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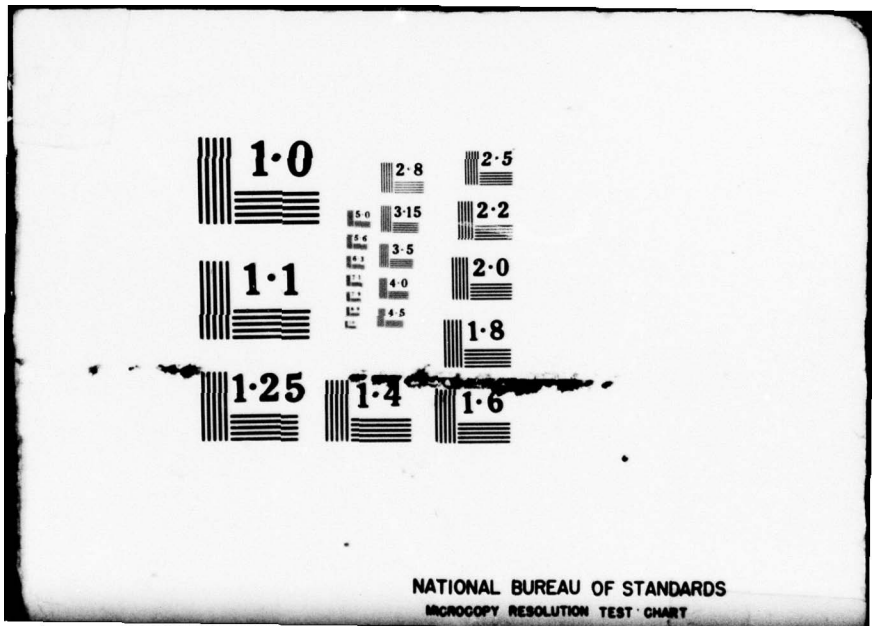
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NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

ADAPTATION OF THE IMPROVED ANTIAIRCRAFT ARTILLERY SIMULATION COMPUTER PROGRAM (P001) FOR USE AT THE NAVAL POSTGRADUATE SCHOOL IN AIRCRAFT COMBAT SURVIVABILITY STUDIES

by

Carl Frederick Swenson

March 1978

Thesis Advisor: R. E. Ball

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The modifications required to convert the Calspan modified P001 from a Control Data Corporation computer program to an

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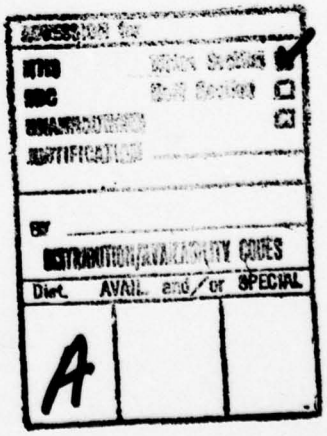
A complete P001/PIP package and user's guide for an aircraft attrition study in the NPS Course AE 3251, Aircraft Combat Survivability, are presented.



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(6) Adaptation of the Improved Antiaircraft Artillery Simulation Computer Program (P001) for Use at the Naval Postgraduate School in Aircraft Combat Survivability Studies.

by

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ABSTRACT

The Air Force Armament Laboratory Antiaircraft Artillery Simulation Computer Program (P001), as modified by Calspan Corporation, was adapted for use on the Naval Postgraduate School IBM 360/65 computer and a preprocessor program (PIP) for P001 was written to facilitate data input to P001 and to complement the P001 output.

The modifications required to convert the Calspan modified P001 from a Control Data Corporation computer program to an NPS IBM 360/65 computer program are described herein. In addition, aircraft characteristics and P001 scenario assumptions, as well as the various P001 Input Program (PIP) options and capabilities, are discussed.

A complete P001/PIP package and user's guide for an aircraft attrition study in the NPS Course AE 3251, Aircraft Combat Survivability, are presented.

TABLE OF CONTENTS

I. INTRODUCTION

The Air Force Armament Laboratory (AFATL) has developed an antiaircraft artillery (AAA) simulation computer program called P001 which is the present standard program for conducting survivability assessments of aircraft in a hostile AAA environment. P001 is used throughout the aircraft industry and is the aircraft attrition program required by the Department of the Navy MIL-STANDARD-2072(AS), SURVIVABILITY, AIRCRAFT; ESTABLISHMENT AND CONDUCT OF PROGRAMS FOR, August 1977.

Briefly, P001 computes the probability of kill of a target aircraft flying a user-input flight path, as a result of its being fired upon by user-selected antiaircraft artillery located at user-input locations. The technique used by P001 to accomplish this task involves:

- Computation of an aim point with consideration of the errors that can arise therein.
- Simulation of the firing process and the sources of error in the firing process.
- Combination of all the effects of random error into one total projectile trajectory distribution.
- Location of the user-input vulnerable area of the aircraft within the total trajectory distribution.
- Computation of the probability of kill.

P001 has been used in NPS Course AE 3251, Aircraft Combat Survivability, to illustrate the interaction of the various

elements that comprise the aircraft combat survivability problem in a hostile AAA environment. The scenario consists of a typical Naval aircraft on an attack mission. The aircraft's target is the bridge shown in Fig. 1. The student must select a flight path to the target and also the location of the defending AAA. P001 is used to determine the probability of survival of the aircraft.

Use of P001 as an educational tool in aircraft combat survivability studies is very effective since it requires a knowledge of the techniques for calculating aircraft vulnerable areas, as well as the basics of the interaction between the threat, the environment and the target aircraft. Some of the interaction parameters include aircraft vulnerable area, speed, altitude, location and aspect angle with respect to the threat, and aircraft maneuver characteristics; the effect of terrain, target altitude and range on projectile performance; and the antiaircraft artillery threat envelope.

The input to P001 requires many time consuming, tedious computations and a significant amount of keypunching, a use of time that does not profitably contribute to the aircraft combat survivability learning experience. In addition, the realism of the input data has a significant effect on the validity of the result and, up to now, it has not been possible to evaluate input data accuracy. Consequently, a preprocessor computer program that would significantly reduce the time required for a student to prepare the input data, as well as provide an indication as to the realism of the input data, is very desirable.

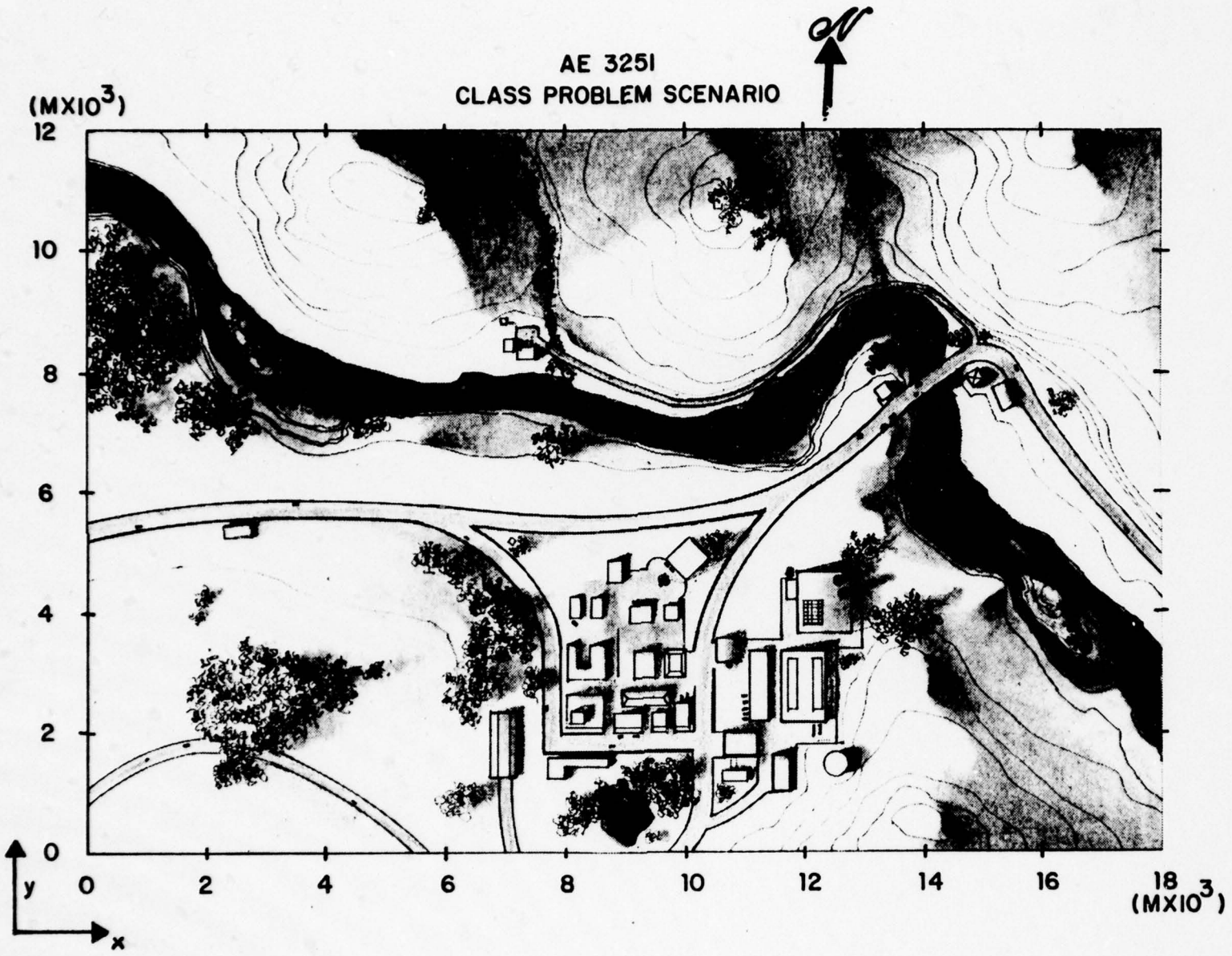
AE 3251
CLASS PROBLEM SCENARIO
N
(MX10^3)
12
10
8
6
4
2
0
y
x
0
2
4
6
8
10
12
14
16
18
(MX10^3)

Figure 1

While the preprocessor program was being developed for P001, a version of P001 that was significantly modified by Calspan was obtained from the Air Force Flight Dynamics Laboratory. This improved version of P001 is capable of including the effects of self-contained airborne electronic countermeasures (ECM) on the acquisition/tracking process, of detection system anti-jam capabilities, and of radar beam multipath characteristics. The output of P001 was also expanded. The improved P001 was written for a Control Data Corporation computer system.

The problem solved by this thesis effort is two-fold:

- The adaptation of the improved P001 to the NPS IBM 360/65.
- The development of a P001 input program (PIP) to reduce student time required to prepare the input data required by P001 and to provide an indication of the realism of the input data.

The main body of this thesis describes the adaptation of the improved P001 to the IBM 360/65 and the details of the development of PIP. Appendix A contains a complete package for a problem in aircraft attrition to be used in AE 3251.

The following sources were heavily relied upon for information throughout the entire thesis development process:

- Antiaircraft Artillery Simulation Computer Program - AFATL Program P001 Vol. I User Manual, Air Force Armament Laboratory, Eglin AFB, Florida (Joint Aircraft Attrition Program Advanced Planning Group, September 1973).

– Antiaircraft Artillery Simulation Computer Program – Program P001 Program Update, Joint Technical Coordinating Group for Aircraft Survivability (Survivability Assessment Subgroup, April 1976).

– M. E. Ramaccia, ATS Working Paper No. 9, Calspan Modification to Antiaircraft Artillery Simulation, AFATL Program P001 (Calspan Corporation, Buffalo, New York, 11 August 1977).

– G. Gary Maxwell, The Development of Class Problems for a Course in Aircraft Combat Survivability (Naval Postgraduate School Master's Thesis, 1978).

II. APPROACH

A. ADAPTATION OF THE IMPROVED P001 TO THE NPS IBM 360/65

The adaptation of P001 from a CDC computer to the NPS IBM computer involved several hundred computer-unique alterations; that is, changes that had to be made due to the inherent differences between the CDC and IBM computer systems. These changes involved:

- Elimination of the FTNBIN, SECOND, TIMREM and DATE subroutines contained in the CDC system, but not available on the IBM 360 system.

- Substitution of the IBM "REREAD" command for the CDC "DECODE" function.

- Substitution of the IBM "A4" format field descriptor for the CDC "A10" descriptor.

- Substitution of the IBM "'" format delimiter for the CDC "*" delimiter.

- Substitution of IBM-NPS job control language (JCL) cards to accomplish the required input, output, tape usage and core size requirements.

- Extensive reconstruction of the P001 main program by creating the subroutine TOOBIG using the input, output and exits sections of the P001 main program. This permitted a scalar map size small enough for the IBM system to compile and thus avoided the "ROLL SIZE EXCEEDED" error given by the NPS compiler.

B. DEVELOPMENT OF A PREPROCESSOR FOR P001 (PIP)

In the early stages of AE 3251 it is not desirable for the student to become heavily involved in the many and various facets and options of the P001 program. For this reason, a simple preprocessor computer program to P001 that will provide punched cards for all of the input in the proper format, requiring only a minimum of student involvement, has been developed. For example, the Calspan-modified P001 program requires an input of 196 cards with over 1,400 entries and 860 calculations for a 50 milestone flight scenario involving 7 ground weapons of 4 threat classes. On the other hand, PIP requires an input of 59 cards with 160 entries and no calculations for the same 50 milestone flight scenario and automatically punches the output that fulfills all P001 input requirements in the proper format and order. This significantly reduces the student involvement in the input process.

PIP requires only that the student provide the X, Y and Z coordinates of each of the aircraft flight path milestones as input data, avoiding the many tedious calculations required by full P001 input. In addition, the preprocessor checks the flight path to determine if it exceeds any aircraft performance limits or scenario guidelines. The aircraft built into PIP has performance characteristics approximating those of the A-7 Corsair. The cruise velocity, climb/dive schedules, acceleration/deceleration schedules, dirty/clean velocity limitations, stall velocity and "G" loading limitation values are only representative quantities and are not intended to

accurately describe the performance characteristics of an actual A-7 since the intent of PIP is only to provide representative flight characteristics that demonstrate the principles of aircraft combat survivability in an AAA scenario.

C. FLIGHT PATH PREPROCESSING

1. FORTRAN Distance Equations

The three cartesian milestone distance components, DX, DY and DZ, are calculated in PIP by taking the difference between the X, Y and Z components of adjacent milestone locations.

Milestone distance component FORTRAN equations:

```
DX = X(I+1) - X(I)
DY = Y(I+1) - Y(I)
DZ = Z(I+1) - Z(I)
```

where,

I = ith milestone
X = milestone x-coordinate location
Y = milestone y-coordinate location
Z = milestone z-coordinate location
DX = milestone x-coordinate distance difference
DY = milestone y-coordinate distance difference
DZ = milestone z-coordinate distance difference.

2. Milestone Distance Equations

The distance between successive milestones is the square root of the sum of the squares of the milestone distance components.

Milestone distance FORTRAN equations:

```
DX2 = DX**2
DY2 = DY**2
DZ2 = DZ**2
DIST = SQRT(DX2 + DY2 + DZ2)
```

where,

DIST = milestone distance

3. Heading and Climb Angle Equations

The aircraft heading and climb angle between milestones are calculated in PIP using standard geometrical considerations based on the relative locations of the X, Y and Z coordinates of adjacent flight path milestones.

Aircraft heading FORTRAN equation:

```
HDG(I+1) = ATAN2(DY,DX)
```

where,

HDG = aircraft heading

Aircraft climb angle FORTRAN equation:

```
CA(I) = ATAN2(DZ,SQRT(DX2 + DY2))
```

where,

CA = aircraft climb angle

4. Aircraft Speed Equations

The aircraft is assigned a cruise speed of between 206 and 257 meters per second (400 and 500 knots, respectively) at milestone 1 by the user. Aircraft speed at successive locations is calculated based on the altitude change between milestones, since an increase/decrease in altitude decreases/increases aircraft speed proportionately, and from a schedule

based on the present aircraft speed as compared with the initially assigned cruise speed. If the aircraft speed is found to be less/more than the assigned cruise speed, a slow acceleration/deceleration to the assigned cruise speed is assumed. The X, Y and Z components of the velocity at each milestone are then calculated based on the heading and climb angle at the milestone.

Aircraft velocity FORTRAN equations:

```
VEL(1) = CVEL
VEL(I+1) = VEL(I) - TAN(CA(I))*DIST/100
           + (CVEL - VEL(I))*( DIST/VEL(I))/30
VAVG = (VEL(I) + VEL(I+1))/2
```

where,

CVEL = aircraft cruise speed

VEL = aircraft velocity

VAVG = average aircraft velocity

Aircraft velocity component FORTRAN equations:

```
XYVEL = VEL(I)*COS(CA(I))
XDOT(I) = XYVEL*COS(HDG(I))
YDOT(I) = XYVEL*SIN(HDG(I))
ZDOT(I) = VEL(I)*SIN(CA(I))
```

where,

XYVEL = horizontal velocity component

XDOT = x-coordinate velocity component

YDOT = y-coordinate velocity component

ZDOT = z-coordinate velocity component.

5. Flight Time Equations

The time interval between flight path milestones is calculated by dividing the distance between the milestones by the average velocity between the milestones. The individual milestone time intervals are summed to provide the total time for the scenario.

Flight time FORTRAN equations:

```
T(I+1) = T(I) + DIST/VAVG
DT(I)  = T(I) - T(I-1)
```

where,

T = flight time (cumulative)

DT= flight time between milestones (I) and (I+1)

6. Turn Rate, Roll Angle, "G" Loading

The turn rate required between milestones is calculated from the heading change and the time interval between the milestones. This turn rate and the aircraft speed are used to calculate the "G" loading on the aircraft caused by the turn. The roll angle required for a level turn is calculated from the turn rate and the aircraft speed.

Turn angle FORTRAN equation:

```
TNANG - HDG(I+1) - HDG(I)
```

where,

TNANG = milestone turn angle.

Turn rate FORTRAN equation:

```
TNRT(I) = TNANG/DT(I)
```

where,

TNRT = milestone turn rate.

Roll angle FORTRAN equation:

```
RA(I) = ATAN(TNRT(I)*VAVG/9.81)
```

where,

RA = milestone aircraft roll angle.

"G" loading FORTRAN equations:

```
ABSRT(I) = ABS(TNRT(I))
G(I) = SQRT(ABSRT(I)**2*VEL(I)**2/9.81**2 + 1)
```

where,

ABSRT = absolute value of turn rate

G = "G" loading

7. P001 Stored Time Increments

The equal time increments between successive "P001 stored" positions along the flight path (not milestones) is equal to the total scenario flight time (T) divided by 1000. This time increment is required in the P001 input data card 02.

8. Probability of Kill Accumulation Periods

The total scenario flight time (T) is divided into ten equal time segments in which the probability of kill will be computed for each segment. These ten increments are required on P001 input card 06.

The values computed above are printed and punched on cards that can be used as part of the P001 input data. All data are punched in the specified order to be input to the P001 program.

D. AIRCRAFT PERFORMANCE LIMITATIONS, FLIGHT PATH REQUIREMENTS AND ERROR MESSAGES

PIP provides several checks on the performance requirements of the aircraft as it traverses the user-input flight path. It also checks the bombing run portion of the flight path to see if it satisfies the requirements for successful bomb drop. These checks are as follows:

1. Cruise Speed

The aircraft cruise speed is initially input by the user at a value between 206 and 257 meters per second and is changed as dictated by altitude changes and the acceleration/deceleration schedule presented in II.C. If the aircraft is assigned a cruise speed outside of the range from 206 to 257 meters per second, the following cruise speed error message is generated:

Error message: "CRUISE SPEED IS _____ METERS PER SECOND WHICH IS NOT WITHIN THE GIVEN LIMITS OF BETWEEN 206 AND 257 METERS PER SECOND."

2. Stall Speed

If the aircraft speed falls below 90 meters per second (175 knots), the following stall error message is generated, identifying the error, the milestone and the velocity value causing the error message:

Error message: "MILESTONE ___ VELOCITY IS ____ METERS PER SECOND. STALL OCCURS AT 90 METERS PER SECOND. DECREASE THE CLIMB ANGLE PRIOR TO MILESTONE ___."

3. "Red Line"

Prior to the bomb release point, the aircraft is "drag limited" to 260 meters per second (500 knots). After ordnance release, the drag limitation eases to permit a speed of 310 meters per second (600 knots).

4. "G" Loading

If the maximum "G" loading of 6 is exceeded, the following turn rate error message is generated, identifying the error, the milestone, the "G" loading and turn rate that caused the error message and denoting the corrective turn angle which will eliminate the error:

Error message: "MILESTONE ___ TURN RESULTS IN A TURN RATE OF ____ DEGREES PER SECOND WHICH RESULTS IN A G LOADING OF _____ WHICH IS IN EXCESS OF THE 6 G MAX LOADING. DECREASE THE TURN ANGLE AT MILESTONE ___ TO BELOW ____ DEGREES."

5. Minimum Altitude

If the aircraft descends to an altitude less than 61 meters prior to bomb release, the following error message is generated identifying the error, the milestone and the milestone altitude that caused the error:

Error message: "ALTITUDE AT MILESTONE ___ IS ____ METERS WHICH IS BELOW THE MIN ALT OF 61 METERS."

6. Maximum Altitude

If the aircraft attains an altitude greater than 457 meters prior to the "pop-up" maneuver, the following error message is generated identifying the error, the milestone and the milestone altitude that caused the error:

Error message: "ALTITUDE AT MILESTONE ___ IS ____ METERS WHICH IS ABOVE THE MAX ALT PRIOR TO POP UP OF 457 METERS."

7. Overall Maximum Altitude

If, at any time, the aircraft exceeds the overall maximum altitude of 2134 meters, the following error message is generated identifying the error, the milestone and the milestone altitude that caused the error:

Error message: "ALTITUDE AT MILESTONE ___ IS ____ METERS WHICH IS ABOVE THE MAX ALT OF 2134 METERS."

8. Minimum "pop up" Altitude

If, during the "pop up" maneuver, the aircraft fails to attain a minimum altitude of 1219 meters, the following error message is generated identifying the error and the altitude attained during the "pop up" maneuver:

Error message: "MAX ALTITUDE DURING POP UP WAS ____ METERS WHICH IS LESS THAN THE MINIMUM POP UP ALTITUDE OF 1219 METERS."

9. Bomb Release Heading

If the aircraft heading at the time of bomb release is greater than 5 degrees from the true heading to the target, the following error message is generated identifying the error, the aircraft heading and the true heading to the target at the time of bomb release:

Error message: "THE AIRCRAFT HEADING INTO THE BOMB RELEASE POINT IS _____. THE HEADING TO THE TARGET IS ____.

THE HEADING DIFFERENCE IS _____ WHICH IS GREATER THAN THE 5 DEGREE MAXIMUM DIFFERENCE LIMIT."

10. Target Acquisition Time

If the aircraft does not hold a heading of less than 5 degrees from the true heading to the target for a time period of at least 2 seconds on the leg immediately prior to the bomb release point, the following error message is generated identifying the error and the time duration of the leg that caused the error:

Error message: "THE LENGTH OF THE LEG IMMEDIATELY PRIOR TO THE BOMB RELEASE POINT IS ___SECONDS IN DURATION WHICH IS LESS THAN THE MINIMUM OF 2 SECONDS."

11. Bomb Release Altitude

If the ordnance is released outside of an altitude envelope of from 305 to 914 meters, the following error message is generated identifying the error and the altitude at bomb release:

Error message: "THE BOMB RELEASE ALTITUDE IS ____ METERS WHICH IS NOT IN THE BOMB RELEASE ALTITUDE RANGE OF BETWEEN 305 TO 914 METERS."

12. Bomb Release Range

If the ordnance is released at a distance greater than 1000 meters from the target, the following error message is generated identifying the error and the distance from the target at the time of bomb release:

Error message: "THE BOMB WAS RELEASED AT A DISTANCE OF ____ METERS FROM THE TARGET WHICH IS IN EXCESS OF THE 1000 METER MAXIMUM BOMB RELEASE RANGE."

13. Gun Location Input Error

If the option is chosen to input the gun locations, but no gun location information is part of the input data or not all of the gun locations are specified, the following error message is generated identifying the error. Program execution terminates after the error message is printed.

Error message: "GUN EMPLACEMENT DATA WAS SPECIFIED AS PART OF THE INPUT DATA; HOWEVER, EITHER NO GUN EMPLACEMENT DATA IS PART OF THE INPUT OR ALL SIX GUN LOCATIONS WERE NOT SPECIFIED. EXECUTION TERMINATES."

14. Anti-jam Error

If the anti-jam option is specified, but no jammer is in operation, the following error message will be generated and the anti-jam function will be "turned off":

Error message: "THE ANTI-JAM FUNCTION IS SPECIFIED; HOWEVER, THE JAM FUNCTION IS NOT SPECIFIED. THE ANTI-JAM FEATURE HAS BEEN TURNED OFF."

15. Type 3 Gun Range Error

If a type 3 weapon is located within 3,000 meters of the center of the bridge, the following error message will be generated, identifying the error, the position of the gun that caused the error and the actual distance from the target of the gun:

Error message: "GUN TYPE 3 LOCATED AT X:____ Y:____ IS ____ METERS FROM THE TARGET WHICH IS LESS THAN THE MINIMUM DISTANCE OF 3000 METERS."

16. Zero Power Jammer Error

If the jamming function has been specified, but the jammer has been assigned a power of zero, the jammer function is "turned off" and the following error message is generated, icentifying the error and the fact that the jammer has been "turned off":

Error message: "THE JAM FUNCTION IS SPECIFIED, BUT THE JAMMER POWER IS SPECIFIED AS ZERO. THE JAM FUNCTION HAS BEEN TURNED OFF."

17. Maximum Power Jammer Error

If the jammer has been assigned a power greater than 1000 watts, the following error message is generated, identifying the error. The jammer power will then be limited to 1000 watts.

Error message: "THE SPECIFIED JAMMER POWER IS GREATER THAN 1000 WATTS AND HAS BEEN LIMITED TO 1000 WATTS."

E. PROGRAM OPTIONS

PIP provides the following electronic warfare options

1. Jamming Option

An airborne jammer aboard the target aircraft is utilized to degrade radar acquisition/tracking capabilities.

2. Anti-jam Option

Ground weapons that have an anti-jam capability use it to partially nullify the effects of the airborne jammer.

3. Multipath Option

The performance of all radar units which are susceptible to multipath effects is appropriately degraded.

PIP also provides for any combination of the following input/output options:

4. List the P001 Input Deck

A complete listing of all required cards for input to the P001 program is provided. The green "JOB" card and the orange final "EOF" card are not part of this listing. These two cards are the only cards that must be provided by the student to run the P001 program with the PIP output.

5. Punch the P001 Input Deck

A complete punched input deck in the proper format and order to run P001 is provided by this option. Again, no "JOB" or "EOF" card is provided.

6. Plot the P001 Scenario

A plot of the basic geographical features of the scenario, the aircraft flight path and milestone locations, the bomb release point, the gun emplacement locations and the threat radius for each weapon (coded as to weapon type) are provided by this option. Fig. 2 shows a typical PIP scenario plot.

7. Extended Printout Option

An extended printout of the results of the P001 analysis will be provided as output.

8. Gun Location Option

The locations of six of the seven guns in the scenario may be input to the program or preset gun locations may be utilized, as desired.

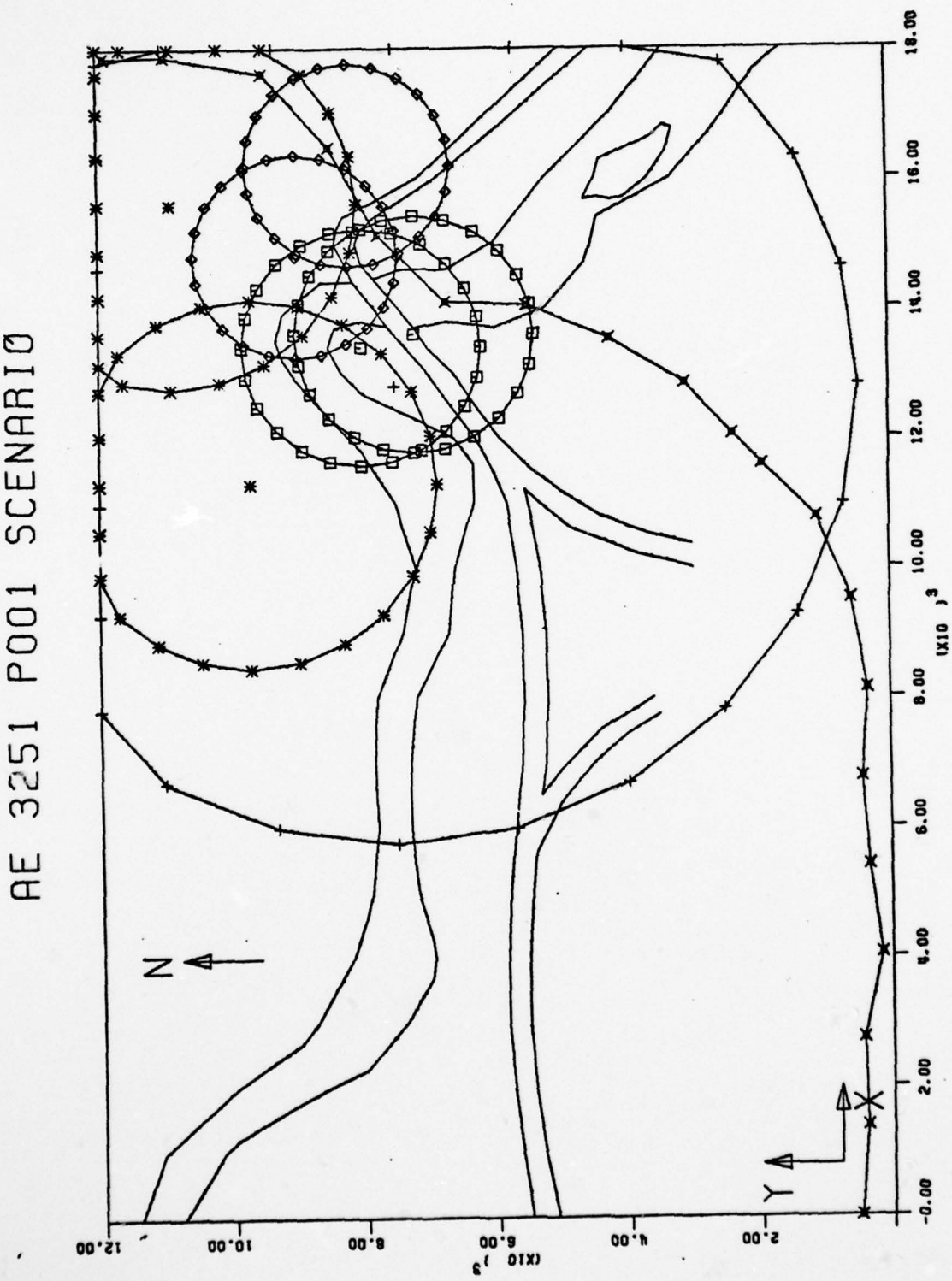

Figure 2 Typical PIP Scenario Plot

In all cases, messages are generated specifying which options were or were not chosen for each execution of PIP.

F. PIP INPUT DATA DEFAULT VALUES

In order to significantly reduce student involvement in the P001 input process, PIP assigns predetermined values to many of the options available under the full P001 input. These default values, over which the student has little or no control, were chosen to provide values that are representative of the typical attack situation simulated by the class problem scenario. The following is a list of these default values as they pertain to each P001 input card:

01 Card: Output Header Information

The output header information is assigned "Aircraft Combat Survivability Scenario" by PIP.

02 Card: Initial Flight Path Data

JMODE = 0: The milestone data are read from cards for one milestone at a time.

KMODE = 12: Flight path stored position data will be printed at every 12th position along the flight path.

TMIN = 0: The time at the beginning of the flight path is assigned a value of zero.

TMAX: The time at the end of the flight path is computed by PIP.

DTFPA: The time increment between successive stored positions along the flight path is calculated by PIP as TMAX/1000.

XR, YR = 0: An x, y reference location in the Flight Path Coordinate System. XR and YR are coordinates in the Flight Path Coordinate System of the point located at XT, YT and ZT in the General Reference Coordinate System, as shown in Fig. 3.

XT, YT = 0: The x, y coordinates in the General Reference Coordinate System of the point located at XR, YR in the Flight Path Coordinate System, as shown in Fig. 3.[1]

PSI = 0: The rotational angle required to rotate the Flight Path Coordinate System into the General Reference Coordinate System (positive for counter-clockwise rotation).

ZT = 0: Vertical correction factor to be added to each point of the flight path, as shown in Fig. 3.[1]

2A Card: Flight Path Milestone Input

All data on Card 2A is calculated by PIP based on the cruise speed and milestone coordinates provided by student input.

03 Card: Ground Weapon Complex Coordinates

If the preset weapon location option is chosen, the seven ground weapons used in the class scenario are assigned in the following locations by PIP:

---

[1] Setting XR, YR, XT, YT, ZT and PSI equal to zero results in the coincidence of the Flight Path Coordinate System and the General Reference Coordinate System.

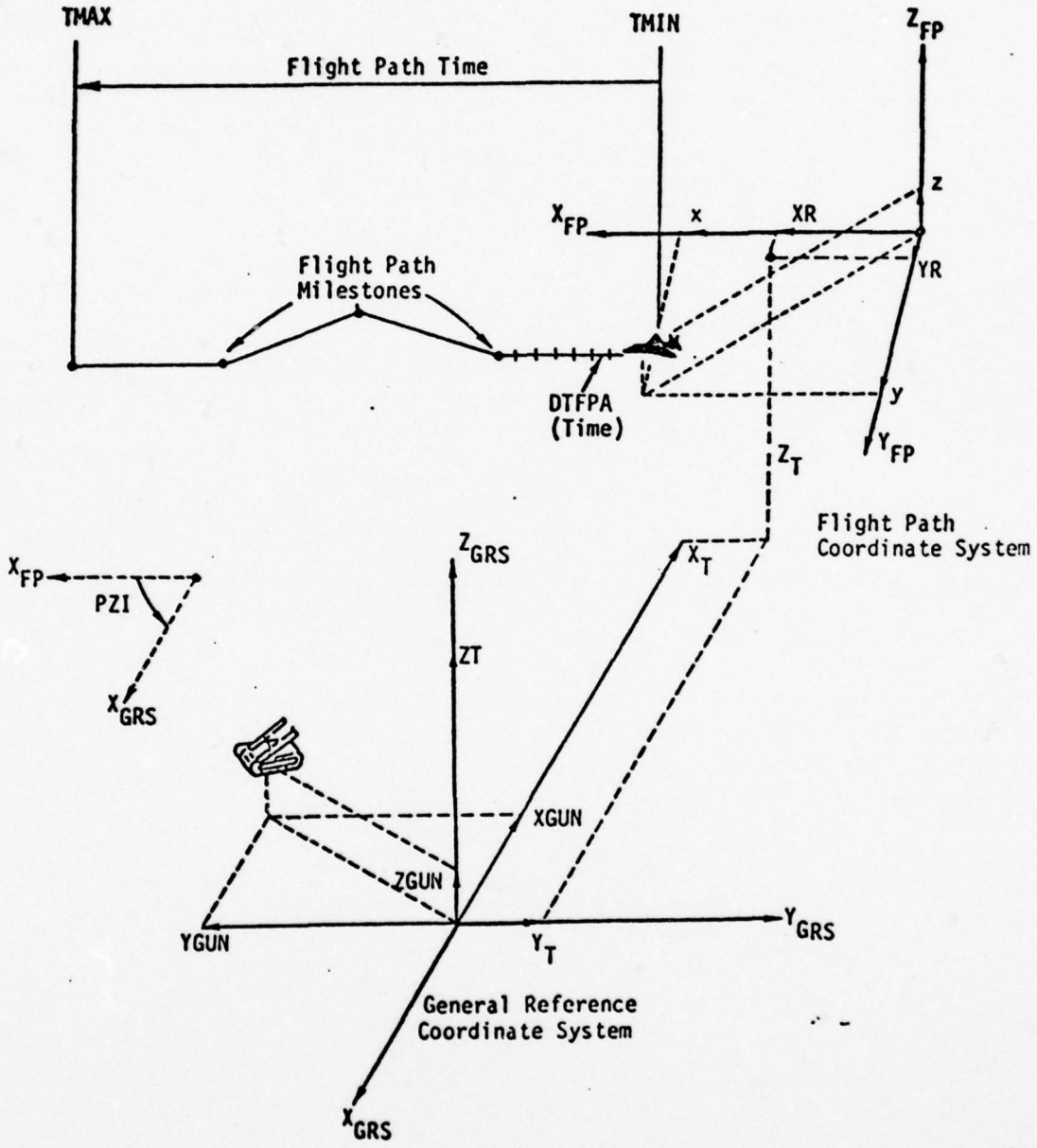

Figure 3 Relationship of the General Reference and Flight Path Coordinate Systems

Gun	XGUN	YGUN	ZGUN
1	14,800	9,000	40
2	16,200	8,200	40
3	13,600	7,200	20
4	13,400	8,000	20
5	11,300	9,700	50
6	15,600	10,900	90
7	12,800	7,500	20

where XGUN, YGUN and ZGUN are as shown in Fig. 3. Fig. 2 shows the weapon locations.

If the preset weapon location option is not chosen, all values on Card 03 are assigned by student input.

04 Card: Ground Weapon Characteristics

Each ground weapon is defined by six parameters. These parameters are:

IGT: Ground weapon type.

IEM: Fire control operation mode.

ICB: Number of barrels of the ground weapon to be fired in a simultaneous manner, where ICB x ISB is the number of barrels per weapon.

IGL: Number of ground weapons located in the ground weapon complex. (ICB x ISB x IGL is the number of barrels at one location.)

CIRCLE: Radius of the circle of the ground weapon complex. If there is only weapon in the ground weapon complex, CIRCLE = 0.0.

The default values selected for the six parameters for each of the seven weapons are as follows:

	IGT	IEM	ICB	ISB	IGL	CIRCLE
Gun 1:	1	1	1	1	1	0.0
Gun 2:	1	1	1	1	1	0.0
Gun 3:	2	1	1	1	1	0.0
Gun 4:	2	1	1	1	1	0.0
Gun 5:	3	4	4	1	1	0.0
Gun 6:	3	3	4	1	1	0.0
Gun 7:	5	3	2	1	1	0.0

05 Card: Ground Weapon Complex Density Factors

IF5 = 0: Ground weapon complex density factors are not printed.

NRHOS = 1: The number of ground weapon density factors equals one.

RHO(1) = 1.0; RHO(2) through RHO(9) = 0.0: Generally, RHO = (number of possible ground weapon complexes in the engagement divided by the number of possible ground weapon complex locations in the scenario).

06 Card: Flight Path P_k Accrual Time Intervals (P_k = probability of kill)

IF6 = 1: Flight path P_k accrual time intervals are printed.

NTINTS = 9: One less than the total number of flight path time intervals to be considered. P001 adds one additional time interval for P_k's accumulated from NTINTS to infinity.

TINTER(1) through TINTER(9): TINTER values are assigned by PIP. Each TINTER is an increment representing 1/10th of the total flight path time.

07 Card: Aircraft Vulnerable Area Table Title

ICARD = a. "Vulnerable Area Table vs Type 1 and 2 Weapons",
b. "Vulnerable Area Table vs Type 3 Weapons",
c. "Vulnerable Area Table vs Type 5 Weapons"

7A Card: Aircraft Vulnerable Area Tables

The values assigned by PIP to the three aircraft vulnerable area tables representing the three senario threat classes are given in Tables I, II and III respectively.

08 Card: Ground Weapon Reaction and Tracking Times

Card 08 is omitted by PIP. Values are assigned within P001.

09 Card: Ground Weapon Parameters

Card 09 is omitted by PIP. Values are assigned within P001.

9A Card: Ground Weapon Parameters

Card 9A is omitted by PIP. Values are assigned within P001.

10 Card: Ground Weapon Projectile Parameters

Card 10 is omitted by PIP. Values are assigned within P001.

11 Card: Logical Unit Input Option

Card 11 is omitted by PIP. Logical Unit 5 is assigned for input within P001.

07 VULNERABLE AREA TABLE VS TYPE 1 AND 2 WEAPONS

0.464	0.464	7.107	7.107	7.107	7.107	7.107	7.107
0.657	0.657	5.551	5.551	5.551	5.551	5.551	5.551
0.697	0.697	5.574	5.574	5.574	5.574	5.574	5.574
0.657	0.657	7.357	7.357	7.357	7.357	7.357	7.357
0.697	0.697	5.574	5.574	5.574	5.574	5.574	5.574
0.657	0.657	5.551	5.551	5.551	5.551	5.551	5.551
0.697	0.697	5.574	5.574	5.574	5.574	5.574	5.574
0.657	0.657	7.357	7.357	7.357	7.357	7.357	7.357
0.697	0.697	5.574	5.574	5.574	5.574	5.574	5.574
0.464	0.464	0.743	0.743	0.743	0.743	0.743	0.743
0.657	0.657	2.858	2.858	2.858	2.858	2.858	2.858
0.464	0.464	3.298	3.298	3.298	3.298	3.298	3.298
0.657	0.657	2.858	2.858	2.858	2.858	2.858	2.858
0.464	0.464	0.743	0.743	0.743	0.743	0.743	0.743
0.657	0.657	2.858	2.858	2.858	2.858	2.858	2.858
0.464	0.464	3.298	3.298	3.298	3.298	3.298	3.298
0.657	0.657	2.858	2.858	2.858	2.858	2.858	2.858
0.657	0.657	5.551	5.551	5.551	5.551	5.551	5.551
0.697	0.697	5.574	5.574	5.574	5.574	5.574	5.574
0.657	0.657	7.357	7.357	7.357	7.357	7.357	7.357
0.697	0.697	5.574	5.574	5.574	5.574	5.574	5.574
0.657	0.657	5.551	5.551	5.551	5.551	5.551	5.551
0.697	0.697	5.574	5.574	5.574	5.574	5.574	5.574
0.657	0.657	7.357	7.357	7.357	7.357	7.357	7.357
0.697	0.697	5.574	5.574	5.574	5.574	5.574	5.574
0.464	0.464	7.107	7.107	7.107	7.107	7.107	7.107

TABLE I. Aircraft Vulnerable Area Table (Type 1 and 2 Weapons)

07 VULNERABLE AREA TABLE VS TYPE 3 WEAPONS

12.540	12.540	13.470	13.470	13.470	13.470	13.470	13.470
9.853	9.853	10.510	10.510	10.510	10.510	10.510	10.510
9.639	9.639	11.150	11.150	11.150	11.150	11.150	11.150
12.640	12.640	14.780	14.780	14.780	14.780	14.780	14.780
9.639	9.639	11.150	11.150	11.150	11.150	11.150	11.150
9.853	9.853	10.510	10.510	10.510	10.510	10.510	10.510
9.639	9.639	11.150	11.150	11.150	11.150	11.150	11.150
12.640	12.640	14.780	14.780	14.780	14.780	14.780	14.780
9.639	9.639	11.150	11.150	11.150	11.150	11.150	11.150
1.394	1.394	1.394	1.394	1.394	1.394	1.394	1.394
4.762	4.762	6.240	6.240	6.240	6.240	6.240	6.240
5.342	5.342	7.432	7.432	7.432	7.432	7.432	7.432
4.762	4.762	6.240	6.240	6.240	6.240	6.240	6.240
1.394	1.394	1.394	1.394	1.394	1.394	1.394	1.394
4.762	4.762	6.240	6.240	6.240	6.240	6.240	6.240
5.342	5.342	7.432	7.432	7.432	7.432	7.432	7.432
4.762	4.762	6.240	6.240	6.240	6.240	6.240	6.240
9.853	9.853	10.510	10.510	10.510	10.510	10.510	10.510
9.639	9.639	11.150	11.150	11.150	11.150	11.150	11.150
12.640	12.640	14.780	14.780	14.780	14.780	14.780	14.780
9.639	9.639	11.150	11.150	11.150	11.150	11.150	11.150
9.853	9.853	10.510	10.510	10.510	10.510	10.510	10.510
9.639	9.639	11.150	11.150	11.150	11.150	11.150	11.150
12.640	12.640	14.780	14.780	14.780	14.780	14.780	14.780
9.639	9.639	11.150	11.150	11.150	11.150	11.150	11.150
12.540	12.540	13.470	13.470	13.470	13.470	13.470	13.470

TABLE II. Aircraft Vulnerable Area Table (Type 3 Weapons)

07 VULNERABLE AREA TABLE VS TYPE 5 WEAPON

55.370	55.370	55.370	55.370	55.370	55.370	55.370	55.370
43.220	43.220	43.220	43.220	43.220	43.220	43.220	43.220
47.100	47.100	47.100	47.100	47.100	47.100	47.100	47.100
62.530	62.530	62.530	62.530	62.530	62.530	62.530	62.530
47.100	47.100	47.100	47.100	47.100	47.100	47.100	47.100
43.220	43.220	43.220	43.220	43.220	43.220	43.220	43.220
47.100	47.100	47.100	47.100	47.100	47.100	47.100	47.100
62.530	62.530	62.530	62.530	62.530	62.530	62.530	62.530
47.100	47.100	47.100	47.100	47.100	47.100	47.100	47.100
5.761	5.761	5.761	5.761	5.761	5.761	5.761	5.761
27.450	27.450	27.450	27.450	27.450	27.450	27.450	27.450
33.070	33.070	33.070	33.070	33.070	33.070	33.070	33.070
27.450	27.450	27.450	27.450	27.450	27.450	27.450	27.450
5.761	5.761	5.761	5.761	5.761	5.761	5.761	5.761
27.450	27.450	27.450	27.450	27.450	27.450	27.450	27.450
33.070	33.070	33.070	33.070	33.070	33.070	33.070	33.070
27.450	27.450	27.450	27.450	27.450	27.450	27.450	27.450
5.761	5.761	5.761	5.761	5.761	5.761	5.761	5.761
47.100	47.100	47.100	47.100	47.100	47.100	47.100	47.100
62.530	62.530	62.530	62.530	62.530	62.530	62.530	62.530
47.100	47.100	47.100	47.100	47.100	47.100	47.100	47.100
43.220	43.220	43.220	43.220	43.220	43.220	43.220	43.220
47.100	47.100	47.100	47.100	47.100	47.100	47.100	47.100
62.530	62.530	62.530	62.530	62.530	62.530	62.530	62.530
47.100	47.100	47.100	47.100	47.100	47.100	47.100	47.100
55.370	55.370	55.370	55.370	55.370	55.370	55.370	55.370

TABLE III. Aircraft Vulnerable Area Table (Type 5 Weapon)

13 Card: Radar Multipath Parameters

IMUL: Assigned by the user on the PIP option card. If IMUL = 0, no multipath effects are considered. If IMUL = 1, multipath radar effects are taken into consideration in the P001 analysis.

IRMP: Radar type identification assigned by PIP, specifying the tracking radar. The value of IRMP indicates appropriate radar parameters within P001. The value of IRECM, assigned by PIP on Card 14, dictates the value of IRMP. The radar parameters and the relationship between IRMP and IRECM are as follows:

	IRECM	IRMP	Beamwidth (deg)	Squint Angle (deg)	Calibration Constant
Gun 6:	1	1	1.4	0.5	0.759
Gun 7:	2,3	2	1.8	0.6	1.060

Multipath radar effects do not apply to guns 1 through 5.

REFC = 0.35: Reflection coefficient. 0.35 is a typical value for terrain with vegetation.

14 Card: ECM (Jamming) Parameters

IJAM: Assigned by the user on the PIP option card. 0 = no jamming. 1 = jamming effects considered in P001 analysis.

IP = 5: Print every 5th value in J/S printout.

IJ = 0. Therefore, GAINJ is the antenna gain of the jammer.

GAINJ = 1.0: The antenna gain of the jammer is 1.0.

PJW: Jammer power, assigned by the user on the PIP option card.

PLEN = 1.0E-06: The length of the jammer cover pulse is 1 microsecond, a standard value.

IX = 1: A radar cross section table is provided by PIP. (Table IV).

XSEC = 0: XSEC is not used if IX = 1. If used (IX = 0), a constant cross section of XSEC m^2 is used.

CALX = 1: The radar cross section table is not scaled.

IRECM: The value of IRECM defaulted by PIP depends upon the gun type and mode. IRECM calls up certain radar parameters from a data statement within P001. IRECM values and the relationship with the gun type and mode are as follows:

Gun Type (IGT)	Mode (IEM)	Radar ID (IRECM)	Gain (RGDB)	Power (PRW)	Frequency (FREQ)	SJTMAX
1	1	N/A	N/A	N/A	N/A	N/A
2	1	N/A	N/A	N/A	N/A	N/A
3	3,4	1	40.0 dB	150,000	15.1E9	3.0 dB
5	3	2 (no AJ)	38.5 dB	175,000	9.38E9	1.5 dB
5	3	3 (AJ)	38.5 dB	175,000	9.38E9	17 dB

SJTMAX: Assigned by PIP as indicated above. SJTMAX is the threshold where tracking errors become significant.

RGDB, PRW, FREQ: Assigned within P001.

12 Card: Print Options for Output

IPRINT(1) through IPRINT(7): If the extended output option is chosen by the user on the PIP option card, IPRINT(1) through IPRINT(7) = 1 and an extended printout of the result of the P001 analysis is obtained. If the extended output

1000.000	1000.000	1000.000	1000.000	1000.000	1000.000	1000.000	1000.000
1000.000	1000.000	1000.000	1000.000	1000.000	1000.000	1000.000	1000.000
1000.000	1000.000	1000.000					
100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
100.000	100.000	100.000					
0.273	0.178	0.053	0.023	0.156	0.166	0.063	0.173
0.235	0.047	0.020	0.015	0.011	0.073	0.072	0.019
0.028	0.110	0.454					
0.005	0.005	0.007	0.011	0.093	0.093	0.039	0.068
0.112	0.032	0.019	0.015	0.009	0.035	0.032	0.017
0.033	0.102	0.509					
0.273	0.178	0.053	0.023	0.156	0.166	0.063	0.173
0.235	0.047	0.020	0.015	0.011	0.073	0.072	0.019
0.028	0.110	0.454					
100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
100.000	100.000	100.000					
1000.000	1000.000	1000.000	1000.000	1000.000	1000.000	1000.000	1000.000
1000.000	1000.000	1000.000	1000.000	1000.000	1000.000	1000.000	1000.000
1000.000	1000.000	1000.000					

TABLE IV. Aircraft Radar Cross-section Table

option is not chosen, IPRINT(1) through IPRINT(7) = 0 and a summary of the P001 analysis is printed as output from P001.

III. SUMMARY AND CONCLUSIONS

The use of the P001 Input Program (PIP) to provide all required input to P001 greatly reduces the student involvement in the aircraft combat survivability scenario computer input procedure, freeing him from time consuming, tedious computations and keypunching which do not contribute profitably to the aircraft combat survivability learning experience. In addition, PIP provides an indication as to the realism of the input data, thus contributing to the validity of the result of the P001 analysis.

Introduction of the Calspan Improved P001 Computer Program into aircraft combat survivability studies provides the class problem in survivability assessment with ECM (jamming), ECCM (anti-jam) and radar multipath features which are realistic parameters to be considered in any current aircraft combat survivability situation.

As developed, the PIP target aircraft performance parameters are those of a "typical" Navy attack aircraft, having flight characteristics that are realistic, but which can not be used to describe the performance of any specific aircraft. As a future project, specific aircraft flight performance parameters and equations could be added to PIP in the form of a flight path generator program to give the input program the added capability of simulating the flight path of a specific aircraft.

APPENDIX A

AIRCRAFT COMBAT SURVIVABILITY PROBLEM

This Appendix contains a complete package for a class problem in aircraft attrition in a hostile AAA environment for AE 3251, Aircraft Combat Survivability.

AE 3251

AIRCRAFT COMBAT SURVIVABILITY

A STUDY

of

AIRCRAFT ATTRITION

in a

HOSTILE AAA ENVIRONMENT

NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA

TABLE OF CONTENTS

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LIST OF FIGURES

I. INTRODUCTION

This aircraft attrition study is designed to present the student with an opportunity to see first hand how the survivability of an aircraft can be evaluated in a given combat scenario. The methods employed in this study are those used by both industry and government when making crucial decisions in the survivability design of an aircraft weapon system. In this study, a computer program named P001 (AFATL Antiaircraft Artillery Simulation Computer Program) will be used to (1) simulate the flight of a typical Naval attack aircraft through a hostile antiaircraft artillery (AAA) environment and (2) compute the aircraft probability of survival.[1]

Section II describes all of the steps necessary to complete this study. Note the flow of the survivability assessment process from a physical description of the aircraft to a determination of its capabilities to withstand certain threat levels (i.e., its vulnerability), to a scenario in which both offensive and defensive strategies must be employed, to the final phase of simulating flight through the hostile environment and computing probabilities of survival using a modern, state-of-the-art computer program.

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[1] The Navy specifies the use of P001 in all non-nuclear survivability assessments in MIL-STANDARD-2072(AS), SURVIVABILITY, AIRCRAFT; ESTABLISHMENT AND CONDUCT OF PROGRAMS FOR, August 1977.

The student should develop a good appreciation for the magnitude of the survivability problem by keeping the above survivability assessment process in mind when working each part of the analysis.

II. PROBLEM DEFINITION

A. You are going to conduct a survivability assessment of a familiar Naval aircraft, shown in Figs. 1 and 2, on a typical attack mission to destroy the bridge shown in Fig. 3.

B. The class will be divided into groups of four, with two members in each group on the blue team and two members on the red team.

C. Each team will independently determine the vulnerable areas of the aircraft to the specified threat in the six major views.

D. Each team will use P001 to determine the survivability of the aircraft in the class problem scenario, as follows:

1. Each team will select a flight path to the bridge according to the rules of the scenario given in Section IV. Keep this path a secret.
2. Each team will also select the locations of six AAA emplacements that will defend the bridge against an air attack. Locate the weapons according to the order of battle given in Section IV. Keep these locations secret, also.
3. Each team will conduct an attack against the other team in the group.
4. The input data cards for the computer run for the blue team attacking the bridge defended by the red team

will consist of the flight path of the blue aircraft flying through the AAA emplacements selected by the red team.

5. The input data cards for the computer run for the red team against the blue team will consist of the flight path of the red aircraft flying through the AAA emplacements selected by the blue team.

E. May the best team win. A small prize will be awarded to the team whose aircraft has the highest probability of survival against their opponent's weapon distribution.

F. Additional runs will be made against a preset AAA distribution to investigate the effects of ECM, ECCM, jinking, etc., on the survivability of the aircraft.

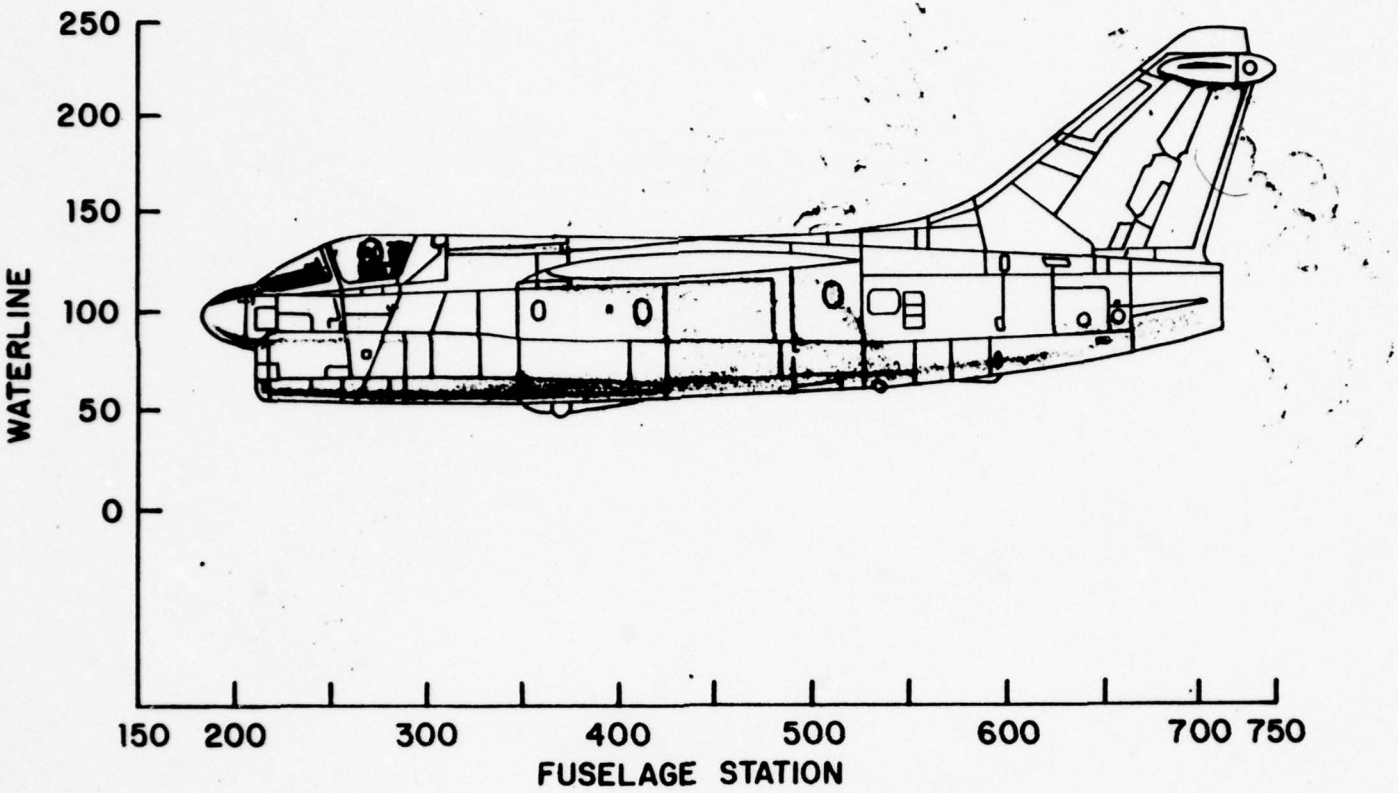
250
200
150
100
50
0
WATERLINE
150
200
300
400
500
600
700
750
FUSELAGE STATION

Figure 1

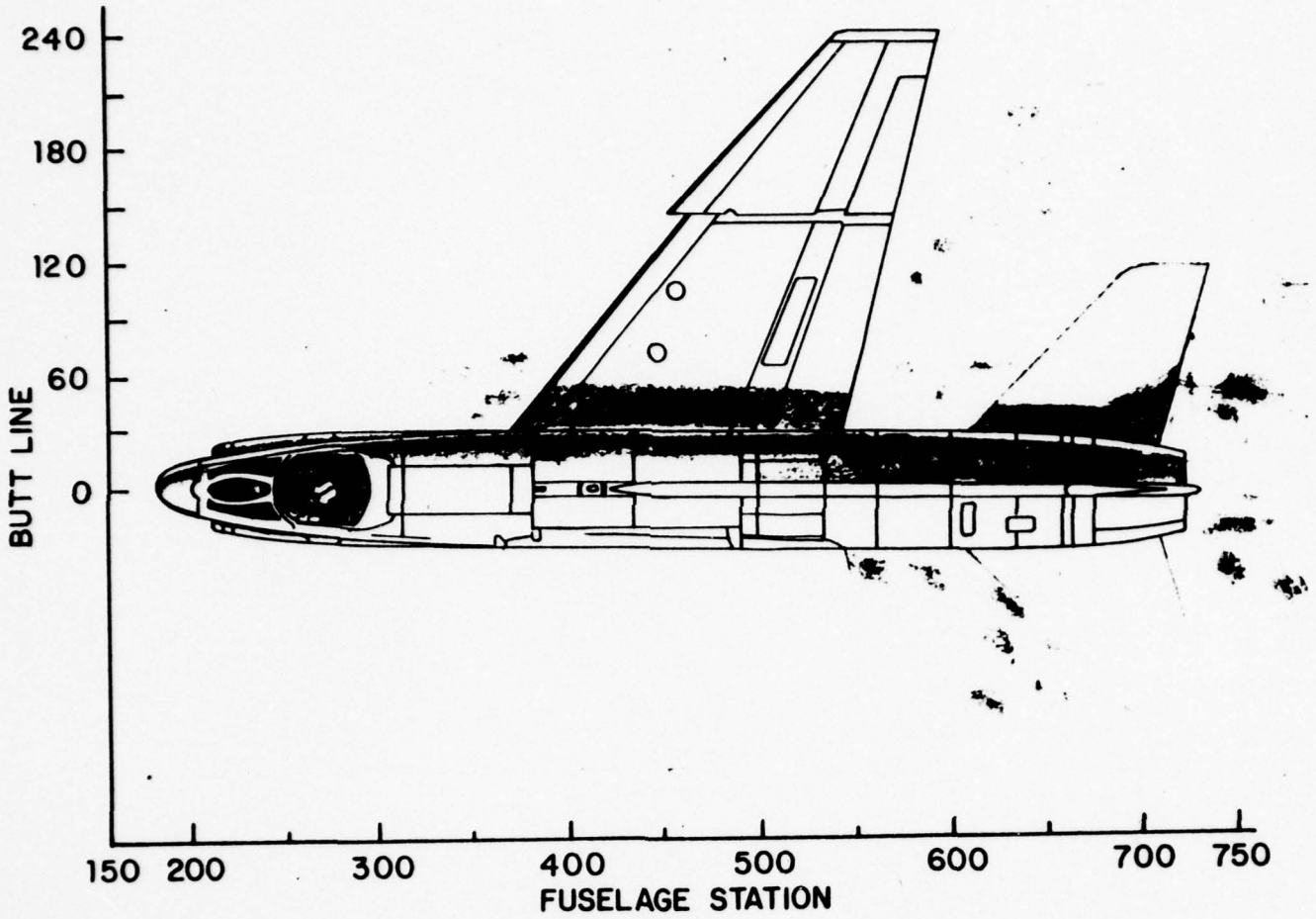
240
180
120
60
0
BUTT LINE
150
200
300
400
500
600
700
750
FUSELAGE STATION

Figure 2

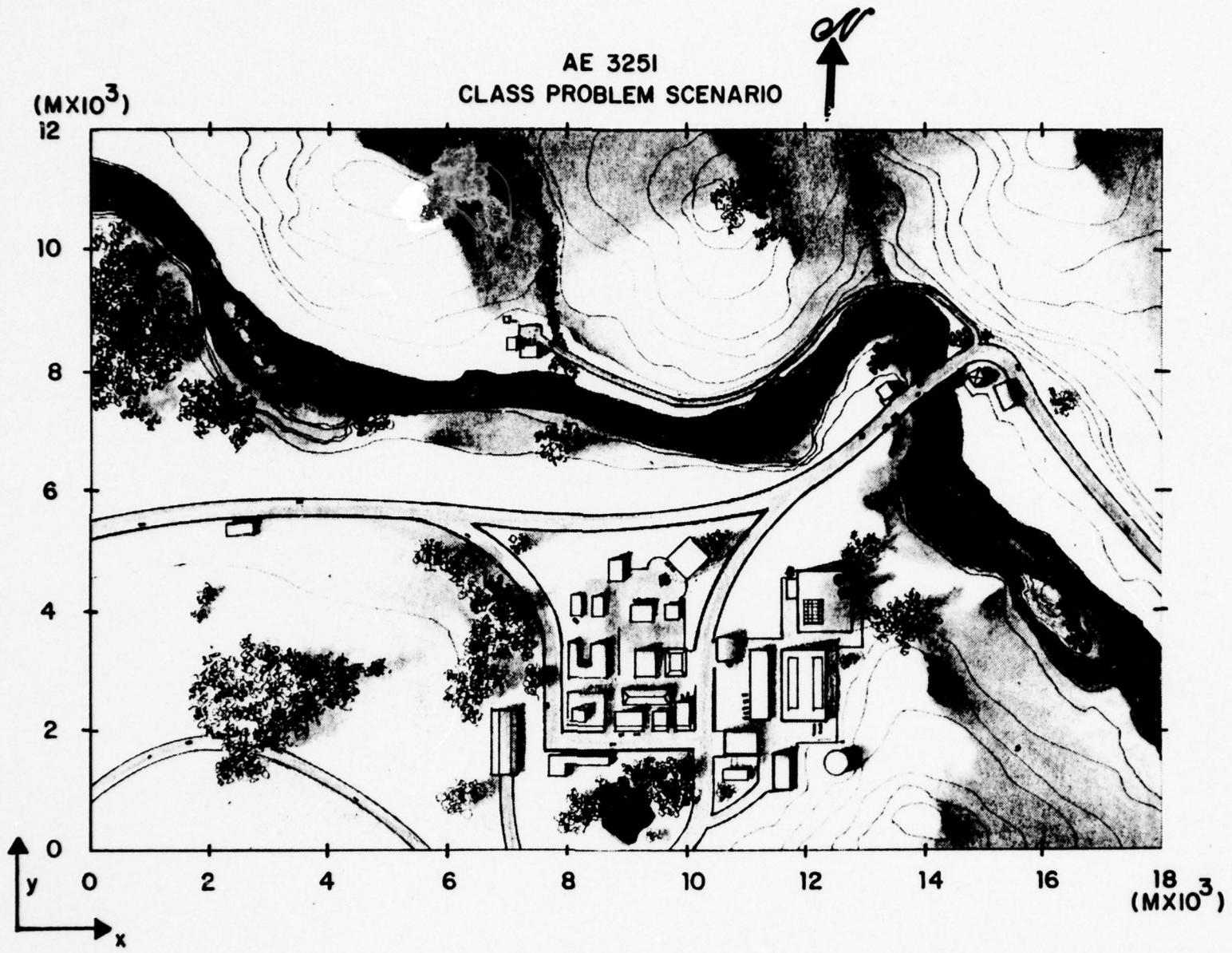
AE 3251
CLASS PROBLEM SCENARIO
N
(MX10^3)
12
10
8
6
4
2
0
y
x
0
2
4
6
8
10
12
14
16
18
(MX10^3)

Figure 3

III. VULNERABILITY ASSESSMENT DESCRIPTION

A. GENERAL METHODOLOGY

The six general requirements for a vulnerability assessment are discussed in detail in Chapter IV of the class text. The following data are given in support of this assessment procedure:

1. Kill Category = "A" Kill
2. Technical Description of the Aircraft - Figs. 1 and 2
3. Critical Components - Pilot, engine and fuel tanks.

a. Each of these singly vulnerable components will make a contribution to Ap_i, the total presented area of the aircraft.

b. The total presented area is assumed to be a "shoe box" centered around the aircraft center of gravity.

4. Damage Analysis - Determination of $P_{K/H}$ for each of the components will be discussed in class due to the classified nature of the material.

5. Threat Types - To be discussed in class; Types I, II, III and V threats will be used in the scenario.

6. Determine Vulnerable Area - Use the equation:

$$A_v = \sum_i A_{p_i} \cdot P_{K/H_i}$$

where i = pilot, engine and fuel tanks.

B. SPECIFIC CALCULATIONS

The vulnerability assessment may now be completed in the following manner:

1. Measure the presented area of each critical component of the aircraft shown in Figs. 1 and 2 for the top/bottom, front/rear and left/right aspects and record in Table I.

2. Calculate the A_{V_i} for each component using the given P_{K/H_i} for the appropriate aspect and striking velocity and enter it into Table I.

3. In order to use the information compiled in Table I in P001, a more complete description of the aircraft A_V with changing aspect angle must be tabulated. This is normally done in a 26 view, ô striking velocity vulnerable area table (VAT). Fig. 4 and Table II show how the aircraft is physically divided into these 26 different views. You have tabulated in Table I the total A_V for each of the striking velocities, but only for the six major aspects. The vulnerable area of the other views can be obtained by interpolating between these six aspects. The following is a summary of the six views you have done in Table I and their relationship to the 26 views needed to describe the aircraft:

View	View #	Long (AZ) (degrees)	Lat (Elev) (degrees)
Bottom	1	0	0
	2-9	0-315	45
Tail-on	10	0	90
	11	45	90
STBD Side	12	90	90
	13	135	90
Head-on	14	180	90
	15	215	90
Port Side	16	270	90
	17	315	90
	18-25	0-315	135
TOP	26	0	180

The A_V's you have calculated will not be used in the P001 analysis. Instead, predetermined VATS for each threat type will be used in order to provide a standardized aircraft for the attrition study.

4. Turn in Table I prior to initiating a computer run for the analysis.

TABLE I.

SINGLY VULNERABLE AREA ($A_{,,}$) SUMMARY FORM

Assessment Date _____ Aircraft _____
Performing Organization _____ Threat _____
Kill Category _____

Projectile V_S, ft/sec (m/sec)			A_P	500 (152.4)		1,000 (304.8)		1,500 (457.2)		2,000 (609.6)		2,500 (762.0)		3,000 (914.4)		3,500 (1066.8)	
Aspect	Component			$P_{K/H}$	A_V	$P_{K/H}$	A_V	$P_{K/H}$	A_V	$P_{K/H}$	A_V	$P_{K/H}$	A_V	$P_{K/H}$	A_V	$P_{K/H}$	A_V
TOP/ BOTTOM	PILOT																
	ENGINE																
	FUEL TANKS	FUSELAGE															
		WINGS															
	TOTAL																
FRONT/ REAR	PILOT																
	ENGINE																
	FUEL TANKS	FUSELAGE															
		WINGS															
	TOTAL																
LEFT/ RIGHT	PILOT																
	ENGINE																
	FUEL TANKS	FUSELAGE															
		WINGS															
	TOTAL																

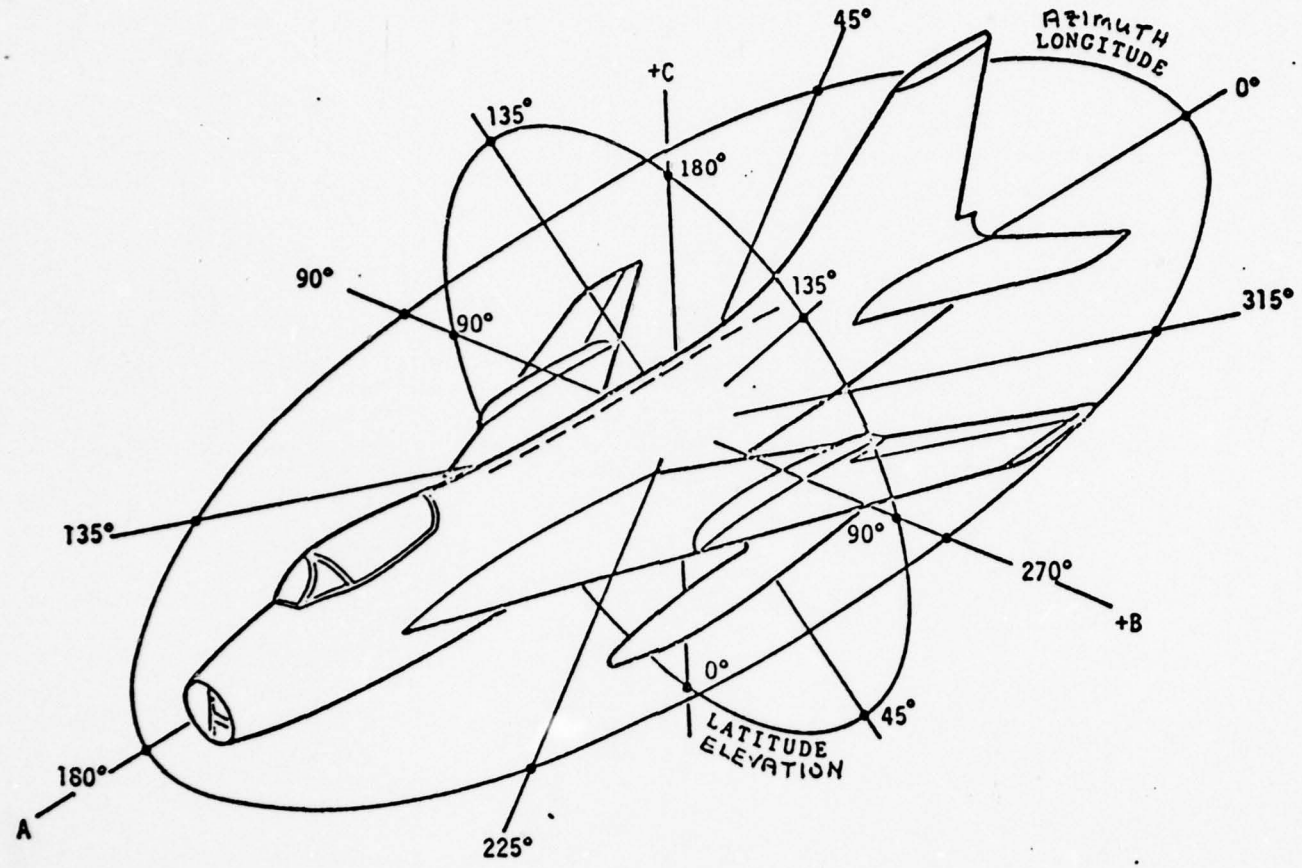

Figure 4 Longitude and Latitude of Aircraft for Vulnerable Area Computation

TABLE II VULNERABLE AREA TABLES

Card Number	I	J	Aircraft View
1	1	1	0° Longitude, 0° Latitude
2	1	2	0° Longitude, 45° Latitude
3	2	2	45° Longitude, 45° Latitude
4	3	2	90° Longitude, 45° Latitude
5	4	2	135° Longitude, 45° Latitude
6	5	2	180° Longitude, 45° Latitude
7	6	2	225° Longitude, 45° Latitude
8	7	2	270° Longitude, 45° Latitude
9	8	2	315° Longitude, 45° Latitude
10	1	3	0° Longitude, 90° Latitude
11	2	3	45° Longitude, 90° Latitude
12	3	3	90° Longitude, 90° Latitude
13	4	3	135° Longitude, 90° Latitude
14	5	3	180° Longitude, 90° Latitude
15	6	3	225° Longitude, 90° Latitude
16	7	3	270° Longitude, 90° Latitude
17	8	3	315° Longitude, 90° Latitude
18	1	4	0° Longitude, 135° Latitude
19	2	4	45° Longitude, 135° Latitude
20	3	4	90° Longitude, 135° Latitude
21	4	4	135° Longitude, 135° Latitude
22	5	4	180° Longitude, 135° Latitude
23	6	4	225° Longitude, 135° Latitude
24	7	4	270° Longitude, 135° Latitude
25	8	4	315° Longitude, 135° Latitude
26	1	5	0° Longitude, 180° Latitude

NOTE: Refer to Figure 4 for definition of longitude and latitude.

