





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

DTIC FILE COPY (2)

AD-A188 036

A STUDY OF USER ACCEPTABILITY OF  
THE AIR FORCE COMMUNICATIONS-ELECTRONICS  
(C-E) SYSTEM OF VAMOSC

by  
Desmatics Staff

— STATISTICS —  
— OPERATIONS RESEARCH —  
— MATHEMATICS —

DTIC  
SELECTED  
NOV 09 1987  
S D

DESMATICS, INC.

P.O. Box 618  
State College, PA 16804

DISTRIBUTION STATEMENT A  
Approved for public release  
Distribution Unlimited

87 1014 436

## **DISCLAIMER NOTICE**

**THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.**

DESMATICS, INC.

②  
P. O. Box 618  
State College, PA 16804  
Phone: (814) 238-9621

*Applied Research in Statistics - Mathematics - Operations Research*

A STUDY OF USER ACCEPTABILITY OF  
THE AIR FORCE COMMUNICATIONS-ELECTRONICS  
(C-E) SYSTEM OF VAMGSC

by

Desmatics Staff

DTIC  
ELECTE  
NOV 09 1987  
S D D

TECHNICAL REPORT NO. 118-13

Original Draft May 1987  
Final Draft June 1987

**DISTRIBUTION STATEMENT A**

Approved for public release;  
Distribution Unlimited

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION . . . . .	1
II. BACKGROUND . . . . .	3
III. C-E SYSTEM USER SURVEY . . . . .	4
IV. RESULTS AND ANALYSIS . . . . .	6
V. SUMMARY AND CONCLUSIONS. . . . .	37
APPENDIX A: INITIAL LETTER AND ATTACHMENT . . . . .	39
APPENDIX B: SURVEY AND ATTACHMENTS. . . . .	42
APPENDIX C: DETAILED COMMENTS FROM ONE RESPONDENT . . . . .	76



Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 118-13	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) A Study of User Acceptability of The Air Force Communications-Electronics (C-E) System of VAMOSC		5. TYPE OF REPORT & PERIOD COVERED Technical Report
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Desmatics Staff		8. CONTRACT OR GRANT NUMBER(s) F33600-82-C-0466
9. PERFORMING ORGANIZATION NAME AND ADDRESS Desmatics Inc P.O. Box 618 State College PA 16804		10. PROGRAM ELEMENT, PROJECT, TASK, AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS HQ AFLC/ACCV (VAMOSC) Wright-Patterson AFB OH 45433		12. REPORT DATE Jun 87
		13. NUMBER OF PAGES 80
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report)  Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  VAMOSC O&S Costs Communications-Electronics		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report documents the results of a C-E system user acceptability study. Since the C-E system is not yet a mature system, it is currently not being used extensively. The study had five primary goals: 1. to identify potential users of the C-E system 2. to inform them about the type of cost information which the C-E system is designed to provide. 3. to determine the usefulness of the current system products 4. to gather user ideas for improvements to the C-E system and its products		

20. Cont

5. to obtain information about the anticipated use of COSTCASTER, a cost-prediction and trade-off model for Air Force ground C-E equipment.

This report contains the background of the study, development of the survey, analysis and discussion of the survey results and conclusions.

It must be stressed, however, that in order for the C-E system to be helpful in practice, as well as in theory, it must produce output products which provide accurate and complete cost information. Unfortunately, the system was placed in operation while it still contained significant defects. Although corrections to a number of those defects have been specified, they do not include the most significant ones. These involve deficient depot and base-level maintenance input data. The Office of VAMOSC has decided, therefore, to suspend operation of the C-E system. Thus, the survey results are currently moot. However, should the decision be reversed in the future, the information obtained through this survey should prove of value to the Office of VAMOSC in assessing the usefulness of the C-E system products and possible modifications that should be made to those products.

## I. INTRODUCTION

Desmatics, Inc., under Contract No. F33600-82-C-0466, is conducting an evaluation of the Communications-Electronics (C-E) subsystem of VAMOSC, the Air Force Visibility and Management of Operating and Support Costs system. The C-E system, D160A, collects and displays Operating and Support (O&S) costs for items of ground communications-electronics and meteorological equipment.

This report documents the results of a C-E system user acceptability study. The Statement of Work for this task stresses the importance of having the C-E system meet the needs of its user community:

"The D160A (C-E) subsystem of the VAMOSC system has been designed in part to aid in high level decision-making activities related to acquisition planning, trade-off analyses, and budgeting by HQ USAF, DOD, and defense contractors. It is important that the C-E system meet the needs of its user community and that the Office of VAMOSC be responsive to these needs. Therefore, the Office of VAMOSC intends to assess the utility and acceptability of the C-E system and its output products to its users."

Because the C-E system is not yet a mature system, it is currently not being used extensively. Thus, the Desmatics acceptability study focused primarily on potential, rather than current, users of the C-E system. The study had five primary goals:

- (1) to identify potential users of the C-E system,
  - (2) to inform them about the type of cost information which the C-E system is designed to provide,
  - (3) to determine the usefulness of the current system products,
  - (4) to gather user ideas for improvements to the C-E system and its products,
- and (5) to obtain information about the anticipated use of COSTCASTER, a cost-prediction and trade-off model for Air Force ground C-E equipment.

The user acceptability study was based on the administration of a survey.

The background of the study, development of the survey, analysis and discussion of survey results, and conclusions are addressed in the following sections of this report.

## II. BACKGROUND

This section describes the background of the Desmatics C-E system user acceptability study, which was based on the administration of a written survey to the C-E system user community. This community, as defined in the context of this report, includes both current and potential users of the C-E system. Because the C-E system has not yet evolved to maturity, the latter category prevails. Determining the nature and extent of the user community began with the compilation of a list of specific individuals/offices who were, in the judgement of Desmatics, current or potential users.

Desmatics' initial list of users/potential users consisted of attendees of the May 1984 Tri-Service VAMOSC Conference who indicated interest in the C-E system and attendees at C-E/COSTCASTER briefings. The Office of VAMOSC reviewed this list and made a number of additions, including individuals who had requested C-E system output.

In order to locate additional users/potential users, a letter requesting the names and addresses of individuals who might be potential C-E system users was prepared by Desmatics. An attachment to the letter provided a brief description of the C-E system. After a review of the letter by the Office of VAMOSC, it was signed by the HQ USAF/LEYE Deputy Chief and then mailed to the individuals/offices on the initial list. A copy of the letter and the attachment describing the C-E system is provided in Appendix A. Of the letters mailed, 18 were returned. Most of these responses identified a number of potential users. A master list for the survey mailing was compiled from these responses.

### III. C-E SYSTEM USER SURVEY

The major part of the C-E system user acceptability study consisted of the design, administration, and analysis of a written survey. Questions included in the survey were developed by Desmatics based on its knowledge of the C-E system and on information obtained from attendees of C-E/COSTCASTER briefings. The survey was constructed through a series of drafts which were reviewed internally and revised. A draft was then submitted to the Office of VAMOSC for approval, and after minor modification the final version was prepared.

The survey, which was mailed to a total of 113 addressees (offices/individuals) on the master mailing list, was accompanied by a set of four attachments to be used as reference when completing the survey:

- Attachment 1: Overview of the Ground Communications-Electronics (C-E) System
- Attachment 2: C-E System Output Products
- Attachment 3: C-E System Standard Products-Sample Reports
- Attachment 4: COSTCASTER: Cost-Prediction/Trade-Off Model for Ground C-E Equipment

A postage-paid business reply envelope was included with the survey for its return. A copy of the survey and its attachments is given in Appendix B.

The surveys were mailed in January 1987. Approximately four weeks later the Office of VAMOSC sent a follow-up letter. In all, a total of 47 surveys were returned, a response rate of 42%.

The survey itself consisted of a total of eighteen questions of three types: multiple-choice, rating-scale, and open-ended. For the sake of brevity and ease of response, most questions were of the first two types.

Background questions requested the respondent's name and address (optional), type of employer, and work-related tasks involving C-E equipment. Respondents were asked if they have a current or future need for &S cost information on C-E equipment. Those responding in the affirmative were asked a series of questions designed to assess the usefulness of the C-E system and the COSTCASTER model in their current or future work. In addition, these respondents were asked for suggestions for enhancements to the C-E system and its outputs.

#### IV. RESULTS AND ANALYSIS

Survey respondents were classified into two main groups according to whether or not they are "potential" users of the C-E system. The respondents classified as POTENTIAL C-E USERS were requested to complete the entire questionnaire. The respondents classified as C-E NONUSERS were requested to answer only questions to identify their current employer and the type of tasks they perform which involve C-E equipment. In subsection A, the respondents are categorized according to their current employer and their need for and familiarity with the C-E system. In subsection B, the responses to each survey question are summarized and analyzed.

##### A. CLASSIFICATION OF RESPONDENTS

Based on responses to Questions 2, 4, and 7, each respondent was categorized according to current employer and need for and familiarity with the C-E system. This categorization is summarized in Table 1.

The row classification in Table 1 corresponds to the respondent's employer. The column classification refers to the type of need for and familiarity with the C-E system. Five categories are identified; these are:

NO NEED FOR C-E,  
NEED: NEVER HEARD OF C-E,  
NEED: HEARD OF C-E BUT NOT SEEN C-E,  
NEED: HEARD OF AND SEEN C-E,  
and NEED: C-E USER.

Classification into these five categories was based on the responses to Questions 4 and 7, which inquired about the respondent's need for and degree of familiarity with the C-E system.

EMPLOYER	NEED: HEARD OF C-E		NEED: HEARD OF AND SEEN C-E		NEED: C-E USER	ALL CATEGORIES
	NO NEED FOR C-E	NEED: NEVER HEARD OF C-E	NEED: HEARD OF C-E BUT NOT SEEN C-E	NEED: HEARD OF AND SEEN C-E		
AIR FORCE	13	2	17	5	1	38 (81%)
DOD CONTRACTOR	1	-	3	2	1	7 (15%)
DEPARTMENT OF DEFENSE	1	-	-	-	-	1 (2%)
NAVY	-	-	-	1	-	1 (2%)
TOTAL RESPONDENTS	15 (32%)	2 (4%)	20 (43%)	8 (17%)	2 (4%)	47 (100%)

POTENTIAL C-E USERS: 32 (68%) Respondents  
 C-E NONUSERS: 15 (32%) Respondents

Table 1. Respondent Categorization

Each respondent was subsequently classified as either a POTENTIAL C-E USER or a C-E NONUSER for purposes of analysis. A respondent was classified as a POTENTIAL C-E USER if he/she indicated a current or future need for O&S cost information on C-E equipment. If no such need was indicated, the respondent was classified as a C-E NONUSER.

As previously mentioned, a total of 47 surveys were returned to Desmatics, Inc. for analysis. A breakdown of these 47 surveys showed 38 (81%) were Air Force employees, 7 (15%) were DOD Contractor employees, 1 (2%) was a DOD employee, and 1 (2%) was a Navy employee. Only 2 (4%) respondents had actually used C-E system output products prior to this survey. Furthermore, 32 (68%) respondents were classified as POTENTIAL C-E USERS and 15 (32%) were classified as C-E NONUSERS.

#### B. ANALYSIS OF SURVEY QUESTIONS

The following pages provide a summary and analysis of the responses to each survey question. Note that Question 1 is not discussed because it was an optional question requesting the respondent's name and address.

```

*****
*
*   Question 2.  Who is your current employer?
*
*   81% Air Force      2% Dept. of Defense
*   0% Army           15% Dept. of Defense contractor
*   2% Navy           0% Other, please specify:
*
*****

```

All respondents (N=47) were requested to answer this question, and there were no nonresponses. A look at the results above shows that the majority of respondents, 81%, were Air Force employees. The only other category with a significant share of respondents was that of the Department of Defense Contractors, which accounted for 15% of the respondents.

```

*****
*
*   Question 3. Which of the following tasks involving C-E
*   equipment do you perform in your work? Please check all
*   that apply.
*
*   13% My work does not involve C-E equipment
*   28% Life cycle cost management
*   36% Trade-off analysis
*   32% Budget preparation
*   38% Life cycle cost modeling/forecasting
*   43% Reliability/maintainability studies
*   40% Logistics forecasting/management
*   21% Manpower forecasting/management
*   45% Systems comparison (existing or conceptual)
*   6% DSARC submissions
*   30% Evaluate product performance agreements
*       (warranties, maintenance agreements, etc.)
*   40% POM submissions
*   21% Other(s), please specify:
*
*****

```

All respondents (N=47) were requested to answer this question. There were no nonresponses to this question. Table 2 provides a breakdown of the responses by respondent group. As can be seen from this table, the tasks performed by at least 50% of POTENTIAL C-E USERS were Systems Comparison (59%), Life Cycle Cost Modeling/Forecasting (56%), Trade-Off Analysis (53%), Logistics Forecasting/Management (53%), and Reliability/Maintainability Studies (50%).

	RESPONDENT GROUP		
	ALL RESPONDENTS N=47	POTENTIAL C-E USERS N=32	C-E NONUSERS N=15
A. MY WORK DOES NOT INVOLVE C-E EQUIPMENT	13%	0%	40%
B. LIFE CYCLE COST MANAGEMENT	28%	41%	0%
C. TRADE-OFF ANALYSIS	36%	53%*	0%
D. BUDGET PREPARATION	32%	44%	7%
E. LIFE CYCLE COST MODELING/FORECASTING	38%	56%*	0%
F. RELIABILITY/MAIN- TAINABILITY STUDIES	43%	50%*	27%
G. LOGISTICS FORE- CASTING/MANAGEMENT	40%	53%*	13%
H. MANPOWER FORE- CASTING/MANAGEMENT	21%	28%	7%
I. SYSTEMS COMPARISON	45%	59%*	13%
J. DSARC SUBMISSIONS	6%	9%	0%
K. EVALUATE PRODUCT PERFORMANCE AGREEMENTS	30%	31%	27%
L. POM SUBMISSIONS	40%	44%	33%
M. OTHER	21%	22%	20%

\*Denotes those tasks performed by at least 50% of the respondents in a given group.

