IDA

INSTITUTE FOR DEFENSE ANALYSES

The 1997 IDA Cost Research Symposium

Stephen J. Balut, Project Leader

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PREFACE

This document was prepared by the Cost Analysis and Research Division of the Institute for Defense Analyses (IDA) as part of a project that is jointly sponsored by IDA's Independent Research Program and the Office of the Director, Program Analysis and Evaluation, in the Office of the Secretary of Defense (OSD). The document contains summaries of ongoing cost research tasks at selected government offices, Federally Funded Research and Development Centers, and Military Universities. These projects were discussed at a meeting held at IDA on 22 May 1997.

The purpose of the document is to make available the material it contains for the use and convenience of those who participated in the meeting, and for other purposes deemed appropriate by the Chairman, OSD Cost Analysis Improvement Group. The material has not been evaluated, analyzed, or subjected to formal IDA review.

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A. INTRODUCTION

On 22 May 1997, representatives from selected offices and organizations that sponsor and conduct defense cost research met at a symposium at the Institute for Defense Analyses (IDA) to discuss and exchange information on their current research programs. The symposium was jointly sponsored by IDA and the Cost Analysis Improvement Group (CAIG) in the Office of the Secretary of Defense (OSD). Before the meeting, the representatives were asked to prepare summaries of each cost research study in progress or planned at their offices and organizations. This document catalogs those summaries.

B. BACKGROUND

Several Department of Defense (DoD) offices conduct and sponsor research into methods for estimating and monitoring the costs of defense systems and forces. Such efforts improve the technical capabilities of the DoD to forecast future costs in support of planning, programming, budgeting, and acquisition decisions. The CAIG leads the department in improving capabilities in the cost area. IDA supports the CAIG and other offices in these efforts. One example of such support was IDA's initiation in 1989 of an annual defense cost research symposium. This symposium facilitates the exchange of research findings, leads to avoidance of costly duplication of effort, and allows for more informed and coordinated cost research planning among the DoD offices, Federally Funded Research and Development Centers (FFRDCs), and Military Universities that independently sponsor cost research.

The charter of the CAIG [1] requires an annual review of the plans of all DoD Components for performing or sponsoring cost research. It also requires development of a six-year plan for DoD cost research that allocates resources to the highest priority, avoids duplication of effort, and facilitates sharing of results among the DoD Components. Further, the CAIG is to make available to all interested DoD Components a data base describing completed, ongoing, and planned cost research projects.

The 1997 IDA Cost Research Symposium helped the CAIG fulfill a portion of these responsibilities. During the symposium, the cost research activities of DoD Components were reviewed and arrangements were made among participants for the exchange of research findings, data, and reports. Each year, IDA produces a catalog of the ongoing cost research activities discussed at the symposium. (This document is an example; References [2 through 9] contain similar information from previous years' symposia.) These documents provide information that can be valuable to DoD Components and FFRDCs when making research planning and resource allocation decisions.

C. ABOUT THE SYMPOSIUM

Representatives of IDA and the OSD CAIG jointly prepared the list of offices and organizations invited to participate in the 1997 symposium. Participation included preparation of research project summaries and attendance at the symposium. Table 1 lists the offices and organizations that accepted our invitation and the names of the individuals who represented them at this year's symposium. The abbreviations and ordering of the offices and organizations in Table 1 are used throughout this document.

Table 1. Participants in the 1997 IDA Cost Research Symposium

Office/Organization	Abbreviation	Representative
Office of the Director, Program Analysis and Evaluation	PA&E	Dr. David McNicol
Army Cost and Economic Analysis Center	CEAC	Mr. Robert Young
Naval Center for Cost Analysis	NCCA	Dr. Dan Nussbaum
Air Force Cost Analysis Agency	AFCAA	COL Edward Weeks
Army Materiel Command	AMCRM	Mr. Wayne Wesson
Army Tank-Automotive and Armaments Command	ATAAC	Mr. Russell F. Feury
Army Space and Strategic Defense Command	SSDC	Ms. Carolyn S. Thompson
Army Aviation Troop Command	ATCOM	Mr. Mark Malone
Ballistic Missile Defense Organization	BMDO	Ms. Donna Snead
Naval Air Systems Command	NAVAIR	Ms. Maria Ponti
Naval Sea Systems Command	NAVSEA	Mr. Pat Tamburrino
Naval Surface Warfare Center, Dahlgren Division	NSWCDD	Ms. Shelly Maynard
Naval Surface Warfare Center, Carderock Division	NSWCCD	Mr. Bob Jones
Air Force Material Command/Aeronautical Systems Center	ASC/FMC	Ms. Marjana Cale
Air Force Space and Missile Systems Center	AFSMC	Mr. David Hansen
Air Force Material Command/Human Systems Center	HSC/EMP	Ms. Betty West
Air Force Electronics Systems Center	ESC/FMC	Ms. Ellen Coakley
RAND Corporation	RAND	Mr. Fred Timson
Aerospace Corporation	Aerospace	Dr. Stephen Book
Air Force Institute of Technology	AFIT/LA	Dr. Roland D. Kankey
Defense Systems Management College	DSMC	Dr. Bernie Rudwick
Ministry of Defence, Directorate of Project Time and Cost Analysis	DCF	Mr. Terry Proffitt
Center for Naval Analyses	CNA	Dr. Henry Eskew
MITRE Corporation	MITRE	Ms. Janine Farris
Logistics Management Institute	LMI	Mr. John Wallace
Institute for Defense Analyses	IDA	Dr. Stephen J. Balut

The one-day symposium was held in the spring to correspond with the CAIG's schedule for updating the DoD's Six-Year Cost Research Plan [10 and 11]. Budget decisions related to such studies are usually made during the summer. These decisions will be better informed because they will be made in light of the information disseminated at the symposium and contained in this document.

The agenda for the 1997 symposium followed the pattern established at the 1996 symposium. The morning was spent reviewing the status of cost research and the afternoon session focused on a timely topic of special interest.

Speakers and their topics are listed in Table 2. Following the keynote address by Dr. McNicol, the Chairman of the OSD CAIG, representatives of each of the Military Departments presented the status of the consolidated research programs of all participating activities in their respective Military Departments. The presentations highlighted research in key areas of the DoD Six-Year Cost Research Plan. The morning session closed with a presentation by Dr. Gordon on the status of cost research activities sponsored or conducted by offices within OSD.

The important topic of force costing was highlighted during the afternoon. The first presentation set the stage by describing the need for force costing capabilities within the DoD. This was followed by the presentations on force cost models currently in use within the DoD. These include a model under development by the RAND Corporation, an Army model developed by the Army Cost and Economic Analysis Center, and three models developed by the Institute for Defense Analyses. Appendices A-D contain descriptions of four of these models.

Table 2. Agenda

Welcome
Dr. Stephen J. Balut, *Institute for Defense Analyses*
Keynote Address
Dr. David McNicol, *Cost Analysis Improvement Group*
Status of Army Cost Research
Mr. Richard Bishop, *Army Cost and Economic Analysis Center*
Status of Navy Cost Research
Mr. Rick Collins, *Naval Center for Cost Analysis*
Status of Air Force Cost Research
Ms. Ranae Pepper, *Air Force Cost Analysis Agency*
Status of OSD Cost Research
Dr. Vance Gordon, *Cost Analysis Improvement Group*
Need for Force Costing in the DoD
Mr. Jeff Bennett, *OSD (PA&E)*
The PA&E/RAND Force Cost Model
Mr. Lance Roark, *OSD (PA&E)*
The Army Force Cost Model
Mr. Jean Duval, *Army Cost and Economic Analysis Center*
The IDA Force Cost Models
FACS
Mr. Paul Goree, *Institute for Defense Analyses*
AGE
Mr. Tim Graves, *Institute for Defense Analyses*
DRMM
Mr. Jim Wilson, *Institute for Defense Analyses*

D. USING THE CATALOG

This document was designed to facilitate a search for information on a specific topic. This is how the document's pertinent sections can be used:

- Table 3, Keyword Assignments. In the table, the rows represent keywords and the columns represent offices and organizations. The number at the intersection of a row and column is the number of studies by the office or organization (column) that have the keyword (row) associated with them.
- Appendix A, Study Titles. This appendix lists the study titles for tasks that are summarized in Appendix B. The titles, grouped according to the office or organization performing the study, appear in the order in which they were submitted to IDA.
- Appendix B, Summaries. This appendix is divided into sections, one for each office and organization that contributed project summaries.[1] The first part of each section describes the office or organization (name, location, director,[2] size, etc.).[3] Following that are summaries of research tasks the office or organization reported as being in progress or planned at the time of the symposium. Near the end of each summary is a list of keywords the director of the office or organization assigned to the task. (In several cases, the author modified the keywords for consistency.)

Finding tasks on a specific topic is accomplished as follows: (1) scan the appropriate row in Table 3 to identify the offices and organizations that are conducting studies on the topic; (2) scan the list of study titles for those offices and organizations in Appendix A; and (3) refer to the appropriate summaries in Appendix B.

E. HOW TASKS COMPARE TO THE PLAN

Some readers may be interested in how the tasks in this catalog align with the topics listed in the latest version of the Six-Year Cost Research Plan. Tables 4 and 5 have been included for this purpose. Table 4 lists the research categories first presented in January 1993 [10] and later modified by the Interim DoD Six-Year Cost Research Plan, FY 1994-99 [11]. The participating offices and organizations assigned the relevant numeral-letter-number codes from Table 4 to each of their tasks. Table 5 shows the number of projects in each category by office/organization.

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1 Of the offices/organizations listed in Table 1, only the Army Aviation Troop Command did not submit summaries this year.

2 Though their actual titles vary, the heads of the offices/organizations are referred to as "directors" in this document.

3 This description is absent if the office/organization did not provide one.

Table 3. Keyword Assignments

	PA&E	BMDO	CEAC	AMCRM	ATCOM	ATAAC	SSDC	NCCA	NAVSEA	NAVAIR	NSWCDD	NSWCCD	AFCAA	ASC/FMC	AFSMC	ALOEMH	ESC/FMC	AFIT	DCF	DSMC	AERO	CNA	LMI	MITRE	RAND	IDA	TOTAL
PERSPECTIVE																											
Industry	3	1	—	—	—	—	—	3	4	6	—	3	5	3	—	2	2	—	1	2	1	—	1	—	1	8	46
Government	12	18	12	1	—	—	6	39	6	7	3	13	41	8	5	2	8	14	3	2	7	2	5	—	2	31	247
CONTEXT																											
Estimating	7	18	12	1	—	—	6	28	7	8	3	7	36	8	5	2	7	11	—	1	5	2	5	2	2	13	196
Analysis	5	10	12	1	—	—	—	14	6	5	1	12	40	5	—	2	6	5	1	1	—	1	4	1	2	15	149
Reviewing/Monitoring	3	6	—	—	—	—	—	—	2	—	—	—	—	1	—	—	—	—	—	1	1	—	—	—	—	2	16
Policy	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	1	—	—	2	—	—	—	—	6	10
Programming	4	1	—	—	—	—	—	1	—	—	—	1	—	1	—	—	—	—	—	—	—	1	3	—	1	12	25
Budgeting	—	1	3	—	—	—	—	1	—	—	—	1	—	1	—	—	—	—	1	—	—	—	3	—	—	4	15
OBJECT																											
Forces	5	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	3	—	1	16	29
Weapon Systems	2	3	2	1	—	—	5	7	—	4	—	1	2	7	—	2	8	6	1	—	—	—	2	1	—	4	58
Aircraft	2	—	1	—	—	—	—	4	—	9	—	—	12	3	—	1	—	1	—	—	—	1	—	—	1	4	39
Helicopters	—	—	—	—	—	—	—	1	—	4	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	4	11
Missiles	—	13	1	—	—	—	6	8	—	2	1	—	5	—	1	—	—	1	—	—	—	—	1	—	—	5	44
Ships	—	—	—	—	—	—	—	7	8	—	—	11	—	—	—	—	—	—	—	—	—	—	—	—	—	2	28
Land Vehicles	—	—	1	—	—	—	—	2	—	—	—	—	—	4	—	1	—	—	—	—	—	—	—	—	—	1	9
Space Systems	—	2	1	—	—	—	—	1	—	—	—	—	15	—	5	1	—	—	—	—	4	—	—	—	—	3	32
Airframe	—	1	—	1	—	—	—	—	—	2	—	—	2	—	—	1	—	1	—	—	—	—	—	—	—	1	9
Propulsion	—	1	—	—	—	—	—	—	—	2	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	5
Electronics/Avionics	1	8	1	—	—	—	1	16	—	5	1	1	8	1	1	—	4	—	—	—	—	—	—	—	—	1	49
Spares/Logistics	—	—	—	—	—	—	—	—	—	3	—	—	9	2	—	—	—	—	—	—	—	—	—	—	—	—	14
Facilities	2	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1	—	1	—	—	—	—	1	7
Infrastructure	—	—	2	—	—	—	—	3	—	—	—	—	—	1	—	—	—	—	—	—	—	—	5	1	—	4	16
Manpower/Personnel	—	—	1	—	—	—	—	—	—	1	—	—	—	3	—	—	1	1	—	—	1	1	2	—	—	5	16
STAGE																											
Concept Development	—	—	—	—	—	—	—	—	1	—	1	6	—	—	—	—	—	1	—	—	1	—	—	—	—	—	10
Demonstration/Validation	2	5	—	—	—	—	6	3	—	—	1	1	—	—	—	—	—	—	—	—	—	—	1	—	—	—	19
EMD	4	6	—	—	—	—	6	9	—	4	1	—	5	3	3	—	2	6	—	1	—	—	1	—	1	9	61
Production	2	14	—	—	—	—	6	12	5	7	1	3	3	4	3	1	—	—	1	—	2	—	1	—	1	12	78
Test and Evaluation	—	2	—	—	—	—	—	—	—	—	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	3	7
Operations and Support	—	1	2	—	—	—	—	13	—	4	—	3	3	3	1	2	—	2	2	—	—	—	3	—	—	8	47
Retirement and Demilitarization	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	2
Life Cycle	3	3	—	1	—	—	6	6	1	1	—	4	27	—	1	2	—	7	—	—	2	1	1	1	—	10	77
FOCUS																											
Labor	2	—	—	—	—	—	5	4	6	—	1	7	6	2	—	1	2	3	—	—	1	—	—	—	1	8	49
Material	3	—	—	—	—	—	4	4	7	—	1	6	4	—	—	2	—	—	—	—	—	—	—	—	1	5	37
Overhead/Indirect	2	—	—	—	—	—	5	2	6	—	1	6	1	—	—	2	1	—	—	—	—	—	—	—	—	6	32
Engineering	2	—	—	—	—	—	1	1	5	—	—	5	—	2	—	—	1	1	—	—	3	—	—	—	—	3	24
Manufacturing	—	5	—	—	—	—	—	1	4	—	—	6	—	3	—	—	—	2	—	—	—	—	1	—	—	5	27
CPR/CCDR	—	6	2	—	—	—	—	2	—	—	—	—	—	—	—	—	1	2	—	—	—	—	—	—	—	1	14
WBS	—	6	1	—	—	—	—	4	3	—	—	1	—	—	4	—	—	—	—	—	—	—	—	—	—	5	24

Table 3—*Continued*

	PA&E	BMDO	CEAC	AMCRM	ATCOM	ATAAC	SSDC	NCCA	NAVSEA	NAVAIR	NSWCDD	NSWCCD	AFCAA	ASC/FMC	AFSMC	ALOEMH	ESC/FMC	AFIT	DCF	DSMC	AERO	CNA	LMI	MITRE	RAND	IDA	TOTAL
FOCUS (continued)																											
Fixed Costs	—	2	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—	3	—	—	3	7
Variable Costs	—	2	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—	3	—	—	5	7
Production Rate	—	1	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1	2
Acquisition Strategy	3	1	—	—	—	—	—	—	3	1	—	3	1	2	—	—	2	1	2	—	2	—	1	—	—	10	22
Automation	1	—	—	—	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	—	—	—	—	—	—	3	7
Advanced Technology	1	—	—	—	—	—	1	—	—	—	—	1	3	—	—	—	—	—	—	—	1	—	—	1	—	3	7
Risk/Uncertainty	1	1	—	—	—	—	—	3	—	—	—	4	3	3	—	—	—	—	—	1	2	1	—	1	1	1	19
Training	—	—	—	—	—	—	—	—	—	—	—	1	3	—	—	—	—	2	—	—	—	—	2	—	—	—	8
Readiness	—	—	—	—	—	—	—	—	—	4	—	1	2	1	—	—	—	—	—	—	—	—	—	—	—	3	8
Reliability	—	—	—	—	—	—	—	—	—	1	—	1	—	2	—	—	—	—	—	—	—	—	—	—	—	—	4
Sustainability	—	—	—	—	—	—	—	5	—	—	—	1	—	2	—	—	—	—	—	—	—	—	—	—	—	—	8
Integration	—	—	—	—	—	—	—	1	—	—	—	—	1	1	—	—	—	1	—	—	—	—	—	—	—	1	4
Modification	—	—	—	—	—	—	—	2	—	1	—	—	2	1	1	—	—	—	—	—	—	—	—	—	—	1	7
Security	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Environment	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	2	—	1	—	—	—	—	—	—	—	1	5
Schedule	2	2	—	—	—	—	—	3	—	—	—	—	2	—	—	—	—	—	—	—	—	—	1	—	—	5	10
Size	—	—	—	—	—	—	—	—	—	—	—	3	6	—	2	—	—	—	—	—	—	—	—	—	—	—	11
APPROACH																											
Data Collection	3	12	7	—	—	—	5	24	3	4	1	7	34	6	4	2	4	7	1	1	4	—	4	1	2	18	133
Survey	—	2	—	—	—	—	—	2	—	—	—	1	2	3	1	—	3	—	—	—	—	—	—	—	1	3	14
Case Study	—	1	1	—	—	—	—	1	—	—	—	3	1	3	—	—	—	—	—	1	1	—	1	—	—	4	13
Mathematical Modeling	2	9	—	—	—	—	6	8	1	2	—	10	28	2	1	—	—	2	—	—	2	—	4	—	—	13	77
Economic Analysis	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	1	1	—	—	—	—	—	9	5
Cost/Production Function	—	4	—	—	—	1	—	—	3	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—	2	10
Time Series	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	2
Statistics/Regression	1	2	—	1	—	—	6	14	—	1	2	7	26	—	2	—	2	6	—	—	1	2	4	1	—	7	77
PRODUCT																											
Data Base	3	16	7	—	—	—	—	27	4	1	1	7	35	1	4	2	2	—	—	1	2	—	—	—	1	18	113
Review	1	1	—	—	—	—	—	—	1	—	—	2	2	2		—	1	—	1	—	1	—	—	—	1	3	12
Method	—	12	—	—	—	—	—	15	1	5	1	4	4	4	2	—	1	—	1	—	—	—	—	1	2	5	50
Mathematical Model	—	—	—	—	—	—	6	1	3	—	1	11	9	—	1	—	—	—	1	—	—	—	—	—	—	2	33
Computer Model	2	2	—	—	—	—	3	4	3	3	1	9	18	2	—	1	1	3	—	—	4	1	2	1	1	10	59
Expert System	—	—	—	1	—	—	—	—	—	—	—	—	2	—	—	—	1	—	—	1	—	—	—	—	1	—	5
Cost Progress Curve	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	1
CER	2	14	4	—	—	—	6	15	1	4	1	5	15	2	2	—	2	11	—	1	3	1	—	—	—	5	89
Study	4	3	—	1	—	—	—	13	1	2	1	5	8	3	1	—	1	—	—	—	—	—	1	—	1	14	44

Table 4. Research Categories

***I.* Themes for Special Emphasis**

A. Measuring the savings from Acquisition Streamlining

B. Cost estimating techniques for the new acquisition environment

1. Selective upgrading of existing systems

2. Selective low-rate procurements

C. Cost estimation for Major Defense Acquisition Programs (MDAPs) in the EMD stage

1. Methods for highlighting dependency on new technologies that either will become significant cost items in their own right or may set the pace of the program

2. Techniques for determining technical and schedule uncertainties in ways that facilitate rational evaluation of their cost impact

D. Techniques for estimating environmental cost throughout an MDAP's life cycle

***II.* Maintenance-of-the-toolbox themes**

A. Sustain the effectiveness of established tools

1. Updates to incorporate recent experience

2. Improvements to broaden scope or enhance methods

B. Incorporate new analysis techniques

C. Make progress on difficult problems that previously have eluded solution

D. Explore new ideas to establish their suitability for improving cost analysis

Table 5. Tabulation by Research Categories

	PA&E	BMDO	CEAC	AMCRM	ATCOM	ATAAC	SSDC	NCCA	NAVSEA	NAVAIR	NSWCDD	NSWCCD	AFCAA	ASC/FMC	AFSMC	ALOEMH	ESC/FMC	AFIT	DCF	DSMC	AERO	CNA	LMI	MITRE	RAND	IDA	TOTAL
I	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0
I.A	—	—	1	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	4
I.B	1	—	—	—	—	—	—	1	—	1	—	—	7	1	—	—	1	2	—	1	4	—	1	—	—	2	22
I.B.1	—	1	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	3	7
I.B.2	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
I.C	—	1	—	—	—	—	—	4	—	—	—	—	1	—	—	—	—	2	—	—	—	—	—	—	—	1	9
I.C.1	3	—	—	—	—	1	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6
I.C.2	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	—	—	—	3	6
I.D	1	—	—	—	—	—	1	—	—	—	—	—	2	—	1	2	—	1	—	—	—	—	—	—	—	1	9
II	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	2
II.A	1	—	1	—	—	—	—	—	3	4	—	2	11	3	—	—	1	—	—	—	2	—	3	—	—	3	34
II.A.1	1	8	10	—	—	—	3	17	1	—	—	1	6	—	—	2	—	3	—	—	1	1	—	—	2	15	71
II.A.2	3	14	9	—	—	—	2	20	3	2	1	5	18	1	4	2	1	4	—	—	1	2	3	—	1	16	112
II.B	—	2	1	1	—	—	—	8	3	4	1	8	10	1	1	—	4	—	2	1	2	2	—	1	—	12	64
II.C	4	3	2	—	—	—	—	20	2	3	1	1	1	1	1	—	1	1	1	—	3	—	1	1	1	11	59
II.D	—	2	—	—	—	—	—	9	1	—	1	3	8	—	—	—	—	4	—	—	4	—	1	—	—	2	35

STUDY TITLES

Office of the Director, Program Analysis and Evaluation

PA&E-1	Force and Support Cost (FSC) System
PA&E-2	Force and Support Cost (FSC) System and FYDP Support—VGS
PA&E-3	Visibility and Management of Operating and Support Costs (VAMOSC) for Major Weapon Systems
PA&E-4	Visibility and Management of Operating and Support Costs (VAMOSC) for Major Weapon Systems
PA&E-5	Software Cost Model Evaluation
PA&E-6	Selected Acquisition Report (SAR) Cost Variance Analysis
PA&E-7	Demilitarization and Disposal Costs of Tactical Aircraft
PA&E-8	Developing Cost Estimating Relationships for the Streamlined Manufacturing Environment
PA&E-9	IDA Cost Research Symposium
PA&E-10	Cost Analysis of Advanced Materials
PA&E-11	Cost of Developing and Producing Next Generation Tactical Aircraft
PA&E-12	Avionics Development and Production Estimating
PA&E-13	Contractor Cost Data Reporting (CCDR) Clearinghouse/Repository
PA&E-14	CAIG Information Center Support

Ballistic Missile Defense Organization

BMDO-1	Cost Estimating Cross-Check Guide
BMDO-2	Radar Hardware Cost Estimating Relationships (CERs) Database
BMDO-3	Missile Integration, Assembly, and Test (IA&T) Cost Methodology Improvement Report (CMIR)
BMDO-4	Endo-Atmospheric Missile Hardware Cost Estimating Relationships Database and Database Source Documentation
BMDO-5	Missile Hardware Step Functions
BMDO-6	Unit Cost versus Production Rate Analysis
BMDO-7	Below-the-Line CERs for Missile System Production, Fielding/Deployment Phase and Production, Fielding/Deployment Phase Database
BMDO-8	Below-the-Line CERs for Radar System Production, Fielding/Deployment Phase
BMDO-9	Radar Cost Methodology Improvement Report (Formerly) Solid State Transmit/Receive (T/R) Module CER Update
BMDO-10	Missile Divert and Attitude Control System (DACS)
BMDO-11	Update Development Engineering Cost Estimating Relationship
BMDO-12	Laser Weapons Database and CERs
BMDO-13	Production Support Factors

BMDO-14	Missile Nonrecurring Production CER
BMDO-15	Update BMDO CBS Element Time Phasing Profiles
BMDO-16	Cost As an Independent Variable
BMDO-17	BMDO Missile Comparison and Methodology Improvement
BMDO-18	BMDO Risk Methodology Update

Army Cost and Economic Analysis Center

CEAC-1	Update FORCES Cost Model, EFCDB, Cost Factor Handbook
CEAC-2	The Army Manpower Cost System (AMCOS)
CEAC-3	ACEIT/ACDB
CEAC-4	Communications and Electronics Cost Model/Methodology
CEAC-5	Operating and Support Management Information System (OSMIS)
CEAC-6	Aircraft Module Data Base Migration and Methodology Enhancement
CEAC-7	Missile Module of ACDB
CEAC-8	Wheeled and Tracked Vehicle Data Base and Methodology Development
CEAC-9	Performance Affordability Assessments Model (PAAM)
CEAC-10	Standard Service Costing (SBC)
CEAC-11	Development of Leadership Resources for Activity Based Costing (ABC)
CEAC-12	Leadership Training Courses for Activity Based Cost (ABC)
CEAC-13	Link Activity Based Costs (ABC) to Service Based Costs (SBC)
CEAC-14	Installation Status Report (ISR) Part 1, (Infrastructure) Revision and Update

Army Materiel Command

AMCRM-1	Artificial Intelligence in Cost and Economic Analysis

Army Aviation and Troop Command

Army Tank-Automotive and Armaments Command

ATAAC-1	Performance Affordability Assessment Model (PAAM)

Army Space and Strategic Defense Command

SSDC-1	Radar Cost Research Final Report
SSDC-2	Updated Radar Transmit/Receive (T/R) Cost Estimating Model
SSDC-3	Demilitarization and Disposal Costs of Missile Systems: Cost Methodology Development
SSDC-4	Software Cost Estimating Relationship Update and Development
SSDC-5	Tactical Air Defense Chemical and Solid-State Lasers Cost Methodology Development
SSDC-6	Multi-mode Seeker Cost Research and Estimating Methodology Development

Naval Center for Cost Analysis

NCCA-1	Top-Level Ship Operating and Support Cost Model
NCCA-2	Detailed Ship Operating and Support Cost Model
NCCA-3	Shipboard Systems Operating and Support Cost Model
NCCA-4	Aircraft Operating and Support Cost Model
NCCA-5	Avionics Operating Support Cost Model
NCCA-6	Avionics Operating and Support Cost Study
NCCA-7	Missile Torpedo Operating and Support Cost Model
NCCA-8	Cost of a Sailor Study
NCCA-9	Manpower Cost Estimating Tool
NCCA-10	Weapon System Software Maintenance Cost/Technical Database Development and Analysis
NCCA-11	Automated Information System (AIS) Software Maintenance Database Development and Analysis
NCCA-12	Integration of Navy VAMOSC Data Base
NCCA-13	Expansion of VAMOSC Shipboard System Database
NCCA-14	Incorporation of Infrastructure Cost into the VAMOSC Database
NCCA-15	Linkage Between VAMOSC and the PPBS
NCCA-16	Missile Cost/Technical Database
NCCA-17	Electronics/Cost Technical Database
NCCA-18	Weapon System Software Development Cost/Technical Database
NCCA-19	Automated Information System (AIS) Software Development Cost/Technical Database
NCCA-20	Cost Estimating Library (CEL)/Factor, Analogy, and CER Electronic Tool (FACET)
NCCA-21	Software Technology and Life Cycle Primer
NCCA-22	Software Development Estimating Handbook - Phase One
NCCA-23	Weapon System Software Development Estimating Methodology Maintenance/Update
NCCA-24	Automated Information System (AIS) Software Development Estimating Methodology
NCCA-25	Aircraft System Integration Cost Database/Model
NCCA-26	Ship System Integration Cost Database/Model
NCCA-27	Ships/Shipboard Systems Government In-house Cost Database Estimating Methodology
NCCA-28	Aircraft/Avionics Government In-house Cost Database Estimating Methodology
NCCA-29	Missile Government In-house Systems Engineering/Program Management Cost Study
NCCA-30	Price Indices for Computers
NCCA-31	Electronics Systems Procurement Hardware Cost Estimating Methodology
NCCA-32	Design Cost Estimating Methodology
NCCA-33	Aircraft Avionics and Missile System Installation Cost Study
NCCA-34	Ship System Modernization Database
NCCA-35	Development to-Production Costs Hardware Cost Estimating Methodology

NCCA-36	Airframe Advanced Structure Material Cost Model
NCCA-37	MADCAM (Microwave and Digital Cost Analysis Model)
NCCA-38	Transmit/Receive (T/R) Module Update
NCCA-39	Commercial Off the Shelf (COTS) Electronics Cost and Technical Database
NCCA-40	COTS vs. Ruggedized COTS vs. MILSPEC Equipment Cost Database and Estimating Methodology
NCCA-41	Impact of COTS Hardware Usage on Contractor and Government In-house Support Cost
NCCA-42	Cost As an Independent Variable (CAIV) Implementation
NCCA-43	The SC-21 Sonar Performance-Based Cost Model (PBCM), a CAIV Effort

Naval Sea Systems Command

NAVSEA-1	Private Shipbuilder Overhead Costs and Savings from Initiatives
NAVSEA-2	Shipbuilding Process Simulation Model
NAVSEA-3	Cost/Schedule Performance Databases
NAVSEA-4	Early Warning System (EWS) Integration
NAVSEA-5	Material Vendor Survey
NAVSEA-6	Cost as an Independent Variable, a Production Cost Model for the Conformal Acoustic Velocity Sensor (CAVES) System
NAVSEA-7	AACEI Cost Model for Aircraft Carriers
NAVSEA-8	Nuclear Attack Submarine Procurement Cost Estimating System (ProCES) Cost Estimating Model
NAVSEA-9	SEA 0177 Shipyard Workload Model Improvements
NAVSEA-10	COTS Electronic Technology Assessment/Refresh Cost Model

Naval Air Systems Command

NAVAIR-1	Joint Strike Fighter (JSF) Advanced Cost Analysis Support (Cost of Stealth)
NAVAIR-2	F/A-18 E/F Northrop-Grumman Composite Fabrication
NAVAIR-3	Out-sourcing of Northrop-Grumman Fabrication Parts for F/A-18 E/F
NAVAIR-4	Relationship Between Missile Development Unit Cost and Production Unit Cost
NAVAIR-5	Naval Aviation Modification Model (NAMM) Data Base
NAVAIR-6	Maintenance Trade Decision Support System
NAVAIR-7	Maintenance Trade Guidebook
NAVAIR-8	NAVAIR Operating and Support Cost Model
NAVAIR-9	SBIR Life Cycle Cost Model Development
NAVAIR-10	Acquisition Reform Impacts/Multi-Year Analysis
NAVAIR-11	System Engineering/Program Management Cost for Tactical Missile Development and Production

Naval Surface Warfare Center, Dahlgren Division

NSWCDD-1	Surface Combatant Performance-Based Life Cycle Model
NSWCDD-2	TBMD Missile Model

NSWCDD-3	Software Maintenance Cost Process Model

Naval Surface Warfare Center, Carderock Division

NSWCCD-1	Costing Tools in Support of Parametric CAD Tools
NSWCCD-2	ATC LCC/Operating and Support Cost Model
NSWCCD-3	Cost Module for Sealift Ship Version of ASSET
NSWCCD-4	Product-Oriented Design and Construction (PODAC) Cost Model
NSWCCD-5	Surface Combatant Performance-Based Life Cycle Cost Model
NSWCCD-6	Fleet-Wide Cost/Benefit Assessment
NSWCCD-7	Dynamic Investment Balance Simulator (DIBS)
NSWCCD-8	Nuclear Attack Submarine Technology-Based Parametric Cost Model
NSWCCD-9	Nuclear Attack Submarine Performance-Based Life Cycle Cost Model
NSWCCD-10	Analysis of Operation and Support (O&S) Costs for Aircraft Carriers
NSWCCD-11	AACEI Cost Model for Surface Combatants
NSWCCD-12	Aircraft Carrier Performance-Based Life Cycle Cost Model
NSWCCD-13	Arsenal Ship Operating and Support Cost Model

Air Force Cost Analysis Agency

AFCAA-1	Space System Database Consolidation
AFCAA-2	NAFCOM
AFCAA-3	Acquisition Reform Cost Study
AFCAA-4	Multinational Satellite Cost Study
AFCAA-5	Re-Engineering Space Cost Estimating
AFCAA-6	New Technology Cost Study
AFCAA-7	Crosslinks Payload Data Collection and CER Development
AFCAA-8	Common Bus Data Collection and CER Development
AFCAA-9	Space-Environmental Cost Study
AFCAA-10	Ground Segment WBS/CER Development
AFCAA-11	EHF Communication Payload Database Update
AFCAA-12	Wide Area Network (WAN) Database
AFCAA-13	Launch Vehicle (Booster) Database Update
AFCAA-14	Space Database Update 2000
AFCAA-15	Booster/Payload Interface Standard
AFCAA-16	Space Estimating Methodology Update 2000
AFCAA-17	Business Base Impact Cost Study Follow-on
AFCAA-18	Strategic/Navigational/Weather/Crosslinks Payload Data Collection Update
AFCAA-19	Munitions Seeker Data Collection
AFCAA-20	SEPM Database and CERs
AFCAA-21	Missiles ACDB Update
AFCAA-22	Missiles SE/PM CER Development
AFCAA-23	Multi-Aircraft Database Normalization
AFCAA-24	Composite/Exotic Materials Database
AFCAA-25	WRAP Rate Study
AFCAA-26	Overhead Primer

AFCAA-27	Aircraft Modification Programs Study
AFCAA-28	Aircraft Database Study Follow-on
AFCAA-29	C3 Platform Integration Database
AFCAA-30	C3 Hardware Maintenance Database
AFCAA-31	C3I Database/CER Updates
AFCAA-32	Post Deployment Software Support (PDSS)
AFCAA-33	Software Growth Study
AFCAA-34	COTS Integration Research
AFCAA-35	Estimating Defensive Information Warfare Software
AFCAA-36	Estimating Internet WWW Software Applications
AFCAA-37	Neural Network Analysis of Historic Software Development Data
AFCAA-38	SoftEST Software Estimating Tool
AFCAA-39	Aircraft Cost and Engineering Tool
AFCAA-40	ACDB Upgrades (FY 98)
AFCAA-41	ACEIT Upgrades (FY 97 and out)

Air Force Materiel Command/Aeronautical Systems Center

ASC/FMC-1	Acquisition Reform Cost Study
ASC/FMC-2	Component Breakout Analysis Tool for Acquisition
ASC/FMC-3	Advanced Aircraft Cost Forecasting Model (AACFM)
ASC/FMC-4	Cost Estimator's Guide to Commercial Aircraft
ASC/FMC-5	Operating and Support (O&S) Cost Estimating Handbook
ASC/FMC-6	Contractor Logistics Support (CLS) and Interim Contractor (ICS) Support Handbook
ASC/FMC-7	PRICE Model Calibration Studies
ASC/FMC-8	Adjusting Cost Estimates

Air Force Space and Missile Systems Center

AFSMC-1	Hazardous Materials Disposal Cost Study
AFSMC-2	Operations and Support (O&S) Database
AFSMC-3	Passive Sensor Cost Model Update
AFSMC-4	Software Database (Phase VII)
AFSMC-5	Unmanned Spacecraft Cost Model (USCM) Update

Human Systems Center/Air Force Materiel Command

HSC/EMP-1	Hazardous Material Cost Trade-Off Analysis Tool
HSC/EMP-2	Process Cost Module

Air Force Electronics Systems Center

ESC/FMC-1	Labor Analysis Process & Automation for Estimating & Proposal Evaluation
ESC/FMC-2	Use of Automated Cost Estimator-Integrated Tools (ACE-IT) for Cost Proposal Evaluation and the Storage of Cost/Schedule/Technical Data
ESC/FMC-3	Industry/Government C^2 Cost Working Group

ESC/FMC-4	C^2 Cost Information Center Web Site
ESC/FMC-5	"Open" Estimating Tool for Software-Intensive Programs with COTS H/W & S/W
ESC/FMC-6	"NOW" Data Collection Process & Analysis
ESC/FMC-7	ESC-Unique Knowledge Bases for SEER SEM and Sage and CERs
ESC/FMC-8	Evaluation/Validation/Calibration of PRICE S for ESD- "Like" Programs

Air Force Institute of Technology

AFIT/LA-1	The Effect of Technical Scope Changes on Defense Contract Cost Overruns
AFIT/LA-2	The Distributional Properties of Cost Variances on Defense Contracts
AFIT/LA-3	An Analysis of Self-Care at WPAFB Hospital
AFIT/LA-4	An Analysis of the Purpose and Development of Management Reserve Budget
AFIT/LA-5	A Comparison of Nonlinear Estimate at Completion Methods
AFIT/LA-6	An Analysis of Smart Bomb Alternatives Using the Analytic Hierarchy Process
AFIT/LA-7	Hazardous Materials Life Cycle Estimation
AFIT/LA-8	Calibration of Five Software Cost Models to an Air Force Data Base ("Pentateuch Project")
AFIT/LA-9	Calibration of Seven Software Cost Models to an Air Force Data Base ("Septuagint Project")
AFIT/LA-10	A Cost Estimating Model for Retirement of the Minuteman III Intercontinental Ballistic Missile Weapon System
AFIT/LA-11	An Evaluation of U.S. Air Force Aviation Fuel Consumption Factors to Accurately Predict Aviation Fuel Costs by Aircraft Mission, Design and Series
AFIT/LA-12	An Investigation of the Relationship of Section Research and Development Costs to Total Demonstrator Costs of Gas Turbine Engines
AFIT/LA-13	Calibration of Software Cost Models to an Air Force Data Base ("Decalogue Project")
AFIT/LA-14	A Cost-Benefit Analysis of Earned Value Standards on Defense Contracts

Directorate of Cost Forecasting

DCF-1	Software Support Cost Model Project (SSCMP)
DCF-2	The Impact of Choice of Indices on Variation of Price Clauses in Contracts
DCF-3	The Impact on Cost Forecasting of the Private Finance Initiative

Defense Systems Management College

DSMC-1	Research on Ongoing Acquisition Research (ROAR)
DSMC-2	Cost and Risk Analysis Research

Aerospace Corporation

Aerospace-1	Costs of Space, Launch, and Ground Systems
Aerospace-2	Validation Testing of Commercial Risk-Analysis Software
Aerospace-3	Small-Satellite Cost Engineering Model
Aerospace-4	Small-Satellite Cost Study

Aerospace-5	Ground Systems Cost Model
Aerospace-6	Lesson Learned Handbook for Collecting Space Systems Acquisition Expertise
Aerospace-7	Acquisition Reform Initiative System Architecture and Processes
Aerospace-8	Formation of Corporate Concept Design Center

Center for Naval Analyses

CNA-1	Procedures and Software for Assessing Uncertainty in Cost Estimates
CNA-2	Update and Extension of Automated Cost Models

Logistics Management Institute

LMI-1	Empirical Analysis of Learning Curves
LMI-2	Analysis of Institutional Training Resources
LMI-3	Returns on Individual Training Investment
LMI-4	Improving DBOF Pricing
LMI-5	Enhancing Resource Analysis
LMI-6	Applying Advanced Tools for Analysis of Program Management

MITRE Corporation

MITRE-1	Telecommunications Future Services Pricing Model
MITRE-2	A Framework for Migrating to the Common Operating Environment (COE)

RAND Corporation

RAND-1	Understanding the Sources of Cost Growth in Weapon Systems
RAND-2	Force Structure and Support Infrastructure Costing for Program Analysis and Evaluation
RAND-3	Advanced Airframe Structural Materials

Institute for Defense Analyses

IDA-1	National Defense Program Costs
IDA-2	Cost of Defense Force Projections
IDA-3	Defense Program Projection (DPP) Support
IDA-4	FYDP Tracking and Analysis System
IDA-5	FYDP Related Studies
IDA-6	Defense Programming Database
IDA-7	Cost of Contingency Operations
IDA-8	Trends in Weapons System O&S Costs
IDA-9	Operations and Maintenance (O&M) Funding Migration
IDA-10	Assessing Defense Funding Supporting Readiness
IDA-11	Force Modernization Metrics
IDA-12	Force Aging
IDA-13	USMC Utility Rotary Wing Aircraft
IDA-14	Rotary Wing Aircraft Recapitalization Analyses
IDA-15	DoD Helicopter Commonality Study
IDA-16	Space and Missile Systems Nuclear Hardening Costs
IDA-17	Cost of Stealth
IDA-18	Cost Estimation for Streamlined Manufacturing Environment
IDA-19	Affordable Multi-Missile Manufacturing (AM3)
IDA-20	Technical and Schedule Risk Assessments for Tactical Aircraft Program

IDA-21	Methods To Assess Schedules for the Strategic Defense System
IDA-22	Integrated Schedule and Cost Model
IDA-23	Resource Analysis Test and Evaluation
IDA-24	Program Risk Analysis and Management
IDA-25	Estimation of Medical-Specific Inflation Indices
IDA-26	Evaluation of Uniformed Services Treatment Facilities
IDA-27	Evaluation of TRICARE Program Costs
IDA-28	Financial Databases of Defense Manufacturers
IDA-29	Private Shipbuilder Overhead Costs
IDA-30	Economic Drivers of Defense Overhead Costs
IDA-31	Contractor Cost Data Reporting (CCDR) Clearinghouse/Repository
IDA-32	Cost and Operational Effectiveness Analysis (COEA) for Pre-positioned Equipment Maintenance Facilities: The Army Facility at Charleston, SC, and the Marine Corps Facility at Blount Island, FL
IDA-33	Reserve Component Volunteerism
IDA-34	Active/Reserve Integration
IDA-35	Environmental Costs, Unexploded Ordnance Remediation
IDA-36	Defense Economic Planning and Projection Systems (DEPPS)
IDA-37	Coast Guard Models
IDA-38	Cost Analysis Education
IDA-39	IDA Cost Research Symposium

OFFICE OF THE DIRECTOR
PROGRAM ANALYSIS AND EVALUATION

Name	Office of the Deputy Director (Resource Analysis) Program Analysis and Evaluation (PA&E)		
Address	1800 Defense Pentagon Washington, DC 20301-1800		
Director	Dr. David L. McNicol	(703) 695-0721	
Size	Professional: Support: Consultants: Subcontractors:		36 5 1 17
Focus	Cost Analysis Improvement Group (CAIG); Life-Cycle Costs of Major Defense Acquisition Programs; Force Structure; Operating and Support Costs; Economic Analysis		
Activity	CAIG reviews and studies per year: POM, Budget, FYDP reviews:		30-40 As required

PA&E-1

Title: Force and Support Cost (FSC) System

Summary: DoD needs a quick and accurate cost estimating tool for proposed changes in forces and support infrastructure. OSD(PA&E) must supply rapid, credible, and incisive evaluations of the likely budget effects of major force and infrastructure alternatives in support of the program/budget review process. This project designs and implements an analysis system to address these fundamental issues.

Classification: Unclassified

Sponsor: OSD(PA&E)
FICAD
The Pentagon, Room 2D-278
Washington, DC 20301

Jeffrey Bennett, (703) 697-4311

Performer: RAND

Resources:

FY	*Dollars*	*Staff-years*
96	$375,000	
97	$550,000	
98	$550,000	

Schedule:

Start	*End*
Ongoing	FY 98

Data Base: *Title:*

Description:

Automation:

Publications: TBD

Category: II.C

Keywords: Government, Programming, Forces, Life Cycle, Acquisition Strategy, Mathematical Modeling, Computer Model

PA&E-2

Title: Force and Support Cost (FSC) System and FYDP Support—VGS

Summary: This project is the O&M adjunct to the RDT&E funded research and development effort **(see PA&E-1).** The O&M funding provides software maintenance of portions previously developed. FSC must be imported from Ingres to ORACLE and from Excel 4.0 macro language to Excel Visual Basic. This effort also provides critical client software support through Microsoft Office applications such as the electronic FYDP book.

Classification: Unclassified

Sponsor: OSD(PA&E)
FICAD
The Pentagon, Room 2D-278
Washington, DC 20301

Jeffrey Bennett, (703) 697-4311

Performer: RAND

Resources:

FY	*Dollars*	*Staff-years*
96	$170,000	
97	$200,000	
98	$200,000	

Schedule:

Start	*End*
Ongoing	FY 98

Data Base: *Title:*

Description:

Automation:

Publications: TBD

Category: II.C

Keywords: Government, Programming, Forces, Life Cycle, Acquisition Strategy, Mathematical Modeling, Computer Model

PA&E-3

Title: Visibility and Management of Operating and Support Costs (VAMOSC) for Major Weapon Systems

Summary: Follow-on to CIM-funded Functional Process Improvement (FPI) project for VAMOSC. The FY 1997 data standardization/identification effort will be based on lessons learned from the FY 1996 VAMOSC Business Process Review (BPR) and will lay a foundation for the prototype development of the standard "To Be" VAMOSC system.

Classification: Unclassified

Sponsor: OSD(PA&E)
FICAD
The Pentagon, Room 2D-278
Washington, DC 20301

Jeff Bennett, (703) 697-4311

Performer: Andrulis

Resources:

FY	*Dollars*	*Staff-years*
96	$275,000	
97	$150,000	
98	$250,000	

Schedule:

Start	*End*
Ongoing	FY 98

Data Base: *Title:*

Description:

Automation:

Publications:

Category: II.A.2

Keywords: Government, Estimating, Reviewing/Monitoring, Programming, Forces, Facilities, Overhead/Indirect

PA&E-4

Title: Visibility and Management of Operating and Support Costs (VAMOSC) for Major Weapon Systems

Summary: The objective of this effort is to maintain PA&E's VAMOSC capability. The contractor will support the VAMOSC/CIM working group and the Senior Level Steering Group, both of which comprise representatives from the CAIG, A&T, DUSD(L), CALS, DFAS, and the Services. The effort involves data modeling of Service VAMOSC databases, implementation of software that can read Service and DFAS data, update to Microsoft Access VAMOSC database application, and analysis of VAMOSC data for weapon systems

Classification: Unclassified

Sponsor: OSD(PA&E)
FICAD
The Pentagon, Room 2D-278
Washington, DC 20301

Jeff Bennett, (703) 697-4311

Performer: Andrulis

Resources:

FY	*Dollars*	*Staff-years*
96	$ 93,000	
97	$260,000	
98	$220,000	

Schedule:

Start	*End*
Ongoing	FY 98

Data Base: *Title:*

Description:

Automation:

Publications:

Category: II.A.2

Keywords: Government, Estimating, Reviewing/Monitoring, Programming, Forces, Facilities, Overhead/Indirect

PA&E-5

Title: Software Cost Model Evaluation

Summary: This project will (1) evaluate a well-recognized software cost model against known costs for a variety of software development projects; (2) simplify the model by reducing the independent variable space to accommodate data available to PA&E; and (3) re-evaluate the tailored model against known costs. In addition, this project will develop a new database of software costs by gathering data from program offices for software-intensive systems.