IV. SCENARIO DESCRIPTION

A. This scenario is purely for instructional purposes and is not based on any actual or planned combat attack situation. The target site, order of battle, attack heading, and outbound flight path parameter limits have been chosen only to provide guidelines for the class problem. As much realism has been introduced for the players as possible while retaining an unclassified scenario.

B. Your target is the bridge shown in Fig. 3. located at:

x: 14,100 meters

y: 7,900 meters

z: 20 meters

Heavy military supply traffic has been reported in this area. Your mission is to destroy this vital supply link.

C. The following order of battle has been gathered from intelligence reports of the target area:

Interceptor Aircraft - three airfields within striking distance

SAM - six sites within a 125 km radius.

AAA - two type 1 mode 1
two type 2 mode 1
one type 3 mode 4
one type 3 mode 3
one type 5 mode 3

(Note: Gun types and their relationship to AAA will be discussed in class.)

Ground Troops - regular infantry and civilian militia are numerous in the target area.

D. The SAM threat and the presence of enemy aircraft requires that the inbound approach to the target be made from the west at low level. A pop-up maneuver is required to visually identify the target followed by a dive bombing run to weapon delivery. Egress must be made to either the north or south, depending on individual strategy.

E. The following is a list of scenario limitations to be used in the development of your strategy:

1. Flight path milestones - specify at least one milestone for approximately 500 meters of flight path.

2. Aircraft cruise speed - 210 to 250 meters per second.

3. Inbound altitude - 70 to 450 meters.

4. Pop-up maneuver

a. Commence maneuver - 4,000 to 6,000 meters from the target.

b. Maneuver altitude - minimum 1,220 meters; maximum 2,130 meters.

5. Weapons delivery.

a. Alignment - the leg immediately prior to the bomb release point must be 600 meters in length (straight) and must have a heading within 5° of the heading to the target from the bomb release point.

b. Bomb release range - 1,000 meters maximum.

c. Bomb release altitude - 310 to 910 meters.

(Note: A typical 20° dive commenced from 1,000 meters of altitude at 2,500 meters from the target will release weapons at 400 meters of altitude about 700 meters from the target and will lose 160 meters in the pull-out.)

6. Maneuvering - if any turn along the flight path is greater than 28°, the maximum g loading of 6 will be exceeded.

7. Weapons placement.

a. Two type 1 mode 1, two type 2 mode 1, one type 3 mode 4, and one type 3 mode 3 weapons are available for defense placement.

b. One type 5 mode 3 weapon is placed at x: 12,800 meters, y: 7,500 meters, and z: 20 meters. You do not specify the location of this weapon.

c. Neither of the type 3 weapons may be placed within 3,000 meters of the center of the bridge.

8. Jammer power - if the jamming function is specified, the jammer power you select must be no more than 1,000 watts.

F. Begin the flight path at an entry point of your choosing along the western boundary and end it along the northern or southern boundary. Note the terrain features, anticipate the AAA placement for bridge defense and plan your flight path accordingly.

G. Locate the AAA weapons given in the order of battle to best defend the bridge against your opponent's attacking aircraft.

V. INPUT DATA PREPARATION

A preprocessor for P001 has been developed at NPS that will punch all of the input cards for the execution of P001, with the exception of the green JOB card and the final orange END OF FILE card. This preprocessor is called PIP (P001 Input Program). The inputs to PIP are the x, y and z coordinates of your flight path milestones and your opponent's six AAA emplacement locations.

A. Milestone cards: The x, y and z coordinates of the aircraft (in meters) for up to 199 flight path milestones must be entered into PIP in 3F10.0 format, one milestone per card. (Milestone #1 will have an x coordinate of 0.0).

B. Milestone delimiter card: A card containing 99999., left justified, must be placed after the final milestone card.

C. Option control card: A control card follows the milestone delimiter card and specifies the aircraft cruise speed, the number of the bomb release milestone (count the initial position on the western border as milestone #1), eight input/output/scenario options and the jammer power. The data on the control card must be specified in F10.0,I2,8I1,F10.0 format and contains the following parameters:

(columns 1-10): Aircraft cruise speed in meters per second

(columns 11-12): Number of the bomb release milestone.

(column 13): EW option - 0 for no jamming, 1 for jamming.

(column 14): ECCM anti-jam option - 0 for no AJ, 1 for radar AJ.

(column 15): Radar multipath option - 0 for no multipath effects, 1 for radar degradation caused by multipath effects.

(column 16): Gun location option - 0 specifies PIP preset AAA locations, 1 requires user input of the six AAA locations.

(column 17): List option - 0 for no listing of the P001 input deck, 1 for listing of P001 input deck.

(column 18): Punch option - 0 for no punched P001 input deck, 1 for punched P001 input deck.

(column 19): Plot option - 0 for no scenario plot, 1 for scenario plot.

(column 20): Extended output option - 0 for no extended output, 1 for extended printout of P001 analysis results.

(columns 21-30): Jammer power in watts (0 to 1,000 watts).

D. Gun emplacement location cards: If column 16 on the control card contains a 1, six gun location cards specifying the x, y and z coordinates of each of the gun emplacements (format 3F10.0) specified in the order given in the order of battle are required as input data.

E. Sample PIP input deck:

```
//  ( Green JOB Card, TIME=2 )
//  EXEC NVTECGO,NAME=PIP,REGION=200K
//STEPLIB DD DSN=F0559.PIP,UNIT=3330,VOL=SER=DISK02,DISP=SHR
//FT06F001 DD SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=3325)
//GO.FT07F001 DD SYSOUT=B
//GO.SYSIN DD*
0.        500.      450.
500.      500.      440.
900.      600.      445.
(etc., until all milestones are described)
99999.
232.0     2511111111    500.0
14800.    9000.     20.
16200.    8200.     10.
(etc., until all six AAA locations are described)
/*
```

F. When the P001 input deck punched by PIP is received, put the green JOB card used for PIP on top of the deck and an orange /* (EOF) card on the bottom of the deck and read it through the card reader. The output of this deck will be a combat survivability analysis for the given flight path and AAA emplacement locations.

APPENDIX B

PIP INPUT DECK LISTING

```
THE FOLLOWING IS AN EXAMPLE OF THE INPUT TO THE P001 INPUT PROGRAM (PIP)
TO BE RUN FROM A LOAD MODULE (DISK 02). THE INPUT UTILIZES THE PRESET
GUN EMPLACEMENT LOCATIONS OPTION AND THE ELECTRONIC WARFARE (JAMMING),
ANTI-JAM AND MULTIPATH SCENARIO OPTIONS. THE CONTROL CARD ALSO SPECIFIES
THAT THE OUTPUT BE LISTED, PUNCHED AND PLOTTED. THERE ARE 20 MILESTONES,
MILESTONE 15 IS THE BOMB RELEASE MILESTONE AND THE CRUISE SPEED IS
SPECIFIED AS 232.0 METERS PER SECOND.  THE EXTENDED OUTPUT OPTION IS
SPECIFIED.
```

```
//   ( GREEN JOB CARD )
// EXEC NVTECGO,NAME=PIP
//STEPLIB DD DSN=F0559.PIP,UNIT=3330,VOL=SER=DISK02,DISP=SHR
//FT06F001 DD SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=3325)
//GO.FT07F001 DD  SYSOUT=B
//GO.SYSIN DD *
0.          500.        457.
1386.       399.        423.
2742.       436.        434.
4054.       155.        374.
5406.       338.        421.
6762.       438.        436.
8129.       349.        380.
9508.       589.        412.
10767.      1122.       448.
11588.      1934.       455.
12054.      2378.       1880.
12844.      3114.       2130.
13525.      4236.       2120.
14050.      5488.       1698.
14097.      6922.       914.
15127.      7738.       606.
16479.      8466.       562.
17619.      9480.       474.
17881.      10972.      456.
17872.      11894.      457.
99999.      232.0   1511101111  500.0
/*
```

THE FOLLOWING IS THE OUTPUT FROM THE P001 INPUT PROGRAM (PIP) UTILIZING
THE PRESET GUN EMPLACEMENT LOCATIONS AND THE ELECTRONIC WARFARE (JAMMING),
ANTI-JAM, MULTIPATH AND EXTENDED OUTPUT OPTIONS:

```
// EXEC PGM=P1EW,REGION=200K
//STEPLIB DD DSN=F0559.P1EW,UNIT=3330,VOL=SER=DISK02,DISP=SHR
//FT06F001 DD SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=3325)
//GO.FT04F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//      DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FT07F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//      DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FT08F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//      DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FT09F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//      DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//FT11F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//      DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FT05F001 DD *

01  AIRCRAFT COMBAT SURVIVABILITY SCENARIO
02     12          114.73   0.1147
     0.0       0.0   500.0   457.0   231.3   -16.9    -5.7   355.8    -1.4     0.0
     6.0    1386.0   399.0   423.0   231.7   -16.9     1.9   355.8     0.5    21.6
    11.8    2742.0   436.0   434.0   231.8     6.3   -10.4     1.6    -2.6   -44.0
    17.6    4054.0   155.0   374.0   227.4   -48.7     8.0   347.9     2.0    54.8
    23.5    5406.0   338.0   421.0   230.0    31.1     2.6     7.7     0.6   -13.8
    29.3    6762.0   438.0   436.0   231.1    17.0    -9.5     4.2    -2.3   -29.2
    35.2    8129.0   349.0   380.0   232.0   -15.1     5.3   356.3     1.3    43.6
    41.3    9508.0   589.0   412.0   228.6    39.8     6.1     9.9     1.5    41.8
    47.2   10767.0  1122.0   448.0   213.4    90.3     1.4    22.9     0.3    56.7
    52.2   11588.0  1934.0   455.0    67.8    67.1   211.2    44.7    65.7    -4.7
    59.4   12054.0  2378.0  1880.0   139.1   132.5    44.5    43.6    13.0    -1.8
    65.0   12844.0  3114.0  2130.0   147.1   137.1    -1.5    43.0    -0.4    45.6
    71.4   13529.0  4236.0  2120.0   103.5   169.5   -61.8    58.6   -17.3    27.4
    78.1   14050.0  5488.0  1698.0    73.4   176.5  -104.5    67.4   -28.7    51.1
    85.4   14097.0  6922.0   914.0     7.3   224.1   -52.6    88.1   -13.2   -70.4
    91.2   15127.0  7738.0   606.0   183.2   145.1    -6.7    38.4    -1.6   -35.8
    97.8   16479.0  8466.0   562.0   205.6   110.7   -13.5    28.3    -3.3    40.2
   104.3   17619.0  9480.0   474.0   175.1   155.7    -2.8    41.7    -0.7    67.8
   110.8   17881.0 10972.0   456.0    40.5   230.5     0.3    80.0     0.1    34.1
   114.7   17872.0 11894.0   457.0    40.4   230.2     0.0    80.0     0.0     0.0
/*
//GO.FT05F002 DD *
03          14800.    9000.      40.
```

```
04 11111
05     11.0
06    1 S 11.473   22.946   34.419   45.893   57.366   68.839   80.312   91.785 103.258
07   VULNERABLE AREA TABLE VS TYPE 1 AND 2 WEAPONS
    0.464    0.464    7.107    7.107    7.107    7.107    7.107    7.107
    0.657    0.657    5.551    5.551    5.551    5.551    5.551    5.551
    0.697    0.697    5.574    5.574    5.574    5.574    5.574    5.574
    0.657    0.657    7.357    7.357    7.357    7.357    7.357    7.357
    0.697    0.697    5.574    5.574    5.574    5.574    5.574    5.574
    0.657    0.657    5.551    5.551    5.551    5.551    5.551    5.551
    0.697    0.697    5.574    5.574    5.574    5.574    5.574    5.574
    0.657    0.657    7.357    7.357    7.357    7.357    7.357    7.357
    0.697    0.697    5.574    5.574    5.574    5.574    5.574    5.574
    0.464    0.464    0.743    0.743    0.743    0.743    0.743    0.743
    0.657    0.657    2.858    2.858    2.858    2.858    2.858    2.858
    0.464    0.464    3.298    3.298    3.298    3.298    3.298    3.298
    0.657    0.657    2.858    2.858    2.858    2.858    2.858    2.858
    0.464    0.464    0.743    0.743    0.743    0.743    0.743    0.743
    0.657    0.657    2.858    2.858    2.858    2.858    2.858    2.858
    0.464    0.464    3.298    3.298    3.298    3.298    3.298    3.298
    0.657    0.657    2.858    2.858    2.858    2.858    2.858    2.858
    0.657    0.657    5.551    5.551    5.551    5.551    5.551    5.551
    0.697    0.697    5.574    5.574    5.574    5.574    5.574    5.574
    0.657    0.657    7.357    7.357    7.357    7.357    7.357    7.357
    0.697    0.697    5.574    5.574    5.574    5.574    5.574    5.574
    0.657    0.657    5.551    5.551    5.551    5.551    5.551    5.551
    0.697    0.697    5.574    5.574    5.574    5.574    5.574    5.574
    0.657    0.657    7.357    7.357    7.357    7.357    7.357    7.357
    0.697    0.697    5.574    5.574    5.574    5.574    5.574    5.574
    0.464    0.464    7.107    7.107    7.107    7.107    7.107    7.107
12111111
03          16200.    8200.      40.
12111111
03          13600.    7200.      20.
04 21111
12111111
03          13400.    8000.      20.
12111111
03          11300.    9700.      50.
04 34411
07   VULNERABLE AREA TABLE VS TYPE 3 WEAPONS
   12.540   12.540   13.470   13.470   13.470   13.470   13.470   13.470
    9.853    9.853   10.510   10.510   10.510   10.510   10.510   10.510
    9.639    9.639   11.150   11.150   11.150   11.150   11.150   11.150
   12.640   12.640   14.780   14.780   14.780   14.780   14.780   14.780
    9.639    9.639   11.150   11.150   11.150   11.150   11.150   11.150
    9.853    9.853   10.510   10.510   10.510   10.510   10.510   10.510
    9.639    9.639   11.150   11.150   11.150   11.150   11.150   11.150
```

```
 12.640  12.640  14.780  14.780  14.780  14.780  14.780  14.780
  9.639   9.639  11.150  11.150  11.150  11.150  11.150  11.150
  1.394   1.394   1.394   1.394   1.394   1.394   1.394   1.394
  4.762   4.762   6.240   6.240   6.240   6.240   6.240   6.240
  5.342   5.342   7.432   7.432   7.432   7.432   7.432   7.432
  4.762   4.762   6.240   6.240   6.240   6.240   6.240   6.240
  1.394   1.394   1.394   1.394   1.394   1.394   1.394   1.394
  4.762   4.762   6.240   6.240   6.240   6.240   6.240   6.240
  5.342   5.342   7.432   7.432   7.432   7.432   7.432   7.432
  4.762   4.762   6.240   6.240   6.240   6.240   6.240   6.240
  9.853   9.853  10.510  10.510  10.510  10.510  10.510  10.510
  9.639   9.639  11.150  11.150  11.150  11.150  11.150  11.150
 12.640  12.640  14.780  14.780  14.780  14.780  14.780  14.780
  9.639   9.639  11.150  11.150  11.150  11.150  11.150  11.150
  9.853   9.853  10.510  10.510  10.510  10.510  10.510  10.510
  9.639   9.639  11.150  11.150  11.150  11.150  11.150  11.150
 12.640  12.640  14.780  14.780  14.780  14.780  14.780  14.780
  9.639   9.639  11.150  11.150  11.150  11.150  11.150  11.150
 12.540  12.540  13.470  13.470  13.470  13.470  13.470  13.470
14  1  5  0 1.0          500.0     1.0E-06       1              1.0              1        3.00
GEND
  19    7    90.0      180.0     1000.0
 1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000
 1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000
 1000.000  1000.000  1000.000
  100.000   100.000   100.000   100.000   100.000   100.000   100.000   100.000
  100.000   100.000   100.000   100.000   100.000   100.000   100.000   100.000
  100.000   100.000   100.000
    0.273     0.178     0.053     0.023     0.156     0.166     0.063     0.173
    0.235     0.047     0.020     0.015     0.011     0.073     0.072     0.019
    0.028     0.110     0.454
    0.005     0.005     0.007     0.011     0.093     0.093     0.039     0.068
    0.112     0.032     0.019     0.015     0.009     0.035     0.032     0.017
    0.033     0.102     0.509
    0.273     0.178     0.053     0.023     0.156     0.166     0.063     0.173
    0.235     0.047     0.020     0.015     0.011     0.073     0.072     0.019
    0.028     0.110     0.454
  100.000   100.000   100.000   100.000   100.000   100.000   100.000   100.000
  100.000   100.000   100.000   100.000   100.000   100.000   100.000   100.000
  100.000   100.000   100.000
 1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000
 1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000
 1000.000  1000.000  1000.000
12111111
03          15600.   10900.      90.
04 33411
13  1     1 0.35
12111111
```

```
03          12800.    7500.      20.
04  53211
07   VULNERABLE AREA TABLE VS TYPE 5 WEAPON
  55.370   55.370   55.370   55.370   55.370   55.370   55.370   55.370
  43.220   43.220   43.220   43.220   43.220   43.220   43.220   43.220
  47.100   47.100   47.100   47.100   47.100   47.100   47.100   47.100
  62.530   62.530   62.530   62.530   62.530   62.530   62.530   62.530
  47.100   47.100   47.100   47.100   47.100   47.100   47.100   47.100
  43.220   43.220   43.220   43.220   43.220   43.220   43.220   43.220
  47.100   47.100   47.100   47.100   47.100   47.100   47.100   47.100
  62.530   62.530   62.530   62.530   62.530   62.530   62.530   62.530
  47.100   47.100   47.100   47.100   47.100   47.100   47.100   47.100
   5.761    5.761    5.761    5.761    5.761    5.761    5.761    5.761
  27.450   27.450   27.450   27.450   27.450   27.450   27.450   27.450
  33.070   33.070   33.070   33.070   33.070   33.070   33.070   33.070
  27.450   27.450   27.450   27.450   27.450   27.450   27.450   27.450
   5.761    5.761    5.761    5.761    5.761    5.761    5.761    5.761
  27.450   27.450   27.450   27.450   27.450   27.450   27.450   27.450
  33.070   33.070   33.070   33.070   33.070   33.070   33.070   33.070
  27.450   27.450   27.450   27.450   27.450   27.450   27.450   27.450
   5.761    5.761    5.761    5.761    5.761    5.761    5.761    5.761
  47.100   47.100   47.100   47.100   47.100   47.100   47.100   47.100
  62.530   62.530   62.530   62.530   62.530   62.530   62.530   62.530
  47.100   47.100   47.100   47.100   47.100   47.100   47.100   47.100
  43.220   43.220   43.220   43.220   43.220   43.220   43.220   43.220
  47.100   47.100   47.108   47.100   47.100   47.100   47.100   47.100
  62.530   62.530   62.530   62.530   62.530   62.530   62.530   62.530
  47.100   47.100   47.100   47.100   47.100   47.100   47.100   47.100
  55.370   55.370   55.370   55.370   55.370   55.370   55.370   55.370
13   1     2 0.35
14   1   5 0 1.0          500.0     1.0E-06      1              1.0              3      17.00
GEND
    19     7     90.0      180.0     1000.0
 1000.000 1000.000 1000.000 1000.000 1000.000 1000.000 1000.000 1000.000
 1000.000 1000.000 1000.000 1000.000 1000.000 1000.000 1000.000 1000.000
 1000.000 1000.000 1000.000
  100.000  100.000  100.000  100.000  100.000  100.000  100.000  100.000
  100.000  100.000  100.000  100.000  100.000  100.000  100.000  100.000
  100.000  100.000  100.000
    0.273    0.178    0.053    0.023    0.156    0.166    0.063    0.173
    0.235    0.047    0.020    0.015    0.011    0.073    0.072    0.019
    0.028    0.110    0.454
    0.005    0.005    0.007    0.011    0.093    0.093    0.039    0.068
    0.112    0.032    0.019    0.015    0.009    0.035    0.032    0.017
    0.033    0.102    0.509
    0.273    0.178    0.053    0.023    0.156    0.166    0.063    0.173
    0.235    0.047    0.020    0.015    0.011    0.073    0.072    0.019
    0.028    0.110    0.454
```

```
   100.000   100.000   100.000   100.000   100.000   100.000   100.000   100.000
   100.000   100.000   100.000   100.000   100.000   100.000   100.000   100.000
   100.000   100.000   100.000
  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000
  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000  1000.000
  1000.000  1000.000  1000.000
121111111
/*
//GO.FT05F003 DD *
/*
```

(NEW PAGE)

***** P001 FLIGHT PATH SCENARIO SUMMARY *****

THE FLIGHT PATH CONSISTS OF 20 MILESTONES WITH A TOTAL FLIGHT TIME OF
114.5 SECONDS. BOMB RELEASE IS AT MILESTONE 15.

***** OPTION SUMMARY *****

CRUISE SPEED IS 232.0 METERS PER SECOND.
A P001 INPUT LISTING IS PROVIDED AS OUTPUT.
A PUNCHED DECK IS PROVIDED AS OUTPUT.
A SCENARIO PLOT IS PROVIDED AS OUTPUT.
EXTENDED PRINTOUT IS PROVIDED AS OUTPUT.
PRESET GUN EMPLACEMENT LOCATIONS ARE UTILIZED.
AN AIRBORNE JAMMER IS BEING UTILIZED.
JAMMER POWER IS 500.0 WATTS.
ANTI-JAM FEATURE IS UTILIZED WHERE APPROPRIATE.
MULTIPATH RADAR EFFECTS ARE CONSIDERED.

***** FLIGHT PATH ERRORS *****

***** NO FLIGHT PATH ERRORS IN THIS RUN *****

***** END OF P001 INPUT PROGRAM - SUMMARY COMPLETE *****

APPENDIX D

P001 INPUT GUIDE CHANGES

Revisions to P001:

1. Delete card 7A and 7B.

2. Insert cards 13 and 14 as given on the following pages.

3. The following list is given as an aid to facilitate the assignment of valid combinations of gun type, mode and operating characteristics to the ECM and multipath options:

Gun Type (IGT)	Mode (IEM)	Radar ID (IRECM)	IRMP	Option
1	1	-	-	-
2	1	-	-	-
3	1	-	-	-
3	2	-	-	-
3	3	-	-	-
3	3	1	-	Jam
3	3	1	1	Jam, Multipath
3	4	-	-	-
3	4	1	-	Jam
4	1	-	-	-
5	1	-	-	-
5	2	-	-	-
5	3	-	-	-
5	3	2	-	Jam
5	3	2	2	Jam, Multipath
5	3	3	-	Jam, Anti-jam
5	3	3	2	Jam, Anti-jam, Multipath
5	3	4	-	Jam
5	3	4	3	Jam, Multipath
5	4	-	-	-
5	4	2	-	Jam
5	4	3	-	Jam, Anti-jam
5	4	4	-	Jam

Radar Multipath Input Parameters					CARD: 13
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	I	ND	I2	1-2	Data group identification code. I=13 indicates that the remainder of the card contains radar multipath parameters.
B	ICARD	ND	7A10,A8	3-80	Seventy-eight columns of alphameric data to be decoded and assigned as follows:
B1	IMUL	ND	I3	3-5	IMUL=0, no multipath. Turn off multipath if previously used. IMUL=1, multipath desired.
B2	IRMP	ND	I5	6-10	Radar type ID. Specifies the tracking radar.
B3	REFC	ND	F10.0	11-20	Reflection coefficient. 0.35 is a typical value for terrain with vegetation.

NOTE: Multipath effects can only be applied to a system with a Mode ID (IEM) of 3.

The value of IRMP selects the appropriate radar parameters:

IRMP	Beamwidth (deg)	Squint Angle (deg)	Calibration Constant
1	1.4	0.5	0.759
2	1.8	0.6	1.06
3	4.5	1.4	2.74

CARD: 13

Radar Multipath Input Parameters					CARD: 13
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
					The following table gives the relationship between the Radar ID (IRECM) and the corresponding radar parameters (IRMP):

Radar ID (IRECM)	IRMP
1	1
2,3	2
4	3

CARD: 13

ECM (Jamming) Input Parameters					CARD: 14
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
A	I	ND	I2	1-2	Data group identification code. I=14 indicates that the remainder of the card contains ECM parameters.
B	ICARD	ND	7A10,A8	3-80	Seventy-eight columns of alphameric data to be decoded and assigned as follows:
B1	IJAM	ND	I3	3-5	Jamming switch. 0=no jamming; 1=jamming; card must be reread with IJAM=0 to turn jamming off.
B2	IP	ND	I3	6-8	IP=0, no J/S printout. IP=n, print every nth value.
B3	IJ	ND	I2	9-10	IJ=0; then GAINJ is antenna gain of jammer.
B4	GAINJ	ND	F10.0	11-20	IJ=1; a 37x37 5^{o} jammer table follows. Gain is in dB.
B5	PJW	watts	F10.0	21-30	Jammer power in watts.
B6	PLEN	sec	F10.0	31-40	Length of jammer cover pulse. Needed when IRECM=3. 1 microsecond is a standard value.
B7	IX	ND	I5	41-45	IX=0; no cross section table is needed.
B8	XSEC	m^2	F10.0	46-55	A constant cross section of XSEC m^2 is used.
B9	CALX	ND	F10.0	56-65	IX=1, a cross section table will be read following the 14 card and a possible jammer table. The cross section table values will be multiplied by CALX. This allows the user to scale the cross section. If not used, it must be set to 1.

CARD: 14

ECM (Jamming) Input Parameters					CARD: 14
ID	PARA	UNITS	FORMAT	COLUMNS	DESCRIPTION
B10	IRECM	ND	I5	66-70	Radar type. This index calls up the following constants from a data statement:
B11	SJTMAX	dB	F10.0	71-80	Threshold where tracking errors become significant. (dB)

IRECM	Gain (RGDB)	Power (PRW)	Frequency (FREQ)	SJTMAX*
1	40.0 dB	150,000	15.1E9	3 dB
2,3	38.5 dB	175,000	9.38E9	1.5, 17 dB
4	28.0 dB	250,000	2.838E9	0 dB

*SJTMAX must be entered as in B11.

NOTE: The following table summarizes the valid combinations of radars, gun types and tracking modes:

Radar ID (IRECM)	Gun ID (IGT)	Mode ID (IEM)
1	3	3,4
2,3	5	3,4
4	5	3,4

The two ID's on the second radar indicate the anti-jam capability.

IRECM = 2, anti-jam off

IRECM = 3, anti-jam on

CARD: 14

APPENDIX E

JCL CARD SETUPS FOR REFERENCES

THE FOLLOWING CARDS ARE THE SETUP TO RUN THE P001 INPUT PROGRAM (PIP)
FROM BATCH, UTILIZING THE CALCOMP PLOTTER:

```
//   ( GREEN JOB CARD )
//   EXEC FORTCLGP
//FTC7F001 DD SYSCUT=B
//FORT.SYSIN DD *
   ( PROGRAM SOURCE CARDS GO HERE      )
/*
//GO.SYSIN DD *
   ( DATA DECK GOES HERE               )
/*
```

THE FOLLOWING CARDS ARE THE SETUP TO RUN THE P001 INPUT PROGRAM (PIP)
FROM BATCH, UTILIZING THE VERSATEC PLOTTER:

```
//   ( GREEN JOB CARD )
//   EXEC FORTCLGV
//FORT.SYSIN DD *
  ( PROGRAM SOURCE CARDS GO HERE       )
/*
//GO.FT07F001 DD  SYSOUT=B
//GO.SYSIN DD *
  ( DATA DECK GOES HERE       )
/*
```

THE FOLLOWING CARDS ARE THE SETUP TO CREATE A LOAD MODULE FOR THE PC01 INPUT PROGRAM (PIP):

```
//   ( GREEN JOB CARD )
// EXEC NWTECLNK
//FORT.SYSIN DD *
  ( PROGRAM SOURCE CARDS GO HERE       )
/*
//LINK.SYSLMOD DD DSN=F0559.PIP,SPACE=(CYL,(2,1,1)),
//  UNIT=3330,VOL=SER=DISK02,DISP=(NEW,KEEP),
//  LABEL=EXPDT=99360
//LINK.SYSIN DD *
 ENTRY MAIN
 NAME PIP(R)
/*
```

THE FOLLOWING CARDS ARE THE SETUP TO RUN THE P001 INPUT PROGRAM (PIP)
FROM A LOAD MODULE, UTILIZING THE VERSATEC PLOTTER.

```
//   ( GREEN JOB CARD )
// EXEC NVTECGO,NAME=PIP,REGION=200K
//STEPLIB DD DSN=F0559.PIP,UNIT=3330,VOL=SER=DISK02,DISP=SHR
//FT06F001 DD SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=3325)
//GO.FT07F001 DD  SYSOUT=B
//GO.SYSIN DD *
  ( DATA DECK GOES HERE      )
/*
```

THE FOLLOWING CARDS ARE THE SETUP TO REMOVE THE PC01 INPUT PROGRAM (PIP) FROM DISK 02:

```
//(  JOB CARD  )
//SCRATCH EXEC PGM=IEHPROGM
//SYSPRINT DD SYSOUT=A
//DD1 DD UNIT=3330,VOL=SER=DISK02,DISP=OLD
//SYSIN DD *
 SCRATCH DSNAME=F0559.PIP,VOL=3330=DISK02,PURGE
/*
```

THE FOLLOWING CARDS ARE THE SETUP TO RUN THE IMPRCVED P001 AAA SIMULATICN PROGRAM (P1EW) FRCM BATCH:

```
//   ( GREEN JOB CARD )
//    EXEC   FORTCLG,REGICN.GO=250K
//FORT.SYSIN DD *
  ( PROGRAM SOURCE CARDS GO HERE       )
/*
//GO.FTC4F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//   DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FTC7F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//   DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FTC8F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//   DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FTC9F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//   DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FT11F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//   DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FTC5F001 DD *
  ( DATA DECK GOES HERE       )
/*
```

THE FOLLOWING CARDS ARE THE SETUP TO CREATE A LOAD MODULE FOR THE IMPROVED POOL AAA SIMULATION PROGRAM (P1EW):

```
//   ( GREEN JOB CARD )
// EXEC FORTCL
//FORT.SYSIN DD *
  ( PROGRAM SOURCE CARDS GO HERE       )
/*
//LINK.SYSLMOD DD DSN=F0559.P1EW,SPACE=(CYL,(2,1,1)),
// UNIT=3330,VOL=SER=DISK02,DISP=(NEW,KEEP),
// LABEL=EXPDT=99360
//LINK.SYSIN DD *
 ENTRY MAIN
 NAME P1EW(R)
/*
```

THE FOLLOWING CARDS ARE THE SETUP TO RUN THE IMPROVED P001 AAA SIMULATION PROGRAM (P1EW) FROM A LOAD MODULE:

```
//   ( GREEN JOB CARD )
// EXEC PGM=P1EW,REGION=200K
//STEPLIB DD DSN=F0559.P1EW,UNIT=3330,VOL=SER=DISK02,DISP=SHR
//FT06F001 DD SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=3325)
//GO.FT04F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//   DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FT07F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//   DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FT08F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//   DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FT09F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//   DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FT11F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),
//   DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)
//GO.FT05F001 DD *
  ( DATA DECK GOES HERE      )
/*
```

THE FOLLOWING CARDS ARE THE SETUP TO REMOVE P1EW FROM DISK 02:

```
//(  JOB CARD  )
//SCRATCH EXEC PGM=IEHPROGM
//SYSPRINT DD SYSOUT=A
//DD1 DD UNIT=3330,VOL=SER=DISK02,DISP=OLD
//SYSIN DD *
 SCRATCH DSNAME=F0559.P1EW,VOL=3330=DISK02,PURGE
/*
```

APPENDIX F

P001 ANALYSIS OUTPUT

MASK ANGLE FOR THIS RUN = 0.0 DEG.

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TIME	XXX	YYY	ZZZ	SPEED	XDOT	YDOT	ZDOT	HEADING	CLIMB	ROLL
0.0	0.0	500.0	457.C	231.99	231.3C	-16.90	-5.70	-4.2C	-1.40	0.0
1.38	317.9	476.8	449.2	232.06	231.35	-16.90	-3.56	-4.2C	-0.96	4.96
2.75	635.5	453.7	441.4	232.14	231.48	-16.90	-2.21	-4.2C	-0.5?	9.91
4.13	953.8	430.5	433.6	232.22	231.58	-16.90	-1.47	-4.2C	-0.03	14.97
5.51	1271.6	407.3	425.8	232.30	231.67	-16.90	1.27	-4.2C	0.34	19.82
6.88	1592.2	404.6	424.7	232.29	231.72	-13.37	0.02	-3.32	0.03	11.62
8.26	1914.0	413.4	427.3	232.24	231.74	-7.87	-2.85	-1.94	-0.71	-2.94
9.63	2235.8	422.2	429.5	232.20	231.76	-2.36	-5.31	-0.57	-1.45	-15.81
11.01	2557.6	431.0	432.5	232.15	231.75	3.14	-8.73	0.81	-2.19	-25.23
12.39	2874.9	407.5	427.9	232.11	231.86	0.73	-8.64	0.21	-2.13	-25.29
13.76	3186.3	340.8	413.7	230.31	230.31	-12.33	-4.17	-3.04	-1.04	-10.54
15.14	3497.6	274.2	399.4	228.45	225.27	-25.33	0.20	-6.29	0.05	12.90
16.52	3809.C	207.5	385.2	229.59	228.22	-38.43	4.56	-9.54	1.14	34.35
17.89	4121.2	164.1	376.3	232.66	227.53	-44.73	7.73	-11.12	1.93	51.30
19.27	4436.6	206.8	387.3	232.53	228.14	-26.12	6.47	-6.50	1.60	35.39
20.65	4752.C	249.5	398.3	232.39	228.74	-7.50	5.21	-1.88	1.29	19.39
22.02	5067.4	292.2	409.2	232.25	229.35	11.11	3.95	2.74	0.95	3.38
23.40	5382.8	334.9	420.2	232.12	229.96	29.73	2.69	7.36	0.62	-12.62
24.78	5704.1	360.C	424.3	232.07	230.24	29.00	-0.06	6.99	-0.04	-17.19
26.15	6025.9	383.7	427.9	232.02	230.50	24.65	-2.93	6.10	-0.73	-20.34
27.53	6347.7	407.4	431.4	231.98	230.76	21.31	-5.80	5.27	-1.41	-24.48
28.90	6669.5	431.2	435.C	231.93	231.02	17.96	-8.67	4.44	-2.10	-29.15
30.28	6989.2	423.2	426.7	232.02	231.25	11.66	-7.04	2.83	-1.70	-17.10
31.66	7308.1	404.4	417.6	232.17	231.46	4.18	-3.59	1.04	-0.85	-0.11
33.03	7627.1	381.7	408.6	232.32	231.67	-3.31	-0.12	-0.80	-0.02	16.07
34.41	7946.0	360.9	387.5	232.47	231.88	-10.80	3.32	-2.64	0.82	33.25
35.79	8261.6	372.1	383.1	232.51	231.07	-9.82	5.28	-2.35	1.32	43.45
37.16	8572.7	426.2	390.3	232.41	230.91	2.57	5.56	0.63	1.36	43.02
38.54	8883.9	480.4	397.5	232.31	230.14	14.95	5.74	3.74	1.41	42.61
39.92	9195.0	534.5	404.7	232.22	229.37	27.34	5.92	6.81	1.45	42.21
41.29	9506.2	588.7	412.0	232.12	228.60	39.73	6.10	9.89	1.50	41.80
42.67	9800.C	712.6	420.3	232.03	225.07	51.51	5.01	12.92	1.22	45.22
44.04	10093.7	837.0	428.7	231.93	221.53	63.29	3.91	15.85	0.94	48.73
45.42	10387.4	961.3	437.1	231.84	217.98	75.07	2.82	18.78	0.66	52.21
46.80	10681.1	1085.6	445.5	231.75	214.44	86.86	1.72	22.01	0.39	55.68
48.17	10926.9	1280.2	449.4	231.73	185.04	95.73	42.27	27.15	13.04	44.74
49.55	11152.9	1506.7	451.3	231.73	144.96	73.39	100.02	33.15	31.04	27.84
50.93	11378.9	1727.2	453.2	231.74	104.88	73.01	157.78	39.15	39.05	10.94
52.30	11594.7	1940.4	475.4	231.25	68.82	69.04	209.81	44.64	44.04	-4.66
53.68	11683.8	2025.2	747.8	224.64	82.45	89.54	176.54	44.47	44.87	-4.10
55.06	11772.6	2110.1	1022.2	213.04	96.08	82.04	145.08	44.26	44.80	-3.55
56.43	11861.5	2195.0	1262.7	211.43	109.71	105.54	113.21	44.05	44.72	-3.00
57.81	11951.0	2279.5	1565.1	204.83	123.24	118.05	81.34	45.64	24.65	-2.44
59.19	12040.1	2364.6	1937.5	199.22	136.97	130.55	49.47	42.62	14.57	-1.89
60.56	12217.5	2530.7	1931.9	196.00	140.76	133.45	34.66	43.48	10.22	8.08
61.94	12412.0	2711.6	1963.3	196.96	142.72	134.88	23.65	43.93	8.53	10.63
63.31	12606.2	2892.5	2054.7	199.92	144.65	135.72	12.95	45.18	9.63	21.33
64.69	12800.4	3072.4	2116.2	200.87	146.60	136.85	1.04	45.64	0.94	42.99
66.07	12996.2	3301.1	2128.3	202.24	135.83	142.50	-11.65	45.63	-3.22	42.67
67.44	13195.5	3542.4	2126.2	203.73	130.45	149.47	-24.52	41.96	-6.85	38.65
68.82	13392.9	3785.7	2124.0	205.21	121.08	156.44	-37.45	37.21	-10.49	34.74
70.20	13400.2	4025.0	2121.9	206.70	111.70	163.41	-50.46	55.67	-14.12	30.82
71.57	13542.4	4266.3	2109.1	208.25	102.12	169.68	-62.56	58.83	-17.59	28.01
72.95	13649.5	4525.5	2022.4	210.27	96.54	171.12	-71.67	60.62	-19.94	32.89

AFATL P-001 AAASIM * AIRCRAFT COMBAT SURVIVABILITY SCENARIO *

TIME	XXX	YYY	ZZZ	SPEED	XDOT	YDOT	ZDOT	HEADING	CLIMB	ROLL
74.33	13755.5	4782.7	1925.7	212.30	90.36	172.56	-90.45	62.44	-22.28	37.75
75.70	13863.5	5039.9	1849.0	214.32	84.17	173.99	-89.22	64.25	-24.62	42.52
77.08	13970.6	5297.1	1762.3	216.35	77.99	175.43	-87.99	66.06	-26.96	47.45
78.45	14052.3	5557.7	1659.9	218.46	70.15	176.81	-101.98	68.41	-27.95	45.20
79.83	14061.1	5828.1	1512.1	220.81	57.72	167.79	-92.19	72.51	-26.02	22.29
81.21	14070.0	6098.4	1364.3	223.15	45.26	196.76	-82.41	77.21	-22.10	-0.62
82.58	14078.9	6368.8	1216.4	225.50	32.80	205.74	-72.62	80.11	-19.18	-23.53
83.96	14087.7	6635.2	1068.6	227.85	20.34	214.71	-62.84	84.02	-16.26	-46.45
85.34	14335.6	6909.6	920.8	230.20	7.87	223.68	-53.05	87.92	-13.35	-69.35
86.71	14530.2	7180.7	941.3	231.10	47.13	206.21	-42.21	76.15	-10.57	-62.57
88.09	14574.6	7300.4	771.2	231.92	88.67	167.47	-31.32	65.05	-7.32	-54.36
89.47	14819.1	7494.0	698.1	232.75	130.61	168.72	-20.42	59.26	-5.07	-46.14
90.84	15065.5	7687.7	625.0	233.58	172.35	149.97	-9.53	41.46	-2.32	-37.93
92.22	15335.7	7850.4	599.2	233.81	186.66	139.79	-7.75	36.04	-1.76	-34.07
93.60	15617.6	8002.2	590.0	233.83	191.23	132.62	-2.17	34.73	-2.22	-8.22
94.97	15899.6	8154.0	580.9	233.85	196.00	125.44	-10.59	32.73	-2.57	-7.63
96.35	16181.6	8305.8	571.7	233.88	200.67	118.27	-17.00	30.59	-2.93	23.49
97.72	16463.5	8457.7	562.5	233.90	205.34	111.09	-17.42	28.42	-3.28	39.32
99.10	16707.1	8668.9	544.4	233.98	189.50	115.71	-11.36	30.63	-2.78	46.72
100.48	16948.5	8883.6	525.8	234.08	193.64	129.23	-9.09	33.87	-2.23	51.57
101.85	17189.9	9098.4	507.1	234.17	186.58	136.76	-6.83	36.66	-1.68	57.41
103.23	17431.3	9313.1	488.5	234.26	180.12	148.29	-4.56	39.43	-1.13	63.26
104.61	17631.3	9550.3	473.2	234.32	168.76	159.23	-2.65	43.51	-0.65	66.21
105.98	17686.8	9866.3	469.3	234.25	140.25	175.06	-2.00	51.62	-0.49	55.08
107.36	17742.3	10182.2	465.5	234.19	111.75	190.90	-1.34	58.72	-0.32	51.54
108.74	17797.6	10498.1	461.7	234.13	83.25	206.74	-0.66	67.84	-0.16	44.99
110.11	17853.3	10814.1	457.9	234.06	54.75	222.58	-0.03	85.69	0.02	37.67
111.49	17879.4	11134.7	456.2	233.98	40.48	230.45	0.25	80.00	0.08	28.09
112.86	17876.2	11460.1	456.5	233.87	40.45	230.34	0.14	80.00	0.06	16.05
114.24	17873.1	11785.5	456.9	233.76	40.41	230.24	0.04	80.00	0.01	4.01

XR= 0.0 YR= 0.0 XT= 0.0 YT= 0.0 PS= 0.0 CZ= 0.0

10 TIME INTERVALS FOR PK ACCUMULATION

0.00 11.47 22.95 34.42 45.89 57.37 68.84 80.31 91.78 103.26 999.99

VULNERABLE AREA (SQ. METERS) AS A FUNCTION OF IMPACT SPEED (METERS/SEC) AND ASPECT VIEW
VULNERABLE AREA TABLE VS TYPE 1 AND 2 WEAPONS

VIEW	0	152	305	457	610	762	914	1067	1219
1	0.00	0.46	0.46	7.11	7.11	7.11	7.11	7.11	7.11
2	0.00	0.66	0.66	5.55	5.55	5.55	5.55	5.55	5.55
3	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
4	0.00	0.66	0.66	7.36	7.36	7.36	7.36	7.36	7.36
5	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
6	0.00	0.66	0.66	5.55	5.55	5.55	5.55	5.55	5.55
7	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
8	0.00	0.66	0.66	7.36	7.36	7.36	7.36	7.36	7.36
9	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
10	0.00	0.46	0.46	0.74	0.74	0.74	0.74	0.74	0.74
11	0.00	0.66	0.66	2.86	2.86	2.86	2.86	2.86	2.86
12	0.00	0.46	0.46	3.30	3.30	3.30	3.30	3.30	3.30
13	0.00	0.66	0.66	2.86	2.86	2.86	2.86	2.86	2.86
14	0.00	0.46	0.46	0.74	0.74	0.74	0.74	0.74	0.74
15	0.00	0.66	0.66	2.86	2.86	2.86	2.86	2.86	2.86
16	0.00	0.46	0.46	3.30	3.30	3.30	3.30	3.30	3.30
17	0.00	0.66	0.66	2.86	2.86	2.86	2.86	2.86	2.86
18	0.00	0.66	0.66	5.55	5.55	5.55	5.55	5.55	5.55
19	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
20	0.00	0.66	0.66	7.36	7.36	7.36	7.36	7.36	7.36
21	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
22	0.00	0.66	0.66	5.55	5.55	5.55	5.55	5.55	5.55
23	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
24	0.00	0.66	0.66	7.36	7.36	7.36	7.36	7.36	7.36
25	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
26	0.00	0.46	0.46	7.11	7.11	7.11	7.11	7.11	7.11

GT	TIME/ ROUND	MIN ELEV	MAX ELEV	AZIM RATE	ELEV RATE	MAX TOF1	MAX TOF2	MUZZ VEL	BALLISTIC CONSTANT 1	BALLISTIC CONSTANT 2	VEL MIN	VEL MAX	RANGE MIN	RANGE MAX	SMOOTH COAST	MAX.AZ ERROR	MAX.EL ERROR
1	0.750	-10.00	85.00	30.00	25.00	1.60	99.99	840.	0.1802040	0.0123920	0.0	300.0	0.	3000.	9999.99	5.730	5.730
2	0.400	-8.50	90.00	30.00	25.00	2.20	99.99	1000.	0.2514990	-0.0062590	0.0	300.0	400.	3000.	9999.99	5.730	5.730
3	0.200	-10.00	85.00	80.00	45.00	3.80	7.60	930.	0.2296800	-0.0068890	0.0	350.0	500.	3500.	1.33	5.730	5.730
4	0.750	-5.00	85.00	30.00	20.00	4.10	99.99	880.	0.0393210	0.0042620	0.0	250.0	0.	5000.	9999.99	5.730	5.730
5	0.857	-4.00	87.00	30.00	18.00	6.20	11.60	960.	0.0784500	-0.0004210	0.0	300.0	0.	5500.	1.33	5.730	5.730
6	4.000	-3.00	82.00	30.00	20.00	99.99	19.20	800.	0.0506540	-0.0003570	999.9	999.9	99999.	99999.	1.33	5.730	5.730

ECM INPUTS (INITIAL OR CHANGED)

```
IP =              5
IJ =              0
GAINJ(DB) =    1.00
PJW(W) =     500.00
PLEN(S) =   0.0
IX =              1
XSEC(SQM) =     0.0
CALX =          1.000
IRECM =           1
SJTMAX(DB) =   3.00
```

JAMMER ANTENNA GAIN 1.000 DB

AIRCRAFT CROSS SECTION TABLE SPECIFIED. PRINTED VALUES WILL BE MULTIPLIED BY CALX. CALX= 1.00

```
TABLE DATA
   19 ELEMENTS FROM      0.0 IC    180.00 EY     10.00 AZ
    7 ELEMENTS FROM    -90.00 IC    90.00 EY     30.00 EL
   ELSEWHERE TABLE IS  1000.00 IC
```

BCS MATRIX

ELEV	0	10	20	30	40	50	60	70	80	90	100	110	120
-120.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
-90.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
-60.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
-30.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
0.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
30.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
60.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
90.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
120.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00

REF MATRIX

REF V	130	140	150	160	170	180
-120.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
-180.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
-600.0	100.007	100.002	100.002	100.003	100.011	100.045
-300.0	0.007	0.027	0.002	0.003	0.011	0.045
30.0	0.007	0.027	0.002	0.003	0.011	0.045
60.0	100.000	100.000	100.000	100.000	100.000	100.000
90.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
120.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00

VULNERABLE AREA (SQ. METERS) AS A FUNCTION OF IMPACT SPEED (METERS/SEC) AND ASPECT VIEW
VULNERABLE AREA TABLE VS TYPE 3 WEAPONS

VIEW	0	152	305	457	610	762	914	1067	1219
1	0.00	12.54	12.54	13.47	13.47	13.47	13.47	13.47	13.47
2	0.00	9.85	9.85	10.51	10.51	10.51	10.51	10.51	10.51
3	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
4	0.00	12.64	12.64	14.78	14.78	14.78	14.78	14.78	14.78
5	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
6	0.00	9.85	9.85	10.51	10.51	10.51	10.51	10.51	10.51
7	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
8	0.00	12.64	12.64	14.78	14.78	14.78	14.78	14.78	14.78
9	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
10	0.00	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39
11	0.00	4.76	4.76	6.24	6.24	6.24	6.24	6.24	6.24
12	0.00	5.34	5.34	7.43	7.43	7.43	7.43	7.43	7.43
13	0.00	4.76	4.76	6.24	6.24	6.24	6.24	6.24	6.24
14	0.00	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39
15	0.00	4.76	4.76	6.24	6.24	6.24	6.24	6.24	6.24
16	0.00	5.34	5.34	7.43	7.43	7.43	7.43	7.43	7.43
17	0.00	4.76	4.76	6.24	6.24	6.24	6.24	6.24	6.24
18	0.00	9.85	9.85	10.51	10.51	10.51	10.51	10.51	10.51
19	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
20	0.00	12.64	12.64	14.78	14.78	14.78	14.78	14.78	14.78
21	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
22	0.00	9.85	9.85	10.51	10.51	10.51	10.51	10.51	10.51
23	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
24	0.00	12.64	12.64	14.78	14.78	14.78	14.78	14.78	14.78
25	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
26	0.00	12.54	12.54	13.47	13.47	13.47	13.47	13.47	13.47

MULTIPATH INPUTS (INITIAL OR CHANGED

IAMP = 1
REFC = 0.350

MULTIPATH INPUTS (INITIAL OR CHANGED

```
IRMP =          2
REFC =      0.350
```

ECM INPUTS (INITIAL OR CHANGED)

```
IP =            5
IJ =            0
GAINJ(DB) =   1.00
PJW(W) =    500.00
PLEN(S) =   0.0
IX =            1
XSEC(SQM) =     0.0
CALX =          1.000
IRECM =         3
SJTMAX(DB) =  17.00
```

JAMMER ANTENNA GAIN 1.000 DB

AIRCRAFT CROSS SECTION TABLE SPECIFIED. PRINTED VALUES WILL BE MULTIPLIED BY CALX. CALX= 1.00

```
TABLE DATA
   19 ELEMENTS FROM      -0.0 IC      180.00 FY      10.00 AZ
   17 ELEMENTS FROM     -60.0 TO       90.00 FY      30.00 EL
   ELSEWHERE TABLE IS  1000.00
```

AD-A057 907 NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF F/G 19/5
ADAPTATION OF THE IMPROVED ANTIAIRCRAFT ARTILLERY SIMULATION CO--ETC(U)
MAR 78 C F SWENSON

UNCLASSIFIED NL

2 OF 3
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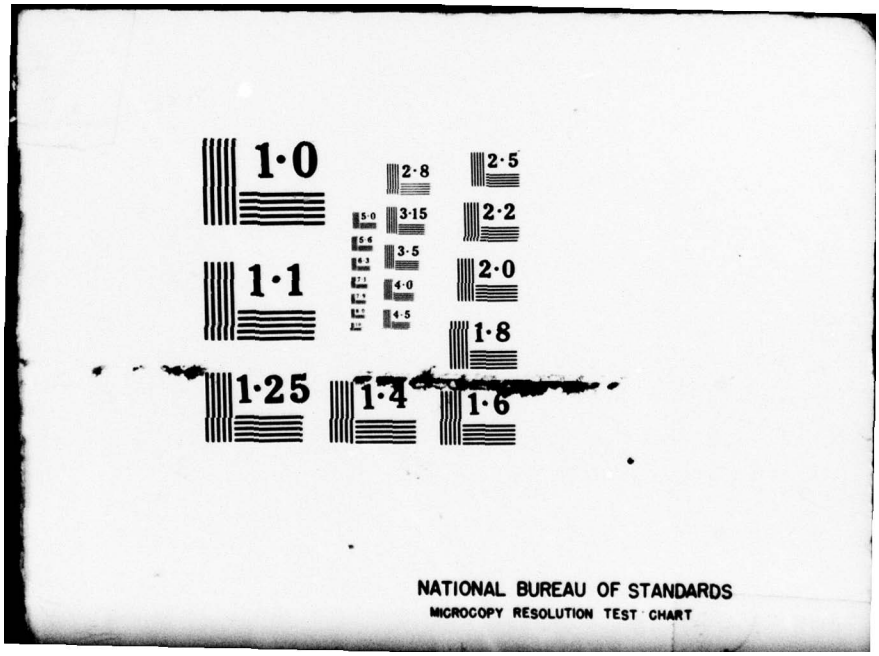

1·0
1·1
1·25
1·4
1·6
1·8
2·0
2·2
2·5
2·8
3·15
3·5
4·0
4·5
5·0
NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

RCS MATRIX

ELEV	130	140	150	160	170	180
-120.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
-90.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
-60.0	133.33	100.00	100.00	100.00	100.00	100.00
-30.0	3.03	0.07	0.02	0.03	0.10	0.45
0.0	0.07	0.03	0.02	0.03	0.11	2.51
30.0	0.07	0.07	0.02	0.03	0.10	0.45
60.0	100.00	100.00	100.00	100.00	100.00	100.00
90.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
120.0	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00

AFATL P-001 AASIM = AIRCRAFT COMBAT SURVIVABILITY SCENARIO = PAGE 4

VULNERABLE AREA (SQ METERS) AS A FUNCTION OF IMPACT SPEED (METERS/SEC) AND ASPECT VIEW
TABLE VS TYPE 5 WEAPON

VIEW	0	152	305	457	610	762	914	1067	1219
1	0.00	55.37	55.37	55.37	55.37	55.37	55.37	55.37	55.37
2	0.00	43.22	43.22	43.22	43.22	43.22	43.22	43.22	43.22
3	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
4	0.00	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53
5	0.00	43.22	43.22	43.22	43.22	43.22	43.22	43.22	43.22
6	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
7	0.00	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53
8	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
9	0.00	27.45	27.45	27.45	27.45	27.45	27.45	27.45	27.45
10	0.00	33.07	33.07	33.07	33.07	33.07	33.07	33.07	33.07
11	0.00	27.45	27.45	27.45	27.45	27.45	27.45	27.45	27.45
12	0.00	5.76	5.76	5.76	5.76	5.76	5.76	5.76	5.76
13	0.00	27.45	27.45	27.45	27.45	27.45	27.45	27.45	27.45
14	0.00	33.07	33.07	33.07	33.07	33.07	33.07	33.07	33.07
15	0.00	27.45	27.45	27.45	27.45	27.45	27.45	27.45	27.45
16	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
17	0.00	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53
18	0.00	43.22	43.22	43.22	43.22	43.22	43.22	43.22	43.22
19	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
20	0.00	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53
21	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
22	0.00	55.37	55.37	55.37	55.37	55.37	55.37	55.37	55.37
23	0.00								
24	0.00								
25	0.00								
26	0.00								

LOC	P(KILL)	RCUNDS	FIRE TIME	XGUN	YGUN	ZGUN	RADIUS	GL	T REACT	T TRACK	CF	CH	SR	LOC
1	0.0	0	0.0	14800.00	9000.00	40.00	0.0	1	0.0	2.50	1	1	1	1
2	0.0010946	7	5.25	16200.00	8700.00	40.00	0.0	1	0.0	2.50	1	1	1	2
3	0.0003691	17	6.80	13600.00	7200.00	20.00	0.0	1	0.0	2.50	2	1	1	3
4	0.0	0	0.0	13400.00	8000.00	20.00	0.0	1	0.0	2.50	2	1	1	4
5	0.0	0	0.0	11300.00	9700.00	50.00	0.0	1	0.0	6.00	3	4	1	5
6	0.0112359	422	21.10	15600.00	10900.00	90.00	0.0	1	0.0	6.00	3	4	1	6
7	0.0684375	134	57.42	12800.00	7500.00	20.00	0.0	1	0.0	6.00	3	2	1	7

ATTRITION ACCRUED AS A FUNCTION OF TIME OF FIRE

TIME SEG.	CUM FOR CLASS 1	DENSITY CLASS 1	DENSITY CLASS 2	DENSITY CLASS 3	DENSITY CLASS 4	DENSITY CLASS 5	DENSITY CLASS 6	DENSITY CLASS 7	DENSITY CLASS 8	DENSITY CLASS 9
1	0.0	0.0								
2	0.0	0.0								
3	0.0	0.0								
4	0.0	0.0								
5	0.0024045	0.0024045								
6	0.0025303	0.0001261								
7	0.0220685	0.0195382								
8	0.0693267	0.0472582								
9	0.0766286	0.0073019								
10	0.0802163	0.0035877								

ATTRITION ACCRUED AS A FUNCTION OF TIME AT INTERCEPT

TIME SEG.	CUM FOR CLASS 1	DENSITY CLASS 1	DENSITY CLASS 2	DENSITY CLASS 3	DENSITY CLASS 4	DENSITY CLASS 5	DENSITY CLASS 6	DENSITY CLASS 7	DENSITY CLASS 8	DENSITY CLASS 9
1	0.0	0.0								
2	0.0	0.0								
3	0.0	0.0								
4	0.0	0.0								
5	0.0	0.0								
6	0.0025023	0.0025023								
7	0.0191067	0.0166461								
8	0.0676140	0.0485073								
9	0.0727475	0.0051335								
10	0.0802164	0.0074689								
	TOTALS	0.0802243								

TOTAL PK FOR DENSITY CLASS 1 AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED.

SECTOR	AZIMUTH REAR=00	ELEV. DOWN=00	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
1	000-045	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	045-090	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	090-135	000-045	0.0	0.0	0.0	0.0	0.0001340	0.0	0.0	0.0	0.0001340

TOTAL PK FOR DENSITY CLASS 1 AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED.

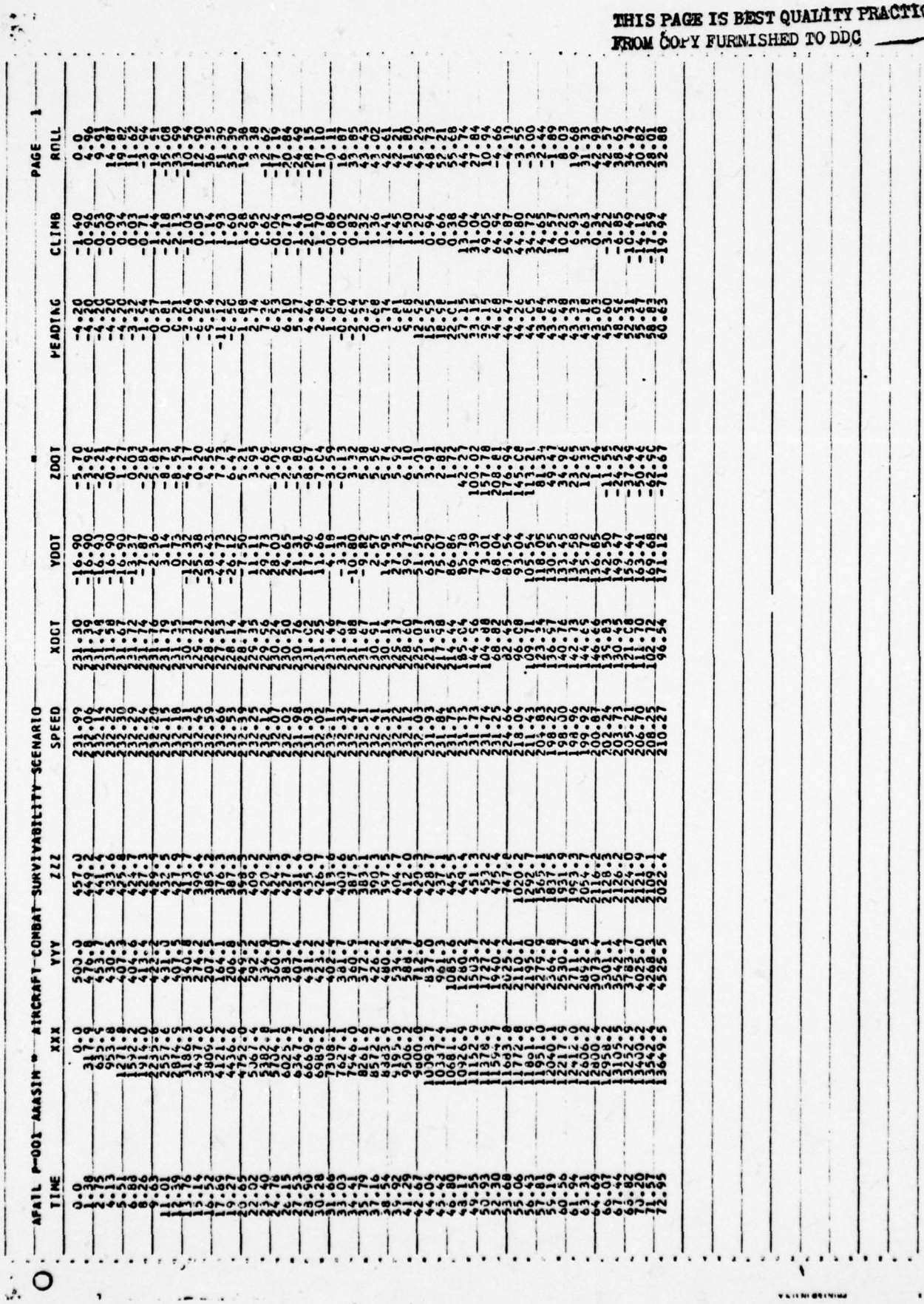
SECTOR	AZIMUTH REAR=00	ELEV. DOWN=CC	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
4	135-180	000-045	0.0	0.0	0.0	0.0	0.0002519	0.0	0.0	0.0	0.0002519
5	180-225	000-045	0.0	0.0003255	0.0012023	0.0	0.0	0.0	0.0	0.0	0.0015274
6	225-270	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	270-315	000-045	0.0	0.0000411	0.0	0.0	0.0	0.0	0.0	0.0	0.0000411
8	315-360	000-045	0.0001108	0.0001518	0.0	0.0	0.0	0.0	0.0	0.0	0.0002626
9	000-045	045-090	0.0	0.0000374	0.0	0.0	0.0	0.0	0.0	0.0	0.0000374
10	045-090	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	090-135	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	135-180	045-090	0.0	0.0	0.0	0.0	0.0007085	0.0	0.0	0.0	0.0007085
13	180-225	045-090	0.0	0.0	0.0058241	0.0025407	0.0167664	0.0070211	0.0	0.0	0.0301523
14	225-270	045-090	0.0	0.0036015	0.0002850	0.0	0.0000393	0.0	0.0	0.0	0.0039257
15	270-315	045-090	0.0	0.0	0.0000294	0.0	0.0	0.0	0.0	0.0	0.0000294
16	315-360	045-090	0.0	0.0006235	0.0002650	0.0	0.0	0.0	0.0	0.0	0.0008884
17	000-045	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	045-090	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	090-135	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	135-180	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	180-225	090-135	0.0	0.0	0.0	0.0	0.0	0.0392846	0.0	0.0	0.0392846
22	225-270	090-135	0.0	0.0	0.0	0.0	0.0001868	0.0011850	0.0	0.0	0.0013718
23	270-315	090-135	0.0	0.0	0.0	0.0054171	0.0	0.0	0.0	0.0	0.0054171
24	315-360	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	000-045	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	045-090	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	090-135	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	135-180	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	180-225	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	225-270	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	270-315	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	315-360	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTALS	0.0001108	0.0047761	0.0075947	0.0079440	0.0180647	0.0436568	0.0	0.0	0.0802164

***** END OF JOB - - PC01 SCENARIO RUN COMPLETE *****

APPENDIX G

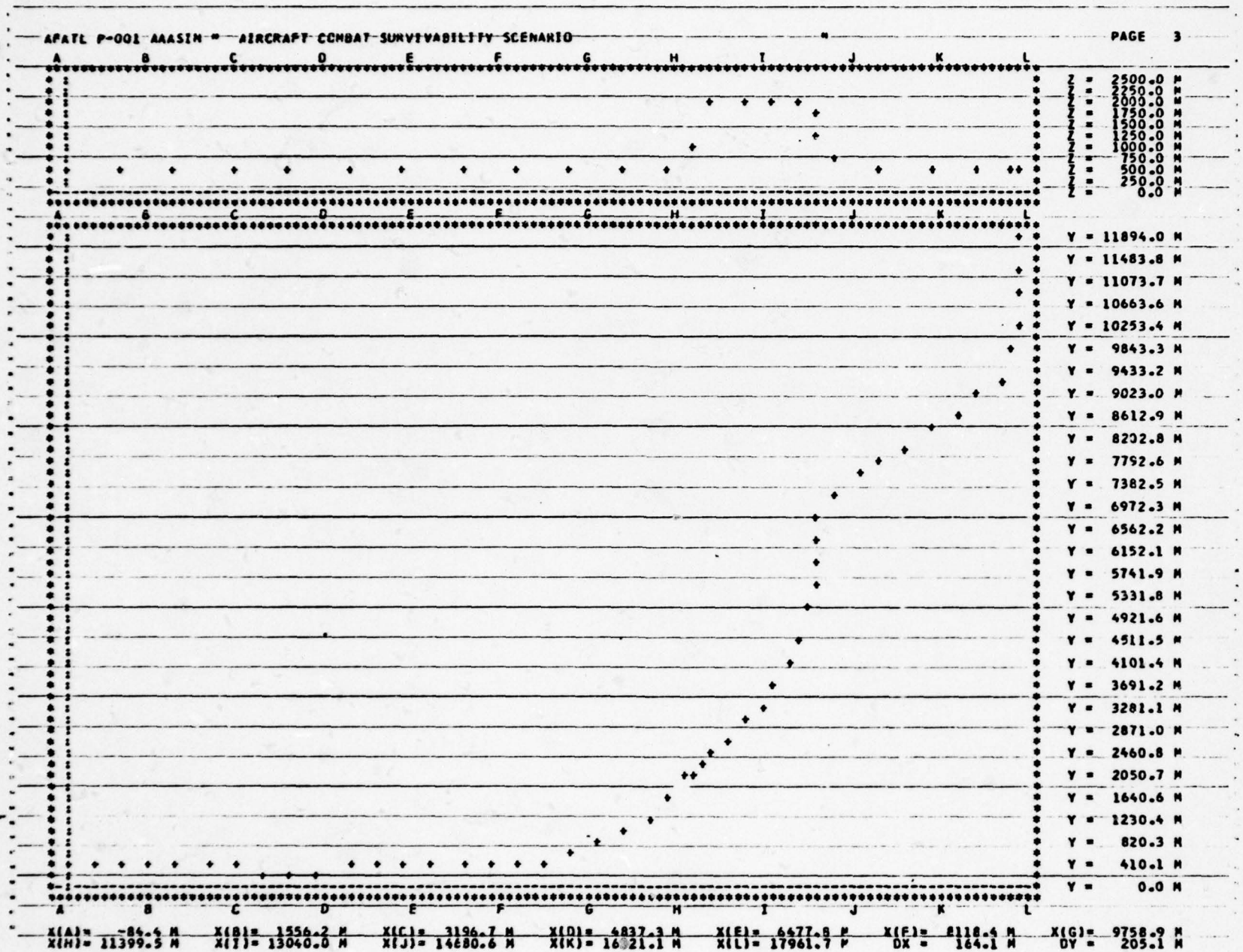
P001 ANALYSIS EXTENDED OUTPUT

MASK ANGLE FOR THIS RUN = 0.0 DEG.