Table 2. Summary of Responses to Question 3.

Of the 47 respondents, 10 (21%) indicated that they performed other tasks involving C-E equipment. One respondent did not state what these tasks were. The remaining responses were:

POTENTIAL C-E USERS

- Computer Resource Life Cycle Management Plan and Technical (Engineering) Support.
- Resolve myriad of issues between wholesale (AF) supplier and retailer (AF) user of Ground C-E equipment.
- Assessment of C-E Equipment Availability, Reliability, and Sustainability.
- Software Support and Computer Resources Support.
- Evaluation of modification proposals.
- ILS/O&S Estimating.

C-E NONUSERS

- Technical Order Management and D056/B40 Data Management.
- My programs are Automated Test Equipment, so from that standpoint I occasionally get involved with testers that test communications equipment. That is as close as I get to C-E equipment.
- Plans and programs involving transition of Communications Electronics Technology to systems development, excluding FYDP and long (20 yrs.) range planning.

```

*****
*
*   Question 4. Do you now have (or do you anticipate in
*   the future) a need for O&S cost information on C-E
*   equipment?
*
*   68% Yes      32% No (If no, please stop here and
*                   return your questionnaire in
*                   the enclosed envelope.)
*
*****

```

All respondents (N=47) were requested to answer this question, and there were no nonresponses. Of the 47 respondents, 32 (68%) answered "yes" and 15 (32%) answered "no." This question was used as a filter question to distinguish between POTENTIAL C-E USERS and C-E NONUSERS. A respondent who answered in the affirmative was requested to complete the remainder of the questionnaire, and was subsequently classified as a POTENTIAL C-E USER. A respondent who answered in the negative was requested to stop and return the already completed portion of the survey; he/she was subsequently classified as a C-E NONUSER.

```

*****
*
*      Question 5.  At what level(s) of detail do you (or will
*      you) require O&S cost information on C-E equipment?
*      Check all that apply.
*
*      75% End Item Level
*      72% Recoverable Component Level
*      9% Other (Please specify)
*
*****

```

Only POTENTIAL C-E USERS (N=32), i.e., those who responded affirmatively to Question 4, were requested to answer this question. There were no nonresponses to this question. Of the 32 respondents, 24 (75%) indicated that they require O&S cost information on C-E equipment at the End Item Level and 23 (72%) required this information at the Recoverable Component Level. Furthermore, 16 (50%) indicated a need for O&S cost information at both levels.

Three (9%) respondents indicated a requirement for information at other levels of detail. Their responses were:

- Computer Software Configuration Item (CSCI).
- In certain instances, I can see benefits from a capability to summarize data to the "L" System (e.g., 407L, 465L, etc.) Level. This need is in line with emphasis on Weapon Systems Management currently being expressed with USAF and DOD.
- Systems or Sub-system level.

```

*****
*
*   Question 6.  Where do you currently obtain your C-E
*   O&S cost information?
*
*   58% I do not currently have access to C-E
*   O&S cost information.
*   42% I obtain C-E O&S cost information from
*   (please specify):
*
*****

```

POTENTIAL C-E USERS (N=32) were requested to answer this question. There was one nonresponse. Of the 31 responses, 18 (58%) indicated that they currently have no access to C-E O&S cost information. The remaining 13 (42%) indicated some access to C-E O&S cost information. Their responses regarding the sources of such information were:

- CFWO (Assessment Branch) and CFC (Program Management Division).
- VAMOSOC (mentioned by two respondents).
- HQ AFCC/ACO.
- Rough estimates based on manufacturers data, projected reliability, maintenance support contract costs.
- Various sources including Defense Logistics Studies Information Exchange, AFR 173-13.
- To-date these type data, when absolutely required to accomplish assigned SM-ALC/MMC mission, are gathered from a variety of data systems and manual records.  
There is today a significant distrust of Maintenance Data Collection (MDC) that does exist, and there is a vast shortfall relative to C-E's equipment within the MDC systems. Therefore, our personnel routinely go to other, less accessible, more manpower intensive, but more accurate sources.
- Budget records.
- Operating Commands (SAC, TAC, etc.).
- Minimal Support from SM-ALC and AFCC.

- Special one-time studies.
- Functional experts.
- (AFR) 66-1.

```

*****
*
*   Question 7. Are you familiar with the Air Force
*   VAMOS C-E system?
*
*   6% I had never heard of the C-E system
*   prior to this survey.
*   63% I had heard of the C-E system prior to
*   this survey, but I had not seen any C-E
*   system output products.
*   25% I had heard of the C-E system and had
*   seen some C-E system output products prior
*   to this survey.
*   6% I had used the C-E system output products
*   prior to this survey.
*
*****

```

POTENTIAL C-E USERS (N=32) were requested to answer this question, and there were no nonresponses. Of the 32 respondents, 30 (94%) had heard of or actually used the C-E system. Only 2 (6%) of the respondents were in this latter group. It may also be noted that 22 (69%) of the POTENTIAL C-E USERS had never seen any C-E system output products prior to this survey.

```

*****
*
*   Question 8. Please indicate the potential usefulness
*   of the C-E O&S Cost Report to you in your current
*   or future work.
*
*   19% Very Useful
*   44% Useful
*   28% Somewhat Useful
*   3% Not Useful
*   6% Don't Know
*
*****

```

POTENTIAL C-E USERS (N=32) were requested to answer this question, and there were no nonresponses. Of the 32 respondents, 29 (91%) indicated that the C-E O&S Cost Report would be helpful in their current or future work. Only 1 (3%) respondent indicated that this report would not be useful, and 2 (6%) said they could not assess the potential usefulness of the Cost Report.

```

*****
*
*   Question 9.  Is the level of visibility within the major
*   cost groupings adequate for your current (or future) work,
*   or is more cost visibility required in some area(s)?
*
*   75% Visibility is Adequate
*   25% More Visibility Required
*   (Please indicate where it is required.)
*
*****

```

POTENTIAL C-E USERS (N=32) were requested to answer this question, and there were no nonresponses. Of the 32 respondents, 8 (25%) indicated that more visibility was required within the major cost groupings. Their comments were:

- Does not consider software impact to support of processor driver hardware. Probably not within the scope of the model; However, it is a significant life-cycle cost factor.
- Attachment I says DSD D160A is to report & retain life-cycle O&S cost for C-E systems. A major portion of this life cycle cost, namely software & software support has been omitted. Focusing solely on hardware cost is misleading and obviously not the total O&S cost.
- Would need to know much more about the "equitable" allocation of costs to specific equipment. Are training costs included?
- In certain instances, I can see benefits from a capability to summarize data to the "L" System (e.g., 407L, 465L, etc.) Level. This need is in line with emphasis on Weapon Systems Management currently being expressed with USAF and DOD.
- LSC needs breakdown.
- Again - system or major sub system groupings.
- Operating systems in the field.

One respondent had fairly extensive comments which are given in Appendix C.

```

*****
*
*   Question 10a.  Could you use the information in the
*   O&S Cost Report without any supporting documentation
*   describing the cost categories on the report?
*
*   44% Yes
*   56% No
*
*****

```

POTENTIAL C-E USERS (N=32) were requested to answer this question, and there were no nonresponses. Of the 32 respondents, 14 (44%) indicated that they could use the information in the O&S Cost Report without any supporting documentation describing the cost categories, while 18 (56%) indicated that they could not use the information without supporting documentation. Those respondents who answered negatively were requested to read Attachment 1, which provides an overview of the C-E system, and then to answer Question 10b. The other respondents were requested to continue with Question 11.

```

*****
*
*   Question 10b.  If your answer was "No," are the
*   descriptions of the cost categories provided in
*   Attachment 1 detailed enough for your needs?
*
*   56% Yes
*   44% No (Please indicate what needs to be
*   added to the descriptions.)
*
*****

```

Only respondents who answered "no" to Question 10a (N=18) were requested to answer Question 10b. There were no nonresponses. Of the 18 respondents, 10 (56%) answered that the descriptions in Attachment 1 were detailed enough, while 8 (44%) answered that the descriptions were not detailed enough. The comments of those latter respondents were:

- Need cost comparisons of similar equipment maintained by contract vs. blue-suit.
- Not Self Explanatory.
- Better.
- Need to know specifics, allocation methods, Degree of homogeneity of data for that group, what units were costed (P.1 of atch. 3 - 217 of 370 units were costed, were those w/wide, CONUS only? Are they representative).
- I would have concern about the allocation process/CERs used to allocate costs. Clearly systems differ to the amount of labor/materials required. Often the justification for a new system is to change one of these variables. Some access to the CERs is/would be necessary.
- The complete description of the figures: the data source, the algorithms, and the description of the cost element.
- Source of data. Procedure for validating data. How is invalid data handled? How much data is invalid? More detailed description, including sub-elements if appropriate.
- It should go down to the LRU, on demand.

\*\*\*\*\*  
 \*  
 \*        Question 11. Do you have any suggestions for additions, \*  
 \*        deletions, or modifications on the O&S Cost Report that \*  
 \*        you did not mention in Question #9? If so, please note \*  
 \*        them here. \*  
 \*  
 \*\*\*\*\*

POTENTIAL C-E USERS (N=32) were requested to answer this question. Of the 32 respondents, 26 (81%) did not provide comments, while 6 (19%) provided comments. Their comments were:

- Need to be able to enter data base on more familiar nomenclature designators than the TMS, e.g., TRC-170 radio, Z-100 microcomputer, Northern Telecom DMS-150 switch, etc.
- Add: Acquisition and training costs to "Indirect Personnel." Replacement Support Equipment and Rep Spares Costs. Medical should be placed under "Installation Support" rather than "Indirect Personnel."
- Ensure implementation of category #8-Training.
- Spares costs are omitted, Training is hazy, fuel costs become rapidly outdated. Data bases used are suspect themselves even prior to allocation.
- List of items and categories of items contained in the database.

One survey had extensive comments which are given in Appendix C.

\*\*\*\*\*  
 \*  
 \*        Question 12. Using the scale below, please rate the        \*  
 \*        potential usefulness of the output products to you in your        \*  
 \*        current or future work, and note any suggestions or        \*  
 \*        comments you may have, identifying specific products by        \*  
 \*        letter. (Use back of page if more space is needed.)        \*  
 \*  
 \*                \_\_\_ Very Useful        \*  
 \*                \_\_\_ Useful        \*  
 \*                \_\_\_ Somewhat Useful        \*  
 \*                \_\_\_ Not Useful        \*  
 \*                \_\_\_ Don't Know        \*  
 \*  
 \*\*\*\*\*

POTENTIAL C-E USERS (N=32) were requested to answer this question after reading attachments 2 and 3, which provide descriptions and samples of C-E system output products. The number of nonresponses differed from output product to output product. However, there were no more than two nonresponses for any individual output product.

A mean response was computed by assigning weights of 0, 1, 2, and 3 for not useful, somewhat useful, useful, and very useful, respectively. Responses of "don't know" were excluded from calculation of the mean response.

The responses are summarized in Table 3. Inspection of this table reveals that all products, except for the Historical Cost Trend, received a mean rating which fell in between "somewhat useful" and "useful." The Historical Cost Trend product received a mean rating slightly above "useful." The products with the five highest mean ratings were:

Product	Number of Respondents	Response				Mean Response <sup>1</sup>
		Don't Know	Not Useful	Somewhat Useful	Very Useful	
A. Basic Inventory Data	32	3	2	8	13	1.79 (3)
B. Base Maintenance Material Cost	32	1	5	10	11	1.52 (13)
C. Base Maintenance Labor Cost	32	1	3	12	11	1.58 (12)
D. Annual Depot Maintenance Cost	32	1	2	12	12	1.65 (10)
E. Replacement Investment Cost	32	2	2	12	10	1.67 (7)
F. Packaging and Transportation Cost	32	2	4	15	7	1.37 (17)
G. Historical Annual LSC	32	3	1	12	7	1.83 (2)
H. Total (Fleet) O&S Cost	31	2	3	9	11	1.69 (5)
I. Total (Fleet) Cost	31	2	3	11	8	1.66 (9)
J. O&S Cost Per Item	31	2	3	7	15	1.69 (6)
K. LSC Per Item	31	2	3	7	13	1.76 (4)
L. % Change in Total O&S Cost	31	2	4	9	13	1.52 (14)
M. % Change in Total LSC	31	2	4	10	12	1.48 (15)
N. % Change in Per Item O&S Cost	31	1	3	14	10	1.43 (16)
O. % Change in Per Item LSC Cost	31	1	3	16	8	1.37 (18)
P. Ratio of O&S Cost/Price	31	4	3	10	7	1.67 (8)
Q. Ratio of LSC Cost/Price	31	3	4	10	7	1.61 (11)
R. Historical Cost Trend	30	3	0	8	10	2.04 (1)

<sup>1</sup>Mean response was computed by assigning weights of 0, 1, 2, and 3 for not useful, somewhat useful, useful, and very useful, respectively. Respondents who responded "don't know" were excluded. Ranks based on the mean response are given in parentheses.

Table 3. Summary of Responses to Question 12.