Classification: Unclassified

Sponsor: OSD(PA&E)
FICAD
The Pentagon, Room 2D-278
Washington, DC 20301

Vance Gordon, (703) 697-2999

Performer: IDA

Resources:

FY	*Dollars*	*Staff-years*
96	$ 50,000	
97	$ 0	
98	$150,000	

Schedule:

Start	*End*
Ongoing	FY 98

Data Base: *Title:*

Description:

Automation:

Publications:

Category: II.C

Keywords: Government, Estimating, Electronics/Avionics, EMD, Data Collection, Statistics/Regression, Data Base, CER

PA&E-6

Title: Selected Acquisition Report (SAR) Cost Variance Analysis

Summary: The project will provide insight into the magnitude and sources of major defense acquisition program (MDAP) cost growth. The project will quantify the amount of

MDAP cost growth that is attributable to policy decisions as well as the amount attributable to errors on the part of the acquisition community as a whole. The principal investigators will transfer historical cost data, cost variance data, and explanatory notes contained in SARs to an electronic spreadsheet. In addition, to recording the SAR taxonomy of cost variances, the principal investigators will classify historical cost variances according to a new taxonomy, which will be provided by the project sponsor.

Classification: Unclassified

Sponsor: OSD(PA&E)
PFED
The Pentagon, Room 2D322
Washington, DC 20301

Jermone E. Pannullo, (703) 693-7828

Performer: RAND

Resources:

FY	*Dollars*	*Staff-years*
96	$ 65,000	
97	$ 65,000	
98	$165,000	

Schedule:

Start	*End*
Ongoing	FY 98

Data Base: *Title:*

Description:

Automation:

Publications:

Category: II.C

Keywords: Government, Industry, Estimating, Review, Study

PA&E-7

Title: Demilitarization and Disposal Costs of Tactical Aircraft

Summary: The project will build analysis tools for estimating the costs of demilitarization and disposal for tactical aircraft. This task is a natural complement to two similar studies, one recently completed for large aircraft (bombers and transports) and another still in progress for tactical missiles.

Classification: Unclassified

Sponsor: OSD(PA&E) with the cooperation of the three Service Cost Agencies

OAPPD
The Pentagon, Room 2D-278
Washington, DC 20301

Major Kurt Held, (703) 697-0221

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
FY 97	FY 98

Data Base: *Title:*

Description:

Automation:

Publications:

Category: I.D

Keywords: Government, Analysis, Risk/Uncertainty, Data Collection, Data Base, Study

PA&E-8

Title: Developing Cost Estimating Relationships for the Streamlined Manufacturing Environment

Summary: The objective of this task is to examine specific acquisition reform measures that have been proposed and to develop methodologies for predicting quantitatively the effects on RDT&E and procurement costs of acquisition reform and manufacturing streamlining.

Classification: Unclassified Proprietary

Sponsor: OSD(PA&E)

Performer: IDA

Dr. Karen W. Tyson, (703) 845-2572; Dr. J. R. Nelson, (703) 845-2571

Resources:

FY	*Dollars*	*Staff-years*
	$200,000	1.3

Schedule:

Start	*End*
Mar 96	Jun 98

Data Base: None

Publications: TBD

Category: I.B

Keywords: Industry, Estimating, Production, Acquisition Strategy, Automation, Advanced Technology, CER

PA&E-9

Title: IDA Cost Research Symposium

Summary: IDA conducts a cost research symposium to facilitate the exchange of information on cost research that is in progress and planned, thereby avoiding wasteful duplication of effort and providing for more informed research planning decisions by participating offices. The Chairman, OSD CAIG, co-sponsors this symposium. The 1997 symposium focused on the DoD Six Year Cost Research Plan and the actions needed to update it. Documentation of the symposium includes a catalog of cost research projects recently completed or still in progress at participating offices.

Classification: Unclassified

Sponsor: IDA Central Research Program

OSD(PA&E)

Performer: IDA

Dr. Stephen J. Balut, (703) 845-2527

Resources:

FY	*Dollars*	*Staff-years*
	$45,0000	0.3

Schedule:

Start	*End*
Oct 96	Sep 97

Data Base: *Title:* DoD Cost Research Projects

Description: One-page summary descriptions of cost research projects (this page is an example)

Automation: None

Publications: *The 1997 IDA Cost Research Symposium*, Dr. Stephen J. Balut, August 1997, Unclassified, Pending

Category: II.A.1

Keywords: Government, Reviewing/Monitoring, Forces, Weapon Systems, Life Cycle, Data Collection, Data Base

PA&E-10

Title: Cost Analysis of Advanced Materials

Summary: Advanced materials are increasingly being used in new weapon systems. Estimating the costs of systems incorporating these materials is complicated by the limited cost history and difficulty in identifying the cost drivers and risks for new materials and processes. This project will develop an advanced materials/processes primer to aid analysts in cost estimates. The materials examined will include ceramics, metal matrix composites, ceramic matrix composites, intermetallic materials, and superalloys. In addition, PA&E cost knowledge of organic matrix composites will be updated to reflect technologies developed since the studies in 1991.

Classification: Unclassified

Sponsor: OSD(PA&E)
WSCAD
The Pentagon, Room 2C-310
Washington, DC 20301

Mr. Gary Bliss (703) 697-7282

Performer: RAND

Resources:

FY	*Dollars*	*Staff-years*
97	$200,000	

Schedule:

Start	*End*
Oct 96	Sep 98

Data Base: *Title:*

Description:

Automation:

Publications:

Category: I.C.1

Keywords: Government, Analysis, Weapon Systems, EMD, Production, Demonstration/Validation, Labor, Material, Schedule, Study

PA&E-11

Title: Cost of Developing and Producing Next Generation Tactical Aircraft

Summary: Over the next five years, DoD will be making funding decisions for tactical aircraft development and production, amounting to over $350 billion. CAIG is responsible for preparing independent cost estimates for these aircraft for cost certification to Congress. The existing tools do not address the cost of the new generation fighter aircraft. Design attributes of the next generation of tactical aircraft are not accommodated in existing cost estimating tools. Important attributes include low observable, advanced materials (both composites and metals), integrated avionics, and unique propulsion designs. These attributes are all evident in the F-22 and Joint Strike Fighter (JSF) programs. An urgent need exists to develop the necessary cost estimating tools to support these and future tactical aircraft programs. The objective is to collect, analyze, and exploit the latest available information to develop databases and methods for estimating the development and production costs of the next generation tactical aircraft.

Classification: Unclassified

Sponsor: OSD(PA&E)
WSCAD
The Pentagon, Room 2C-310
Washington, DC 20301

Gary Pennett, (703) 697-7282

Performer: IDA

Resources:

FY	Dollars	Staff-years
97	$250,000	
98	$200,000	

Schedule:

Start	End
Oct 96	Sep 98

Data Base: *Title:*

Description:

Automation:

Publications:

Category: I.C.1

Keywords: Government, Estimating, Analysis, Aircraft, EMD, Material, Demonstration/Validation, Engineering

PA&E-12

Title: Avionics Development and Production Estimating

Summary: PA&E is continually involved in estimating development and production for new and existing avionics. Many studies have been completed in the past that deal with either development or production costs for either new or retrofit aircraft, but none of the studies are comprehensive or up to date. The most recent development cost study is ten years old and the most recent production cost study is fifteen years old. With avionics becoming a larger percentage (over 25% for the F-22 and JSF) of new or retrofit aircraft development and production cost, accurate models are critical to proper program budgeting and decision making. The objective is to develop suitable cost estimating relationships for different classes of avionics for development, production, and retrofit. The results of this study will apply directly to the F-22, JSF, Camanche, and RIA programs. Other programs that will benefit from this study include JSTARS, C-17, B-1B CUMP, and F/A-18E/F.

Classification: Unclassified

Sponsor: OSD(PA&E)
WSCAD
The Pentagon, Room 2D-310
Washington, DC 20301

Gary Pennett, (703) 697-7282

Performer: IDA

Resources:

FY	Dollars	Staff-years
97	$250,000	
98	$150,000	

Schedule:

Start	End
Oct 96	Sep 98

Data Base:

Publications:

Category: I.C.1

Keywords: Government, Estimating, Analysis, Aircraft, EMD, Engineering

PA&E-13

Title: Contractor Cost Data Reporting (CCDR) Clearinghouse/Repository

Summary: DoD develops cost estimates of major weapon systems using historical data, the primary sources of which are the Contractor Cost Data Reports (CCDRs) provided by hundreds of defense contractors. At this time, most of this data is transmitted in paper copy form, is not validated, and is difficult to store and disseminate in a useful manner on a wide-scale

basis. To be of optimal use, these reports have to be in electronic form and be catalogued, validated, normalized, and distributed by a clearinghouse staff (5 personnel), with the assistance of a central electronic data repository. We are currently requiring contractors to submit the CCDR report in a universally accepted electronic format. The central repository will require a sophisticated suite of relational database software and hardware to handle the attendant large-scale electronic data transmissions and queries. This effort will include development of automated tools for mapping corporate accounting data into formats prescribed by the CCDR reporting system, as well as a fully operating data repository that will convert the CCDR report data into a database for easy retrieval and use by DoD-wide cost analysts.

Classification: Unclassified

Sponsor: OSD(PA&E)
WSCAD
The Pentagon, Room 2D-310
Washington, DC 20301

R. Wayne Knox, (703) 697-0374

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*
96	$350,000	
97	$250,000	
98	$250,000	

Schedule:

Start	*End*
Oct 96	Sep 98

Data Base: *Title:*

Description:

Automation:

Publications:

Category: II.A.2

Keywords: Government, Industry, Analysis, Labor, Material, Schedule, Study

PA&E-14

Title: CAIG Information Center Support

Summary: The purpose of this task is to purchase equipment and software for establishing the CAIG Information Center. The immediate objective is to establish a central catalog of existing holdings, including technical reports, CAIG case files, and PPBS documents.

Classification: Unclassified

Sponsor: OSD(PA&E)
Resource Analysis
The Pentagon, Room 2D-278
Washington, DC 20301

Libbie Blaeuer, (703) 697-0221

Performer:

Resources:

FY	*Dollars*	*Staff-years*
97	$50,000	
98	$50,000	

Schedule:

Start	*End*
Oct 96	Sep 98

Database: *Title:*

Description:

Automation:

Publications:
Category: II.A
Keywords:

BALLISTIC MISSILE DEFENSE ORGANIZATION

Name	Ballistic Missile Defense Organization		
Address	Pentagon Washington, DC 20330-7100		
Director	Ms. Donna Snead	(703) 604-3584	
Size	Professional:		6
	Support:		0
	Consultants:		0
	Subcontractors:		12
Focus	Cost Methodology Improvement Projects		
Activity	Number of projects in process:	18	
	Average duration of a project:	15 months	
	Average number of staff members assigned to a project:	2	
	Average number of staff-years expended per project:	0.5	
	Percentage of effort conducted by consultants:	0%	
	Percentage of effort conducted by subcontractors:	90%	

BMDO-1

Title: Cost Estimating Cross-Check Guide

Summary: The purpose of this effort is to provide a methodology and database which cost analysts can use to perform cross-checks and credibility assessments of estimates they generate. Currently, there exists no formal methodology or consolidated database to accomplish these assessments. Most cost cross-checks are currently done using the cost analyst's personal database and experience. It is anticipated that this guide will support quick reaction cost estimates, POM drills, and budget updates, with the latter two experiencing the greatest benefits. This effort was completed during 1996 and is in a loose leaf notebook and electronic format in order to be updated as additional data becomes available.

Classification: Unclassified (Proprietary)

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 5806-3301

G. Todd Honeycutt, Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.8

Schedule:

Start	*End*
Sep 94	Nov 96

Data Base: *Title:*

Description: The current database exists as Microsoft Excel spreadsheets containing cost, performance, and design for 38 missile systems, 49 satellites, and 46 radar systems. Bar chars graphically depict the relative cost of the various measures of cost outlined in the methodology.

Automation: Microsoft Excel

Publications: *Cost Estimating Cross Check Guide, Sequence A172*, November 1996.

Category: II.A.2

Keywords: Government, Estimating, Analysis, Reviewing/Monitoring, Weapon Systems, Missiles, Space Systems, Electronics/Avionics, Test and Evaluation, Demonstration/Validation, EMD, Production, Data Collection, Data Base, Method

BMDO-2

Title: Radar Hardware Cost Estimating Relationships (CERs) Database

Summary: The Ballistic Missile Defense Organization (BMDO) requires cost estimating methods and CERs for radar hardware components, subassemblies, and subsystems to support life cycle cost modeling of BMDO programs. A large number of CERs have been developed that apply to the BMDO effort. The requirement exists for a repository of all available radar hardware CERs that are available for application in BMDO life cycle economic models. The objective of this task is to research and collect existing radar hardware CERs and catalog them into a database. Each CER is fully documented, based on information in the source document and displayed in a standard

format. A common radar WBS structure was developed and used to catalog each CER. CERs were collected at the radar subsystem, assembly, subassembly, and component levels. The database is further divided into conventional tube technology and solid state technology. A separate WBS and CERs are presented for each type of technology. This task was initially completed and a report issued in June 1995. The report is in a loose leaf notebook format and continues to be added to as new radar CERs are developed and/or collected for BMDO. The current effort is to update the existing database with more recent cost and technical data from operational large ground-based radars. These radars and associated data are most relevant to BMDO ground-based radars. The effort will focus on collecting development and production cost data on antenna equipment, processors, receiver/exciters, beam steering generators, ancillary equipment, and support equipment. The data collected will be used to generate CERs applicable specifically to large ground-based radars.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Fred Maksimowki; Sharon Roberts; Bill Shelton, (205) 971-6552; Mike Boito, (703) 528-0505

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.5

Schedule:

Start	*End*
Apr 97	Jun 97

Data Base: *Title:*

Description: A resume sheet is prepared for each CER that describes the equation, input variables, and source of the equation; identifies what is included and excluded in the CER; presents statistical fit data if available; discusses any limitations; lists the systems used to develop the CER; and lists the year dollars of the results.

Automation: Appropriate CERs are incorporated into existing BMDO models

Publications: *Radar Hardware Cost Estimating Relationships (CER) Database, Sequence No. A097*, June 1995.

Category: II.A.1

Keywords: Government, Estimating, Analysis, Reviewing/Monitoring, Data Base, Electronics/Avionics, Production, WBS, Data Collection, Mathematical Modeling, Survey

BMDO-3

Title: Missile Integration, Assembly, and Test (IA&T) Cost Methodology Improvement Report (CMIR)

Summary: The Ballistic Missile Defense Organization (BMDO) cost estimating methods require different levels of integration of missile components, subassemblies, and subsystems. Current convention uses integration factors of 7.4% to 10% of recurring production costs. This factor cannot be supported at levels below the assembly level. The objective of this task was to research and collect data on missile integration cost at the subsystem, assembly, subassembly, and component levels, and to develop cost estimating relationships (CERs) to estimate this effort. The methodology developed may be used to estimate the recurring production cost of integration, assembly, and test activities.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Sharon Roberts, Robert Barber (205) 971-7321

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.5

Schedule:

Start	*End*
Nov 94	Dec 96

Data Base: *Title:*

Description:

Automation: Incorporated into existing BMDO missile cost models

Publications: *Missile Integration, Assembly, and Test (IA&T) Cost Methodology Improvement Report (CMIR), Sequence No. A171*, December 1996

Category: II.A.2

Keywords: Government, Estimating, Analysis, Missiles, Production, Study, Manufacturing, CPR/CCDR, Data Collection, Mathematical Modeling, Cost/Production Function, Statistics/Regression, Data Base, CER

BMDO-4

Title: Endo-Atmospheric Missile Hardware Cost Estimating Relationships Database and Database Source Documentation

Summary: The Ballistic Missile Defense Organization (BMDO) requires cost estimating methods and CERs for missile hardware components, subassemblies, and subsystems to support life cycle modeling of BDMO programs. A large number of CERs have been developed that apply to the BMDO effort. The requirement exists for a repository of all missile hardware CERs that are available for application in BMDO life cycle economic models. The objective of this task is to research and collect existing missile hardware CERs and catalog them into a database. Each CER is fully documented based on information in the source document and put into a standard format. A common WBS structure was developed and used for cataloging each CER. Cost estimating relationships were collected at the missile subsystem, assembly, subassembly, and component levels. This task was initially completed and a report issued in November 1994. The report is in a loose leaf notebook format and continues to be added to as new radar CERs are developed and/or collected for BMDO.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Sharon Roberts, Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.5

Schedule:

Start	*End*
May 94	Nov 94

Data Base: *Title:*

Description: A resume sheet is prepared for each CER that describes the equation, input variables, and the source of the equation; identifies what is included and excluded in the CER; presents statistical fit data if available; discusses any limitations; lists the systems used to develop the CER; and provides the year dollars of the results.

Automation: Appropriate CERs are incorporated into BMDO Missile Cost Models.

Publications: *Endo-Atmospheric Missile Hardware Cost Estimating Relationships (CERs) Database and Database Source Documentation*, Volumes 1 and 2, November 1994.

Category: II.A.1

Keywords: Government, Estimating, Analysis, Reviewing/Monitoring, Missiles, Propulsion, Airframe, Electronics/Avionics, Production, WBS, Data Collection, Mathematical Modeling, Survey, Data Base, CER

BMDO-5

Title: Missile Hardware Step Functions

Summary: There has been an increased number of questions regarding the step function used by the Ballistic Missile Defense Organization (BMDO) to model missile prototype hardware cost. Data from a number of missile systems were assembled and evaluated to determine the relationship between the "missile" level hardware costs for the theoretical first unit during each phase of a program acquisition cycle (PD&RR, EMD, LRIP, and Production). The study revealed a step function for scaling from EMD to full-scale production, but the data was not sufficient to produce scaling factors among other phases. A final report containing the data points used in the analysis, the normalization process, and results of analysis was developed.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Rick Taylor, (205) 971-6423; Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.6

Schedule:

Start	*End*
Sep 94	Nov 96

Data Base: *Title:*

Description: Data for approximately 20 missile systems including missile-level hardware costs for each phase, quantities, contract description, technology factor, newness factor, and data source

Automation: Microsoft Excel

Publications: *Missile Hardware Step Functions, Sequence No. A170*, November 1996.

Category: II.A.2

Keywords: Government, Estimating, Analysis, Missiles, Production, Data Base, Demonstration/Validation, EMD, Manufacturing, CPR/CCDR, Data Collection, Mathematical Modeling, Cost/Production Function, Study

BMDO-6

Title: Unit Cost versus Production Rate Analysis

Summary: The purpose of this effort is to develop a data base and methodology for adjusting recurring production hardware cost for changes in production rates. Causes and effects were identified, data collected, and a methodology developed to provide for adjustments in production rate changes. Currently, a methodology does not exist to provide for this adjustment. It is anticipated that this methodology will be used for POM and/or budget updates.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Vicki B. Kitchens, (205) 971-6517; Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.5

Schedule:

Start	*End*
Sep 94	Dec 95

Data Base: *Title:*

Description: Current data base exists as a Microsoft Excel spreadsheet containing annual production rate, economic rate, rate variable, recurring production cost, average yearly unit cost, cumulative quantity, cumulative recurring production cost, cumulative unit cost, average yearly quantity for total program, and descriptions of contractors for 9 missile systems, 5 passive sensor systems, and 2 airborne radar systems.

Automation: Microsoft Excel

Publications: *Unit Cost vs. Production Rate Analysis, Sequence No. A137*, December 1995.

Categories: II.A.2, II.B, II.C, II.D

Keywords: Government, Estimating, Analysis, Programming, Budgeting, Missiles, Electronics/Avionics, Production, Manufacturing, Production Rate, Schedule, Data Collection, Mathematical Modeling, Economic Analysis, Cost/Production Function, Statistics/Regression, Data Base, Method, CER, Study

BMDO-7

Title: Below-The-Line CERs for Missile System Production, Fielding/Deployment Phase and Production, Fielding/Deployment Phase Database

Summary: The purpose of this effort is to provide a methodology and database which cost analysts can use to estimate the Below-The-Line (BTL) or Program-level cost elements. Currently, a consolidated methodology and database do not exist to accomplish these estimates. Consequently, because of allocations made during data normalization and mapping into the BMDO BTL cost elements, one cannot be sure that some costs are not either left out or that some costs might not be duplicated. By using one database it thus becomes possible that one specific account/accounts might still be understated or overstated. However, total cost should be captured and also without double accounting. The goal of the effort is to develop CERs that utilize technical or programmatic descriptors in lieu of cost ratios. The database report has been published and CER development is currently being conducted. The database is in electronic form and as a hardcopy loose-leaf notebook, and it will be updated as current/more data is collected.

Classification: Unclassified (Proprietary)

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Charlie Lyons; Tim Bryson; John Grace; Fred Maksimowski;
Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		1.2

Schedule:

Start	*End*
Sep 95	Sep 96

Data Base: *Title:*

Description: The current database exists as Microsoft Excel spreadsheets containing cost, performance, and design data for 13 missile systems. The final data form for the BTL effort is total program in constant FY 93 dollars by BMDO Production, Fielding/Deployment elements.

Automation: Microsoft Excel

Publications: *BMDO Detailed Cost Estimating and Analysis Database, Publication No. 1: Missile System Production, Fielding/Deployment Cost Estimating and Analysis Database*, Volumes 1 and 2, Sequence No. A161, September 1996

Categories: II.A.2, II.C

Keywords: Government, Estimating, Analysis, Reviewing/Monitoring, Missiles, Production, CPR/CCDR, WBS, Fixed Costs, Variable Costs, Schedule, Data Collection, Mathematical Modeling, Data Base, Method, CER

BMDO-8

Title: Below-The-Line CERs for Radar System Production, Fielding/Deployment Phase

Summary: The purpose of this effort is to provide a methodology and database which cost analysts can use to estimate the Below-The-Line (BTL) or Program-level cost elements. Currently, a consolidated methodology and database do not exist to accomplish these estimates. Consequently, because of allocations made during data normalization and mapping into the BMDO BTL cost elements, one cannot be sure that some costs are not either left out or that some costs might not be duplicated. By using one database it thus becomes possible that one specific account/accounts might still be understated or overstated. However, total cost should be captured and also without double accounting. The goal of the effort is to develop CERs that utilize technical or programmatic descriptors in lieu of cost ratios. This effort has not been initiated yet due to higher priorities.

Classification: Unclassified (Proprietary)

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		1.2

Schedule:

Start	*End*
May 97	Jul 98

Data Base: *Title:*

Description: The current database exists as Microsoft Excel spreadsheets containing cost, performance, and design data for several radar systems. The final form for the BTL effort is total program in constant FY 93 dollars by BMDO Production, Fielding/Deployment elements.

Automation: Microsoft Excel

Publications: *Below-The-Line CERs for Radar Systems in Production, Fielding/Deployment Phase*, pending.

Categories: II.A.2, II.C

Keywords: Government, Estimating, Analysis, Reviewing/Monitoring, WBS, Fixed Costs, Electronics/Avionics, Production, CPR/CCDR, Data Collection, Variable Costs, Mathematical Modeling, Data Base, Method, CER

BMDO-9

Title: Radar Cost Methodology Improvement Report (Formerly) Solid State Transmit/Receive (T/R) Module CER Update

Summary: This radar cost methodology improvement report was developed to upgrade BMDO's current catalog of radar CERs. Two particular radar WBS areas needed improvement in the database of CERs available for use in BMD costing. Those areas were the radar antenna array structure and feed, and the solid state transmit/receive modules. Both CERs are applicable to the current

Theater Missile Defense radars (THAAD GBR and MEADS) and the National Missile Defense Radars (NMD GBR and NMD AEWR), as well as most radars that may be considered in BMDO architectures. The purpose of this effort was to collect, normalize, and prepare a database of recurring hardware cost and programmatic and technical data that can be used to develop CERs for estimating a recurring production first unit hardware cost. Each CER utilizes technical or programmatic descriptors as independent variables. The effort focused on a database reflecting the parameter ranges projected to be used in BMDO radars.

Classification: Unclassified (Proprietary)

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.3

Schedule:

Start	*End*
Sep 95	Nov 96

Data Base: *Title:*

Description: The current database exists as a Microsoft Excel spreadsheet containing cost, performance, and design data.

Automation: Microsoft Excel

Publications: *Radar Cost Methodology Improvement Report, Sequence A169*, November 1996

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Analysis, Electronics/Avionics, EMD, Demonstration/Validation, Production, Manufacturing, Data Base, CPR/CCDR, WBS, Data Collection, Mathematical Modeling, Method, CER

BMDO-10

Title: Missile Divert and Attitude Control System (DACS)

Summary: The purpose of this effort is to provide a methodology and database which cost analysts can use to estimate DACS, whether they are solid, liquid, or gel. Currently, the database to accomplish these estimates is virtually nonexistent. Several technology programs are underway to develop the technology. Currently, at least one of the BMDO elements has specified solid/gel DACS in the CARD. If enough data can be collected, a CER to estimate first unit production cost will be developed. If sufficient data is not available for a CER, a methodology to estimate using current CERs modified by technology information is desirable.

Classification: Unclassified (Proprietary)

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Rick Taylor, (205) 971-6432

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.2

Schedule:

Start	*End*
Mar 96	Apr 97

Data Base: A current data base does not exist.

Publications: *TN-96-001 Missile Divert and Attitude Control System*, pending.

Category: II.A.2

Keywords: Government, Estimating, Missiles, EMD, Production, Manufacturing, Data Collection, Data Base, Method, CER

BMDO-11

Title: Update Development Engineering Cost Estimating Relationship

Summary: The purpose of this effort is to provide an updated and improved methodology and database which cost analysts can use to estimate the key research and development cost driver, development engineering. This effort will build on BMDO-sponsored research at USASSDC and utilize data collected in the latest BMDO database efforts.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

James Rowan, (205) 971-6436

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.5

Schedule:

Start	*End*
Sep 95	May 97

Data Base: *Title:*

Description: The current database exists as Microsoft Excel spreadsheets containing cost, performance, and design data for several missile, radar, sensor, and BMC3 systems.

Automation: Microsoft Excel

Publications: *A Parametric Approach to Estimating Cost Of Development Engineering*, Draft pending.

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Missiles, Electronics/Avionics, Data Collection, Data Base, Demonstration/Validation, EMD, CPR/CCDR, Method, CER

BMDO-12

Title: Laser Weapons Database and CERs

Summary: The purpose of this effort is to provide a methodology and database which cost analysts can use to estimate laser weapons/BMD systems. This effort encompasses the development of a laser WBS/CBS and CERs to estimate Recurring Production first unit cost. This effort revolves around the current cost estimating work on the Space Based Laser (SBL) system.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

G. Todd Honeycutt; Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.3

Schedule:

Start	*End*
Sep 95	Apr 97

Data Base: The current database exists as Microsoft Excel spreadsheets and collections of hardcopy data.

Publications: The data collected in this effort has been used in the BMDO Space Based Laser estimate and forms the basis for the estimate rationale in several areas.

Category: II.A.1

Keywords: Government, Estimating, Analysis, Reviewing/Monitoring, CERs, Weapon Systems, Space Systems, Electronics/Avionics, Data Base, Demonstration/Validation, EMD, Production, Test and Evaluation, Data Collection, Method

BMDO-13

Title: Production Support Factors

Summary: The purpose of this effort is to provide a methodology and database which cost analysts can use to estimate the Recurring Production Support costs, i.e., Recurring Engineering, Sustaining Tooling, and Quality Control. Although these accounts are not specifically broken out in the BMDO Cost Breakdown Structure, they are separate accounts in the Army structure and must be addressed in many BMDO cost reconciliations with the Army.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Tim Bryson, (205) 971-6567; Bob Barber, (205) 971-7321

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.3

Schedule:

Start	*End*
Feb 96	Apr 97

Data Base: *Title:*

Description: The current database exists as Microsoft Excel spreadsheets containing cost, performance, and design data for 8 missile systems.

Automation: Microsoft Excel

Publications: *Below-The-Line CERs for Missile System Production, Fielding/Deployment Phase*, pending. The results of this effort will be published in the form of a Technical Notice and then incorporated into the above final report.

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Missiles, Production, Data Base, Method, CERs

BMDO-14

Title: Missile Nonrecurring Production CER Update

Summary: The purpose of this effort is to provide an improved methodology and database which cost analysts can use to estimate Nonrecurring Production for missile systems. To date, the methodology has been developed, a database generated, and a new CER developed. The final report is pending some changes in the database due to corrections and allocation of costs to the proper accounts. When those are completed, the CER will be adjusted/reworked and the report finalized.

Classification: Unclassified (Proprietary)

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Fred Maksimowski; Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.3

Schedule:

Start	*End*
Feb 96	Apr 97

Data Base: *Title:*

Description: The current database exists as Microsoft Excel spreadsheets containing cost, performance, and programmatic data for10 missile systems. Costs are included at summary as well as individual contract level.

Automation: Microsoft Excel

Publications: *Nonrecurring Production CER for Missile Systems*, pending. The effort will be published in the form of a Technical Notice and then incorporated into the final report for Below-The-Line CERs for Missile System Production, Fielding/Deployment Phase [BMDO-7].

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Missiles, Production, Data Base, Method, CERs

BMDO-15

Title: Update BMDO CBS Element Time Phasing Profiles

Summary: The purpose of this effort is to provide an improved methodology and database which cost analysts can use to determine the proper time phasing profiles for BMDO elements at the BMDO CBS levels.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Vicki Kitchens, (205) 971-6517; James Rowan, (205) 971-6438; Tom Odom, (205) 971-6566; Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.3

Schedule:

Start	*End*
Feb 96	May 97

Data Base: *Title:*

Description: The current database exists as Microsoft Excel spreadsheets containing time vs. expenditure data.

Automation: Microsoft Excel

Publications: *BMDO Cost Breakdown Structure (CBS) Time Phasing Profiles*, pending

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Missiles, Production, Data Base, Method, CERs

BMDO-16

Title: Cost As an Independent Variable

Summary: Cost As an Independent Variable is one of the new ways of doing business. The implementation of the process requires close interaction between the cost analyst and technical and program personnel. Existing cost and technical models will require change at the least, and possibly complete integration or more extensive use of "cost Engineering" models, i.e., models containing Performance Design Relationships (PERs) or Design Engineering Relationships (DERs). To fully implement the process, the CARD concept may have to be rethought and/or revised. CAIV impact on cost risk also must be reviewed. The objective of this task is to monitor the process within DoD and BMDO, create workable policies and concepts, advise and participate in the CARD requirement changes required for implementation, develop alternate paths for political and other abnormalities to the process, and present positive solutions to facilitate implementation within BMDO.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Dr. James Ratliff, (205) 971-6682; Dr. Michael Anderberg, Tim Bowden, (703) 528-0505; Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.3

Schedule:

Start	*End*
Feb 96	Indefinite

Data Base: *Title:*

Description: Database in process

Automation: Microsoft Excel

Publications: *BMDO Policy on Cost As an Independent Variable*, pending

Categories: I.C, II.B, II.D

Keywords: Government, Industry, Estimating, Missiles, Life Cycle, Acquisition Strategy, Cost/Production Function, Data Base, Method, CERs

BMDO-17

Title: BMDO Missile Comparison and Methodology Improvement

Summary: The current BMDO missile inventory of systems in development or in concept numbers approximately ten. Cost modeling of these missiles started at various times and a comparison of the basic WBSs for completeness and consistency needs to be accomplished. In addition, a review of the various CERs used in each of the models needs to be accomplished to assure BMDO that the latest, best, and most appropriate CERs are being used for costing of the missile components. A consistency check needs to be accomplished to assure BMDO that each of the CERs has the proper range of data point parameters to coincide with the parameters of the missiles being costed.

Classification: Unclassified (Proprietary)

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
6725 Odyssey Drive
Huntsville, AL 35806-3301

Fred Maksimowski, Bill Shelton, (205) 971-6552

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.3

Schedule:

Start	*End*
Feb 96	Aug 97

Data Base: *Title:*

Description: The database for this task is the AREM Missile cost models. In addition, a database of CERs in notebook form exists for missiles, and a database of CERs exists for several other missile components such as Infrared Sensors, Lasers, etc. These can be used to improve the models and make them more consistent. Also, the Missile Production Cost Database has been delivered. This is a database from which CERs can be regressed as well as new data points added for re-regression of CERs for improved cost models.

Automation: Microsoft Excel

Publications: *BMDO Missile Comparisons and Improved Methodology*, pending

Categories: I.B.1, II.A.2

Keywords: Government, Estimating, Missiles, Life Cycle, WBS, Case Study, Review, Computer Model, CERs

BMDO-18

Title: BMDO Risk Methodology Update

Summary: The Ballistic Missile Defense Organization (BMDO) requires accurate risk estimation budget preparation. The current model has not been substantially updated since 1992. The principal change to the model being studied will be the incorporation of correlation using the functional correlation methodology. Other related adjustments to the model are inclusion of schedule and technical risk in below-the-line items through correlation, a shift of distributional choice for cost estimating risk from triangular to Gaussian, and a shift of the mapping of schedule and risk scores to distribution from a quadratic to a regression-based methodology.

Classification: Unclassified

Sponsor: Ballistic Missile Defense Organization (BMDO)
BMDO/POE
Crystal Square Two, Suite 1200
1725 Jefferson Davis Highway
Arlington, VA 22209

Donna M. Snead, (703) 604-3584

Performer: Science Applications International Corporation
1525 Wilson Blvd
Arlington, VA, 22209

TASC, Inc.
1101 Wilson Blvd
Arlington, VA, 22209

Tim Bowden, (703) 528-0505; Dick Coleman, (703) 528-0505

Resources:

FY	*Dollars*	*Staff-years*
N/A		0.5

Schedule:

Start	*End*
Apr 97	Jun 97

Data Base: *Title:*

Description: The database consists of historical SARs.

Automation: MS Excel and Crystal Balls.

Publications: *Cost Risk Analysis of the Ballistic Missile Defense (BMD) System*, dated February 1996, will be updated.

Category: II.A.2

Keywords: Government, Estimating, Weapon Systems, Life Cycle, Risk/Uncertainty, Mathematical Modeling, Computer Model

ARMY COST AND ECONOMIC ANALYSIS CENTER

Name	US Army Cost and Economic Analysis Center (USACEAC)	
Address	5611 Columbia Pike Falls Church, VA 22041-5050	
Director	Robert W. Young	(703) 681-3217 DSN: 761-3217 FAX: (703) 681-8732
Size	Professional: Support: Consultants: Subcontractors:	65 11 0 1
Focus	The focus of the Army's Centrally Funded Cost Research Program is to improve the capability of the Army to develop cost estimates and economic analyses. The main categories of concentration are: Data Base Development; Methodology Development; Costing the Effects of New Technology; Software Support Systems; PPBES Linkages. The Commodity areas we cover are: Aircraft Systems; Missiles and Space Systems; Wheel and Tracked Combat Vehicle Systems; Communications and Electronics Systems; General Systems/Future Technology/Tools and Models; Information Management Systems; Force Unit Costing; Operating and Support Costing.	
Activity	Number of projects in process:	12–15
	Average duration of a project:	9–12 months
	Average number of staff members assigned to a project:	0.25
	Average number of staff-years expended per project:	2
	Percentage of effort conducted by consultants:	0%
	Percentage of effort conducted by contractors:	90%
	Percentage of effort conducted by subcontractors:	5%

CEAC-1

Title: Update FORCES Cost Model, EFCDB, Cost Factor Handbook

Summary: Update the costs and factors in FORCES. Develop a deployment module that provides user with one source of input and output to estimate the cost to deploy army units in support of any type contingency to include documentation. The Forces and Organization Cost Estimating Systems (FORCES) includes a Force Cost Model, Exportable Force Cost Data Base (EFCDB), Cost Factors Handbook, Military End Strength Reduction Model, and Civilian Manpower Reduction Model. The Cost Factor Handbook will be linked to ACEIT to improve cost analysts access to the data.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center

Performer: Management Analysis, Inc. (MAI)

Wayne Grant

Resources:

FY	*Dollars*	*Staff-years*
97	$350,000	

Schedule:

Start	*End*

Data Base: The Exportable Force Cost Data Base

Publications:

Category: II.A.1

Keywords: Government, Estimating, Analysis, Forces

CEAC-2

Title: The Army Manpower Cost System (AMCOS)

Summary: The Army Manpower Cost System (AMCOS) is a family of active, reserve, and civilian manpower models developed by the Army Research Institute (ARI) to improve the accuracy and flexibility of manpower cost estimation. USACEAC has assumed responsibility for operating, maintaining, updating, and modifying the AMCOS model, which is used to provide manpower cost estimates to the Army Research Laboratory, for manpower costs associated with alternative system design options. Develop Windows-based database for AMCOS with a new user interface. Consolidate six AMCOS databases into a single database.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center

Performer: SRA

Resources:

FY	*Dollars*	*Staff-years*
97	$130,000	

Schedule:

Start	*End*

Data Base:

Publications:

Category: II.A

Keywords: Government, Estimating, Analysis, Forces, Data Collection, Manpower/Personnel

CEAC-3

Title: ACEIT/ACDB

Summary: This project funds the Army portion of a joint effort of the US Army Cost and Economic Analysis Center, the Air Force Electronic Systems Center, and Air Force Cost Analysis Agency to meet the Army Cost Estimation Support Requirements. This funds approximately 27 ACEIT Training Sessions across the Army and provides dial-up support for technical assistance when required. It includes the update of annual Inflation Indices, problem resolution, bug fixes and configuration

control for Army Acquisition Information/Databases. This contract acts as the Super Data Base Administrator (DBA) for USACEAC commodity contractors' DBAs.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center
Mr. Richard Bishop, (703) 681-9124; DSN: 761-9124

Performer: Tecolote Research, Inc.
Tom Kielpinski

Resources:

FY	*Dollars*	*Staff-years*
97	$250,000	

Schedule:

Start	*End*
Apr 96	May 97

Data Base: IBM PC compatible

Publications: *Tecolote ACE-IT Users Guide*

Categories: II.A.1, II.A.2

Keywords: Government, Weapon Systems, Data Base

CEAC-4

Title: Communications and Electronics Cost Model/Methodology

Summary: This project will continue to improve and expand the electronics cost model developed for USACEAC in FY96. This effort will add additional Army communications, electronics, and sub-munition systems to the database and model; expand the electronics Work Breakdown Schedule to include active RF assemblies, analog electronics, and power supplies. Investigate, within existing CERS, the cost relationship of change in volume for a given capability.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center
Naval Surface Warfare Center

Performer: Technomics, Inc.
John Horak

Resources:

FY	*Dollars*	*Staff-years*
97	$100,000	

Schedule:

Start	*End*
Apr 96	Dec 96

Data Base:

Publications: *Communications and Electronics Cost Model*, TR-9607-01, October 1996

Categories: I.C.2, II.A.2, II.B, II.C

Keywords: Government, Estimating, Analysis, WBS, Data Base, CER, Data Collection

CEAC-5

Title: Operating and Support Management Information System (OSMIS)

Summary: OSMIS is a Management Information System designed to assist the Army in determining the historical operating and support costs of selected major fielded weapons systems through the production of cost data and cost factors based on actual usage data. The cost data generated from OSMIS is derived from interaction with existing Army Logistics Support Management Information Systems. A new effort will be to re-host the master databases and reengineer the data collection, factor development, and increase the users' access to the database. A relational database is being developed to decrease the query turn-around time dramatically.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center
Terry Mateer, (703) 681-3335; DSN: 761-3335

Performer: CALIBRE Systems, Inc.
Les Zavecz

Resources:

FY	*Dollars*	*Staff-years*
97	$1,600,000	

Schedule:

Start	*End*
Jan 97	Oct 97

Data Base:

Publications: *FY 96 U. S. Army Cost Per Flying Hour Reimbursement Rate Methodology and Definitions*, August 1995

U.S Army Operating and Support Management Information System (OSMIS)/ Visibility and Maintenance of Operating and Support Cost (VAMOSC) Annual Report (FY96), May 1997.

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Analysis, Budgeting, Weapon Systems, Operations and Support, Data Base

CEAC-6

Title: Aircraft Module Data Base Migration and Methodology Enhancement

Summary: This project will provide products to improve the capability of the Aircraft Cost Analyst to develop accurate cost estimates as high technology products and processes increase in Aircraft systems. This project includes the completion of the Aircraft Module conversion activities and the fielding of the Aircraft Module in the Automated Cost Data Base (ACDB).

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center

Performer: Science Applications International Corporation (SAIC)
Paul Popovich

Resources:

FY	*Dollars*	*Staff-years*
97	$110,000	

Schedule:

Start	*End*
Apr 96	Apr 97

Data Base: Automated Cost Data Base (ACDB)

Publications:

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Analysis, Aircraft, Electronics/Avionics, Data Base, Data Collection

CEAC-7

Title: Missile Module of ACDB

Summary: USACEAC has developed a standard architecture for the acquisition of weapon and information management systems. The primary objective of this project is to identify and collect missile cost data from CCDRs, CPRs, contracts, or other sources which can be mapped and normalized to populate the Missile Module of the USACEAC data base. Data from other DoD agencies are of particular interest if applicable to US Army Missile Systems.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center

Performer: Tecolote Research, Inc.

Resources:	*FY*	*Dollars*	*Staff-years*
	97	$100,000	
Schedule:	*Start*	*End*	
	Apr 96	Apr 97	

Data Base: Automated Cost Data Base (ACDB)

Publications:

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Analysis, Missiles, Space Systems, Data Base, CER, CPR/CCDR, Data Collection

CEAC-8

Title: Wheel and Tracked Combat Vehicle Data Base and Methodology Development

Summary: This project will provide USACEAC support in the development of a Wheeled and Tracked Vehicle Module (WTVM) for the Automated Cost Data Base (ACDB), a component of the Army Cost Estimating Integrated Tool (ACEIT). Support will consist of data collection and analysis, data base evaluation and management, and the development of cost relationships using collected data. It also entails fielding the data base with demonstrations and training as well as performing special studies and analyses that further the state of the art of cost estimation of Wheeled and Tracked Vehicle Systems.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center

Performer: Science Applications International Corporation (SAIC)
Robert Currie

Resources:	*FY*	*Dollars*	*Staff-years*
	97	$140,000	
Schedule:	*Start*	*End*	

Data Base: Automated Cost Data Base (ACDB)

Publications:

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Analysis, Land Vehicles, CER, CPR/CCDR, Data Collection, Data Base

CEAC-9

Title: Performance Affordability Assessment Model (PAAM)

Summary: Develop a cost model that captures Cost As An Independent Variable. Using the battlefield effectiveness model, Combined Arms Support Task Force Evaluation Model (CASTFOREM), provide linkage between the performance characteristics of systems or technologies that are played within the CASTFOREM model and their costs.

Classification: Unclassified

Sponsor: US Army Tank, Automotive and Armaments Command
US Army Cost and Economic Analysis Center
Ms. Diane Hohn, (810) 574-8693; DSN: 786-8693

Performer: Science Applications International Corporation (SAIC)

Resources:	*FY*	*Dollars*	*Staff-years*
	97	$93,000 (in kind)	
Schedule:	*Start*	*End*	

Data Base:

Publications:

Categories: I.B.1, II.C

Keywords: Estimating, Analysis, CER, Data Base, Data Collection

CEAC-10

Title: Standard Service Costing (SSC)

Summary: This project will develop the methodology and databases for estimating the standard cost of services provided by Army Installations. This project will include an umbrella concept to implement SSC using Proof of Principle Plan, a mechanism to improve or develop SSC costing methodologies, and a case study for measuring performance and estimating costs of services. The methodologies developed will support ACSIM's Installation Status Report (ISR) Part III and AIM-HI Requirements Generator in connecting expected cost to output and outcome measures IAW GPRA.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center

Performer: Calibre Systems Inc.

Resources:

FY	Dollars	Staff-years
96	$250,000	

Schedule:

Start	End
Sep 96	Sep 97

Data Base:

Publications:

Category: II.A.1

Keywords: Government, Estimating, Analysis, Infrastructure, Facilities, Data Collection, Case Study

CEAC-11

Title: Development of Leadership Resources for Activity Based Costing (ABC)

Summary: This project will develop databases, including one for an Army-wide ABC effort tracking system, a dictionary of Army activities and related statistics, an Army Service Based Cost (SBC) dictionary linked to the ABC dictionary, and a separate database for tracking membership in the ABC Policy steering committee.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center

Performer: Calibre Systems Inc.

Resources:

FY	Dollars	Staff-years
96	$300,000	

Schedule:

Start	End
Sep 96	Sep 97

Data Base: *Title:*

Description:

Automation:

Publications:

Category: I.A

Keywords: Government, Estimating, Analysis, Budgeting

CEAC-12

Title: Leadership Training Courses for Activity Based Cost (ABC)

Summary: This project will develop the Army-wide ABC training capability needed and establish a WorldWide Web home page and associated links to help train and administer the Army managerial

costing policy. The project will develop a course and manual for installation and garrison commanders and project/service managers that impart the concepts and knowledge of Managerial/Cost Accounting, ABC, Service Based Costing (SBC), and Standard Service Costing (SSC).

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center

Performer: Calibre Systems Inc.

Resources:

FY	*Dollars*	*Staff-years*
96	$155,000	

Schedule:

Start	*End*
Sep 96	Sep 97

Data Base: *Title:*

Description:

Automation:

Publications:

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Analysis, Budgeting

CEAC-13

Title: Link Activity Based Costs (ABC) to Service Based Costs (SBC)

Summary: This project will develop prototype linkage Tracing Activity Based Costs to Service Based Costs at installations where ABC has been implemented. This task supports an Army-wide ABC capability needed to help train and administer the Army managerial costing policy. The linkage of ABC and SBC will support the VCSA requirement that ABC support higher HQ efforts such as SBC. Linking ABC and SBC efforts will reduce duplication of data collection, budget reconciliation, and cost validation.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Policy

Performer: Calibre Systems Inc.

Resources:

FY	*Dollars*	*Staff-years*
96	$100,000	

Schedule:

Start	*End*
Sep 96	Sep 97

Data Base:

Publications:

Categories: II.A.1, II.A.2

Keywords:

CEAC-14

Title: Installation Status Report (ISR) Part 1, (Infrastructure) Revision and Update

Summary: ISR maintains the current condition assessment that incorporates and validates installation infrastructure standards. ISR I cost factors are developed by Facility Category Group (FCG) for Sustainment, New Construction, and Renovation. The revision of the current cost factors in ISR are for CONUS/OCONUS installations. The update includes factors and refined methodologies for CONUS/OCONUS, Reserve, National Guard Bureau, and medical facilities, and the sustainment and renovation factors of all historical facilities.

Classification: Unclassified

Sponsor: US Army Cost and Economic Analysis Center

Performer: Management Analysis, Inc. (MAI)

Resources:

FY	*Dollars*	*Staff-years*
96	$100,000	

Schedule:

Start	*End*
Sep 96	Sep 97

Data Base:

Publications:

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Analysis, Infrastructure, Operations and Support

ARMY MATERIEL COMMAND

Name	Headquarters, US Army Materiel Command, Cost Analysis Division		
Address	5001 Eisenhower Avenue Alexandria, VA 22333-0001		
Director	Mr. Wayne Wesson, Acting	(703) 617-9100	
Size	Professional:		18
	Support:		1
	Consultants:		0
	Subcontractors:		1
Focus	Materiel Systems Cost Estimating, Economic Analysis and Earned Value Management		
Activity	Number of projects in process:		1
	Average duration of a project:		2 years
	Average number of staff members assigned to a project:		1
	Average number of staff-years expended per project:		0.5
	Percentage of effort conducted by consultants:		0%
	Percentage of effort conducted by subcontractors:		25%

AMCRM-1

Title: Artificial Intelligence in Cost and Economic Analysis

Summary: This project involves the application of artificial intelligence techniques in the development of a family of tools to assist in cost and economic analysis of Army programs to achieve the best possible validation and estimation studies and decision making. A knowledge based or expert system will be developed and other technologies such as artificial neural networks will be evaluated for possible adoption.

