |
| Z1        | -0.22731519 | 0.03635445 | 0.01292749 | 39.10 | 0.0246 |
| Z2        | -0.10701422 | 0.04649846 | 0.00175137 | 5.30  | 0.1480 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 0.9984  | 0.9984 | .    |
| 2    | Z2       |         | 0.0012  | 0.9996 | .    |

| STEP | VARIABLE | F         | PROB>F |
|------|----------|-----------|--------|
|      | ENTERED  | REMOVED   |        |
| 1    | Z1       | 1837.8954 | 0.0001 |
| 2    | Z2       | 5.2967    | 0.1480 |

-----SYS=B-52-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.98951441     | 0.98951441  | 10.54 | 0.0118 |
| ERROR      | 8  | 0.75101711     | 0.09387714  |       |        |
| TOTAL      | 9  | 1.74053152     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.66879195  |            |            |       |        |
| Z1        | -0.21690646 | 0.06680998 | 0.98951441 | 10.54 | 0.0118 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.5685  | 0.5685 | 0.22323 |

-----SYS=B-58-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

### C.3.2 - Fighter Aircraft Programs

-----SYS=A-10-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.20697599     | 0.20697599  | 8.93 | 0.0203 |
| ERROR      | 7  | 0.16217060     | 0.02316723  |      |        |
| TOTAL      | 8  | 0.36914658     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | 2.98062538  |            |            |      |        |
| Z2        | -0.18585056 | 0.06217860 | 0.20697599 | 8.93 | 0.0203 |

| STEP | VARIABLE ENTERED | REMOVED | NUMBER IN | PARTIAL R**2 | MODEL R**2 | C(P)     |
|------|------------------|---------|-----------|--------------|------------|----------|
| 1    | Z2               |         | 1         | 0.5607       | 0.5607     | -0.02786 |

-----SYS=F-100-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.51333658     | 0.51333658  | 95.15 | 0.0023 |
| ERROR      | 3  | 0.01618481     | 0.00539494  |       |        |
| TOTAL      | 4  | 0.52952138     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.18648143  |            |            |       |        |
| Z1        | -0.15830979 | 0.01622930 | 0.51333658 | 95.15 | 0.0023 |

| STEP | VARIABLE ENTERED | REMOVED | NUMBER IN | PARTIAL R**2 | MODEL R**2 | C(P) |
|------|------------------|---------|-----------|--------------|------------|------|
| 1    | Z1               |         | 1         | 0.9694       | 0.9694     | .    |

-----SYS=F-101-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.92472428     | 0.92472428  | 69.59 | 0.0011 |
| ERROR      | 4  | 0.05315185     | 0.01328796  |       |        |
| TOTAL      | 5  | 0.97787613     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.32628329  |            |            |       |        |
| Z1        | -0.25635237 | 0.03072985 | 0.92472428 | 69.59 | 0.0011 |

| STEP | VARIABLE ENTERED | REMOVED | NUMBER IN | PARTIAL R**2 | MODEL R**2 | C(P)     |
|------|------------------|---------|-----------|--------------|------------|----------|
| 1    | Z1               |         | 1         | 0.9456       | 0.9456     | -0.64188 |

-----SYS=F-102-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 3  | 1.49040707     | 0.49680236  | 99999.99 | 0.0001 |
| ERROR      | 0  | 0.00000000     | 0.00000000  |          |        |
| TOTAL      | 3  | 1.49040707     |             |          |        |

|           | B VALUE     | STD ERROR | TYPE II SS | F        | PROB>F |
|-----------|-------------|-----------|------------|----------|--------|
| INTERCEPT | 3.93259582  |           |            |          |        |
| Z1        | -0.34479395 | 0         | 0.04063607 | 99999.99 | 0.0001 |
| Z2        | -0.17351653 | 0         | 0.00109082 | 99999.99 | 0.0001 |
| Z4        | 0.00452538  | 0         | 0.00361762 | 99999.99 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 0.9792  | 0.9792 | .    |
| 2    | Z4       |         | 0.0201  | 0.9993 | .    |
| 3    | Z2       |         | 0.0007  | 1.0000 | .    |

| STEP | VARIABLE | F         | PROB>F |
|------|----------|-----------|--------|
|      | ENTERED  | REMOVED   |        |
| 1    | Z1       | 94.0561   | 0.0105 |
| 2    | Z4       | 27.4485   | 0.1201 |
| 3    | Z2       | 9999.9999 | 0.0001 |

-----SYS=F-106-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 1.19964727     | 1.19964727  | 30.66 | 0.0311 |
| ERROR      | 2  | 0.07824803     | 0.03912402  |       |        |
| TOTAL      | 3  | 1.27789530     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.79595764  |            |            |       |        |
| Z1        | -0.49884822 | 0.09008726 | 1.19964727 | 30.66 | 0.0311 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 0.9388  | 0.9388 | .    |

-----SYS=F-15A/B-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.15260233     | 0.15260233  | 146.05 | 0.0003 |
| ERROR      | 4  | 0.00417943     | 0.00104486  |        |        |
| TOTAL      | 5  | 0.15678176     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 3.52762254  |            |            |        |        |
| Z1        | -0.13148161 | 0.01087959 | 0.15260233 | 146.05 | 0.0003 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |          |
|------|----------|---------|---------|--------|----------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)     |
| 1    | Z1       |         | 0.9733  | 0.9733 | -0.25298 |

-----SYS=F-15CD-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 0.10028222     | 0.05014111  | 12.55 | 0.0112 |
| ERROR      | 5  | 0.01997148     | 0.00399430  |       |        |
| TOTAL      | 7  | 0.12025370     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.40658802  |            |            |       |        |
| Z2        | -0.38379314 | 0.07694411 | 0.09937655 | 24.88 | 0.0041 |
| Z3        | 0.04803014  | 0.01516091 | 0.04008825 | 10.04 | 0.0249 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   |         |
| 1    | Z2       |         | 0.5006  | 0.5006 | 8.43111 |
| 2    | Z3       |         | 0.3334  | 0.8339 | 2.13368 |

| STEP | VARIABLE | F       | PROB>F |
|------|----------|---------|--------|
|      | ENTERED  | REMOVED |        |
| 1    | Z2       | 6.0134  | 0.0496 |
| 2    | Z3       | 10.0364 | 0.0249 |

-----SYS=F-15E-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.03658110     | 0.03658110  | 14.86 | 0.0182 |
| ERROR      | 4  | 0.00984798     | 0.00246199  |       |        |
| TOTAL      | 5  | 0.04642908     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.74308354  |            |            |       |        |
| Z2        | -0.41938638 | 0.10880016 | 0.03658110 | 14.86 | 0.0182 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   |         |
| 1    | Z2       |         | 0.7879  | 0.7879 | 1.36436 |

-----SYS=F-16AB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.30339378     | 0.30339378  | 13.73 | 0.0341 |
| ERROR      | 3  | 0.06628231     | 0.02209410  |       |        |
| TOTAL      | 4  | 0.36967609     |             |       |        |

|           | B VALUE    | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|------------|------------|------------|-------|--------|
| INTERCEPT | 1.79323054 |            |            |       |        |
| Z3        | 0.11921293 | 0.03217053 | 0.30339378 | 13.73 | 0.0341 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  | C(P) |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   |      |
| 1    | Z3       |         | 0.8207  | 0.8207 | .    |



-----SYS=F-16E-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

### C.3.3 - Electronics Programs

-----SYS=ARC-109V-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.16857539     | 0.16857539  | 17.20 | 0.0255 |
| ERROR      | 3  | 0.02940906     | 0.00980302  |       |        |
| TOTAL      | 4  | 0.19798445     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -2.85965214 |            |            |       |        |
| Z2        | -0.13022074 | 0.03140241 | 0.16857539 | 17.20 | 0.0255 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z2       |         | 0.8515  | 0.8515 | .    |

-----SYS=ARC-54-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.11782452     | 0.11782452  | 69.37 | 0.0004 |
| ERROR      | 5  | 0.00849241     | 0.00169848  |       |        |
| TOTAL      | 6  | 0.12631693     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -3.18672110 |            |            |       |        |
| Z1        | -0.12274020 | 0.01473668 | 0.11782452 | 69.37 | 0.0004 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9328  | 0.9328 | 2.39221 |

-----SYS=ASN-63-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

-----SYS=ASN-70-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.02259868     | 0.02259868  | 8.17 | 0.0289 |
| ERROR      | 6  | 0.01660517     | 0.00276753  |      |        |
| TOTAL      | 7  | 0.03920385     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -3.14533001 |            |            |      |        |
| Z2        | -0.04210252 | 0.01473373 | 0.02259868 | 8.17 | 0.0289 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z2       |         | 1      | 0.5764  | 0.5764 | 1.63655 |

-----SYS=ASN-99-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 2  | 0.21690825     | 0.10845413  | 5.27 | 0.0588 |
| ERROR      | 5  | 0.10299453     | 0.02059891  |      |        |
| TOTAL      | 7  | 0.31990278     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -1.98281650 |            |            |      |        |
| Z2        | -0.22321542 | 0.07241846 | 0.19570144 | 9.50 | 0.0274 |
| Z3        | 0.02825718  | 0.01503053 | 0.07280366 | 3.53 | 0.1189 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z2       |         | 1      | 0.4505  | 0.4505 | 56.9445 |
| 2    | Z3       |         | 2      | 0.2276  | 0.6780 | 33.7055 |

| STEP | VARIABLE |         | F      | PROB>F |
|------|----------|---------|--------|--------|
|      | ENTERED  | REMOVED |        |        |
| 1    | Z2       |         | 4.9183 | 0.0684 |
| 2    | Z3       |         | 3.5343 | 0.1189 |

-----SYS=ASN-108-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.11931741     | 0.11931741  | 15.24 | 0.0298 |
| ERROR      | 3  | 0.02348470     | 0.00782823  |       |        |
| TOTAL      | 4  | 0.14280211     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -1.91448159 |            |            |       |        |
| Z1        | -0.09411975 | 0.02410798 | 0.11931741 | 15.24 | 0.0298 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |      |
|------|----------|---------|--------|---------|--------|------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 1      | 0.8355  | 0.8355 | .    |

-----SYS=ASQ-133-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.27102133     | 0.27102133  | 32.26 | 0.0047 |
| ERROR      | 4  | 0.03360165     | 0.00840041  |       |        |
| TOTAL      | 5  | 0.30462298     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -0.21450800 |            |            |       |        |
| Z1        | -0.15053337 | 0.02650217 | 0.27102133 | 32.26 | 0.0047 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.8897  | 0.8897 | 0.31390 |

-----SYS=ASW-32-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.21856871     | 0.21856871  | 5.03 | 0.0883 |
| ERROR      | 4  | 0.17379957     | 0.04344989  |      |        |
| TOTAL      | 5  | 0.39236828     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -1.32228292 |            |            |      |        |
| Z1        | -0.14043494 | 0.06261459 | 0.21856871 | 5.03 | 0.0883 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.5570  | 0.5570 | 28.0511 |

-----SYS=CP-1035N-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.06223814     | 0.06223814  | 7.41 | 0.0528 |
| ERROR      | 4  | 0.03358322     | 0.00839581  |      |        |
| TOTAL      | 5  | 0.09582136     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -2.01464817 |            |            |      |        |
| Z4        | -0.06480008 | 0.02380008 | 0.06223814 | 7.41 | 0.0528 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z4       |         | 1      | 0.6495  | 0.6495 | 1.19365 |

-----SYS=JTIDS-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 2  | 0.24213371     | 0.12106686  | 1102.71 | 0.0009 |
| ERROR      | 2  | 0.00021958     | 0.00010979  |         |        |
| TOTAL      | 4  | 0.24235329     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -0.21091901 |            |            |        |        |
| Z1        | -0.23180750 | 0.01130700 | 0.04614476 | 420.30 | 0.0024 |
| Z3        | -0.01665512 | 0.00645848 | 0.00073012 | 6.65   | 0.1232 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |      |
|------|----------|---------|--------|---------|--------|------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 1      | 0.9961  | 0.9961 | .    |
| 2    | Z3       |         | 2      | 0.0030  | 0.9991 | .    |

| STEP | VARIABLE |         | F        | PROB>F |
|------|----------|---------|----------|--------|
|      | ENTERED  | REMOVED |          |        |
| 1    | Z1       |         | 762.5651 | 0.0001 |
| 2    | Z3       |         | 6.6502   | 0.1232 |

-----SYS=LANNAV-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 1  | 0.40052225     | 0.40052225  | 40204.49 | 0.0001 |
| ERROR      | 5  | 0.00004981     | 0.00000996  |          |        |
| TOTAL      | 6  | 0.40057206     |             |          |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F        | PROB>F |
|-----------|-------------|------------|------------|----------|--------|
| INTERCEPT | 0.64554446  |            |            |          |        |
| Z1        | -0.12220077 | 0.00060945 | 0.40052225 | 40204.49 | 0.0001 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z1       |         | 1            | 0.9999          | 0.9999        | 303.121 |

-----SYS=LANTARP-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 2  | 0.32598915     | 0.16299457  | 97008.88 | 0.0001 |
| ERROR      | 4  | 0.00000672     | 0.00000168  |          |        |
| TOTAL      | 6  | 0.32599587     |             |          |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F        | PROB>F |
|-----------|-------------|------------|------------|----------|--------|
| INTERCEPT | 0.43874654  |            |            |          |        |
| Z1        | -0.10971994 | 0.00026818 | 0.28123695 | 99999.99 | 0.0001 |
| Z4        | 0.00008308  | 0.00000765 | 0.00019842 | 118.09   | 0.0004 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z1       |         | 1            | 0.9994          | 0.9994        | 209.118 |
| 2    | Z4       |         | 2            | 0.0006          | 1.0000        | 5.949   |

| STEP | VARIABLE |         | F         | PROB>F |
|------|----------|---------|-----------|--------|
|      | ENTERED  | REMOVED |           |        |
| 1    | Z1       |         | 7940.7559 | 0.0001 |
| 2    | Z4       |         | 118.0914  | 0.0004 |

-----SYS=LANTREC-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.14785176     | 0.14785176  | 758.78 | 0.0001 |
| ERROR      | 3  | 0.00058456     | 0.00019485  |        |        |
| TOTAL      | 4  | 0.14843632     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -0.34649331 |            |            |        |        |
| Z1        | -0.14556527 | 0.00528443 | 0.14785176 | 758.78 | 0.0001 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.9961          | 0.9961        | .    |

#### C.3.4 - Helicopter Programs

-----SYS=HH-52-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.13405924     | 0.13405924  | 189.77 | 0.0002 |
| ERROR      | 4  | 0.00282571     | 0.00070643  |        |        |
| TOTAL      | 5  | 0.13688495     |             |        |        |

|           | B VALUE    | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|------------|------------|------------|--------|--------|
| INTERCEPT | 0.03849064 |            |            |        |        |
| Z4        | 0.12447636 | 0.00903591 | 0.13405924 | 189.77 | 0.0002 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z4       |         | 1            | 0.9794          | 0.9794        | 54.1490 |

-----SYS=CH-46-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 1.26216747     | 0.63108374  | 75.38 | 0.0002 |
| ERROR      | 5  | 0.04186031     | 0.00837206  |       |        |
| TOTAL      | 7  | 1.30402778     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.91405691  |            |            |       |        |
| Z1        | -0.12800003 | 0.03385284 | 0.11969126 | 14.30 | 0.0129 |
| Z2        | -0.29649699 | 0.07233527 | 0.14066073 | 16.80 | 0.0094 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z2       |         | 1            | 0.8761          | 0.8761        | 8.24418 |
| 2    | Z1       |         | 2            | 0.0918          | 0.9679        | 1.17264 |

| STEP | VARIABLE |         | F       | PROB>F |
|------|----------|---------|---------|--------|
|      | ENTERED  | REMOVED |         |        |
| 1    | Z2       |         | 42.4314 | 0.0006 |
| 2    | Z1       |         | 14.2965 | 0.0129 |

-----SYS=H-53-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.36413891     | 0.36413891  | 56.37 | 0.0003 |
| ERROR      | 6  | 0.03876051     | 0.00646008  |       |        |
| TOTAL      | 7  | 0.40289942     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.07266030  |            |            |       |        |
| Z1        | -0.14183982 | 0.01889225 | 0.36413891 | 56.37 | 0.0003 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |          |
|------|----------|---------|---------|--------|----------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2     |
| 1    | Z1       |         | 1       | 0.9038 | 0.9038   |
|      |          |         |         |        | C(P)     |
|      |          |         |         |        | -0.85056 |

-----SYS=CH-47-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 0.95253232     | 0.47626616  | 43.60 | 0.0001 |
| ERROR      | 9  | 0.09832239     | 0.01092471  |       |        |
| TOTAL      | 11 | 1.05085471     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.68400939  |            |            |       |        |
| Z1        | -0.11827591 | 0.02135363 | 0.33516543 | 30.68 | 0.0004 |
| Z2        | -0.22206813 | 0.03636441 | 0.40740777 | 37.29 | 0.0002 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z2       |         | 1       | 0.5875 | 0.5875  |
| 2    | Z1       |         | 2       | 0.3189 | 0.9064  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 23.1105 |
|      |          |         |         |        | 1.0564  |

| STEP | VARIABLE | F       | PROB>F |
|------|----------|---------|--------|
|      | ENTERED  | REMOVED |        |
| 1    | Z2       | 14.2419 | 0.0036 |
| 2    | Z1       | 30.6796 | 0.0004 |

-----SYS=H-54-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.18000333     | 0.18000333  | 10.45 | 0.0481 |
| ERROR      | 3  | 0.05167528     | 0.01722509  |       |        |
| TOTAL      | 4  | 0.23167861     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.76204133  |            |            |       |        |
| Z1        | -0.15447484 | 0.04778574 | 0.18000333 | 10.45 | 0.0481 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |        |
|------|----------|---------|---------|--------|--------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2   |
| 1    | Z1       |         | 1       | 0.7770 | 0.7770 |
|      |          |         |         |        | C(P)   |
|      |          |         |         |        | .      |

-----SYS=HH-60D-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 3  | 0.07173034     | 0.02391011  | 99999.99 | 0.0001 |
| ERROR      | 0  | 0.00000000     | 0.00000000  |          |        |
| TOTAL      | 3  | 0.07173034     |             |          |        |

|           | B VALUE     | STD ERROR | TYPE II SS | F        | PROB>F |
|-----------|-------------|-----------|------------|----------|--------|
| INTERCEPT | 2.30518915  |           |            |          |        |
| Z1        | -0.05064461 | 0         | 0.00071690 | 99999.99 | 0.0001 |
| Z2        | -0.05886398 | 0         | 0.00040194 | 99999.99 | 0.0001 |
| Z3        | -0.00071212 | 0         | 0.00005455 | 99999.99 | 0.0001 |

| STEP    | VARIABLE | NUMBER | PARTIAL | MODEL  |      |
|---------|----------|--------|---------|--------|------|
| ENTERED | REMOVED  | IN     | R**2    | R**2   | C(P) |
| 1       | Z2       | 1      | 0.9785  | 0.9785 | .    |
| 2       | Z1       | 2      | 0.0207  | 0.9992 | .    |
| 3       | Z3       | 3      | 0.0008  | 1.0000 | .    |

| STEP    | VARIABLE | F         | PROB>F |
|---------|----------|-----------|--------|
| ENTERED | REMOVED  |           |        |
| 1       | Z2       | 91.1672   | 0.0108 |
| 2       | Z1       | 27.2272   | 0.1205 |
| 3       | Z3       | 9999.9999 | 0.0001 |

-----SYS=SH-3-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.32143167     | 0.32143167  | 24.60 | 0.0016 |
| ERROR      | 7  | 0.09147543     | 0.01306792  |       |        |
| TOTAL      | 8  | 0.41290709     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.49416647  |            |            |       |        |
| Z1        | -0.15806200 | 0.03187031 | 0.32143167 | 24.60 | 0.0016 |

| STEP    | VARIABLE | NUMBER | PARTIAL | MODEL  |         |
|---------|----------|--------|---------|--------|---------|
| ENTERED | REMOVED  | IN     | R**2    | R**2   | C(P)    |
| 1       | Z1       | 1      | 0.7785  | 0.7785 | 0.00725 |

### C.3.5 - Tactical Armament Programs

-----SYS=LLLGB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 0.71772163     | 0.71772163  | 3753.30 | 0.0001 |
| ERROR      | 8  | 0.00152979     | 0.00019122  |         |        |
| TOTAL      | 9  | 0.71925142     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | -2.51061063 |            |            |         |        |
| Z1        | -0.17034813 | 0.00278055 | 0.71772163 | 3753.30 | 0.0001 |

| STEP    | VARIABLE | NUMBER | PARTIAL | MODEL  |         |
|---------|----------|--------|---------|--------|---------|
| ENTERED | REMOVED  | IN     | R**2    | R**2   | C(P)    |
| 1       | Z1       | 1      | 0.9979  | 0.9979 | 1.11880 |

-----SYS=CEM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 2  | 2.36370132     | 1.18185066  | 181.11 | 0.0001 |
| ERROR      | 5  | 0.03262793     | 0.00652559  |        |        |
| TOTAL      | 7  | 2.39632925     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -1.09196351 |            |            |        |        |
| Z2        | -0.30591095 | 0.01679777 | 2.16424399 | 331.66 | 0.0001 |
| Z4        | -0.00083110 | 0.00032751 | 0.04202123 | 6.44   | 0.0520 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   |         |
| 1    | Z2       |         | 0.9688  | 0.9688 | 46.3232 |
| 2    | Z4       |         | 0.0175  | 0.9864 | 19.9954 |

| STEP | VARIABLE | F        | PROB>F |
|------|----------|----------|--------|
|      | ENTERED  | REMOVED  |        |
| 1    | Z2       | 186.6073 | 0.0001 |
| 2    | Z4       | 6.4395   | 0.0520 |

-----SYS=GBU-15-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.09760238     | 0.09760238  | 8.61 | 0.0219 |
| ERROR      | 7  | 0.07931718     | 0.01133103  |      |        |
| TOTAL      | 8  | 0.17691956     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -1.23612677 |            |            |      |        |
| Z2        | -0.10838260 | 0.03692870 | 0.09760238 | 8.61 | 0.0219 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   |         |
| 1    | Z2       |         | 0.5517  | 0.5517 | 1.41277 |

### C.3.6 - Tactical Missile Programs

-----SYS=AMRAAM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 3.86655114     | 3.86655114  | 7317.93 | 0.0001 |
| ERROR      | 8  | 0.00422694     | 0.00052837  |         |        |
| TOTAL      | 9  | 3.87077808     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 1.68243228  |            |            |         |        |
| Z1        | -0.35610306 | 0.00416276 | 3.86655114 | 7317.93 | 0.0001 |



| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)     |
|------|----------|---------|--------------|---------|--------|----------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |          |
| 1    | Z1       |         | 1            | 0.9989  | 0.9989 | -0.29569 |

-----SYS=HARM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 2  | 2.42845988     | 1.21422994  | 2171.92 | 0.0001 |
| ERROR      | 8  | 0.00447246     | 0.00055906  |         |        |
| TOTAL      | 10 | 2.43293234     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 0.93266880  |            |            |        |        |
| Z1        | -0.16383163 | 0.01057877 | 0.13408539 | 239.84 | 0.0001 |
| Z2        | -0.13846115 | 0.01818247 | 0.03241955 | 57.99  | 0.0001 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z1       |         | 1            | 0.9848  | 0.9848 | 47.7452 |
| 2    | Z2       |         | 2            | 0.0133  | 0.9982 | 1.6368  |

| STEP | VARIABLE | F        | PROB>F |
|------|----------|----------|--------|
| 1    | Z1       | 584.5267 | 0.0001 |
| 2    | Z2       | 57.9896  | 0.0001 |

-----SYS=IIR-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 3  | 2.66682132     | 0.88894044  | 128.98 | 0.0001 |
| ERROR      | 5  | 0.03446049     | 0.00689210  |        |        |
| TOTAL      | 8  | 2.70128181     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 0.43571126  |            |            |       |        |
| Z1        | -0.19118490 | 0.05684627 | 0.07795690 | 11.31 | 0.0200 |
| Z2        | -0.14216161 | 0.08340168 | 0.02002472 | 2.91  | 0.1490 |
| Z3        | -0.01186183 | 0.00471809 | 0.04356345 | 6.32  | 0.0536 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z2       |         | 1            | 0.9569  | 0.9569 | 11.2343 |
| 2    | Z1       |         | 2            | 0.0142  | 0.9711 | 7.8888  |
| 3    | Z3       |         | 3            | 0.0161  | 0.9872 | 3.8092  |

| STEP | VARIABLE | F        | PROB>F |
|------|----------|----------|--------|
| 1    | Z2       | 155.5503 | 0.0001 |
| 2    | Z1       | 2.9455   | 0.1369 |
| 3    | Z3       | 6.3208   | 0.0536 |

| -----SYS=AIM7F-R----- |             |                |             |          |        |         |
|-----------------------|-------------|----------------|-------------|----------|--------|---------|
|                       | DF          | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |         |
| REGRESSION            | 3           | 3.46681704     | 1.15560568  | 571.32   | 0.0001 |         |
| ERROR                 | 4           | 0.00809078     | 0.00202270  |          |        |         |
| TOTAL                 | 7           | 3.47490783     |             |          |        |         |
|                       | B VALUE     | STD ERROR      | TYPE II SS  | F        | PROB>F |         |
| INTERCEPT             | 1.69969019  |                |             |          |        |         |
| Z1                    | -0.31468519 | 0.03890963     | 0.13230278  | 65.41    | 0.0013 |         |
| Z2                    | -0.18254365 | 0.07192420     | 0.01302909  | 6.44     | 0.0641 |         |
| Z4                    | -0.00583438 | 0.00320354     | 0.00670905  | 3.32     | 0.1427 |         |
| STEP                  | VARIABLE    |                | NUMBER      | PARTIAL  | MODEL  |         |
|                       | ENTERED     | REMOVED        | IN          | R**2     | R**2   | C(P)    |
| 1                     | Z1          |                | 1           | 0.9902   | 0.9902 | 8.68830 |
| 2                     | Z2          |                | 2           | 0.0056   | 0.9957 | 3.50675 |
| 3                     | Z4          |                | 3           | 0.0019   | 0.9977 | 3.01043 |
| STEP                  | VARIABLE    |                |             | F        | PROB>F |         |
|                       | ENTERED     | REMOVED        |             |          |        |         |
| 1                     | Z1          |                |             | 605.4055 | 0.0001 |         |
| 2                     | Z2          |                |             | 6.5207   | 0.0510 |         |
| 3                     | Z4          |                |             | 3.3169   | 0.1427 |         |

| -----SYS=AIM7F-GD----- |             |                |             |         |        |         |
|------------------------|-------------|----------------|-------------|---------|--------|---------|
|                        | DF          | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |         |
| REGRESSION             | 1           | 4.95424289     | 4.95424289  | 237.69  | 0.0001 |         |
| ERROR                  | 4           | 0.08337301     | 0.02084325  |         |        |         |
| TOTAL                  | 5           | 5.03761591     |             |         |        |         |
|                        | B VALUE     | STD ERROR      | TYPE II SS  | F       | PROB>F |         |
| INTERCEPT              | 1.04508899  |                |             |         |        |         |
| Z1                     | -0.46191702 | 0.02996112     | 4.95424289  | 237.69  | 0.0001 |         |
| STEP                   | VARIABLE    |                | NUMBER      | PARTIAL | MODEL  |         |
|                        | ENTERED     | REMOVED        | IN          | R**2    | R**2   | C(P)    |
| 1                      | Z1          |                | 1           | 0.9834  | 0.9834 | 0.32703 |

#### C.4 - Modified Alternative Two Stepwise Regression

This section contains the summary results produced by the stepwise regression procedure in SAS. The SAS program used to produce this run was discussed in Appendix B.4.

#### C.4.1 - Bomber Aircraft Programs

-----SYS=B-1B-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 1.47808272     | 1.47808272  | 1837.90 | 0.0001 |
| ERROR      | 3  | 0.00241268     | 0.00080423  |         |        |
| TOTAL      | 4  | 1.48049540     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 6.06180789  |            |            |         |        |
| Z1        | -0.31029881 | 0.00723802 | 1.47808272 | 1837.90 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 0.9984  | 0.9984 | .    |

-----SYS=B-52-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.98951441     | 0.98951441  | 10.54 | 0.0118 |
| ERROR      | 8  | 0.75101711     | 0.09387714  |       |        |
| TOTAL      | 9  | 1.74053152     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.66879195  |            |            |       |        |
| Z1        | -0.21690646 | 0.06680998 | 0.98951441 | 10.54 | 0.0118 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |          |
|------|----------|---------|---------|--------|----------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)     |
| 1    | Z1       |         | 0.5685  | 0.5685 | -1.49368 |

-----SYS=B-58-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

#### C.4.2 - Fighter Aircraft Programs

-----SYS=A-10-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.18748236     | 0.18748236  | 7.22 | 0.0312 |
| ERROR      | 7  | 0.18166422     | 0.02595203  |      |        |
| TOTAL      | 8  | 0.36914658     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | 2.41566916  |            |            |      |        |
| Z2        | -0.00043912 | 0.00016338 | 0.18748236 | 7.22 | 0.0312 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |          |
|------|----------|---------|--------|---------|--------|----------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)     |
| 1    | Z2       |         | 1      | 0.5079  | 0.5079 | -1.47809 |

-----SYS=F-100-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.51333658     | 0.51333658  | 95.15 | 0.0023 |
| ERROR      | 3  | 0.01618481     | 0.00539494  |       |        |
| TOTAL      | 4  | 0.52952138     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.18648143  |            |            |       |        |
| Z1        | -0.15830979 | 0.01622930 | 0.51333658 | 95.15 | 0.0023 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |      |
|------|----------|---------|--------|---------|--------|------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 1      | 0.9694  | 0.9694 | .    |

-----SYS=F-101-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.92472428     | 0.92472428  | 69.59 | 0.0011 |
| ERROR      | 4  | 0.05315185     | 0.01328796  |       |        |
| TOTAL      | 5  | 0.97787613     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.32628329  |            |            |       |        |
| Z1        | -0.25635237 | 0.03072985 | 0.92472428 | 69.59 | 0.0011 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |      |
|------|----------|---------|--------|---------|--------|------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 1      | 0.9456  | 0.9456 | .    |

-----SYS=F-102-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 3  | 1.49040707     | 0.49680236  | 99999.99 | 0.0001 |
| ERROR      | 0  | 0.00000000     | 0.00000000  |          |        |
| TOTAL      | 3  | 1.49040707     |             |          |        |

|           | B VALUE     | STD ERROR | TYPE II SS | F        | PROB>F |
|-----------|-------------|-----------|------------|----------|--------|
| INTERCEPT | 3.48150418  |           |            |          |        |
| Z1        | -0.40736132 | 0         | 0.81537812 | 99999.99 | 0.0001 |
| Z3        | 0.00000014  | 0         | 0.00511276 | 99999.99 | 0.0001 |
| Z4        | -0.00095772 | 0         | 0.00006041 | 99999.99 | 0.0001 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |      |
|------|----------|---------|--------|---------|--------|------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 1      | 0.9792  | 0.9792 | .    |
| 2    | Z3       |         | 2      | 0.0208  | 1.0000 | .    |
| 3    | Z4       |         | 3      | 0.0000  | 1.0000 | .    |

| STEP | VARIABLE |         | F         | PROB>F |
|------|----------|---------|-----------|--------|
|      | ENTERED  | REMOVED |           |        |
| 1    | Z1       |         | 94.0561   | 0.0105 |
| 2    | Z3       |         | 512.6888  | 0.0281 |
| 3    | Z4       |         | 9999.9999 | 0.0001 |

-----SYS=F-106-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 1.19964727     | 1.19964727  | 30.66 | 0.0311 |
| ERROR      | 2  | 0.07824803     | 0.03912402  |       |        |
| TOTAL      | 3  | 1.27789530     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.79595764  |            |            |       |        |
| Z1        | -0.49884822 | 0.09008726 | 1.19964727 | 30.66 | 0.0311 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.9388          | 0.9388        | .    |

-----SYS=F-15AB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.15260233     | 0.15260233  | 146.05 | 0.0003 |
| ERROR      | 4  | 0.00417943     | 0.00104486  |        |        |
| TOTAL      | 5  | 0.15678176     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 3.52762254  |            |            |        |        |
| Z1        | -0.13148161 | 0.01087959 | 0.15260233 | 146.05 | 0.0003 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.9733          | 0.9733        | .    |

-----SYS=F-15CD-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 4  | 0.11878998     | 0.02969750  | 60.87 | 0.0033 |
| ERROR      | 3  | 0.00146372     | 0.00048791  |       |        |
| TOTAL      | 7  | 0.12025370     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 0.58701319  |            |            |       |        |
| Z1        | 0.62615186  | 0.06423618 | 0.04635932 | 95.02 | 0.0023 |
| Z2        | -0.00858822 | 0.00105195 | 0.03252027 | 66.65 | 0.0038 |
| Z3        | 0.00007899  | 0.00001050 | 0.02758857 | 56.54 | 0.0049 |
| Z5        | 0.11367418  | 0.01626840 | 0.02382162 | 48.82 | 0.0060 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z2       |         | 1            | 0.5476          | 0.5476        | 72.2996 |
| 2    | Z4       |         | 2            | 0.1826          | 0.7302        | 43.4975 |
| 3    | Z1       |         | 3            | 0.1286          | 0.8589        | 23.8057 |
| 4    | Z3       |         | 4            | 0.0908          | 0.9496        | 10.4951 |
| 5    | Z5       |         | 5            | 0.0385          | 0.9881        | 6.0000  |
| 6    |          | Z4      | 4            | 0.0003          | 0.9878        | 4.0530  |

| STEP | VARIABLE |         | F      | PROB>F |
|------|----------|---------|--------|--------|
|      | ENTERED  | REMOVED |        |        |
| 1    | Z2       |         | 7.2632 | 0.0358 |
| 2    | Z4       |         | 3.3850 | 0.1252 |
| 3    | Z1       |         | 3.6448 | 0.1289 |
| 4    | Z3       |         | 5.4068 | 0.1026 |
| 5    | Z5       |         | 6.4951 | 0.1256 |
| 6    |          | Z4      | 0.0530 | 0.8394 |

-----SYS=F-15E-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.03589868     | 0.03589868  | 13.64 | 0.0210 |
| ERROR      | 4  | 0.01053040     | 0.00263260  |       |        |
| TOTAL      | 5  | 0.04642908     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.06410108  |            |            |       |        |
| Z3        | -0.00000446 | 0.00000121 | 0.03589868 | 13.64 | 0.0210 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z3       |         | 1            | 0.7732          | 0.7732        | 1.59749 |

-----SYS=F-16AB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.29665823     | 0.29665823  | 12.19 | 0.0397 |
| ERROR      | 3  | 0.07301787     | 0.02433929  |       |        |
| TOTAL      | 4  | 0.36967609     |             |       |        |

|           | B VALUE    | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|------------|------------|------------|-------|--------|
| INTERCEPT | 1.81923894 |            |            |       |        |
| Z4        | 0.12764470 | 0.03656188 | 0.29665823 | 12.19 | 0.0397 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z4       |         | 1            | 0.8025          | 0.8025        | .    |

-----SYS=F-16E-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

### C.4.3 - Electronics Programs

-----SYS=ARC-109V-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.16351455     | 0.16351455  | 14.23 | 0.0326 |
| ERROR      | 3  | 0.03446990     | 0.01148997  |       |        |
| TOTAL      | 4  | 0.19798445     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -2.99345507 |            |            |       |        |
| Z1        | -0.09510960 | 0.02521190 | 0.16351455 | 14.23 | 0.0326 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 0.8259  | 0.8259 | .    |

-----SYS=ARC-54-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.11782452     | 0.11782452  | 69.37 | 0.0004 |
| ERROR      | 5  | 0.00849241     | 0.00169848  |       |        |
| TOTAL      | 6  | 0.12631693     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -3.18672110 |            |            |       |        |
| Z1        | -0.12274020 | 0.01473668 | 0.11782452 | 69.37 | 0.0004 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9328  | 0.9328 | 98.0531 |

-----SYS=ASN-63-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

-----SYS=ASN-70-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 2  | 0.02702549     | 0.01351275  | 5.55 | 0.0538 |
| ERROR      | 5  | 0.01217836     | 0.00243567  |      |        |
| TOTAL      | 7  | 0.03920385     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -3.20442829 |            |            |      |        |
| Z2        | -0.00046417 | 0.00015919 | 0.02070889 | 8.50 | 0.0332 |
| Z3        | 0.00000146  | 0.00000061 | 0.01411101 | 5.79 | 0.0611 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z2       |         | 1            | 0.3294          | 0.3294        | 18.1826 |
| 2    | Z3       |         | 2            | 0.3599          | 0.6894        | 8.2759  |

| STEP | VARIABLE |         | F      | PROB>F |
|------|----------|---------|--------|--------|
|      | ENTERED  | REMOVED |        |        |
| 1    | Z2       |         | 2.9475 | 0.1368 |
| 2    | Z3       |         | 5.7935 | 0.0611 |

-----SYS=ASN-99-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 2  | 0.24600823     | 0.12300412  | 8.32 | 0.0256 |
| ERROR      | 5  | 0.07389455     | 0.01477891  |      |        |
| TOTAL      | 7  | 0.31990278     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -3.44823854 |            |            |      |        |
| Z1        | 0.10330948  | 0.04664951 | 0.07248174 | 4.90 | 0.0777 |
| Z3        | -0.00000112 | 0.00000036 | 0.14281158 | 9.66 | 0.0266 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z3       |         | 1            | 0.5424          | 0.5424        | 17.2355 |
| 2    | Z1       |         | 2            | 0.2266          | 0.7690        | 8.7202  |

| STEP | VARIABLE |         | F      | PROB>F |
|------|----------|---------|--------|--------|
|      | ENTERED  | REMOVED |        |        |
| 1    | Z3       |         | 7.1129 | 0.0372 |
| 2    | Z1       |         | 4.9044 | 0.0777 |

-----SYS=ASN-108-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.11931741     | 0.11931741  | 15.24 | 0.0298 |
| ERROR      | 3  | 0.02348470     | 0.00782823  |       |        |
| TOTAL      | 4  | 0.14280211     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -1.91448159 |            |            |       |        |
| Z1        | -0.09411975 | 0.02410798 | 0.11931741 | 15.24 | 0.0298 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.8355          | 0.8355        | .    |

-----SYS=ASQ-133-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 0.29373628     | 0.14686814  | 40.47 | 0.0068 |
| ERROR      | 3  | 0.01088670     | 0.00362890  |       |        |
| TOTAL      | 5  | 0.30462298     |             |       |        |



|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -0.41860430 |            |            |       |        |
| Z2        | -0.00317744 | 0.00084376 | 0.05146323 | 14.18 | 0.0328 |
| Z3        | 0.00002187  | 0.00001040 | 0.01605538 | 4.42  | 0.1262 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z2       |         | 1            | 0.9116          | 0.9116        | .    |
| 2    | Z3       |         | 2            | 0.0527          | 0.9643        | .    |

| STEP | VARIABLE |         | F       | PROB>F |
|------|----------|---------|---------|--------|
|      | ENTERED  | REMOVED |         |        |
| 1    | Z2       |         | 41.2264 | 0.0030 |
| 2    | Z3       |         | 4.4243  | 0.1262 |

-----SYS=ASW-32-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.21856871     | 0.21856871  | 5.03 | 0.0883 |
| ERROR      | 4  | 0.17379957     | 0.04344989  |      |        |
| TOTAL      | 5  | 0.39236828     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -1.32228292 |            |            |      |        |
| Z1        | -0.14043494 | 0.06261459 | 0.21856871 | 5.03 | 0.0883 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.5570          | 0.5570        | .    |

-----SYS=CP-1035N-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.06927195     | 0.06927195  | 10.44 | 0.0320 |
| ERROR      | 4  | 0.02654941     | 0.00663735  |       |        |
| TOTAL      | 5  | 0.09582136     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -2.01397140 |            |            |       |        |
| Z5        | -0.06879717 | 0.02129557 | 0.06927195 | 10.44 | 0.0320 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z5       |         | 1            | 0.7229          | 0.7229        | .    |

-----SYS=JTIDS-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 2  | 0.24224975     | 0.12112488  | 2339.67 | 0.0004 |
| ERROR      | 2  | 0.00010354     | 0.00005177  |         |        |
| TOTAL      | 4  | 0.24235329     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | -0.26033430 |            |            |         |        |
| Z1        | -0.22281625 | 0.00534897 | 0.08983223 | 1735.21 | 0.0006 |
| Z4        | -0.01362598 | 0.00337039 | 0.00084616 | 16.34   | 0.0561 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 0.9961  | 0.9961 | .    |
| 2    | Z4       |         | 0.0035  | 0.9996 | .    |

| STEP | VARIABLE | F        | PROB>F |
|------|----------|----------|--------|
|      | ENTERED  | REMOVED  |        |
| 1    | Z1       | 762.5651 | 0.0001 |
| 2    | Z4       | 16.3446  | 0.0561 |

-----SYS=LANNAV-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 2  | 0.40055971     | 0.20027985  | 64829.71 | 0.0001 |
| ERROR      | 4  | 0.00001236     | 0.00000309  |          |        |
| TOTAL      | 6  | 0.40057206     |             |          |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F        | PROB>F |
|-----------|-------------|------------|------------|----------|--------|
| INTERCEPT | 0.64140172  |            |            |          |        |
| Z1        | -0.11867768 | 0.00106724 | 0.03820152 | 12365.66 | 0.0001 |
| Z2        | -0.00002120 | 0.00000609 | 0.00003745 | 12.12    | 0.0253 |

| STEP | VARIABLE | NUMBER  | R**2   | R**2   | C(P)    |
|------|----------|---------|--------|--------|---------|
|      | ENTERED  | REMOVED |        |        |         |
| 1    | Z1       |         | 0.9999 | 0.9999 | 122.687 |
| 2    | Z2       |         | 0.0001 | 1.0000 | 30.181  |

| STEP | VARIABLE | F         | PROB>F |
|------|----------|-----------|--------|
|      | ENTERED  | REMOVED   |        |
| 1    | Z1       | 9999.9999 | 0.0001 |
| 2    | Z2       | 12.1235   | 0.0253 |

-----SYS=LANTARP-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 2  | 0.32598975     | 0.16299487  | 99999.99 | 0.0001 |
| ERROR      | 4  | 0.00000612     | 0.00000153  |          |        |
| TOTAL      | 6  | 0.32599587     |             |          |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F        | PROB>F |
|-----------|-------------|------------|------------|----------|--------|
| INTERCEPT | 0.43874661  |            |            |          |        |
| Z1        | -0.10972822 | 0.00025555 | 0.28193572 | 99999.99 | 0.0001 |
| Z5        | 0.00009616  | 0.00000843 | 0.00019902 | 130.15   | 0.0003 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9994  | 0.9994 | 71.8489 |
| 2    | Z5       |         | 0.0006  | 1.0000 | 1.2318  |

|      |  | VARIABLE |         | F         | PROB>F |
|------|--|----------|---------|-----------|--------|
| STEP |  | ENTERED  | REMOVED |           |        |
| 1    |  | Z1       |         | 7940.7559 | 0.0001 |
| 2    |  | Z5       |         | 130.1470  | 0.0003 |