<u>Product</u>	<u>Mean Rating</u>
Historical Cost Trend	2.04
Historical Annual LSC	1.83
Basic Inventory Data	1.79
LSC Per Item	1.76
Total (Fleet) Cost	1.69

Several respondents made suggestions as to how some products could provide more useful information. Their comments were:

Product

a) Basic Inventory Data

- Add nomenclatures: TMS & NSN.
- Acquisition Price is helpful item here.
- NSN meaningless, TMS meaningless, Std. Reporting designators meaningless!

b) Base Maintenance Material Cost

- Don't understand this report.
- Meaningless without knowing what is included, Allocation Method, etc.

c) Base Maintenance Labor Cost

- Need to understand basis for "labor allocation factor."
- Meaningless without knowing what is included, Allocation Method, etc.
- Again. I don't have any warm fuzzies about the "Depot Level" type allocations going on. Usefulness of data for product substitutions/cost benefits seems limited.

d) Annual Depot Maintenance Cost

- NSN meaningless. Don't understand distinction between program cost and allocated depot maintenance cost.
- Meaningless without knowing what is included, Allocation Method, etc.
- Again. I don't have any warm fuzzies about the "Depot Level" type

allocations going on. Usefulness of data for product substitutions/cost benefits seems limited.

e) Replacement Investment Cost

- Spares costs, installation kits, Tech orders included?
- Don't understand derivation of Figures in "allocated replacement cost."

f) Packaging and Transportation Cost

- NSN meaningless, don't understand how figures are derived.
- Transportation costs from where to where? Better off taking weight and having local transportation office estimate.

g) Historical Annual LSC

- Figures seem distorted by large '82 expenditures on replacements.
- Again. I don't have any warm fuzzies about the "Depot Level" type allocations going on. Usefulness of data for product substitutions/cost benefits seems limited.
- Numbers on chart given make little logical sense. Replacement Investment cost ranges from \$6 to \$21,584. Base Maintenance Labor cost decreases one year. Trans & Packing Quadruples 81 to 82. Depot maintenance cost triples, Base Maint Material cost = 0.

h) Total (Fleet) O&S Cost

- If costs are relatively fixed, this ranking is totally dependent on # in inventory. No detail to verify this.

i) Total (Fleet) LSC

- If costs are relatively fixed, this ranking is totally dependent on # in inventory. No detail to verify this.

j) O&S Cost Per Item

- If costs are relatively fixed, this ranking is totally dependent on # in inventory. No detail to verify this.
- Need a sort by TMS sequence.

- Data included in 8206, Part 1.

k) LSC Per Item

- If costs are relatively fixed, this ranking is totally dependent on # in inventory. No detail to verify this.
- Need a sort by TMS sequence.
- Data included in 8206, Part 1.

l) % Change in Total O&S Cost

- If costs are relatively fixed, this ranking is totally dependent on # in inventory. No detail to verify this.

m) % Change in Total LSC

- If costs are relatively fixed, this ranking is totally dependent on # in inventory. No detail to verify this.

n) % Change in Per Item O&S Cost

- If costs are relatively fixed, this ranking is totally dependent on # in inventory. No detail to verify this.
- Need a sort by TMS sequence.

o) % Change in Per Item LSC Cost

- If costs are relatively fixed, this ranking is totally dependent on # in inventory. No detail to verify this.
- Need a sort by TMS sequence.

p) Ratio of O&S Cost/Price

- If costs are relatively fixed, this ranking is totally dependent on # in inventory. No detail to verify this.
- Need a sort by TMS sequence.

q) Ratio of LSC Cost/Price

- If costs are relatively fixed, this ranking is totally dependent on # in inventory. No detail to verify this.
- Need a sort by TMS sequence.

r) Historical Cost Trend

- Explain!
- Would be useful if costs given have credence.

Some general comments were:

- Significance of asterisked items is not explained.
- Ranking reports of no value. Large year-to-year variations in ranking make basic data and/or calculation methods suspect.
- Ranking reports should all be in either whole dollars or thousands.  
"Hundreds of dollars is difficult to work with & could inject errors.

One survey had extensive comments which are given in Appendix C.

```

*****
*
*   Question 13. Overall, given the variety and content of
*   the standard output products, how useful would the C-E
*   system be in your current or future work?
*
*   13% Very Useful
*   56% Useful
*   19% Somewhat Useful
*   9% Not Useful
*   3% Don't Know
*
*****

```

POTENTIAL C-E USERS (N=32) were requested to answer this question. There were no nonresponses. Of the 32 respondents, 28 (88%) indicated that the C-E system would be helpful in their current or future work. Of these 4 (13%) respondents indicated that this system would be very useful in their work. Only 3 (9%) indicated that the C-E system would not be useful.

\*\*\*\*\*

\*  
 \* Question 14. The C-E system is currently a batch system \*  
 \* which provides its output products on microfiche and \*  
 \* paper, and in some instances on magnetic tape. Do you \*  
 \* think the potential usefulness of the C-E system would be \*  
 \* increased if the O&S cost information were available \*  
 \* on-line? \*  
 \* \*  
 \* 68% Yes 32% No \*  
 \* \*  
 \*\*\*\*\*

POTENTIAL C-E USERS (N=32) were requested to answer this question. There was one nonresponse. Of the 31 respondents, 21 (68%) said that the potential usefulness of the C-E system would be increased if the O&S cost information were available on-line, while 10 (32%) said that on-line availability would not increase the potential usefulness of the C-E system.

```
*****
*
*      Question 15.  Have you seen a briefing or
*      demonstration of COSTCASTER?
*
*      9% Yes      91% No
*
*****
```

POTENTIAL C-E USERS (N=32) were requested to answer this question, and there were no nonresponses. Of the 32 respondents, only 3 (9%) indicated that they had seen a briefing or demonstration of COSTCASTER.

```

*****
*
*      Question 16. Please indicate the potential usefulness
*      of COSTCASTER to you in your current or future work.
*
*      16% Very Useful
*      39% Useful
*      16% Somewhat Useful
*      13% Not Useful
*      16% Don't Know
*
*****

```

POTENTIAL C-E USERS (N=32) were requested to answer this question after reading Attachment 4, which provided a description of the COSTCASTER model. There was one nonresponse. Of the 31 respondents, 22 (71%) indicated that COSTCASTER would be helpful in their current or future work. Of these 5 (16%) respondents indicated that COSTCASTER would be very useful in their work. Only 4 (13%) indicated that COSTCASTER would not be useful.

\*\*\*\*\*  
\*  
\*        Question 17. If you have any additional comments on any        \*  
\*        topic in this questionnaire, please note them here.        \*  
\*  
\*\*\*\*\*

POTENTIAL C-E USERS (N=32) were requested to answer this question. Of the 32 respondents, 7 (22%) provided additional comments. Their comments were:

- Referring to Question 13: Slightly off target for my work, which is engineering overview of programs and systems support.  
Referring to Question 14: If the data is updated frequently.
- Would like to obtain a description of the COSTCASTER model.
- I don't feel you can make intelligent management decision with a significant portion of O&S data missing (e.g., software).
- To be useful, I think an expert on VAMOSC would need to interface with user, to translate his questions into a form or report producible by VAMOSC, and to caveat results.
- I encourage you to make VAMOSC a better system.
- VAMOSC USES:
  1. Questionable allocation methods.
  2. Questionable data bases.
  3. Omits spares, installation kits, associated minor construction, documentation.
- What is the C-E population? Does it include ATE?

```

*****
*
*   Question 18a.  Would you like further information   *
*   about the C-E system?                                *
*
*   65% Yes      35% No                                *
*
*****

```

POTENTIAL C-E USERS (N=32) were requested to answer Question 18a. There was one nonresponse to this question. Of the 31 respondents, 20 (65%) indicated they would like further information about the C-E system. Respondents who answered "yes" to this question were requested to provide their name and address. However, not all of them did so. Desmatics provided the Office of VAMOSC with a list of those respondents for which this information was available.

```

*****
*
*   Question 18b.  Would you like further information   *
*   about COSTCASTER?                                     *
*
*   69% Yes      31% No                                 *
*
*****

```

POTENTIAL C-E USERS (N=32) were requested to answer Question 18b. There were no nonresponses to this question. Of the 32 respondents, 22 (69%) indicated that they would like further information about COSTCASTER. Respondents who answered "yes" to this question were requested to provide their name and address. However, not all of them did so. Desmatics provided the Office of VAMOSC with a list of those respondents for which this information was available.

\*\*\*\*\*  
 \*  
 \* Question 18c. May we contact you by phone with more \*  
 \* detailed questions or for explanations or clarifications \*  
 \* concerning your responses? \*  
 \*  
 \* 87% Yes 13% No \*  
 \*  
 \*\*\*\*\*

POTENTIAL C-E USERS (N=32) were requested to answer Question 18c. There were two nonresponses to this question. Of the 30 respondents, 26 (87%) indicated that they were willing to be contacted for follow-up. However, it was not necessary for Desmatics to make any additional contacts with the respondents.

## V. SUMMARY AND CONCLUSIONS

If the C-E system were truly a production system, there is little doubt that it would prove helpful in performing tasks which require O&S cost information on C-E equipment. Of the potential users identified by this survey, 88% thought that the C-E system would be helpful in their work (13% believed the system would be very useful, 56% believed it would be useful, and 19% believed it would be somewhat useful). In addition, 68% believed that the usefulness of the C-E system would be increased if its information were available on-line. Furthermore, 71% thought that the COSTCASTER model would be helpful.

The ratings of the system output products, in terms of usefulness, were also positive. The Historical Cost Trend report was rated the most useful of the output products, followed by the Historical Annual LSC report. Thus, major interest appears to be in having O&S cost data portrayed for a period of years. Based on this observation, it is reasonable to assume that the relatively high assessment of the usefulness of the COSTCASTER model was due, in part, to the fact that it is designed to provide such data both in tabular and graphical form. The interest in having data portrayed over a number of years is not surprising in view of the fact that the tasks performed by at least 50% of the potential users (systems comparison, life cycle cost modeling/forecasting, trade-off analysis, logistics forecasting/management, reliability/maintainability) tend to require such information.

A need was expressed for supporting documentation describing the cost categories on the O&S Cost Report. This emphasizes the need for C-E system users to be familiar with the user's manual or for cost category descriptions

to be given on the cost report itself.

In general, respondents said that the level of visibility within the major cost groupings was adequate for their work. Further, a need for O&S cost information was indicated at both the end item and recoverable component levels. Although nearly 60% of the potential users indicated that they do not currently have access to C-E O&S cost information, only 6% said that they had never heard of the Air Force C-E system. Thus, a large portion of potential users, although aware of the C-E system, did not attempt to utilize a system they judged to be helpful.

It must be stressed, however, that in order for the C-E system to be helpful in practice, as well as in theory, it must produce output products which provide accurate and complete cost information. Unfortunately, the system was placed in operation while it still contained significant defects. Although corrections to a number of those defects have been specified, they do not include the most significant ones. These involve deficient depot and base-level maintenance input data. The Office of VAMOSC has decided, therefore, to suspend operation of the C-E system. Thus, the survey results are currently moot. However, should the decision be reversed in the future, the information obtained through this survey should prove of value to the Office of VAMOSC in assessing the usefulness of the C-E system products and possible modifications that should be made to those products.

APPENDIX A: INITIAL LETTER AND ATTACHMENT



DEPARTMENT OF THE AIR FORCE  
 HEADQUARTERS UNITED STATES AIR FORCE  
 WASHINGTON, D.C. 20330-5130

REPLY TO  
 ATTN OF:

LEYE

28 August 1986

SUBJECT:

GROUND COMMUNICATIONS-ELECTRONICS (C-E) SYSTEM

TO:

See Distribution List

1. The Ground Communications-Electronics (C-E) System, D160A, tracks Operating and Support costs for Air Force ground communications-electronics and meteorological equipment. A brief overview of the C-E system is attached.
2. HQ AFLC/MML has tasked Desmatics, Inc. to identify potential users of the C-E system and to collect their opinions on the content and form of system products. This information is essential if the system is to provide high quality pertinent information to its users.
3. Your help in identifying potential users of C-E system information would be greatly appreciated. If you know of any office (including yours) who are currently using O&S cost data for Air Force C-E equipment, or who may have need for such data, please provide their names and addresses below. Return this form in the enclosed envelope as soon as possible so that we may contact those you have indicated. Questions may be directed to Lt Ricky Burden, AFLC/MML (VAMOSC), AUTOVON 787-4963.

*W.S. Carter*

W.S. CARTER  
 Deputy, Acquisition Logistics &  
 Communications Group  
 Dir, Maintenance & Supply

- 2 Atch  
 1. Distribution List  
 2. C-E Systems

Name

Mailing Address

Phone Number

An Overview of the Ground  
Communications-Electronics (C-E) System

The Ground Communications-Electronics (C-E) system (DSD D160A) is a component of the Air Force Visibility and Management of Operating and Support Costs (VAMOSC) system. The purpose of the C-E system is to report operating and support costs of ground C-E equipment at the Type Model Series (TMS) level. The C-E system obtains the majority of its input data from other Air Force systems which provide cost, manpower, and maintenance information.

Because cost data is generally not available at the TMS level, the C-E system allocates shares of common costs to each TMS on an equitable basis by means of several algorithms appropriate to the type of data available.