Classification: Unclassified

Sponsor: HQ AMC

Army AI Center Funded

Performer: HQ AMC, MSC's, contractor, other offices.

Mr. Wayne Wesson, (703) 617-8323; DSN: 767-8323,
FAX: (703) 617-8425, E-mail: wwesson@hqamc.army.mil

Resources:

FY	*Dollars*	*Staff-years*
	$45,000 OMA	

Schedule:

Start	*End*
Mar 96	Continuous

Data Base: Kappa-PC unique

Publications: New start

Category: II.B

Keywords: Government, Estimating, Analysis, Weapon Systems, Life Cycle, Statistics/Regression, Expert System, Study

ARMY AVIATION AND TROOP COMMAND

Name	Systems and Cost Analysis Directorate		
Address	4300 Goodfellow Boulevard St. Louis, MO 63120-1798		
Director	Mr. Frank T. Lawrence	(314) 263-1211	
Size	Professional:		41
	Support:		5
	Consultants:		0
	Subcontractors:		0
Focus	Proposal evaluation teams, Source Selection Evaluation Boards (SSEBs); Cost studies; Effectiveness analyses; Analytical studies; Program Office Estimates; Economic analyses; Cost Performance Report (CPR) analyses; Reliability studies; Validation of cost studies		
Activity	Number of projects in process:	25-35	
	Average duration of a project:	3 weeks	
	Average number of staff members assigned to a project:	2	
	Average number of staff-years expended per project:	0.12	
	Percentage of effort conducted by consultants:	0%	
	Percentage of effort conducted by subcontractors	0%	

ARMY TANK-AUTOMOTIVE
AND ARMAMENTS COMMAND

Name	Directorate of Cost & Systems Analysis (AMSTA-RM-V), Cost Analysis Division (AMSTA-RM-VC)		
Address	US Army Tank-Automotive and Armaments Command Warren, MI 48397-5000		
Director	Russell F. Feury	Phone: (810) 574-6665 Fax: (810) 574-8620	
Size	Professional:		37
	Support:		—
	Consultants:		—
	Subcontractors:		—
Focus	Responsible for the preparation of Program Office Estimates (POEs), Life Cycle Estimates (LCCEs) and Economic Analyses (EAs). Perform cost validation to determine the reasonableness of cost estimates. Support the Army's Operating and Support Cost Reproduction program. Support the Earned Value Management Process. Develop cost models and data bases along with performing cost research. Support is provided to combat and combat support vehicle systems.		
Activity	Number of projects in process:		17
		Program Office Estimates	3*
		Life Cycle Estimates	6
		Economic Analyses	6
		Cost Research	2
	Average duration of a project:		
		Program Office Estimates	12–16 weeks
		Life Cycle Estimates	5–7 weeks
		Economic Analyses	3–5 weeks
		Cost Research	Variable
	Average number of staff members assigned to a project:		
		Program Office Estimates	3
		Life Cycle Estimates	2
		Economic Analyses	1
		Cost Research	2
	Average number of staff-years expended per project:		—
	Percentage of effort conducted by consultants:		—
	Percentage of effort conducted by subcontractors:		—

*High Mobility Multipurpose Light Tactical Vehicle, Future Scout and Cavalry System, Crusader

ATAAC-1

Title: Performance Affordability Assessment Model (PAAM)

Summary: The objective of this modeling effort is to develop a cost model that will perform rapid costing of technology alternatives that are played during the CASTFOREM wargame modeling process, and allow the cost trade-offs to be performed. This effort meets the objectives of the current DoD focus of Cost as an Independent Variable (CAIV).

Classification: Unclassified

Sponsor: US Army Tank-Automotive and Armaments Command
AMSTA-RM-VC

Richard Bazzy, (810) 574-6666

Performer: US Army Tank-Automotive and Armaments Command
AMSTA-RM-VC

Diane Hohn, (810) 574-8693; Lawrence Delaney, Manus Nemeth

Resources:

FY	*Dollars*	*Staff-years*
	$226,000 (to date)	3.5 (to date)

Schedule:

Start	*End*
May 94	No estimate given

Prototype demo: demonstrated to Mr. Hollis, November 1996.

Data Base: None

Publications: None

Category: I.C.1

Keywords: Cost/Production Function

ARMY SPACE AND STRATEGIC DEFENSE COMMAND

Name	US Army Space and Strategic Defense Command Program Analysis and Integration (PA&I) Directorate, Cost Analysis Division	
Address	ATTN: CSSD-TC-PC 106 Wynn Drive P.O. Box 1500 Huntsville, AL 35807	
Director	Ms. Carolyn S. Thompson, PA&I Director	(205) 955-3069
	Mr. Jackson G. Calvert, Cost Analysis Division Chief	(205) 955-3612
Size	Professional:	11
	Support:	0
	Consultants:	Mevatech Corporation
	Subcontractors:	SAIC
Focus	Systems Costs, Component Cost Analyses, Economic Analyses	
Activity	Number of projects in process:	TBD
	Average duration of a project:	3 years
	Average number of staff members assigned to a project:	1
	Average number of staff-years expended per project:	0.25
	Percentage of effort conducted by consultants:	25%
	Percentage of effort conducted by subcontractors:	50%

SSDC-1

Title: Radar Cost Research Final Report

Summary: Perform cost research and analysis for radar hardware portion of the SSDC Theater High Altitude Area Defense (THAAD) Ground Based Radar cost estimating model. Specific areas of the model evaluated include T/R Modules, Signal Processor, Data Processor, Beam Steering, Exciter, Digital and Controls, Ancillary Equipment, and Monitors and Displays. Comments and/or recommendations were made for various hardware estimating methods currently used in the SSDC model.

Classification: Unclassified (Distribution Statement F)

Sponsor: Ballistic Missile Defense Organization

Performer: Mevatec Corporation
Dawn Tucker

US Army Space and Strategic Defense Command
Ben Davis, (205) 955-5466

Resources:

FY	*Dollars*	*Staff-years*
96	$28,000	0.30

Schedule:

Start	*End*
Mar 96	Oct 96

Data Base: *Title:* Strategic and Theater Automated Research (STAR)

Description: PC based document search and retrieval system

Automation: FoxPro and a personal computer

Publications: *Radar Cost Research Final Report*, 11 October 1996, TA 96-002

Category: II.A.2

Keywords: Government, Estimating, Missiles, Demonstration/Validation, EMD, Production, Life Cycle, Advanced Technology, Mathematical Modeling, Statistics/Regression, Mathematical Model, Computer Model, CER

SSDC-2

Title: Updated Radar Transmit/Receive (T/R) Cost Estimating Model

Summary: A spreadsheet model was developed in 1991 to estimate the costs of radar Transmit/Receive (T/R) modules. This spreadsheet model was updated in 1995. The subject research is an addendum to these studies, and provides a revised methodology to estimate T/R modules for solid state radars.

Classification: Unclassified (Distribution Statement F)

Sponsor: Ground Based Radar Project Office (now THAAD Project Office)

Performer: Tecolote Research, Inc.
Gregory Higdon and Darryl Arnold

US Army Space and Strategic Defense Command
Ben Davis, (205) 955-5466

Resources:

FY	*Dollars*	*Staff-years*
95	$20,000	0.2
96	$75,000	0.8

Schedule:

Start	*End*
Dec 94	Dec 95

Data Base: *Title:* Strategic and Theater Automated Research (STAR)

Description: PC based document search and retrieval system

Automation: FoxPro and a personal computer

Publications: *An Updated Calibration for the T/R Module Cost Estimating Formula*, 23 February 1996, CR-0536/1

Category: II.A.1

Keywords: Government, Estimating, Missiles, Weapon Systems, Demonstration/Validation, EMD, Production, Life Cycle, Labor, Material, Overhead/Indirect, Data Collection, Mathematical Modeling, Statistics/Regression, Mathematical Model, Computer Model, CER

SSDC-3

Title: Demilitarization and Disposal Costs of Missile Systems: Cost Methodology Development

Summary: A basic cost estimating structure and preliminary data collection for demilitarization and disposal costs was developed during a previous task. This task focused on completing the data collection process, and developing cost estimating methodologies for estimating the demilitarization and disposal costs for missiles. The end result is a set of equations which may be used during the RDT&E life cycle phase to estimate missile demilitarization and disposal costs.

Classification: Unclassified (Distribution Statement F)

Sponsor: Ballistic Missile Defense Organization and OSD Cost Analysis Improvement Group

Performer: SAIC (Under contract to Mevatech Corporation)
Lem Vaughan and John Grace

US Army Space and Strategic Defense Command
Bill Hughes, (205) 955-5913

Resources:

FY	Dollars	Staff-years
96	$115,500	0.75
97	$ 38,500	0.75

Schedule:

Start	End
Jan 96	Apr 97

Data Base: *Title:* Strategic and Theater Automated Research (STAR)

Description: PC based document search and retrieval system

Automation: FoxPro

Publications: *Demilitarization and Disposal Costs of Missile Systems: Cost Methodology Development*, March/April 1997, TA 96-001

Category: I.D

Keywords: Government, Estimating, Missiles, Weapon Systems, Demonstration/Validation, EMD, Production, Life Cycle, Labor, Material, Overhead/Indirect, Data Collection, Mathematical Modeling, Statistics/Regression, Mathematical Model, Computer Model, CER

SSDC-4

Title: Software Cost Estimating Relationship Update and Development

Summary: Software development costs are frequently estimated using one of the popular software-based cost estimating tools such as COCOMO or REVIC. Although such tools have been validated for the general case, these tools require the cost analyst to provide numerous subjective inputs on such items such as software programmer expertise. The subject effort will update a set of existing software cost estimating relationships that can be used as a non-subjective estimating tool and/or as a means for validating estimates made by tools such as COCOMO.

Classification: Unclassified (Distribution Statement F)

Sponsor: Ballistic Missile Defense Organization

Performer: Mevatech Corporation and SAIC
Lem Vaughan

US Army Space and Strategic Defense Command
Bill Hughes, (205) 955-5913

Resources:

FY	*Dollars*	*Staff-years*
97	$67,000	0.67

Schedule:

Start	*End*
Apr 97	Oct 97

Data Base: *Title:* Strategic and Theater Automated Research (STAR)

Description: PC based document search and retrieval system

Automation: FoxPro and a personal computer

Publications: TBD

Category: II.A.1

Keywords: Government, Estimating, Missiles, Weapon Systems, Demonstration/Validation, EMD, Production, Life Cycle, Labor, Engineering, Overhead/Indirect, Data Collection, Mathematical Modeling, Statistics/Regression, Mathematical Model, CER

SSDC-5

Title: Tactical Air Defense Chemical and Solid-State Lasers Cost Methodology Development

Summary: Little past cost research has been performed on laser technologies. The advent of the Theater High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) program requires that tactical laser cost estimating methodologies be updated and/or created. This task will incorporate some of the recent cost/technical experience associated with the Alpha, Chemical Oxygen-Iodine Laser (COIL), THEL, Mid-Infrared Advanced Chemical Laser (MIRACL), and Sealite programs, and potentially other sources of data.

Classification: Unclassified (Distribution Statement F)

Sponsor: Ballistic Missile Defense Organization and OSD Cost Analysis Improvement Group

Performer: SAIC (Under contract to Mevatech Corporation)
US Army Space and Strategic Defense Command

Edward C. Strange, (205) 955-4921

Resources:

FY	*Dollars*	*Staff-years*
97	$93,000	0.9

Schedule:

Start	*End*
Mar 97	Oct 97

Data Base: *Title:* Strategic and Theater Automated Research (STAR)

Description: PC based document search and retrieval system

Automation: FoxPro

Publications: TBD

Category: II.A.1

Keywords: Government, Estimating, Missiles, Weapon Systems, Demonstration/Validation, EMD, Production, Life Cycle, Labor, Material, Overhead/Indirect, Data Collection, Mathematical Modeling, Statistics/Regression, Mathematical Model, CER

SSDC-6

Title: Multi-mode Seeker Cost Research and Estimating Methodology Development

Summary: Several missile program offices are considering the availability/applicability of the new technology of Radio Frequency/Infrared (RF/IR) multi-mode seekers. It is envisioned that several next generation Theater Missile Defense (TMD) - Extended Air Defense missiles will use dual-mode RF/IF guidance systems to address increasingly sophisticated threats. The objective of this task is to perform research on historical cost and technical data primarily at the component level (a sufficient data set is not anticipated at the RF/IF system level), and to develop a model or series of equations for estimating the costs associated with RF/IR technology.

Classification: Unclassified (Distribution Statement F)

Sponsor: Ballistic Missile Defense Organization

Performer: SAIC (Under contract to Mevatech Corporation)
US Army Space and Strategic Defense Command

Jackson G. Calvert, (205) 955-3612

Resources:

FY	*Dollars*	*Staff-years*
97	$140,000	1.4

Schedule:

Start	*End*
Apr 97	Oct 97

Data Base: *Title:* Strategic and Theater Automated Research (STAR)

Description: PC based document search and retrieval system

Automation: FoxPro

Publications: TBD

Category: II.A.2

Keywords: Government, Estimating, Missiles, Electronics/Avionics, Weapon Systems, Demonstration/Validation, EMD, Production, Life Cycle, Labor, Material, Overhead/Indirect, Data Collection, Mathematical Modeling, Statistics/Regression, Mathematical Model, CER

NAVAL CENTER FOR COST ANALYSIS

Name	Naval Center for Cost Analysis (NCCA)	
Address	1111 Jefferson Davis Highway Suite 400, West Tower Arlington, VA 22202-4306	
Director	Dr. Daniel A. Nussbaum Captain John E. Fink (Deputy Director) Mr. Rick Collins (Technical Director)	(703) 604-0293 (703) 604-0308 (703) 604-0280
Size	Total: Professional:	37 civilian; 15 military 31 civilian; 15 military
Focus	Naval Center for Cost Analysis (NCCA) is responsible for assisting (via IPTs) in preparation of LCC estimates for DoN weapon and automated information systems, administrating the DoN contractor cost data reporting program, managing the DoN VAMOSC Program and coordinating the DoN cost research program. The focus of the NCCA cost research program is the following: improved acquisition and operating and support (O&S) cost/technical data bases (e.g., VAMOSC, ACDB, etc.); improved methods for estimating direct and indirect O&S costs; improved methods for estimating software development/maintenance costs; improved methods for estimating specific E&MD cost elements, e.g., non-recurring engineering, system integration, government in-house support, etc.; methods for estimating the cost impact of acquisition reform initiatives.	
Activity	Number of projects in process:	16
	Average duration of a project:	46.4 months
	Average number of staff members assigned to a project:	1–2
	Average number of staff-years expended per project:	2–3
	Percentage of effort conducted by consultants:	57%
	Percentage of effort conducted by subcontractors:	0%

NCCA-1

Title: Top-Level Ship Operating and Support Cost Model

Summary: Create a parametric cost estimating model, using the VAMOSC Individual Ship Report as the underlying database, for a top-level model that estimates annual ship operating and support costs as a function of light displacement, overall length, number of officers assigned, and number of enlisted assigned.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Jack Smuck, (703) 604-0292

Performer: NCCA in-house

LCDR Timothy Anderson, (703) 604-0296

Resources:

FY	*Dollars*	*Staff-years*
96		0.25
97		0.1

Schedule:

Start	*End*
Jan 96	Oct 97

Data Base: VAMOSC/other cost data and technical data

Publications: Completed study report and appropriate spreadsheet files

Category: II.A.2

Keywords: Government, Estimating, Ships, Operations and Support, Labor, Overhead/Indirect, Statistics/Regression, Computer Model

NCCA-2

Title Detailed Ship Operating and Support Cost Model

Summary: This model is being developed using a "system dynamics" approach. This approach provides a structured methodology for dealing with complex systems having many interacting components. A system dynamics approach enables us to capture the dynamic behavior of a system while allowing for a flexible design which can be easily enhanced and expanded. Many questions posed today (e.g., How can the Navy reduce operating and support costs while maintaining readiness?) cannot be addressed with existing tools. The model will provide the flexibility for fast, top-level cost estimating, as well as the framework for analyzing possible policy decisions and their impact on cost and availability. Model outputs will include both cost and availability. The inclusion of availability within the model is crucial because cost reduction policies need to be analyzed in conjunction with their impact on availability, and vice versa.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Jack Smuck, (703) 604-0292

Performer: NCCA in-house and British MoD

Mr. Paul Hardin, (703) 604-0290; Ms. Colleen McAuliffe, (703) 604-0271, LT Lee Lavinder, (703) 604-0279

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
97	UK funds	0.75	00	$27,000	0.5
98	$27,000	0.5	01	$14,000	0.5
99	$27,000	0.5	02	$ 0	0.5

Schedule:

Start	End
Jan 97	Nov 97 (development)
Dec 97	Sept 02 (maintenance)

Data Base: VAMOSC/other cost data and technical data

Publications: Mathematical model with supporting documentation

Categories: II.B, II.C, II.D

Keywords: Government, Estimating, Analysis, Operations and Support, Sustainability, Ships, Mathematical Modeling, Statistics/Regression, Data Base, Method, CER, Study

NCCA-3

Title: Shipboard Systems Operating and Support Cost Model

Summary: This model is being developed using a "system dynamics" approach. This approach provides a structured methodology for dealing with complex systems having many interacting components. A system dynamics approach enables us to capture the dynamic behavior of a system while allowing for a flexible design which can be easily enhanced and expanded. Many questions posed today (e.g., How can the Navy reduce operating and support costs while maintaining readiness?) cannot be addressed with existing tools. The model will provide the flexibility for fast, top-level cost estimating, as well as the framework for analyzing possible policy decisions and their impact on cost and availability. Model outputs will include both cost and availability. The inclusion of availability within the model is crucial because cost reduction policies need to be analyzed in conjunction with their impact on availability, and vice versa.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Jack Smuck, (703) 604-0292

Performer: NCCA in-house and British MoD

Mr. Paul Hardin, (703) 604-0290
Ms. Collen McAuliffe, (703) 604-0271
LT Lee Lavinder, (703) 604-0279

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
96	UK Funds	1.0	99	$27,000	0.5
97	UK Funds	0.75	00	$27,000	0.5
98	$ 0	0.5	01	$ 0	0.5
			02	$14,000	0.5

Schedule:

Start	End
Jan 96	Jun 97 (development)
Aug 97	Sep 02 (maintenance)

Data Base: VAMOSC/other cost data and technical data

Publications: Mathematical model with supporting documentation

Categories: II.B, II.C, II.D

Keywords: Government, Estimating, Analysis, Operations and Support, Sustainability, Weapon Systems, Mathematical Modeling, Statistics/Regression, Data Base, Method, CER, Study

NCCA-4

Title: Aircraft Operating and Support Cost Model

Summary: This model is being developed using a "system dynamics" approach. This approach provides a structured methodology for dealing with complex systems having many interacting components. A system dynamics approach enables us to capture the dynamic behavior of a system while allowing for a flexible design which can be easily enhanced and expanded. Many questions posed today (e.g., How can the Navy reduce operating and support costs while maintaining readiness?) cannot be addressed with existing tools. The model will provide the flexibility for fast, top-level cost estimating, as well as the framework for analyzing possible policy decisions and their impact on cost and availability. Model outputs will include both cost and availability. The inclusion of availability within the model is crucial because cost reduction policies need to be analyzed in conjunction with their impact on availability, and vice versa.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Bill Stranges, (703) 604-0310

Performer: NCCA in-house

CDR Dan Schluckebier, (703) 604-0313

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
97	$100,000	0	00	$27,000	0.5
98	$ 52,000	1.0	01	$14,000	0.5
99	$ 0	0.75	02	$ 0	0.5

Schedule:

Start	End
Jul 97	Sep 98 (development)
Oct 98	Sep 02 (maintenance)

Data Base: VAMOSC/other cost data and technical data

Publications: Mathematical model with supporting documentation

Categories: II.B, II.C, II.D

Keywords: Government, Estimating, Analysis, Operations and Support, Sustainability, Aircraft, Mathematical Modeling, Statistics/Regression, Data Base, Method, CER, Study

NCCA-5

Title: Avionics Operating and Support Cost Model

Summary: This model is being developed using a "system dynamics" approach. This approach provides a structured methodology for dealing with complex systems having many interacting components. A system dynamics approach enables us to capture the dynamic behavior of a system while allowing for a flexible design which can be easily enhanced and expanded. Many questions posed today (e.g., How can the Navy reduce operating and support costs while maintaining readiness?) cannot be addressed with existing tools. The model will provide the flexibility for fast, top-level cost estimating, as well as the framework for analyzing possible policy decisions and their impact on cost and availability. Model outputs will include both cost and availability. The inclusion of

availability within the model is crucial because cost reduction policies need to be analyzed in conjunction with their impact on availability, and vice versa.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower,
Arlington, VA 22202-4306

Mr. Bill Stranges, (703) 604-0310

Performer: NCCA in-house

CDR Dan Schluckebier,(703) 604-0313

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
98	$102,000	0	01	$14,000	0.5
99	$ 0	0.75	02	$15,000	0.5
00	$ 27,000	0.5			

Schedule:

Start	End
Oct 98	Sep 99 (development)
Oct 99	Sep 02 (maintenance)

Data Base: VAMOSC/other cost data and technical data

Publications: Mathematical model with supporting documentation

Categories: II.B, II.C, II.D

Keywords: Government, Estimating, Analysis, Operations and Support, Sustainability, Electronics/Avionics, Mathematical Modeling, Statistics/Regression, Data Base, Method, CER, Study

NCCA-6

Title: Avionics Operations and Support Cost Study

Summary: This effort developed a VAMOSC-based database for Navy Avionics subsystems and equipment items and a set of total O&S cost factors per flight hour.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Scott E. Hine, (703) 602-5770

Performer: LSA, Inc.

Mr. Rick Osseck

Resources:

FY	Dollars	Staff-years
97	$50,000	

Schedule:

Start	End
Oct 96	Feb 97

Data Base: VAMOSC data for Navy avionics subsystems and equipment items

Publications: *Avionics Operating and Support (O&S) Cost Study Update*, January 1997

Category: II.C

Keywords: Government, Estimating, Electronics/Avionics, Operations and Support, WBS, Data Collection, Mathematical Modeling, Time Series, Data Base, Method

NCCA-7

Title: Missile and Torpedo Operating and Support Cost Model

Summary: This model is being developed using a "system dynamics" approach. This approach provides a structured methodology for dealing with complex systems having many interacting components. A system dynamics approach enables us to capture the dynamic behavior of a system while allowing for a flexible design which can be easily enhanced and expanded. Many questions posed today (e.g., How can the Navy reduce operating and support costs while maintaining readiness?) cannot be addressed with existing tools. The model will provide the flexibility for fast, top-level cost estimating, as well as the framework for analyzing possible policy decisions and their impact on cost and availability. Model outputs will include both cost and availability. The inclusion of availability within the model is crucial because cost reduction policies need to be analyzed in conjunction with their impact on availability, and vice versa.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower,
Arlington, VA 22202-4306

Mr. Jack Smuck, (703) 604-0292

Performer: NCCA in-house

Mr. Paul Hardin, (703) 604-0290

Resources:

FY	*Dollars*	*Staff-years*
99	$104,000	1.0
00	$ 53,000	0.75
01	$ 0	0.5
02	$ 15,000	0.5

Schedule:

Start	*End*
Oct 98	Sep 00 (development)
Oct 00	Sep 02 (maintenance)

Data Base: VAMOSC/other cost data and technical data

Publications: Mathematical model with supporting documentation

Categories: II.B, II.C, II.D

Keywords: Government, Estimating, Analysis, Operations and Support, Sustainability, Missiles, Mathematical Modeling, Statistics/Regression, Data Base, Method, CER, Study

NCCA-8

Title: Cost of a Sailor Study

Summary: Conduct a study to determine indirect costs (infrastructure costs) of manpower assigned to the at-sea operating forces. For every direct at-sea manpower dollar spent, determine how many indirect dollars are spent.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Jack Smuck, (703) 604-0292

Performer: NCCA in-house

Mr. Leonard Cheshire, (703) 604-0285

Resources:	*FY*	*Dollars*	*Staff-years*
	96		0.25
	97		0.25
	98		0.5

Schedule:	*Start*	*End*
	FY96	FY98

Data Base: Personnel Cost Estimating Database/Model

Publications: TBD

Category: II.C

Keywords: Government, Infrastructure, Study

NCCA-9

Title: Manpower Cost Estimating Tool

Summary: Update, revise, and reformat the existing Navy Billet Cost Factor Cost Estimation Model to distinguish between direct manpower costs and variable indirect manpower costs. Study is to be conducted in conjunction with the NCCA in-house effort on indirect personnel costs (Cost of a Sailor Study), using NCCA's results as inputs to the final database/model.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Jack Smuck, (703) 604-0292

Performer: SAG Corporation
900 S. Washington St., #109
Falls Church, VA 22046

Mr. Pat Mackin, (703) 538-4500

Resources:	*FY*	*Dollars*	*Staff-years*	*FY*	*Dollars*	*Staff-years*
	97	$119,000		00	$80,000	
	98	$ 77,000		01	$82,000	
	99	$ 78,000		02	$83,000	

Schedule:	*Start*	*End*
	FY97	FY97 (initial update/revision)
	FY98	FY02 (annual updates)

Data Base: Revised Navy Billet Cost Factors/Model

Publications: TBD

Category: II.C

Keywords: Infrastructure, Study, Government

NCCA-10

Title: Weapon System Software Maintenance Cost/Technical Database Development and Analysis

Summary: Software maintenance metrics and cost data will be collected on a variety of weapon systems. The initial effort will focus on shipboard electronic systems. This data will be used to develop software maintenance arrival/closure distribution curves and cost estimating relationships/factors. Follow-

on efforts will focus on avionics, aircraft, and ship systems. This effort is a continuation of the NSWCDD project entitled, "Software Maintenance Cost Process Model."

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Ms. Cheri Cummings, (703) 604-0275

Performer: Technomics, Inc.
5290 Overpass Road #206
Santa Barbara, CA 93111
(805) 964-9894

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
96	$ 74,000	0.1	00	$80,000	0.15
97	$100,000	0.1	01	$82,000	0.15
98	$154,000	0.15	02	$83,000	0.15
99	$ 78,000	0.15			

Schedule:

Start	End
Feb 96	Sep 02

Data Base: TBD

Publications: TBD

Categories: II.A.1, II.A.2, II.C

Keywords: Software, Government, Estimating, Maintenance, Data Collection, Statistics/Regression, Data Base, CER, Operations and Support

NCCA-11

Title: Automated Information System (AIS) Software Maintenance Database Development and Analysis

Summary: The following efforts will be conducted in support of the AIS software maintenance database and analysis: Collect AIS software metrics and associated cost data from different Critical Design Agents (CDAs); create an AIS software maintenance database; determine what metrics drive AIS software maintenance cost; and develop AIS software maintenance estimating relationships. These tools will be employed to support economic analyses and independent cost estimates (ICEs) for AIS programs.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Ms. Cheri Cummings, (703) 604-0275

Performer: Information Spectrum, Inc.

NCCA in-house

LCDR Katherine Kinnavy, (703) 604-0295; Ms. Karen Richey, (703) 604-0291

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
97	$25,000	0.5	00	$40,000	0.5
98	$51,000	0.5	01	$41,000	0.5
99	$39,000	0.5	02	$41,500	0.5

Schedule:	*Start*	*End*
	Oct 96	Sep 02
Data Base:	VAMOSC AIS	
Publications:	VAMOSC AIS Software Maintenance Report (AISSMR)	
Categories:	II.A.1, II.A.2, II.C	
Keywords:	Software, Government, Estimating, Data Collection, Maintenance, Statistics/Regression, Data Base, CER, Operations and Support	

NCCA-12

Title: Integration of Navy VAMOSC Data Base into a Relational Database Management System

Summary: Integration of the current weapon system operating and support (O&S) cost data into a relational database management system was initiated in FY96 and will continue through FY97. Direct access to detailed and summary level data is planned. The current inefficient and incompatible system of batch processing and paper report distribution will be replaced with a Tier II client-server application.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Ms. Cheri Cummings, (703) 604-0275

Performer: Information Spectrum, Inc.

NCCA in-house

CDR Walter Bednarski, (703) 604-0273

Resources:

FY	*Dollars*	*Staff-years*
96	$1,000,000	1.5
97	$700,000	1.5

Schedule:	*Start*	*End*
	Oct 95	Sep 97
Data Base:	VAMOSC Ships, Air, Missile, and Torpedo Data	
Publications:	Documentation of system	
Category:	II.A.2	
Keywords:	Government, Operations and Support, Data Collection, Data Base	

NCCA-13

Title: Expansion of VAMOSC Shipboard Systems Database

Summary: This effort will expand the VAMOSC Shipboard Systems cost database by ten or more systems annually, including electronics, launching, and gun systems.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Ms. Cheri Cummings, (703) 604-0275

Performer: Information Spectrum, Inc.
NCCA in-house
CDR Walter Bednarski, (703) 604-0273

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
96	$170,000	0.1	00	$170,000	0.1
97	$170,000	0.1	01	$170,000	0.1
98	$170,000	0.1	02	$170,000	0.1
99	$170,000	0.1	03	$170,000	0.1

Schedule:

Start	End
FY 96	FY 03

Data Base: VAMOSC Shipboard Systems

Publications: VAMOSC Shipboard Systems Report

Category: II.A.2

Keywords: Government, Operations and Support, Ships, Data Collection, Data Base

NCCA-14

Title: Incorporation of Infrastructure Cost into the VAMOSC Database

Summary: This effort will investigate the types of infrastructure cost, determine sources for this cost data, determine how the costs can be incorporated into VAMOSC, and allocate the costs to weapons systems.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306
Ms. Cheri Cummings, (703) 604-0275

Performer: Information Spectrum, Inc.
NCCA in-house
Robert Hirama, (703) 604-0303

Resources:

FY	Dollars	Staff-years
96	$300,000	0.1
97	$ 85,000	0.1
98	$ 85,000	0.1

Schedule:

Start	End
FY 96	FY 98

Data Base: VAMOSC Ships, Air, Missile, and Torpedo Data

Publications: Enhanced database with documentation

Category: II.C

Keywords: Government, Operations and Support, Infrastructure

NCCA-15

Title: Linkage Between VAMOSC and the PPBS

Summary: The research will investigate and document the links between the historical, accounting cost data in VAMOSC and the planning and budgeting data in the PPBS. The goal is to establish tracking and

potential consistency between the two systems in order to determine the completeness of the VAMOSC data and to allow VAMOSC to be used to do better planning and budgeting.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Ms. Cheri Cummings, (703) 604-0275

Performer: Mathtech, Inc.

NCCA in-house

CDR Walter Bednarski, (703) 604-0273

Resources:

FY	*Dollars*	*Staff-years*
96	$160,000	0.1
97	$100,000	0.1

Schedule:

Start	*End*
Apr 96	Sep 97

Data Base: VAMOSC Ships, Air, Missile, and Torpedo Cost and Budget Data.

Publications: Final report, database improvements

Category: II.B

Keywords: Government, Operations and Support, Programming, Budgeting, Study

NCCA-16

Title: Missile Cost/Technical Database

Summary: Expand the USA CEAC Automated Cost Database (ACDB) missile module with cost and technical data for Navy and Joint Navy/Air Force missiles and munitions.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mrs. Cheri Cummings, (703) 604-0275

Performer: Tecolote Research, Inc.
1700 N. Moore Street, Suite 1400
Arlington, VA 22209
(703) 243-2800

Resources:

FY	*Dollars*	*Staff-years*	*FY*	*Dollars*	*Staff-years*
98	$51,000	0.1	01	$54,000	0.1
99	$52,000	0.1	02	$56,000	0.1
00	$53,000	0.1			

Schedule:

Start	*End*
Oct 98	Sep 02

Data Base: USA CEAC ACDB Missile Module with Cost and Technical Data

Publications: None

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Analysis, Missiles, EMD, Production, CPR/CCDR, Data Collection, Data Base

NCCA-17

Title: Electronics Cost/Technical Database

Summary: Develop a Navy electronics module for the Automated Cost Database (ACDB). The database will include development/production cost, technical and programmatic data for a variety of shipboard and airborne electronics systems, including sonar, radar, fire control, and electronic warfare systems.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower,
Arlington, VA 22202-4306

Mrs. Cheri Cummings, (703) 604-0275

Performer: Tecolote Research, Inc.
1700 N. Moore Street, Suite 1400
Arlington, VA 22209

(703) 243-2800

NCCA in-house

Mr. Jim Keller, (703) 604-0286; Mr. Don Clarke, (703) 604-0282

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
97	$75,000	0.33	00	$80,000	0.33
98	$77,000	0.33	01	$82,000	0.33
99	$78,000	0.33	02	$83,000	0.33

Schedule:

Start	End
Jul 97	Sep 02

Data Base: Navy ACDB Electronics Module with Cost and Technical Data

Publications: TBD

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Analysis, Electronics/Avionics, EMD, Production, CPR/CCDR, Data Collection, Data Base

NCCA-18

Title: Weapon System Software Development Cost/Technical Database

Summary: This effort will entail maintaining/updating the NCCA software effort, schedule, labor rate, and SLOC growth databases cited in **NCCA-23**. Near-term effort will target the collection of shipboard system software development cost/technical data points. Future effort will target avionics systems.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mrs. Cheri E. Cummings, (703) 604-0275

Performer: MCR, Inc.

NCCA in-house

Ms. Pamela L. Johnson, (703) 604-0294; Ms. Jill E. von Kuegelgen, (703) 604-0298; LCDR Katherine Kinnavy, (703) 604-0295

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
97	$ 50,000	0.25	01	$82,000	0.25
98	$102,000	0.25	02	$83,000	0.25
99	$ 78,000	0.25	03	$85,000	0.25
00	$ 80,000	0.25			

Schedule:

Start	End
Jul 97	Sep 02

Data Base: NCCA Database (software effort); NCCA Software Schedule; NCCA Software Labor Rate; NCCA Software SLOC Growth

Publications: TBD

Categories: II.A.1, II.A.2, II.C

Keywords: Software, Government, Analysis, Electronics/Avionics, Life Cycle, Data Collection, Data Base, Schedule, Risk/Uncertainty

NCCA-19

Title: Automated Information System (AIS) Software Development Cost/Technical Database

Summary: The following efforts will be conducted: a) collect and analyze AIS software metrics and associated cost data for historical, completed development efforts; and b) create an electronic database for storing and manipulating data. Information gathered may include lines of code but will try to focus on function points as the primary sizing metric.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Dr. Brian Flynn, (703) 604-0301

Performer: Contractor TBD

NCCA in-house

Mr. John Georges, (703) 604-0288

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
97	$25,000	0.5	00	$40,000	0.5
98	$51,000	0.5	01	$41,000	0.5
99	$39,000	0.5	02	$41,500	0.5

Schedule:

Start	End
FY 97	FY 03

Data Base: AIS software development

Publications: TBD

Categories: II.A.1, II.A.2, II.C

Keywords: Government, Estimating, Demonstration/Validation, EMD, Engineering, Data Collection, Data Base

NCCA-20

Title: Cost Estimating Library (CEL)/Factor, Analogy, and CER Electronic Tool (FACET)

Summary: Two products are to be built that will be a source of in-house approved cost estimating relationships (CERs) and cost factors. CEL is a cataloged hardcopy volume set of cost estimating methodologies that have been used in recent, in-house cost estimates. FACET is a spreadsheet database engine that will generate, index, and save CERs, analogies, and cost factors. CEL will be phased out as FACET is phased in. Methodologies cover a wide range of Navy weapons systems.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower,
Arlington, VA 22202-4306

Mrs. Cheri Cummings, (703) 604-0275

Performer: NCCA in-house

Mr. Jim Keller, (703) 604-0286; Mr. Jeff Cherwonik, (703) 604-0272

Resources:

FY	*Dollars*	*Staff-years*
95		0.25
96		0.75
97		0.25

Schedule:

Start	*End*
Jun 95	Dec 96

Data Base: CERs and factors for a variety of Navy weapons systems

Publications: Completed reference manuals and spreadsheet program

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Weapon Systems, Life Cycle, WBS, Statistics/Regression, Mathematical Modeling, Data Base, CER

NCCA-21

Title: Software Technology and Life Cycle Primer

Summary: Develop a primer that reviews basic concepts of a) software life cycle, b) software development standards, c) software development process, and d) software cost estimating.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mrs. Cheri Cummings , (703) 604-0275

Performer: NCCA in-house

Ms. Pamela L. Johnson, (703) 604-0294

Resources:

FY	*Dollars*	*Staff-years*
		0.25

Schedule:	*Start*	*End*
	Nov 96	Jun 97
Data Base:	None	
Publications:	Software Primer	
Category:	II.A.2	
Keywords:	Software, Government, Analysis, Electronics/Avionics, Weapon Systems, Life Cycle	

NCCA-22

Title: Software Development Estimating Handbook - Phase One

Summary: This handbook is a comprehensive software development estimating manual that provides a) a centralized and well-documented compilation of existing databases, and b) formal procedures, tools, and guidelines for developing software effort, schedule, cost, and risk (growth) estimates. Raw effort database consists of 457 data points, including 151 program-level and 306 CSCI-level data points.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mrs. Cheri E. Cummings, (703) 604-0275

Performer: NCCA in-house

Ms. Pamela L. Johnson, (703) 604-0294; Ms. Jill E. von Kuegelgen, (703) 604-0298; CDR Barbara Marsh-Jones, (703) 604-0304

Resources:

FY	*Dollars*	*Staff-years*
		8

Schedule:	*Start*	*End*
	Jan 95	Jun 97

Data Bases: NCCA Database (software effort); NCCA Software Schedule; NCCA Software Labor Rate; NCCA Software SLOC Growth

Publications: Software Development Estimating Handbook - Phase One

Categories: II.A.2, II.C, II.D

Keywords: Government, Analysis, Electronics/Avionics, Life Cycle, Data Collection, Data Base, Schedule, Risk/Uncertainty

NCCA-23

Title: Weapon System Software Development Estimating Methodology Maintenance/Update

Summary: This effort will entail maintaining/updating the NCCA software effort, schedule, labor rate, and SLOC growth estimating methodologies developed in **NCCA-18**. Effort will include updating the current software development estimating tools and documenting the results. Additionally, effort will target the identification and assessment of commercially available software development estimating methodologies.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway

Suite 400, West Tower
Arlington, VA 22202-4306

Mrs. Cheri E. Cummings, (703) 604-0275

Performer: Contractor, TBD

NCCA in-house

Ms. Pamela L. Johnson, (703) 604-0294; Ms. Jill E. von Kuegelgen, (703) 604-0298; LCDR Katherine Kinnavy, (703) 604-0295

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
98	$53,500	0.25	01	$41,000	0.25
99	$78,500	0.25	02	$41,500	0.25
00	$80,000	0.25			

Schedule:

Start	End
Oct 98	Sep 02

Data Base: TBD

Publications: TBD

Categories: II.A.1, II.A.2, II.C

Keywords: Software, Government, Analysis, Electronics/Avionics, Life Cycle, Data Collection, Data Base, Schedule, Risk/Uncertainty

NCCA-24

Title: Automated Information System (AIS) Software Development Estimating Methodology

Summary: This effort will attempt to develop new tools and techniques for estimating the cost of software development efforts for AISs, from the requirements phase through implementation. Data will be obtained from NCCA's function-point database, a related research effort. Analytical techniques employed may include regression analysis and analysis of variance. Efforts will concentrate on developing tools for cost estimating in today's environment of 4GL, COTS, CASE tools, GUI builders, and open systems.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Dr. Brian Flynn, (703) 604-0301

Performer: NCCA in-house

Mr. Harold Dagel, (703) 604-0314

Contractor TBD

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
98	$53,500	0.5	01	$40,000	0.5
99	$80,000	0.5	02	$40,000	0.5
00	$80,000	0.5			

Schedule:

Start	End
FY 98	FY 03

Data Base: Function-point database will be developed under a related effort

Publications: TBD

Categories: II.A.1, II.A.2, II.C

Keywords: Government, Estimating, Demonstration/Validation, EMD, Statistics/Regression, Method, CER

NCCA-25

Title: Aircraft System Integration Cost Database/Model

Summary: The purpose of this research is to develop a data base and parametric model that can be used to estimate the cost of integrating electronics and ordnance on aircraft. A database of historic cost data, as well as physical, performance and program data, will be used to develop cost estimating methodology.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Bill Stranges, (703) 604-0310

Performer: Contractor TBD

Resources:

FY	Dollars	Staff-years
99	$78,500	0.2
00	$80,000	0.2
01	$27,000	0.15
02	$28,000	0.15

Schedule:

Start	End
FY 99	FY 00

Data Base: Historical costs from government in-house labs/field activities and Navy contractors for various electronics/ordnance integration efforts.

Publications: Completed study report

Categories: I.B, II.B, II.C, II.D

Keywords: Government, Estimating, Modification, Integration, Weapon Systems, EMD, Material, Labor, Data Collection, Data Base, Study

NCCA-26

Title: Ship System Integration Cost Database/Model

Summary: Develop a database and cost estimating methodology for projecting hardware integration and hardware/software integration costs for shipboard electronic and weapon systems. The database should include cost data, technical characteristics, and other relevant information (e.g., software size) for a variety of systems, including sonar, radar, fire control, EW, and launching systems. The cost data should include relevant contractor and Navy in-house costs.

Classification: Cost Data: Business Sensitive
Technical Characteristics: Classified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Jack Smuck, (703) 604-0292

Performer: Contractor TBD

Resources:

FY	*Dollars*	*Staff-years*
99	$78,500	0.2
00	$80,000	0.2
01	$27,000	0.15
02	$28,000	0.15

Schedule:

Start	*End*
FY99	FY00

Data Base: Ship Systems Electronics Cost and Technical Characteristics

Publications: TBD

Category: II.A.2

Keywords: Government, Estimating, Weapon Systems, Missiles, Ships, Electronics/Avionics, EMD, Production, Data Collection, Data Base, Method

NCCA-27

Title: Ships/Shipboard Systems Government In-House Cost Database Estimating Methodology

Summary: Develop a database of government in-house (GIH) costs for ships and shipboard systems. The database should entail both the development and procurement phases. Use the database to develop cost factors/cost estimating relationships for GIH costs.

Classification: Cost Data: Business Sensitive
Technical Characteristics: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Jack Smuck, (703) 604-0292

Performer: Contractor TBD

Resources:

FY	*Dollars*	*Staff-years*
99	$78,500	
00	$80,000	

Schedule:

Start	*End*
FY99	FY00

Data Base: GIH costs for ships and shipboard systems

Publications: TBD

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Ships, Data Collection, CER, Data Base, Method

NCCA-28

Title: Aircraft/Avionics Government In-House Cost Database Estimating Methodology

Summary: Develop a database of government in-house (GIH) costs for aircraft and avionics systems. The database should entail both the development and procurement phases. Use the database to develop cost factors/cost estimating relationships for GIH costs.

Classification: Cost Data: Business Sensitive
Technical Characteristics: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway

Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Bill Stranges, (703) 604-0310

Performer: Contractor TBD

Resources:

FY	*Dollars*	*Staff-years*
99	$78,500	
00	$80,000	

Schedule:

Start	*End*
FY99	FY00

Data Base: GIH costs for aircraft and avionics systems

Publications: TBD

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Aircraft, Electronics/Avionics, Data Collection, CER, Data Base, Method

NCCA-29

Title: Missile Government In-House Systems Engineering/Program Management Cost Study

Summary: Investigate how the government staffs its SE/PM activity during the development and procurement phases. With respect to the procurement phase, research if and how the staffing level varies with competition and extremely low rate production.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Bill Stranges, (703) 604-0310

POE(T), RADM Cook

Performer: NCCA in-house

Captain John Fink, (703) 604-0308; Mr. Jeff Cherwonik, (703) 604-0272

Resources:

FY	*Dollars*	*Staff-years*
96		0.5

Schedule:

Start	*End*
FY 96	FY 96

Data Base: Government In-house Support Cost Database

Publications: Complete study report

Category: II.C

Keywords: Estimating, Missiles, Production, Data Collection, Data Base

NCCA-30

Title: Price Indices for Computers

Summary: This research will attempt to develop price indices for computers of different sizes such as PCs, mainframes, and Crays. First, relevant literature will be reviewed, such as work by Griliches at the National Bureau of Economic Research. Data will be gathered and indices developed.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Dr. Brian Flynn, (703) 604-0301

Performer: Naval Post Graduate School (NPGS), Monterey, CA

NCCA in-house

Dr. Brian Flynn, (703) 604-0301; Ms. Cheryl Strobel, (703) 604-0279

Resources:

FY	*Dollars*	*Staff-years*
97	$10,000	0.15
98	$20,000	0.15

Naval Post Graduate support will be funded by $30,000 from NPGS research money.

Schedule:

Start	*End*
Jul 97	Jun 98

Data Base: Commercial computer price trends

Publications: TBD

Category: II.A.1

Keywords: Industry, Estimates, Production, Data Collection, Time Series, Statistics/Regression, Data Base, Method, CER

NCCA-31

Title: Electronics Systems Procurement Hardware Cost Estimating Methodology

Summary: Develop parametric procurement cost estimating relationships (CERs) for shipboard and airborne electronics hardware, including sonar, radar, fire control, EW, and launching systems.

Classification: Classified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Jack Smuck, (703) 604-0292

Performer: NCCA in-house

Resources:

FY	*Dollars*	*Staff-years*
99		1.0

Schedule:

Start	*End*
FY 99	FY 99

Data Base: None

Publications: TBD

Category: II.A.2

Keywords: Government, Estimating, Electronics/Avionics, Production, Labor, Material, Overhead/Indirect, Statistics/Regression, CER

NCCA-32

Title: Design Cost Estimating Methodology

Summary: Develop an approach to estimating weapon system design (i.e., non-recurring engineering) cost. This approach will consider a variety of potential explanatory variables, including length of development phase, prototype quantity, product complexity (i.e., dummy and non-dummy variables), and extent of computer-aided design (CAD). In order to capture the impact of Acquisition Reform initiatives, the approach will also consider explanatory variables such as extent of commercial off-the-shelf (COTS) hardware/software insertion and integrated product and process development (IPPD) techniques.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower,
Arlington, VA 22202-4306

Mr. Rick Collins, (703) 604-0280

Performer: Contractor TBD

Resources:

FY	*Dollars*	*Staff-years*
00	$120,000	

Schedule:

Start	*End*
Oct 99	Sep 00

Data Base: Nonrecurring engineering manhours/cost, technical and programmatic data

Publications: Completed study report

Categories: I.C, II.C

Keywords: Government, Estimating, Weapon Systems, Aircraft, Helicopters, Missiles, Ship, Land Vehicles, Electronics/Avionics, Mathematical Modeling, Statistics/Regression, Data Base, Method, Mathematical Mode, CER, Study

NCCA-33

Title: Aircraft Avionics and Missile System Installation Cost Study

Summary: Update and expand on a previously developed aircraft avionics and missile system retrofit installation cost model.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Bill Stranges, (703) 604-0310

Performer: NCCA in-house

Resources:

FY	*Dollars*	*Staff-years*
02	$125,000	

Schedule:

Start	*End*
Oct 01	Sept 02

Data Base: Historical cost data obtained from the government and aircraft manufacturers for selected Navy aircraft programs.