-----SYS=LANTREC-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.14785176     | 0.14785176  | 758.78 | 0.0001 |
| ERROR      | 3  | 0.00058456     | 0.00019485  |        |        |
| TOTAL      | 4  | 0.14843632     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -0.34649331 |            |            |        |        |
| Z1        | -0.14556527 | 0.00528443 | 0.14785176 | 758.78 | 0.0001 |

|      |  | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P) |
|------|--|----------|---------|--------|---------|--------|------|
| STEP |  | ENTERED  | REMOVED | IN     | R**2    | R**2   |      |
| 1    |  | Z1       |         | 1      | 0.9961  | 0.9961 | .    |

#### C.4.4 - Helicopter Programs

-----SYS=HH-52-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 2  | 0.13622601     | 0.06811300  | 310.10 | 0.0003 |
| ERROR      | 3  | 0.00065894     | 0.00021965  |        |        |
| TOTAL      | 5  | 0.13688495     |             |        |        |

|           | B VALUE    | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|------------|------------|------------|--------|--------|
| INTERCEPT | 0.04459178 |            |            |        |        |
| Z4        | 0.03816879 | 0.00639070 | 0.00783511 | 35.67  | 0.0094 |
| Z5        | 0.14651552 | 0.00984815 | 0.04861639 | 221.34 | 0.0007 |

|      |  | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P) |
|------|--|----------|---------|--------|---------|--------|------|
| STEP |  | ENTERED  | REMOVED | IN     | R**2    | R**2   |      |
| 1    |  | Z5       |         | 1      | 0.9379  | 0.9379 | .    |
| 2    |  | Z4       |         | 2      | 0.0572  | 0.9952 | .    |

|      |  | VARIABLE |         | F       | PROB>F |
|------|--|----------|---------|---------|--------|
| STEP |  | ENTERED  | REMOVED |         |        |
| 1    |  | Z5       |         | 60.4616 | 0.0015 |
| 2    |  | Z4       |         | 35.6714 | 0.0094 |

-----SYS=CH-46-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 1.22477069     | 0.61238534  | 38.63 | 0.0009 |
| ERROR      | 5  | 0.07925709     | 0.01585142  |       |        |
| TOTAL      | 7  | 1.30402778     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.42191179  |            |            |       |        |
| Z1        | -0.26636196 | 0.03039306 | 1.21748489 | 76.81 | 0.0003 |
| Z4        | -0.03434631 | 0.01345674 | 0.10326394 | 6.51  | 0.0511 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       | 1       | 0.8600  | 0.8600 | 2.80764 |
| 2    | Z4       | 2       | 0.0792  | 0.9392 | 0.95612 |

| STEP | VARIABLE | F       | PROB>F |
|------|----------|---------|--------|
|      | ENTERED  | REMOVED |        |
| 1    | Z1       | 36.8672 | 0.0009 |
| 2    | Z4       | 6.5145  | 0.0511 |

-----SYS=H-53-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.36413891     | 0.36413891  | 56.37 | 0.0003 |
| ERROR      | 6  | 0.03876051     | 0.00646008  |       |        |
| TOTAL      | 7  | 0.40289942     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.07266030  |            |            |       |        |
| Z1        | -0.14183982 | 0.01889225 | 0.36413891 | 56.37 | 0.0003 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |          |
|------|----------|---------|---------|--------|----------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)     |
| 1    | Z1       | 1       | 0.9038  | 0.9038 | -0.67396 |

-----SYS=CH-47-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 3  | 0.94598510     | 0.31532837  | 24.05 | 0.0002 |
| ERROR      | 8  | 0.10486961     | 0.01310870  |       |        |
| TOTAL      | 11 | 1.05085471     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.98150621  |            |            |       |        |
| Z1        | -0.07590720 | 0.02686504 | 0.10465273 | 7.98  | 0.0223 |
| Z2        | -0.00176284 | 0.00051800 | 0.15182170 | 11.58 | 0.0093 |
| Z3        | 0.00000688  | 0.00000302 | 0.06788950 | 5.18  | 0.0524 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z2       | 1       | 0.6285  | 0.6285 | 15.0366 |
| 2    | Z1       | 2       | 0.2071  | 0.8356 | 4.1956  |
| 3    | Z3       | 3       | 0.0646  | 0.9002 | 2.1890  |

| STEP | VARIABLE |         | F       | PROB>F |
|------|----------|---------|---------|--------|
|      | ENTERED  | REMOVED |         |        |
| 1    | Z2       |         | 16.9213 | 0.0021 |
| 2    | Z1       |         | 11.3352 | 0.0083 |
| 3    | Z3       |         | 5.1790  | 0.0524 |

-----SYS=H-54-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.18000333     | 0.18000333  | 10.45 | 0.0481 |
| ERROR      | 3  | 0.05167528     | 0.01722509  |       |        |
| TOTAL      | 4  | 0.23167861     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.76204133  |            |            |       |        |
| Z1        | -0.15447484 | 0.04778574 | 0.18000333 | 10.45 | 0.0481 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.7770          | 0.7770        | .    |

-----SYS=HH-60D-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.06912153     | 0.06912153  | 52.99 | 0.0184 |
| ERROR      | 2  | 0.00260882     | 0.00130441  |       |        |
| TOTAL      | 3  | 0.07173034     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.23770674  |            |            |       |        |
| Z1        | -0.08690880 | 0.01193889 | 0.06912153 | 52.99 | 0.0184 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P) |
|------|----------|---------|--------------|-----------------|---------------|------|
|      | ENTERED  | REMOVED |              |                 |               |      |
| 1    | Z1       |         | 1            | 0.9636          | 0.9636        | .    |

-----SYS=SH-3-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.32143167     | 0.32143167  | 24.60 | 0.0016 |
| ERROR      | 7  | 0.09147543     | 0.01306792  |       |        |
| TOTAL      | 8  | 0.41290709     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.49416647  |            |            |       |        |
| Z1        | -0.15806200 | 0.03187031 | 0.32143167 | 24.60 | 0.0016 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z1       |         | 1            | 0.7785          | 0.7785        | 5.71821 |

# C.4.5 - Tactical Armament Programs

-----SYS=LLLGB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 0.71772163     | 0.71772163  | 3753.30 | 0.0001 |
| ERROR      | 8  | 0.00152979     | 0.00019122  |         |        |
| TOTAL      | 9  | 0.71925142     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | -2.51061063 |            |            |         |        |
| Z1        | -0.17034813 | 0.00278055 | 0.71772163 | 3753.30 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9979  | 0.9979 | 2.88405 |

-----SYS=CEM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 2  | 2.38507851     | 1.19253926  | 529.98 | 0.0001 |
| ERROR      | 5  | 0.01125073     | 0.00225015  |        |        |
| TOTAL      | 7  | 2.39632925     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -1.72144379 |            |            |        |        |
| Z1        | -0.22764557 | 0.00726387 | 2.21000293 | 982.16 | 0.0001 |
| Z4        | -0.00687050 | 0.00125462 | 0.06747828 | 29.99  | 0.0028 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9671  | 0.9671 | 86.1819 |
| 2    | Z4       |         | 0.0282  | 0.9953 | 10.8874 |

| STEP | VARIABLE | F        | PROB>F |
|------|----------|----------|--------|
|      | ENTERED  | REMOVED  |        |
| 1    | Z1       | 176.6261 | 0.0001 |
| 2    | Z4       | 29.9884  | 0.0028 |

-----SYS=GBU-15-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 0.15959725     | 0.07979863  | 27.64 | 0.0009 |
| ERROR      | 6  | 0.01732231     | 0.00288705  |       |        |
| TOTAL      | 8  | 0.17691956     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -1.54399316 |            |            |       |        |
| Z2        | -0.00037584 | 0.00005466 | 0.13651261 | 47.28 | 0.0005 |
| Z3        | 0.00000051  | 0.00000008 | 0.11268652 | 39.03 | 0.0008 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED |        | R**2    | R**2   |         |
| 1    | Z1       |         | 1      | 0.5313  | 0.5313 | 19.3822 |
| 2    | Z3       |         | 2      | 0.2023  | 0.7336 | 10.8608 |
| 3    | Z2       |         | 3      | 0.1725  | 0.9060 | 3.8875  |
| 4    |          | Z1      | 2      | 0.0040  | 0.9021 | 2.0935  |

| STEP | VARIABLE |         | F      | PROB>F |
|------|----------|---------|--------|--------|
|      | ENTERED  | REMOVED |        |        |
| 1    | Z1       |         | 7.9351 | 0.0259 |
| 2    | Z3       |         | 4.5544 | 0.0768 |
| 3    | Z2       |         | 9.1799 | 0.0291 |
| 4    |          | Z1      | 0.2107 | 0.6655 |

#### C.4.6 - Tactical Missile Programs

-----SYS=AMRAAM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 3.86655114     | 3.86655114  | 7317.93 | 0.0001 |
| ERROR      | 8  | 0.00422694     | 0.00052837  |         |        |
| TOTAL      | 9  | 3.87077808     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 1.68243228  |            |            |         |        |
| Z1        | -0.35610306 | 0.00416276 | 3.86655114 | 7317.93 | 0.0001 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P)     |
|------|----------|---------|--------|---------|--------|----------|
|      | ENTERED  | REMOVED |        | R**2    | R**2   |          |
| 1    | Z1       |         | 1      | 0.9989  | 0.9989 | -0.08448 |

-----SYS=HARM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 3  | 2.42365888     | 0.80788629  | 609.83 | 0.0001 |
| ERROR      | 7  | 0.00927346     | 0.00132478  |        |        |
| TOTAL      | 10 | 2.43293234     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 0.66544704  |            |            |         |        |
| Z1        | -0.25136139 | 0.00654520 | 1.95386405 | 1474.86 | 0.0001 |
| Z4        | -0.01712223 | 0.00377179 | 0.02730046 | 20.61   | 0.0027 |
| Z5        | 0.00726288  | 0.00249397 | 0.01123516 | 8.48    | 0.0226 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED |        | R**2    | R**2   |         |
| 1    | Z1       |         | 1      | 0.9848  | 0.9848 | 67.2061 |
| 2    | Z4       |         | 2      | 0.0067  | 0.9916 | 36.2519 |
| 3    | Z5       |         | 3      | 0.0046  | 0.9962 | 15.6530 |

|      |  | VARIABLE |         | F        | PROB>F |
|------|--|----------|---------|----------|--------|
| STEP |  | ENTERED  | REMOVED |          |        |
| 1    |  | Z1       |         | 584.5267 | 0.0001 |
| 2    |  | Z4       |         | 6.3908   | 0.0354 |
| 3    |  | Z5       |         | 8.4808   | 0.0226 |

-----SYS=IIR-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 3  | 2.67262986     | 0.89087662  | 155.47 | 0.0001 |
| ERROR      | 5  | 0.02865195     | 0.00573039  |        |        |
| TOTAL      | 8  | 2.70128181     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 0.11061786  |            |            |        |        |
| Z1        | -0.28493477 | 0.01447628 | 2.22004327 | 387.42 | 0.0001 |
| Z4        | -0.02671880 | 0.00716121 | 0.07977098 | 13.92  | 0.0136 |
| Z5        | 0.00404648  | 0.00218778 | 0.01960351 | 3.42   | 0.1236 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.9474  | 0.9474 | 13.7801 |
| 2    | Z4       |         | 2      | 0.0348  | 0.9821 | 3.3729  |
| 3    | Z5       |         | 3      | 0.0073  | 0.9894 | 2.7839  |

|      |  | VARIABLE |         | F        | PROB>F |
|------|--|----------|---------|----------|--------|
| STEP |  | ENTERED  | REMOVED |          |        |
| 1    |  | Z1       |         | 125.9713 | 0.0001 |
| 2    |  | Z4       |         | 11.6813  | 0.0142 |
| 3    |  | Z5       |         | 3.4210   | 0.1236 |

-----SYS=AIM7F-R-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 2  | 3.45875409     | 1.72937705  | 535.29 | 0.0001 |
| ERROR      | 5  | 0.01615374     | 0.00323075  |        |        |
| TOTAL      | 7  | 3.47490783     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 1.23402235  |            |            |        |        |
| Z1        | -0.41251857 | 0.01376895 | 2.89993692 | 897.61 | 0.0001 |
| Z4        | -0.01447367 | 0.00614091 | 0.01794711 | 5.56   | 0.0650 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.9902  | 0.9902 | 1073.29 |
| 2    | Z4       |         | 2      | 0.0052  | 0.9954 | 508.32  |

|      |  | VARIABLE |         | F        | PROB>F |
|------|--|----------|---------|----------|--------|
| STEP |  | ENTERED  | REMOVED |          |        |
| 1    |  | Z1       |         | 605.4055 | 0.0001 |
| 2    |  | Z4       |         | 5.5551   | 0.0650 |



-----SYS=AIM7F-GD-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 4.95424289     | 4.95424289  | 237.69 | 0.0001 |
| ERROR      | 4  | 0.08337301     | 0.02084325  |        |        |
| TOTAL      | 5  | 5.03761591     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 1.04508899  |            |            |        |        |
| Z1        | -0.46191702 | 0.02996112 | 4.95424289 | 237.69 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 0.9834  | 0.9834 | .    |

### C.5 - Modified Alternative Three Stepwise Regression

This section contains the summary results produced by the stepwise regression procedure in SAS. The SAS program used to produce this run was discussed in Appendix B.5.

#### C.5.1 - Bomber Aircraft Programs

-----SYS=B-1B-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 1.47808272     | 1.47808272  | 1837.90 | 0.0001 |
| ERROR      | 3  | 0.00241268     | 0.00080423  |         |        |
| TOTAL      | 4  | 1.48049540     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 6.06180789  |            |            |         |        |
| Z1        | -0.31029881 | 0.00723802 | 1.47808272 | 1837.90 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9984  | 0.9984 | 1.83156 |

-----SYS=B-52-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.98951441     | 0.98951441  | 10.54 | 0.0118 |
| ERROR      | 8  | 0.75101711     | 0.09387714  |       |        |
| TOTAL      | 9  | 1.74053152     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.66879195  |            |            |       |        |
| Z1        | -0.21690646 | 0.06680998 | 0.98951441 | 10.54 | 0.0118 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z1       |         | 1            | 0.5685  | 0.5685 | 0.54747 |

-----SYS=B-58-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

### C.5.2 - Fighter Aircraft Programs

-----SYS=A-10-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

-----SYS=F-100-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.51333658     | 0.51333658  | 95.15 | 0.0023 |
| ERROR      | 3  | 0.01618481     | 0.00539494  |       |        |
| TOTAL      | 4  | 0.52952138     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.18648143  |            |            |       |        |
| Z1        | -0.15830979 | 0.01622930 | 0.51333658 | 95.15 | 0.0023 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z1       |         | 1            | 0.9694  | 0.9694 | 0.46928 |

-----SYS=F-101-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.92472428     | 0.92472428  | 69.59 | 0.0011 |
| ERROR      | 4  | 0.05315185     | 0.01328796  |       |        |
| TOTAL      | 5  | 0.97787613     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.32628329  |            |            |       |        |
| Z1        | -0.25635237 | 0.03072985 | 0.92472428 | 69.59 | 0.0011 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------------|---------|--------|---------|
|      | ENTERED  | REMOVED |              | R**2    | R**2   |         |
| 1    | Z1       |         | 1            | 0.9456  | 0.9456 | 0.75666 |

-----SYS=F-102-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 1.45937506     | 1.45937506  | 94.06 | 0.0105 |
| ERROR      | 2  | 0.03103201     | 0.01551601  |       |        |
| TOTAL      | 3  | 1.49040707     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.39652787  |            |            |       |        |
| Z1        | -0.37709990 | 0.03888328 | 1.45937506 | 94.06 | 0.0105 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 0.9792  | 0.9792 | .    |

-----SYS=F-106-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 1.19964727     | 1.19964727  | 30.66 | 0.0311 |
| ERROR      | 2  | 0.07824803     | 0.03912402  |       |        |
| TOTAL      | 3  | 1.27789530     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 4.79595764  |            |            |       |        |
| Z1        | -0.49884822 | 0.09008726 | 1.19964727 | 30.66 | 0.0311 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |      |
|------|----------|---------|---------|--------|------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P) |
| 1    | Z1       |         | 0.9388  | 0.9388 | .    |

-----SYS=F-15AB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.15260233     | 0.15260233  | 146.05 | 0.0003 |
| ERROR      | 4  | 0.00417943     | 0.00104486  |        |        |
| TOTAL      | 5  | 0.15678176     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 3.52762254  |            |            |        |        |
| Z1        | -0.13148161 | 0.01087959 | 0.15260233 | 146.05 | 0.0003 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9733  | 0.9733 | 1.13109 |

-----SYS=F-15CD-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.06145850     | 0.06145850  | 6.27 | 0.0463 |
| ERROR      | 6  | 0.05879520     | 0.00979920  |      |        |
| TOTAL      | 7  | 0.12025370     |             |      |        |

|           | B VALUE    | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|------------|------------|------------|------|--------|
| INTERCEPT | 2.60679451 |            |            |      |        |
| Z2        | 0.06093005 | 0.02432965 | 0.06145850 | 6.27 | 0.0463 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z2       |         | 0.5111  | 0.5111 | 1.13138 |

-----SYS=F-15E-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.03274593     | 0.03274593  | 9.57 | 0.0364 |
| ERROR      | 4  | 0.01368315     | 0.00342079  |      |        |
| TOTAL      | 5  | 0.04642908     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | 3.23492940  |            |            |      |        |
| Z1        | -0.06959951 | 0.02249524 | 0.03274593 | 9.57 | 0.0364 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.7053  | 0.7053 | 0.30402 |

-----SYS=F-16AB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.28836638     | 0.28836638  | 10.64 | 0.0471 |
| ERROR      | 3  | 0.08130971     | 0.02710324  |       |        |
| TOTAL      | 4  | 0.36967609     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 3.18677898  |            |            |       |        |
| Z1        | -0.22828275 | 0.06998603 | 0.28836638 | 10.64 | 0.0471 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.7801  | 0.7801 | 0.53015 |

-----SYS=F-16E-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

### C.5.3 - Electronics Programs

-----SYS=ARC-109V-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.16351455     | 0.16351455  | 14.23 | 0.0326 |
| ERROR      | 3  | 0.03446990     | 0.01148997  |       |        |
| TOTAL      | 4  | 0.19798445     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -2.99345507 |            |            |       |        |
| Z1        | -0.09510960 | 0.02521190 | 0.16351455 | 14.23 | 0.0326 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.8259  | 0.8259 | 0.42312 |

-----SYS=ARC-54-----

|            |    |                |             |       |        |
|------------|----|----------------|-------------|-------|--------|
|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
| REGRESSION | 1  | 0.11782452     | 0.11782452  | 69.37 | 0.0004 |
| ERROR      | 5  | 0.00849241     | 0.00169848  |       |        |
| TOTAL      | 6  | 0.12631693     |             |       |        |

|           |             |            |            |       |        |
|-----------|-------------|------------|------------|-------|--------|
|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
| INTERCEPT | -3.18672110 |            |            |       |        |
| Z1        | -0.12274020 | 0.01473668 | 0.11782452 | 69.37 | 0.0004 |

|      |          |         |         |        |         |
|------|----------|---------|---------|--------|---------|
| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z1       |         | 1       | 0.9328 | 0.9328  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 1.08414 |

-----SYS=ASN-63-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

-----SYS=ASN-70-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

-----SYS=ASN-99-----

|            |    |                |             |      |        |
|------------|----|----------------|-------------|------|--------|
|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
| REGRESSION | 1  | 0.10319665     | 0.10319665  | 2.86 | 0.1419 |
| ERROR      | 6  | 0.21670613     | 0.03611769  |      |        |
| TOTAL      | 7  | 0.31990278     |             |      |        |

|           |             |            |            |      |        |
|-----------|-------------|------------|------------|------|--------|
|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
| INTERCEPT | -3.71223305 |            |            |      |        |
| Z1        | 0.12221795  | 0.07230398 | 0.10319665 | 2.86 | 0.1419 |

|      |          |         |         |        |         |
|------|----------|---------|---------|--------|---------|
| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z1       |         | 1       | 0.3226 | 0.3226  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 1.03675 |

-----SYS=ASN-108-----

|            |    |                |             |       |        |
|------------|----|----------------|-------------|-------|--------|
|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
| REGRESSION | 1  | 0.11931741     | 0.11931741  | 15.24 | 0.0298 |
| ERROR      | 3  | 0.02348470     | 0.00782823  |       |        |
| TOTAL      | 4  | 0.14280211     |             |       |        |

|           |             |            |            |       |        |
|-----------|-------------|------------|------------|-------|--------|
|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
| INTERCEPT | -1.91448159 |            |            |       |        |
| Z1        | -0.09411975 | 0.02410798 | 0.11931741 | 15.24 | 0.0298 |

|      |          |         |         |        |         |
|------|----------|---------|---------|--------|---------|
| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|      | ENTERED  | REMOVED | IN      | R**2   | R**2    |
| 1    | Z1       |         | 1       | 0.8355 | 0.8355  |
|      |          |         |         |        | C(P)    |
|      |          |         |         |        | 0.14936 |

-----SYS=ASQ-133-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.27102133     | 0.27102133  | 32.26 | 0.0047 |
| ERROR      | 4  | 0.03360165     | 0.00840041  |       |        |
| TOTAL      | 5  | 0.30462298     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | -0.21450800 |            |            |       |        |
| Z1        | -0.15053337 | 0.02650217 | 0.27102133 | 32.26 | 0.0047 |

| STEP | VARIABLE<br>ENTERED | REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|---------------------|---------|--------------|-----------------|---------------|---------|
| 1    | Z1                  |         | 1            | 0.8897          | 0.8897        | 0.55358 |

-----SYS=ASW-32-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.21856871     | 0.21856871  | 5.03 | 0.0883 |
| ERROR      | 4  | 0.17379957     | 0.04344989  |      |        |
| TOTAL      | 5  | 0.39236828     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -1.32228292 |            |            |      |        |
| Z1        | -0.14043494 | 0.06261459 | 0.21856871 | 5.03 | 0.0883 |

| STEP | VARIABLE<br>ENTERED | REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|---------------------|---------|--------------|-----------------|---------------|---------|
| 1    | Z1                  |         | 1            | 0.5570          | 0.5570        | 1.61839 |

-----SYS=CP-1035N-----

NO VARIABLES MET THE 0.1500 SIGNIFICANCE LEVEL FOR ENTRY INTO THE MODEL.

-----SYS=JTIDS-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 2  | 0.24230245     | 0.12115122  | 4765.46 | 0.0002 |
| ERROR      | 2  | 0.00005085     | 0.00002542  |         |        |
| TOTAL      | 4  | 0.24235329     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | -0.33479724 |            |            |         |        |
| Z1        | -0.19895651 | 0.00232942 | 0.18545801 | 7294.95 | 0.0001 |
| Z2        | -0.00975694 | 0.00164089 | 0.00089886 | 35.36   | 0.0271 |

| STEP | VARIABLE<br>ENTERED | REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|---------------------|---------|--------------|-----------------|---------------|---------|
| 1    | Z1                  |         | 1            | 0.9961          | 0.9961        | 22.4416 |
| 2    | Z2                  |         | 2            | 0.0037          | 0.9998        | 2.2550  |

| STEP | VARIABLE |         | F        | PROB>F |
|------|----------|---------|----------|--------|
|      | ENTERED  | REMOVED |          |        |
| 1    | Z1       |         | 762.5651 | 0.0001 |
| 2    | Z2       |         | 35.3564  | 0.0271 |

-----SYS=LANNAV-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 1  | 0.40052225     | 0.40052225  | 40204.49 | 0.0001 |
| ERROR      | 5  | 0.00004981     | 0.00000996  |          |        |
| TOTAL      | 6  | 0.40057206     |             |          |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F        | PROB>F |
|-----------|-------------|------------|------------|----------|--------|
| INTERCEPT | 0.64554446  |            |            |          |        |
| Z1        | -0.12220077 | 0.00060945 | 0.40052225 | 40204.49 | 0.0001 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   |         |
| 1    | Z1       |         | 1      | 0.9999  | 0.9999 | 2.87387 |

-----SYS=LANTARP-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F        | PROB>F |
|------------|----|----------------|-------------|----------|--------|
| REGRESSION | 2  | 0.32598953     | 0.16299476  | 99999.99 | 0.0001 |
| ERROR      | 4  | 0.00000634     | 0.00000158  |          |        |
| TOTAL      | 6  | 0.32599587     |             |          |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F        | PROB>F |
|-----------|-------------|------------|------------|----------|--------|
| INTERCEPT | 0.43865929  |            |            |          |        |
| Z1        | -0.10981132 | 0.00025772 | 0.28774799 | 99999.99 | 0.0001 |
| Z3        | 0.00007521  | 0.00000672 | 0.00019880 | 125.43   | 0.0004 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  | C(P)    |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   |         |
| 1    | Z1       |         | 1      | 0.9994  | 0.9994 | 101.398 |
| 2    | Z3       |         | 2      | 0.0006  | 1.0000 | 2.226   |

| VARIABLE |         |         |           |
|----------|---------|---------|-----------|
| STEP     | ENTERED | REMOVED | F         |
| 1        | Z1      |         | 7940.7559 |
| 2        | Z3      |         | 125.4327  |

-----SYS=LANTREC-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 0.14785176     | 0.14785176  | 758.78 | 0.0001 |
| ERROR      | 3  | 0.00058456     | 0.00019485  |        |        |
| TOTAL      | 4  | 0.14843632     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -0.34649331 |            |            |        |        |
| Z1        | -0.14556527 | 0.00528443 | 0.14785176 | 758.78 | 0.0001 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.9961  | 0.9961 | 1.36336 |

#### C.5.4 - Helicopter Programs

-----SYS=HH-52-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.12412828     | 0.12412828  | 38.92 | 0.0034 |
| ERROR      | 4  | 0.01275667     | 0.00318917  |       |        |
| TOTAL      | 5  | 0.13688495     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 0.83324089  |            |            |       |        |
| Z1        | -0.18605919 | 0.02982321 | 0.12412828 | 38.92 | 0.0034 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.9068  | 0.9068 | 2.22061 |

-----SYS=CH-46-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 2  | 1.23047248     | 0.61523624  | 41.82 | 0.0008 |
| ERROR      | 5  | 0.07355530     | 0.01471106  |       |        |
| TOTAL      | 7  | 1.30402778     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.36868024  |            |            |       |        |
| Z1        | -0.22350402 | 0.02780654 | 0.95043149 | 64.61 | 0.0005 |
| Z2        | -0.03351173 | 0.01231329 | 0.10896573 | 7.41  | 0.0417 |

| STEP | VARIABLE |         | NUMBER | PARTIAL | MODEL  |         |
|------|----------|---------|--------|---------|--------|---------|
|      | ENTERED  | REMOVED | IN     | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 1      | 0.8600  | 0.8600 | 7.07423 |
| 2    | Z2       |         | 2      | 0.0836  | 0.9436 | 2.46287 |

| VARIABLE |         |         | F       | PROB>F |
|----------|---------|---------|---------|--------|
| STEP     | ENTERED | REMOVED |         |        |
| 1        | Z1      |         | 36.8672 | 0.0009 |
| 2        | Z2      |         | 7.4071  | 0.0417 |

-----SYS=H-53-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.36413891     | 0.36413891  | 56.37 | 0.0003 |
| ERROR      | 6  | 0.03876051     | 0.00646008  |       |        |
| TOTAL      | 7  | 0.40289942     |             |       |        |



|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.07266030  |            |            |       |        |
| Z1        | -0.14183982 | 0.01889225 | 0.36413891 | 56.37 | 0.0003 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.9038  | 0.9038 | 0.07011 |

-----SYS=CH-47-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 2  | 0.69121174     | 0.34560587  | 8.65 | 0.0080 |
| ERROR      | 9  | 0.35964297     | 0.03996033  |      |        |
| TOTAL      | 11 | 1.05085471     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.12140343  |            |            |       |        |
| Z1        | -0.13334229 | 0.04047426 | 0.43371767 | 10.85 | 0.0093 |
| Z2        | -0.03107691 | 0.01625348 | 0.14608719 | 3.66  | 0.0882 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.5187  | 0.5187 | 3.30915 |
| 2    | Z2       |         | 0.1390  | 0.6578 | 2.04234 |

| STEP | VARIABLE | F       | PROB>F |
|------|----------|---------|--------|
| 1    | Z1       | 10.7790 | 0.0082 |
| 2    | Z2       | 3.6558  | 0.0882 |

-----SYS=H-54-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.18000333     | 0.18000333  | 10.45 | 0.0481 |
| ERROR      | 3  | 0.05167528     | 0.01722509  |       |        |
| TOTAL      | 4  | 0.23167861     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.76204133  |            |            |       |        |
| Z1        | -0.15447484 | 0.04778574 | 0.18000333 | 10.45 | 0.0481 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |         |
|------|----------|---------|---------|--------|---------|
|      | ENTERED  | REMOVED | R**2    | R**2   | C(P)    |
| 1    | Z1       |         | 0.7770  | 0.7770 | 1.11535 |

-----SYS=HH-60D-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.06912153     | 0.06912153  | 52.99 | 0.0184 |
| ERROR      | 2  | 0.00260882     | 0.00130441  |       |        |
| TOTAL      | 3  | 0.07173034     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 2.23770674  |            |            |       |        |
| Z1        | -0.08690880 | 0.01193889 | 0.06912153 | 52.99 | 0.0184 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |        |
|------|----------|---------|---------|--------|--------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2   |
| 1    | Z1       |         | 1       | 0.9636 | 0.9636 |

-----SYS=SH-3-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F     | PROB>F |
|------------|----|----------------|-------------|-------|--------|
| REGRESSION | 1  | 0.32143167     | 0.32143167  | 24.60 | 0.0016 |
| ERROR      | 7  | 0.09147543     | 0.01306792  |       |        |
| TOTAL      | 8  | 0.41290709     |             |       |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F     | PROB>F |
|-----------|-------------|------------|------------|-------|--------|
| INTERCEPT | 1.49416647  |            |            |       |        |
| Z1        | -0.15806200 | 0.03187031 | 0.32143167 | 24.60 | 0.0016 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |        |
|------|----------|---------|---------|--------|--------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2   |
| 1    | Z1       |         | 1       | 0.7785 | 0.7785 |

C(P)  
1.19459

#### C.5.5 - Tactical Armament Programs

-----SYS=LLIGB-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 0.71772163     | 0.71772163  | 3753.30 | 0.0001 |
| ERROR      | 8  | 0.00152979     | 0.00019122  |         |        |
| TOTAL      | 9  | 0.71925142     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | -2.51061063 |            |            |         |        |
| Z1        | -0.17034813 | 0.00278055 | 0.71772163 | 3753.30 | 0.0001 |

| STEP | VARIABLE | NUMBER  | PARTIAL | MODEL  |        |
|------|----------|---------|---------|--------|--------|
|      | ENTERED  | REMOVED | IN      | R**2   | R**2   |
| 1    | Z1       |         | 1       | 0.9979 | 0.9979 |

C(P)  
0.61282

-----SYS=CEM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 2  | 2.38510832     | 1.19255416  | 531.40 | 0.0001 |
| ERROR      | 5  | 0.01122093     | 0.00224419  |        |        |
| TOTAL      | 7  | 2.39632925     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | -1.76338250 |            |            |         |        |
| Z1        | -0.21757597 | 0.00667579 | 2.38382773 | 1062.22 | 0.0001 |
| Z2        | -0.00646602 | 0.00117893 | 0.06750808 | 30.08   | 0.0027 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z1       |         | 1            | 0.9671          | 0.9671        | 28.6780 |
| 2    | Z2       |         | 2            | 0.0282          | 0.9953        | 2.6575  |

| STEP | VARIABLE |         | F        | PROB>F |
|------|----------|---------|----------|--------|
|      | ENTERED  | REMOVED |          |        |
| 1    | Z1       |         | 176.6261 | 0.0001 |
| 2    | Z2       |         | 30.0813  | 0.0027 |

-----SYS=GBU-15-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F    | PROB>F |
|------------|----|----------------|-------------|------|--------|
| REGRESSION | 1  | 0.09399839     | 0.09399839  | 7.94 | 0.0259 |
| ERROR      | 7  | 0.08292118     | 0.01184588  |      |        |
| TOTAL      | 8  | 0.17691956     |             |      |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F    | PROB>F |
|-----------|-------------|------------|------------|------|--------|
| INTERCEPT | -1.47118132 |            |            |      |        |
| Z1        | -0.05988187 | 0.02125783 | 0.09399839 | 7.94 | 0.0259 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z1       |         | 1            | 0.5313          | 0.5313        | 3.52993 |

#### C.5.6 - Tactical Missile Programs

-----SYS=AMRAAM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F       | PROB>F |
|------------|----|----------------|-------------|---------|--------|
| REGRESSION | 1  | 3.86655114     | 3.86655114  | 7317.93 | 0.0001 |
| ERROR      | 8  | 0.00422694     | 0.00052837  |         |        |
| TOTAL      | 9  | 3.87077808     |             |         |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F       | PROB>F |
|-----------|-------------|------------|------------|---------|--------|
| INTERCEPT | 1.68243228  |            |            |         |        |
| Z1        | -0.35610306 | 0.00416276 | 3.86655114 | 7317.93 | 0.0001 |

| STEP | VARIABLE |         | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|----------|---------|--------------|-----------------|---------------|---------|
|      | ENTERED  | REMOVED |              |                 |               |         |
| 1    | Z1       |         | 1            | 0.9989          | 0.9989        | 0.84349 |

-----SYS=HARM-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 3  | 2.42228052     | 0.80742684  | 530.61 | 0.0001 |
| ERROR      | 7  | 0.01065182     | 0.00152169  |        |        |
| TOTAL      | 10 | 2.43293234     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 0.62374635  |            |            |        |        |
| Z1        | -0.22324962 | 0.00822781 | 1.12031155 | 736.23 | 0.0001 |
| Z2        | -0.03103104 | 0.00869326 | 0.01938890 | 12.74  | 0.0091 |
| Z3        | 0.00746506  | 0.00267922 | 0.01181338 | 7.76   | 0.0271 |

| STEP | VARIABLE<br>ENTERED REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|-----------------------------|--------------|-----------------|---------------|---------|
| 1    | Z1                          | 1            | 0.9848          | 0.9848        | 17.2441 |
| 2    | Z2                          | 2            | 0.0059          | 0.9908        | 9.7633  |
| 3    | Z3                          | 3            | 0.0049          | 0.9956        | 4.0000  |

| STEP | VARIABLE<br>ENTERED REMOVED | F        | PROB>F |
|------|-----------------------------|----------|--------|
| 1    | Z1                          | 584.5267 | 0.0001 |
| 2    | Z2                          | 5.1375   | 0.0532 |
| 3    | Z3                          | 7.7633   | 0.0271 |

-----SYS=IIR-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 3  | 2.67373327     | 0.89124442  | 161.76 | 0.0001 |
| ERROR      | 5  | 0.02754854     | 0.00550971  |        |        |
| TOTAL      | 8  | 2.70128181     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | -0.04615566 |            |            |        |        |
| Z1        | -0.24109761 | 0.01474557 | 1.47296206 | 267.34 | 0.0001 |
| Z2        | -0.03307276 | 0.01047234 | 0.05495179 | 9.97   | 0.0251 |
| Z3        | 0.00422128  | 0.00216844 | 0.02087968 | 3.79   | 0.1091 |

| STEP | VARIABLE<br>ENTERED REMOVED | NUMBER<br>IN | PARTIAL<br>R**2 | MODEL<br>R**2 | C(P)    |
|------|-----------------------------|--------------|-----------------|---------------|---------|
| 1    | Z1                          | 1            | 0.9474          | 0.9474        | 20.8096 |
| 2    | Z2                          | 2            | 0.0347          | 0.9821        | 5.7896  |
| 3    | Z3                          | 3            | 0.0077          | 0.9898        | 4.0000  |

| STEP | VARIABLE<br>ENTERED REMOVED | F        | PROB>F |
|------|-----------------------------|----------|--------|
| 1    | Z1                          | 125.9713 | 0.0001 |
| 2    | Z2                          | 11.6183  | 0.0143 |
| 3    | Z3                          | 3.7896   | 0.1091 |

-----SYS=AIM7F-R-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 2  | 3.45535635     | 1.72767817  | 441.83 | 0.0001 |
| ERROR      | 5  | 0.01955148     | 0.00391030  |        |        |
| TOTAL      | 7  | 3.47490783     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 1.15179091  |            |            |        |        |
| Z1        | -0.39169935 | 0.01371427 | 3.18984571 | 815.76 | 0.0001 |
| Z2        | -0.01126437 | 0.00583969 | 0.01454937 | 3.72   | 0.1116 |

| STEP | VARIABLE ENTERED | REMOVED | NUMBER IN | PARTIAL R**2 | MODEL R**2 | C(P)    |
|------|------------------|---------|-----------|--------------|------------|---------|
| 1    | Z1               |         | 1         | 0.9902       | 0.9902     | 2.97887 |
| 2    | Z2               |         | 2         | 0.0042       | 0.9944     | 2.00129 |

| STEP | VARIABLE ENTERED | REMOVED | F        | PROB>F |
|------|------------------|---------|----------|--------|
| 1    | Z1               |         | 605.4055 | 0.0001 |
| 2    | Z2               |         | 3.7208   | 0.1116 |

-----SYS=AIM7F-GD-----

|            | DF | SUM OF SQUARES | MEAN SQUARE | F      | PROB>F |
|------------|----|----------------|-------------|--------|--------|
| REGRESSION | 1  | 4.95424289     | 4.95424289  | 237.69 | 0.0001 |
| ERROR      | 4  | 0.08337301     | 0.02084325  |        |        |
| TOTAL      | 5  | 5.03761591     |             |        |        |

|           | B VALUE     | STD ERROR  | TYPE II SS | F      | PROB>F |
|-----------|-------------|------------|------------|--------|--------|
| INTERCEPT | 1.04508899  |            |            |        |        |
| Z1        | -0.46191702 | 0.02996112 | 4.95424289 | 237.69 | 0.0001 |

| STEP | VARIABLE ENTERED | REMOVED | NUMBER IN | PARTIAL R**2 | MODEL R**2 | C(P)    |
|------|------------------|---------|-----------|--------------|------------|---------|
| 1    | Z1               |         | 1         | 0.9834       | 0.9834     | 2.19307 |

#### C.6 - Modified Alternative One Non-linear Regression

This section contains the summary results produced by the non-linear regression procedure in SAS. The SAS program used to produce this run was discussed in Appendix B.6.