The C-E system is designed to provide operating and support costs in the following categories:

1. Operations Personnel (not currently implemented)
2. Base Maintenance Personnel
3. Administrative Personnel
4. Supply Support Personnel
5. Fuel (not currently implemented)
6. Maintenance Material
7. Utilities
8. Depot Maintenance
9. Replacement Investment
10. Base Operations Support
11. Real Property Maintenance
12. Communications
13. Temporary Duty
14. Permanent Change of Station
15. Medical
16. General Depot Support
17. Transportation and Packaging
18. Engineering Support
19. Advanced Training (not currently implemented)

Further information about the C-E system may be obtained by contacting the C-E Action Officer, Lt Ricky Burden, HQ AFLC/MML(VAMOSC), AV 787-4963.

APPENDIX B: SURVEY AND ATTACHMENTS

THE AIR FORCE GROUND COMMUNICATIONS-ELECTRONICS (C-E) SYSTEM:

A SURVEY OF USER REQUIREMENTS

The Ground Communications-Electronics (C-E) system is a component of the Air Force Visibility and Management of Operating and Support Costs (VAMOSC) system. The C-E system is designed to provide operating and support (O&S) cost information on ground communications-electronics and meteorological equipment at the Type Model Series (TMS) level.

The Air Force Office of VAMOSC, HQ AFLC/ACCV, has tasked Desmatics, Inc. to develop the attached questionnaire to obtain comments and suggestions from potential users of the C-E system. This information will be used to modify or develop system output products to meet user requirements.

The Office of VAMOSC and Desmatics would greatly appreciate receiving your response to this questionnaire. To complete it, you will need to refer to the four attachments provided. These attachments are:

1. An Overview of the C-E System
2. A Description of C-E System Output Products
3. Samples of C-E System Standard Products
4. A Description of the COSTCASTER model

When you have completed this questionnaire, please return it in the envelope provided to:

Desmatics, Inc.  
P.O. Box 618  
State College, PA 16804

1. Name \_\_\_\_\_ }  
Address \_\_\_\_\_ } Optional  
Commercial Phone No. \_\_\_\_\_ }

2. Who is your current employer?

Air Force                       Dept. of Defense  
 Army                               Dept. of Defense contractor  
 Navy                               Other, please specify:

3. Which of the following tasks involving C-E equipment do you perform in your work? Please check all that apply.

My work does not involve C-E equipment  
 Life cycle cost management  
 Trade-off analysis  
 Budget preparation  
 Life cycle cost modeling/forecasting  
 Reliability/maintainability studies  
 Logistics forecasting/management  
 Manpower forecasting/management  
 Systems comparison (existing or conceptual)  
 DSARC submissions  
 Evaluate product performance agreements (warranties, maintenance agreements, etc.)  
 POM submissions  
 Other(s), please specify:

4. Do you now have (or do you anticipate in the future) a need for O&S cost information on C-E equipment?

Yes                       No (If no, please stop here and return your questionnaire in the enclosed envelope.)

5. At what level(s) of detail do you (or will you) require O&S cost information on C-E equipment? Check all that apply.

- End Item Level
- Recoverable Component Level
- Other (Please specify)

6. Where do you currently obtain your C-E O&S cost information?

- I do not currently have access to C-E O&S cost information.
- I obtain C-E O&S cost information from (please specify):

7. Are you familiar with the Air Force VAMOSC C-E system?

- I had never heard of the C-E system prior to this survey.
- I had heard of the C-E system prior to this survey, but I had not seen any C-E system output products.
- I had heard of the C-E system and had seen some C-E system output products prior to this survey.
- I had used the C-E system output products prior to this survey.

Before continuing with Question 8, please review Attachment 1 (which provides an overview of the C-E system and its cost categories) and the first page of Attachments 2 and 3 (which provide a description and example of the C-E O&S Cost Report, the principal standard product of the C-E system).

8. Please indicate the potential usefulness of the C-E O&S Cost Report to you in your current or future work.

- Very Useful
- Useful
- Somewhat Useful
- Not Useful
- Don't Know

9. Is the level of visibility within the major cost groupings adequate for your current (or future) work, or is more cost visibility required in some area(s)?

Visibility is Adequate  
 More Visibility Required (Please indicate where it is required.)

10. (a) Could you use the information in the O&S Cost Report without any supporting documentation describing the cost categories on the report?

Yes  
 No

- (b) If your answer was "No," are the descriptions of the cost categories provided in Attachment 1 detailed enough for your needs?

Yes  
 No (Please indicate what needs to be added to the descriptions.)

11. Do you have any suggestions for additions, deletions, or modifications on the O&S Cost Report that you did not mention in Question #9? If so, please note them here.

Before continuing with Question 12, please review the remaining pages of Attachments 2 and 3, which describe and give samples of the other C-E system standard products.

12. Using the scale below, please rate the potential usefulness of the output products to you in your current or future work, and note any suggestions or comments you may have, identifying specific products by letter. (Use back of page if more space is needed.)

- 1 Very Useful
- 2 Useful
- 3 Somewhat Useful
- 4 Not Useful
- 5 Don't Know

LOGISTIC SUPPORT COST REPORTS:

<u>Product</u>	<u>Rating</u>	<u>Suggestions and/or Comments</u>
(a) Basic Inventory Data (Attachment 3, page 2)	—	
(b) Base Maintenance Material Cost (Attachment 3, page 2)	—	
(c) Base Maintenance Labor Cost (Attachment 3, page 3)	—	
(d) Annual Depot Maintenance Cost (Attachment 3, page 3)	—	
(e) Replacement Investment Cost (Attachment 3, page 4)	—	
(f) Packaging and Transportation Cost (Attachment 3, page 4)	—	
(g) Historical Annual LSC (Attachment 3, page 5)	—	

12. (Continued)

- 1 Very Useful
- 2 Useful
- 3 Somewhat Useful
- 4 Not Useful
- 5 Don't Know

RANKING REPORTS AND HISTORICAL COST TREND REPORT:

<u>Product</u>	<u>Rating</u>	<u>Suggestions and/or Comments</u>
(h) Total (Fleet) O&S Cost (Attachment 3, page 6)	—	
(i) Total (Fleet) LSC (Attachment 3, page 7)	—	
(j) O&S Cost Per Item (Attachment 3, page 8)	—	
(k) LSC Per Item (Attachment 3, page 9)	—	
(l) % Change in Total O&S Cost (Attachment 3, page 10)	—	
(m) % Change in Total LSC (Attachment 3, page 11)	—	
(n) % Change in Per Item O&S Cost (Attachment 3, page 12)	—	
(o) % Change in Per Item LSC Cost (Attachment 3, page 13)	—	
(p) Ratio of O&S Cost/Price (Attachment 3, page 14)	—	
(q) Ratio of LSC Cost/Price (Attachment 3, page 15)	—	
(r) Historical Cost Trend (Attachment 3, page 16)	—	

13. Overall, given the variety and content of the standard output products, how useful would the C-E system be in your current or future work?

- Very Usefu .
- Useful
- Somewhat Useful
- Not Useful
- Don't Know

14. The C-E system is currently a batch system which provides its output products on microfiche and paper, and in some instances on magnetic tape. Do you think the potential usefulness of the C-E system would be increased if the O&S cost information were available on-line?

- Yes       No

Before continuing with Question 15, please review Attachment 4, which describes COSTCASTER, a cost-prediction and trade-off model for Air Force ground C-E equipment.

15. Have you seen a briefing or demonstration of COSTCASTER?

- Yes       No

16. Please indicate the potential usefulness of COSTCASTER to you in your current or future work.

- Very Useful
- Useful
- Somewhat Useful
- Not Useful
- Don't Know

17. If you have any additional comments on any topic in this questionnaire, please note them here.

18. (a) Would you like further information about the C-E system?

Yes       No

(b) Would you like further information about COSTCASTER?

Yes       No

(c) May we contact you by phone with more detailed questions or for explanations or clarifications concerning your responses?

Yes       No

If you answered any of Questions 18 (a), (b), or (c) "yes," please make sure you have completed Question 1.

Thank you for completing this questionnaire. Please return it in the envelope provided to:

Desmatics, Inc.  
P.O. Box 618  
State College, PA 16804

## ATTACHMENT 1

### Overview of the Ground Communications-Electronics (C-E) System

The Ground Communications-Electronics (C-E) system (DSD D160A) is a component of the Air Force Visibility and Management of Operating and Support Costs (VAMOSOC) system. The purpose of the C-E system is to report and retain over their respective life cycles, the annual operating and support costs of ground communications-electronics and meteorological equipment. Costs are reported at the Type Model Series (TMS) level.

The C-E system obtains the majority of its input data from other Air Force systems which provide cost, manpower, and maintenance information. Because cost data is generally not available at the TMS level, the C-E system allocates shares of common costs to each TMS on an equitable basis by means of several algorithms appropriate to the type of data available. The system is designed to provide operating and support costs in nineteen categories grouped as follows:

1. Unit Mission Personnel
  - Operations Personnel (not currently implemented)
  - Base Maintenance Personnel
  - Administrative Personnel
  - Supply Support Personnel
2. Unit Level Consumption
  - Fuel (not currently implemented)
  - Maintenance Material
  - Utilities
3. Depot Maintenance
4. Replacement Investment
5. Installation Support
  - Base Operations Support
  - Real Property Maintenance
  - Communications

6. Indirect Personnel
  - Temporary Duty
  - Permanent Change of Station
  - Medical
7. Depot Non-Maintenance
  - General Depot Support
  - Transportation and Packaging
  - Engineering Support
8. Advanced Training (not currently implemented)

The content of each of these categories is briefly defined below.

#### 1. Unit Mission Personnel

These costs are the allocated pay and allowances (retirement, leave, holiday, etc.) of the four types of C-E mission personnel listed below together with their duties:

Operations Personnel: operate C-E equipment.

Base Maintenance Personnel : perform base-level maintenance on C-E equipment.

Administrative Personnel: provide administrative support for the C-E unit.

Supply Support Personnel: provide a liaison between the C-E base maintenance organization and base supply.

#### 2. Unit Level Consumption

Fuel: the allocated cost of fuel for each TMS which requires fuel for operation (e.g. TMSs powered by fuel-consuming generators).

Maintenance Material: the cost of consumable maintenance material for base-level maintenance for a TMS.

Utilities: the allocated cost of centrally produced or purchased electricity for operation of a TMS.

### 3. Depot Maintenance

Depot Maintenance: the allocated costs of depot-level maintenance or modification of TMSs and their recoverable components at centralized DoD repair depots and contractor repair facilities, or on site with mobile depot maintenance teams.

### 4. Replacement Investment

Replacement Investment: the allocated cost of reparable spares to replace recoverable components which are beyond economical repair.

### 5. Installation Support

Base Operating Support (BOS): the allocated cost of various services (such as installation administration, comptroller activities, food services, and recreational activities) provided to C-E unit mission personnel.

Real Property Maintenance (RPM): the allocated cost of maintaining and operating real property facilities.

Communications (COM): the allocated cost of base communications services.

#### 6. Indirect Personnel Costs

Temporary Duty (TDY): the allocated cost of moving C-E mission personnel to and from temporary duty stations for periods not to exceed eighty nine days.

Permanent Change of Station (PCS): the allocated cost of moving military C-E mission personnel to permanent duty locations.

Medical: the allocated cost of medical and dental care for military C-E mission personnel and their dependents.

#### 7. Depot Non-Maintenance

General Depot Support (GDS): the allocated cost of functions which support depot maintenance activities. These functions include supply operations, inventory control point operations, and central procurement agencies.

Engineering Support: the allocated cost of depot-level contracted service engineering for safe system operation.

Transportation and Packaging (T&P): the allocated cost of packing and shipping a TMS or any of its components to a depot for repair, and back to the user. Also included is the cost of shipping replacement parts from supply points to users.

8. Advanced Training

Advanced Training: the cost for specialized training over and above basic training, usually on specific C-E end items.

## ATTACHMENT 2

### C-E System Output Products

The C-E system produces a number of standard products annually. The principal standard product is the C-E O&S Cost Report. There are, in addition, seven logistic support cost reports and ten ranking reports. Finally, there is a report containing a historical listing of rankings by TMS. Costs are reported in then year dollars in all cases. Reports are available on paper or microfiche, with history file data also available on magnetic tape. Also available to users on request is a set of Demand Products. This is a set of 24 tables and intermediate data base files containing the detailed information used to build the standard products. These are available either on microfiche or magnetic tape.

The standard output products, together with a brief description of the data they contain, are listed in the following subsections. A sample of each of these products is in Attachment 3.

#### 1. C-E Operating and Support (O&S) Cost Report

A sample C-E O&S Cost Report is on page 1 of Attachment 3. One such report is produced for each TMS costed by the C-E system. The five cost categories marked by a double asterisk, Base Maintenance Personnel, Maintenance Material, Depot Maintenance, Replacement Investment, and Transportation and Packaging are collectively known as Logistics Support Costs (LSC).

## 2. C-E Logistic Support Cost Reports

There are seven Logistic Support Cost reports for each TMS costed by the C-E system. These products are listed below, and samples are shown on pages 2-5 in Attachment 3.

- Page 2: C-E Basic Inventory Data Report  
C-E Base Maintenance Material Cost Report
- Page 3: C-E Base Maintenance Labor Cost Report  
C-E Annual Depot Maintenance Cost Report
- Page 4: C-E Replacement Investment Cost Report  
C-E Packaging and Transportation Cost Report
- Page 5: C-E Historical Annual LSC Report

## 3. C-E Ranking Reports

There are ten individual C-E Ranking Reports. Samples are on pages 6-15 in Attachment 3. Rankings are based on the following data:

- Page 6: Total O&S cost
- Page 7: Total LSC
- Page 8: O&S cost per item
- Page 9: LSC per item
- Page 10: Percentage change in O&S cost from the previous year
- Page 11: Percentage change in LSC from the previous year
- Page 12: Percentage change in per item O&S cost from the previous year
- Page 13: Percentage change in per item LSC from the previous year
- Page 14: Ratio of O&S cost per item/Acquisition price
- Page 15: Ratio of LSC per item/Acquisition price

## 4. The C-E Historical Cost Trend Report

This report, shown on page 16 of Attachment 3, contains the consolidated ranking information for O&S cost and LSC over a ten-year period. One such report is produced for each TMS costed by the C-E system.