TIME	XXX	YYY	ZZZ	SPEED	XDOT	YDOT	ZDOT	HEADING	CLIMB	ROLL
74.33	13756.5	4782.7	1935.7	212.30	90.36	172.56	-80.45	62.44	-22.28	37.75
75.70	13863.5	5039.9	1849.0	214.32	84.17	173.99	-89.22	64.25	-24.62	42.62
77.08	13970.6	5297.1	1762.3	216.35	77.99	175.43	-97.99	66.06	-26.96	47.49
78.45	14052.3	5557.7	1659.9	218.46	70.15	178.81	-101.98	68.41	-27.95	45.20
79.83	14061.1	5828.1	1512.1	220.81	57.72	187.79	-92.19	72.21	-25.02	22.29
81.21	14071.0	6098.4	1364.3	223.15	45.26	196.76	-82.41	76.21	-22.10	-0.62
82.58	14078.5	6368.8	1216.4	225.50	32.80	205.74	-72.62	80.11	-19.18	-23.53
83.96	14087.7	6639.2	1068.6	227.85	20.34	214.71	-62.84	84.02	-16.26	-46.44
85.34	14096.6	6909.6	920.8	230.20	7.87	223.69	-53.05	87.92	-13.33	-69.35
86.71	14330.2	7106.7	844.3	231.10	47.13	206.21	-42.21	76.85	-10.57	-62.57
88.09	14574.6	7300.4	771.2	231.92	88.87	187.47	-31.32	65.05	-7.82	-54.36
89.47	14819.1	7494.0	698.1	232.75	130.61	168.72	-20.42	53.26	-5.07	-46.14
90.84	15063.5	7687.7	625.0	233.58	172.35	149.97	-9.53	41.46	-2.32	-37.93
92.22	15335.7	7850.4	599.2	233.81	186.66	139.79	-7.75	36.64	-1.86	-24.07
93.60	15617.6	8002.2	590.0	233.83	191.33	132.62	-9.17	34.73	-2.22	-8.22
94.97	15899.6	8154.0	580.9	233.85	196.00	125.44	-10.59	32.63	-2.57	7.63
96.35	16181.6	8305.8	571.7	233.88	200.67	118.27	-12.00	30.52	-2.93	23.48
97.72	16463.5	8457.7	562.5	233.90	205.34	111.09	-13.42	28.42	-3.28	39.33
99.10	16707.1	8668.9	544.4	233.98	199.50	119.71	-11.36	30.98	-2.78	45.72
100.48	16948.5	8883.6	525.8	234.08	193.04	129.23	-9.09	33.82	-2.23	51.57
101.85	17189.5	9098.4	507.1	234.17	186.58	138.76	-6.83	36.66	-1.68	57.41
103.23	17431.3	9313.1	488.5	234.26	180.12	148.29	-4.56	39.49	-1.13	63.26
104.61	17631.3	9550.3	473.2	234.32	168.76	159.23	-2.65	42.91	-0.66	66.21
105.98	17686.8	9866.3	469.3	234.25	140.25	175.06	-2.00	51.62	-0.49	59.08
107.36	17742.3	10182.2	465.5	234.19	111.75	190.90	-1.34	59.73	-0.32	51.94
108.74	17797.8	10498.1	461.7	234.13	83.25	206.74	-0.66	67.84	-0.15	44.80
110.11	17853.3	10814.1	457.9	234.06	54.75	222.58	-0.03	75.55	0.02	37.67
111.49	17879.4	11134.7	456.2	233.98	40.48	230.45	0.25	80.00	0.08	28.08
112.86	17876.2	11460.1	456.5	233.87	40.45	230.34	0.14	80.00	0.05	16.05
114.24	17873.1	11785.5	456.9	233.76	40.41	230.24	0.04	80.00	0.01	4.01

XR= 0.0 YR= 0.0 XT= 0.0 YT= 0.0 PSI= 0.0 DZ= 0.0



10 TIME INTERVALS FOR PK ACCUMULATION

0.00 11.47 22.95 34.42 45.89 57.37 68.84 80.31 91.78 103.26 999.99

VULNERABLE AREA (SQ. METERS) AS A FUNCTION OF IMPACT SPEED (METERS/SEC) AND ASPECT VIEW
VULNERABLE AREA TABLE VS TYPE 1 AND 2 WEAPONS

VIEW	0	152	305	457	610	762	914	1067	1219
1	0.00	0.46	0.46	7.11	7.11	7.11	7.11	7.11	7.11
2	0.00	0.66	0.66	5.55	5.55	5.55	5.55	5.55	5.55
3	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
4	0.00	0.66	0.66	7.36	7.36	7.36	7.36	7.36	7.36
5	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
6	0.00	0.66	0.66	5.55	5.55	5.55	5.55	5.55	5.55
7	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
8	0.00	0.66	0.66	7.36	7.36	7.36	7.36	7.36	7.36
9	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
10	0.00	0.46	0.46	0.74	0.74	0.74	0.74	0.74	0.74
11	0.00	0.66	0.66	2.86	2.86	2.86	2.86	2.86	2.86
12	0.00	0.46	0.46	3.30	3.30	3.30	3.30	3.30	3.30
13	0.00	0.66	0.66	2.86	2.86	2.86	2.86	2.86	2.86
14	0.00	0.46	0.46	0.74	0.74	0.74	0.74	0.74	0.74
15	0.00	0.66	0.66	2.86	2.86	2.86	2.86	2.86	2.86
16	0.00	0.46	0.46	3.30	3.30	3.30	3.30	3.30	3.30
17	0.00	0.66	0.66	2.86	2.86	2.86	2.86	2.86	2.86
18	0.00	0.66	0.66	5.55	5.55	5.55	5.55	5.55	5.55
19	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
20	0.00	0.66	0.66	7.36	7.36	7.36	7.36	7.36	7.36
21	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
22	0.00	0.66	0.66	5.55	5.55	5.55	5.55	5.55	5.55
23	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
24	0.00	0.66	0.66	7.36	7.36	7.36	7.36	7.36	7.36
25	0.00	0.70	0.70	5.57	5.57	5.57	5.57	5.57	5.57
26	0.00	0.46	0.46	7.11	7.11	7.11	7.11	7.11	7.11

G T	TIME/ ROUND	MIN ELEV	MAX ELEV	AZIM RATE	ELEV RATE	MAX TOF1	MAX TOF2	MUZZ VEL	BALLISTIC CONSTANT 1	BALLISTIC CONSTANT 2	VEL MIN	VEL MAX	RANGE MIN	RANGE MAX	SMOOTH CONST	MAX.AZ ERROR	MAX.EL ERROR
1	0.750	-10.00	85.00	30.00	25.00	1.60	99.99	840.	0.1802090	C.0123920	0.0	300.0	0.	3000.	9999.99	5.730	5.730
2	0.400	-8.50	90.00	30.00	25.00	2.20	99.99	1000.	0.2514990	-0.0062590	0.0	300.0	400.	3000.	9999.99	5.730	5.730
3	1.200	-10.00	85.00	80.00	45.00	3.80	7.50	930.	0.2299800	-0.0068890	0.0	350.0	500.	3300.	1.33	5.730	5.730
4	0.750	-5.00	85.00	30.00	20.00	4.10	99.99	880.	0.0893210	0.0042620	0.0	250.0	0.	5000.	9999.99	5.730	5.730
5	0.857	-4.00	87.00	30.00	18.00	6.20	11.60	960.	0.0784500	-0.0004210	0.0	300.0	0.	5500.	1.33	5.730	5.730
6	4.000	-3.00	82.00	30.00	20.00	99.99	19.20	800.	0.0506940	-0.0003570	999.9	999.9	99999.	99999.	1.33	5.730	5.730

AFATL P-001 AASIM * AIRCRAFT COMBAT SURVIVABILITY SCENARIO * PAGE 5

LOCATION 1 GUN TYPE 1 ERROR MODE 1 POSITION=(14800.0, 9000.0, 40.0) RADIUS= 0.0 M

L N	OEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK

PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED. LOC 1 GT 1 EM 1 X 14800. Y 9000. Z 40. RADIUS 0.M

SECTOR	AZIMUTH REAR=30	ELEV. DOWN=00	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
1	000-045	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	045-090	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	090-135	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	135-180	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	180-225	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	225-270	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	270-315	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	315-360	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	000-045	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	045-090	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	090-135	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	135-180	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	180-225	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	225-270	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	270-315	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	315-360	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	000-045	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	045-090	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	090-135	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	135-180	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	180-225	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	225-270	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	270-315	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	315-360	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	000-045	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	045-090	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	090-135	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	135-180	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	180-225	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	225-270	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	270-315	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	315-360	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTALS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOCATION 2 GUN TYPE 1 ERROR MODE 1 POSITION=(16200.0, 8200.0, 40.0) RADIUS= 0.0 M

L N	OEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	1	91.00	1.59	92.59	1342.	1013.	64.6	48.8	104.7	31.8	666.0	-2.49	2.07	0.09	-0.17	3.63	0.00004	0.00004
1	1	91.77	1.37	93.14	1179.	907.	55.2	45.6	89.7	19.7	698.4	-0.45	5.86	0.55	0.12	3.92	0.00006	0.00010
1	1	92.54	1.18	93.72	1023.	804.	49.0	42.7	69.2	16.1	725.4	-1.97	6.77	0.60	0.24	4.31	0.00011	0.00021
1	1	93.31	1.01	94.31	877.	708.	46.8	40.1	53.4	11.7	744.2	-3.38	8.88	0.74	0.35	4.78	0.00020	0.00041
1	1	94.01	0.87	94.89	755.	630.	42.1	38.4	42.9	5.8	748.9	-6.20	11.87	1.08	0.47	5.26	0.00029	0.00071
1	1	94.78	0.77	95.55	643.	567.	82.7	37.6	37.6	9.5	730.2	-16.29	16.35	2.07	0.50	5.63	0.00025	0.00096
1	1	95.55	0.73	96.28	568.	542.	115.7	30.9	13.0	37.5	675.6	-30.00	21.15	2.58	-0.38	6.32	0.00013	0.00109

PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED. LOC 2 GT 1 EM 1 X 16200. Y 8200. Z 40. RADIUS 0.M

SECTOR	AZIMUTH REAR=00	ELEV. CONN=00	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
1	000-045	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	045-090	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	090-135	000-045	0.0	0.0	0.0	0.0	0.0001340	0.0	0.0	0.0	0.0001340
4	135-180	000-045	0.0	0.0	0.0	0.0	0.0002519	0.0	0.0	0.0	0.0002519
5	180-225	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	225-270	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	270-315	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	315-360	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	000-045	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	045-090	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	090-135	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	135-180	045-090	0.0	0.0	0.0	0.0	0.0007089	0.0	0.0	0.0	0.0007089
13	180-225	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	225-270	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	270-315	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	315-360	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	000-045	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	045-090	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	090-135	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	135-180	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	180-225	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	225-270	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	270-315	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	315-360	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	000-045	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	045-090	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	090-135	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	135-180	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	180-225	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	225-270	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	270-315	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	315-360	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTALS	0.0	0.0	0.0	0.0	0.0010945	0.0	0.0	0.0	0.0010945

LOCATION 3 GUN TYPE 2 ERROR MODE 1 POSITION=(13600.0, 7200.0, 20.0) RADIUS= 0.0 M

L N	OEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	1	80.96	2.17	83.13	1851.	1432.	137.4	57.4	178.7	17.0	606.0	3.77	1.52	-0.52	C.C2	3.22	0.00003	0.00003
1	1	81.34	2.06	83.40	1774.	1383.	132.3	56.7	167.1	8.4	616.3	4.24	2.04	-0.54	C.CC	3.17	0.00003	0.00006
1	1	81.72	1.96	83.68	1695.	1333.	127.4	55.9	155.9	1.5	625.9	4.79	2.16	-0.58	-C.C2	3.11	0.00003	0.00009
1	1	82.11	1.86	83.96	1624.	1285.	123.1	54.9	146.5	-4.0	635.6	5.44	2.28	-0.62	-C.C4	3.05	0.00004	0.00012
1	1	82.55	1.74	84.30	1539.	1228.	118.4	53.6	136.5	-8.5	645.9	6.37	2.42	-0.68	-C.CE	2.96	0.00004	0.00016
1	1	82.94	1.65	84.59	1467.	1181.	114.7	52.3	129.4	-10.5	654.2	7.33	2.53	-0.75	-C.11	2.86	0.00004	0.00020
1	1	83.32	1.56	84.85	1397.	1135.	111.3	50.8	123.5	-12.0	661.6	8.49	2.61	-0.84	-C.15	3.CE	0.00005	0.00025
1	1	83.71	1.48	85.19	1325.	1050.	107.4	49.1	118.4	-11.5	667.7	9.86	2.64	-0.95	-C.20	3.34	0.00005	0.00030
1	1	84.15	1.43	85.58	1252.	1061.	101.5	47.5	108.8	-32.2	662.0	11.77	2.6C	-1.11	-C.27	3.54	0.00005	0.00035
1	1	84.54	1.44	85.98	1189.	1070.	98.8	47.1	104.1	-81.6	639.2	13.65	2.45	-1.27	-0.35	3.51	0.00002	0.00037
1	1	84.92	1.47	86.40	1129.	1087.	96.2	46.8	115.4	-138.2	612.4	15.70	2.12	-1.44	-C.45	3.41	0.00000	0.00037
1	1	85.31	1.53	86.83	1073.	1113.	93.8	46.6	143.5	-202.6	580.7	17.75	1.57	-1.61	-C.56	3.24	0.0	0.00037
1	1	85.75	1.61	87.36	1064.	1157.	85.2	44.4	152.9	-279.4	543.8	13.57	-5.13	-0.57	-2.72	3.30	0.0	0.00037
1	1	86.14	1.70	87.84	1075.	1205.	77.3	44.7	132.0	-255.6	505.0	16.50	-9.78	-0.25	-1.25	3.34	0.0	0.00037
1	1	86.52	1.82	88.34	1093.	1266.	75.3	49.5	141.9	-263.2	460.7	13.78	-7.20	-0.32	-1.56	3.65	0.0	0.00037
1	1	86.91	1.97	88.87	1119.	1337.	78.4	54.2	145.2	-257.4	412.2	11.52	-9.52	-0.27	-1.03	2.90	0.0	0.00037
1	1	87.35	2.18	89.54	1156.	1437.	78.2	61.3	152.7	-256.1	352.8	9.62	-8.20	-0.24	-C.50	1.70	0.0	0.00037

PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED. LOC 3 GT 2 EM 1 X 13600. Y 7200. Z 20. RADIUS 0.M

SECTOR	AZIMUTH REAR=00	ELEV. DOWN=00	0-152	152-305	305-457	-457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
1	000-045	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	045-090	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	090-135	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	135-180	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	180-225	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	225-270	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	270-315	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	315-360	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	000-045	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	045-090	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	090-135	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	135-180	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	180-225	045-090	0.0	0.0	0.0	0.0000267	0.0001358	0.0	0.0	0.0	0.0001625
14	225-270	045-090	0.0	0.0	0.0	0.0	0.0000393	0.0	0.0	0.0	0.0000393
15	270-315	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	315-360	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	000-045	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	045-090	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	090-135	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	135-180	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	180-225	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	225-270	090-135	0.0	0.0	0.0	0.0	0.0001672	0.0	0.0	0.0	0.0001672
23	270-315	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	315-360	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	000-045	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	045-090	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	090-135	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	135-180	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED. LOC 3 GT 2 EM 1 X 13600. Y 7200. Z 20. RADIUS 0.M

SECTOR	AZIMUTH REAR=00	ELEV. DOWN=CO	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
29	180-225	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	225-270	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	270-315	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	315-360	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTALS	0.0	0.0	0.0	0.0000267	0.0003423	0.0	0.0	0.0	0.0003690

LOCATION 4 GUN TYPE 2 ERROR MODE 1 POSITION=(13400.0, 8000.0, 20.0) RADIUS= 0.0 M

L N	GEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK

PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED. LOC 4 GT 2 EM 1 X 13400. Y 8000. Z 20. RADIUS 0.M

SECTOR	AZIMUTH REAR=00	ELEV. DOWN=00	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
1	000-045	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	045-090	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	090-135	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	135-180	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	180-225	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	225-270	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	270-315	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	315-360	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	000-045	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	045-090	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	090-135	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	135-180	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	180-225	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	225-270	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	270-315	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	315-360	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	000-045	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	045-090	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	090-135	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	135-180	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	180-225	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	225-270	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	270-315	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	315-360	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	000-045	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	045-090	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	090-135	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	135-180	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	180-225	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	225-270	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	270-315	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	315-360	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTALS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

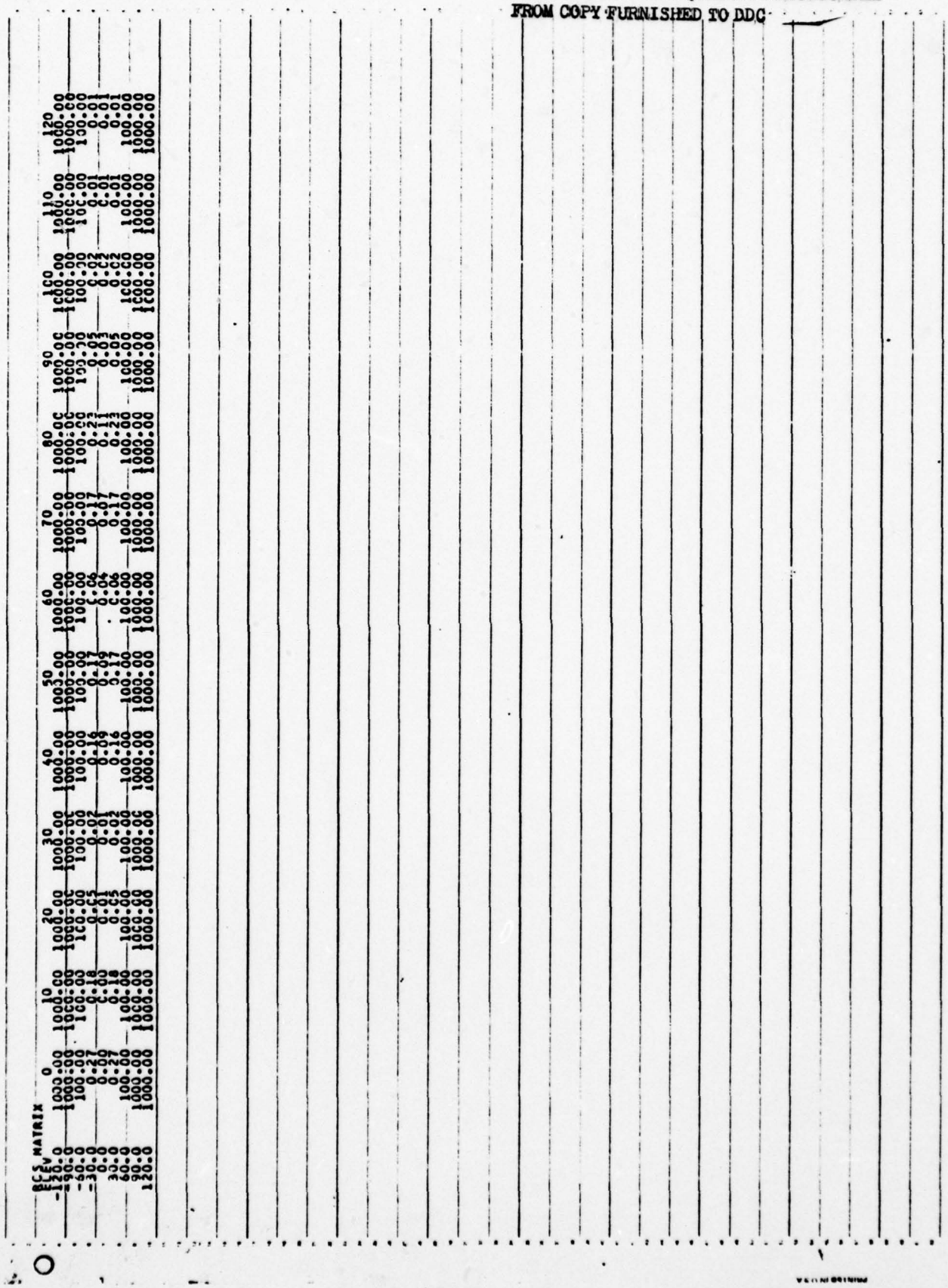
ECM INPUTS (INITIAL OR CHANGED)

```
IP =              5
IJ =              0
GAINJ(DB) =    1.00
PJW(W) =     500.00
PLEN(S) =   0.0
IX =              1
XSEC(SQM) =     0.0
CALX =        1.000
IRECM =           1
SJTMAX(DB) =   3.00
```

JAMMER ANTENNA GAIN 1.000 DB

AIRCRAFT CROSS SECTION TABLE SPECIFIED. PRINTED VALUES WILL BE MULTIPLIED BY CALX. CALX= 1.00

```
TABLE DATA
   19 ELEMENTS FROM    0.0 TO   180.00 BY   10.00 AZ
    7 ELEMENTS FROM  -90.00 TO    90.00 BY   30.00 EL
ELSEWHERE TABLE IS  1000.00
```



VULNERABLE AREA (SQ. METERS) AS A FUNCTION OF IMPACT SPEED (METERS/SEC) AND ASPECT VIEW
VULNERABLE AREA TABLE VS TYPE 3 WEAPONS

VIEW	0	152	305	457	610	762	914	1067	1219
1	0.00	12.54	12.54	13.47	13.47	13.47	13.47	13.47	13.47
2	0.00	9.85	9.85	10.51	10.51	10.51	10.51	10.51	10.51
3	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
4	0.00	12.64	12.64	14.78	14.78	14.78	14.78	14.78	14.78
5	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
6	0.00	9.85	9.85	10.51	10.51	10.51	10.51	10.51	10.51
7	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
8	0.00	12.64	12.64	14.78	14.78	14.78	14.78	14.78	14.78
9	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
10	0.00	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39
11	0.00	4.76	4.76	6.24	6.24	6.24	6.24	6.24	6.24
12	0.00	5.34	5.34	7.43	7.43	7.43	7.43	7.43	7.43
13	0.00	4.76	4.76	6.24	6.24	6.24	6.24	6.24	6.24
14	0.00	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39
15	0.00	4.76	4.76	6.24	6.24	6.24	6.24	6.24	6.24
16	0.00	5.34	5.34	7.43	7.43	7.43	7.43	7.43	7.43
17	0.00	4.76	4.76	6.24	6.24	6.24	6.24	6.24	6.24
18	0.00	9.85	9.85	10.51	10.51	10.51	10.51	10.51	10.51
19	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
20	0.00	12.64	12.64	14.78	14.78	14.78	14.78	14.78	14.78
21	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
22	0.00	9.85	9.85	10.51	10.51	10.51	10.51	10.51	10.51
23	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
24	0.00	12.64	12.64	14.78	14.78	14.78	14.78	14.78	14.78
25	0.00	9.64	9.64	11.15	11.15	11.15	11.15	11.15	11.15
26	0.00	12.54	12.54	13.47	13.47	13.47	13.47	13.47	13.47

LOCATION 5 GUN TYPE 3 ERROR MODE 4 POSITION=(11300.0, 9700.0, 50.0) RADIUS= 0.0 M

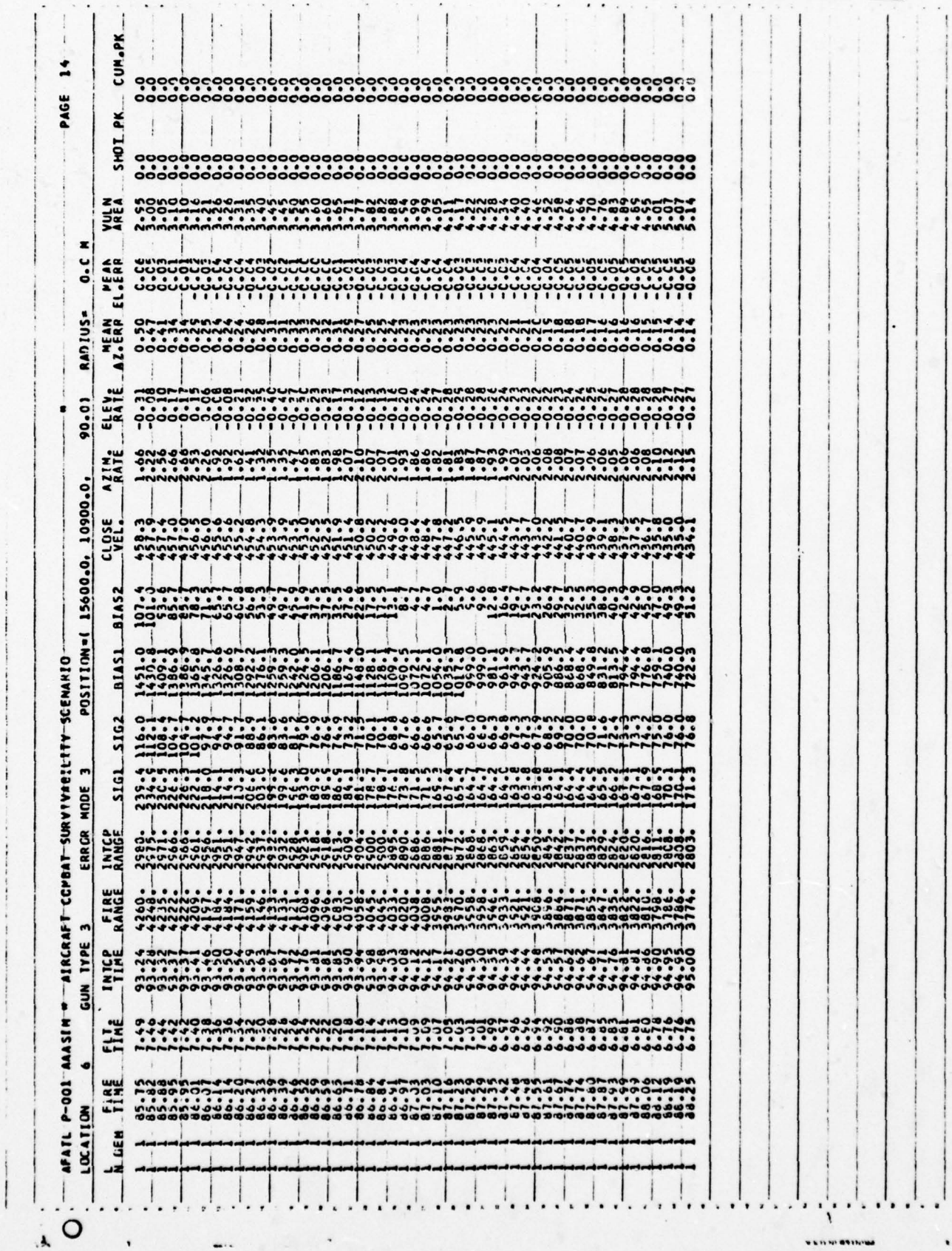
L N DEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK

PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED. LOC 5 GT 3 EM 4 X 11300. Y 9700. Z 50. RADIUS 0.0 M

SECTOR	AZIMUTH REAR=00	ELEV. DOWN=00	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
1	000-045	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	045-090	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	090-135	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	135-180	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	180-225	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	225-270	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	270-315	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	315-360	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	000-045	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	045-090	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	090-135	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	135-180	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	180-225	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	225-270	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	270-315	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	315-360	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	000-045	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	045-090	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	090-135	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	135-180	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	180-225	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	225-270	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	270-315	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	315-360	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	000-045	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	045-090	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	090-135	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	135-180	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	180-225	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	225-270	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	270-315	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	315-360	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTALS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MULTIPATH INPUTS (INITIAL OR CHANGE)

IRMP = 1
REFC = 0.350



AFATL P-001 AASIM * AIRCRAFT COMBAT SURVIVABILITY SCENARIO * PAGE 15

LOCATION 6 GUN TYPE 3 ERROR MODE 3 POSITION=(15600.0, 10900.0, 90.0) RADIUS= 0.0 M

L N	DEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	1	88.31	6.73	95.05	3762.	2799.	172.6	77.7	704.7	53.0	433.1	2.17	-0.27	0.13	-0.06	5.20	0.0	0.0
1	1	88.38	6.71	95.09	3746.	2795.	174.1	78.6	686.3	54.8	432.2	2.19	-0.27	0.12	-0.06	5.26	0.0	0.0
1	1	88.44	6.69	95.14	3737.	2791.	175.7	79.5	668.0	56.6	431.3	2.20	-0.27	0.11	-0.06	5.32	0.0	0.0
1	1	88.44	6.69	95.14	3737.	2791.	175.7	79.5	668.0	56.6	431.3	2.20	-0.27	0.11	-0.06	5.32	0.0	0.0
1	1	88.51	6.68	95.19	3729.	2787.	177.2	80.4	650.5	58.1	430.4	2.22	-0.28	0.11	-0.06	5.39	0.0	0.0
1	1	88.57	6.67	95.24	3713.	2783.	178.5	81.2	633.1	59.5	429.4	2.22	-0.28	0.10	-0.07	5.45	0.00000	0.00000
1	1	88.63	6.65	95.28	3701.	2779.	180.7	82.1	615.7	60.7	428.4	2.23	-0.29	0.09	-0.07	5.51	0.00000	0.00000
1	1	88.63	6.65	95.28	3701.	2779.	180.7	82.1	615.7	60.7	428.4	2.23	-0.29	0.09	-0.07	5.51	0.00000	0.00000
1	1	88.70	6.63	95.33	3689.	2775.	182.6	82.9	597.8	62.0	427.5	2.24	-0.29	0.09	-0.07	5.57	0.00000	0.00000
1	1	88.76	6.61	95.38	3677.	2772.	184.6	83.7	579.9	63.2	426.5	2.25	-0.30	0.08	-0.07	5.64	0.00000	0.00000
1	1	88.83	6.60	95.43	3665.	2768.	186.6	84.5	562.8	64.2	425.5	2.27	-0.30	0.08	-0.07	5.70	0.00000	0.00000
1	1	88.89	6.58	95.47	3653.	2764.	188.7	85.3	545.7	65.1	424.4	2.28	-0.30	0.07	-0.07	5.76	0.00000	0.00000
1	1	88.89	6.58	95.47	3653.	2764.	188.7	85.3	545.7	65.1	424.4	2.28	-0.30	0.07	-0.07	5.76	0.00000	0.00000
1	1	88.95	6.57	95.52	3641.	2760.	191.1	86.1	528.4	65.9	423.4	2.30	-0.31	0.06	-0.07	5.83	0.00000	0.00000
1	1	89.02	6.56	95.57	3629.	2756.	193.3	86.8	511.5	66.7	422.3	2.32	-0.31	0.06	-0.08	5.89	0.00000	0.00000
1	1	89.08	6.54	95.62	3618.	2752.	195.7	87.5	494.6	67.3	421.2	2.33	-0.31	0.05	-0.08	5.95	0.00000	0.00001
1	1	89.08	6.54	95.62	3618.	2752.	195.7	87.5	494.6	67.3	421.2	2.33	-0.31	0.05	-0.08	5.95	0.00000	0.00001
1	1	89.15	6.53	95.67	3606.	2749.	198.2	88.2	477.8	67.9	420.1	2.35	-0.31	0.04	-0.08	6.02	0.00000	0.00001
1	1	89.21	6.51	95.72	3594.	2745.	200.7	88.8	461.0	68.3	419.0	2.37	-0.31	0.04	-0.08	6.08	0.00000	0.00001
1	1	89.27	6.50	95.77	3582.	2741.	203.3	89.5	444.3	68.7	417.9	2.38	-0.32	0.03	-0.08	6.14	0.00000	0.00002
1	1	89.34	6.48	95.82	3570.	2738.	206.0	90.1	427.7	69.0	416.8	2.40	-0.32	0.02	-0.08	6.20	0.00000	0.00002
1	1	89.34	6.48	95.82	3570.	2738.	206.0	90.1	427.7	69.0	416.8	2.40	-0.32	0.02	-0.08	6.20	0.00000	0.00003
1	1	89.40	6.47	95.87	3559.	2734.	208.8	90.7	411.2	69.3	415.7	2.41	-0.32	0.02	-0.09	6.27	0.00001	0.00003
1	1	89.47	6.45	95.92	3547.	2731.	211.7	91.3	394.7	69.4	414.5	2.42	-0.33	0.01	-0.09	6.33	0.00001	0.00004
1	1	89.53	6.44	95.97	3535.	2727.	214.6	91.9	378.3	69.5	413.4	2.44	-0.33	0.00	-0.09	6.39	0.00001	0.00005
1	1	89.59	6.42	96.02	3523.	2724.	217.6	92.4	362.0	69.5	412.2	2.45	-0.34	-0.01	-0.09	6.46	0.00001	0.00006
1	1	89.59	6.42	96.02	3523.	2724.	217.6	92.4	362.0	69.5	412.2	2.45	-0.34	-0.01	-0.09	6.46	0.00001	0.00007
1	1	89.66	6.41	96.07	3512.	2720.	220.8	92.9	345.8	69.4	411.0	2.47	-0.34	-0.01	-0.09	6.52	0.00001	0.00008
1	1	89.72	6.39	96.12	3500.	2717.	224.0	93.4	329.6	69.2	409.8	2.49	-0.34	-0.02	-0.09	6.58	0.00001	0.00009
1	1	89.79	6.38	96.17	3488.	2714.	227.2	93.9	313.4	69.0	408.6	2.50	-0.35	-0.03	-0.10	6.64	0.00001	0.00010
1	1	89.79	6.38	96.17	3488.	2714.	227.2	93.9	313.4	69.0	408.6	2.50	-0.35	-0.03	-0.10	6.64	0.00001	0.00012
1	1	89.85	6.36	96.22	3477.	2710.	230.6	94.3	297.3	68.7	407.4	2.52	-0.35	-0.03	-0.10	6.70	0.00002	0.00014
1	1	89.91	6.36	96.27	3465.	2707.	233.9	94.7	282.9	68.2	406.0	2.54	-0.35	-0.04	-0.10	6.77	0.00002	0.00015
1	1	89.98	6.34	96.32	3454.	2704.	237.5	95.2	266.9	67.8	404.8	2.55	-0.36	-0.05	-0.10	6.83	0.00002	0.00017
1	1	90.04	6.33	96.37	3442.	2700.	241.1	95.6	250.9	67.3	403.5	2.57	-0.36	-0.05	-0.10	6.89	0.00002	0.00019
1	1	90.04	6.33	96.37	3442.	2700.	241.1	95.6	250.9	67.3	403.5	2.57	-0.36	-0.05	-0.10	6.89	0.00002	0.00022
1	1	90.11	6.31	96.42	3431.	2697.	244.9	95.9	235.0	66.8	402.3	2.59	-0.36	-0.06	-0.10	6.95	0.00002	0.00024
1	1	90.17	6.31	96.48	3419.	2694.	248.6	96.3	220.7	66.1	400.8	2.60	-0.37	-0.07	-0.11	7.02	0.00002	0.00026
1	1	90.23	6.29	96.53	3408.	2691.	252.3	96.6	204.8	65.4	399.5	2.62	-0.37	-0.08	-0.11	7.08	0.00003	0.00029
1	1	90.23	6.29	96.53	3408.	2691.	252.3	96.6	204.8	65.4	399.5	2.62	-0.37	-0.08	-0.11	7.08	0.00003	0.00032
1	1	90.30	6.28	96.58	3396.	2688.	256.5	97.0	189.0	64.7	398.2	2.64	-0.37	-0.08	-0.11	7.14	0.00003	0.00034
1	1	90.36	6.27	96.63	3385.	2685.	260.5	97.3	174.8	63.8	396.8	2.65	-0.38	-0.09	-0.11	7.20	0.00003	0.00037
1	1	90.42	6.25	96.68	3374.	2682.	264.8	97.6	159.0	63.0	395.4	2.67	-0.38	-0.10	-0.11	7.26	0.00003	0.00040
1	1	90.49	6.24	96.73	3362.	2679.	269.1	97.9	143.2	62.1	394.1	2.69	-0.39	-0.11	-0.11	7.33	0.00003	0.00044
1	1	90.49	6.24	96.73	3362.	2679.	269.1	97.9	143.2	62.1	394.1	2.69	-0.39	-0.11	-0.11	7.33	0.00003	0.00047
1	1	90.55	6.23	96.79	3351.	2676.	273.4	98.2	129.0	61.1	392.6	2.71	-0.39	-0.11	-0.12	7.39	0.00003	0.00050
1	1	90.62	6.22	96.84	3340.	2673.	278.0	98.4	113.2	60.1	391.2	2.72	-0.39	-0.12	-0.12	7.45	0.00003	0.00053
1	1	90.68	6.21	96.89	3328.	2670.	282.6	98.7	99.0	59.0	389.7	2.74	-0.40	-0.13	-0.12	7.51	0.00003	0.00057
1	1	90.68	6.21	96.89	3328.	2670.	282.6	98.7	99.0	59.0	389.7	2.74	-0.40	-0.13	-0.12	7.51	0.00003	0.00060
1	1	90.75	6.20	96.94	3317.	2668.	287.4	98.9	83.2	57.9	388.2	2.76	-0.40	-0.14	-0.12	7.58	0.00003	0.00063
1	1	90.81	6.19	97.00	3306.	2665.	292.2	99.2	68.9	56.7	386.7	2.78	-0.41	-0.15	-0.12	7.64	0.00003	0.00067

LOCATION 6 GUN TYPE 3 ERROR MODE 3 POSITION=(15600.0, 10900.0, 90.0) RADIUS= 0.0 M

L N	OEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	1	90.87	6.17	97.05	3295.	2662.	297.3	99.4	53.0	55.5	385.2	2.80	-0.41	-0.15	-0.12	7.70	0.00003	0.00070
1	1	90.94	6.17	97.11	3284.	2660.	302.4	99.6	38.7	54.3	383.6	2.81	-0.41	-0.16	-0.13	7.76	0.00004	0.00074
1	1	90.94	6.17	97.11	3284.	2660.	302.4	99.6	38.7	54.3	383.6	2.81	-0.41	-0.16	-0.13	7.76	0.00004	0.00077
1	1	91.00	6.16	97.16	3273.	2657.	307.7	99.8	23.5	53.0	382.1	2.83	-0.42	-0.17	-0.13	7.83	0.00004	0.00081
1	1	91.07	6.15	97.21	3262.	2654.	313.1	100.1	8.2	51.6	380.5	2.85	-0.42	-0.18	-0.13	7.89	0.00004	0.00084
1	1	91.13	6.14	97.27	3251.	2652.	318.7	100.3	6.3	50.2	378.8	2.87	-0.43	-0.18	-0.13	7.95	0.00003	0.00088
1	1	91.19	6.12	97.32	3240.	2650.	324.6	100.4	21.1	48.6	377.3	2.89	-0.43	-0.19	-0.13	8.01	0.00003	0.00091
1	1	91.19	6.12	97.32	3240.	2650.	324.6	100.4	21.1	48.6	377.3	2.89	-0.43	-0.19	-0.13	8.01	0.00003	0.00095
1	1	91.26	6.12	97.37	3231.	2647.	325.5	100.0	23.5	45.2	376.4	2.86	-0.43	-0.16	-0.09	8.06	0.00004	0.00098
1	1	91.32	6.11	97.43	3222.	2645.	326.7	99.5	23.8	42.0	375.5	2.50	-0.38	-0.11	-0.05	8.11	0.00004	0.00102
1	1	91.39	6.10	97.49	3213.	2642.	327.5	98.9	22.8	38.8	374.7	2.48	-0.36	-0.05	-0.01	8.16	0.00004	0.00106
1	1	91.39	6.10	97.49	3213.	2642.	327.5	98.9	22.8	38.8	374.7	2.48	-0.36	-0.05	-0.01	8.16	0.00004	0.00109
1	1	91.45	6.09	97.54	3204.	2640.	327.7	98.5	22.0	36.9	374.1	2.58	-0.18	-0.00	0.02	8.20	0.00004	0.00113
1	1	91.51	6.08	97.59	3196.	2638.	327.6	97.6	20.1	34.6	373.3	2.88	0.05	0.03	0.09	8.25	0.00004	0.00117
1	1	91.58	6.07	97.65	3187.	2636.	326.6	96.9	20.1	33.7	372.4	3.24	0.29	0.05	0.03	8.30	0.00004	0.00121
1	1	91.64	6.06	97.71	3178.	2634.	324.5	96.3	21.6	33.4	371.5	3.59	0.48	0.04	0.02	8.36	0.00004	0.00125
1	1	91.64	6.06	97.71	3178.	2634.	324.5	96.3	21.6	33.4	371.5	3.59	0.48	0.04	0.02	8.36	0.00004	0.00129
1	1	91.71	6.06	97.76	3170.	2631.	322.3	95.7	24.6	33.4	370.5	3.85	0.59	0.01	0.00	8.40	0.00004	0.00133
1	1	91.77	6.04	97.81	3161.	2629.	320.3	95.1	29.9	33.5	369.7	3.99	0.61	-0.02	-0.02	8.45	0.00004	0.00137
1	1	91.83	6.03	97.86	3153.	2625.	318.2	94.5	35.4	33.2	369.0	4.00	0.55	-0.05	-0.04	8.48	0.00004	0.00141
1	1	91.83	6.03	97.86	3153.	2625.	318.2	94.5	35.4	33.2	369.0	4.00	0.55	-0.05	-0.04	8.48	0.00004	0.00145
1	1	91.90	6.01	97.91	3144.	2621.	315.8	93.8	40.5	32.5	368.5	3.92	0.44	-0.07	-0.05	8.51	0.00004	0.00150
1	1	91.96	6.00	97.96	3136.	2617.	313.4	93.2	44.9	31.3	368.0	3.77	0.31	-0.09	-0.05	8.54	0.00004	0.00154
1	1	92.03	5.98	98.01	3128.	2612.	310.9	92.5	48.3	29.8	367.5	3.61	0.16	-0.05	-0.05	8.56	0.00004	0.00159
1	1	92.09	5.97	98.06	3120.	2609.	309.4	91.8	51.9	28.1	367.2	3.49	0.11	-0.08	-0.04	8.58	0.00005	0.00163
1	1	92.09	5.97	98.06	3120.	2609.	308.4	91.8	51.9	28.1	367.2	3.49	0.11	-0.08	-0.04	8.58	0.00005	0.00168
1	1	92.15	5.95	98.10	3111.	2605.	305.9	91.2	55.1	26.3	366.8	3.41	0.08	-0.07	-0.03	8.61	0.00005	0.00172
1	1	92.22	5.93	98.15	3103.	2601.	303.3	90.5	57.3	24.6	366.5	3.41	0.10	-0.06	-0.02	8.63	0.00005	0.00177
1	1	92.28	5.92	98.20	3095.	2597.	300.6	89.9	59.7	23.1	366.1	3.46	0.15	-0.04	-0.01	8.65	0.00005	0.00182
1	1	92.28	5.92	98.20	3095.	2597.	300.6	89.9	59.7	23.1	366.1	3.46	0.15	-0.04	-0.01	8.65	0.00005	0.00187
1	1	92.35	5.90	98.25	3087.	2593.	298.0	89.3	62.4	21.8	365.7	3.56	0.21	-0.04	-0.00	8.69	0.00005	0.00192
1	1	92.41	5.89	98.30	3079.	2589.	295.4	88.6	65.5	20.6	365.3	3.67	0.27	-0.03	-0.01	8.70	0.00005	0.00197
1	1	92.47	5.87	98.35	3071.	2585.	292.9	88.0	69.0	19.7	364.8	3.77	0.32	-0.04	-0.01	8.73	0.00005	0.00202
1	1	92.54	5.86	98.40	3063.	2581.	290.3	87.4	72.8	18.7	364.3	3.85	0.35	-0.05	-0.01	8.75	0.00005	0.00207
1	1	92.54	5.86	98.40	3063.	2581.	290.3	87.4	72.8	18.7	364.3	3.85	0.35	-0.05	-0.01	8.75	0.00005	0.00212
1	1	92.60	5.84	98.45	3055.	2577.	287.8	86.9	76.7	17.8	363.8	3.90	0.35	-0.06	-0.02	8.78	0.00005	0.00217
1	1	92.67	5.83	98.50	3048.	2574.	285.3	86.3	80.6	16.9	363.4	3.91	0.33	-0.06	-0.03	8.81	0.00005	0.00223
1	1	92.73	5.82	98.55	3040.	2570.	282.8	85.7	84.3	15.8	362.9	3.90	0.29	-0.07	-0.03	8.83	0.00005	0.00228
1	1	92.79	5.80	98.60	3032.	2566.	280.3	85.2	87.8	14.6	362.4	3.88	0.26	-0.08	-0.03	8.86	0.00006	0.00234
1	1	92.79	5.80	98.60	3032.	2566.	280.3	85.2	87.8	14.6	362.4	3.88	0.26	-0.08	-0.03	8.86	0.00006	0.00239
1	1	92.86	5.79	98.64	3025.	2563.	277.8	84.6	91.0	13.3	361.9	3.85	0.23	-0.08	-0.03	8.89	0.00006	0.00245
1	1	92.92	5.77	98.69	3017.	2559.	275.3	84.0	94.1	12.0	361.5	3.83	0.20	-0.08	-0.02	8.91	0.00006	0.00250
1	1	92.99	5.76	98.74	3009.	2556.	272.8	83.5	97.1	10.7	361.1	3.83	0.20	-0.07	-0.02	8.93	0.00006	0.00256
1	1	92.99	5.76	98.74	3009.	2556.	272.8	83.5	97.1	10.7	361.1	3.83	0.20	-0.07	-0.02	8.93	0.00006	0.00262
1	1	93.05	5.75	98.80	3002.	2552.	270.2	83.0	99.3	9.4	360.6	3.84	0.20	-0.07	-0.02	8.96	0.00006	0.00268
1	1	93.11	5.73	98.85	2995.	2548.	267.7	82.4	101.5	8.2	360.1	3.87	0.22	-0.07	-0.01	8.98	0.00006	0.00274
1	1	93.18	5.72	98.90	2987.	2545.	265.3	81.9	104.6	7.0	359.6	3.91	0.23	-0.07	-0.01	9.01	0.00006	0.00280
1	1	93.24	5.71	98.95	2980.	2542.	262.9	81.4	107.9	5.9	359.2	3.96	0.25	-0.07	-0.01	9.03	0.00006	0.00286
1	1	93.24	5.71	98.95	2980.	2542.	262.9	81.4	107.9	5.9	359.2	3.96	0.25	-0.07	-0.01	9.03	0.00006	0.00292
1	1	93.31	5.69	99.00	2973.	2538.	260.6	80.9	111.2	4.8	358.7	4.00	0.26	-0.07	-0.01	9.06	0.00006	0.00298
1	1	93.37	5.68	99.05	2965.	2535.	258.1	80.5	113.0	3.7	358.1	4.03	0.26	-0.07	-0.02	9.08	0.00006	0.00305

LOCATION 6 GUN TYPE 3 ERROR MODE 3 POSITION=(1560G.0, 10900.0, 90.0) RADIUS= 0.0 M

L N	DEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	1	93.43	5.67	99.10	2958.	2532.	255.5	80.0	116.4	2.6	357.6	4.06	0.26	-0.08	-0.02	9.11	0.00006	0.00311
1	1	93.56	5.65	99.21	2944.	2522.	255.4	79.9	116.3	2.6	357.4	4.08	0.26	-0.08	-0.02	9.13	0.00006	0.00324
1	1	93.69	5.63	99.31	2930.	2512.	255.2	79.8	116.2	2.6	357.2	4.09	0.26	-0.08	-0.02	9.16	0.00006	0.00337
1	1	93.82	5.62	99.41	2917.	2502.	255.1	79.7	116.1	2.6	357.0	4.10	0.26	-0.08	-0.02	9.18	0.00006	0.00350
1	1	93.95	5.60	99.52	2903.	2492.	254.9	79.6	116.0	2.6	356.8	4.11	0.26	-0.08	-0.02	9.21	0.00006	0.00363
1	1	94.08	5.58	99.62	2890.	2482.	254.8	79.5	115.9	2.6	356.6	4.12	0.26	-0.08	-0.02	9.24	0.00006	0.00376
1	1	94.21	5.56	99.73	2877.	2472.	254.6	79.4	115.8	2.6	356.4	4.13	0.26	-0.08	-0.02	9.26	0.00006	0.00389
1	1	94.34	5.55	99.83	2864.	2462.	254.5	79.3	115.7	2.6	356.2	4.14	0.26	-0.08	-0.02	9.29	0.00006	0.00403
1	1	94.47	5.53	99.94	2851.	2452.	254.3	79.2	115.6	2.6	356.0	4.15	0.26	-0.08	-0.02	9.31	0.00006	0.00416
1	1	94.60	5.51	100.04	2838.	2442.	254.2	79.1	115.5	2.6	355.8	4.16	0.26	-0.08	-0.02	9.34	0.00006	0.00429
1	1	94.73	5.50	100.15	2825.	2432.	254.0	79.0	115.4	2.6	355.6	4.17	0.26	-0.08	-0.02	9.36	0.00006	0.00442
1	1	94.86	5.48	100.25	2812.	2422.	253.9	78.9	115.3	2.6	355.4	4.18	0.26	-0.08	-0.02	9.39	0.00006	0.00455
1	1	94.99	5.46	100.36	2799.	2412.	253.7	78.8	115.2	2.6	355.2	4.19	0.26	-0.08	-0.02	9.42	0.00006	0.00467
1	1	95.12	5.45	100.46	2786.	2402.	253.6	78.7	115.1	2.6	355.0	4.20	0.26	-0.08	-0.02	9.44	0.00006	0.00480
1	1	95.25	5.43	100.57	2773.	2392.	253.4	78.6	115.0	2.6	354.8	4.21	0.26	-0.08	-0.02	9.47	0.00006	0.00493
1	1	95.38	5.41	100.67	2760.	2382.	253.3	78.5	114.9	2.6	354.6	4.22	0.26	-0.08	-0.02	9.49	0.00006	0.00505
1	1	95.51	5.40	100.78	2747.	2372.	253.1	78.4	114.8	2.6	354.4	4.23	0.26	-0.08	-0.02	9.52	0.00006	0.00518
1	1	95.64	5.38	100.88	2734.	2362.	253.0	78.3	114.7	2.6	354.2	4.24	0.26	-0.08	-0.02	9.54	0.00006	0.00531
1	1	95.77	5.36	100.99	2721.	2352.	252.8	78.2	114.6	2.6	354.0	4.25	0.26	-0.08	-0.02	9.57	0.00006	0.00542
1	1	95.90	5.35	101.09	2708.	2342.	252.7	78.1	114.5	2.6	353.8	4.26	0.26	-0.08	-0.02	9.60	0.00006	0.00554
1	1	96.03	5.33	101.20	2695.	2332.	252.5	78.0	114.4	2.6	353.6	4.27	0.26	-0.08	-0.02	9.62	0.00006	0.00565
1	1	96.16	5.31	101.30	2682.	2322.	252.4	77.9	114.3	2.6	353.4	4.28	0.26	-0.08	-0.02	9.65	0.00006	0.00577
1	1	96.29	5.30	101.41	2669.	2312.	252.2	77.8	114.2	2.6	353.2	4.29	0.26	-0.08	-0.02	9.67	0.00006	0.00588
1	1	96.42	5.28	101.51	2656.	2302.	252.1	77.7	114.1	2.6	353.0	4.30	0.26	-0.08	-0.02	9.70	0.00006	0.00599
1	1	96.55	5.26	101.62	2643.	2292.	251.9	77.6	114.0	2.6	352.8	4.31	0.26	-0.08	-0.02	9.73	0.00006	0.00610
1	1	96.68	5.25	101.72	2630.	2282.	251.8	77.5	113.9	2.6	352.6	4.32	0.26	-0.08	-0.02	9.75	0.00006	0.00621
1	1	96.81	5.23	101.83	2617.	2272.	251.6	77.4	113.8	2.6	352.4	4.33	0.26	-0.08	-0.02	9.78	0.00006	0.00632
1	1	96.94	5.21	101.93	2604.	2262.	251.5	77.3	113.7	2.6	352.2	4.34	0.26	-0.08	-0.02	9.80	0.00006	0.00643
1	1	97.07	5.20	102.04	2591.	2252.	251.3	77.2	113.6	2.6	352.0	4.35	0.26	-0.08	-0.02	9.83	0.00006	0.00654
1	1	97.20	5.18	102.14	2578.	2242.	251.2	77.1	113.5	2.6	351.8	4.36	0.26	-0.08	-0.02	9.86	0.00006	0.00665
1	1	97.33	5.16	102.25	2565.	2232.	251.0	77.0	113.4	2.6	351.6	4.37	0.26	-0.08	-0.02	9.88	0.00006	0.00676
1	1	97.46	5.15	102.35	2552.	2222.	250.9	76.9	113.3	2.6	351.4	4.38	0.26	-0.08	-0.02	9.91	0.00006	0.00687
1	1	97.59	5.13	102.46	2539.	2212.	250.7	76.8	113.2	2.6	351.2	4.39	0.26	-0.08	-0.02	9.93	0.00006	0.00698
1	1	97.72	5.11	102.56	2526.	2202.	250.6	76.7	113.1	2.6	351.0	4.40	0.26	-0.08	-0.02	9.96	0.00006	0.00709
1	1	97.85	5.10	102.67	2513.	2192.	250.4	76.6	113.0	2.6	350.8	4.41	0.26	-0.08	-0.02	9.98	0.00006	0.00720
1	1	97.98	5.08	102.77	2500.	2182.	250.3	76.5	112.9	2.6	350.6	4.42	0.26	-0.08	-0.02	9.99	0.00006	0.00731
1	1	98.11	5.06	102.88	2487.	2172.	250.1	76.4	112.8	2.6	350.4	4.43	0.26	-0.08	-0.02	10.01	0.00006	0.00742
1	1	98.24	5.05	102.98	2474.	2162.	250.0	76.3	112.7	2.6	350.2	4.44	0.26	-0.08	-0.02	10.02	0.00006	0.00753
1	1	98.37	5.03	103.09	2461.	2152.	249.8	76.2	112.6	2.6	350.0	4.45	0.26	-0.08	-0.02	10.04	0.00006	0.00764
1	1	98.50	5.01	103.19	2448.	2142.	249.7	76.1	112.5	2.6	349.8	4.46	0.26	-0.08	-0.02	10.07	0.00006	0.00775
1	1	98.63	5.00	103.30	2435.	2132.	249.5	76.0	112.4	2.6	349.6	4.47	0.26	-0.08	-0.02	10.09	0.00006	0.00786
1	1	98.76	4.98	103.40	2422.	2122.	249.4	75.9	112.3	2.6	349.4	4.48	0.26	-0.08	-0.02	10.12	0.00006	0.00797
1	1	98.89	4.96	103.51	2409.	2112.	249.2	75.8	112.2	2.6	349.2	4.49	0.26	-0.08	-0.02	10.14	0.00006	0.00808
1	1	99.02	4.95	103.61	2396.	2102.	249.1	75.7	112.1	2.6	349.0	4.50	0.26	-0.08	-0.02	10.17	0.00006	0.00819
1	1	99.15	4.93	103.72	2383.	2092.	248.9	75.6	112.0	2.6	348.8	4.51	0.26	-0.08	-0.02	10.19	0.00006	0.00830
1	1	99.28	4.91	103.82	2370.	2082.	248.8	75.5	111.9	2.6	348.6	4.52	0.26	-0.08	-0.02	10.22	0.00006	0.00841
1	1	99.41	4.90	103.93	2357.	2072.	248.6	75.4	111.8	2.6	348.4	4.53	0.26	-0.08	-0.02	10.24	0.00006	0.00852
1	1	99.54	4.88	104.03	2344.	2062.	248.5	75.3	111.7	2.6	348.2	4.54	0.26	-0.08	-0.02	10.27	0.00006	0.00863
1	1	99.67	4.86	104.14	2331.	2052.	248.3	75.2	111.6	2.6	348.0	4.55	0.26	-0.08	-0.02	10.29	0.00006	0.00874
1	1	99.80	4.85	104.24	2318.	2042.	248.2	75.1	111.5	2.6	347.8	4.56	0.26	-0.08	-0.02	10.32	0.00006	0.00885
1	1	99.93	4.83	104.35	2305.	2032.	248.0	75.0	111.4	2.6	347.6	4.57	0.26	-0.08	-0.02	10.34	0.00006	0.00896
1	1	100.06	4.81	104.45	2292.	2022.	247.9	74.9	111.3	2.6	347.4	4.58	0.26	-0.08	-0.02	10.37	0.00006	0.00907
1	1	100.19	4.80	104.56	2279.	2012.	247.7	74.8	111.2	2.6	347.2	4.59	0.26	-0.08	-0.02	10.39	0.00006	0.00918
1	1	100.32	4.78	104.66	2266.	2002.	247.6	74.7	111.1	2.6	347.0	4.60	0.26	-0.08	-0.02	10.42	0.00006	0.00929
1	1	100.45	4.76	104.77	2253.	1992.	247.4	74.6	111.0	2.6	346.8	4.61	0.26	-0.08	-0.02	10.44	0.00006	0.00940
1	1	100.58	4.75	104.87	2240.	1982.	247.3	74.5	110.9	2.6	346.6	4.62	0.26	-0.08	-0.02	10.47	0.00006	0.00951
1	1	100.71	4.73	104.98	2227.	1972.	247.1	74.4	110.8	2.6	346.4	4.63	0.26	-0.08	-0.02	10.49	0.00006	0.00962
1	1	100.84	4.71	105.08	2214.	1962.	247.0	74.3	110.7	2.6	346.2	4.64	0.26	-0.08	-0.02	10.52	0.00006	0.00973
1	1	100.97	4.70	105.19	2201.	1952.	246.8	74.2	110.6	2.6	346.0	4.65	0.26	-0.08	-0.02	10.54	0.00006	0.00984
1	1	101.10	4.68	105.29	2188.	1942.	246.7	74.1	110.5	2.6	345.8	4.66	0.26	-0.08	-0.02	10.57	0.00006	0.00995
1	1	101.23	4.66	105.40	2175.	1932.	246.5	74.0	110.4	2.6	345.6	4.67	0.26	-0.08	-0.02	10.59	0.00006	0.01006
1	1	101.36	4.65	105.50	2162.	1922.	246.4	73.9	110.3	2.6	345.4	4.68	0.26	-0.08	-0.02	10.62	0.00006	0.01017
1	1	101.49	4.63	105.61	2149.	1912.	246.2	73.8	110.2	2.6	345.2	4.69	0.26	-0.08	-0.02	10.64	0.00006	0.01028
1	1	101.62	4.61	105.71	2136.	1902.	246.1	73.7	110.1	2.6	345.0	4.70	0.26	-0.08	-0.02	10.67	0.00006	0.01039
1	1	101.75	4.60	105.82	2123.	1892.	245.9	73.6	110.0	2.6	344.8	4.71	0.26	-0.08	-0.02	10.69	0.00006	0.01050
1	1	101.88	4.58	105.92	2110.	1882.	245.8	73.5	109.9	2.6	344.6	4.72	0.26	-0.08	-0.02	10.72	0.00006	0.01061
1	1	102.01	4.56	106.03	2097.	1872.	245.6	73.4	109.8	2.6	344.4	4.73	0.26	-0.08	-0.02	10.74	0.00006	0.01072
1	1	102.14	4.55	106.13	2084.	1862.	245.5	73.3	109.7	2.6	344.2	4.74	0.26	-0.08	-0.02	10.77	0.00006	0.01083
1	1	102.27	4.53	106.24	2071.	1852.	245.3	73.2	109.6	2.6	344.0	4.75	0.26	-0.08	-0.02	10.79	0.00006	0.01094
1	1	102.40	4.51	106.34	2058.	1842.	245.2	73.1	109.5	2.6	343.8	4.76	0.26	-0.08	-0.02	10.82	0.00006	0.01105
1	1	102.53	4.50	106.45	2045.	1832.	245.0	73.0	109.4	2.6	343.6	4.77	0.26	-0.08	-0.02	10.84	0.00006	0.01116

LOCATION 6 GUN TYPE 3 ERROR MODE 3 POSITION=(15600.0, 10900.0, 90.0) RADIUS= 0.0 *

L N	DEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	1	95.99	5.34	101.33	2725.	2444.	273.5	71.6	209.7	40.0	332.1	4.75	0.12	-0.12	-0.00	10.03	0.00005	0.00626
1	1	95.99	5.34	101.33	2725.	2444.	273.5	71.6	209.7	40.0	332.1	4.75	0.12	-0.12	-0.00	10.03	0.00005	0.00631
1	1	96.06	5.33	101.39	2721.	2443.	274.9	71.6	212.9	41.1	331.3	4.76	0.11	-0.12	-0.00	10.04	0.00005	0.00636
1	1	96.12	5.33	101.45	2717.	2442.	276.3	71.7	214.4	42.0	330.4	4.78	0.11	-0.12	-0.00	10.05	0.00005	0.00641
1	1	96.19	5.32	101.51	2712.	2441.	277.9	71.8	217.7	43.1	329.6	4.79	0.10	-0.12	-0.00	10.05	0.00005	0.00646
1	1	96.19	5.32	101.51	2712.	2441.	277.9	71.8	217.7	43.1	329.6	4.79	0.10	-0.12	-0.00	10.05	0.00005	0.00651
1	1	96.25	5.32	101.57	2708.	2441.	279.3	71.9	219.4	44.0	328.7	4.80	0.10	-0.12	-0.00	10.06	0.00005	0.00656
1	1	96.31	5.32	101.64	2704.	2440.	280.6	72.0	221.2	45.0	327.9	4.82	0.10	-0.12	-0.00	10.07	0.00005	0.00661
1	1	96.38	5.32	101.70	2700.	2440.	282.5	72.1	223.1	46.0	327.0	4.83	0.09	-0.12	-0.00	10.08	0.00005	0.00665
1	1	96.44	5.32	101.76	2696.	2439.	284.4	72.3	226.8	47.0	326.1	4.85	0.09	-0.12	-0.00	10.09	0.00005	0.00670
1	1	96.44	5.32	101.76	2696.	2439.	284.4	72.3	226.8	47.0	326.1	4.85	0.09	-0.12	-0.00	10.09	0.00005	0.00674
1	1	96.51	5.32	101.82	2692.	2439.	286.2	72.4	228.9	48.0	325.2	4.86	0.08	-0.12	-0.00	10.10	0.00005	0.00679
1	1	96.57	5.32	101.89	2688.	2439.	288.0	72.9	231.1	48.9	324.3	4.87	0.08	-0.12	-0.00	10.10	0.00004	0.00683
1	1	96.63	5.32	101.95	2685.	2439.	289.9	73.4	233.5	49.9	323.3	4.89	0.07	-0.12	-0.00	10.11	0.00004	0.00688
1	1	96.63	5.32	101.95	2685.	2439.	289.9	73.4	233.5	49.9	323.3	4.89	0.07	-0.12	-0.00	10.11	0.00004	0.00692
1	1	96.70	5.32	102.02	2681.	2439.	292.0	74.0	235.9	50.9	322.4	4.90	0.07	-0.12	-0.00	10.12	0.00004	0.00696
1	1	96.76	5.32	102.08	2677.	2439.	294.1	74.6	238.5	51.8	321.4	4.91	0.06	-0.12	-0.00	10.13	0.00004	0.00700
1	3	96.83	5.32	102.14	2674.	2439.	50.2	31.3	189.7	25.3	324.7	4.15	-0.02	-0.07	0.01	10.15	0.00000	0.00700
1	3	96.89	5.32	102.21	2670.	2439.	50.3	30.7	178.1	25.6	324.9	4.17	-0.02	-0.03	0.01	10.16	0.00000	0.00700
1	3	96.89	5.32	102.21	2670.	2439.	50.3	30.7	178.1	25.6	324.9	4.17	-0.02	-0.03	0.01	10.16	0.00000	0.00700
1	3	96.95	5.32	102.28	2667.	2439.	49.1	30.3	165.4	26.2	324.9	4.18	-0.03	0.02	0.02	10.16	0.00000	0.00701
1	3	97.02	5.32	102.34	2664.	2440.	49.2	29.8	159.5	26.6	324.6	4.41	-0.01	0.06	0.02	10.17	0.00000	0.00701
1	3	97.08	5.32	102.41	2661.	2440.	49.4	29.4	160.3	26.9	323.8	4.71	0.01	0.07	0.03	10.18	0.00000	0.00702
1	3	97.08	5.32	102.41	2661.	2440.	49.4	29.4	160.3	26.9	323.8	4.71	0.01	0.07	0.03	10.18	0.00000	0.00702
1	3	97.15	5.32	102.47	2658.	2441.	49.5	29.0	167.4	27.2	322.5	5.02	0.04	0.07	0.02	10.19	0.00000	0.00702
1	3	97.21	5.33	102.54	2655.	2442.	49.5	28.7	177.8	27.7	320.7	5.26	0.06	0.05	0.02	10.20	0.00000	0.00702
1	3	97.27	5.33	102.61	2652.	2443.	50.2	28.4	192.6	28.0	318.8	5.41	0.07	0.03	0.02	10.21	0.00000	0.00702
1	3	97.34	5.34	102.68	2649.	2444.	50.1	28.1	205.8	28.6	316.8	5.44	0.07	0.00	0.02	10.22	0.00000	0.00702
1	3	97.34	5.34	102.68	2649.	2444.	50.1	28.1	205.8	28.6	316.8	5.44	0.07	0.00	0.02	10.22	0.00000	0.00702
1	3	97.40	5.34	102.74	2646.	2445.	50.9	27.8	218.7	28.9	315.0	5.38	0.05	-0.02	0.02	10.23	0.00000	0.00702
1	3	97.47	5.35	102.81	2643.	2446.	50.7	27.6	226.5	29.4	313.5	5.25	0.03	-0.03	0.02	10.23	0.0	0.00702
1	3	97.53	5.35	102.88	2641.	2448.	50.5	27.3	230.4	30.0	312.2	5.11	0.01	-0.04	0.02	10.24	0.0	0.00702
1	3	97.59	5.35	102.95	2638.	2449.	51.3	27.1	232.8	30.2	311.3	4.98	-0.01	-0.03	0.02	10.25	0.0	0.00702
1	3	97.59	5.35	102.95	2638.	2449.	51.3	27.1	232.8	30.2	311.3	4.98	-0.01	-0.03	0.02	10.25	0.0	0.00702
1	3	97.66	5.36	103.02	2636.	2450.	51.1	26.9	231.3	30.7	310.4	4.90	-0.02	-0.02	0.02	10.26	0.0	0.00702
1	3	97.72	5.37	103.09	2633.	2452.	51.0	26.7	229.3	31.1	309.7	4.87	-0.03	-0.01	0.02	10.26	0.0	0.00702
1	3	97.79	5.38	103.16	2630.	2454.	49.7	26.5	228.1	31.2	308.8	4.90	-0.03	-0.00	0.03	10.27	0.0	0.00702
1	3	97.79	5.38	103.16	2630.	2454.	49.7	26.5	228.1	31.2	308.8	4.90	-0.03	-0.00	0.03	10.27	0.0	0.00702
1	3	97.85	5.38	103.23	2626.	2456.	49.5	26.3	228.5	31.5	307.8	4.96	-0.03	-0.00	0.03	10.28	0.0	0.00702
1	3	97.91	5.39	103.30	2621.	2458.	48.4	26.1	231.1	31.4	306.7	5.05	-0.02	-0.01	0.03	10.29	0.0	0.00702
1	3	97.98	5.40	103.38	2615.	2460.	49.7	26.1	234.4	31.5	305.5	5.11	-0.01	-0.03	0.04	10.29	0.0	0.00702
1	3	98.04	5.41	103.45	2610.	2462.	49.1	26.0	237.2	31.3	304.4	5.14	0.01	-0.04	0.04	10.31	0.0	0.00702
1	3	98.04	5.41	103.45	2610.	2462.	49.1	26.0	237.2	31.3	304.4	5.14	0.01	-0.04	0.04	10.31	0.0	0.00702
1	3	98.11	5.42	103.53	2604.	2465.	48.9	26.0	235.0	30.8	303.4	5.10	0.03	-0.06	0.04	10.32	0.0	0.00702
1	3	98.17	5.43	103.60	2599.	2467.	48.9	25.9	230.2	29.5	302.9	5.02	0.05	-0.06	0.04	10.33	0.0	0.00702
1	3	98.23	5.43	103.67	2594.	2470.	49.4	25.9	221.5	27.8	302.7	4.94	0.06	-0.06	0.03	10.34	0.0	0.00702
1	3	98.23	5.43	103.67	2594.	2470.	49.4	25.9	221.5	27.8	302.7	4.94	0.06	-0.06	0.03	10.34	0.0	0.00702
1	3	98.30	5.45	103.75	2589.	2473.	48.8	25.8	207.9	26.1	302.7	4.88	0.07	-0.06	0.03	10.34	0.00000	0.00702
1	3	98.36	5.46	103.82	2584.	2476.	49.3	25.8	194.4	24.1	302.9	4.84	0.06	-0.05	0.03	10.35	0.00000	0.00702
1	3	98.43	5.47	103.90	2579.	2479.	49.8	25.8	179.0	22.5	303.0	4.85	0.04	-0.04	0.03	10.35	0.00000	0.00702
1	3	98.49	5.48	103.97	2574.	2482.	49.5	25.7	166.3	20.9	303.1	4.89	0.02	-0.03	0.02	10.36	0.00000	0.00703