##### C.6.1 - Bomber Aircraft Programs

-----SYS=B-1B-----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 59477976.810   | 11895595.362 |
| RESIDUAL          | 0  | 0.000          | 0.000        |
| UNCORRECTED TOTAL | 5  | 59477976.810   |              |
| (CORRECTED TOTAL) | 4  | 17234615.032   |              |

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 471.1154679 | 0                        | 471.11546791                           | 471.11546791 |
| B         | -0.1207258  | 0                        | -0.12072576                            | -0.12072576  |
| C         | -1.2592530  | 0                        | -1.25925304                            | -1.25925304  |
| D         | 0.0172283   | 0                        | 0.01722827                             | 0.01722827   |
| E         | -0.0016723  | 0                        | -0.00167231                            | -0.00167231  |

| LOT | XL | XU  | YI | R       | AUC   | UCP   | DIF         | PCT         |
|-----|----|-----|----|---------|-------|-------|-------------|-------------|
| 1   | 0  | 1   | 1  | 1.00000 | 535.8 | 535.8 | 0           | 0           |
| 2   | 1  | 8   | 7  | 7.00000 | 260.3 | 260.3 | 7.10543E-15 | 2.72971E-15 |
| 3   | 8  | 18  | 10 | 1.42857 | 200.5 | 200.5 | 2.13163E-14 | 1.06316E-14 |
| 4   | 18 | 52  | 34 | 3.40000 | 142.0 | 142.0 | 3.55271E-15 | 2.50191E-15 |
| 5   | 52 | 100 | 48 | 1.41176 | 111.3 | 111.3 | 8.88178E-15 | 7.98004E-15 |

----- SYS=B-52 -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 70187964.335   | 14037592.867 |
| RESIDUAL          | 5  | 2212807.575    | 442561.515   |
| UNCORRECTED TOTAL | 10 | 72400771.910   |              |

(CORRECTED TOTAL) 9 18070289.989

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 155.4216043 | 105.28218225             | -115.21093838                          | 426.05414705 |
| B         | -0.1979825  | 0.13252609               | -0.53864674                            | 0.14268169   |
| C         | -1.0896503  | 0.30249679               | -1.86723175                            | -0.31206879  |
| D         | -0.0093222  | 0.12358501               | -0.32700295                            | 0.30835858   |
| E         | -0.0044413  | 0.03322792               | -0.08985512                            | 0.08097256   |

| LOT | XL  | XU  | YI  | R       | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|-----|---------|-------|---------|---------|---------|
| 1   | 0   | 20  | 20  | 1.00000 | 112.5 | 78.5601 | 33.940  | 30.169  |
| 2   | 20  | 63  | 43  | 2.15000 | 37.0  | 46.0826 | -9.083  | -24.548 |
| 3   | 63  | 88  | 25  | 0.58140 | 28.6  | 48.4378 | -19.838 | -69.363 |
| 4   | 88  | 165 | 77  | 3.08000 | 32.3  | 29.7992 | 2.501   | 7.742   |
| 5   | 165 | 298 | 133 | 1.72727 | 23.4  | 29.6541 | -6.254  | -26.727 |
| 6   | 298 | 500 | 202 | 1.51880 | 28.4  | 25.9869 | 2.413   | 8.497   |
| 7   | 500 | 601 | 101 | 0.50000 | 27.3  | 28.6932 | -1.393  | -5.103  |
| 8   | 601 | 640 | 39  | 0.38614 | 27.3  | 30.8457 | -3.546  | -12.988 |
| 9   | 640 | 702 | 62  | 1.58974 | 35.4  | 26.5789 | 8.821   | 24.918  |
| 10  | 702 | 742 | 40  | 0.64516 | 35.0  | 29.4688 | 5.531   | 15.803  |

----- SYS=B-58 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |             |
|-------------------|----|----------------|-------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
| REGRESSION        | 4  | 14238328.874   | 3559582.219 |
| RESIDUAL          | 0  | 0.000          | 0.000       |
| UNCORRECTED TOTAL | 4  | 14238328.874   |             |
| (CORRECTED TOTAL) | 3  | 1830393.074    |             |

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 16.66546663 | 0                        | 16.665466631                           | 16.665466631 |
| B         | -0.37971504 | 0                        | -0.379715043                           | -0.379715043 |
| C         | 0.41794575  | 0                        | 0.417945749                            | 0.417945749  |
| D         | -0.87300949 | 0                        | -0.873009490                           | -0.873009490 |
| E         | 0.27629059  | 0                        | 0.276290593                            | 0.276290593  |

| LOT | XL | XU  | YI | R       | AUC   | UCP   | DIF         | PCT         |
|-----|----|-----|----|---------|-------|-------|-------------|-------------|
| 1   | 0  | 17  | 17 | 1.00000 | 93.86 | 93.86 | 1.77636E-15 | 1.89256E-15 |
| 2   | 17 | 53  | 36 | 2.11765 | 80.26 | 80.26 | 1.77636E-15 | 2.21325E-15 |
| 3   | 53 | 73  | 20 | 0.55556 | 73.16 | 73.16 | 1.77636E-15 | 2.42804E-15 |
| 4   | 73 | 103 | 30 | 1.50000 | 36.56 | 36.56 | 8.88178E-16 | 2.42937E-15 |

C.6.2 - Fighter Aircraft Programs

----- SYS=A-10 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |              |
|-------------------|----|----------------|--------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
| REGRESSION        | 5  | 5178580.2874   | 1035716.0575 |
| RESIDUAL          | 4  | 8637.0970      | 2159.2743    |
| UNCORRECTED TOTAL | 9  | 5187217.3844   |              |
| (CORRECTED TOTAL) | 8  | 1226666.3049   |              |

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 21.23601132 | 5.1507658640             | 6.9353861501                           | 35.536636497 |
| B         | 0.05164370  | 0.0657715049             | -0.1309648049                          | 0.234252199  |
| C         | -1.27892455 | 0.1135469836             | -1.5941772476                          | -0.963671845 |
| D         | 0.01528574  | 0.0422549676             | -0.1020312726                          | 0.132602749  |
| E         | -0.00239225 | 0.0066442251             | -0.0208393265                          | 0.016054827  |

| LOT | XL  | XU  | YI  | R       | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|-----|---------|-------|---------|---------|---------|
| 1   | 0   | 22  | 22  | 1.00000 | 12.37 | 10.4089 | 1.9611  | 15.853  |
| 2   | 22  | 75  | 53  | 2.40909 | 9.16  | 9.3665  | -0.2065 | -2.255  |
| 3   | 75  | 95  | 20  | 0.37736 | 8.20  | 11.7717 | -3.5717 | -43.557 |
| 4   | 95  | 195 | 100 | 5.00000 | 8.20  | 8.1970  | 0.0030  | 0.037   |
| 5   | 195 | 339 | 144 | 1.44000 | 7.82  | 7.7074  | 0.1126  | 1.440   |
| 6   | 339 | 483 | 144 | 1.00000 | 7.59  | 7.7225  | -0.1325 | -1.746  |
| 7   | 483 | 627 | 144 | 1.00000 | 7.82  | 7.8442  | -0.0242 | -0.309  |
| 8   | 627 | 687 | 60  | 0.41667 | 10.18 | 9.7094  | 0.4706  | 4.623   |
| 9   | 687 | 707 | 20  | 0.33333 | 13.64 | 13.1009 | 0.5391  | 3.952   |

----- SYS=F-100 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 11835640.869   | 2367128.174 |
| RESIDUAL          | 0  | 0.000          | 0.000       |
| UNCORRECTED TOTAL | 5  | 11835640.869   |             |
| (CORRECTED TOTAL) | 4  | 2086478.767    |             |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|--------------|--------------------------|------------------------------------------------------------|
| A         | 3.957000040  | 0                        | 3.9570000399    3.9570000399                               |
| B         | -0.384653773 | 0                        | -0.3846537734    -0.3846537734                             |
| C         | -0.347876734 | 0                        | -0.3478767340    -0.3478767340                             |
| D         | -0.274517676 | 0                        | -0.2745176759    -0.2745176759                             |
| E         | 0.010967897  | 0                        | 0.0109678971    0.0109678971                               |

| LOT | XL   | XU   | YI  | R       | AUC  | UCP  | DIF          | PCT          |
|-----|------|------|-----|---------|------|------|--------------|--------------|
| 1   | 0    | 23   | 23  | 1.0000  | 6.51 | 6.51 | 3.33067E-16  | 5.11624E-15  |
| 2   | 23   | 568  | 545 | 23.6957 | 3.45 | 3.45 | -2.22045E-16 | -6.43608E-15 |
| 3   | 568  | 1161 | 593 | 1.0881  | 3.08 | 3.08 | -3.88578E-16 | -1.26162E-14 |
| 4   | 1161 | 1720 | 559 | 0.9427  | 3.10 | 3.10 | 3.33067E-16  | 1.07441E-14  |
| 5   | 1720 | 2277 | 557 | 0.9964  | 2.50 | 2.50 | -5.55112E-17 | -2.22045E-15 |

----- SYS=F-101 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 7068239.3652   | 1413647.8730 |
| RESIDUAL          | 1  | 8620.4794      | 8620.4794    |
| UNCORRECTED TOTAL | 6  | 7076859.8446   |              |
| (CORRECTED TOTAL) | 5  | 2200718.4643   |              |



| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 30.11407700 | 16.917997226             | -184.84599576                          | 245.07414975 |
| B         | -0.28262118 | 0.079536471              | -1.29321158                            | 0.72796922   |
| C         | -0.92075123 | 0.162521380              | -2.98574789                            | 1.14424543   |
| D         | -0.10127519 | 0.079440492              | -1.11064608                            | 0.90809571   |
| E         | 0.02276889  | 0.018622788              | -0.21385225                            | 0.25939004   |

| LOT | XL  | XU  | YI  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 31  | 31  | 1.00000 | 16.85 | 15.9455 | 0.90452  | 5.3681  |
| 2   | 31  | 115 | 84  | 2.70968 | 7.58  | 8.0942  | -0.51421 | -6.7838 |
| 3   | 115 | 424 | 309 | 3.67857 | 6.91  | 6.8948  | 0.01517  | 0.2196  |
| 4   | 424 | 630 | 206 | 0.66667 | 5.76  | 5.7691  | -0.00906 | -0.1574 |
| 5   | 630 | 714 | 84  | 0.40777 | 5.27  | 5.7559  | -0.48590 | -9.2201 |
| 6   | 714 | 807 | 93  | 1.10714 | 5.22  | 4.5168  | 0.70322  | 13.4717 |

----- SYS=F-102 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 4462706.4660   | 1115676.6165 |
| RESIDUAL          | 0  | 0.0000         | 0.0000       |
| UNCORRECTED TOTAL | 4  | 4462706.4660   |              |

(CORRECTED TOTAL)      3      1795723.5179

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 2.912427078  | 0                        | 2.9124270782                           | 2.9124270782  |
| B         | -0.590430858 | 0                        | -0.5904308580                          | -0.5904308580 |
| C         | -0.258038597 | 0                        | -0.2580385966                          | -0.2580385966 |
| D         | -0.010553539 | 0                        | -0.0105535395                          | -0.0105535395 |
| E         | -0.003937765 | 0                        | -0.0039377645                          | -0.0039377645 |

| LOT | XL  | XU  | YI  | R       | AUC   | UCP   | DIF          | PCT          |
|-----|-----|-----|-----|---------|-------|-------|--------------|--------------|
| 1   | 0   | 37  | 37  | 1.00000 | 11.66 | 11.66 | -2.22045E-16 | -1.90433E-15 |
| 2   | 37  | 145 | 108 | 2.91892 | 5.17  | 5.17  | 2.22045E-16  | 4.29487E-15  |
| 3   | 145 | 707 | 562 | 5.20370 | 3.50  | 3.50  | -1.11022E-16 | -3.17207E-15 |
| 4   | 707 | 847 | 140 | 0.24911 | 2.21  | 2.21  | 2.77556E-16  | 1.25591E-14  |

----- SYS=F-106 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE     | DF | SUM OF SQUARES | MEAN SQUARE  |
|------------|----|----------------|--------------|
| REGRESSION | 4  | 4765078.8733   | 1191269.7183 |
| RESIDUAL   | 0  | 0.0000         | 0.0000       |

UNCORRECTED TOTAL 4 4765078.8733

(CORRECTED TOTAL) 3 480903.3427

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 8.705994979  | 0                        | 8.7059949788                           | 8.7059949788  |
| B         | -0.538191590 | 0                        | -0.5381915901                          | -0.5381915901 |
| C         | -0.100069618 | 0                        | -0.1000696176                          | -0.1000696176 |
| D         | -0.243108557 | 0                        | -0.2431085572                          | -0.2431085572 |
| E         | 0.040672324  | 0                        | 0.0406723237                           | 0.0406723237  |

| LOT | XL  | XU  | YI  | R       | AUC   | UCP   | DIF          | PCT          |
|-----|-----|-----|-----|---------|-------|-------|--------------|--------------|
| 1   | 0   | 4   | 42  | 1.00000 | 34.19 | 34.19 | 8.88178E-16  | 2.59777E-15  |
| 2   | 42  | 130 | 88  | 2.09524 | 10.54 | 10.54 | -8.88178E-16 | -8.42674E-15 |
| 3   | 130 | 175 | 45  | 0.51136 | 11.64 | 11.64 | -4.44089E-16 | -3.81520E-15 |
| 4   | 175 | 340 | 165 | 3.66667 | 7.59  | 7.59  | 0            | 0            |

----- SYS=F-15AB -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 10242798.539   | 2048559.708 |
| RESIDUAL          | 1  | 4843.520       | 4843.520    |
| UNCORRECTED TOTAL | 6  | 10247642.059   |             |
| (CORRECTED TOTAL) | 5  | 1585918.021    |             |

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 28.40889477 | 12.214770553             | -126.79197987                          | 183.60976942 |
| B         | -0.14928381 | 0.065766639              | -0.98491473                            | 0.68634711   |
| C         | -0.93147080 | 0.196329082              | -3.42602811                            | 1.56308652   |
| D         | -0.00877048 | 0.047709730              | -0.61497030                            | 0.59742934   |
| E         | 0.00190393  | 0.008225191              | -0.10260534                            | 0.10641320   |

| LOT | XL  | XU  | YI  | R       | AUC    | UCP     | DIF      | PCT     |
|-----|-----|-----|-----|---------|--------|---------|----------|---------|
| 1   | 0   | 30  | 30  | 1.00000 | 25.597 | 24.7881 | 0.80894  | 3.1603  |
| 2   | 30  | 92  | 62  | 2.06667 | 19.556 | 19.7410 | -0.18500 | -0.9460 |
| 3   | 92  | 164 | 72  | 1.16129 | 17.183 | 17.9070 | -0.72405 | -4.2137 |
| 4   | 164 | 272 | 108 | 1.50000 | 17.126 | 16.8441 | 0.28194  | 1.6462  |
| 5   | 272 | 296 | 24  | 0.22222 | 16.021 | 15.1099 | 0.91114  | 5.6872  |
| 6   | 296 | 404 | 108 | 4.50000 | 16.272 | 16.2726 | -0.00061 | -0.0038 |

----- SYS=F-15CD -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 8408519.8857   | 1681703.9771 |
| RESIDUAL          | 3  | 10329.2606     | 3443.0869    |
| UNCORRECTED TOTAL | 8  | 8418849.1462   |              |

(CORRECTED TOTAL) 7 752208.0946

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 118.4565394 | 122.25912839             | -270.63313672                          | 507.54621551 |
| B         | -0.0754078  | 0.07643225               | -0.31865340                            | 0.16783788   |
| C         | -1.4984221  | 0.19017008               | -2.10363834                            | -0.89320578  |
| D         | 0.1672946   | 0.46833405               | -1.32317855                            | 1.65776766   |
| E         | -0.0319244  | 0.23019699               | -0.76452637                            | 0.70067749   |

| LOT | XL  | XU  | YI | R       | AUC    | UCP     | DIF     | PCT     |
|-----|-----|-----|----|---------|--------|---------|---------|---------|
| 1   | 0   | 97  | 97 | 1.00000 | 17.249 | 17.2381 | 0.0109  | 0.0632  |
| 2   | 97  | 175 | 78 | 0.80412 | 15.588 | 15.3315 | 0.2565  | 1.6455  |
| 3   | 175 | 235 | 60 | 0.76923 | 15.508 | 16.1558 | -0.6478 | -4.1773 |
| 4   | 235 | 277 | 42 | 0.70000 | 17.665 | 17.6862 | -0.0212 | -0.1202 |
| 5   | 277 | 313 | 36 | 0.85714 | 19.943 | 19.8749 | 0.0681  | 0.3413  |
| 6   | 313 | 352 | 39 | 1.08333 | 19.308 | 20.8517 | -1.5437 | -7.9949 |
| 7   | 352 | 388 | 36 | 0.92308 | 21.954 | 20.0546 | 1.8994  | 8.6517  |
| 8   | 388 | 436 | 48 | 1.33333 | 21.017 | 20.7982 | 0.2188  | 1.0409  |

----- SYS=F-15E -----

NOTE: THE RESIDUAL SS HAS FAILED TO CONVERGE IN THE SPECIFIED NUMBER OF ITERATIONS.

| LOT | XL  | XU  | YI | R       | AUC    | UCP | DIF | PCT |
|-----|-----|-----|----|---------|--------|-----|-----|-----|
| 1   | 0   | 60  | 60 | 1.00000 | 20.544 | .   | .   | .   |
| 2   | 60  | 132 | 72 | 1.20000 | 19.203 | .   | .   | .   |
| 3   | 132 | 228 | 96 | 1.33333 | 17.608 | .   | .   | .   |
| 4   | 228 | 324 | 96 | 1.00000 | 16.175 | .   | .   | .   |
| 5   | 324 | 420 | 96 | 1.00000 | 16.041 | .   | .   | .   |
| 6   | 420 | 516 | 96 | 1.00000 | 17.927 | .   | .   | .   |

----- SYS=F-16AB -----

NOTE: THE RESIDUAL SS HAS FAILED TO CONVERGE IN THE SPECIFIED NUMBER OF ITERATIONS.

| LOT | XL  | XU  | YI  | R       | AUC   | UCP | DIF | PCT |
|-----|-----|-----|-----|---------|-------|-----|-----|-----|
| 1   | 0   | 105 | 105 | 1.00000 | 10.14 | .   | .   | .   |
| 2   | 105 | 250 | 145 | 1.38095 | 7.74  | .   | .   | .   |
| 3   | 250 | 425 | 175 | 1.20690 | 8.04  | .   | .   | .   |
| 4   | 425 | 605 | 180 | 1.02857 | 5.05  | .   | .   | .   |
| 5   | 605 | 725 | 120 | 0.66667 | 5.13  | .   | .   | .   |

----- SYS=F-16E -----

NOTE: THE RESIDUAL SS HAS FAILED TO CONVERGE IN THE SPECIFIED NUMBER OF ITERATIONS.

| LOT | XL   | XU   | YI  | R       | AUC   | UCP | DIF | PCT |
|-----|------|------|-----|---------|-------|-----|-----|-----|
| 1   | 0    | 120  | 120 | 1.00000 | 9.86  | .   | .   | .   |
| 2   | 120  | 264  | 144 | 1.20000 | 10.58 | .   | .   | .   |
| 3   | 264  | 414  | 150 | 1.04167 | 14.55 | .   | .   | .   |
| 4   | 414  | 630  | 216 | 1.44000 | 11.93 | .   | .   | .   |
| 5   | 630  | 846  | 216 | 1.00000 | 11.28 | .   | .   | .   |
| 6   | 846  | 1062 | 216 | 1.00000 | 11.02 | .   | .   | .   |
| 7   | 1062 | 1278 | 216 | 1.00000 | 10.88 | .   | .   | .   |
| 8   | 1278 | 1494 | 216 | 1.00000 | 10.69 | .   | .   | .   |
| 9   | 1494 | 1710 | 216 | 1.00000 | 10.61 | .   | .   | .   |
| 10  | 1710 | 1926 | 216 | 1.00000 | 10.54 | .   | .   | .   |

### C.6.3 - Electronics Programs

----- SYS=ARC-109V -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 66.744073730   | 13.348814746 |
| RESIDUAL          | 0  | 0.000000000    | 0.000000000  |
| UNCORRECTED TOTAL | 5  | 66.744073730   |              |

(CORRECTED TOTAL)      4      29.010182832

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|--------------|--------------------------|------------------------------------------------------------|
| A         | 0.0146272785 | 0                        | 0.01462727850      0.01462727850                           |
| B         | -.5732392562 | 0                        | -.57323925617      -.57323925617                           |
| C         | -.0544552721 | 0                        | -.05445527211      -.05445527211                           |
| D         | -.1365562160 | 0                        | -.13655621600      -.13655621600                           |
| E         | 0.0180417909 | 0                        | 0.01804179095      0.01804179095                           |

| LOT | XL  | XU  | YI  | R       | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|-----|---------|--------|--------|--------------|--------------|
| 1   | 0   | 4   | 4   | 1.00000 | 0.0487 | 0.0487 | 0            | 0            |
| 2   | 4   | 28  | 24  | 6.00000 | 0.0393 | 0.0393 | -8.67362E-19 | -2.20703E-15 |
| 3   | 28  | 107 | 79  | 3.29167 | 0.0285 | 0.0285 | -3.03577E-18 | -1.06518E-14 |
| 4   | 107 | 333 | 226 | 2.86076 | 0.0313 | 0.0313 | 8.67362E-19  | 2.77112E-15  |
| 5   | 333 | 441 | 108 | 0.47788 | 0.0303 | 0.0303 | -5.20417E-18 | -1.71755E-14 |

----- SYS=ARC-54 -----

ERROR: ON OBSERVATION 6, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL   | XU    | YI   | R       | AUC    | UCP | DIF | PCT |
|-----|------|-------|------|---------|--------|-----|-----|-----|
| 1   | 0    | 900   | 900  | 1.0000  | 0.0210 | .   | .   | .   |
| 2   | 900  | 1753  | 853  | 0.9478  | 0.0165 | .   | .   | .   |
| 3   | 1753 | 3134  | 1381 | 1.6190  | 0.0164 | .   | .   | .   |
| 4   | 3134 | 4294  | 1160 | 0.8400  | 0.0145 | .   | .   | .   |
| 5   | 4294 | 4594  | 300  | 0.2586  | 0.0144 | .   | .   | .   |
| 6   | 4594 | 7697  | 3103 | 10.3433 | 0.0139 | .   | .   | .   |
| 7   | 7697 | 10347 | 2650 | 0.8540  | 0.0143 | .   | .   | .   |

----- SYS=ASN-63 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 27730.837094   | 5546.167419 |
| RESIDUAL          | 5  | 11.127902      | 2.225580    |
| UNCORRECTED TOTAL | 10 | 27741.964996   |             |
| (CORRECTED TOTAL) | 9  | 14794.094157   |             |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.678269504  | 0.93091584111            | -1.7146911636                          | 3.0712301721  |
| B         | -0.088463668 | 0.11590072096            | -0.3863916377                          | 0.2094643019  |
| C         | -1.173255343 | 0.12203697556            | -1.4869568287                          | -0.8595538571 |
| D         | 0.086542728  | 0.02866133425            | 0.0128674909                           | 0.1602179656  |
| E         | -0.032473882 | 0.01069228110            | -0.0599588677                          | -0.0049888972 |

| LOT | XL   | XU   | YI  | R       | AUC    | UCP      | DIF       | PCT     |
|-----|------|------|-----|---------|--------|----------|-----------|---------|
| 1   | 0    | 781  | 781 | 1.00000 | 0.1866 | 0.186625 | -0.000025 | -0.013  |
| 2   | 781  | 930  | 149 | 0.19078 | 0.1744 | 0.169378 | 0.005022  | 2.880   |
| 3   | 930  | 1217 | 287 | 1.92617 | 0.1769 | 0.178303 | -0.001403 | -0.793  |
| 4   | 1217 | 1358 | 141 | 0.49129 | 0.1817 | 0.181340 | 0.000360  | 0.198   |
| 5   | 1358 | 1450 | 92  | 0.65248 | 0.1772 | 0.197918 | -0.020718 | -11.692 |
| 6   | 1450 | 1585 | 135 | 1.46739 | 0.2189 | 0.200671 | 0.018229  | 8.328   |
| 7   | 1585 | 1693 | 108 | 0.80000 | 0.1911 | 0.196452 | -0.005352 | -2.801  |
| 8   | 1693 | 1851 | 158 | 1.46296 | 0.1917 | 0.194390 | -0.002690 | -1.403  |
| 9   | 1851 | 1887 | 36  | 0.22785 | 0.2005 | 0.199715 | 0.000785  | 0.391   |
| 10  | 1887 | 1923 | 36  | 1.00000 | 0.2145 | 0.226862 | -0.012362 | -5.763  |

----- SYS=ASN-70 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 119.45451746   | 23.89090349 |
| RESIDUAL          | 3  | 0.00148135     | 0.00049378  |
| UNCORRECTED TOTAL | 8  | 119.45599881   |             |

|                   |   |             |
|-------------------|---|-------------|
| (CORRECTED TOTAL) | 7 | 64.18968336 |
|-------------------|---|-------------|

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.049631948  | 0.00597388760            | 0.0306200504                           | 0.0686438449  |
| B         | -0.011493359 | 0.01080449650            | -0.0458786693                          | 0.0228919509  |
| C         | -1.072124923 | 0.01310544926            | -1.1138330156                          | -1.0304168310 |
| D         | 0.009279370  | 0.01736852532            | -0.0459959622                          | 0.0645547015  |
| E         | 0.002507962  | 0.00889961684            | -0.0258150685                          | 0.0308309927  |

| LOT | XL  | XU  | YI  | R       | AUC    | UCP       | DIF        | PCT     |
|-----|-----|-----|-----|---------|--------|-----------|------------|---------|
| 1   | 0   | 152 | 152 | 1.00000 | 0.0350 | 0.0349992 | 0.0000008  | 0.0024  |
| 2   | 152 | 402 | 250 | 1.64474 | 0.0353 | 0.0353010 | -0.0000010 | -0.0029 |
| 3   | 402 | 483 | 81  | 0.32400 | 0.0342 | 0.0341939 | 0.0000061  | 0.0178  |
| 4   | 483 | 541 | 58  | 0.71605 | 0.0356 | 0.0355978 | 0.0000022  | 0.0062  |
| 5   | 541 | 567 | 26  | 0.44828 | 0.0370 | 0.0370488 | -0.0000488 | -0.1318 |
| 6   | 567 | 575 | 8   | 0.30769 | 0.0399 | 0.0399702 | -0.0000702 | -0.1759 |
| 7   | 575 | 583 | 8   | 1.00000 | 0.0370 | 0.0406929 | -0.0036929 | -9.9808 |
| 8   | 583 | 594 | 11  | 1.37500 | 0.0427 | 0.0404615 | 0.0022385  | 5.2423  |

----- SYS=ASN-99 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 382.29426152   | 76.45885230 |
| RESIDUAL          | 3  | 1.30934762     | 0.43644921  |
| UNCORRECTED TOTAL | 8  | 383.60360914   |             |

|                   |   |             |
|-------------------|---|-------------|
| (CORRECTED TOTAL) | 7 | 61.21154176 |
|-------------------|---|-------------|

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.413208936  | 0.30040695637            | -0.5428362023                          | 1.3692540750  |
| B         | 0.010252534  | 0.04673986871            | -0.1384970983                          | 0.1590021660  |
| C         | -1.612154656 | 0.17608325011            | -2.1725395990                          | -1.0517697121 |
| D         | 0.210809029  | 0.09457908397            | -0.0901889155                          | 0.5118069731  |
| E         | -0.052418074 | 0.02728520774            | -0.1392532474                          | 0.0344170999  |

| LOT | XL  | XU   | YI  | R       | AUC    | UCP       | DIF       | PCT     |
|-----|-----|------|-----|---------|--------|-----------|-----------|---------|
| 1   | 0   | 157  | 157 | 1.00000 | 0.0464 | 0.0434344 | 0.002966  | 6.391   |
| 2   | 157 | 353  | 196 | 1.24841 | 0.0404 | 0.0450313 | -0.004631 | -11.464 |
| 3   | 353 | 538  | 185 | 0.94388 | 0.0413 | 0.0398728 | 0.001427  | 3.456   |
| 4   | 538 | 781  | 243 | 1.31351 | 0.0433 | 0.0426104 | 0.000690  | 1.593   |
| 5   | 781 | 805  | 24  | 0.09877 | 0.0570 | 0.0674564 | -0.010456 | -18.344 |
| 6   | 805 | 877  | 72  | 3.00000 | 0.0624 | 0.0642077 | -0.001808 | -2.897  |
| 7   | 877 | 933  | 56  | 0.77778 | 0.0635 | 0.0641983 | -0.000698 | -1.100  |
| 8   | 933 | 1050 | 117 | 2.08929 | 0.0684 | 0.0658455 | 0.002555  | 3.735   |

----- SYS=ASN-108 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 560.63059524   | 112.12611905 |
| RESIDUAL          | 0  | 0.00000000     | 0.00000000   |
| UNCORRECTED TOTAL | 5  | 560.63059524   |              |
| (CORRECTED TOTAL) | 4  | 226.66710333   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|--------------|--------------------------|------------------------------------------------------------|
| A         | 0.0580075009 | 0.05800750093            | 0.05800750093                                              |
| B         | -.4176390214 | 0.41763902135            | -.41763902135                                              |
| C         | -.3241819744 | 0.32418197435            | -.32418197435                                              |
| D         | -.1278505557 | 0.12785055570            | -.12785055570                                              |
| E         | 0.0240188462 | 0.02401884625            | 0.02401884625                                              |

| LOT | XL  | XU  | YI  | R       | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|-----|---------|--------|--------|--------------|--------------|
| 1   | 0   | 8   | 8   | 1.00000 | 0.1373 | 0.1373 | 0            | 0            |
| 2   | 8   | 39  | 31  | 3.87500 | 0.1048 | 0.1048 | -1.73472E-18 | -1.65527E-15 |
| 3   | 39  | 116 | 77  | 2.48387 | 0.0874 | 0.0874 | 5.20417E-18  | 5.95443E-15  |
| 4   | 116 | 332 | 216 | 2.80519 | 0.0943 | 0.0943 | 3.46945E-18  | 3.67916E-15  |
| 5   | 332 | 440 | 108 | 0.50000 | 0.0872 | 0.0872 | 8.67362E-18  | 9.94681E-15  |

----- SYS=ASQ-133 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 2882.9126662   | 576.5825332 |
| RESIDUAL          | 1  | 1.8574302      | 1.8574302   |
| UNCORRECTED TOTAL | 6  | 2884.7700964   |             |
| (CORRECTED TOTAL) | 5  | 403.6845454    |             |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
|           |              |                          |                                        |              |
| A         | 1.127610498  | 0.44461074506            | -4.5216136290                          | 6.7768346244 |
| B         | -0.085916155 | 0.10070611805            | -1.3654880914                          | 1.1936557805 |
| C         | -1.216524781 | 0.25099184938            | -4.4056272195                          | 1.9725776571 |
| D         | 0.065720464  | 0.08665592678            | -1.0353297421                          | 1.1667706694 |
| E         | -0.012889515 | 0.01765299431            | -0.2371884612                          | 0.2114094302 |

| LOT | XL  | XU  | YI | R       | AUC    | UCP      | DIF       | PCT     |
|-----|-----|-----|----|---------|--------|----------|-----------|---------|
| 1   | 0   | 14  | 14 | 1.00000 | 0.5856 | 0.638393 | -0.052793 | -9.0152 |
| 2   | 14  | 33  | 19 | 1.35714 | 0.5862 | 0.552513 | 0.033687  | 5.7467  |
| 3   | 33  | 101 | 68 | 3.57895 | 0.4255 | 0.425465 | 0.000035  | 0.0081  |
| 4   | 101 | 168 | 67 | 0.98529 | 0.3828 | 0.371279 | 0.011521  | 3.0098  |
| 5   | 168 | 249 | 81 | 1.20896 | 0.3535 | 0.359431 | -0.005931 | -1.6777 |
| 6   | 249 | 307 | 58 | 0.71605 | 0.3355 | 0.340216 | -0.004716 | -1.4058 |

----- SYS=ASW-32 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 300.66771097   | 60.13354219 |
| RESIDUAL          | 1  | 0.21036271     | 0.21036271  |
| UNCORRECTED TOTAL | 6  | 300.87807368   |             |

(CORRECTED TOTAL)      5      54.90298664

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
|           |             |                          |                                        |              |
| A         | 19.12971366 | 19.464691772             | -228.18866000                          | 266.44808731 |
| B         | 0.80253498  | 0.251593491              | -2.39421192                            | 3.99928187   |
| C         | -4.61111330 | 0.780629398              | -14.52979043                           | 5.30756383   |
| D         | 1.84333492  | 0.370280592              | -2.86145029                            | 6.54812013   |
| E         | -0.55878998 | 0.117372207              | -2.05012125                            | 0.93254129   |

| LOT | XL  | XU  | YI | R       | AUC    | UCP      | DIF        | PCT     |
|-----|-----|-----|----|---------|--------|----------|------------|---------|
| 1   | 0   | 12  | 12 | 1.00000 | 0.2338 | 0.240501 | -0.0067008 | -2.8660 |
| 2   | 12  | 38  | 26 | 2.16667 | 0.1643 | 0.169911 | -0.0056109 | -3.4150 |
| 3   | 38  | 86  | 48 | 1.84615 | 0.1524 | 0.146793 | 0.0056075  | 3.6794  |
| 4   | 86  | 134 | 48 | 1.00000 | 0.0974 | 0.101842 | -0.0044415 | -4.5601 |
| 5   | 134 | 184 | 50 | 1.04167 | 0.1441 | 0.139663 | 0.0044373  | 3.0793  |
| 6   | 184 | 264 | 80 | 1.60000 | 0.1518 | 0.153356 | -0.0015559 | -1.0250 |



----- SYS=CP-1035N -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 208.81019346   | 41.76203869 |
| RESIDUAL          | 1  | 0.43795874     | 0.43795874  |
| UNCORRECTED TOTAL | 6  | 209.24815220   |             |

(CORRECTED TOTAL) 5 41.36682739

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 0.0875925714 | 0.1921372934             | -2.353703878                           | 2.528889021  |
| B         | -.1243106659 | 0.3810827580             | -4.966348189                           | 4.717726858  |
| C         | -.7330733443 | 1.4747928369             | -19.471791130                          | 18.005644441 |
| D         | 0.0186594333 | 0.8082231309             | -10.250623668                          | 10.287942535 |
| E         | -.0295428257 | 0.2664753948             | -3.415379192                           | 3.356293541  |

| LOT | XL  | XU  | YI | R       | AUC    | UCP      | DIF       | PCT     |
|-----|-----|-----|----|---------|--------|----------|-----------|---------|
| 1   | 0   | 12  | 12 | 1.00000 | 0.1248 | 0.138765 | -0.013965 | -11.190 |
| 2   | 12  | 38  | 26 | 2.16667 | 0.0903 | 0.102414 | -0.012114 | -13.415 |
| 3   | 38  | 86  | 48 | 1.84615 | 0.1236 | 0.114458 | 0.009142  | 7.396   |
| 4   | 86  | 134 | 48 | 1.00000 | 0.1287 | 0.131723 | -0.003023 | -2.348  |
| 5   | 134 | 184 | 50 | 1.04167 | 0.1310 | 0.126219 | 0.004781  | 3.650   |
| 6   | 184 | 264 | 80 | 1.60000 | 0.1154 | 0.117898 | -0.002498 | -2.164  |

----- SYS=JTIDS -----

NOTE: THE RESIDUAL SS HAS FAILED TO CONVERGE IN THE SPECIFIED NUMBER OF ITERATIONS.

| LOT | XL  | XU  | YI | R       | AUC    | UCP | DIF | PCT |
|-----|-----|-----|----|---------|--------|-----|-----|-----|
| 1   | 0   | 45  | 45 | 1.00000 | 0.4068 | .   | .   | .   |
| 2   | 45  | 121 | 76 | 1.68889 | 0.2764 | .   | .   | .   |
| 3   | 121 | 198 | 77 | 1.01316 | 0.2466 | .   | .   | .   |
| 4   | 198 | 270 | 72 | 0.93506 | 0.2308 | .   | .   | .   |
| 5   | 270 | 327 | 57 | 0.79167 | 0.2205 | .   | .   | .   |

----- SYS=LANNAV -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 87339.225704   | 17467.845141 |
| RESIDUAL          | 2  | 0.005192       | 0.002596     |
| UNCORRECTED TOTAL | 7  | 87339.230896   |              |
| (CORRECTED TOTAL) | 6  | 17386.822804   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
|           |              |                          |                                        |               |
| A         | 1.820047696  | 0.01599478698            | 1.7512269261                           | 1.8888684659  |
| B         | -0.113529232 | 0.00052966833            | -0.1158082361                          | -0.1112502283 |
| C         | -1.001306001 | 0.00180932141            | -1.0090909684                          | -0.9935210340 |
| D         | -0.000212656 | 0.00013614692            | -0.0007984550                          | 0.0003731437  |
| E         | 0.000066777  | 0.00002353573            | -0.0000344897                          | 0.0001680447  |

| LOT | XL  | XU  | YI  | R       | AUC    | UCP     | DIF         | PCT       |
|-----|-----|-----|-----|---------|--------|---------|-------------|-----------|
| 1   | 0   | 4   | 4   | 1.00000 | 1.7500 | 1.75062 | -0.00062346 | -0.035626 |
| 2   | 4   | 38  | 34  | 8.50000 | 1.3199 | 1.31992 | -0.00001796 | -0.001361 |
| 3   | 38  | 176 | 138 | 4.05882 | 1.0761 | 1.07609 | 0.00000570  | 0.000529  |
| 4   | 176 | 320 | 144 | 1.04348 | 0.9679 | 0.96804 | -0.00014280 | -0.014753 |
| 5   | 320 | 464 | 144 | 1.00000 | 0.9184 | 0.91801 | 0.00039006  | 0.042472  |
| 6   | 464 | 608 | 144 | 1.00000 | 0.8854 | 0.88568 | -0.00027661 | -0.031241 |
| 7   | 608 | 724 | 116 | 0.80556 | 0.8643 | 0.86426 | 0.00003864  | 0.004471  |

----- SYS=LANTARP -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 64803.849970   | 12960.769994 |
| RESIDUAL          | 2  | 0.030804       | 0.015402     |
| UNCORRECTED TOTAL | 7  | 64803.880775   |              |

(CORRECTED TOTAL) 6 12795.420992

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
|           |              |                          |                                        |               |
| A         | 1.486138797  | 0.03739691403            | 1.3252310953                           | 1.6470464992  |
| B         | -0.105203237 | 0.00153455514            | -0.1118059675                          | -0.0986005067 |
| C         | -0.996944641 | 0.00504398714            | -1.0186474042                          | -0.9752418773 |
| D         | -0.000255165 | 0.00034888583            | -0.0017563165                          | 0.0012459857  |
| E         | 0.000098995  | 0.00005881348            | -0.0001540618                          | 0.0003520517  |

| LOT | XL  | XU  | YI  | R       | AUC    | UCP     | DIF        | PCT      |
|-----|-----|-----|-----|---------|--------|---------|------------|----------|
| 1   | 0   | 4   | 4   | 1.00000 | 1.4375 | 1.44126 | -0.0037580 | -0.26142 |
| 2   | 4   | 38  | 34  | 8.50000 | 1.1286 | 1.12869 | -0.0000891 | -0.00789 |
| 3   | 38  | 166 | 128 | 3.76471 | 0.9375 | 0.93746 | 0.0000407  | 0.00434  |
| 4   | 166 | 310 | 144 | 1.12500 | 0.8490 | 0.84933 | -0.0003268 | -0.03850 |
| 5   | 310 | 454 | 144 | 1.00000 | 0.8081 | 0.80719 | 0.0009061  | 0.11213  |
| 6   | 454 | 598 | 144 | 1.00000 | 0.7795 | 0.78022 | -0.0007234 | -0.09281 |
| 7   | 598 | 714 | 116 | 0.80556 | 0.7619 | 0.76172 | 0.0001826  | 0.02397  |

-----SYS=LANTREC-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 11938.396467   | 2387.679293 |
| RESIDUAL          | 0  | 0.000000       | 0.000000    |
| UNCORRECTED TOTAL | 5  | 11938.396467   |             |

(CORRECTED TOTAL)      4      1483.530658

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 1.298507734  | 0                        | 1.2985077343                           | 1.2985077343  |
| B         | -0.088012254 | 0                        | -0.0880122536                          | -0.0880122536 |
| C         | -1.281533089 | 0                        | -1.2815330886                          | -1.2815330886 |
| D         | 0.138259272  | 0                        | 0.1382592715                           | 0.1382592715  |
| E         | -0.038358090 | 0                        | -0.0383580897                          | -0.0383580897 |

| LOT | XL  | XU  | YI  | R       | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|-----|---------|--------|--------|--------------|--------------|
| 1   | 0   | 79  | 79  | 1.00000 | 0.4383 | 0.4383 | 2.08167E-17  | 4.74941E-15  |
| 2   | 79  | 271 | 192 | 2.43038 | 0.3353 | 0.3353 | 2.08167E-17  | 6.20838E-15  |
| 3   | 271 | 463 | 192 | 1.00000 | 0.2975 | 0.2975 | -2.08167E-17 | -6.99720E-15 |
| 4   | 463 | 655 | 192 | 1.00000 | 0.2865 | 0.2865 | 1.24900E-16  | 4.35951E-14  |
| 5   | 655 | 720 | 65  | 0.33854 | 0.2693 | 0.2693 | -2.42861E-16 | -9.01824E-14 |

C.6.4 - Helicopter Programs

-----SYS=HH-52-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 3110.9423345   | 622.1884669 |
| RESIDUAL          | 1  | 0.0196905      | 0.0196905   |
| UNCORRECTED TOTAL | 6  | 3110.9620250   |             |

(CORRECTED TOTAL)      5      731.1991835

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 22.43731843 | 6.0133639610             | -53.968484058                          | 98.843120920 |
| B         | -0.36448958 | 0.0193149419             | -0.609905230                           | -0.119073926 |
| C         | -1.79326858 | 0.0755090930             | -2.752687114                           | -0.833850042 |
| D         | 0.38317637  | 0.0589105435             | -0.365340995                           | 1.131693737  |
| E         | -0.15829848 | 0.0366975875             | -0.624578031                           | 0.307981062  |

| LOT | XL | XU | YI | R       | AUC   | UCP     | DIF        | PCT      |
|-----|----|----|----|---------|-------|---------|------------|----------|
| 1   | 0  | 28 | 28 | 1.00000 | 1.577 | 1.57696 | 0.0000380  | 0.00241  |
| 2   | 28 | 43 | 15 | 0.53571 | 1.104 | 1.10305 | 0.0009491  | 0.08597  |
| 3   | 43 | 60 | 17 | 1.13333 | 1.085 | 1.08670 | -0.0017007 | -0.15674 |
| 4   | 60 | 75 | 15 | 0.88235 | 1.012 | 1.01015 | 0.0018476  | 0.18257  |
| 5   | 75 | 87 | 12 | 0.80000 | 1.041 | 1.04941 | -0.0084115 | -0.80802 |
| 6   | 87 | 99 | 12 | 1.00000 | 1.055 | 1.04769 | 0.0073097  | 0.69286  |

----- SYS=CH-46 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 358546.34036   | 71709.26807 |
| RESIDUAL          | 3  | 1066.67880     | 355.55960   |
| UNCORRECTED TOTAL | 8  | 359613.01916   |             |

(CORRECTED TOTAL)      7      57764.44745

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 14.84253798 | 4.7445452600             | -0.2569773129                          | 29.942053267 |
| B         | -0.10911015 | 0.0834332078             | -0.3746363315                          | 0.156416036  |
| C         | -1.25276923 | 0.1814569649             | -1.8302560167                          | -0.675282435 |
| D         | -0.03378883 | 0.0675873844             | -0.2488856842                          | 0.181308018  |
| E         | 0.01217687  | 0.0202471831             | -0.0522597888                          | 0.076613532  |

| LOT | XL  | XU  | YI  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 14  | 14  | 1.00000 | 7.541 | 6.05556 | 1.48544  | 19.6982 |
| 2   | 14  | 50  | 36  | 2.57143 | 3.898 | 4.04658 | -0.14858 | -3.8116 |
| 3   | 50  | 110 | 60  | 1.66667 | 2.766 | 2.99020 | -0.22420 | -8.1055 |
| 4   | 110 | 195 | 85  | 1.41667 | 2.419 | 2.51818 | -0.09918 | -4.1000 |
| 5   | 195 | 394 | 199 | 2.34118 | 1.986 | 1.96628 | 0.01972  | 0.9931  |
| 6   | 394 | 486 | 92  | 0.46231 | 2.236 | 2.29735 | -0.06135 | -2.7435 |
| 7   | 486 | 576 | 90  | 0.97826 | 2.370 | 2.17992 | 0.19008  | 8.0203  |
| 8   | 576 | 624 | 48  | 0.53333 | 2.547 | 2.62396 | -0.07696 | -3.0217 |

----- SYS=H-53 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 619004.53712   | 123800.90742 |
| RESIDUAL          | 3  | 74.22814       | 24.74271     |
| UNCORRECTED TOTAL | 8  | 619078.76526   |              |

(CORRECTED TOTAL)      7      355155.11828

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
|           |              |                          |                                        |              |
| A         | 7.759975405  | 0.82393298378            | 5.1378086840                           | 10.382142126 |
| B         | -0.156464566 | 0.02280188809            | -0.2290315753                          | -0.083897558 |
| C         | -0.987962101 | 0.01941428568            | -1.0497480649                          | -0.926176137 |
| D         | 0.010328796  | 0.01088092474            | -0.0242997465                          | 0.044957339  |
| E         | -0.000804402 | 0.00078785644            | -0.0033117550                          | 0.001702951  |

| LOT | XL  | XU  | YI  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 10  | 10  | 1.0000  | 6.752 | 6.74302 | 0.00898  | 0.1329  |
| 2   | 10  | 141 | 131 | 13.1000 | 4.264 | 4.26411 | -0.00011 | -0.0027 |
| 3   | 141 | 281 | 140 | 1.0687  | 3.762 | 3.76047 | 0.00153  | 0.0408  |
| 4   | 281 | 293 | 12  | 0.0857  | 3.382 | 3.30548 | 0.07652  | 2.2625  |
| 5   | 293 | 323 | 30  | 2.5000  | 3.341 | 3.54013 | -0.19913 | -5.9601 |
| 6   | 323 | 331 | 8   | 0.2667  | 3.154 | 3.23394 | -0.07994 | -2.5345 |
| 7   | 331 | 361 | 30  | 3.7500  | 3.685 | 3.55546 | 0.12954  | 3.5155  |
| 8   | 361 | 367 | 6   | 0.2000  | 3.947 | 3.16293 | 0.78407  | 19.8650 |

----- SYS=CH-47 -----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 482317.81150   | 96463.56230 |
| RESIDUAL          | 7  | 3542.72349     | 506.10336   |
| UNCORRECTED TOTAL | 12 | 485860.53499   |             |