ATTACHMENT 3

C-E System Standard Products

Sample Reports

COMMUNICATIONS-ELECTRONICS

MML(VAMOSC) OPERATING AND SUPPORT  
MAF-LEY(A)8117 COST REPORT

DATE 10-15-84

Q-D180A-H3A-AX-MH3 AS OF: 09-30-84

PAGE 237

TMS GSH035  
NOMENCLATURE RECORDER-REPRODUCER  
WORLDWIDE INVENTORY 370

SRD FY 84  
COSTED INVENTORY 217

DETAIL COST CATEGORY SUBTOTAL TMS TOTAL

1,866,083

UNIT MISSION PERSONNEL  
OPERATIONS PERSONNEL  
\* \* \* BASE MAINTENANCE PERSONNEL  
UNIT ADMINISTRATIVE PERSONNEL  
SUPPLY SUPPORT PERSONNEL

954,421  
830,958  
80,704

UNIT LEVEL CONSUMPTION  
FUEL  
\* \* \* MAINTENANCE MATERIAL  
ELECTRIC UTILITIES

58,424

\* \* \* DEPOT MAINTENANCE COST  
\* \* \* REPLACEMENT INVESTMENT

258,185  
3,284

INSTALLATION SUPPORT  
BASE OPERATING SUPPORT  
REAL PROPERTY MAINTENANCE  
COMMUNICATIONS

701,941  
127,538  
74,504

INDIRECT PERSONNEL COST  
TEMPORARY DUTY (TDY) COST  
PERMANENT CHANGE OF STATION  
MEDICAL (HEALTH CARE)

241,992

DEPOT NON-MAINTENANCE  
GENERAL DEPOT SUPPORT  
ENGINEERING SUPPORT  
\* \* \* TRANSPORTATION AND PACKAGING

35,903  
142,064  
64,025  
111,071  
0  
67,439

178,510

ADVANCED TRAINING

\* 0

OPERATING AND SUPPORT COST - TMS GSH035

3,510,441

C-E O&S COST REPORT

\*not currently computed

\*\*LSC

\* ECR \* COMMUNICATIONS - ELECTRONICS  
 MHL/VAMOSC BASIC INVENTORY DATA DATE 07/28/86 Q-D160A-03A-DM-MD3 PAGE 1  
 RCS MAF-LEY(AR)B118 TMS: GSH035 / FY: 84 AS OF: 09-30-84  
 STANDARD REPORTING DESIGNATORS: JWF

NSN	ACQUISITION PRICE	INVENTORY				AVG ANM	CONDEMNATIONS					
		QTR 1	QTR 2	QTR 3	QTR 4		QTR 1	QTR 2	QTR 3	QTR 4	TOTAL	
2583500261305	\$ 4,400	000004	000004	000004	000004	4.00	0000	0001	0001	0000	0000	0
2583500456246	\$ 5,393	000373	000365	000363	000362	365.75	0000	0001	0001	0000	0000	2

-----569.75

C-E BASIC INVENTORY DATA REPORT

\* JCB \* COMMUNICATIONS - ELECTRONICS  
 MHL/VAMOSC BASE MAINTENANCE MATERIAL COST DATE 07/28/86 Q-D160A-03F-DM-MD3 PAGE 1  
 RCS MAF-LEY(AR)B123 TMS: GSH035 AS OF: 09-30-84

FY	BASE MAINTENANCE MATERIAL COST	AVERAGE ANNUAL INVENTORY	NORMALIZED BASE MAINTENANCE MATERIAL COST
84	\$ 261	369.75	\$ 0

C-E BASE MAINTENANCE MATERIAL COST REPORT

\* 108\* COMMUNICATIONS - ELECTRONICS  
 PHL/AMCSC BASE MAINTENANCE LABOR COST DATE 07/28/86 Q-0160A-03E-DH-MD3 PAGE 1  
 RCS MAP-LEF(AR)125 TMS: G5H035 AS OF: 09-30-84  
 AFSC:

SY	MANHOURS	TOTAL ANNUAL DIRECT MANHOURS	BASE LABOR ALLOCATION FACTOR	TOTAL AFSC LABOR COST	BASE LABOR COST	AVERAGE ANNUAL INVENTORY	NORMALIZED BASE LABOR COST	
84	15429.1	85881.6	.016	856,708.193	954,421	369.75	2,581	
							TOTAL \$	2,581

C-E BASE MAINTENANCE LABOR COST REPORT

\* 108\* COMMUNICATIONS - ELECTRONICS  
 PHL/AMCSC ANNUAL DEPOT MAINTENANCE COSTS DATE 07/28/86 Q-0160A-03E-DH-MD3 PAGE 1  
 RCS MAP-LEF(AR)120 TMS: G5H035 / FY: 84 AS OF: 09-30-84

MSM	DEPOT MAINTENANCE QUANTITY	PROGRAM COST	RECOVERABLE ALLOCATION FACTOR	ALLOCATED DEPOT MAINTENANCE COSTS	AVERAGE ANNUAL INVENTORY	NORMALIZED ALLOCATED COSTS	
583507613805	0	0	1.000	0	369.75	0	
583507613806	40	254,208	1.000	254,208	369.75	687	
583507613807	0	0	1.000	0	369.75	0	
583507613808	0	0	1.000	0	369.75	0	
583507613809	5	3,977	1.000	3,977	369.75	10	
						TOTAL \$	697

C-E ANNUAL DEPOT MAINTENANCE COST REPORT

\* GDB\*

COMMUNICATIONS - ELECTRONICS

MHL/VAMGSC RCS HAF-LEY (AR) 8121 REPLACEMENT INVESTMENT COSTS DATE 07/28/86 Q-D160A-03C-DP-M03 PAGE 1 AS OF: 09-30-84

TMS: GSH035 / FY: 84

NSM	DEPOT MAINT QUANTITY	DEPOT CONDEMN QTY	BASE CONDEMN QTY	UNIT REPLACEMENT COST	RECOV ALLOC FACTOR	ALLOCATED REPLACEMENT COST	AVERAGE ANNUAL INVENTORY	NORMALIZED ALLOCATED REPLACEMENT INVESTMENT COST
*5835007613805	0	0	0	\$ 4,400	1.000	\$ 0	369.75	\$ 0
*5835008562436	40	0	0	\$ 5,393	1.000	\$ 0	369.75	\$ 0
5835009541190	0	8	15	\$ 64	1.000	\$ 1,472	369.75	\$ 3
5835009542833	0	13	15	\$ 64	1.000	\$ 1,792	369.75	\$ 4
5835010774160	5	0	0	\$ 383	1.000	\$ 0	369.75	\$ 0

TOTAL \$ 7

G-E REPLACEMENT INVESTMENT COST REPORT

3

\* HLB\*

COMMUNICATIONS - ELECTRONICS

MHL/VAMGSC RCS HAF-LEY (AR) 8124 PACKAGING AND TRANSPORTATION COSTS DATE 07/28/86 Q-D160A-03D-DH-M03 PAGE 1 AS OF: 09-30-84

TMS: GSH035 / FY: 84

NSM	PACKAGED WEIGHT (LBS)	ONE-WAY QUANTITY	ROUND TRIP QUANTITY	ONE-WAY PACKAGING AND TRANSPORT COSTS	ROUND TRIP PACKAGING AND TRANSPORT COSTS	RECOV A LOC FACTOR	ALLOCATED PKG AND TRANS COST	AVERAGE ANNUAL INVENTORY	NORMALIZED ALLOCATED PKG AND TRANS COST
5835007613805	749	0	0	\$ 0	\$ 0	1.000	\$ 0	369.75	\$ 0
5835008562436	565	0	40	\$ 0	\$ 66,991	1.000	\$ 66,991	369.75	\$ 181
5835009541190	1	15	0	\$ 22	\$ 24	1.000	\$ 46	369.75	\$ 0
5835009542833	1	15	13	\$ 22	\$ 39	1.000	\$ 61	369.75	\$ 0
5835010774160	23	0	5	\$ 0	\$ 341	1.000	\$ 341	369.75	\$ 0

TOTAL \$ 181

G-E PACKAGING AND TRANSPORTATION COST REPORT

• E16 • COMMUNICATIONS - ELECTRONICS

HML/VAMOSC HISTORICAL ANNUAL LOGISTIC SUPPORT COST DATE 07/28/86 0-0160A-D3G-0M-M03 PAGE 1

RCS WAF-LEYCARJ8122

TMS: GSH035

AS OF: 09-30-84

FY	DEPT MAINT COST	% OF TOTAL COST	REPLACEMENT INVESTMENT COST	% OF TOTAL COST	TRANSPOR- TATION & PACKAGING COST	% OF TOTAL COST	BASE MAINT LABOR COST	% OF TOTAL COST	BASE MAINT MATERIAL COST	% OF TOTAL COST	TOTAL LOGISTIC SUPPORT COST	AVERAGE ANNUAL INVENTORY
81	\$ 203	11	\$ 60	3	\$ 26	1	\$ 1,433	83	\$ 0	0	\$ 1,722	359.00
82	\$ 218	0	\$ 21,584	90	\$ 123	0	\$ 1,912	8	\$ 0	0	\$ 23,638	359.00
83	\$ 366	15	\$ 7	0	\$ 167	6	\$ 1,896	77	\$ 0	0	\$ 2,434	368.00
84	\$ 698	20	\$ 0	0	\$ 182	5	\$ 2,581	74	\$ 0	0	\$ 3,469	369.75

C-E HISTORICAL ANNUAL I.S.C REPORT

COMMUNICATIONS - ELECTRONICS

MAIL/VAMOSC

RCS: HAF-LEY(A)8208

RANK THIS YEAR	TMS	WORLDWIDE AVERAGE ANNUAL INVENTORY	O & S COST	RANK LAST YEAR	<	>	RANK THIS YEAR	TMS	WORLDWIDE AVERAGE ANNUAL INVENTORY	O & S COST	RANK LAST YEAR
81	TSC60V4	8.25	16060	140	<	>	121	FCC022	33.75	9385	111
82	PRC077	1093.25	15813	101	<	>	122	001 7411	11.50	9281	170
83	GY0060R	7.50	15580	226	<	>	123	FCC058V	36.50	9286	142
84	MO28ASR	577.75	15397	37	<	>	124	FY0026	43.00	9207	129
85	FCC033V	32.75	15239	100	<	>	125	T5093V3	4.00	9007	199
86	MRC108	224.75	15200	114	<	>	126	GRN028	59.50	8860	47
87	TA312PI	8017.50	14958	25	<	>	127	DL245BYC	11.50	8625	178
88	GSM012	7.75	14761	168	<	>	128	TTC022	19.00	8646	102
89	MODEL40	110.75	14429	77	<	>	129	TYCO08V	25.00	8641	143
90	GY0039V1	3.00	14405	785	<	>	130	FRC075	4.50	8457	194
91	FSC082	22.00	14348	122	<	>	131	UY0014V	4.00	8308	40
92	FAC004	250.25	13958	192	<	>	132	R165SURR	97.75	8124	156
93	G50080	17.00	13796	127	<	>	133	GRA081	276.75	7988	13
94	DK0205Q	13.50	13681	76	<	>	134	GSCO38V2	20.00	7960	622
95	GK4005	7.25	13485	185	<	>	135	TSM109	17.75	7804	146
96	TSC102	43.25	13364	133	<	>	136	UY0013V	4.00	7750	162
97	SMD398Q	57.25	12832	180	<	>	137	T50096	2.00	7271	79
98	GSH034	3.00	12878	95	<	>	138	T50061	25.00	7252	214
99	FY0059	59.50	12511	106	<	>	139	GGC037V	38.25	7087	58
100	G50076	673.25	12367	112	<	>	140	GRC175	285.25	6966	11
101	GM0013A	8.00	12277	118	<	>	141	UPX006	206.50	6798	137
102	T10011	38.50	12276	23	<	>	142	MRC117	33.00	6782	15
103	FRM031	16.50	12244	160	<	>	143	GSA135	109.25	6602	228
104	MP00013	9.00	11939	128	<	>	144	FSC031	4.50	6602	50
105	FRC097	9.75	11876	498	<	>	146	C07050	42.75	6350	131
106	GSC042V1	7.50	11833	274	<	>	147	UPX014	38.75	6141	266
107	FRT060	87.25	11575	136	<	>	148	USCO26	20.00	6012	177
108	TR0035V	1.00	11568	277	<	>	149	TSC088	3.50	5961	159
109	GSC028	7.25	11302	74	<	>	150	SA1635Q	125.75	5947	62
110	MS0002	26.50	11184	163	<	>	151	TP5088	1.75	5896	149
111	TSC093	276.75	10530	48	<	>	152	RVR400	187.25	5851	193
112	UPA062C	1.75	10486	183	<	>	153	FE5034A	14.25	5758	198
113	MPM014F	1238.00	10408	31	<	>	154	FCC019	54.75	5739	144
114	R00390	1.75	10132	104	<	>	155	TGC028	15.25	5681	153
115	MP00012	3.50	9968	200	<	>	156	FCC017	14.00	5655	128
116	MP5011	18.50	9925	217	<	>	157	FY0007	7.00	5431	176
117	GSH052V	32.75	9791	97	<	>	158	TMA025	302.00	5408	238
118	TGC027	13.75	9723	135	<	>	159	GTC028	44.50	5087	32
119	TSC60V3	64.00	9546	151	<	>	160	GM0002	12.00	4955	223