LOCATION 6 GUN TYPE 3 ERROR MODE 3 POSITION=(15600.0, 10900.0, 90.0) RADIUS= 0.0 M

L N	OEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	3	98.49	5.48	103.97	2574.	2482.	49.5	25.7	166.3	20.9	303.1	4.89	0.02	-0.03	C.02	10.36	0.00000	0.00703
1	3	98.55	5.49	104.05	2569.	2486.	49.3	25.7	153.7	19.8	303.1	4.95	0.00	-0.02	C.02	10.36	0.00001	0.00704
1	3	98.62	5.51	104.13	2565.	2489.	49.2	25.7	143.2	19.0	302.8	5.02	-0.01	-0.02	C.02	10.37	0.00001	0.00705
1	3	98.68	5.52	104.20	2560.	2493.	49.2	25.7	134.6	18.3	302.4	5.08	-0.02	-0.02	0.02	10.38	0.00002	0.00708
1	3	98.68	5.52	104.20	2560.	2493.	49.2	25.7	134.6	18.3	302.4	5.08	-0.02	-0.02	C.02	10.38	0.00002	0.00710
1	3	98.75	5.53	104.28	2555.	2495.	49.5	25.6	129.4	18.0	302.0	5.14	-0.03	-0.02	C.02	10.38	0.00003	0.00713
1	3	98.81	5.52	104.33	2551.	2493.	48.8	25.5	128.9	18.9	301.9	5.17	-0.03	-0.02	C.02	10.38	0.00003	0.00717
1	3	98.87	5.51	104.38	2547.	2490.	49.2	25.4	130.5	19.6	301.7	5.19	-0.03	-0.03	0.02	10.38	0.00003	0.00719
1	3	98.94	5.49	104.43	2542.	2485.	48.7	25.3	132.5	20.8	301.7	5.19	-0.02	-0.03	C.02	10.39	0.00002	0.00722
1	3	98.94	5.49	104.43	2542.	2485.	48.7	25.3	132.5	20.8	301.7	5.19	-0.02	-0.03	0.02	10.38	0.00002	0.00724
1	3	99.00	5.48	104.48	2538.	2481.	48.0	25.2	134.4	22.0	301.6	5.18	-0.02	-0.03	C.02	10.38	0.00002	0.00726
1	3	99.07	5.46	104.52	2534.	2477.	49.0	25.0	137.8	22.7	301.6	5.17	-0.02	-0.03	0.02	10.38	0.00002	0.00728
1	3	99.13	5.44	104.57	2530.	2472.	48.3	24.9	139.5	23.8	301.6	5.17	-0.03	-0.02	C.02	10.38	0.00001	0.00729
1	3	99.13	5.44	104.57	2530.	2472.	48.3	24.9	139.5	23.8	301.6	5.17	-0.03	-0.02	C.02	10.38	0.00001	0.00730
1	3	99.19	5.43	104.62	2526.	2467.	47.7	24.8	141.3	25.0	301.5	5.17	-0.04	-0.02	0.02	10.38	0.00001	0.00731
1	3	99.26	5.41	104.67	2522.	2463.	47.9	24.7	144.3	26.1	301.5	5.18	-0.04	-0.02	C.02	10.38	0.00001	0.00732
1	3	99.32	5.39	104.72	2518.	2459.	47.4	24.6	146.9	27.5	301.4	5.21	-0.05	-0.01	0.02	10.38	0.00001	0.00733
1	3	99.39	5.38	104.76	2515.	2455.	47.7	24.5	150.9	28.8	301.3	5.23	-0.06	-0.01	C.02	10.37	0.00000	0.00733
1	3	99.39	5.38	104.76	2515.	2455.	47.7	24.5	150.9	28.8	301.3	5.23	-0.06	-0.01	0.02	10.37	0.00000	0.00734
1	3	99.45	5.36	104.81	2511.	2450.	47.2	24.4	154.7	30.4	301.1	5.26	-0.07	-0.01	C.02	10.37	0.00000	0.00734
1	3	99.51	5.35	104.86	2507.	2446.	46.9	24.2	159.0	32.0	300.9	5.29	-0.08	-0.01	C.02	10.37	0.00000	0.00734
1	3	99.58	5.33	104.91	2504.	2441.	46.5	24.1	163.7	33.7	300.7	5.31	-0.08	-0.01	C.02	10.37	0.00000	0.00735
1	3	99.64	5.31	104.96	2501.	2438.	47.0	24.0	169.5	35.2	300.4	5.33	-0.09	-0.01	0.02	10.37	0.00000	0.00735
1	3	99.64	5.31	104.96	2501.	2438.	47.0	24.0	169.5	35.2	300.4	5.33	-0.09	-0.01	C.02	10.37	0.00000	0.00735
1	3	99.71	5.30	105.00	2497.	2433.	46.7	23.9	174.7	36.9	300.2	5.35	-0.09	-0.01	0.01	10.37	0.00000	0.00735
1	3	99.77	5.28	105.05	2494.	2429.	46.5	23.8	180.0	38.6	299.9	5.36	-0.10	-0.01	C.01	10.37	0.00000	0.00735
1	3	99.83	5.27	105.10	2491.	2425.	47.1	23.7	186.1	40.0	299.6	5.36	-0.10	-0.01	0.01	10.37	0.00000	0.00735
1	3	99.83	5.27	105.10	2491.	2425.	47.1	23.7	186.1	40.0	299.6	5.36	-0.10	-0.01	C.01	10.37	0.00000	0.00735
1	3	99.90	5.25	105.15	2488.	2421.	46.9	23.6	191.4	41.6	299.4	5.37	-0.10	-0.01	0.01	10.37	0.00000	0.00735
1	3	99.96	5.24	105.20	2485.	2417.	46.8	23.5	196.8	43.3	299.1	5.38	-0.11	-0.01	C.01	10.36	0.0	0.00735
1	3	100.03	5.22	105.25	2482.	2413.	46.7	23.5	202.3	45.0	298.8	5.39	-0.12	-0.01	0.01	10.36	0.0	0.00735
1	3	100.09	5.21	105.30	2479.	2409.	46.6	23.4	207.9	46.7	298.5	5.40	-0.12	-0.00	C.01	10.36	0.0	0.00735
1	3	100.09	5.21	105.30	2479.	2409.	46.6	23.4	207.9	46.7	298.5	5.40	-0.12	-0.00	0.01	10.36	0.0	0.00735
1	3	100.15	5.19	105.35	2477.	2405.	46.5	23.1	213.8	48.4	298.2	5.41	-0.13	-0.00	C.01	10.36	0.0	0.00735
1	3	100.22	5.18	105.40	2474.	2401.	45.6	22.8	219.0	50.4	297.9	5.43	-0.14	-0.00	0.01	10.35	0.0	0.00735
1	3	100.28	5.17	105.45	2472.	2397.	45.6	22.5	225.3	52.2	297.6	5.44	-0.14	-0.00	C.01	10.35	0.0	0.00735
1	3	100.28	5.17	105.45	2472.	2397.	45.6	22.5	225.3	52.2	297.6	5.44	-0.14	-0.00	C.01	10.35	0.0	0.00735
1	3	100.35	5.15	105.50	2469.	2394.	45.6	22.3	231.7	54.0	297.2	5.45	-0.15	0.00	C.01	10.35	0.0	0.00735
1	3	100.41	5.14	105.55	2467.	2390.	44.5	22.0	237.5	56.0	296.9	5.47	-0.16	0.00	C.01	10.34	0.0	0.00735
1	3	100.47	5.13	105.60	2465.	2386.	45.0	21.8	244.3	57.8	296.5	5.48	-0.16	0.00	C.00	10.34	0.0	0.00735
1	3	100.54	5.11	105.65	2463.	2382.	45.3	21.8	251.2	59.6	296.1	5.49	-0.17	0.00	0.00	10.34	0.0	0.00735
1	3	100.54	5.11	105.65	2463.	2382.	45.3	21.8	251.2	59.6	296.1	5.49	-0.17	0.00	C.00	10.34	0.0	0.00735
1	3	100.60	5.10	105.70	2461.	2379.	45.5	21.7	258.2	61.3	295.8	5.50	-0.17	0.00	C.00	10.33	0.0	0.00735
1	3	100.67	5.09	105.75	2459.	2375.	45.1	21.7	264.4	63.4	295.4	5.50	-0.18	0.00	C.00	10.33	0.0	0.00735
1	3	100.73	5.08	105.81	2457.	2371.	44.7	21.7	270.6	65.4	295.0	5.51	-0.19	0.00	C.00	10.32	0.0	0.00735
1	3	100.73	5.08	105.81	2457.	2371.	44.7	21.7	270.6	65.4	295.0	5.51	-0.19	0.00	C.00	10.32	0.0	0.00735
1	3	100.79	5.06	105.85	2455.	2368.	45.1	21.6	277.8	67.1	294.6	5.52	-0.19	0.00	0.00	10.32	0.0	0.00735
1	3	100.86	5.05	105.90	2453.	2365.	45.5	21.6	286.5	68.9	294.1	5.52	-0.20	0.01	-0.00	10.31	0.0	0.00735
1	3	100.92	5.04	105.96	2452.	2361.	45.2	21.5	293.1	70.9	293.7	5.53	-0.20	0.01	-0.00	10.31	0.0	0.00735
1	3	100.99	5.02	106.01	2450.	2358.	45.0	21.5	299.9	72.9	293.3	5.54	-0.21	0.01	-0.00	10.30	0.0	0.00735

LOCATION 6 GUN TYPE 3 ERROR MODE 3 POSITION=(15600.0, 10900.0, 90.0) RADIUS= C.C M

L M	UEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT_PK	CUM.PK
1	3	101.05	5.01	106.06	2449.	2355.	45.6	21.5	307.7	74.6	292.8	5.55	-0.22	0.01	-0.00	10.30	0.0	0.00735
1	3	101.11	5.00	106.12	2447.	2351.	44.7	21.4	313.8	76.9	292.4	5.55	-0.22	0.01	-0.00	10.29	0.0	0.00735
1	3	101.18	4.99	106.17	2446.	2348.	45.3	21.4	321.8	78.5	291.9	5.56	-0.23	0.01	-0.00	10.28	0.0	0.00735
1	3	101.24	4.98	106.22	2445.	2345.	45.3	21.4	329.1	80.5	291.5	5.56	-0.24	0.01	-0.00	10.28	0.0	0.00735
1	3	101.24	4.98	106.22	2445.	2345.	45.3	21.4	329.1	80.5	291.5	5.56	-0.24	0.01	-0.00	10.28	0.0	0.00735
1	3	101.31	4.97	106.27	2444.	2342.	45.3	21.3	336.4	82.4	291.0	5.57	-0.24	0.01	-0.01	10.27	0.0	0.00735
1	3	101.37	4.95	106.32	2443.	2338.	45.2	21.3	343.9	84.3	290.5	5.57	-0.25	0.01	-0.01	10.26	0.0	0.00735
1	3	101.43	4.94	106.38	2442.	2335.	45.4	21.3	351.5	86.2	290.0	5.58	-0.25	0.01	-0.01	10.25	0.0	0.00735
1	3	101.43	4.94	106.38	2442.	2335.	45.4	21.3	351.5	86.2	290.0	5.58	-0.25	0.01	-0.01	10.25	0.0	0.00735
1	3	101.50	4.93	106.43	2441.	2332.	45.5	21.3	359.2	88.0	289.5	5.58	-0.26	0.01	-0.01	10.24	0.0	0.00735
1	3	101.56	4.92	106.48	2441.	2329.	45.7	21.2	367.0	89.9	289.0	5.58	-0.27	0.01	-0.01	10.24	0.0	0.00735
1	3	101.63	4.91	106.54	2440.	2326.	45.2	21.2	374.1	92.0	288.5	5.59	-0.27	0.01	-0.01	10.23	0.0	0.00735
1	3	101.69	4.90	106.59	2440.	2324.	46.1	21.2	383.1	93.4	288.0	5.59	-0.28	0.01	-0.01	10.22	0.0	0.00735
1	3	101.69	4.90	106.59	2440.	2324.	46.1	21.2	383.1	93.4	288.0	5.59	-0.28	0.01	-0.01	10.22	0.0	0.00735
1	3	101.75	4.89	106.65	2439.	2321.	45.8	21.2	390.4	95.5	287.5	5.59	-0.28	0.01	-0.01	10.23	0.0	0.00735
1	3	101.82	4.88	106.70	2439.	2318.	46.1	21.1	398.8	97.2	286.9	5.59	-0.29	0.01	-0.01	10.25	0.0	0.00735
1	3	101.88	4.87	106.75	2439.	2316.	46.5	21.1	407.3	98.9	286.4	5.59	-0.30	0.01	-0.01	10.28	0.0	0.00735
1	3	101.88	4.87	106.75	2439.	2316.	46.5	21.1	407.3	98.9	286.4	5.59	-0.30	0.01	-0.01	10.28	0.0	0.00735
1	3	101.95	4.86	106.81	2439.	2313.	46.3	21.1	415.0	100.9	285.8	5.59	-0.30	0.01	-0.01	10.30	0.0	0.00735
1	3	102.01	4.86	106.87	2439.	2310.	46.1	21.1	423.0	102.8	285.2	5.59	-0.31	0.01	-0.01	10.33	0.0	0.00735
1	3	102.07	4.85	106.92	2439.	2308.	46.0	21.1	431.0	104.7	284.6	5.59	-0.31	0.01	-0.02	10.35	0.0	0.00735
1	3	102.14	4.83	106.97	2439.	2306.	47.2	21.0	441.1	105.9	284.0	5.59	-0.32	0.01	-0.02	10.38	0.0	0.00735
1	3	102.14	4.83	106.97	2439.	2306.	47.2	21.0	441.1	105.9	284.0	5.59	-0.32	0.01	-0.02	10.38	0.0	0.00735
1	3	102.20	4.83	107.03	2439.	2303.	47.2	21.0	449.5	107.7	283.4	5.59	-0.33	0.01	-0.02	10.40	0.0	0.00735
1	3	102.27	4.82	107.08	2439.	2301.	47.2	21.0	458.0	109.5	282.7	5.59	-0.33	0.01	-0.02	10.43	0.0	0.00735
1	3	102.33	4.81	107.14	2440.	2298.	47.2	21.0	466.7	111.2	282.1	5.59	-0.34	0.01	-0.02	10.45	0.0	0.00735
1	3	102.33	4.81	107.14	2440.	2298.	47.2	21.0	466.7	111.2	282.1	5.59	-0.34	0.01	-0.02	10.45	0.0	0.00735
1	3	102.39	4.80	107.20	2440.	2296.	47.3	21.0	475.5	112.9	281.4	5.58	-0.34	0.01	-0.02	10.48	0.0	0.00735
1	3	102.46	4.80	107.25	2441.	2294.	47.5	21.0	484.6	114.5	280.7	5.58	-0.35	0.01	-0.02	10.50	0.0	0.00735
1	3	102.52	4.79	107.31	2442.	2292.	47.7	21.0	493.8	116.1	280.0	5.58	-0.35	0.01	-0.02	10.52	0.0	0.00735
1	3	102.59	4.78	107.37	2443.	2290.	47.9	21.0	503.3	117.6	279.3	5.57	-0.36	0.01	-0.02	10.55	0.0	0.00735
1	3	102.59	4.78	107.37	2443.	2290.	47.9	21.0	503.3	117.6	279.3	5.57	-0.36	0.01	-0.02	10.55	0.0	0.00735
1	3	102.65	4.78	107.42	2443.	2288.	48.2	20.9	512.9	119.0	278.5	5.57	-0.37	0.01	-0.02	10.57	0.0	0.00735
1	3	102.71	4.77	107.48	2444.	2286.	48.5	20.9	522.7	120.4	277.8	5.57	-0.37	0.01	-0.02	10.60	0.0	0.00735
1	3	105.08	4.74	109.82	2427.	2277.	42.3	20.6	363.4	94.2	296.2	5.13	0.28	-0.01	0.05	9.83	0.0	0.00735
1	3	105.08	4.74	109.82	2427.	2277.	42.3	20.6	363.4	94.2	296.2	5.13	0.28	-0.01	0.05	9.83	0.0	0.00735
1	3	105.15	4.75	109.89	2422.	2279.	41.7	20.6	329.3	91.6	299.4	5.22	0.16	-0.01	0.05	9.73	0.0	0.00735
1	3	105.21	4.75	109.96	2416.	2280.	42.3	20.6	302.1	89.5	302.1	5.26	0.07	-0.01	0.06	9.65	0.0	0.00735
1	3	109.27	4.75	110.03	2411.	2282.	42.0	20.7	277.3	88.0	304.3	5.31	0.05	-0.01	0.06	9.57	0.0	0.00735
1	3	105.34	4.76	110.10	2406.	2284.	41.7	20.7	255.4	86.3	306.4	5.31	0.07	-0.01	0.05	9.51	0.0	0.00735
1	3	105.34	4.76	110.10	2406.	2284.	41.7	20.7	255.4	86.3	306.4	5.31	0.07	-0.01	0.05	9.51	0.0	0.00735
1	3	105.40	4.77	110.17	2401.	2287.	41.6	20.7	235.6	83.9	308.2	5.30	0.13	-0.02	0.05	9.46	0.0	0.00735
1	3	105.47	4.78	110.24	2396.	2289.	41.6	20.7	217.5	80.8	309.8	5.28	0.20	-0.01	0.10	9.41	0.0	0.00735
1	3	105.53	4.79	110.32	2391.	2292.	40.7	20.8	199.1	77.2	311.4	5.27	0.27	-0.01	0.05	9.35	0.0	0.00735
1	3	105.53	4.79	110.32	2391.	2292.	40.7	20.8	199.1	77.2	311.4	5.27	0.27	-0.01	0.05	9.35	0.0	0.00735
1	3	105.59	4.80	110.39	2387.	2294.	40.9	20.8	182.8	72.9	312.9	5.27	0.31	-0.00	0.05	9.31	0.0	0.00735
1	3	105.66	4.80	110.46	2382.	2297.	41.2	20.8	169.2	68.6	314.1	5.28	0.33	0.00	0.08	9.27	0.0	0.00735
1	3	105.72	4.82	110.54	2377.	2300.	40.6	20.9	155.3	64.5	315.3	5.31	0.33	0.01	0.07	9.22	0.0	0.00735
1	3	105.79	4.83	110.61	2373.	2303.	41.1	20.9	144.7	60.8	316.3	5.35	0.30	0.01	0.07	9.17	0.0	0.00735
1	3	105.79	4.83	110.61	2373.	2303.	41.1	20.9	144.7	60.8	316.3	5.35	0.30	0.01	0.07	9.17	0.0	0.00735
1	3	105.85	4.84	110.69	2368.	2306.	40.7	21.0	133.7	57.8	317.2	5.39	0.25	0.02	0.06	9.12	0.00000	0.00735

LOCATION 6 GUN TYPE 3 ERROR MODE 3 POSITION=(15600.0, 10900.0, 90.0) RADIUS= 0.0 M

L N	GEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	3	105.91	4.85	110.76	2364.	2310.	41.4	21.0	125.8	55.2	317.9	5.43	0.21	0.02	0.06	9.08	0.00000	0.00735
1	3	105.98	4.86	110.83	2360.	2311.	41.4	21.1	118.5	53.4	317.9	5.47	0.17	0.02	C.06	9.05	0.00000	0.00735
1	3	106.04	4.86	110.90	2356.	2312.	40.5	21.1	111.8	52.3	316.8	5.49	0.15	0.02	C.07	9.01	0.00000	0.00735
1	3	106.04	4.86	110.90	2356.	2312.	40.5	21.1	111.8	52.3	316.8	5.49	0.15	0.02	C.07	9.01	0.00000	0.00735
1	3	106.11	4.86	110.97	2352.	2313.	40.9	21.1	107.4	51.1	315.9	5.52	0.14	0.02	C.07	8.98	0.00000	0.00736
1	3	106.17	4.86	111.03	2348.	2313.	41.3	21.1	103.6	49.9	314.9	5.53	0.15	0.03	C.07	8.95	0.00000	0.00736
1	3	106.23	4.87	111.10	2344.	2314.	40.7	21.1	98.4	48.7	313.7	5.54	0.16	0.03	0.07	8.92	0.00001	0.00737
1	3	106.23	4.87	111.10	2344.	2314.	40.7	21.1	98.4	48.7	313.7	5.54	0.16	0.03	0.07	8.92	0.00001	0.00737
1	3	106.30	4.87	111.17	2340.	2315.	41.2	21.1	95.4	47.2	312.7	5.55	0.18	0.03	C.07	8.89	0.00001	0.00738
1	3	106.36	4.87	111.23	2336.	2316.	41.9	21.1	92.7	45.6	311.6	5.56	0.15	0.03	0.07	8.86	0.00001	0.00739
1	3	106.43	4.88	111.30	2333.	2317.	41.4	21.1	88.7	44.1	310.3	5.57	0.20	0.03	C.07	8.82	0.00002	0.00741
1	3	106.49	4.89	111.37	2329.	2318.	41.1	21.1	85.1	42.6	309.0	5.59	0.20	0.04	0.06	8.78	0.00002	0.00744
1	3	106.49	4.89	111.37	2329.	2318.	41.1	21.1	85.1	42.6	309.0	5.59	0.20	0.04	C.06	8.78	0.00002	0.00746
1	3	106.55	4.89	111.44	2326.	2319.	42.0	21.1	83.7	41.1	307.8	5.61	0.19	0.04	C.06	8.74	0.00003	0.00749
1	3	106.62	4.89	111.51	2322.	2321.	41.8	21.2	81.0	39.9	306.4	5.63	0.18	0.04	C.06	8.70	0.00004	0.00753
1	3	106.68	4.90	111.58	2319.	2323.	41.6	21.2	78.8	39.0	305.0	5.65	0.16	0.05	C.06	8.65	0.00005	0.00758
1	3	106.68	4.90	111.58	2319.	2323.	41.6	21.2	78.8	39.0	305.0	5.65	0.16	0.05	C.06	8.65	0.00005	0.00763
1	3	106.75	4.91	111.65	2316.	2324.	41.6	21.2	77.0	38.2	303.5	5.68	0.15	0.05	C.06	8.62	0.00006	0.00769
1	3	106.81	4.91	111.72	2313.	2326.	42.8	21.2	77.4	37.5	302.2	5.70	0.13	0.05	C.06	8.60	0.00006	0.00775
1	3	106.87	4.91	111.79	2310.	2328.	43.0	21.2	76.4	37.0	300.6	5.72	0.12	0.05	C.06	8.56	0.00007	0.00781
1	3	106.94	4.92	111.86	2307.	2330.	43.2	21.3	75.7	36.6	299.0	5.73	0.12	0.05	C.06	8.53	0.00007	0.00789
1	3	106.94	4.92	111.86	2307.	2330.	43.2	21.3	75.7	36.6	299.0	5.73	0.12	0.05	C.06	8.53	0.00007	0.00796
1	3	107.00	4.94	111.94	2304.	2333.	42.3	21.3	73.5	36.3	297.3	5.75	0.11	0.05	C.06	8.49	0.00008	0.00804
1	3	107.07	4.94	112.01	2302.	2335.	42.7	21.3	73.3	35.8	295.7	5.76	0.11	0.05	C.06	8.45	0.00008	0.00812
1	3	107.13	4.95	112.08	2299.	2338.	43.2	21.4	73.4	35.4	294.1	5.77	0.11	0.05	C.06	8.41	0.00009	0.00821
1	3	107.13	4.95	112.08	2299.	2338.	43.2	21.4	73.4	35.4	294.1	5.77	0.11	0.05	C.06	8.41	0.00009	0.00829
1	3	107.19	4.96	112.15	2296.	2340.	43.9	21.7	73.7	34.9	292.4	5.78	0.11	0.06	C.06	8.37	0.00009	0.00839
1	3	107.26	4.97	112.23	2294.	2343.	43.8	21.9	72.9	34.6	290.6	5.80	0.11	0.06	0.06	8.33	0.00010	0.00848
1	3	107.32	4.98	112.30	2292.	2346.	44.6	22.1	73.6	34.1	288.9	5.81	0.11	0.06	C.06	8.29	0.00010	0.00859
1	3	107.39	4.99	112.38	2289.	2349.	44.4	22.2	73.1	33.9	287.1	5.82	0.10	0.06	C.06	8.24	0.00011	0.00869
1	3	107.39	4.99	112.38	2289.	2349.	44.4	22.2	73.1	33.9	287.1	5.82	0.10	0.06	C.06	8.24	0.00011	0.00880
1	3	107.45	5.01	112.46	2287.	2353.	44.5	22.3	73.1	33.7	285.3	5.84	0.09	0.06	0.05	8.19	0.00011	0.00891
1	3	107.51	5.02	112.53	2285.	2356.	44.8	22.3	73.6	33.6	283.4	5.85	0.08	0.06	C.05	8.14	0.00011	0.00902
1	3	107.58	5.03	112.61	2283.	2360.	45.4	22.4	74.6	33.5	281.6	5.86	0.07	0.06	C.04	8.09	0.00011	0.00912
1	3	107.64	5.05	112.69	2282.	2363.	45.2	22.5	74.4	33.6	279.6	5.87	0.07	0.06	0.04	8.03	0.00011	0.00923
1	3	107.64	5.05	112.69	2282.	2363.	45.2	22.5	74.4	33.6	279.6	5.87	0.07	0.06	C.04	8.03	0.00011	0.00933
1	3	107.71	5.05	112.76	2280.	2367.	46.4	22.5	76.4	33.5	277.8	5.88	0.06	0.06	C.04	7.99	0.00010	0.00944
1	3	107.77	5.08	112.85	2276.	2372.	45.7	22.6	75.7	33.7	275.7	5.89	0.05	0.06	C.04	7.92	0.00010	0.00954
1	3	107.83	5.09	112.92	2273.	2376.	46.3	22.7	77.0	33.8	273.8	5.90	0.05	0.07	C.04	7.86	0.00010	0.00964
1	3	107.83	5.09	112.92	2273.	2376.	46.3	22.7	77.0	33.8	273.8	5.90	0.05	0.07	0.04	7.86	0.00010	0.00973
1	3	107.90	5.10	113.00	2275.	2380.	47.3	22.8	78.9	33.9	271.8	5.91	0.04	0.07	C.04	7.81	0.00010	0.00983
1	3	107.96	5.12	113.08	2274.	2385.	47.5	22.9	79.6	34.1	269.8	5.92	0.04	0.07	0.04	7.74	0.00009	0.00992
1	3	108.03	5.14	113.16	2272.	2390.	48.1	23.0	80.9	34.2	267.8	5.93	0.03	0.07	C.04	7.68	0.00009	0.01001
1	3	108.09	5.16	113.25	2271.	2395.	47.9	23.1	81.3	34.5	265.6	5.94	0.03	0.07	0.04	7.61	0.00009	0.01009
1	3	108.09	5.16	113.25	2271.	2395.	47.9	23.1	81.3	34.5	265.6	5.94	0.03	0.07	0.04	7.61	0.00009	0.01017
1	3	108.15	5.18	113.33	2270.	2400.	48.1	23.2	82.2	34.7	263.5	5.94	0.02	0.07	0.03	7.54	0.00008	0.01026
1	3	108.22	5.19	113.41	2269.	2405.	49.7	23.3	85.1	34.9	261.5	5.95	0.01	0.07	0.03	7.48	0.00008	0.01033
1	3	108.28	5.22	113.50	2268.	2411.	49.6	23.4	85.7	35.2	259.3	5.96	0.01	0.07	C.03	7.40	0.00007	0.01041
1	3	108.28	5.22	113.50	2268.	2411.	49.6	23.4	85.7	35.2	259.3	5.96	0.01	0.07	0.03	7.40	0.00007	0.01048
1	3	108.35	5.24	113.58	2268.	2417.	49.9	23.5	86.9	35.6	257.1	5.96	-0.00	0.07	0.03	7.32	0.00007	0.01055
1	3	108.41	5.26	113.67	2267.	2423.	50.6	23.6	88.6	35.9	254.9	5.97	-0.01	0.07	0.03	7.29	0.00007	0.01061

LOCATION 6 GUN TYPE 3 ERROR MODE 3 POSITION=(15600.0, 10900.0, 90.0) RADIUS= 0.0 M

L N	DEN	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	3	108.47	5.28	113.76	2266.	2429.	50.7	23.7	89.7	36.4	252.6	5.97	-0.01	0.07	0.03	7.16	0.00006	0.01067
1	3	108.54	5.31	113.85	2266.	2436.	51.2	23.9	91.3	36.8	250.4	5.98	-0.02	0.07	0.03	7.08	0.00006	0.01073
1	3	108.54	5.31	113.85	2266.	2436.	51.2	23.9	91.3	36.8	250.4	5.98	-0.02	0.07	0.03	7.08	0.00006	0.01079
1	3	108.60	5.34	113.94	2265.	2443.	51.2	24.0	92.2	37.3	248.0	5.98	-0.03	0.06	0.03	6.99	0.00005	0.01084
1	3	108.67	5.36	114.03	2265.	2450.	51.7	24.2	95.2	37.8	245.6	5.98	-0.03	0.06	0.02	6.91	0.00005	0.01089
1	3	108.73	5.39	114.12	2265.	2457.	52.6	24.3	97.6	38.3	243.3	5.99	-0.04	0.06	0.02	6.82	0.00004	0.01093
1	3	108.73	5.39	114.12	2265.	2457.	52.6	24.3	97.6	38.3	243.3	5.99	-0.04	0.06	0.02	6.82	0.00004	0.01097
1	3	108.79	5.41	114.20	2265.	2464.	54.1	24.4	100.6	38.7	241.0	5.99	-0.05	0.06	0.02	6.74	0.00004	0.01101
1	3	108.86	5.44	114.30	2265.	2472.	54.1	24.6	101.8	39.3	238.6	5.99	-0.05	0.06	0.02	6.64	0.00004	0.01105
1	3	108.92	5.47	114.40	2265.	2480.	54.6	24.7	103.8	39.8	236.2	5.99	-0.06	0.06	0.02	6.54	0.00003	0.01109
1	3	108.99	5.50	114.49	2265.	2488.	55.7	24.9	106.6	40.3	233.8	5.99	-0.06	0.06	0.02	6.45	0.00003	0.01112
1	3	108.99	5.50	114.49	2265.	2488.	55.7	24.9	106.6	40.3	233.8	5.99	-0.06	0.06	0.02	6.45	0.00003	0.01115
1	3	109.05	5.53	114.58	2265.	2496.	57.3	25.1	110.1	40.8	231.4	5.99	-0.07	0.06	0.02	6.36	0.00003	0.01118
1	3	109.11	5.57	114.68	2266.	2505.	57.7	25.2	112.1	41.4	228.9	5.99	-0.08	0.06	0.02	6.25	0.00003	0.01121

PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED. LOC 6 GT 3 EM 3 X 15600. Y 10900. Z 90. RADIUS 0.M

SECTOR	AZIMUTH REAR=00	ELEV. DOWN=00	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
1	000-045	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	045-090	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	090-135	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	135-180	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	180-225	000-045	0.0	0.0003255	0.0012023	0.0	0.0	0.0	0.0	0.0	0.0015274
6	225-270	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	270-315	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	315-360	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	000-045	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	045-090	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	090-135	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	135-180	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	180-225	045-090	0.0	0.0	0.0058241	0.0	0.0	0.0	0.0	0.0	0.0058241
14	225-270	045-090	0.0	0.0036015	0.0002850	0.0	0.0	0.0	0.0	0.0	0.0038855
15	270-315	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	315-360	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	000-045	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	045-090	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	090-135	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	135-180	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	180-225	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	225-270	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	270-315	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	315-360	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	000-045	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	045-090	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	090-135	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	135-180	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	180-225	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	225-270	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	270-315	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED. LOC 6 GT 3 EM 3 X 15600. Y 10500. Z 90. RADIUS 0.M

SECTOR	AZIMUTH	ELEV. REAR=00 DOWN=00	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
32	315-360	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTALS	0.0	0.0039258	0.0073024	0.0	0.0	0.0	0.0	0.0	0.0111996

MULTIPATH INPUTS (INITIAL OR CHANGED

IRNP = 2
REFC = 0.350

ECM INPUTS (INITIAL OR CHANGED)

IP = 5
IJ = 0
GAINJ(DB) = 1.00
PJ◢(W) = 500.00
PLEN(S) = 0.0
IX = 1
XSEC(SQM) = 0.0
CALX = 1.000
IRECM = 3
SJTMAX(DB) = 17.00

JAMMER ANTENNA GAIN 1.000 DB

AIRCRAFT CROSS SECTION TABLE SPECIFIED. PRINTED VALUES WILL BE MULTIPLIED BY CALX. CALX= 1.00

TABLE DATA
19 ELEMENTS FROM 0.0 TO 180.00 BY 10.00 AZ
7 ELEMENTS FROM -30.00 TO 90.00 BY 30.00 EL
ELSEWHERE TABLE IS 1000.00

VULNERABLE AREA (SQ. METERS) AS A FUNCTION OF IMPACT SPEED (METERS/SEC) AND ASPECT VIEW
VULNERABLE AREA TABLE VS TYPE 5 WEAPON

VIEW	0	152	305	457	610	762	914	1067	1219
1	0.00	55.37	55.37	55.37	55.37	55.37	55.37	55.37	55.37
2	0.00	43.22	43.22	43.22	43.22	43.22	43.22	43.22	43.22
3	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
4	0.00	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53
5	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
6	0.00	43.22	43.22	43.22	43.22	43.22	43.22	43.22	43.22
7	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
8	0.00	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53
9	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
10	0.00	5.76	5.76	5.76	5.76	5.76	5.76	5.76	5.76
11	0.00	27.45	27.45	27.45	27.45	27.45	27.45	27.45	27.45
12	0.00	33.07	33.07	33.07	33.07	33.07	33.07	33.07	33.07
13	0.00	27.45	27.45	27.45	27.45	27.45	27.45	27.45	27.45
14	0.00	5.76	5.76	5.76	5.76	5.76	5.76	5.76	5.76
15	0.00	27.45	27.45	27.45	27.45	27.45	27.45	27.45	27.45
16	0.00	33.07	33.07	33.07	33.07	33.07	33.07	33.07	33.07
17	0.00	27.45	27.45	27.45	27.45	27.45	27.45	27.45	27.45
18	0.00	5.76	5.76	5.76	5.76	5.76	5.76	5.76	5.76
19	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
20	0.00	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53
21	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
22	0.00	43.22	43.22	43.22	43.22	43.22	43.22	43.22	43.22
23	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
24	0.00	62.53	62.53	62.53	62.53	62.53	62.53	62.53	62.53
25	0.00	47.10	47.10	47.10	47.10	47.10	47.10	47.10	47.10
26	0.00	55.37	55.37	55.37	55.37	55.37	55.37	55.37	55.37

LOCATION 7 GUN TYPE 5 ERROR MODE 3 POSITION=(12800.0, 7500.0, 20.0) RADIUS= C.C M

L N	DEN	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	3	39.49	11.44	50.93	7912.	5561.	55.3	50.9	635.3	524.9	416.5	1.31	0.09	-0.01	C.00	35.88	0.0	0.0
1	3	39.87	11.29	51.16	7856.	5515.	59.3	50.2	612.4	582.6	418.7	1.32	0.09	-0.01	-0.00	36.27	0.0	0.0
1	3	40.32	11.11	51.43	7797.	5862.	59.3	50.4	580.4	650.5	421.7	1.35	0.05	-0.01	-0.00	36.65	0.0	0.0
1	3	40.77	10.94	51.70	7736.	5909.	53.8	50.6	533.9	724.3	425.3	1.37	0.09	-0.01	-0.00	37.07	0.0	0.0
1	3	41.15	10.79	51.94	7685.	5763.	60.0	50.8	493.0	781.8	428.8	1.39	0.09	-0.00	-0.00	37.37	0.0	0.0
1	3	41.60	10.63	52.23	7614.	5712.	55.8	50.8	439.9	825.4	433.1	1.27	0.10	-0.06	0.00	37.63	0.0	0.0
1	3	42.05	10.56	52.60	7537.	5690.	58.4	50.1	335.8	708.3	435.3	1.15	0.12	-0.03	C.00	37.31	0.0	0.0
1	3	42.43	10.50	52.93	7472.	5672.	57.3	49.5	307.7	698.0	436.6	1.23	0.11	-0.04	C.00	36.85	0.0	0.0
1	3	42.88	10.44	53.32	7396.	5652.	56.0	48.8	272.9	683.1	438.4	1.22	0.12	-0.03	C.00	36.30	0.0	0.0
1	3	43.33	10.38	53.71	7322.	5633.	54.1	48.0	276.7	764.9	440.1	1.25	0.12	-0.03	C.00	35.69	0.0	0.0
1	3	43.71	10.33	54.04	7258.	5618.	54.2	47.5	269.7	736.6	441.8	1.27	0.12	-0.03	C.00	35.16	0.0	0.0
1	3	44.16	10.28	54.44	7185.	5601.	53.3	46.8	295.6	782.0	443.6	1.30	0.12	-0.02	C.00	34.52	0.0	0.0
1	3	44.61	10.23	54.84	7112.	5585.	52.4	46.1	316.9	838.5	445.7	1.33	0.12	-0.02	C.00	33.86	0.0	0.0
1	3	45.05	10.19	55.24	7040.	5571.	52.2	45.4	365.3	855.0	447.7	1.36	0.13	-0.02	C.01	33.19	0.0	0.0
1	3	45.44	10.15	55.59	6976.	5559.	51.9	44.9	397.9	951.5	449.6	1.38	0.13	-0.01	C.01	32.62	0.0	0.0
1	3	45.89	10.12	56.00	6900.	5547.	51.4	44.2	459.7	1012.5	451.8	1.41	0.13	-0.01	C.01	31.95	0.0	0.0
1	3	46.33	10.08	56.42	6840.	5536.	51.2	43.7	509.7	1082.3	454.2	1.44	0.13	-0.01	C.01	31.25	0.0	0.0
1	3	46.72	10.05	56.77	6781.	5528.	51.3	43.4	546.8	1147.4	456.4	1.46	0.13	-0.00	C.01	30.66	0.0	0.0
1	3	47.17	10.03	57.20	6712.	5519.	51.0	42.8	618.7	1213.1	458.9	1.49	0.13	-0.01	C.01	29.96	0.0	0.0
1	3	47.61	10.01	57.62	6624.	5512.	50.9	43.7	497.1	1275.0	463.2	0.80	0.21	-0.13	-0.02	29.20	0.0	0.0
1	1	48.00	9.99	57.99	6546.	5506.	1691.4	1661.0	882.7	985.4	463.6	0.94	0.05	-0.04	-C.01	29.62	0.00000	0.00000
1	1	48.45	9.98	58.43	6455.	5503.	1586.6	1560.0	790.3	860.6	467.3	0.91	0.33	-0.06	-0.03	29.43	0.00000	0.00000
1	1	48.89	9.97	58.87	6365.	5501.	1513.1	1490.4	690.1	734.2	471.7	1.00	0.14	-0.02	-C.C6	29.15	0.00000	0.00000
1	1	49.34	9.97	59.31	6275.	5500.	1468.6	1449.5	590.1	604.4	476.7	0.98	0.23	-0.01	-C.10	28.79	0.00000	0.00001
1	1	49.73	9.89	59.61	6198.	5473.	1443.5	1427.3	491.0	442.0	479.6	1.03	0.20	0.01	-C.15	28.39	0.00000	0.00001
1	1	50.17	9.77	59.94	6109.	5432.	1432.5	1417.5	370.5	237.5	482.3	1.05	0.22	0.03	-C.15	28.40	0.00000	0.00001
1	1	50.62	9.65	60.27	6021.	5392.	1437.5	1423.3	248.1	38.9	485.2	1.09	0.22	0.06	-C.15	31.36	0.00000	0.00001
1	1	51.01	9.54	60.55	5945.	5358.	1451.8	1437.1	141.2	126.8	487.5	1.11	0.23	0.08	-C.22	32.14	0.00000	0.00002
1	3	51.45	9.43	60.98	5858.	5317.	46.7	43.5	223.7	1563.0	498.4	1.27	0.38	0.08	-C.28	27.42	0.0	0.00002
1	3	51.90	9.31	61.22	5771.	5278.	46.4	43.9	486.9	1532.5	501.0	1.13	0.17	0.11	-C.31	27.92	0.0	0.00002
1	3	52.29	9.22	61.50	5708.	5244.	54.2	45.2	1527.6	555.3	503.0	1.26	0.26	0.06	-C.18	28.43	0.0	0.00002
1	3	52.73	9.11	61.84	5685.	5205.	54.1	44.6	1080.0	377.2	505.4	0.15	2.92	-0.03	C.04	30.03	0.0	0.00002
1	3	53.18	8.99	62.18	5659.	5166.	52.9	44.2	552.0	218.3	507.0	0.73	1.55	-0.01	C.01	31.72	0.0	0.00002
1	3	53.57	8.90	62.47	5640.	5133.	51.4	43.7	256.4	105.2	508.2	0.43	2.30	-0.03	C.04	32.81	0.0	0.00002
1	3	54.01	8.80	62.81	5619.	5096.	50.3	43.4	7.7	11.0	509.7	0.60	1.93	-0.03	C.04	33.86	0.00236	0.00237
1	3	54.46	8.69	63.16	5600.	5059.	49.3	43.1	196.0	110.1	511.3	0.52	2.15	-0.03	C.05	34.65	0.0	0.00237
1	1	54.91	8.59	63.50	5583.	5021.	1113.2	1094.4	35.7	300.0	512.7	0.75	2.36	-0.08	C.C2	35.31	0.00000	0.00238
1	1	55.29	8.51	63.80	5569.	4989.	1071.1	1055.9	17.4	268.8	515.1	0.46	1.56	-0.08	0.04	35.48	0.00000	0.00238
1	1	55.74	8.41	64.15	5555.	4953.	1026.6	1011.0	4.3	236.1	517.8	0.62	2.18	-0.05	C.C5	35.69	0.00001	0.00239
1	1	56.19	8.31	64.50	5542.	4917.	987.0	970.8	24.5	205.3	520.4	0.56	2.09	-0.09	0.07	35.88	0.00001	0.00239
1	1	56.57	8.23	64.81	5532.	4886.	956.5	940.0	41.4	181.3	522.6	0.60	2.15	-0.10	C.C8	36.04	0.00001	0.00240
1	1	57.02	8.12	65.14	5523.	4845.	924.9	907.2	67.6	159.3	525.8	0.59	2.13	-0.11	C.10	36.13	0.00001	0.00240
1	1	57.47	7.99	65.46	5515.	4795.	896.1	876.9	101.8	144.6	530.1	0.60	2.15	-0.12	C.11	36.12	0.00001	0.00241
1	1	57.85	7.88	65.73	5509.	4753.	875.2	854.5	130.2	133.1	533.7	0.61	2.15	-0.13	0.12	36.10	0.00001	0.00242
1	1	58.30	7.75	66.05	5504.	4703.	855.0	832.3	162.3	121.1	538.1	0.62	2.16	-0.14	C.14	36.07	0.00001	0.00243
1	1	58.75	7.63	66.38	5501.	4654.	839.2	814.0	192.9	110.2	542.5	0.62	2.16	-0.15	C.15	36.02	0.00001	0.00244
1	1	59.20	7.50	66.70	5500.	4604.	827.1	799.6	222.5	100.4	547.0	0.63	2.16	-0.15	C.16	35.97	0.00001	0.00244
1	1	59.58	7.40	66.98	5477.	4562.	812.5	781.0	235.1	107.6	551.0	0.64	2.04	-0.04	-C.03	35.88	0.00001	0.00245
1	1	60.03	7.28	67.31	5421.	4513.	785.1	749.9	256.8	83.7	556.0	1.71	0.46	-0.04	C.01	35.73	0.00001	0.00246
1	1	60.48	7.17	67.64	5366.	4464.	758.6	720.2	271.2	66.0	561.0	1.29	1.20	-0.03	-0.03	35.54	0.00001	0.00247
1	1	60.86	7.06	67.92	5320.	4423.	737.0	696.1	284.5	45.5	565.5	1.53	0.87	-0.04	C.01	35.37	0.00001	0.00248

LOCATION 7 GUN TYPE 5 ERROR MODE 3 POSITION=(12800.0, 7500.0, 20.0) RADIUS= 0.0 M

L N	DEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	1	01.31	6.95	68.26	5267.	4375.	712.1	669.3	298.9	26.3	570.6	1.47	1.07	-0.04	-C.0C	35.17	0.0CC01	C.00249
1	1	01.76	6.84	68.59	5215.	4327.	688.1	643.9	312.8	5.7	575.8	1.55	1.01	-0.05	C.01	34.95	0.00001	0.00250
1	1	02.14	6.74	68.88	5170.	4286.	668.4	623.3	324.4	10.2	580.3	1.57	1.06	-0.05	C.01	34.77	0.00001	0.00251
1	3	02.56	6.63	69.22	5120.	4239.	37.6	33.6	153.5	146.6	589.6	1.60	1.06	0.02	C.05	33.78	0.0	0.00251
1	3	03.04	6.52	69.56	5071.	4192.	37.4	33.1	196.5	133.1	594.2	1.64	1.06	-0.01	C.04	33.79	0.0	0.00251
1	3	03.42	6.43	69.85	5029.	4152.	37.1	32.7	204.7	120.0	598.9	1.69	1.08	-0.00	C.04	33.56	0.0	0.00251
1	3	03.87	6.33	70.20	4982.	4106.	36.9	32.3	226.9	113.5	604.0	1.74	1.09	-0.01	C.04	33.47	0.0	0.00251
1	3	04.32	6.22	70.54	4936.	4060.	36.5	31.8	241.3	108.1	609.4	1.79	1.11	-0.01	C.07	33.28	0.0	0.00251
1	3	04.76	6.13	70.89	4891.	4014.	36.1	31.4	256.2	105.7	614.7	1.83	1.11	-0.01	C.07	33.11	0.0	0.00251
1	3	05.15	6.04	71.19	4844.	3976.	35.9	30.9	266.5	103.9	619.4	1.85	1.11	-0.07	0.04	32.94	0.0	0.00251
1	3	05.60	5.93	71.53	4774.	3927.	35.4	30.5	193.2	76.5	627.2	1.29	0.75	-0.08	C.04	32.23	0.0	0.00251
1	3	06.04	5.81	71.86	4705.	3870.	34.9	30.0	143.5	68.7	634.1	1.60	0.96	-0.07	0.05	31.69	0.00C00	0.00251
1	3	06.43	5.71	72.14	4646.	3822.	34.5	29.6	117.9	63.6	639.6	1.54	-0.88	-0.07	C.06	31.91	0.00000	0.00252
1	3	06.86	5.59	72.47	4578.	3766.	34.0	29.1	100.2	66.1	645.5	1.65	0.95	-0.06	0.06	31.62	0.00C01	0.00252
1	3	07.32	5.48	72.80	4511.	3710.	33.5	28.6	92.4	70.4	651.3	1.69	0.95	-0.05	C.07	32.03	0.00001	0.00253
1	3	07.71	5.38	73.09	4455.	3662.	33.1	28.2	91.0	77.3	656.2	1.75	0.98	-0.05	C.07	32.17	0.00000	0.00253
1	3	08.16	5.26	73.42	4389.	3607.	32.6	27.7	93.1	86.0	661.8	1.82	0.99	-0.04	C.08	32.37	0.00000	0.00253
1	3	08.60	5.15	73.76	4325.	3551.	32.2	27.1	98.1	96.2	667.2	1.89	1.01	-0.03	0.09	32.61	0.00000	0.00253
1	3	09.05	5.04	74.10	4262.	3497.	31.7	26.6	105.3	106.6	672.7	1.97	1.03	-0.02	C.10	32.87	0.0	0.00253
1	3	09.44	4.95	74.39	4209.	3449.	31.3	26.2	112.1	115.8	677.2	2.03	1.04	-0.02	C.10	33.11	0.0	0.00253
1	3	09.88	4.85	74.73	4141.	3395.	30.9	25.7	121.4	126.3	682.6	2.11	1.06	-0.01	C.11	33.41	0.0	0.00253
1	3	10.33	4.74	75.08	4087.	3341.	30.4	25.3	130.7	136.6	687.7	2.20	1.07	-0.00	C.11	33.72	0.0	0.00253
1	3	10.72	4.66	75.37	4037.	3295.	30.0	24.8	139.3	145.1	692.2	2.27	1.09	0.00	C.12	34.00	0.0	0.00253
1	3	11.16	4.55	75.72	3979.	3242.	29.7	24.4	149.6	154.6	697.4	2.37	1.10	0.01	C.13	34.34	0.0	0.00253
1	3	11.61	4.46	76.07	3912.	3190.	29.2	24.0	157.6	161.4	702.5	2.40	1.00	-0.06	0.01	34.67	0.0	0.00253
1	3	12.00	4.37	76.37	3846.	3145.	28.9	23.6	113.3	111.5	708.8	1.94	0.20	-0.06	0.04	34.42	0.0	0.00253
1	3	12.44	4.28	76.72	3770.	3094.	28.5	23.2	75.0	80.4	715.4	2.25	0.63	-0.05	0.02	34.29	0.00000	0.00253
1	3	12.84	4.19	77.08	3695.	3043.	28.C	22.7	50.4	51.2	721.4	2.28	0.44	-0.04	0.05	34.32	0.00014	0.00267
1	3	13.28	4.11	77.38	3631.	3000.	27.8	22.4	55.9	37.9	726.5	2.40	0.54	-0.04	0.05	34.44	0.00092	0.00359
1	3	13.72	4.02	77.75	3557.	2950.	27.4	22.0	23.9	23.6	732.0	2.50	0.49	-0.03	C.06	34.64	0.00353	C.00710
1	3	14.17	3.94	78.11	3484.	2901.	27.0	21.6	15.9	15.1	737.1	2.62	0.50	-0.03	0.06	34.90	0.00625	0.01331
1	3	14.62	3.82	78.44	3413.	2836.	26.5	21.0	33.0	11.7	743.0	2.75	0.49	-0.02	C.07	35.23	0.00396	0.01722
1	3	15.00	3.73	78.73	3352.	2780.	26.1	20.5	48.9	10.4	748.0	2.86	0.49	-0.01	0.08	35.40	0.00160	0.01879
1	3	15.45	3.62	79.07	3283.	2716.	25.6	20.0	68.1	9.2	753.7	3.00	0.47	-0.01	C.08	35.46	0.00030	0.01908
1	3	15.90	3.51	79.41	3215.	2651.	25.2	19.6	87.7	8.4	759.3	3.15	0.46	0.00	0.09	35.40	0.00003	0.01911
1	3	16.28	3.42	79.70	3158.	2596.	24.7	19.3	104.2	7.4	764.0	3.27	0.44	0.01	C.10	35.23	0.00000	0.01911
1	3	16.73	3.31	80.04	3092.	2532.	24.3	18.9	123.1	6.0	769.3	3.43	0.42	0.01	C.10	34.93	0.0	0.01911
1	3	17.18	3.21	80.39	3025.	2469.	23.8	18.6	141.5	4.2	774.5	3.60	0.39	0.02	C.11	34.52	0.0	0.01911
1	3	17.56	3.12	80.68	2975.	2414.	23.4	18.3	156.5	2.2	778.7	3.74	0.36	0.03	C.11	34.09	0.0	0.01911
1	3	18.01	3.02	81.03	2915.	2351.	22.9	18.0	173.0	0.5	783.6	3.91	0.33	0.03	C.12	33.50	0.0	0.01911
1	3	18.46	2.92	81.38	2853.	2290.	22.5	16.6	173.7	1.8	789.3	3.12	0.19	-0.26	0.07	32.68	0.0	0.01911
1	3	18.91	2.83	81.74	2796.	2228.	22.1	16.1	105.4	0.9	799.1	2.79	0.13	-0.15	0.08	31.07	0.00000	0.01911
1	3	19.29	2.75	82.04	2673.	2176.	21.9	15.7	81.0	0.8	805.4	3.19	0.12	-0.18	0.05	29.59	0.00002	0.01912
1	3	19.74	2.66	82.40	2589.	2116.	21.6	15.3	55.2	1.0	812.3	3.26	0.08	-0.16	0.04	28.65	0.00053	0.01964
1	3	20.19	2.57	82.76	2505.	2057.	21.2	15.0	39.1	2.3	818.4	3.54	0.03	-0.16	0.02	27.30	0.00247	0.02207
1	3	20.57	2.50	83.07	2435.	2007.	20.9	14.6	29.2	2.9	823.1	3.73	-0.00	-0.15	C.01	26.55	0.00515	0.02711
1	3	21.02	2.41	83.43	2354.	1950.	20.7	14.3	21.6	3.9	828.2	3.99	-0.06	-0.15	-0.01	29.08	0.00867	0.03554
1	3	21.47	2.33	83.80	2275.	1894.	20.4	13.9	16.1	4.8	832.4	4.27	-0.13	-0.14	-C.02	31.18	0.01195	0.04707
1	3	21.85	2.26	84.11	2208.	1848.	20.2	13.5	13.2	5.5	835.7	4.53	-0.20	-0.14	-C.05	32.95	0.01408	0.06049
1	1	22.30	2.19	84.49	2132.	1796.	92.2	44.4	133.8	16.6	827.3	5.80	-0.34	-0.37	-0.07	36.03	0.00046	0.06051
1	1	22.75	2.12	84.86	2058.	1745.	87.2	45.3	125.8	27.7	829.8	4.89	-0.40	-0.34	-0.10	38.12	0.00045	0.06134

LOCATION 7 GUN TYPE 5 ERROR MODE 3 POSITION=(12800.0, 7500.0, 20.0) RADIUS= 0.0 M

L N	OEM	FIRE TIME	FLT. TIME	INTCP TIME	FIRE RANGE	INTCP RANGE	SIG1	SIG2	BIAS1	BIAS2	CLOSE VEL.	AZIM. RATE	ELEV. RATE	MEAN AZ.ERR	MEAN EL.ERR	VULN AREA	SHOT PK	CUM.PK
1	1	83.13	2.06	85.19	1997.	1704.	85.0	46.1	121.0	36.1	830.9	5.66	-0.54	-0.36	-0.12	39.94	0.00043	0.06174
1	1	83.58	2.04	85.62	1927.	1692.	86.0	48.2	107.2	60.5	819.3	5.82	-0.68	-0.38	-0.16	41.95	0.00034	0.06206
1	1	84.03	2.09	86.12	1861.	1729.	89.2	51.7	88.2	106.4	790.9	6.27	-0.88	-0.40	-0.20	43.68	0.00011	0.06216
1	1	84.47	2.16	86.63	1797.	1774.	92.5	55.3	77.5	157.5	760.0	6.61	-1.09	-0.42	-0.23	44.95	0.00002	0.06218
1	1	84.86	2.22	87.08	1746.	1819.	95.5	58.7	76.5	204.5	732.1	6.94	-1.20	-0.44	-0.27	45.59	0.00000	0.06218
1	1	85.31	2.31	87.61	1689.	1879.	98.9	62.8	85.0	263.8	697.0	7.30	-1.58	-0.46	-0.31	45.67	0.00000	0.06218
1	3	85.75	2.40	88.16	1701.	1946.	25.6	18.7	52.5	182.3	671.0	8.03	-3.47	0.05	-0.67	47.25	0.0	0.06218
1	3	86.14	2.50	88.64	1731.	2010.	25.3	19.1	11.0	108.1	632.8	7.56	-3.91	-0.22	-0.40	47.23	0.0	0.06218
1	3	86.59	2.62	89.21	1770.	2091.	25.0	19.4	4.1	82.8	592.7	6.73	-3.66	-0.16	-0.46	43.35	0.00000	0.06218
1	3	87.03	2.75	89.79	1814.	2179.	25.0	19.8	7.7	51.7	551.7	6.26	-3.59	-0.22	-0.35	39.58	0.00041	0.06257
1	3	87.42	2.88	90.30	1856.	2260.	25.0	20.1	8.9	41.0	517.4	5.79	-3.55	-0.21	-0.34	36.40	0.00138	0.06387
1	3	87.87	3.04	90.90	1909.	2361.	25.1	20.6	10.4	28.3	477.1	5.34	-3.42	-0.21	-0.25	32.95	0.00363	0.06726
1	1	88.31	3.23	91.54	1967.	2483.	102.6	84.1	148.7	209.5	442.7	4.59	-3.39	-0.16	-0.25	29.86	0.00001	0.06727
1	1	88.76	3.47	92.23	2027.	2627.	109.9	87.5	178.9	170.8	417.0	4.63	-3.14	-0.11	-0.21	31.75	0.00002	0.06729
1	1	89.15	3.68	92.83	2082.	2754.	118.6	90.4	206.6	136.9	395.6	4.13	-3.06	-0.09	-0.18	32.42	0.00003	0.06732
1	1	89.59	3.94	93.54	2145.	2906.	132.2	93.8	238.1	96.9	371.6	3.89	-2.88	-0.06	-0.16	32.81	0.00005	0.06737
1	1	90.04	4.23	94.27	2219.	3064.	150.4	97.4	267.5	58.8	348.0	3.55	-2.73	-0.02	-0.14	33.03	0.00006	0.06742
1	1	90.43	4.48	94.91	2281.	3203.	164.0	100.9	289.6	28.1	328.5	3.34	-2.59	0.00	-0.13	32.97	0.00006	0.06748
1	1	90.87	4.80	95.68	2356.	3372.	173.3	105.4	309.7	2.9	306.0	3.09	-2.45	0.04	-0.12	32.47	0.00006	0.06754
1	1	91.32	5.14	96.47	2437.	3546.	181.2	110.9	327.5	32.7	284.2	3.14	-2.25	-0.04	-0.01	31.24	0.00005	0.06758
1	1	91.71	5.45	97.16	2517.	3700.	185.6	115.2	340.6	43.3	266.0	1.56	-0.87	-0.16	0.06	29.55	0.00004	0.06762
1	1	92.15	5.63	97.99	2611.	3881.	190.5	121.2	336.4	49.7	246.5	2.06	-1.45	-0.08	0.02	28.08	0.00004	0.06765
1	1	92.60	6.21	98.81	2706.	4051.	195.2	127.9	302.7	56.2	231.3	1.56	-1.61	-0.09	0.03	28.86	0.00005	0.06770
1	1	92.99	6.55	99.53	2788.	4203.	200.0	134.7	270.5	61.9	218.6	1.65	-1.14	-0.07	0.03	30.31	0.00006	0.06776
1	1	93.43	6.98	100.42	2884.	4390.	206.5	144.2	230.0	68.6	203.8	1.44	-0.57	-0.07	0.03	32.52	0.00008	0.06784
1	1	93.88	7.47	101.35	2980.	4588.	215.9	155.6	185.3	76.1	189.2	1.39	-0.56	-0.06	0.03	35.36	0.00010	0.06793
1	1	94.33	8.01	102.34	3077.	4802.	234.0	169.4	135.8	84.1	174.8	1.28	-0.88	-0.05	0.03	38.97	0.00012	0.06804
1	1	94.71	8.54	103.26	3161.	5001.	253.3	183.5	88.5	91.9	162.9	1.22	-0.85	-0.04	0.03	42.82	0.00012	0.06815
1	1	95.16	9.20	104.36	3259.	5237.	280.2	203.0	23.7	104.6	152.0	1.14	-0.79	-0.03	0.03	45.39	0.00011	0.06826
1	1	95.61	9.46	105.07	3357.	5227.	305.4	221.1	85.5	140.1	160.4	1.07	-0.75	-0.02	0.03	47.37	0.00009	0.06834
1	1	95.99	9.70	105.69	3442.	5409.	336.2	243.2	180.4	170.6	168.3	1.02	-0.71	-0.02	0.03	48.61	0.00006	0.06840
1	1	96.44	10.00	106.44	3541.	5511.	407.1	294.4	288.0	208.5	177.9	0.96	-0.68	-0.01	0.03	51.06	0.00004	0.06844

PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED. LOC 7 GT 5 EM 3 X 12800. Y 7500. Z 20. RADIUS 0.M

SECTOR	AZIMUTH REAR=00	ELEV. DOWN=00	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
1	000-045	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	045-090	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	090-135	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	135-180	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	180-225	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	225-270	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	270-315	000-045	0.0	0.0002411	0.0	0.0	0.0	0.0	0.0	0.0	0.0000411
8	315-360	000-045	0.0001108	0.0001518	0.0	0.0	0.0	0.0	0.0	0.0	0.0002626
9	000-045	045-090	0.0	0.0000374	0.0	0.0	0.0	0.0	0.0	0.0	0.0000374
10	045-090	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	090-135	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	135-180	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	180-225	045-090	0.0	0.0	0.0	0.0025140	0.0166329	0.0036211	0.0	0.0	0.0220685

PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED. LOC 7 GT 5 EM 3 X 12800. Y 7500. Z 20. RADIUS 0.M

SECTOR	AZIMUTH REAR=00	ELEV. DOWN=00	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
14	225-270	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	270-315	045-090	0.0	0.0	0.0000294	0.0	0.0	0.0	0.0	0.0	0.0000294
16	315-360	045-090	0.0	0.0006235	0.0002650	0.0	0.0	0.0	0.0	0.0	0.0008884
17	000-045	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	045-090	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	090-135	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	135-180	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	180-225	090-135	0.0	0.0	0.0	0.0	0.0	0.0392846	0.0	0.0	0.0392846
22	225-270	090-135	0.0	0.0	0.0	0.0	0.0000196	0.0017850	0.0	0.0	0.0018045
23	270-315	090-135	0.0	0.0	0.0	0.0054171	0.0	0.0	0.0	0.0	0.0054171
24	315-360	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	000-045	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	045-090	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	090-135	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	135-180	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	180-225	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	225-270	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	270-315	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	315-360	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTALS	0.0001108	0.0008536	0.0002945	0.0079175	0.0166521	0.0438568	0.0	0.0	0.0684357

LOC	P(KILL)	RCUNDS	FIRE TIME	XGUN	YGUN	ZGUN	RADIUS GL	T REACT	T TRACK GT	EM	CB	SB	LOC
1	0.0	0	0.0	14800.00	6000.00	40.00	0.0 1	0.0	2.50	1	1	1	1
2	0.0010946	7	5.25	16200.00	8200.00	40.00	0.0 1	0.0	2.50	1	1	1	2
3	0.0003691	17	6.80	13600.00	7200.00	20.00	0.0 1	0.0	2.50	2	1	1	3
4	0.0	0	0.0	13400.00	8000.00	20.00	0.0 1	0.0	2.50	2	1	1	4
5	0.0	0	0.0	11300.00	9700.00	50.00	0.0 1	0.0	6.00	3	4	1	5
6	0.0112059	422	21.10	15600.00	10900.00	90.00	0.0 1	0.0	6.00	3	4	1	6
7	0.0684375	134	57.42	12800.00	7500.00	20.00	0.0 1	0.0	6.00	5	5	2	1	7

LOC	TIME 1	TIME 2	TIME 3	TIME 4	TIME 5	TIME 6	TIME 7	TIME 8	TIME 9	TIME10
1	11.47	22.95	34.42	45.89	57.37	68.84	80.31	91.78	103.26	999.99
2	11.47	22.95	34.42	45.89	57.37	68.84	80.31	91.78	103.26	999.99
3	11.47	22.95	34.42	45.89	57.37	68.84	80.31	91.78	103.26	999.99
4	11.47	22.95	34.42	45.89	57.37	68.84	80.31	91.78	103.26	999.99
5	11.47	22.95	34.42	45.89	57.37	68.84	80.31	91.78	103.26	999.99
6	11.47	22.95	34.42	45.89	57.37	68.84	80.31	91.78	103.26	999.99
7	11.47	22.95	34.42	45.89	57.37	68.84	80.31	91.78	103.26	999.99

LOC	PK(TF 1)	PK(TF 2)	PK(TF 3)	PK(TF 4)	PK(TF 5)	PK(TF 6)	PK(TF 7)	PK(TF 8)	PK(TF 9)	PK(TF10)
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.C	0.C	0.0
1CUM		0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.C	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.0000997	C.CC09949	0.0
2CUM		0.0	0.0	0.0	0.0	0.0	0.0	0.0000997	C.CC1C945	0.0010945
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.0003690	0.C	0.0
3CUM		0.0	0.0	0.0	0.0	0.0	0.0	C.0003690	0.C003690	0.0003690
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.0	0.C	0.0
4CUM		0.0	0.0	0.0	0.0	0.0	0.0	C.0	0.C	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.0	0.C	0.0
5CUM		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.C	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.0013700	0.CC59808	0.0038855
6CUM		0.0	0.0	0.0	0.0	0.0	0.0	C.0013700	0.CC73426	0.0111995
7	0.0	0.0	0.0	0.0	0.0024045	C.0001261	0.0195878	C.0465743	0.CC08801	0.0
7CUM		0.0	0.0	0.0	0.0024045	C.0025303	0.0220685	C.0676150	0.C684355	0.0684355

LOC	PK(TI 1)	PK(TI 2)	PK(TI 3)	PK(TI 4)	PK(TI 5)	PK(TI 6)	PK(TI 7)	PK(TI 8)	PK(TI 9)	PK(TI10)
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.C	0.C	0.0
1CUM		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.C	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.0	0.CC1C945	0.0
2CUM		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.CC1C945	0.0010945
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.0003690	0.C	0.0
3CUM		0.0	0.0	0.0	0.0	0.0	0.0	C.0003690	0.0C03690	0.0003690
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.C	0.0
4CUM		0.0	0.0	0.0	0.0	0.0	0.0	C.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.0	0.C	0.0
5CUM		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.C	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C.0	0.C070194	0.0042097
6CUM		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.C07C194	0.0111995

LOC	PK(TI 1)	PK(TI 2)	PK(TI 3)	PK(TI 4)	PK(TI 5)	PK(TI 6)	PK(TI 7)	PK(TI 8)	PK(TI 9)	PK(TI10)
7	0.0	0.0	0.0	0.0	0.0	0.0025023	0.0166461	0.0491013	0.0085465	0.0003037
7CUM		0.0	0.0	0.0	0.0	0.0025023	0.0191067	0.0672699	0.0681527	0.0684356

LOC	RHO 1	RHO 2	RHO 3	RHO 4	RHO 5	RHO 6	RHO 7	RHO 8	RHO 9
1	1.00000								
2	1.00000								
3	1.00000								
4	1.00000								
5	1.00000								
6	1.00000								
7	1.00000								

ATTRITION ACCRUED AS A FUNCTION OF TIME OF FIRE

TIME SEG.	CUM FOR CLASS 1	DENSITY CLASS 1	DENSITY CLASS 2	DENSITY CLASS 3	DENSITY CLASS 4	DENSITY CLASS 5	DENSITY CLASS 6	DENSITY CLASS 7	DENSITY CLASS 8	DENSITY CLASS 9
1	0.0	0.0								
2	0.0	0.0								
3	0.0	0.0								
4	0.0	0.0								
5	0.0024045	0.0024045								
6	0.0025303	0.0001261								
7	0.0220685	0.0195878								
8	0.0653287	0.0483268								
9	0.0766286	0.0078437								
10	0.0802163	0.0035855								

ATTRITION ACCRUED AS A FUNCTION OF TIME AT INTERCEPT

TIME SEG.	CUM FOR CLASS 1	DENSITY CLASS 1	DENSITY CLASS 2	DENSITY CLASS 3	DENSITY CLASS 4	DENSITY CLASS 5	DENSITY CLASS 6	DENSITY CLASS 7	DENSITY CLASS 8	DENSITY CLASS 9
1	0.0	0.0								
2	0.0	0.0								
3	0.0	0.0								
4	0.0	0.0								
5	0.0	0.0								
6	0.0025023	0.0025023								
7	0.0191067	0.0166461								
8	0.0676140	0.0485522								
9	0.0760475	0.0090451								
10	0.0802164	0.0041689								
	TOTALS	0.0802243								

TOTAL PK FOR DENSITY CLASS 1 AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED.