(CORRECTED TOTAL) 11 132801.70813

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
|           |             |                          |                                        |              |
| A         | 15.29996256 | 4.2031877041             | 5.3609231930                           | 25.239001931 |
| B         | -0.04675339 | 0.0529901281             | -0.1720561418                          | 0.078549354  |
| C         | -1.40145733 | 0.1211065334             | -1.6878310777                          | -1.115083588 |
| D         | 0.11154793  | 0.0645673356             | -0.0411307828                          | 0.264226644  |
| E         | -0.03226695 | 0.0202429469             | -0.0801342931                          | 0.015600402  |

| LOT | XL  | XU  | YI  | R       | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|-----|---------|-------|---------|---------|---------|
| 1   | 0   | 18  | 18  | 1.00000 | 6.181 | 5.52558 | 0.6554  | 10.604  |
| 2   | 18  | 42  | 24  | 1.33333 | 5.226 | 4.87795 | 0.3481  | 6.660   |
| 3   | 42  | 66  | 24  | 1.00000 | 4.559 | 4.56248 | -0.0035 | -0.076  |
| 4   | 66  | 126 | 60  | 2.50000 | 3.459 | 3.27939 | 0.1796  | 5.193   |
| 5   | 126 | 198 | 72  | 1.20000 | 2.760 | 3.14952 | -0.3895 | -14.113 |
| 6   | 198 | 358 | 160 | 2.22222 | 2.307 | 2.40447 | -0.0975 | -4.225  |
| 7   | 358 | 442 | 84  | 0.52500 | 2.313 | 2.43296 | -0.1200 | -5.186  |
| 8   | 442 | 585 | 143 | 1.70238 | 2.695 | 2.51476 | 0.1802  | 6.688   |
| 9   | 585 | 630 | 45  | 0.31469 | 3.463 | 2.77722 | 0.6858  | 19.803  |
| 10  | 630 | 666 | 36  | 0.80000 | 3.085 | 3.42923 | -0.3442 | -11.158 |
| 11  | 666 | 678 | 12  | 0.33333 | 3.671 | 4.52391 | -0.8529 | -23.234 |
| 12  | 678 | 690 | 12  | 1.00000 | 3.852 | 5.06355 | -1.2116 | -31.453 |

----- SYS=H-54 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |             |
|-------------------|----|----------------|-------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
| REGRESSION        | 5  | 21128.788908   | 4225.757782 |
| RESIDUAL          | 0  | 0.000000       | 0.000000    |
| UNCORRECTED TOTAL | 5  | 21128.788908   |             |

(CORRECTED TOTAL)      4      3891.650213

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 4.420312300  | 0                        | 4.4203122997                           | 4.4203122997  |
| B         | -0.236844759 | 0                        | -0.2368447593                          | -0.2368447593 |
| C         | -0.521576392 | 0                        | -0.5215763923                          | -0.5215763923 |
| D         | -0.365945519 | 0                        | -0.3659455189                          | -0.3659455189 |
| E         | 0.069305738  | 0                        | 0.0693057383                           | 0.0693057383  |

| LOT | XL | XU | YI | R       | AUC   | UCP   | DIF          | PCT          |
|-----|----|----|----|---------|-------|-------|--------------|--------------|
| 1   | 0  | 6  | 6  | 1.00000 | 5.248 | 5.248 | -1.11022E-16 | -2.11552E-15 |
| 2   | 6  | 30 | 24 | 4.00000 | 3.388 | 3.388 | 0            | 0            |
| 3   | 30 | 60 | 30 | 1.25000 | 2.801 | 2.801 | 4.99600E-16  | 1.78365E-14  |
| 4   | 60 | 83 | 23 | 0.76667 | 3.402 | 3.402 | -2.77556E-16 | -8.15861E-15 |
| 5   | 83 | 89 | 6  | 0.26087 | 3.083 | 3.083 | -1.11022E-15 | -3.60111E-14 |

----- SYS=HH-60D -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |             |
|-------------------|----|----------------|-------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
| REGRESSION        | 4  | 123892.22000   | 30973.05500 |
| RESIDUAL          | 0  | 0.00000        | 0.00000     |
| UNCORRECTED TOTAL | 4  | 123892.22000   |             |

(CORRECTED TOTAL)      3      24351.97000

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 6.436049085  | 0                        | 6.4360490849                           | 6.4360490849  |
| B         | -0.249974446 | 0                        | -0.2499744460                          | -0.2499744460 |
| C         | -0.581005061 | 0                        | -0.5810050607                          | -0.5810050607 |
| D         | -0.116925505 | 0                        | -0.1169255055                          | -0.1169255055 |
| E         | 0.011296887  | 0                        | 0.0112968875                           | 0.0112968875  |

| LOT | XL | XU | YI | R       | AUC | UCP | DIF         | PCT         |
|-----|----|----|----|---------|-----|-----|-------------|-------------|
| 1   | 0  | 3  | 3  | 1.00000 | 9.2 | 9.2 | 0           | 0           |
| 2   | 3  | 28 | 25 | 8.33333 | 7.1 | 7.1 | 1.11022E-16 | 1.56369E-15 |

|   |    |    |    |         |     |     |              |              |
|---|----|----|----|---------|-----|-----|--------------|--------------|
| 3 | 28 | 63 | 35 | 1.40000 | 6.7 | 6.7 | -3.33067E-16 | -4.97115E-15 |
| 4 | 63 | 92 | 29 | 0.82857 | 6.6 | 6.6 | 5.55112E-16  | 8.41078E-15  |

----- SYS=SH-3 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 72787.516732   | 14557.503346 |
| RESIDUAL          | 4  | 188.796810     | 47.199202    |
| UNCORRECTED TOTAL | 9  | 72976.313542   |              |

(CORRECTED TOTAL)      8      13013.690662

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 4.241110221  | 1.4873914006             | 0.1115055240                           | 8.3707149186  |
| B         | -0.168868932 | 0.0318611323             | -0.2573284203                          | -0.0804094444 |
| C         | -1.053078893 | 0.1429321133             | -1.4499166900                          | -0.6562410961 |
| D         | 0.109714456  | 0.0758984868             | -0.1010106750                          | 0.3204395867  |
| E         | -0.031686932 | 0.0221309357             | -0.0931314290                          | 0.0297575644  |

| LOT | XL  | XU  | YI | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|----|---------|-------|---------|----------|---------|
| 1   | 0   | 20  | 20 | 1.00000 | 3.327 | 3.31562 | 0.01138  | 0.342   |
| 2   | 20  | 69  | 49 | 2.45000 | 2.480 | 2.49516 | -0.01516 | -0.611  |
| 3   | 69  | 140 | 71 | 1.44898 | 2.319 | 2.29672 | 0.02228  | 0.961   |
| 4   | 140 | 185 | 45 | 0.63380 | 1.811 | 1.82212 | -0.01112 | -0.614  |
| 5   | 185 | 221 | 36 | 0.80000 | 1.870 | 1.82120 | 0.04880  | 2.609   |
| 6   | 221 | 257 | 36 | 1.00000 | 1.589 | 1.83972 | -0.25072 | -15.778 |
| 7   | 257 | 287 | 30 | 0.83333 | 1.703 | 1.73998 | -0.03698 | -2.171  |
| 8   | 287 | 335 | 48 | 1.60000 | 1.930 | 1.88854 | 0.04146  | 2.148   |
| 9   | 335 | 350 | 15 | 0.31250 | 2.144 | 1.49183 | 0.65217  | 30.418  |

C.6.5 - Tactical Armament Programs

----- SYS=LLLGB -----

ERROR: ON OBSERVATION 4, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL    | XU    | YI    | R       | AUC    | UCP | DIF | PCT |
|-----|-------|-------|-------|---------|--------|-----|-----|-----|
| 1   | 0     | 1600  | 1600  | 1.00000 | 0.0275 | .   | .   | .   |
| 2   | 1600  | 4550  | 2950  | 1.84375 | 0.0206 | .   | .   | .   |
| 3   | 4550  | 8290  | 3740  | 1.26780 | 0.0189 | .   | .   | .   |
| 4   | 8290  | 17270 | 8980  | 2.40107 | 0.0162 | .   | .   | .   |
| 5   | 17270 | 26890 | 9620  | 1.07127 | 0.0147 | .   | .   | .   |
| 6   | 26890 | 41290 | 14400 | 1.49688 | 0.0137 | .   | .   | .   |
| 7   | 41290 | 56890 | 15600 | 1.08333 | 0.0129 | .   | .   | .   |

|    |       |        |       |         |        |   |   |   |
|----|-------|--------|-------|---------|--------|---|---|---|
| 8  | 56890 | 72490  | 15600 | 1.00000 | 0.0123 | . | . | . |
| 9  | 72490 | 88090  | 15600 | 1.00000 | 0.0118 | . | . | . |
| 10 | 88090 | 100000 | 11910 | 0.76346 | 0.0115 | . | . | . |

----- SYS=CEM -----

ERROR: ON OBSERVATION 3, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL     | XU     | YI    | R       | AUC     | UCP | DIF | PCT |
|-----|--------|--------|-------|---------|---------|-----|-----|-----|
| 1   | 0      | 172    | 172   | 1.00000 | 0.06924 | .   | .   | .   |
| 2   | 172    | 1432   | 1260  | 7.32558 | 0.03038 | .   | .   | .   |
| 3   | 1432   | 7557   | 6125  | 4.86111 | 0.01988 | .   | .   | .   |
| 4   | 7557   | 21777  | 14220 | 2.32163 | 0.01765 | .   | .   | .   |
| 5   | 21777  | 50227  | 28450 | 2.00070 | 0.01619 | .   | .   | .   |
| 6   | 50227  | 85247  | 35020 | 1.23093 | 0.01401 | .   | .   | .   |
| 7   | 85247  | 134157 | 48910 | 1.39663 | 0.01258 | .   | .   | .   |
| 8   | 134157 | 171666 | 37509 | 0.76690 | 0.01181 | .   | .   | .   |

----- SYS=GBU-15 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 40030.311602   | 8006.062320 |
| RESIDUAL          | 4  | 49.974635      | 12.493659   |
| UNCORRECTED TOTAL | 9  | 40080.286237   |             |

(CORRECTED TOTAL)      8      10225.399632

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.0678323318 | 0.03726888402            | -0.0356412788                          | 0.17130594234 |
| B         | -.2109658305 | 0.10548744960            | -0.5038419808                          | 0.08191031974 |
| C         | -.6307718564 | 0.20302948990            | -1.1944644626                          | -.06707925008 |
| D         | 0.0137175573 | 0.02084862138            | -0.0441667122                          | 0.07160182689 |
| E         | -.0040812309 | 0.00281998878            | -0.0119106690                          | 0.00374820724 |

| LOT | XL   | XU   | YI  | R       | AUC    | UCP      | DIF       | PCT     |
|-----|------|------|-----|---------|--------|----------|-----------|---------|
| 1   | 0    | 40   | 40  | 1.00000 | 0.1975 | 0.159707 | 0.037793  | 19.136  |
| 2   | 40   | 105  | 65  | 1.62500 | 0.2000 | 0.135899 | 0.064101  | 32.051  |
| 3   | 105  | 445  | 340 | 5.23077 | 0.1439 | 0.144104 | -0.000204 | -0.142  |
| 4   | 445  | 695  | 250 | 0.73529 | 0.1483 | 0.142964 | 0.005336  | 3.598   |
| 5   | 695  | 1015 | 320 | 1.28000 | 0.1308 | 0.146472 | -0.015672 | -11.982 |
| 6   | 1015 | 1615 | 600 | 1.87500 | 0.1718 | 0.170528 | 0.001272  | 0.740   |
| 7   | 1615 | 2215 | 600 | 1.00000 | 0.1539 | 0.155601 | -0.001701 | -1.105  |
| 8   | 2215 | 2815 | 600 | 1.00000 | 0.1483 | 0.146841 | 0.001459  | 0.984   |
| 9   | 2815 | 3415 | 600 | 1.00000 | 1420   | 0.140330 | 0.001670  | 1.176   |



# C.6.6 - Tactical Missile Programs

----- SYS=AMRAAM -----

## NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 3265482.7960   | 653096.5592 |
| RESIDUAL          | 5  | 1362.0730      | 272.4146    |
| UNCORRECTED TOTAL | 10 | 3266844.8690   |             |
| (CORRECTED TOTAL) | 9  | 183807.0285    |             |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 4.861103989  | 1.4239470778             | 1.2007845490                           | 8.5214234292  |
| B         | -0.353344334 | 0.0293595433             | -0.4288143487                          | -0.2778743188 |
| C         | -0.982790974 | 0.0732795904             | -1.1711594277                          | -0.7944225202 |
| D         | -0.008078680 | 0.0100972726             | -0.0340341697                          | 0.0178768089  |
| E         | 0.001005259  | 0.0014695677             | -0.0027723305                          | 0.0047828478  |

| LOT | XL    | XU    | YI   | R       | AUC   | UCP     | DIF        | PCT     |
|-----|-------|-------|------|---------|-------|---------|------------|---------|
| 1   | 0     | 194   | 194  | 1.00000 | 1.233 | 1.23273 | 0.0002703  | 0.0219  |
| 2   | 194   | 1251  | 1057 | 5.44845 | 0.512 | 0.51211 | -0.0001064 | -0.0208 |
| 3   | 1251  | 3215  | 1964 | 1.85809 | 0.342 | 0.33830 | 0.0037019  | 1.0824  |
| 4   | 3215  | 6211  | 2996 | 1.52546 | 0.257 | 0.26154 | -0.0045423 | -1.7674 |
| 5   | 6211  | 9111  | 2900 | 0.96796 | 0.232 | 0.22453 | 0.0074718  | 3.2206  |
| 6   | 9111  | 12011 | 2900 | 1.00000 | 0.194 | 0.19986 | -0.0058628 | -3.0220 |
| 7   | 12011 | 14911 | 2900 | 1.00000 | 0.182 | 0.18334 | -0.0013351 | -0.7336 |
| 8   | 14911 | 17911 | 3000 | 1.03448 | 0.170 | 0.17067 | -0.0006672 | -0.3925 |
| 9   | 17911 | 20911 | 3000 | 1.00000 | 0.158 | 0.16107 | -0.0030747 | -1.9460 |
| 10  | 20911 | 24674 | 3763 | 1.25433 | 0.155 | 0.15070 | 0.0042960  | 2.7716  |

----- SYS=HARM -----

## NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 1585799.5841   | 317159.9168 |
| RESIDUAL          | 6  | 241.1342       | 40.1890     |
| UNCORRECTED TOTAL | 11 | 1586040.7184   |             |
| (CORRECTED TOTAL) | 10 | 338342.8883    |             |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 2.302362145  | 0.23253976870            | 1.7333574181                           | 2.8713668712  |
| B         | -0.170399327 | 0.01727732160            | -0.2126754401                          | -0.1281232131 |
| C         | -1.118875406 | 0.03305171946            | -1.1997501080                          | -1.0380007031 |
| D         | 0.003511073  | 0.00885977190            | -0.0181680236                          | 0.0251901694  |
| E         | -0.001774829 | 0.00237377979            | -0.0075832636                          | 0.0040336046  |

| LOT | XL    | XU    | YI   | R       | AUC   | UCP      | DIF       | PCT     |
|-----|-------|-------|------|---------|-------|----------|-----------|---------|
| 1   | 0     | 80    | 80   | 1.00000 | 0.809 | 0.787214 | 0.021786  | 2.6929  |
| 2   | 80    | 316   | 236  | 2.95000 | 0.517 | 0.481427 | 0.035573  | 6.8806  |
| 3   | 316   | 712   | 396  | 1.67797 | 0.400 | 0.394460 | 0.005540  | 1.3850  |
| 4   | 712   | 1399  | 687  | 1.73485 | 0.314 | 0.326171 | -0.012171 | -3.8761 |
| 5   | 1399  | 3144  | 1745 | 2.54003 | 0.249 | 0.250566 | -0.001566 | -0.6288 |
| 6   | 3144  | 5612  | 2468 | 1.41433 | 0.223 | 0.221012 | 0.001988  | 0.8914  |
| 7   | 5612  | 7731  | 2119 | 0.85859 | 0.208 | 0.209496 | -0.001496 | -0.7192 |
| 8   | 7731  | 9863  | 2132 | 1.00613 | 0.197 | 0.199684 | -0.002684 | -1.3622 |
| 9   | 9863  | 12863 | 3000 | 1.40713 | 0.184 | 0.183227 | 0.000773  | 0.4203  |
| 10  | 12863 | 15863 | 3000 | 1.00000 | 0.177 | 0.176455 | 0.000545  | 0.3082  |
| 11  | 15863 | 16961 | 1098 | 0.36600 | 0.196 | 0.193046 | 0.002954  | 1.5072  |

----- SYS=IIR -----

NOTE: THE RESIDUAL SS HAS FAILED TO CONVERGE IN THE SPECIFIED NUMBER OF ITERATIONS.

| LOT | XL    | XU    | YI    | R       | AUC   | UCP | DIF | PCT |
|-----|-------|-------|-------|---------|-------|-----|-----|-----|
| 1   | 0     | 200   | 200   | 1.00000 | 0.309 | .   | .   | .   |
| 2   | 200   | 1100  | 900   | 4.50000 | 0.135 | .   | .   | .   |
| 3   | 1100  | 3700  | 2600  | 2.88889 | 0.083 | .   | .   | .   |
| 4   | 3700  | 9429  | 5729  | 2.20346 | 0.082 | .   | .   | .   |
| 5   | 9429  | 18429 | 9000  | 1.57095 | 0.062 | .   | .   | .   |
| 6   | 18429 | 30429 | 12000 | 1.33333 | 0.057 | .   | .   | .   |
| 7   | 30429 | 42429 | 12000 | 1.00000 | 0.055 | .   | .   | .   |
| 8   | 42429 | 54429 | 12000 | 1.00000 | 0.053 | .   | .   | .   |
| 9   | 54429 | 60664 | 6235  | 0.51958 | 0.057 | .   | .   | .   |

----- SYS=AIM7F-R -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 115060.49536   | 23012.09907 |
| RESIDUAL          | 3  | 91.08954       | 30.36318    |
| UNCORRECTED TOTAL | 8  | 115151.58490   |             |

(CORRECTED TOTAL)      7      6543.29279

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 4.332650684  | 1.4175614097             | -0.1787385022                          | 8.8440398705  |
| B         | -0.327106257 | 0.0509162339             | -0.4891471709                          | -0.1650653422 |
| C         | -1.141041591 | 0.1171114860             | -1.5137488952                          | -0.7683342867 |
| D         | 0.014054213  | 0.0311735390             | -0.0851555747                          | 0.1132640013  |
| E         | -0.006925074 | 0.0083058004             | -0.0333582841                          | 0.0195081357  |

| LOT | XL   | XU   | YI   | R       | AUC   | UCP      | DIF       | PCT     |
|-----|------|------|------|---------|-------|----------|-----------|---------|
| 1   | 0    | 100  | 100  | 1.00000 | 0.741 | 0.770494 | -0.029494 | -3.9803 |
| 2   | 100  | 325  | 225  | 2.25000 | 0.378 | 0.351117 | 0.026883  | 7.1118  |
| 3   | 325  | 925  | 600  | 2.66667 | 0.199 | 0.202110 | -0.003110 | -1.5627 |
| 4   | 925  | 1725 | 800  | 1.33333 | 0.169 | 0.168897 | 0.000103  | 0.0612  |
| 5   | 1725 | 2825 | 1100 | 1.37500 | 0.134 | 0.135061 | -0.001061 | -0.7918 |
| 6   | 2825 | 4225 | 1400 | 1.27273 | 0.116 | 0.113491 | 0.002509  | 2.1630  |
| 7   | 4225 | 5125 | 900  | 0.64286 | 0.111 | 0.109195 | 0.001805  | 1.6262  |
| 8   | 5125 | 6269 | 1144 | 1.27111 | 0.095 | 0.099455 | -0.004455 | -4.6896 |

----- SYS=AIM7F-GD -----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 28537.684604   | 5707.536921 |
| RESIDUAL          | 1  | 83.473421      | 83.473421   |
| UNCORRECTED TOTAL | 6  | 28621.158025   |             |
| (CORRECTED TOTAL) | 5  | 7732.207921    |             |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 2.236562833  | 1.8206485548             | -20.896597704                          | 25.369723369 |
| B         | -0.410861480 | 0.3376420698             | -4.700941618                           | 3.879218658  |
| C         | -1.000627167 | 0.5355992835             | -7.805951664                           | 5.804697329  |
| D         | -0.011772598 | 0.1089908226             | -1.396609990                           | 1.373064793  |
| E         | 0.002011038  | 0.0204550528             | -0.257890863                           | 0.261912939  |

| LOT | XL   | XU   | YI   | R       | AUC   | UCP     | DIF       | PCT     |
|-----|------|------|------|---------|-------|---------|-----------|---------|
| 1   | 0    | 15   | 15   | 1.00000 | 1.551 | 1.21319 | 0.337811  | 21.780  |
| 2   | 15   | 85   | 70   | 4.66667 | 0.379 | 0.45237 | -0.073366 | -19.358 |
| 3   | 85   | 295  | 210  | 3.00000 | 0.228 | 0.24345 | -0.015454 | -6.778  |
| 4   | 295  | 505  | 210  | 1.00000 | 0.195 | 0.18169 | 0.013308  | 6.825   |
| 5   | 505  | 1255 | 750  | 3.57143 | 0.130 | 0.12562 | 0.004383  | 3.372   |
| 6   | 1255 | 2565 | 1310 | 1.74667 | 0.090 | 0.09115 | -0.001151 | -1.279  |

#### C.7 - Modified Alternative Two Non-linear Regression

This section contains the summary results produced by the non-linear regression procedure in SAS. The SAS program used to produce this run was discussed in Appendix B.7.

# C.7.1 - Bomber Aircraft Programs

----- SYS=B-1B -----

## NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 59477976.810   | 11895595.362 |
| RESIDUAL          | 0  | 0.000          | 0.000        |
| UNCORRECTED TOTAL | 5  | 59477976.810   |              |

(CORRECTED TOTAL)      4      17234615.032

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 391.4722477 | 0                        | 391.47224774                           | 391.47224774 |
| B         | -0.2627880  | 0                        | -0.26278796                            | -0.26278796  |
| C         | -0.0067588  | 0                        | -0.00675882                            | -0.00675882  |
| D         | -0.0001379  | 0                        | -0.00013791                            | -0.00013791  |
| E         | 0.0003286   | 0                        | 0.00032864                             | 0.00032864   |
| F         | -0.0000183  | 0                        | -0.00001827                            | -0.00001827  |

| LOT | XL | XU  | R       | AUC   | UCP   | DIF          | PCT          |
|-----|----|-----|---------|-------|-------|--------------|--------------|
| 1   | 0  | 1   | 1.00000 | 535.8 | 535.8 | 0            | 0            |
| 2   | 1  | 8   | 6.00000 | 260.3 | 260.3 | 7.10543E-15  | 2.72971E-15  |
| 3   | 8  | 18  | 0.42857 | 200.5 | 200.5 | 3.55271E-15  | 1.77193E-15  |
| 4   | 18 | 52  | 2.40000 | 142.0 | 142.0 | -7.10543E-15 | -5.00382E-15 |
| 5   | 52 | 100 | 0.41176 | 111.3 | 111.3 | -1.77636E-14 | -1.59601E-14 |

----- SYS=B-52 -----

## NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 6  | 70513165.164   | 11752194.194 |
| RESIDUAL          | 4  | 1887606.746    | 471901.687   |
| UNCORRECTED TOTAL | 10 | 72400771.910   |              |

(CORRECTED TOTAL)      9      18070289.989

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 107.2953890 | 64.476400577             | -71.717375570                          | 286.30815366 |
| B         | -0.1422280  | 0.165700874              | -0.602281150                           | 0.31782516   |
| C         | -0.0214379  | 0.051481838              | -0.164372441                           | 0.12149669   |
| D         | 0.0040693   | 0.030871934              | -0.081643812                           | 0.08978233   |
| E         | -0.0016023  | 0.001591992              | -0.006022368                           | 0.00281767   |
| F         | 0.0000062   | 0.000005795              | -0.000009913                           | 0.00002227   |

| LOT | XL  | XU  | R        | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|----------|-------|---------|---------|---------|
| 1   | 0   | 20  | 1.00000  | 112.5 | 75.0815 | 37.418  | 33.261  |
| 2   | 20  | 63  | 1.15000  | 37.0  | 48.0827 | -11.083 | -29.953 |
| 3   | 63  | 88  | -0.41860 | 28.6  | 51.7717 | -23.172 | -81.020 |
| 4   | 88  | 165 | 2.08000  | 32.3  | 31.2411 | 1.059   | 3.278   |
| 5   | 165 | 298 | 0.72727  | 23.4  | 26.2379 | -2.838  | -12.128 |
| 6   | 298 | 500 | 0.51880  | 28.4  | 28.1514 | 0.249   | 0.875   |
| 7   | 500 | 601 | -0.50000 | 27.3  | 25.2483 | 2.052   | 7.515   |
| 8   | 601 | 640 | -0.61386 | 27.3  | 33.5844 | -6.284  | -23.020 |
| 9   | 640 | 702 | 0.58974  | 35.4  | 24.1623 | 11.238  | 31.745  |
| 10  | 702 | 742 | -0.35484 | 35.0  | 31.0651 | 3.935   | 11.243  |

-----SYS=B-58-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 14238328.874   | 3559582.219 |
| RESIDUAL          | 0  | 0.000          | 0.000       |
| UNCORRECTED TOTAL | 4  | 14238328.874   |             |

(CORRECTED TOTAL)      3      1830393.074

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 22.83529489 | 0                        | 22.835294889                           | 22.835294889 |
| B         | 0.42851176  | 0                        | 0.428511757                            | 0.428511757  |
| C         | 0.01887566  | 0                        | 0.018875660                            | 0.018875660  |
| D         | 0.40288351  | 0                        | 0.402883508                            | 0.402883508  |
| E         | -0.00387371 | 0                        | -0.003873709                           | -0.003873709 |
| F         | -0.00035249 | 0                        | -0.000352488                           | -0.000352488 |

| LOT | XL | XU  | R        | AUC   | UCP   | DIF          | PCT          |
|-----|----|-----|----------|-------|-------|--------------|--------------|
| 1   | 0  | 17  | 1.00000  | 93.86 | 93.86 | 1.77636E-15  | 1.89256E-15  |
| 2   | 17 | 53  | 1.11765  | 80.26 | 80.26 | -3.55271E-15 | -4.42651E-15 |
| 3   | 53 | 73  | -0.44444 | 73.16 | 73.16 | 1.77636E-15  | 2.42804E-15  |
| 4   | 73 | 103 | 0.50000  | 36.56 | 36.56 | -5.32907E-15 | -1.45762E-14 |

C.7.2 - Fighter Aircraft Programs

-----SYS=A-10-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 6  | 5178532.0308   | 863088.6718 |
| RESIDUAL          | 3  | 8685.3536      | 2895.1179   |
| UNCORRECTED TOTAL | 9  | 5187217.3844   |             |

(CORRECTED TOTAL) 8 1226666.3049

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 8.992847757  | 3.9901148671             | -3.7056928073                          | 21.691388322 |
| B         | 0.064936971  | 0.1214881237             | -0.3216989824                          | 0.451572925  |
| C         | -0.004343674 | 0.0311506591             | -0.1034806462                          | 0.094793299  |
| D         | 0.000447665  | 0.0073700082             | -0.0230073861                          | 0.023902716  |
| E         | -0.000992853 | 0.0014071986             | -0.0054712627                          | 0.003485556  |
| F         | 0.000002582  | 0.0000071008             | -0.0000200159                          | 0.000025181  |

| LOT | XL  | XU  | R        | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|----------|-------|---------|---------|---------|
| 1   | 0   | 22  | 1.00000  | 12.37 | 9.7943  | 2.5757  | 20.822  |
| 2   | 22  | 75  | 1.40909  | 9.16  | 9.5001  | -0.3401 | -3.713  |
| 3   | 75  | 95  | -0.62264 | 8.20  | 11.1783 | -2.9783 | -36.320 |
| 4   | 95  | 195 | 4.00000  | 8.20  | 8.1955  | 0.0045  | 0.055   |
| 5   | 195 | 339 | 0.44000  | 7.82  | 7.7661  | 0.0539  | 0.689   |
| 6   | 339 | 483 | 0.00000  | 7.59  | 7.7617  | -0.1717 | -2.262  |
| 7   | 483 | 627 | 0.00000  | 7.82  | 7.7044  | 0.1156  | 1.479   |
| 8   | 627 | 687 | -0.58333 | 10.18 | 10.0641 | 0.1159  | 1.138   |
| 9   | 687 | 707 | -0.66667 | 13.64 | 12.4110 | 1.2290  | 9.011   |

----- SYS=F-100 -----

ERROR: ON OBSERVATION 2, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL   | XU   | R       | AUC  | UCP | DIF | PCT |
|-----|------|------|---------|------|-----|-----|-----|
| 1   | 0    | 23   | 1.0000  | 6.51 | .   | .   | .   |
| 2   | 23   | 568  | 22.6957 | 3.45 | .   | .   | .   |
| 3   | 568  | 1161 | 0.0881  | 3.08 | .   | .   | .   |
| 4   | 1161 | 1720 | -0.0573 | 3.10 | .   | .   | .   |
| 5   | 1720 | 2277 | -0.0036 | 2.50 | .   | .   | .   |

----- SYS=F-101 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 6  | 7076859.8446   | 1179476.6408 |
| RESIDUAL          | 0  | 0.0000         | 0.0000       |
| UNCORRECTED TOTAL | 6  | 7076859.8446   |              |

(CORRECTED TOTAL) 5 2200718.4643

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 26.64064384 | 0                        | 26.640643837                           | 26.640643837 |
| B         | -0.12621768 | 0                        | -0.126217679                           | -0.126217679 |

|   |             |   |              |              |
|---|-------------|---|--------------|--------------|
| C | 0.00334168  | 0 | 0.003341678  | 0.003341678  |
| D | -0.02231696 | 0 | -0.022316955 | -0.022316955 |
| E | -0.00188568 | 0 | -0.001885675 | -0.001885675 |
| F | 0.00000645  | 0 | 0.000006447  | 0.000006447  |

| LOT | XL  | XU  | R        | AUC   | UCP   | DIF          | PCT          |
|-----|-----|-----|----------|-------|-------|--------------|--------------|
| 1   | 0   | 31  | 1.00000  | 16.85 | 16.85 | -8.88178E-16 | -5.27109E-15 |
| 2   | 31  | 115 | 1.70968  | 7.58  | 7.58  | 1.11022E-15  | 1.46467E-14  |
| 3   | 115 | 424 | 2.67857  | 6.91  | 6.91  | 4.44089E-16  | 6.42676E-15  |
| 4   | 424 | 630 | -0.33333 | 5.76  | 5.76  | 1.11022E-15  | 1.92747E-14  |
| 5   | 630 | 714 | -0.59223 | 5.27  | 5.27  | -4.44089E-16 | -8.42674E-15 |
| 6   | 714 | 807 | 0.10714  | 5.22  | 5.22  | -2.22045E-15 | -4.25373E-14 |

----- SYS=F-102 -----

ERROR: ON OBSERVATION 3, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL  | XU  | R        | AUC   | UCP | DIF | PCT |
|-----|-----|-----|----------|-------|-----|-----|-----|
| 1   | 0   | 37  | 1.00000  | 11.66 | .   | .   | .   |
| 2   | 37  | 145 | 1.91892  | 5.17  | .   | .   | .   |
| 3   | 145 | 707 | 4.20370  | 3.50  | .   | .   | .   |
| 4   | 707 | 847 | -0.75089 | 2.21  | .   | .   | .   |

----- SYS=F-106 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 4765078.8733   | 1191269.7183 |
| RESIDUAL          | 0  | 0.0000         | 0.0000       |
| UNCORRECTED TOTAL | 4  | 4765078.8733   |              |

(CORRECTED TOTAL)      3      480903.3427

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 41.92637550 | 0                        | 41.926375495                           | 41.926375495 |
| B         | 0.08339599  | 0                        | 0.083395993                            | 0.083395993  |
| C         | 0.09504415  | 0                        | 0.095044148                            | 0.095044148  |
| D         | 0.02604880  | 0                        | 0.026048798                            | 0.026048798  |
| E         | -0.00722594 | 0                        | -0.007225944                           | -0.007225944 |
| F         | 0.00001326  | 0                        | 0.000013260                            | 0.000013260  |

| LOT | XL  | XU  | R        | AUC   | UCP   | DIF          | PCT          |
|-----|-----|-----|----------|-------|-------|--------------|--------------|
| 1   | 0   | 42  | 1.00000  | 34.19 | 34.19 | 8.88178E-16  | 2.59777E-15  |
| 2   | 42  | 130 | 1.09524  | 10.54 | 10.54 | 4.44089E-16  | 4.21337E-15  |
| 3   | 130 | 175 | -0.48864 | 11.64 | 11.64 | -1.55431E-15 | -1.33532E-14 |
| 4   | 175 | 340 | 2.66667  | 7.59  | 7.59  | 0            | 0            |

----- SYS=F-15AB -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |             |
|-------------------|----|----------------|-------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
| REGRESSION        | 6  | 10247642.059   | 1707940.343 |
| RESIDUAL          | 0  | 0.000          | 0.000       |
| UNCORRECTED TOTAL | 6  | 10247642.059   |             |

(CORRECTED TOTAL)      5      1585918.021

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 34.73564275 | 0                        | 34.735642753                           | 34.735642753 |
| B         | -0.11117925 | 0                        | -0.111179246                           | -0.111179246 |
| C         | 0.00573761  | 0                        | 0.005737609                            | 0.005737609  |
| D         | -0.00126181 | 0                        | -0.001261809                           | -0.001261809 |
| E         | -0.00104248 | 0                        | -0.001042484                           | -0.001042484 |
| F         | 0.00000768  | 0                        | 0.000007681                            | 0.000007681  |

| LOT | XL  | XU  | R        | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|----------|--------|--------|--------------|--------------|
| 1   | 0   | 30  | 1.00000  | 25.597 | 25.597 | 1.33227E-15  | 5.20478E-15  |
| 2   | 30  | 92  | 1.06667  | 19.556 | 19.556 | -8.88178E-16 | -4.54172E-15 |
| 3   | 92  | 164 | 0.16129  | 17.183 | 17.183 | 4.44089E-16  | 2.58447E-15  |
| 4   | 164 | 272 | 0.50000  | 17.126 | 17.126 | 3.10862E-15  | 1.81515E-14  |
| 5   | 272 | 296 | -0.77778 | 16.021 | 16.021 | 1.73195E-14  | 1.08105E-13  |
| 6   | 296 | 404 | 3.50000  | 16.272 | 16.272 | -1.77636E-15 | -1.09166E-14 |

----- SYS=F-15CD -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |              |
|-------------------|----|----------------|--------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
| REGRESSION        | 6  | 8418404.2869   | 1403067.3811 |
| RESIDUAL          | 2  | 444.8593       | 222.4297     |
| UNCORRECTED TOTAL | 8  | 8418849.1462   |              |

(CORRECTED TOTAL)      7      752208.0946

| PARAMETER | ESTIMATE      | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|---------------|--------------------------|----------------------------------------|---------------|
|           |               |                          | LOWER                                  | UPPER         |
| A         | 0.9801180073  | 0.51809237116            | -1.2490780381                          | 3.2093140527  |
| B         | 0.7189668282  | 0.10570628335            | 0.2641444029                           | 1.1737892536  |
| C         | -0.0170067852 | 0.01515794181            | -0.0822268615                          | 0.0482132910  |
| D         | 0.1002200911  | 0.02718929732            | -0.0167672985                          | 0.2172074807  |
| E         | -0.0083388636 | 0.00097887764            | -0.0125506804                          | -0.0041270468 |
| F         | 0.0000803205  | 0.00001104174            | 0.0000328113                           | 0.0001278298  |



| LOT | XL  | XU  | R        | AUC    | UCP     | DIF      | PCT     |
|-----|-----|-----|----------|--------|---------|----------|---------|
| 1   | 0   | 97  | 1.00000  | 17.249 | 17.2449 | 0.00408  | 0.0236  |
| 2   | 97  | 175 | -0.19588 | 15.588 | 15.6287 | -0.04066 | -0.2609 |
| 3   | 175 | 235 | -0.23077 | 15.508 | 15.3527 | 0.15534  | 1.0017  |
| 4   | 235 | 277 | -0.30000 | 17.665 | 17.9630 | -0.29802 | -1.6871 |
| 5   | 277 | 313 | -0.14286 | 19.943 | 19.6627 | 0.28034  | 1.4057  |
| 6   | 313 | 352 | 0.08333  | 19.308 | 19.5181 | -0.21006 | -1.0880 |
| 7   | 352 | 388 | -0.07692 | 21.954 | 21.8241 | 0.12989  | 0.5917  |
| 8   | 388 | 436 | 0.33333  | 21.017 | 21.0277 | -0.01071 | -0.0510 |

----- SYS=F-15E -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 14025321.012   | 2805064.202 |
| RESIDUAL          | 1  | 7455.525       | 7455.525    |
| UNCORRECTED TOTAL | 6  | 14032776.537   |             |

|                   |   |            |
|-------------------|---|------------|
| (CORRECTED TOTAL) | 5 | 172346.387 |
|-------------------|---|------------|

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 5.409385832  | 4.6193468078             | -53.284034708                          | 64.102806372 |
| B         | 0.323377166  | 0.0000000000             | 0.323377166                            | 0.323377166  |
| C         | 0.100097860  | 0.0712591021             | -0.805320292                           | 1.005516011  |
| D         | 0.027360355  | 0.0586383625             | -0.717698679                           | 0.772419389  |
| E         | 0.000469879  | 0.0053297742             | -0.067250232                           | 0.068189990  |
| F         | -0.000019228 | 0.0000401219             | -0.000529018                           | 0.000490561  |

| LOT | XL  | XU  | R       | AUC    | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|--------|---------|----------|---------|
| 1   | 0   | 60  | 1.00000 | 20.544 | 20.5440 | -0.00000 | -0.0000 |
| 2   | 60  | 132 | 0.20000 | 19.203 | 19.2030 | -0.00000 | -0.0000 |
| 3   | 132 | 228 | 0.33333 | 17.608 | 17.6080 | 0.00000  | 0.0000  |
| 4   | 228 | 324 | 0.00000 | 16.175 | 15.8377 | 0.33726  | 2.0850  |
| 5   | 324 | 420 | 0.00000 | 16.041 | 16.7743 | -0.73326 | -4.5712 |
| 6   | 420 | 516 | 0.00000 | 17.927 | 17.5301 | 0.39695  | 2.2142  |

----- SYS=F-16AB -----

NOTE: THE RESIDUAL SS HAS FAILED TO CONVERGE IN THE SPECIFIED NUMBER OF ITERATIONS.

| LOT | XL  | XU  | R        | AUC   | UCP | DIF | PCT |
|-----|-----|-----|----------|-------|-----|-----|-----|
| 1   | 0   | 105 | 1.00000  | 10.14 | .   | .   | .   |
| 2   | 105 | 250 | 0.38095  | 7.74  | .   | .   | .   |
| 3   | 250 | 425 | 0.20690  | 8.04  | .   | .   | .   |
| 4   | 425 | 605 | 0.02857  | 5.05  | .   | .   | .   |
| 5   | 605 | 725 | -0.33333 | 5.13  | .   | .   | .   |

----- SYS=F-16E -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

|                   |    |                |             |
|-------------------|----|----------------|-------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
| REGRESSION        | 6  | 48016685.827   | 8002780.971 |
| RESIDUAL          | 4  | 159.796        | 39.949      |
| UNCORRECTED TOTAL | 10 | 48016845.623   |             |
| (CORRECTED TOTAL) | 9  | 1747028.765    |             |

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 18.61030848 | 0.46944060102            | 17.306950060                           | 19.913666907 |
| B         | -4.33353785 | 0.05977156146            | -4.499488061                           | -4.167587633 |
| C         | -0.16506958 | 0.00382917502            | -0.175700935                           | -0.154438234 |
| D         | 0.40093864  | 0.00794338859            | 0.378884556                            | 0.422992724  |
| E         | 0.04896582  | 0.00066344703            | 0.047123818                            | 0.050807816  |
| F         | -0.00013544 | 0.00000181963            | -0.000140495                           | -0.000130391 |

| LOT | XL   | XU   | R       | AUC   | UCP     | DIF       | PCT      |
|-----|------|------|---------|-------|---------|-----------|----------|
| 1   | 0    | 120  | 1.00000 | 9.86  | 9.8600  | 0.000000  | 0.00000  |
| 2   | 120  | 264  | 0.20000 | 10.58 | 10.5800 | 0.000000  | 0.00000  |
| 3   | 264  | 414  | 0.04167 | 14.55 | 14.5500 | -0.000000 | -0.00000 |
| 4   | 414  | 630  | 0.44000 | 11.93 | 11.9300 | -0.000000 | -0.00000 |
| 5   | 630  | 846  | 0.00000 | 11.28 | 11.2594 | 0.020612  | 0.18273  |
| 6   | 846  | 1062 | 0.00000 | 11.02 | 11.0401 | -0.020138 | -0.18274 |
| 7   | 1062 | 1278 | 0.00000 | 10.88 | 10.8693 | 0.010734  | 0.09866  |
| 8   | 1278 | 1494 | 0.00000 | 10.69 | 10.7296 | -0.039603 | -0.37047 |
| 9   | 1494 | 1710 | 0.00000 | 10.61 | 10.6117 | -0.001715 | -0.01616 |
| 10  | 1710 | 1926 | 0.00000 | 10.54 | 10.5099 | 0.030134  | 0.28590  |

C.7.3 - Electronics Programs

----- SYS=ARC-109V -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

|                   |    |                |              |
|-------------------|----|----------------|--------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
| REGRESSION        | 5  | 66.744073730   | 13.348814746 |
| RESIDUAL          | 0  | 0.000000000    | 0.000000000  |
| UNCORRECTED TOTAL | 5  | 66.744073730   |              |
| (CORRECTED TOTAL) | 4  | 29.010182832   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.0508125509 | 0.05081255088            | 0.05081255088                          | 0.05081255088 |
| B         | -.1148650331 | 0.11486503313            | -.11486503313                          | -.11486503313 |

|   |              |   |               |               |
|---|--------------|---|---------------|---------------|
| C | -.0278567293 | 0 | -.02785672932 | -.02785672932 |
| D | 0.0062632117 | 0 | 0.00626321166 | 0.00626321166 |
| E | -.0000107375 | 0 | -.00001073750 | -.00001073750 |
| F | 0.0000011106 | 0 | 0.00000111057 | 0.00000111    |

| LOT | XL  | XU  | R        | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|----------|--------|--------|--------------|--------------|
| 1   | 0   | 4   | 1.00000  | 0.0487 | 0.0487 | -1.73472E-18 | -3.56206E-15 |
| 2   | 4   | 28  | 5.00000  | 0.0393 | 0.0393 | -2.60209E-18 | -6.62108E-15 |
| 3   | 28  | 107 | 2.29167  | 0.0285 | 0.0285 | -4.33681E-19 | -1.52169E-15 |
| 4   | 107 | 333 | 1.86076  | 0.0313 | 0.0313 | 1.73472E-18  | 5.54225E-15  |
| 5   | 333 | 441 | -0.52212 | 0.0303 | 0.0303 | -1.38778E-17 | -4.58013E-14 |

----- SYS=ARC-54 -----

ERROR: ON OBSERVATION 1, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL   | XU    | R        | AUC    | UCP | DIF | PCT |
|-----|------|-------|----------|--------|-----|-----|-----|
| 1   | 0    | 900   | 1.00000  | 0.0210 | .   | .   | .   |
| 2   | 900  | 1753  | -0.05222 | 0.0165 | .   | .   | .   |
| 3   | 1753 | 3134  | 0.61899  | 0.0164 | .   | .   | .   |
| 4   | 3134 | 4294  | -0.16003 | 0.0145 | .   | .   | .   |
| 5   | 4294 | 4594  | -0.74138 | 0.0144 | .   | .   | .   |
| 6   | 4594 | 7697  | 9.34333  | 0.0139 | .   | .   | .   |
| 7   | 7697 | 10347 | -0.14599 | 0.0143 | .   | .   | .   |