Publications: Completed study report

Category: II.A.1

Keywords: Government, Electronics/Avionics, Missiles, Modification, Case Study, Study

NCCA-34

Title: Ship System Modernization Database

Summary: Update NCCA's ship modernization cost database, which includes shipboard installation labor/material cost and electronics/ordnance procurement cost.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Jack Smuck, (703) 604-0292

Performer: Contractor TBD

Resources:

FY	*Dollars*	*Staff-years*
02	$125,000	

Schedule:

Start	*End*
Oct 01	Sep 02

Data Base: Ship System Modernization Cost Characteristics

Publications: TBD

Categories: II.A.1, II.A.2

Keywords: Government, Estimating, Ships, Production, WBS, Data Collection, Data Base

NCCA-35

Title: Development to-Production Costs Hardware Cost Estimating Methodology

Summary: This study will update and expand the scope of a completed (in FY94) NCCA in-house research effort to evaluate the relationship between development and production hardware costs. This relationship, generally referred to as a step-up or step-down factor, is used as a technique for estimating either Engineering and Manufacturing (EMD) hardware costs or Production hardware costs. The previous NCCA effort evaluated the step-up/step-down factors for a variety of missile, electronics and tracked vehicle programs. This update will incorporate additional programs and analysis of the relationship between Demonstration and Validation (D&V) and EMD hardware costs.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Bill Stranges, (703) 604-0310

Performer: Contractor TBD

Resources:

FY	*Dollars*	*Staff-years*
00	$120,000	

Schedule:	*Start*	*End*
	Oct 98	Sep 00

Data Base: None

Publications: TBD

Category: II.D

Keywords: Industry, Missiles, Electronics/Avionics, Land Vehicles, EMD, Production, Survey, Statistics/Regression, CER, Demonstration/Validation

NCCA-36

Title: Airframe Advanced Structure Material Cost Model

Summary: Update 1988 cost model on impact of use of advanced structure materials in the manufacture of aircraft. In particular, collect and analyze recent cost data by functional categories on the F-14D, V-22, F/A-18C/D,F/A-18E/F, and AV-8B.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Bill Stranges, (703) 604-0310

Performer: NCCA in-house

Resources:	*FY*	*Dollars*	*Staff-years*
	99	$157,000	0.75

Schedule:	*Start*	*End*
	Oct 98	Sep 99

Data Base: Historical cost data obtained from the government and aircraft manufacturers for Navy aircraft programs.

Publications: Completed study report

Category: II.A.2

Keywords: Government, Analysis, Aircraft, Production, Material, Data Collection, Study

NCCA-37

Title: MADCAM (Microwave and Digital Cost Analysis Model)

Summary: The model is being populated with additional data. MADCAM estimates the T1 cost of electronics boxes in FY90 as a function of their distinguishing design characteristics and the technology of the components. Task began in 1992 under an Air Force contract, and was then transferred to the Navy in late 1994. The model is in its fourth release and is called "MADCAM 96." It contains 83 data points comprising 24 space applications, 14 air, and 25 surface applications.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Scott E. Hine, (703) 602-5770

Performer: Tecolote Research, Inc.

Mr. Brad Frederic; Mr. Bill Jago

Resources:

FY	*Dollars*	*Staff-years*
95	$81,700	
97	$103,000	

Schedule:

Start	*End*
Sep 95	Feb 96
Sep 96	Jun 97

Data Base: Electronic Boxes

Publications: *MADCAM 96 (Microwave and Digital Cost Analysis Model) Presentation Document*, 29 February 1996

Category: I.B.1

Keywords: Government, Estimating, Missiles, EMD, Manufacturing, Data Collection, Computer Model

NCCA-38

Title: Transmit/Receive (T/R) Module Update

Summary: The current Tecolote cost model for solid state Transmit/Receive Modules was first released in 1991. The updated model will incorporate data from the following programs: GBR, International COBRA, CEC, and F-22. The Firefinder and MRSR programs may also be added to the model.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Scott E. Hine, (703) 602-5770

Performer: Tecolote Research, Inc.

Mr. Brian Enser

Resources:

FY	*Dollars*	*Staff-years*
97	$115,000	

Schedule:

Start	*End*
Mar 97	Dec 97

Data Base: T/R Module Cost/Technical Data

Publications: An updated user manual and model documentation will be provided upon task completion.

Category: II.A.1

Keywords: Government, Estimating, Analysis, Electronics/Avionics, Space Systems, Production, Labor, Material, Data Collection, Computer Model

NCCA-39

Title: Commercial Off the Shelf (COTS) Electronics Cost and Technical Database

Summary: This task was completed in 1996. The report contains technical and cost information, with company product identification and point of contact and Excel spreadsheets for the following electronic components: analog/digital converters, application specific integrated circuits (ASICs), computer systems, CPU boards and chips, digital signal processor boards and chips, field programmable gate arrays (FPGAs), input devices, infrared sensors, mass storage devices, multichip modules (MCMs), memory chips, MMIC chips, power supplies, software, and

transmit/receive (T/R) modules. Cost data is incomplete in selected areas due to reluctance of vendors to release price lists for complete lines of products.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Scott E. Hine, (703) 602-5770

Performer: LSA, Inc.

Mr. Rick Osseck

Resources:

FY	*Dollars*	*Staff-years*
96	$34,000	

Schedule:

Start	*End*
Sep 95	Feb 96

Data Base: COTS Electronics Cost and Technical Data

Publications: *Commercial Off the Shelf (COTS) Electronics Cost and Technical Database*, Draft Final Report, May 9, 1996

Category: I.C

Keywords: Government, Estimating, Data Collection, Computer Model

NCCA-40

Title: COTS vs. Ruggedized COTS vs. MILSPEC Equipment Cost Database and Estimating Methodology

Summary: Develop a database to facilitate MILSPEC vs. ruggedized COTS vs. COTS equipment trade-off studies and estimating methodology development. The database should include cost and technical data to support analysis at three levels of detail: 1) component (e.g., semiconductors, microcircuits, resistors, etc.); 2) circuit card assembly (CCA); and 3) cabinet. While component and CCA level data are readily available from qualified DOD vendors, cabinet-level data for COTS and ruggedized COTS cabinets are not. NCCA, with ASN(RD&A) and SYSCOM assistance, will request the prime contractors for selected systems currently in production to generate cost estimates for the COTS and ruggedized COTS equivalent of select MILSPEC cabinets. These estimates will be compared to the actuals for the delivered MILSPEC cabinets.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Rick Collins, (703) 604-0280

Performer: Contractor TBD

Resources:

FY	*Dollars*	*Staff-years*
97	$100,000	
99	$ 78,000	

Schedule:

Start	*End*
Aug 97	Jul 98
Oct 98	Sep 99 (update)

Data Base: MILSPEC, Ruggedized COTS, and COTS Cost and Technical Data

Publications: TBD

Categories: I.C, II.B, II.C, II.D

Keywords: Government, Industry, Estimating, Electronics/Avionics, Production, Data Collection, Data Base, Method

NCCA-41

Title: Impact of COTS Hardware Usage on Contractor and Government In-House Support Cost

Summary: Develop an approach to estimating contractor and government in-house (GIH) (i.e., laboratory and field activity) support costs for shipboard electronics programs that utilize commercial off-the-shelf (COTS) and ruggedized COTS hardware. At a minimum, this effort will result in 1) a matrix that relates a given MILSPEC/ MILSTD to the contractor and GIH cost element(s) i.e., program management, system engineering, T&E, data, etc.) that it influences, and 2) identification and quantification of the relevant relationships (e.g., if MILSPEC A is waived, then T&E cost will decrease by 10-20 percent).

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Rick Collins, (703) 604-0280

Performer: Contractor TBD

Resources:

FY	Dollars	Staff-years
98	$102,000	

Schedule:

Start	End
Oct 97	Sep 98

Data Base: TBD

Publications: TBD

Categories: I.C, II.A.1

Keywords: Government, Estimating, Electronics/Avionics, EMD, Production, Survey, Method

NCCA-42

Title: Cost As an Independent Variable (CAIV) Implementation

Summary: This task will research, analyze, and document the implementation requirements of the USD(A&T) CAIV initiative. A report on CAIV impacts on Life Cycle Costs (LCC) will be developed.

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis
1111 Jefferson Davis Highway
Suite 400, West Tower
Arlington, VA 22202-4306

Mr. Scott E. Hine, (703) 602-5770

Performer: Cambridge Research

Resources:

FY	Dollars	Staff-years
97	$75,000	

Schedule:

Start	End
Dec 96	Sep 97

Data Base: *Title:*

Description:

Automation:

Publications: The following reports will be published upon task completion: 1) Airborne Electronics Technical and Cost Data; 2) Performance/Technology/Cost/Relationships & Trends; and 3) CAIV Impacts on LCC.

Category: II.A.1

Keywords: Government, Estimating, Analysis, Weapon Systems, Life Cycle, WBS, Data Collection, Data Base, Method, Study

NCCA-43

Title: The SC-21 Sonar Performance-Based Cost Model (PBCM), a CAIV Effort

Summary: The objective is to build a cost-performance tradeoff model for shipboard sonar systems for use by the SC-21 program. The approach utilizes nonlinear mathematical programming to integrate deterministic engineering design equations with stochastic regression relationships, and may be appropriate for a wide range of weapon systems. In essence, it is a mathematically constructed feasible solution space of cost, performance, and technical parameters. By constraining one or more variables (e.g., cost, range), the possible values of all other variables become tightly bounded (e.g., resolution, power). In this way, trade studies are easily performed and risk and uncertainty is statistically quantified. Additionally, this model easily incorporates process relationships as well. This versatility makes PBCM a powerful, general use statistical and constraint management tool.

Classification: Classified/Business Sensitive

Sponsor: Naval Sea Systems Command (Sea 0172)
2531 Jefferson Davis Highway
Arlington, VA 22242-5106

W.N. Summerall, (703)602-6575
Virginia Lustre (Technical), (703)602-6453

Performer: NCCA in-house

Jim Keller, (703) 604-0286

Resources:

FY	*Dollars*	*Staff-years*
97		0.2
98		0.3

Schedule:

Start	*End*
Oct 96	Mar 98

Data Base: TBD

Publications: TBD

Categories: II.A.2, II.D

Keywords: Government, Estimating, Analysis, Weapon Systems, Life Cycle, WBS, Data Collection, Data Base, Method, Study

NAVAL SEA SYSTEMS COMMAND

Name	Cost Engineering and Industrial Analysis Division Comptroller Directorate, Naval Sea Systems Command		
Address	2531 Jefferson Davis Highway Arlington, VA 22242-5160		
Director	Pat Tamburrino, Jr.	(703) 602-1209	
Size	Professional: Support: Consultants: Subcontractors:		63 5 0 16
Focus	O&S Cost Estimating; Total Ownership Cost Estimating; Commonality and Standardization of Ship Design and Construction Processes and of Ship Components or Sub-assemblies (impact on acquisition and O&S costs); Build Strategy Impact on Ship Costs; Ship Design Trade-Off Analysis Tools; Ship and Weapon System Cost Modeling		
Activity	Number of projects in process:		26
	Average duration of a project:		2 years
	Average number of staff members assigned to a project:		1
	Average number of staff-years expended per project:		2
	Percentage of effort conducted by consultants:		
	Percentage of effort conducted by subcontractors:		85%

NAVSEA-1

Title: Private Shipbuilder Overhead Costs and Savings from Initiatives

Summary: The objectives of this study are to 1) provide a better understanding of private shipbuilder overhead costs; 2) develop models to predict overhead costs at selected shipyards; 3) measure the savings associated with Sealift Technology Initiatives; and 4) assess the costs associated with excessive (acquisition) regulatory burden. Participation by private shipbuilders engaged in Navy work is sought by NAVSEA/IDA on a voluntary basis. However, data will be obtained from applicable SUPSHIP business offices and regional DCAA offices for those builders who do not care to participate.

Classification: Unclassified; however, Proprietary and Business Sensitive information will be captured, developed during the study, and protected from disclosure.

Sponsor: OSD(PA&E), Program Analysis and Evaluation
Pentagon, Room 2C310
Washington, DC 20301

Mr. Gary Bliss, (703) 695-4348

Performer: IDA
1801 N. Beauregard Street
Alexandria, VA 22311

Dr. Stephen J. Balut, (703) 845-2527

Resources:

FY	*Dollars*	*Staff-years*
94	$100,000	
95	$110,000	
96	$110,000	
97	$110,000	
98	$ 90,000	

Schedule:

Start	*End*
Mar 94	Dec 98

Data Base: Database will support development and improvement of the Overhead Cost Models.

Publications: TBD

Categories: II.A.2, II.D

Keywords: Estimating, Ships, Overhead/Indirect

NAVSEA-2

Title: Shipbuilding Process Simulation Model

Summary: This project is intended to develop a system dynamics model of the shipbuilding process that can be used to quantify the cost and schedule impacts of ship construction delays, construction process reconfiguration, alternative build strategies, and design trade-off studies. The effort is aimed at producing a model sensitive to the myriad cause-and-effect relationships and the complex web of feedback linkages inherent in the ship production process.

Classification: Unclassified

Sponsor: Naval Sea System Command (SEA 01712)
2531 Jefferson Davis Highway
Arlington, Virginia 22242-5160

Jerome Acks, (703) 602-1308; DSN: 332-1308

Performer: Decision Dynamics, Inc.
4600 East West Hwy.
Bethesda, MD 20814

Dr. L. Alfred, (301) 657-8626, URL www.decisiondynamics.com

Resources:

FY	Dollars	Staff-years
Prior FY	$535,000	
97	$ 75,000	

Schedule:

Start	End
Dec 94	Oct 97

Data Base: None

Publications: *Final Report: Dynamic Simulation Model of Shipbuilding Construction Delays Computer Program: ShipBuild V0.9,* March 1997

Category: II.B

Keywords: Government, Industry, Analysis, Estimating, Ships, Labor, Material, Engineering, Manufacturing, WBS, Mathematical Model, Cost/Production Function, Computer Model

NAVSEA-3

Title: Cost/Schedule Performance Databases

Summary: Electronic Data Interchange (EDI) is being developed to obtain contractor cost and schedule performance data. Upon implementation, a large volume of detailed contractor cost and schedule data will be available in standard electronic format. This project proposes to develop models and databases to collect, analyze, and present this data. These models would allow expansion of analytical capabilities and develop comparisons and metrics by individual system, contracts, contractors, programs, and program offices.

Classification: Business Sensitive

Sponsor: Naval Sea Systems Command (SEA 01762)
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

Lisa Pfeiffer, (703) 602-1362; DSN: 332-1362

Performer: TBD

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
96	$ 0		99	$100,000	
97	$ 0		00	TBD	
98	$100,000		01	TBD	

Schedule:

Start	End
TBD	

Data Base: TBD

Publications: TBD

Categories: II.B, II.C

Keywords: Industry, Government, Analysis, Estimating, Reviewing/Monitoring, Ships, Production, Labor, Material, Overhead/Indirect, Engineering, Manufacturing, WBS, Data Collection, Data Base

NAVSEA-4

Title: Early Warning System (EWS) Integration

Summary: NAVSEA acquisition managers use an on-line service that allows access to contract Cost/Schedule performance status. Two commercially available models, Performance

Analyzer (PA) and WINSIGHT, provide detailed lower level and summary levels to managers. There is a need to ensure the interface and integration between EWS and its supporting tools, PA and WINSIGHT. This will provide managers the flexibility to use their adopted analysis tools/models, allow the analysis results to flow to Navy management without interruptions, and allow other organizations to benefit from the use of EWS.

Classification: Business Sensitive

Sponsor: Naval Sea Systems Command (SEA 01762)
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

Mourad Yacoub, (703) 602-1679; DSN: 332-1679

Performer: TBD

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
96	$ 0		99	$100,000	
97	$ 0		00	TBD	
98	$100,000		01	TBD	

Schedule:

Start	End
TBD	

Data Base: TBD

Publications: TBD

Categories: II.B, II.C

Keywords: Industry, Government, Analysis, Estimating, Reviewing/Monitoring, Ships, Production, Labor, Material, Overhead/Indirect, Engineering, Manufacturing, WBS, Data Collection, Data Base

NAVSEA-5

Title: Material Vendor Survey

Summary: The objective of this annual survey is to capture future price trends and last year's actual price change for material used in Navy ship construction. The survey samples over 900 shipboard material and equipment suppliers, requesting their price changes for the current year and their projections of future price changes for the next two years. The results are grouped according to Ship Work Breakdown Structure (SWBS- Cost Groups 1-9), and indices are calculated.

Classification: Unclassified

Sponsor: Naval Sea Systems Command (SEA 01712)
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

John Bissell, (703) 602-5018; DSN: 332-9150

Performer: NAVSEA Shipbuilding Support Office (NAVSHIPSO)
Norfolk Naval Shipyard
Detachment, Code 2900
Philadelphia, PA 19112-5087

Bob Laarkamp

Resources:

FY	Dollars	Staff-years
Each year	$125,000	

Schedule:

Start	End
Oct each year	Sep each year

Data Base: End use is MATCER Data File update. Backup data is maintained at NAVSHIPSO.

Publications: None

Category: II.A.1

Keywords: Ships, Estimating

NAVSEA-6

Title: Cost as an Independent Variable, a Production Cost Model for the Conformal Acoustic Velocity Sensor (CAVES) System

Summary: A cost model has been developed for the CAVES system, a submarine hull mounted sonar, to estimate the production cost of several technology implementations for the system. Technologies include fiber optic accelerometers, piezo-ceramic accelerometers, and fiber optic telemetry. The model is structured from a postulated system block diagram that depicts the functional breakdown of the various subassemblies. The original model was implemented in a spreadsheet environment. The new cost model will be implemented in Microsoft Access to allow simplified data entry, capturing the model's input assumptions in the form of electronic copies of specifications, drawings, analytical performance models, and cost estimating rationale. A variety of output reports will be developed to facilitate use of the cost modeling data as an independent design parameter. Hardware costs are developed from a bill of materials in which pricing comes from a combination of vendor quotes, historical costs for similar items, or engineering judgment. Added to the recurring system hardware costs are non-recurring cost factors for tooling, inspection equipment, special manufacturing equipment. Labor is assigned at the subsystem level and at the project management level to account for incoming inspection, assembly, fabrication, testing, planning, monitoring, reporting, and controlling the production program.

Classification: Unclassified

Sponsor: PEO(USW), ASTO
Washington, DC

Mike Traweek, Project Officer, 703-604-6011

Performer: Dynamic Systems, Inc.
635 Slaters Lane, Suite 100
Alexandria, VA 22314

Resources:

FY	*Dollars*	*Staff-years*
96	$75,000	
97	$50,000	

Schedule:

Start	*End*
Oct 95	Oct 97

Data Base: None

Publications: *Submarine Innovative Technology Assessment Report*, prepared by SEA 03U, draft dated 13 November 96

Categories: I.B.2, I.C.1

Keyword: Production

NAVSEA-7

Title: AACEI Cost Model for Aircraft Carriers

Summary: The objective is to update the ASSET ACEIT EXCEL Interface (AACEI) cost modeling process and tailor it for use to estimate the end cost of ship alternatives under study by the CVX program office. A weight-based cost model formulated within the Automated Cost Estimating Integrated Tools (ACEIT) was developed under previous tasks (Sealift,

SC21). Weight information for a ship designed in ASSET is electronically transferred by the ASSET user to the ACEIT cost model where the cost of the ASSET ship design is generated at two - and selected three - digit levels of detail. This process provides the ASSET user immediate insight into the cost impact of design changes, and the ability to identify where effort should be focused (areas of maximum cost impact). Automated graphical and tabular presentations allow both cost and engineering analysts to immediately identify anomalies in the cost and the technical characteristics of each alternative. Early efforts focused on adapting the Sealift version of AACEI to estimating CVX basic construction cost estimates. Proposed work will revise CERs; establish PRD and INF values to capture the differences from the source CERs to the ships under consideration; expand detail of end cost estimates; increase three-digit modeling capability; develop additional automated, tailored graphical and tabular reports; investigate and implement integration of O&S estimating; investigate methods to improve upon weight-based estimating; investigate ability to integrate with other tools (i.e., Performance Based Cost Modeling and PODAC); and add functionality to ACE to improve efficiency in the Navy environment.

Classification: Unclassified

Sponsor: Naval Sea System Command (SEA 01712)
2531 Jefferson Davis Highway
Arlington, Virginia 22242-5160

Steve Moretto, (703) 602-1307; DSN: 332-1307

Performer: Tecolote Research, Inc.
1700 N. Moore Street, Suite 1400
Rosslyn Center Office Building
Arlington, VA 22209

Alfred Smith, (703) 243-2800, ext. 335

Resources:

FY	*Dollars*	*Staff-years*
Prior FY	$ 35,000	
98	$400,000	

Schedule:

Start	*End*
Sep 97	Dec 98

Data Base: None

Publications:

Category: II.A

Keywords: Government, Analysis, Review, Ships, Concept Development, Labor, Material, Overhead/Indirect, Engineering, Acquisition Strategy, Data Collection, Mathematical Modeling, CER, Method, Mathematical Model, Study

NAVSEA-8

Title: Nuclear Attack Submarine Procurement Cost Estimating System (ProCES) Cost Estimating Model

Summary: The objective of this project was to develop a cost estimating tool for nuclear attack submarines, focusing on the procurement phase but also including Research, Development Test & Evaluation, Operations & Support, and Disposal. The tool was designed to perform program cost estimating and analysis and support acquisition and financial management operations. The tool provides input to numerous program documents and reports, including Program Life Cycle Cost Estimates (PLCCEs), Congressional Quarterly Reports, Budget Exhibits, Program Objective Memorandum (POM) Requirements Documentation, and other external reports. The work was completed in FY97.

Classification: Business Sensitive

Sponsor: Nuclear Attack Submarine Program Office (PMS450)
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

Mr. Dave Hart, (703) 602-8961, ext. 144

Performer: Booz·Allen & Hamilton, Inc
2231 Crystal Drive, Suite 711
Arlington, VA 22202

Ann Repczynski, (703) 412-7876; Stephen Webster, (540) 663-0382; Brian Schneeberg, (703) 917-2484

Resources:

FY	*Dollars*	*Staff-years*
96	$150,000	1.5
97	$100,000	1.0

Schedule:

Start	*End*
Dec 95	Feb 97

Data Base: *Title:* Procurement Cost Estimating System (ProCES)

Description: Life cycle cost estimating tool focusing on the procurement phase.

Automation: Microsoft Access 2.0

Publications: *Procurement Cost Estimating System (ProCES) System User Manual*, Booz·Allen & Hamilton, Inc., February 1997.

Category: II.A.2

Keywords: Government, Estimating, Analysis, Ships, Life Cycle, Production, Labor, Material, Overhead/Indirect, Engineering, Manufacturing, Acquisition Strategy, Cost/Production Function, Data Base, Computer Model, Mathematical Model.

NAVSEA-9

Title: SEA 0177 Shipyard Workload Model Improvements

Summary: The objective is to document existing network software operating systems that make up the shipyard workload model, and correct and implement solutions to a number of problems requiring an immediate fix. The long-term goal is to obtain additional funding for potential improvements to increase overall capability of the workload model.

Classification: Unclassified; however, proprietary and business-sensitive information is maintained, used, and protected from disclosure.

Sponsor: Naval Sea Systems Command (SEA 01)
2531 Jefferson Davis Highway
Arlington, VA. 22242-5160

Mr. Robert Storey, (703) 602-3538

Performer: Naval Sea Systems Command (SEA 0177)
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

Mr. John Bissell, (703) 602-5018

AAC Associates, Inc.
2361 Jefferson Davis Highway
Heitman Center ML 108
Arlington, VA. 22202

Mr. Surendra Gupta, (703) 415-4400

Resources:	*FY*	*Dollars*	*Staff-years*
	97	$65,535	
	98		
Schedule:	*Start*	*End*	
	3 Apr 97	30 Sep 97	

Data Base: Database will support Shipyard Workload Model improvements.

Publications: None

Category: II.A.2

Keywords: Industry, Analysis, Ships, Production, Acquisition Strategy, Cost/Production Function, Computer Model

NAVSEA-10

Title: COTS Electronic Technology Assessment/Refresh Cost Model

Summary: Development of a cost model as an element of an overall process for COTS planning and budgeting. The cost model is intended to support decision making on COTS upgrades and technology refreshes driven by rapid COTS product cycles, availability, reliability, and supportability. The primary use of the model is to optimize out-year support costs for electronic systems by performing cost tradeoffs of viable solutions for near and long-term support problems of COTS based electronic systems. The output of the cost model provides life cycle support costs with respect to fiscal years and is intended to be used as a planning and budgeting tool.

Classification: Unclassified

Sponsor: Naval Sea Systems Command (PMS 411)
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

Capt. Richard Goldsby 703-602-5064

Naval Surface Warfare Center, Crane Division
Sustainable Hardware and Affordable Readiness Practices (SHARP) Program
Crane, IN 47522

Mike Grubb 812-854-5089

Performer: Naval Surface Warfare Center, Crane Division
Code 602
Crane, IN 47522

Mike Roby 812-854-2406

Resources:	FY	Dollars	Staff-years
	96	$50,000	
	97	$260,000	
Schedule:	Start	End	
	July 96	Sep 97	

Data Base: None

Publications: Technology Assessment Guidebook

Category: I.B, I.C

Keywords: Government, Estimating, Programming, Budgeting, Electronics/Avionics, Life Cycle, Modification, Sustainability, Engineering, WBS, Data Collection, Survey, Mathematical Modeling, Computer Model

NAVAL AIR SYSTEMS COMMAND

Name	Naval Air Systems	
Address	Naval Air Systems Command Cost Department (AIR-4.2) 22347 Cedar Point Road, Unit 6 Patuxent River, MD 20670-1161	
Director	Ronald J. Rosenthal	(703) 604-3611
Size	Professional: NAVAIR Hqs: NAWC-AD-LAKE: NAWC-AD-PAX: NAWC-WD-CL:	 72 13 103 15
Focus	The Cost Department provides life cycle cost estimates, source selection cost evaluation, contractor performance measurement, cost analysis research, and cost/technical/programmatic databases for the purpose of providing a clear and comprehensive understanding of life cycle costs and attendant uncertainties to be used in developing, acquiring, and supporting affordable Naval Aviation Systems. Primary focus of NAVAIR cost research is as follows: Development of methodologies for estimating cost impacts of acquisition reform initiatives; Joint Strike Fighter (JSF) related: affordability initiatives and cost analysis/estimating technology upgrades; improved methodologies and databases for estimating major aircraft modification; CER Development: (1) for estimating missile SE/PM costs and (2) for relating missile production unit cost to development unit cost; expand and refine current O&S models to incorporate major data sets required to implement affordable readiness.	
Activity	Number of projects in process:	7
	Average duration of a project:	2 years
	Average number of staff members assigned to a project:	1–2
	Average number of staff-years expended per project:	1
	Percentage of effort conducted by consultants:	75%
	Percentage of effort conducted by subcontractors:	0%

NAVAIR-1

Title: Joint Strike Fighter (JSF) Advanced Cost Analysis Support (Cost of Stealth)

Summary: Provide cost and technical support in the areas of low observability. Examine proposed and alternative technologies that can contribute to JSF low observability. Determine costs associated with specific approaches for signature control. Further develop relationships to historical low observability life cycle cost data.

Classification: TBD

Sponsor: Naval Air Systems Command
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Joint Strike Fighter Program Office

Performer: Science Applications International Corporation (SAIC)

Resources:

FY	*Dollars*	*Staff-years*
97	$180,000	

Schedule:

Start	*End*
Feb 97	Jan 98

Data Base: *Title:* JSF Low Observable Database

Description: List of all literature collected during search

Automation: Microsoft Access model

Publications: Study Report

Category: I.C.1

Keywords: Estimating, Analysis, Electronics/Avionics, EMD, Data Collection

NAVAIR-2

Title: F/A-18 E/F Northrop-Grumman Composite Fabrication

Summary: One of the key differences in the configuration of an F/A-18 E/F compared to an F/A-18 A/B/C/D is the increased usage of composite material for the airframe structure. The increase composite usage occurs mainly on the Northrop-Grumman portion of the aircraft. This study will develop a composite fabrication data base of historical production programs. The study will also develop an analogous estimating technique for estimating composites for the Northrop-Grumman portion of the aircraft.

Classification: Proprietary

Sponsor: Naval Air Systems Command
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Bill Geoghegan

Performer: Naval Air Systems Command
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Garry Newton

Resources:

FY	*Dollars*	*Staff-years*
	$0	0.1 man-years

Schedule:	*Start*	*End*
	Oct 96	Sep 97
Data Base:	*Title*: Composite Fabrication Database	
	Description: Historical production history for composite manufacturing	
	Automation: Excel	
Publication:	Technical report, database	
Category:	II.C	
Keywords:	Aircraft, Production	

NAVAIR-3

Title: Out-sourcing of Northrop-Grumman Fabrication Parts for F/A-18 E/F

Summary: For the F/A-18 E/F program, Northrop-Grumman has made a corporate decision to out-source all of its conventional fabrication parts to smaller machine shop vendors. This study will evaluate the impact of this decision on both the Northrop-Grumman's in-house labor as well as the impact on its manufacturing subcontract dollars. The study will analyze machine shop vendors' historical production data. This study will also evaluate small vendor's learning curve performance as compared to large airframe manufacturer capabilities, as well as the impact on Northrop-Grumman's in-house manufacturing support staffs.

Classification: Unclassified (will contain Proprietary data)

Sponsor: Naval Air Systems Command
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Bill Geoghegan

Performer: Naval Air Systems Command
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Garry Newton

Resources:	*FY*	*Dollars*	*Staff-years*
		$0	0.1 man years
Schedule:	*Start*	*End*	
	Oct 96	Sept 97	

Database: N/A

Publication: Technical report

Category: II.A.2

Keywords: Aircraft, Production

NAVAIR-4

Title: Relationship Between Missile Development Unit Cost and Production Unit Cost

Summary: Purpose is to develop cost estimating relationships that relate missile production unit cost to development unit cost. Focus is on missile guidance, control, airframe, and assembly costs. Study considers the following programs: HARM, EO MAVERICK, STINGER, SPARROW (AIM-7F), HARPOON, PHOENIX (AIM-54C), ACM, AMRAAM, IIR MAVERICK, and PATRIOT. Database and CERs developed to support life cycle cost estimating requirements.

Classification: Classified

Sponsor: Naval Air Systems Command
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Bill Stranges

Performer: Management Consulting & Research, Inc.
McLean, VA

SAIC

Resources:

FY	*Dollars*	*Staff-years*
96	$35,000	

Schedule:

Start	*End*
Feb 96	Feb 97

Data Base: To be developed

Publications: Technical briefing and analysis

Category: II.C

Keywords: Missiles, Production, Estimating, CER, Government

NAVAIR-5

Title: Naval Aviation Modification Model (NAMM) Data Base

Summary: With current military downsizing, the emphasis in acquisition has been in the area of modifications. The NAMM model allows the analyst to bound a "roughly right" modification cost estimate in a short turnaround time. The effort began in February 1994 with an analysis of the tasks to be done to accomplish the NAMM objective and an identification of the cost, technical, and programmatic data to be incorporated into the model. This was followed by data collection, data review and analysis, data validation and verification, and the development of a Microsoft Access 2.0 Windows-based run-time model. The model was briefed at the Department of Defense Cost Analysis Symposium (DODCAS) in 1996. The model has been tested and released. Currently, there are 78 data points. Future plans are to revisit the model in 1999, to update existing data points, and to add new data points. (This task appeared in 1995 catalog as NAVAIR-2).

Classification: Unclassified

Sponsor: Naval Air Systems Command
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Jan Young

Performer: Naval Air Systems Command

Maria Ponti

Management Consulting & Research, Inc., McLean, VA

Resources:

FY	*Dollars*	*Staff-years*
94	$204,000	
95	$100,000	
96	$ 50,000	
97	$ 30,000	
98		
99	$ 50,000	

Schedule:

Start	*End*
Feb 94	Mar 97 (Phase III end)

Data Base: Access 2.0

Publications: Study report, user's guide

Category: II.C

Keywords: Government, Estimating, Aircraft, Modification, Production, Data Collection, Data Base, CER

NAVAIR-6

Title: Maintenance Trade Decision Support System

Summary: Develop an automated support system to assist in the cost analyses of level and source of repair alternatives for aircraft electronics, components, engines, airframe, and weapons. The process should identify a screening mechanism to neck-down potential alternative maintenance candidates to those with the greatest cost savings potential. The tool should step a user through the pertinent cost elements to consider while identifying data sources, default values, and potential estimating relationships to utilize. Alternative maintenance concepts to be addressed include engineering change proposals (ECPs) to reduce cost by improving reliability and maintainability (R&M), changing maintenance level or depth of repair, and changing the source of maintenance. Initially based upon the NAVAIR-4.2.5 Maintenance Trade Cost Guidebook, the support system is to accommodate lessons learned in ongoing direct vendor delivery studies, commercial versus organic maintenance analyses, logistics ECP studies, and reliability improvement analyses.

Classification: Unclassified

Sponsor: Naval Air Systems Command (Code 4.2.5)
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

John A. Johnston

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*
97	$50,000	0.2
98-00	$75,000	0.2

Schedule:

Start	*End*
Jun 97	Jun 00

Data Base: Direct Vendor Delivery Studies, Reliability Warranty Studies, Commercial vs. Organic Maintenance Studies

Publications: TBD

Categories: II.B, II.A

Keywords: Government, Industry, Estimating, Analysis, Weapon Systems, Aircraft, Helicopters, Electronics/Avionics, Spares/Logistics, EMD, Production, Operations and Support, Readiness, Mathematical Modeling, Method, Computer Model

NAVAIR-7

Title: Maintenance Trade Guidebook

Summary: Develop a Maintenance Trade Guidebook that provides a consistent and systematic approach for performing all types of maintenance trades in the new acquisition environment. The guidebook contains recommendations for screening potential candidates, provides a recommended cost structure for various categories of maintenance trades (both Acquisition and Operations and Support cost elements) which are tailored for each study. It describes data sets, points of contact and key issues for each category of cost element. In addition, it contains a potential cost methodology for use for each element to be estimated. Alternative maintenance concepts to be addressed include engineering change proposals (ECPs) to reduce cost by improving reliability and

maintainability (R&M), changing maintenance level or depth of repair, and changing the source of maintenance. It incorporates lessons learned in ongoing direct vendor delivery studies, commercial versus organic maintenance analyses, logistics ECP studies, and reliability improvement analyses.

Classification: Unclassified

Sponsor: Naval Air Systems Command (Code 4.2.5)
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Mark Mutschler

Performer: In-house study

Resources:

FY	*Dollars*	*Staff-years*
97	0	1.0

Schedule:

Start	*End*
Oct 96	Apr 97

Data Base: Direct Vendor Delivery Studies, Reliability Warranty Studies, Commercial vs. Organic Maintenance Studies

Publications: TBD

Categories: II.B, II.A

Keywords: Government, Industry, Estimating, Analysis, Weapon Systems, Aircraft, Helicopters, Electronics/Avionics, Spares/Logistics, EMD, Production, Operations and Support, Life Cycle, Readiness, CER, Method, Study

NAVAIR-8

Title: NAVAIR Operating and Support Cost Model

Summary: Expand and refine the current NAVAIR aircraft O&S model to incorporate major data sets needed for program managers to implement affordable readiness and CAIV initiatives. Develop an Excel spreadsheet modeling environment using Visual Basic to establish basic data entry templates, to allow integration of other electronic data inputs, and to provide a consistent and repeatable set of outputs. Besides traditional CAIG category elements and reporting, provide key information on cost drivers and their trends that impact a particular aircraft program. Provide current squadron manning for each maintenance level by work center and specialty, major system reliability and maintainability trends across a several-year period, a listing of all major O&S data sets and points of contact for more in-depth study, and sensitivity analyses in critical areas like Depot Rework where costs are being changed by new Phased Maintenance and Reliability Centered Maintenance approaches. Publish on an annual basis the O&S costs in the new format for all major Navy T/M/S aircraft.

Classification: Unclassified

Sponsor: Naval Air Systems Command (Code 4.2.5)
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Jeff Keates, Oscar Gutierrez

Performer: In-house study

Resources:

FY	*Dollars*	*Staff-years*
97	0	1.5

Schedule:

Start	*End*
Jan 97	Sep 97

Data Base: Flight Hour Program Costs, Depot Rework Costs, Personnel Cost, Sustaining Support Costs, Reliability and Maintainability Cost Drivers

Publications: Standard Estimating Model and T/M/S Reporting

Categories: I.A, II.B, II.A

Keywords: Government, Industry, Estimating, Analysis, Weapon Systems, Aircraft, Helicopters, Electronics/Avionics, Propulsion, Airframe, Operations and Support, Readiness, Reliability, CER, Method, Computer Model

NAVAIR-9

Title: SBIR Life Cycle Cost Model Development

Summary: Develop an automated modeling environment operating under ACEIT to develop Operations and Support and Integrated Logistics Support Estimates for Naval Aviation Systems. Develop a compendium of Naval Aviation Data Sets, expand upon existing CERs, and develop new ones when applicable that will permit the develop of consistent and repeatable estimates at the aircraft and major subsystem levels. Incorporate estimating approaches used in current NAVAIR and NCCA Operations and Support Cost Estimating. Develop an ability to do sensitivity analyses in areas like manning, impact of reliability/maintainability changes, impacts of aging fleet, and other issues that impact future costs of operation. This effort is funded under a Small Business Innovation Research Project and is in Phase II with Brennan and Associates, Inc.

Classification: Unclassified

Sponsor: Naval Air Systems Command (Code 4.2.5)
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Laurence W. Stoll

Performer: Brennan and Associates, Inc.
2614 W. Arkansas Lane, 560K
Arlington, Texas 76016

Resources:

FY	*Dollars*	*Staff-years*
97-98	$560,000	0.2

Schedule:

Start	*End*
Oct 96	Mar 98

Data Base: Databases to be established in ACEIT Environment for O&S costs, ILS costs

Publications: Formal document cost study

Categories: I.A, II.A, II.B

Keywords: Government, Industry, Estimating, Analysis, Weapon Systems, Aircraft, Helicopters, Electronics/Avionics, Airframe, Propulsion, Manpower/Personnel, Spares/Logistics, EMD, Production, Operations and Support, Readiness, Mathematical Modeling, Method, Computer Model, Data Collection, Study

NAVAIR-10

Title: Acquisition Reform Impacts/Multi-Year Analysis

Summary: This is a review of the impacts of acquisition reform on the manufacturers of the V-22 weapons system. The researchers investigated the initiatives that each contractor put forward as well as their potential impacts. Special emphasis was placed on multi-year procurements.

Classification: Unclassified

Sponsor: Naval Air Systems Command (Code 4.2.5)
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Performer: TASC, Inc.

Resources:

FY	*Dollars*	*Staff-years*
96	$100,000	0.5

Schedule:

Start	*End*
Sep 96	Dec 96

Data Base: N/A

Publications: TASC study report

Category: I.B

Keywords: Industry, Aircraft, Acquisition Strategy

NAVAIR-11

Title: System Engineering/Program Management Cost for Tactical Missile Development and Production

Summary: This study is to develop cost estimating methodologies for SE/PM for tactical missile development and production programs. The study addresses only contractor SE/PM and excludes from consideration government-incurred SE/PM cost. The database is compiled from cost history for several more recent Navy tactical missile programs and augmented with data from several older programs. A variety of analyses were performed to derive Cost Estimating Relationships (CERs) to estimate SE/PM development and production costs. This concludes Phase I effort of the study. Phase II will analyze data from a different prospective (e.g., by contractor) and develop CERs or a process for estimating SE/PM through head counts, direct charges, etc. (This task was included in the 1995 catalog as NAVAIR-8.)

Classification: Unclassified but may contain proprietary data.

Sponsor: Naval Air Systems Command
22347 Cedar Point Road, Unit 6
Patuxent River, MD 20670-1161

Joe Incorvia

Performer: Management Consulting & Research, Inc., McLean, VA

Resources:

FY	*Dollars*	*Staff-years*
95	$47,000	
96	$75,000	

Schedule:

Start	*End*
Aug 94	Sep 97

Data Base: To be developed

Publications: Study report

Category: II.A.2

Keywords: Government, Industry, Estimating, Missiles, Aircraft, Statistics/Regression, Data Collection, Method

NAVAL SURFACE WARFARE CENTER
DAHLGREN DIVISION

Name	Cost/Affordability Branch
Address	Code T50 (Warfare Analysis Division) Dahlgren, VA 22448-5000
Director	Amanda Cardiel
Size	Professional: 9 Support: 0 Consultants: 0 Subcontractors: As required
Focus	The Cost/Affordability Branch resides within the Warfare Analysis and Systems Department at the Naval Surface Warfare Center, Dahlgren Division (NSWCDD). The Office has NSWCDD responsibility for providing leadership in the areas of Cost and Operational Effectiveness Analysis (COEA) for Surface Navy Combat Systems and Theater Tactical Ballistic Missile Defense (TBMD). Particular areas of expertise and emphasis include developing and maintaining models, databases, and procedures for performing these functions, technology assessments, life cycle cost estimates, budget and force-level analyses, performance-based cost models, and product-oriented cost models. The current focus of the NSWCDD cost research program is: models to generate cost estimates for complex surface navy combat system equipment and TBMD ordnance during concept formulation and DemVal phases of a program; data collection in preparation for model development to estimate life cycle software maintenance workload during the concept formulation and DemVal phases; performance-based methods for estimating life cycle cost; implementing Cost as an Independent Variable and for analyzing total ownership cost.
Activity	Number of projects in process: Average duration of a project: Average number of staff members assigned to a project: Average number of staff-years expended per project: Percentage of effort conducted by consultants: Percentage of effort conducted by subcontractors:

NSWCDD-1

Title: Surface Combatant Performance-Based Life Cycle Cost Model

Summary: The objective is to develop a cost model sensitive to high-level performance parameters for predicting the Life Cycle Cost (LCC) of major surface combatants. The resulting model is envisioned as a tool to provide quick ROM cost estimates of surface combatant ship concepts during the Cost Operational Effectiveness Analysis (COEA) process, or to investigate the cost implications of alternative mission requirements prior to Milestone II. Phase I of the effort, the development of a pre-prototype cost model, is complete. Phase I deliverables included a POA&M, Project Definition Report, and pre-prototype model. Planned Phase II deliverables include a production model complete with a survivability module, a "Bullseye Chart" user interface for combat system performance parameters, and documentation of the algorithms. RDT&E and Operating and Support modules and production model upgrades, as needed, will be incorporated into the model during Phase III, scheduled for completion by the end of FY98.

Classification: Classified/Business Sensitive

Sponsor: Naval Sea System Command (SEA 0172)
2531 Jefferson Davis Highway,
Arlington, Virginia 22242-5160

W.N. Summerall (703) 602-6575; DSN: 332-6575
Virginia Lustre (Technical), (703) 602-6453

Performer: Naval Surface Warfare Center (Code A50), Dahlgren Division,
(Combat Systems and Cost Model Integration)
Dahlgren, Virginia 22448-5000

Amanda Cardiel, (540) 653-5235

Naval Surface Warfare Center (Code 211), Carderock Division (HME systems),
9500 MacArthur Blvd.
W. Bethesda, MD 20817-5700

Michael Jeffers, (301) 227-1941
Daniel Platt, (301) 227-2454

Resources:

FY	*Dollars*	*Staff-years*	*FY*	*Dollars*	*Staff-years*
Prior FY	$100,000		97	$50,000	
96	$120,000		98	$50,000	

Schedule:

Start	*End*
Jun 93	Sep 99

Data Base: TBD

Publications: TBD

Categories: II.A.2, II.D

Keywords: Government, Estimating, Analysis, Electronics/Avionics, Concept Development, Demonstration/Validation, Labor, Material, Overhead/Indirect, Data Collection, Statistics/Regression, CER, Data Base, Method, Computer Model

NSWCDD-2

Title: TBMD Missile Model

Summary: This effort is directed towards the development of a model to estimate the various missile designs in the TBMD COEA. The missile cost model is a workbook spreadsheet that operates in Microsoft Excel. This model is complex in that it integrates a number of cost

models and individual CERs. Missile subsystem costs are estimated by cost models operating at the assembly level or by CERs estimating total subsystem costs. New CERs have been developed for some of the missile subsystems during this COEA.

Classification: Unclassified (Proprietary)

Sponsor: Naval Surface Warfare Center (Code A50)
Dahlgren Division
Dahlgren, Virginia 22448-5000

Performer: Naval Surface Warfare Center (Code A50)
Dahlgren Division (Combat Systems and Cost Model Integration)
Dahlgren, Virginia 22448-5000

Ted Towles, (540) 653-7369; Amanda Cardiel

Technomics, Inc.
5290 Overpass Road, Suite 206
Santa Barbara, CA 93111

Eugene Waller, (805) 964-9894; Chris Brown

Resources:

FY	*Dollars*	*Staff-years*
Prior FY	$180,000	
96	$ 20,000	
97	$ 20,000	

Schedule:

Start	*End*
Feb 95	Sep 97

Data Base: Data used to create the models and CERs were from various Army and Navy development and production programs that were deemed to be relevant to current technology missiles. There are two seeker hardware cost models resident in the missile cost model, one for infrared and one for RF seekers. These two models are composed of a number of assembly-level CERs. The missile cost model includes CERs for rocket motors, divert/attitude control systems, target detectors, inertial measurement units, GPSs, control sections, wings and fins, batteries, data links, and integration. Besides hardware costs, CERs are used to estimate non-recurring development, development support, and procurement support. All models and CERs were developed between 1992 and 1995.

Publications: TBD

Category: II.C

Keywords: Government, Estimating, Missiles, EMD, Test and Evaluation, Production, Statistics/Regression, Mathematical Model

NSWCDD-3

Title: Software Maintenance Cost Process Model

Summary: This effort is directed towards the development of a methodology for predicting the Operating and Support (O&S) costs of software maintenance programs that support Milestone 0, I, and II Life Cycle Cost Studies. Earlier phases collected data to develop preliminary relationships and initial structuring of the model. When completed, the Software Life Cycle Cost Process Model will enable software analysts and program managers to estimate the costs to maintain a planned software system over its life span. This effort is being continued in the NCCA project entitled, "Weapon System Software Maintenance Cost/Technical Database Development and Analysis."

Classification:

Sponsor: Naval Surface Warfare Center (Code A50), Dahlgren Division
Dahlgren, Virginia 22448-5000

Performer: Naval Surface Warfare Center (Code A50), Dahlgren Division
Dahlgren, Virginia 22448-5000

John Kozicki, (540) 653-7369; Amanda Cardiel

Technomics, Inc.
5290 Overpass Road, Suite 206
Santa Barbara, CA 93111

Eugene Waller, (805) 964-9894; Scott Wied

Resources:

FY	*Dollars*	*Staff-years*
FY 95 & Prior	$139,000	

Schedule:

Start	*End*
Feb 91	Sep 95

Data Base: Data obtained and analyzed pertain mainly to command and control software written for Naval shipboard systems. Data was collected from FCDSSA on Advance Combat Direction System (ACDS), and from Tomahawk Program Office on Tomahawk Weapon Control System (TWCS).

Publications: *Software Life Cycle Data Collection Requirements*, May 1992,

Software Life Cycle Process Relationship Development, TR-9204-1, March 1993,

Software Life Cycle Cost Process Model, TR-9411-1, April 1995

Category: II.B

Keywords: Government, Estimating,

NAVAL SURFACE WARFARE CENTER
CARDEROCK DIVISION

Name	Cost and Economic Analysis Office		
Address	9500 MacArthur Boulevard West Bethesda, MD 20817-5700		
Director	Robert R. Jones	(301) 227-4012	
Size	Professional:		10
	Support:		3
	Consultants:		0
	Subcontractors:		3
Focus	New, product-based methods for estimating the cost of surface ships. New and improved methods for estimating cost impacts of affordability through commonality initiatives. New and improved methods for estimating operating and support cost. New and improved performance-based methods for estimating life cycle cost. New methods for facilitating integrated product team cost and economic analysis. New methods for implementing Cost as an Independent Variable and for analyzing Total Ownership Cost.		
Activity	Number of projects in process:		12
	Average duration of a project:		2
	Average number of staff members assigned to a project:		2
	Average number of staff-years expended per project:		4
	Percentage of effort conducted by consultants:		0

NSWCCD-1

Title: Costing Tools in Support of Parametric CAD Tools

Summary: Develop costing tools that interface with CAD tools for designing shipboard distributive systems. These cost estimating procedure will allow system engineers to quickly assess the relative cost of alternative system approaches as the designs are being developed at CAD work stations. Initial efforts are aimed at developing a cost estimating methodology that can be universally applied to distributive system zonal architecture, specifically investigating zonal fire main (completed in FY95) and HVAC systems (completed in FY96). Also conducting a study of the interface needed to connect cost estimating tools and CAD tools.