SECTOR	AZIMUTH REAR=00	ELEV. DOWN=00	0-152	152-305	305-457	457-610	610-762	762-914	914-1067	1067-1219	TOTAL PK
1	000-045	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	045-090	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	090-135	000-045	0.0	0.0	0.0	0.0	0.0001340	0.0	0.0	0.0	0.0001340
4	135-180	000-045	0.0	0.0	0.0	0.0	0.0002519	0.0	0.0	0.0	0.0002519
5	180-225	000-045	0.0	0.0003255	0.0012023	0.0	0.0	0.0	0.0	0.0	0.0015274
6	225-270	000-045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	270-315	000-045	0.0	0.0030411	0.0	0.0	0.0	0.0	0.0	0.0	0.0030411
8	315-360	000-045	0.0001108	0.0001518	0.0	0.0	0.0	0.0	0.0	0.0	0.0002626
9	000-045	045-090	0.0	0.0000374	0.0	0.0	0.0	0.0	0.0	0.0	0.0000374
10	045-090	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	090-135	045-090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	135-180	045-090	0.0	0.0	0.0	0.0	0.0007089	0.0	0.0	0.0	0.0007089
13	180-225	045-090	0.0	0.0	0.0058241	0.0025407	0.0167664	0.0030211	0.0	0.0	0.0279221
14	225-270	045-090	0.0	0.0036015	0.0002850	0.0	0.0000393	0.0	0.0	0.0	0.0039247
15	270-315	045-090	0.0	0.0	0.0000294	0.0	0.0	0.0	0.0	0.0	0.0000294
16	315-360	045-090	0.0	0.0006235	0.0002650	0.0	0.0	0.0	0.0	0.0	0.0008884
17	000-045	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	045-090	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	090-135	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	135-180	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	180-225	090-135	0.0	0.0	0.0	0.0	0.0	0.0392846	0.0	0.0	0.0392846
22	225-270	090-135	0.0	0.0	0.0	0.0	0.0001868	0.0017850	0.0	0.0	0.0019715
23	270-315	090-135	0.0	0.0	0.0	0.0054171	0.0	0.0	0.0	0.0	0.0054171
24	315-360	090-135	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	000-045	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	045-090	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	090-135	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	135-180	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	180-225	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	225-270	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	270-315	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	315-360	135-180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTALS	0.0001108	0.0047761	0.0075947	0.0079440	0.0180647	0.0436568	0.0	0.0	0.0802164

***** END OF JOB - - P001 SCENARIO RUN COMPLETE *****

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C*************************************************************************      5
C                                                                              10
C                                                                              15
C  'THIS PROGRAM WILL PUNCH ALL REQUIRED CARDS FOR THE EXECUTION OF THE        20
C  P001 ANALYSIS WITH THE EXCEPTION OF THE FIRST CARD (THE GREEN JOB           25
C  CARD) AND THE LAST CARD (THE ORANGE END OF FILE CARD).  THE MINIMAL         30
C  INPUT TO THIS PROGRAM IS THE X, Y AND Z COORDINATES FOR EACH OF THE         35
C  FLIGHT PATH MILESTONES.  SIX GUN EMPLACEMENT LOCATIONS MAY BE               40
C  SPECIFIED IF THE SIX PRESET GUN LOCATIONS ARE NOT DESIRED.  IF THE          45
C  PRESET GUN EMPLACEMENT LOCATIONS ARE USED, THE FINAL DATA CARD IS A         50
C  CONTROL CARD THAT SPECIFIES THE DESIRED INPUT, OUTPUT AND SCENARIO          55
C  OPTIONS.  IF THE PRESET GUN LOCATIONS ARE NOT USED, THE FINAL DATA          60
C  CARDS WILL BE THE 6 INPUT GUN LOCATION CARDS.                               65
C                                                                              70
C  MILESTONE CARDS: THE X, Y, Z COORDINATES FOR UP TO 199 FLIGHT PATH          75
C  MILESTONES MUST BE ENTERED IN 3F10.0 FORMAT, ONE MILESTONE PER INPUT        80
C  CARD. THE VALUES (IN METERS) MUST BE ENTERED IN DECIMAL FORM WITH THE       85
C  X COORDINATE IN COLUMNS 1-10, THE Y COORDINATE IN COLUMNS 11-20 AND         90
C  Z COORDINATE IN COLUMNS 21-30.  THE DECIMAL POINT MUST APPEAR IN EACH       95
C  COORDINATE VALUE.                                                          100
C                                                                             105
C  MILESTONE DELIMITER   CARD:  A CARD CONTAINING 99999. LEFT JUSTIFIED       110
C  (INPUT FORMAT F6.0) MUST BE PLACED AFTER THE FINAL MILESTONE CARD TO       115
C  MARK THE END OF THE MILESTONE DATA INPUT.                                  120
C                                                                             125
C  CONTROL CARD:  A CONTROL CARD SPECIFYING THE CRUISE SPEED, THE NUMBER      130
C  OF THE BOMB RELEASE MILESTONE (COUNT THE INITIAL POSITION AS MILE-         135
C  STONE 1), 8 INPUT/OUTPUT/SCENARIO OPTIONS AND THE JAMMER POWER             140
C  FOLLOWS THE "99999." CARD.  THE DATA ON THE OPTION CARD MUST BE            145
C  SPECIFIED IN F10.0, I2, 8I1, F10.0 FORMAT.                                 150
C                                                                             155
C       F10.0:  THE AIRCRAFT CRUISE SPEED IN METERS PER SECOND.               160
C       I2: THE NUMBER OF THE BOMB RELEASE MILESTONE.                         165
C       I1:  EW OPTION - 0 FOR NO EW; 1 FOR EW (WITH EW, AN AIRBORNE          170
C  JAMMER IS USED TO JAM TRACKING RADARS.                                     175
C       I1:  ANTI-JAM OPTION - 0 FOR NO AJ; 1 FOR AJ (WITH AJ, RADAR          180
C  SYSTEMS WITH THE CAPABILITY USE AJ AGAINST THE JAMMER.)                    185
C       I1:  MULTIPATH OPTION - 0 FOR NO MULTIPATH; 1 FOR MULTIPATH (IF       190
C  SPECIFIED, THE EFFECTS OF RADAR MULTIPATH ARE INCLUDED IN THE RADAR        195
C  SYSTEMS THAT ARE AFFECTED BY MULTIPATH.)                                   200
C       I1:  GUN EMPLACEMENT LOCATION INPUT OPTION - 0 FOR PRESET GUN         205
C  LOCATIONS; 1 FOR GUN EMPLACEMENT LOCATIONS INPUT AS DATA.                  210
C       I1:  LIST OPTION - 0 FOR NO LISTING OF THE P001 INPUT DECK;           215
C  1 FOR LIST OF P001 INPUT DECK PROVIDED AS PART OF THE OUTPUT.              220
C       I1:  PUNCH OPTION - 0 FOR NO P001 INPUT PUNCHED CARDS DESIRED;        225
C  1 FOR P001 INPUT DECK PROVIDED AS PART OF THE OUTPUT.                      230
C       I1:  PLOT OPTION - 0 FOR NO PLOT OF FLIGHT PATH AND GUN LOCATIONS     235
C  DESIRED; 1 FOR PLOT DESIRED.                                               240
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C       I1:  EXTENCED OUTPUT OPTION - 0 FCR NO EXTENCED OUTPUT DESIRED;
C   1 FCR EXTENDED PRINTOUT DESIRED AS OUTPUT.
C       F10.0:  JAMMER PCWER - MUST BE BETWEEN 0 TC 1000 WATTS.
C
C   GUN EMPLACEMENT LOCATION CARDS:  IF DESIRED AS INPUT DATA, THE 6 GUN
C   EMPLACEMENT LOCATION CARDS FOLLOW THE OPTION CCNTROL CARD IN
C   THE SAME FORMAT AS THE MILESTONE CARDS (3F10.0).  THE GUN EMPLACEMENT
C   CARDS MUST BE PLACED IN THE FOLLOWING ORDER:  2 TYPE 1 MCDE 1, 2 TYPE
C   2 MODE 1, 1 TYPE 3 MODE 4, 1 TYPE 3 MODE 3.  WHETHER OR NOT THE
C   PRESET GUN LOCATION CPTICN IS SPECIFIED, 1 TYPE 5 MODE 3 WEAPCN IS
C   ADDED TO THE SCENARIO.  THE LOCATION OF THIS GUN IS FIXED AND IS
C   SPECIFIED BY THE PROGRAM.
C
C   INPUT DECK EXAMPLE:  (FOR 10 MILESTONES)
C
C   1000.      -200.      100.
C   1200.      -300.      200.
C   1525.      -350.      450.
C   1800.      -400.      350.
C   2100.      -525.      400.
C   2350.      -655.      375.
C   2500.      -803.      425.
C   2819.     -1055.      450.
C   3000.     -1100.      500.
C   3200.     -1215.      625.
C   99999.
C   232.0      0711111110    500.0
C   1000.      2000.        60.
C   1200.      1600.        30.
C   2575.      -550.         0.
C   (ETC., UNTIL ALL  6 GUN EMPLACEMENTS ARE LOCATED.)
C
C*****************************************************************************
C
C   /////*****MAIN PROGRAM*****/////
C
      DIMENSION X10(200), Y10(200)
      DIMENSION M(200), VEL(200), XDOT(200), YDOT(200), ZDOT(200), X(200
     1), Y(200), Z(200), HDG(200), CA(200), T(200), HDGDEG(200), CADEG(2
     200), RA(200), TIM(10), XGUN(15), YGUN(15), ZGUN(15), XCIRC(25), Y
     3CIRC(25)
      DIMENSION TNRT(200), ITNMAX(200), TNRTDG(200), TNCOR(200), ISTALL(
     1200), G(200), ABSRT(200), DT(200)
      DIMENSION RCSTAB(1000)
      DIMENSION VAT1N2(208), VAT3(208), VAT5(208)
C
C   PREDETERMINED GUN EMPLACEMENT LOCATICNS
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C                                                                       485
      DATA XGUN/14800.,16200.,13600.,13400.,11300.,15600.,12800./       490
      DATA YGUN/9000.,8200.,7200.,8000.,9700.,10900.,7500./             495
      DATA ZGUN/40.,40.,20.,20.,50.,90.,20./                            500
C                                                                       505
CC    VULNERABLE AREA TABLE VS TYPE 1 AND 2 WEAPONS                     510
C                                                                       515
      DATA VAT1N2/2*.4645,6*7.107,2*.6568,6*5.551,2*.6968,6*5.574,2*.656520
     18,6*7.357,2*.6968,6*5.574,2*.6568,6*5.551,2*.6968,6*5.574,2*.6568,525
     26*7.357,2*.6968,6*5.574,2*.4645,6*.7432,2*.6568,6*2.858,2*.4645,6*530
     33.298,2*.6568,6*2.858,2*.4645,6*.7432,2*.6568,6*2.858,2*.4645,6*3.535
     4258,2*.6568,6*2.858,2*.6568,6*5.551,2*.6968,6*5.574,2*.6568,6*7.35540
     57,2*.6968,6*5.574,2*.6568,6*5.551,2*.6968,6*5.574,2*.6568,6*7.357,545
     62*.6968,6*5.574,2*.4645,6*7.107/                                  550
C                                                                       555
CC    VULNERABLE AREA TABLE VS TYPE 3 WEAPONS                           560
C                                                                       565
      DATA VAT3/2*12.54,6*13.47,2*9.853,6*10.51,2*9.639,6*11.15,2*12.64,570
     16*14.78,2*9.639,6*11.15,2*9.853,6*10.51,2*9.639,6*11.15,2*12.64,6*575
     214.78,2*9.639,6*11.15,8*1.394,2*4.762,6*6.240,2*5.342,6*7.432,2*4.580
     3762,6*6.240,8*1.394,2*4.762,6*6.240,2*5.342,6*7.432,2*4.762,6*6.24585
     40,2*9.853,6*10.51,2*9.639,6*11.15,2*12.64,6*14.78,2*9.639,6*11.15,590
     52*9.853,6*10.51,2*9.639,6*11.15,2*12.64,6*14.78,2*9.639,6*11.15,2*595
     612.54,6*13.47/                                                    600
C                                                                       605
CC    VULNERABLE AREA TABLE VS TYPE 5 WEAPONS                           610
C                                                                       615
      DATA VAT5/8*55.37,8*43.22,8*47.10,8*62.53,8*47.10,8*43.22,8*47.10,620
     18*62.53,8*47.10,8*5.761,8*27.45,8*33.07,8*27.45,8*5.761,8*27.45,8*625
     233.07,8*27.45,8*5.761,8*47.10,8*62.53,8*47.10,8*43.22,8*47.10,8*62630
     3.53,8*47.10,8*55.37/                                              635
C                                                                       640
CC    RADAR CROSS SECTION TABLE                                         645
C                                                                       650
      DATA RCSTAB/19*1000.,19*100.,.273,.178,.053,.023,.156,.166,.063,.1655
     173,.235,.047,.02,.015,.011,.073,.072,.019,.028,.11,.454,.005,.005,660
     2.007,.011,.093,.093,.039,.068,.112,.032,.019,.015,.009,.035,.032,.665
     3017,.033,.102,.509,.273,.178,.053,.023,.156,.166,.063,.173,.235,.0670
     447,.02,.015,.011,.073,.072,.019,.028,.11,.454,19*100.,19*1000./   675
C                                                                       680
CC    CALL ERRSET SUPPRESSES ANY POSSIBLE UNDERFLOW PROBLEMS THAT MAY   685
CC    RESULT FROM MANIPULATION OF SCENARIO PARAMETERS.                  690
C                                                                       695
      CALL ERRSET (208,50,-1,1,1)                                       700
C                                                                       705
      PI = 3.14159                                                      710
      MNUM = 0                                                          715
      IBR = 0                                                           720
```

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C                                                                       725
C  READ THE MILESTONE CARDS, COUNT THE NUMBER OF MILESTONES AND STOP    730
C  INPUT UPON REACHING THE '99999.' DELIMITER CARD.                     735
CCC                                                                     740
CCC                                                                     745
C                                                                       750
      DO 1 I=1,200                                                      755
      READ (5,40) X(I),Y(I),Z(I)                                        760
      IF (X(I).EQ.99999.) GO TO 2                                       765
      MNUM = MNUM+1                                                     770
      X10(I) = X(I)/2000.0                                              775
      Y10(I) = Y(I)/2000.0                                              780
    1 CONTINUE                                                          785
C                                                                       790
CCC                                                                     795
C                                                                       800
    2 CONTINUE                                                          805
C                                                                       810
C  READ THE CRUISE SPEED, BOMB RELEASE MILESTONE, EW OPTION, ANTI-JAM   815
C  OPTION, MULTIPATH OPTION, GUN LOCATION INPUT OPTION AND THE LIST     820
C  PUNCH, PLOT AND EXTENDED OUTPUT OPTIONS AND THE JAMMER POWER.        825
C                                                                       830
      READ (5,42) CVEL,MBR,IEW,IAJ,IMULT,IGUN,ILST,IPNCH,IPLOT,IEXT,PJAM 835
C                                                                       840
C  JAMMER ON BUT JAMMER POWER = 0 ???  THEN TURN JAMMER OFF.            845
C                                                                       850
      IF (IEW.EQ.1.AND.PJAM.LE.0.0) IPJAM1=1                            855
      IF (IPJAM1.EQ.1) IEW=0                                            860
      IF (IPJAM1.EQ.1) WRITE (6,43)                                     865
C                                                                       870
C  JAMMER POWER GREATER THAN 1000 WATTS ???  THEN LIMIT IT TO 1000 WATTS 875
C                                                                       880
      IF (PJAM.GT.1000) IPJAM2=1                                        885
      IF (IPJAM2.EQ.1) PJAM=1000                                        890
      IF (IPJAM2.EQ.1.AND.IEW.EQ.1) WRITE (6,44)                        895
C                                                                       900
C  AJ ON BUT JAMMER OFF ???  THEN TURN AJ OFF.                          905
C                                                                       910
      IF (IAJ.EQ.1.AND.IEW.EQ.0) WRITE (6,45)                           915
      IF (IEW.EQ.0) IAJ = 0                                             920
C                                                                       925
C  OPTION TO INPUT THE 6 ADDITIONAL GUN EMPLACEMENT LOCATIONS           930
C                                                                       935
      IF (IGUN.NE.1) GO TO 3                                            940
C                                                                       945
CCC                                                                     950
C                                                                       955
      DO 3 I=1,6                                                        960
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      READ (5,41,END=38) XGUN(I),YGUN(I),ZGUN(I)                        965
    3 CONTINUE                                                          970
C                                                                       975
CCC                                                                     980
CCC                                                                     985
CC    CALCULATE THE X, Y AND Z VELOCITIES, THE CLIMB ANGLE, HEADING AND 990
CC    ROLL ANGLE AND THE TIME AT EACH MILESTONE ALONG WITH VARIOUS OTHER 995
CC    PARAMETERS FOR LATER USE.                                        1000
CCC                                                                    1005
CCC                                                                    1010
C                                                                      1015
      DO 9 I=1,MNUM                                                    1020
      IF (I.NE.MNUM) GO TO 4                                           1025
C                                                                      1030
CC    CALCULATIONS FOR THE FINAL MILESTONE                             1035
C                                                                      1040
      HDG(I) = HDG(I-1)                                                1045
      HDGDEG(I) = HDG(I)*57.29578                                      1050
      IF (HDGDEG(I).LT.0) HDGDEG(I)=HDGDEG(I)+360                      1055
      RA(I) = 0                                                        1060
      CADEG(I) = 0                                                     1065
      ZDOT(I) = 0                                                      1070
      XDOT(I) = VEL(I)*COS(HDG(I))                                     1075
      YDOT(I) = VEL(I)*SIN(HDG(I))                                     1080
      TNRT(I) = 0                                                      1085
      GO TO 8                                                          1090
C                                                                      1095
CC    GENERAL COORDINATE CALCULATIONS FOR LATER USE                    1100
C                                                                      1105
    4 CONTINUE                                                         1110
      DX = X(I+1)-X(I)                                                 1115
      DX2 = DX**2                                                      1120
      DY = Y(I+1)-Y(I)                                                 1125
      DY2 = DY**2                                                      1130
      DZ = Z(I+1)-Z(I)                                                 1135
      DZ2 = DZ**2                                                      1140
      DIST = SQRT(DX2+DY2+DZ2)                                         1145
C                                                                      1150
CC    CLIMB ANGLE CALCULATIONS                                         1155
C                                                                      1160
      CA(I) = ATAN2(DZ,SQRT(DX2+DY2))                                  1165
      IF (CA(I).GT.1.5533) CA(I)=1.5533                                1170
      CADEG(I) = CA(I)*57.29578                                        1175
C                                                                      1180
CC    HEADING CALCULATIONS                                             1185
C                                                                      1190
      IF (DX.NE.0.OR.DY.NE.0) GO TO 5                                  1195
      HDG(I) = HDG(I-1)                                                1200
```

```
      GO TO 6                                                                  1205
    5 HDG(I+1) = ATAN2(DY,DX)                                                  1210
      HDG(1) = HDG(2)                                                          1215
    6 HDGDEG(I) = HDG(I)*57.29578                                              1220
      IF (HDGDEG(I).LT.0) HDGDEG(I)=HDGDEG(I)+360                              1225
C                                                                              1230
C   VELOCITY CALCULATIONS                                                      1235
C                                                                              1240
      VEL(1) = CVEL                                                            1245
      VEL(I+1) = VEL(I)-TAN(CA(I))*DIST/100+(CVEL-VEL(I))*(DIST/VEL(I))/       1250
     130                                                                       1255
C                                                                              1260
C   BOMB RELEASE POINT CONSIDERATIONS                                          1265
C                                                                              1270
      IF (I.EQ.MBR) IBR = 1                                                    1275
C                                                                              1280
C   *****  RESTRICTION: MAX VEL PRIOR TO BOMB RELEASE POINT IS 260 MPS.        1285
C                                                                              1290
      IF (VEL(I+1).GT.260.AND.IBR.EQ.0) VEL(I+1)=260                           1295
C                                                                              1300
C   *****  RESTRICTION: MAX VEL AFTER BOMB RELEASE POINT IS 310 MPS.           1305
C                                                                              1310
      IF (VEL(I+1).GT.310.AND.IBR.NE.0) VEL(I+1)=310                           1315
      VAVG = (VEL(I)+VEL(I+1))/2                                               1320
C                                                                              1325
C   VELOCITY COMPONENT CALCULATIONS                                            1330
C                                                                              1335
      ZDOT(I) = VEL(I)*SIN(CA(I))                                              1340
      XYVEL = VEL(I)*COS(CA(I))                                                1345
      XDOT(I) = XYVEL*COS(HDG(I))                                              1350
      YDOT(I) = XYVEL*SIN(HDG(I))                                              1355
C                                                                              1360
C   MILESTONE TIME CALCULATIONS                                                1365
C                                                                              1370
      T(1) = 0                                                                 1375
      T(I+1) = T(I)+DIST/VAVG                                                  1380
      DT(I) = 1                                                                1385
      IF (I.EQ.1) GO TO 7                                                      1390
      DT(I) = T(I)-T(I-1)                                                      1395
C                                                                              1400
C   TURN RATE AND ROLL ANGLE CALCULATIONS                                      1405
C                                                                              1410
    7 TNANG = HDG(I+1)-HDG(I)                                                  1415
      TNRT(I) = TNANG/DT(I)                                                    1420
      RA(I) = ATAN(TNRT(I)*VAVG/9.81)*57.29578                                 1425
    8 CONTINUE                                                                 1430
    9 CONTINUE                                                                 1435
C                                                                              1440
```

```
C                                                                       1445
C                                                                       1450
C  CARD 2 TIME INCREMENT CALCULATION                                    1455
C                                                                       1460
      TINC = T(MNUM)/1000                                               1465
C                                                                       1470
C  CARD 6 TIME INCREMENT CALCULATIONS                                   1475
C                                                                       1480
      TINKI = 0                                                         1485
C                                                                       1490
C                                                                       1495
C                                                                       1500
      DO 10 I=1,9                                                       1505
      TINK(I) = TINKI+T(MNUM)/10                                        1510
      TINKI = TINK(I)                                                   1515
   10 CONTINUE                                                          1520
C                                                                       1525
C                                                                       1530
C                                                                       1535
C  /////*****PRINT PROGRAM*****/////                                    1540
C                                                                       1545
C                                                                       1550
C  OPTION TO LIST THE P001 CARD DECK                                    1555
C                                                                       1560
      IF (ILST.EQ.0) GO TO 16                                           1565
C                                                                       1570
C  COMMENCE PRINTED OUTPUT OF THE P001 CARD DECK.                       1575
C                                                                       1580
C                                                                       1585
C  THE JCL CARDS.                                                       1590
C                                                                       1595
      WRITE (6,47)                                                      1600
      WRITE (6,48)                                                      1605
      WRITE (6,49)                                                      1610
      WRITE (6,50)                                                      1615
      WRITE (6,51)                                                      1620
      WRITE (6,52)                                                      1625
      WRITE (6,51)                                                      1630
      WRITE (6,53)                                                      1635
      WRITE (6,51)                                                      1640
      WRITE (6,54)                                                      1645
      WRITE (6,51)                                                      1650
      WRITE (6,55)                                                      1655
      WRITE (6,51)                                                      1660
      WRITE (6,56)                                                      1665
C                                                                       1670
C  BLANK CARD FOR RADAR MASK ANGLE = 0.                                 1675
C                                                                       1680
```

```
      WRITE (6,57)                                                      1685
C                                                                       1690
CCC   THE CUTPUT TITLE CARD.                                            1695
C                                                                       1700
      WRITE (6,58)                                                      1705
C                                                                       1710
CCC   CARD 2                                                            1715
C                                                                       1720
      WRITE (6,59) T(MNUM),TINC                                         1725
C                                                                       1730
CCCCC THE 2A CARDS (MILESTONES).                                        1735
C                                                                       1740
C                                                                       1745
C                                                                       1750
      DO 11 I=1,MNUM                                                    1755
      WRITE (6,60) T(I),X(I),Y(I),Z(I),XDOT(I),YDOT(I),ZDOT(I),HDGDEG(I)1760
     1,CADEG(I),RA(I)                                                   1765
   11 CONTINUE                                                          1770
C                                                                       1775
CCC                                                                     1780
C                                                                       1785
      WRITE (6,61)                                                      1790
      WRITE (6,62)                                                      1795
C                                                                       1800
CCC   CARD 3 (GUN EMPLACEMENT CARD).                                    1805
C                                                                       1810
      WRITE (6,63) XGUN(1),YGUN(1),ZGUN(1)                              1815
C                                                                       1820
CCC   CARD 4 (GUN TYPE).                                                1825
C                                                                       1830
      WRITE (6,64)                                                      1835
C                                                                       1840
CCC   CARD 5                                                            1845
C                                                                       1850
      WRITE (6,65)                                                      1855
C                                                                       1860
CCC   CARD 6                                                            1865
C                                                                       1870
      WRITE (6,66) (TINK(I),I=1,9)                                      1875
C                                                                       1880
CCC   CARD 7 (VULNERABLE AREA TABLE VS TYPE 1 AND 2 WEAPONS)            1885
C                                                                       1890
      WRITE (6,67)                                                      1895
      WRITE (6,68) (VAT1N2(I),I=1,208)                                  1900
C                                                                       1905
CC    CARD 12 (EXECUTE RUN).                                            1910
CC    EXTENDED OUTPUT OPTION                                            1915
C                                                                       1920
```

```
      IF (IEXT.NE.1) WRITE (6,70)                                        1925
      IF (IEXT.EQ.1) WRITE (6,69)                                        1930
C                                                                        1935
CC    THE REMAINDER OF THE CARDS INTRODUCE NEW GUN LOCATIONS, GUN TYPES  1940
CC    AND VULNERABLE AREA TABLES TO BE EXECUTED BY THE PROGRAM.          1945
C                                                                        1950
      WRITE (6,63) XGUN(2),YGUN(2),ZGUN(2)                               1955
C                                                                        1960
CC    EXTENDED OUTPUT OPTION                                             1965
C                                                                        1970
      IF (IEXT.NE.1) WRITE (6,70)                                        1975
      IF (IEXT.EQ.1) WRITE (6,69)                                        1980
      WRITE (6,63) XGUN(3),YGUN(3),ZGUN(3)                               1985
      WRITE (6,71)                                                       1990
C                                                                        1995
CC    EXTENDED OUTPUT OPTION                                             2000
C                                                                        2005
      IF (IEXT.NE.1) WRITE (6,70)                                        2010
      IF (IEXT.EQ.1) WRITE (6,69)                                        2015
      WRITE (6,63) XGUN(4),YGUN(4),ZGUN(4)                               2020
C                                                                        2025
CC    EXTENDED OUTPUT OPTION                                             2030
C                                                                        2035
      IF (IEXT.NE.1) WRITE (6,70)                                        2040
      IF (IEXT.EQ.1) WRITE (6,69)                                        2045
      WRITE (6,63) XGUN(5),YGUN(5),ZGUN(5)                               2050
      WRITE (6,72)                                                       2055
C                                                                        2060
CC    CARD 7 (VULNERABLE AREA TABLE VS TYPE 3 WEAPONS)                   2065
C                                                                        2070
      WRITE (6,147)                                                      2075
      WRITE (6,68) (VAT3(I),I=1,208)                                     2080
C                                                                        2085
CC    EW (JAMMER) OPTION                                                 2090
C                                                                        2095
      IF (IEW.NE.1) GO TO 12                                             2100
      IRECM = 1                                                          2105
      SJTMAX = 3                                                         2110
C                                                                        2115
CC    CARC 14 (SPECIFIES EW OPTION AND JAMMER INFO.)                     2120
C                                                                        2125
      WRITE (6,73) IEW,PJAM,IRECM,SJTMAX                                 2130
C                                                                        2135
CC    WRITE THE RADAR CROSS SECTION TABLE.                               2140
C                                                                        2145
      WRITE (6,74) (RCSTAB(I),I=1,133)                                   2150
C                                                                        2155
   12 CONTINUE                                                           2160
```

```
C                                                                       2165
CC                                                                      2170
CC  EXTENDED OUTPUT OPTION                                              2175
C                                                                       2180
      IF (IEXT.NE.1) WRITE (6,70)                                       2185
      IF (IEXT.EQ.1) WRITE (6,69)                                       2190
      WRITE (6,63) XGUN(6),YGUN(6),ZGUN(6)                              2195
      WRITE (6,75)                                                      2200
C                                                                       2205
CC  MULTIPATH OPTICN                                                    2210
C                                                                       2215
      IF (IMULT.NE.1) GO TO 13                                          2220
C                                                                       2225
CC  CARD 13 (MULTIPATH EFFECTS)                                         2230
C                                                                       2235
      IRMP = 1                                                          2240
      WRITE (6,76) IMULT,IRMP                                           2245
C                                                                       2250
   13 CONTINUE                                                          2255
C                                                                       2260
CC                                                                      2265
CC  EXTENDED OUTPUT OPTION                                              2270
C                                                                       2275
      IF (IEXT.NE.1) WRITE (6,70)                                       2280
      IF (IEXT.EQ.1) WRITE (6,69)                                       2285
      WRITE (6,63) XGUN(7),YGUN(7),ZGUN(7)                              2290
      WRITE (6,77)                                                      2295
C                                                                       2300
CC  CARD 7 (VULNERABLE AREA TABLE VS TYPE 5 WEAPONS)                    2305
C                                                                       2310
      WRITE (6,148)                                                     2315
      WRITE (6,68) (VAT5(I),I=1,208)                                    2320
C                                                                       2325
CC  MULTIPATH OPTICN                                                    2330
C                                                                       2335
      IF (IMULT.NE.1) GO TO 14                                          2340
C                                                                       2345
CC  CARD 13 (MULTIPATH EFFECTS)                                         2350
C                                                                       2355
      IRMP = 2                                                          2360
      WRITE (6,76) IMULT,IRMP                                           2365
C                                                                       2370
   14 CCNTINUE                                                          2375
C                                                                       2380
CC  EW (JAMMER) OPTION                                                  2385
C                                                                       2390
      IF (IEW.NE.1) GO TO 15                                            2395
      IRECM = 2                                                         2400
```

```
C                                                                       2405
CC  ANTI-JAM OPTION                                                     2410
C                                                                       2415
      IF (IAJ.EQ.1) IRECM=3                                             2420
      IF (IRECM.EQ.2) SJTMAX=1.5                                        2425
      IF (IRECM.EQ.3) SJTMAX=17                                         2430
C                                                                       2435
CC  CARD 14 (SPECIFIES EW OPTION AND JAMMER INFO.)                      2440
C                                                                       2445
      WRITE (6,73) IEW,PJAM,IRECM,SJTMAX                                2450
C                                                                       2455
CC  WRITE THE RADAR CROSS SECTION TABLE.                                2460
C                                                                       2465
      WRITE (6,74) (RCSTAB(I),I=1,133)                                  2470
C                                                                       2475
   15 CONTINUE                                                          2480
C                                                                       2485
CC                                                                      2490
CC  EXTENDED OUTPUT OPTION                                              2495
C                                                                       2500
      IF (IEXT.NE.1) WRITE (6,70)                                       2505
      IF (IEXT.EQ.1) WRITE (6,69)                                       2510
      WRITE (6,61)                                                      2515
      WRITE (6,78)                                                      2520
      WRITE (6,61)                                                      2525
C                                                                       2530
CC  /////*****PUNCH PROGRAM*****/////                                   2535
CCC                                                                     2540
C                                                                       2545
CC  OPTION TO PUNCH THE P001 CARD DECK                                  2550
C                                                                       2555
   16 CONTINUE                                                          2560
      IF (IPNCH.EQ.0) GO TO 22                                          2565
C                                                                       2570
CC  COMMENCE PUNCHED OUTPUT OF THE P001 CARD DECK.                      2575
CCC                                                                     2580
C                                                                       2585
CC  THE JCL CARDS.                                                      2590
C                                                                       2595
      WRITE (7,79)                                                      2600
      WRITE (7,80)                                                      2605
      WRITE (7,81)                                                      2610
      WRITE (7,82)                                                      2615
      WRITE (7,83)                                                      2620
      WRITE (7,84)                                                      2625
      WRITE (7,83)                                                      2630
      WRITE (7,85)                                                      2635
      WRITE (7,83)                                                      2640
```

```
      WRITE (7,86)                                                          2645
      WRITE (7,83)                                                          2650
      WRITE (7,87)                                                          2655
      WRITE (7,83)                                                          2660
      WRITE (7,88)                                                          2665
C                                                                           2670
CC  LEADING BLANK DATA CARD SIGNIFIES RADAR MASKING ANGLE OF ZERO.          2675
C                                                                           2680
      WRITE (7,89)                                                          2685
C                                                                           2690
CC  THE OUTPUT TITLE CARD.                                                  2695
C                                                                           2700
      WRITE (7,90)                                                          2705
C                                                                           2710
CC  CARD 2                                                                  2715
C                                                                           2720
      WRITE (7,91) T(MNUM),TINC                                             2725
C                                                                           2730
CC  THE 2A CARDS (MILESTONES).                                              2735
CC                                                                          2740
C                                                                           2745
C                                                                           2750
      DO 17 I=1,MNUM                                                        2755
      WRITE (7,92) T(I),X(I),Y(I),Z(I),XDOT(I),YDOT(I),ZDOT(I),HDGDEG(I)    2760
     1,CADEG(I),RA(I)                                                       2765
   17 CONTINUE                                                              2770
C                                                                           2775
CC                                                                          2780
C                                                                           2785
      WRITE (7,93)                                                          2790
      WRITE (7,94)                                                          2795
C                                                                           2800
CC  CARD 3 (GUN EMPLACEMENT CARD).                                          2805
C                                                                           2810
      WRITE (7,95) XGUN(1),YGUN(1),ZGUN(1)                                  2815
C                                                                           2820
CC  CARD 4 (GUN TYPE).                                                      2825
C                                                                           2830
      WRITE (7,96)                                                          2835
C                                                                           2840
CC  CARD 5                                                                  2845
C                                                                           2850
      WRITE (7,97)                                                          2855
C                                                                           2860
CC  CARD 6                                                                  2865
C                                                                           2870
      WRITE (7,98) (TINK(I),I=1,9)                                          2875
C                                                                           2880
```

```
C  CARD 7 (VULNERABLE AREA TABLE VS TYPE 1 AND 2 WEAPONS)                    2885
C                                                                           2890
      WRITE (7,99)                                                          2895
      WRITE (7,100) (VAT1N2(I),I=1,208)                                     2900
C                                                                           2905
CC                                                                          2910
C  CARD 12 (EXECUTE RUN).                                                   2915
C  EXTENDED OUTPUT OPTION                                                   2920
C                                                                           2925
      IF (IEXT.NE.1) WRITE (7,102)                                          2930
      IF (IEXT.EQ.1) WRITE (7,101)                                          2935
C                                                                           2940
C  THE REMAINDER OF THE CARDS INTRODUCE NEW GUN LOCATIONS, GUN TYPES        2945
C  AND VULNERABLE AREA TABLES TO BE EXECUTED BY THE PROGRAM.                2950
C                                                                           2955
      WRITE (7,95) XGUN(2),YGUN(2),ZGUN(2)                                  2960
C                                                                           2965
C  EXTENDED OUTPUT OPTION                                                   2970
C                                                                           2975
      IF (IEXT.NE.1) WRITE (7,102)                                          2980
      IF (IEXT.EQ.1) WRITE (7,101)                                          2985
      WRITE (7,95) XGUN(3),YGUN(3),ZGUN(3)                                  2990
      WRITE (7,103)                                                         2995
C                                                                           3000
C  EXTENDED OUTPUT OPTION                                                   3005
C                                                                           3010
      IF (IEXT.NE.1) WRITE (7,102)                                          3015
      IF (IEXT.EQ.1) WRITE (7,101)                                          3020
      WRITE (7,95) XGUN(4),YGUN(4),ZGUN(4)                                  3025
C                                                                           3030
C  EXTENDED OUTPUT OPTION                                                   3035
C                                                                           3040
      IF (IEXT.NE.1) WRITE (7,102)                                          3045
      IF (IEXT.EQ.1) WRITE (7,101)                                          3050
      WRITE (7,95) XGUN(5),YGUN(5),ZGUN(5)                                  3055
      WRITE (7,104)                                                         3060
C                                                                           3065
C  CARD 7 (VULNERABLE AREA TABLE VS TYPE 3 WEAPONS)                         3070
C                                                                           3075
      WRITE (7,145)                                                         3080
      WRITE (7,100) (VAT3(I),I=1,208)                                       3085
C                                                                           3090
C  EW (JAMMER) OPTION                                                       3095
C                                                                           3100
      IF (IEW.NE.1) GO TO 18                                                3105
      IRECM = 1                                                             3110
      SJTMAX = 3                                                            3115
C                                                                           3120
```

```
C  CARD 14 (SPECIFIES EW OPTION AND JAMMER INFO.)                    3125
C                                                                    3130
      WRITE (7,105) IEW,PJAM,IRECM,SJTMAX                            3135
C                                                                    3140
C  WRITE THE RADAR CROSS SECTION TABLE.                              3145
C                                                                    3150
      WRITE (7,106) (RCSTAB(I),I=1,133)                              3155
C                                                                    3160
   18 CONTINUE                                                       3165
C                                                                    3170
C                                                                    3175
C  EXTENDED OUTPUT OPTION                                            3180
C                                                                    3185
      IF (IEXT.NE.1) WRITE (7,102)                                   3190
      IF (IEXT.EQ.1) WRITE (7,101)                                   3195
      WRITE (7,95) XGUN(6),YGUN(6),ZGUN(6)                           3200
      WRITE (7,107)                                                  3205
C                                                                    3210
C  MULTIPATH OPTION                                                  3215
C                                                                    3220
      IF (IMULT.NE.1) GO TO 19                                       3225
      IRMP = 1                                                       3230
C                                                                    3235
C  CARD 13 (MULTIPATH EFFECTS)                                       3240
C                                                                    3245
      WRITE (7,108) IMULT,IRMP                                       3250
C                                                                    3255
   19 CONTINUE                                                       3260
C                                                                    3265
C                                                                    3270
C  EXTENDED OUTPUT OPTION                                            3275
C                                                                    3280
      IF (IEXT.NE.1) WRITE (7,102)                                   3285
      IF (IEXT.EQ.1) WRITE (7,101)                                   3290
      WRITE (7,95) XGUN(7),YGUN(7),ZGUN(7)                           3295
      WRITE (7,109)                                                  3300
C                                                                    3305
C  CARD 7 (VULNERABLE AREA TABLE VS TYPE 5 WEAPON)                   3310
C                                                                    3315
      WRITE (7,150)                                                  3320
      WRITE (7,100) (VAT5(I),I=1,208)                                3325
C                                                                    3330
C  MULTIPATH OPTION                                                  3335
C                                                                    3340
      IF (IMULT.NE.1) GO TO 20                                       3345
      IRMP = 2                                                       3350
C  CARD 13 (MULTIPATH EFFECTS)                                       3355
C                                                                    3360
```

```
      WRITE (7,108) IMULT,IRMP                                          3365
C                                                                       3370
   20 CCNTINUE                                                          3375
CC                                                                      3380
CC    EW (JAMMER) OPTION                                                3385
CC                                                                      3390
      IF (IEW.NE.1) GO TC 21                                            3395
      IRECM = 2                                                         3400
CC                                                                      3405
CC    ANTI-JAM OPTION                                                   3410
CC                                                                      3415
      IF (IAJ.EQ.1) IRECM=3                                             3420
      IF (IRECM.EC.2) SJTMAX=1.5                                        3425
      IF (IRECM.EQ.3) SJTMAX=17                                         3430
C                                                                       3435
CC    CARC 14 (SPECIFIES EW OPTION AND JAMMER INFO.)                    3440
CC                                                                      3445
      WRITE (7,105) IEW,PJAM,IRECM,SJTMAX                               3450
CC                                                                      3455
CC    WRITE THE RADAR CROSS SECTION TABLE.                              3460
CC                                                                      3465
      WRITE (7,106) (RCSTAB(I),I=1,133)                                 3470
C                                                                       3475
   21 CONTINUE                                                          3480
CC                                                                      3485
CCC                                                                     3490
CCC   EXTENDED OUTPUT OPTION                                           3495
CC                                                                      3500
      IF (IEXT.NE.1) WRITE (7,102)                                      3505
      IF (IEXT.EQ.1) WRITE (7,101)                                      3510
      WRITE (7,93)                                                      3515
      WRITE (7,110)                                                     3520
      WRITE (7,93)                                                      3525
C                                                                       3530
CCCCC                                                                   3535
CCCCC ////*****PLOT SECTICN*****/////                                   3540
CCCCCC                                                                  3545
CCCCCC                                                                  3550
CCCCC CPTICN TC PLOT THE P001 SCENARIO                                  3555
CC                                                                      3560
   22 CCNTINUE                                                          3565
C                                                                       3570
CCC   INITIALIZE PLOT                                                  3575
CC                                                                      3580
      CALL PLOTS                                                        3585
      IF (IPLOT.EQ.0) GO TO 25                                          3590
C                                                                       3595
CC    ESTABLISH X AXIS                                                  3600
```

```
C                                                                       3605
      REAL XTITLE/'     '/                                              3608
      CALL AXIS (0.0,0.0,XTITLE,-1,9.0,0.0,0.0,2000.0)                  3610
C                                                                       3615
CC    ESTABLISH Y AXIS                                                  3620
C                                                                       3625
      REAL YTITLE/'     '/                                              3628
      CALL AXIS (0.0,0.0,YTITLE,0,6.0,90.0,0.0,2000.0)                  3630
C                                                                       3635
CC    COMPLETE OUTLINE                                                  3640
C                                                                       3645
      REAL LX1(3)/0.0,9.0,9.0/                                          3650
      REAL LY1(3)/6.0,6.0,0.0/                                          3655
      CALL LINE (LX1,LY1,3,1,1)                                         3660
C                                                                       3665
CC    PLOT THE ROAD                                                     3670
C                                                                       3675
      REAL RDX1(26)/0.0,0.5,1.0,1.5,2.0,2.5,3.0,3.5,4.0,4.5,5.0,5.5,5.75  3680
     1,6.0,6.5,6.86,7.0,7.2,7.3,7.4,7.5,7.6,7.7,8.0,8.5,9.0/            3685
      REAL RDY1(26)/2.75,2.82,2.88,2.92,2.92,2.90,2.85,2.80,2.78,2.79,2.  3690
     183,2.9,3.0,3.14,3.5,3.8,3.9,4.06,4.1,4.15,4.2,4.18,4.13,3.57,3.03,  3695
     22.48/                                                             3700
      CALL LINE (RDX1,RDY1,26,1,1)                                      3705
      REAL RDX2(12)/0.0,0.5,1.0,1.5,2.0,2.5,2.8,3.0,3.2,3.5,3.72,3.87/  3710
      REAL RDY2(12)/2.55,2.65,2.72,2.76,2.76,2.73,2.7,2.6,2.5,2.25,2.0,1  3715
     1.75/                                                              3720
      CALL LINE (RDX2,RDY2,12,1,1)                                      3725
      REAL RDX3(14)/4.0,3.75,3.45,3.25,3.5,4.0,4.5,5.0,5.3,5.6,5.45,5.3,  3730
     15.1,5.0/                                                          3735
      REAL RDY3(14)/1.8,2.2,2.5,2.65,2.62,2.6,2.61,2.65,2.7,2.76,2.6,2.4  3740
     1,1.9,1.5/                                                         3745
      CALL LINE (RDX3,RDY3,14,1,1)                                      3750
      REAL RDX4(19)/5.18,5.25,5.4,5.5,5.6,5.75,6.0,6.2,6.5,6.7,6.85,7.23  3755
     1,7.35,7.5,7.6,7.7,7.95,8.35,9.0/                                  3760
      REAL RDY4(19)/1.5,1.8,2.2,2.35,2.5,2.7,2.95,3.1,3.3,3.5,3.6,3.9,4.  3765
     10,4.04,4.0,3.9,3.5,3.0,2.25/                                      3770
      CALL LINE (RDX4,RDY4,19,1,1)                                      3775
C                                                                       3780
CC    PLOT THE RIVER                                                    3785
C                                                                       3790
      REAL RVX1(23)/0.0,0.5,1.0,1.35,1.5,2.0,2.3,2.5,3.0,3.5,4.0,4.5,5.0  3795
     1,5.5,5.9,6.0,6.45,6.6,6.75,6.95,7.05,7.2,7.2/                     3800
      REAL RVY1(23)/5.73,5.55,5.0,4.5,4.38,4.1,4.0,3.95,3.9,3.92,3.9,3.7  3805
     1,3.6,3.75,4.0,4.1,4.5,4.6,4.65,4.6,4.5,4.3,4.06/                  3810
      CALL LINE (RVX1,RVY1,23,1,1)                                      3815
      REAL RVX2(27)/0.0,0.5,0.6,0.9,1.0,1.15,1.5,1.85,2.0,2.15,2.5,3.0,3  3820
     1.5,4.0,4.2,4.5,5.0,5.5,5.8,6.0,6.1,6.35,6.5,6.7,6.85,6.9,6.86/    3825
      REAL RVY2(27)/5.4,5.1,5.0,4.5,4.3,4.0,3.7,3.5,3.48,3.5,3.6,3.65,3.  3830
```

```
     165,3.6,3.5,3.35,3.3,3.15,3.15,3.3,3.5,4.0,4.15,4.25,4.2,4.0,3.8/      3835
      CALL LINE (RVX2,RVY2,27,1,1)                                          3840
      REAL RVX3(11)/6.85,6.9,6.85,7.0,7.35,7.5,7.7,8.0,8.4,8.83,9.0/        3845
      REAL RVY3(11)/3.6,3.35,3.0,2.6,2.3,2.25,2.2,1.65,1.3,1.0,0.8/         3850
      CALL LINE (RVX3,RVY3,11,1,1)                                          3855
      REAL RVX4(7)/7.23,7.3,7.3,7.5,8.0,8.5,9.0/                            3860
      REAL RVY4(7)/3.9,3.7,3.35,3.0,2.6,2.1,1.7/                            3865
      CALL LINE (RVX4,RVY4,7,1,1)                                           3870
C                                                                           3875
CC  PLOT THE BIG ISLAND                                                     3880
C                                                                           3885
      REAL BIX1(12)/7.84,8.0,8.14,8.31,8.4,8.38,8.2,8.0,7.85,7.83,7.85,7    3890
     1.84/                                                                  3895
      REAL BIY1(12)/2.3,2.22,2.18,1.8,1.7,1.63,1.68,1.82,2.0,2.1,2.2,2.3    3900
     1/                                                                     3905
      CALL LINE (BIX1,BIY1,12,1,1)                                          3910
C                                                                           3915
CC  PLOT THE XY AXIS ARROWS                                                 3920
C                                                                           3925
      REAL XYX1(9)/0.4,0.35,0.45,0.4,0.4,1.0,0.8,0.8,1.0/                   3930
      REAL XYY1(9)/1.0,0.8,0.8,1.0,0.4,0.4,0.45,0.35,0.4/                   3935
      CALL LINE (XYX1,XYY1,9,1,1)                                           3940
      REAL XCHAR(1)/'X'/                                                    3945
      CALL SYMBOL (0.8,0.1,0.21,XCHAR,0.0,1)                                3950
      REAL YCHAR(1)/'Y'/                                                    3955
      CALL SYMBOL (0.1,0.8,0.21,YCHAR,0.0,1)                                3960
C                                                                           3965
CC  PLOT THE TRUE NORTH ARROW                                               3970
C                                                                           3975
      REAL TNX1(5)/2.0,2.0,1.95,2.05,2.0/                                   3980
      REAL TNY1(5)/4.8,5.4,5.2,5.2,5.4/                                     3985
      CALL LINE (TNX1,TNY1,5,1,1)                                           3990
      REAL TNCHAR(1)/'N'/                                                   3995
      CALL SYMBOL (1.9,5.5,0.21,TNCHAR,0.0,1)                               4000
C                                                                           4005
CC  WRITE THE PLOT TITLE                                                    4010
C                                                                           4015
      REAL PTITLE(6)/' AE ','3251',' POC','1 SC','ENAR','IO  '/             4020
      CALL SYMBOL (2.3,6.5,0.21,PTITLE,0.0,24)                              4025
C                                                                           4030
CC  PLOT THE MILESTONES AND FLIGHT PATH                                     4035
C                                                                           4040
      CALL LINE (X10,Y10,MNUM,1,7)                                          4045
C                                                                           4050
CC  PLOT THE BOMB RELEASE POINT                                             4055
C                                                                           4060
      RX = X10(MBR)                                                         4065
      RY = Y10(MBR)                                                         4070
```

```
      CALL LINE (RX,RY,1,1,6)                                          4075
C                                                                      4080
CCCC  PLOT THE GUN LCCATIONS AND RANGE RADIUS                          4085
CCCCC                                                                  4090
C                                                                      4095
C                                                                      4100
      DC 24 I=1,7                                                      4105
      T1M1X = XGUN(I)/2000.0                                           4110
      T1M1Y = YGUN(I)/2000.0                                           4115
      IF (I.GE.1) MKR = 3                                              4120
      IF (I.GE.3) MKR = 4                                              4125
      IF (I.GE.5) MKR = 5                                              4130
      IF (I.GE.7) MKR = 2                                              4135
      IF (I.GE.1) RAD = 0.78                                           4140
      IF (I.GE.3) RAD = 0.91                                           4145
      IF (I.GE.5) RAD = 1.42                                           4150
      IF (I.GE.7) RAD = 3.52                                           4155
      CALL LINE (T1M1X,T1M1Y,1,1,MKR)                                  4160
C                                                                      4165
CCC                                                                    4170
C                                                                      4175
      DO 23 J=1,25                                                     4180
      XCIRC(J) = T1M1X+RAD*COS(J*PI/12)                                4185
      YCIRC(J) = T1M1Y+RAD*SIN(J*PI/12)                                4190
      IF (XCIRC(J).LT.0) XCIRC(J)=0                                    4195
      IF (YCIRC(J).LT.0) YCIRC(J)=0                                    4200
      IF (XCIRC(J).GT.9) XCIRC(J)=9                                    4205
      IF (YCIRC(J).GT.6) YCIRC(J)=6                                    4210
   23 CCNTINUE                                                         4215
C                                                                      4220
CCC                                                                    4225
C                                                                      4230
      CALL LINE (XCIRC,YCIRC,25,1,MKR)                                 4235
   24 CONTINUE                                                         4240
C                                                                      4245
CCC                                                                    4250
C                                                                      4255
      CALL PLOT (0.0,12.0,-3)                                          4260
      CALL PLOTE                                                       4265
   25 CONTINUE                                                         4270
C                                                                      4275
C     /////***** ERROR CHECK SECTION *****/////                        4280
C                                                                      4285
CCCCC CPTICN SUMMARY                                                   4290
C                                                                      4295
      WRITE (6,111) MNUM,T(MNUM),MBR                                   4300
      WRITE (6,112)                                                    4305
      WRITE (6,113) CVEL                                               4310
```

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      IF (ILST.EQ.0) WRITE (6,114)                                      4315
      IF (ILST.EQ.1) WRITE (6,115)                                      4320
      IF (IPNCH.EQ.0) WRITE (6,116)                                     4325
      IF (IPNCH.EQ.1) WRITE (6,117)                                     4330
      IF (IPLOT.EQ.0) WRITE (6,118)                                     4335
      IF (IPLOT.EC.1) WRITE (6,119)                                     4340
      IF (IEXT.NE.1) WRITE (6,145)                                      4345
      IF (IEXT.EQ.1) WRITE (6,146)                                      4350
      IF (IGUN.EQ.0) WRITE (6,120)                                      4355
      IF (IGUN.EQ.1) WRITE (6,121)                                      4360
      IF (IEW.EQ.0) WRITE (6,122)                                       4365
      IF (IEW.EQ.1) WRITE (6,123)                                       4370
      IF (IEW.EQ.1) WRITE (6,124) PJAM                                  4375
      IF (IAJ.EQ.0) WRITE (6,125)                                       4380
      IF (IAJ.EQ.1) WRITE (6,126)                                       4385
      IF (IMULT.EC.0) WRITE (6,127)                                     4390
      IF (IMULT.EC.1) WRITE (6,128)                                     4395
      WRITE (6,129)                                                     4400
C                                                                       4405
      IERR = 0                                                          4410
      POPALT = 0                                                        4415
C                                                                       4420
CC    *****  RESTRICTION:  NO TYPE 3 WEAPON MAY BE LOCATED WITHIN 3000  4425
CC    METERS OF THE CENTER OF THE BRIDGE.                               4430
C                                                                       4435
      XTGT = 14100                                                      4440
      YTGT = 7900                                                       4445
      GDIST = SQRT((XTGT-XGUN(5))**2+(YTGT-YGUN(5))**2)                 4450
      IF (GDIST.LT.3000) WRITE (6,130) XGUN(5),YGUN(5),GDIST            4455
      GDIST = SQRT((XTGT-XGUN(6))**2+(YTGT-YGUN(6))**2)                 4460
      IF (GDIST.LT.3000) WRITE (6,130) XGUN(6),YGUN(6),GDIST            4465
C                                                                       4470
CC                                                                      4475
CC    *****  RESTRICTION:  INITIAL CRUISE VELOCITY MUST BE BETWEEN 206  4480
CC    AND 257 METERS PER SECOND.                                        4485
C                                                                       4490
      IF (CVEL.LT.206.OR.CVEL.GT.257) WRITE (6,131) CVEL                4495
C                                                                       4500
CC                                                                      4505
C                                                                       4510
      DO 35 I=1,MNUM                                                    4515
C                                                                       4520
CC    CALCULATE DISTANCE TO TARGET                                      4525
C                                                                       4530
      DISTGT = SQRT((XTGT-X(I))**2+(YTGT-Y(I))**2)                      4535
C                                                                       4540
CC    *****  RESTRICTION: ALT MAX PRIOR TO POP UP IS 457 METERS.        4545
C                                                                       4550
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      IZMAX = 0                                                          4555
      IF (DISTGT.GT.6000.AND.Z(I).GT.457) IZMAX=1                        4560
      IF (IZMAX.NE.1) GO TO 26                                           4565
      IERR = 1                                                           4570
      WRITE (6,132) I,Z(I)                                               4575
C                                                                        4580
CC    *****  RESTRICTION: MIN ALT IS 61 METERS.                          4585
C                                                                        4590
   26 IZMIN = 0                                                          4595
      IF (Z(I).LT.61) IZMIN=1                                            4600
      IF (IZMIN.NE.1) GO TO 27                                           4605
      IERR = 1                                                           4610
      WRITE (6,133) I,Z(I)                                               4615
C                                                                        4620
CC    *****  RESTRICTION: MAX ALT OVERALL IS 2134 METERS.                4625
C                                                                        4630
   27 IZZMAX = 0                                                         4635
      IF (Z(I).GT.2134) IZZMAX=1                                         4640
      IF (IZZMAX.NE.1) GO TO 28                                          4645
      IERR = 1                                                           4650
      WRITE (6,134) I,Z(I)                                               4655
C                                                                        4660
CC    *****  RESTRICTION: MIN POP UP ALT IS 1219 METERS.                 4665
C                                                                        4670
   28 CONTINUE                                                           4675
      IF (DISTGT.GT.6000) GO TO 29                                       4680
      IF (Z(I).GT.POPALT) POPALT=Z(I)                                    4685
      IPOP = 0                                                           4690
      IF (I.EQ.MBR.AND.POPALT.LT.1219) IPOP=1                            4695
      IF (IPOP.NE.1) GO TO 29                                            4700
      IERR = 1                                                           4705
      WRITE (6,135) POPALT                                               4710
C                                                                        4715
CC    *****  RESTRICTION: ACFT HEADING MUST BE WITHIN 5 DEGREES OF THE   4720
CC    CENTER OF THE BRIDGE DURING THE LEG PRIOR TO BOMB RELEASE POINT.   4725
C                                                                        4730
   29 CONTINUE                                                           4735
      IF (I.NE.MBR) GO TO 33                                             4740
      DX = XTGT-X(I)                                                     4745
      DY = YTGT-Y(I)                                                     4750
      TGTHDG = ATAN2(DY,DX)*57.29578                                     4755
      IF (TGTHDG.LT.0) TGTHDG=TGTHDG+360                                 4760
      HDGLMT = ABS(HDGDEG(I)-TGTHDG)                                     4765
      IAIM = 0                                                           4770
      IF (HDGLMT.GT.5) IAIM=1                                            4775
      IF (IAIM.NE.1) GO TO 30                                            4780
      IERR = 1                                                           4785
      WRITE (6,136) HDGDEG(I),TGTHDG,HDGLMT                              4790
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C                                                                       4795
CC  *****  RESTRICTION: THE LEG PRIOR TO THE BOMB RELEASE POINT MUST BE  4800
C   A MINIMUM OF 2 SECONDS IN DURATION TO ENSURE PROPER AIM.            4805
C                                                                       4810
   30 ITIME = 0                                                         4815
      TDIFF = T(MBR)-T(MBR-1)                                           4820
      IF (TDIFF.LT.2) ITIME=1                                           4825
      IF (ITIME.NE.1) GO TO 31                                          4830
      IERR = 1                                                          4835
      WRITE (6,137) TDIFF                                               4840
C                                                                       4845
CC  *****  RESTRICTION: BOMB RELEASE ALT MUST BE BETWEEN 305 TO 914 M.  4850
C                                                                       4855
   31 IMBR = 0                                                          4860
      IF (Z(MBR).LT.305.OR.Z(MBR).GT.914) IMBR=1                        4865
      IF (IMBR.NE.1) GO TO 32                                           4870
      IERR = 1                                                          4875
      WRITE (6,138) Z(MBR)                                              4880
C                                                                       4885
CC  *****  RESTRICTION: BOMBS CAN NOT BE RELEASED AT A DISTANCE GREATER  4890
C   THAN 1000 METERS FROM THE TARGET.                                   4895
C                                                                       4900
   32 IDIST = 0                                                         4905
      IF (DISTGT.GT.1000) IDIST=1                                       4910
      IF (IDIST.NE.1) GO TO 33                                          4915
      IERR = 1                                                          4920
      WRITE (6,139) DISTGT                                              4925
   33 CONTINUE                                                          4930
C                                                                       4935
CC  *****  RESTRICTION: STALL OCCURS AT 90 MPS.                          4940
C                                                                       4945
      ISTALL(I) = 0                                                     4950
      IF (VEL(I).LT.90) ISTALL(I)=1                                     4955
      IF (ISTALL(I).NE.1) GO TO 34                                      4960
      IERR = 1                                                          4965
      WRITE (6,140) I,VEL(I),I                                          4970
C                                                                       4975
CC  *****  RESTRICTION: MAX 'G' LIMIT IS 6.                             4980
C                                                                       4985
   34 ABSRT(I) = ABS(TNRT(I))                                           4990
      G(I) = SQRT(ABSRT(I)**2*VEL(I)**2/9.81**2+1)                      4995
      ITNMAX(I) = 0                                                     5000
      IF (G(I).GT.6) ITNMAX(I)=1                                        5005
      IF (ITNMAX(I).NE.1) GO TO 35                                      5010
      TNRTDG(I) = ABS(TNRT(I))*57.29578                                 5015
      TNCOR(I) = DT(I)*0.25*57.29578                                    5020
      IERR = 1                                                          5025
      WRITE (6,141) I,TNRTDG(I),G(I),I,TNCOR(I)                         5030
```

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C                                                                       5035
   35 CONTINUE                                                          5040
C                                                                       5045
CC                                                                      5050
C                                                                       5055
      IF (IERR.EQ.1) GO TO 36                                           5060
      WRITE (6,142)                                                     5065
   36 CONTINUE                                                          5070
      IF (IERR.NE.1) GO TO 37                                           5075
      WRITE (6,143)                                                     5080
   37 CONTINUE                                                          5085
      WRITE (6,144)                                                     5090
C                                                                       5095
      GO TO 39                                                          5100
   38 WRITE (6,46)                                                      5105
   39 CONTINUE                                                          5110
C  /////***** FORMAT STATEMENTS *****/////                             5115
CC                                                                      5120
C                                                                       5125
      STOP                                                              5130
C                                                                       5135
CC                                                                      5140
C                                                                       5145
   40 FORMAT (3F10.0)                                                   5150
   41 FORMAT (3F10.0)                                                   5155
   42 FORMAT (F10.0,I2,8I1,F10.0)                                       5160
   43 FORMAT (1X,'THE JAM FUNCTION IS SPECIFIED, BUT THE JAMMER POWER ',5165
     1 'IS SPECIFIED AS ZERO.',     /1X,'THE JAM FUNCTION HAS BEEN ',   5170
     2 'TURNED OFF.',/////)                                             5175
   44 FORMAT (1X,'THE SPECIFIED JAMMER POWER IS GREATER THAN 1000 ',    5180
     1 'WATTS AND HAS BEEN LIMITED TO 1000 WATTS.',/////)               5185
   45 FORMAT (1X,'THE ANTI-JAM FUNCTION IS SPECIFIED; HOWEVER, THE ',   5190
     1'JAM FUNCTION IS NOT SPECIFIED.',/1X,'THE ANTI-JAM FEATURE HAS ', 5195
     2'BEEN TURNED OFF.',/////)                                         5200
   46 FORMAT (1X,'GUN EMPLACEMENT DATA WAS SPECIFIED AS PART OF THE ',  5205
     1 'INPUT DATA; HOWEVER, EITHER NO GUN EMPLACEMENT',/1X,'DATA IS ', 5210
     2 'PART OF THE INPUT OR  ALL  SIX   GUN LOCATIONS WERE NOT ',      5215
     3 'SPECIFIED.  EXECUTION TERMINATES.')                             5220
   47 FORMAT (1X,'// EXEC PGM=P1EW,REGION=200K')                        5225
   48 FORMAT (1X,'//STEPLIB DD DSN=F0559.P1EW,UNIT=3330,',              5230
     1 'VOL=SER=DISK02,DISP=SHR')                                       5235
   49 FORMAT (1X,'//FT06F001 DD SYSOUT=A,DCB=(RECFM=FBA,',              5240
     1'LRECL=133,BLKSIZE=3325)')                                        5245
   50 FORMAT (1X,'//GO.FT04F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),')      5250
   51 FORMAT (1X,'//      DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)')      5255
   52 FORMAT (1X,'//GO.FT07F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),')      5260
   53 FORMAT (1X,'//GO.FT08F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),')      5265
   54 FORMAT (1X,'//GO.FT09F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),')      5270
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55 FORMAT (1X,'//FT11F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),')                    5275
56 FORMAT (1X,'//GO.FT05F001 DD *')                                             5280
57 FORMAT (1X,'    ')                                                           5285
58 FORMAT (1X,'01  AIRCRAFT COMBAT SURVIVABILITY SCENARIC')                     5290
59 FORMAT (1X,'02',4X,'12',8X,F7.2,1X,F7.4)                                     5295
60 FORMAT (1X,10(F7.1,1X))                                                      5300
61 FORMAT (1X,'/*')                                                             5305
62 FORMAT (1X,'//GO.FT05F002 DD *')                                            5310
63 FORMAT (1X,'03',6X,3(1X,F7.0))                                              5315
64 FORMAT (1X,'04 11111')                                                      5320
65 FORMAT (1X,'05',5X,'11.0')                                                  5325
66 FORMAT (1X,'06',3X,'1 9',9(F7.3,1X))                                        5330
67 FORMAT (1X,'07  VULNERABLE AREA TABLE VS TYPE 1 AND 2 WEAPONS')              5335
68 FORMAT (1X,8F8.3)                                                           5340
69 FORMAT (1X,'121111111')                                                     5345
70 FORMAT (1X,'12')                                                            5350
71 FORMAT (1X,'04 21111')                                                      5355
72 FORMAT (1X,'04 34411')                                                      5360
73 FORMAT (1X,'14',I3,2X,'5 0 1.0',7X,F6.1  ,4X,'1.0E-06',6X,'1',11X,          5365
  1 '1.0',6X,I5,F10.2 ,/1X,'GEND',/1X,3X,'19     7    90.0     180.0',        5370
  2 '    1000.0')                                                              5375
74 FORMAT (1X,8F10.3,/1X,8F10.3,/1X,3F10.3)                                    5380
75 FORMAT (1X,'04 33411')                                                      5385
76 FORMAT (1X,'13',I3,I5,' 0.35')                                              5390
77 FORMAT (1X,'04 53211')                                                      5395
78 FORMAT (1X,'//GO.FT05F003 DD *')                                            5400
79 FORMAT ('// EXEC PGM=P1EW,REGION=200K')                                     5405
80 FORMAT ('//STEPLIB DD DSN=F0559.P1EW,UNIT=3330,',                           5410
  1 'VOL=SER=DISK02,DISP=SHR')                                                 5415
81 FORMAT ('//FT06F001 DD SYSOUT=A,DCB=(RECFM=FBA,',              'LR          5420
  1ECL=133,BLKSIZE=3325)')                                                     5425
82 FORMAT ('//GO.FT04F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),')                   5430
83 FORMAT ('//      DCB=(RECFM=VBS,LRECL=404,BLKSIZE=3236)')                   5435
84 FORMAT ('//GO.FT07F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),')                   5440
85 FORMAT ('//GO.FT08F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),')                   5445
86 FORMAT ('//GO.FT09F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),')                   5450
87 FORMAT ('//FT11F001 DD UNIT=SYSDA,SPACE=(CYL,(1,1)),')                      5455
88 FORMAT ('//GO.FT05F001 DD *')                                               5460
89 FORMAT ('    ')                                                             5465
90 FORMAT ('01  AIRCRAFT COMBAT SURVIVABILITY SCENARIO')                       5470
91 FORMAT ('02',4X,'12',8X,F7.2,1X,F7.4)                                       5475
92 FORMAT (10(F7.1,1X))                                                        5480
93 FORMAT ('/*')                                                               5485
94 FORMAT ('//GO.FT05F002 DD *')                                               5490
95 FORMAT ('03',6X,3(1X,F7.0))                                                 5495
96 FORMAT ('04 11111')                                                         5500
97 FORMAT ('05',5X,'11.0')                                                     5505
98 FORMAT ('06',3X,'1 9',9(F7.3,1X))                                           5510
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 99 FORMAT ('07  VULNERABLE AREA TABLE VS TYPE 1 AND 2 WEAPONS')                5515
100 FORMAT (8F8.3)                                                              5520
101 FORMAT ('121111111')                                                        5525
102 FORMAT ('12')                                                               5530
103 FORMAT ('04 21111')                                                         5535
104 FORMAT ('04 34411')                                                         5540
105 FORMAT ('14',I3,'  5 0 1.0',7X,F6.1  ,4X,'1.0E-06',6X,'1',11X,             5545
   1 '1.0',6X,I5,F10.2 ,/'GEND',/,3X,'19    7    90.0    180.0    ',          5550
   2 '1000.0')                                                                  5555
106 FORMAT (8F10.3,/,8F10.3,/,3F10.3)                                           5560
107 FORMAT ('04 33411')                                                         5565
108 FORMAT ('13',I3,I5,' 0.35')                                                 5570
109 FORMAT ('04 53211')                                                         5575
110 FORMAT ('//GO.FT05F003 DD *')                                               5580
111 FORMAT ('1',' *****  POOl FLIGHT PATH SCENARIO SUMMARY  *****',///,        5585
   1' THE FLIGHT PATH CONSISTS OF ',I3,' MILESTONES WITH A TOTAL ',             5590
   2 'FLIGHT TIME OF ',F6.1,' SECONDS.',/1X,                                    5595
   3 'BOMB RELEASE IS AT MILESTONE ',I3,'.',/////)                              5600
112 FORMAT (1X,'*****  OPTION SUMMARY  *****',///)                             5605
113 FORMAT (1X,'CRUISE SPEED IS ',F6.1,' METERS PER SECOND.')                    5610
114 FORMAT (1X,'A POOl INPUT LISTING IS NOT SPECIFIED AS OUTPUT.')               5615
115 FORMAT (1X,'A POOl INPUT LISTING IS PROVIDED AS OUTPUT.')                    5620
116 FORMAT (1X,'A PUNCHED DECK IS NOT SPECIFIED AS OUTPUT.')                     5625
117 FORMAT (1X,'A PUNCHED DECK IS PROVIDED AS OUTPUT.')                          5630
118 FORMAT (1X,'A SCENARIO PLOT IS NOT SPECIFIED AS OUTPUT.')                    5635
119 FORMAT (1X,'A SCENARIO PLOT IS PROVIDED AS OUTPUT.')                         5640
120 FORMAT (1X,'PRESET GUN EMPLACEMENT LOCATIONS ARE UTILIZED.')                 5645
121 FORMAT (1X,'GUN EMPLACEMENT LOCATIONS ARE SPECIFIED AS INPUT.')              5650
122 FORMAT (1X,'AN AIRBORNE JAMMER IS NOT BEING UTILIZED.')                      5655
123 FORMAT (1X,'AN AIRBORNE JAMMER IS BEING UTILIZED.')                          5660
124 FORMAT (1X,'JAMMER POWER IS ',F6.1,' WATTS.')                               5665
125 FORMAT (1X,'ANTI-JAM FEATURE IS NOT SELECTED.')                             5670
126 FORMAT (1X,'ANTI-JAM FEATURE IS UTILIZED WHERE APPROPRIATE.')                5675
127 FORMAT (1X,'MULTIPATH RADAR EFFECTS ARE NOT CONSIDERED.',/////)              5680
128 FORMAT (1X,'MULTIPATH RADAR EFFECTS ARE CONSIDERED.',/////)                  5685
129 FORMAT (1X,'*****  FLIGHT PATH ERRORS  *****',///)                          5690
130 FORMAT (1X,'GUN TYPE 3 LOCATED AT X: ',F7.1,'  Y: ',F7.1,' IS ',            5695
   1 F6.1,' METERS FROM THE TARGET',/1X,'WHICH IS LESS THAN THE ',              5700
   2 'MINIMUM DISTANCE OF 3000 METERS.',///)                                    5705
131 FORMAT (1X,'CRUISE SPEED IS ',F6.1,' METERS PER SECOND WHICH IS ',          5710
   1 'NOT WITHIN THE GIVEN LIMITS OF BETWEEN',/1X,'206 AND 257 ',               5715
   2 'METERS PER SECOND.',///)                                                  5720
132 FORMAT (1X,'ALTITUDE AT MILESTONE ',I3,' IS ',F7.1,' METERS WHICH'          5725
   1 ,' IS ABOVE THE MAX ALT PRIOR TO POP UP OF 457 METERS.',///)               5730
133 FORMAT (1X,'ALTITUDE AT MILESTONE ',I3,' IS ',F7.1,' METERS WHICH'          5735
   1 ,' IS BELOW THE MIN ALT OF 61 METERS.',///)                                5740
134 FORMAT (1X,'ALTITUDE AT MILESTONE ',I3,' IS ',F7.1,' METERS WHICH'          5745
   1 ,' IS ABOVE THE MAX ALT OF 2134 METERS.',///)                              5750
```

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135 FORMAT (1X,'MAX ALTITUDE DURING POP UP WAS ',F6.1,' METERS WHICH',     5755
   1 ' IS LESS THAN THE MINUMUM POP UP ALTITUDE',/1X,                     5760
   2 'OF 1219 METERS.',///)                                               5765
136 FORMAT (1X,'THE AIRCRAFT HEADING INTO THE BOMB RELEASE POINT IS ',     5770
   1 F5.1,'.  THE HEADING TO THE TARGET IS ',F5.1,'.',/1X,                5775
   2 'THE HEADING DIFFERENCE IS ',F5.1,' WHICH IS GREATER THAN THE ',     5780
   3 '5 DEGREE MAXIMUM DIFFERENCE LIMIT.',///)                            5785
137 FORMAT (1X,'THE LENGTH OF THE LEG IMMEDIATELY PRIOR TO THE BOMB ',     5790
   1 'RELEASE POINT IS ',F4.2,' SECONDS ',/1X,       'IN DURATION ',      5795
   2 'WHICH IS LESS THAN THE MINIMUM OF 2 SECONDS.',///)                  5800
138 FORMAT (1X,'THE BOMB RELEASE ALTITUDE IS ',F7.1,' METERS WHICH IS'     5805
   1,' NOT IN THE BOMB RELEASE ALTITUDE',/1X,'RANGE OF BETWEEN 305 TO'    5810
   2 ,' 914 METERS.',///)                                                 5815
139 FORMAT (1X,'THE BOMB WAS RELEASED AT A DISTANCE OF ',F7.1,             5820
   1 ' METERS FROM THE TARGET WHICH IS IN EXCESS',/1X,'OF THE 1000 ',     5825
   2 'METER BOMB RELEASE MAXIMUM RANGE.',///)                             5830
140 FORMAT (1X,'MILESTONE ',I3,' VELOCITY IS ',F6.1,' METERS PER',        5835
   1' SECOND.  STALL OCCURS AT 90 METERS PER SECOND.  DECREASE',   /1X     5840
   2,'THE CLIMB ANGLE PRIOR TO MILESTONE ',I3,'.',///)                    5845
141 FORMAT (1X,'MILESTONE ',I3,' TURN RESULTS IN A TURN RATE OF ',1X,F     5850
   15.1,' DEGREES PER SECOND WHICH RESULTS IN A G LOADING',/1X,    ' O     5855
   2F ',F5.1,' WHICH IS IN EXCESS OF',   ' THE 6 G MAX LOADING.',  '      5860
   3DECREASE THE TURN ANGLE AT MILESTONE ',I3,' TO BELOW ',        F5.    5865
   41,' DEGREES.',///)                                                    5870
142 FORMAT (1X,'*****  NO FLIGHT PATH ERRORS IN THIS RUN  *****',///)     5875
143 FORMAT (1X,'*****  NO FURTHER FLIGHT PATH ERRORS  *****',///)         5880
144 FORMAT (1X,'*****  END OF POOL INPUT PROGRAM - SUMMARY COMPLETE',     5885
   1 '  *****')                                                           5890
145 FORMAT (1X,'THE EXTENDED OUTPUT OPTION IS NOT SPECIFIED.')            5895
146 FORMAT (1X,'EXTENDED PRINTOUT IS PROVIDED AS OUTPUT.')                5900
147 FORMAT (1X,'07  VULNERABLE AREA TABLE VS TYPE 3 WEAPONS')             5905
148 FORMAT (1X,'07  VULNERABLE AREA TABLE VS TYPE 5 WEAPON')              5910
149 FORMAT ('07  VULNERABLE AREA TABLE VS TYPE 3 WEAPONS')                5915
150 FORMAT ('07  VULNERABLE AREA TABLE VS TYPE 5 WEAPON')                 5920
    END                                                                   5925
```

APPENDIX I

P001 PROGRAM LISTING (IBM)

```
C
C     AASIM -- MULTIPLE GUN ANTIAIRCRAFT ARTILLERY SIMULATION
C     WRITTEN BY THOMAS D. MCMURCHIE AND JAMES O. SEVERSON
C     AIRFORCE ARMAMENT LABORATORY (AFATL-DLYS) EGLIN AFB, FLORIDA
C
C
C
C          PROGRAM RECEIVED 25 OCT 72
C          CONVERTED AND MAINTAINED BY ASD/XRDA
C
C
C     MODIFIED FOR USE ON IBM 360/370 AT NPS MONTEREY, CA., 7 MAR 78.
C     FOR INFORMATION CALL PROF R.E. BALL 408-646-2885, (AUTOVON 878).
C
C
      COMMON/BLOCK1/ITITLE(20)
      COMMON/BLOCK2/NFPA,TMIN,TMAX,DTFPA
      COMMON/BLOCK3/XGUN,YGUN,ZGUN
      COMMON/BLOCK4/IGT,IEM,ICB,ISB,IGL,CIRCLE
      COMMON/BLOCK5/NRHOS,RHO(9)
      COMMON/BLOCK6/NTINTS,TINTER(10)
      COMMON/BLOCK7/IVACOM(20),VAT(9,5,9)
      COMMON/BLOCK8/TREACT,TRACK1,TRACK2
      COMMON/BLOCK9/TROUND(6),THDMAX(6),PHDMAX(6),PHIMIN(6),PHIMAX(6),
     1    VELMIN(6),VELMAX(6),RANMIN(6),RANMAX(6),
     2    ATLAG(6),ETHMAX(6),EPHMAX(6),RMODES(6)
      COMMON/BLOCKA/TFMAX1(6),TFMAX2(6),RVACON(6),RVBCON(6),VMUZEL(6)
      COMMON/CONSTS/DEGREE,RADIAN,PI,PI2,QTRPI,SQRT2
      COMMON/HEADFO/LINE,NUMBER
      COMMON/NFPARM/XA,YA,ZA,RA2,RA,TIME
      COMMON/IGXGYG/IG,XG(8),YG(8)
      COMMON/MAGIC /FRACT,INDEX1,INDEX2
      COMMON/VSASBS/VMUZZ,ASHCON,BSHCON,CQUAD
      COMMON/BUDGET/BDACON(6)
      COMMON/CECM1/IRECM,IJ,GAINJ,IX,XSEC,CALX,PJW,
     *    X,Y,Z,ROL,PIT,HDG,
     *    FTGT,FJAM,GJ,SJT,SN
      COMMON /NEWA/ VY1,VY,ALFA,J,IRMP,PLEN,01,08,D1,JJJ,XR,ZT,PZI,IERR
      COMMON /NEWB/ Y1,P2,VX,BETA,IF6,IMUL,IP,N,07,D,TTRACK,KMODE,PSI,K
      COMMON /NEWC/ CP,X2,P1,B2,JFILE,IJAM,ISL,04,CPS,TPERS,JMODE,YT,T2
      COMMON /NEWD/ T33,X1,Z2,B1,VX2,C3,CPK,NROUND,IOFF,I,XT,TM,SP,T1
      COMMON /NEWE/ Z1,A2,VX1,VZ2,PHI,IF5,IEOF,YR,IF2,T13,IFILE,Y2,A1
      COMMON /NEWF/ V2,VZ1,V,FUZZ,IF9,SD2RJ,SD2RJM,V1,VY2,F,JP,IF7,REFC
      COMMON /NEWG/ SJTMAX,D2,PK,D2,ISW
      COMMON XFPA(1201),YFPA(1201),ZFPA(1201),BFPA(1201),AFPA(1201),
```

```
     1       FFPA(1201),VXFPA(1201),VYFPA(1201),VZFPA(1201)
      COMMON ICARD(20),PTOTTF(10),PTOTTI(10)
      COMMON SPKTOT(32,8),IPRINT(6),IFLAGS(4)
      COMMON    PKTTDC(9),PKTIDC(10,9),PKTFDC(10,9)
      COMMON INUNIT
      DIMENSION TEMP(16,6),SPKT(8,4,8),SPKT2(32,8)
      EQUIVALENCE (SPKT2(1,1),SPKT(1,1,1),TEMP(1,1))
C
CC    SOME EQUIVALENCES REMOVED BY B.E.E. BY CARRYING TWO VARIABLES
CC        THROUGH PROGRAM WITH SAME VALUES FOR CLARITY.
C
      DATA ESVPCT/0.10/
      DATA SD2J/0./
      DATA ILOOP/-1/
      INUNIT = 5
      IFLAGS(1) = 0
      IFLAGS(2) = 0
      IFLAGS(3) = 0
      IFLAGS(4) = 0
      CALL REREAD
      CALL ERRSET(208,256,-1,1,1,207)
      ASSIGN 9996 TO IERR
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                       C
C  IIIII  N   N  IIIII  TTTTT  IIIII    A    L       IIIII  ZZZZZ  EEEEE C
C    I    NN  N    I      T      I     A A   L         I       Z   E     C
C    I    N N N    I      T      I    A   A  L         I      Z    EEE   C
C    I    N  NN    I      T      I    AAAAA  L         I     Z     E     C
C  IIIII  N   N  IIIII    T    IIIII  A   A  LLLLL  IIIII  ZZZZZ  EEEEE C
C                                                                       C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
      READ(INUNIT,1050) ISW,AMASK
      AMASK1=AMASK*57.3
      PRINT 38,AMASK1
   38 FORMAT(5X,25HMASK ANGLE FOR THIS RUN =,F6.3,5H DEG.)
 1050 FORMAT(A2,8X,F10.5)
   95 ISL=1
      IMUL = 0
      IJAM = 0
      SD2RJ = 0.
      SD2J = 0.
      DO 96 J=1,9
      PKTTDC(J)=0.0
      DO 96 I=1,10
      PKTIDC(I,J)=0.0
   96 PKTFDC(I,J)=0.0
      DO 94 I=1,32
      DO 94 J=1,8
```