----- SYS=ASN-63 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 6  | 27734.582905   | 4622.430484 |
| RESIDUAL          | 4  | 7.382091       | 1.845523    |
| UNCORRECTED TOTAL | 10 | 27741.964996   |             |

(CORRECTED TOTAL)      9      14794.094157

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 1.240752912  | 1.9685313177             | -4.2246922779                          | 6.7061981026 |
| B         | -0.213365065 | 0.2122262038             | -0.8025914974                          | 0.3758613666 |
| C         | 0.028514035  | 0.0122282807             | -0.0054366552                          | 0.0624647261 |
| D         | -0.018275487 | 0.0254872215             | -0.0890384007                          | 0.0524874273 |
| E         | -0.000309112 | 0.0001785589             | -0.0008048642                          | 0.0001866403 |
| F         | 0.000000157  | 0.0000002237             | -0.0000004642                          | 0.0000007779 |

| LOT | XL  | XU  | R        | AUC    | UCP      | DIF      | PCT   |
|-----|-----|-----|----------|--------|----------|----------|-------|
| 1   | 0   | 781 | 1.00000  | 0.1866 | 0.186588 | 0.000012 | 0.006 |
| 2   | 781 | 930 | -0.80922 | 0.1744 | 0.174048 | 0.000352 | 0.202 |

|    |      |      |          |        |          |           |         |
|----|------|------|----------|--------|----------|-----------|---------|
| 3  | 930  | 1217 | 0.92617  | 0.1769 | 0.177948 | -0.001048 | -0.592  |
| 4  | 1217 | 1358 | -0.50871 | 0.1817 | 0.175628 | 0.006072  | 3.342   |
| 5  | 1358 | 1450 | -0.34752 | 0.1772 | 0.198935 | -0.021735 | -12.266 |
| 6  | 1450 | 1585 | 0.46739  | 0.2189 | 0.209425 | 0.009475  | 4.329   |
| 7  | 1585 | 1693 | -0.20000 | 0.1911 | 0.193070 | -0.001970 | -1.031  |
| 8  | 1693 | 1851 | 0.46296  | 0.1917 | 0.192685 | -0.000985 | -0.514  |
| 9  | 1851 | 1887 | -0.77215 | 0.2005 | 0.178739 | 0.021761  | 10.853  |
| 10 | 1887 | 1923 | 0.00000  | 0.2145 | 0.228055 | -0.013555 | -6.319  |

----- SYS=ASN-70 -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 6  | 119.45541158   | 19.90923526 |
| RESIDUAL          | 2  | 0.00058723     | 0.00029361  |
| UNCORRECTED TOTAL | 8  | 119.45599881   |             |

|                   |   |             |
|-------------------|---|-------------|
| (CORRECTED TOTAL) | 7 | 64.18968336 |
|-------------------|---|-------------|

| PARAMETER | ESTIMATE      | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|---------------|--------------------------|----------------------------------------|---------------|
|           |               |                          | LOWER                                  | UPPER         |
| A         | 0.0218463199  | 0.00609012041            | -0.00435764119                         | 0.04805028099 |
| B         | 0.0948802807  | 0.04266164368            | -0.08867997361                         | 0.27844053493 |
| C         | 0.0232979526  | 0.00943226876            | -0.01728627017                         | 0.06388217539 |
| D         | 0.0238339372  | 0.01260854403            | -0.03041684523                         | 0.07808471960 |
| E         | -0.0002326897 | 0.00011062991            | -0.00070869698                         | 0.00024331766 |
| F         | 0.0000003870  | 0.00000045746            | -0.0000158130                          | 0.00000235534 |

| LOT | XL  | XU  | R        | AUC    | UCP       | DIF        | PCT     |
|-----|-----|-----|----------|--------|-----------|------------|---------|
| 1   | 0   | 152 | 1.00000  | 0.0350 | 0.0349997 | 0.0000003  | 0.0009  |
| 2   | 152 | 402 | 0.64474  | 0.0353 | 0.0352999 | 0.0000001  | 0.0002  |
| 3   | 402 | 483 | -0.67600 | 0.0342 | 0.0342276 | -0.0000276 | -0.0808 |
| 4   | 483 | 541 | -0.28395 | 0.0356 | 0.0355356 | 0.0000644  | 0.1808  |
| 5   | 541 | 567 | -0.55172 | 0.0370 | 0.0370202 | -0.0000202 | -0.0547 |
| 6   | 567 | 575 | -0.69231 | 0.0399 | 0.0382730 | 0.0016270  | 4.0777  |
| 7   | 575 | 583 | 0.00000  | 0.0370 | 0.0394846 | -0.0024846 | -6.7150 |
| 8   | 583 | 594 | 0.37500  | 0.0427 | 0.0425299 | 0.0001701  | 0.3984  |

----- SYS=ASN-99 -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 6  | 383.24385910   | 63.87397652 |
| RESIDUAL          | 2  | 0.35975004     | 0.17987502  |
| UNCORRECTED TOTAL | 8  | 383.60360914   |             |

|                   |   |             |
|-------------------|---|-------------|
| (CORRECTED TOTAL) | 7 | 61.21154176 |
|-------------------|---|-------------|

| PARAMETER | ESTIMATE      | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|---------------|--------------------------|----------------------------------------|---------------|
|           |               |                          | LOWER                                  | UPPER         |
| A         | 0.0312275602  | 0.00549491168            | 0.00758460367                          | 0.05487051665 |
| B         | 0.1820348477  | 0.03618256478            | 0.02635212629                          | 0.33771756921 |
| C         | 0.0693993361  | 0.01765860401            | -0.00658033937                         | 0.14537901155 |
| D         | -0.0363124110 | 0.01151691632            | -0.08586624687                         | 0.01324142483 |
| E         | -0.0011134637 | 0.00047564600            | -0.00316002573                         | 0.00093309836 |
| F         | 0.0000020265  | 0.00000137434            | -0.00000388687                         | 0.00000793985 |

| LOT | XL  | XU   | R        | AUC    | UCP       | DIF        | PCT     |
|-----|-----|------|----------|--------|-----------|------------|---------|
| 1   | 0   | 157  | 1.00000  | 0.0464 | 0.0452072 | 0.0011928  | 2.5706  |
| 2   | 157 | 353  | 0.24841  | 0.0404 | 0.0426832 | -0.0022832 | -5.6515 |
| 3   | 353 | 538  | -0.05612 | 0.0413 | 0.0401839 | 0.0011161  | 2.7023  |
| 4   | 538 | 781  | 0.31351  | 0.0433 | 0.0429980 | 0.0003020  | 0.6974  |
| 5   | 781 | 805  | -0.90123 | 0.0570 | 0.0480138 | 0.0089862  | 15.7652 |
| 6   | 805 | 877  | 2.00000  | 0.0624 | 0.0637264 | -0.0013264 | -2.1256 |
| 7   | 877 | 933  | -0.22222 | 0.0635 | 0.0655052 | -0.0020052 | -3.1578 |
| 8   | 933 | 1050 | 1.08929  | 0.0684 | 0.0676280 | 0.0007720  | 1.1286  |

----- SYS=ASN-108 -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 5  | 560.63059524   | 112.12611905 |
| RESIDUAL          | 0  | 0.00000000     | 0.00000000   |
| UNCORRECTED TOTAL | 5  | 560.63059524   |              |

(CORRECTED TOTAL) 4 226.66710333

| PARAMETER | ESTIMATE      | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |                |
|-----------|---------------|--------------------------|----------------------------------------|----------------|
|           |               |                          | LOWER                                  | UPPER          |
| A         | 0.1578636452  | 0                        | 0.15786364515                          | 0.15786364515  |
| B         | -0.1229443753 | 0                        | -0.12294437533                         | -0.12294437533 |
| C         | -0.0226386425 | 0                        | -0.02263864247                         | -0.02263864247 |
| D         | 0.0065149460  | 0                        | 0.00651494598                          | 0.00651494598  |
| E         | -0.0000251335 | 0                        | -0.00002513352                         | -0.00002513352 |
| F         | 0.0000011142  | 0                        | 0.00000111416                          | 0.00000111416  |

| LOT | XL  | XU  | R        | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|----------|--------|--------|--------------|--------------|
| 1   | 0   | 8   | 1.00000  | 0.1373 | 0.1373 | 3.46945E-18  | 2.52691E-15  |
| 2   | 8   | 39  | 2.87500  | 0.1048 | 0.1048 | -3.46945E-18 | -3.31054E-15 |
| 3   | 39  | 116 | 1.48387  | 0.0874 | 0.0874 | -1.73472E-18 | -1.98481E-15 |
| 4   | 116 | 332 | 1.80519  | 0.0943 | 0.0943 | 8.67362E-18  | 9.19790E-15  |
| 5   | 332 | 440 | -0.50000 | 0.0872 | 0.0872 | 8.67362E-18  | 9.94681E-15  |

----- SYS=ASQ-133 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 6  | 2884.7700964   | 480.7950161 |
| RESIDUAL          | 0  | 0.0000000      | 0.0000000   |
| UNCORRECTED TOTAL | 6  | 2884.7700964   |             |

(CORRECTED TOTAL) 5 403.6845454

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.5067848917 | 0                        | 0.50678489172                          | 0.50678489172 |
| B         | 0.0157039671 | 0                        | 0.01570396708                          | 0.01570396708 |
| C         | 0.1149379953 | 0                        | 0.11493799534                          | 0.11493799534 |
| D         | -.0421892894 | 0                        | -.04218928944                          | -.04218928944 |
| E         | 0.0000648061 | 0                        | 0.00006480609                          | 0.00006480609 |
| F         | -.0000168676 | 0                        | -.00001686763                          | -.00001686763 |

| LOT | XL  | XU  | R        | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|----------|--------|--------|--------------|--------------|
| 1   | 0   | 14  | 1.00000  | 0.5856 | 0.5856 | -1.38778E-17 | -2.36984E-15 |
| 2   | 14  | 33  | 0.35714  | 0.5862 | 0.5862 | 1.38778E-17  | 2.36742E-15  |
| 3   | 33  | 101 | 2.57895  | 0.4255 | 0.4255 | -2.08167E-17 | -4.89229E-15 |
| 4   | 101 | 168 | -0.01471 | 0.3828 | 0.3828 | 6.93889E-18  | 1.81267E-15  |
| 5   | 168 | 249 | 0.20896  | 0.3535 | 0.3535 | -4.16334E-17 | -1.17775E-14 |
| 6   | 249 | 307 | -0.28395 | 0.3355 | 0.3355 | -5.55112E-17 | -1.65458E-14 |

----- SYS=ASW-32 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 6  | 300.87807368   | 50.14634561 |
| RESIDUAL          | 0  | 0.00000000     | 0.00000000  |
| UNCORRECTED TOTAL | 6  | 300.87807368   |             |

(CORRECTED TOTAL) 5 54.90298664

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.001319622  | 0                        | 0.0013196215                           | 0.0013196215  |
| B         | 3.402523866  | 0                        | 3.4025238662                           | 3.4025238662  |
| C         | 1.679353266  | 0                        | 1.6793532665                           | 1.6793532665  |
| D         | -1.657279443 | 0                        | -1.6572794431                          | -1.6572794431 |
| E         | -0.074485255 | 0                        | -0.0744852551                          | -0.0744852551 |
| F         | 0.000472229  | 0                        | 0.0004722289                           | 0.0004722289  |

| LOT | XL  | XU  | R       | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|---------|--------|--------|--------------|--------------|
| 1   | 0   | 12  | 1.00000 | 0.2338 | 0.2338 | 4.85723E-17  | 2.07751E-14  |
| 2   | 12  | 38  | 1.16667 | 0.1643 | 0.1643 | 2.77556E-17  | 1.68932E-14  |
| 3   | 38  | 86  | 0.84615 | 0.1524 | 0.1524 | -3.46945E-17 | -2.27654E-14 |
| 4   | 86  | 134 | 0.00000 | 0.0974 | 0.0974 | 2.08167E-17  | 2.13724E-14  |
| 5   | 134 | 184 | 0.04167 | 0.1441 | 0.1441 | 5.20417E-17  | 3.61150E-14  |
| 6   | 184 | 264 | 0.60000 | 0.1518 | 0.1518 | 8.32667E-17  | 5.48529E-14  |

----- SYS=CP-1035N -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 6  | 209.24815220   | 34.87469203 |
| RESIDUAL          | 0  | 0.00000000     | 0.00000000  |
| UNCORRECTED TOTAL | 6  | 209.24815220   |             |

|                   |   |             |
|-------------------|---|-------------|
| (CORRECTED TOTAL) | 5 | 41.36682739 |
|-------------------|---|-------------|

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|--------------|--------------------------|------------------------------------------------------------|
| A         | 0.1600619731 | 0                        | 0.16006197307 0.16006197307                                |
| B         | -.1845185671 | 0                        | -.18451856709 -.18451856709                                |
| C         | 0.1531327144 | 0                        | 0.15313271438 0.15313271438                                |
| D         | -.2041390896 | 0                        | -.20413908964 -.20413908964                                |
| E         | 0.0052094070 | 0                        | 0.00520940704 0.00520940704                                |
| F         | -.0000486158 | 0                        | -.00004861585 -.00004861585                                |

| LOT | XL  | XU  | R       | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|---------|--------|--------|--------------|--------------|
| 1   | 0   | 12  | 1.00000 | 0.1248 | 0.1248 | 0            | 0            |
| 2   | 12  | 38  | 1.16667 | 0.0903 | 0.0903 | -6.93889E-18 | -7.68427E-15 |
| 3   | 38  | 86  | 0.84615 | 0.1236 | 0.1236 | -8.67362E-18 | -7.01749E-15 |
| 4   | 86  | 134 | 0.00000 | 0.1287 | 0.1287 | 4.16334E-17  | 3.23492E-14  |
| 5   | 134 | 184 | 0.04167 | 0.1310 | 0.1310 | 1.38778E-17  | 1.05937E-14  |
| 6   | 184 | 264 | 0.60000 | 0.1154 | 0.1154 | -2.25514E-17 | -1.95419E-14 |

----- SYS=JTIDS -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 1571.0420382   | 314.2084076 |
| RESIDUAL          | 0  | 0.0000000      | 0.0000000   |
| UNCORRECTED TOTAL | 5  | 1571.0420382   |             |

|                   |   |            |
|-------------------|---|------------|
| (CORRECTED TOTAL) | 4 | 40.2575028 |
|-------------------|---|------------|

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.7228105396 | 0                        | 0.72281053955                          | 0.72281053955 |
| B         | -.3744574829 | 0                        | -.37445748291                          | -.37445748291 |
| C         | -.2036849818 | 0                        | -.20368498175                          | -.20368498175 |
| D         | 0.2806883737 | 0                        | 0.28068837373                          | 0.28068837373 |
| E         | 0.0014359721 | 0                        | 0.00143597211                          | 0.00143597211 |
| F         | 0.0000091069 | 0                        | 0.00000910691                          | 0.00000910691 |

| LOT | XL  | XU  | R        | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|----------|--------|--------|--------------|--------------|
| 1   | 0   | 45  | 1.00000  | 0.4068 | 0.4068 | 2.08167E-17  | 5.11718E-15  |
| 2   | 45  | 121 | 0.68889  | 0.2764 | 0.2764 | -3.46945E-17 | -1.25523E-14 |
| 3   | 121 | 198 | 0.01316  | 0.2466 | 0.2466 | -5.20417E-17 | -2.11037E-14 |
| 4   | 198 | 270 | -0.06494 | 0.2308 | 0.2308 | 2.42861E-17  | 1.05226E-14  |
| 5   | 270 | 327 | -0.20833 | 0.2205 | 0.2205 | -5.55112E-17 | -2.51751E-14 |

-----SYS=LANNAV-----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 6  | 87339.225542   | 14556.537590 |
| RESIDUAL          | 1  | 0.005354       | 0.005354     |
| UNCORRECTED TOTAL | 7  | 87339.230896   |              |
| (CORRECTED TOTAL) | 6  | 17386.822804   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 1.815537373  | 0.02193274964            | 1.5368598558                           | 2.0942148897 |
| B         | -0.136509837 | 0.08143956615            | -1.1712809649                          | 0.8982612900 |
| C         | -0.001440080 | 0.00441573882            | -0.0575464571                          | 0.0546662979 |
| D         | 0.000475466  | 0.00133388676            | -0.0164728989                          | 0.0774238315 |
| E         | 0.000337788  | 0.00120426489            | -0.0149636016                          | 0.0156391778 |
| F         | -0.000001275 | 0.00000452195            | -0.0000587312                          | 0.0000561805 |

| LOT | XL  | XU  | R        | AUC    | UCP     | DIF         | PCT       |
|-----|-----|-----|----------|--------|---------|-------------|-----------|
| 1   | 0   | 4   | 1.00000  | 1.7500 | 1.74019 | 0.00980909  | 0.560519  |
| 2   | 4   | 38  | 7.50000  | 1.3199 | 1.31992 | -0.00002284 | -0.001730 |
| 3   | 38  | 176 | 3.05882  | 1.0761 | 1.07609 | 0.00000639  | 0.000594  |
| 4   | 176 | 320 | 0.04348  | 0.9679 | 0.96814 | -0.00024087 | -0.024886 |
| 5   | 320 | 464 | 0.00000  | 0.9184 | 0.91806 | 0.00033823  | 0.036828  |
| 6   | 464 | 608 | 0.00000  | 0.8854 | 0.88551 | -0.00010702 | -0.012087 |
| 7   | 608 | 724 | -0.19444 | 0.8643 | 0.86430 | -0.00000064 | -0.000074 |



----- SYS=LANTARP -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 6  | 64803.866662   | 10800.644444 |
| RESIDUAL          | 1  | 0.014113       | 0.014113     |
| UNCORRECTED TOTAL | 7  | 64803.880775   |              |

(CORRECTED TOTAL) 6 12795.420992

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 1.541585938  | 0.03429497993            | 1.1058339233                           | 1.9773379532 |
| B         | -0.201283770 | 0.08644487134            | -1.2996523050                          | 0.8970847655 |
| C         | -0.004728681 | 0.00422865218            | -0.0584579361                          | 0.0490005732 |
| D         | 0.001547595  | 0.00131046069            | -0.0151031182                          | 0.0181983090 |
| E         | 0.001401953  | 0.00126344957            | -0.0146514370                          | 0.0174553435 |
| F         | -0.000005277 | 0.00000476124            | -0.0000657729                          | 0.0000552198 |

| LOT | XL  | XU  | R        | AUC    | UCP     | DIF       | PCT     |
|-----|-----|-----|----------|--------|---------|-----------|---------|
| 1   | 0   | 4   | 1.00000  | 1.4375 | 1.46059 | -0.023090 | -1.6063 |
| 2   | 4   | 38  | 7.50000  | 1.1286 | 1.12857 | 0.000030  | 0.0026  |
| 3   | 38  | 166 | 2.76471  | 0.9375 | 0.93751 | -0.000012 | -0.0013 |
| 4   | 166 | 310 | 0.12500  | 0.8490 | 0.84886 | 0.000137  | 0.0161  |
| 5   | 310 | 454 | 0.00000  | 0.8081 | 0.80781 | 0.000288  | 0.0357  |
| 6   | 454 | 598 | 0.00000  | 0.7795 | 0.77991 | -0.000409 | -0.0525 |
| 7   | 598 | 714 | -0.19444 | 0.7619 | 0.76189 | 0.000006  | 0.0008  |

----- SYS=LANTREC -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 11938.396467   | 2387.679293 |
| RESIDUAL          | 0  | 0.000000       | 0.000000    |
| UNCORRECTED TOTAL | 5  | 11938.396467   |             |

(CORRECTED TOTAL) 4 1483.530658

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.4997170701 | 0                        | 0.49971707010                          | 0.49971707010 |
| B         | -.0435003603 | 0                        | -.04350036028                          | -.04350036028 |
| C         | 0.0438966071 | 0                        | 0.04389660715                          | 0.04389660715 |
| D         | -.0258765392 | 0                        | -.02587653915                          | -.02587653915 |
| E         | -.0001320020 | 0                        | -.00013200201                          | -.00013200201 |
| F         | -.0000005200 | 0                        | -.00000051995                          | -.00000051995 |

| LOT | XL  | XU  | R        | AUC    | UCP    | DIF          | PCT          |
|-----|-----|-----|----------|--------|--------|--------------|--------------|
| 1   | 0   | 79  | 1.00000  | 0.4383 | 0.4383 | 1.38778E-17  | 3.16628E-15  |
| 2   | 79  | 271 | 1.43038  | 0.3353 | 0.3353 | -4.85723E-17 | -1.44862E-14 |
| 3   | 271 | 463 | 0.00000  | 0.2975 | 0.2975 | -3.46945E-17 | -1.16620E-14 |
| 4   | 463 | 655 | 0.00000  | 0.2865 | 0.2865 | -6.93889E-17 | -2.42195E-14 |
| 5   | 655 | 720 | -0.66146 | 0.2693 | 0.2693 | 6.93889E-18  | 2.57664E-15  |

#### C.7.4 - Helicopter Programs

----- SYS=HH-52 -----

NOTE: THE RESIDUAL SS HAS FAILED TO CONVERGE IN THE SPECIFIED NUMBER OF ITERATIONS.

| LOT | XL | XU | R        | AUC   | UCP | DIF | PCT |
|-----|----|----|----------|-------|-----|-----|-----|
| 1   | 0  | 28 | 1.00000  | 1.577 | .   | .   | .   |
| 2   | 28 | 43 | -0.46429 | 1.104 | .   | .   | .   |
| 3   | 43 | 60 | 0.13333  | 1.085 | .   | .   | .   |
| 4   | 60 | 75 | -0.11765 | 1.012 | .   | .   | .   |
| 5   | 75 | 87 | -0.20000 | 1.041 | .   | .   | .   |
| 6   | 87 | 99 | 0.00000  | 1.055 | .   | .   | .   |

----- SYS=CH-46 -----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 6  | 357821.38843   | 59636.89807 |
| RESIDUAL          | 2  | 1791.63073     | 895.81536   |
| UNCORRECTED TOTAL | 8  | 359613.01916   |             |
| (CORRECTED TOTAL) | 7  | 57764.44745    |             |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 9.322454628  | 4.2707781297             | -9.0534224310                          | 27.698331687 |
| B         | -0.162306695 | 0.1497192053             | -0.8065035190                          | 0.481890130  |
| C         | -0.036788011 | 0.0341743064             | -0.1838297990                          | 0.110253777  |
| D         | -0.007432906 | 0.0424292453             | -0.1899932201                          | 0.175127408  |
| E         | -0.001451244 | 0.0021274502             | -0.0106050243                          | 0.007702536  |
| F         | 0.000006080  | 0.0000092127             | -0.0000335590                          | 0.000045720  |

| LOT | XL  | XU  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 14  | 1.00000 | 7.541 | 6.63693 | 0.90407  | 11.989  |
| 2   | 14  | 50  | 1.57143 | 3.898 | 3.57457 | 0.32343  | 8.297   |
| 3   | 50  | 110 | 0.66667 | 2.766 | 3.06946 | -0.30346 | -10.971 |
| 4   | 110 | 195 | 0.41667 | 2.419 | 2.55480 | -0.13580 | -5.614  |

|   |     |     |          |       |         |          |        |
|---|-----|-----|----------|-------|---------|----------|--------|
| 5 | 195 | 394 | 1.34118  | 1.986 | 1.98788 | -0.00188 | -0.095 |
| 6 | 394 | 486 | -0.53769 | 2.236 | 2.34645 | -0.11045 | -4.940 |
| 7 | 486 | 576 | -0.02174 | 2.370 | 2.03160 | 0.33840  | 14.279 |
| 8 | 576 | 624 | -0.46667 | 2.547 | 2.55410 | -0.00710 | -0.279 |

----- SYS=H-53 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 6  | 619062.83448   | 103177.13908 |
| RESIDUAL          | 2  | 15.93078       | 7.96539      |
| UNCORRECTED TOTAL | 8  | 619078.76526   |              |

(CORRECTED TOTAL)      7      355155.11828

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 7.660410922  | 0.43240009023            | 5.7999230535                           | 9.5208987900 |
| B         | -0.089077522 | 0.02743778554            | -0.2071340818                          | 0.0289790379 |
| C         | 0.022361226  | 0.00706204652            | -0.0080246415                          | 0.0527470936 |
| D         | -0.001734750 | 0.00052040790            | -0.0039739087                          | 0.0005044095 |
| E         | -0.003510148 | 0.00137348874            | -0.0094198578                          | 0.0023995622 |
| F         | 0.000022733  | 0.00000871121            | -0.0000147491                          | 0.0000602143 |

| LOT | XL  | XU  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 10  | 1.0000  | 6.752 | 6.75069 | 0.00131  | 0.019   |
| 2   | 10  | 141 | 12.1000 | 4.264 | 4.26402 | -0.00002 | -0.000  |
| 3   | 141 | 281 | 0.0687  | 3.762 | 3.76199 | 0.00001  | 0.000   |
| 4   | 281 | 293 | -0.9143 | 3.382 | 3.28108 | 0.10092  | 2.984   |
| 5   | 293 | 323 | 1.5000  | 3.341 | 3.35137 | -0.01037 | -0.310  |
| 6   | 323 | 331 | -0.7333 | 3.154 | 3.54594 | -0.39194 | -12.427 |
| 7   | 331 | 361 | 2.7500  | 3.685 | 3.67701 | 0.00799  | 0.217   |
| 8   | 361 | 367 | -0.8000 | 3.947 | 3.59430 | 0.35270  | 8.936   |

----- SYS=CH-47 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 6  | 480190.32300   | 80031.72050 |
| RESIDUAL          | 6  | 5670.21199     | 945.03533   |
| UNCORRECTED TOTAL | 12 | 485860.53499   |             |

(CORRECTED TOTAL)      11      132801.70813

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 5.531826052  | 2.1708353906             | 0.21997937394                          | 10.843672730 |
| B         | -0.011485309 | 0.0996756834             | -0.25538309584                         | 0.232412478  |

|   |              |              |               |             |
|---|--------------|--------------|---------------|-------------|
| C | 0.024840378  | 0.0320394937 | -.05355749494 | 0.103238252 |
| D | -0.028148940 | 0.0222075562 | -.08248891190 | 0.026191032 |
| E | -0.001788743 | 0.0011816651 | -.00468017517 | 0.001102690 |
| F | 0.000006452  | 0.0000059129 | -.00000801607 | 0.000020921 |

| LOT | XL  | XU  | R        | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|----------|-------|---------|----------|---------|
| 1   | 0   | 18  | 1.00000  | 6.181 | 5.08695 | 1.09405  | 17.700  |
| 2   | 18  | 42  | 0.33333  | 5.226 | 4.74430 | 0.48170  | 9.217   |
| 3   | 42  | 66  | 0.00000  | 4.559 | 4.52097 | 0.03803  | 0.834   |
| 4   | 66  | 126 | 1.50000  | 3.459 | 3.18207 | 0.27693  | 8.006   |
| 5   | 126 | 198 | 0.20000  | 2.760 | 3.27897 | -0.51897 | -18.803 |
| 6   | 198 | 358 | 1.22222  | 2.307 | 2.46305 | -0.15605 | -6.764  |
| 7   | 358 | 442 | -0.47500 | 2.313 | 2.47385 | -0.16085 | -6.954  |
| 8   | 442 | 585 | 0.70238  | 2.695 | 2.43170 | 0.26330  | 9.770   |
| 9   | 585 | 630 | -0.68531 | 3.463 | 2.74814 | 0.71486  | 20.643  |
| 10  | 630 | 666 | -0.20000 | 3.085 | 3.43485 | -0.34985 | -11.340 |
| 11  | 666 | 678 | -0.66667 | 3.671 | 3.71654 | -0.04554 | -1.241  |
| 12  | 678 | 690 | 0.00000  | 3.852 | 4.48835 | -0.63635 | -16.520 |

----- SYS=H-54 -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 5  | 21128.788908   | 4225.757782 |
| RESIDUAL          | 0  | 0.000000       | 0.000000    |
| UNCORRECTED TOTAL | 5  | 21128.788908   |             |

|                   |   |             |
|-------------------|---|-------------|
| (CORRECTED TOTAL) | 4 | 3891.650213 |
|-------------------|---|-------------|

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER | UPPER         |
|-----------|--------------|--------------------------|-------------------------------------------------|---------------|
| A         | 5.326885310  | 0                        | 5.3268853100                                    | 5.3268853100  |
| B         | -0.115212040 | 0                        | -0.1152120399                                   | -0.1152120399 |
| C         | 0.067327205  | 0                        | 0.0673272052                                    | 0.0673272052  |
| D         | -0.029514167 | 0                        | -0.0295141675                                   | -0.0295141675 |
| E         | 0.012730861  | 0                        | 0.0127308607                                    | 0.0127308607  |
| F         | -0.000501738 | 0                        | -0.0005017380                                   | -0.0005017380 |

| LOT | XL | XU | R        | AUC   | UCP   | DIF          | PCT          |
|-----|----|----|----------|-------|-------|--------------|--------------|
| 1   | 0  | 6  | 1.00000  | 5.248 | 5.248 | 0            | 0            |
| 2   | 6  | 30 | 3.00000  | 3.388 | 3.388 | -1.66533E-16 | -4.91539E-15 |
| 3   | 30 | 60 | 0.25000  | 2.801 | 2.801 | -5.55112E-17 | -1.98183E-15 |
| 4   | 60 | 83 | -0.23333 | 3.402 | 3.402 | 1.66533E-16  | 4.89516E-15  |
| 5   | 83 | 89 | -0.73913 | 3.083 | 3.083 | 1.66533E-16  | 5.40167E-15  |

-----SYS=HH-60D-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 123892.22000   | 30973.05500 |
| RESIDUAL          | 0  | 0.00000        | 0.00000     |
| UNCORRECTED TOTAL | 4  | 123892.22000   |             |
| (CORRECTED TOTAL) | 3  | 24351.97000    |             |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 9.211226549  | 0                        | 9.2112265487                           | 9.2112265487  |
| B         | -0.021459679 | 0                        | -0.0214596792                          | -0.0214596792 |
| C         | 0.014681265  | 0                        | 0.0146812647                           | 0.0146812647  |
| D         | -0.002671138 | 0                        | -0.0026711380                          | -0.0026711380 |
| E         | -0.001209662 | 0                        | -0.0012096623                          | -0.0012096623 |
| F         | -0.000020933 | 0                        | -0.0000209333                          | -0.0000209333 |

| LOT | XL | XU | R        | AUC | UCP | DIF          | PCT          |
|-----|----|----|----------|-----|-----|--------------|--------------|
| 1   | 0  | 3  | 1.00000  | 9.2 | 9.2 | 2.22045E-16  | 2.41353E-15  |
| 2   | 3  | 28 | 7.33333  | 7.1 | 7.1 | 1.11022E-16  | 1.56369E-15  |
| 3   | 28 | 63 | 0.40000  | 6.7 | 6.7 | 2.22045E-16  | 3.31410E-15  |
| 4   | 63 | 92 | -0.17143 | 6.6 | 6.6 | -5.99201E-16 | -1.51394E-14 |

-----SYS=SH-3-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 6  | 72855.311085   | 12142.551847 |
| RESIDUAL          | 3  | 121.002457     | 40.334152    |
| UNCORRECTED TOTAL | 9  | 72976.313542   |              |
| (CORRECTED TOTAL) | 8  | 13013.690662   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 3.882573865  | 0.67198971344            | 1.7439666019                           | 6.0211811279 |
| B         | -0.055720968 | 0.08630019881            | -0.3303713510                          | 0.2189294145 |
| C         | 0.022655652  | 0.02306690396            | -0.0507547695                          | 0.0960660742 |
| D         | -0.002540528 | 0.01847087720            | -0.0613240946                          | 0.0562430388 |
| E         | -0.003812695 | 0.00276820656            | -0.0126225128                          | 0.0049971220 |
| F         | 0.000040903  | 0.00002614513            | -0.0000423035                          | 0.0001241103 |

| LOT | XL  | XU  | R        | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|----------|-------|---------|----------|---------|
| 1   | 0   | 20  | 1.00000  | 3.327 | 3.22451 | 0.10249  | 3.080   |
| 2   | 20  | 69  | 1.45000  | 2.480 | 2.51039 | -0.03039 | -1.225  |
| 3   | 69  | 140 | 0.44898  | 2.319 | 2.32774 | -0.00874 | -0.377  |
| 4   | 140 | 185 | -0.36620 | 1.811 | 1.78191 | 0.02909  | 1.607   |
| 5   | 185 | 221 | -0.20000 | 1.870 | 1.80115 | 0.06885  | 3.682   |
| 6   | 221 | 257 | 0.00000  | 1.589 | 1.80421 | -0.21521 | -13.544 |
| 7   | 257 | 287 | -0.16667 | 1.703 | 1.80007 | -0.09707 | -5.700  |
| 8   | 287 | 335 | 0.60000  | 1.930 | 1.82227 | 0.10773  | 5.582   |
| 9   | 335 | 350 | -0.68750 | 2.144 | 1.92193 | 0.22207  | 10.358  |

#### C.7.5 - Tactical Armament Programs

----- SYS=LLLGB -----

ERROR: ON OBSERVATION 1, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL    | XU     | R        | AUC    | UCP | DIF | PCT |
|-----|-------|--------|----------|--------|-----|-----|-----|
| 1   | 0     | 1600   | 1.00000  | 0.0275 | .   | .   | .   |
| 2   | 1600  | 4550   | 0.84375  | 0.0206 | .   | .   | .   |
| 3   | 4550  | 8290   | 0.26780  | 0.0189 | .   | .   | .   |
| 4   | 8290  | 17270  | 1.40107  | 0.0162 | .   | .   | .   |
| 5   | 17270 | 26890  | 0.07127  | 0.0147 | .   | .   | .   |
| 6   | 26890 | 41290  | 0.49688  | 0.0137 | .   | .   | .   |
| 7   | 41290 | 56890  | 0.08333  | 0.0129 | .   | .   | .   |
| 8   | 56890 | 72490  | 0.00000  | 0.0123 | .   | .   | .   |
| 9   | 72490 | 88090  | 0.00000  | 0.0118 | .   | .   | .   |
| 10  | 88090 | 100000 | -0.23654 | 0.0115 | .   | .   | .   |

----- SYS=CEM -----

ERROR: ON OBSERVATION 2, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL     | XU     | R        | AUC     | UCP | DIF | PCT |
|-----|--------|--------|----------|---------|-----|-----|-----|
| 1   | 0      | 172    | 1.00000  | 0.06924 | .   | .   | .   |
| 2   | 172    | 1432   | 6.32558  | 0.03038 | .   | .   | .   |
| 3   | 1432   | 7557   | 3.86111  | 0.01988 | .   | .   | .   |
| 4   | 7557   | 21777  | 1.32163  | 0.01765 | .   | .   | .   |
| 5   | 21777  | 50227  | 1.00070  | 0.01619 | .   | .   | .   |
| 6   | 50227  | 85247  | 0.23093  | 0.01401 | .   | .   | .   |
| 7   | 85247  | 134157 | 0.39663  | 0.01258 | .   | .   | .   |
| 8   | 134157 | 171666 | -0.23310 | 0.01181 | .   | .   | .   |

----- SYS=GBU-15 -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 6  | 40059.072127   | 6676.512021 |
| RESIDUAL          | 3  | 21.214110      | 7.071370    |
| UNCORRECTED TOTAL | 9  | 40080.286237   |             |

|                   |   |              |
|-------------------|---|--------------|
| (CORRECTED TOTAL) | 8 | 10225.399632 |
|-------------------|---|--------------|

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER | UPPER         |
|-----------|--------------|--------------------------|-------------------------------------------------|---------------|
| A         | 0.3258410059 | 0.17004513635            | -.21532764050                                   | 0.86700965238 |
| B         | -.0972556418 | 0.15974854554            | -.60565538797                                   | 0.41114410439 |
| C         | 0.0159924614 | 0.00945987765            | -.01411359919                                   | 0.04609852208 |
| D         | -.0046008434 | 0.00170780683            | -.01003593862                                   | 0.00083425187 |
| E         | -.0002335444 | 0.00044380508            | -.00164595403                                   | 0.00117886531 |
| F         | 0.0000003796 | 0.00000046940            | -.00000111426                                   | 0.00000187348 |

| LOT | XL   | XU   | R        | AUC    | UCP      | DIF       | PCT     |
|-----|------|------|----------|--------|----------|-----------|---------|
| 1   | 0    | 40   | 1.00000  | 0.1975 | 0.253870 | -0.056370 | -28.542 |
| 2   | 40   | 105  | 0.62500  | 0.2000 | 0.210782 | -0.010782 | -5.391  |
| 3   | 105  | 445  | 4.23077  | 0.1439 | 0.144107 | -0.000207 | -0.144  |
| 4   | 445  | 695  | -0.26471 | 0.1483 | 0.137232 | 0.011068  | 7.463   |
| 5   | 695  | 1015 | 0.28000  | 0.1308 | 0.136507 | -0.005707 | -4.363  |
| 6   | 1015 | 1615 | 0.87500  | 0.1718 | 0.170567 | 0.001233  | 0.717   |
| 7   | 1615 | 2215 | 0.00000  | 0.1539 | 0.152271 | 0.001629  | 1.058   |
| 8   | 2215 | 2815 | 0.00000  | 0.1483 | 0.148119 | 0.000181  | 0.122   |
| 9   | 2815 | 3415 | 0.00000  | 0.1420 | 0.144948 | -0.002948 | -2.076  |

## C.7.6 - Tactical Missile Programs

----- SYS=AMRAAM -----

ERROR: ON OBSERVATION 2, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL    | XU    | R        | AUC   | UCP | DIF | PCT |
|-----|-------|-------|----------|-------|-----|-----|-----|
| 1   | 0     | 194   | 1.00000  | 1.233 | .   | .   | .   |
| 2   | 194   | 1251  | 4.44845  | 0.512 | .   | .   | .   |
| 3   | 1251  | 3215  | 0.85809  | 0.342 | .   | .   | .   |
| 4   | 3215  | 6211  | 0.52546  | 0.257 | .   | .   | .   |
| 5   | 6211  | 9111  | -0.03204 | 0.232 | .   | .   | .   |
| 6   | 9111  | 12011 | 0.00000  | 0.194 | .   | .   | .   |
| 7   | 12011 | 14911 | 0.00000  | 0.182 | .   | .   | .   |
| 8   | 14911 | 17911 | 0.03448  | 0.170 | .   | .   | .   |
| 9   | 17911 | 20911 | 0.00000  | 0.158 | .   | .   | .   |
| 10  | 20911 | 24674 | 0.25433  | 0.155 | .   | .   | .   |

----- SYS=HARM -----

ERROR: ON OBSERVATION 5, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL    | XU    | R        | AUC   | UCP | DIF | PCT |
|-----|-------|-------|----------|-------|-----|-----|-----|
| 1   | 0     | 80    | 1.00000  | 0.809 | .   | .   | .   |
| 2   | 80    | 316   | 1.95000  | 0.517 | .   | .   | .   |
| 3   | 316   | 712   | 0.67797  | 0.400 | .   | .   | .   |
| 4   | 712   | 1399  | 0.73485  | 0.314 | .   | .   | .   |
| 5   | 1399  | 3144  | 1.54003  | 0.249 | .   | .   | .   |
| 6   | 3144  | 5612  | 0.41433  | 0.223 | .   | .   | .   |
| 7   | 5612  | 7731  | -0.14141 | 0.208 | .   | .   | .   |
| 8   | 7731  | 9863  | 0.00613  | 0.197 | .   | .   | .   |
| 9   | 9863  | 12863 | 0.40713  | 0.184 | .   | .   | .   |
| 10  | 12863 | 15863 | 0.00000  | 0.177 | .   | .   | .   |
| 11  | 15863 | 16961 | -0.63400 | 0.196 | .   | .   | .   |

----- SYS=IIR -----

ERROR: ON OBSERVATION 2, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL    | XU    | R        | AUC   | UCP | DIF | PCT |
|-----|-------|-------|----------|-------|-----|-----|-----|
| 1   | 0     | 200   | 1.00000  | 0.309 | .   | .   | .   |
| 2   | 200   | 1100  | 3.50000  | 0.135 | .   | .   | .   |
| 3   | 1100  | 3700  | 1.88889  | 0.083 | .   | .   | .   |
| 4   | 3700  | 9429  | 1.20346  | 0.082 | .   | .   | .   |
| 5   | 9429  | 18429 | 0.57095  | 0.062 | .   | .   | .   |
| 6   | 18429 | 30429 | 0.33333  | 0.057 | .   | .   | .   |
| 7   | 30429 | 42429 | 0.00000  | 0.055 | .   | .   | .   |
| 8   | 42429 | 54429 | 0.00000  | 0.053 | .   | .   | .   |
| 9   | 54429 | 60664 | -0.48042 | 0.057 | .   | .   | .   |

----- SYS=AIM7F-R -----

ERROR: ON OBSERVATION 4, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL   | XU   | R        | AUC   | UCP | DIF | PCT |
|-----|------|------|----------|-------|-----|-----|-----|
| 1   | 0    | 100  | 1.00000  | 0.741 | .   | .   | .   |
| 2   | 100  | 325  | 1.25000  | 0.378 | .   | .   | .   |
| 3   | 325  | 925  | 1.66667  | 0.199 | .   | .   | .   |
| 4   | 925  | 1725 | 0.33333  | 0.169 | .   | .   | .   |
| 5   | 1725 | 2825 | 0.37500  | 0.134 | .   | .   | .   |
| 6   | 2825 | 4225 | 0.27273  | 0.116 | .   | .   | .   |
| 7   | 4225 | 5125 | -0.35714 | 0.111 | .   | .   | .   |
| 8   | 5125 | 6269 | 0.27111  | 0.095 | .   | .   | .   |



----- SYS=AIM7F-GD -----

ERROR: ON OBSERVATION 6, USE OF THE ABOVE PARAMETERS HAS RESULTED IN A  
DERIVATIVE OR RESIDUAL IN EXCESS OF 1E30. ITERATIONS TERMINATED.

| LOT | XL   | XU   | R       | AUC   | UCP | DIF | PCT |
|-----|------|------|---------|-------|-----|-----|-----|
| 1   | 0    | 15   | 1.00000 | 1.551 | .   | .   | .   |
| 2   | 15   | 85   | 3.66667 | 0.379 | .   | .   | .   |
| 3   | 85   | 295  | 2.00000 | 0.228 | .   | .   | .   |
| 4   | 295  | 505  | 0.00000 | 0.195 | .   | .   | .   |
| 5   | 505  | 1255 | 2.57143 | 0.130 | .   | .   | .   |
| 6   | 1255 | 2565 | 0.74667 | 0.090 | .   | .   | .   |

### C.8 - Modified Alternative Three Non-linear Regression

This section contains the summary results produced by the non-linear regression procedure in SAS. The SAS program used to produce this run was discussed in Appendix B.8.