Classification: Business Sensitive

Sponsor: Naval Sea System Command (SEA 017R)
2531 Jefferson Davis Highway
Arlington, Virginia 22242-5160

Jerome Acks, (703) 602-1308; DSN: 332-1308

Performer: Naval Surface Warfare Center (Code 211), Carderock Division
9500 MacArthur Blvd.
W. Bethesda, MD 20817-5700

John Trumbule, (301)227-5570; DSN: 287-5570; Robert Jones

Resources:

FY	*Dollars*	*Staff-years*
Prior FY	$150,000	1
96	$ 0	0
97	$ 0	0

Schedule:

Start	*End*
Oct 95	Sep 97

Data Base: *Title*: None

Description: Cost data on a zonal distributed fire main system and HVAC distributed system

Automation: Microsoft Excel Spreadsheet

Publications: Prototype cost model and documentation for distributive systems report (FY95)

Distributive System Zonal Architecture Study Report (FY95)

Cost Estimating and CAD Interface Study Report (FY95)

Category: II.B

Keywords: Industry, Government, Estimating, Analysis, Ships, Production, Labor, Material, Overhead/Indirect, Engineering, Manufacturing, Case Study, Mathematical Modeling, Data Base, Mathematical Model, Computer Model, CER, Study

NSWCCD-2

Title: ATC LCC/Operating and Support Cost Model

Summary: Develop a toolbox of operating and support/life cycle cost models to support analysis of the use of common modules across classes, and increased equipment commonality. The model(s) will be used to assess the cost impacts of time-phased introduction of ATC modules and other ATC initiatives on a fleet-wide basis. Initial effort was to develop an optimization model, based on acquisition cost, for a selecting a "family" of modules used on a fleet-wide basis. Additional efforts will be to incorporate research and development, and operating and support costs into the optimization model.

Classification: Unclassified

Sponsor: Naval Sea System Command (SEA 017R)
2531 Jefferson Davis Highway
Arlington, Virginia 22242-5160

Jerome Acks, (703) 602-1308; DSN: 332-1308

Performer: Naval Surface Warfare Center (Code 211), Carderock Division
9500 MacArthur Blvd.
W. Bethesda, MD 20817-5700

John Trumbule, (301) 227-5570; DSN: 287-5570; Robert Jones

Resources:

FY	*Dollars*	*Staff-years*
Prior FY	$485,000	3
96	$155,000	1
97	$150,000	1

Schedule:

Start	*End*
Mar 94	TBD

Data Base: None

Publications: *An Optimization Approach to the Cost Assessment of Affordability Through Commonality Systems,"* Anjali K. Milano, Timothy C. Smith, and Michael F. Jeffers, Jr., 1994.

Report on Optimization Model and Documentation (FY95)

ATC Module Optimization Study Report (FY95)

Results of Life Cycle Cost Analysis Conducted on Reverse Osmosis Desalination Module (FY95)

Zonal Firemain Operating and Support Cost Analysis (FY96)

Affordability Through Commonality Life Cycle Cost Optimization Study for Reverse Osmosis Plants (FY96)

Steering Gear Optimization Study Report (FY 96)

Operations and Support Cost Analysis for the Modular Crew Sanitary Space (FY96)

Operations and Support Cost Analysis for the Smart Track Modular Deck System (FY96)

Categories: II.A.2, II.D

Keywords: Government, Estimating, Analysis, Ships, Operations and Support, Labor, Material, Overhead/Indirect, Data Collection, Mathematical Modeling, Case Study, Data Base, Mathematical Model, Computer Model

NSWCCD-3

Title: Cost Module for Sealift Ship Version of ASSET

Summary: The objective is to update the cost module of the ASSET ship design synthesis model and tailor it for use in assessing technology developments for sealift ships for the Mid-Term Sealift Ship Technology Development Program (MTSSTDP). The approach taken is to develop an electronic interface to transfer information between ASSET and a cost model formulated within the Automated Cost Estimating Integrated Tools (ACEIT). Technical information is produced in ASSET and electronically transferred by the ASSET user to ACEIT, which automatically estimates the cost of the ship; the cost estimate is then automatically transferred back to ASSET to provide near-immediate cost feedback to design engineers as they use ASSET. Early effort focused on basic construction cost estimates. Current work expands upon this and adds life cycle costing capability.

Classification: Unclassified

Sponsor: Naval Sea System Command (SEA 01712),
2531 Jefferson Davis Highway
Arlington, Virginia 22242-5160

Jerome Acks, (703) 602-1308; DSN: 332-1308

Performer: Naval Surface Warfare Center (211), Carderock Division
Bethesda, Maryland 20084-5000

C. F. Snyder, (301) 227-5479; DSN: 287-5479

Chris Whitacre, (301) 227-3003; DSN: 287-3003

Tecolote Research, Inc.
1700 N. Moore Street, Suite 1400
Rosslyn Center Office Building
Arlington, VA 22209

Alfred Smith, (703) 243-2800

Resources:

FY	*Dollars*	*Staff-years*
Prior FY	$220,000	
96	$60,000	

Schedule:

Start	*End*
Feb 94	Sep 96

Data Base: None

Publications: *MTSSTDP Ship Construction Cost Model - Training & User's Guide (vol. 1)*

MTSSTDP Ship Construction Cost Model - Appendices (vol. 2)

Category: II.A.2

Keywords: Government, Analysis, Review, Ships, Concept Development, Labor, Material, Overhead/Indirect, Engineering, Acquisition Strategy, Data Collection, Mathematical Modeling, CER, Method, Mathematical Model, Study

NSWCCD-4

Title: Product-Oriented Design and Construction (PODAC) Cost Model

Summary: This cost model will incorporate a Product Work Breakdown Structure and be sensitive to changes in shipbuilding strategies, ship construction process, use of common modules, zonal architectures, and equipment standardization. It will assist in assessment of the cost and affordability of design commonality alternatives that have potential for reducing acquisition and ownership costs of ships in conjunction with the NAVSEA Affordability Through Commonality (ATC) Program and the Mid-Term Sealift Ship Technology Development Program (MTSSTDP). Concept exploration phase was completed with selection of a baseline from conceptual models developed by cost research projects—Development of Product-Oriented Cost Estimating Tools and Near-Term Prototype PODAC model. The prototype is currently being developed by an integrated product team composed of Navy, shipyard personnel, and model developers. Partial functionality of the model was demonstrated in February 1997. In 1997 validation testing of the model will be done.

Classification: Unclassified

Sponsor: Naval Sea System Command (SEA 017R)
2531 Jefferson Davis Highway
Arlington, Virginia 22242-5160

Irv Chewning, (703) 602-0720, ext. 172; DSN: 332-0270, ext. 172,

Robin Hull, (703) 602-1308, ext. 119; DSN 332-1308, ext. 119

Performer: Naval Surface Warfare Center (Code 211), Carderock Division
9500 MacArthur Blvd.
W. Bethesda, MD 20817-5700

John Trumbule, (301) 227-5570; DSN: 287-5570; Robert Jones (310) 227-4012; DSN: 287-4012

Designers & Planners, Inc.; SPAR, Inc.; University of Michigan Transportation Research Institute; Avondale Shipbuilding, Inc.; Bath Iron Work, Inc.; Ingalls Shipbuilding, Inc.; National Steel and Shipbuilding Company; and Newport News Shipbuilding

Resources:

FY	*Dollars*	*Staff-years*	*FY*	*Dollars*	*Staff-years*
Prior FY	$295,000		98	$500,000	
96	$990,000		99	TBD	
97	$862,000				

Schedule:

Start	*End*	
Sep 94	Sep 95	Concept Exploration
Oct 95	Feb 97	Prototype Dem/Evaluation
Apr 97	Sep 97	Full-Scale Development of Model

Data Base: Resident within cost model

Publications: *Production-Oriented Design and Construction (PODAC) Cost Model Plan of Action and Milestones and Functional Specification* (FY 96)

Categories: II.A.2, II.B

Keywords: Government, Estimating, Ships, Production, Labor, Material, Overhead/Indirect, Engineering, Manufacturing, WBS, Case Study, Survey, Cost/Production Function, Method, Mathematical Model, Study

NSWCCD-5

Title: Surface Combatant Performance-Based Life Cycle Cost Model

Summary: The objective is to develop a cost model sensitive to high-level performance parameters for predicting the Life Cycle Cost (LCC) of major surface combatants. The resulting model is envisioned as a tool to provide quick ROM cost estimates of surface combatant ship concepts during the Cost Operational Effectiveness Analysis (COEA) process, or to investigate the cost implications of alternative mission requirements prior to Milestone II. Phase I of the effort , the development of a pre-prototype cost model, is complete. Phase I Deliverables included a POA&M, Project Definition Report, and pre-prototype model. Planned Phase II deliverables include a production model complete with a survivability module, a "Bullseye Chart" user interface for combat system performance parameters, and documentation of the algorithms. RDT&E and Operating and Support modules and production model upgrades as needed, will be incorporated into the model during Phase III, scheduled for completion by the end of FY98.

Classification: Classified/Business Sensitive

Sponsor: Naval Sea System Command (SEA 0172)
2531 Jefferson Davis Highway
Arlington, Virginia 22242-5160

W.N. Summerall (703) 602-6575; DSN: 332-6575
Virginia Lustre (Technical), (703) 602-6453

Performer: Naval Surface Warfare Center (Code A50), Dahlgren Division,
(Combat Systems and Cost Model Integration)
Dahlgren, Virginia 22448-5000

Amanda Cardiel (540) 653-5235

Naval Surface Warfare Center (Code 211), Carderock Division (HME systems),
9500 MacArthur Blvd.
W. Bethesda, MD 20817-5700

Michael Jeffers, (301) 227-1941
Daniel Platt, (301) 227-2454

Resources:

FY	*Dollars*	*Staff-years*	*FY*	*Dollars*	*Staff-years*
Prior FY	$100,000		97	$50,000	
96	$120,000		98	$50,000	

Schedule:

Start	*End*
Jun 93	Sep 99

Data Base: TBD

Publications: TBD

Categories: II.A.2, II.D

Keywords: Government, Estimating, Analysis, Electronics/Avionics, Concept Development, Demonstration/Validation, Labor, Material, Overhead/Indirect, Data Collection, Statistics/Regression, CER, Data Base, Method, Computer Model

NSWCCD-6

Title: Fleet-Wide Cost/Benefit Assessment

Summary: The purpose of this task was to develop a methodology for conducting return on investment (ROI) analysis for the overall ATC program and for individual ATC modules. This portion of the work was completed in FY96.

The FY97 effort is using the lessons and techniques developed during FY96 to assess the impacts of ATC initiatives on the SC 21 program.

Classification: Business Sensitive

Sponsor: Naval Sea System Command (SEA 017R)
2531 Jefferson Davis Highway,
Arlington, Virginia 22242-5160

Jerome Acks, (703) 602-1308; DSN: 332-1308

Performer: Naval Surface Warfare Center (Code 211), Carderock Division
9500 MacArthur Blvd.
W. Bethesda, MD 20817-5700

John Trumbule, (301)227-5570; DSN: 287-5570; Robert R. Jones

Resources:

FY	*Dollars*	*Staff-years*
Prior FY	$150,000	1
96	$160,000	1
97	$150,000	1

Schedule:

Start	*End*
Oct 94	Sep 98

Data Base: None

Publications: *A Methodology for Return on Investment (ROI) Analysis for the Affordability Through Commonality (ATC) Team* (FY96)

Category: II.B

Keywords: Industry, Government, Estimating, Analysis, Ships, Manufacturing, Mathematical Modeling, Mathematical Model, Computer Model

NSWCCD-7

Title: Dynamic Investment Balance Simulator (DIBS) (previously called Planning Under Uncertainty Computer Model)

Summary: DIBS determines future Navy Force structures that are consistent with a range of possible future funding streams. It is a hybrid system which uses Excel spreadsheets and macros for input, output, and control of execution, and an embedded Fortran program as the simulation engine. The model uses a goal-seeking algorithm to develop procurement plans that drive force structure towards specified force objectives stated at the SASDT category level, taking into account planned retirements and attrition of existing assets. When topline funding is insufficient to achieve the desired force structure size, the goal-seeking algorithm strives to maintain the force structure "shape"—i.e., the relative numbers of platforms of various types. O&S costs of the existing assets are estimated as a function of current force structure. Other Navy budgets elements—RDT&E, WPN, etc.—are estimated using statistical relationships. Force structure is modeled at the ship class and aircraft type-model-series level of detail. The model has input variables which allow examination of tradeoffs between acquisition (future force structure) and O&S (maintaining current force structure) in a range of funding environments. The model is also capable of exploring more explicit tradeoffs within limited acquisition categories. A separate but related macroeconomic model capable of generating a range of future Navy funding streams was also been developed under this effort. The DIBS prototype developed in FY93 was successfully demonstrated. Proposals have been submitted for further development and enhancements.

Classification: Secret

Sponsor: Chief Naval Operations (Code N812)
Pentagon
Washington, DC 20310

Matt Henry, (703) 697-5242

Performer: Naval Surface Warfare Center (Code 211), Carderock Division
9500 MacArthur Blvd.
W. Bethesda, MD 20817-5700

Michael F. Jeffers, Jr., (301) 227-1941; DSN: 287-1941

Resources:

FY	*Dollars*	*Staff-years*
Prior FY	$390,000	2.5
96	$ 0	0
97	$ 0	0

Schedule:

Start	*End*
Feb 93	TBD
Nov 93	Prototype
Apr 95	Enhancements
Sep 95	New Relationships, Excel 5.0

Data Base: *Title*: DIBS Data Base

Description: Model contains a force structure database derived from the SASDT and Ship Management Information System, O&S cost factors derived from VAMOSC-Ships/Air, maintained in Excel. To remain current, databases are periodically updated.

Automation: Microsoft Excel Spreadsheet

Publications: Draft reports of DIBS model and operation. Relationships documented in briefing form.

Category: II.A

Keywords: Government, Analysis, Policy, Programming, Budgeting, Weapon Systems, Life Cycle, Acquisition Strategy, Risk/Uncertainty, Mathematical Modeling, Statistics/Regression, Mathematical Model, Computer Model

NSWCCD-8

Title: Nuclear Attack Submarine Technology-Based Parametric Cost Model

Summary: The objective of this project was to develop a technology-driven life cycle cost model for nuclear attack submarines. Using the previously developed nuclear attack submarine, performance-based parametric cost model, this project integrated the performance-based analysis with 6.2 Submarine Technology analysis of component-level technology goals. The resulting model is a tool for providing quick ROM cost estimates of submarine system concepts that include new technology options. The FY96 version of this model was limited to structural systems technologies and their effect on procurement cost. The model development plan called for the ability to assess the life cycle cost effects of technologies related to structural systems, signature control, maneuvering and seakeeping, and power and automation. No funding was received in FY97 to complete development of the model.

Classification: Business Sensitive

Sponsor: Naval Surface Warfare Center, Carderock Division
9500 MacArthur Boulevard
West Bethesda, Maryland 20817-5700

Dr. Kihan Kim, (301) 227-1378; DSN: 287-1378

Performer: Naval Surface Warfare Center (211), Carderock Division
NSWC/CD
Bethesda, Maryland 20084-5000

Marc Greenberg , (301) 227-4716; DSN: 287-4716; Robert R. Jones; Dr. Stuart Ullman

Resources:

FY	*Dollars*	*Staff-years*
96	$75,000	0.5
97	$ 0	0

Schedule:

Start	*End*
Apr 96	Sep 96

Data Base: *Title*: None

Description: Historical summary of the technical characteristics of nuclear attack submarine structural systems

Automation: Microsoft Excel Spreadsheet

Publications: None

Category: II.B

Keywords: Government, Analysis, Ships, Concept Development, Life Cycle, Manufacturing, Advanced Technology, Risk/Uncertainty, Size, Data Collection, Mathematical Modeling, Statistics/Regression, Data Base, Mathematical Model, Computer Model

NSWCCD-9

Title: Nuclear Attack Submarine Performance-Based Life Cycle Cost Model

Summary: The objective of the study was to develop a cost model sensitive to performance capabilities, which can be used for predicting the Life Cycle Cost (LCC) of nuclear attack

submarines. The model continues to be used for the New Attack Submarine Cost Operational Effectiveness Analysis (COEA) process to (1) provide quick ROM cost estimates of nuclear attack submarine concepts, and (2) to investigate the cost implications of alternative mission requirements. This work was completed in FY96.

Classification: Classified/Business Sensitive

Sponsor: Naval Sea Systems Command (SEA 017)
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

Christopher Deegan, (703) 602-6575

Performer: Naval Surface Warfare Center, Carderock Division
9500 MacArthur Boulevard
West Bethesda, Maryland 20817-5700

Robert Jones, (301) 227-4012; DSN: 287-4012; Michael Jeffers; John Trumbule; Marc Greenburg; Christine Whitacre

Resources:

FY	*Dollars*	*Staff-years*
Prior	$600,000	4
97	$ 0	0

Schedule:

Start	*End*
Dec 91	Sep 96

Data Base: *Title*: None

Description: Nuclear submarine cost, schedule, weight, and performance characteristics

Automation: Microsoft Excel Spreadsheet

Publications: *Nuclear Attack Submarine Parametric Analysis Model*, CRDKNSWC/SSD-93-10, September 1993, Confidential.

Nuclear Attack Submarine Parametric Analysis Model Addendum—Version 3.0 Documentation, CRDKNSWC/SSD-93-57, September 1993, Confidential.

Performance Based Cost Estimating Models: Nuclear Attack Submarine Parametric Cost Model, Presentation at the Twenty-Ninth Annual Department of Defense Cost Analysis Symposium.

Category: II.B

Keywords: Government, Estimating, Analysis, Ships, Concept Development, Life Cycle, Engineering, Manufacturing, Production Rate, Acquisition Strategy, Risk/Uncertainty, Size, Data Collection, Mathematical Modeling, Statistics/Regression, Data Base, Mathematical Model, Computer Model

NSWCCD-10

Title: Analysis of Operation and Support (O&S) Costs for Aircraft Carriers

Summary: The objective of the project is to collect aircraft carrier O&S cost data and develop cost estimating relationships that will support costs estimates required for the acquisition and design of aircraft carriers. The data and resulting analysis will also be used to assist the design community in trade-off studies of technology. The study will improve understanding of the composition of aircraft carrier O&S costs. The analysis will identify cost drivers, develop cost estimating relationships, and improve methodologies for estimating costs by compiling and documenting statistical models. FY 98 and 99 efforts will aim at expanding the O&S modeling to the third digit Ship Work Breakdown Structure (ship subsystems) and further refinement of manning costs

Classification: Business Sensitive

Sponsor: Naval Sea Systems Command (SEA 01712)
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

Steve Moretto, (703) 602-1307; DSN: 332-1307

Performer: Naval Surface Warfare Center, Carderock Division
Philadelphia, PA 19112

Tim Klingersmith, (215) 897-1076

PERA-CV, Bremerton, WA

Glenn Jurgis

Resources:

FY	*Dollars*	*Staff-years*
96	$135,000	1.5
97	$ 25,000	
98	$600,000	
99	TBD	

Schedule:

Start	*End*
Jan 96	Sep 99

Data Base: The data base will consist of Intermediate, Organizational and Depot-Level Aircraft Carrier O&S cost data organized at the first and second levels of the standard Ship Work Breakdown Structure.

Publications: None

Categories: II.A.1, II.A.2, II.B, II.C, II.D

Keywords: Government, Estimating, Analysis, Ships, Production, Labor, Operations and Support, Cost, Statistics/Regression, Study, CER

NSWCCD-11

Title: AACEI Cost Model for Surface Combatants

Summary: The objective of this project is to modify the Sealift ASSET/ACEIT/Excel Interface (AACEI) for use on surface combatants. The ASSET ship design synthesis model is the primary engineering tool used by NAVSEA to develop feasibility studies for ships. The current cost model attached to ASSET is developed within the Automated Cost Estimating Integrated Tools (ACEIT) software. An electronic interface is used to transfer information between the two programs. The current cost model is configured for estimating construction cost of sealift ships. This project will modify the model to estimate the end cost (i.e., complete SCN budget) of surface combatants.

Classification: Unclassified

Sponsor: Naval Sea Systems Command (SEA 01712)
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

Scott Gustavson, (703) 602-6453, Ext. 133

Performer: Naval Surface Warfare Center (Code 211), Carderock Division
9500 MacArthur Blvd.
W. Bethesda, MD 20817-5700

Bill Whitacre, (301) 227- 3644; DSN: 287- 3644

Tecolote Research, Inc.
1700 N. Moore Street, Suite 1400
Rosslyn Center Office Building
Arlington, VA 22209

Alfred Smith, (703) 243-2800

Resources:	*FY*	*Dollars*	*Staff-years*
	96	$20,000	

Schedule:	*Start*	*End*

Data Base: None

Publications: Study reports

Category: II.A

Keywords: Government, Analysis, Review, Ships, Concept Development, Labor, Material, Overhead/Indirect, Engineering, Mathematical Modeling, CER, Method, Mathematical Model, Study

NSWCCD-12

Title: Aircraft Carrier Performance-Based Life Cycle Cost Model

Summary: The CVX performance-based life cycle cost model (PBCM) will be developed in an evolutionary fashion. The FY97 effort will focus on a "pre-prototype" or screening version of the model that will estimate procurement costs based on high-level descriptors of (a) performance requirements and (b) system descriptors. This pre-prototype model will serve as an initial proof of concept designed to assess the feasibility of proceeding to more comprehensive and detailed PBCM. Following successful completion and acceptance of the pre-prototype procurement model, a full acquisition cost (RDT&E and procurement) prototype model will be developed. Finally, the prototype will be expanded to incorporate R&D and operating and support costs. The model will be used for the CVX Cost Operational Effectiveness Analysis (COEA) process to (1) provide quick ROM cost estimates of aircraft carrier concepts, and (2) to investigate the cost implications of alternative mission requirements.

Classification: Classified/Business Sensitive

Sponsor: Naval Sea Systems Command (SEA 017)
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

Stephen Moretto, (703) 602-1307; DSN 332-1307

Performer: Naval Surface Warfare Center, Carderock Division
9500 MacArthur Boulevard
West Bethesda, Maryland 20817-5700

Marc Greenberg, (301) 227-4716; DSN: 287-4716; Robert R. Jones; William Whitacre; Dr. Stuart Ullman

Resources:	*FY*	*Dollars*	*Staff-years*
	97	$ 65,000	0.5
	98	$450,000	3.0

Schedule:	*Start*	*End*
	Dec 96	Sep 97
	Dec 97	Dec 98

Data Base: *Title:* None

Description: Aircraft carrier, LHA, and LHD cost, weight, and performance

Automation: Microsoft Excel Spreadsheet

Publications: None to date

Category: II.B

Keywords: Government, Analysis, Ships, Concept Development, Life Cycle, Manufacturing, Risk/Uncertainty, Size, Data Collection, Mathematical Modeling, Statistics/Regression, Data Base, Mathematical Model, Computer Model

NSWCCD-13

Title: Arsenal Ship Operating and Support Cost Model

Summary: As part of the source selection support effort, an operating and support cost model is being developed. This model is intended to be sensitive to particular Arsenal Ship issues such as reduced manning levels and maintenance concepts outside standard Navy procedures.

Classification: Business Sensitive

Sponsor: Arsenal Ship Joint Project Office
7100 Fairfax Drive
Arlington, VA

Mr. Dave Schwiering, (703) 527-9206

Performer: Naval Surface Warfare Center, Carderock Division
9500 MacArthur Boulevard
West Bethesda, Maryland 20817-5700

Michael F. Jeffers, (301)227-1941; DSN: 287-1941; Christine Whitacre; Robert R. Jones

Resources:

FY	*Dollars*	*Staff-years*
97	$225,000	1.5

Schedule:

Start	*End*
Sep 96	Oct 97

Data Base: *Title*: None

Description: Operating and support cost

Automation: Microsoft Excel Spreadsheet

Publications: None to date

Category: II.B

Keywords: Industry, Government, Analysis, Ships, Operations and Support, Training, Readiness, Reliability, Sustainability, Data Collection, Mathematical Modeling, Statistics/Regression, Data Base, Mathematical Model, Computer Model

AIR FORCE COST ANALYSIS AGENCY

Name	Air Force Cost Analysis Agency	
Address	1111 Jefferson Davis Highway Suite 403 Arlington, VA 22202-4306	
Director	Colonel(S) Ed Weeks	(703) 604-0387
Size	Professional: Support: Consultants: Subcontractors:	50 (authorized); 43 (assigned) 2 0 0
Focus	Field Operating Agency (FOA) responsible to the Air Force Assistant Secretary (Financial Management/Comptroller) for independent life-cycle cost analyses of major weapon system programs. Selectively manned operations support unit to Headquarters USAF. Develops costing methods, models, and databases. Derives reliable cost estimates, then advises AF and OSD senior leaders on budget, resource allocation, program, and acquisition milestone decisions.	
Activity	Number of projects in process:	15
	Average duration of a project:	1 year
	Average number of staff members assigned to a project:	1
	Average number of staff-years expended per project:	0.2
	Percentage of effort conducted by consultants:	90%
	Percentage of effort conducted by subcontractors:	0%

AFCAA-1

Title: Space System Database Consolidation

Summary: This project involves the re-normalizing of several of the current space system data packages based on the Phase I NASA/AF standard database WBS and normalization procedures. This project is essential to the completion of the goal to achieve overall consistency in current and future satellite databases. The effort will include narrative summary of each data point (program resume), a description of relevant technical and physical parameters, and detailed data spreadsheets with raw data and normalized data. Phase III and Phase IV of this project will add new data packages.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: Tecolote Research, Inc.

Resources:

FY	Dollars	Staff-years
94-5	$100,000	
96	$125,000	

Schedule:

	Start	End
Phase I		Complete
Phase II	Jul 96	Sep 97
Phase III	Dec 97	Dec 98
Phase IV	Dec 98	Dec 99

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Estimating, Space Systems, Analysis, Life Cycle, Readiness, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression, CER, Computer Model

AFCAA-2

Title: NAFCOM

Summary: The project develops and integrates specific AF requirements into the database and NASA Cost Model (NASCOM). The incorporation of AF requirements allows data and cost estimates to be displayed, analyzed, and used in a manner compatible with AF terminology and costing procedures. Phase II includes incorporating Air Force specific cost drivers into the Complexity Generator development process. Phase III will incorporate phasing, risk analysis, and further generation of complexity factors from Phase II. A Phase IV is anticipated.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: NASA and SAIC

Resources:		*FY*	*Dollars*	*Staff-years*
	Phase I	96	$150,000	
	Phase II	97	$150,000	
	Phase III	98	TBD	
	Phase IV	99	TBD	

Schedule:	*Start*	*End*
Phase I		Complete
Phase II	Jan 97	Jan 98
Phase III	Oct 97	Oct 98
Phase IV	Oct 98	Oct 99

Data Base: NAFCOM Database

Publications: Normalized Database and NAFCOM Documentation

Category: II.A.2

Keywords: Government, Estimating, Space Systems, Analysis, Life Cycle, Spares/Logistics, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression, CER, Computer Model

AFCAA-3

Title: Acquisition Reform Cost Study

Summary: Follow-on project to examine the cost impact and the factoring of streamlined acquisition. Phase I produced a detailed Work Breakdown Structure (WBS); identified 45 acquisition reform initiatives and 23 business practices for streamlining; mapped to WBS and program life-cycle phases; identified potential data sources in government, industry, and academia; and determined high pay-off areas for Phase II. Phase II is going to look at using a common spacecraft bus; the possibility of streamlining aerospace acquisition using Boeing's 777 business practices; contractor's practices of qualifying modified commercial memory chips and processors for space applications; and the effect of MIL-STDS and government requirements on integration and test, as well as horizontal launch integration.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division

Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TASC

Resources:	*FY*	*Dollars*	*Staff-years*
	96	$50,000	
	97	$150,000	

Schedule:	*Start*	*End*
Phase I		Complete
Phase II	Mar 97	Dec 97

Data Base: TBD

Publications: TBD

Category: I.B

Keywords: Government, Estimating, Analysis, Life Cycle, Readiness, Data Collection, Data Base, Mathematical Modeling, Computer Model, Statistics/Regression, CER

AFCAA-4

Title: Multinational Satellite Cost Study

Summary: This project will examine the cost estimating issues in developing and manufacturing multinational satellites. It will cover the efficiencies and inefficiencies associated with multinational cooperation of satellite construction.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

	Start	*End*
Phase I	Oct 97	Jun 98
Phase II	Oct 98	Oct 99

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Space Systems, Estimating, Analysis, Life Cycle, Spares/Logistics, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression

AFCAA-5

Title: Re-Engineering Space Cost Estimating

Summary: This project will examine the process of space cost estimating. This effort specifically addresses the current space cost estimating methodology and the re-engineering of space cost estimating. This re-engineering is necessary to increase the ability and capability of the AFCAA to conduct Component Cost Analyses. By this effort, the AFCAA will improve the process of cost estimating. The project will address hardware estimating methodology, functional estimating, activity estimating (activity based costing), schedule-cost estimating and other methodologies. (This is NOT the re-engineering or re-visit of the space acquisition associated with streamlining).

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Dec 97	Dec 98

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Space Systems, Estimating, Analysis, Life Cycle, Spares/Logistics, Data Collection, Data Base, Mathematical Modeling, CER, Mathematical Model, Statistics/Regression, Computer Model

AFCAA-6

Title: New Technology Cost Study

Summary: This project will consider the cost impact of new technology. In the fast changing space environment, an examination of emerging technology is necessary to maintain the utility of cost model. Some areas to be examined will include MMIC, GaAs, NiH, and composites.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Dec 97	Dec 98

Data Base: TBD

Publications: TBD

Categories: I.C, II.B

Keywords: Government, Advanced Technology, Space Systems, Estimating, Analysis, Life Cycle, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression

AFCAA-7

Title: Crosslinks Payload Data Collection and CER Development

Summary: This project involves the data collection on crosslink payloads and the development of cost estimating relationships (CERs). Data collection will involve the collection of past and current crosslinks. The data collected will be consistent with the NASA/AF standard WBS and standard normalization procedures. It will provide the database to develop CERs and cost estimating crosschecks.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Lisa Lin, (703) 604-0413; DSN: 664-0413
(linl@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Oct 97	Mar 98

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Estimating, Analysis, Spares/Logistics, Life Cycle, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression

AFCAA-8

Title: Common Bus Data Collection and CER Development

Summary: Phase I of this project involves the data collection on satellite common bus. Common bus will be/may be the industry norm to place specific payloads into orbit. Data collection will involve the collection of past and current common bus, both commercial and DoD satellites. The data collected will be consistent with the NASA/AF standard WBS and standard normalization procedures. The data will be used to develop a cost estimating relationship (CER). It will update/collect data and develop CERs to estimate common bus costs. Given the emerging environment of common bus usage for multiple payloads, the development of a database and CER is essential to future cost estimating capability. Phase II will provide an update to the data base, while Phase III will update the data base and revisit the CER development.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources: *FY* *Dollars* *Staff-years*

Schedule:

	Start	*End*
Phase I	Dec 97	Dec 98
Phase II	Dec 99	Dec 00
Phase III	Dec 01	Dec 02

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Space Systems, Estimating, Analysis, Life Cycle, Spares/Logistics, Data Collection, Data Base, Mathematical Modeling, Computer Model, Statistics/Regression, CER, Mathematical Model

AFCAA-9

Title: Space-Environmental Cost Study

Summary: This project will study the cost impact of environmental concerns in space systems. It will focus primarily on costs associated with cleanup, containment, and handling of environmentally sensitive chemicals and hazardous materials.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Lisa Lin, (703) 604-0413; DSN: 664-0413
(linl@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources: *FY* *Dollars* *Staff-years*

Schedule:

Start	*End*
Oct 97	Mar 98

Data Base: TBD

Publications: TBD

Category: I.D

Keywords: Government, Environment, Estimating, Analysis, Life Cycle, Data Collection, Database, Mathematical Modeling, Statistics/Regression

AFCAA-10

Title: Ground Segment WBS/CER Development

Summary: Phase I of this project will standardize the WBS definition, identify cost drivers, and collect necessary data to update existing government databases and test the relevancy of cost drivers. This effort will concentrate on existing usable government databases. This effort is essential to provide the independent capability to estimate the ground segment of the total space architecture. Phase II will provide an update to this effort.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources: *Schedule:*

FY	*Dollars*	*Staff-years*
	Start	*End*
Phase I	Oct 98	Jun 99
Phase II	Dec 00	Dec 01

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Space Systems, Estimating, Analysis, Life Cycle, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression

AFCAA-11

Title: EHF Communication Payload Database Update

Summary: This project will update EHF communication payload cost data for creating a database for the development of cost estimating relationships (CERs). The project will examine EHF payloads such as Milstar, UFO, and other applicable programs.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources: *Schedule:*

FY	*Dollars*	*Staff-years*
Start	*End*	
Nov 98	Jul 99	

Data Base: TBD

Publications: TBD

Category: II.A.1

Keywords: Government, Electronics/Avionics, Space Systems, Estimating, Analysis, Life Cycle, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression

AFCAA-12

Title: Wide Area Network (WAN) Database

Summary: This project will examine the feasibility of CONUS-wide sharing of a cost database. With the consolidation and cross-sharing of a cost database to achieve cost synergy, availability and access will be examined through the use of a wide area network. It will consider the cost, infrastructure, operations, and security of establishing a WAN database among the space cost community.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Nov 99	Mar 00

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Advanced Technology, Space Systems, Estimating, Analysis, Life Cycle, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression

AFCAA-13

Title: Launch Vehicle (Booster) Database Update

Summary: This project will update the database used in the Launch Vehicle Cost Model (Phase I, Mar 95) and update/develop cost estimating relationship (CERs) from the cost databases. It will provide the cost estimating tools to estimate accurately launch vehicles. The CERs will be tested against actual data for validation and reasonableness. Phase III will provide an update to the Phase II product.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

	Start	*End*
Phase II	Dec 99	Dec 00
Phase III	Dec 02	Dec 03

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Space Systems, Estimating, Analysis, Life Cycle, Spares/Logistics, Data Collection, Data Base, Mathematical Modeling, Computer Model, Statistics/Regression, CER, Mathematical Model

AFCAA-14

Title: Space Database Update 2000

Summary: This project will update the consolidated space database. It will encompass a wide range of databases, i.e., bus, payloads, launchers, ground. It will be the main repository of all other databases. This will also be crossfed to other space agencies, i.e., NASA, SMC.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Oct 99	Jun 00

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Space Systems, Estimating, Analysis, Life Cycle, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression

AFCAA-15

Title: Booster/Payload Interface Standard

Summary: This project will analyze the cost impact of standardizing the interface between the booster and the payload industry-wide in anticipation of Evolved Expendable Launch Vehicle (EELV) development. To achieve cost reduction and streamlining, standardization of boosters and payload interfaces will be common place. The project will consider the industry and DoD impacts of accommodating the standardization from the booster and the payload perspective. It will encompass the pre-EMD, EMD, and Production phases.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Dec 00	Dec 01

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Estimating, Space Systems, Analysis, Life Cycle, Spares/Logistics, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression, CER, Computer Model

AFCAA-16

Title: Space Estimating Methodology Update 2000

Summary: This project will examine space cost estimating methodologies to take into account the changing technology, economic environment (including corporate strategies, accounting changes, electronic media changes, CCDR format/availability changes, and policies). It will cover any new datapoints or programs. It will provide the database to develop CERs.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Nov 99	Jul 00

Data Base: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Space Systems, Estimating, Analysis, Life Cycle, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression

AFCAA-17

Title: Business Base Impact Cost Study Follow-on

Summary: This project will re-examine the cost impact of the changing business base due to DoD downsizing and other economic environments. It will examine several major aerospace corporations' experience and corporate strategies. This project will help the estimating process by reflecting the current state of corporate business decisions.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Dec 01	Dec 02

Data Base: TBD

Publications: TBD

Category: II.A.1

Keywords: Government, Overhead/Indirect, Space Systems, Estimating, Acquisition Strategy, Analysis, Spares/Logistics, Life Cycle, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression

AFCAA-18

Title: Strategic/Navigational/Weather/Crosslinks Payload Data Collection Update

Summary: This project will update the database for various payloads such as strategic (DSP-like), navigational (GPS-like), weather (DMSP-like), and crosslinks. It will provide the database to develop cost estimating relationships (CERs) and cost estimating crosschecks.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Dec 01	Dec 02

Data Base: TBD

Publications: TBD

Category: II.A.1

Keywords: Government, Estimating, Acquisition, Analysis, Spares/Logistics, Life Cycle, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression

AFCAA-19

Title: Munitions Seeker Data Collection

Summary: The objective of this project is to develop a technical and cost data base on new munitions using new seeker technology (IR Focal Plane Array, millimeter wave, dual mode seekers, synthetic aperture array, K-band RF, etc.). This will ensure estimators have data to perform estimates on weapon systems with new seeker technology. Sources of data, validation efforts, and normalization rationale will be completely documented.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Lisa Lin, (703) 604-0413; DSN: 664-0413
(linl@afcaapo.afcaanet.hq.af.mil)

Performer: TASC, Inc.

Resources:

FY	*Dollars*	*Staff-years*
96	$150,000	

Schedule:

Start	*End*
Jun 96	Sep 97

Data Base: TBD

Publications: TBD

Category: II.A.1

Keywords: Government, Analysis, Electronics/Avionics, Missiles, Data Base, EMD, Data Collection

AFCAA-20

Title: SEPM Database and CERs

Summary: The objective of this project is to build a database and develop CERs/factors to improve our ability to estimate the costs of systems engineering/program management based on manloading data.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Lisa Lin, (703) 604-0413; DSN: 664-0413
(linl@afcaapo.afcaanet.hq.af.mil)

Performer: TASC, Inc.

Resources:

FY	*Dollars*	*Staff-years*
96	$180,000	

Schedule:

Start	*End*
Jun 96	Jul 97

Data Base: *Title:*

Description: SEPM Data for weapon system programs and AIS programs

Automation: Access with Excel export reports

Publications: TBD

Category: II.C

Keywords: Government, Estimating, Analysis, Aircraft, Mathematical Modeling, Data Collection, Electronics/Avionics, CER, Data Base, Statistics/Regression, Mathematical Model, Computer Model

AFCAA-21

Title: Missiles ACDB Update

Summary: The objective of this project is to collect the necessary data to perform periodic updates of the Automated Cost Data Base (ACDB) to include 665 CCDR reports on missile programs. These updates require a second phase to conclude data entry and possibly new reports.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: Tecolote Research, Inc.

Resources:

	FY	*Dollars*	*Staff-years*
Phase I	97	$165,000	
Phase II	98	TBD	

Schedule:

	Start	*End*
Phase I	May 97	Dec 97
Phase II	Oct 97	Oct 98

Data Base: *Title:* Automated Cost Data Base (ACDB)

Description: Missiles and Munitions systems data

Automation: PC in FoxPro

Publications: TBD

Category: II.A.1

Keywords: Government, Analysis, Programming, Forces, Mathematical Modeling, Computer Model, Life Cycle, Labor, Materials, Data Collection, Data Base, Missiles

AFCAA-22

Title: Missiles SE/PM CER Development

Summary: The objective of this project is to take data from the Automated Cost Data Base (ACDB) and other sources and develop CERs to estimate SE/PM costs for missile/munitions programs in development as well as production.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Lisa Lin, (703) 604-0413; DSN: 664-0413, (linl@afcaapo.afcaanet.hq.af.mil)

Performer: TASC, Inc.

Resources:

FY	*Dollars*	*Staff-years*
99	TBD	
01	TBD	

Schedule:

Start	*End*
Oct 98	Apr 99
Oct 00	Apr 01

Data Base: *Title:* Automated Cost Data Base (ACDB)

Description: Missiles and munitions systems data

Automation: PC in Access

Publications: TBD

Categories: II.A.2, II.B

Keywords: Government, Analysis, Data Collection, Data Base, Mathematical Modeling, Statistics/Regression, CER, Computer Model, Missiles

AFCAA-23

Title: Multi-Aircraft Database Normalization

Summary: The objective of this project is to normalize and fully document previously collected Air Force and Navy cost and technical data. The database will be flexible enough to allow for either an analogy-based or CER-based approach for both recurring and non-recurring costs of aircraft systems. The database will contain functional hourly and cost information as well as technical information for each hardware WBS element. Sources of data and normalization rationale will be completely documented. This project is a continuation of a research effort undertaken with FY 93 funds.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
Tina Colarossi, (703) 602-9324; DSN: 332-9324
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: Tecolote Research, Inc.

Resources:

FY	*Dollars*	*Staff-years*
93	$100,000	
96	$225,000	

Schedule:

	Start	*End*
Phase I	Complete	
Phase II	Mar 96	Jun 97

Data Base: TBD

Publications: TBD

Categories: I.B, I.D, II.A, II.B

Keywords: Government, Analysis, Estimating, Aircraft, Airframe, EMD, Production, Labor, Materials, Data Collection, Data Base

AFCAA-24

Title: Composite/Exotic Materials Database

Summary: The objective of this project is to update/develop a historical composite/exotic materials database to allow analysts to better understand and apply the data during subsequent cost estimating relationship (CER) development. Cost, technical, and programmatic data for various weapon systems will be collected. The data will be validated and normalized. Sources of data, validation efforts, and normalization rationale will be completely documented. This project is a continuation of a research effort undertaken with FY 94 funds.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: Tecolote Research, Inc.

Resources:

FY	*Dollars*	*Staff-years*
94	$150,000	
96	$228,000	

Schedule:

	Start	*End*
Phase I	Complete	
Phase II	May 96	Sep 97

Data Base: FoxPro database run out of ACDB. Provides detailed cost, technical and programmatic data on the following systems: AV-8B, F/A-18, F-22, B-2, V-22 and A-6.

Publications: Final documentation, with raw data

Categories: II.A, II.B, II.D

Keywords: Government, Estimating, Analysis, Aircraft, Airframe, Data Base

AFCAA-25

Title: WRAP Rate Study

Summary: The objective of this project is to understand and document historical and current methodologies used to calculate fully loaded labor (WRAP) rates for a variety of prime aircraft manufacturers. This effort will allow normalization of current WRAP rates to the historical data underlying an estimate; it will also allow normalization of the historical cost data to reflect current WRAP rate calculations.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Oct 97	Oct 98

Data Base: TBD

Publications: TBD

Categories: I.B, II.A, II.B

Keywords: Government, Analysis, Estimating, Aircraft, Production, Labor, Materials, Data Collection, Data Base

AFCAA-26

Title: Overhead Primer

Summary: The objective of this project is to provide a primer discussing methods of measuring and predicting business base changes for a prime weapon system contractor; then describing how to calculate alternate overhead rates given different assumptions of that contractor's future business base.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Oct 97	Oct 98

Data Base: TBD

Publications: TBD

Categories: I.B, II.A, II.B

Keywords: Government, Analysis, Estimating, Aircraft, Production, Labor, Materials, Data Collection, Data Base

AFCAA-27

Title: Aircraft Modification Programs Study

Summary: This effort seeks to identify publications relating to aircraft modification, previously collected cost data, and possible sources of cost data not yet collected. These publications and data will include descriptions and costs (in the greatest detail possible) associated with airframe structural modification and engine, avionics, and/or munitions modification tasks. Specific types of tasks may include modification integration, software updates, maintainability and reliability testing and flight testing of the modified system, installation, design, manufacture, and other collateral efforts.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Oct 97	Oct 98

Data Base: TBD

Publications: TBD

Categories: I.B, II.B, II.D

Keywords: Government, Estimating, Analysis, Aircraft, Study

AFCAA-28

Title: Aircraft Database Study Follow-On

Summary: Collect, analyze, and organize historical cost data for the following aeronautical programs: C-5, C-17, B-1, B-2, F-22, JSTARS.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Oct 98	Oct 99

Data Base: TBD

Publications: TBD

Category: II.A

Keywords: Government, Estimating, Analysis, Life Cycle, Data Collection, Mathematical Modeling, Statistics/Regression, CER, Data Base, Computer Model

AFCAA-29

Title: C3 Platform Integration Database

Summary: Data collection, analysis, and CER development for platform integration costs to integrate C3 systems/sub-systems.

Classification: Unclassified

Sponsor: Air Force Cost Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: TASC (MCR)

Resources:

	FY	*Dollars*	*Staff-years*
Phase I	95	$100,00	
Phase II	96	$118,000	

Schedule:		*Start*	*End*
	Phase I	Complete	
	Phase II	Jun 96	Jun 97

Database: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Estimating Analysis, Aircraft, Data Collection, Electronics/Avionics, Mathematical Modeling, Computer Model, Statistics/Regression, CER, Data Base, Mathematical Model

AFCAA-30

Title: C3 Hardware Maintenance Database

Summary: Data collection, analysis, and CER development for hardware maintenance costs to integrate C3 systems/sub-systems.