```
   94 SPKTOT(I,J)=0.0
      REWIND 7
      GO TO 8888
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                             C
C                  SSSS   EEEEE  TTTTT  U   U  PPPP                          C
C                 S       E        T    U   U  P   P                        C
C                  SSS    EEEE     T    U   U  PPPP                         C
C                     S   E        T    U   U  P                            C
C                  SSSS   EEEEE    T     UUU   P                            C
C                                                                             C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
   87 NROUND=0
      IF(IMUL.EQ.1 .AND. IEM.NE.3) GO TO 9994
      IF(IJAM.EQ.1 .AND. (IEM.EQ.1 .OR. IEM.EQ.2)) GO TO 9995
      CPS=1.0
      DO 14 I=1,NTINTS
      PTOTTF(I)=0.0
   14 PTOTTI(I)=0.0
      DO 27 I=1,32
      DO 27 J=1,8
   27 SPKT2(I,J)=0.0
      TPERS=TROUND(IGT)/FLOAT(IGL*ICB)
      IF(IEM.GT.1)GO TO 90
      TFMAX=TFMAX1(IGT)
      TTRACK=TRACK1
      GO TO 91
   90 TFMAX=TFMAX2(IGT)
      TTRACK=TRACK2
      VXES = 0.0
      VYES = 0.0
      VZES = 0.0
   91 TIME=TMIN
      TFIRE= TMIN+TTRACK
      IF(TFIRE.GT.TMAX)GO TO 69
      TTFMAX=1.2*TFMAX
      ATLCON=0.125/ATLAG(IGT)
      EMDTA=EXP(-0.512*ATLCON)
      ETMAX=ETHMAX(IGT)
      EPMAX=EPHMAX(IGT)
      VMUZZ=VMUZEL(IGT)
      TCMAX=THDMAX(IGT)
      PCMAX=PHDMAX(IGT)
      PHMIN=PHIMIN(IGT)
      PHMAX=PHIMAX(IGT)
      ASHCON=RVACCN(IGT)
      BSHCON=RVBCON(IGT)
      RSMODE=RMODES(IGT)
```

```
      RMIN =RANMIN(IGT)
      RMAX =RANMAX(IGT)
      VMIN=VELMIN(IGT)
      VMAX=VELMAX(IGT)
      IG=1
      LINE=66
      IF (IPRINT(6).LE.0) GO TO 60
      CALL PAGES(5,0,JP)
      WRITE (6,1013) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                           C
C                TTTTT  RRRR      A      CCC   K   K                       C
C                  T    R   R    A A    C   C  K  K                        C
C                  T    RRRR    A   A   C      K K                         C
C                  T    R  R    AAAAA   C   C  K  K                        C
C                  T    R   R   A   A    CCC   K   K                       C
C                                                                           C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C   COMPUTE ACTUAL AIRCRAFT PARAMETERS AT FIRE TIME FOR USE IN ERROR EQS
C
   60 CALL INTERP(TIME/DTFPA)
      X=GETVAL(XFPA)-XGUN
      Y=GETVAL(YFPA)-YGUN
      Z=GETVAL(ZFPA)-ZGUN
      VX=GETVAL(VXFPA)
      VY=GETVAL(VYFPA)
      VZ=GETVAL(VZFPA)
      ILOOP = ILOCP+1
      RCL = GETVAL(PFPA)
      PIT = GETVAL(AFPA)
      HDG = GETVAL(BFPA)
      G2=X*X+Y*Y
      G=SQRT(G2)
      THET=ATAN2(Y,X)
      PHIT=ATAN2(Z,G)
C
CC    IF MULTIPATH HAS BEEN SPECIFIED(IMUL=1) AND THE ELEVATION
CC    ANGLE IS MEASURED BY RADAR(IOEM=3), COMPUTE THE ELEVATION
CC    TRACKING BIAS(PBMP),VARIANCE(SP2MP),AND APPARENT TARGET
CC    ALTITUDE(Z).
C
      SP2MP = 0.
      PBMP = 0.
      IF(IMUL.NE.1 .OR. IOEM.NE.3) GO TO 30
      CALL MULPTH(IRMP,REFC,PHIT,PBMP,SP2MP)
      PHIT = PHIT+PBMP
      Z = G*TAN(PHIT)
```

```
   30 CONTINUE
      R = SQRT(G2+Z*Z)
      RD=(X*VX+Y*VY+Z*VZ)/R
      TD=(X*VY-Y*VX)/G2
      PD=(VZ-Z*RD/R)/G
      IF(TIME.GT.TMIN) GO TO 58
      RDD = 0.0
      TDD = 0.0
      PDD = 0.0
      RANS=R
      THES=THET
      PHIS=PHIT
      ERAN2 = 0.0
      ERAN3 = 0.0
      ERAN4 = 0.0
      ETHE2 = 0.0
      ETHE3 = 0.0
      ETHE4 = 0.0
      EPHI2 = 0.0
      EPHI3 = 0.0
      EPHI4 = 0.0
      GO TO 59
   58 RDD=(RD-RDS)/.064
      TDD=(TD-TDS)/.064
      PDD=(PD-PDS)/.064
C
CC    (STORE PREVIOUSLY OBSERVED MEAN TRACKING ERRORS FOR USE IN MEAN
CC     TRACKING ERROR EQUATIONS)
C
   59 ERAN1=ERAN2
      ERAN2=ERAN3
      ERAN3=ERAN4
      ERAN4=R-RANS
      ERAN=ERAN1+.71875*(ERAN2-ERAN1)
      ETHE1=ETHE2
      ETHE2=ETHE3
      ETHE3=ETHE4
      ETHE4=(G/R)*ANGLIM(THET-THES)
      ETHE=ETHE1+.71875*(ETHE2-ETHE1)
      EPHI1=EPHI2
      EPHI2=EPHI3
      EPHI3=EPHI4
      EPHI4=PHIT-PHIS
      EPHI=EPHI1+.71875*(EPHI2-EPHI1)
C       CHECK  MASK  ANGLE
      IF(PHIT.LE.AMASK)   TFIRE= TIME+ TREACT+TTRACK
C
C     (SKIP FIRE ATTEMPT IF INSUFFICIENT TRACKING TC FIRE)
```

```
C
      IF(TIME.LE.TFIRE)GO TO 62
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C                FFFFF  IIIII  RRRR   EEEEE                           C
C                F        I    R   R  E                               C
C                FFFF     I    RRRR   EEEE                            C
C                F        I    R  R   E                               C
C                F      IIIII  R   R  EEEEE                           C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
      VG=SQRT(VX*VX+VY*VY)
      V =SQRT(VG*VG+VZ*VZ)
      PSI=ANGLIM(PFPA(INDEX1)+FRACT*ANGLIM(PFPA(INDEX2)-PFPA(INDEX1)))
C
CC    (SKIP FIRE ATTEMPT IF MAX ALLOWED TRACKING ERROR IS EXCEEDED)
C
   54 IF(ABS(ETHE4).GT.ETMAX)GO TO 64
      IF(ABS(EPHI4).GT.EPMAX)GO TO 64
      IF(IOEM.GT.1)GO TO 56
C
CCC   (LIMIT INPUT RANGE ESTIMATE)
C
      RC=AMAX1(RMIN,AMIN1(RMAX,RANS-0.575*RD))
C
CCC   COMPUTE MEAN ASSUMED TIME OF FIRE AIRCRAFT POSITION (MECHANICAL
CCC    COMPUTATION)
C
      XF=RC*CTBCPB-XG(IG)
      YF=RC*STBCPB-YG(IG)
      ZF=RC*SPB
      GF=SQRT(XF*XF+YF*YF)
      RF=SQRT(GF*GF+ZF*ZF)
C
CCC   (SET UP MATRIX T, THE TRANSFORMATION BETWEEN THE LINE OF SIGHT
CCC    SYSTEM AND THE FALSE HORIZON SYSTEM)
C
      T22 = X/G
      CT  = X/G
      ST=Y/G
      T33 = G/R
      CP  = G/R
      T13 = Z/R
      SP  = Z/R
      CS=COS(PSI)
      SS=SIN(PSI)
      CA=VG/V
      SA=VZ/V
```

```
      CG=VX/VG
      SG=VY/VG
      T11=CT*CP
      T12=ST*CP
      T21=-ST
      T31=-CT*SP
      T32=-ST*SP
C
C     (SET UP FALSE HORIZON SYSTEM VELOCITY COMPONENTS)
C
      VXP=T11*VX+T12*VY+T13*VZ
      VYP=T21*VX+T22*VY
      VZP=T31*VX+T32*VY+T33*VZ
      VGP=SQRT(VXP*VXP+VYP*VYP)
      CAP=VGP/V
      SAP=VZP/V
      CBP=VXP/VGP
      SBP=VYP/VGP
C
C     (SET UP UNIT VECTOR OUT LEFT WING OF AIRCRAFT)
C
      UX=-SA*CG*SS-SG*CS
      UY= CG*CS-SA*SG*SS
      UZ= CA*SS
      UZP=T31*UX+T32*UY+T33*UZ
      IF(VXP)31,32,31
   32 CSP=-T11*UX-T12*UY-T13*UZ
      GO TO 33
   31 CSP=(VGP*(T21*UX+T22*UY)+UZP*VZP*SBP)/VXP
   33 SSP=UZP/CAP
C
C     (COMPUTE FALSE HORIZON SYSTEM MEAN AND STANDARD DEVIATION OF
C      ERROR IN DIVE AND COURSE ANGLE ESTIMATES)
C
      EMAP=SAP*(.3196*ABS(CBP)-.1859*ABS(SBP))
      ESAP=.04712+.08063*ABS(SAP)*(1.0+1.16*ABS(CBP))
      EMBP=.4060*CAP*SBP*CBP
      ESBP=(.1670-.08098*ABS((CBP*CBP-SBP*SBP)*CSP)+
     1       .09006*ABS(SBP*SSP*CSP))/CAP
      SEMAP=SIN(EMAP)
      CEMAP=COS(EMAP)
      SEMBP=SIN(EMBP)
      CEMBP=COS(EMBP)
C     THE NEXT CARD ELIMINATES AN EQUIVALENCE BY USING A DOUBLE
C         REPLACEMENT.
      A33 = SAP*CEMAP + CAP*SEMAP
      SABP= SAP*CEMAP + CAP*SEMAP
      CABP=CAP*CEMAP-SAP*SEMAP
```

```
      SBBP=SBP*CEMBP+CBP*SEMBP
      CBBP=CBP*CEMBP-SBP*SEMB
C
CC    (LIMIT VELOCITY ASSESSMENT (MECHANICAL COMPUTERS))
C
      VBP=AMIN1(VMAX,AMAX1(VMIN,V))
      ESVP=ESVPCT*V
C
CC    SET UP THE ELEMENTS OF THE MATRIX A.
CC    A CONTAINS THE PARTIALS OF VXE,VYE,VZE W.R.T. ALPHA,BETA,SPEED
C
      A31=CABP*CBBP
      A32=CABP*SBBP
      A21=-VBP*A32
      A22= VBP*A31
      A11=-VBP*SABP*CBBP
      A12=-VBP*SABP*SBBP
      A13= VBP*CABP
C
CC    COMPUTE MEAN ESTIMATED VELOCITY COMPONENTS (MECHANICAL
CC     COMPUTATION)
C
      VXE=(A31*T11+A32*T21+A33*T31)*VBP
      VYE=(A31*T12+A32*T22+A33*T32)*VBP
      VZE=(A31*T13         +A33*T33)*VBP
      GO TO 63
C
CC    COMPUTE MEAN ASSUMED TIME OF FIRE AIRCRAFT POSITION (ELECTRONIC
CC     COMPUTATION)
C
   56 XF=RANS*CTBCPB
      YF=RANS*STBCPB
      ZF=RANS*SPB
      GF=RANS*CPB
      RF=RANS
C
CC ITERATION TO DETERMINE MEAN THEORETICAL INTERCEPT POINT
C
   63 RS=0.0
      VS=VMUZZ
      T=0.0
   21 XE=XF+VXE*T
      YE=YF+VYE*T
      ZE=ZF+VZE*T
      XE2=XE*XE
      YE2=YE*YE
      ZE2=ZE*ZE
      GE2=XE2+YE2
```

```
      RE2=GE2+ZE2
      RE=SQRT(RE2)
      RC=RE-RS
      IF(RC.LT.1.0)GO TO 22
      VC=VS-(XE*VXE+YE*VYE+ZE*VZE)/RE
      IF(VD.LE.1.0)GO TO 64
      T=T+RC/VD
      IF(T.GT.TTFMAX)GO TO 64
      RS=RSHELL(T)
      VS = VSHELL(T)
      GC TO 21
   22 T2=T*T
C
CC       CHANGE  22 JAN  76
CC         IF INTERCEPT POINT BELOW MASK*****SKIP FIRE
C
      GE= SQRT(GE2)
      IF(ATAN2(ZE,GE).LE. AMASK)  GO  TO 64
C
CC  ITERATION TO DETERMINE ACTUAL INTERCEPT POSITICN, RANGE, ANC TIME
C
      TU=AMIN1(TFMAX,TMAX-TIME)
   23 CALL RPLANE(TU)
      IF(RSHELL(TU).GT.RA)GO TO 24
C
CC     (SKIP FIRE ATTEMPT IF SHELL CANNOT CATCH AIRCRAFT)
C
      IF((XA*GETVAL(VXFPA)+YA*GETVAL(VYFPA)+ZA*GETVAL(VZFPA))/RA .LT.
     1    VSHELL(TU))GO TO 64
      TU=TU-1.0
      IF(TU)64,64,23
   24 TL=0.0
   25 T=0.5*(TL+TU)
      CALL RPLANE(T)
      RC=RA-RSHELL(T)
      IF(RC.GT.1.0)GO TO 26
      IF(RC.GT.-1.0)GO TO 37
      TL=T
      GC TO 25
   26 TL=T
      GC TO 25
   37 Q0=VS*RE-XE*VXE-YE*VYE-ZE*VZE
      Q1=(VZE-VS*ZE/RE)/Q0
      Q2=(XE*VYE-YE*VXE)/Q0
C
CC    COMPUTE THE PARTIAL DERIVATIVES OF BIG THETA
C
      DTTDX=Q2*XE-YE
```

```
      DTTDY=Q2*YE+XE
      DTTDZ=Q2*ZE
      DTTDR=(ZF*DTTDZ+ YF*DTTDY+XF*DTTDX)/RF
      DTTDT=           XF*DTTDY-YF*DTTDX
      DTTDP= GF*DTTDZ-(YF*DTTDY+XF*DTTDX)*ZF/GF
C
CCC   COMPUTE THE PARTIAL DERIVATIVES OF BIG PHI
C
      DPPDX=Q1*XE
      DPPDY=Q1*YE
      DPPDZ=Q1*ZE+1.0
      DPPDR=(ZF*DPPDZ+ YF*DPPDY+XF*DPPDX)/RF
      DPPDT=           XF*DPPDY-YF*DPPDX
      DPPDP= GF*DPPDZ-(YF*DPPDY+XF*DPPDX)*ZF/GF
      GE4=GE2*GE2
      GO TO (210,220,230,240),IOEM
C
CCC  COMPUTATIONS FOR MODE 1 OPERATION
C
  210 GO TO (211,212,213,214,215,999),IGT
C
CCCC  TRACKING ERROR DISTRIBUTION SIZES (SPHERICAL COORDINATES)
      (FOR GT 1, 2, OR 3)
C
  211 CONTINUE
  212 CONTINUE
  213 SR2=(123.0+0.0225*R)**2
      ST2=(.0643*TD)**2
      SP2=(.1320*PD)**2
      GO TO 219
C
CCC   (FOR GT 4 AND 5)
C
  214 CONTINUE
  215 SR2=(123.0+0.0225*R)**2
      ST2=(0.0167-.000710/(.0517+ABS(TD)))**2
      SP2=(0.0116-.000216/(.0235+ABS(ABS(PD)-4.0*PDD)))**2
C
CCC   SET UP THE ELEMENTS OF THE MATRIX B=AT
C
  219 B11=A11*T11+A12*T21+A13*T31
      B12=A11*T12+A12*T22+A13*T32
      B13=A11*T13         +A13*T33
      B21=A21*T11+A22*T21
      B22=A21*T12+A22*T22
      B23=A21*T13
      B31=A31*T11+A32*T21+A33*T31
      B32=A31*T12+A32*T22+A33*T32
```

```
      B33=A31*T13          +A33*T33
C
CCC   COMPUTE THE PARTIAL DERIVATIVES OF BIG THETA AND BIG PHI W.R.T.
CCC   ON CARRIAGE INPUTS (ALPHA, BETA, SPEED)
C
      DTTDAP=B11*DTTDX+B12*DTTDY+B13*DTTDZ
      DTTDBP=B21*DTTDX+B22*DTTDY+B23*DTTDZ
      DTTDVP=B31*DTTDX+B32*DTTDY+B33*DTTDZ
      DPPDAP=B11*DPPDX+B12*DPPDY+B13*DPPDZ
      DPPDBP=B21*DPPDX+B22*DPPDY+B23*DPPDZ
      DPPDVP=B31*DPPDX+B32*DPPDY+B33*DPPDZ
C
CCC   COMPUTE THE VARIANCES OF BIG THETA AND BIG PHI
C
      STT2=((DTTDR**2)*SR2  +(DTTDT**2)*ST2  +(DTTDP**2)*SP2
     1    +((DTTDAP*ESAP)**2+(DTTDBP*ESBP)**2+(DTTDVP*ESVP)**2)*T2)/GE4
      SPP2=((DPPDR**2)*SR2  +(DPPDT**2)*ST2  +(DPPDP**2)*SP2
     1    +((DPPDAP*ESAP)**2+(DPPDBP*ESBP)**2+(DPPDVP*ESVP)**2)*T2)/GE2
      GO TO 29
C
CCC  COMPUTATIONS FOR MODE 2, 3, OR 4 OPERATION
C
  220 GO TO (999,999,223,999,225,226),IGT
C
CCCC  TRACKING ERROR DISTRIBUTIONS SIZES (SPHERICAL COORDINATES)
CCC   (FOR MODE 2)
C
  223 CONTINUE
  225 CONTINUE
  226 SR2=(41.0+0.0075*R)**2
      ST2=(.000982+.1681*TD*TD)**2
      SP2=(.000491+.033*ABS(ABS(PD)-4.0*PDD))**2
      GO TO 65
  230 GO TO (999,999,233,999,235,236),IGT
C
CCC   (FOR MODE 3)
C
  233 CONTINUE
  235 CONTINUE
  236 SR2=(17.0+0.24*ABS(RDD)+0.018*RDD*RDD)**2+SR2RJ
      ST2=(0.00196+0.050*TD)**2
      SP2=(0.000982+0.11*ABS(ABS(PD)-2.0*PDD))**2+SP2MP
      GO TO 65
  240 GO TO (999,999,243,999,245,246),IGT
C
CC    (FOR MODE 4)
C
  243 CONTINUE
```

```
  245 CONTINUE
  246 SR2=(17.0+0.24*ABS(RDD)+0.018*RDD*RDD)**2+SD2RJ
      ST2=(0.000982+0.1681*TD*TD)**2
      SP2=(0.000491+0.033*ABS(ABS(PD)-4.0*PDD))**2+SP2MP
C
   65 RBTD=RANS*THESD
      RBPD=RANS*PHISD
C
CC    VELOCITY COMPONENT ERROR DISTRIBUTION SIZES
C
      SVX2=(SR2*(PHISD*CTBSPB+THESD*STBCPB)**2
     1      +ST2*(RBPD*STBSPB-RBTD*CTBCPB-RANSD*STBCPB)**2
     2      +SP2*(RBPD*CTBCPB-RBTD*STBSPB+RANSD*CTBSPB)**2)*ATLCON
      SVY2=(SR2*(PHISD*STBSPB-THESD*CTBCPB)**2
     1      +ST2*(RBPD*CTBSPB+RBTD*STBCPB-RANSD*CTBCPB)**2
     2      +SP2*(RBPD*STBCPB+RBTD*CTBSPB+RANSD*STBSPB)**2)*ATLCON
      SVZ2=(SR2*(PHISD*CPB)**2+SP2*(RBPD*SPB-RANSD*CPB)**2)*ATLCON
C
CC    COMPUTE THE VARIANCES OF BIG THETA AND BIG PHI
C
      STT2=((DTTDR**2)*SR2 +(DTTDT**2)*ST2 +(DTTDP**2)*SP2
     1      +((DTTDX**2)*SVX2+(DTTDY**2)*SVY2+(DTTDZ**2)*SVZ2)*T2)/GE4
     1+SD2J
      SPP2=((DPPDR**2)*SR2 +(DPPDT**2)*ST2 +(DPPDP**2)*SP2
     1      +((DPPDX**2)*SVX2+(DPPDY**2)*SVY2+(DPPDZ**2)*SVZ2)*T2)/GE2
     1+SD2J
C
CC  COMPUTATION OF VULNERABLE AREA OF AIRCRAFT AT INTERCEPT
C
   29 VP=VSHELL(T)
      XU=XE/RE
      YU=YE/RE
      ZU=ZE/RE
      XE=XU*RA
      YE=YU*RA
      ZE=ZU*RA
      GE=SQRT(XE*XE+YE*YE)
      VXA=GETVAL(VXFPA)
      VYA=GETVAL(VYFPA)
      VZA=GETVAL(VZFPA)
      VGA=SQRT(VXA*VXA+VYA*VYA)
      VA =SQRT(VGA*VGA+VZA*VZA)
      VXI=VP*XU-VXA
      VYI=VP*YU-VYA
      VZI=VP*ZU-VZA
      VI=SQRT(VXI*VXI+VYI*VYI+VZI*VZI)
      ALFA=GETVAL(AFPA)
      CA=COS(ALFA)
```

```
      SA=SIN(ALFA)
      BETA=BFPA(INDEX1)+FRACT*ANGLIM(BFPA(INDEX2)-BFPA(INDEX1))
      CG=COS(BETA)
      SG=SIN(BETA)
      PZI=PFPA(INDEX1)+FRACT*ANGLIM(PFPA(INDEX2)-PFPA(INDEX1))
C     THE NEXT CARDS ELIMINATE AN EQUIVALENCE BY USING A DOUBLE
C          REPLACEMENT.
      T33 = COS(PZI)
      CP  = COS(PZI)
      T13 = SIN(PZI)
      SP  = SIN(PZI)
      Q1=VXI*CG+VYI*SG
      Q2=VZI*CA-Q1*SA
      Q3=VYI*CG-VXI*SG
      VXF=Q1*CA+VZI*SA
      VYF=Q2*SP+Q3*CP
      VZF=Q2*CP-Q3*SP
C
CC    (SET UP INDICES FOR VULNERABLE AREA INTERPOLATION)
C
      F1=ATAN2(VYF,VXF)/QTRPI
      IF(F1.LT.0.0)F1=F1+8.0
      I1=F1
      F1=F1-FLOAT(I1)
      I1=I1+1
      F2=ARCOS(VZF/VI)/QTRPI
      I2=F2
      F2=F2-FLOAT(I2)
      I2=I2+1
      F3=AMIN1(7.999999999,VI/152.4)
      I3=F3
      F3=F3-FLOAT(I3)
      I3=I3+1
      D1=1.0-F1
      D2=1.0-F2
      D3=1.0-F3
      J1=I1+1
      J2=I2+1
      J3=I3+1
C
CC    (PERFORM LINEAR THREE DIMENSIONAL INTERPOLATION)
C
      AVT=D3*(D2*(D1*VAT(I1,I2,I3)+F1*VAT(J1,I2,I3))+
     1        F2*(D1*VAT(I1,J2,I3)+F1*VAT(J1,J2,I3)))+
     2    F3*(D2*(D1*VAT(I1,I2,J3)+F1*VAT(J1,I2,J3))+
     3        F2*(D1*VAT(I1,J2,J3)+F1*VAT(J1,J2,J3)))
C
C  SET UP DISTRIBUTION SIZES OF OTHER SOURCES OF RANDOM ERROR
```

```
C
      SVA=XU*VXA+YU*VYA+ZU*VZA
      CVA2=VA*VA-SVA*SVA
      VMQ=.99*VMUZZ/RA-ASHCON
      DTI=(VMQ-SQRT(VMQ*VMQ-4.0*BSHCON))/(2.0*BSHCON)-T
      SLXMV2=CVA2*(DTI*VP/(VP-SVA/.99))**2
      SLYFR2=(0.010*VA*T)**2
      SLXFR2=SLYFR2*(1.0+CVA2/(VP-SVA)**2)
      SAOAP2=(0.003*RA)**2
      SAOGJ2=(0.005*RA)**2
      SAOBD2=(BDACON(IGT)*RA)**2
      IF(IOEM.EQ.1)GO TO 68
      SAOPE2=(0.002*RA)**2
      GO TO 67
   68 SAOPE2=(V*V-((X*VX+Y*VY+Z*VZ)/R)**2)*
     1       RA2*(0.0001463-7.478E-11*(R-1386.0)**2)**2
   67 CDIST=SAOAP2+SAOGJ2+SAOPE2+SAOBD2
C
C  COMBINE ALL ERRORS INTO ONE DISTRIBUTION, COMPUTE BIAS
C
      SXA2=STT2*RA2
      SYA2=SPP2*RA2
      SXL2=CDIST+SLXMV2+SLXFR2
      SYL2=CDIST+SLYFR2
      CTT=XE/GE
      STT=YE/GE
      CPP=GE/RE
      SPP=ZE/RE
      BXA=XA*STT-YA*CTT
      BYA=ZA*CPP-(YA*STT+XA*CTT)*SPP
      BXA2=BXA*BXA
      BYA2=BYA*BYA
      VAM=VXA*STT-VYA*CTT
      VAP=VZA*CPP-(VYA*STT+VXA*CTT)*SPP
      VAM2=VAM*VAM
      VAP2=VAP*VAP
      VAI2=VAM2+VAP2
      CD2=VAM2/VAI2
      SD2=VAP2/VAI2
      SXAT2=SXA2+CD2*SXL2+SD2*SYL2
      SYAT2=SYA2+CD2*SYL2+SD2*SXL2
      TWOCOV=2.0*VAM*VAP*(SXL2-SYL2)/VAI2
      DIF=SXAT2-SYAT2
      DEN=2.0*SQRT(TWOCOV*TWOCOV+DIF*DIF)
      HC2Z=DIF/DEN
      CZ2=0.5+HC2Z
      SZ2=0.5-HC2Z
      SZCZ=TWOCOV/DEN
```

```
      STUFF=2.0*SZCZ*BXA*BYA
      BXF2=CZ2*BXA2+SZ2*BYA2+STUFF
      BYF2=CZ2*BYA2+SZ2*BXA2-STUFF
      SXF2=CZ2*SXAT2+SZ2*SYAT2+SZCZ*TWOCOV
      SYF2=CZ2*SYAT2+SZ2*SXAT2-SZCZ*TWOCOV
      AVTPI=AVT/PI2
C
C     COMPUTE PROBABILITY OF KILL
C
      STUFF=BXF2/(SXF2+AVTPI)+BYF2/(SYF2+AVTPI)
      IF(STUFF.LT.50.0)GO TO 75
      PK=0.0
      GO TO 78
   75 PK=AMIN1(1.0,EXP(-.5*STUFF)*AVTPI/SQRT((SXF2+AVTPI)*(SYF2+AVTPI)))
   78 PS=(1.0-PK)**ISB
      PK=1.0-PS
      TI=TIME+T
C
C     ACCUMULATE PK AS A FUNCTION OF INPUT TIME INTERVALS
C
      I=0
   50 I=I+1
      IF(TIME.GE.TINTER(I))GO TO 50
      J=I
   51 IF(TI.LT.TINTER(J))GO TO 52
      J=J+1
      GO TO 51
   52 PTOTTF(I)=PK+PS*PTOTTF(I)
      PTOTTI(J)=PK+PS*PTOTTI(J)
      CPS=CPS*PS
C
C     ACCUMULATE PK FOR EACH SPHERICAL SECTOR
C
      SPKT(I1,I2,I3)=PK+PS*SPKT(I1,I2,I3)
C
C     COMPUTE QUANTITIES FOR EXTENDED OUPUT,  WHEN DESIRED
C
      IF(IPRINT(6).LE.0)GO TO 20
      O1=THESD*DEGREE
      O2=PHISD*DEGREE
      O3=ETHE4*DEGREE
      C4=EPHI4*DEGREE
C     *****  ABS(BXF2,BYF2,SXF2,SYF2) WERE ADDED BELOW AS A TEMPORARY
C     *****  MEASURE TO PRECLUDE NEGATIVE ARGUMENTS FOR A SQRT FUNCTION.
C     *****  CAUSE OF NEGATIVE ARGUMENT: POSSIBLE ACCURACY DIFFERENCES
C     *****  BETWEEN THE CDC AND IBM TYPE COMPUTERS.
C     *****  CHANGE MADE BY LCDR C. SWENSON ON 3 MAR 1978.
      BXF2 = ABS(BXF2)
```

```
      O5=SQRT(BXF2+FUZZ)
      BYF2 = ABS(BYF2)
      O6=SQRT(BYF2+FUZZ)
      SXF2 = ABS(SXF2)
      O7=SQRT(SXF2)
      SYF2 = ABS(SYF2)
      O8=SQRT(SYF2)
      O9=1.0-CPS
C
CC    WRITE EXTENDED OUTPUT
C
      CALL PAGES(1,5,JP)
      IF (JP.EQ.0) WRITE (6,1013) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
      WRITE(6,1014)IG,IOEM,TIME,T,TI,R,RA,O7,O8,O5,O6,VI,O1,O2,O3,O4,
     1             AVT,PK,O9
   20 NROUND=NROUND+ISB
C
CC  FIRE ADDITIONAL GUNS IN COMPLEX, IF ANY
C
   64 IG=IG+1
      IF(IG.GT.IGL)IG=1
      TFIRE=TFIRE+TPERS
      IF(TIME.GT.TFIRE)GO TO 54
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C                TTTTT  RRRR      A      CCC   K   K                  C
C                  T    R   R    A A    C   C  K  K                   C
C                  T    RRRR    A   A   C      KKK                    C
C                  T    R  R    AAAAA   C   C  K  K                   C
C                  T    R   R   A   A    CCC   K   K                  C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
   62 TIME=TIME+0.064
      IF(TIME.GT.TMAX)GO TO 69
C
CC    SWITCH TO MODE 1 TRACKING IF JAMMING IS ABOVE THRESHOLD OR IF
C     RANGE IS TOO CLOSE
C
      IOEM = IEM
      SD2J = 0.
      SD2RJ = 0.
      IF(R.LT.RSMODE) GO TO 501
      IF(IJAM.EQ.0) GO TO 502
C
      CALL ECM2
C
      IF(SJT.GT.SJTMAX) GO TO 501
      IF(IOEM.EQ.3)CALL JAMER2(IRECM,SJT,SD2J)
```

```
      IF(IOEM.EQ.4) SD2RJ=SD2RJM
      IF(IRECM.EQ.3) SD2RJ = SD2RJM
      GO TO 502
  501 IOEM = 1
  502 CONTINUE
      IF(IJAM.EQ.0) GO TO 53
      IF(IP.EQ.0) GO TO 53
      IF( (ILOOP/IP)*IP.NE.ILOOP) GO TO 53
      DUM = 10.*ALOG10(GJ)
      WRITE(11,1044) TIME,R,XSEC,DUM,SJT,IOEM,SD2J,SD2RJ,SN
C
C  COMPUTE MEAN TRACKING ERRORS
C
   53 GO TO(310,320,330,340),IOEM
C
C     (MODE 1, GT 1 - 5)
C
  310 GO TO (311,312,313,314,315,999),IGT
  311 CONTINUE
  312 CONTINUE
  313 CONTINUE
  314 CONTINUE
  315 THESD=1.11*TD+0.9*TDD+6.0*ETHE
      PHISD=1.10*PD-0.7*PDD+6.0*EPHI
      RANSD=RD+3.0*ERAN
      GO TO 73
C
C     (MODE 2, GT 3, 5, AND 6)
C
  320 GO TO (999,999,323,999,325,326),IGT
  323 CONTINUE
  325 CONTINUE
  326 THESD=0.91*TD+0.45*TDD+6.0*ETHE
      PHISD=0.75*PD-0.25*PDD+6.0*EPHI
      RANSD=RD+3.0*ERAN
      GO TO 73
C
C     (MODE 3, GT 3, 5, AND 6)
C
  330 GO TO (999,999,333,999,335,336),IGT
  333 CONTINUE
  335 CONTINUE
  336 THESD=TD+6.0*ETHE
      PHISD=PD+6.0*EPHI
      RANSD = 0.804*RD + 3.0*ERAN
      GO TO 73
C
C     (MODE 4, GT 3, 5, AND 6)
```

```
C
  340 GO TO (999,999,343,999,345,346),IGT
  343 CONTINUE
  345 CONTINUE
  346 THESD=0.910*TD+0.45*TDD+6.0*ETHE
      PHISD=0.75*PD-0.25*PDD+6.0*EPHI
      RANSD = 0.804*RD + 3.0*ERAN
C
CC    (LIMIT SLEW RATES AND ELEVATION ANGLE TO WEAPON MAXIMUMS)
C
   73 THESD=SIGN(AMIN1(TDMAX,ABS(THESD)),THESD)
      PHISD=SIGN(AMIN1(PDMAX,ABS(PHISD)),PHISD)
      THES=ANGLIM(THES+0.064*THESD)
      PHIS=AMAX1(PHMIN,AMIN1(PHMAX,PHIS+0.064*PHISD))
      RANS=AMAX1(0.0,RANS+0.064*RANSD)
      CTB=COS(THES)
      STB=SIN(THES)
      CPB=COS(PHIS)
      SPB=SIN(PHIS)
      CTBCPB=CTB*CPB
      CTBSPB=CTB*SPB
      STBCPB=STB*CPB
      STBSPB=STB*SPB
      RDS=RD
      TDS=TD
      PDS=PD
      IF(IEM.LT.2)GO TO 60
C
CCC   COMPUTE MEAN (SMOOTHED) VELOCITY COMPONENTS (ELECTRONIC
CCC    COMPUTATION)
C
      VXE=RANSD*CTBCPB-RANS*(STBCPB*THESD+CTBSPB*PHISD)
      VYE=RANSD*STBCPB+RANS*(CTBCPB*THESD-STBSPB*PHISD)
      VZE=RANSD*SPB+RANS*CPB*PHISD
      VXE=VXE+EMDTA*(VXES-VXE)
      VYE=VYE+EMDTA*(VYES-VYE)
      VZE=VZE+EMDTA*(VZES-VZE)
      VXES=VXE
      VYES=VYE
      VZES=VZE
      GO TO 60
 1013 FORMAT(' LOCATION',I5,6X,'GUN TYPE',I2,6X,'ERROR MODE',I2,6X,
     1'POSITION=(',F8.1,',',F8.1,',',F8.1,')   RADIUS=',F6.1,' M'/'0L
     2   FIRE   FLT.   INTCP   FIRE   INTCP',31X,'CLOSE   AZIM.  ELEV.
     3 MEAN   MEAN   VULN'/' N OEM  TIME   TIME    TIME   RANGE  RANGE
     4SIG1  SIG2   BIAS1  BIAS2    VEL.    RATE   RATE  AZ.ERR EL.ERR
     5AREA   SHOT PK   CUM.PK'/)
 1014 FORMAT(I2,I3,2F7.2,F8.2,2F7.0,1X,2F6.1,1X,2F7.1,F8.1,1X,2F7.2,1X,
```

```
     2    3F7.2,2F9.5)
1044 FORMAT(1X,F7.2,4X,F8.0,2X,F9.2,5X,F7.2,5X,F7.2,
    15X,I2,3X,E10.4,5X,E10.4,5X,F7.2)
  15 CALL S15   (TEMP,SPKT,SPKT2,&87,&95,&7777)
  69 CALL S69   (TEMP,SPKT,SPKT2,&87,&95,&7777)
 999 CALL S999  (TEMP,SPKT,SPKT2,&87,&95,&7777)
8888 CALL S8888 (TEMP,SPKT,SPKT2,&87,&95,&7777)
9994 CALL S9994 (TEMP,SPKT,SPKT2,&87,&95,&7777)
9995 CALL S9995 (TEMP,SPKT,SPKT2,&87,&95,&7777)
9996 CALL S9996 (TEMP,SPKT,SPKT2,&87,&95,&7777)
9997 CALL S9997 (TEMP,SPKT,SPKT2,&87,&95,&7777)
7777 CONTINUE
     END
C
CCC  SUBROUTINE TOOBIG WAS CONSTRUCTED FROM A PORTION OF THE ORIGINAL P001
C    MAIN PROGRAM IN ORDER TO ENABLE PROPER COMPILATION OF THE MAIN.
C
     SUBROUTINE TOOBIG (TEMP,SPKT,SPKT2)
     COMMON/BLOCK1/ITITLE(20)
     COMMON/BLOCK2/NFPA,TMIN,TMAX,DTFPA
     COMMON/BLOCK3/XGUN,YGUN,ZGUN
     COMMON/BLOCK4/IGT,IEM,ICB,ISB,IGL,CIRCLE
     COMMON/BLOCK5/NRHOS,RHO(9)
     COMMON/BLOCK6/NTINTS,TINTER(10)
     COMMON/BLOCK7/IVACCM(20),VAT(9,5,9)
     COMMON/BLOCK8/TREACT,TRACK1,TRACK2
     COMMON/BLOCK9/TROUND(6),THDMAX(6),PHDMAX(6),PHIMIN(6),PHIMAX(6),
    1    VELMIN(6),VELMAX(6),RANMIN(6),RANMAX(6),
    2     ATLAG(6),ETHMAX(6),EPHMAX(6),RMODES(6)
     COMMON/BLOCKA/TFMAX1(6),TFMAX2(6),RVACON(6),RVBCON(6),VMUZEL(6)
     COMMON/CONSTS/DEGREE,RADIAN,PI,PI2,QTRPI,SQRT2
     COMMON/HEADFO/LINE,NUMBER
     COMMON/NFPARM/XA,YA,ZA,RA2,RA,TIME
     COMMON/IGXGYG/IG,XG(8),YG(8)
     COMMON/MAGIC /FRACT,INDEX1,INDEX2
     COMMON/VSASBS/VMUZZ,ASHCON,BSHCON,CQUAD
     COMMON/BUDGET/BDACON(6)
     COMMON/CECM1/IRECM,IJ,GAINJ,IX,XSEC,CALX,PJW,
    *       X,Y,Z,ROL,PIT,HDG,
    *        FTGT,FJAM,GJ,SJT,SN
     COMMON /NEWA/ VY1,VY,ALFA,J,IRMP,PLEN,O1,O8,D1,JJJ,XR,ZT,PZI,IERR
     COMMON /NEWB/ Y1,P2,VX,BETA,IF6,IMUL,IP,N,O7,D,TTRACK,KMODE,PSI,K
     COMMON /NEWC/ CP,X2,P1,B2,JFILE,IJAM,ISL,O4,CPS,TPERS,JMCDE,YT,T2
     COMMON /NEWD/ T33,X1,Z2,B1,VX2,C3,CPK,NROUNC,IOFF,I,XT,TM,SP,T1
     COMMON /NEWE/ Z1,A2,VX1,VZ2,PHI,IF5,IEOF,YR,IF2,T13,IFILE,Y2,A1
     COMMON /NEWF/ V2,VZ1,V,FUZZ,IF9,SD2RJ,SD2RJM,V1,VY2,F,JP,IF7,REFC
     COMMON /NEWG/ SJTMAX,O2,PK,D2,ISW
```

```
      COMMON XFPA(1201),YFPA(1201),ZFPA(1201),BFPA(1201),AFPA(1201),
     1       PFPA(1201),VXFPA(1201),VYFPA(1201),VZFPA(1201)
      COMMON ICARD(20),PTOTTF(10),PTOTTI(10)
      COMMON SPKTOT(32,8),IPRINT(6),IFLAGS(4)
      COMMON    PKTTDC(9),PKTIDC(10,9),PKTFDC(10,9)
      COMMON INUNIT
      DIMENSION TEMP(16,6),SPKT(8,4,8),SPKT2(32,8)
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                           C
C                IIIII  N   N  PPPP   U   U  TTTTT                         C
C                  I    NN  N  P   P  U   U    T                           C
C                  I    N N N  PPPP   U   U    T                           C
C                  I    N  NN  P      U   U    T                           C
C                IIIII  N   N  P       UUU     T                           C
C                                                                           C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
      ENTRY S8888 (TEMP,SPKT,SPKT2,*,*,*)
      ASSIGN 9997 TO IEOF
      GO TO 15
   12 ASSIGN 9999 TO IEOF
      ENTRY S15   (TEMP,SPKT,SPKT2,*,*,*)
   15 READ(INUNIT,1007,ERR=9992,END=9993)I,ICARD
      IF(I.LE.0 .OR. I.GT.14) GO TO 9998
      GO TO (101,102,103,104,105,106,107,108,109,110,111,112
     1,113,114),I
C
C  DECODE DATA BLOCK 01 -- HEADER INFORMATION
C     XROA VERSION ALLOWS ONLY 70 SPACES FOR TITLE.
C
  101 DO 17 I=1,20
   17 ITITLE(I)=ICARD(I)
      GO TO 15
C
C  DECODE DATA BLOCK 02 -- FLIGHT PATH INPUT, TRANSLATION, ROTATION,
C                          AND INTERPOLATION
C     SUGGEST SECTION ON TAPE9 BE RE-WRITTEN FOR COMPATIBILITY WITH
C         ASD FLIGHT PATH PROGRAMS.  SEE P-1127, FOR EXAMPLE.
C
  102   READ (99,1028)      JMODE,KMODE,TMIN,TMAX,DTFPA,XR,YR,XT,YT,PSI,
     1 ZT
C     THIS CARD WAS ADDED
      IF2=1
      TMAX=TMAX-TMIN
      TM=0.0
      T2=-1.0
      NFPA=0
      K=0
```

```
      PZI=PSI*RADIAN
      T13 = SIN(PZI)
      SP  = SIN(PZI)
      T33 = COS(PZI)
      CP  = COS(PZI)
      LINE=66
      IF(JMODE)5,5,1
    1 ASSIGN 4 TO IEOF
      ASSIGN 3 TO IERR
      IF(JMODE.GT.IFILE)GO TO 2
      REWIND 9
      IFILE=1
      GO TO 4
    2 IFILE=IFILE+1
    3 READ(9,ERR=9992,END=9993)
      GO TO 3
    4 IF(JMODE.GT.IFILE)GO TO 2
      ASSIGN 9999 TO IECF
      ASSIGN 28 TO IERR
      READ(9,ERR=9992,END=9993)
   28 ASSIGN 9996 TO IERR
      JMODE=6
    5 T1=T2
      X1=X2
      Y1=Y2
      Z1=Z2
      P1=P2
      A1=A2
      B1=B2
      V1=V2
      VX1=VX2
      VY1=VY2
      VZ1=VZ2
      IF(JMODE)6,6,7
    6 READ(INUNIT,1000,ERR=9992,END=9993)T2,X,Y,Z,VX,VY,VZ2,B2,A2,P2
      B2=B2*RADIAN
      A2=A2*RADIAN
      P2=P2*RADIAN
      V2=SQRT(VX*VX+VY*VY+VZ2*VZ2)
      GO TO 9
    7 JMODE=JMODE+1
      IF(JMODE.LE.6)GO TO 8
      JMODE=1
      READ(9,ERR=9992,END=9993)TEMP
    8 T2  =TEMP( 1,JMODE)
      X   =TEMP( 2,JMODE)
      Y   =TEMP( 3,JMODE)
      Z   =TEMP( 4,JMODE)
```

```
      VX =TEMP( 5,JMODE)
      VY =TEMP( 6,JMODE)
      VZ2=TEMP( 7,JMODE)
      V2 =TEMP(11,JMODE)
      B2 =TEMP(13,JMODE)
      A2 =TEMP(14,JMODE)
      P2 =TEMP(15,JMODE)
    9 X2=XT+(X-XR)*CP+(Y-YR)*SP
      Y2=YT+(Y-YR)*CP-(X-XR)*SP
      Z2=ZT+Z
      VX2=VX*CP+VY*SP
      VY2=VY*CP-VX*SP
      B2=ANGLIM(B2-PZI)
      T2=T2-TMIN
   10 IF(TM.GT.T2)GO TO 5
      F=(TM-T1)/(T2-T1)
      NFPA=NFPA+1
      XFPA(NFPA)=X1+F*(X2-X1)
      YFPA(NFPA)=Y1+F*(Y2-Y1)
      ZFPA(NFPA)=Z1+F*(Z2-Z1)
      VXFPA(NFPA)=VX1+F*(VX2-VX1)
      VYFPA(NFPA)=VY1+F*(VY2-VY1)
      VZFPA(NFPA)=VZ1+F*(VZ2-VZ1)
      V=V1+F*(V2-V1)
      BFPA(NFPA)=ANGLIM(B1+F*ANGLIM(B2-B1))
      AFPA(NFPA)=A1+F*(A2-A1)
      PFPA(NFPA)=ANGLIM(P1+F*ANGLIM(P2-P1))
      K=K-1
      IF(K)34,34,35
   34 K=KMODE
      PHI=DEGREE*PFPA(NFPA)
      BETA=DEGREE*BFPA(NFPA)
      ALFA=DEGREE*AFPA(NFPA)
      CALL PAGES(1,2,JP)
      IF (JP.EQ.0) WRITE (6,1003)
      WRITE(6,1004)TM,XFPA(NFPA),YFPA(NFPA),ZFPA(NFPA),
     1                V,VXFPA(NFPA),VYFPA(NFPA),VZFPA(NFPA),BETA,ALFA,PHI
   35 TM=DTFPA*FLOAT(NFPA)
      IF(TM.LE.TMAX)GO TO 10
      TMAX=TM-DTFPA-FUZZ
      CALL PAGES(4,0,JP)
      WRITE(6,1005)XR,YR,XT,YT,PSI,ZT
      CALL TPLOT(NFPA)
      IF(JMODE.GT.0 .OR. INUNIT.EQ.8)GO TO 12
      ASSIGN 12 TO IEOF
   13 READ(INUNIT,1000,ERR=9992,END=9993)
      GO TO 13
C
```

```
C  DECODE DATA BLOCK 03 -- WEAPON LOCATION
C
  103   READ (99,1008)      XGUN,YGUN,ZGUN
        GO TO 12
C
C  DECODE DATA BLOCK 04 -- WEAPON TYPE, MODE, NUMBER OF BARRELS (CYCLIC
C                          AND SIMULTANEOUS), NUMBER OF WEAPONS PER
C                          LOCATION, RADIUS OF CIRCLE OF WEAPON COMPLEX
C
  104   READ (99,1009)      IGT,IEM,ICB,ISB,IGL,CIRCLE
        IF(IGL-1)9998,61,66
   61   XG(1)=0.0
        YG(1)=0.0
        GO TO 12
   66   DO 16 I=1,IGL
        F=PI2*FLOAT(I)/FLOAT(IGL)
        XG(I)=CIRCLE*COS(F)
   16   YG(I)=CIRCLE*SIN(F)
        GO TO 12
C
C  DECODE DATA BLOCK 05 -- WEAPON DENSITY FACTORS
C
  105   READ (99,1015)      IF5,NRHOS,(RHO(I),I=1,NRHOS)
        GO TO 12
C
C  DECODE DATA BLOCK 06 -- PK ACCRUAL TIME INTERVALS
C
  106   READ (99,1015)      IF6,NTINTS,(TINTER(I),I=1,NTINTS)
        NTINTS=NTINTS+1
        TINTER(NTINTS)=999.99
        GO TO 12
C
C  DECODE DATA BLOCK 07 -- AIRCRAFT VULNERABLE AREAS
C
  107   DO 11 I=1,20
   11   IVACOM(I)=ICARD(I)
        READ(INUNIT,1000,ERR=9992,END=9993)(VAT(1,1,K),K=2,9)
        DO 88 J=2,4
        DO 89 I=1,8
        READ(INUNIT,1000,ERR=9992,END=9993)(VAT(I,J,K),K=2,9)
   89   CONTINUE
        DO 88 K=2,9
   88   VAT(9,J,K)=VAT(1,J,K)
        READ(INUNIT,1000,ERR=9992,END=9993)(VAT(1,5,K),K=2,9)
        DO 18 K=2,9
        DO 18 I=2,9
        VAT(I,5,K)=VAT(1,5,K)
   18   VAT(I,1,K)=VAT(1,1,K)
```

```
      IF7=1
      GO TO 12
C
C  DECODE DATA BLOCK 08 -- WEAPON REACTION AND TRACK TIMES
C
  108   READ (99,1008)      TREACT,TRACK1,TRACK2
      GO TO 12
C
C  DECODE DATA BLOCK 09 -- WEAPON PARAMETERS
C
  109   READ (99,1008)      TROUND(IGT),THDMAX(IGT),PHDMAX(IGT),
     1          PHIMIN(IGT),PHIMAX(IGT),VELMIN(IGT),VELMAX(IGT),
     2          RANMIN(IGT),RANMAX(IGT)
      READ(INUNIT,1000,ERR=9992,END=9993)ATLAG(IGT),ETHMAX(IGT),
     1  EPHMAX(IGT),RMODES(IGT)
      IF9=1
      GO TO 12
C
C  DECODE DATA BLOCK 10 -- SHELL PARAMETERS
C
  110   READ (99,1008)      TFMAX1(IGT),TFMAX2(IGT),RVACON(IGT),
     1          RVBCON(IGT),VMUZEL(IGT)
      IF9=1
      GO TO 12
C
C  DECODE DATA BLOCK 11 -- INPUT OPTION (CARD/TAPE)
C
  111   READ (99,1028)    I
      IF(I)81,81,82
   81 INUNIT=5
      GO TO 15
   82 INUNIT=8
      ASSIGN 83 TO IEOF
      IF(I.GT.JFILE)GO TO 84
      REWIND 8
      JFILE=1
   83 IF(I-JFILE)12,12,84
   84 JFILE=JFILE+1
   85 READ(8,1000,ERR=9992,END=83)
      GO TO 85
C
C     DECODE DATA BLOCK 13  --- LOW ALTITUDE RADAR MULTIPATH EFFECT
C
  113   READ (99,1038)      IMUL,IRMP,REFC
      IF(IMUL.EQ.0) GO TO 12
      CALL PAGES(12,0,JP)
      WRITE(6,1098) IRMP,REFC
 1098 FORMAT(///,' MULTIPATH INPUTS (INITIAL OR CHANGED ',//,
```

```
     0' IRMP =      ',I5,/,
     1' REFC =      ',F6.3,///)
      GO TO 12
C
C     DECODE DATA BLOCK 14 --- ECM
C
  114 SD2RJ = 0.
      SD2RJ = 0.
        READ (99,1041)       IJAM,IP,IJ,GAINJ,PJW,PLEN,IX,XSEC,CALX,
     *                      IRECM,SJTMAX
      IF(IJAM.EQ.0) GO TO 12
      CALL PAGES(28,0,JP)
      WRITE(6,1096) IP,IJ,GAINJ,PJW,PLEN,IX,XSEC,CALX,IRECM,SJTMAX
 1096 FORMAT(///,' ECM INPUTS (INITIAL OR CHANGED) ',//,
     0' IP =        ',I5,/,
     1' IJ =        ',I5,/,
     2' GAINJ(DB) =',F7.2,/,
     3' PJW(W) =    ',F9.2,/,
     4' PLEN(S) =   ',E12.6,/,
     5' IX =        ',I5,/,
     6' XSEC(SQM) =',F10.3,/,
     7' CALX =      ',F10.3,/,
     8' IRECM =     ',I5,/,
     9' SJTMAX(DB) =',F7.2,///)
      CALL ECM1
      IF(IRECM.EQ.3) CALL JAMER1(PLEN,SD2RJM)
      IF(IEM.EQ.4) CALL JAMER1(PLEN,SD2RJM)
      GO TO 12
C
C   DECODE DATA BLOCK 12 -- PRINT OPTIONS FOR OUTPUT FORMAT - ALSO
C                           SIGNALS FOR RUN TO BEGIN
C
  112   READ (99,1016)     IPRINT
C
C   PRINT DATA BLOCKS 6, 7, 9, AND 10 (IF THEY CHANGE)
C     "IF2" IS USED TO SET LINE COUNT TO PROPER VALUE.  INPUT AND
C         OUTPUT PRINT OUT START A NEW PAGE FOR EACH "12" CARD.
C
      IF (IF2.EQ.0) LINE = 66
      IF2=0
      IF(IJAM.EQ.0) GO TO 48
      IF(IP.EQ.0) GO TO 48
      WRITE(11,1043) ITITLE
      WRITE(11,1042)
      WRITE(11,1001) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
      WRITE(11,1045)
   48 CONTINUE
      IF(IF5.EQ.0)GO TO 97
```

```
      CALL PAGES(5,0,JP)
      WRITE(6,1029)NRHOS,(RHO(I),I=1,NRHOS)
      IF5=0
   97 IF(IF6.EQ.0)GO TO 98
      CALL PAGES(5,0,JP)
      WRITE(6,1011)NTINTS,(TINTER(I),I=1,NTINTS)
      IF6=0
   98 IF(IF7.EQ.0)GO TO 99
      CALL PAGES(7,0,JP)
      WRITE(6,1010)IVACOM
      DO 19 N=1,26
      J=(N+14)/8
      I=15+N-J*8
      CALL PAGES(1,7,JP)
      IF (JP.EQ.0) WRITE (6,1010) IVACOM
   19 WRITE(6,1026)N,(VAT(I,J,K),K=2,9)
      IF7=0
   99 IF(IF9.EQ.0)GO TO 87
      CALL PAGES(10,0,JP)
      WRITE(6,1025)
      DO 86 I=1,6
      01=PHIMIN(I)*DEGREE
      02=PHIMAX(I)*DEGREE
      03=THDMAX(I)*DEGREE
      04=PHDMAX(I)*DEGREE
      07=ETHMAX(I)*DEGREE
      08=EPHMAX(I)*DEGREE
   86 WRITE(6,1012)I,TRGUND(I),01,02,03,04,TFMAX1(I),TFMAX2(I),VMUZEL(I)
     1,RVACON(I),RVBCON(I),VELMIN(I),VELMAX(I),RANMIN(I),RANMAX(I)
     2,ATLAG(I),07,08
      IF9=0
      RETURN 1
 1000 FORMAT(10E8.0)
 1001 FORMAT(' LOCATION',I5,6X,'GUN TYPE',I2,6X,'ERROR MODE',I2,9X,
     1 'POSITION=(',F7.0,',',F7.0,',',F7.0,')   RADIUS=',F5.0,'M'/)
 1003 FORMAT(3X'TIME',14X'XXX',7X'YYY',7X'ZZZ',12X'SPEED',6X'XDOT',
     1    6X'YDOT',6X'ZDOT',10X'HEADING',5X'CLIMB',6X'ROLL'/)
 1004 FORMAT(1X,F6.2,7X,3F10.1,7X,4F10.2,7X,3F10.2)
 1005 FORMAT(//'0XR=',F9.2,'    YR=',F9.2,8X,'XT=',F9.2,'    YT=',F9.2,8X,
     1'PSI=',F7.2,8X,'DZ=',F9.2)
 1007 FORMAT(I2,19A4,A2)
 1008 FORMAT(8X,9E8.0)
 1009 FORMAT(3X,5I1,E8.0)
 1010 FORMAT('-VULNERABLE AREA (SQ. METERS) AS A FUNCTION OF IMPACT ',
     1    'SPEED (METERS/SEC) AND ASPECT VIEW'/5X,20A4//' VIEW',7X'0
     2 152      305      457      610      762      914      1067      1219'/)
 1011 FORMAT(1H-,I2,' TIME INTERVALS FOR PK ACCUMLLATION'//4X'0.00',
     1    10F8.2)
```

```
 1012 FORMAT(I2,F7.3,3F7.2,3F6.2,F6.0,2F12.7,2F6.1,2F7.0,F8.2,2F8.3)
 1015 FORMAT(5X,I1,1X,I1,9E8.0)
 1016 FORMAT(2X,6I1)
 1025 FORMAT('0G  TIME/     MIN     MAX   AZIM  ELEV   MAX    MAX   MUZZ    B
     2ALLISTIC    BALLISTIC    VEL    VEL  RANGE  RANGE  SMOOTH  MAX.AZ  MA
     3X.EL'/ ' T  ROUND    ELEV   ELEV   RATE  RATE  TOF1   TOF2    VEL   CO
     4NSTANT 1  CONSTANT 2   MIN    MAX    MIN    MAX   CONST   ERROR   E
     5RROR'/)
 1026 FORMAT(I5,4X,'0.00',8F8.2)
 1028 FORMAT(2X,I4,I2,9E8.0)
 1029 FORMAT(1H-,I1,' DENSITY CLASSES FOR PK ACCUMULATION'//9F12.5)
 1038 FORMAT(2X,I3,I5,F10.0)
 1041 FORMAT(2X,I3,I3,I2,3F10.0,I5,2F10.0,I5,F10.0)
 1042 FORMAT(//,' ECM VARIABLES')
 1043 FORMAT('1AAASIM----',10A10)
 1045 FORMAT(//,
     1'  FIRE TIME  RANGE(M)   X-SEC(SQM)  JAM.GAIN(DB)  J/S(DB)',
     2'  MODE  ADD.TRK.VAR.  ADD.RNG.VAR.    S/N(DB)')
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C                 COO   U   U  TTTTT  PPPP   U   U  TTTTT             C
C                O   O  U   U    T    P   P  U   U    T               C
C                O   O  U   U    T    PPPP   U   U    T               C
C                O   O  U   U    T    P      U   U    T               C
C                 OOO    UUU     T    P       UUU     T               C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
      ENTRY S69   (TEMP,SPKT,SPKT2,*,*,*)
   69 DO 92 I=1,4
   92 IFLAGS(I)=IFLAGS(I)+IPRINT(I)
C
CC  PRINT PK AS A FUNCTION OF AIRCRAFT ASPECT AND IMPACT SPEED
C
      IF(IPRINT(5).EQ.0)GO TO 80
      CALL PRSEGS(SPKT2,ISL)
C
CC  COMPUTE PK AS A FUNCTION OF ASPECT AND IMPACT SPEED FOR ALL GUNS
C
   80 DO 36 I=1,32
      DO 36 J=1,8
      PK=RHO(1)*SPKT2(I,J)
   36 SPKTOT(I,J)=PK+(1.0-PK)*SPKTOT(I,J)
C
CC  STORAGE OF PK VS DENSITY FACTOR AND TIME INTERVALS (AT FIRE AND
CC     INTERCEPT) PER WEAPON OR WEAPON COMPLEX
C
      CPK=1.0-CPS
      DO 55 I=1,NRHOS
```