#### C.8.1 - Bomber Aircraft Programs

----- SYS=B-1B -----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 59466668.798   | 14866667.199 |
| RESIDUAL          | 1  | 11308.012      | 11308.012    |
| UNCORRECTED TOTAL | 5  | 59477976.810   |              |

|                   |   |              |
|-------------------|---|--------------|
| (CORRECTED TOTAL) | 4 | 17234615.032 |
|-------------------|---|--------------|

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 420.3917395 | 39.242173043             | -78.219311224                          | 919.00279014 |
| B         | -0.3170991  | 0.032657183              | -0.732041307                           | 0.09784302   |
| C         | 0.0100323   | 0.015469801              | -0.186526980                           | 0.20659160   |
| D         | -0.0023587  | 0.003120035              | -0.042001814                           | 0.03728451   |

| LOT | XL | XU  | R       | AUC   | UCP     | DIF     | PCT     |
|-----|----|-----|---------|-------|---------|---------|---------|
| 1   | 0  | 1   | 1.00000 | 535.8 | 608.748 | -72.948 | -13.615 |
| 2   | 1  | 8   | 7.00000 | 260.3 | 260.459 | -0.159  | -0.061  |
| 3   | 8  | 18  | 1.42857 | 200.5 | 193.007 | 7.493   | 3.737   |
| 4   | 18 | 52  | 3.40000 | 142.0 | 141.970 | 0.030   | 0.021   |
| 5   | 52 | 100 | 1.41176 | 111.3 | 111.701 | -0.401  | -0.360  |

----- SYS=B-52 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 70010588.917   | 17502647.229 |
| RESIDUAL          | 6  | 2390182.993    | 398363.832   |
| UNCORRECTED TOTAL | 10 | 72400771.910   |              |

(CORRECTED TOTAL)      9      18070289.989

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 125.5056846 | 56.841932390             | -13.581613802                          | 264.59298299 |
| B         | -0.2192839  | 0.090311383              | -0.440268029                           | 0.00170028   |
| C         | -0.0293013  | 0.068014851              | -0.195727795                           | 0.13712513   |
| D         | 0.0014296   | 0.020777630              | -0.049411425                           | 0.05227071   |

| LOT | XL  | XU  | R       | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|---------|-------|---------|---------|---------|
| 1   | 0   | 20  | 1.00000 | 112.5 | 79.5062 | 32.994  | 29.328  |
| 2   | 20  | 63  | 2.15000 | 37.0  | 45.7277 | -8.728  | -23.588 |
| 3   | 63  | 88  | 0.58140 | 28.6  | 45.3272 | -16.727 | -58.487 |
| 4   | 88  | 165 | 3.08000 | 32.3  | 30.1416 | 2.158   | 6.682   |
| 5   | 165 | 298 | 1.72727 | 23.4  | 29.6917 | -6.292  | -26.888 |
| 6   | 298 | 500 | 1.51880 | 28.4  | 26.4665 | 1.934   | 6.808   |
| 7   | 500 | 601 | 0.50000 | 27.3  | 28.7515 | -1.452  | -5.317  |
| 8   | 601 | 640 | 0.38614 | 27.3  | 28.5284 | -1.228  | -4.500  |
| 9   | 640 | 702 | 1.58974 | 35.4  | 22.7719 | 12.628  | 35.673  |
| 10  | 702 | 742 | 0.64516 | 35.0  | 26.2731 | 8.727   | 24.934  |

----- SYS=B-58 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 14238328.874   | 3559582.219 |
| RESIDUAL          | 0  | 0.000          | 0.000       |
| UNCORRECTED TOTAL | 4  | 14238328.874   |             |

(CORRECTED TOTAL)      3      1830393.074

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 153.3118110 | 0                        | 153.31181104                           | 153.31181104 |
| B         | 0.1019116   | 0                        | 0.10191164                             | 0.10191164   |
| C         | -0.6367487  | 0                        | -0.63674867                            | -0.63674867  |
| D         | 0.2367006   | 0                        | 0.23670062                             | 0.23670062   |

| LOT | XL | XU  | R       | AUC   | UCP   | DIF          | PCT          |
|-----|----|-----|---------|-------|-------|--------------|--------------|
| 1   | 0  | 17  | 1.00000 | 93.86 | 93.86 | 0            | 0            |
| 2   | 17 | 53  | 2.11765 | 80.26 | 80.26 | 0            | 0            |
| 3   | 53 | 73  | 0.55556 | 73.16 | 73.16 | -1.77636E-15 | -2.42804E-15 |
| 4   | 73 | 103 | 1.50000 | 36.56 | 36.56 | 1.77636E-15  | 4.85874E-15  |

### C.8.2 - Fighter Aircraft Programs

----- SYS=A-10 -----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 5168879.5108   | 1292219.8777 |
| RESIDUAL          | 5  | 18337.8736     | 3667.5747    |
| UNCORRECTED TOTAL | 9  | 5187217.3844   |              |

(CORRECTED TOTAL)      8      1226666.3049

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 15.71180805 | 3.9867335725             | 5.4637316781                           | 25.959884415 |
| B         | -0.04925741 | 0.0381699048             | -0.1473748550                          | 0.048860029  |
| C         | -0.07311328 | 0.0258140398             | -0.1394694237                          | -0.006757144 |
| D         | 0.01137569  | 0.0042311512             | 0.0004993263                           | 0.022252052  |

| LOT | XL  | XU  | R       | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|---------|-------|---------|---------|---------|
| 1   | 0   | 22  | 1.00000 | 12.37 | 12.5406 | -0.1706 | -1.379  |
| 2   | 22  | 75  | 2.40909 | 9.16  | 8.5510  | 0.6090  | 6.648   |
| 3   | 75  | 95  | 0.37736 | 8.20  | 11.2503 | -3.0503 | -37.198 |
| 4   | 95  | 195 | 5.00000 | 8.20  | 8.2345  | -0.0345 | -0.420  |
| 5   | 195 | 339 | 1.44000 | 7.82  | 7.5730  | 0.2470  | 3.158   |
| 6   | 339 | 483 | 1.00000 | 7.59  | 8.0608  | -0.4708 | -6.203  |
| 7   | 483 | 627 | 1.00000 | 7.82  | 7.7943  | 0.0257  | 0.329   |
| 8   | 627 | 687 | 0.41667 | 10.18 | 9.4882  | 0.6918  | 6.796   |
| 9   | 687 | 707 | 0.33333 | 13.64 | 9.7831  | 3.8569  | 28.276  |

----- SYS=F-100 -----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 11818388.687   | 2954597.172 |
| RESIDUAL          | 1  | 17252.182      | 17252.182   |
| UNCORRECTED TOTAL | 5  | 11835640.869   |             |

(CORRECTED TOTAL)      4      2086478.767

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 14.75080973 | 10.413362783             | -117.56137779                          | 147.06299725 |
| B         | -0.11038944 | 0.115895518              | -1.58295789                            | 1.36217900   |
| C         | -0.11993218 | 0.130943866              | -1.78370494                            | 1.54384058   |
| D         | 0.00477863  | 0.005270482              | -0.06218811                            | 0.07174538   |

| LOT | XL   | XU   | R       | AUC  | UCP     | DIF     | PCT     |
|-----|------|------|---------|------|---------|---------|---------|
| 1   | 0    | 23   | 1.0000  | 6.51 | 9.39053 | -2.8805 | -44.243 |
| 2   | 23   | 568  | 23.6957 | 3.45 | 3.45000 | -0.0000 | -0.000  |
| 3   | 568  | 1161 | 1.0881  | 3.08 | 3.02404 | 0.0560  | 1.817   |
| 4   | 1161 | 1720 | 0.9427  | 3.10 | 3.00062 | 0.0994  | 3.206   |
| 5   | 1720 | 2277 | 0.9964  | 2.50 | 2.66722 | -0.1672 | -6.689  |

----- SYS=F-101 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 7063772.8462   | 1765943.2115 |
| RESIDUAL          | 2  | 13086.9984     | 6543.4992    |
| UNCORRECTED TOTAL | 6  | 7076859.8446   |              |

(CORRECTED TOTAL)      5      2200718.4643

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 28.73275276 | 7.1583791231             | -2.0676050922                          | 59.533110613 |
| B         | -0.21474999 | 0.0392090785             | -0.3834548935                          | -0.046045089 |
| C         | -0.07641715 | 0.0568808341             | -0.3211583156                          | 0.168324014  |
| D         | 0.01751292  | 0.0129113132             | -0.0380405836                          | 0.073066431  |

| LOT | XL  | XU  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 31  | 1.00000 | 16.85 | 15.4567 | 1.39332  | 8.269   |
| 2   | 31  | 115 | 2.70968 | 7.58  | 8.3628  | -0.78281 | -10.327 |
| 3   | 115 | 424 | 3.67857 | 6.91  | 6.8862  | 0.02379  | 0.344   |
| 4   | 424 | 630 | 0.66667 | 5.76  | 5.7187  | 0.04126  | 0.716   |
| 5   | 630 | 714 | 0.40777 | 5.27  | 5.9077  | -0.63767 | -12.100 |
| 6   | 714 | 807 | 1.10714 | 5.22  | 4.5483  | 0.67168  | 12.868  |

----- SYS=F-102 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 4462706.4660   | 1115676.6165 |
| RESIDUAL          | 0  | 0.0000         | 0.0000       |
| UNCORRECTED TOTAL | 4  | 4462706.4660   |              |

(CORRECTED TOTAL)      3      1795723.5179

| PARAMETER | ESTIMATE    |     |         | ASYMPTOTIC<br>STD. ERROR |              | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|-----|---------|--------------------------|--------------|----------------------------------------|--------------|
|           |             |     |         |                          |              | LOWER                                  | UPPER        |
| A         | 29.37248470 |     |         | 0                        | 29.372484697 | 29.372484697                           |              |
| B         | -0.38590304 |     |         | 0                        | -0.385903040 | -0.385903040                           |              |
| C         | -0.01258317 |     |         | 0                        | -0.012583174 | -0.012583174                           |              |
| D         | 0.00343420  |     |         | 0                        | 0.003434196  | 0.003434196                            |              |
| LOT       | XL          | XU  | R       | AUC                      | UCP          | DIF                                    | PCT          |
| 1         | 0           | 37  | 1.00000 | 11.66                    | 11.66        | -4.44089E-16                           | -3.80866E-15 |
| 2         | 37          | 145 | 2.91892 | 5.17                     | 5.17         | 3.33067E-16                            | 6.44230E-15  |
| 3         | 145         | 707 | 5.20370 | 3.50                     | 3.50         | 1.66533E-16                            | 4.75810E-15  |
| 4         | 707         | 847 | 0.24911 | 2.21                     | 2.21         | -1.60982E-15                           | -7.28427E-14 |

----- SYS=F-106 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 4765078.8733   | 1191269.7183 |
| RESIDUAL          | 0  | 0.0000         | 0.0000       |
| UNCORRECTED TOTAL | 4  | 4765078.8733   |              |

(CORRECTED TOTAL)      3      480903.3427

| PARAMETER | ESTIMATE    |     |         | ASYMPTOTIC<br>STD. ERROR |              | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |             |
|-----------|-------------|-----|---------|--------------------------|--------------|----------------------------------------|-------------|
|           |             |     |         |                          |              | LOWER                                  | UPPER       |
| A         | 107.9899447 |     |         | 0                        | 107.98994473 | 107.98994473                           |             |
| B         | -0.3855099  |     |         | 0                        | -0.38550994  | -0.38550994                            |             |
| C         | -0.1277521  |     |         | 0                        | -0.12775213  | -0.12775213                            |             |
| D         | 0.0277680   |     |         | 0                        | 0.02776795   | 0.02776795                             |             |
| LOT       | XL          | XU  | R       | AUC                      | UCP          | DIF                                    | PCT         |
| 1         | 0           | 42  | 1.00000 | 34.19                    | 34.19        | 0                                      | 0           |
| 2         | 42          | 130 | 2.09524 | 10.54                    | 10.54        | 1.55431E-15                            | 1.47468E-14 |
| 3         | 130         | 175 | 0.51136 | 11.64                    | 11.64        | 1.55431E-15                            | 1.33532E-14 |
| 4         | 175         | 340 | 3.66667 | 7.59                     | 7.59         | 3.33067E-16                            | 4.38823E-15 |

----- SYS=F-15AB -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 10242273.331   | 2560568.333 |
| RESIDUAL          | 2  | 5368.728       | 2684.364    |
| UNCORRECTED TOTAL | 6  | 10247642.059   |             |

(CORRECTED TOTAL)      5      1585918.021

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
|           |             |                          |                                        |              |
| A         | 33.00956607 | 3.5087725636             | 17.912370364                           | 48.106761782 |
| B         | -0.13217983 | 0.0291921752             | -0.257784999                           | -0.006574655 |
| C         | 0.00511343  | 0.0208959692             | -0.084795658                           | 0.095022515  |
| D         | -0.00057844 | 0.0036076978             | -0.016101278                           | 0.014944405  |

| LOT | XL  | XU  | R       | AUC    | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|--------|---------|----------|---------|
| 1   | 0   | 30  | 1.00000 | 25.597 | 24.5132 | 1.08383  | 4.2342  |
| 2   | 30  | 92  | 2.06667 | 19.556 | 19.9511 | -0.39512 | -2.0205 |
| 3   | 92  | 164 | 1.16129 | 17.183 | 17.8575 | -0.67446 | -3.9252 |
| 4   | 164 | 272 | 1.50000 | 17.126 | 16.7910 | 0.33496  | 1.9558  |
| 5   | 272 | 296 | 0.22222 | 16.021 | 15.7434 | 0.27764  | 1.7330  |
| 6   | 296 | 404 | 4.50000 | 16.272 | 16.2683 | 0.00374  | 0.0230  |

----- SYS=F-15CD -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 8383640.2339   | 2095910.0585 |
| RESIDUAL          | 4  | 35208.9123     | 8802.2281    |
| UNCORRECTED TOTAL | 8  | 8418849.1462   |              |

(CORRECTED TOTAL) 7 752208.0946

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
|           |             |                          |                                        |              |
| A         | 12.58028608 | 2.6059631246             | 5.3450704194                           | 19.815501747 |
| B         | -0.22344210 | 0.1956881553             | -0.7667521718                          | 0.319867967  |
| C         | 0.52846678  | 0.4274828221             | -0.6583997503                          | 1.715333309  |
| D         | -0.22305618 | 0.2070370306             | -0.7978753503                          | 0.351762995  |

| LOT | XL  | XU  | R       | AUC    | UCP     | DIF     | PCT     |
|-----|-----|-----|---------|--------|---------|---------|---------|
| 1   | 0   | 97  | 1.00000 | 17.249 | 16.9172 | 0.3318  | 1.9236  |
| 2   | 97  | 175 | 0.80412 | 15.588 | 16.6559 | -1.0679 | -6.8508 |
| 3   | 175 | 235 | 0.76923 | 15.508 | 16.5086 | -1.0006 | -6.4522 |
| 4   | 235 | 277 | 0.70000 | 17.665 | 15.4607 | 2.2043  | 12.4785 |
| 5   | 277 | 313 | 0.85714 | 19.943 | 18.2735 | 1.6695  | 8.3715  |
| 6   | 313 | 352 | 1.08333 | 19.308 | 20.8823 | -1.5743 | -8.1537 |
| 7   | 352 | 388 | 0.92308 | 21.954 | 19.5223 | 2.4317  | 11.0763 |
| 8   | 388 | 436 | 1.33333 | 21.017 | 20.9404 | 0.0766  | 0.3643  |

----- SYS=F-15E -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 14001335.938   | 3500333.985 |
| RESIDUAL          | 2  | 31440.598      | 15720.299   |
| UNCORRECTED TOTAL | 6  | 14032776.537   |             |

(CORRECTED TOTAL) 5 172346.387

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 24.45302341 | 5.2661696489             | 1.7942752589                           | 47.111771555 |
| B         | -0.58548971 | 1.1367227974             | -5.4764668911                          | 4.305487470  |
| C         | 0.91118363  | 2.0141430321             | -7.7550695980                          | 9.577436851  |
| D         | -0.38971056 | 0.8671843642             | -4.1209447252                          | 3.341523603  |

| LOT | XL  | XU  | R       | AUC    | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|--------|---------|----------|---------|
| 1   | 0   | 60  | 1.00000 | 20.544 | 20.1017 | 0.44228  | 2.1529  |
| 2   | 60  | 132 | 1.20000 | 19.203 | 19.2030 | 0.00000  | 0.0000  |
| 3   | 132 | 228 | 1.33333 | 17.608 | 17.6080 | -0.00000 | -0.0000 |
| 4   | 228 | 324 | 1.00000 | 16.175 | 17.0696 | -0.89464 | -5.5310 |
| 5   | 324 | 420 | 1.00000 | 16.041 | 16.7439 | -0.70294 | -4.3821 |
| 6   | 420 | 516 | 1.00000 | 17.927 | 16.4985 | 1.42850  | 7.9684  |

----- SYS=F-16AB -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 5506165.2105   | 1376541.3026 |
| RESIDUAL          | 1  | 71871.5295     | 71871.5295   |
| UNCORRECTED TOTAL | 5  | 5578036.7400   |              |

(CORRECTED TOTAL) 4 338023.5480

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 20.61348844 | 12.374621862             | -136.61845695                          | 177.84543382 |
| B         | -0.27484174 | 0.463715151              | -6.16680644                            | 5.61712297   |
| C         | 0.07634874  | 0.879571876              | -11.09949151                           | 11.25218899  |
| D         | -0.00358540 | 0.410067668              | -5.21390519                            | 5.20673438   |

| LOT | XL  | XU  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 105 | 1.00000 | 10.14 | 10.0868 | 0.05322  | 0.525   |
| 2   | 105 | 250 | 1.38095 | 7.74  | 8.3252  | -0.58520 | -7.561  |
| 3   | 250 | 425 | 1.20690 | 8.04  | 6.9207  | 1.11928  | 13.921  |
| 4   | 425 | 605 | 1.02857 | 5.05  | 5.9162  | -0.86619 | -17.152 |
| 5   | 605 | 725 | 0.66667 | 5.13  | 4.7607  | 0.36935  | 7.200   |

----- SYS=F-16E -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF          | SUM OF SQUARES           | MEAN SQUARE                                                |
|-------------------|-------------|--------------------------|------------------------------------------------------------|
| REGRESSION        | 4           | 47698330.421             | 11924582.605                                               |
| RESIDUAL          | 6           | 318515.201               | 53085.867                                                  |
| UNCORRECTED TOTAL | 10          | 48016845.623             |                                                            |
| (CORRECTED TOTAL) | 9           | 1747028.765              |                                                            |
| PARAMETER         | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
| A                 | 11.53047455 | 3.8707457009             | 2.0590941839    21.001854913                               |
| B                 | -0.26208935 | 0.8643464471             | -2.3770704412    1.852891742                               |
| C                 | 0.41345526  | 1.5024837872             | -3.2629927777    4.089903299                               |
| D                 | -0.15866546 | 0.6149134821             | -1.6633056334    1.345974712                               |

| LOT | XL   | XU   | R       | AUC   | UCP     | DIF     | PCT     |
|-----|------|------|---------|-------|---------|---------|---------|
| 1   | 0    | 120  | 1.00000 | 9.86  | 11.2164 | -1.3564 | -13.756 |
| 2   | 120  | 264  | 1.20000 | 10.58 | 11.8721 | -1.2921 | -12.212 |
| 3   | 264  | 414  | 1.04167 | 14.55 | 11.2935 | 3.2565  | 22.382  |
| 4   | 414  | 630  | 1.44000 | 11.93 | 11.8429 | 0.0871  | 0.730   |
| 5   | 630  | 846  | 1.00000 | 11.28 | 10.9881 | 0.2919  | 2.588   |
| 6   | 846  | 1062 | 1.00000 | 11.02 | 10.9674 | 0.0526  | 0.477   |
| 7   | 1062 | 1278 | 1.00000 | 10.88 | 10.9510 | -0.0710 | -0.653  |
| 8   | 1278 | 1494 | 1.00000 | 10.69 | 10.9375 | -0.2475 | -2.315  |
| 9   | 1494 | 1710 | 1.00000 | 10.61 | 10.9259 | -0.3159 | -2.977  |
| 10  | 1710 | 1926 | 1.00000 | 10.54 | 10.9158 | -0.3758 | -3.565  |

C.8.3 - Electronics Programs

----- SYS=ARC-109V -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF            | SUM OF SQUARES           | MEAN SQUARE                                                |
|-------------------|---------------|--------------------------|------------------------------------------------------------|
| REGRESSION        | 4             | 66.727156462             | 16.681789116                                               |
| RESIDUAL          | 1             | 0.016917268              | 0.016917268                                                |
| UNCORRECTED TOTAL | 5             | 66.744073730             |                                                            |
| (CORRECTED TOTAL) | 4             | 29.010182832             |                                                            |
| PARAMETER         | ESTIMATE      | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
| A                 | 0.0159605141  | 0.00586251125            | -0.05852855384    0.09044958197                            |
| B                 | 0.1184559828  | 0.06575925142            | -0.71708106568    0.95399303137                            |
| C                 | -0.0275524341 | 0.01453107962            | -0.21218433170    0.15707946354                            |
| D                 | 0.0105163011  | 0.00482914855            | -0.05084286029    0.07187546256                            |



| LOT | XL  | XU  | R       | AUC    | UCP       | DIF        | PCT     |
|-----|-----|-----|---------|--------|-----------|------------|---------|
| 1   | 0   | 4   | 1.00000 | 0.0487 | 0.0166784 | 0.0320216  | 65.7527 |
| 2   | 4   | 28  | 6.00000 | 0.0393 | 0.0390682 | 0.0002318  | 0.5898  |
| 3   | 28  | 107 | 3.29167 | 0.0285 | 0.0287686 | -0.0002686 | -0.9425 |
| 4   | 107 | 333 | 2.86076 | 0.0313 | 0.0312762 | 0.0000238  | 0.0759  |
| 5   | 333 | 441 | 0.47788 | 0.0303 | 0.0303098 | -0.0000098 | -0.0325 |

----- SYS=ARC-54 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 4663.5182872   | 1165.8795718 |
| RESIDUAL          | 3  | 2.6826555      | 0.8942185    |
| UNCORRECTED TOTAL | 7  | 4666.2009427   |              |

(CORRECTED TOTAL)      6      1109.4069615

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|--------------|--------------------------|------------------------------------------------------------|
| A         | 0.0374671127 | 0.00525603013            | 0.02073979678      0.05419442855                           |
| B         | -.1100038840 | 0.01613980148            | -.16136880225      -.05863896581                           |
| C         | 0.0032297260 | 0.01024858274            | -.02938638854      0.03584584060                           |
| D         | -.0003479754 | 0.00090847104            | -.00323918453      0.00254323366                           |

| LOT | XL   | XU    | R       | AUC    | UCP       | DIF         | PCT     |
|-----|------|-------|---------|--------|-----------|-------------|---------|
| 1   | 0    | 900   | 1.0000  | 0.0210 | 0.0202485 | 0.00075147  | 3.5784  |
| 2   | 900  | 1753  | 0.9478  | 0.0165 | 0.0173637 | -0.00086371 | -5.2346 |
| 3   | 1753 | 3134  | 1.6190  | 0.0164 | 0.0164541 | -0.00005411 | -0.3299 |
| 4   | 3134 | 4294  | 0.8400  | 0.0145 | 0.0154872 | -0.00098723 | -6.8085 |
| 5   | 4294 | 4594  | 0.2586  | 0.0144 | 0.0149745 | -0.00057452 | -3.9897 |
| 6   | 4594 | 7697  | 10.3433 | 0.0139 | 0.0138999 | 0.00000009  | 0.0006  |
| 7   | 7697 | 10347 | 0.8540  | 0.0143 | 0.0140814 | 0.00021864  | 1.5290  |

----- SYS=ASN-63 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 27727.704513   | 6931.926128 |
| RESIDUAL          | 6  | 14.260483      | 2.376747    |
| UNCORRECTED TOTAL | 10 | 27741.964996   |             |

(CORRECTED TOTAL)      9      14794.094157

| PARAMETER | ESTIMATE | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|----------|--------------------------|------------------------------------------------------------|
|           |          |                          |                                                            |

|   |               |               |                |                |
|---|---------------|---------------|----------------|----------------|
| A | 0.1473430711  | 0.01848939300 | 0.10210112360  | 0.19258501862  |
| B | 0.0110769420  | 0.01874353687 | -0.03478687362 | 0.05694075761  |
| C | 0.0542800582  | 0.02007166477 | 0.00516642831  | 0.10339368800  |
| D | -0.0237623145 | 0.00844562143 | -0.04442802058 | -0.00309660840 |

| LOT | XL   | XU   | R       | AUC    | UCP      | DIF       | PCT     |
|-----|------|------|---------|--------|----------|-----------|---------|
| 1   | 0    | 781  | 1.00000 | 0.1866 | 0.186616 | -0.000016 | -0.0088 |
| 2   | 781  | 930  | 0.19078 | 0.1744 | 0.169289 | 0.005111  | 2.9309  |
| 3   | 930  | 1217 | 1.92617 | 0.1769 | 0.178462 | -0.001562 | -0.8829 |
| 4   | 1217 | 1358 | 0.49129 | 0.1817 | 0.185294 | -0.003594 | -1.9782 |
| 5   | 1358 | 1450 | 0.65248 | 0.1772 | 0.191787 | -0.014587 | -8.2321 |
| 6   | 1450 | 1585 | 1.46739 | 0.2189 | 0.196867 | 0.022033  | 10.0652 |
| 7   | 1585 | 1693 | 0.80000 | 0.1911 | 0.197078 | -0.005978 | -3.1281 |
| 8   | 1693 | 1851 | 1.46296 | 0.1917 | 0.198179 | -0.006479 | -3.3798 |
| 9   | 1851 | 1887 | 0.22785 | 0.2005 | 0.174179 | 0.026321  | 13.1278 |
| 10  | 1887 | 1923 | 1.00000 | 0.2145 | 0.201723 | 0.012777  | 5.9566  |

----- SYS=ASN-70 -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 119.44605374   | 29.86151344 |
| RESIDUAL          | 4  | 0.00994507     | 0.00248627  |
| UNCORRECTED TOTAL | 8  | 119.45599881   |             |

|                   |   |             |
|-------------------|---|-------------|
| (CORRECTED TOTAL) | 7 | 64.18968336 |
|-------------------|---|-------------|

| PARAMETER | ESTIMATE      | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER | UPPER         |
|-----------|---------------|--------------------------|-------------------------------------------------|---------------|
| A         | 0.0322894109  | 0.00190455419            | 0.02700159230                                   | 0.03757722951 |
| B         | 0.0003491408  | 0.00729291290            | -0.01989895755                                  | 0.02059723918 |
| C         | 0.0350827560  | 0.02223282003            | -0.02664461317                                  | 0.09681012510 |
| D         | -0.0155475768 | 0.01043692524            | -0.04452473468                                  | 0.01342958113 |

| LOT | XL  | XU  | R       | AUC    | UCP       | DIF         | PCT     |
|-----|-----|-----|---------|--------|-----------|-------------|---------|
| 1   | 0   | 152 | 1.00000 | 0.0350 | 0.0349860 | 0.00001405  | 0.0401  |
| 2   | 152 | 402 | 1.64474 | 0.0353 | 0.0353080 | -0.00000804 | -0.0228 |
| 3   | 402 | 483 | 0.32400 | 0.0342 | 0.0343348 | -0.00013484 | -0.3943 |
| 4   | 483 | 541 | 0.71605 | 0.0356 | 0.0360134 | -0.00041341 | -1.1613 |
| 5   | 541 | 567 | 0.44828 | 0.0370 | 0.0350423 | 0.00195771  | 5.2911  |
| 6   | 567 | 575 | 0.30769 | 0.0399 | 0.0343338 | 0.00556620  | 13.9504 |
| 7   | 575 | 583 | 1.00000 | 0.0370 | 0.0366433 | 0.00035675  | 0.9642  |
| 8   | 583 | 594 | 1.37500 | 0.0427 | 0.0364939 | 0.00620608  | 14.5341 |

----- SYS=ASN-99 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 377.79901903   | 94.44975476 |
| RESIDUAL          | 4  | 5.80459011     | 1.45114753  |
| UNCORRECTED TOTAL | 8  | 383.60360914   |             |

(CORRECTED TOTAL) 7 61.21154176

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER UPPER |
|-----------|--------------|--------------------------|-------------------------------------------------------|
| A         | 0.0422568171 | 0.02166309700            | -.01788876871 0.10240240291                           |
| B         | -.0524338786 | 0.14815162948            | -.46376317948 0.35889542235                           |
| C         | 0.0555403392 | 0.11164882445            | -.25444229870 0.36552297704                           |
| D         | -.0044947878 | 0.02836463211            | -.08324656620 0.07425699062                           |

| LOT | XL  | XU   | R       | AUC    | UCP       | DIF        | PCT     |
|-----|-----|------|---------|--------|-----------|------------|---------|
| 1   | 0   | 157  | 1.00000 | 0.0464 | 0.0420196 | 0.0043804  | 9.441   |
| 2   | 157 | 353  | 1.24841 | 0.0404 | 0.0446279 | -0.0042279 | -10.465 |
| 3   | 353 | 538  | 0.94388 | 0.0413 | 0.0412358 | 0.0000642  | 0.155   |
| 4   | 538 | 781  | 1.31351 | 0.0433 | 0.0459040 | -0.0026040 | -6.014  |
| 5   | 781 | 805  | 0.09877 | 0.0570 | 0.0308784 | 0.0261216  | 45.827  |
| 6   | 805 | 877  | 3.00000 | 0.0624 | 0.0694296 | -0.0070296 | -11.265 |
| 7   | 877 | 933  | 0.77778 | 0.0635 | 0.0389539 | 0.0245461  | 38.655  |
| 8   | 933 | 1050 | 2.08929 | 0.0684 | 0.0572374 | 0.0111626  | 16.320  |

----- SYS=ASN-108 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 560.44783167   | 140.11195792 |
| RESIDUAL          | 1  | 0.18276357     | 0.18276357   |
| UNCORRECTED TOTAL | 5  | 560.63059524   |              |
| (CORRECTED TOTAL) | 4  | 226.66710333   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER UPPER |
|-----------|--------------|--------------------------|-------------------------------------------------------|
| A         | 0.0870537668 | 0.01960837869            | -.16209029278 0.33619782639                           |
| B         | 0.0143034991 | 0.04476375754            | -.55446480427 0.58307180239                           |
| C         | -.0341408919 | 0.03573379601            | -.48817450394 0.41989272024                           |
| D         | 0.0122068141 | 0.01078759014            | -.12486030626 0.14927393439                           |

| LOT | XL  | XU  | R       | AUC    | UCP      | DIF        | PCT     |
|-----|-----|-----|---------|--------|----------|------------|---------|
| 1   | 0   | 8   | 1.00000 | 0.1373 | 0.086342 | 0.0509578  | 37.1142 |
| 2   | 8   | 39  | 3.87500 | 0.1048 | 0.106436 | -0.0016362 | -1.5613 |
| 3   | 39  | 116 | 2.48387 | 0.0874 | 0.088877 | -0.0014768 | -1.6897 |
| 4   | 116 | 332 | 2.80519 | 0.0943 | 0.094149 | 0.0001515  | 0.1607  |
| 5   | 332 | 440 | 0.50000 | 0.0872 | 0.087201 | -0.0000015 | -0.0017 |

----- SYS=ASQ-133 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF           | SUM OF SQUARES           | MEAN SQUARE                                           |
|-------------------|--------------|--------------------------|-------------------------------------------------------|
| REGRESSION        | 4            | 2881.6655470             | 720.4163867                                           |
| RESIDUAL          | 2            | 3.1045494                | 1.5522747                                             |
| UNCORRECTED TOTAL | 6            | 2884.7700964             |                                                       |
| (CORRECTED TOTAL) | 5            | 403.6845454              |                                                       |
| PARAMETER         | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER UPPER |
| A                 | 0.8332392236 | 0.13240040025            | 0.26356002142 1.4029184257                            |
| B                 | -.1710693183 | 0.04571182154            | -.36775357285 0.0256149362                            |
| C                 | 0.0144429374 | 0.04825545860            | -.19318582428 0.2220716991                            |
| D                 | -.0033197376 | 0.01055400950            | -.04873047425 0.0420909991                            |

| LOT | XL  | XU  | R       | AUC    | UCP      | DIF       | PCT     |
|-----|-----|-----|---------|--------|----------|-----------|---------|
| 1   | 0   | 14  | 1.00000 | 0.5856 | 0.650345 | -0.064745 | -11.056 |
| 2   | 14  | 33  | 1.35714 | 0.5862 | 0.509327 | 0.076873  | 13.114  |
| 3   | 33  | 101 | 3.57895 | 0.4255 | 0.425572 | -0.000072 | -0.017  |
| 4   | 101 | 168 | 0.98529 | 0.3828 | 0.380973 | 0.001827  | 0.477   |
| 5   | 168 | 249 | 1.20896 | 0.3535 | 0.357924 | -0.004424 | -1.251  |
| 6   | 249 | 307 | 0.71605 | 0.3355 | 0.334144 | 0.001356  | 0.404   |

----- SYS=ASW-32 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF           | SUM OF SQUARES           | MEAN SQUARE                                           |
|-------------------|--------------|--------------------------|-------------------------------------------------------|
| REGRESSION        | 4            | 297.64022248             | 74.41005562                                           |
| RESIDUAL          | 2            | 3.23785120               | 1.61892560                                            |
| UNCORRECTED TOTAL | 6            | 300.87807368             |                                                       |
| (CORRECTED TOTAL) | 5            | 54.90298664              |                                                       |
| PARAMETER         | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER UPPER |
| A                 | 0.2619618586 | 0.17582125599            | -0.4945442595 1.0184679768                            |
| B                 | -.5831542777 | 0.55996678201            | -2.9925233506 1.8262147953                            |
| C                 | 0.6240044721 | 0.67866403320            | -2.2960832635 3.5440922077                            |
| D                 | -.2020645653 | 0.24257811890            | -1.2458054375 0.8416763069                            |

| LOT | XL  | XU  | R       | AUC    | UCP      | DIF       | PCT     |
|-----|-----|-----|---------|--------|----------|-----------|---------|
| 1   | 0   | 12  | 1.00000 | 0.2338 | 0.209222 | 0.024578  | 10.512  |
| 2   | 12  | 38  | 2.16667 | 0.1643 | 0.148447 | 0.015853  | 9.649   |
| 3   | 38  | 86  | 1.84615 | 0.1524 | 0.160313 | -0.007913 | -5.193  |
| 4   | 86  | 134 | 1.00000 | 0.0974 | 0.122968 | -0.025568 | -26.250 |
| 5   | 134 | 184 | 1.04167 | 0.1441 | 0.121075 | 0.023025  | 15.979  |
| 6   | 184 | 264 | 1.60000 | 0.1518 | 0.150903 | 0.000897  | 0.591   |

----- SYS=CP-1035N -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |             |
|-------------------|----|----------------|-------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
| REGRESSION        | 4  | 208.77722624   | 52.19430656 |
| RESIDUAL          | 2  | 0.47092596     | 0.23546298  |
| UNCORRECTED TOTAL | 6  | 209.24815220   |             |

(CORRECTED TOTAL)      5      41.36682739

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 0.1441177358 | 0.05725212293            | -0.1022209735                          | 0.3904564451 |
| B         | -.1133723800 | 0.31036400704            | -1.4487755931                          | 1.2220308331 |
| C         | 0.1630960443 | 0.37179165468            | -1.4366119083                          | 1.7628039969 |
| D         | -.0722983037 | 0.13460877802            | -0.6514794929                          | 0.5068828855 |

| LOT | XL  | XU  | R       | AUC    | UCP      | DIF       | PCT     |
|-----|-----|-----|---------|--------|----------|-----------|---------|
| 1   | 0   | 12  | 1.00000 | 0.1248 | 0.139403 | -0.014603 | -11.701 |
| 2   | 12  | 38  | 2.16667 | 0.0903 | 0.105224 | -0.014924 | -16.527 |
| 3   | 38  | 86  | 1.84615 | 0.1236 | 0.113302 | 0.010298  | 8.332   |
| 4   | 86  | 134 | 1.00000 | 0.1287 | 0.129633 | -0.000933 | -0.725  |
| 5   | 134 | 184 | 1.04167 | 0.1310 | 0.128968 | 0.002032  | 1.551   |
| 6   | 184 | 264 | 1.60000 | 0.1154 | 0.117671 | -0.002271 | -1.968  |

----- SYS=JTIDS -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |             |
|-------------------|----|----------------|-------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
| REGRESSION        | 4  | 1571.0286520   | 392.7571630 |
| RESIDUAL          | 1  | 0.0133862      | 0.0133862   |
| UNCORRECTED TOTAL | 5  | 1571.0420382   |             |

(CORRECTED TOTAL)      4      40.2575028

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.7123306580 | 0.00950327022            | 0.59158210655                          | 0.83307920944 |
| B         | -.1878889323 | 0.01738888387            | -.40883209065                          | 0.03305422614 |
| C         | -.0266094010 | 0.03022747827            | -.41067973992                          | 0.35746093789 |
| D         | 0.0057233491 | 0.01161755959            | -.14188936301                          | 0.15333606118 |

| LOT | XL  | XU  | R       | AUC    | UCP      | DIF         | PCT      |
|-----|-----|-----|---------|--------|----------|-------------|----------|
| 1   | 0   | 45  | 1.00000 | 0.4068 | 0.406661 | 0.00013935  | 0.03426  |
| 2   | 45  | 121 | 1.68889 | 0.2764 | 0.276378 | 0.00002173  | 0.00786  |
| 3   | 121 | 198 | 1.01316 | 0.2466 | 0.247429 | -0.00082856 | -0.33599 |
| 4   | 198 | 270 | 0.93506 | 0.2308 | 0.229547 | 0.00125288  | 0.54284  |
| 5   | 270 | 327 | 0.79167 | 0.2205 | 0.221091 | -0.00059143 | -0.26822 |

----- SYS=LANNAV -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 87339.224642   | 21834.806160 |
| RESIDUAL          | 3  | 0.006254       | 0.002085     |
| UNCORRECTED TOTAL | 7  | 87339.230896   |              |
| (CORRECTED TOTAL) | 6  | 17386.822804   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 1.808394264  | 0.00518113163            | 1.7919053125                           | 1.8248832153  |
| B         | -0.113344103 | 0.00044802870            | -0.1147699547                          | -0.1119182520 |
| C         | -0.000418780 | 0.00007843678            | -0.0006684054                          | -0.0001691553 |
| D         | 0.000107106  | 0.00001226956            | 0.0000680579                           | 0.0001461536  |

| LOT | XL  | XU  | R       | AUC    | UCP     | DIF         | PCT       |
|-----|-----|-----|---------|--------|---------|-------------|-----------|
| 1   | 0   | 4   | 1.00000 | 1.7500 | 1.74286 | 0.00713790  | 0.407880  |
| 2   | 4   | 38  | 8.50000 | 1.3199 | 1.31997 | -0.00007416 | -0.005619 |
| 3   | 38  | 176 | 4.05882 | 1.0761 | 1.07608 | 0.00002032  | 0.001888  |
| 4   | 176 | 320 | 1.04348 | 0.9679 | 0.96811 | -0.00020612 | -0.021295 |
| 5   | 320 | 464 | 1.00000 | 0.9184 | 0.91804 | 0.00035571  | 0.038732  |
| 6   | 464 | 608 | 1.00000 | 0.8854 | 0.88567 | -0.00027431 | -0.030981 |
| 7   | 608 | 724 | 0.80556 | 0.8643 | 0.86414 | 0.00016354  | 0.018922  |

----- SYS=LANTARP -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 64803.844449   | 16200.961112 |
| RESIDUAL          | 3  | 0.036326       | 0.012109     |
| UNCORRECTED TOTAL | 7  | 64803.880775   |              |
| (CORRECTED TOTAL) | 6  | 12795.420992   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 1.507492289  | 0.01249992066            | 1.4677112911                           | 1.5472732861  |
| B         | -0.105073600 | 0.00124837207            | -0.1090465440                          | -0.1011006558 |
| C         | -0.000217308 | 0.00024912533            | -0.0010101495                          | 0.0005755332  |
| D         | 0.000091352  | 0.00003222838            | -0.0000112149                          | 0.0001939188  |

| LOT | XL | XU  | R       | AUC    | UCP     | DIF       | PCT     |
|-----|----|-----|---------|--------|---------|-----------|---------|
| 1   | 0  | 4   | 1.00000 | 1.4375 | 1.45610 | -0.018604 | -1.2942 |
| 2   | 4  | 38  | 8.50000 | 1.1286 | 1.12860 | 0.000002  | 0.0002  |
| 3   | 38 | 166 | 3.76471 | 0.9375 | 0.93750 | 0.000001  | 0.0001  |

|   |     |     |         |        |         |           |         |
|---|-----|-----|---------|--------|---------|-----------|---------|
| 4 | 166 | 310 | 1.12500 | 0.8490 | 0.84923 | -0.000233 | -0.0275 |
| 5 | 310 | 454 | 1.00000 | 0.8081 | 0.80710 | 0.001003  | 0.1242  |
| 6 | 454 | 598 | 1.00000 | 0.7795 | 0.78013 | -0.000630 | -0.0809 |
| 7 | 598 | 714 | 0.80556 | 0.7619 | 0.76210 | -0.000201 | -0.0264 |

----- SYS=LANTREC -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 11937.506442   | 2984.376611 |
| RESIDUAL          | 1  | 0.890024       | 0.890024    |
| UNCORRECTED TOTAL | 5  | 11938.396467   |             |

(CORRECTED TOTAL)      4      1483.530658

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|--------------|--------------------------|------------------------------------------------------------|
| A         | 0.6975337602 | 0.04062413242            | 0.18136353367      1.2137039867                            |
| B         | -.1481376166 | 0.01677415086            | -.36126997736      0.0649947442                            |
| C         | 0.0081061307 | 0.02132797809            | -.26288715890      0.2790994202                            |
| D         | -.0025687334 | 0.00637124702            | -.08352179806      0.0783843313                            |

| LOT | XL  | XU  | R       | AUC    | UCP      | DIF        | PCT     |
|-----|-----|-----|---------|--------|----------|------------|---------|
| 1   | 0   | 79  | 1.00000 | 0.4383 | 0.436295 | 0.0020054  | 0.4575  |
| 2   | 79  | 271 | 2.43038 | 0.3353 | 0.335300 | 0.0000000  | 0.0000  |
| 3   | 271 | 463 | 1.00000 | 0.2975 | 0.301071 | -0.0035709 | -1.2003 |
| 4   | 463 | 655 | 1.00000 | 0.2865 | 0.283227 | 0.0032728  | 1.1424  |
| 5   | 655 | 720 | 0.33854 | 0.2693 | 0.269300 | 0.0000000  | 0.0000  |

C.8.4 - Helicopter Programs

----- SYS=HH-52 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 3109.7383954   | 777.4345988 |
| RESIDUAL          | 2  | 1.2236296      | 0.6118148   |
| UNCORRECTED TOTAL | 6  | 3110.9620250   |             |