RANKING REPORT: TOTAL O&S COST

COMMUNICATIONS - ELECTRONICS

WORLDWIDE AVERAGE ANNUAL INVENTORY

RANKING BY LOGISTIC SUPPORT COSTS  
 COSTS EXPRESSED IN HUNDREDS OF DOLLARS  
 RCS: HAF-LEY(A)8206

36-07-84 PART 3

3-D160A-R5X-RK-MRS

PAGE 4

AS OF 09-30-84

RANK THIS YEAR	TMS	WORLDWIDE AVERAGE ANNUAL INVENTORY	LOGISTIC SUPPORT COST	RANK LAST YEAR	<	>	RANK THIS YEAR	TMS	WORLDWIDE AVERAGE ANNUAL INVENTORY	LOGISTIC SUPPORT COST	RANK LAST YEAR
241	TT637U	54.75	126	256	<	>	281	TT774Q	107.25	62	392
242	S530AG	185.00	121	385	<	>	282	TT628U	15.50	61	684
243	GRN025A	2.50	120	307	<	>	283	GSH13 14	11.25	60	331
244	R00376VG	29.00	119	325	<	>	284	FRC0196	6.00	54	232
245	FY0028	7.00	118	270	<	>	285	FRC165V	12.00	51	376
246	FSH13V1	6.00	115	352	<	>	286	R1828V	29.00	51	378
247	FGC136	6.25	114	335	<	>	287	FY0086V	16.00	48	398
248	FSA004	1.50	114	303	<	>	288	UYK015V	4.00	48	314
249	TMO014	13.00	114	308	<	>	289	FSA088	17.00	47	712
250	FGC067X	15.75	113	720	<	>	290	FSC082	3.00	47	444
251	GSH019	18.00	108	266	<	>	291	FTC047	8.00	46	353
252	GPA123	16.25	107	277	<	>	292	GSH19AV1	5.00	44	380
253	TSC102	7.25	101	278	<	>	293	PRC047	0.00	44	104
254	UGC33AK	16.25	99	321	<	>	294	R1401A	19.25	44	383
255	CP1256VG	1.75	97	322	<	>	295	UNW017A	55.00	44	361
256	T10002	52.00	90	363	<	>	296	FY0018	2.00	43	332
257	FSH009	4.00	89	261	<	>	297	FY0084	39.50	43	366
258	FRC114	1.75	88	301	<	>	298	R00353	7.00	43	397
259	GY0039V1	5.50	88	785	<	>	299	GSH052V	18.50	42	454
260	FRT060	7.50	85	448	<	>	300	GSH33V4	2.50	42	433
261	T10003A	13.50	85	334	<	>	301	OA9034V	3.00	42	402
262	FTA013	5.00	82	360	<	>	302	TMO13	9.00	39	371
263	FRC158V	4.00	80	425	<	>	303	GCA010	3.00	38	417
264	GM0011	4.00	80	315	<	>	304	SSFA265	168.25	38	414
265	15347411	4.50	78	394	<	>	305	431	38.75	37	398
266	FRA090	3.50	78	319	<	>	306	FSA022V	3.00	37	369
267	R2130GRR	61.00	78	339	<	>	307	USC026	20.00	37	368
268	GG4015	48.75	77	338	<	>	308	TMO21A	6.75	36	420
269	R00422G	16.00	77	372	<	>	309	R00240U	10.00	35	389
270	SS5G238	357.50	77	351	<	>	310	001 7411	11.50	33	377
271	SAT704G	64.50	74	336	<	>	311	R1625UR	16.75	33	415
272	TRC089	2.00	73	349	<	>	312	OL245GYC	11.50	30	407
273	UGC114	14.00	73	347	<	>	313	FSH13V2	2.25	29	410
274	TMO020	8.50	72	298	<	>	314	FY0061	3.00	29	453
275	GRN032	13.00	71	194	<	>	315	GXM007	7.00	29	400
276	GSA092	6.25	70	300	<	>	316	OZ11A/1S	4.50	29	605
277	PDP11 45	1.25	69	374	<	>	317	R01368	28.25	28	438
278	ML0644Q	10.00	65	355	<	>	318	FCC025	4.25	27	406
279	GM0004	5.25	64	388	<	>	319	GRN026	3.00	27	375
280	R1655URR	97.75	62	337	<	>	320	GSC038V2	20.00	27	658

RANKING REPORT: TOTAL LSC

COMMUNICATIONS - ELECTRONICS

COSTS EXPRESSED IN HUNDREDS OF DOLLARS

RCS: HAF-LEY(A)B208

AS OF 09-30-84

RANK THIS YEAR	TMS	WORLDWIDE AVERAGE ANNUAL INVENTORY	PER ITEM O&S COST	RANK LAST YEAR	<	>	RANK THIS YEAR	TMS	WORLDWIDE AVERAGE ANNUAL INVENTORY	PER ITEM O&S COST	RANK LAST YEAR
241	TM021A	8.75	116	285	<	>	281	MJ0627U	4.00	76	346
242	GCC058	8.75	115	387	<	>	282	GXHO07	7.00	74	335
243	302	17.50	114	135	<	>	283	R1895	5.00	74	376
244	GTC028	44.50	114	76	<	>	284	R00510G	1.75	73	280
245	F5044A	7.00	111	278	<	>	285	KR7524	1.00	72	340
246	2PTFB15	4.00	110	238	<	>	286	FY0086V	16.00	71	358
247	FRC171V	1.00	109	747	<	>	287	Y5C015	22.75	71	643
248	MD1050G	9.00	108	310	<	>	288	RD0446VG	11.00	70	538
249	CV1689G	3.50	108	348	<	>	289	CV3257UR	10.00	69	394
250	FCC025	4.25	108	317	<	>	290	MRC108	224.75	68	378
251	FCC019	54.75	105	253	<	>	291	TC1612	2.50	68	320
252	3955BE28	2.00	103	293	<	>	292	TTCC07	14.75	68	331
253	551V077	2.00	103	284	<	>	293	GRTO21	419.25	63	230
254	UGC129	240.25	103	235	<	>	294	MD0938G	5.25	63	371
255	F2221	4.25	99	390	<	>	295	GRTO22	1712.50	61	302
256	GRN032	13.00	99	34	<	>	296	MD0976G	9.50	61	361
257	UPX023	19.75	99	313	<	>	297	TRO025A	17.25	61	326
258	TT789	1.75	98	710	<	>	298	GSA135	109.25	60	101
259	MRC107	298.50	97	424	<	>	299	FGC146	52.00	59	373
260	UKH009V	13.50	97	361	<	>	300	GG4035	49.50	59	327
261	UGC33AX	16.25	96	345	<	>	301	TC1623	1.00	59	351
262	GSH035	369.75	95	205	<	>	302	GRN025A	2.50	58	451
263	55TS831	1.25	95	265	<	>	303	GSH024	5.00	58	369
264	GSH036	31.75	94	258	<	>	304	RD0240U	10.00	58	383
265	TM0014	13.00	94	126	<	>	305	FGT010	23.75	57	647
266	C9141GY	10.00	90	338	<	>	306	SSH085	2.00	56	339
267	CV3410	3.00	89	329	<	>	307	TM0556G	4.00	56	420
268	FM0007	4.00	88	356	<	>	308	G50080	250.25	55	397
269	GGC015V7	33.00	84	319	<	>	309	MJ0698G	9.75	55	515
270	TD922AV2	5.00	84	323	<	>	310	FCC061A	27.75	54	403
271	TM-021	5.25	84	472	<	>	311	5A1704G	64.50	53	97
272	R1655URR	97.75	83	334	<	>	312	53A8	10.00	52	502
273	TFC101	8.00	83	324	<	>	313	CV3260UR	4.00	51	355
274	118.1	1.00	82	315	<	>	314	R2130GR	61.00	51	425
275	500317G	20.00	82	199	<	>	315	TD1344	42.50	51	641
276	2002.22	26.00	81	201	<	>	316	LP1013	1.25	50	330
277	FGC134	2.75	80	105	<	>	317	JJ389G	16.00	49	374
278	RT6000V	18.75	79	343	<	>	318	RO0070	12.75	49	417
279	WJ8730A	8.25	79	562	<	>	319	TT636U	562.50	48	377
280	ID2096V1	8.00	77	347	<	>	320	R1625UR	16.75	48	368

RANKING REPORT: O&S COST PER ITEM

COMMUNICATIONS - ELECTRONICS

MHL/VAMOSC RANKING BY LOGISTIC SUPPORT COST PER ITEM COSTS EXPRESSED IN HUNDREDS OF DOLLARS 86-07-25 0-D160A-RSX-RK-MRS PAGE 1  
 PART 4 AS OF 09-

RCS: HAF-LEY(A)B208

RANK THIS YEAR	TMS	WORLDWIDE AVERAGE ANNUAL INVENTORY	PER ITEM LOGISTIC SUPPORT COST	RANK LAST YEAR	<	>	RANK THIS YEAR	TMS	WORLDWIDE AVERAGE ANNUAL INVENTORY	PER ITEM LOGISTIC SUPPORT COST	RANK LAST YEAR
1	TPNO19V	7.75	5512	10	<	>	41	FPNO16A	7.00	469	45
2	MP000T2	1.75	4826	5	<	>	42	FRC096	19.75	458	59
3	FRR098	21.50	4342	1	<	>	43	TSC088	3.50	458	440
4	MPNO14E	3.00	3930	16	<	>	44	FRC125	1.25	441	66
5	FRC117	3.25	3127	19	<	>	45	FPNO18	10.25	428	39
6	MSC054	4.00	2768	9	<	>	48	GPNO22	15.50	421	3
7	GSQ120V1	19.50	2605	65	<	>	47	TRNO39	3.25	414	46
8	OY0059M	7.00	2478	12	<	>	48	MRC085	1.00	408	82
9	MPNO14M	17.00	2261	4	<	>	49	GYK025V	1.00	367	165
10	OY0060M	7.50	2075	63	<	>	50	GPNO25	2.00	310	93
11	MPNO14G	9.00	2025	21	<	>	51	TRNO31	31.00	310	85
12	TYCO10	7.75	1685	31	<	>	52	TSC053	24.50	288	81
13	GM0020	3.00	1361	24	<	>	53	FY0004	30.25	286	90
14	TTC030	19.25	1287	25	<	>	54	FRR075	15.75	280	72
15	FY0008	3.00	1249	35	<	>	59	TSW007	19.25	279	74
16	MPSO11	3.50	1235	43	<	>	56	TSC60V4	8.25	273	80
17	MS0002	7.25	1202	15	<	>	57	TSC60V3	13.75	271	48
18	MPNO14J	2.25	1140	29	<	>	58	GPNO12	22.50	266	68
19	TPSO4JE	56.25	1022	23	<	>	59	GIC021	1.00	257	91
20	FY0005	3.00	981	34	<	>	60	FY0008	7.00	255	87
21	MPNO13A	8.25	869	26	<	>	61	MRC105V	2.25	235	61
22	TLO011	8.00	849	47	<	>	62	FPNO62	33.00	221	38
23	OK2518M	14.25	839	57	<	>	63	TGC028	15.25	220	55
24	GKCO01	4.00	790	42	<	>	64	TGCO27	32.75	218	427
25	MSOT1A	2.50	773	50	<	>	65	TRNO26	30.50	217	89
26	MPNO13B	20.50	760	6	<	>	66	TPX042	60.50	209	107
27	GYKO19	2.75	751	75	<	>	67	GRNO27V	56.25	204	77
28	MPNO14F	1.75	702	17	<	>	68	RPO274	1.75	185	814
29	FRC39AV	22.25	699	51	<	>	69	TRCO97A	332.50	182	94
30	TSO93V2	4.00	653	52	<	>	70	GYQ039V1	19.50	176	785
31	GPNO20	26.25	638	40	<	>	71	TTC022	19.00	175	58
32	GRC189	1.00	629	99	<	>	72	TSC60V2	63.25	173	37
33	MSO077	16.75	600	32	<	>	73	TSC062	47.25	168	79
34	TSC60V1	54.50	582	97	<	>	74	MRC116	1.25	166	102
35	TRC144	1.25	544	49	<	>	75	TSC100	4.00	162	109
36	FRC126	1.25	519	84	<	>	78	UYQ013V	23.00	162	183
37	FPNO47	17.25	509	68	<	>	77	GRNO29	25.00	154	154
38	FY0058	3.00	494	86	<	>	78	TYCO08V	1.75	145	153
39	TSO096	2.00	491	2	<	>	79	TPSO68	1.75	142	148
40	FRC075	4.50	474	60	<	>	80	GS0175	1.00	140	96