Classification: Unclassified

Sponsor: Air Force Cost Agency, Technical Support Division
Capt Nick Lento, (703) 604-0396; DSN: 664-0396
(lento@afcaapo.afcaanet.hq.af.mil)

Performer: MCR

Resources:	*FY*	*Dollars*	*Staff-years*
Phase I	95	$120,000	
Phase II	96	$100,000	

Schedule:	*Start*	*End*
Phase I	Complete	
Phase II	Jun 96	Oct 97

Database: TBD

Publications: TBD

Category: II.A.2

Keywords: Government, Estimating Analysis, Aircraft, Electronics/Avionics, Data Collection, Mathematical Modeling, Computer Model, Statistics/Regression, CER, Data Base, Mathematical Model

AFCAA-31

Title: C3I Database/CER Updates

Summary: The objective of this project is to collect additional datapoints and refine CERs developed in other recent projects: C3 Integration, C3 O&S Roadmap, and SEPM study.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency

Performer: TBD

Resources:	*FY*	*Dollars*	*Staff-years*

Schedule:	*Start*	*End*
	Oct 99	Sep 00

Data Base: TBD

Publications: TBD

Category: II.A.1

Keywords: Government, Estimating, Analysis, Aircraft, Data Collection, Electronics/Avionics, Mathematical Modeling, Data Base, Statistics/Regression, CER, Mathematical Model, Computer Model

AFCAA-32

Title: Post Deployment Software Support (PDSS)

Summary: Software maintenance presently represents approximately 70% of software life cycle costs. Yet, we have very little insight into the processes and costs to adequately estimate this life cycle phase. This project will document the processes used by Air Force software maintenance organizations to allocate resources to different types of software maintenance activities and projects. This understanding will be used as the basis for developing better post deployment software support estimating methods.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Mr. John B. Donald, (703) 604-0412; DSN: 664-0412
(donald@afcaapo.afcaanet.hq.af.mil)

Performer: The Analytical Sciences Corporation (Prime)

Management Consulting and Research (Subcontractor)

Resources:

FY	*Dollars*	*Staff-years*
96	$112,000	

Schedule:

Start	*End*
Sep 96	Jun 97

Data Base: None

Publications: *Post Deployment Software Support Resource Allocation and Estimating Processes*

Categories: II.A, II.D

Keywords: Government, Estimating, Analysis, Aircraft, Missiles, Space Systems, Electronics/Avionics, Life Cycle, Size, Data Collection, Data Base, Study

AFCAA-33

Title: Software Growth Study

Summary: This research project investigates the growth of software during its life cycle. A FY 95 effort was a relatively small preliminary study to determine the feasibility of a more in-depth data collection effort by assessing the availability of relevant data from a variety of sources (OSD PA&E, NCCA, AFCAA, USACEAC, etc.). Initially for FY 96, projected software size and other information will be collected at various stages of software development. The study first investigates data availability and collects raw data from Air Force product centers. Follow-on efforts will analyze and normalize data as well as expand data collection to include government and private industry software projects throughout their life cycle. In total, the study will attempt to develop a data base of domain-specific software growth factors for use in software cost estimation and risk analysis.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Mr. John B. Donald, (703) 604-0412; DSN: 664-0412
(donald@afcaapo.afcaanet.hq.af.mil)

Performer: The Analytical Sciences Corporation (Prime)
Management Consulting and Research (Subcontractor)

Resources:

FY	*Dollars*	*Staff-years*
95	$25,000	
96	$50,000	

Schedule:

Start	*End*
Sep 96	Jun 97

Data Base: Historical software growth factors for various domains (AIS, Aircraft, Missile, Space Systems, Electronics, Avionics Systems)

Publications: *Software Growth Report*

Categories: II.A, II.D

Keywords: Government, Estimating, Analysis, Aircraft, Missiles, Space Systems, Electronics/Avionics, Life Cycle, Risk/Uncertainty, Size, Data Collection, Data Base, Study

AFCAA-34

Title: COTS Integration Research

Summary: Currently there is insufficient information to adequately estimate the cost of integrating commercial-off-the-shelf (COTS) software with DoD-developed software. The inability to adequately predict this cost makes COTS software integration a significant estimating wild card. This project is intended to define and characterize COTS software and collect appropriate data to lay the foundation for developing an improved estimating capability. Phase one will prepare a data collection tool, complete with a detailed description and justification of each data element. The second phase will concentrate on identifying sources of data and initial data collection efforts. The third phase, in FY98, will concentrate on collecting additional data and performing appropriate analysis.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Mr. John B. Donald, (703) 604-0412; DSN: 664-0412
(donald@afcaapo.afcaanet.hq.af.mil)

Performer: The Analytical Sciences Corporation (Prime)
Management Consulting and Research (Subcontractor)

Resources:

FY	*Dollars*	*Staff-years*
97	TBD	
98	TBD	

Schedule:

Start	*End*
FY97	TBD

Data Base: COTS Integration data for various domains (AIS Systems)

Publications: Description of COTS Software Integration and Analysis of Data Collection

Categories: II.A, II.D

Keywords: Industry, Government, Estimating, Automation, Life Cycle, Risk/Uncertainty, Size, Data Collection, Data Base, Study, Method

AFCAA-35

Title: Estimating Defensive Information Warfare Software

Summary: This project will focus on gathering information pertaining to current automated information system (AIS) security issues. Although security can be a major cost driver in AIS development, there is very little cost information available. To meet the requirements of information superiority, the emphasis on defending major automated information systems has increased. This study will provide methods to estimate the cost of hardware and software to meet the security requirements/guidelines set by the Joint Technical Architecture and the National Security Agency.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Mr. John B. Donald, (703) 604-0412; DSN: 664-0412
(donald@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*
98	TBD	

Schedule:

Start	*End*
FY98	TBD

Data Base: TBD

Publications: TBD

Categories: II.A, II.D

Keywords: Government, Industry, Estimating, Analysis, EMD, Operations and Support, Life Cycle, Labor, Engineering, Automation, Training, Integration, Modification, Security, Schedule, Size, Data Collection, Survey, Mathematical Modeling, Statistics/Regression, Data Base, Review, Method, Mathematical Model, CER, Study

AFCAA-36

Title: Estimating Internet WWW Software Applications

Summary: This study will develop methods to estimate the cost and schedule to develop Internet-based software applications using new development tools such as HTML, WebSQL, Java, and Java script. Current software estimating techniques do not fully address this problem. The WWW is an integral part of the architectures of major automated information systems (MAIS) currently in development. A prime difficulty in estimating WWW code is defining SLOC in a way that is meaningful to existing software estimating models. This effort will address this issue, among others, to provide a useful procedure for using existing models until better estimating techniques are developed.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Mr. John B. Donald, (703) 604-0412; DSN: 664-0412
(donald@afcaapo.afcaanet.hq.af.mil)

Performer: TBD

Resources:

FY	*Dollars*	*Staff-years*
TBD	TBD	

Schedule:	*Start*	*End*
	TBD	
Data Base:	TBD	
Publications:	TBD	
Categories:	II.A, II.D	
Keywords:	Government, Industry, Estimating, Analysis, EMD, Operations and Support, Life Cycle, Labor, Engineering, Automation, Training, Schedule, Size, Data Collection, Survey, Statistics/Regression, Data Base, Review, Study, Method	

AFCAA-37

Title: Neural Network Analysis of Historic Software Development Data

Summary: This effort will apply neural network analysis expert systems technology to available software development data to determine whether complex, multivariate relationships exist that can be used as alternate methods for estimating software development effort and/or schedule. The initial effort will focus on analysis of existing data to identify possible relationships within the data and to "train" the neural network algorithm(s). Subsequent efforts will attempt to apply the "trained" algorithm to estimate the effort and schedule of completed software development efforts. If credible estimating relationships are identified, a neural network estimating model may subsequently be developed.

Classification: TBD

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Mr. John B. Donald, (703) 604-0412; DSN: 664-0412
(donald@afcaapo.afcaanet.hq.af.mil)

Performer: Air Force Cost Analysis Agency
Mr. John B. Donald, (703) 604-0412; DSN: 664-0412
(donald@afcaapo.afcaanet.hq.af.mil)

Resources:

FY	*Dollars*	*Staff-years*
96	$100,000	TBD
97		TBD

Schedule: TBD

Data Base: None

Publications: *Application of Neural Network Analysis to Software Estimating*

Categories: I.B, II.B, II.D

Keywords: Government, Industry, Analysis, Estimating, Expert System, Mathematical Modeling, Mathematical Model, Computer Model, Study

AFCAA-38

Title: SoftEST Software Estimating Tool

Summary: A Microsoft Windows-based implementation of the REVIC COCOMO '83 estimating methodology. Also designed to serve as a possible future backplane for development and implementation of existing and future software estimating techniques (e.g., COCOMO 2, SASET), implementation of a generally accepted software estimating process coupled with extensive user help, and to serve as a standard "front-end" to a variety of commercial estimating models. The objective is to facilitate use of multiple estimating models without the need to rebuild the estimate in each model. The overall goal is to improve the quality and consistency of software estimates.

Classification: Unclassified

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Mr. John B. Donald, (703) 604-0412; DSN: 664-0412
(donald@afcaapo.afcaanet.hq.af.mil)

Performer: Management Consulting and Research (Prime)
R.K.K. Enterprises (Subcontractor)

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
93	$239,000		95	$225,000	
94	$200,000		96	$200,000	

Schedule:

Phase	Start	End
SoftEST Ver 1.0		Dec 96
SoftEST Ver 1.1		May 97

Data Base: None

Publications: None

Categories: I.B, II.A, II.B

Keywords: Government, Estimating, Analysis, Cost Model, EMD, Life Cycle, Operations and Support, Automation, Advanced Technology, Training, Risk/Uncertainty, Modification, Size, Mathematical Modeling, Computer Model, Expert System, CER

AFCAA-39

Title: Aircraft Cost and Engineering Tool

Summary: The objective of this task is to allow changes in the design of an aircraft to automatically flow-through to the CERs embedded in a cost model. Each iteration of an aircraft design has a different cost estimate. As changes to the design are made, the impact of these changes will be calculated automatically and provided to the designer. Phase I established the interface with DAR corporation's Roskam model; Phase II will incorporate other engineering models.

Classification: Proprietary

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: Tecolote Research, Inc.

Resources:

	FY	Dollars	Staff-years
Phase I	96	$95,000	
Phase II	99	TBD	

Schedule:

	Start	End
Phase I	May 96	Jul 97
Phase II	Oct 98	Oct 99

Data Base: ACE Executive Interface

Publications: User documentation

Category: II.A.2

Keywords: Government, Automation, Weapon Systems, Aircraft, Estimating, Analysis, Case Study, Study

AFCAA-40

Title: ACDB Upgrades (FY 98)

Summary: Update of the Automated Cost Database (ACDB) search and retrieval module. This tool allows cost and technical data from major weapon system acquisitions to be stored and enables our analysts to easily search and retrieve data from the database to perform cost estimates. Phase I focus is on improving the abilities to search and retrieve data in the database. Phase II creates an autoloader in Excel to feed data into the database. Efforts for converting existing databases into the new format are also included in Phase II.

Classification: Proprietary

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: Tecolote Research, Inc.

Resources:

	FY	*Dollars*	*Staff-years*
Phase I	96	$193,000	
Phase II	TBD		

Schedule:

	Start	*End*
Phase I	Apr 96	Sep 97
Phase II	Oct 97	Oct 98

Data Base: This project does not create the databases but enhances the database tool itself for easier search and retrieval and data entry.

Publications: TBD

Category: II.A.2

Keywords: Government, Automation, Data Base, Computer Model

AFCAA-41

Title: ACEIT Upgrades (FY 97 and out)

Summary: Update of ACEIT cost estimating software to improve cost estimate accuracy and cost estimator productivity. Our mission is to perform cost estimates in support of weapon system major milestone decisions. This tool enables our agency to prepare and document our cost estimates more effectively. This project specifically upgrades the Windows version of ACEIT and improves phasing, speed, documentation, COSTAT statistics, and the incorporation of the RISK module into ACEIT. Follow-on efforts will finish the RISK module integration; other improvements are yet to be determined.

Classification: Unclassified.

Sponsor: Air Force Cost Analysis Agency, Technical Support Division
Ms. Theresa O'Brien, (703) 604-0394; DSN: 664-0394
(obrien@afcaapo.afcaanet.hq.af.mil)

Performer: Tecolote Research, Inc.

Resources:

	FY	*Dollars*	*Staff-years*
Past Improvements:	93-5	$646,000	
Current Improvements:	96-7	$410,000	
Follow on Efforts:	TBD		

Schedule:		*Start*	*End*
	Current Improvements:	Jan 97	Sep 97
	Follow on Efforts:	Oct 97	Oct 98
Data Base:	N/A		
Publications:	ACE IT user manuals and supporting documentation		
Categories:	II.A.2, II.B		
Keywords:	Industry, Government, Estimating, Analysis, Weapon Systems, Life Cycle, Method, Computer Model		

AIR FORCE MATERIEL COMMAND/AERONAUTICAL SYSTEMS CENTER

Name	Cost Division, Directorate of Financial Management and Comptroller, Air Force Materiel Command/Aeronautical Systems Center		
Address	ASC/FMC Bldg. 14, Rm 152 1865 4th Street Wright-Patterson AFB, OH 45433		
Director	Ms. Kathy Ruffner	(937) 255-6843	
Size	Professional: Support: Consultants: Subcontractors:		41 4 0 0
Focus	Cost Estimating and Research, Resources Analysis (Source Selection Policy and Estimates) Scheduling Performance Measurement Systems and Analysis Independent Review Team support Integrated Risk Management Program Support Cost Operational Effectiveness Analysis		
Activity	Number of projects in process:		2
	Average duration of a project:		—
	Average number of staff members assigned to a project:		1
	Average number of staff-years expended per project:		—
	Percentage of effort conducted by consultants:		0
	Percentage of effort conducted by subcontractors:		—

ASC/FMC-1

Title: Acquisition Reform Cost Study

Summary: Dr. Kaminski [USD (Acquisition and Technology)] and Mr. Money (SAF/AQ) are asking program managers to estimate cost savings and cost avoidance as a result of acquisition reform initiatives. These estimates must withstand the scrutiny of Congress and GAO. Cost analysts need a tool or process to assess the impact of acquisition reform initiatives.

Classification: Unclassified

Sponsor: ASC/FMCE
Wright Patterson Air Force Base, OH
Ms. Julia Leet, (937) 255-6347

Performer: ASC/FMCE
Mr. Scott Graham, (937) 255-6347

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Mar 96	Dec 96

Data Base: None

Publications: TBD

Category: I.B

Keywords: Government, Industry, Estimating, Analysis, Programming, Budgeting, Weapon Systems, Life Cycle, Acquisition Strategy, Risk/Uncertainty, Data Collection, Survey, Case Study, Data Base, Review, CER

ASC/FMC-2

Title: Component Breakout Analysis Tool for Acquisition

Summary: A multi-functional Integrated Product Team (IPT) was formed to study the "hidden" costs to the government of performing Component Breakout during weapon system acquisition. The team researched regulations and issues surrounding the requirement for Component Breakout analysis on an annual basis. The team also conducted interviews with system program offices at Aeronautical Systems Center (ASC), Electronics Systems Center (ESC), and Space and Missile Center (SMC) to understand the approaches taken regarding the component breakout analysis process. The focus of this team was breakout of a component to the Original Equipment Manufacturer (OEM) during the acquisition cycle. A separate team, led by SA-ALC, was commissioned to study the issue of spare parts breakout. The end product of the acquisition Component Breakout IPT is a cost model that assists a program office in understanding the tradeoff between the expected savings from breakout of a component to the OEM, and the increased costs to the government due to increased manpower (required to manage the new contract) and the government's assumption of risk due to the breakout process.

Classification: Unclassified

Sponsor: AFMC/DR

Performer: ASC/FMCE

Ms. Julia Leet, IPT Lead, (937) 255-6347
Ms. Linda Turner, (937) 255-6347

Resources:

FY	*Dollars*	*Staff-years*
	$1,000	0.75

Schedule:	*Start*	*End*
	Feb 95	Mar 96

Data Base: None

Automation: Excel 5.0 spreadsheet cost model; Microsoft Word definitions and instructions.

Publications: Component Breakout cost model placed on HQ AFMC Home Page, World Wide Web.

Categories: II.C

Keywords: Government, Estimating, Weapon Systems, Manpower/Personnel, EMD, Production, Labor, Risk/Uncertainty, Survey, Case Study, Mathematical Modeling, Computer Model

ASC/FMC-3

Title: Advanced Aircraft Cost Forecasting Model (AACFM)

Summary: This model primarily estimates life cycle costs in an early system environment. It is similar to PRICE in estimating systems and major subsystems. However, it includes unique O&S and risk cost modeling features. The database is currently unclassified, but it is easy to populate with classified data by the end user. The model includes a published paper, briefing, and a user's guide. AACFM is hosted in Microsoft Access 2.0 and runs on Windows 3.1. The model requires at least a 486 personal computer with at least 8 megabytes of random access memory (RAM) to run efficiently.

Classification: Unclassified

Sponsor: ASC/XRPC

Mr. Patrick Cyrus (937) 255-8060

Performer: Econ, Inc.
4020 Moorpark Avenue
San Jose, CA 95117
Mr. Charles Hopkins, (408) 249-6364 (home/office), (703) 631-0832 (temporary)

Econ, Inc.
711 West Bay Area Blvd.
Webster, TX 77598
Mr. Robert Phillips

Resources:

FY	*Dollars*	*Staff-years*
	$745,542 (Phase IIA & B)	4,475 (total labor hours)

Schedule:	*Start*	*End*
	Apr 94 (Phase IIB)	Jan 96 (Phase IIB)

Data Base: System Level: Program go-ahead data, First Flight date, Year of Initial Operating Capability (IOC), Number of Test Aircraft, Number of Production Aircraft, State of the Art, Base Complexity, Complexity Growth, Calculated Complexity, Weight Specification or Operating Environment, Integration Factors (EMD, Production), Base year.
Hardware Level: Number of engines per aircraft, Aircraft empty weight, Subsystem state-of-art rating, Subsystem operating environment, 100th unit cost.
Software Level: Software Complexity, Software function, Percent new design, Number of lines of code, Software certification level, Operating environment, Composite hourly rate for labor.
Integration: Development integration complexity, Production integration complexity.

Publications: Draft user manual and briefing

Category: II.B

Keywords: Government, Estimating, Electronics/Avionics, Weapon Systems, Life Cycle, Engineering, Manufacturing, Mathematical Modeling

ASC/FMC-4

Title: Cost Estimator's Guide to Commercial Aircraft

Summary: This project contains production CER's and factors for commercial aircraft. Also included are aircraft descriptions and biographical details. The project provides methods for estimating T1 cost at the aircraft system vehicle and airframe level. Factor analysis is provided for airframe, avionics, SE/PM, test, and data.

Classification: Unclassified

Sponsor: ASC/FMCE
Wright Patterson Air Force Base, OH
Ms. Julia Leet, (937) 255-6347

Performer: ASC/FMCE
Earl Kessinger, (937) 255-5303

Resources:

FY	Dollars	Staff-years

Schedule:

Start	End
	May 96

Data Base: None

Publications:

Category: II.A.2

Keywords: Industry, Government, Estimating, Analysis, Aircraft, Airframe, Production, Manufacturing, Data Collection, CER, Method

ASC/FMC-5

Title: Operating and Support (O&S) Cost Estimating Handbook

Summary: This handbook provides an introduction for estimating Operating and support costs for Air Force systems. It is aimed primarily at entry level analysts from the financial management career field. The content and format of this handbook is designed to meet the expressed needs of Aeronautical Systems Center analysts in the aircraft acquisition process.

Classification: Unclassified

Sponsor: ASC/FMCE, WRIGHT PATTERSON AIR FORCE BASE, OH
Ms. Julia Leet, (937) 255-6347

Performer: ASC/FMCE
Ms. Marlene Malson (937) 255- 2122

Resources:

FY	Dollars	Staff-years
96/97		0.07

Schedule:

Start	End
Jun 96	Dec 96

Data Base: None

Publications:

Category: II.A

Keywords: Government, Estimating, Weapon Systems, Spares/Logistics, Facilities, Infrastructure, Manpower/Personnel, Operations and Support, Reliability, Sustainability, Data Collection, Method

ASC/FMC-6

Title: Contractor Logistics Support (CLS) and Interim Contractor Support (ICS) Handbook

Summary: This handbook provides information on the proper methods and processes for analyzing, estimating, and evaluating CLS and ICS. This includes the burdened cost of contract labor, material, and assets used in providing logistics support to a weapon system, subsystem, and associated support equipment. The handbook covers depot maintenance and O&I as negotiated.

Classification: Unclassified

Sponsor: ASC/FMC
Wright Patterson Air Force Base, OH

Ms. Kathy Ruffner, (937) 255-6483

Performer: ASC/FMCE

Mr. A. Michael Welch, (937) 255-3164, ext. 3017

Resources:

FY	*Dollars*	*Staff-years*
96/97		0.32

Schedule:

Start	*End*
Jun 96	Feb 97

Data Base: None

Publications:

Category: II.A

Keywords: Government, Estimating, Analysis, Reviewing/Monitoring, Weapon Systems, Spares/Logistics, Manpower/Personnel, Operations and Support, Life Cycle, Labor, Material, Readiness, Reliability, Sustainability, Data Collection, Method

ASC/FMC-7

Title: PRICE Model Calibration Studies

Summary: The B-2 and F-15 System Program Offices are sponsoring PRICE Model calibration efforts for their respective programs. The B-2 study will analyze hardware and software data to support both PRICE H and PRICE S models. The F-15 study will look at aircraft integration associated with various modification efforts in support of enhancing the use of the PRICE H model.

Classification: Unclassified

Sponsor: ASC/FMCE

Mr. Scott DeBanto, (937) 255-6347

Performer: Lockheed Martin PRICE SYSTEMS

Resources:

FY	*Dollars*	*Staff-years*
97	$215,000	0

Schedule:

Start	*End*
Feb 97	Mar 98

Data Base: *Title:* PRICE Model Aircraft Calibration Database

Description: B-2 & F-15 Data

Automation: Access

Publications:

Category: II.A

Keywords: Government, Estimating, Analysis, Weapon Systems, Aircraft, EMD, Production, Engineering, Manufacturing, Integration, Modification, Data Collection, Computer Model

ASC/FMC-8

Title: Adjusting Cost Estimates

Summary: This is an effort to reach joint government/industry agreement on improved methods for adjusting historical cost and models in order to recognize current and expected future savings technology improvements, management efficiencies, process improvements and streamlining, Acquisition Reform initiatives, and Lean Aircraft/Lean Logistics initiatives.

Classification: Unclassified

Sponsor: ASC/FMC

Ms. Kathy Ruffner, (937) 255-6347

Performer: ASC/FMCE

Ms. Kathy Watern, (937) 255-6483

Resources:

FY	*Dollars*	*Staff-years*
97		0.5

Schedule:

Start	*End*
Jan 97	Ongoing through FY97

Data Base: None

Publications:

Category: II

Keywords: Government, Industry, Estimating, Analysis, Weapon Systems, Aircraft, EMD, Production, Test and Evaluation, Operations and Support, Life Cycle, Acquisition Strategy, Risk/Uncertainty, Data Collection, Survey, Case Study, Review, Method, Study

AIR FORCE SPACE AND MISSILE SYSTEMS CENTER

Name	Air Force Space and Missile Systems Center, Cost Division	
Address	SMC/FMC 2430 E. El Segundo Boulevard, Suite 2010 Los Angeles AFB, CA 90278-4687	
Director	Mr. David Hansen	(310) 363-0139
Size	Professional: Support: Consultants: Subcontractors:	5 Aerospace Corporation 0 3 Support Contractors
Focus	Systems costing, life cycle costs, space systems, missile systems ground systems, future systems planning costs, software sizing/costing	
Activity	Number of projects in process:	5
	Average duration of a project:	3 years
	Average number of staff members assigned to a project:	1
	Average number of staff-years expended per project:	0.2
	Percentage of effort conducted by consultants:	0%
	Percentage of effort conducted by subcontractors:	90%

AFSMC-1

Title: Hazardous Materials Disposal Cost Study

Summary: The OSD Cost Analysis Improvement Group (CAIG) is requiring all programs to include the costs of disposing of hazardous waste in their program life cycle cost estimates. Few programs have included these costs in their estimates and some do not include all of the costs. This is the fourth part of a study to define the types of costs related to hazardous waste disposal, determine what part of the life cycle will be impacted by these costs, and develop CERs to estimate those costs. This task will consist of modifying the developed handbook and training program with changes requested by AFMC to incorporate all AFMC product center information to make this a command handbook.

Classification: Unclassified

Sponsor: SMC/FMC

Performer: Aerospace Corporation
EER Systems, Inc.

Ms. Mary Helen Alverio, (310) 363-2882

Resources:

FY	*Dollars*	*Staff-years*
prior years	$226,094	0.6
97	$415,000	0.1

Schedule:

Start	*End*
Mar 97	Mar 98

Data Base: Handbook of cost methodologies for estimating the cost of environmental mitigation strategies, hazardous material cleanup, and planning for use of non-hazardous materials.

Publications: *Space and Missile Systems Center Environmental, Safety and Health Management and Cost Handbook*

Categories: I.D, II.C

Keywords: Government, Estimating, Space Systems, Data Collection, Life Cycle, Missiles, Environment, Study

AFSMC-2

Title: Operations and Support (O&S) Database

Summary: Populate fields of database and modify automated stand-alone tool to work in windows. Database contains data that can be used for analogy estimates, calibration efforts, and CER development, and is compatible with current Air Force computer systems.

Classification: Unclassified (Proprietary and Non-Proprietary Versions)

Sponsor: SMC/FMC

Performer: Aerospace Corporation
Management Consulting and Research, Inc.; Cost Management Systems, Inc.

Ms. Shirley Tinkler, (310) 363-5057

Resources:

FY	*Dollars*	*Staff-years*
prior years	$996,000	0.4
97	$ 80,000	0.1

Schedule:

Start	*End*
Oct 96	Oct 97

Data Base: *Title:* SMC Operations and Support (O&S) Database

Description: Contains cost and technical data for O&S space, ground mobile, and airborne platforms.

Automation: dBase IV

Publications: *SMC O&S Database Final Report (Phase 3), OSDB User's Manual*, Space and Missile Systems Center/FMC

Category: II.A.2

Keywords: Government, Estimating, Space Systems, Operations and Support, WBS, Data Base, Size, Data Collection

AFSMC-3

Title: Passive Sensor Cost Model Update

Summary: The methods for estimating space sensor payloads (passive sensors, e.g., infrared) need to be updated. Subsystems reviewed were: focal plane arrays; optical telescope assemblies; cryogenic coolers; servo electronics; gimbals and structures; star sensors; power supplies; and sensor integration, assembly and test.

Classification: Unclassified (Proprietary database separately bound)

Sponsor: SMC/FMC

Performer: EER Systems, Inc.

Ms. Phu Nguyen, (310) 363-0071

Resources:

FY	*Dollars*	*Staff-years*
prior	$680,000	0.7
97	$ 80,000	0.1

Schedule:

Start	*End*
Nov 96	Nov 97

Data Base: *Title:* Sensor Database

Description: Contains cost and technical and programmatic data by WBS at the sensor component level.

Automation: TBD

Publications: *Passive Sensor Cost Model*, Space and Missile Systems Center/FMC

Category: II.A.2

Keywords: Government, Estimating, EMD, Space Systems, Production, WBS, CER, Statistics/Regression, Data Base, Method, Data Collection, Survey, Electronics/Avionics

AFSMC-4

Title: Software Database (Phase VII)

Summary: Maintained the SMC Software Database by adding new data. Modified automated stand-alone tool to work in windows. Normalized missing parameters. DoD's largest software database.

Classification: Unclassified (Proprietary and Non-Proprietary Versions)

Sponsor: SMC/FMC

Performer: Aerospace Corporation
Management Consulting and Research, Inc.; Cost Management Systems, Inc.

Ms. Shirley Tinkler, (310) 363-5057

Resources:

FY	*Dollars*	*Staff-years*
prior years	$911,000	0.6
97	$ 50,000	0.1

Schedule:

Start	*End*
Oct 96	Oct 97

Data Base: *Title:* SMC Software Database

Description: Contains cost and sizing data from space, ground mobile, and airborne platforms.

Automation: dBase IV on a PC

Publications: *SMC Software Database Final Report (Phase V), SWDB User's Manual*, Space and Missile Systems Center/FMC

Category: II.A.2

Keywords: Government, Estimating, Space Systems, WBS, Data Base, EMD, Size, Data Collection, Production, Modification

AFSMC-5

Title: Unmanned Spacecraft Cost Model (USCM) Update

Summary: Update the 7th edition (1994) of the model with developing, validating, documenting new CERs, and obtaining new data points.

Classification: Unclassified (Proprietary database separately bound)

Sponsor: SMC/FMC

Performer: Aerospace Corporation
Tecolote Research, Inc.

Ms. Phu Nguyen, (310)363-0071

Resources:

FY	*Dollars*	*Staff-years*
prior years	$1,529,000	1.0
97	$ 110,000	0.1

Schedule:

Start	*End*
Jun 96	Jun 97

Data Base: *Title:* USMC Database

Description: Includes cost, technical, and programmatic data by WBS at the spacecraft component level.

Automation: The database is contained in Lotus spreadsheets and dBase IV PC

Publications: *Unmanned Spacecraft Cost Model*, 7th edition, Space and Missile Systems Center/FMC

Categories: II.A.2, II.B

Keywords: Government, Estimating, EMD, Space Systems, Production, WBS, CER, Mathematical Modeling, Statistics/Regression, Data Base, Method, Mathematical Model

HUMAN SYSTEMS CENTER/AIR FORCE MATERIEL COMMAND

Name	Armstrong Laboratory, Environmental Sciences Branch Human Systems Center Air Force Materiel Command	
Address	AL/OEMH 2402 E Drive Brooks AFB, TX 78235-5114	
Director	Major Andrew MacCabe	(210) 536-6113
Size	Professional: Support: Consultants: Subcontractors:	15 (authorized); 15 (assigned) 1(authorized); 1 (assigned) 2 0
Focus	Provides Air Force environmental managers, health care providers, and the community with timely support and recommendations for protection of human health and the environment.	
Activity	Number of projects in process:	22
	Average duration of a project:	1 week -3 years
	Average number of staff members assigned to a project:	1-4
	Average number of staff-years expended per project:	25 - 6 years
	Percentage of effort conducted by consultants:	15%
	Percentage of effort conducted by subcontractors:	0%

HSC/EMP-1

Title: Hazardous Materials Cost Trade-Off Analysis Tool

Summary: One of two cost estimating modules in the ESOH Software Suite. This tool is weapon system oriented, chemical specific by process within the production, operation and support, and decommissioning phases of a weapon system; reveals the costs of protecting human health and the environment that were previously hidden in overhead costs; provides program offices and engineers the capability to perform cost trade-off studies between hazardous and less hazardous materials; provides data to document life cycle cost impacts of using hazardous materials on a weapon system; and provides the environmental cost data can be used to support decision making for pollution prevention programs.

Classification: Unclassified

Sponsor: AL/OEMH
2402 E Drive
Brooks AFB, TX 78235-5114

Ms. Betty S. West, (210) 536-5121

Performer: TASC

Ms. Cara Hume, (513) 426-1040

Resources:

FY	*Dollars*	*Staff-years*	*FY*	*Dollars*	*Staff-years*
90	$ 475,758	2.6	95	$863,721	4.4
91	$ 655,880	3.8	96	$182,000	0.4
92	$ 456,060	2.9	97	$ 61,000	1.0
93	$1,207,067	6.5			

Schedule:

Start	*End*
90	Dec 96

Data Base: *Title:* HAZWIN

Description: Hazardous materials cost element data for production, maintenance and decommissioning of weapon systems (F-16, F-15, B-1, C-130, Titan IV, Black Hawk, Mark 50, M1-A1, TPS-75, C-5, F-18, AV-8)

Automation: Microsoft Visual Basic with Access Database

Publications: *Hazardous Materials Cost Trade-Off Analysis Tool, Version 1.0, User's Guide; Hazardous Materials Cost Trade-Off Analysis Tool, Version 1.0, Methodology Manual*

Categories: I.D, II.A.1, II.A.2

Keywords: Industry, Government, Estimating, Analysis, Weapon Systems, Aircraft, Helicopters, Land Vehicles, Space Systems, Airframe, Propulsion, Production, Operations and Support, Retirement and Demilitarization, Life Cycle, Material, Overhead/Indirect, Environment, Data Collection, Economic Analysis, Data Base, Computer Model

HSC/EMP-2

Title: Process Cost Module

Summary: One of two cost estimating modules in the ESOH Software Suite. This tool is process oriented. It estimates the total costs for a process life cycle; captures the environmental costs as a subset of the direct and indirect costs of a process; provides program offices and engineers the capability to perform process analyses and cost trade-off studies between hazardous and less hazardous materials inputs into a process; provides data to document the cost impacts of using hazardous materials in a manufacturing or maintenance process; and provides the environmental cost data that can be used to support decision making in pollution prevention programs.

Classification: Unclassified

Sponsor: HSC/EMP
8213 14th Street
Brooks AFB, TX 78235-5114

Ms. Betty S. West, (210) 536-5121

Performer: Parsons Engineering Science, Inc.

Mr. Mary Hopkins, (705) 591-1305

Resources:

FY	*Dollars*	*Staff-years*
95	$338,524	1.3
96	$327,000	2.0
97	$ 30,500	1.0

Schedule:

Start	*End*
Apr 95	98

Data Base: *Title:* TBD

Description: Direct and indirect cost data for common maintenance processes at Air Force Logistics Centers

Automation: Microsoft Visual Basic with Access Database

Publications: Data Report and Architecture Report for Maintenance Process Cost Module

Categories: I.D, II.A.1, II.A.2

Keywords: Industry, Government, Estimating, Analysis, Weapon Systems, Operations and Support, Life Cycle, Labor, Material, Overhead/Indirect, Environment, Data Collection, Economic Analysis, Data Base

ELECTRONIC SYSTEMS CENTER
AIR FORCE MATERIEL COMMAND

Name	Cost Training & Tools, Cost Division Electronic Systems Center, Air Force Materiel Command	
Address	9 Eglin Street Hanscom AFB, MA 01731-2117	
Director	Ms. Ellen Coakley	(617) 377-5226
Size	Professional: Support: Consultants: Subcontractors:	4 4 0 0
Focus	Development and fielding of cost estimating tools and databases for C^2 systems. Responsibility for searching out and reviewing the latest C^2 cost and schedule estimating tools available from other government agencies and commercial sources and evaluating for potential use at ESC. Providing timely, quality cost estimating training to ESC analysts and assuring they are up-to-date on new methodologies, tools, estimating approaches, and policies.	
Activity	Number of projects in process: Average duration of a project: Average number of staff members assigned to a project: Average number of staff-years expended per project: Percentage of effort conducted by consultants: Percentage of effort conducted by subcontractors:	

ESC/FMC-1

Title: Labor Analysis Process & Automation for Estimating & Proposal Evaluation

Summary: This process and tool assess skill levels and the ability of an offeror to attract and retain labor. This process and tool is also used to identify appropriate skill mixes and the associated labor rates for each skill. It can be used for both IDIQ and non-IDIQ type contracts and A-76 studies. The source data comes from periodic Bureau of Labor Statistics (BLS) salary surveys, (or another similar benchmark) that include specific Labor Category Definitions and associated Direct Labor Rates. Model includes Direct Labor Rates per hour for Engineers, Computer Programmers, Computer System Analysts, Computer System Analysts Supervisor/Manager, and Engineering Technicians by geographical area. Direct labor rates for many other categories such as base support type activities are also available. This process and automated tool assesses the realism of proposed labor by identifying unrealistically low or high proposed rates. It also assesses the offeror's ability to attract and retain required labor: "Can the contractor realistically expect to provide the bid labor for the price offered?" Used in reverse, the tool is also very powerful, and can evaluate, for example, "If rate equates to skill-level 'X', is this skill level adequate to accomplish the job, based on inputs from appropriate functional specialists such as engineers, etc?" The associated automated tool is easy to use, identifies what percentage of the benchmark's population was above and below any specific labor rate, and also automatically outputs some briefing charts.

Classification: Unclassified

Sponsor: ESC/FMC

Performer: ESC/FMC

Ellen Coakley with support from Tecolote Research, Inc.

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Jan 96	Mar 96 (Initial Fielding) with update completed Mar 97

Data Base: *Title:*

Description:

Automation:

Publications:

Category: II.B

Keywords: Government, Estimating, Analysis, Weapon Systems, Manpower/Personnel, Labor, Survey, Computer Model

ESC/FMC-2

Title: Use of Automated Cost Estimator-Integrated Tools (ACE-IT) for Cost Proposal Evaluation and the Storage of Cost/Schedule/Technical Data

Summary: Automated Cost Estimator-Integrated Tools (ACE-IT) can be used as an analysis tool to evaluate Cost Proposals. The Cost Proposal data would be loaded into ACE-IT's Automated Cost Data Base (ACDB) from computer disk or by electronic transfer and then analyzed in CO$TAT (the statistics module), with the resulting trends and analyses stored in the ACE Knowledge Base. In addition to using ACE for proposal evaluation of the instant contract, ACE-IT would be used to store proposal data for all offerors and to develop trend factors and algorithms by contractor.

Classification: Unclassified

Sponsor: ESC/FMC

Performer: ESC/FMC, ESC/FMCT

Tecolote Research, Inc.

Resources: *FY* *Dollars* *Staff-years*

Schedule: *Start* *End*

May 96

Data Base: *Title:*

Description: Data from Cost Proposals

Automation: PC ACE-IT Windows ACE/CO$TAT/ACDB

Publications:

Category: II.B

Keywords: Government, Estimating, Analysis, Weapon Systems, Data Collection, Data Base

ESC/FMC-3

Title: Industry/Government C^2 Cost Working Group

Summary: ESC/FMC is in the process of organizing a government/industry C^2 Working Group. All government agencies are invited to participate, particularly the C^2 Focal Points from each agency.

Classification: Unclassified

Sponsor: ESC/FMC

Performer: ESC/FMC

Resources: *FY* *Dollars* *Staff-years*

Schedule: *Start* *End*

May 97

Data Base: *Title:*

Description:

Automation:

Publications:

Category: I.B

Keywords: Industry, Government, Weapon Systems, Electronics/Avionics, Acquisition Strategy, Survey

ESC/FMC-4

Title: C^2 Cost Information Center Web Site

Summary: The C^2 Cost Information Center would be a World Wide Web site with government and industry as joint users and joint contributors. The initial scope will include Estimating Methodology Knowledge Bases, search capability across the entire web site, commercial off-the-shelf (COTS) directories (by vendors, product, & government contract), COTS hardware and software Primers, and links to other appropriate sites and periodic articles written by guest writers (senior government & industry).

Classification: Unclassified

Sponsor: ESC/FMC

Performer: ESC/FMC

Ellen Coakley, ESC/FMCT, and Tecolote Research, Inc.

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Apr 97	Jul 97 (Initial Fielding)

Data Base: *Title:*

Description:

Automation:

Publications:

Category: II.B

Keywords: Industry, Government, Weapon Systems, Electronics/Avionics, Acquisition Strategy, CER, Estimating, Method

ESC/FMC-5

Title: "Open" Estimating Tool for Software-Intensive Programs with COTS H/W & S/W

Summary: This tool can be used to estimate programs that are software intensive with commercial off-the-shelf (COTS) hardware and COTS software. The initial focus of the tool is on estimating Management Information Systems/Automated Information Systems Type Programs. These types of Programs with today's technology are being developed using Fourth Generation Languages (4GLs) and as much COTS software as possible—thus creating the need for COTS software integration. This tool's primary objective is to be able to estimate this type of environment. The scope of the tool is all acquisition costs for these type of programs, including software maintenance support.

Classification: Unclassified

Sponsor: ESC/FMC

Performer: ESC/FMC

Ellen Coakley, Peggy Wells, and Tecolote Research, Inc.

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Jan 97	Jun 97 (Initial Fielding)

Data Base: TBD

Publications: TBD

Category: II.C

Keywords: Government, Estimating, Analysis, Weapon Systems, Electronics/Avionics, EMD, Data Collection, Survey, Expert System

ESC/FMC-6

Title: "NOW" Data Collection Process & Analysis

Summary: This data collection process will allow cost/schedule/technical and programmatic metrics of a program to be collected electronically "as-you-go" in a program (instead of the backfill data collection process). It will obtain metrics throughout the life of the program, focusing on metrics that the contractor already has available. These metrics will be obtained electronically from the contractor and automatically entered into ACE-IT.

Classification: Unclassified

Sponsor: ESC/FMC

Performer: ESC/FMC

Ellen Coakley, ESC/FMCT, and Tecolote Research, Inc.

Resources: *FY* *Dollars* *Staff-years*

Schedule: *Start* *End*
Summer 97

Data Base: *Title:*

Description: Data from cost proposals and cost/schedule/technical data for on-contract efforts

Automation: PC ACE-IT Windows Automated Cost Data Base

Publications:

Category: II.A

Keywords: Government, Estimating, Analysis, Weapon Systems, Electronics/Avionics, EMD, Labor, Overhead/Indirect, Engineering, CPR/CCDR, Data Collection, Data Base

ESC/FMC-7

Title: ESC-Unique Knowledge Bases for SEER SEM and Sage and CERs

Summary: A "Most Likely," "Most" or "Least" value for each of the input parameters of the SEER SEM and Sage model was derived based on the ESC Software Database. These knowledge bases were generated for various software applications. They can be used as a starting point for the parameter inputs for ESC-"like" programs when using SEER SEM or Sage to estimate the software development. Using these knowledge bases, Cost Estimating Relationships (CERs) were derived based on the SEER SEM model. These CERs are five variable equations (Lines of Code (LOC), Personnel Experience, Personnel Capability, Reliability, and the number of Integrating Components). Additional CERs were derived based entirely on the ESC Software Database, with four variable equations (LOC, Personnel, Reliability, and the number of Integrating Components).

Classification: Unclassified

Sponsor: ESC/FMC

Performer: ESC/FMCT

Peggy L. Wells

Resources: *FY* *Dollars* *Staff-years*

Schedule: *Start* *End*
Sep 96 Jul 97

Data Base: ESC Software Database

Publications: ESC-Unique Knowledge Bases

ESC-Unique Cost Estimating Relationships

Category: II.B

Keywords: Government, Estimating, Analysis, Weapon Systems, Data Collection, Statistics/Regression, CER

ESC/FMC-8

Title: Evaluation/Validation/Calibration of PRICE S for ESD-"Like" Programs

Summary:	Using the ESC Software Database, the PRICE S model will be evaluated/validated.
Classification:	Unclassified
Sponsor:	ESC/FMC
Performer:	ESC/FMCT
	Peggy L. Wells
Resources:	*FY* *Dollars* *Staff-years*
Schedule:	*Start* *End*
	Jun 97 Aug 97
Data Base:	*Title:*
	Description:
	Automation:
Publications:	
Category:	II.A.2
Keywords:	Government, Estimating, Analysis, Weapon Systems, Statistics/Regression, Review, Study

AIR FORCE INSTITUTE OF TECHNOLOGY

Name	Graduate School of Logistics and Acquisition Management Air Force Institute of Technology	
Address	AFIT/LAS 2950 P Street, Building 641 Wright-Patterson AFB, OH 45433-7765	
Director	Dr. Roland D. Kankey	(937) 255-7777, ext. 3382
Size	Professional: Support: Consultants: Subcontractors:	40 4 0 0
Focus	The School's research focus is on logistics and acquisition issues, to include cost analysis, cost management, contracting, and acquisition management. Items reported here are a combination of faculty research and student thesis projects which are directed by AFIT faculty and worked as an integral part of the academic program leading to Master of Science degrees.	
Activity	Number of projects in process:	5–10
	Average duration of a project:	15 months
	Average number of staff members assigned to a project:	1
	Average number of staff-years expended per project:	
	Percentage of effort conducted by consultants:	0%
	Percentage of effort conducted by subcontractors:	0%

AFIT/LA-1

Title: The Effect of Technical Scope Changes on Defense Contract Cost Overruns

Summary: This study tests a hypothesized causal relationship between technical scope changes to a defense contract and cost overruns. Managers and analysts should be able to use this information to evaluate the consequences of introducing technical change into defense projects. Results showed that changes do not cause cost overruns.

Classification: None

Sponsor: OUSD(A)

Performer: Air Force Institute of Technology

James Gordon, advised by Dr. David Christensen, (937) 255-7777, ext. 3375

Resources:

FY	Dollars	Staff-years

Schedule:

Start	End
Jun 95	Aug 96

Data Base: DAES database from OUSD(A) and CPR data archived at ASC.

Publications: Thesis available from Defense Technical Information Center in 1996.

Category: I.C

Keywords: Government, Estimating, Weapon Systems, Life Cycle, Study, CPR/CCDR, Statistics/Regression

AFIT/LA-2

Title: The Distributional Properties of Cost Variances on Defense Contracts

Summary: This study tests whether cost variances reported on defense contracts are normally distributed. The results will be useful for variance investigation models and risk models that require knowledge of the cost variance's distribution. Results showed the cost variances to not be independent and normally distributed.

Classification: None

Sponsor: OUSD(A)

Performer: Air Force Institute of Technology

Robert Conley, advised by Dr. David Christensen, (937) 255-7777, ext. 3375

Resources:

FY	Dollars	Staff-years

Schedule:

Start	End
Jun 95	Aug 96

Data Base: DAES database from OUSD(A) and CPR data archived at ASC.

Publications: Thesis available from Defense Technical Information Center in 1996.

Category: I.C

Keywords: Government, Estimating, Weapon Systems, Life Cycle, Study, CPR/CCDR, Statistics/Regression

AFIT/LA-3

Title: An Analysis of Self-care at WPAFB Hospital

Summary: Self-care education has been shown to reduce unnecessary use of civilian health care services. This study showed that self-care education can reduce the use of unnecessary outpatient visits at a military hospital.

Classification: None

Sponsor: HQ AFMC/SG and WPMC/SG (Wright-Patterson AFB)

Performer: Air Force Institute of Technology

Chris Svehlak, advised by Dr. David Christensen, (937) 255-7777, ext. 3375

Resources:

FY	*Dollars*	*Staff-years*
	$65,000	

Schedule:

Start	*End*
Jun 94	Aug 95

Data Base: Consolidated Health Care System at WPMC/SG

Publications: Thesis available from Defense Technical Information Center.

Category: II

Keywords: Government, Analysis, Manpower/Personnel, Study, Operations and Support, Training, Data Collection

AFIT/LA-4

Title: An Analysis of the Purpose and Development of Management Reserve Budget

Summary: This study documented the purposes and development of Management Reserve Budget by a review of system descriptions prepared by C/SCSC-compliant defense contractors and by interview of government and contractor experts.

Classification: None

Sponsor: OUSD(A) API/PM
23020 Defense Pentagon, Room 3E1025
Washington, DC 20301-3020

Performer: Air Force Institute of Technology

Kevin Gould, advised by Dr. David Christensen, (937) 255-7777, ext. 3375

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Jun 94	Aug 95

Data Base: System Descriptions

Publications: Thesis available from Defense Technical Information Center.

Category: I.C.2

Keywords: Government, Estimating, Weapon Systems, EMD, Manufacturing, Data Collection, Study

AFIT/LA-5

Title: A Comparison of Nonlinear Estimate at Completion Methods

Summary: This study compared the accuracy of selected nonlinear formulas for estimating the final cost of a defense contract. Results showed that popular index-based formulas were more accurate than nonlinear formulas using Rayleigh and Beta distributions.

Classification: None

Sponsor: OUSD(A) API/PM
23020 Defense Pentagon, Room 3E1025
Washington, DC 20301-3020

Performer: Air Force Institute of Technology

Todd Nystrom, advised by Dr. David Christensen, (937) 255-7777, ext. 3375

Resources: *FY* *Dollars* *Staff-years*

Schedule: *Start* *End*
Jun 94 Aug 95

Data Base: Defense Acquisition Executive Summary Database

Publications: Thesis available from Defense Technical Information Center.

Category: I.B

Keywords: Government, Estimating, Weapon Systems, EMD, Manufacturing, Data Collection, Study

AFIT/LA-6

Title: An Analysis of Smart Bomb Alternatives Using the Analytic Hierarchy Process

Summary: This study is an economic analysis of smart bomb interface options on fighter aircraft. Quantitative and qualitative evaluation criteria were considered using a multi-criteria decision model, the Analytic Hierarchy Process.

Classification: None

Sponsor: SAF/APQW

Performer: Air Force Institute of Technology

David King, advised by Dr. David Christensen, (937) 255-7777, ext. 3375

Resources: *FY* *Dollars* *Staff-years*

Schedule: *Start* *End*
Jun 94 Aug 95

Data Base: Expert opinion

Publications: Thesis available from Defense Technical Information Center.

Category: I.B.1

Keywords: Government, Analysis, Airframe, Concept Development, Acquisition Strategy, Economic Analysis, Computer Model

AFIT/LA-7

Title: Hazardous Materials Life Cycle Estimation

Summary: This study explored ways to more effectively use an established model for estimating the cost of hazardous waste, the HAZMAT model, developed by The Analytic Sciences Corporation. The focus of the study was to develop parametrics that would allow the model to be used earlier in a project's design process. Results showed that the modified model was nearly as accurate as the original model, required less input data, and could be used much earlier.

Classification: None

Sponsor:

Performer: Air Force Institute of Technology

Mark Garner and Jennifer Kirchhoffer, advised by Dr. David Christensen, (937) 255-7777, ext. 3375

Resources: *FY* *Dollars* *Staff-years*

Schedule: *Start* *End*
Jun 94 Aug 95

Data Base: HAZMAT database

Publications: Thesis available from Defense Technical Information Center.