(CORRECTED TOTAL)      5      731.1991835

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|--------------|--------------------------|------------------------------------------------------------|
| A         | 2.447061845  | 0.10877403273            | 1.9790398141      2.9150838754                             |
| B         | -0.338949052 | 0.09140992248            | -0.7322585254      0.0543604216                            |
| C         | 0.301034252  | 0.22801949617            | -0.6800652343      1.2821337381                            |
| D         | -0.160697748 | 0.13534712264            | -0.7430558130      0.4216603162                            |

| LOT | XL | XU | R       | AUC   | UCP     | DIF       | PCT     |
|-----|----|----|---------|-------|---------|-----------|---------|
| 1   | 0  | 28 | 1.00000 | 1.577 | 1.57536 | 0.001644  | 0.1043  |
| 2   | 28 | 43 | 0.53571 | 1.104 | 1.10307 | 0.000929  | 0.0842  |
| 3   | 43 | 60 | 1.13333 | 1.085 | 1.09549 | -0.010494 | -0.9672 |
| 4   | 60 | 75 | 0.88235 | 1.012 | 1.06133 | -0.049326 | -4.8741 |
| 5   | 75 | 87 | 0.80000 | 1.041 | 1.01204 | 0.028964  | 2.7823  |
| 6   | 87 | 99 | 1.00000 | 1.055 | 0.99484 | 0.060164  | 5.7028  |

----- SYS=CH-46 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 357538.09265   | 89384.52316 |
| RESIDUAL          | 4  | 2074.92651     | 518.73163   |
| UNCORRECTED TOTAL | 8  | 359613.01916   |             |

(CORRECTED TOTAL)      7      57764.44745

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 9.324267189  | 2.1761136537             | 3.2824888363                           | 15.366045541 |
| B         | -0.200928871 | 0.0460698874             | -0.3288376533                          | -0.073020088 |
| C         | -0.048511096 | 0.0612143899             | -0.2184671895                          | 0.121444998  |
| D         | 0.007479847  | 0.0202602672             | -0.0487709116                          | 0.063730606  |

| LOT | XL  | XU  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 14  | 1.00000 | 7.541 | 6.49539 | 1.04561  | 13.8657 |
| 2   | 14  | 50  | 2.57143 | 3.898 | 3.65599 | 0.24201  | 6.2085  |
| 3   | 50  | 110 | 1.66667 | 2.766 | 2.99520 | -0.22920 | -8.2863 |
| 4   | 110 | 195 | 1.41667 | 2.419 | 2.60321 | -0.18421 | -7.6152 |
| 5   | 195 | 394 | 2.34118 | 1.986 | 1.98293 | 0.00307  | 0.1545  |
| 6   | 394 | 486 | 0.46231 | 2.236 | 2.41894 | -0.18294 | -8.1814 |
| 7   | 486 | 576 | 0.97826 | 2.370 | 2.05307 | 0.31693  | 13.3726 |
| 8   | 576 | 624 | 0.53333 | 2.547 | 2.21548 | 0.33152  | 13.0159 |

----- SYS=H-53 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 618986.38829   | 154746.59707 |
| RESIDUAL          | 4  | 92.37697       | 23.09424     |
| UNCORRECTED TOTAL | 8  | 619078.76526   |              |

(CORRECTED TOTAL)      7      355155.11828

| PARAMETER | ESTIMATE | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |
|-----------|----------|--------------------------|----------------------------------------|
|-----------|----------|--------------------------|----------------------------------------|



|   |              |               |               | LOWER        | UPPER |
|---|--------------|---------------|---------------|--------------|-------|
| A | 8.098072212  | 0.72234356536 | 6.0925520916  | 10.103592332 |       |
| B | -0.146330073 | 0.01828271100 | -0.1970903296 | -0.095569816 |       |
| C | 0.002260500  | 0.00391699415 | -0.0086146717 | 0.013135673  |       |
| D | -0.000227730 | 0.00028415485 | -0.0010166599 | 0.000561199  |       |

| LOT | XL  | XU  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 10  | 1.0000  | 6.752 | 6.78831 | -0.03631 | -0.538  |
| 2   | 10  | 141 | 13.1000 | 4.264 | 4.26419 | -0.00019 | -0.005  |
| 3   | 141 | 281 | 1.0687  | 3.762 | 3.75529 | 0.00671  | 0.178   |
| 4   | 281 | 293 | 0.0857  | 3.382 | 3.54158 | -0.15958 | -4.719  |
| 5   | 293 | 323 | 2.5000  | 3.341 | 3.58741 | -0.24641 | -7.375  |
| 6   | 323 | 331 | 0.2667  | 3.154 | 3.48261 | -0.32861 | -10.419 |
| 7   | 331 | 361 | 3.7500  | 3.685 | 3.55020 | 0.13480  | 3.658   |
| 8   | 361 | 367 | 0.2000  | 3.947 | 3.42571 | 0.52129  | 13.207  |

----- SYS=CH-47 -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 477000.62362   | 119250.15591 |
| RESIDUAL          | 8  | 8859.91137     | 1107.48892   |
| UNCORRECTED TOTAL | 12 | 485860.53499   |              |

(CORRECTED TOTAL)      11      132801.70813

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 9.200466776  | 2.5130927138             | 2.4052086758                           | 13.995724876 |
| B         | -0.195294087 | 0.0689680426             | -0.3543362130                          | -0.036251961 |
| C         | 0.033445360  | 0.0676542618             | -0.1225671527                          | 0.189457872  |
| D         | -0.018542753 | 0.0235750313             | -0.0729073966                          | 0.035821892  |

| LOT | XL  | XU  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 18  | 1.00000 | 6.181 | 5.94007 | 0.24093  | 3.898   |
| 2   | 18  | 42  | 1.33333 | 5.226 | 4.41779 | 0.80821  | 15.465  |
| 3   | 42  | 66  | 1.00000 | 4.559 | 4.00040 | 0.55860  | 12.253  |
| 4   | 66  | 126 | 2.50000 | 3.459 | 2.91588 | 0.54312  | 15.702  |
| 5   | 126 | 198 | 1.20000 | 2.760 | 3.25683 | -0.49683 | -18.001 |
| 6   | 198 | 358 | 2.22222 | 2.307 | 2.48869 | -0.18169 | -7.875  |
| 7   | 358 | 442 | 0.52500 | 2.313 | 2.74306 | -0.43006 | -18.593 |
| 8   | 442 | 585 | 1.70238 | 2.695 | 2.47444 | 0.22056  | 8.184   |
| 9   | 585 | 630 | 0.31469 | 3.463 | 2.47991 | 0.98309  | 28.388  |
| 10  | 630 | 666 | 0.80000 | 3.085 | 2.55051 | 0.53449  | 17.325  |
| 11  | 666 | 678 | 0.33333 | 3.671 | 2.43987 | 1.23113  | 33.537  |
| 12  | 678 | 690 | 1.00000 | 3.852 | 2.52592 | 1.32608  | 34.426  |

----- SYS=H-54 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 21064.153629   | 5266.038407 |
| RESIDUAL          | 1  | 64.635279      | 64.635279   |
| UNCORRECTED TOTAL | 5  | 21128.788908   |             |

(CORRECTED TOTAL) 4 3891.650213

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 5.760323665  | 1.7612913546             | -16.618644286                          | 28.139291617 |
| B         | -0.042795431 | 0.0943792030             | -1.241977584                           | 1.156386722  |
| C         | -0.145122422 | 0.0944582009             | -1.345308322                           | 1.055063478  |
| D         | 0.027000751  | 0.0191574627             | -0.216413970                           | 0.270415472  |

| LOT | XL | XU | R       | AUC   | UCP     | DIF      | PCT     |
|-----|----|----|---------|-------|---------|----------|---------|
| 1   | 0  | 6  | 1.00000 | 5.248 | 5.14546 | 0.10254  | 1.954   |
| 2   | 6  | 30 | 4.00000 | 3.388 | 3.38139 | 0.00661  | 0.195   |
| 3   | 30 | 60 | 1.25000 | 2.801 | 2.89297 | -0.09197 | -3.283  |
| 4   | 60 | 83 | 0.76667 | 3.402 | 3.19526 | 0.20674  | 6.077   |
| 5   | 83 | 89 | 0.26087 | 3.083 | 4.05495 | -0.97195 | -31.526 |

----- SYS=HH-60D -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 123892.22000   | 30973.05500 |
| RESIDUAL          | 0  | 0.00000        | 0.00000     |
| UNCORRECTED TOTAL | 4  | 123892.22000   |             |

(CORRECTED TOTAL) 3 24351.97000

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 9.241541094  | 0                        | 9.2415410940                           | 9.2415410940  |
| B         | -0.065204779 | 0                        | -0.0652047792                          | -0.0652047792 |
| C         | -0.015984625 | 0                        | -0.0159846252                          | -0.0159846252 |
| D         | 0.001387580  | 0                        | 0.0013875804                           | 0.0013875804  |

| LOT | XL | XU | R       | AUC | UCP | DIF          | PCT          |
|-----|----|----|---------|-----|-----|--------------|--------------|
| 1   | 0  | 3  | 1.00000 | 9.2 | 9.2 | 0            | 0            |
| 2   | 3  | 28 | 8.33333 | 7.1 | 7.1 | -4.44089E-16 | -6.25478E-15 |
| 3   | 28 | 63 | 1.40000 | 6.7 | 6.7 | 2.22045E-16  | 3.31410E-15  |
| 4   | 63 | 92 | 0.82857 | 6.6 | 6.6 | 2.10942E-15  | 3.19610E-14  |

----- SYS=SH-3 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 4  | 72737.149293   | 18184.287323 |
| RESIDUAL          | 5  | 239.164249     | 47.832850    |
| UNCORRECTED TOTAL | 9  | 72976.313542   |              |

(CORRECTED TOTAL) 8 13013.690662

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 4.612074568  | 0.64985554711            | 2.9415919149                           | 6.2825572210  |
| B         | -0.222589525 | 0.04552856269            | -0.3396227250                          | -0.1055563250 |
| C         | 0.079873489  | 0.04739695099            | -0.0419624864                          | 0.2017094643  |
| D         | -0.022717363 | 0.01567293890            | -0.0630053511                          | 0.0175706251  |

| LOT | XL  | XU  | R       | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|---------|-------|---------|----------|---------|
| 1   | 0   | 20  | 1.00000 | 3.327 | 3.36668 | -0.03968 | -1.193  |
| 2   | 20  | 69  | 2.45000 | 2.480 | 2.50866 | -0.02866 | -1.155  |
| 3   | 69  | 140 | 1.44898 | 2.319 | 2.25627 | 0.06273  | 2.705   |
| 4   | 140 | 185 | 0.63380 | 1.811 | 1.83582 | -0.02482 | -1.370  |
| 5   | 185 | 221 | 0.80000 | 1.870 | 1.83774 | 0.03226  | 1.725   |
| 6   | 221 | 257 | 1.00000 | 1.589 | 1.86427 | -0.27527 | -17.324 |
| 7   | 257 | 287 | 0.83333 | 1.703 | 1.76064 | -0.05764 | -3.385  |
| 8   | 287 | 335 | 1.60000 | 1.930 | 1.91738 | 0.01262  | 0.654   |
| 9   | 335 | 350 | 0.31250 | 2.144 | 1.43668 | 0.70732  | 32.991  |

C.8.5 - Tactical Armament Programs

----- SYS=LLGB -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 220659.18760   | 55164.79690 |
| RESIDUAL          | 6  | 7.22990        | 1.20498     |
| UNCORRECTED TOTAL | 10 | 220666.41749   |             |

(CORRECTED TOTAL) 9 31936.24632

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.0818757671 | 0.00314381181            | 0.07418313116                          | 0.08956840304 |
| B         | -.1720492881 | 0.00365210298            | -.18098566859                          | -.16311290758 |
| C         | 0.0011655335 | 0.00364019053            | -.00774169833                          | 0.01007276524 |
| D         | -.0004554186 | 0.00110583461            | -.00316130034                          | 0.00225046318 |

| LOT | XL    | XU     | R       | AUC    | UCP       | DIF         | PCT     |
|-----|-------|--------|---------|--------|-----------|-------------|---------|
| 1   | 0     | 1600   | 1.00000 | 0.0275 | 0.0279118 | -0.00041177 | -1.4973 |
| 2   | 1600  | 4550   | 1.84375 | 0.0206 | 0.0208354 | -0.00023535 | -1.1425 |
| 3   | 4550  | 8290   | 1.26780 | 0.0189 | 0.0182885 | 0.00061147  | 3.2353  |
| 4   | 8290  | 17270  | 2.40107 | 0.0162 | 0.0161889 | 0.00001110  | 0.0685  |
| 5   | 17270 | 26890  | 1.07127 | 0.0147 | 0.0147784 | -0.00007840 | -0.5333 |
| 6   | 26890 | 41290  | 1.49688 | 0.0137 | 0.0137170 | -0.00001704 | -0.1244 |
| 7   | 41290 | 56890  | 1.08333 | 0.0129 | 0.0128783 | 0.00002169  | 0.1681  |
| 8   | 56890 | 72490  | 1.00000 | 0.0123 | 0.0122767 | 0.00002327  | 0.1892  |
| 9   | 72490 | 88090  | 1.00000 | 0.0118 | 0.0118286 | -0.00002857 | -0.2421 |
| 10  | 88090 | 100000 | 0.76346 | 0.0115 | 0.0114990 | 0.00000100  | 0.0087  |

----- SYS=CEM -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 1106605.2347   | 276651.3087 |
| RESIDUAL          | 4  | 507.9642       | 126.9911    |
| UNCORRECTED TOTAL | 8  | 1107113.1989   |             |

(CORRECTED TOTAL)      7      367517.1256

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|--------------|--------------------------|------------------------------------------------------------|
| A         | 0.1182807993 | 0.04281435771            | -0.00058930616      0.23715090482                          |
| B         | -.1953660986 | 0.02765118984            | -.27213707052      -.11859512670                           |
| C         | 0.0042048544 | 0.00577218897            | -0.01182109457      0.02023080339                          |
| D         | -.0015240464 | 0.00100615476            | -0.00431754206      0.00126944925                          |

| LOT | XL     | XU     | R       | AUC     | UCP       | DIF        | PCT     |
|-----|--------|--------|---------|---------|-----------|------------|---------|
| 1   | 0      | 172    | 1.00000 | 0.06924 | 0.0543398 | 0.0149002  | 21.5197 |
| 2   | 172    | 1432   | 7.32558 | 0.03038 | 0.0237469 | 0.0066331  | 21.8339 |
| 3   | 1432   | 7557   | 4.86111 | 0.01988 | 0.0205487 | -0.0006687 | -3.3636 |
| 4   | 7557   | 21777  | 2.32163 | 0.01765 | 0.0186074 | -0.0009574 | -5.4242 |
| 5   | 21777  | 50227  | 2.00070 | 0.01619 | 0.0157053 | 0.0004847  | 2.9937  |
| 6   | 50227  | 85247  | 1.23093 | 0.01401 | 0.0139354 | 0.0000746  | 0.5326  |
| 7   | 85247  | 134157 | 1.39663 | 0.01258 | 0.0126965 | -0.0001165 | -0.9257 |
| 8   | 134157 | 171666 | 0.76690 | 0.01181 | 0.0118134 | -0.0000034 | -0.0285 |

----- SYS=GBU-15 -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 39978.151274   | 9994.537818 |
| RESIDUAL          | 5  | 102.134963     | 20.426993   |
| UNCORRECTED TOTAL | 9  | 40080.286237   |             |
| (CORRECTED TOTAL) | 8  | 10225.399632   |             |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.1633332802 | 0.06426867496            | -.00187221379                          | 0.32853877411 |
| B         | -.0477695586 | 0.04952308717            | -.17507086183                          | 0.07953174458 |
| C         | 0.0411646747 | 0.01544402810            | 0.00146511206                          | 0.08086423744 |
| D         | -.0069403884 | 0.00256213937            | -.01352648185                          | -.00035429489 |

| LOT | XL   | XU   | R       | AUC    | UCP      | DIF       | PCT     |
|-----|------|------|---------|--------|----------|-----------|---------|
| 1   | 0    | 40   | 1.00000 | 0.1975 | 0.157506 | 0.039994  | 20.250  |
| 2   | 40   | 105  | 1.62500 | 0.2000 | 0.163887 | 0.036113  | 18.057  |
| 3   | 105  | 445  | 5.23077 | 0.1439 | 0.144310 | -0.000410 | -0.285  |
| 4   | 445  | 695  | 0.73529 | 0.1483 | 0.142751 | 0.005549  | 3.742   |
| 5   | 695  | 1015 | 1.28000 | 0.1308 | 0.156380 | -0.025580 | -19.556 |
| 6   | 1015 | 1615 | 1.87500 | 0.1718 | 0.169315 | 0.002485  | 1.447   |
| 7   | 1615 | 2215 | 1.00000 | 0.1539 | 0.147449 | 0.006451  | 4.192   |
| 8   | 2215 | 2815 | 1.00000 | 0.1483 | 0.146902 | 0.001398  | 0.943   |
| 9   | 2815 | 3415 | 1.00000 | 0.1420 | 0.146475 | -0.004475 | -3.152  |

#### C.8.6 - Tactical Missile Programs

----- SYS=AMRAAM -----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 3265460.2541   | 816365.0635 |
| RESIDUAL          | 6  | 1384.6149      | 230.7691    |
| UNCORRECTED TOTAL | 10 | 3266844.8690   |             |

(CORRECTED TOTAL)      9      183807.0285

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 5.045800208  | 0.44796748004            | 3.9496624812                           | 6.1419379352  |
| B         | -0.343071789 | 0.00881099198            | -0.3646315255                          | -0.3215120530 |
| C         | -0.006370446 | 0.00629273118            | -0.0217682160                          | 0.0090273232  |
| D         | 0.000737621  | 0.00092399967            | -0.0015233265                          | 0.0029985683  |

| LOT | XL    | XU    | R       | AUC   | UCP     | DIF        | PCT     |
|-----|-------|-------|---------|-------|---------|------------|---------|
| 1   | 0     | 194   | 1.00000 | 1.233 | 1.23420 | -0.0011974 | -0.0971 |
| 2   | 194   | 1251  | 5.44845 | 0.512 | 0.51208 | -0.0000816 | -0.0159 |
| 3   | 1251  | 3215  | 1.85809 | 0.342 | 0.33892 | 0.0030849  | 0.9020  |
| 4   | 3215  | 6211  | 1.52546 | 0.257 | 0.26118 | -0.0041762 | -1.6250 |
| 5   | 6211  | 9111  | 0.96796 | 0.232 | 0.22403 | 0.0079688  | 3.4348  |
| 6   | 9111  | 12011 | 1.00000 | 0.194 | 0.19975 | -0.0057522 | -2.9650 |
| 7   | 12011 | 14911 | 1.00000 | 0.182 | 0.18344 | -0.0014418 | -0.7922 |
| 8   | 14911 | 17911 | 1.03448 | 0.170 | 0.17087 | -0.0008719 | -0.5129 |
| 9   | 17911 | 20911 | 1.00000 | 0.158 | 0.16139 | -0.0033882 | -2.1444 |
| 10  | 20911 | 24674 | 1.25433 | 0.155 | 0.15079 | 0.0042130  | 2.7181  |

----- SYS=HARM -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 1585156.2088   | 396289.0522 |
| RESIDUAL          | 7  | 884.5096       | 126.3585    |
| UNCORRECTED TOTAL | 11 | 1586040.7184   |             |

(CORRECTED TOTAL) 10 338342.8883

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 1.656765461  | 0.20064117653            | 1.1823206601                           | 2.1312102614  |
| B         | -0.219511233 | 0.01429558754            | -0.2533151973                          | -0.1857072686 |
| C         | -0.017378620 | 0.00958535466            | -0.0400445639                          | 0.0052873242  |
| D         | 0.002964776  | 0.00293975166            | -0.0039866878                          | 0.0099162399  |

| LOT | XL    | XU    | R       | AUC   | UCP      | DIF        | PCT     |
|-----|-------|-------|---------|-------|----------|------------|---------|
| 1   | 0     | 80    | 1.00000 | 0.809 | 0.775906 | 0.0330938  | 4.0907  |
| 2   | 80    | 316   | 2.95000 | 0.517 | 0.463062 | 0.0539379  | 10.4329 |
| 3   | 316   | 712   | 1.67797 | 0.400 | 0.372500 | 0.0275001  | 6.8750  |
| 4   | 712   | 1399  | 1.73485 | 0.314 | 0.311730 | 0.0022704  | 0.7230  |
| 5   | 1399  | 3144  | 2.54003 | 0.249 | 0.252338 | -0.0033383 | -1.3407 |
| 6   | 3144  | 5612  | 1.41433 | 0.223 | 0.225839 | -0.0028389 | -1.2731 |
| 7   | 5612  | 7731  | 0.85859 | 0.208 | 0.214597 | -0.0065974 | -3.1718 |
| 8   | 7731  | 9863  | 1.00613 | 0.197 | 0.197977 | -0.0009767 | -0.4958 |
| 9   | 9863  | 12863 | 1.40713 | 0.184 | 0.179491 | 0.0045089  | 2.4505  |
| 10  | 12863 | 15863 | 1.00000 | 0.177 | 0.176606 | 0.0003938  | 0.2225  |
| 11  | 15863 | 16961 | 0.36600 | 0.196 | 0.185725 | 0.0102746  | 5.2421  |

----- SYS=IIR -----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 2027375.5260   | 506843.8815 |
| RESIDUAL          | 5  | 4088.5793      | 817.7159    |
| UNCORRECTED TOTAL | 9  | 2031464.1053   |             |

(CORRECTED TOTAL) 8 458719.8690

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.6997821589 | 0.51718579264            | -.62966697608                          | 2.0292312940  |
| B         | -.2178424771 | 0.06174588977            | -.37656303924                          | -0.0591219149 |
| C         | -.0277469244 | 0.01548013010            | -.06753928894                          | 0.0120454400  |
| D         | 0.0044028397 | 0.00384180432            | -.00547268954                          | 0.0142783690  |

| LOT | XL    | XU    | R       | AUC   | UCP      | DIF       | PCT     |
|-----|-------|-------|---------|-------|----------|-----------|---------|
| 1   | 0     | 200   | 1.00000 | 0.309 | 0.256951 | 0.052049  | 16.844  |
| 2   | 200   | 1100  | 4.50000 | 0.135 | 0.139712 | -0.004712 | -3.490  |
| 3   | 1100  | 3700  | 2.88889 | 0.083 | 0.093260 | -0.010260 | -12.361 |
| 4   | 3700  | 9429  | 2.20346 | 0.082 | 0.073523 | 0.008477  | 10.338  |
| 5   | 9429  | 18429 | 1.57095 | 0.062 | 0.064431 | -0.002431 | -3.921  |
| 6   | 18429 | 30429 | 1.33333 | 0.057 | 0.057873 | -0.000873 | -1.531  |
| 7   | 30429 | 42429 | 1.00000 | 0.055 | 0.055641 | -0.000641 | -1.166  |
| 8   | 42429 | 54429 | 1.00000 | 0.053 | 0.051917 | 0.001083  | 2.043   |
| 9   | 54429 | 60664 | 0.51958 | 0.057 | 0.055606 | 0.001394  | 2.445   |

----- SYS=AIM7F-R -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 115016.42335   | 28754.10584 |
| RESIDUAL          | 4  | 135.16155      | 33.79039    |
| UNCORRECTED TOTAL | 8  | 115151.58490   |             |

(CORRECTED TOTAL) 7 6543.29279

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 2.847495934  | 0.30411208374            | 2.0031568524                           | 3.6918350160  |
| B         | -0.380338179 | 0.02240005663            | -0.4425298647                          | -0.3181464925 |
| C         | -0.007523489 | 0.02304299988            | -0.0715002476                          | 0.0564532696  |
| D         | -0.001839594 | 0.00652258621            | -0.0199489516                          | 0.0162697634  |

| LOT | XL   | XU   | R       | AUC   | UCP      | DIF       | PCT     |
|-----|------|------|---------|-------|----------|-----------|---------|
| 1   | 0    | 100  | 1.00000 | 0.741 | 0.775384 | -0.034384 | -4.6402 |
| 2   | 100  | 325  | 2.25000 | 0.378 | 0.332053 | 0.045947  | 12.1553 |
| 3   | 325  | 925  | 2.66667 | 0.199 | 0.203751 | -0.004751 | -2.3872 |
| 4   | 925  | 1725 | 1.33333 | 0.169 | 0.169503 | -0.000503 | -0.2979 |
| 5   | 1725 | 2825 | 1.37500 | 0.134 | 0.136034 | -0.002034 | -1.5179 |
| 6   | 2825 | 4225 | 1.27273 | 0.116 | 0.115450 | 0.000550  | 0.4744  |
| 7   | 4225 | 5125 | 0.64286 | 0.111 | 0.109276 | 0.001724  | 1.5529  |
| 8   | 5125 | 6269 | 1.27111 | 0.095 | 0.095361 | -0.000361 | -0.3797 |

----- SYS=AIM7F-GD -----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 4  | 28537.332819   | 7134.333205 |
| RESIDUAL          | 2  | 83.825206      | 41.912603   |
| UNCORRECTED TOTAL | 6  | 28621.158025   |             |

(CORRECTED TOTAL) 5 7732.207921

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 2.161801150  | 0.61963713513            | -.50431155141                          | 4.8279138512 |
| B         | -0.402137892 | 0.09402236555            | -.80668792457                          | 0.0024121400 |
| C         | -0.015704954 | 0.06233739100            | -.28392404580                          | 0.2525141387 |
| D         | 0.002839980  | 0.01204498436            | -.04898597396                          | 0.0546659345 |

| LOT | XL   | XU   | R       | AUC   | UCP     | DIF       | PCT     |
|-----|------|------|---------|-------|---------|-----------|---------|
| 1   | 0    | 15   | 1.00000 | 1.551 | 1.20108 | 0.349915  | 22.561  |
| 2   | 15   | 85   | 4.66667 | 0.379 | 0.45504 | -0.076040 | -20.063 |
| 3   | 85   | 295  | 3.00000 | 0.228 | 0.24236 | -0.014356 | -6.296  |
| 4   | 295  | 505  | 1.00000 | 0.195 | 0.18112 | 0.013883  | 7.120   |
| 5   | 505  | 1255 | 3.57143 | 0.130 | 0.12610 | 0.003903  | 3.002   |
| 6   | 1255 | 2565 | 1.74667 | 0.090 | 0.09102 | -0.001020 | -1.133  |

### C.9 - Basic Learning Curve Non-linear Regression

This section contains the summary results produced by the non-linear regression procedure in SAS. The SAS program used to produce this run was discussed in Appendix B.9.

#### C.9.1 - Bomber Aircraft Programs

-----SYS=B-1B-----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 59459243.599   | 29729621.800 |
| RESIDUAL          | 3  | 18733.211      | 6244.404     |
| UNCORRECTED TOTAL | 5  | 59477976.810   |              |

(CORRECTED TOTAL)      4      17234615.032

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 397.5616196 | 17.590158123             | 341.58094132                           | 453.54229778 |
| B         | -0.2944904  | 0.011736989              | -0.33184339                            | -0.25713745  |

| LOT | XL | XU  | AUC   | UCP     | DIF     | PCT     |
|-----|----|-----|-------|---------|---------|---------|
| 1   | 0  | 1   | 535.8 | 563.503 | -27.703 | -5.1705 |
| 2   | 1  | 8   | 260.3 | 268.592 | -8.292  | -3.1857 |
| 3   | 8  | 18  | 200.5 | 188.655 | 11.845  | 5.9079  |
| 4   | 18 | 52  | 142.0 | 141.844 | 0.156   | 0.1100  |
| 5   | 52 | 100 | 111.3 | 111.783 | -0.483  | -0.4338 |



-----SYS=B-52-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 69617419.295   | 34808709.647 |
| RESIDUAL          | 8  | 2783352.615    | 347919.077   |
| UNCORRECTED TOTAL | 10 | 72400771.910   |              |

(CORRECTED TOTAL)      9      18070289.989

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 95.12495044 | 42.528246791             | -2.9463086649                          | 193.19620954 |
| B         | -0.21081760 | 0.079539299              | -0.3942373265                          | -0.02739788  |

| LOT | XL  | XU  | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|-------|---------|---------|---------|
| 1   | 0   | 20  | 112.5 | 64.0969 | 48.4031 | 43.025  |
| 2   | 20  | 63  | 37.0  | 43.9196 | -6.9196 | -18.702 |
| 3   | 63  | 88  | 28.6  | 38.2738 | -9.6738 | -33.824 |
| 4   | 88  | 165 | 32.3  | 34.4274 | -2.1274 | -6.586  |
| 5   | 165 | 298 | 23.4  | 30.2952 | -6.8952 | -29.467 |
| 6   | 298 | 500 | 28.4  | 26.9882 | 1.4118  | 4.971   |
| 7   | 500 | 601 | 27.3  | 25.1565 | 2.1435  | 7.852   |
| 8   | 601 | 640 | 27.3  | 24.5219 | 2.7781  | 10.176  |
| 9   | 640 | 702 | 35.4  | 24.1219 | 11.2781 | 31.859  |
| 10  | 702 | 742 | 35.0  | 23.7508 | 11.2492 | 32.141  |

-----SYS=B-58-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 2  | 13658345.536   | 6829172.768 |
| RESIDUAL          | 2  | 579983.338     | 289991.669  |
| UNCORRECTED TOTAL | 4  | 14238328.874   |             |

(CORRECTED TOTAL)      3      1830393.074

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 157.0740981 | 75.105407035             | -166.08193672                          | 480.23013298 |
| B         | -0.2335523  | 0.138510861              | -0.82952293                            | 0.36241843   |

| LOT | XL | XU  | AUC   | UCP     | DIF     | PCT     |
|-----|----|-----|-------|---------|---------|---------|
| 1   | 0  | 17  | 93.86 | 105.742 | -11.882 | -12.659 |
| 2   | 17 | 53  | 80.26 | 69.434  | 10.826  | 13.489  |
| 3   | 53 | 73  | 73.16 | 59.758  | 13.402  | 18.319  |
| 4   | 73 | 103 | 36.56 | 55.281  | -18.721 | -51.207 |

# C.9.2 - Fighter Aircraft Programs

-----SYS=A-10-----

## NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |              |
|-------------------|----|----------------|--------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
| REGRESSION        | 2  | 5143666.2635   | 2571833.1317 |
| RESIDUAL          | 7  | 43551.1209     | 6221.5887    |
| UNCORRECTED TOTAL | 9  | 5187217.3844   |              |

(CORRECTED TOTAL)      8      1226666.3049

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 10.44782824 | 2.9696356900             | 3.4256992951                           | 17.469957183 |
| B         | -0.04599938 | 0.0493414332             | -0.1626742658                          | 0.070675507  |

| LOT | XL  | XU  | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|-------|---------|----------|---------|
| 1   | 0   | 22  | 12.37 | 9.50007 | 2.86993  | 23.2007 |
| 2   | 22  | 75  | 9.16  | 8.76264 | 0.39736  | 4.3380  |
| 3   | 75  | 95  | 8.20  | 8.51770 | -0.31770 | -3.8744 |
| 4   | 95  | 195 | 8.20  | 8.31830 | -0.11830 | -1.4427 |
| 5   | 195 | 339 | 7.82  | 8.08476 | -0.26476 | -3.3857 |
| 6   | 339 | 483 | 7.59  | 7.92317 | -0.33317 | -4.3896 |
| 7   | 483 | 627 | 7.82  | 7.81356 | 0.00644  | 0.0823  |
| 8   | 627 | 687 | 10.18 | 7.75224 | 2.42776  | 23.8484 |
| 9   | 687 | 707 | 13.64 | 7.73107 | 5.90893  | 43.3206 |

-----SYS=F-100-----

## NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |             |
|-------------------|----|----------------|-------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
| REGRESSION        | 2  | 11794615.199   | 5897307.599 |
| RESIDUAL          | 3  | 41025.670      | 13675.223   |
| UNCORRECTED TOTAL | 5  | 11835640.869   |             |

(CORRECTED TOTAL)      4      2086478.767

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 6.522601084  | 1.6964681180             | 1.1235912984                           | 11.921610870 |
| B         | -0.113747451 | 0.0390394559             | -0.2379905194                          | 0.010495618  |

| LOT | XL | XU  | AUC  | UCP     | DIF      | PCT     |
|-----|----|-----|------|---------|----------|---------|
| 1   | 0  | 23  | 6.51 | 5.15193 | 1.35807  | 20.8612 |
| 2   | 23 | 568 | 3.45 | 3.51092 | -0.06092 | -1.7657 |

|   |      |      |      |         |          |         |
|---|------|------|------|---------|----------|---------|
| 3 | 568  | 1161 | 3.08 | 3.03035 | 0.04965  | 1.6120  |
| 4 | 1161 | 1720 | 3.10 | 2.85429 | 0.24571  | 7.9263  |
| 5 | 1720 | 2277 | 2.50 | 2.74886 | -0.24886 | -9.9546 |

-----SYS=F-101-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 7050997.4292   | 3525498.7146 |
| RESIDUAL          | 4  | 25862.4154     | 6465.6038    |
| UNCORRECTED TOTAL | 6  | 7076859.8446   |              |
| (CORRECTED TOTAL) | 5  | 2200718.4643   |              |

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 23.80267039 | 5.0404305235             | 9.8083810870                           | 37.796959692 |
| B         | -0.22694100 | 0.0379518949             | -0.3323109280                          | -0.121571074 |

| LOT | XL  | XU  | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|-------|---------|---------|---------|
| 1   | 0   | 31  | 16.85 | 14.1241 | 2.7259  | 16.177  |
| 2   | 31  | 115 | 7.58  | 9.1482  | -1.5682 | -20.689 |
| 3   | 115 | 424 | 6.91  | 6.8006  | 0.1094  | 1.584   |
| 4   | 424 | 630 | 5.76  | 5.7506  | 0.0094  | 0.163   |
| 5   | 630 | 714 | 5.27  | 5.4332  | -0.1632 | -3.097  |
| 6   | 714 | 807 | 5.22  | 5.2828  | -0.0628 | -1.202  |

-----SYS=F-102-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 4453106.4209   | 2226553.2105 |
| RESIDUAL          | 2  | 9600.0451      | 4800.0225    |
| UNCORRECTED TOTAL | 4  | 4462706.4660   |              |
| (CORRECTED TOTAL) | 3  | 1795723.5179   |              |

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 24.49644778 | 5.5200056068             | 0.74551965680                          | 48.247375905 |
| B         | -0.33004967 | 0.0393944065             | -.49955197862                          | -0.160547353 |

| LOT | XL  | XU  | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|-------|---------|----------|---------|
| 1   | 0   | 37  | 11.66 | 11.1039 | 0.55611  | 4.769   |
| 2   | 37  | 145 | 5.17  | 5.6942  | -0.52418 | -10.139 |
| 3   | 145 | 707 | 3.50  | 3.4506  | 0.04943  | 1.412   |
| 4   | 707 | 847 | 2.21  | 2.7251  | -0.51508 | -23.307 |

-----SYS=F-106-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 4716695.7571   | 2358347.8785 |
| RESIDUAL          | 2  | 48383.1162     | 24191.5581   |
| UNCORRECTED TOTAL | 4  | 4765078.8733   |              |

(CORRECTED TOTAL)      3      480903.3427

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 105.6439907 | 18.564826447             | 25.765111978                           | 185.52286948 |
| B         | -0.4877353  | 0.043911227              | -0.676672104                           | -0.29879843  |

| LOT | XL  | XU  | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|-------|---------|---------|---------|
| 1   | 0   | 42  | 34.19 | 33.3133 | 0.8767  | 2.564   |
| 2   | 42  | 130 | 10.54 | 12.4638 | -1.9238 | -18.252 |
| 3   | 130 | 175 | 11.64 | 9.1230  | 2.5170  | 21.623  |
| 4   | 175 | 340 | 7.59  | 7.1389  | 0.4511  | 5.943   |

-----SYS=F-15AB-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 2  | 10240631.316   | 5120315.658 |
| RESIDUAL          | 4  | 7010.743       | 1752.686    |
| UNCORRECTED TOTAL | 6  | 10247642.059   |             |

(CORRECTED TOTAL)      5      1585918.021

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|-------------|--------------------------|----------------------------------------|--------------|
|           |             |                          | LOWER                                  | UPPER        |
| A         | 31.95366041 | 2.4340528283             | 25.195737787                           | 38.711583030 |
| B         | -0.11784042 | 0.0147920050             | -0.158909051                           | -0.076771783 |

| LOT | XL | XU | AUC    | UCP     | DIF      | PCT     |
|-----|----|----|--------|---------|----------|---------|
| 1   | 0  | 30 | 25.597 | 24.2610 | 1.33599  | 5.2193  |
| 2   | 30 | 92 | 19.556 | 19.8077 | -0.25165 | -1.2868 |

|   |     |     |        |         |          |         |
|---|-----|-----|--------|---------|----------|---------|
| 3 | 92  | 164 | 17.183 | 18.0709 | -0.88792 | -5.1674 |
| 4 | 164 | 272 | 17.126 | 16.9650 | 0.16104  | 0.9403  |
| 5 | 272 | 296 | 16.021 | 16.4224 | -0.40144 | -2.5057 |
| 6 | 296 | 404 | 16.272 | 16.0308 | 0.24120  | 1.4823  |

-----SYS=F-15CD-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 8333341.5389   | 4166670.7695 |
| RESIDUAL          | 6  | 85507.6073     | 14251.2679   |
| UNCORRECTED TOTAL | 8  | 8418849.1462   |              |
| (CORRECTED TOTAL) | 7  | 752208.0946    |              |

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|-------------|--------------------------|------------------------------------------------------------|
| A         | 13.47963026 | 3.0855581257             | 5.9295360664    21.029724456                               |
| B         | 0.05386192  | 0.0461614635             | -0.0590911924    0.166815035                               |

| LOT | XL  | XU  | AUC    | UCP     | DIF     | PCT     |
|-----|-----|-----|--------|---------|---------|---------|
| 1   | 0   | 97  | 17.249 | 16.3646 | 0.8844  | 5.127   |
| 2   | 97  | 175 | 15.588 | 17.5503 | -1.9623 | -12.588 |
| 3   | 175 | 235 | 15.508 | 17.9520 | -2.4440 | -15.760 |
| 4   | 235 | 277 | 17.665 | 18.1704 | -0.5054 | -2.861  |
| 5   | 277 | 313 | 19.943 | 18.3102 | 1.6328  | 8.187   |
| 6   | 313 | 352 | 19.308 | 18.4287 | 0.8793  | 4.554   |
| 7   | 352 | 388 | 21.954 | 18.5352 | 3.4188  | 15.573  |
| 8   | 388 | 436 | 21.017 | 18.6427 | 2.3743  | 11.297  |

-----SYS=F-15E-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 2  | 13997992.955   | 6998996.478 |
| RESIDUAL          | 4  | 34783.582      | 8695.895    |
| UNCORRECTED TOTAL | 6  | 14032776.537   |             |
| (CORRECTED TOTAL) | 5  | 172346.387     |             |

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|-------------|--------------------------|------------------------------------------------------------|
| A         | 25.35535866 | 3.6487036830             | 15.225070246    35.485647068                               |
| B         | -0.06958201 | 0.0269457573             | -0.144394417    0.005230390                                |

| LOT | XL  | XU  | AUC    | UCP     | DIF      | PCT     |
|-----|-----|-----|--------|---------|----------|---------|
| 1   | 0   | 60  | 20.544 | 20.4958 | 0.04823  | 0.2347  |
| 2   | 60  | 132 | 19.203 | 18.4898 | 0.71319  | 3.7139  |
| 3   | 132 | 228 | 17.608 | 17.6822 | -0.07416 | -0.4212 |
| 4   | 228 | 324 | 16.175 | 17.1550 | -0.98001 | -6.0588 |
| 5   | 324 | 420 | 16.041 | 16.7995 | -0.75850 | -4.7285 |
| 6   | 420 | 516 | 17.927 | 16.5320 | 1.39499  | 7.7815  |

-----SYS=F-16AB-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 5475416.1108   | 2737708.0554 |
| RESIDUAL          | 3  | 102620.6292    | 34206.8764   |
| UNCORRECTED TOTAL | 5  | 5578036.7400   |              |

(CORRECTED TOTAL) 4 338023.5480

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER UPPER |
|-----------|-------------|--------------------------|-------------------------------------------------------|
| A         | 22.07459257 | 8.5312299747             | -5.0760468231 49.225231966                            |
| B         | -0.20707532 | 0.0718796714             | -0.4358323696 0.021681739                             |

| LOT | XL  | XU  | AUC   | UCP     | DIF     | PCT     |
|-----|-----|-----|-------|---------|---------|---------|
| 1   | 0   | 105 | 10.14 | 10.6199 | -0.4799 | -4.733  |
| 2   | 105 | 250 | 7.74  | 7.6092  | 0.1308  | 1.689   |
| 3   | 250 | 425 | 8.04  | 6.6312  | 1.4088  | 17.522  |
| 4   | 425 | 605 | 5.05  | 6.0660  | -1.0160 | -20.119 |
| 5   | 605 | 725 | 5.13  | 5.7478  | -0.6178 | -12.043 |

-----SYS=F-16E-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 47668708.478   | 23834354.239 |
| RESIDUAL          | 8  | 348137.145     | 43517.143    |
| UNCORRECTED TOTAL | 10 | 48016845.623   |              |

(CORRECTED TOTAL) 9 1747028.765

| PARAMETER | ESTIMATE    | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER UPPER |
|-----------|-------------|--------------------------|-------------------------------------------------------|
| A         | 12.83252442 | 3.0230650421             | 5.8612566788 19.803792165                             |
| B         | -0.02117649 | 0.0350270408             | -0.1019497728 0.059596788                             |

| LOT | XL   | XU   | AUC   | UCP     | DIF     | PCT     |
|-----|------|------|-------|---------|---------|---------|
| 1   | 0    | 120  | 9.86  | 11.8462 | -1.9862 | -20.144 |
| 2   | 120  | 264  | 10.58 | 11.4866 | -0.9066 | -8.569  |
| 3   | 264  | 414  | 14.55 | 11.3451 | 3.2049  | 22.027  |
| 4   | 414  | 630  | 11.93 | 11.2416 | 0.6884  | 5.770   |
| 5   | 630  | 846  | 11.28 | 11.1586 | 0.1214  | 1.076   |
| 6   | 846  | 1062 | 11.02 | 11.0978 | -0.0778 | -0.706  |
| 7   | 1062 | 1278 | 10.88 | 11.0497 | -0.1697 | -1.560  |
| 8   | 1278 | 1494 | 10.69 | 11.0101 | -0.3201 | -2.994  |
| 9   | 1494 | 1710 | 10.61 | 10.9763 | -0.3663 | -3.452  |
| 10  | 1710 | 1926 | 10.54 | 10.9469 | -0.4069 | -3.860  |