RANKING REPORT: LSC PER ITEM

RANK	TMS	WORLDWIDE AVERAGE INVENTORY		O & S COST		PERCENT OF CHANGE
		THIS YEAR	LAST YEAR	THIS YEAR	LAST YEAR	
201	FPN016A	35312	7.00	26730	16.00	32.108
202	GSO080	13796	250.25	10459	256.25	31.908
203	GPA131V	76525	123.75	58085	107.50	31.747
204	TSC102	13364	7.25	10152	3.50	31.639
205	FOC135	2907	19.25	2229	18.00	30.417
206	CV3410	268	3.00	206	3.00	30.097
207	458X3263	9546	64.00	7352	33.00	29.842
208	GRN035A	144	2.50	111	4.00	29.730
209	7481	506	15.25	392	17.75	29.082
210	S5TUB94	9	1.00	7	1.00	28.971
211	TDM1021	137	4.00	107	3.00	28.037
212	MRC108	15200	224.75	11884	254.00	27.903
213	TTC030	42967	19.25	33624	19.75	27.787
214	C95136	488	4.00	381	4.00	27.297
215	GRN020A	2724	8.00	2151	8.00	26.639
216	MD10508	983	9.00	777	9.00	26.512
217	PPN018	3527	94.50	2799	100.75	26.009
218	CV325BUR	413	9.00	329	9.00	25.532
219	GRN020B	37069	74.50	29623	75.00	25.136
220	GRA039	1142	263.25	921	285.75	23.996
221	C10484G	145	8.00	117	10.50	23.932
222	FSA022V	647	3.00	525	3.50	23.238
223	R1625UR	809	16.75	659	12.75	22.762
224	CM0020	4308	3.00	3515	3.00	22.560
225	AVW002D	120	4.00	98	4.25	22.448
226	TSC60V2	43365	63.25	35494	16.25	22.176
227	OY0059H	20012	7.00	16465	7.00	21.543
228	CV1689Q	377	3.50	312	5.25	20.833
229	UY0013V	7750	4.00	6449	4.00	20.174
230	FRR098	98839	21.50	82385	13.25	19.972
231	FPN047	100612	17.25	84134	22.25	18.583
232	PRC025	1379	167.50	1155	197.00	19.394
233	MRC105V	3806	2.25	3192	2.00	19.236
234	FGT010	1358	23.75	1141	.....	19.108
235	C8210V6	194	20.00	163	17.50	19.018
236	FRC114	596	1.75	506	2.00	17.787
237	FTCO47	2021	8.00	1724	8.00	17.227
238	R00353	109	7.00	93	6.25	17.204
239	TRO035V	11575	87.25	9947	92.00	16.367
240	R1655URR	8124	97.75	7026	107.50	15.628

RANKING REPORT: PERCENTAGE CHANGE IN O&S COST FROM THE PREVIOUS YEAR

COMMUNICATIONS ELECTRONICS

RANKING BY PERCENTAGE CHANGE OF LOGISTIC SUPPORT COST FROM PREVIOUS YEAR  
 COSTS EXPRESSED IN HUNDREDS OF DOLLARS  
 RCS: HAF-LEY(A)8206

06-07-78 U-3160A-RSX-RX-WRB

PART 7

PAGE 4 OF 09-30-84

RANK	TMS	LOGISTIC SUPPORT COST		WORLDWIDE AVERAGE INVENTORY		LOGISTIC SUPPORT COST		WORLDWIDE AVERAGE INVENTORY		PERCENT OF CHANGE
		THIS YEAR	LAST YEAR	THIS YEAR	LAST YEAR	THIS YEAR	LAST YEAR	THIS YEAR	LAST YEAR	
201	SSV08002	9	13.25	6	13.00	50.000	50.000			
202	TS2844G	3	22.00	2	23.00	50.000	50.000			
203	TSC060VS	609	4.50	409	5.00	48.900	48.900			
204	GM0013A	7972	673.25	5370	673.75	48.454	48.454			
205	TSC053	7048	24.50	4755	26.00	48.160	48.160			
206	431	37	38.75	25	44.00	48.000	48.000			
207	SSLV020	19	4.25	13	4.75	48.154	48.154			
208	RVR400	1090	187.25	747	193.50	45.917	45.917			
209	F2231	16	4.25	11	4.00	45.455	45.455			
210	PT0008	650	348.25	448	315.75	45.089	45.089			
211	MRC108	12430	224.75	8593	254.00	44.653	44.653			
212	FRC098	93344	21.50	64728	13.25	44.207	44.207			
213	GSA135	2777	108.25	1930	108.25	43.886	43.886			
214	GSH035	12836	369.75	8964	368.00	43.195	43.195			
215	TRC089	73	2.00	51	3.75	43.137	43.137			
216	TRC150	539	7.75	378	7.00	42.593	42.593			
217	TLO011	6789	6.00	4764	9.00	42.506	42.506			
218	FRC096	9042	19.75	6357	18.00	42.237	42.237			
219	GM0032	1745	14.75	1228	20.50	42.101	42.101			
220	FPN047	8788	17.25	6186	22.25	42.063	42.063			
221	FRC165V	51	12.00	36	12.00	41.667	41.667			
222	GGA035	136	49.50	96	54.50	41.667	41.667			
223	GK001	3160	4.00	2244	3.50	40.820	40.820			
224	FY0007	743	7.00	528	7.00	40.720	40.720			
225	PPN018	2745	94.50	1951	100.75	40.687	40.687			
226	GRA083	440	177.00	313	199.75	40.575	40.575			
227	GSH036	1408	31.75	1001	28.00	40.460	40.460			
228	UGC114	73	14.00	52	14.00	40.385	40.385			
229	GPA030	1162	31.25	831	34.25	39.832	39.832			
230	FCC058V	845	36.50	605	34.50	39.669	39.669			
231	FY0006	3746	3.00	2684	3.00	38.568	38.568			
232	OY0059H	17343	7.00	12449	7.00	39.312	39.312			
233	MJ0644G	65	10.00	47	9.25	38.298	38.298			
234	FSH13V2	29	2.25	21	3.00	38.095	38.095			
235	GRA115	161	203.00	117	200.50	37.607	37.607			
236	R1401A	44	19.25	32	19.25	37.500	37.500			
237	T10003A	85	13.50	62	13.50	37.087	37.087			
238	OL245GYC	30	11.50	22	.....	36.364	36.364			
239	GTC028	1036	44.50	760	45.50	36.316	36.316			
240	FCC148	507	52.00	374	57.25	35.561	35.561			

RANKING REPORT: PERCENTAGE CHANGE IN LSC FROM THE PREVIOUS YEAR

COMMUNICATIONS - ELECTRONICS

RANKING BY PERCENTAGE CHANGE OF PER ITEM OPERATING AND SUPPORT COST FROM PREVIOUS YEAR COSTS EXPRESSED IN HUNDREDS OF DOLLARS  
RCS: HAF-LEY(AM)8208

AS OF 09-30-84

RANK	TMS	PER ITEM O & S COST THIS YEAR		WORLDWIDE AVERAGE INVENTORY THIS YEAR		PER ITEM O & S COST LAST YEAR		WORLDWIDE AVERAGE INVENTORY LAST YEAR		PERCENT OF CHANGE
		21	17	8.00	17	8.00	17	8.00		
241	PNA2855	21	17	8.00	17	8.00	17	8.00	23.528	
242	TR0035V	133	108	87.25	108	87.25	108	92.00	23.148	
243	FGC135	151	123	19.25	123	19.25	123	18.00	22.764	
244	GM0020	1436	1171	3.00	1171	3.00	1171	3.00	22.630	
245	FR0075	294	241	15.75	241	15.75	241	12.25	21.992	
246	OY0059M	2859	2352	7.00	2352	7.00	2352	7.00	21.556	
247	TY358FGG	23	19	70.00	19	70.00	19	83.25	21.053	
248	FR0095	121	100	3.00	100	3.00	100	3.25	21.000	
249	082 7411	401	332	7.50	332	7.50	332	8.50	20.783	
250	FGC148	59	49	52.00	49	52.00	49	57.25	20.408	
251	UY0013V	1938	1612	4.00	1612	4.00	1612	4.00	20.223	
252	TSC100	2182	17713	1.75	17713	1.75	17713	1.50	20.149	
253	UPX023	99	83	19.75	83	19.75	83	15.75	19.277	
254	TY7746	25	21	107.25	21	107.25	21	83.25	19.048	
255	PGA101A	563	474	4.25	474	4.25	474	5.00	18.776	
256	CP1057GR	19	16	6.25	16	6.25	16	11.75	18.750	
257	GS0078	210	177	59.50	177	59.50	177	74.00	18.644	
258	FTC047	253	215	8.00	215	8.00	215	8.00	17.674	
259	GSA092	374	322	6.25	322	6.25	322	7.00	16.149	
260	GPA131V	618	540	123.75	540	123.75	540	107.50	14.444	
261	RD0353	18	14	7.00	14	7.00	14	6.25	14.286	
262	GX-H007	74	65	7.00	65	7.00	65	8.00	13.846	
263	FPS077V	140	123	358.50	123	358.50	123	353.00	13.821	
264	MST011A	6894	6061	2.50	6061	2.50	6061	1.00	13.744	
265	GSH024	58	51	5.00	51	5.00	51	5.00	13.725	
266	TFC101	83	73	8.00	73	8.00	73	8.00	13.699	
267	TD922AV2	84	74	5.00	74	5.00	74	5.00	13.514	
268	GSH018	160	141	19.00	141	19.00	141	26.00	13.475	
269	TC1503	163	144	12.00	144	12.00	144	12.00	13.194	
270	RD0355U	116	103	38.25	103	38.25	103	38.75	12.621	
271	OCM	9	8	2.00	8	2.00	8	2.00	12.500	
272	KR7524	72	64	1.00	64	1.00	64	1.00	12.500	
273	TCC003	28	25	15.25	25	15.25	25	18.00	12.000	
274	GRC117V	213	191	21.00	191	21.00	191	22.00	11.518	
275	CB210VB	10	9	20.00	9	20.00	9	17.50	11.111	
276	SSLV082	130	117	4.00	117	4.00	117	4.00	11.111	
277	FRC087	1327	1205	9.00	1205	9.00	1205	8.75	10.124	
278	CU2008U	11	10	2.00	10	2.00	10	2.00	10.000	
279	GM0011	22	20	4.00	20	4.00	20	4.50	10.000	
280	TRP026	786	718	30.50	718	30.50	718	32.00	9.471	

RANKING REPORT: PERCENTAGE CHANGE IN PER ITEM O&S COST FROM THE PREVIOUS YEAR

COMMUNICATIONS - LOGISTICS

0-D160A-R5X-RK-MRS PAGE 7

56-37-25

AS OF 09-30-84

LOGISTIC SUPPORT COST FROM PREVIOUS YEAR  
 COSTS EXPRESSED IN HUNDREDS OF DOLLARS  
 RCS: HAF-LEY(A)8206

PART 8

RANK	TMS	PER ITEM LOGISTIC SUPPORT COST		WORLDWIDE AVERAGE INVENTORY		PER ITEM LOGISTIC SUPPORT COST		WORLDWIDE AVERAGE INVENTORY		PERCENT OF CHANGE
		THIS YEAR	LAST YEAR	THIS YEAR	LAST YEAR	THIS YEAR	LAST YEAR	THIS YEAR	LAST YEAR	
241	TCC077	129	84	5.50	8.00	84	8.00	37.234		
242	TRO035V	15	11	87.25	92.00	11	92.00	36.364		
243	FRC075	474	349	4.50	4.00	349	4.00	35.817		
244	MP00073	133	98	16.50	12.50	98	12.50	35.714		
245	FCC058V	23	17	36.50	34.50	17	34.50	35.294		
246	GRN019	63	47	5.00	4.00	47	4.00	34.043		
247	45BX3263	20	15	64.00	33.00	15	33.00	33.333		
248	6PT2X10F	4	3	1.00	1.25	3	1.25	33.333		
249	FRC165V	4	3	12.00	12.00	3	12.00	33.333		
250	GPA131V	68	51	123.75	107.50	51	107.50	33.333		
251	GRN028	16	12	59.50	64.75	12	64.75	33.333		
252	GXH007	4	3	7.00	8.00	3	8.00	33.333		
253	RO2174P	4	3	1366.25	527.00	3	527.00	33.333		
254	TCC007	8	6	115.25	120.25	6	120.25	33.333		
255	TMH013	4	3	9.00	12.25	3	12.25	33.333		
256	TMH021A	4	3	8.75	6.25	3	6.25	33.333		
257	GRN0208	93	70	74.50	75.00	70	75.00	32.857		
258	TFC097A	182	140	332.50	335.25	140	335.25	30.000		
259	FRC096	458	353	19.75	18.00	353	18.00	28.745		
260	FRC150	70	54	7.75	7.00	54	7.00	29.630		
261	FRC109V	19	15	22.00	24.00	15	24.00	26.667		
262	GSH036	44	35	31.75	28.00	35	28.00	25.714		
263	TSW007	279	222	19.25	20.75	222	20.75	25.678		
264	MSC054	2768	2224	4.00	4.00	2224	4.00	24.460		
265	GKCO01	790	641	4.00	3.50	641	3.50	23.245		
266	GRN019A	134	109	121.50	118.00	109	118.00	22.936		
267	GPA133	81	66	101.25	99.50	66	99.50	22.727		
268	TSC60V1	582	481	54.50	59.00	481	59.00	20.998		
269	GMO020	1361	1127	3.00	3.00	1127	3.00	20.763		
270	FCC025	6	5	4.25	4.00	5	4.00	20.000		
271	FRR095	108	90	3.00	3.25	90	3.25	20.000		
272	FSA022V	12	10	3.00	3.50	10	3.50	20.000		
273	FTCO47	6	5	8.00	8.00	5	8.00	20.000		
274	PRC025	6	5	167.50	197.00	5	197.00	20.000		
275	ROO355U	6	5	38.25	38.75	5	38.75	20.000		
276	FRR075	280	234	15.75	12.25	234	12.25	19.658		
277	TTC030	1287	1078	19.25	19.75	1078	19.75	19.368		
278	TTC007	27	23	14.75	14.00	23	14.00	17.391		
279	GCC038V	7	6	68.00	66.00	6	66.00	16.667		
280	G50080	15	13	250.25	256.25	13	256.25	15.385		