```
      D=RHO(I)
      PK=D*CPK
      PKTTDC(I)=PK+(1.0-PK)*PKTTDC(I)
      DO 55 J=1,NTINTS
      D1=D*PTOTTF(J)
      PKTFDC(J,I)=D1+(1.0-D1)*PKTFDC(J,I)
      D2=D*PTOTTI(J)
   55 PKTIDC(J,I)=D2+(1.0-D2)*PKTIDC(J,I)
C
CC COMPUTE, STORE, AND WRITE TOTAL PKS FOR ENTIRE ARRAY OF WEAPONS
C
      F=FLOAT(NROUND/ISB)*TPERS
      WRITE(7)ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      ISL=ISL+1
      ASSIGN 70 TO IEOF
      GO TO 15
   70 ENDFILE 7
      LINE=66
      REWIND 7
C     PUNCH2 CARDS WRITE ONLY ONE CARD IMAGE ON TAPE4 WHEN THERE IS
CC       ONLY ONE DEFENSE PER EMPLOYMENT (I.E., ONLY ONE "12" CARD
C        BEFORE 7/8/9 END-OF-RECORD).
      K = ISL
      CALL PAGES(4,0,JP)
      WRITE (6,1033)
      ASSIGN 40 TO IEOF
   79 READ(7,ERR=9992,END=9993)ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,
     1   TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      CALL PAGES(1,4,JP)
      IF (JP.EQ.0) WRITE (6,1033)
      WRITE (6,1034) ISL,CPK,NROUND,F,XGUN,YGUN,ZGUN,CIRCLE,IGL,
     1     TREACT,TTRACK,IGT,IEM,ICB,ISB,ISL
      WRITE (4,1060) ITITLE(9),ITITLE(10),ISL,IGT,IEM,ICB,ISB,IGL,CPK,
     1     NROUND,XGUN,YGUN,ZGUN,F,NUMBER
      GO TO 79
   40 IF (K.NE.2) WRITE (4,1064) ITITLE(9),ITITLE(10),PKTTDC(1),NUMBER
      IF (IFLAGS(2).LE.0) GO TO 76
      REWIND 7
      CALL PAGES(4,0,JP)
      WRITE (6,1031) (I,I=1,10)
   77 READ(7) ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      IF(IPRINT(2).LE.0)GO TO 77
      CALL PAGES(1,4,JP)
      IF (JP.EQ.0) WRITE (6,1031) (I,I=1,10)
      WRITE(6,1032)ISL,(TINTER(I),I=1,NTINTS)
```

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ADAPTATION OF THE IMPROVED ANTIAIRCRAFT ARTILLERY SIMULATION CO--ETC(U)
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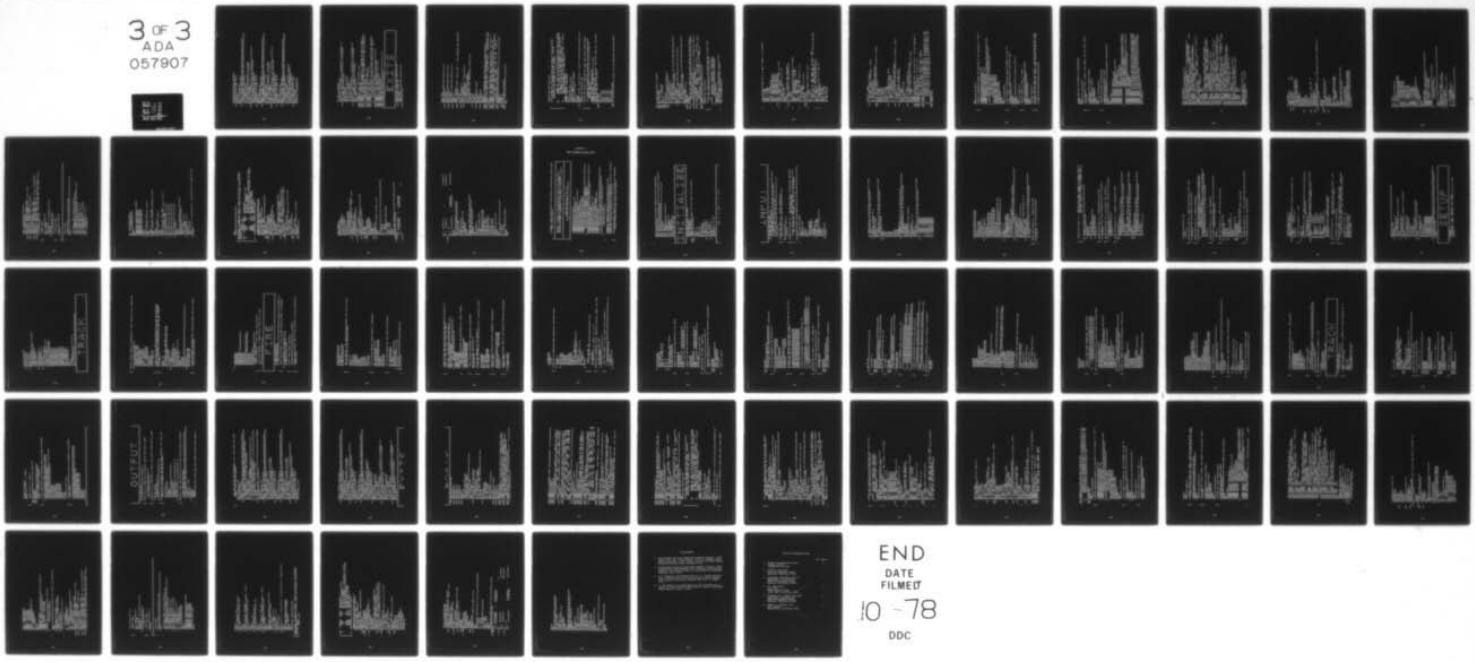

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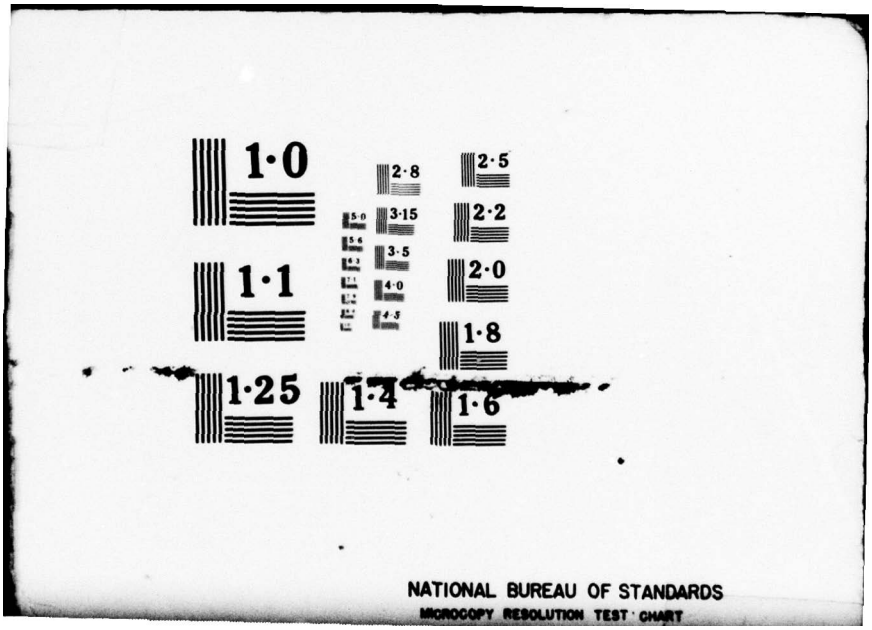
1·0
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5·6
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```
      IFLAGS(2)=IFLAGS(2)-IPRINT(2)
      IF(IFLAGS(2).GT.0)GO TO 77
   76 IF(IFLAGS(3).LE.0)GO TO 42
      REWIND 7
      CALL PAGES(4,0,JP)
      WRITE (6,1035) (I,I=1,10)
   41 READ(7) ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      IF(IPRINT(3).LE.0)GO TO 41
      CALL PAGES(2,4,JP)
      IF (JP.EQ.0) WRITE (6,1035) (I,I=1,10)
      WRITE(6,1018)ISL,(PTOTTF(I),I=1,NTINTS)
      DO 410 I=2,NTINTS
  410 PTOTTF(I) = PTOTTF(I-1) + (1.0-PTOTTF(I-1))*PTOTTF(I)
      WRITE (6,1058) ISL,(PTOTTF(I),I=2,NTINTS)
      IFLAGS(3)=IFLAGS(3)-IPRINT(3)
      IF(IFLAGS(3).GT.0)GO TO 41
   42 IF(IFLAGS(4).LE.0)GO TO 71
      REWIND 7
      CALL PAGES(4,0,JP)
      WRITE (6,1036) (I,I=1,10)
   43 READ(7) ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      IF(IPRINT(4).LE.0) GO TO 43
      CALL PAGES(2,4,JP)
      IF (JP.EQ.0) WRITE (6,1036) (I,I=1,10)
      WRITE(6,1018)ISL,(PTOTTI(I),I=1,NTINTS)
      DO 430 I=2,NTINTS
  430 PTOTTI(I) = PTOTTI(I-1) + (1.0-PTOTTI(I-1))*PTOTTI(I)
      WRITE (6,1058) ISL,(PTOTTI(I),I=2,NTINTS)
      IFLAGS(4)=IFLAGS(4)-IPRINT(4)
      IF(IFLAGS(4).GT.0)GO TO 43
   71 IF(IFLAGS(1).LE.0)GO TO 44
      REWIND 7
      CALL PAGES(4,0,JP)
      WRITE (6,1017) (I,I=1,9)
   74 READ(7) ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      IF(IPRINT(1).LE.0)GO TO 74
      CALL PAGES(1,4,JP)
      IF (JP.EQ.0) WRITE (6,1017) (I,I=1,9)
      WRITE(6,1059)ISL,(RHO(I),I=1,NRHOS)
      IFLAGS(1)=IFLAGS(1)-IPRINT(1)
      IF(IFLAGS(1).GT.0)GO TO 74
   44 CALL PAGES(7+NTINTS,0,JP)
      WRITE(6,1019)
      WRITE (6,1021) (I,I=1,9)
      PTOTTF(1) = PKTFDC(1,1)
```

```
      DO 440 I=1,NTINTS
      IF (I.EQ.1) GO TO 440
      PTOTTF(I) = PTOTTF(I-1) + (1.0-PTCTTF(I-1))*PKTFDC(I,1)
  440 WRITE (6,1018) I,PTOTTF(I),(PKTFDC(I,J),J=1,NRHOS)
      CALL PAGES (9+NTINTS,0,JP)
      WRITE(6,1020)
      WRITE (6,1021) (I,I=1,9)
      PTOTTI(1) = PKTIDC(1,1)
      DO 441 I=1,NTINTS
      IF (I.EQ.1) GO TO 441
      PTOTTI(I) = PTOTTI(I-1) + (1.0-PTOTTI(I-1))*PKTIDC(I,1)
  441 WRITE (6,1018) I,PTOTTI(I),(PKTIDC(I,J),J=1,NRHOS)
      WRITE (6,1023) (PKTTDC(I),I=1,NRHOS)
      CALL PRSEGS(SPKTOT,0)
      GO TO 95
 1017 FORMAT('- LOC',12X,9(7X'RHO',I2)/)
 1018 FORMAT(I5,10F12.7)
 1019 FORMAT('-ATTRITION ACCRUED AS A FUNCTION OF TIME OF FIRE')
 1020 FORMAT('-ATTRITION ACCRUED AS A FUNCTION OF TIME AT INTERCEPT')
 1021 FORMAT('0TIME',5X'CUM FOR',9(5X'DENSITY')/' SEG.',5X'CLASS 1',
     1    9(5X'CLASS',I2)/)
 1023 FORMAT(1H0,10X,'TOTALS',9F12.7)
 1031 FORMAT('- LOC',10(6X,'TIME',I2)/)
 1032 FORMAT(I5,10F12.2)
 1033 FORMAT('- LOC',5X'P(KILL)',6X'ROUNDS',3X'FIRE TIME',8X'XGUN',
     1    8X'YGUN',8X'ZGUN   RADIUS GL',5X'T REACT',5X'T TRACK',
     2    ' GT EM CB SB  LOC')
 1034 FORMAT(I5,F12.7,I12,4F12.2,F9.2,I3,2F12.2,4I3,I5)
 1035 FORMAT('- LOC',10(4X,'PK(TF',I2,')')/)
 1036 FORMAT('- LOC',10(4X,'PK(TI',I2,')')/)
 1058 FORMAT(I5,'CUM',9X,9F12.7)
 1059 FORMAT(I5,12X,9F12.5)
 1060 FORMAT(2A9,I3,5I2,F10.7,I5,2F7.0,F6.0,F6.1,I6)
 1064 FORMAT(2A9,13X,F10.7,31X,I6)
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C               EEEEE  X   X  IIIII  TTTTT   SSSS                     C
C               E       X X     I      T    S                        C
C               EEE      X      I      T     SSS                     C
C               E       X X     I      T        S                     C
C               EEEEE  X   X  IIIII    T    SSSS                      C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
      ENTRY S999 (TEMP,SPKT,SPKT2,*,*,*)
  999 WRITE(6,1027)IGT,IEM
      CALL EXIT
      ENTRY S9994 (TEMP,SPKT,SPKT2,*,*,*)
 9994 WRITE(6,1040)
```

```
      CALL EXIT
      ENTRY S9995 (TEMP,SPKT,SPKT2,*,*,*)
 9995 WRITE(6,1039)
      CALL EXIT
      ENTRY S9996 (TEMP,SPKT,SPKT2,*,*,*)
 9996 WRITE(6,1037)
      CALL EXIT
      ENTRY S9997 (TEMP,SPKT,SPKT2,*,*,*)
 9997 REWIND 4
      LINE = 66
      WRITE (6,6060)
 6060 FORMAT (///,1X,'*****  END OF JOB - - P001 SCENARIO RUN COMPLETE',
     1   '  *****')
      RETURN 3
 6061 CALL PAGES(3,0,JP)
      WRITE (6,1061)
  990 READ(4,1062,END=991) ICARD,IPRINT,I
      CALL PAGES(1,3,JP)
      IF (JP.EQ.0) WRITE (6,1061)
      WRITE (6,1063) ICARD,IPRINT,I
      IF(ISW.NE.IOFF) CALL AVG(ICARD(3),IPRINT,ISW)
      GO TO 990
  991 REWIND 4
      CALL EXIT
      RETURN 3
 9998 WRITE(6,1006)I,ICARD
      CALL EXIT
      RETURN 3
 9999 WRITE(6,1002)
      CALL EXIT
      RETURN 3
 1002 FORMAT(//'-UNEXPECTED END-OF-RECORD/FILE ENCOUNTERED.')
 1006 FORMAT(////'-IMPROPER INPUT CARD ENCOUNTERED.  "',I2,19A4,A2,'"')
 1027 FORMAT(////'-GUN TYPE',I2,',  ERROR MODE',I2,'.  COMBINATION INVAL
     1ID.')
 1037 FORMAT(////'-UNRECOVERABLE PARITY ERROR DETECTED.  CALL EXIT.')
 1039 FORMAT(' ECM SHOULD NOT BE SPECIFIED WHEN IEM IS 1 OR 2 ')
 1040 FORMAT(' MULTIPATH TRACKING ERROR SPECIFIED WITH IEM=3 ONLY ')
 1061 FORMAT(1H0,4X'DATE',7X'TIME',4X'LCC  GT  EM  CB  SB  GL',5X'P(K',
     1     'ILL)    RDS      XGUN      YGUN      ZGUN    F TIME     PAGE'/)
 1062 FORMAT(2A9,A3,5A2,A10,A5,2A7,3A6)
 1063 FORMAT(2(2X,A9),2X,A3,5(2X,A2),2X,A10,1X,A5,2(1X,A7),3(2X,A6))
      RETURN 3
   87 RETURN 1
   55 RETURN 2
 9992 GO TO IERR,(3,28,9996)
 9993 GO TO IEOF,(4,12,40,70,83,9997,9999)
      END
```

```
      SUBROUTINE PAGES(N,NT,JP)
C
CCC   KEEPS NUMBER OF LINES PER PAGE LESS THAN 59, PRINTS HEADER,
CCC       AND GETS TIME INFORMATION FROM SYSTEM.  REPLACES
CCC       NPAGE(MAX) AND HEADER IN AFATL PROGRAM.
CCC
CCC   N         NUMBER OF LINES TO BE PRINTED BEFORE NEXT CALL TO PAGES.
CCC   NT        NUMBER OF LINES IN TITLE OR HEADER OF DATA BEING PRINTED.
CCC             IF CALL TO PAGES IS TO PRINT HEADER ONLY, "N" SHOULD
CCC             BE NUMBER OF LINES AND "NT" SHOULD BE ZERO.
CCC   JP        FLAG FROM PAGES, SET TO ZERO WHEN A NEW PAGE IS STARTED
C               INDICATING NECESSITY TO PRINT HEADER.
      COMMON /BLOCK1/ ITITLE(20)
      COMMON /HEADFO/ LINE,NUMBER
      JP = 2
      LINE = LINE + N
      IF (LINE .LT. 59) RETURN
      NUMBER = NUMBER + 1
      WRITE (6,1000) ITITLE,NUMBER
      LINE = 2 + N + NT
      JP = 0
      RETURN
 1000 FORMAT('1AFATL P-001 AAASIM "',17A4,'"',A10,2(1XA9),2X'PAGE',I4/)
      END
      SUBROUTINE PRSEGS(P,ISL)
C
CCC   PRINTS THE PK AS A FUNCTION OF ASPECT AND IMPACT SPEED TABLES
CCC
CCC   THIS SUBROUTINE EXTENSIVELY MODIFIED TO PRINT ASPECT SECTOR
CCC       ANGLES AND PROPERLY LABEL THE TWO CASES FOR WHICH IT
C         PRINTS TABLES.
      COMMON /BLOCK3/ XGUN,YGUN,ZGUN
      COMMON /BLOCK4/ IGT,IEM,ICB,ISB,IGL,CIRCLE
      DIMENSION P(32,8),PT(8)
      REAL*8 ANG(8)/'315-360','000-045','045-090','090-135','135-180',
     1'180-225','225-270','270-315'/
 8888 CONTINUE
      PK = 0.0
      PT(1) = 0.0
      PT(2) = 0.0
      PT(3) = 0.0
      PT(4) = 0.0
      PT(5) = 0.0
      PT(6) = 0.0
      PT(7) = 0.0
      PT(8) = 0.0
  111 CALL PAGES(6,0,JP)
  222 IF (ISL.GT.0) WRITE (6,1001) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
```

```
  333 IF (ISL.EQ.0) WRITE (6,1030)
  444 WRITE(6,1040)
  555 DO 2 I=1,32
  666 IAZ = 1 + MOD(I,8)
  777 IEL = 2 + (I-1)/8
  888 PP=0.0
  999 DO 3 J=1,8
  112 PT(J)=PT(J)+(1.0-PT(J))*P(I,J)
  113 PK = PK + (1.0-PK) * P(I,J)
    3 PP=PP+(1.0-PP)*P(I,J)
      CALL PAGES(1,6,JP)
      IF (JP.NE.0) GO TO 2
      IF (ISL.GT.0) WRITE (6,1001) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
      IF (ISL.EQ.0) WRITE (6,1030)
      WRITE (6,1040)
    2 WRITE (6,1041) I,ANG(IAZ),ANG(IEL),(P(I,J),J=1,8),PP
      CALL PAGES(2,6,JP)
      IF (JP.NE.0) GO TO 4
      IF (ISL.GT.0) WRITE (6,1001) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
      IF (ISL.EQ.0) WRITE (6,1030)
      WRITE (6,1040)
    4 WRITE (6,1042) PT,PK
 8889 CONTINUE
      RETURN
 1001 FORMAT('-PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED.',
     1     5X'LOC',I4,5X'GT',I2,5X'EM',I2,5X'X',F7.0,3X'Y',F7.0,3X'Z',
     2     F7.0,4X'RADIUS',F5.0,'M')
 1030 FORMAT('-TOTAL PK FOR DENSITY CLASS 1 AS A FUNCTION OF ASPECT',
     1     ' SECTOR AND IMPACT SPEED.')
 1040 FORMAT('0SECTOR  AZIMUTH   ELEV.',4X'0-152     152-305     ',
     1     '305-457     457-610     610-762     762-914     914-1067',
     2     4X'1067-1219    TOTAL PK' / 9X'REAR=00  DOWN=00')
 1041 FORMAT(I4,2X,A7,2X,A7,8F12.7,F14.7)
 1042 FORMAT(1H0,15X'TOTALS',8F12.7,F14.7)
      END
      SUBROUTINE TPLOT(NFPA)
C
C     PLOTS X VS. Y AND X VS. Z ON PRINTER FOR EACH FLIGHT PATH.
C         NO PLOT WHEN XMAX-XMIN IS LESS THAN 50.
C
      COMMON  XFPA(1201), YFPA(1201), ZFPA(1201),
     1        BFPA(1201), AFPA(1201), PFPA(1201),
     2       VXFPA(1201),VYFPA(1201),VZFPA(1201)
      DIMENSION PLOT(111)
      LOGICAL XA
      DATA BLANK,YAXIS,XAXIS,POINT/1H ,1H:,1H-,1H+/
C     PLOT ONLY ABOUT 50 POINTS WITH "IFPA".
      IFPA = MAXO(NFPA/50,1)
```

```
C       FIND MIN-MAX VALUES OF X, Y, AND Z (ZMIN = 0. BY DEFN.)
        XMIN = 1.E99
        YMIN = 1.E99
        XMAX = -1.E99
        YMAX = -1.E99
        ZMAX = -1.E99
        DO 100 I=1,NFPA,IFPA
        XMIN = AMIN1(XMIN,XFPA(I))
        YMIN = AMIN1(YMIN,YFPA(I))
        XMAX = AMAX1(XMAX,XFPA(I))
        YMAX = AMAX1(YMAX,YFPA(I))
  100   ZMAX = AMAX1(ZMAX,ZFPA(I))
C       CHECK X RANGE TO AVOID FUNNY X-Z PLOT.
        XRNG = XMAX - XMIN
        IF (XRNG .GT. 49.999) GO TO 110
        CALL PAGES(3,0,I)
        WRITE (6,210)
        RETURN
C       SCALE X,Y TO METERS PER CHARACTER.
  110   D = AMAX1(XRNG/11.,(YMAX-YMIN)/7.25)
        DX = D/10.
        DY = D/8.
C       CENTER PLOT BY RE-CALCULATING X-Y MIN-MAX.
        XMIN = (XMAX+XMIN)/2. - 55.*DX
        YMIN = (YMAX+YMIN)/2. - 29.*DY
        XMAX = XMIN + 110.*DX
        YMAX = YMIN + 58.*DY
C       SCALE Z (NOT TO SAME SCALE AS X-Y).
        DO 120 I=1,100
        D = FLOAT(I*500)
        IF (D .GT. ZMAX) GO TO 130
  120   CONTINUE
  130   DZ = D/10.
C       SEE IF AXES SHOULD APPEAR ON PLOT.
        XA = .FALSE.
        NYA = -10
        IF (XMIN .LE. 0. .AND. XMAX .GE. 0.) XA = .TRUE.
        IF (YMIN .LE. 0. .AND. YMAX .GE. 0.) NYA = 59 - INT(0.5-YMIN/DY)
        IF (XA) NXA = 1 + INT(0.5-XMIN/DX)
C       SET 8 LINES PER INCH SPACING ON PRINTER.
        WRITE (6,280)
C       SET PAGE CONTROL, PLOT X-Z, THEN X-Y.
        CALL PAGES(56,0,I)
        WRITE (6,250)
        WRITE (6,220)
        IFPA = 2 * IFPA
        DO 160 K=1,11
        DO 140 I=1,111
```

```
      PLOT(I) = BLANK
  140 IF (K.EQ.11) PLOT(I)=XAXIS
      IF (XA .AND. K.NE.11) PLOT(NXA) = YAXIS
      Z = FLOAT(11-K)*DZ
      DO 150 I=1,NFPA,IFPA
      IX = 1+INT(0.5+(XFPA(I)-XMIN)/DX)
  150 IF (K .EQ. 11-INT(0.5+ZFPA(I)/DZ)) PLOT(IX) = POINT
  160 WRITE (6,230) PLOT,Z
      WRITE (6,220)
      WRITE (6,250)
      WRITE (6,220)
      IFPA = IFPA/2
      DO 190 K=1,59
      DO 170 I=1,111
      PLOT(I) = BLANK
  170 IF (K .EQ. NYA) PLOT(I) = XAXIS
      IF (XA) PLOT(NXA) = YAXIS
      Y = YMIN + FLOAT(59-K)*DY
      DO 180 I=1,NFPA,IFPA
      IX = 1 + INT(0.5+(XFPA(I)-XMIN)/DX)
  180 IF (K .EQ. 59-INT(0.5+(YFPA(I)-YMIN)/DY)) PLOT(IX) = POINT
      I = MOD(K,2)
      IF (I.NE.1) WRITE (6,240) PLOT
  190 IF (I.EQ.1) WRITE (6,260) PLOT,Y
      WRITE (6,220)
      WRITE (6,250)
C     PRINT X AXIS VALUES.
      D=10.*DX
      DO 200 I=1,12
  200 PLOT(I) = XMIN + D*FLOAT(I-1)
      WRITE (6,270) (PLOT(I),I=1,12),DX,DY
C     RE-SET PRINTER SPACING BACK TO 6 LINES PER INCH.
      WRITE (6,290)
      RETURN
  210 FORMAT('ONEARLY CONSTANT X IN FLIGHT PATH.  NO PLOT PRINTED.'/)
  220 FORMAT(1X,113(1H*))
  230 FORMAT(2H *,111A1,1H*,3X'Z =',F8.1,' M')
  240 FORMAT(2H *,111A1,1H*)
  250 FORMAT(2X'A', 9X'B', 9X'C', 9X'D', 9X'E', 9X'F',
     1       9X'G', 9X'H', 9X'I', 9X'J', 9X'K', 9X'L')
  260 FORMAT(2H *,111A1,1H*,3X'Y =',F8.1,' M')
  270 FORMAT('0X(A)=',F8.1,' M',4X'X(B)=',F8.1,' M',4X'X(C)=',F8.1,' M',
     1       4X'X(D)=',F8.1,' M',4X'X(E)=',F8.1,' M',4X'X(F)=',F8.1,' M',
     2       4X'X(G)=',F8.1,' M'/1X'X(H)=',F8.1,' M',4X'X(I)=',F8.1,' M',
     3       4X'X(J)=',F8.1,' M',4X'X(K)=',F8.1,' M',4X'X(L)=',F8.1,' M',
     4       4X' DX =',F8.1,' M',4X' DY =',F8.1,' M')
  280 FORMAT(1HT)
  290 FORMAT(1HS)
```

```
      END
      SUBROUTINE RPLANE(T)
C
CC    COMPUTES INFORMATION ABOUT THE POSITION OF THE AIRCRAFT AT TIME =T
C
      COMMON/BLOCK2/NFPA,TMIN,TMAX,DTFPA
      COMMON/BLOCK3/XGUN,YGUN,ZGUN
      COMMON/NFPARM/XA,YA,ZA,RA2,RA,TIME
      COMMON/IGXGYG/IG,XG(8),YG(8)
      COMMON XFPA(1201),YFPA(1201),ZFPA(1201),BFPA(1201),AFPA(1201),
     1       PFPA(1201),VXFPA(1201),VYFPA(1201),VZFPA(1201)
      COMMON/CECM1/IRECM,IJ,GAINJ,IX,XSEC,CALX,PJW,
     *       X,Y,Z,ROL,PIT,HDG,
     *         FTGT,FJAM,GJ,SJT,SN
      CALL INTERP((T+TIME)/DTFPA)
      XA=GETVAL(XFPA)-XGUN-XG(IG)
      YA=GETVAL(YFPA)-YGUN-YG(IG)
      ZA=GETVAL(ZFPA)-ZGUN
      RA2=XA*XA+YA*YA+ZA*ZA
      RA=SQRT(RA2)
      RETURN
      END
      FUNCTION ANGLIM(X)
C
CC    LIMITS ANGLES TO PRINCIPAL ANGLES BETWEEN -PI AND +PI
C
      COMMON /CONSTS/ DEGREE,RADIAN,PI,PI2,QTRPI,SQRT2
      IF(ABS(X)-PI)1,1,2
    1 ANGLIM=X
      RETURN
    2 ANGLIM=X-PI2*FLOAT(IFIX((X+SIGN(PI,X))/PI2))
      RETURN
      END
      FUNCTION RSHELL(T)
C
CC    COMPUTES RANGE TO SHELL AT TIME = T
C
      COMMON/VSASBS/VMUZZ,ASHCON,BSHCON,DQUAD
      DQUAD=1.0+T*(ASHCON+T*BSHCON)
      RSHELL=T*VMUZZ/DQUAD
      RETURN
      END
      FUNCTION VSHELL(T)
C
CC    COMPUTES SPEED OF SHELL AT TIME=T.  CAN ONLY BE USED AFTER A CALL
CC    TO RSHELL AT THE SAME TIME, SINCE RSHELL COMPUTES DQUAD FOR VSHELL
C
      COMMON/VSASBS/VMUZZ,ASHCON,BSHCON,DQUAD
```

```
      VSHELL=VMUZZ*(1.0-BSHCON*T*T)/(DQUAD*DQUAD)
      RETURN
      END
      SUBROUTINE INTERP(FINT)
C
CCC   SETS CONSTANTS (FRACT, INDEX1, AND INDEX2) FOR TWO PCINT INTER-
CCC     POLATION
C
      CCMMON/MAGIC/FRACT,INDEX1,INDEX2
      INDEX1=FINT
      FRACT=FINT-FLOAT(INDEX1)
      INDEX1=INDEX1+1
      INDEX2=INDEX1+1
      RETURN
      END
      FUNCTION GETVAL(ARRAY)
C
CCC   PERFORMS TWO POINT INTERPOLATION
C
      CCMMON/MAGIC/FRACT,INDEX1,INDEX2
      DIMENSION ARRAY(1201)
      GETVAL=ARRAY(INDEX1)+FRACT*(ARRAY(INDEX2)-ARRAY(INDEX1))
      RETURN
      END
      BLOCK DATA
      CCMMON /BLOCK1/ ITITLE
      COMMON /BLOCK3/ XGUN,YGUN,ZGUN
      COMMON /BLOCK4/ IGT,IEM,ICB,ISB,IGL,CIRCLE
      COMMON /BLOCK5/ NRHOS,RHO(9)
      CCMMON /BLOCK6/ NTINTS,TINTER(10)
      COMMON /BLOCK7/ IVACOM    ,VAT(9,5,9)
      CCMMON /BLOCK8/ TREACT,TRACK1,TRACK2
      CCMMON /BLOCK9/ TROUND(6),THDMAX(6),PHDMAX(6),PHIMIN(6),PHIMAX(6),
     1                VELMIN(6),VELMAX(6),RANMIN(6),RANMAX(6),ATLAG(6),
     2                ETHMAX(6),EPHMAX(6),RMODES(6)
      COMMON /BLOCKA/ TFMAX1(6),TFMAX2(6),RVACON(6),RVBCCN(6),VMUZEL(6)
      COMMON /CONSTS/ DEGREE,RADIAN,PI,PI2,QTRPI,SQRT2
      CCMMON /HEADFO/ LINE,NUMBER
      CCMMON /BUDGET/ BCACON(6)
      CCMMON /NEWA/ VY1,VY,ALFA,J,IRMP,PLEN,O1,O8,D1,JJJ,XR,ZT,PZI,IERR
      CCMMON /NEWB/ Y1,P2,VX,BETA,IF6,IMUL,IP,N,O7,C,TTRACK,KMODE,PSI,K
      CCMMON /NEWC/ CP,X2,P1,B2,JFILE,IJAM,ISL,C4,CPS,TPERS,JMODE,YT,T2
      CCMMON /NEWD/ T33,X1,Z2,B1,VX2,C3,CPK,NROUND,IOFF,I,XT,TM,SP,T1
      COMMON /NEWE/ Z1,A2,VX1,VZ2,PHI,IF5,IEOF,YR,IF2,T13,IFILE,Y2,A1
      CCMMON /NEWF/ V2,VZ1,V,FUZZ,IF9,SD2RJ,SD2RJM,V1,VY2,F,JP,IF7,REFC
      CCMMON /NEWG/ SJTMAX,O2,PK,D2,ISW
      DATA IJAM/0/,SD2RJ/0./
      DATA IMUL/0/
```

```
      DATA IOFF/2HOF/
      DATA IF2,IF5,IF6,IF7,IF9/1,1,1,1,1/
      DATA VX2/0.0/,VY2/0.0/,VZ2/0.0/
      DATA X2/0.0/,Y2/0.0/,Z2/0.0/,V2/0.0/,P2/0.0/,A2/0.0/,B2/0.0/
      DATA IFILE/9999/,JFILE/9999/,          FUZZ/0.000000001/
C     VALUES ON "ASIDOC" CARDS FROM A.S.I. DOCUMENTATION DRAFT.    (BEE)
      DATA ATLAG  /2*9999.99,1.33,9999.99,2*1.33/
      DATA BDACON /.00265,.00501,.0031,.00697,.00113,.00113/
      DATA DEGREE /57.295779513082/,  RADIAN/0.01745329251994/
      DATA EPHMAX /6*.1/,      ETHMAX /6*.1/
      DATA IGT    /3/,  IEM/4/,  ICB/1/,  ISB/4/,  IGL/1/,  CIRCLE/0./
      INTEGER ITITLE(20)/7*'    ','ASD/','XROA',11*'    '/
      INTEGER IVACOM(20)/20*'    '/
      DATA LINE   /66/,  NUMBER/0/
      DATA NRHOS  /9/
      DATA NTINTS /10/
      DATA PHDMAX /.43633,.43633,.78540,.34910,.31416,.3491/
      DATA PHIMAX /1.48353,1.57079,1.48353,1.48353,1.51844,1.43117/
      DATA PHIMIN /-.17453,-.14835,-.17453,-.08727,-.06981,-.05236/
      DATA PI     /3.14159265358898/,  PI2/6.2831853071796/
      DATA QTRPI  /0.785398163397 45/
      DATA RANMAX /3000.,3000.,3300.,5000.,5500.,99999./
      DATA RANMIN /0.0,400.,500.,0.,0.,99999./
      DATA RHO    /1.,.5,.3333333333,.25,.2,.1666666666,.1,.02,.01/
      DATA RMODES /-1.,-1.,400.,-1.,1500.,0.0/
      DATA RVACON /.180209,.251499,.22998,.089321,.07845,.050694/
      DATA RVBCON /.012392,-.006259,-.006889,.004262,-.000421,-.000357/
      DATA SQRT2  /1.414213562373 1/
C     TFMAX CARDS PROVIDE EXACT AGREEMENT WITH AFATL PROGRAM ON TEST
C         CASE, BUT NOT EXACT VALUES FOR MAX RANGE.   13 FEB 73    (BEE)
      DATA TFMAX1 /1.6,2.2,3.8,4.1,6.2,99.99/
      DATA TFMAX2 /99.99,99.99,7.5,99.99,11.6,19.2/
      DATA THDMAX /0.5236,.5236,1.39626,0.52360,.5236,.5236/
      DATA TINTER /10.,20.,30.,40.,50.,60.,70.,80.,90.,999.99/
      DATA TREACT /0./,  TRACK1/2.5/,  TRACK2/6.0/
      DATA TROUND /.75,.4,.2,.75,.857,4./
      DATA VAT    /405*0./
      DATA VELMAX /300.,300.,350.,250.,300.,999.9/
      DATA VELMIN /0.,0.,0.,0.,0.,999.9/
      DATA VMUZEL /840.,1000.,930.,880.,960.0,800./
      DATA XGUN   /0./
      DATA YGUN   /0./
      DATA ZGUN   /0./
      END
      SUBROUTINE AVG(ITST,IPRINT,ISW)
      DIMENSION IPRINT(6)
      DATA IBLNK,SUM,CNT/2H  ,0.0,0.0/
      DATA IALL/2HAL/
```

```
      CALL REREAD
        READ (99,900)           PK
  900 FORMAT(F10.7)
        READ (99,910)          YGUN
  910 FORMAT(F7.0)
      IF(ISW.EQ.IALL) GOTO 600
      IF(ITST.EQ.IBLNK) GOTO 200
      IF(YGUN.NE.0.0) GOTO 150
      CNT=CNT+0.5
      SUM=SUM+PK/2.
      POLD=0.0
      GOTO 500
  150 CONTINUE
      CNT=CNT+1.0
      SUM=SUM+PK
      POLD=PK
      GOTO 500
  200 IF(CNT.LE.0.5) GOTO 500
      CNT=CNT-0.5
      SUM=SUM-POLD/2.0
  201 AVERG=SUM/CNT
      WRITE(6,800) CNT,AVERG
  800 FORMAT(/5X,18HAVERAGE P(KILL) ON,F6.1,20H OFFSET LOCATIONS IS,
     X       F10.7/)
      SUM=0.0
      CNT=0.0
  500 RETURN
  600 IF(ITST.NE.IBLNK) GOTO 610
      IF(CNT.NE.0.0) GOTO 201
      GOTO 500
  610 SUM=SUM+PK
      CNT=CNT+1.0
      GOTO 500
      END
      SUBROUTINE JAMER1(PLEN,SDSQ)
      SDR = PLEN*0.6826/2.*2.998E8
      SDSQ = SDR*SDR
      RETURN
      END
      SUBROUTINE MULPTH(I,REFC,EL,BIAS,SD2)
      DIMENSION C(3),S(3),B(3)
      DATA
     * AK/-0.6931471806/
     *,SQRT2/1.414213562/
     *,B/0.0244346,0.0314159,0.0785398/
     *,C/0.0132557,0.0185345,0.0478558/
     *,S/0.00872665,0.0104720,0.0244346/
      BW = B(I)
```

```
      CAL = C(I)
      SQ = S(I)
      DIR = EXP(AK*(SQ/BW)**2)
      EL2 = 2.*EL
      RU = EXP(AK*((EL2+SQ)/BW)**2)
      RL = EXP(AK*((EL2-SQ)/BW)**2)
      DRU1S = (DIR+REFC*RU)**2
      DRU2S = (DIR-REFC*RU)**2
      DRL1S = (DIR+REFC*RL)**2
      DRL2S = (DIR-REFC*RL)**2
      DIF1 = (DRU1S-DRL1S)
      SUM1 = (DRU1S+DRL1S)
      DIF2 = (DRU2S-DRL2S)
      SUM2 = (DRU2S+DRL2S)
      SIGER1 = DIF1/SUM1
      SIGER2 = DIF2/SUM2
      ANGER1 = CAL*SIGER1
      ANGER2 = CAL*SIGER2
      PPBY2 = ABS(ANGER2-ANGER1)/2.
      BIAS = ANGER1+PPBY2
      SD = PPBY2/SQRT2
      SD2 = SD*SD
      RETURN
      END
      SUBROUTINE ECM1
      DIMENSION RGDB(3),PRW(3),FREQ(3),IRTYP(4),RNOISE(3)
      DIMENSION TABJ(37,37),TABX(37,37)
      COMMON /BLOCK1/ ITITLE(10)
      COMMON /HEADFO/ LINE,NUMBER
      COMMON
     */CECM1/IRECM,IJ,GAINJ,IX,XSEC,CALX,PJW,
     *       X,Y,Z,ROL,PIT,HDG,
     *        FTGT,FJAM,GJ,SJT,SN
C
      NAMELIST/NAM1/RGDB,PRW,FREQ,IRTYP,I,RG,WL,FTGT,FJAM,PJW
      DATA
     * RGDB/40., 38.5, 28./
     *,PRW/105000., 175000.,250000./
     *,FREQ/15.1E9, 9.3805E9, 2.838E9/
     *,IRTYP/1,2,2,3/
     *,PI4/12.56637061/
     *,RNOISE/-123.0,-130.6,-132.2/
C
      I = IRTYP(IRECM)
      RG = 10.**(RGDB(I)/10.)
      WL = 2.998E8/FREQ(I)
      RN = RNOISE(I)
      FTGT = PRW(I)*RG*RG*WL*WL/PI4/PI4/PI4
```

```
      FJAM = PJW*RG*WL*WL/PI4/PI4
      CALL PAGES(3,0,JP)
      IF(IJ.EQ.0) WRITE(6,9003) GAINJ
 9003 FORMAT(//,' JAMMER ANTENNA GAIN',F7.3,' DB')
      IF(IJ.NE.0) WRITE(6,9004)
 9004 FORMAT(//,' JAMMER TABLE SPECIFIED')
      CALL PAGES(3,0,JP)
      IF(IX.EQ.0) WRITE(6,9005) XSEC
 9005 FORMAT(//,' AIRCRAFT CROSS SECTION ',F9.2,' SQ.METERS')
      IF(IX.NE.0) WRITE(6,9006) CALX
 9006 FORMAT(//,' AIRCRAFT CROSS SECTION TABLE SPECIFIED. ',
     *' PRINTED VALUES WILL BE MULTIPLIED BY CALX. CALX= ',F9.2)
      IF(IJ.EQ.0) GO TO 1
C
C     JAMMER TABLE
C
      CALL TABLR(TABJ,37)
      DO 3 I=1,37
      DO 3 J=1,37
      TABJ(I,J) = 10.**(TABJ(I,J)/10.)
    3 CONTINUE
    1 GJ = 10.**(GAINJ/10.)
      IF(IX.EQ.0) GO TO 2
C
C     X-SECTION TABLE
C
      CALL TABLR(TABX,37)
    2 RETURN
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      ENTRY ECM2
C
      NAMELIST/NAM2/ X,Y,Z,ROL,PIT,HDG,
     *CX1,CY1,CZ1,CX2,CY2,CZ2,AZ,EL,GAINJ,XSEC,D2,SJ,ST,SJT
     *,GJ
C
      IF(IX.EQ.0 .AND. IJ.EQ.0) GO TO 5
      CALL DIRCOS(X,Y,Z,0.,0.,0.,CX1,CY1,CZ1)
      CALL CARROT(CX1,CY1,CZ1,ROL,PIT,HDG,CX2,CY2,CZ2)
      CALL RECSPH(CX2,CY2,CZ2,AZ,EL)
      IF(IJ.EQ.0) GO TO 6
      CALL INTRP(TABJ,AZ,EL,37,GJ)
    6 IF(IX.EQ.0) GO TO 5
      CALL INTRP(TABX,AZ,EL,37,XSEC)
      XSEC = XSEC*CALX
    5 D2 = DIST2(X,Y,Z,0.,0.,0.)
      SJ = FJAM*GJ/D2
```

```
      ST = FTGT*XSEC/D2/D2
      SN = 10.*ALOG10(ST)-RN
      SJT = 10.*ALOG10(SJ/ST)
      RETURN
      END
      SUBROUTINE JAMER2(IRAD,AJS,SDSQ)
      DIMENSION AJS1(3),SD1(3)
      DIMENSION AJS2(4),SD2(4)
      DIMENSION AJS3(2),SD3(2)
      DIMENSION AJS4(4),SD4(4)
      DATA
     * N1/3/
     *,AJS1/ -5., 6., 9./
     *,SD1/ 0.002963, 0.01185, 0.1374 /
      DATA
     * N2/4/
     *,AJS2/ -2., 6., 10., 16./
     *,SD2/ 0.002963, 0.009877, 0.08278, 0.1374 /
      DATA
     * N3/2/
     *,AJS3/15., 30./
     *,SD3/ 0.0018, 0.01441 /
      DATA
     * N4/4/
     *,AJS4/ -2., 6., 10., 16./
     *,SD4/ 0.006914, 0.02173, 0.1024, 0.1374 /
      GO TO (1,2,3,4),IRAD
    1 CALL INT2(N1,AJS1,SD1,AJS,SD)
      GO TO 5
    2 CALL INT2(N2,AJS2,SD2,AJS,SD)
      GO TO 5
    3 CALL INT2(N3,AJS3,SD3,AJS,SD)
      GO TO 5
    4 CALL INT2(N4,AJS4,SD4,AJS,SD)
    5 SDSQ = SD*SD
      RETURN
      END
      SUBROUTINE INT2(NVAL,X,Y,XVAL,YVAL)
      DIMENSION X(NVAL),Y(NVAL)
      YVAL = Y(1)
      IF(X(1)-XVAL) 4,4,3
    4 DO 1 I=1,NVAL
      IF(X(I)-XVAL) 1,1,2
    1 CONTINUE
      YVAL = Y(NVAL)
      GO TO 3
    2 YVAL = Y(I-1) + (Y(I)-Y(I-1)) / (X(I)-X(I-1)) * (XVAL-X(I-1))
    3 RETURN
```

```
      END
      SUBROUTINE TABLR(TABX,IDIM)
C
C  SUBROUTINE TO READ AND PRINT A TABLE OF UP TO 37 X 37 ELEMENTS
C  THE PROGRAM PROVIDES A DEFAULT VALUE FOR ELEMENTS OUTSIDE THE
C  DEFINED TABLE.
C            INPUTS ARE:
C  CARD   VARIABLE   FORMAT   DEFINITION
C   1       INAME     8A10    ARBITRARY IDENTIFICATION
C   2        NAZ       I5     NO. OF AZ ELEMENTS
C                             (ASSUMING ELEMENT 1 CORRESPONDS TO AZ=0)
C            NEL       I5     NO. OF EL ELEMENTS,EL GOES-ELEND TO +ELEND
C          ELEND     F10.4    MAXIMUM ENTRY EL(DEG)
C          AZEND     F10.4    MAXIMUM ENTRY AZ(DEG)
C          DEFALT    F10.4    DEFAULT VALUE
C  3+   TABX(IDIM,1) 8F10.0 DATA TABLE
C
      COMMON/TABLES/ELO,DELAZ,DELEL,JEL
      DIMENSION TABX(IDIM,IDIM),INAME(8)
      DATA LE,LZ/2HEL,2HAZ/
      DATA AZO,CDTR/0.,.0174533/
      READ(5,98) INAME
      READ(5,99) NAZ,NEL,ELEND,AZEND,DEFALT
   98 FORMAT(8A10)
   99 FORMAT(2I5,3F10.4)
C NOTE IMPLIED INCREMENT
      DELAZ=AZEND/(NAZ-1)
      DELEL=(2.*ELEND)/(NEL-1)
C LOCATE FIRST ELEVATION ENTRY ETC
      JEL=(IDIM-NEL)/2 +1
      MEL=JEL+NEL-1
      ELO=-ELEND
      WRITE(6,101)INAME,NAZ,AZO,AZEND,DELAZ,
     1LZ,NEL,ELO,ELEND,DELEL,LE,DEFALT
  101 FORMAT('1  TABLE DATA',/,1X,8A10,/,2(1X,I5,
     1' ELEMENTS FROM ',F10.2,' TO ',F10.2,' BY ',
     2F10.2,2X,A2,/),' ELSEWHERE TABLE IS ',F10.2)
C INSERT DEFAULT
      MAZ=(180./DELAZ)+1
      IF ((MAZ.GT.37).OR.(MEL.GT.37)) GO TO 999
      DO 8 IAZ=1,MAZ
      DO 8 IEL=1,IDIM
    8 TABX(IEL,IAZ)=DEFALT
C READ TABLE
      DO 14 I=JEL,MEL
      READ(5,102) (TABX(I,J),J=1,NAZ)
   14 CONTINUE
  102 FORMAT(8F10.0)
```

```
      IDELAZ=DELAZ
      NPAGE=NAZ/13+1
      DO 20 LP=1,NPAGE
      JH1=(LP-1)*13*IDELAZ
      JH2=JH1+12*IDELAZ
      KH1=(LP-1)*13+1
      KH2=KH1+12
      IF(LP.EQ.NPAGE)KH2=MAZ
      IF(LP.EQ.NPAGE)JH2=180
      WRITE(6,106)(JH,JH=JH1,JH2,IDELAZ)
  106 FORMAT('1   RCS MATRIX',/,'    ELEV ',13I9)
      JELO=MAXO(JEL-1,1)
      MELO=MINO(MEL+1,IDIM)
      ELPT=ELO-DELEL*(JEL-JELO)
C PRINT TABLE
      DO 15 J=JELO,MELO
      WRITE(6,104)ELPT,(TABX(J,K),K=KH1,KH2)
  104 FORMAT(1X,F7.1,2X,13F9.2)
      ELPT=ELPT+DELEL
   15 CONTINUE
   20 CONTINUE
C CONVERT TO RADIANS
      DELEL=DELEL*CDTR
      DELAZ=DELAZ*CDTR
      ELO=ELO*CDTR
      RETURN
  999 CONTINUE
      WRITE(6,105)
  105 FORMAT(' >>>> ERROR IN INPUT <<<<')
      STOP
      END
      SUBROUTINE DIRCOS(X1,Y1,Z1,X2,Y2,Z2,COSA,COSB,COSG)
      XD = X2-X1
      YD = Y2-Y1
      ZD = Z2-Z1
      D = SQRT(XD*XD+YD*YD+ZD*ZD)
      COSA = XD/D
      COSB = YD/D
      COSG = ZD/D
      RETURN
      END
      SUBROUTINE CARROT(X1,Y1,Z1,ROL,PIT,HDG,X2,Y2,Z2)
C CARROT CARTESIAN ROTATION
C HEADING
      X =  X1*COS(HDG)     +     Y1*SIN(HDG)
      Y = -X1*SIN(HDG)     +     Y1*COS(HDG)
      Z =                                          Z1
C PITCH
```

```
      XX =  X*COS(PIT)                                  -Z*SIN(PIT)
      YY =                        Y
      ZZ =   X*SIN(PIT)    +                            Z*COS(PIT)
C ROLL
      X2 =  XX
      Y2 =                      YY*COS(ROL)     +     ZZ*SIN(ROL)
      Z2 =  -YY*SIN(ROL)    +    ZZ*COS(ROL)
      RETURN
      END
      SUBROUTINE RECSPH(X,Y,Z,PHI,THE)
      THE = ARCOS(Z/SQRT(X*X+Y*Y+Z*Z))
      THE=THE-1.5708
      PHI=0.0
      SB=SQRT(X*X+Y*Y)
      IF(SB .NE. 0.0)PHI=X/SB
      PHI=ARCOS(PHI)
      PHI=ABS(PHI)
      RETURN
      END
      SUBROUTINE INTRP(TAB,AZ,EL,NVAL,VALUE)
      COMMON/TABLES/ELO,DELAZ,DELEL,JEL
      DIMENSION TAB (NVAL,NVAL)
      A=ABS(AZ)
      E=EL
      AAZ=A/DELAZ+1.
      IAZ=AAZ
      EEL=(E-ELO)/DELEL+JEL
      IEL=EEL
      IAZ=MINO(MAXO(IAZ,1),36)
      IEL=MINO(MAXO(IEL,1),36)
      V1=TAB(IEL,IAZ)
      V2=TAB(IEL,IAZ+1)
      V3=TAB(IEL+1,IAZ)
      V4=TAB(IEL+1,IAZ+1)
      S=AAZ-IAZ
      V12=V1+(V2-V1)*S
      V34=V3+(V4-V3)*S
      S=EEL-IEL
      VALUE=V12+(V34-V12)*S
      RETURN
      END
      FUNCTION DIST2(X1,Y1,Z1,X2,Y2,Z2)
      XD = X2-X1
      YD = Y2-Y1
      ZD = Z2-Z1
      DIST2 = XD*XD+YD*YD+ZD*ZD
      RETURN
      END
```

```
      PROGRAM  P7022(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE7,TAPE8,
     1    TAPE9,TAPE4,TAPE11)
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C     AAASIM -- MULTIPLE GUN ANTIAIRCRAFT ARTILLERY SIMULATION         C
C     WRITTEN BY THOMAS D. MCMURCHIE AND JAMES O. SEVERSON             C
C     AIRFORCE ARMAMENT LABORATORY (AFATL-DLYS) EGLIN AFB, FLORIDA     C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C                    PROGRAM RECEIVED 25 OCT 72                        C
C                CONVERTED AND MAINTAINED BY ASD/XROA                  C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      COMMON/BLOCK1/ITITLE(10)
      COMMON/BLOCK2/NFPA,TMIN,TMAX,DTFPA
      COMMON/BLOCK3/XGUN,YGUN,ZGUN
      COMMON/BLOCK4/IGT,IEM,ICB,ISB,IGL,CIRCLE
      COMMON/BLOCK5/NRHOS,RHO(9)
      COMMON/BLOCK6/NTINTS,TINTER(10)
      COMMON/BLOCK7/IVACOM(8),VAT(9,5,9)
      COMMON/BLOCK8/TREACT,TRACK1,TRACK2
      COMMON/BLOCK9/TROUND(6),THDMAX(6),PHDMAX(6),PHIMIN(6),PHIMAX(6),
     1    VELMIN(6),VELMAX(6),RANMIN(6),RANMAX(6),
     2     ATLAG(6),ETHMAX(6),EPHMAX(6),RMODES(6)
      COMMON/BLOCKA/TFMAX1(6),TFMAX2(6),RVACON(6),RVBCON(6),VMUZEL(6)
      COMMON/CONSTS/DEGREE,RADIAN,PI,PI2,QTRPI,SQRT2
      COMMON/HEADFO/LINE,NUMBER
      COMMON/NFPARM/XA,YA,ZA,RA2,RA,TIME
      COMMON/IGXGYG/IG,XG(8),YG(8)
      COMMON/MAGIC /FRACT,INDEX1,INDEX2
      COMMON/VSASBS/VMUZZ,ASHCON,BSHCON,DQUAD
      COMMON/BUDGET/BDACCN(6)
      COMMON XFPA(1201),YFPA(1201),ZFPA(1201),BFPA(1201),AFPA(1201),
     1       PFPA(1201),VXFPA(1201),VYFPA(1201),VZFPA(1201)
      COMMON/CECM1/IRECM,IJ,GAINJ,IX,XSEC,CALX,PJK,
     *       X,Y,Z,ROL,PIT,HDG,
     *        FTGT,FJAM,GJ,SJT,SN
C
      DIMENSION ICARD(8),TEMP(16,6),PTOTTF(10),PTCTTI(10)
      DIMENSION PKTTDC(9),PKTIDC(10,9),PKTFDC(10,9)
      DIMENSION SPKT(8,4,8),SPKT2(32,8),SPKTOT(32,8),IPRINT(6),IFLAGS(4)
      EQUIVALENCE (SPKT2(1,1),SPKT(1,1,1),TEMP(1,1))
C
C     SOME EQUIVALENCES REMOVED BY B.E.E. BY CARRYING TWO VARIABLES
C         THROUGH PROGRAM WITH SAME VALUES FOR CLARITY.
```

```
C
      DATA IFILE/9999/,JFILE/9999/,INUNIT/5/,FUZZ/0.000000001/
      DATA ESVPCT/0.10/
      DATA X2/0.0/,Y2/0.0/,Z2/0.0/,V2/0.0/,P2/0.0/,A2/0.0/,B2/0.0/
      DATA VX2/0.0/,VY2/0.0/,VZ2/0.0/
      DATA IF2,IF5,IF6,IF7,IF9,IFLAGS/1,1,1,1,1,0,0,0,0/
      DATA IOFF/2HOF/
      DATA IMUL/0/
      DATA IJAM/0/,SD2RJ/0./,SD2J/0./
      DATA ILOOP/-1/
      CALL FTNBIN(1,0,CPU)
      CALL SECOND(CPU)
      CALL TIMREM(CIO)
      CALL DATE(ITITLE(9))
      ASSIGN 9996 TO IERR
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C  IIIII  N   N  IIIII  TTTTT  IIIII    A    L       IIIII  ZZZZZ  EEEEE C
C    I    NN  N    I      T      I     A A   L         I       Z   E     C
C    I    N N N    I      T      I    A   A  L         I      Z    EEE   C
C    I    N  NN    I      T      I    AAAAA  L         I     Z     E     C
C  IIIII  N   N  IIIII    T    IIIII  A   A  LLLLL   IIIII  ZZZZZ  EEEEE C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
      READ(INUNIT,1050) ISW,AMASK
      AMASK1=AMASK*57.3
      PRINT 38,AMASK1
   38 FORMAT(5X,25HMASK ANGLE FOR THIS RUN =,F6.3,5H DEG.)
 1050 FORMAT(A2,8X,F10.5)
   95 ISL=1
      IMUL = 0
      IJAM = 0
      SD2RJ = 0.
      SD2J = 0.
      DO 96 J=1,9
      PKTTDC(J)=0.0
      DO 96 I=1,10
      PKTIDC(I,J)=0.0
   96 PKTFDC(I,J)=0.0
      DO 94 I=1,32
      DO 94 J=1,8
   94 SPKTOT(I,J)=0.0
      REWIND 7
      ASSIGN 9997 TO IEOF
      GO TO 15
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C              IIIII  N   N  PPPP   U   U  TTTTT                      C
```

```
C                 I    NN  N  P   P  U   U    T                          C
C                 I    N N N  PPPP   U   U    T                          C
C                 I    N  NN  P      U   U    T                          C
C               IIIII  N   N  P       UUU     T                          C
C                                                                        C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
   12 ASSIGN 9999 TO IEOF
   15 READ(INUNIT,1007)I,ICARD
      IF (EOF(INUNIT).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(INUNIT).NE.0.) GO TO IERR,(3,28,9996)
      IF(I.LE.0 .OR. I.GT.14) GO TO 9998
      GO TO (101,102,103,104,105,106,107,108,109,110,111,112
     1,113,114),I
C
C  DECODE DATA BLOCK 01 -- HEADER INFORMATION
C     XROA VERSION ALLOWS ONLY 70 SPACES FOR TITLE.
C
  101 DO 17 I=1,7
   17 ITITLE(I)=ICARD(I)
      GO TO 15
C
C  DECODE DATA BLOCK 02 -- FLIGHT PATH INPUT, TRANSLATION, ROTATION,
C                          AND INTERPOLATION
C     SUGGEST SECTION ON TAPE9 BE RE-WRITTEN FOR COMPATIBILITY WITH
C         ASD FLIGHT PATH PROGRAMS.  SEE P-1127, FOR EXAMPLE.
C
  102 DECODE(78,1028,ICARD)JMODE,KMODE,TMIN,TMAX,DTFPA,XR,YR,XT,YT,PSI,
     1 ZT
C     THIS CARD WAS ADDED
      IF2=1
      TMAX=TMAX-TMIN
      TM=0.0
      T2=-1.0
      NFPA=0
      K=0
      PZI=PSI*RADIAN
      T13=SP=SIN(PZI)
      T33=CP=COS(PZI)
      LINE=66
      IF(JMODE)5,5,1
    1 ASSIGN 4 TO IEOF
      ASSIGN 3 TO IERR
      IF(JMODE.GT.IFILE)GO TO 2
      REWIND 9
      IFILE=1
      GO TO 4
    2 IFILE=IFILE+1
    3 READ(9)
```

```
      IF (EOF(9).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(9).NE.0.) GO TO IERR,(3,28,9996)
      GO TO 3
    4 IF(JMODE.GT.IFILE)GO TO 2
      ASSIGN 9999 TO IEOF
      ASSIGN 28 TO IERR
      READ (9)
      IF (EOF(9).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(9).NE.0.) GO TO IERR,(3,28,9996)
   28 ASSIGN 9996 TO IERR
      JMODE=6
    5 T1=T2
      X1=X2
      Y1=Y2
      Z1=Z2
      P1=P2
      A1=A2
      B1=B2
      V1=V2
      VX1=VX2
      VY1=VY2
      VZ1=VZ2
      IF(JMODE)6,6,7
    6 READ(INUNIT,1000)T2,X,Y,Z,VX,VY,VZ2,B2,A2,P2
      IF (EOF(INUNIT).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(INUNIT).NE.0.) GO TO IERR,(3,28,9996)
      B2=B2*RADIAN
      A2=A2*RADIAN
      P2=P2*RADIAN
      V2=SQRT(VX*VX+VY*VY+VZ2*VZ2)
      GO TO 9
    7 JMODE=JMODE+1
      IF(JMODE.LE.6)GO TO 8
      JMODE=1
      READ(9)TEMP
      IF (EOF(9).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(9).NE.0.) GO TO IERR,(3,28,9996)
    8 T2 =TEMP( 1,JMODE)
      X  =TEMP( 2,JMODE)
      Y  =TEMP( 3,JMODE)
      Z  =TEMP( 4,JMODE)
      VX =TEMP( 5,JMODE)
      VY =TEMP( 6,JMODE)
      VZ2=TEMP( 7,JMODE)
      V2 =TEMP(11,JMODE)
      B2 =TEMP(13,JMODE)
      A2 =TEMP(14,JMODE)
      P2 =TEMP(15,JMODE)
```

```
    9 X2=XT+(X-XR)*CP+(Y-YR)*SP
      Y2=YT+(Y-YR)*CP-(X-XR)*SP
      Z2=ZT+Z
      VX2=VX*CP+VY*SP
      VY2=VY*CP-VX*SP
      B2=ANGLIM(B2-PZI)
      T2=T2-TMIN
   10 IF(TM.GT.T2)GO TO 5
      F=(TM-T1)/(T2-T1)
      NFPA=NFPA+1
      XFPA(NFPA)=X1+F*(X2-X1)
      YFPA(NFPA)=Y1+F*(Y2-Y1)
      ZFPA(NFPA)=Z1+F*(Z2-Z1)
      VXFPA(NFPA)=VX1+F*(VX2-VX1)
      VYFPA(NFPA)=VY1+F*(VY2-VY1)
      VZFPA(NFPA)=VZ1+F*(VZ2-VZ1)
      V=V1+F*(V2-V1)
      BFPA(NFPA)=ANGLIM(B1+F*ANGLIM(B2-B1))
      AFPA(NFPA)=A1+F*(A2-A1)
      PFPA(NFPA)=ANGLIM(P1+F*ANGLIM(P2-P1))
      K=K-1
      IF(K)34,34,35
   34 K=KMODE
      PHI=DEGREE*PFPA(NFPA)
      BETA=DEGREE*BFPA(NFPA)
      ALFA=DEGREE*AFPA(NFPA)
      CALL PAGES(1,2,JP)
      IF (JP.EQ.0) WRITE (6,1003)
      WRITE(6,1004)TM,XFPA(NFPA),YFPA(NFPA),ZFPA(NFPA),
     1             V,VXFPA(NFPA),VYFPA(NFPA),VZFPA(NFPA),BETA,ALFA,PHI
   35 TM=DTFPA*FLOAT(NFPA)
      IF(TM.LE.TMAX)GO TO 10
      TMAX=TM-DTFPA-FUZZ
      CALL PAGES(4,0,JP)
      WRITE(6,1005)XR,YR,XT,YT,PSI,ZT
      CALL TPLOT(NFPA)
      IF(JMODE.GT.0 .OR. INUNIT.EQ.8)GO TO 12
      ASSIGN 12 TO IEOF
   13 READ(INUNIT,1000)
      IF (EOF(INUNIT).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(INUNIT).NE.0.) GO TO IERR,(3,28,9996)
      GO TO 13
C
C   DECODE DATA BLOCK 03 -- WEAPON LOCATION
C
  103 DECODE(30,1008,ICARD)XGUN,YGUN,ZGUN
      GO TO 12
C
```

```
C  DECODE DATA BLOCK 04 -- WEAPON TYPE, MODE, NUMBER OF BARRELS (CYCLIC
C                         AND SIMULTANEOUS), NUMBER OF WEAPONS PER
C                         LOCATION, RADIUS OF CIRCLE OF WEAPON COMPLEX
C
  104 DECODE(14,1009,ICARD)IGT,IEM,ICB,ISB,IGL,CIRCLE
      IF(IGL-1)9998,61,66
   61 XG(1)=0.0
      YG(1)=0.0
      GO TO 12
   66 DO 16 I=1,IGL
      F=PI2*FLOAT(I)/FLOAT(IGL)
      XG(I)=CIRCLE*COS(F)
   16 YG(I)=CIRCLE*SIN(F)
      GO TO 12
C
C  DECODE DATA BLOCK 05 -- WEAPON DENSITY FACTORS
C
  105 DECODE(78,1015,ICARD)IF5,NRHOS,(RHO(I),I=1,NRHOS)
      GO TO 12
C
C  DECODE DATA BLOCK 06 -- PK ACCRUAL TIME INTERVALS
C
  106 DECODE(78,1015,ICARD)IF6,NTINTS,(TINTER(I),I=1,NTINTS)
      NTINTS=NTINTS+1
      TINTER(NTINTS)=999.99
      GO TO 12
C
C  DECODE DATA BLOCK 07 -- AIRCRAFT VULNERABLE AREAS
C
  107 DO 11 I=1,8
   11 IVACOM(I)=ICARD(I)
      READ(INUNIT,1000)(VAT(1,1,K),K=2,9)
      IF (EOF(INUNIT).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(INUNIT).NE.0.) GO TO IERR,(3,28,9996)
      DO 88 J=2,4
      DO 89 I=1,8
      READ (INUNIT,1000) (VAT(I,J,K),K=2,9)
      IF (EOF(INUNIT).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(INUNIT).NE.0.) GO TO IERR,(3,28,9996)
   89 CONTINUE
      DO 88 K=2,9
   88 VAT(9,J,K)=VAT(1,J,K)
      READ(INUNIT,1000)(VAT(1,5,K),K=2,9)
      IF (EOF(INUNIT).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(INUNIT).NE.0.) GO TO IERR,(3,28,9996)
      DO 18 K=2,9
      DO 18 I=2,9
      VAT(I,5,K)=VAT(1,5,K)
```

```
   18 VAT(I,1,K)=VAT(1,1,K)
      IF7=1
      GO TO 12
C
CC  DECODE DATA BLOCK 08 -- WEAPON REACTION AND TRACK TIMES
C
  108 DECODE(30,1008,ICARD)TREACT,TRACK1,TRACK2
      GO TO 12
C
CC  DECODE DATA BLOCK 09 -- WEAPON PARAMETERS
C
  109 DECODE(78,1008,ICARD)TROUND(IGT),THDMAX(IGT),PHDMAX(IGT),
     1          PHIMIN(IGT),PHIMAX(IGT),VELMIN(IGT),VELMAX(IGT),
     2          RANMIN(IGT),RANMAX(IGT)
      READ(INUNIT,1000)ATLAG(IGT),ETHMAX(IGT),EPHMAX(IGT),RMODES(IGT)
      IF (EOF(INUNIT).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(INUNIT).NE.0.) GO TO IERR,(3,28,9996)
      IF9=1
      GO TO 12
C
CC  DECODE DATA BLOCK 10 -- SHELL PARAMETERS
C
  110 DECODE(46,1008,ICARD)TFMAX1(IGT),TFMAX2(IGT),RVACON(IGT),
     1          RVBCON(IGT),VMUZEL(IGT)
      IF9=1
      GO TO 12
C
CC  DECODE DATA BLOCK 11 -- INPUT OPTION (CARD/TAPE)
C
  111 DECODE(4,1028,ICARD)I
      IF(I)81,81,82
   81 INUNIT=5
      GO TO 15
   82 INUNIT=8
      ASSIGN 83 TO IEOF
      IF(I.GT.JFILE)GO TO 84
      REWIND 8
      JFILE=1
   83 IF(I-JFILE)12,12,84
   84 JFILE=JFILE+1
   85 READ(8,1000)
      IF (EOF(8).NE.0.) GO TO 83
      IF (IOCHEC(8).NE.0.) GO TO IERR,(3,28,9996)
      GO TO 85
C
CC     DECODE DATA BLOCK 13  --- LOW ALTITUDE RADAR MULTIPATH EFFECT
C
  113 DECODE(18,1038,ICARD) IMUL,IRMP,REFC
```

```
      IF(IMUL.EQ.0) GO TO 12
      CALL PAGES(12,0,JP)
      WRITE(6,1098) IRMP,REFC
 1098 FORMAT(///,* MULTIPATH INPUTS (INITIAL OR CHANGED *,//,
     0* IRMP =      *,I5,/,
     1* REFC =      *,F6.3,///)
      GO TO 12
C
C     DECODE DATA BLOCK 14 --- ECM
C
  114 SD2RJ = 0.
      SC2RJ = 0.
      DECODE(78,1041,ICARD) IJAM,IP,IJ,GAINJ,PJW,PLEN,IX,XSEC,CALX,
     *                      IRECM,SJTMAX
      IF(IJAM.EQ.0) GO TO 12
      CALL PAGES(28,0,JP)
      WRITE(6,1096) IP,IJ,GAINJ,PJW,PLEN,IX,XSEC,CALX,IRECM,SJTMAX
 1096 FORMAT(///,* ECM INPUTS (INITIAL OR CHANGED) *,//,
     0* IP =        *,I5,/,
     1* IJ =        *,I5,/,
     2* GAINJ(DB) =*,F7.2,/,
     3* PJW(W) =   *,F9.2,/,
     4* PLEN(S) =  *,E12.6,/,
     5* IX =        *,I5,/,
     6* XSEC(SQM) =*,F10.3,/,
     7* CALX =      *,F10.3,/,
     8* IRECM =     *,I5,/,
     9* SJTMAX(DB) =*,F7.2,///)
      CALL ECM1
      IF(IRECM.EQ.3) CALL JAMER1(PLEN,SC2RJM)
      IF(IEM.EQ.4) CALL JAMER1(PLEN,SD2RJM)
      GO TO 12
C
C  DECODE DATA BLOCK 12 -- PRINT OPTIONS FOR OUTPUT FORMAT - ALSO
C                          SIGNALS FOR RUN TO BEGIN
C
  112 DECODE(6,1016,ICARD)IPRINT
C
C  PRINT DATA BLOCKS 6, 7, 9, AND 10 (IF THEY CHANGE)
C     "IF2" IS USED TO SET LINE COUNT TO PROPER VALUE.  INPUT AND
C         OUTPUT PRINT OUT START A NEW PAGE FOR EACH "12" CARD.
C
      IF (IF2.EQ.0) LINE = 66
      IF2=0
      IF(IJAM.EQ.0) GO TO 48
      IF(IP.EQ.0) GO TO 48
      WRITE(11,1043) ITITLE
      WRITE(11,1042)
```

```
      WRITE(11,1001) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
      WRITE(11,1045)
   48 CONTINUE
      IF(IF5.EQ.0)GO TO 97
      CALL PAGES(5,0,JP)
      WRITE(6,1029)NRHOS,(RHO(I),I=1,NRHOS)
      IF5=0
   97 IF(IF6.EQ.0)GO TO 98
      CALL PAGES(5,0,JP)
      WRITE(6,1011)NTINTS,(TINTER(I),I=1,NTINTS)
      IF6=0
   98 IF(IF7.EQ.0)GO TO 99
      CALL PAGES(7,0,JP)
      WRITE(6,1010)IVACCM
      DO 19 N=1,26
      J=(N+14)/8
      I=15+N-J*8
      CALL PAGES(1,7,JP)
      IF (JP.EQ.0) WRITE (6,1010) IVACCM
   19 WRITE(6,1026)N,(VAT(I,J,K),K=2,9)
      IF7=0
   99 IF(IF9.EQ.0)GO TO 87
      CALL PAGES(10,0,JP)
      WRITE(6,1025)
      DO 86 I=1,6
      01=PHIMIN(I)*DEGREE
      02=PHIMAX(I)*DEGREE
      03=THDMAX(I)*DEGREE
      04=PHDMAX(I)*DEGREE
      07=ETHMAX(I)*DEGREE
      08=EPHMAX(I)*DEGREE
   86 WRITE(6,1012)I,TROUND(I),01,02,03,04,TFMAX1(I),TFMAX2(I),VMUZEL(I)
     1,RVACON(I),RVBCON(I),VELMIN(I),VELMAX(I),RANMIN(I),RANMAX(I)
     2,ATLAG(I),07,08
      IF9=0
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                          C
C                SSSS   EEEEE  TTTTT  U   U  PPPP                         C
C               S       E        T    U   U  P   P                        C
C                SSS    EEEE     T    U   U  PPPP                         C
C                   S   E        T    U   U  P                            C
C               SSSS    EEEEE    T     UUU   P                            C
C                                                                          C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
   87 NROUND=0
      IF(IMUL.EQ.1 .AND. IEM.NE.3) GO TO 9994
      IF(IJAM.EQ.1 .AND. (IEM.EQ.1 .OR. IEM.EQ.2)) GO TO 9995
      CPS=1.0
```

```
      DO 14 I=1,NTINTS
      PTOTFF(I)=0.0
   14 PTOTTI(I)=0.0
      DO 27 I=1,32
      DO 27 J=1,8
   27 SPKT2(I,J)=0.0
      TPERS=TROUND(IGT)/FLOAT(IGL*ICB)
      IF(IEM.GT.1)GO TO 90
      TFMAX=TFMAX1(IGT)
      TTRACK=TRACK1
      GO TO 91
   90 TFMAX=TFMAX2(IGT)
      TTRACK=TRACK2
      VXES=VYES=VZES=0.0
   91 TIME=TMIN
      TFIRE= TMIN+TTRACK
      IF(TFIRE.GT.TMAX)GO TO 69
      TTFMAX=1.2*TFMAX
      ATLCON=0.125/ATLAG(IGT)
      EMDTA=EXP(-0.512*ATLCON)
      ETMAX=ETHMAX(IGT)
      EPMAX=EPHMAX(IGT)
      VMUZZ=VMUZEL(IGT)
      TDMAX=THDMAX(IGT)
      PDMAX=PHDMAX(IGT)
      PHMIN=PHIMIN(IGT)
      PHMAX=PHIMAX(IGT)
      ASHCON=RVACCN(IGT)
      BSHCON=RVBCON(IGT)
      RSMODE=RMODES(IGT)
      RMIN =RANMIN(IGT)
      RMAX =RANMAX(IGT)
      VMIN=VELMIN(IGT)
      VMAX=VELMAX(IGT)
      IG=1
      LINE=66
      IF (IPRINT(6).LE.0) GO TO 60
      CALL PAGES(5,0,JP)
      WRITE (6,1013) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C                TTTTT  RRRR      A      CCC   K   K                  C
C                  T    R   R    A A    C   C  K  K                   C
C                  T    RRRR    A   A   C      K K                    C
C                  T    R  R    AAAAA   C   C  K  K                   C
C                  T    R   R   A   A    CCC   K   K                  C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
```

```
C
CC  COMPUTE ACTUAL AIRCRAFT PARAMETERS AT FIRE TIME FOR USE IN ERROR EQS
C
   60 CALL INTERP(TIME/DTFPA)
      X=GETVAL(XFPA)-XGUN
      Y=GETVAL(YFPA)-YGUN
      Z=GETVAL(ZFPA)-ZGUN
      VX=GETVAL(VXFPA)
      VY=GETVAL(VYFPA)
      VZ=GETVAL(VZFPA)
      ILOOP = ILOOP+1
      ROL = GETVAL(PFPA)
      PIT = GETVAL(AFPA)
      HDG = GETVAL(BFPA)
      G2=X*X+Y*Y
      G=SQRT(G2)
      THET=ATAN2(Y,X)
      PHIT=ATAN2(Z,G)
C
CC      IF MULTIPATH HAS BEEN SPECIFIED(IMUL=1) AND THE ELEVATION
CC      ANGLE IS MEASURED BY RADAR(IOEM=3), COMPUTE THE ELEVATION
CC      TRACKING BIAS(PBMP),VARIANCE(SP2MP),AND APPARENT TARGET
CC      ALTITUDE(Z).
C
      SP2MP = 0.
      PBMP = 0.
      IF(IMUL.NE.1 .OR. IOEM.NE.3) GO TO 30
      CALL MULPTH(IRMP,REFC,PHIT,PBMP,SP2MP)
      PHIT = PHIT+PBMP
      Z = G*TAN(PHIT)
   30 CONTINUE
      R = SQRT(G2+Z*Z)
      RD=(X*VX+Y*VY+Z*VZ)/R
      TD=(X*VY-Y*VX)/G2
      PD=(VZ-Z*RD/R)/G
      IF(TIME.GT.TMIN) GO TO 58
      RDD=TDD=PDD=0.0
      RANS=R
      THES=THET
      PHIS=PHIT
      ERAN2=ERAN3=ERAN4=ETHE2=ETHE3=ETHE4=EPHI2=EPHI3=EPHI4=0.0
      GO TO 59
   58 RDD=(RD-RDS)/.064
      TDD=(TD-TDS)/.064
      PDD=(PD-PDS)/.064
C
CC      (STORE PREVIOUSLY OBSERVED MEAN TRACKING ERRORS FOR USE IN MEAN
C        TRACKING ERROR EQUATIONS)
```

```
C
   59 ERAN1=ERAN2
      ERAN2=ERAN3
      ERAN3=ERAN4
      ERAN4=R-RANS
      ERAN=ERAN1+.71875*(ERAN2-ERAN1)
      ETHE1=ETHE2
      ETHE2=ETHE3
      ETHE3=ETHE4
      ETHE4=(G/R)*ANGLIM(THET-THES)
      ETHE=ETHE1+.71875*(ETHE2-ETHE1)
      EPHI1=EPHI2
      EPHI2=EPHI3
      EPHI3=EPHI4
      EPHI4=PHIT-PHIS
      EPHI=EPHI1+.71875*(EPHI2-EPHI1)
C       CHECK  MASK  ANGLE
      IF(PHIT.LE.AMASK)   TFIRE= TIME+ TREACT+TTRACK
CCC
CCC   (SKIP FIRE ATTEMPT IF INSUFFICIENT TRACKING TO FIRE)
CCC
      IF(TIME.LE.TFIRE)GO TO 62
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C                FFFFF  IIIII  RRRR   EEEEE                           C
C                F        I    R   R  E                               C
C                FFFF     I    RRRR   EEEE                            C
C                F        I    R  R   E                               C
C                F      IIIII  R   R  EEEEE                           C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
      VG=SQRT(VX*VX+VY*VY)
      V =SQRT(VG*VG+VZ*VZ)
      PSI=ANGLIM(PFPA(INDEX1)+FRACT*ANGLIM(PFPA(INDEX2)-PFPA(INDEX1)))
C