### C.9.2 - Electronics Programs

-----SYS=ARC-109V-----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 66.650250587   | 33.325125294 |
| RESIDUAL          | 3  | 0.093823143    | 0.031274381  |
| UNCORRECTED TOTAL | 5  | 66.744073730   |              |
| (CORRECTED TOTAL) | 4  | 29.010182832   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|--------------|--------------------------|------------------------------------------------------------|
| A         | 0.0311517458 | 0.00711689517            | 0.00850222688   0.05380126466                              |
| B         | -.0012134599 | 0.04277992471            | -.13736057031   0.13493365047                              |

| LOT | XL  | XU  | AUC    | UCP       | DIF        | PCT     |
|-----|-----|-----|--------|-----------|------------|---------|
| 1   | 0   | 4   | 0.0487 | 0.0311372 | 0.0175628  | 36.0633 |
| 2   | 4   | 28  | 0.0393 | 0.0310515 | 0.0082485  | 20.9886 |
| 3   | 28  | 107 | 0.0285 | 0.0309953 | -0.0024953 | -8.7556 |
| 4   | 107 | 333 | 0.0313 | 0.0309503 | 0.0003497  | 1.1172  |
| 5   | 333 | 441 | 0.0303 | 0.0309274 | -0.0006274 | -2.0708 |

-----SYS=ARC-54-----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 4660.0577861   | 2330.0288930 |
| RESIDUAL          | 5  | 6.1431566      | 1.2286313    |
| UNCORRECTED TOTAL | 7  | 4666.2009427   |              |
| (CORRECTED TOTAL) | 6  | 1109.4069615   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.0400966747 | 0.00603910116            | 0.02457289599                          | 0.05562045349 |
| B         | -.1181189900 | 0.01782682583            | -.16394364051                          | -.07229433954 |

| LOT | XL   | XU    | AUC    | UCP       | DIF         | PCT     |
|-----|------|-------|--------|-----------|-------------|---------|
| 1   | 0    | 900   | 0.0210 | 0.0203585 | 0.00064148  | 3.0547  |
| 2   | 900  | 1753  | 0.0165 | 0.0171902 | -0.00069016 | -4.1828 |
| 3   | 1753 | 3134  | 0.0164 | 0.0159847 | 0.00041534  | 2.5326  |
| 4   | 3134 | 4294  | 0.0145 | 0.0151942 | -0.00069418 | -4.7874 |
| 5   | 4294 | 4594  | 0.0144 | 0.0148678 | -0.00046784 | -3.2489 |
| 6   | 4594 | 7697  | 0.0139 | 0.0143295 | -0.00042946 | -3.0897 |
| 7   | 7697 | 10347 | 0.0143 | 0.0136811 | 0.00061894  | 4.3283  |

-----SYS=ASN-63-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 27708.765769   | 13854.382885 |
| RESIDUAL          | 8  | 33.199227      | 4.149903     |
| UNCORRECTED TOTAL | 10 | 27741.964996   |              |

(CORRECTED TOTAL)      9      14794.094157

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.1873636108 | 0.02200872886            | 0.13661090141                          | 0.23811632018 |
| B         | -.0011536203 | 0.01945646701            | -.04602074654                          | 0.04371350595 |

| LOT | XL   | XU   | AUC    | UCP      | DIF       | PCT     |
|-----|------|------|--------|----------|-----------|---------|
| 1   | 0    | 781  | 0.1866 | 0.186144 | 0.000456  | 0.2443  |
| 2   | 781  | 930  | 0.1744 | 0.185910 | -0.011510 | -6.5999 |
| 3   | 930  | 1217 | 0.1769 | 0.185862 | -0.008962 | -5.0661 |
| 4   | 1217 | 1358 | 0.1817 | 0.185822 | -0.004122 | -2.2688 |
| 5   | 1358 | 1450 | 0.1772 | 0.185804 | -0.008604 | -4.8554 |
| 6   | 1450 | 1585 | 0.2189 | 0.185787 | 0.033113  | 15.1269 |
| 7   | 1585 | 1693 | 0.1911 | 0.185771 | 0.005329  | 2.7888  |
| 8   | 1693 | 1851 | 0.1917 | 0.185754 | 0.005946  | 3.1018  |
| 9   | 1851 | 1887 | 0.2005 | 0.185742 | 0.014758  | 7.3604  |
| 10  | 1887 | 1923 | 0.2145 | 0.185738 | 0.028762  | 13.4087 |

-----SYS=ASN-70-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE     | DF | SUM OF SQUARES | MEAN SQUARE |
|------------|----|----------------|-------------|
| REGRESSION | 2  | 119.43754853   | 59.71877426 |
| RESIDUAL   | 6  | 0.01845028     | 0.00307505  |



UNCORRECTED TOTAL 8 119.45599881

(CORRECTED TOTAL) 7 64.18968336

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.0345300666 | 0.00129289467            | 0.03136646505                          | 0.03769366818 |
| B         | 0.0035818910 | 0.00702335300            | -.01360364714                          | 0.02076742906 |

| LOT | XL  | XU  | AUC    | UCP       | DIF        | PCT     |
|-----|-----|-----|--------|-----------|------------|---------|
| 1   | 0   | 152 | 0.0350 | 0.0350316 | -0.0000316 | -0.0902 |
| 2   | 152 | 402 | 0.0353 | 0.0352282 | 0.0000718  | 0.2035  |
| 3   | 402 | 483 | 0.0342 | 0.0352917 | -0.0010917 | -3.1921 |
| 4   | 483 | 541 | 0.0356 | 0.0353103 | 0.0002897  | 0.8139  |
| 5   | 541 | 567 | 0.0370 | 0.0353203 | 0.0016797  | 4.5398  |
| 6   | 567 | 575 | 0.0399 | 0.0353241 | 0.0045759  | 11.4684 |
| 7   | 575 | 583 | 0.0370 | 0.0353259 | 0.0016741  | 4.5246  |
| 8   | 583 | 594 | 0.0427 | 0.0353279 | 0.0073721  | 17.2648 |

-----SYS=ASN-99-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 373.20568145   | 186.60284073 |
| RESIDUAL          | 6  | 10.39792769    | 1.73298795   |
| UNCORRECTED TOTAL | 8  | 383.60360914   |              |

(CORRECTED TOTAL) 7 61.21154176

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.0286102060 | 0.01535491364            | -.00896194123                          | 0.06618235333 |
| B         | 0.0783227073 | 0.08833989279            | -.13783737933                          | 0.29448279389 |

| LOT | XL  | XU   | AUC    | UCP       | DIF        | PCT     |
|-----|-----|------|--------|-----------|------------|---------|
| 1   | 0   | 157  | 0.0464 | 0.0394240 | 0.0069760  | 15.034  |
| 2   | 157 | 353  | 0.0404 | 0.0440759 | -0.0036759 | -9.099  |
| 3   | 353 | 538  | 0.0413 | 0.0461060 | -0.0048060 | -11.637 |
| 4   | 538 | 781  | 0.0433 | 0.0475500 | -0.0042500 | -9.815  |
| 5   | 781 | 805  | 0.0570 | 0.0482613 | 0.0087387  | 15.331  |
| 6   | 805 | 877  | 0.0624 | 0.0484830 | 0.0139170  | 22.303  |
| 7   | 877 | 933  | 0.0635 | 0.0487628 | 0.0147372  | 23.208  |
| 8   | 933 | 1050 | 0.0684 | 0.0491112 | 0.0192888  | 28.200  |

-----SYS=ASN-108-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

|                   |    |                |              |
|-------------------|----|----------------|--------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
| REGRESSION        | 2  | 559.83537858   | 279.91768929 |
| RESIDUAL          | 3  | 0.79521666     | 0.26507222   |
| UNCORRECTED TOTAL | 5  | 560.63059524   |              |

(CORRECTED TOTAL) 4 226.66710333

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER UPPER |
|-----------|--------------|--------------------------|-------------------------------------------------------|
| A         | 0.1071388021 | 0.02368643872            | 0.03175671085 0.18252089330                           |
| B         | -.0273349515 | 0.04133497659            | -.15888351453 0.10421361147                           |

| LOT | XL  | XU  | AUC    | UCP      | DIF        | PCT     |
|-----|-----|-----|--------|----------|------------|---------|
| 1   | 0   | 8   | 0.1373 | 0.104063 | 0.0332367  | 24.2074 |
| 2   | 8   | 39  | 0.1048 | 0.098515 | 0.0062847  | 5.9969  |
| 3   | 39  | 116 | 0.0874 | 0.095246 | -0.0078461 | -8.9773 |
| 4   | 116 | 332 | 0.0943 | 0.092515 | 0.0017848  | 1.8927  |
| 5   | 332 | 440 | 0.0872 | 0.091051 | -0.0038505 | -4.4158 |

-----SYS=ASQ-133-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

|                   |    |                |              |
|-------------------|----|----------------|--------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
| REGRESSION        | 2  | 2881.4910612   | 1440.7455306 |
| RESIDUAL          | 4  | 3.2790352      | 0.8197588    |
| UNCORRECTED TOTAL | 6  | 2884.7700964   |              |

(CORRECTED TOTAL) 5 403.6845454

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER UPPER |
|-----------|--------------|--------------------------|-------------------------------------------------------|
| A         | 0.8273763041 | 0.07992882397            | 0.60546131471 1.0492912935                            |
| B         | -.1588452324 | 0.02006626778            | -.21455736956 -0.1031330953                           |

| LOT | XL  | XU  | AUC    | UCP      | DIF       | PCT     |
|-----|-----|-----|--------|----------|-----------|---------|
| 1   | 0   | 14  | 0.5856 | 0.646800 | -0.061200 | -10.451 |
| 2   | 14  | 33  | 0.5862 | 0.503755 | 0.082445  | 14.064  |
| 3   | 33  | 101 | 0.4255 | 0.427960 | -0.002460 | -0.578  |
| 4   | 101 | 168 | 0.3828 | 0.380548 | 0.002252  | 0.588   |
| 5   | 168 | 249 | 0.3535 | 0.354677 | -0.001177 | -0.333  |
| 6   | 249 | 307 | 0.3355 | 0.338551 | -0.003051 | -0.909  |

-----SYS=ASW-32-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

|                   |    |                |              |
|-------------------|----|----------------|--------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
| REGRESSION        | 2  | 294.11789514   | 147.05894757 |
| RESIDUAL          | 4  | 6.76017854     | 1.69004464   |
| UNCORRECTED TOTAL | 6  | 300.87807368   |              |

(CORRECTED TOTAL) 5 54.90298664

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.1760301399 | 0.08792128925            | -.06807519032                          | 0.42013547019 |
| B         | -.0424103596 | 0.10217631956            | -.32609346350                          | 0.24127274423 |

| LOT | XL  | XU  | AUC    | UCP      | DIF       | PCT     |
|-----|-----|-----|--------|----------|-----------|---------|
| 1   | 0   | 12  | 0.2338 | 0.165439 | 0.068361  | 29.239  |
| 2   | 12  | 38  | 0.1643 | 0.153903 | 0.010397  | 6.328   |
| 3   | 38  | 86  | 0.1524 | 0.147936 | 0.004464  | 2.929   |
| 4   | 86  | 134 | 0.0974 | 0.144266 | -0.046866 | -48.118 |
| 5   | 134 | 184 | 0.1441 | 0.142005 | 0.002095  | 1.454   |
| 6   | 184 | 264 | 0.1518 | 0.139964 | 0.011836  | 7.797   |

-----SYS=CP-1035N-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

|                   |    |                |              |
|-------------------|----|----------------|--------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
| REGRESSION        | 2  | 208.02749775   | 104.01374888 |
| RESIDUAL          | 4  | 1.22065445     | 0.30516361   |
| UNCORRECTED TOTAL | 6  | 209.24815220   |              |

(CORRECTED TOTAL) 5 41.36682739

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.1130722942 | 0.03120846788            | 0.02642486869                          | 0.19971971966 |
| B         | 0.0130187763 | 0.05589748321            | -.14217541741                          | 0.16821297010 |

| LOT | XL  | XU  | AUC    | UCP      | DIF       | PCT     |
|-----|-----|-----|--------|----------|-----------|---------|
| 1   | 0   | 12  | 0.1248 | 0.115289 | 0.009511  | 7.621   |
| 2   | 12  | 38  | 0.0903 | 0.117837 | -0.027537 | -30.495 |
| 3   | 38  | 86  | 0.1236 | 0.119274 | 0.004326  | 3.500   |
| 4   | 86  | 134 | 0.1287 | 0.120195 | 0.008505  | 6.608   |
| 5   | 134 | 184 | 0.1310 | 0.120779 | 0.010221  | 7.802   |
| 6   | 184 | 264 | 0.1154 | 0.121318 | -0.005918 | -5.128  |

-----SYS=JTIDS-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 2  | 1570.5474784   | 785.2737392 |
| RESIDUAL          | 3  | 0.4945598      | 0.1648533   |
| UNCORRECTED TOTAL | 5  | 1571.0420382   |             |
| (CORRECTED TOTAL) | 4  | 40.2575028     |             |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.6962203056 | 0.03042583085            | 0.59939009890                          | 0.79305051229 |
| B         | -.2052710954 | 0.00952282092            | -.23557747301                          | -.17496471786 |

| LOT | XL  | XU  | AUC    | UCP      | DIF        | PCT     |
|-----|-----|-----|--------|----------|------------|---------|
| 1   | 0   | 45  | 0.4068 | 0.401024 | 0.0057755  | 1.4197  |
| 2   | 45  | 121 | 0.2764 | 0.283703 | -0.0073026 | -2.6420 |
| 3   | 121 | 198 | 0.2466 | 0.246404 | 0.0001960  | 0.0795  |
| 4   | 198 | 270 | 0.2308 | 0.227427 | 0.0033728  | 1.4614  |
| 5   | 270 | 327 | 0.2205 | 0.216210 | 0.0042899  | 1.9456  |

-----SYS=LANNAV-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 87339.063553   | 43669.531777 |
| RESIDUAL          | 5  | 0.167343       | 0.033469     |
| UNCORRECTED TOTAL | 7  | 87339.230896   |              |
| (CORRECTED TOTAL) | 6  | 17386.822804   |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 1.827897570  | 0.00782092731            | 1.8077935279                           | 1.8480016125  |
| B         | -0.115451960 | 0.00076222757            | -0.1174113003                          | -0.1134926204 |

| LOT | XL  | XU  | AUC    | UCP     | DIF       | PCT      |
|-----|-----|-----|--------|---------|-----------|----------|
| 1   | 0   | 4   | 1.7500 | 1.76085 | -0.010846 | -0.61976 |
| 2   | 4   | 38  | 1.3199 | 1.31040 | 0.009498  | 0.71959  |
| 3   | 38  | 176 | 1.0761 | 1.07693 | -0.000834 | -0.07748 |
| 4   | 176 | 320 | 0.9679 | 0.96898 | -0.001081 | -0.11173 |
| 5   | 320 | 464 | 0.9184 | 0.91806 | 0.000343  | 0.03731  |
| 6   | 464 | 608 | 0.8854 | 0.88518 | 0.000216  | 0.02438  |
| 7   | 608 | 724 | 0.8643 | 0.86307 | 0.001228  | 0.14207  |

-----SYS=LANTARP-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 64803.725383   | 32401.862691 |
| RESIDUAL          | 5  | 0.155392       | 0.031078     |
| UNCORRECTED TOTAL | 7  | 64803.880775   |              |

(CORRECTED TOTAL) 6 12795.420992

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 1.528228736  | 0.00742280092            | 1.5091480955                           | 1.5473093768  |
| B         | -0.107486040 | 0.00086312970            | -0.1097047534                          | -0.1052673266 |

| LOT | XL  | XU  | AUC    | UCP     | DIF       | PCT     |
|-----|-----|-----|--------|---------|-----------|---------|
| 1   | 0   | 4   | 1.4375 | 1.47523 | -0.037732 | -2.6248 |
| 2   | 4   | 38  | 1.1286 | 1.12086 | 0.007742  | 0.6860  |
| 3   | 38  | 166 | 0.9375 | 0.93803 | -0.000532 | -0.0567 |
| 4   | 166 | 310 | 0.8490 | 0.85026 | -0.001261 | -0.1485 |
| 5   | 310 | 454 | 0.8081 | 0.80716 | 0.000935  | 0.1157  |
| 6   | 454 | 598 | 0.7795 | 0.77962 | -0.000120 | -0.0154 |
| 7   | 598 | 714 | 0.7619 | 0.76116 | 0.000736  | 0.0966  |

-----SYS=LANTREC-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 2  | 11937.333986   | 5968.666993 |
| RESIDUAL          | 3  | 1.062480       | 0.354160    |
| UNCORRECTED TOTAL | 5  | 11938.396467   |             |

(CORRECTED TOTAL) 4 1483.530658

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.6954062484 | 0.02324498901            | 0.62142907086                          | 0.76938342594 |
| B         | -.1424665459 | 0.00603056463            | -.16165881785                          | -.12327427399 |

| LOT | XL  | XU  | AUC    | UCP      | DIF        | PCT     |
|-----|-----|-----|--------|----------|------------|---------|
| 1   | 0   | 79  | 0.4383 | 0.435150 | 0.0031499  | 0.7187  |
| 2   | 79  | 271 | 0.3353 | 0.336229 | -0.0009286 | -0.2769 |
| 3   | 271 | 463 | 0.2975 | 0.300389 | -0.0028890 | -0.9711 |
| 4   | 463 | 655 | 0.2865 | 0.282602 | 0.0038981  | 1.3606  |
| 5   | 655 | 720 | 0.2693 | 0.274188 | -0.0048880 | -1.8151 |

# C.9.4 - Helicopter Programs

-----SYS=HH-52-----

## NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 3107.9156123   | 1553.9578061 |
| RESIDUAL          | 4  | 3.0464127      | 0.7616032    |
| UNCORRECTED TOTAL | 6  | 3110.9620250   |              |

|                   |   |             |
|-------------------|---|-------------|
| (CORRECTED TOTAL) | 5 | 731.1991835 |
|-------------------|---|-------------|

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 2.493367272  | 0.11979054150            | 2.1607799099                           | 2.8259546347  |
| B         | -0.209425262 | 0.01619817133            | -0.2543979870                          | -0.1644525370 |

| LOT | XL | XU | AUC   | UCP     | DIF       | PCT     |
|-----|----|----|-------|---------|-----------|---------|
| 1   | 0  | 28 | 1.577 | 1.56954 | 0.007462  | 0.4732  |
| 2   | 28 | 43 | 1.104 | 1.18293 | -0.078933 | -7.1497 |
| 3   | 43 | 60 | 1.085 | 1.09344 | -0.008439 | -0.7778 |
| 4   | 60 | 75 | 1.012 | 1.03255 | -0.020550 | -2.0306 |
| 5   | 75 | 87 | 1.041 | 0.99358 | 0.047422  | 4.5554  |
| 6   | 87 | 99 | 1.055 | 0.96519 | 0.089810  | 8.5128  |

-----SYS=CH-46-----

## NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 353636.25318   | 176818.12659 |
| RESIDUAL          | 6  | 5976.76599     | 996.12766    |
| UNCORRECTED TOTAL | 8  | 359613.01916   |              |

|                   |   |             |
|-------------------|---|-------------|
| (CORRECTED TOTAL) | 7 | 57764.44745 |
|-------------------|---|-------------|

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 7.913197352  | 2.6222009519             | 1.4968981360                           | 14.329496569 |
| B         | -0.229146650 | 0.0608097538             | -0.3779428649                          | -0.080350436 |

| LOT | XL  | XU  | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|-------|---------|----------|---------|
| 1   | 0   | 14  | 7.541 | 5.60723 | 1.93377  | 25.6434 |
| 2   | 14  | 50  | 3.898 | 3.63688 | 0.26112  | 6.6988  |
| 3   | 50  | 110 | 2.766 | 2.91930 | -0.15330 | -5.5423 |
| 4   | 110 | 195 | 2.419 | 2.51009 | -0.09109 | -3.7657 |
| 5   | 195 | 394 | 1.986 | 2.16268 | -0.17668 | -8.8961 |

|   |     |     |       |         |         |         |
|---|-----|-----|-------|---------|---------|---------|
| 6 | 394 | 486 | 2.236 | 1.96262 | 0.27338 | 12.2261 |
| 7 | 486 | 576 | 2.370 | 1.87954 | 0.49046 | 20.6943 |
| 8 | 576 | 624 | 2.547 | 1.82718 | 0.71982 | 28.2616 |

-----SYS=H-53-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 618899.61680   | 309449.80840 |
| RESIDUAL          | 6  | 179.14846      | 29.85808     |
| UNCORRECTED TOTAL | 8  | 619078.76526   |              |

(CORRECTED TOTAL)      7      355155.11828

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 6.843657436  | 0.32662952658            | 6.0444231991                           | 7.6428916719  |
| B         | -0.113354723 | 0.01005077858            | -0.1379481105                          | -0.0887613365 |

| LOT | XL  | XU  | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|-------|---------|----------|---------|
| 1   | 0   | 10  | 6.752 | 5.94543 | 0.80657  | 11.946  |
| 2   | 10  | 141 | 4.264 | 4.28706 | -0.02306 | -0.541  |
| 3   | 141 | 281 | 3.762 | 3.73992 | 0.02208  | 0.587   |
| 4   | 281 | 293 | 3.382 | 3.60313 | -0.22113 | -6.538  |
| 5   | 293 | 323 | 3.341 | 3.57455 | -0.23355 | -6.990  |
| 6   | 323 | 331 | 3.154 | 3.55021 | -0.39621 | -12.562 |
| 7   | 331 | 361 | 3.685 | 3.52768 | 0.15732  | 4.269   |
| 8   | 361 | 367 | 3.947 | 3.50732 | 0.43968  | 11.139  |

-----SYS=CH-47-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 474145.72700   | 237072.86350 |
| RESIDUAL          | 10 | 11714.80799    | 1171.48080   |
| UNCORRECTED TOTAL | 12 | 485860.53499   |              |

(CORRECTED TOTAL)      11      132801.70813

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |              |
|-----------|--------------|--------------------------|----------------------------------------|--------------|
|           |              |                          | LOWER                                  | UPPER        |
| A         | 7.541906538  | 2.4952972205             | 1.9820028845                           | 13.101810191 |
| B         | -0.184337563 | 0.0589965137             | -0.3157908139                          | -0.052884312 |

| LOT | XL  | XU  | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|-------|---------|----------|---------|
| 1   | 0   | 18  | 6.181 | 5.42721 | 0.75379  | 12.195  |
| 2   | 18  | 42  | 5.226 | 4.05383 | 1.17217  | 22.430  |
| 3   | 42  | 66  | 4.559 | 3.62184 | 0.93716  | 20.556  |
| 4   | 66  | 126 | 3.459 | 3.26339 | 0.19561  | 5.655   |
| 5   | 126 | 198 | 2.760 | 2.95786 | -0.19786 | -7.169  |
| 6   | 198 | 358 | 2.307 | 2.68101 | -0.37401 | -16.212 |
| 7   | 358 | 442 | 2.313 | 2.50034 | -0.18734 | -8.099  |
| 8   | 442 | 585 | 2.695 | 2.38855 | 0.30645  | 11.371  |
| 9   | 585 | 630 | 3.463 | 2.31415 | 1.14885  | 33.175  |
| 10  | 630 | 666 | 3.085 | 2.28673 | 0.79827  | 25.876  |
| 11  | 666 | 678 | 3.671 | 2.27139 | 1.39961  | 38.126  |
| 12  | 678 | 690 | 3.852 | 2.26399 | 1.58801  | 41.226  |

-----SYS=H-54-----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 20902.098236   | 10451.049118 |
| RESIDUAL          | 3  | 226.690672     | 75.563557    |
| UNCORRECTED TOTAL | 5  | 21128.788908   |              |
| (CORRECTED TOTAL) | 4  | 3891.050213    |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER | UPPER        |
|-----------|--------------|--------------------------|-------------------------------------------------|--------------|
| A         | 4.641352529  | 1.2888428554             | 0.53961014147                                   | 8.7430949164 |
| B         | -0.107575461 | 0.0780507650             | -.35597202054                                   | 0.1408210988 |

| LOT | XL | XU | AUC   | UCP     | DIF      | PCT     |
|-----|----|----|-------|---------|----------|---------|
| 1   | 0  | 6  | 5.248 | 4.28907 | 0.95893  | 18.272  |
| 2   | 6  | 30 | 3.388 | 3.43674 | -0.04874 | -1.439  |
| 3   | 30 | 60 | 2.801 | 3.08883 | -0.28783 | -10.276 |
| 4   | 60 | 83 | 3.402 | 2.93354 | 0.46846  | 13.770  |
| 5   | 83 | 89 | 3.083 | 2.87442 | 0.20858  | 6.765   |

-----SYS=HH-60D-----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 2  | 123876.79818   | 61938.39909 |
| RESIDUAL          | 2  | 15.42182       | 7.71091     |
| UNCORRECTED TOTAL | 4  | 123892.22000   |             |
| (CORRECTED TOTAL) | 3  | 24351.97000    |             |



| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 8.082251192  | 0.33275452509            | 6.6505082967                           | 9.5139940869  |
| B         | -0.048393005 | 0.01114976000            | -0.0963670774                          | -0.0004189327 |

| LOT | XL | XU | AUC | UCP     | DIF      | PCT     |
|-----|----|----|-----|---------|----------|---------|
| 1   | 0  | 3  | 9.2 | 8.05351 | 1.14649  | 12.4618 |
| 2   | 3  | 28 | 7.1 | 7.12939 | -0.02939 | -0.4139 |
| 3   | 28 | 63 | 6.7 | 6.72769 | -0.02769 | -0.4133 |
| 4   | 63 | 92 | 6.6 | 6.54988 | 0.05012  | 0.7594  |

-----SYS=SH-3-----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 72573.708002   | 36286.854001 |
| RESIDUAL          | 7  | 402.605540     | 57.515077    |
| UNCORRECTED TOTAL | 9  | 72976.313542   |              |

|                   |   |              |  |
|-------------------|---|--------------|--|
| (CORRECTED TOTAL) | 8 | 13013.690662 |  |
|-------------------|---|--------------|--|

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 4.691213336  | 0.62747560389            | 3.2074573940                           | 6.1749692774  |
| B         | -0.166602909 | 0.02860136663            | -0.2342349372                          | -0.0989708810 |

| LOT | XL  | XU  | AUC   | UCP     | DIF      | PCT     |
|-----|-----|-----|-------|---------|----------|---------|
| 1   | 0   | 20  | 3.327 | 3.41726 | -0.09026 | -2.713  |
| 2   | 20  | 69  | 2.480 | 2.52017 | -0.04017 | -1.620  |
| 3   | 69  | 140 | 2.319 | 2.17062 | 0.14838  | 6.399   |
| 4   | 140 | 185 | 1.811 | 2.01012 | -0.19912 | -10.995 |
| 5   | 185 | 221 | 1.870 | 1.93625 | -0.06625 | -3.543  |
| 6   | 221 | 257 | 1.589 | 1.88416 | -0.29516 | -18.575 |
| 7   | 257 | 287 | 1.703 | 1.84383 | -0.14083 | -8.270  |
| 8   | 287 | 335 | 1.930 | 1.80330 | 0.12670  | 6.565   |
| 9   | 335 | 350 | 2.144 | 1.77423 | 0.36977  | 17.247  |

#### C.9.5 - Tactical Armament Programs

-----SYS=LLLGB-----

#### NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE     | DF | SUM OF SQUARES | MEAN SQUARE  |
|------------|----|----------------|--------------|
| REGRESSION | 2  | 220658.75413   | 110329.37706 |
| RESIDUAL   | 8  | 7.66336        | 0.95792      |

UNCORRECTED TOTAL 10 220666.41749

(CORRECTED TOTAL) 9 31936.24632

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER UPPER |
|-----------|--------------|--------------------------|-------------------------------------------------------|
| A         | 0.0812265050 | 0.00211969466            | 0.07633843320 0.08611457683                           |
| B         | -.1706336345 | 0.00246086390            | -.17630845162 -.16495881745                           |

| LOT | XL    | XU     | AUC    | UCP       | DIF         | PCT     |
|-----|-------|--------|--------|-----------|-------------|---------|
| 1   | 0     | 1600   | 0.0275 | 0.0278113 | -0.00031126 | -1.1319 |
| 2   | 1600  | 4550   | 0.0206 | 0.0208049 | -0.00020489 | -0.9946 |
| 3   | 4550  | 8290   | 0.0189 | 0.0182502 | 0.00064985  | 3.4383  |
| 4   | 8290  | 17270  | 0.0162 | 0.0162498 | -0.00004977 | -0.3072 |
| 5   | 17270 | 26890  | 0.0147 | 0.0147626 | -0.00006259 | -0.4258 |
| 6   | 26890 | 41290  | 0.0137 | 0.0137067 | -0.00000673 | -0.0491 |
| 7   | 41290 | 56890  | 0.0129 | 0.0128714 | 0.00002863  | 0.2220  |
| 8   | 56890 | 72490  | 0.0123 | 0.0122749 | 0.00002509  | 0.2040  |
| 9   | 72490 | 88090  | 0.0118 | 0.0118286 | -0.00002863 | -0.2426 |
| 10  | 88090 | 100000 | 0.0115 | 0.0115116 | -0.00001165 | -0.1013 |

-----SYS=CEM-----

# NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 2  | 1106261.2968   | 553130.6484 |
| RESIDUAL          | 6  | 851.9021       | 141.9837    |
| UNCORRECTED TOTAL | 8  | 1107113.1989   |             |

(CORRECTED TOTAL) 7 367517.1256

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER UPPER |
|-----------|--------------|--------------------------|-------------------------------------------------------|
| A         | 0.0970924048 | 0.01588017393            | 0.05823499093 0.13594981861                           |
| B         | -.1753319483 | 0.01461763837            | -.21110004666 -.13956384992                           |

| LOT | XL     | XU     | AUC     | UCP       | DIF        | PCT     |
|-----|--------|--------|---------|-----------|------------|---------|
| 1   | 0      | 172    | 0.06924 | 0.0477470 | 0.0214930  | 31.041  |
| 2   | 172    | 1432   | 0.03038 | 0.0309053 | -0.0005253 | -1.729  |
| 3   | 1432   | 7557   | 0.01988 | 0.0226510 | -0.0027710 | -13.938 |
| 4   | 7557   | 21777  | 0.01765 | 0.0182182 | -0.0005682 | -3.219  |
| 5   | 21777  | 50227  | 0.01619 | 0.0155158 | 0.0006742  | 4.164   |
| 6   | 50227  | 85247  | 0.01401 | 0.0138422 | 0.0001678  | 1.197   |
| 7   | 85247  | 134157 | 0.01258 | 0.0127124 | -0.0001324 | -1.053  |
| 8   | 134157 | 171666 | 0.01181 | 0.0119788 | -0.0001688 | -1.429  |

-----SYS=GBU-15-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |              |
|-------------------|----|----------------|--------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
| REGRESSION        | 2  | 39833.966695   | 19916.983348 |
| RESIDUAL          | 7  | 246.319542     | 35.188506    |
| UNCORRECTED TOTAL | 9  | 40080.286237   |              |

(CORRECTED TOTAL)      8      10225.399632

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.1696624466 | 0.05284477817            | 0.04470339937                          | 0.29462149375 |
| B         | -.0149690405 | 0.04201730343            | -.11432497281                          | 0.08438689180 |

| LOT | XL   | XU   | AUC    | UCP      | DIF       | PCT     |
|-----|------|------|--------|----------|-----------|---------|
| 1   | 0    | 40   | 0.1975 | 0.162988 | 0.034512  | 17.475  |
| 2   | 40   | 105  | 0.2000 | 0.159211 | 0.040789  | 20.394  |
| 3   | 105  | 445  | 0.1439 | 0.156153 | -0.012253 | -8.515  |
| 4   | 445  | 695  | 0.1483 | 0.154307 | -0.006007 | -4.051  |
| 5   | 695  | 1015 | 0.1308 | 0.153368 | -0.022568 | -17.254 |
| 6   | 1015 | 1615 | 0.1718 | 0.152390 | 0.019410  | 11.298  |
| 7   | 1615 | 2215 | 0.1539 | 0.151524 | 0.002376  | 1.544   |
| 8   | 2215 | 2815 | 0.1483 | 0.150903 | -0.002603 | -1.755  |
| 9   | 2815 | 3415 | 0.1420 | 0.150419 | -0.008419 | -5.929  |

C.9.6 - Tactical Missile Programs

-----SYS=AMRAAM-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

|                   |    |                |              |
|-------------------|----|----------------|--------------|
| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
| REGRESSION        | 2  | 3265080.1098   | 1632540.0549 |
| RESIDUAL          | 8  | 1764.7593      | 220.5949     |
| UNCORRECTED TOTAL | 10 | 3266844.8690   |              |

(CORRECTED TOTAL)      9      183807.0285

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 4.629798003  | 0.27246839272            | 4.0014787005                           | 5.2581173046  |
| B         | -0.340271226 | 0.00672409173            | -0.3557771594                          | -0.3247652935 |

| LOT | XL    | XU    | AUC   | UCP     | DIF        | PCT     |
|-----|-------|-------|-------|---------|------------|---------|
| 1   | 0     | 194   | 1.233 | 1.16875 | 0.0642458  | 5.2105  |
| 2   | 194   | 1251  | 0.512 | 0.51911 | -0.0071091 | -1.3885 |
| 3   | 1251  | 3215  | 0.342 | 0.34112 | 0.0008837  | 0.2584  |
| 4   | 3215  | 6211  | 0.257 | 0.26249 | -0.0054854 | -2.1344 |
| 5   | 6211  | 9111  | 0.232 | 0.22133 | 0.0106654  | 4.5972  |
| 6   | 9111  | 12011 | 0.194 | 0.19817 | -0.0041698 | -2.1494 |
| 7   | 12011 | 14911 | 0.182 | 0.18236 | -0.0003646 | -0.2003 |
| 8   | 14911 | 17911 | 0.170 | 0.17043 | -0.0004313 | -0.2537 |
| 9   | 17911 | 20911 | 0.158 | 0.16094 | -0.0029386 | -1.8599 |
| 10  | 20911 | 24674 | 0.155 | 0.15239 | 0.0026101  | 1.6839  |

-----SYS=HARM-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 2  | 1583952.5788   | 791976.2894 |
| RESIDUAL          | 9  | 2088.1396      | 232.0155    |
| UNCORRECTED TOTAL | 11 | 1586040.7184   |             |

(CORRECTED TOTAL)      10      338342.8883

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL<br>LOWER      UPPER |
|-----------|--------------|--------------------------|------------------------------------------------------------|
| A         | 1.321855681  | 0.16671340218            | 0.94472055564      1.6989908071                            |
| B         | -0.210771087 | 0.01436595311            | -.24326940685      -0.1782727664                           |

| LOT | XL    | XU    | AUC   | UCP      | DIF       | PCT     |
|-----|-------|-------|-------|----------|-----------|---------|
| 1   | 0     | 80    | 0.809 | 0.665066 | 0.143934  | 17.7916 |
| 2   | 80    | 316   | 0.517 | 0.441199 | 0.075801  | 14.6618 |
| 3   | 316   | 712   | 0.400 | 0.357009 | 0.042991  | 10.7477 |
| 4   | 712   | 1399  | 0.314 | 0.306165 | 0.007835  | 2.4951  |
| 5   | 1399  | 3144  | 0.249 | 0.261000 | -0.012000 | -4.8194 |
| 6   | 3144  | 5612  | 0.223 | 0.226577 | -0.003577 | -1.6042 |
| 7   | 5612  | 7731  | 0.208 | 0.206832 | 0.001168  | 0.5614  |
| 8   | 7731  | 9863  | 0.197 | 0.195032 | 0.001968  | 0.9992  |
| 9   | 9863  | 12863 | 0.184 | 0.184811 | -0.000811 | -0.4406 |
| 10  | 12863 | 15863 | 0.177 | 0.175857 | 0.001143  | 0.6459  |
| 11  | 15863 | 16961 | 0.196 | 0.170911 | 0.025089  | 12.8004 |

-----SYS=IIR-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS      DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 2025173.0565   | 1012586.5282 |
| RESIDUAL          | 7  | 6291.0488      | 898.7213     |
| UNCORRECTED TOTAL | 9  | 2031464.1053   |              |

(CORRECTED TOTAL) 8 458719.8690

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 0.3563409020 | 0.09506244145            | 0.13155214296                          | 0.58112966105 |
| B         | -.1781343592 | 0.02647206583            | -.24073135061                          | -.11553736785 |

| LOT | XL    | XU    | AUC   | UCP      | DIF       | PCT     |
|-----|-------|-------|-------|----------|-----------|---------|
| 1   | 0     | 200   | 0.309 | 0.168722 | 0.140278  | 45.3973 |
| 2   | 200   | 1100  | 0.135 | 0.114715 | 0.020285  | 15.0263 |
| 3   | 1100  | 3700  | 0.083 | 0.090095 | -0.007095 | -8.5478 |
| 4   | 3700  | 9429  | 0.082 | 0.074987 | 0.007013  | 8.5528  |
| 5   | 9429  | 18429 | 0.062 | 0.065363 | -0.003363 | -5.4247 |
| 6   | 18429 | 30429 | 0.057 | 0.059042 | -0.002042 | -3.5832 |
| 7   | 30429 | 42429 | 0.055 | 0.054920 | 0.000080  | 0.1453  |
| 8   | 42429 | 54429 | 0.053 | 0.052182 | 0.000818  | 1.5432  |
| 9   | 54429 | 60664 | 0.057 | 0.050581 | 0.006419  | 11.2614 |

-----SYS=AIM7F-R-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE |
|-------------------|----|----------------|-------------|
| REGRESSION        | 2  | 114765.36199   | 57382.68099 |
| RESIDUAL          | 6  | 386.22291      | 64.37049    |
| UNCORRECTED TOTAL | 8  | 115151.58490   |             |

(CORRECTED TOTAL) 7 6543.29279

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 2.460174723  | 0.34182830823            | 1.6237503812                           | 3.2965990655  |
| B         | -0.375843314 | 0.01864235156            | -0.4214595381                          | -0.3302270904 |

| LOT | XL   | XU   | AUC   | UCP      | DIF       | PCT     |
|-----|------|------|-------|----------|-----------|---------|
| 1   | 0    | 100  | 0.741 | 0.698208 | 0.042792  | 5.775   |
| 2   | 100  | 325  | 0.378 | 0.337272 | 0.040728  | 10.774  |
| 3   | 325  | 925  | 0.199 | 0.223662 | -0.024662 | -12.393 |
| 4   | 925  | 1725 | 0.169 | 0.166353 | 0.002647  | 1.566   |
| 5   | 1725 | 2825 | 0.134 | 0.135364 | -0.001364 | -1.018  |
| 6   | 2825 | 4225 | 0.116 | 0.114627 | 0.001373  | 1.184   |
| 7   | 4225 | 5125 | 0.111 | 0.102814 | 0.008186  | 7.375   |
| 8   | 5125 | 6269 | 0.095 | 0.095458 | -0.000458 | -0.482  |

-----SYS=AIM7F-GD-----

NON-LINEAR LEAST SQUARES SUMMARY STATISTICS

DEPENDENT VARIABLE TCA

| SOURCE            | DF | SUM OF SQUARES | MEAN SQUARE  |
|-------------------|----|----------------|--------------|
| REGRESSION        | 2  | 28534.005468   | 14267.002734 |
| RESIDUAL          | 4  | 87.152557      | 21.788139    |
| UNCORRECTED TOTAL | 6  | 28621.158025   |              |
| (CORRECTED TOTAL) | 5  | 7732.207921    |              |

| PARAMETER | ESTIMATE     | ASYMPTOTIC<br>STD. ERROR | ASYMPTOTIC 95 %<br>CONFIDENCE INTERVAL |               |
|-----------|--------------|--------------------------|----------------------------------------|---------------|
|           |              |                          | LOWER                                  | UPPER         |
| A         | 2.190240906  | 0.36956205669            | 1.1641860256                           | 3.2163957859  |
| B         | -0.422980503 | 0.02461355446            | -0.4913177613                          | -0.3546432450 |

| LOT | XL   | XU   | AUC   | UCP     | DIF       | PCT     |
|-----|------|------|-------|---------|-----------|---------|
| 1   | 0    | 15   | 1.551 | 1.20734 | 0.343661  | 22.157  |
| 2   | 15   | 85   | 0.379 | 0.44519 | -0.066187 | -17.464 |
| 3   | 85   | 295  | 0.228 | 0.24644 | -0.018444 | -8.090  |
| 4   | 295  | 505  | 0.195 | 0.17497 | 0.020035  | 10.274  |
| 5   | 505  | 1255 | 0.130 | 0.12692 | 0.003081  | 2.370   |
| 6   | 1255 | 2565 | 0.090 | 0.09079 | -0.000790 | -0.878  |

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VITA

Captain Keith K. Agena was born on 10 March 1962 in Fort Ranning, [REDACTED]

[REDACTED] He graduated from Moanalua High School in Honolulu, Hawaii, in 1980 and later attended the University of Hawaii, from which he received the degree of Bachelor of Arts in Mathematics in December 1984. He was commissioned in the USAF through the Reserve Officer Training Center (ROTC) program in December 1984. In February 1985, he was assigned to the Deputy for Reconnaissance and Electronic Warfare, Aeronautical Systems Division, Wright-Patterson AFB, Ohio. He served there as a cost analyst until entering the School of Systems and Logistics, Air Force Institute of Technology, in June 1988.

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| 05                                                                                                                                                                                                                                                    | 03    |                                                  |                                                                                                                                                                         |                                                         |                           |
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| Approved for public release: IAW AFR 190-1.<br><br><i>Larry W. Emmelhainz</i><br>LARRY W. EMMELHAINZ, Lt Col, USAF 11 Oct 89<br>Director of Research and Consultation<br>Air Force Institute of Technology (AU)<br>Wright-Patterson AFB OH 45433-6583 |       |                                                  |                                                                                                                                                                         |                                                         |                           |
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| 22a. NAME OF RESPONSIBLE INDIVIDUAL<br>Richard L. Murphy, Assistant Professor                                                                                                                                                                         |       |                                                  | 22b. TELEPHONE (Include Area Code)<br>(513) 255-8409                                                                                                                    |                                                         | 22c. OFFICE SYMBOL<br>LSQ |

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The purpose of this study was to refine the Air Force Systems Command (AFSC) Production Rate Model ~~that~~ was developed in 1984 by The Analytic Sciences Corporation (TASC). In 1985, under an AFSC sponsored thesis, USAF Captain Hugh Bolton addressed various shortcomings in the TASC formulation. Bolton also investigated two alternative formulations and discovered that both models provided better estimates overall than the basic learning curve model and the TASC formulation. Further evaluation of the characteristics of these two alternatives was, however, beyond the scope of his research.

> The current effort analyzed several modifications to Bolton's original alternatives in an effort to derive better results. To accomplish this, four research objectives were established.

- The first objective was to develop alternative formulations by expanding and/or altering TASC's and Bolton's formulations. These models should preserve the logic of the original formulations.

- The second objective was to compare the results between TASC'S and Bolton's model formulations and the new alternative model formulations to determine which alternatives performed better and under what circumstances.

- The third objective was: (1) to investigate if statistical relationships exist for individual variables; (2) to determine which variables appear significant for different weapon systems; and (3) to identify any patterns that may exist in the occurrence of those variables.

The research was successful in evaluating these objectives. The modified formulations developed in this research ~~effort~~ outperformed the existing TASC and Bolton formulations. It was recommended that AFSC incorporate the new modified formulations into its Production Rate Model.

*Weapon systems; Industrial production rates;  
cost/regression analysis, Cost estimates, Thesis. (FDC)*

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