RANKING REPORT: PERCENTAGE CHANGE IN PER ITEM LSC FROM THE PREVIOUS YEAR

COMMUNICATIONS - ELECTRONICS

RANKING BY OPERATING AND SUPPORT COST

PER ITEM/ACQUISITION PRICE RATIO

COSTS EXPRESSED IN HUNDREDS OF DOLLARS

PCS: HAF-LEY(A)8208

WORLDWIDE

AVERAGE

ANNUAL

INVENTORY

PER ITEM

OAS COST

ACQUISITION

PRICE

RATIO

RANK	TMS	ANNUAL INVENTORY	PER ITEM OAS COST	ACQUISITION PRICE	RATIO
121	GM0002	12.00	413	299.66	1.378
122	GRA038	263.25	4	2.95	1.355
123	DS0008	69.25	8	5.95	1.344
124	2002 22	26.00	81	60.34	1.342
125	FRM031	38.50	319	237.66	1.337
126	302	17.50	114	85.25	1.333
127	SS1A523A	6.25	4	3.00	1.333
128	TS2606	6.00	3	2.25	1.333
129	TT549UG	52.50	12	9.00	1.322
130	SSAV059	4.00	19	14.29	1.309
131	SSAV058	6.00	16	12.10	1.309
132	FCC019	54.75	105	80.20	1.309
133	FE5034A	14.25	404	308.58	1.309
134	GTC028	44.50	114	87.04	1.308
135	FTA015	116.25	31	23.70	1.307
136	MODEL60	110.75	130	99.42	1.300
137	UGC114	14.00	13	10.00	1.299
138	2PTF815	4.00	110	84.65	1.287
139	PTO006	348.25	13	10.10	1.282
140	FGC148	52.00	59	46.00	1.272
141	RP0242VG	5.50	47	38.93	1.266
142	FGT010	23.75	57	45.00	1.258
143	FSC082	3.00	4783	3800.00	1.250
144	C8210VG	20.00	10	8.00	1.250
145	SSCA260	2.00	1	.80	1.246
146	GSA092	6.25	374	300.00	1.241
147	GRM028	59.50	149	120.00	1.239
148	GCC037V	38.25	185	149.20	1.237
149	SKY515	172.25	26	21.01	1.230
150	GRM020C	56.25	652	530.00	1.226
151	GSH024	5.00	58	47.30	1.225
152	JJ3998	16.00	49	40.00	1.225
153	TT769	1.75	98	80.00	1.215
154	GSM253	42.00	20	16.45	1.210
155	TT359FGC	70.00	23	19.00	1.200
156	AM841G	11.00	42	35.00	1.200
157	GPM012	22.50	3361	2800.00	1.200
158	MO28ASR	577.75	27	22.50	1.200
159	SA2135VQ	11.25	18	15.00	1.200
160	SSDV046	20.50	3	2.50	1.200

RANKING REPORT: RATIO OF OAS COST PER ITEM/ACQUISITION PRICE

COMMUNICATIONS - ELECTRONICS

RANKING BY LOGISTIC SUPPORT COST  
 PER ITEM/ACQUISITION PRICE RATIO  
 COSTS EXPRESSED IN HUNDREDS OF DOLLARS  
 RGS: HAF-LEY(A)8208

LS-07-25 PART 10

0-D160A-R5X-RK-MRS

PAGE 3

AS OF 09-30-84

RANK	TWS	WORLDWIDE AVERAGE ANNUAL INVENTORY	PER ITEM LOGISTIC SUPPORT COST	ACQUISITION PRICE	RATIO
81	GGJ035	45.50	3	11.15	.259
82	TA312PT	8017.50	1	3.71	.269
83	GM0023	41.25	4	15.00	.268
84	GTC028	44.50	23	87.04	.264
85	FYAO81V	1.00	13	50.00	.260
86	GRN026	3.00	9	35.00	.257
87	GRN019A	121.50	134	530.00	.252
88	C9141GY	10.00	25	100.00	.250
89	OY0059M	7.00	2478	10000.00	.247
90	GM0030	2.00	6	24.38	.246
91	GRN027V	56.25	204	854.16	.238
92	MODEL40	110.75	23	99.42	.231
93	GRC115	8.75	114	500.00	.228
94	FY0058	3.00	494	2180.00	.226
95	TM0017	3.00	7	30.90	.226
96	GRA115	203.00	1	4.54	.220
97	URC103	3.50	53	240.00	.220
98	FGC146	52.00	10	46.00	.217
99	SSH269	8.75	1	4.65	.215
100	VRC048	245.25	5	33.19	.215
101	GIC021	1.00	257	1200.00	.214
102	GRN020C	56.25	112	530.00	.211
103	TT359FGC	70.00	4	19.00	.210
104	MRC107	298.50	77	369.73	.208
105	TS0061	25.00	132	631.68	.208
106	GM0013A	673.25	12	58.34	.205
107	FRN037	3.00	62	303.70	.204
108	MRC108	224.75	55	273.07	.201
109	PT0008	348.25	2	10.10	.198
110	GGJ015	48.75	2	10.35	.193
111	FRC015	4.50	474	2500.00	.189
112	FS4004	1.50	76	402.00	.189
113	HPN014E	3.00	3930	20763.00	.189
114	GRC175	285.25	10	53.52	.186
115	R00422Q	16.00	5	27.04	.184
116	TRC144	1.25	544	3000.00	.181
117	TT471FGC	60.25	4	22.06	.181
118	TM0020	8.50	8	44.40	.180
119	URC032	195.25	17	96.43	.176
120	GRN020B	74.50	93	530.00	.175

RANKING REPORT: RATIO OF LSC PER ITEM/ACQUISITION PRICE

1100

COMMUNICATIONS - ELECTRONICS

HISTORICAL COST TREND  
MCS: MAP-LEV(A)0207 07-22-86 0-0160A-RCA-87-MRC PAGE 507  
AS OF 09-30-84

COSTS EXPRESSED IN NUMBERS OF DOLLARS

TMS: 65M035

ITEM	QTY	TOTAL COSTS		COST	BANK	COST CHANGE PERCENT	COST PER END ITEM	COST/ACQUISITION RATIO
		QTY	AMOUNT					
OPERATION & SUPPORT	14	110,496	100,000	307	213	100.000	483	6.977
INVENTORY	10	85,585	100,000	230	106	100.000	483	541.795

ITEM	QTY	TOTAL COSTS		COST	BANK	COST CHANGE PERCENT	COST PER END ITEM	COST/ACQUISITION RATIO
		QTY	AMOUNT					
OPERATION & SUPPORT	10	94,607	-14,325	257	205	-16.286	565	5.840
INVENTORY	31	8,964	-89,526	24	194	-89.915	727	.545

ITEM	QTY	TOTAL COSTS		COST	BANK	COST CHANGE PERCENT	COST PER END ITEM	COST/ACQUISITION RATIO
		QTY	AMOUNT					
OPERATION & SUPPORT	48	35,104	-62,918	95	262	-63.035	471	2.359
INVENTORY	24	12,836	45,195	55	144	45.033	267	.766

G-E HISTORICAL COST TREND REPORT

## ATTACHMENT 4

### COSTCASTER: COST-PREDICTION/TRADE-OFF MODEL FOR GROUND C-E EQUIPMENT

COSTCASTER is a computerized cost analysis decision aid developed for the Air Force Logistics Command by Desmatics, Inc. It helps in deciding whether to modify, replace or retain items of Air Force ground communications-electronics (C-E) equipment.

COSTCASTER, which has been implemented in prototype form on the Zenith Z-100 and IBM PC microcomputers using LOTUS 1-2-3 software, is designed for ease of use even by persons having no computer experience. Menus are displayed at every major decision point to guide the user through the interactive cost analysis sessions.

COSTCASTER is designed to use a historical data base of operating and support (O&S) cost information derived from the Air Force VAMOSC system. COSTCASTER uses statistical methods to predict O&S costs for individual types of C-E equipment items based on the historical cost data.

COSTCASTER trade-off analysis allows the user to compare the predicted O&S costs for an existing item of equipment with the costs expected to be incurred by an alternative item (i.e., a replacement or modification). To perform a trade-off analysis, the user provides estimates of a few quantities, such as the expected economic life of the alternative item. (Default estimates, supplied by COSTCASTER, may be used if desired.) COSTCASTER makes it easy for the user to experiment with alternative sets of estimates and to assess the results.

COSTCASTER provides immediate output in the form of tables and graphs which summarize the results of the cost prediction and trade-off analysis. These tables and graphs, which are displayed on the computer screen, may also be output on the printer.

APPENDIX C: DETAILED COMMENTS FROM CNRA MEMBERS

11 MAR 1987

Desmatics, Inc.  
P.O. Box 618  
State College, Pennsylvania 16804

Dear Gentlemen:

The attached questionnaire you provided for our review has been completed per your request. In addition to the responses to the questionnaire, we believe a number of issues/problems must be addressed before a viable C-E cost data base can be established.

a. Aggregation Process. There are no reports which aggregate the equipment level data to a system level and/or a base level. This situation, in addition to providing gaps in the data, exacerbates the allocation problem.

b. Allocation Process. A total of 13 cost elements listed in attachment 1 were obtained through an allocation process rather than a direct measure. While I understand the necessity for deriving cost expenditures by allocation, this should not be done unless a logical basis for the allocation can be established. Some costs are not allocatable below the system and base level. To artificially allocate these costs below this level tends to distort the data and mask the uniqueness of costs associated with each item of equipment.

c. Logistics Support Costs. Aggregating costs by general categories, such as, logistics support cost, decreases clarity and leads to misuse of the data. Logistics support cost is a much used term whose meaning varies with each application. Although it could be adequately defined for your use, its misuse in other applications would continue to confuse the users and lead to misuse of the data.

d. Missing Data Elements. There are a number of data elements which do not appear in any of the reports furnished. While not all equipment would incur expenditures in all of these cost elements, some equipments would incur costs and in many cases these costs would be significant. The following elements should be included: TCTO (procurement and installation), engineering change proposals or sustaining engineering, contract unit level support, support equipment replacement and spares.

Generally, the formats presented appear to be designed to maximize the page output. Data is fragmented and redundant headings are repeated. This

makes the data awkward to use and time consuming to retrieve. An effort should be made to maximize the data density and group similar systems for ease in comparative analyses.

The foregoing comments do not detract from the usefulness of the data, however, the failure to accommodate these concerns will severely limit the utility of the C-E VAMOSC system.

Enclosures:  
As Stated

cc: AFLC/ACCV

## ATTACHMENT TO C-E QUESTIONNAIRE

12a. It would appear that quarterly inventory changes at the NSN level of detail would be too finite for use by cost analysts and item managers would have this information from existing reports. This data should be aggregated to an annual basis and probably limited to the top five cost drivers.

12b. The format for this report appears rather awkward to use. Is the "normalized" column a cost per unit? Is this a trend report listing all fiscal years in the data base? Would it be more appropriate to organize this type of data by base rather than by TMS? Aggregated data by TMS should be listed in the following format for efficient retrieval.

<u>TMS</u>	<u>FY</u>	<u>Cost Element</u>	<u>Cost Element</u>	<u>Total</u>
GSH035	84	-	-	-
	85	-	-	-
	86	-	-	-
SSTS831	84	-	-	-
	85	-	-	-
	86	-	-	-

As a general rule the more dense the data, the easier it is to use.

12c. See 12b, for format. If this report is intended to be AFSC specific, an additional column can be added. The Total Annual Direct manhours/AFSC appears to be out of place. If this information is useful suggest a separate report listing all AFSCs. The Base Labor Allocation Factor shows no relationship to other data in the report. How is this factor used?

12d. This report appears to list all LRUs of the end item regardless of depot activity. Suggest the the report be limited to only those having some depot action and that the TMS listed in the first column. Further suggest a sequence be established for the TMS listings and used throughout the reports (except those reports that rank), The recoverable allocation factor should be the percentage of units repaired against the units condemned. This factor times the quantity times the unit costs (see 8118 report) should provide the replenishment spares costs. When NSNs are common to more than one system (both C-3 and others) the allocation factor should be indicated. This factor could be based on end item inventory, operating hours, repairable generations of the specific systems (NRTS), etc. Allocated Depot Maintenance Costs should be broken into Maintenance, Overhead and Material Management; one based on the workload and the other on an item count. If the source data permits, the program costs should be broken into labor and material.

12e. This report should be combined with 8120.

12F. What constitutes a "one-way" and round trip? Why is Recon Alloc Factor listed on this report? Why are the allocated Pkg and Trans Cost normalized on the inventory and not the quantity shipped? If the inventory does not vary with the line entries it should be listed in the heading; only items that vary should be listed in the columns.

12g. TMS should be listed in column 1.

12r. To improve the utility of this historical data suggest it be condensed to one line per fiscal year. The format could be as follows:

<u>Item</u>	<u>FY</u>	<u>Inn.</u>	<u>O&amp;S COSTS</u>	<u>Logistics Costs</u>
	82	359	110,496	85,585
	83	368	94,667	8,964
	84	369	35,104	12,836

etc.

The percent change and ranking, although of value on the annual reports, serve no purpose in a report of a ten year cost trend. This condensed data will provide the trend at a glance and will greatly facilitate the retrieval and use of the data.

END  
FILMED  
FEB. 1988  
DTIC