Category: I.D

Keywords: Government, Estimating, Weapon Systems, Life Cycle, Environment, Computer Model

AFIT/LA-8

Title: Calibration of Five Software Cost Models to an Air Force Data Base ("Pentateuch Project")

Summary: Five popular software cost estimation models (PRICE-S, REVIC, SASET, SEER-SEM, and SLIM) were calibrated to a large Air Force software database managed by the Air Force's Space and Missiles Center (SMC). This project involved effort calibration of these five models to various subsets of the SMC database such as missile programs, unmanned space programs, and military mobile programs. When sufficient data was available for a subset, the models were validated with data not used in calibration. Otherwise, the models were calibrated to the entire subset of data. Note: This is an update of the 1995 IDA Catalog entry on Page B-328

Classification: Unclassified

Sponsor: SMC/FMC, Gina Novak-Ley

MCR, Inc., Sherry Stukes

Performer: Five AFIT thesis students: Captain James Golansky (PRICE-S Calibration), Captain Robert Kressin (SLIM Calibration), Captain Kolin Rathmann (SEER-SEM Calibration), Captain Carl D. Vegas (SASET Calibration), Mrs. Betty Weber (REVIC Calibration).

Advisor: Professor Daniel V. Ferens (AFIT/LAS), (937) 255-7777, ext. 3379
Reader: Professor David S. Christensen (AFIT/LAS)

Resources:

FY	Dollars	Staff-years
	$180,000	1.25

Schedule:

Start	End
Sep 94	Aug 95

Data Base: Version 1.0 of the SMC Software Database (SWDB) of more than 2400 programs

Publications: These five AFIT theses are available from NTIS or DTIC, all published in September, 1995:

Galonsky, James C., *Calibration of the PRICE-S Software Model*, (AFIT Thesis GCA/LAS/95S-1), Dayton, OH, Air Force Institute of Technology: 1995.

Kressin, Robert K., *Calibration of SLIM to the Air Force Space and Missile Systems Center Software Database*, (AFIT Thesis GCA/LAS/95S-6), Dayton, OH, Air Force Institute of Technology: 1995.

Rathmann, Kolin D., *Calibration and Evaluation of SEER-SEM for the Air Force Space and Missile Systems Center*, (AFIT Thesis GCA/LAS/95S-9), Dayton, OH, Air Force Institute of Technology: 1995.

Vegas, Carl D., *Calibration of the Software Architecture Sizing and Estimation Tool*, (AFIT Thesis GCA/LAS/95S-11), Dayton, OH, Air Force Institute of Technology: 1995.

Weber, Betty G., *A Calibration of the REVIC Software Cost Estimating Model*, (AFIT Thesis GCA/LAS/95S-13), Dayton, OH, Air Force Institute of Technology: 1995.

Categories: II.A.1, II.A.2, II.D

Keywords: Government, Analysis, Estimating, EMD, Life Cycle, Labor, Data Collection, Statistics/Regression, Study

AFIT/LA-9

Title: Calibration of Seven Software Cost Models to an Air Force Data Base ("Septuagint Project")

Summary: In 1995, five software cost estimation models were calibrated to a large Air Force software database managed by the Air Force's Space and Missiles Center (SMC). As a follow-on effort, two additional models, CHECKPOINT and SoftCost-R, were calibrated to the same SMC database. Again, the project involved effort calibration of the models to various subsets of the SMC database such as missile programs, unmanned space programs, and military mobile programs. The models were validated with data not used in calibration. The original effort, the Pentateuch study, is described in AFIT/LA-8.

Classification: Unclassified

Sponsor: SMC/FMC, Shirley Tinkler

MCR, Inc., Sherry Stukes

Performer: Two AFIT thesis students: Captain Karen Mertes (CHECKPOINT Calibration)
Captain Steve Southwell (SoftCost-R Calibration)

Advisor: Professor Daniel V. Ferens (AFIT/LAS), (937) 255-7777, ext. 3379
Reader: Professor David S. Christensen (AFIT/LAS)

Resources:

FY	*Dollars*	*Staff-years*
96	$100,000	1.00

Schedule:

Start	*End*
Sep 95	Aug 96

Data Base: Version 2.1 of the SMC Software Database (SWDB) of more than 2400 programs.

Publications: These two AFIT theses are available from NTIS or DTIC, published in September, 1996:

Mertes, Karen R., *Calibration of the CHECKPOINT Model to the Space and Missile Systems Center (SMC) Software Database (SWDB)*, (AFIT Thesis GCA/LAS/96S-11), Dayton, OH, Air Force Institute of Technology, 1996.

Southwell, Steven V., *Calibration of the SoftCost-R Software Cost Model to the Space and Missile Systems Center (SMC) Software Database (SWDB)*, (AFIT Thesis GSM/LAS/96S-61), Dayton, OH, Air Force Institute of Technology, 1996.

Categories: II.A.1, II.A.2, II.D

Keywords: Government, Analysis, Estimating, EMD, Life Cycle, Labor, Data Collection, Statistics/Regression, Study

AFIT/LA-10

Title: A Cost Estimating Model for Retirement of the Minuteman III Intercontinental Ballistic Missile Weapon System

Summary: This study focuses on developing a cost estimating model for the total cost of the planned deactivation of Minuteman ICBMs at Grand Forks, North Dakota. The cost model structure and results provide functional parallels for future weapons system deactivations.

Classification: Unclassified

Sponsor: Air Force Space Command (AFSPC/XPP)
Peterson AFB, CO

Performer: Air Force Institute of Technology

Joel Hanson, advised by Dr. Wendell Simpson and Dr. Roland Kankey, (937) 255-7777, ext. 3382

Resources:	*FY*	*Dollars*	*Staff-years*
Schedule:	*Start*	*End*	
	Jun 94	Aug 95	

Data Base: N/A

Publications: Distribution only as directed by HQ AFSPC/XPP.

Category: II.A.2

Keywords: Government, Estimating, Missiles, Computer Model, Retirement and Demilitarization

AFIT/LA-11

Title: An Evaluation of U.S. Air Force Aviation Fuel Consumption Factors To Accurately Predict Aviation Fuel Costs by Aircraft Mission, Design and Series

Summary: This study evaluated the use of published aviation fuel factors to estimate aviation fuel costs. Results showed that using the published factors would have greatly understated costs for some aircraft and overstated costs for other aircraft. Findings should allow flying wings to more effectively use scarce base operating funds.

Classification: None

Sponsor: USAFE

Performer: Air Force Institute of Technology

Capt Jodi Clayton, advised by Lt Col Stephen Giuliano, (937) 255-7777, ext. 3381

Resources:	*FY*	*Dollars*	*Staff-years*
Schedule:	*Start*	*End*	
	Jun 95	Aug 96	

Data Base: Aviation fuel factors and actual consumption from USAFE.

Publications: Thesis available from Defense Technical Information Center in 1996.

Category: II.D

Keywords: Government, Estimating, Aircraft, Operations and Support, Training, Economic Analysis, Study

AFIT/LA-12

Title: An Investigation of the Relationship of Section Research and Development Costs to Total Demonstrator Costs of Gas Turbine Engines

Summary: This study investigated factors influencing demonstrator costs of gas turbine engines. The results should allow the Turbine Engine Division of the Aero-Propulsion and Power Directorate at the Wright Laboratories to better allocate research and development dollars.

Classification: None

Sponsor: Wright Laboratories

Performer: Air Force Institute of Technology

Capt Michael Dahlstrom, advised by Lt Col Stephen Giuliano, (937) 255-7777, ext. 3381

Resources:	*FY*	*Dollars*	*Staff-years*
Schedule:	*Start*	*End*	
	Jun 95	Aug 96	

Data Base: CPR data from Wright Laboratories.

Publications: Thesis available from Defense Technical Information Center in 1996.

Category: II.C

Keywords: Government, Estimating, Propulsion, EMD, Engineering, Statistics/Regression, Study

AFIT/LA-13

Title: Calibration of Software Cost Models to an Air Force Data Base ("Decalogue Project")

Summary: As a follow-on effort to the Pentateuch and Septuagint studies described in AFIT/LA-8 and AFIT/LA-9, two new software cost estimation models will be calibrated to a large Air Force software database managed by the Air Force's Space and Missiles Center (SMC). These models were SAGE and COCOMO 2.0. This project involves effort calibration of these models to various subsets of the SMC database such as missile programs, unmanned space programs, and military mobile programs. The models are validated with data not used in calibration. One of the earlier models, CHECKPOINT, will be calibrated to another database, managed by Electronic Systems Center (ESC), to determine if the 1996 CHECKPOINT calibration results from the Septuagint study are consistent across different databases. If time permits, SAGE will also be calibrated to the ESC database.

Classification: Unclassified

Sponsor: SMC/FMC, Shirley Tinkler

MCR, Inc., Sherry Stukes

Performer: Three AFIT thesis students: Captain David Marzo (SAGE Calibration)
Lieutenant Wayne Bernheisel (COCOMO 2.0 Calibration), and Lt Thomas Shrum (CHECKPOINT for the ESC database).

Advisor: Professor Daniel V. Ferens (AFIT/LAS), (937) 255-7777, ext. 3379
Reader: Professor David S. Christensen (AFIT/LAS)

Resources:

FY	*Dollars*	*Staff-years*
97	$150,000	1.50

(Based on assessment from SMC of 1996 Septuagint project.)

Schedule:

Start	*End*
Sep 96	Aug 97

Data Base: Version 2.1 of the SMC Software Database (SWDB) of more than 2,400 programs.

Publications: Two AFIT theses will be available from NTIS or DTIC in 1998.

Categories: II.A.1, II.A.2, II.D

Keywords: Government, Analysis, Estimating, EMD, Life Cycle, Labor, Data Collection, Statistics/Regression, Study

AFIT/LA-14

Title: A Cost-Benefit Analysis of Earned Value Standards on Defense Contracts

Summary: This study compares the documented benefits and costs of earned value standards (formerly C/SCSC) on defense contracts. Some studies have reported the benefits, others reported the costs. This study is the first to compare the benefit to the costs.

Classification: None

Sponsor: OUSD(A)

Performer: Air Force Institute of Technology

John Cole and Judson Fussell, advised by David Christensen, (937) 255-7777, ext.3375

Resources:	*FY*	*Dollars*	*Staff-years*
Schedule:	Start	End	
	Jun 96	Aug 97	
Data Base:	*Title:* None		
	Description: Articles published in various defense journals and special reports		
	Automation: No		
Publications:	Thesis available from Defense Technical Information Center.		
Category:	I.B		
Keywords:	Government, Policy, Weapon Systems, Life Cycle, Integration, Data Collection, Study		

DIRECTORATE OF COST FORECASTING

Name	Directorate of Cost Forecasting	
Address	Elm 1b, #187 MoD Abbey Wood PO Box 702 Bristol, BS12 7DU England	
Director	Mr. E. J. Lomas	(44-117-913-2725)
Size	Professional:	72
	Support:	8
	Consultants:	8
	Subcontractors:	None
Focus		
Activity	Number of projects in process:	50
	Average duration of a project:	3 mos. - 5 years
	Average number of staff members assigned to a project:	4
	Average number of staff-years expended per project:	1
	Percentage of effort conducted by consultants:	10%
	Percentage of effort conducted by subcontractors:	None

DCF-1

Title: Software Support Cost Model Project (SSCMP)

Summary: The overall aim of the SSCMP is to develop a software package to enable procurers, managers, and designers to estimate the costs of support for software over its in-service life. The program started in 1991 with a theoretical feasibility study, followed by a Software Questionnaire Study and Pilot study completed in April 1995. The Pilot Study suggested that the key factors that influence software support costs are not necessarily size, complexity, or age, which are the factors usually identified in current thinking. A Main Study is now underway with the following objectives: to define the factors and effects that have an impact on software support costs and to develop a concept model of software support based on a study of MoD and commercial software support.

Classification: Unclassified

Sponsor: Directorate of Cost Forecasting - UK MoD
Mr. E. J. Lomas (44-117-913-2725)

Performer: BMT Reliability Consultants Ltd, Fareham, UK

Resources:

FY	*Dollars*	*Staff-years*
96	$500,000	1.0

Schedule:

Start	*End*
Dec 95	Sept 98

Data Base: Using Microsoft Excel to store and manipulate collected data.

Publications: Reports on specific activities throughout the program.

Category: II.C

Keywords: Government, Industry, Operations and Support, Data Collection, Mathematical Model

DCF-2

Title: The Impact of Choice of Indices on Variation of Price Clauses in Contracts

Summary: Because of the difficulty within long development or production contracts in forecasting accurately the rise in costs, it is common practice to agree a fixed price for the early years and allow adjustment in later years by means of linkage to an index or a number of indices. This helps share the risk between producer and customer. The MoD has used this approach for some time but recently the increase in costs that this approach allows has caused the subject to be re-visited.

It was found that the choice of index could have a marked effect on the eventual cost and that there was a careful balance to be struck between the initial fixed price and the extent of the variation of price allowed. The work also uncovered that indices were not always applied intelligently; general inflation indices based on domestic household consumption were not appropriate to the defence-related activities.

Classification: Unclassified

Sponsor: Directorate of Cost Forecasting, UK MoD

Performer: In-house work

Resources:

FY	*Dollars*	*Staff-years*
96	$50,000	1.0

Schedule:

Start	*End*
June 96	July 97

Data Base: MoD contracts

Publications: In-house only

Category: II.B

Keywords: Government, Budgeting, Weapon Systems, Production, Acquisition Strategy, Economic Analysis, Review

DCF-3

Title: The Impact on Cost Forecasting of the Private Finance Initiative

Summary: The UK Government's Private Finance Initiative (PFI) brings private sector service provision into areas previously provided solely by the public sector. It involves transfer of risk to the service provider but permits greater opportunities for innovation. The PFI brings new aspects for cost forecasters to consider, especially legal implications when the service is to be provided at or near the front line. The challenge is to identify and quantify these new aspects so that PFI proposals can be judged against traditional procurement routes on a proper level playing field basis.

Classification: Unclassified

Sponsor: Directorate of Cost Forecasting - UK MoD

Performer: In-house work

Resources:

FY	*Dollars*	*Staff-years*
96	$300,000	6.0

Schedule:

Start	*End*
Jan 97	Sept 99

Data Base: MoD and industry information

Publications: In-house only at first, wider circulation possible later.

Category: II.B

Keywords: Government, Analysis, Forces, Facilities, Operations and Support, Acquisition Strategy, Method

DEFENSE SYSTEMS MANAGEMENT COLLEGE

Name	Financial Management Department		
Address	Defense Systems Management College Fort Belvoir, VA 22060		
Director	Mr. Bernard Rudwick	(703) 805-5254	
Size	Professional:		11
	Support:		2
	Consultants:		0
	Subcontractors:		0
Focus	Cost Analysis, Budget Process, Funds Management		
Activity	Number of projects in process:		12
	Average duration of a project:		3 months
	Average number of staff members assigned to a project:		1–2
	Average number of staff-years expended per project:		0.1
	Percentage of effort conducted by consultants:		0%
	Percentage of effort conducted by subcontractors:		0%

DSMC-1

Title: Research on Ongoing Acquisition Research (ROAR)

Summary: ROAR is an on-line and World-Wide Web system available to DoD and university researchers who currently conduct studies on acquisition-related topics such as cost modeling and pricing concerns, engineering and manufacturing practices, industrial base issues, logistics, contracting, commercial practices, acquisition workforce management, and education, etc. Access is available via the ROAR BBS (703-805-2865) and voice (703-271-5988) for those who contribute from their own ongoing study.

Classification: Unclassified

Sponsor: Defense Systems Management College and Defense Acquisition University, Fort Belvoir, VA 22060

Mr. James Abellera, (703) 805-2525

Performer: DSMC Faculty

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
89	Continuing

Data Base: *Title:*

Description: ROAR tracks over 2,500 studies around the world.

Automation: ROAR data became accessible via the Internet in the second half of CY 1995. The URL for ROAR is: http://www.dsmc.dsm.mil/roar.html.

Publications: New search results are available electronically every week via the ROAR BBS for registered subscribers until their projects are completed.

Category: I.B

Keywords: Industry, Government, Data Collection, Data Base

DSMC-2

Title: Cost and Risk Analysis Research

Summary: The objective of this applied research effort is twofold. The first part seeks to develop a more effective strategy for analyzing, managing, and controlling risk (particularly cost overruns) and particularly within developmental programs. Hence this research effort is broader than merely attempting to quantify the uncertainty in a cost estimate. This research centers on applying an integrated approach to program management, an approach which coordinates the four key elements of technical performance measurement, cost control, schedule control, and risk management. This method helps maintain active channels of communication between contractor and client, and assists in the overall management of the program. Past effort in this area has focused on the Airborne Low-Frequency Sonar Program of the SH-60F Seahawk helicopter as a pilot vehicle for validating the risk management process. Current efforts involve relating Cost as the Independent Variable (CAIV) to the process of Risk Management in an era of budget decline and downsizing in DoD and its contractors.

The second related part of this research effort has focused on developing methods for reducing the cost of development or production programs where affordability has been a major constraint. An example of this process was the DSMC effort in support of the recent C-17 Should Cost Study conducted by the USAF Material Command, which resulted in a large cost reduction in future production costs.

Classification: Unclassified

Sponsor:	Defense Systems Management College, Fort Belvoir, VA 22060
Performer:	Defense Systems Management College, Fort Belvoir, VA 22060 Mr. Bernard Rudwick, (703) 805-5254
Resources:	*FY* *Dollars* *Staff-years*
Schedule:	*Start* *End* 95 Indefinite
Data Base:	*Title:* *Description:* *Automation:*
Publications:	Internal memoranda only are available at the present time. These are in the process of being converted into an updated edition of the *DSMC Guide on Risk Management.*
Category:	II.B
Keywords:	Industry, Government, Estimating, Analysis, Reviewing/Monitoring, Helicopters, EMD, Risk/Uncertainty, Case Study, Economic Analysis, Expert System, Study

AEROSPACE CORPORATION

Name	The Aerospace Corporation, Resource and Requirements Analysis Department		
Address	2350 E. El Segundo Boulevard El Segundo, CA 90245 Mail Station: M4/021 P.O. Box 92957 Los Angeles, CA 90009-2957		
Director	Ms. Susan E. Jones		(310) 336-8576
Size	Professional:	15	
	Support:	1	
	Consultants:	About 1,000 Aerospace Corporation Engineers	
	Subcontractors:	0	
Focus	Acquisition reform, relationship between requirements and cost, commercial practices, cost as an independent variable, space-system cost modeling, cost-risk analysis, schedule-risk analysis, statistical analysis, life-cycle cost analysis, cost/performance/design trade studies.		
Activity	Number of projects in process:		8
	Average duration of a project:		1 year
	Average number of staff members assigned to a project:		2
	Average number of staff-years expended per project:		1.0
	Percentage of effort conducted by consultants: (Aerospace Corp. Engineers)		20%
	Percentage of effort conducted by subcontractors:		0%

Aerospace-1

Title: Costs of Space, Launch, and Ground Systems

Summary: Historical costs of space, launch, and ground systems, including non-recurring and recurring costs of space and launch vehicles, payloads, launch processing, launch delays, launch failures, software, ground facilities, learning rates, cost overruns, etc.

Classification: Unclassified; Government/FFRDC-only; Contractor-Proprietary Data.

Sponsor: The Aerospace Corporation's Research Program and
C. L. Whitehair, Vice President, Space Launch Operations
The Aerospace Corporation

Performer: The Aerospace Corporation
P.O. Box 92957, MS: M4/021
Los Angeles, CA 90009-2957

S. A. Book, (310) 336-8655; (book@courier1.aero.org)

Resources:

FY	*Dollars*	*Staff-years*
97	$120,000	0.6

Schedule:

Start	*End*
Ongoing updates since 1987	

Data Base: Contractor-Proprietary

Publications: *Costs of Space, Launch, and Ground Systems*, The Aerospace Corporation, Corporate Briefing ("The Whitehair Study"), April 1997.

Category: II.A

Keywords: Government, Policy, Space Systems, Life Cycle, Acquisition Strategy, Data Collection, Case Study, Data Base, Study

Aerospace-2

Title: Validation Testing of Commercial Risk-Analysis Software

Summary: Government-requested validation testing of commercial risk-analysis software products is an ongoing research effort. Some test cases investigate handling of simple, routine tasks; others "push the envelope" of their limitations and advertising. Currently under consideration for test is RI$K Version 2.2 developed by Tecolote Research, Inc., for inclusion in ACE-IT. Deficiencies specifically noted in controlled-access, government/FFRDC-only, validation testing reports delivered to SMC/FMC locally for forwarding to AFCAA and SAF/FM. Explanations of deficiencies may be passed on to developers by AF personnel at their option.

Classification: Unclassified, Controlled-Access, Government/FFRDC Only

Sponsor: AF Space and Missile Systems Center/FMC acting also on behalf of Air Force Cost Analysis Agency (AFCAA) and Office of Secretary of the Air Force/Financial Management (SAF/FM)

Performer: The Aerospace Corporation
P.O. Box 92957, MS: M4/021
Los Angeles, CA 90009-2957

S. A. Book, (310) 336-8655; (book@courier1.aero.org)

Resources:

FY	*Dollars*	*Staff-years*
97	Awaiting Task	N/A

Schedule:

Start	*End*
Oct 96	Sep 97

Data Base: None

Publications: S. A. Book and P. H. Young, *Validation Report on PLAN™ Risk Modeling Software*, The Aerospace Corporation, 66 pages, 8 April 1992. (U.S. Government/FFRDC only)

S. A. Book and E. L. Burgess, *Validation Report on CRYSTAL BALL Risk Modeling Software*, The Aerospace Corporation, 74 pages, 5 January 1993. (U.S. Government/FFRDC only)

S. A. Book, N. R. Chunduri, and P. H. Young, *Validation Report on RI$K Risk Modeling Software*, The Aerospace Corporation, 58 pages, 19 March 1993. (U.S. Government/FFRDC only)

S. A. Book, N. R. Chunduri, and P. H. Young, *Validation Report on @RISK Risk Modeling Software*, The Aerospace Corporation, 78 pages, 6 April 1993. (U.S. Government/FFRDC only)

S. A. Book, O. F. Blackshire, and P. H. Young, *Validation Report on RISK+ Risk Modeling Software for Microsoft Project 4.0*, The Aerospace Corporation, 141 pages, 6 October 1995. (U.S. Government/FFRDC only)

Categories: I.C.2, II.D

Keywords: Government, Estimating, Risk/Uncertainty, Mathematical Modeling, Review

Aerospace-3

Title: Small-Satellite Cost Engineering Model

Summary: Integration of physical, engineering, and cost relationships, encompassing new generation of low-weight, single-purpose, short-lifetime tactical satellites. Goal is to allow analyst to investigate in real-time cost impacts of performance changes.

Classification: Unclassified, Government-only, Contractor-Proprietary Data

Sponsor: NASA Jet Propulsion Laboratory

Performer: The Aerospace Corporation
P.O. Box 92957, MS: M4/939
Los Angeles, CA 90009-2957

D. A. Bearden, (310) 336-5852

E. T. Davalos, (310) 336-8222

Resources:

FY	*Dollars*	*Staff-years*
97	$150,000	1.0

Schedule:

Start	*End*
Jan 94	None (maintenance ongoing)

Data Base: Recent historical costs and technical parameters of new generation of small satellites and launch vehicles.

Publications: D. A. Bearden, E. L. Burgess, and N. Y. Lao, *Small-Satellite Cost Study*, The Aerospace Corporation, publicly releasable briefing containing no proprietary information

K. D. Bell, A. B. Dawdy, and L. A. Hsu, *Cost-Effective Concept Definition Using an Integrated Cost Engineering Model Process*, The Aerospace Corporation

Categories: I.B, II.A.2, II.C., II.D

Keywords: Government, Estimating, Space Systems, Production, Engineering, Data Collection, Computer Model

Aerospace-4

Title: Small-Satellite Cost Study

Summary: Data gathering and CER development, encompassing new generation of low-weight, single-purpose, short-lifetime tactical satellites. Implemented in test-and-evaluation version of computer model. Assist NASA HQ in non-advocate reviews of Center-initiated funding proposals.

Classification: Unclassified; Government-only, Contractor-Proprietary Data

Sponsor: NASA Headquarters

Performer: The Aerospace Corporation
P.O. Box 92957, MS: M4/021
Los Angeles, CA 90009-2957

D. A. Bearden, (310) 336-5852

N. Y. Lao, (310) 336-7876

E. T. Davalos, (310) 336-8222

Resources:

FY	*Dollars*	*Staff-years*
97	$60,000	0.3

Schedule:

Start	*End*
Jan 91	None (maintenance and upgrades ongoing)

Data Base: Recent historical costs and technical parameters of new generation of small satellites and launch vehicles.

Publications: *Small-Satellite Cost Study*, publicly releasable briefing containing no proprietary information

Categories: I.B, II.A.1, II.B, II.D

Keywords: Government, Estimating, Space Systems, Production, Engineering, Data Collection, Data Base, Computer Model, CERs

Aerospace-5

Title: Ground Systems Cost Model

Summary: Model costs of ground systems hardware, software, operations, and maintenance. Derive CERs from historical data when available, from vendor quotes when appropriate. Include satellite control facilities and equipment, communications equipment, launch processing, and security needs.

Classification: Unclassified, some Contractor-Proprietary Data

Sponsor: AF Space and Missile Systems Center, Aerospace Sponsored Research

Performer: The Aerospace Corporation
P.O. Box 92957, MS: M4/021
Los Angeles, CA 90009-2957

L. B. Sidor, (310) 336-1571

Resources:

FY	*Dollars*	*Staff-years*
97	$60,000	0.4

Schedule:

Start	*End*
Oct 96	Sep 97

Data Base: Cost and technical data

Publications: A. J. Matthews, "A Ground Cost Model (G-COST) for Military Systems," *AIAA*, 28 February 1996.

Categories: II.A, II.C

Keywords: Government, Estimating, Facilities, Manpower/Personnel, Life Cycle, Labor, Fixed Costs, Variable Costs, Data Collection, Statistics/Regression, Computer Model

Aerospace-6

Title: Lessons Learned Handbook for Collecting Space Systems Acquisition Expertise

Summary: Captures lessons learned about space engineering that are presently embodied in military specifications, standards, and Air Force Space and Missile Systems Center Commander's Policies. Emphasis on space technology lessons, events that motivated creation of standards, and ways of preventing future mission loss. Intended to identify critical parts of space-related standards that may be canceled or removed from contracts and to provide alternative risk-mitigation measures.

Classification: Unclassified

Sponsor: The Aerospace Corporation's Research Program

Performer: The Aerospace Corporation
P.O. Box 92957, MS: M4/021
Los Angeles, CA 90009-2957

R. H. Lucas, (310) 336-7786

Resources:

FY	Dollars	Staff-years
97	$40,000	0.25

Schedule:

Start	End
Oct 96	Sep 97

Data Base: None

Publications: None as yet. Handbook for internal AF/Aerospace distribution intended.

Category: I.B

Keywords: Government, Advanced Technology, Risk/Uncertainty, Study

Aerospace-7

Title: Acquisition Reform Initiative System Architecture and Processes

Summary: Effort will focus on defining elements of a new acquisition methodology that takes into account the changing (and changeable) nature of the space acquisition environment. Will attempt to identify the "best" acquisition processes used by large corporations when they undertake major commercial development projects. In support of this definition, the existing space acquisition system, its elements, their functions, and interfaces will be analyzed so that more flexible replacement elements can be determined. Acquisition practices of other industries will be evaluated and incorporated into this new acquisition architecture as appropriate.

Classification: Unclassified.

Sponsor: The Aerospace Corporation's Research Program

Performer: The Aerospace Corporation,
P.O. Box 92957, MS: M4/021
Los Angeles, CA 90009-2957

G. E. Gurevich, (310) 336-4041

S. E. Jones, (310) 336-8576

R. H. Lucas, (310) 336-7786

Resources:	*FY*	*Dollars*	*Staff-years*
	97	$180,000	1.0
Schedule:	*Start*	*End*	
	Oct 96	Sep 97	

Data Base: None

Publications: None as yet

Category: I.B

Keywords: Industry, Policy, Acquisition Strategy, Study

Aerospace-8

Title: Formation of Corporate Concept Design Center

Summary: Establish central focal point for applying distributed concurrent-engineering methodology to utilize broad engineering expertise and in-house cost and performance models to produce conceptual designs for space, launch, and ground systems. Rapid development of system designs in response to performance-requirement adjustments will allow quick-turnaround system- and component-level performance assessment and life-cycle-cost analysis.

Classification: Unclassified

Sponsor: The Aerospace Corporation's Research Program

Performer: The Aerospace Corporation
P.O. Box 92957, MS: M4/021
Los Angeles, CA 90009-2957

A. B. Dawdy, (310) 336-6134

E. T. Davalos, (310) 336-8222

Resources:	*FY*	*Dollars*	*Staff-years*
	97	$160,000	0.9
Schedule:	*Start*	*End*	
	Oct 96	Sep 97	

Data Base: None.

Publications: None as yet

Categories: II.B, II.C, II.D

Keywords: Government, Estimating, Space Systems, Concept Development, Engineering, Mathematical Modeling, Computer Model

CENTER FOR NAVAL ANALYSES

Name	Center for Naval Analyses
Address	4401 Ford Avenue Alexandria, VA 22302
Director	Dr. Henry Eskew (703) 824-2254
Size	Professional: Support: Consultants: Subcontractors:
Focus	
Activity	Number of projects in process: Average duration of a project: Average number of staff members assigned to a project: Average number of staff-years expended per project: Percentage of effort conducted by consultants: Percentage of effort conducted by subcontractors:

CNA-1

Title: Procedures and Software for Assessing Uncertainty in Cost Estimates

Summary: This is a study of selected analytical procedures and software packages associated with cost uncertainty analysis. The analytical questions have to do with (1) treatment of correlation among cost elements, (2) selection of specific probability distributions for characterizing uncertainty in different circumstances, and (3) generation of parameter values for the distributions. A set of software packages that support risk/uncertainty analysis is being evaluated, including one developed by the sponsor of the work. (This project was included in last year's report as CNA-1.)

Classification: Unclassified

Sponsor: Naval Center for Cost Analysis

Robert E. Lee, (703) 604-0302

Performer: The CNA Corporation

Dr. Henry Eskew, (703) 824-2254; Dr. Walter Nunn, (703) 824-2456

Resources:

FY	*Dollars*	*Staff-years*
		0.3

Schedule:

Start	*End*
Sep 94	Jun 95

Data Base: N/A

Publications: *Procedures and Software for Assessing Uncertainty in Cost Estimates*, CNA Research Memorandum 95-87, Henry L. Eskew and Walter R. Nunn, June 1995, Unclassified.

Categories: II.A.2, II.B

Keywords: Government, Estimating, Analysis, Risk/Uncertainty, Statistics/Regression, Study

CNA-2

Title: Update and Extension of Automated Cost Models

Summary: This project involves updating and expanding two automated cost models: one that estimates acquisition costs of tactical aircraft, and another that projects long-term fiscal requirements of the Department of the Navy. For the aircraft model, the major intent is to add the capability to estimate annual operations and support (O&S) costs. For the fiscal requirements model, the plan is to convert the present mainframe-based model to an electronic spreadsheet for use on a personal computer, and to also use current program and budget data for updating the model's tables and algorithms. (This project was included in last year's report.)

Classification: Unclassified

Sponsor: CNA Initiated Study

Navy POC: Director, Assessment Division (N-81)

Performer: The CNA Corporation

Mr. Jino Choi, (703) 824-2266; Dr. Henry Eskew, (703) 824-2254

Resources:

FY	*Dollars*	*Staff-years*
95		0.2
96		0.5

Schedule:

Start	*End*

May 95 Sep 96

Data Base: N/A

Publications: *Some New Estimates of the Navy's Indirect Manning Costs*, CNA Research Memorandum 95-203, Henry L. Eskew, December 1995, Unclassified.

Revised Projection Algorithms for the Fiscal Requirements Model, CNA Information Memorandum 447, Henry L. Eskew, December 1995, Unclassified.

User's Guide to the Fiscal Requirements Model_PC/Mac Version, CNA Information Memorandum 434, Barbara J. Lingberg, January 1996, Unclassified.

A Model for Estimating Life-Cycle Costs of Tactical Aircraft, CNA Research Memorandum 96-107, Jino Choi, September 1996, Unclassified.

Categories: II.A.1, II.A.2, II.B

Keywords: Government, Estimating, Programming, Aircraft, Forces, Manpower/Personnel, Life Cycle, Statistics/Regression, Computer Model

LOGISTICS MANAGEMENT INSTITUTE

Name	Logistics Management Institute		
Address	2000 Corporate Ridge McLean, VA 22102-7805		
Director	Mr. Ed Simms	(703) 917-7221	
Size	Professional:		5
	Support:		1
	Consultants:		1
	Subcontractors:		0
Focus	Infrastructure, Weapon Systems		
Activity	Number of projects in process:		6
	Average duration of a project:		1 year
	Average number of staff members assigned to a project:		1-2
	Average number of staff-years expended per project:		1
	Percentage of effort conducted by consultants:		0%
	Percentage of effort conducted by subcontractors:		0%

LMI-1

Title: Empirical Analysis of Learning Curves

Summary: Reductions in scale of the Defense budget, advances manufacturing technologies, and acquisition reform will all affect the costs of future acquisitions. The sensitivity of cost estimates to underlying assumptions becomes of greater importance during this period of transition. This task is examining these issues from an empirical perspective and is building analytical tools to assist analysts in the CAIG in preparing their independent estimates.

Classification: Unclassified

Sponsor: Weapon System Cost Analysis Division
OSD (PA&E)

Major David Nicholls, (703) 695-7282

Performer: LMI

Walt Cooper, (703) 917-7242; Dr. David Lee (703) 917-7557; Joe Domin, (703) 917-7242

Resources:

FY	Dollars	Staff-years
96	$200,000	1.0
97	$168,000	0.85

Schedule:

Start	End
Apr 96	Mar 98

Data Base: We are creating no new data bases in this project.

Publications: Report on initial research in preparation.

Categories: I.B, II.A.2, II.C, II.D

Keywords: Industry, Estimating, Missiles, Production, Manufacturing, Acquisition Strategy, Data Collection, Cost/Production Function, Statistics/Regression, Study

LMI-2

Title: Analysis of Institutional Training Resources

Summary: Institutional training is a $14 billion-a-year program in the Department of Defense. This task develops tools to assist senior analysts exercise their staff oversight responsibilities. The research focuses on the relationship between resources (fiscal, manpower and physical) and levels of training activity.

Classification: Unclassified

Sponsor: Director, Readiness and Training Directorate
Office of the Deputy Under Secretary of (Readiness)

Mike Kendall, (703) 697-4992

Performer: LMI

Matt Fuller, (703) 917-7447

Resources:

FY	Dollars	Staff-years
97	$225,000	1.3

Schedule:

Start	End
Apr 97	Apr 98

Data Base: Tools under construction use several existing data bases, including training load and workload files furnished by the Defense Manpower Data Center, the FYDP, and other data bases containing information on end strengths.

Publications: Technical notes and users guides

Category: II.A

Keywords: Government, Estimating, Analysis, Programming, Budgeting, Forces, Infrastructure, Manpower/Personnel, Operations and Support, Fixed Costs, Variable Costs, Training, Data Collection, Mathematical Modeling, Statistics/Regression, Computer Model

LMI-3

Title: Returns on Individual Training Investment

Summary: This study is exploring the relationship among training investments, current and proposed training policies, and expected continued length of satisfactory service.

Classification: Unclassified

Sponsor: Deputy Under Secretary of Defense (Requirements and Resources)
John Enns, (703) 697-0617

Performer: LMI
Matt Fuller, (703) 917-7447

Resources:

FY	*Dollars*	*Staff-years*
96	$150,000	0.8

Schedule:

Start	*End*
Jan 96	Apr 97

Data Base: No new data are being developed.

Publications: Technical report in preparation

Category: II.A

Keywords: Government, Estimating, Analysis, Programming, Budgeting, Forces, Infrastructure, Manpower/Personnel, Operations and Support, Fixed Costs, Variable Costs, Training, Data Collection, Mathematical Modeling, Statistics/Regression, Computer Model

LMI-4

Title: Improving DBOF Pricing

Summary: This study is providing a better understanding of the impact of various pricing problems on the resource requirements for infrastructure activities. The project will select a sample of depot-level repairables (DLRs) for each Military Service that have experienced the largest base-level repair elasticities with DBOF prices, analyze those items to determine the number and dollar value of uneconomic repair decisions, and extrapolate the sample results from each Service to the entire set of DLRs.

Classification: Unclassified

Sponsor: Director, Force and Infrastructure Cost Analysis Division
OSD (PA&E)
Mr. Jeff Bennett

Performer: LMI
John Wallace, (703) 917-7239

Resources:

FY	*Dollars*	*Staff-years*
96	$200,000	1.0

Schedule:

Start	*End*
Feb 96	Sep 97

Data Base: A DLR data base

Publications: A final report will be published upon completion of the analysis.

Category: II.A

Keywords: Government, Estimating, Analysis, Programming, Budgeting, Forces, Infrastructure, Operations and Support, Fixed Costs, Variable Costs, Data Collection, Mathematical Modeling, Statistics/Regression

LMI-5

Title: Enhancing Resource Analysis

Summary: The Department plans to increase funding available for modernization programs throughout the Future Years Defense Program by reducing infrastructure costs. Both areas—weapon systems and infrastructure—are becoming increasingly complex in scope, placing a sharp focus on the use of state-of-the-art analytical techniques. This task reviews tools and practices in use by the OSD Cost Analysis Improvement Group and identifies needed enhancements. The task also supports a symposium, conducted annually with the Deputy Director, Resource Analysis, to explore methods of improving the programming of infrastructure resources.

Classification: Unclassified

Sponsor: Deputy Director, Resource Analysis
OSD (PA&E)

Dr. David Gallagher and Mr. Jeff Bennett

Performer: LMI

Dr. David Lee, (703) 917-7557; Bill Esmann, (703) 917-7563

Resources:

FY	*Dollars*	*Staff-years*
97	$85,000	0.4

Schedule:

Start	*End*
Mar 97	Mar 98

Data Base: No data bases are being constructed in this task.

Publications: A proceedings of the symposium will be published in the summer of 1997.

Category: II.A.2

Keywords: Government, Analysis, Weapon Systems, Infrastructure, Life Cycle, Case Study

LMI-6

Title: Applying Advanced Tools for Analysis of Program Management

Summary: The Deputy Director, Performance Management, advises senior managers within the Department on the status of major defense acquisition programs. This task provides advanced analytical tools to assist the Deputy Director in identifying potential cost and/or schedule problems promptly and quantitatively.

Classification: Unclassified

Sponsor: Deputy Director
Performance Management Acquisition Program Integration Directorate
OUSD(A&T)

Mr. Reed White

Performer: LMI

Dr. David Lee, (703) 917-7557

Resources:

FY	*Dollars*	*Staff-years*
97	$50,000	0.3

Schedule:

Start	*End*
Mar 97	Aug 97

Data Base: No data bases will be constructed as part of this project.

Publications: Technical report to describe theoretical basis for the analytical tool and procedures for its use.

Category: II.A.2

Keywords: Government, Estimating, Weapon Systems, Demonstration/Validation, EMD, Schedule, Mathematical Modeling, Mathematical Model

MITRE CORPORATION

Name	The Economic and Decision Analysis Center (EDAC) The MITRE Corporation	
Address	1820 Dolley Madison Boulevard McLean, VA 22102	
Director	Dr. William Hutzler	(703) 883-6911
Size	Professional: Support: Consultants: Subcontractors:	85 10 0 0
Focus	Applied economic analysis, cost analysis, decision support, acquisition analysis, nondevelopmental item acquisition, program management, risk management and analysis, life cycle management, logistics engineering, business process reengineering, business and technology case analysis, and information services and technology benchmarking.	
Activity	Number of projects annually:	300
	Average duration of a project:	6 months
	Average number of staff members assigned to a project:	2
	Average number of staff-years expended per project:	2
	Percentage of effort conducted by consultants:	0%
	Percentage of effort conducted by subcontractors:	0%

MITRE-1

Title: Telecommunications Future Services Pricing Model

Summary: There is little pricing information available for telecommunications technologies which offer higher bandwidths, such as Asynchronous Transfer Mode. This problem is exacerbated when an analyst is faced with projecting the prices of bandwidths not yet commercially available, and which may not become available for one to three years. The EDAC is researching economic trends for future telecommunications services and high bandwidths not yet commercially available. The product of its research will be a cost model that will predict prices for initial offerings of higher bandwidths, and also how those prices will change over time.

Classification: Unclassified

Sponsor: MITRE Economic and Decision Analysis Center

Performer: MITRE

Resources:

FY	*Dollars*	*Staff-years*
		0.5

Schedule:

Start	*End*
97	97

Data Base: None

Publications: None

Category: II.C

Keywords: Estimating, Infrastructure, Advanced Technology, Statistics/Regression, Computer Model

MITRE-2

Title: A Framework for Migrating to the Common Operating Environment (COE)

Summary: COE migration is an important command and control issue affecting numerous Army and Air Force programs. The objectives of this research are as follows: (1) develop a framework that (a) identifies activities and describes the process necessary to migrate a legacy system to the COE and (b) identifies the technical, schedule, and cost risks; (2) develop a process model to facilitate schedule construction, critical path analysis, and risk identification; and (3) develop guidelines for costing a migration to the COE.

Classification: Unclassified

Sponsor: Project Special Initiative

Performer: MITRE

Resources:

FY	*Dollars*	*Staff-years*
		0.5

Schedule:

Start	*End*
97	97

Data Base: None

Publications: None

Category: II.B

Keywords: Estimating, Analysis, Weapon Systems, Life Cycle, Risk/Uncertainty, Data Collection, Method

RAND CORPORATION

Name	RAND Corporation		
	Note: There is no formal cost research organization at RAND. Cost analysts are members of the management science group and, like all other research staff members, are assigned to projects in the various divisions (Project Air Force, Arroyo Center, National Defense Research Institute, other domestic).		
Address	1700 Main Street Santa Monica, CA 90407-2138		
Director	Fred Timson	(310) 0411, ext. 7802	
Size	Professional:	6	
	Support:	0.0	
	Consultants:	3 (1.0 man-years)	
	Subcontractors:	0	
Focus	Force costing, O&S costing, system costing, space systems		
Activity	Number of projects in process:		3
	Average duration of a project:		1–2 years
	Average number of staff members assigned to a project:		1–3
	Average number of staff-years expended per project:		0.5 to 4
	Percentage of effort conducted by consultants:		< 5%
	Percentage of effort conducted by subcontractors:		0%

RAND-1

Title: Understanding the Sources of Cost Growth in Weapon Systems

Summary: Building on past research, the objectives are to (1) continuously update RAND's cost growth database and (2) identify and evaluate factors affecting cost growth. [This task appeared in the 1996 catalog as RAND-1]

Classification: Unclassified

Sponsor: OSD(PA&E)

Performer: RAND

Fred Timson, (310) 393-0411; Rob Leonard, (310) 393-0411

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Jan 91	Continuing

Data Base: *Title:* Defense System Cost Performance Database

Description: Cost growth histories and assorted program data on 244 weapon systems through December 1994

Automation: PC (Excel)

Publications: *The Defense System Cost Performance Database: Cost Growth Analysis Using SARs*, MR-625-OSD, Jarvaise, Drezner, Norton, 1996, Unclassified

Categories: II.A.1, II.A.2

Keywords: Government, Analysis, Risk/Uncertainty, Data Collection, Data Base, Study

RAND-2

Title: Force Structure and Support Infrastructure Costing for Program Analysis and Evaluation

Summary: The objective of this research is to design, develop, and implement an automated system for costing force structure and related changes in defense programs. The project will include recommendations for developing a centralized database within PA&E to support the costing system. [This task appeared in the 1996 catalog as RAND-2.]

Classification: Unclassified

Sponsor: OSD(PA&E)

Performer: RAND

Adele Palmer, (310) 393-0411 (Co-PI); Jim Bigelow, (310) 393-0411 (Co-PI);

Manuel Carrillo, (310) 393-0411; Gary Massey, (310) 393-0411; Mary Layne (202) 296-5000

Resources:

FY	*Dollars*	*Staff-years*

Schedule:

Start	*End*
Dec 90	Continuing

Data Base: *Title:*

Description:

Automation:

Publications: *The Force Structure Costing Project: An Introductory Briefing*, WD-5252-PA&E, Adele Palmer, December 1990, Unclassified (distribution of RAND WDs controlled by sponsor)

Category: II.C

Keywords: Government, Estimating, Analysis, Programming, Forces, Expert System, Method, Computer Model

RAND-3

Title:	Advanced Airframe Structural Materials
Summary:	This project will update the advanced materials/processes primer and cost estimating factors/methodology previously developed by RAND. (Resetar, Rodgers & Hess, Advanced Airframe Structural Materials, RAND, R-4016-AF, 1991.) [This is a new task in FY 1997.]
Classification:	Unclassified
Sponsor:	OSD(PA&E)
Performer:	Fred Timson, (310) 393-0411; Susan Resetar, (202) 296-5000
Resources:	*FY* *Dollars* *Staff-years*
Schedule:	*Start* *End* Spring 1997 Spring 1998
Data Base:	*Title:* *Description:* *Automation:*
Publications:	None
Category:	II.A.1
Keywords:	Industry, Estimating, Aircraft, EMD, Production, Labor, Material, Data Collection, Survey, Review, Method

INSTITUTE FOR DEFENSE ANALYSES

Name	Institute for Defense Analyses		
Address	1801 N. Beauregard Street Alexandria, VA 22311-1772		
Director	Dr. Stephen J. Balut Cost Analysis Research Division (CARD)	(703)845-2527	
Size	Professional: Support: Consultants: Subcontractors:		45 5 40 1
Focus	Costs of Weapon Systems, Forces and Operations.		
Activity	Number of projects in process:		40
	Average duration of a project:		1 year
	Average number of staff members assigned to a project:		2 - 4
	Average number of staff-years expended per project:		2
	Percentage of effort conducted by consultants:		30%
	Percentage of effort conducted by subcontractors:		2%

IDA-1

Title: National Defense Program Costs

Summary: Develop a computer model that permits small- to medium-size countries to estimate the capabilities and resource requirements of alternative future force compositions. The model provides cost estimates that are sensitive to the following force characteristics: numbers and types of combat and support units, numbers and types of equipment, unit manning, peacetime training levels (OPTEMPO), equipment modernization, and WRM inventory changes. The model can be tailored to use the currencies, cost accounts, personnel classifications, and a wide variety of force and equipment configurations of any military force. Cost modeling provides the ability to model direct and indirect personnel costs, fixed and variable operating costs, and multi-year procurement funding. Users have convenient access to all characteristics of the model so they can adjust the model's use to their own circumstances.

Classification: Unclassified

Sponsor: OSD(PA&E), Europe and Pacific Division
Room 2C270, The Pentagon
Washington, DC 20301

Colonel Gary Morgan, (703) 697-6415

Performer: IDA

Mr. James L. Wilson, (703) 845-2469

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
93	$ 25,000	0.2	96	$1,000,000	6.8
94	$288,000	1.9	97	$1,000,000	6.8
95	$550,000	3.5			

Schedule:

Start	End
Sep 93	Dec 97

Data Base: None

Publications: TBD

Category: II.A.2

Keywords: Government, Programming, Forces, Life Cycle, Fixed Costs, Variable Costs, Computer Model

IDA-2

Title: Cost of Defense Force Projections

Summary: Develop methodologies and capability to estimate the cost of projected defense forces, acquisition programs, and major support functions out to the year 2013. Following the projection, contribute to analyses of cost implications of alternative force and acquisition strategies.