CCC   (SKIP FIRE ATTEMPT IF MAX ALLOWED TRACKING ERROR IS EXCEEDED)
C
   54 IF(ABS(ETHE4).GT.ETMAX)GO TO 64
      IF(ABS(EPHI4).GT.EPMAX)GO TO 64
      IF(IOEM.GT.1)GO TO 56
C
CCC   (LIMIT INPUT RANGE ESTIMATE)
C
      RC=AMAX1(RMIN,AMIN1(RMAX,RANS-0.575*RD))
C
CCCC  COMPUTE MEAN ASSUMED TIME OF FIRE AIRCRAFT POSITION (MECHANICAL
CCCC   COMPUTATION)
C
```

```
      XF=RC*CTBCPB-XG(IG)
      YF=RC*STBCPB-YG(IG)
      ZF=RC*SPB
      GF=SQRT(XF*XF+YF*YF)
      RF=SQRT(GF*GF+ZF*ZF)
C
CC    (SET UP MATRIX T, THE TRANSFORMATION BETWEEN THE LINE OF SIGHT
CC     SYSTEM AND THE FALSE HORIZON SYSTEM)
C
      T22=CT=X/G
      ST=Y/G
      T33=CP=G/R
      T13=SP=Z/R
      CS=COS(PSI)
      SS=SIN(PSI)
      CA=VG/V
      SA=VZ/V
      CG=VX/VG
      SG=VY/VG
      T11=CT*CP
      T12=ST*CP
      T21=-ST
      T31=-CT*SP
      T32=-ST*SP
C
CC    (SET UP FALSE HORIZON SYSTEM VELOCITY COMPONENTS)
C
      VXP=T11*VX+T12*VY+T13*VZ
      VYP=T21*VX+T22*VY
      VZP=T31*VX+T32*VY+T33*VZ
      VGP=SQRT(VXP*VXP+VYP*VYP)
      CAP=VGP/V
      SAP=VZP/V
      CBP=VXP/VGP
      SBP=VYP/VGP
C
CC    (SET UP UNIT VECTOR OUT LEFT WING OF AIRCRAFT)
C
      UX=-SA*CG*SS-SG*CS
      UY= CG*CS-SA*SG*SS
      UZ= CA*SS
      UZP=T31*UX+T32*UY+T33*UZ
      IF(VXP)31,32,31
   32 CSP=-T11*UX-T12*UY-T13*UZ
      GO TO 33
   31 CSP=(VGP*(T21*UX+T22*UY)+UZP*VZP*SBP)/VXP
   33 SSP=UZP/CAP
C
```

```
C      (COMPUTE FALSE HORIZON SYSTEM MEAN AND STANDARD DEVIATION OF
CC      ERROR IN DIVE AND COURSE ANGLE ESTIMATES)
C
       EMAP=SAP*(.3196*ABS(CBP)-.1859*ABS(SBP))
       ESAP=.04712+.08063*ABS(SAP)*(1.0+1.16*ABS(CBP))
       EMBP=.4060*CAP*SBP*CBP
       ESBP=(.1670-.08098*ABS((CBP*CBP-SBP*SBP)*CSP)+
      1       .09006*ABS(SBP*SSP*CSP))/CAP
       SEMAP=SIN(EMAP)
       CEMAP=COS(EMAP)
       SEMBP=SIN(EMBP)
       CEMBP=COS(EMBP)
C      THE NEXT CARD ELIMINATES AN EQUIVALENCE BY USING A DOUBLE
C          REPLACEMENT.
       A33=SABP=SAP*CEMAP+CAP*SEMAP
       CABP=CAP*CEMAP-SAP*SEMAP
       SBBP=SBP*CEMBP+CBP*SEMBP
       CBBP=CBP*CEMBP-SBP*SEMB
C
CC     (LIMIT VELOCITY ASSESSMENT (MECHANICAL COMPUTERS))
C
       VBP=AMIN1(VMAX,AMAX1(VMIN,V))
       ESVP=ESVPCT*V
C
CCC    SET UP THE ELEMENTS OF THE MATRIX A.
CCC    A CONTAINS THE PARTIALS OF VXE,VYE,VZE W.R.T. ALPHA,BETA,SPEED
C
       A31=CABP*CBBP
       A32=CABP*SBBP
       A21=-VBP*A32
       A22= VBP*A31
       A11=-VBP*SABP*CBBP
       A12=-VBP*SABP*SBBP
       A13= VBP*CABP
C
CC     COMPUTE MEAN ESTIMATED VELOCITY COMPONENTS (MECHANICAL
CC      COMPUTATION)
C
       VXE=(A31*T11+A32*T21+A33*T31)*VBP
       VYE=(A31*T12+A32*T22+A33*T32)*VBP
       VZE=(A31*T13         +A33*T33)*VBP
       GO TO 63
C
CC     COMPUTE MEAN ASSUMED TIME OF FIRE AIRCRAFT POSITION (ELECTRONIC
C       COMPUTATION)
C
   56  XF=RANS*CTBCPB
       YF=RANS*STBCPB
```

```
      ZF=RANS*SPB
      GF=RANS*CPB
      RF=RANS
C
CC    ITERATION TO DETERMINE MEAN THEORETICAL INTERCEPT POINT
C
   63 RS=0.0
      VS=VMUZZ
      T=0.0
   21 XE=XF+VXE*T
      YE=YF+VYE*T
      ZE=ZF+VZE*T
      XE2=XE*XE
      YE2=YE*YE
      ZE2=ZE*ZE
      GE2=XE2+YE2
      RE2=GE2+ZE2
      RE=SQRT(RE2)
      RC=RE-RS
      IF(RC.LT.1.C)GO TO 22
      VD=VS-(XE*VXE+YE*VYE+ZE*VZE)/RE
      IF(VD.LE.1.C)GO TO 64
      T=T+RC/VD
      IF(T.GT.TTFMAX)GO TO 64
      RS=RSHELL(T)
      VS = VSHELL(T)
      GO TO 21
   22 T2=T*T
C
CC       CHANGE   22 JAN  76
CC         IF INTERCEPT POINT BELOW MASK*****SKIP FIRE
C
      GE= SQRT(GE2)
      IF(ATAN2(ZE,GE).LE. AMASK)  GO  TO 64
C
CC    ITERATION TO DETERMINE ACTUAL INTERCEPT POSITICN, RANGE, AND TIME
C
      TU=AMIN1(TFMAX,TMAX-TIME)
   23 CALL RPLANE(TU)
      IF(RSHELL(TU).GT.RA)GO TO 24
C
CC       (SKIP FIRE ATTEMPT IF SHELL CANNCT CATCH AIRCRAFT)
C
      IF((XA*GETVAL(VXFPA)+YA*GETVAL(VYFPA)+ZA*GETVAL(VZFPA))/RA .LT.
     1    VSHELL(TU))GO TO 64
      TU=TU-1.0
      IF(TU)64,64,23
   24 TL=0.0
```

```
   25 T=0.5*(TL+TU)
      CALL RPLANE(T)
      RC=RA-RSHELL(T)
      IF(RC.GT.1.0)GO TO 26
      IF(RC.GT.-1.0)GO TO 37
      TU=T
      GO TO 25
   26 TL=T
      GO TO 25
   37 QO=VS*RE-XE*VXE-YE*VYE-ZE*VZE
      Q1=(VZE-VS*ZE/RE)/QO
      Q2=(XE*VYE-YE*VXE)/QO
C
CC    COMPUTE THE PARTIAL DERIVATIVES OF BIG THETA
C
      DTTDX=Q2*XE-YE
      DTTDY=Q2*YE+XE
      DTTDZ=Q2*ZE
      DTTDR=(ZF*DTTDZ+ YF*DTTDY+XF*DTTDX)/RF
      DTTDT=           XF*DTTDY-YF*DTTDX
      DTTDP= GF*DTTDZ-(YF*DTTDY+XF*DTTDX)*ZF/GF
C
CC    COMPUTE THE PARTIAL DERIVATIVES OF BIG PHI
C
      DPPDX=Q1*XE
      DPPDY=Q1*YE
      DPPDZ=Q1*ZE+1.0
      DPPDR=(ZF*DPPDZ+ YF*DPPDY+XF*DPPDX)/RF
      DPPDT=           XF*DPPDY-YF*DPPDX
      DPPDP= GF*DPPDZ-(YF*DPPDY+XF*DPPDX)*ZF/GF
      GE4=GE2*GE2
      GO TO (210,220,230,240),IOEM
C
CC  COMPUTATIONS FOR MODE 1 OPERATION
C
  210 GO TO (211,212,213,214,215,999),IGT
C
CC    TRACKING ERROR DISTRIBUTION SIZES (SPHERICAL COORDINATES)
CC    (FOR GT 1, 2, OR 3)
C
  211 CONTINUE
  212 CONTINUE
  213 SR2=(123.0+0.0225*R)**2
      ST2=(.0643*TD)**2
      SP2=(.1320*PD)**2
      GO TO 219
C
C     (FOR GT 4 AND 5)
```

```
C
  214 CONTINUE
  215 SR2=(123.0+0.0225*R)**2
      ST2=(0.0167-.000710/(.0517+ABS(TD)))**2
      SP2=(0.0116-.000216/(.0235+ABS(ABS(PD)-4.0*PDD)))**2
C
CC    SET UP THE ELEMENTS OF THE MATRIX B=AT
C
  219 B11=A11*T11+A12*T21+A13*T31
      B12=A11*T12+A12*T22+A13*T32
      B13=A11*T13         +A13*T33
      B21=A21*T11+A22*T21
      B22=A21*T12+A22*T22
      B23=A21*T13
      B31=A31*T11+A32*T21+A33*T31
      B32=A31*T12+A32*T22+A33*T32
      B33=A31*T13         +A33*T33
C
CC    COMPUTE THE PARTIAL DERIVATIVES OF BIG THETA AND BIG PHI W.R.T.
CC    ON CARRIAGE INPUTS (ALPHA, BETA, SPEED)
C
      DTTDAP=B11*DTTDX+B12*DTTDY+B13*DTTDZ
      DTTDBP=B21*DTTDX+B22*DTTDY+B23*DTTDZ
      DTTDVP=B31*DTTDX+B32*DTTDY+B33*DTTDZ
      DPPDAP=B11*DPPDX+B12*DPPDY+B13*DPPDZ
      DPPDBP=B21*DPPDX+B22*DPPDY+B23*DPPDZ
      DPPDVP=B31*DPPDX+B32*DPPDY+B33*DPPDZ
C
CC    COMPUTE THE VARIANCES OF BIG THETA AND BIG PHI
C
      STT2=((DTTDR**2)*SR2  +(DTTDT**2)*ST2  +(DTTDP**2)*SP2
     1     +((DTTDAP*ESAP)**2+(DTTDBP*ESBP)**2+(DTTDVP*ESVP)**2)*T2)/GE4
      SPP2=((DPPDR**2)*SR2  +(DPPDT**2)*ST2  +(DPPDP**2)*SP2
     1     +((DPPDAP*ESAP)**2+(DPPDBP*ESBP)**2+(DPPDVP*ESVP)**2)*T2)/GE2
      GO TO 29
C
CC  COMPUTATIONS FOR MODE 2, 3, OR 4 OPERATION
C
  220 GO TO (999,999,223,999,225,226),IGT
C
CC    TRACKING ERROR DISTRIBUTIONS SIZES (SPHERICAL COORDINATES)
CC    (FOR MODE 2)
C
  223 CONTINUE
  225 CONTINUE
  226 SR2=(41.0+0.0075*R)**2
      ST2=(.000982+.1681*TD*TD)**2
      SP2=(.000491+.033*ABS(ABS(PD)-4.0*PDD))**2
```

```
      GO TO 65
  230 GO TO (999,999,233,999,235,236),IGT
C
CC        (FOR MODE 3)
C
  233 CONTINUE
  235 CONTINUE
  236 SR2=(17.0+0.24*ABS(RDD)+0.018*RDD*RDD)**2+SD2RJ
      ST2=(0.00196+0.050*TD)**2
      SP2=(0.000982+0.11*ABS(ABS(PD)-2.0*PDD))**2+SP2MP
      GO TO 65
  240 GO TO (999,999,243,999,245,246),IGT
C
CC        (FOR MODE 4)
C
  243 CONTINUE
  245 CONTINUE
  246 SR2=(17.0+0.24*ABS(RDD)+0.018*RDD*RDD)**2+SD2RJ
      ST2=(0.000982+0.1681*TD*TD)**2
      SP2=(0.000491+0.033*ABS(ABS(PD)-4.0*PDD))**2+SP2MP
C
   65 RBTD=RANS*THESD
      RBPD=RANS*PHISD
C
CC        VELOCITY COMPONENT ERROR DISTRIBUTION SIZES
C
      SVX2=(SR2*(PHISD*CTBSPB+THESD*STBCPB)**2
     1      +ST2*(RBPD*STBSPB-RBTD*CTBCPB-RANSD*STBCPB)**2
     2      +SP2*(RBPD*CTBCPB-RBTD*STBSPB+RANSD*CTBSPB)**2)*ATLCON
      SVY2=(SR2*(PHISD*STBSPB-THESD*CTBCPB)**2
     1      +ST2*(RBPD*CTBSPB+RBTD*STBCPB-RANSD*CTBCPB)**2
     2      +SP2*(RBPD*STBCPB+RBTD*CTBSPB+RANSD*STBSPB)**2)*ATLCON
      SVZ2=(SR2*(PHISD*CPB)**2+SP2*(RBPD*SPB-RANSD*CPB)**2)*ATLCON
C
CC        COMPUTE THE VARIANCES OF BIG THETA AND BIG PHI
C
      STT2=((DTTDR**2)*SR2 +(DTTDT**2)*ST2 +(DTTDP**2)*SP2
     1    +((DTTDX**2)*SVX2+(DTTDY**2)*SVY2+(DTTDZ**2)*SVZ2)*T2)/GE4
     1+SD2J
      SPP2=((DPPDR**2)*SR2 +(DPPDT**2)*ST2 +(DPPDP**2)*SP2
     1    +((DPPDX**2)*SVX2+(DPPDY**2)*SVY2+(DPPDZ**2)*SVZ2)*T2)/GE2
     1+SD2J
C
CC   COMPUTATION OF VULNERABLE AREA OF AIRCRAFT AT INTERCEPT
C
   29 VP=VSHELL(T)
      XU=XE/RE
      YU=YE/RE
```

```
      ZU=ZE/RE
      XE=XU*RA
      YE=YU*RA
      ZE=ZU*RA
      GE=SQRT(XE*XE+YE*YE)
      VXA=GETVAL(VXFPA)
      VYA=GETVAL(VYFPA)
      VZA=GETVAL(VZFPA)
      VGA=SQRT(VXA*VXA+VYA*VYA)
      VA =SQRT(VGA*VGA+VZA*VZA)
      VXI=VP*XU-VXA
      VYI=VP*YU-VYA
      VZI=VP*ZU-VZA
      VI=SQRT(VXI*VXI+VYI*VYI+VZI*VZI)
      ALFA=GETVAL(AFPA)
      CA=COS(ALFA)
      SA=SIN(ALFA)
      BETA=BFPA(INDEX1)+FRACT*ANGLIM(BFPA(INDEX2)-BFPA(INDEX1))
      CG=COS(BETA)
      SG=SIN(BETA)
      PZI=PFPA(INDEX1)+FRACT*ANGLIM(PFPA(INDEX2)-PFPA(INDEX1))
C     THE NEXT CARDS ELIMINATE AN EQUIVALENCE BY USING A DOUBLE
C          REPLACEMENT.
      T33=CP=COS(PZI)
      T13=SP=SIN(PZI)
      Q1=VXI*CG+VYI*SG
      Q2=VZI*CA-Q1*SA
      Q3=VYI*CG-VXI*SG
      VXF=Q1*CA+VZI*SA
      VYF=Q2*SP+Q3*CP
      VZF=Q2*CP-Q3*SP
C
C     (SET UP INDICES FOR VULNERABLE AREA INTERPOLATION)
C
      F1=ATAN2(VYF,VXF)/QTRPI
      IF(F1.LT.0.0)F1=F1+8.0
      I1=F1
      F1=F1-FLOAT(I1)
      I1=I1+1
      F2=ACOS(VZF/VI)/QTRPI
      I2=F2
      F2=F2-FLOAT(I2)
      I2=I2+1
      F3=AMIN1(7.999999999,VI/152.4)
      I3=F3
      F3=F3-FLOAT(I3)
      I3=I3+1
      D1=1.0-F1
```

```
      D2=1.0-F2
      D3=1.0-F3
      J1=I1+1
      J2=I2+1
      J3=I3+1
C
CCC   (PERFORM LINEAR THREE DIMENSIONAL INTERPOLATION)
C
      AVT=D3*(D2*(D1*VAT(I1,I2,I3)+F1*VAT(J1,I2,I3))+
     1          F2*(D1*VAT(I1,J2,I3)+F1*VAT(J1,J2,I3)))+
     2     F3*(D2*(D1*VAT(I1,I2,J3)+F1*VAT(J1,I2,J3))+
     3          F2*(D1*VAT(I1,J2,J3)+F1*VAT(J1,J2,J3)))
C
CCC SET UP DISTRIBUTION SIZES OF OTHER SOURCES OF RANDOM ERROR
C
      SVA=XU*VXA+YU*VYA+ZU*VZA
      CVA2=VA*VA-SVA*SVA
      VMQ=.99*VMUZZ/RA-ASHCON
      DTI=(VMQ-SQRT(VMQ*VMQ-4.0*BSHCON))/(2.0*BSHCON)-T
      SLXMV2=CVA2*(DTI*VP/(VP-SVA/.99))**2
      SLYFR2=(0.010*VA*T)**2
      SLXFR2=SLYFR2*(1.0+CVA2/(VP-SVA)**2)
      SAOAP2=(0.003*RA)**2
      SAOGJ2=(0.005*RA)**2
      SAOBD2=(BDACCN(IGT)*RA)**2
      IF(IOEM.EQ.1)GO TO 68
      SAOPE2=(0.002*RA)**2
      GO TO 67
   68 SAOPE2=(V*V-((X*VX+Y*VY+Z*VZ)/R)**2)*
     1       RA2*(0.0001463-7.478E-11*(R-1386.0)**2)**2
   67 CDIST=SAOAP2+SAOGJ2+SAOPE2+SAOBD2
C
CCC CCMBINE ALL ERRORS INTO CNE DISTRIBUTION, COMPUTE BIAS
C
      SXA2=STT2*RA2
      SYA2=SPP2*RA2
      SXL2=CDIST+SLXMV2+SLXFR2
      SYL2=CDIST+SLYFR2
      CTT=XE/GE
      STT=YE/GE
      CPP=GE/RE
      SPP=ZE/RE
      BXA=XA*STT-YA*CTT
      BYA=ZA*CPP-(YA*STT+XA*CTT)*SPP
      BXA2=BXA*BXA
      BYA2=BYA*BYA
      VAM=VXA*STT-VYA*CTT
      VAP=VZA*CPP-(VYA*STT+VXA*CTT)*SPP
```

```
      VAM2=VAM*VAM
      VAP2=VAP*VAP
      VAI2=VAM2+VAP2
      CD2=VAM2/VAI2
      SD2=VAP2/VAI2
      SXAT2=SXA2+CD2*SXL2+SD2*SYL2
      SYAT2=SYA2+CD2*SYL2+SD2*SXL2
      TWOCOV=2.0*VAM*VAP*(SXL2-SYL2)/VAI2
      DIF=SXAT2-SYAT2
      DEN=2.0*SQRT(TWOCOV*TWOCOV+DIF*DIF)
      HC2Z=DIF/DEN
      CZ2=0.5+HC2Z
      SZ2=0.5-HC2Z
      SZCZ=TWOCOV/DEN
      STUFF=2.0*SZCZ*BXA*BYA
      BXF2=CZ2*BXA2+SZ2*BYA2+STUFF
      BYF2=CZ2*BYA2+SZ2*BXA2-STUFF
      SXF2=CZ2*SXAT2+SZ2*SYAT2+SZCZ*TWOCOV
      SYF2=CZ2*SYAT2+SZ2*SXAT2-SZCZ*TWOCOV
      AVTPI=AVT/PI2
C
CC    COMPUTE PROBABILITY OF KILL
C
      STUFF=BXF2/(SXF2+AVTPI)+BYF2/(SYF2+AVTPI)
      IF(STUFF.LT.50.0)GO TO 75
      PK=0.0
      GO TO 78
   75 PK=AMIN1(1.0,EXP(-.5*STUFF)*AVTPI/SQRT((SXF2+AVTPI)*(SYF2+AVTPI)))
   78 PS=(1.0-PK)**ISB
      PK=1.0-PS
      TI=TIME+T
C
CC    ACCUMULATE PK AS A FUNCTION OF INPUT TIME INTERVALS
C
      I=0
   50 I=I+1
      IF(TIME.GE.TINTER(I))GO TO 50
      J=I
   51 IF(TI.LT.TINTER(J))GO TO 52
      J=J+1
      GO TO 51
   52 PTOTTF(I)=PK+PS*PTOTTF(I)
      PTOTTI(J)=PK+PS*PTOTTI(J)
      CPS=CPS*PS
C
CC    ACCUMULATE PK FOR EACH SPHERICAL SECTOR
C
      SPKT(I1,I2,I3)=PK+PS*SPKT(I1,I2,I3)
```

```
C
C       COMPUTE QUANTITIES FOR EXTENDED OUPUT,  WHEN DESIRED
C
        IF(IPRINT(6).LE.0)GO TO 20
        C1=THESD*DEGREE
        C2=PHISD*DEGREE
        C3=ETHE4*DEGREE
        C4=EPHI4*DEGREE
        C5=SQRT(BXF2+FUZZ)
        C6=SQRT(BYF2+FUZZ)
        C7=SQRT(SXF2)
        C8=SQRT(SYF2)
        C9=1.0-CPS
C
C       WRITE EXTENDED OUTPUT
C
        CALL PAGES(1,5,JP)
        IF (JP.EQ.0) WRITE (6,1013) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
        WRITE(6,1014)IG,ICEM,TIME,T,TI,R,RA,C7,C8,C5,C6,VI,C1,C2,C3,C4,
     1               AVT,PK,C9
   20 NROUND=NROUND+ISB
C
C   FIRE ADDITIONAL GUNS IN COMPLEX, IF ANY
C
   64 IG=IG+1
      IF(IG.GT.IGL)IG=1
      TFIRE=TFIRE+TPERS
      IF(TIME.GT.TFIRE)GO TO 54
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                       C
C                TTTTT  RRRR     A     CCC   K   K                    C
C                  T    R   R   A A   C   C  K  K                     C
C                  T    RRRR   A   A  C      KKK                      C
C                  T    R  R   AAAAA  C   C  K  K                     C
C                  T    R   R  A   A   CCC   K   K                    C
C                                                                       C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
   62 TIME=TIME+0.064
      IF(TIME.GT.TMAX)GO TO 69
C
C       SWITCH TO MODE 1 TRACKING IF JAMMING IS ABOVE THRESHOLD OR IF
C       RANGE IS TOO CLOSE
C
        ICEM = IEM
        SD2J = 0.
        SD2RJ = 0.
        IF(R.LT.RSMODE) GO TO 501
        IF(IJAM.EQ.0) GO TO 502
```

```
C
      CALL ECM2
C
      IF(SJT.GT.SJTMAX) GO TO 501
      IF(IOEM.EQ.3)CALL JAMER2(IRECM,SJT,SD2J)
      IF(IOEM.EQ.4) SD2RJ=SD2RJM
      IF(IRECM.EQ.3) SD2RJ = SD2RJM
      GO TO 502
  501 IOEM = 1
  502 CONTINUE
      IF(IJAM.EQ.0) GO TO 53
      IF(IP.EQ.0) GO TO 53
      IF( (ILOOP/IP)*IP.NE.ILOOP) GO TO 53
      DUM = 10.*ALOG10(GJ)
      WRITE(11,1044) TIME,R,XSEC,DUM,SJT,IOEM,SD2J,SD2RJ,SN
C
C  COMPUTE MEAN TRACKING ERRORS
C
   53 GO TO(310,320,330,340),IOEM
C
C     (MODE 1, GT 1 - 5)
C
  310 GO TO (311,312,313,314,315,999),IGT
  311 CONTINUE
  312 CONTINUE
  313 CONTINUE
  314 CONTINUE
  315 THESD=1.11*TD+0.9*TDD+6.0*ETHE
      PHISD=1.10*PD-0.7*PDD+6.0*EPHI
      RANSD=RD+3.0*ERAN
      GO TO 73
C
C     (MODE 2, GT 3, 5, AND 6)
C
  320 GO TO (999,999,323,999,325,326),IGT
  323 CONTINUE
  325 CONTINUE
  326 THESD=0.91*TD+0.45*TDD+6.0*ETHE
      PHISD=0.75*PD-0.25*PDD+6.0*EPHI
      RANSD=RD+3.0*ERAN
      GO TO 73
C
C     (MODE 3, GT 3, 5, AND 6)
C
  330 GO TO (999,999,333,999,335,336),IGT
  333 CONTINUE
  335 CONTINUE
  336 THESD=TD+6.0*ETHE
```

```
      PHISD=PD+6.C*EPHI
      RANSD = 0.804*RD + 3.0*ERAN
      GO TO 73
C
CC    (MODE 4, GT 3, 5, AND 6)
C
  340 GO TO (999,999,343,999,345,346),IGT
  343 CONTINUE
  345 CONTINUE
  346 THESD=0.910*TD+0.45*TDD+6.0*ETHE
      PHISD=0.75*PD-0.25*PDD+6.0*EPHI
      RANSD = 0.804*RD + 3.0*ERAN
C
CC    (LIMIT SLEW RATES AND ELEVATION ANGLE TO WEAPCN MAXIMUMS)
C
   73 THESD=SIGN(AMIN1(TDMAX,ABS(THESD)),THESD)
      PHISD=SIGN(AMIN1(PDMAX,ABS(PHISD)),PHISD)
      THES=ANGLIM(THES+0.064*THESD)
      PHIS=AMAX1(PHMIN,AMIN1(PHMAX,PHIS+0.064*PHISD))
      RANS=AMAX1(0.0,RANS+0.064*RANSD)
      CTB=COS(THES)
      STB=SIN(THES)
      CPB=COS(PHIS)
      SPB=SIN(PHIS)
      CTBCPB=CTB*CPB
      CTBSPB=CTB*SPB
      STBCPB=STB*CPB
      STBSPB=STB*SPB
      RDS=RD
      TDS=TD
      PDS=PD
      IF(IEM.LT.2)GO TO 60
C
CC    COMPUTE MEAN (SMOOTHED) VELOCITY COMPONENTS (ELECTRONIC
CC     COMPUTATION)
C
      VXE=RANSD*CTBCPB-RANS*(STBCPB*THESD+CTBSPB*PHISD)
      VYE=RANSD*STBCPB+RANS*(CTBCPB*THESD-STBSPB*PHISD)
      VZE=RANSD*SPB+RANS*CPB*PHISD
      VXE=VXE+EMDTA*(VXES-VXE)
      VYE=VYE+EMDTA*(VYES-VYE)
      VZE=VZE+EMDTA*(VZES-VZE)
      VXES=VXE
      VYES=VYE
      VZES=VZE
      GO TO 60
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                       C
```

```
C                OOO   U   U  TTTTT  PPPP   U   U  TTTTT                C
C               O   O  U   U    T    P   P  U   U    T                  C
C               O   O  U   U    T    PPPP   U   U    T                  C
C               O   O  U   U    T    P      U   U    T                  C
C                OOO    UUU     T    P       UUU     T                  C
C                                                                        C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
   65 DO 92 I=1,4
   92 IFLAGS(I)=IFLAGS(I)+IPRINT(I)
C
C  PRINT PK AS A FUNCTION OF AIRCRAFT ASPECT AND IMPACT SPEED
C
      IF(IPRINT(5).EQ.0)GO TO 80
      CALL PRSEGS(SPKT2,ISL)
C
C  COMPUTE PK AS A FUNCTION OF ASPECT AND IMPACT SPEED FOR ALL GUNS
C
   80 DO 36 I=1,32
      DO 36 J=1,8
      PK=RHO(1)*SPKT2(I,J)
   36 SPKTOT(I,J)=PK+(1.0-PK)*SPKTOT(I,J)
C
C  STORAGE OF PK VS DENSITY FACTOR AND TIME INTERVALS (AT FIRE AND
C     INTERCEPT) PER WEAPON OR WEAPON COMPLEX
C
      CPK=1.0-CPS
      DO 55 I=1,NRHOS
      D=RHO(I)
      PK=D*CPK
      PKTTDC(I)=PK+(1.0-PK)*PKTTDC(I)
      DO 55 J=1,NTINTS
      D1=D*PTOTTF(J)
      PKTFDC(J,I)=D1+(1.0-D1)*PKTFDC(J,I)
      D2=D*PTOTTI(J)
   55 PKTIDC(J,I)=D2+(1.0-D2)*PKTIDC(J,I)
C
C  COMPUTE, STORE, AND WRITE TOTAL PKS FOR ENTIRE ARRAY OF WEAPONS
C
      F=FLOAT(NROUND/ISB)*TPERS
      WRITE(7)ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      ISL=ISL+1
      ASSIGN 70 TO IEOF
      GO TO 15
   70 ENDFILE 7
      LINE=66
      REWIND 7
C     PUNCH2 CARDS WRITE ONLY ONE CARD IMAGE ON TAPE4 WHEN THERE IS
```

```
C         ONLY ONE DEFENSE PER EMPLOYMENT (I.E., ONLY ONE "12" CARD
C         BEFORE 7/8/9 END-OF-RECORD).
      K = ISL
      CALL PAGES(4,0,JP)
      WRITE (6,1033)
      ASSIGN 40 TC IEOF
   79 READ(7) ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      IF (EOF(7).NE.0.) GO TO IEOF,(4,12,40,70,83,9997,9999)
      IF (IOCHEC(7).NE.0.) GO TO IERR,(3,28,9996)
      CALL PAGES(1,4,JP)
      IF (JP.EQ.0) WRITE (6,1033)
      WRITE (6,1034) ISL,CPK,NROUND,F,XGUN,YGUN,ZGUN,CIRCLE,IGL,
     1    TREACT,TTRACK,IGT,IEM,ICB,ISB,ISL
      WRITE (4,1060) ITITLE(9),ITITLE(10),ISL,IGT,IEM,ICB,ISB,IGL,CPK,
     1    NROUND,XGUN,YGUN,ZGUN,F,NUMBER
      GO TO 79
   40 IF (K.NE.2) WRITE (4,1064) ITITLE(9),ITITLE(10),PKTTDC(1),NUMBER
      IF (IFLAGS(2).LE.0) GO TO 76
      REWIND 7
      CALL PAGES(4,0,JP)
      WRITE (6,1031) (I,I=1,10)
   77 READ(7) ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      IF(IPRINT(2).LE.0)GO TO 77
      CALL PAGES(1,4,JP)
      IF (JP.EQ.0) WRITE (6,1031) (I,I=1,10)
      WRITE(6,1032)ISL,(TINTER(I),I=1,NTINTS)
      IFLAGS(2)=IFLAGS(2)-IPRINT(2)
      IF(IFLAGS(2).GT.0)GO TO 77
   76 IF(IFLAGS(3).LE.0)GO TO 42
      REWIND 7
      CALL PAGES(4,0,JP)
      WRITE (6,1035) (I,I=1,10)
   41 READ(7) ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      IF(IPRINT(3).LE.0)GO TO 41
      CALL PAGES(2,4,JP)
      IF (JP.EQ.0) WRITE (6,1035) (I,I=1,10)
      WRITE(6,1018)ISL,(PTOTTF(I),I=1,NTINTS)
      DO 410 I=2,NTINTS
  410 PTOTTF(I) = PTOTTF(I-1) + (1.0-PTOTTF(I-1))*PTOTTF(I)
      WRITE (6,1058) ISL,(PTOTTF(I),I=2,NTINTS)
      IFLAGS(3)=IFLAGS(3)-IPRINT(3)
      IF(IFLAGS(3).GT.0)GO TO 41
   42 IF(IFLAGS(4).LE.0)GO TO 71
      REWIND 7
      CALL PAGES(4,0,JP)
```

```
      WRITE (6,1036) (I,I=1,10)
   43 READ(7) ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      IF(IPRINT(4).LE.0) GO TO 43
      CALL PAGES(2,4,JP)
      IF (JP.EQ.0) WRITE (6,1036) (I,I=1,10)
      WRITE(6,1018)ISL,(PTOTTI(I),I=1,NTINTS)
      DO 430 I=2,NTINTS
  430 PTOTTI(I) = PTOTTI(I-1) + (1.0-PTOTTI(I-1))*PTOTTI(I)
      WRITE (6,1058) ISL,(PTOTTI(I),I=2,NTINTS)
      IFLAGS(4)=IFLAGS(4)-IPRINT(4)
      IF(IFLAGS(4).GT.0)GO TO 43
   71 IF(IFLAGS(1).LE.0)GO TO 44
      REWIND 7
      CALL PAGES(4,0,JP)
      WRITE (6,1017) (I,I=1,9)
   74 READ(7) ISL,IGT,IEM,ICB,ISB,IGL,XGUN,YGUN,ZGUN,TREACT,TTRACK,
     1 CIRCLE,NROUND,F,CPK,NRHOS,RHO,NTINTS,TINTER,PTOTTF,PTOTTI,IPRINT
      IF(IPRINT(1).LE.0)GO TO 74
      CALL PAGES(1,4,JP)
      IF (JP.EQ.0) WRITE (6,1017) (I,I=1,9)
      WRITE(6,1055)ISL,(RHO(I),I=1,NRHOS)
      IFLAGS(1)=IFLAGS(1)-IPRINT(1)
      IF(IFLAGS(1).GT.0)GO TO 74
   44 CALL PAGES(7+NTINTS,0,JP)
      WRITE(6,1019)
      WRITE (6,1021) (I,I=1,9)
      PTOTTF(1) = PKTFDC(1,1)
      DO 440 I=1,NTINTS
      IF (I.EQ.1) GO TO 440
      PTOTTF(I) = PTOTTF(I-1) + (1.0-PTOTTF(I-1))*PKTFDC(I,1)
  440 WRITE (6,1018) I,PTOTTF(I),(PKTFDC(I,J),J=1,NRHOS)
      CALL PAGES (9+NTINTS,0,JP)
      WRITE(6,1020)
      WRITE (6,1021) (I,I=1,9)
      PTOTTI(1) = PKTIDC(1,1)
      DO 441 I=1,NTINTS
      IF (I.EQ.1) GO TO 441
      PTOTTI(I) = PTOTTI(I-1) + (1.0-PTOTTI(I-1))*PKTIDC(I,1)
  441 WRITE (6,1018) I,PTOTTI(I),(PKTIDC(I,J),J=1,NRHOS)
      WRITE (6,1023) (PKTTDC(I),I=1,NRHOS)
      CALL PRSEGS(SPKTOT,0)
      GO TO 95
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C               EEEEE  X   X  IIIII  TTTTT   SSSS                     C
C               E       X X     I      T    S                        C
C               EEE      X      I      T     SSS                     C
```

```
C                E       X X     I       T         S                      C
C                EEEEE  X   X  IIIII     T    SSSS                        C
C                                                                         C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
  999 WRITE(6,1027)IGT,IEM
      CALL EXIT
 9994 WRITE(6,1040)
      CALL EXIT
 9995 WRITE(6,1039)
      CALL EXIT
 9996 WRITE(6,1037)
      CALL EXIT
 9997 REWIND 4
      LINE = 66
      ITITLE(3)=10H *****  FI
      ITITLE(4)=1CHNAL SUMMAR
      ITITLE(5)=1CHY  *****
      ITITLE(1)=ITITLE(2)=ITITLE(6)=ITITLE(7)=1H
      CALL PAGES(3,0,JP)
      WRITE (6,1061)
  990 READ (4,1062) ICARD,IPRINT,I
      IF (EOF(4).NE.0.) GO TO 991
      CALL PAGES(1,3,JP)
      IF (JP.EQ.0) WRITE (6,1061)
      WRITE (6,1063) ICARD,IPRINT,I
      IF(ISW.NE.IOFF) CALL AVG(ICARD(3),IPRINT,ISW)
      GO TO 990
  991 REWIND 4
      CALL TIMREM(TI)
      CIO=CIO-TI+2.886
      CALL SECOND(TU)
      TU = TU + .C06
      CPU=TU-CPU+0.
      WRITE (6,1024) CPU,CIO,TU
      CALL EXIT
 9998 WRITE(6,1006)I,ICARD
      CALL EXIT
 9999 WRITE(6,1002)
      CALL EXIT
 1000 FORMAT(10E8.0)
 1001 FORMAT(* LOCATIO   ,I5,6X,*GUN TYPE*,I2,6X,*ERROR MODE*,I2,9X,
     1  *POSITION=(*,F7.0,*,*,F7.0,*,*,F7.0,*)    RADIUS=*,F5.0,*M*/)
 1002 FORMAT(//*-UNEXPECTED END-OF-RECORD/FILE ENCOUNTERED.*)
 1003 FORMAT(3X*TIME*,14X*XXX*,7X*YYY*,7X*ZZZ*,12X*SPEED*,6X*XDOT*,
     1     6X*YDOT*,6X*ZDOT*,10X*HEADING*,5X*CLIMB*,6X*ROLL*/)
 1004 FORMAT(1X,F6.2,7X,3F10.1,7X,4F10.2,7X,3F10.2)
 1005 FORMAT(//*0XR=*,F9.2,*    YR=*,F9.2,8X,*XT=*,F9.2,*    YT=*,F9.2,8X,
     1*PSI=*,F7.2,8X,*DZ=*,F9.2)
```

```
1006 FORMAT(////*-IMPROPER INPUT CARD ENCOUNTERED.  "*,I2,7A10,A8,*"*)
1007 FORMAT(I2,7A10,A8)
1008 FORMAT(6X,9E8.0)
1009 FORMAT(1X,5I1,E8.0)
1010 FORMAT(*-VULNERABLE AREA (SQ. METERS) AS A FUNCTION OF IMPACT *,
    1     *SPEED (METERS/SEC) AND ASPECT VIEW*/5X,8A10//* VIEW*,7X*0
    2 152      305      457      610      762      914     1067     1219*/)
1011 FORMAT(1H-,I2,* TIME INTERVALS FOR PK ACCUMULATION*//4X*0.00*,
    1     10F8.2)
1012 FORMAT(I2,F7.3,3F7.2,3F6.2,F6.0,2F12.7,2F6.1,2F7.0,F8.2,2F8.3)
1013 FORMAT(* LOCATION*,I5,6X,*GUN TYPE*,I2,6X,*ERROR MODE*,I2,6X,
    1*POSITION=(*,F8.1,*,*,F8.1,*,*,F8.1,*)    RADIUS=*,F6.1,* M*/*OL
    2    FIRE    FLT.     INTCP    FIRE   INTCP*,31X,*CLOSE    AZIM.   ELEV.
    3 MEAN    MEAN    VULN*/* N OEM   TIME    TIME     TIME    RANGE   RANGE
    4SIG1   SIG2    BIAS1   BIAS2     VEL.     RATE    RATE   AZ.ERR EL.ERR
    5AREA    SHOT PK    CUM. PK*/)
1014 FORMAT(I2,I3,2F7.2,F8.2,2F7.0,1X,2F6.1,1X,2F7.1,F8.1,1X,2F7.2,1X,
    2     3F7.2,2F10.6)
1015 FORMAT(3X,I1,1X,I1,9E8.0)
1016 FORMAT(6I1)
1017 FORMAT(*- LOC*,12X,9(7X*RHO*,I2)/)
1018 FORMAT(I5,10F12.7)
1019 FORMAT(*-ATTRITION ACCRUED AS A FUNCTION OF TIME OF FIRE*)
1020 FORMAT(*-ATTRITION ACCRUED AS A FUNCTION OF TIME AT INTERCEPT*)
1021 FORMAT(*OTIME*,5X*CUM FOR*,9(5X*DENSITY*)/* SEG.*,5X*CLASS 1*,
    1     9(5X*CLASS*,I2)/)
1023 FORMAT(1HO,10X,*TOTALS*,9F12.7)
1024 FORMAT(///*-END OF JOB.*,9X*EXECUTION CPU TIME *,F7.2,9X*EXEC*,
    1     *UTION (CPU + IO/2) TIME *,F7.2,9X*TOTAL CPU TIME *,F7.2)
1025 FORMAT(*OG   TIME/     MIN     MAX    AZIM   ELEV    MAX    MAX   MUZZ    B
    2ALLISTIC    BALLISTIC     VEL     VEL   RANGE  RANGE  SMOOTH  MAX.AZ  MA
    3X.EL*/ * T   ROUND    ELEV    ELEV    RATE   RATE   TOF1   TOF2    VEL  CO
    4NSTANT 1  CONSTANT 2    MIN     MAX     MIN    MAX    CONST   ERROR   E
    5RROR*/)
1026 FORMAT(I5,4X,*0.00*,8F8.2)
1027 FORMAT(////*-GUN TYPE*,I2,*,  ERROR MODE*,I2,*.  COMBINATION INVAL
    1ID.*)
1028 FORMAT(I4,I2,9E8.0)
1029 FORMAT(1H-,I1,* DENSITY CLASSES FOR PK ACCUMULATION*//9F12.5)
1031 FORMAT(*- LOC*,10(6X,*TIME*,I2)/)
1032 FORMAT(I5,10F12.2)
1033 FORMAT(*- LOC*,5X*P(KILL)*,6X*ROUNDS*,3X*FIRE TIME*,8X*XGUN*,
    1     8X*YGUN*,8X*ZGUN   RADIUS GL*,5X*T REACT*,5X*T TRACK*,
    2     * GT EM CB SB  LOC*)
1034 FORMAT(I5,F12.7,I12,4F12.2,F9.2,I3,2F12.2,4I3,I5)
1035 FORMAT(*- LOC*,10(4X,*PK(TF*,I2,*)*)/)
1036 FORMAT(*- LOC*,10(4X,*PK(TI*,I2,*)*)/)
1037 FORMAT(////*-UNRECOVERABLE PARITY ERROR DETECTED.  CALL EXIT.*)
```

```
 1038 FORMAT(I3,I5,F10.0)
 1039 FORMAT(* ECM SHOULD NOT BE SPECIFIED WHEN IEM IS 1 OR 2 *)
 104C FORMAT(* MULTIPATH TRACKING ERRCR SPECIFIED WITH IEM=3 ONLY *)
 1041 FORMAT(I3,I3,I2,3F10.0,I5,2F10.0,I5,F10.0)
 1042 FORMAT(//,* ECM VARIABLES*)
 1043 FORMAT(*1AAASIM----*,10A10)
 1044 FORMAT(1X,F7.2,4X,F8.0,2X,F9.2,5X,F7.2,5X,F7.2,
     15X,I2,3X,E10.4,5X,E10.4,5X,F7.2)
 1045 FORMAT(//,
     1*  FIRE TIME  RANGE(M)   X-SEC(SQM)  JAM.GAIN(DB)  J/S(DB)*,
     2*  MODE  ADD.TRK.VAR.  ADD.RNG.VAR.    S/N(DB)*)
 1058 FORMAT(I5,*CUM*,9X,9F12.7)
 1059 FORMAT(I5,12X,9F12.5)
 1060 FORMAT(2A9,I3,5I2,F10.7,I5,2F7.0,F6.0,F6.1,I6)
 1061 FCRMAT(1HO,4X*DATE*,7X*TIME* 4X*LCC  GT  EM  CB  SB  GL*,5X*P(K*,
    1    *ILL)   RDS    XGUN    YGUN    ZGUN  F TIME    PAGE*/)
 1062 FORMAT(2A9,A3,5A2,A10,A5,2A7,3A6)
 1063 FORMAT(2(2X,A9),2X,A3,5(2X,A2),2X,A10,1X,A5,2(1X,A7),3(2X,A6))
 1064 FORMAT(2A9,13X,F10.7,31X,I6)
      END
      SLBROUTINE PAGES(N,NT,JP)
C
CC    KEEPS NUMBER OF LINES PER PAGE LESS THAN 59, PRINTS HEADER,
CC        AND GETS TIME INFORMATION FRCM SYSTEM.  REPLACES
CC        NPAGE(MAX) AND HEADER IN AFATL PROGRAM.
CC
CC    N       NUMBER OF LINES TO BE PRINTED BEFORE NEXT CALL TO PAGES.
CC    NT      NUMBER OF LINES IN TITLE CR HEADER CF DATA BEING PRINTED.
CC            IF CALL TO PAGES IS TO PRINT HEADER ONLY, "N" SHCULD
CC            BE NUMBER OF LINES AND "NT" SHOULD EE ZERO.
CC    JP      FLAG FROM PAGES, SET TO ZERO WHEN A NEW PAGE IS STARTED
C             INDICATING NECESSITY TO PRINT HEADER.
      COMMON /BLOCK1/ ITITLE(10)
      CCMMON /HEACFO/ LINE,NUMBER
      JP = 2
      LINE = LINE + N
      IF (LINE .LT. 59) RETURN
      NUMBER = NUMBER + 1
      CALL TIME(ITITLE(10))
      WRITE (6,1000) ITITLE,NUMBER
      LINE = 2 + N + NT
      JP = 0
      RETURN
 1000 FCRMAT(*1AFATL P-C01 AAASIM  "*,7A10,*"*,A10,2(1XA9),4X*PAGE*,I4/)
      END
      SLBROUTINE PRSEGS(P,ISL)
C
C     PRINTS THE PK AS A FUNCTION OF ASPECT AND IMPACT SPEED TABLES
```

```
C
C     THIS SUBROUTINE EXTENSIVELY MODIFIED TO PRINT ASPECT SECTOR
C         ANGLES AND PROPERLY LABEL THE TWO CASES FOR WHICH IT
C         PRINTS TABLES.
      COMMON /BLOCK3/ XGUN,YGUN,ZGUN
      COMMON /BLOCK4/ IGT,IEM,ICB,ISB,IGL,CIRCLE
      DIMENSION P(32,8),PT(8),ANG(8)
      DATA ANG/7H315-360,7H000-045,7H045-090,7H090-135,7H135-180,
     1         7H180-225,7H225-270,7H270-315/
      PK=PT(1)=PT(2)=PT(3)=PT(4)=PT(5)=PT(6)=PT(7)=PT(8)=0.0
      CALL PAGES(6,0,JP)
      IF (ISL.GT.0) WRITE (6,1001) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
      IF (ISL.EQ.0) WRITE (6,1030)
      WRITE(6,1040)
      DO 2 I=1,32
      IAZ = 1 + MOD(I,8)
      IEL = 2 + (I-1)/8
      PP=0.0
      DO 3 J=1,8
      PT(J)=PT(J)+(1.0-PT(J))*P(I,J)
      PK = PK + (1.0-PK) * P(I,J)
    3 PP=PP+(1.0-PP)*P(I,J)
      CALL PAGES(1,6,JP)
      IF (JP.NE.0) GO TO 2
      IF (ISL.GT.0) WRITE (6,1001) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
      IF (ISL.EQ.0) WRITE (6,1030)
      WRITE (6,1040)
    2 WRITE (6,1041) I,ANG(IAZ),ANG(IEL),(P(I,J),J=1,8),PP
      CALL PAGES(2,6,JP)
      IF (JP.NE.0) GO TO 4
      IF (ISL.GT.0) WRITE (6,1001) ISL,IGT,IEM,XGUN,YGUN,ZGUN,CIRCLE
      IF (ISL.EQ.0) WRITE (6,1030)
      WRITE (6,1040)
    4 WRITE (6,1042) PT,PK
      RETURN
 1001 FORMAT(*-PK AS A FUNCTION OF ASPECT SECTOR AND IMPACT SPEED.*,
     1     5X*LOC*,I4,5X*GT*,I2,5X*EM*,I2,5X*X*,F7.0,3X*Y*,F7.0,3X*Z*,
     2     F7.0,5X*RADIUS*,F5.0,* M*)
 1030 FORMAT(*-TOTAL PK FOR DENSITY CLASS 1 AS A FUNCTION OF ASPECT*,
     1     * SECTOR AND IMPACT SPEED.*)
 1040 FORMAT(*0SECTOR  AZIMUTH   ELEV.*,8X*0-152     152-305     *,
     1     *305-457     457-610     610-762     762-914     914-1067*,
     2     3X*1067-1219       TOTAL PK* / 9X*REAR=00  DOWN=00*)
 1041 FORMAT(I7,2X,A7,2X,A7,8F12.7,F14.7)
 1042 FORMAT(1H0,18X*TOTALS*,8F12.7,F14.7)
      END
      SUBROUTINE TPLOT(NFPA)
C
```

```
C      PLOTS X VS. Y AND X VS. Z ON PRINTER FOR EACH FLIGHT PATH.
C          NO PLOT WHEN XMAX-XMIN IS LESS THAN 50.
C
       COMMON  XFPA(1201), YFPA(1201), ZFPA(1201),
      1         BFPA(1201), AFPA(1201), PFPA(1201),
      2        VXFPA(1201),VYFPA(1201),VZFPA(1201)
       DIMENSION PLOT(111)
       LOGICAL XA
       DATA BLANK,YAXIS,XAXIS,POINT/1H ,1H:,1H-,1H+/
C      PLOT ONLY ABOUT 50 POINTS WITH "IFPA".
       IFPA = MAXO(NFPA/50,1)
C      FIND MIN-MAX VALUES OF X, Y, AND Z (ZMIN = 0. BY DEFN.)
       XMIN = YMIN = 1.E99
       XMAX = YMAX = ZMAX = -1.E99
       DO 100 I=1,NFPA,IFPA
       XMIN = AMIN1(XMIN,XFPA(I))
       YMIN = AMIN1(YMIN,YFPA(I))
       XMAX = AMAX1(XMAX,XFPA(I))
       YMAX = AMAX1(YMAX,YFPA(I))
  100  ZMAX = AMAX1(ZMAX,ZFPA(I))
C      CHECK X RANGE TO AVOID FUNNY X-Z PLOT.
       XRNG = XMAX - XMIN
       IF (XRNG .GT. 49.999) GO TO 110
       CALL PAGES(3,0,I)
       WRITE (6,210)
       RETURN
C      SCALE X,Y TO METERS PER CHARACTER.
  110  D = AMAX1(XRNG/11.,(YMAX-YMIN)/7.25)
       DX = D/10.
       DY = D/8.
C      CENTER PLOT BY RE-CALCULATING X-Y MIN-MAX.
       XMIN = (XMAX+XMIN)/2. - 55.*DX
       YMIN = (YMAX+YMIN)/2. - 29.*DY
       XMAX = XMIN + 110.*DX
       YMAX = YMIN + 58.*DY
C      SCALE Z (NOT TO SAME SCALE AS X-Y).
       DO 120 I=1,100
       D = FLOAT(I*500)
       IF (D .GT. ZMAX) GO TO 130
  120  CONTINUE
  130  DZ = D/10.
C      SEE IF AXES SHOULD APPEAR ON PLOT.
       XA = .FALSE.
       NYA = -10
       IF (XMIN .LE. 0. .AND. XMAX .GE. 0.) XA = .TRUE.
       IF (YMIN .LE. 0. .AND. YMAX .GE. 0.) NYA = 59 - INT(0.5-YMIN/DY)
       IF (XA) NXA = 1 + INT(0.5-XMIN/DX)
C      SET 8 LINES PER INCH SPACING ON PRINTER.
```

```
      WRITE (6,280)
C     SET PAGE CONTROL, PLOT X-Z, THEN X-Y.
      CALL PAGES(56,0,I)
      WRITE (6,250)
      WRITE (6,220)
      IFPA = 2 * IFPA
      DO 160 K=1,11
      DO 140 I=1,111
      PLOT(I) = BLANK
  140 IF (K.EQ.11) PLOT(I)=XAXIS
      IF (XA .AND. K.NE.11) PLOT(NXA) = YAXIS
      Z = FLOAT(11-K)*DZ
      DO 150 I=1,NFPA,IFPA
      IX = 1+INT(0.5+(XFPA(I)-XMIN)/DX)
  150 IF (K .EQ. 11-INT(0.5+ZFPA(I)/DZ)) PLOT(IX) = POINT
  160 WRITE (6,230) PLOT,Z
      WRITE (6,220)
      WRITE (6,250)
      WRITE (6,220)
      IFPA = IFPA/2
      DO 190 K=1,59
      DO 170 I=1,111
      PLOT(I) = BLANK
  170 IF (K .EQ. NYA) PLOT(I) = XAXIS
      IF (XA) PLOT(NXA) = YAXIS
      Y = YMIN + FLOAT(59-K)*DY
      DO 180 I=1,NFPA,IFPA
      IX = 1 + INT(0.5+(XFPA(I)-XMIN)/DX)
  180 IF (K .EQ. 59-INT(0.5+(YFPA(I)-YMIN)/DY)) PLOT(IX) = POINT
      I = MOD(K,2)
      IF (I.NE.1) WRITE (6,240) PLOT
  190 IF (I.EQ.1) WRITE (6,260) PLOT,Y
      WRITE (6,220)
      WRITE (6,250)
C     PRINT X AXIS VALUES.
      D=10.*DX
      DO 200 I=1,12
  200 PLOT(I) = XMIN + D*FLOAT(I-1)
      WRITE (6,270) (PLOT(I),I=1,12),DX,DY
C     RE-SET PRINTER SPACING BACK TO 6 LINES PER INCH.
      WRITE (6,290)
      RETURN
  210 FORMAT(*ONEARLY CONSTANT X IN FLIGHT PATH.  NO PLOT PRINTED.*/)
  220 FORMAT(1X,113(1H*))
  230 FORMAT(2H *,111A1,1H*,3X*Z =*,F8.1,* M*)
  240 FORMAT(2H *,111A1,1H*)
  250 FORMAT(2X*A*, 9X*B*, 9X*C*, 9X*D*, 9X*E*, 9X*F*,
     1       9X*G*, 9X*H*, 9X*I*, 9X*J*, 9X*K*, 9X*L*)
```

```
  260 FORMAT(2H *,111A1,1H*,3X*Y =*,F8.1,* M*)
  270 FORMAT(*0X(A)=*,F8.1,* M*,4X*X(B)=*,F8.1,* M*,4X*X(C)=*,F8.1,* M*,
     1       4X*X(D)=*,F8.1,* M*,4X*X(E)=*,F8.1,* M*,4X*X(F)=*,F8.1,* M*,
     2       4X*X(G)=*,F8.1,* M*/1X*X(H)=*,F8.1,* M*,4X*X(I)=*,F8.1,* M*,
     3       4X*X(J)=*,F8.1,* M*,4X*X(K)=*,F8.1,* M*,4X*X(L)=*,F8.1,* M*,
     4       4X* DX =*,F8.1,* M*,4X* DY =*,F8.1,* M*)
  280 FORMAT(1HT)
  290 FORMAT(1HS)
      END
      SUBROUTINE RPLANE(T)
C
CCC   COMPUTES INFORMATION ABOUT THE POSITION OF THE AIRCRAFT AT TIME =T
C
      COMMON/BLOCK2/NFPA,TMIN,TMAX,DTFPA
      COMMON/BLOCK3/XGUN,YGUN,ZGUN
      COMMON/NFPARM/XA,YA,ZA,RA2,RA,TIME
      COMMON/IGXGYG/IG,XG(8),YG(8)
      COMMON XFPA(1201),YFPA(1201),ZFPA(1201),BFPA(1201),AFPA(1201),
     1       PFPA(1201),VXFPA(1201),VYFPA(1201),VZFPA(1201)
      COMMON/CECM1/IRECM,IJ,GAINJ,IX,XSEC,CALX,PJW,
     *       X,Y,Z,ROL,PIT,HDG,
     *        FTGT,FJAM,GJ,SJT,SN
      CALL INTERP((T+TIME)/DTFPA)
      XA=GETVAL(XFPA)-XGUN-XG(IG)
      YA=GETVAL(YFPA)-YGUN-YG(IG)
      ZA=GETVAL(ZFPA)-ZGUN
      RA2=XA*XA+YA*YA+ZA*ZA
      RA=SQRT(RA2)
      RETURN
      END
      FUNCTION ANGLIM(X)
C
CCC   LIMITS ANGLES TO PRINCIPAL ANGLES BETWEEN -PI AND +PI
C
      COMMON /CONSTS/ DEGREE,RADIAN,PI,PI2,QTRPI,SQRT2
      IF(ABS(X)-PI)1,1,2
    1 ANGLIM=X
      RETURN
    2 ANGLIM=X-PI2*FLOAT(IFIX((X+SIGN(PI,X))/PI2))
      RETURN
      END
      FUNCTION RSHELL(T)
C
CCC   COMPUTES RANGE TO SHELL AT TIME = T
C
      COMMON/VSASBS/VMUZZ,ASHCON,BSHCON,DQUAD
      DQUAD=1.0+T*(ASHCON+T*BSHCON)
      RSHELL=T*VMUZZ/DQUAD
```

```
      RETURN
      END
      FUNCTION VSHELL(T)
C
CCC   COMPUTES SPEED OF SHELL AT TIME=T.  CAN ONLY BE USED AFTER A CALL
CCC   TO RSHELL AT THE SAME TIME, SINCE RSHELL COMPUTES DQUAD FOR VSHELL
C
      COMMON/VSASBS/VMUZZ,ASHCON,BSHCON,DQUAD
      VSHELL=VMUZZ*(1.0-BSHCON*T*T)/(DQUAD*DQUAD)
      RETURN
      END
      SUBROUTINE INTERP(FINT)
C
CCC   SETS CONSTANTS (FRACT, INDEX1, AND INDEX2) FOR TWO POINT INTER-
CCC     POLATION
C
      COMMON/MAGIC/FRACT,INDEX1,INDEX2
      INDEX1=FINT
      FRACT=FINT-FLOAT(INDEX1)
      INDEX1=INDEX1+1
      INDEX2=INDEX1+1
      RETURN
      END
      FUNCTION GETVAL(ARRAY)
C
CCC   PERFORMS TWO POINT INTERPOLATION
C
      COMMON/MAGIC/FRACT,INDEX1,INDEX2
      DIMENSION ARRAY(1201)
      GETVAL=ARRAY(INDEX1)+FRACT*(ARRAY(INDEX2)-ARRAY(INDEX1))
      RETURN
      END
      BLOCK DATA
      COMMON /BLOCK1/ ITITLE(10)
      COMMON /BLOCK3/ XGUN,YGUN,ZGUN
      COMMON /BLOCK4/ IGT,IEM,ICB,ISB,IGL,CIRCLE
      COMMON /BLOCK5/ NRHOS,RHO(9)
      COMMON /BLOCK6/ NTINTS,TINTER(10)
      COMMON /BLOCK7/ IVACOM(8),VAT(9,5,9)
      COMMON /BLOCK8/ TREACT,TRACK1,TRACK2
      COMMON /BLOCK9/ TROUND(6),THDMAX(6),PHDMAX(6),PHIMIN(6),PHIMAX(6),
     1                VELMIN(6),VELMAX(6),RANMIN(6),RANMAX(6),ATLAG(6),
     2                ETHMAX(6),EPHMAX(6),RMODES(6)
      COMMON /BLOCKA/ TFMAX1(6),TFMAX2(6),RVACON(6),RVBCON(6),VMUZEL(6)
      COMMON /CONSTS/ DEGREE,RADIAN,PI,PI2,QTRPI,SQRT2
      COMMON /HEADFO/ LINE,NUMBER
      COMMON /BUDGET/ BDACON(6)
C     VALUES ON "ASIDOC" CARDS FROM A.S.I. DOCUMENTATION DRAFT.    (BEE)
```

```
      DATA ATLAG  /2*9999.99,1.33,9999.99,2*1.33/
      DATA BDACON /.00265,.00501,.0031,.00697,.00113,.00113/
      DATA DEGREE /57.295779513082/,  RADIAN/0.017453292519943/
      DATA EPHMAX /6*.1/,      ETHMAX /6*.1/
      DATA IGT    /3/,  IEM/4/,  ICB/1/,  ISB/4/,  IGL/1/,  CIRCLE/0./
      DATA ITITLE /7*(1H ),10H  ASD/XROA,1H ,1H /
      DATA IVACOM /8*(1H )/
      DATA LINE   /66/,  NUMBER/0/
      DATA NRHOS  /9/
      DATA NTINTS /10/
      DATA PHDMAX /.43633,.43633,.78540,.34910,.31416,.3491/
      DATA PHIMAX /1.48353,1.57079,1.48353,1.48353,1.51844,1.43117/
      DATA PHIMIN /-.17453,-.14835,-.17453,-.08727,-.06981,-.05236/
      DATA PI     /3.1415926535898/,  PI2/6.2831853071796/
      DATA QTRPI  /0.78539816339745/
      DATA RANMAX /3000.,3000.,3300.,5000.,5500.,99999./
      DATA RANMIN /0.0,400.,500.,0.,0.,99999./
      DATA RHO    /1.,.5,.3333333333,.25,.2,.1666666666,.1,.02,.01/
      DATA RMODES /-1.,-1.,400.,-1.,1500.,0.0/
      DATA RVACON /.180209,.251499,.22998,.089321,.07845,.050694/
      DATA RVBCON /.012392,-.006259,-.006889,.004262,-.000421,-.000357/
      DATA SQRT2  /1.4142135623731/
C     TFMAX CARDS PROVIDE EXACT AGREEMENT WITH AFATL PROGRAM ON TEST
C         CASE, BUT NOT EXACT VALUES FOR MAX RANGE.   13 FEB 73    (BEE)
      DATA TFMAX1 /1.6,2.2,3.8,4.1,6.2,99.99/
      DATA TFMAX2 /99.99,99.99,7.5,99.99,11.6,19.2/
      DATA THDMAX /0.5236,.5236,1.39626,0.52360,.5236,.5236/
      DATA TINTER /10.,20.,30.,40.,50.,60.,70.,80.,90.,999.99/
      DATA TREACT /0./,  TRACK1/2.5/,  TRACK2/6.0/
      DATA TROUND /.75,.4,.2,.75,.857,4./
      DATA VAT    /405*0./
      DATA VELMAX /300.,300.,350.,250.,300.,999.9/
      DATA VELMIN /0.,0.,0.,0.,0.,999.9/
      DATA VMUZEL /840.,1000.,930.,880.,960.0,800./
      DATA XGUN   /0./
      DATA YGUN   /0./
      DATA ZGUN   /0./
      END
      SUBROUTINE AVG(ITST,IPRINT,ISW)
      DIMENSION IPRINT(6)
      DATA IBLNK,SUM,CNT/2H  ,0.0,0.0/
      DATA IALL/2HAL/
      DECODE(10,900,IPRINT(1)) PK
  900 FORMAT(F10.7)
      DECODE(7,910,IPRINT(4)) YGUN
  910 FORMAT(F7.0)
      IF(ISW.EQ.IALL) GOTO 600
      IF(ITST.EQ.IBLNK) GOTO 200
```

```
      IF(YGUN.NE.0.0) GOTO 150
      CNT=CNT+0.5
      SUM=SUM+PK/2.
      POLD=0.0
      GOTO 500
150   CONTINUE
      CNT=CNT+1.0
      SUM=SUM+PK
      POLD=PK
      GOTO 500
200   IF(CNT.LE.0.5) GOTO 500
      CNT=CNT-0.5
      SUM=SUM-POLD/2.0
201   AVERG=SUM/CNT
      WRITE(6,800) CNT,AVERG
  800 FORMAT(/5X,18HAVERAGE P(KILL) ON,F6.1,20H OFFSET LOCATIONS IS,
     X       F10.7/)
      SUM=0.0
      CNT=0.0
  500 RETURN
600   IF(ITST.NE.IBLNK) GOTO 610
      IF(CNT.NE.0.0) GOTO 201
      GOTO 500
610   SUM=SUM+PK
      CNT=CNT+1.0
      GOTO 500
      END
      SUBROUTINE MULPTH(I,REFC,EL,BIAS,SD2)
      DIMENSION C(3),S(3),B(3)
      DATA
     * AK/-0.6931471806/
     *,SQRT2/1.414213562/
     *,B/0.0244346,0.0314159,0.0785398/
     *,C/0.0132557,0.0185345,0.0478558/
     *,S/0.00872665,0.0104720,0.0244346/
      BW = B(I)
      CAL = C(I)
      SQ = S(I)
      DIR = EXP(AK*(SQ/BW)**2)
      EL2 = 2.*EL
      RU = EXP(AK*((EL2+SQ)/BW)**2)
      RL = EXP(AK*((EL2-SQ)/BW)**2)
      DRU1S = (DIR+REFC*RU)**2
      DRU2S = (DIR-REFC*RU)**2
      DRL1S = (DIR+REFC*RL)**2
      DRL2S = (DIR-REFC*RL)**2
      DIF1 = (DRU1S-DRL1S)
      SUM1 = (DRU1S+DRL1S)
```

```
      DIF2 = (DRU2S-DRL2S)
      SUM2 = (DRU2S+DRL2S)
      SIGER1 = DIF1/SUM1
      SIGER2 = DIF2/SUM2
      ANGER1 = CAL*SIGER1
      ANGER2 = CAL*SIGER2
      PPBY2 = ABS(ANGER2-ANGER1)/2.
      BIAS = ANGER1+PPBY2
      SD = PPBY2/SQRT2
      SD2 = SD*SD
      RETURN
      END
      SUBROUTINE ECM1
      DIMENSION RGDB(3),PRW(3),FREQ(3),IRTYP(4),RNOISE(3)
      DIMENSION TABJ(37,37),TABX(37,37)
      COMMON /BLOCK1/ ITITLE(10)
      COMMON /HEADFO/ LINE,NUMBER
      COMMON
     */CECM1/IRECM,IJ,GAINJ,IX,XSEC,CALX,PJW,
     *       X,Y,Z,ROL,PIT,HDG,
     *        FTGT,FJAM,GJ,SJT,SN
C
      NAMELIST/NAM1/RGDB,PRW,FREQ,IRTYP,I,RG,WL,FTGT,FJAM,PJW
      DATA
     * RGDB/40., 38.5, 28./
     *,PRW/105000., 175000.,250000./
     *,FREQ/15.1E9, 9.3805E9, 2.838E9/
     *,IRTYP/1,2,2,3/
     *,PI4/12.56637061/
     *,RNOISE/-123.0,-130.6,-132.2/
C
      I = IRTYP(IRECM)
      RG = 10.**(RGDB(I)/10.)
      WL = 2.998E8/FREQ(I)
      RN = RNOISE(I)
      FTGT = PRW(I)*RG*RG*WL*WL/PI4/PI4/PI4
      FJAM = PJW*RG*WL*WL/PI4/PI4
      CALL PAGES(3,0,JP)
      IF(IJ.EQ.0) WRITE(6,9003) GAINJ
 9003 FORMAT(//,* JAMMER ANTENNA GAIN*,F7.3,* DB*)
      IF(IJ.NE.0) WRITE(6,9004)
 9004 FORMAT(//,* JAMMER TABLE SPECIFIED*)
      CALL PAGES(3,0,JP)
      IF(IX.EQ.0) WRITE(6,9005) XSEC
 9005 FORMAT(//,* AIRCRAFT CROSS SECTION *,F9.2,* SQ.METERS*)
      IF(IX.NE.0) WRITE(6,9006) CALX
 9006 FORMAT(//,* AIRCRAFT CROSS SECTION TABLE SPECIFIED. *,
     ** PRINTED VALUES WILL BE MULTIPLIED BY CALX. CALX= *,F9.2)
```

```
      IF(IJ.EQ.0) GO TO 1
C
C     JAMMER TABLE
C
      CALL TABLR(TABJ,37)
      DO 3 I=1,37
      DO 3 J=1,37
      TABJ(I,J) = 10.**(TABJ(I,J)/10.)
    3 CONTINUE
    1 GJ = 10.**(GAINJ/10.)
      IF(IX.EQ.0) GO TO 2
C
C     X-SECTION TABLE
C
      CALL TABLR(TABX,37)
    2 RETURN
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      ENTRY ECM2
C
      NAMELIST/NAM2/ X,Y,Z,ROL,PIT,HDG,
     *CX1,CY1,CZ1,CX2,CY2,CZ2,AZ,EL,GAINJ,XSEC,D2,SJ,ST,SJT
     *,GJ
C
      IF(IX.EQ.0 .AND. IJ.EQ.0) GO TO 5
      CALL DIRCOS(X,Y,Z,0.,0.,0.,CX1,CY1,CZ1)
      CALL CARROT(CX1,CY1,CZ1,ROL,PIT,HDG,CX2,CY2,CZ2)
      CALL RECSPH(CX2,CY2,CZ2,AZ,EL)
      IF(IJ.EQ.0) GO TO 6
      CALL INTRP(TABJ,AZ,EL,37,GJ)
    6 IF(IX.EQ.0) GO TO 5
      CALL INTRP(TABX,AZ,EL,37,XSEC)
      XSEC = XSEC*CALX
    5 D2 = DIST2(X,Y,Z,0.,0.,0.)
      SJ = FJAM*GJ/D2
      ST = FTGT*XSEC/D2/D2
      SN = 10.*ALOG10(ST)-RN
      SJT = 10.*ALOG10(SJ/ST)
      RETURN
      END
      SUBROUTINE JAMER2(IRAD,AJS,SDSQ)
      DIMENSION AJS1(3),SD1(3)
      DIMENSION AJS2(4),SD2(4)
      DIMENSION AJS3(2),SD3(2)
      DIMENSION AJS4(4),SD4(4)
      GO TO (1,2,3,4),IRAD
      DATA
```

```
     * N1/3/
     *,AJS1/ -5., 6., 9./
     *,SD1/ 0.002963, 0.01185, 0.1374 /
    1 CALL INT2(N1,AJS1,SD1,AJS,SD)
      GO TO 5
      DATA
     * N2/4/
     *,AJS2/ -2., 6., 10., 16./
     *,SD2/ 0.002963, 0.009877, 0.08278, 0.1374 /
    2 CALL INT2(N2,AJS2,SD2,AJS,SD)
      GO TO 5
      DATA
     * N3/2/
     *,AJS3/15., 30./
     *,SD3/ 0.0018, 0.01441 /
    3 CALL INT2(N3,AJS3,SD3,AJS,SD)
      GO TO 5
      DATA
     * N4/4/
     *,AJS4/ -2., 6., 10., 16./
     *,SD4/ 0.006914, 0.02173, 0.1024, 0.1374 /
    4 CALL INT2(N4,AJS4,SD4,AJS,SD)
    5 SDSQ = SD*SD
      RETURN
      END
      SUBROUTINE INT2(NVAL,X,Y,XVAL,YVAL)
      DIMENSION X(NVAL),Y(NVAL)
      YVAL = Y(1)
      IF(X(1)-XVAL) 4,4,3
    4 DO 1 I=1,NVAL
      IF(X(I)-XVAL) 1,1,2
    1 CONTINUE
      YVAL = Y(NVAL)
      GO TO 3
    2 YVAL = Y(I-1) + (Y(I)-Y(I-1)) / (X(I)-X(I-1)) * (XVAL-X(I-1))
    3 RETURN
      END
      SUBROUTINE JAMER1(PLEN,SDSQ)
      SDR = PLEN*0.6826/2.*2.998E8
      SDSQ = SDR*SDR
      RETURN
      END
      SUBROUTINE TABLR(TABX,IDIM)
C
C SUBROUTINE TO READ AND PRINT A TABLE OF UP TO 37 X 37 ELEMENTS
C THE PROGRAM PROVIDES A DEFAULT VALUE FOR ELEMENTS OUTSIDE THE
C DEFINED TABLE.
C           INPUTS ARE:
```

```
C CARD   VARIABLE   FORMAT   DEFINITION
C  1       INAME     8A10    ARBITRARY IDENTIFICATION
C  2        NAZ       I5     NO. OF AZ ELEMENTS
C                             (ASSUMING ELEMENT 1 CORRESPONDS TO AZ=0)
C           NEL       I5     NO. OF EL ELEMENTS,EL GOES-ELEND TO +ELEND
C         ELEND     F10.4    MAXIMUM ENTRY EL(DEG)
C         AZEND     F10.4    MAXIMUM ENTRY AZ(DEG)
C         DEFALT    F10.4    DEFAULT VALUE
C 3+  TABX(IDIM,1) 8F10.0 DATA TABLE
C
      COMMON/TABLES/ELO,DELAZ,DELEL,JEL
      DIMENSION TABX(IDIM,1),INAME(8)
      DATA LE,LZ/2HEL,2HAZ/
      DATA AZO,CDTR/0.,.0174533/
      READ(5,98) INAME
      READ(5,99) NAZ,NEL,ELEND,AZEND,DEFALT
   98 FORMAT(8A10)
   99 FORMAT(2I5,3F10.4)
C NOTE IMPLIED INCREMENT
      DELAZ=AZEND/(NAZ-1)
      DELEL=(2.*ELEND)/(NEL-1)
C LOCATE FIRST ELEVATION ENTRY ETC
      JEL=(IDIM-NEL)/2 +1
      MEL=JEL+NEL-1
      ELO=-ELEND
      WRITE(6,101)INAME,NAZ,AZO,AZEND,DELAZ,
     1LZ,NEL,ELO,ELEND,DELEL,LE,DEFALT
  101 FORMAT(*1  TABLE DATA*,/,1X,8A10,/,2(1X,I5,
     1* ELEMENTS FROM *,F10.2,* TO *,F10.2,* BY *
     2F10.2,2X,A2,/),* ELSEWHERE TABLE IS *,F10.2)
C INSERT DEFAULT
      MAZ=(180./DELAZ)+1
      IF ((MAZ.GT.37).OR.(MEL.GT.37)) GO TO 999
      DO 8 IAZ=1,MAZ
      DO 8 IEL=1,IDIM
    8 TABX(IEL,IAZ)=DEFALT
C READ TABLE
      DO 14 I=JEL,MEL
      READ(5,102) (TABX(I,J),J=1,NAZ)
   14 CONTINUE
  102 FORMAT(8F10.0)
      IDELAZ=DELAZ
      NPAGE=NAZ/13+1
      DO 20 LP=1,NPAGE
      JH1=(LP-1)*13*IDELAZ
      JH2=JH1+12*IDELAZ
      KH1=(LP-1)*13+1
      KH2=KH1+12
```

```
      IF(LP.EQ.NPAGE)KH2=MAZ
      IF(LP.EQ.NPAGE)JH2=180
      WRITE(6,106)(JH,JH=JH1,JH2,IDELAZ)
  106 FORMAT(*1   RCS MATRIX*,/,*    ELEV *,13I9)
      JELO=MAXO(JEL-1,1)
      MELO=MINO(MEL+1,IDIM)
      ELPT=ELO-DELEL*(JEL-JELO)
C PRINT TABLE
      DO 15 J=JELO,MELO
      WRITE(6,104)ELPT,(TABX(J,K),K=KH1,KH2)
  104 FORMAT(1X,F7.1,2X,13F9.2)
      ELPT=ELPT+DELEL
   15 CONTINUE
   20 CONTINUE
C CONVERT TO RADIANS
      DELEL=DELEL*CDTR
      DELAZ=DELAZ*CDTR
      ELO=ELO*CDTR
      RETURN
  999 CONTINUE
      WRITE(6,105)
  105 FORMAT(* >>>> ERROR IN INPUT <<<<*)
      STOP
      END
      SUBROUTINE CIRCOS(X1,Y1,Z1,X2,Y2,Z2,COSA,COSB,COSG)
      XD = X2-X1
      YD = Y2-Y1
      ZD = Z2-Z1
      D = SQRT(XD*XD+YD*YD+ZD*ZD)
      COSA = XD/D
      COSB = YD/D
      COSG = ZD/D
      RETURN
      END
      SUBROUTINE CARROT(X1,Y1,Z1,ROL,PIT,HDG,X2,Y2,Z2)
C CARROT CARTESIAN ROTATION
C HEADING
      X =  X1*COS(HDG)     +     Y1*SIN(HDG)
      Y = -X1*SIN(HDG)     +     Y1*COS(HDG)
      Z =                                          Z1
C PITCH
      XX =  X*COS(PIT)                            -Z*SIN(PIT)
      YY =                  Y
      ZZ =   X*SIN(PIT)    +                      Z*COS(PIT)
C ROLL
      X2 =  XX
      Y2 =                        YY*COS(ROL)     +    ZZ*SIN(ROL)
      Z2 =  -YY*SIN(ROL)    +     ZZ*COS(ROL)
```

```
      RETURN
      END
      SUBROUTINE RECSPH(X,Y,Z,PHI,THE)
      THE = ACOS(Z/SQRT(X*X+Y*Y+Z*Z) )
      THE=THE-1.5708
      PHI=0.0
      SB=SQRT(X*X+Y*Y)
      IF(SB .NE. 0.0)PHI=X/SB
      PHI=ACOS(PHI)
      PHI=ABS(PHI)
      RETURN
      END
      SUBROUTINE INTRP(TAB,AZ,EL,NVAL,VALUE)
      COMMON/TABLES/ELO,DELAZ,DELEL,JEL
      DIMENSION TAB(NVAL,1)
      A=ABS(AZ)
      E=EL
      AAZ=A/DELAZ+1.
      IAZ=AAZ
      EEL=(E-ELO)/DELEL+JEL
      IEL=EEL
      IAZ=MIN0(MAX0(IAZ,1),36)
      IEL=MIN0(MAX0(IEL,1),36)
      V1=TAB(IEL,IAZ)
      V2=TAB(IEL,IAZ+1)
      V3=TAB(IEL+1,IAZ)
      V4=TAB(IEL+1,IAZ+1)
      S=AAZ-IAZ
      V12=V1+(V2-V1)*S
      V34=V3+(V4-V3)*S
      S=EEL-IEL
      VALUE=V12+(V34-V12)*S
      RETURN
      END
      FUNCTION DIST2(X1,Y1,Z1,X2,Y2,Z2)
      XD = X2-X1
      YD = Y2-Y1
      ZD = Z2-Z1
      DIST2 = XD*XD+YD*YD+ZD*ZD
      RETURN
      END
```

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