Classification: Secret

Sponsor: OUSD(A&T)(API), Program Assessment, Acquisition
Room 1E462, The Pentagon,
Washington, DC 20301

Dr. Royce Kneece, (703) 697-1786

Performer: IDA

Mr. Timothy J. Graves, (703) 845-2339

Resources:

FY	Dollars	Staff-years	FY	Dollars	Staff-years
90	$125,000	1.0	93	$250,000	2.0
91	$125,000	1.0	94	$300,000	2.4
92	$200,000	1.3	95	$75,000	0.6

Schedule:

Start	End
Jul 90	Sep 96

Data Base: *Title:* Defense Program Projection

Description: FYDP type data for all DoD programs to include Defense Mission Categories, Program Element, Procurement Annex Line Item

Automation: PC in dBASE, FoxPro

Publications: *The Defense Program Projection*, Unclassified, pending.

Categories: II.A.1, II.A.2, II.B

Keywords: Government, Programming, Forces, Life Cycle, Acquisition Strategy, Mathematical Modeling, Computer Model

IDA-3

Title: Defense Program Projection (DPP) Support

Summary: The objective of this task is to assist PA&E with installation of the latest version of the DPP model and all associated reference files and preprocessors, operation and maintenance, documentation, and training as necessary to operate the model.

Classification: Secret

Sponsor: OSD/PA&E/Force Structure Division
The Pentagon, Room 2C281
Washington, DC

Mr. Joseph Nogueira, (703) 697-9132

Performer: IDA

Mr. Timothy J. Graves, (703) 845-2339

Resources:

FY	Dollars	Staff-years
91	$45,475	0.3
94	$120,000	1.0
95	$100,000	0.8
96	$85,000	0.7

Schedule:

Start	End
Sep 91	Nov 96

Data Base: *Title:* Defense Program Projection

Description: FYDP type data for all DoD programs to include Defense Mission Categories, Program Element, Procurement Annex Line Item

Automation: FoxPro, dBASE

Publications: None

Categories: II.A.1, II.A.2, II.B

Keywords: Government, Programming, Forces, Acquisition Strategy, Operations and Support, Mathematical Modeling, Computer Model

IDA-4

Title: FYDP Tracking and Analysis System

Summary: This task strengthens the DoD's capability to apply FYDP data when conducting analyses in support of PPBS processes through the development of a system of computer-based analytical tools. In FY 1995 the task was changed to support the development of a new operating environment for the IDA Force Acquisition Cost System series of computer-based models.

Classification: Secret

Sponsor: OSD(PA&E), Force and Infrastructure Cost Analysis Division
Room 2D278, The Pentagon
Washington, DC 20301

Mr. Al Leung, (703) 697-4311

Performer: IDA

Mr. Timothy Graves, (703) 845-2339

Resources:

FY	*Dollars*	*Staff-years*
93	$ 85,000	0.6
94	$150,000	1.2
97	$ 25,000	0.2

Schedule:

Start	*End*
Jul 93	Sep 98

Data Base: *Title:* FYDP

Description: FYDP type data for all DoD programs to include Program Element

Automation: PC in FoxPro, Visual Basic, Excel, Visual Basic

Publications: TBD

Categories: II.A.1, II.A.2, II.B

Keywords: Government, Programming, Forces, Life Cycle, Acquisition Strategy, Mathematical Modeling, Computer Model

IDA-5

Title: FYDP Related Studies

Summary: This task supports the conduct of studies to improve the existing FYDP-related taxonomy of missions and infrastructure and to maintain and utilize previously developed models for FYDP-related analyses.

Classification: Secret

Sponsor: OSD(PA&E), Force and Infrastructure Cost Analysis Division
Room 2D278, The Pentagon
Washington DC 20301

Mr. Al Leung, (703) 697-4311

Performer: IDA

Mr. Timothy J. Graves, (703) 845-2339

Resources:

FY	*Dollars*	*Staff-years*	*FY*	*Dollars*	*Staff-years*
92	$40,000	0.3	95	$130,000	1.0
93	$220,000	2.4	96	$150,000	1.2

Schedule:

Start	*End*
Sep 92	Dec 97

Data Base: *Title:* AMORD, FYDP

Description: FYDP type data for all DoD programs to include Defense Mission Categories, Program Element

Automation:

Publications: TBD

Categories: II.A.1, II.A.2, II.B

Keywords: Government, Programming, Forces, Mathematical Modeling, Computer Model

IDA-6

Title: Defense Programming Database

Summary: This task is to analyze and document the databases currently used to provide senior management and their staffs with the information necessary to make informed program decisions, and to recommend improvements. The primary database used is the Future Years Defense Program (FYDP). Initially, support will to be provided to affect the transfer of responsibility for updating the FYDP from the Comptroller to PA&E. Following this, the design and development of a rapid prototype Defense Programming Database will be accomplished. The design architecture will include the tools necessary for data retrieval and report writing. Products will be approved by a DoD task force prior to implementation.

Classification: Unclassified work dealing with a classified database

Sponsor: OSD(PA&E)
1800 Defense Pentagon (2D322)
Washington, DC 20301-1800

Dr. Bryan Jack, (703) 693-7827

Performer: IDA

Mr. Paul Goree, (703) 845-2238

Resources:

FY	*Dollars*	*Staff-years*
95	$340,000	2.2
96	$550,000	3.5
97	$475,000	2.9

Schedule:

Start	*End*
Jun 95	May 98

Data Base: *Title:*

Description:

Automation: FYDP, APPS, DPD, MDAP

Publications: TBD

Categories: II.A, II.C, II.D

Keywords: Government, Programming, Forces, Infrastructure, Manpower/Personnel, Life Cycle, Automation, Data Collection, Data Base

IDA-7

Title: Cost of Contingency Operations

Summary: The initial estimates of the cost to support the military operations in Bosnia (Operation Joint Endeavor (OJE)) have proven to be significantly low. The DoD Deployment Model, used to estimate these costs, had been successfully used to estimate costs for other contingency operations in Haiti and Somalia. Cost estimates derived in this manner for the Bosnia operations were in err or by over a factor of two. This task examines the initial and subsequent estimates in an attempt to understand why the estimates were lacking. The first phase of this task identified, in a broad sense, the causes for the errors in the estimates. In phase two of the task, the OSD Comptroller plans to define and institute an improved and common estimating process for use throughout the DoD for developing preliminary and final cost estimates for proposed contingency operations. Once procedures are defined and standardized, cost estimating tools will be developed, automated, and provided to offices that estimate such costs. Prior to distribution of the automated tools to users (e.g., CINCs, planners, financial analysts), both procedures and tools will be endorsed by the OSC(C), Joint Staff, and Military Departments.

Classification: Unclassified

Sponsor: OUSD(Comptroller)
1800 Defense Pentagon (3D868)
Washington, DC 20301-1800

Ms. Sallie Morse, (703) 697-9317

Performer: IDA

Mr. Paul Goree, (703) 845-2238

Resources:

FY	*Dollars*	*Staff-years*
97	$450,000	2.7

Schedule:

Start	*End*
Dec 97	Mar 98

Data Base: *Title:* To be developed

Description:

Automation: Design will use COTS and desktop computers, possibly using Web technology

Publications: A users guide and model documentation will be prepared.

Category: II.C

Keywords: Estimating, Forces, Life Cycle, Computer Model, CER

IDA-8

Title: Trends in Weapons System O&S Costs

Summary: The objective of this task is to investigate available operating and support cost data to see if past efforts to reduce O&S costs have been effective. Results will be normalized, as much as possible, for changes in weapons capability, operating tempo, and economic inflation.

Classification: Secret

Sponsor: OUSD(A&T)(API), Program Assessment, Acquisition
The Pentagon, Room 1E466
Washington DC 20301

Mr. Phil Rodgers, (703) 697-6070

Performer: IDA

Mr. Timothy J. Graves, (703) 845-2239

Resources:

FY	*Dollars*	*Staff-years*
96	$100,000	0.8

Schedule:

Start	*End*
Jul 96	Sep 97

Data Base: *Title:* VAMOSC data, Service OPTEMPO data

Description: FYDP type data for all DoD programs to include Defense Mission Categories, Program Element, Procurement Annex Line Item

Automation:

Publications: Pending, Unclassified

Categories: II.A.1, II.A.2, II.B

Keywords: Government, Programming, Forces, Acquisition Strategy, Operations and Support, Mathematical Modeling, Computer Model

IDA-9

Title: Operations and Maintenance (O&M) Funding Migration

Summary: The objective of this task is to identify the magnitude of funding shifted from investment to O&M accounts during budget formulation and execution historically and, where possible, identify the reasoning which resulted in understating of future O&M requirements.

Classification: Secret

Sponsor: OUSD(A&T)/API/AR, Acquisition Resources
The Pentagon, Room 1E474
Washington, DC

Mr. Phil Rodgers, (703) 697-6070

Performer: IDA

Mr. Timothy J. Graves, (703) 845-2339

Resources:

FY	*Dollars*	*Staff-years*
97	$100,000	0.8

Schedule:

Start	*End*
Jan 97	Dec 97

Data Base: *Title:* DoDSPEAR

Description: The DoDSPEAR (DoD Selective Program Element Analysis Report) model data base contains FYDP data by budget formulation position (POM, BES, PB) from the FY82 PB and forward.

Automation: FoxPro, dBASE, Visual Basic

Publications: TBD

Categories: II.A.1, II.A.2, II.B

Keywords: Government, Programming, Forces, Acquisition Strategy, Operations and Support, Mathematical Modeling, Computer Model

IDA-10

Title: Assessing Defense Funding Supporting Readiness

Summary: Maintaining the readiness of U.S. defense forces is one of the highest budgetary priorities of the Department of Defense. In order to do this, analysts and senior defense executives must be able to evaluate defense budgets and the FYDP to determine if they provide adequate funding for the desired level of readiness. A major portion of this research is identifying and quantifying the accounting changes that have occurred in DoD funding policies over the past two decades. The research also is developing a methodology for identifying the portions of the defense program that have the most impact on readiness and is developing alternative metrics that describe changes in defense force size. [This task appeared in the 1996 catalog as IDA-7.]

Classification: Secret

Sponsor: Deputy Under Secretary of Defense (Readiness)
Director for Readiness and Training
Room 1C757, The Pentagon
Washington, DC 20301

Colonel Charles Mitchell, (703) 697-4992

Performer: IDA

Mr. Stanley A. Horowitz, (703) 845-2450

Resources:

FY	*Dollars*	*Staff-years*
95	$300,000	1.9
96	$400,000	2.5
97	$350,000	2.2

Schedule:

Start	*End*
Oct 94	Jun 98

Data Base: FYDP Funding Adjustments (Pending)

Publications: TBD

Categories: II.B, II.C

Keywords: Government, Analysis, Forces, Life Cycle, Readiness

IDA-11

Title: Force Modernization Metrics

Summary: In building the Defense Program Projection, which looks at prospective defense spending twelve years beyond the end of the FYDP, tools are needed to present ways in which the force will be evolving. Building such tools is the central job of this task. In addition to tracking force age and capital asset value, attention will be devoted to developing indicators of capability for various missions and classes of systems to allow projections of capability to be made for alternative defense programs. The recapitalization of defense facilities will also be addressed.

Classification: Secret

Sponsor: Deputy Director (General Purpose Programs) Program Analysis and Evaluation
Room 2E330, The Pentagon
Washington, DC 0301

Mr. Will Jarvis, (703) 697-9132

Performer: IDA

Mr. Stanley A. Horowitz, (703) 845-2450

Resources:

FY	*Dollars*	*Staff-years*
97	$340,000	2.2

Schedule:

Start	*End*
Oct 96	Jun 98

Data Base: Equipment inventories over time and potential capability measures. Age and plant replacement value of facilities by type and location.

Publications: TBD

Categories: II.B, II.C

Keywords: Government, Analysis, Review, Policy, Programming, Forces, Life Cycle, Advanced Technology, Modification, Data Collection, Time Series, Data Base, Computer Model, Study

IDA-12

Title: Force Aging

Summary: This task has four subtasks: (1) developing data bases and an aging model to assess the effects of aging force structure during the period of the Defense Program Projection; (2) performing case studies of selected weapon systems (i.e., F-16 Service Life and Resource Requirements) and types of weapon systems (i.e., vehicles and Army helicopters); (3) assessing the effects of re-engineering the B-52H; and (4) developing a facilities aging model. Relative to the data bases and tools, the initial focus has been on collecting data on equipment inventories and creating a capital stock data base. The primary case study has been on the F-16 assessing service life and resource requirements needed until the Joint Strike Fighter deploys. The next class of system to be reviewed will be tracked vehicles.

Classification: Secret

Sponsor: OSD(PA&E) and USD(A&T)

Performer: IDA

Mr. Waynard C. Devers, (703) 845-2252

Resources:

FY	*Dollars*	*Staff-years*
94	$ 53,000	0.4
95	$200,000	1.3
96	$310,000	2.0
97	$255,000	1.6

Schedule:

Start	*End*
Jan 95	Jun 98

Data Base: *Title:*

Description: Equipment data bases, including inventory, age, service life, and operating tempo by serial number for Army, Navy, Marine Corps and Air Force aircraft, combat vehicles, and selected trucks; and capital stock data base, for selected equipment. Facilities data base, including inventories by facilities categories, age, installation, plant replacement value, target replacement life, and, for selected facilities condition, and readiness codes.

Automation: Equipment Data Base—Foxpro, Capital Stock Data Base—Excel, Facilities Data Base—Foxpro

Publications: None

Categories: I.B.1, II.B, II.C

Keywords: Forces, Weapon Systems, Aircraft, Helicopters, Ships, Land Vehicles, Facilities, Life Cycle, Production, Data Collection, Data Base, Case Study

IDA-13

Title: USMC Utility Rotary Wing Aircraft

Summary: This task provides operating and support costs estimates for selected USMC utility rotary wing aircraft.

Classification: Unclassified

Sponsor: OSD(PA&E)

Performer: IDA

Mr. Waynard C. Devers, (703) 845-2252

Resources:

FY	*Dollars*	*Staff-years*
96	$75,000	0.5

Schedule:

Start	*End*
Nov 95	Dec 97

Data Base: *Title:*

Description: Operating and support cost data bases, including inventory, operating tempo, cost drivers and cost factors for Marine Corps utility rotary wing.

Automation: Data Base—Excel

Publications: Report due at completion of study with data bases.

Categories: I.B.1, II.A.1

Keywords: Forces, Weapon Systems, Helicopters, Data Collection, Data Base, Case Study

IDA-14

Title: Rotary Wing Aircraft Recapitalization Analyses

Summary: Concepts for future rotary wing aircraft systems envision filling the force structure using fewer platforms types. Given this, there are many possible approaches to current and planned rotary wing platforms to accommodate the eventual transition to fewer platform types. The objective of this task is to analyze the affordability implications of various rotary wing aircraft recapitalization strategies.

Classification: Unclassified

Sponsor: Office of the Director for Force Structure, Resource and Assessment (J-8) of the Joint Staff

Lieutenant Colonel Mark Gibson, USMC, (703) 697-6070

Performer: IDA

Mr. Bruce Harmon, (703) 845-2501

Resources:

FY	*Dollars*	*Staff-years*
96	$82,916	0.6
97	$16,854	0.1

Schedule:	*Start*	*End*
	Oct 95	Dec 96
Data Base:	*Title:*	
	Description:	Data and model characterizing future rotary wing aircraft inventories and investment costs.
	Automation:	
Publications:	None	
Category:	II.A.2	
Keywords:	Government, Programming, Estimating, Helicopters, Acquisition Strategy, Production Rate, Cost/Production Function, Case Study	

IDA-15

Title:	DoD Helicopter Commonality Study		
Summary:	This task has two major subtasks. (1) In support of the Marine Corps utility helicopter acquisition decision, the study provides an analysis of the costs and savings associated with the alternative approaches to achieving commonality. (2) In support of commonality issues that may be addressed in the Quadrennial Defense Review, the study provides an assessment of utility and attack helicopter commonality issues and develops a framework for further analyses of the cost implications of commonality.		
Classification:	Unclassified		
Sponsor:	OSD(PA&E)		
Performer:	IDA		
	Mr. Waynard C. Devers, (703) 845-2252		
Resources:	*FY*	*Dollars*	*Staff-years*
	97	200,000	1.3
Schedule:	*Start*	*End*	
	Nov 97	Dec 97	
Data Base:	None		
Publications:	None		
Category:	1.B.1		
Keywords:	Helicopters		

IDA-16

Title:	Space and Missile Systems Nuclear Hardening Costs
Summary:	Investigate relationships between costs and technical characteristics, including nuclear-radiation hardening and other survivability features of selected military satellite and ground-based missile systems. Develop CERs to estimate the marginal costs to harden satellites and missiles against nuclear weapons effects. [This task appeared in the 1996 catalog as IDA-15.]
Classification:	Secret-Restricted Data, Proprietary Information
Sponsor:	DSWA/ETD 6801 Telegraph Road Alexandria, VA 22310-3398 Mr. Michael Rooney, (703) 325-0456

Performer: IDA

Dr. Daniel B. Levine, (703) 845-2562
Mr. George Tolis, (703) 845-2795
Dr. Robert Oliver, (703) 578-2981
Mr. John Honig, (703) 845-2045

Resources:

FY	*Dollars*	*Staff-years*
94	$275,000	1.7
96	$275,000	1.7
97	$100,000	0.6

Schedule:

Start	*End*
Apr 93	Dec 97

Data Base: *Title:*

Description: Satellite cost data from the Unmanned Space Vehicle Cost Model and from collection by IDA. Missile cost data from U.S. Army and Navy sources. Satellite and missile RDT&E and production costs segregated by subsystem. Satellite and missile technical data, including performance characteristics and nuclear-hardening specifications.

Automation: Excel spreadsheets

Publications: *Estimating the Costs of Nuclear-Radiation-Hardened Military Satellites*, IDA Paper P-2857, Secret/Restricted Data, November 1994.

Estimating the Costs of Nuclear-Radiation-Hardened-Military Satellites (Unclassified Version), IDA Paper P-3120, April 1996.

Category: II.C

Keywords: Government, Industry, Estimating, Space Systems, Missiles, EMD, Production, WBS, Statistics/Regression, CER, Data Collection, Data Base, Mathematical Model

IDA-17

Title: Cost of Stealth

Summary: The objectives of this task is to estimate the cost of obtaining signature reduction for tactical aircraft through (1) experiences gained by accomplished programs; and (2) technologies that will contribute to reductions in cost or signature in the future.

Classification: Top Secret/Proprietary Information/Special Access

Sponsor: USD (A&T)
S&TS/AW
Room 3E1081, The Pentagon
Washington, DC 20301

Mr. Mutzelburg, (703) 695-0525

Performer: IDA

Dr. J. R. Nelson, (703) 845-2571
Mr. Bruce Harmon, (703) 845-2501
Mr. W. Devers, (703) 845-2252
Dr. R. Bontz, (703) 845-2240

Resources:

FY	*Dollars*	*Staff-years*
97	$350,000	1.5

Schedule:

Start	*End*
Oct 96	Continuing

Data Base: *Title:*

Description:

Automation:

Publications: TBD

Category: II.B

Keywords: Government, Analysis, Aircraft, EMD, Production, Operations and Support, Schedule, Data Collection, Data Base, Method

IDA-18

Title: Cost Estimation for Streamlined Manufacturing Environment

Summary: The objective of this task is to examine new manufacturing processes and acquisition reform measures and to develop methods for predicting their impact on the cost of different types of major systems. To the maximum extent practicable, the methods should be cast in terms of modifications to existing cost estimating methods. The parametric models used extensively by cost estimating organizations are based, for the most part, on historical cost data from programs that did not use these innovative practices. It is expected that these effects will differ greatly, depending on the specific acquisition and manufacturing practices adopted and on the type of equipment.

Classification: Secret/Proprietary Information

Sponsor: OSD/PA&E

Performer: IDA

Dr. Karen W. Tyson, (703) 845-2572

Resources:

FY	Dollars	Staff-years
96	$200K	1.3
97	$200K	1.3

Schedule:

Start	End
May 1996	Sep 1997

Data Base: *Title:* n/a

Description:

Automation:

Publications: TBD

Category: I.B

Keywords: Industry, Government, Estimating, Analysis, Weapon Systems, Electronics/Avionics, EMD, Production, Labor, Material, Overhead/Indirect, WBS, Acquisition Strategy, Automation, Advanced Technology, Data Collection, Case Study, Mathematical Modeling, Economic Analysis, Statistics/Regression, Method, CER, Study

IDA-19

Title: Affordable Multi-Missile Manufacturing (AM3)

Summary: IDA will support DARPA/DoD evaluation of missile industry cost reduction initiatives to be submitted in the form of Integrated Portfolio Benefit Analyses. As part of this support, IDA will provide guidance to the industry teams related to analytical ground rules and methods. IDA will comment on the realism of the proposed savings and, where appropriate, recommend adjustments. Summarized findings will be presented as a report, and will be used in the award of Phase III Factory Demonstrations.

Classification: Unclassified

Sponsor: Defense Advanced Research Projects Agency
3701 North Fairfax Drive
Arlington, VA 22203-1714

Dr. Michael F. McGrath, (703) 696-2224

Performer: IDA

Mr. Thomas P. Frazier (703) 845-2132

Resources:

FY	Dollars	Staff-years
96	$200,000	1.25
97	$200,000	1.25

Schedule:

Start	End
Nov 95	Jul 97

Data Base: *Title:*

Description: Updated and consolidated Missile Cost Estimating Relationships (CERS) from Tecolote, MCR, SAIC, NWC China Lake, USAF, industry, and IDA sources will be used to validate "business as usual/as is" cost levels. Industry cost savings initiates ("to be" cost environment) will be related and compared to the business as usual cost levels and affordability improvement trends will be documented.

Automation:

Publications: TBD

Categories: I.B, I.C, II.A.1, II.A.2

Keywords: Industry, Estimating, Analysis, Missiles, EMD, Production, Operations and Support, Labor, Material, Overhead/Indirect, Engineering, Manufacturing, Acquisition Strategy, Automation, Integration, Data Collection, Mathematical Modeling, Statistics/ Regression, Data Base, Review, CER, Study

IDA-20

Title: Technical and Schedule Risk Assessments for Tactical Aircraft Programs

Summary: This task supports Air Warfare/Strategic and Tactical Systems in providing independent program assessments of technical and schedule risks for tactical aircraft and missiles to the OIPT (Overarching Integrated Product Team) for DAB milestone reviews. This is a continuing project. [This task appeared in the 1996 catalog as IDA-11.]

Classification: Secret/Proprietary Information

Sponsor: USD(A&T), S&TS/AW, Room 3E1081, The Pentagon, Washington, DC 20301

Mr. Gissendanner, (703) 697-8183

Performer: IDA

Dr. J. R. Nelson, (703) 845-2571
Mr. Bruce Harmon, (703) 845-2501

Resources:

FY	Dollars	Staff-years
prior	$400,000	2.5
97	$ 75,000	0.4

Schedule:

Start	End
Feb 92	Continuing

Data Base: N/A

Publications: TBD

Category: I.C.2

Keywords: Government, Analysis, Aircraft, EMD, Production, Schedule, Data Collection, Data Base, Method

IDA-21

Title: Methods To Assess Schedules for the Strategic Defense System

Summary: The objective of this task is to develop methods for assessing the acquisition schedules of ballistic missile defense systems. The systems include space-based surveillance and interceptor systems, surface-based interceptor systems, and other surface-based elements. [This task appeared in the 1996 catalog as IDA-12.]

Classification: Unclassified

Sponsor: BMDO/PDE
Room 1E1037, The Pentagon
Washington, DC

Ms. Donna Snead, (703) 604-3584

Performer: IDA

Mr. Bruce Harmon, (703) 845-2510

Resources:

FY	Dollars	Staff-years
95	$50,000	0.4
96	$50,000	0.4

Schedule:

Start	End
Jan 91	Mar 98

Data Base: *Title:*

Description: Schedule and characteristic data on 26 unmanned spacecraft, 22 missile, and 51 software programs.

Automation: None

Publications: *Assessing Acquisition Schedules for Unmanned Spacecraft*, IDA Paper P-2766, April 1993.

Schedule Assessment Methods for Surface-Launched Interceptors, IDA Paper P-3014, August 1995.

Categories: I.C.2, II.A.2

Keywords: Government, Schedule, Estimating, Method, Statistics/Regression, Space Systems, Missiles, EMD, Production

IDA-22

Title: Integrated Schedule and Cost Model

Summary: Collect satellite and missile schedule and cost data, including functional costs over time at the program level from contractor and government sources. Investigate schedule and functional cost relationships at major acquisition milestones. Develop analytical model that provides estimates of changes in costs associated with changes in schedules and vice versa for satellite and missile systems. [This task appeared in the 1996 catalog as IDA-13.]

Classification: Proprietary Information

Sponsor: BMDO
Director, Cost Estimating and Analysis
The Pentagon, Room 1E1037
Washington, DC 20301

Ms. Donna Snead, (703) 693-1813

Performer: IDA

Mr. James Bui, (703) 845-2133
Mr. Bruce Harmon, (703) 845-2501

Resources:

FY	*Dollars*	*Staff-years*	*FY*	*Dollars*	*Staff-years*
96	$100,000	0.6	96	$50,000	0.3

Schedule:

Start	*End*
Jun 94	Mar 98

Data Base: *Title:*

Description: Contractor-provided and CCDR functional cost over time data for selected space and missile systems. Program-level functional RDT&E and production costs. Satellite and missile schedule information collected by IDA.

Automation: Excel Spreadsheets

Publications: TBD

Category: II.A

Keywords: Government, Industry, Estimating, Space Systems, Missiles, EMD, Production, Engineering, Manufacturing, WBS, Statistics/Regression, CER, Data Collection, Data Base, Mathematical Model, CPR/CCDR, Schedule

IDA-23

Title: Resource Analysis for Test and Evaluation

Summary: Analysis of resources devoted to the Major Range and Test Facility Base to include operating cost, investment cost, and personnel resources. Analyses include cost comparisons of alternative approaches to developing test and evaluation capability and realigning workload within existing infrastructure. Evaluation will include identification of efficiencies in management, operations, and resource processing. [This task appeared in the 1996 catalog as IDA-19.]

Classification: Top Secret

Sponsor: Deputy Director
Defense Test System Engineering and Evaluation (DTSEE)
Room 3D1067, The Pentagon
Washington, DC 20301

Mr. John F. Gehrig, (703)697-4818

Performer: IDA

Mr. Charles T. Ackerman, (703) 578-2714
Mr. Dennis O. Madl (703) 578-2718

Resources:

FY	*Dollars*	*Staff-years*
97	$1,700,000	10

Schedule:

Start	*End*
Oct 96	Apr 98

Data Base: *Title:* T&E Resources

Description: Operating Cost, Investment Projects, Real Property

Automation: Hard copy, floppies or hard disk

Publications: *Cost Comparison of the Navy's Air Combat Environment Test and Evaluation Facility (ACETEF) and the Air Force's Electronic Combat Integrated Test (ECIT)*, IDA Paper P-2727, June 1992.

The Need for Unexploded Ordnance Remediation Technology, IDA Document D-1527, October 1992.

Test and Evaluation Reliance - An Assessment, IDA Document D-1829, June 1996.

Category: II.A

Keywords: Government, Analysis, Policy, Programming, Budgeting, Infrastructure, EMD, Test and Evaluation, Operations and Support, Acquisition Strategy, Labor, Overhead/Indirect, Economic Analysis, Study, Data Base

IDA-24

Title: Program Risk Analysis and Management

Summary: The objective of this task is to develop algorithms by which contractors may develop more reasonable risk margins for bidding on production contracts. In addition, the task will investigate mechanisms by which the government may review and monitor contractor risk estimates. [This task appeared in the 1996 catalog as IDA-10.]

Classification: Unclassified

Sponsor: USD(A&T)
Acquisition Program Integration

Mr. Wayne Abba, (703) 695-5166

Performer: IDA

Dr. Matthew S. Goldberg, (703) 845-2099

Resources:

FY	Dollars	Staff-years
95	$700,000	4.0
96	$400,000	2.3

Schedule:

Start	End
Dec 94	Sep 97

Data Base: N/A

Publications: Final report due at end of project.

Category: I.C.2

Keywords: Industry, Government, Estimating, Reviewing/Monitoring, Budgeting, Missiles, Production, WBS, Risk/Uncertainty, Acquisition Strategy, Mathematical Modeling, Data Base, Review, Method

IDA-25

Title: Estimation of Medical-Specific Inflation Indices

Summary: This task is investigating the sources of inflation in medical care provided directly at military hospitals. Particular attention is being given to the volume and intensity of medical care, as well as the influence of technology on the cost of care.

Classification: Unclassified

Sponsor: Director, Program Analysis and Evaluation

Mr. Paul F. Dickens III, (703) 697-2999

Performer: IDA

Dr. Matthew S. Goldberg, (703) 845-2099

Resources:	*FY*	*Dollars*	*Staff-years*
	95	$250,000	1.5

Schedule:	*Start*	*End*
	Jan 95	Sep 97

Data Base: N/A

Publications: Final report due at end of project.

Category: II.C

Keywords: Government, Programming, Budgeting, Infrastructure, Operations and Support, Advanced Technology, Economic Analysis, Cost/Production Function, Statistics/Regression, Study

IDA-26

Title: Evaluation of Uniformed Services Treatment Facilities

Summary: The primary objective of this task was a cost-effectiveness analysis of a Managed Care Plan (MCP) available at Uniformed Services Treatment Facilities (USTFs). The DoD has a contract with each USTF to provide health care at a capitated rate based on the sex and age group of the beneficiaries served. This study assessed the impact of the MCP on the access to and quality of care received by covered beneficiaries, and compared the cost of the MCP with an estimate of what the cost would have been had other sources of government health care been used. [This task appeared in the 1996 catalog as IDA-25.]

Classification: Unclassified

Sponsor: OASD (HA/HSF)
The Pentagon, Room 1B657
Washington, DC 20301

Mr. Gunther J. Zimmerman, (703) 695-3331

Performer: IDA

Dr. Philip M. Lurie, (703) 845-2118

Resources:	*FY*	*Dollars*	*Staff-years*
	95	$400,000	2.5

Schedule:	*Start*	*End*
	Feb 95	Sep 96

Data Base: None

Publications: *Evaluation of the Uniformed Services Family Health Plan*, IDA Paper P-3199, August 1996 (pending).

Categories: II.A.1, II.A.2, II.B

Keywords: Government, Analysis, Policy, Manpower/Personnel, Test and Evaluation, Variable Costs, Data Collection, Survey, Mathematical Modeling, Economic Analysis, Data Base, Study

IDA-27

Title: Evaluation of TRICARE Program Costs

Summary: The DoD is implementing a congressionally mandated uniform health care benefit, including an HMO option, for beneficiaries eligible for military health care. This new program, called TRICARE, is designed to improve the access to and quality of health care, while not increasing costs to either the government or covered beneficiaries. The objectives of this task are (1) to compare the costs, both to the government and to covered beneficiaries, of the TRICARE program with those of the traditional benefit of direct care and CHAMPUS, and (2) determine the impact of TRICARE on the out-of-pocket expenses of military retirees.

Classification: Unclassified

Sponsor: OASD (HSO&R)
The Pentagon, Room 1D511
Washington, DC 20301

Col. Jerome Luby, (703) 614-4705

Performer: IDA

Dr. Philip M. Lurie, (703) 845-2118

Resources:

FY	*Dollars*	*Staff-years*
97	$750,000	3.5

Schedule:

Start	*End*
Oct 96	Sep 99

Data Base: None

Publications: None

Categories: II.A.1, II.A.2, II.B

Keywords: Government, Analysis, Policy, Manpower/Personnel, Test and Evaluation, Variable Costs, Data Collection, Survey, Mathematical Modeling, Economic Analysis, Data Base, Study

IDA-28

Title: Financial Databases of Defense Manufacturers

Summary: The Weapon Systems Cost Analysis Division of PA&E is continually involved in both acquisition policy determination as well as the cost analysis of the effects of DoD programmatic actions on individual contractors in specific programs. While the economics profession has a well-developed theory of the firm to apply to commercial markets, many of the important and unique characteristics of the defense market-place are ignored. Thus, many of the policy judgments about acquisition issues are neither grounded in adequate microeconomic theory, nor based on empirical research. Dramatic increases in defense contractor overhead costs as a general trend in the industry continue to compromise the affordability of weapon systems. Between 1980 and 1989 OSD(PA&E) funded IDA collection of financial data on 12 defense contractors. The database extends through 1987 for most contractors. IDA used the data to decompose overhead in to fixed and overhead components. The effort needs to be extended to update the database. The financial databases for the original contractors will be updated and extended to include most recent data available. These data will be structured to ensure consistency with earlier IDA reports on the same contractors and will be used to update

the overhead statistical models. IDA will also establish an automated database for storage and retrieval.

Classification: Unclassified, Proprietary

Sponsor: OSD(PA&E)
Weapon Systems Cost Analysis Division
Room 2D310, The Pentagon
Washington, DC 20301

Mr. Gary Pennett, (703) 695-7282

Performer: IDA

Mr. John Cloos, (703) 845-2506

Resources:

FY	*Dollars*	*Staff-years*
94	$150,000	1
95	$100,000	0.6
96	$100,000	0.6

Schedule:

Start	*End*
1994	1998

Data Base: Normalized Contractor Account Pools

Publications: Numerous company reports and studies.

Categories: II.A.1, II.A.2

Keywords: Industry, Estimating, Analysis, Aircraft, Airframe, EMD, Production, Overhead/ Indirect, Manufacturing, Fixed Costs, Variable Costs, Data Collection, Survey, Economic, Analysis, Data Base

IDA-29

Title: Private Shipbuilder Overhead Costs

Summary: The Weapon Systems Cost Analysis Division of PA&E is continually involved in both acquisition policy determination as well as the cost analysis of the effects of DoD programmatic actions on individual contractors in specific programs. While the economics profession has a well-developed theory of the firm to apply to commercial markets, many of the important and unique characteristics of the defense market-place are ignored. Thus, many of the policy judgments about acquisition issues are neither grounded in adequate microeconomic theory, nor based on empirical research. Dramatic increases in defense contractor overhead costs as a general trend in the industry continue to compromise the affordability of Naval ships, weapon systems, and hull mechanical and electrical ship board components. This is a continuation of a task that studies the overhead cost structure of six private shipyards to gain a better understanding of the root cause of these upward cost trends. The financial databases for the shipyards initiated in last year's study will be extended to most aspects of cost distribution and allocations in cost pools. These data will be structured to ensure consistency with earlier IDA reports on the same contractors and will be used to update the overhead statistical models.

Classification: Unclassified, Proprietary

Sponsor: OSD(PA&E)
Weapon Systems Cost Analysis Division
Room 2D310, The Pentagon
Washington, DC 20301

Mr. Gary Pennett, (703) 695-7282

Performer: IDA

Mr. John Cloos, (703) 845-2506

Resources:

FY	*Dollars*	*Staff-years*
95	$340,000	

Schedule:

Start	*End*
93	99

Data Base: Normalized Contractor Account Pools

Publications: Multiple publications, including individual contractor reports.

Categories: II.A.1, II.A.2

Keywords: Industry, Estimating, Ships, Production, Labor, Material, Overhead/Indirect, Engineering, Manufacturing, WBS, Data Collection, Mathematical Modeling, Statistics/Regression, Data Base, Study

IDA-30

Title: Economic Drivers of Defense Overhead Costs

Summary: The objective of this task is to identify the economic and regulatory factors that drive the overhead costs charged by defense firms. A theoretical model of overhead costs from an economic framework will be developed. The model will be used to analyze the relationship of economic factors and DoD regulations on contractor overhead costs under current business practices. The model will also assess how changes in DoD regulations impact the balance of economic forces. This project address the "Knotty Problems" paragraph in the DoD Six Year Cost Research Plan.

Classification: Unclassified/Company Proprietary

Sponsor: OD(PA&E)
Room 1D311, The Pentagon
Washington, DC 20301

Ms. Kristine Kolesar, (202) 697-2999

Performer: IDA

Dr. Thomas Frazier, (703) 845-2132
Dr. An-Jen Tia, (703) 845-2448
Dr. Bill Rogerson, (847) 491-8484

Resources:

FY	*Dollars*	*Staff-years*
95	$250,000	
96	$250,000	

Schedule:

Start	*End*
Apr 95	Sep 98

Data Base: *Title:* IDA's Defense Contractor Overhead Data Base, Contractor Cost Data Reports

Description:

Automation: TBD

Publications: *Renegotiation of Fixed Price Contracts on the F-16 Program*, IDA Paper P-3286, December 1996.

Category: II.C

Keywords: Government, Estimating, Overhead/Indirect, Economic Analysis, Study

IDA-31

Title: Contractor Cost Data Reporting (CCDR) Clearinghouse/Repository

Summary: The DoD develops cost estimates of major weapon systems using historical data, the primary sources of which are the Contractor Cost Data Reports (CCDRs) provided by hundreds of defense contractors. At this time, most of this data is transmitted in paper copy form, is not validated, and is difficult to store and disseminate in a useful manner on a wide-scale basis. To be of optimal use, these reports have to be in electronic form and be catalogued, validated, normalized, and distributed by a clearinghouse staff (5 personnel), with the assistance of a central electronic data repository. We are currently requiring contractors to submit the CCDR report in a universally accepted electronic format. The central repository will require a sophisticated suite of relational database software and hardware to handle the attendant large-scale electronic data transmissions and queries. This effort will include development of automated tools for mapping corporate accounting data into formats prescribed by the CCDR reporting system, as well as a fully operating data repository that will convert the CCDR report data into a database for easy retrieval and use by DoD-wide cost analysts.

Classification: Unclassified

Sponsor: OSD(PA&E), WSCAD
The Pentagon, Room 2D-310
Washington, DC 20301

Thomas J. Coonce, (703) 697-0374

Performer: To Be Determined

Resources:

FY	*Dollars*	*Staff-years*
96	$402,400	
97	$ 0	
98	$250,000	

Schedule:

Start	*End*
Oct 96	Sep 99

Data Base: *Title:*

Description:

Automation:

Publications:

Category: II.A.2

Keywords: Government, Industry, Analysis, Labor, Material, Schedule, Study

IDA-32

Title: Cost and Operational Effectiveness Analysis (COEA) for Pre-positioned Equipment Maintenance Facilities: The Army Facility at Charleston, SC, and the Marine Corps Facility at Blount Island, FL.

Summary: Collocating the two sites is unattractive: the fixed costs are substantial, the annual savings are small, and there are significant operational and cost risks.

Classification: Unclassified

Sponsor: Joint Staff, Director of Logistics (J-4)

Performer: Dr. Daniel B. Levine, Dr. Harold Balaban, Mr. Bernard J. McHugh, Mr. George Tolis, RADM Robert P. Hilton, Sr. (Ret), Mr. Robert Suchan

Resources:

FY	*Dollars*	*Staff-years*
96	$200,000	1.25
97	$100,000	0.63

Schedule:

Start	*End*
May 96	Dec 96

Data Base: *Title:*

Description:

Automation:

Publications: In process

Category: I.A

Keywords: Government, Estimating, Infrastructure, Operations and Support, Labor, Material, Data Collection, Economic Analysis, Study

IDA-33

Title: Reserve Component Volunteerism

Summary: This work is designed to develop an understanding of the need to have members of the reserve components available to pursue combat or non-combat scenarios in circumstances that are unlikely to involve involuntary activation of reserve personnel. It will evaluate the extent to which it is necessary to have pre-identified individuals or units that are known to be available on a voluntary basis in these circumstances. It will also develop policies to support such a program of reserve volunteerism if one is determined to be needed. The potential cost of these policies will be examined.

Classification: Unclassified

Sponsor: Assistant Secretary of Defense (Reserve Affairs)
The Pentagon, Room 2E515
Washington, DC 20301

Colonel Michael Angelo, (703) 697-0739

Performer: IDA

Mr. Stanley A. Horowitz, (703) 845-2450

Resources:

FY	*Dollars*	*Staff-years*
94	$250,000	2.0

Schedule:

Start	*End*
Apr 94	Nov 95

Data Base: *Title:*

Description: Categorization of requirements for reserve volunteers by type of contingency, type of unit, and military specialty personnel.

Automation: Microcomputer floppy disks

Publications: *Reserve Volunteerism*, IDA Paper P-3153, Institute for Defense Analyses, April 1996.

Case Studies in Reserve Component Volunteerism: The 711th Postal Company in Operation Restore Hope Document D-1664, Institute for Defense Analyses, April 1995.

Case Studies in Reserve Component Volunteerism: The 670th Military Police Company in Operation Uphold Democracy, Document D-1663, Institute for Defense Analyses, May 1995.

Case Studies in Reserve Component Volunteerism: A Composite Battalion Task Force for the U.S. Army Element of the Multinational Force and Observers Mission, Sinai, Document D-1665, Institute for Defense Analyses, May 1995.

Case Studies in Reserve Component Volunteerism: The 175th Fighter Group, Maryland National Guard, Over Bosnia, Document D-1667, Institute for Defense Analyses, May 1995.

Case Studies in Reserve Component Volunteerism: The 258th Quartermaster Supply Company, Document D-1668, Institute for Defense Analyses, May 1995.

Case Studies in Reserve Component Volunteerism: E Company Reinforced, 2nd Battalion, 25th Marine Regiment in Guantanamo, Cuba, Document D-1695, Institute for Defense Analyses, July 1995.

Category: II.C

Keywords: Government, Analysis, Policy, Manpower/Personnel, Labor, Readiness, Data Collection, Data Base, Study

IDA-34

Title: Active/Reserve Integration

Summary: This work is designed to examine alternative ways to integrate active and reserve forces, particularly in the Army. For Army National Guard combat units, a key aspect of successful integration is being able to mobilize, train, and deploy for combat fast enough to effectively carry out its combat mission. The great uncertainty surrounding how long it would take Guard brigades and divisions to deploy has led this subject to be the focus of work on the task.

Classification: Unclassified

Sponsor: Assistant Secretary of Defense (Reserve Affairs)
The Pentagon, Room 2E515
Washington, DC 0301

Mr. Joel Resnick, (703) 695-7305

Performer: IDA

Mr. Stanley A. Horowitz, (703) 845-2450

Resources:

FY	*Dollars*	*Staff-years*
96	$175,000	1.0
97	$250,000	1.4

Schedule:

Start	*End*
Jan 96	Dec 97

Data Base: *Title:*

Description: Plan for mobilization, training, and deployment of a National Guard armored division.

Automation: Microcomputer zip drive

Publications: *Conference on Force Integration: Seeking Better Reserve Component Capability and Credibility*, Institute for Defense Analyses, Document D-1849, May 1996.

Category: II.C

Keywords: Government, Analysis, Policy, Manpower/Personnel, Labor, Readiness, Data Collection, Data Base, Study

IDA-35

Title: Environmental Costs, Unexploded Ordnance Remediation

Summary: The objective of this task is to identify the cost drivers in the remediation of unexploded ordnance from Department of Defense (DoD) lands. This information will enable the DoD to conduct payback analysis on the introduction of new technology into the remediation process, determine the appropriateness of fixed cost contracts for cleanup, and determine a rational basis for deciding whether or not to attempt to remediate contaminated lands.

Classification: Unclassified

Sponsor: IDA Central Research Project

Performer: IDA

Ms. Christine J. Crabill, (703)578-2716

Resources:

FY	Dollars	Staff-years
96	$15,000	0.2

Schedule:

Start	End
Oct 96	Sep 97

Data Base: *Title:*

Description:

Automation:

Publications: TBD

Category: I.D

Keywords: Environment

IDA-36

Title: Defense Economic Planning and Projection Systems (DEPPS)

Summary: Maintain the currency of the Defense Translator within DEPPS by periodically updating the various sections of the translator associated with the appropriations accounts. The Defense Translator accounts for the distribution of defense spending among the industries producing the goods and services that DoD buys, and describes the commodity composition of defense demands.

Classification: Unclassified

Sponsor: OSD (PA&E)/RA/EARPD
Room 2D300, The Pentagon
Washington, DC 20301

Mr. Paul Dickens, (703) 697-2999

Performer: IDA

Dr. Thomas Frazier, (703) 845-2132
Mr. Jeff Card, (703) 845-2212

Resources:

FY	Dollars	Staff-years
85	$122,000	1.0
87	$182,000	1.5
88	$ 40,000	0.3
90	$ 75,000	0.6

92	$ 60,000	0.5
93	$ 80,000	0.7
94	$160,000	1.1
97	$ 30,000	0.2

Schedule:

Start	*End*
Jul 85	Dec 94

Data Base: N/A

Publications: *A Comparison of the DEIMS and the Department of Commerce Translator Vectors*, IDA Paper P-2647, T. P. Frazier, S. K. Welman, and R. H. White, March 1993, Unclassified.

A User's Manual for the Revised Defense Translator Model, IDA Document D-796, T. P. Frazier and J. B. Tate, June 1990, Unclassified.

The Revised Defense Translator, IDA Paper P-2141, T. P. Frazier, C. G. Campbell, and R. T. Cheslow, October 1989, Unclassified.

Categories: II.A.1, II.A.2

Keywords: Government, Analysis, Budgeting, Forces, Production, Manufacturing, Mathematical Modeling, Economic Analysis, Study

IDA-37

Title: Coast Guard Models

Summary: Analyze the Coast Guard's needs for cost models to support the full spectrum of its cost-estimating needs. Survey the staff of Coast Guard headquarters and examine governing federal and Department of Transportation requirements to develop a statement of cost-modeling requirements. Develop a cost estimating framework that provides a standard Coast Guard structure. Design, prototype, and develop a project oriented, life-cycle cost model that meets the Coast Guard's requirements for developing cost estimates for Planning Proposals prepared by field activities and program change analyses typically performed by Headquarters organizations.

Classification: Unclassified

Sponsor: U.S. Coast Guard Research and Development Center
1082 Shennecossett Road
Groton, CT

Mr. Clark Prichett, (203) 441-2653

Performer: IDA

Mr. James L. Wilson, (703) 845-2469

Resources:

FY	*Dollars*	*Staff-years*	*FY*	*Dollars*	*Staff-years*
93	$ 10,000	0.1	96	$100,000	0.6
94	$ 75,000	0.5	97	$190,000	1.1
95	$280,000	1.8			

Schedule:

Start	*End*
Jul 93	Sep 96

Data Base: None

Publications: Pending

Categories: II.C, II.D

Keywords: Government, Estimating, Life Cycle, Fixed Costs, Variable Costs, Computer Model

IDA-38

Title: Cost Analysis Education

Summary: IDA collaborated with George Mason University in the development and conduct of a graduate-level course in cost analysis during the past four years. Current plans are to continue to offer the course annually. Course content focused on the daily problems confronted by defense cost analysts and approaches to solve them. Government employees are invited to attend lectures free of charge. This project supports the development of lecture materials by IDA cost analysts. [This task appeared in the 1996 catalog as IDA-37.]

Classification: Unclassified

Sponsor: IDA Central Research Program

Performer: IDA

Dr. Stephen Balut, (703) 845-2527

Resources:

FY	*Dollars*	*Staff-years*
97	$25,000	0.3

Schedule:

Start	*End*
Oct 96	May 97

Data Base: None

Publications: None

Category: II.A.1

Keywords: Government, Analysis, Forces

IDA-39

Title: IDA Cost Research Symposium

Summary: IDA conducts a cost research symposium to facilitate the exchange of information on cost research that is in progress and planned, thereby avoiding wasteful duplication of effort and providing for more informed research planning decisions by participating offices. The Chairman, OSD CAIG, cosponsors this symposium. The 1997 Symposium will focus on the DoD Six Year Cost Research Plan and the actions needed to update it. Documentation of the symposium includes a catalog of cost research projects recently completed or still in progress at participating offices.

Classification: Unclassified

Sponsor: IDA Central Research Program

OSD(PA&E)

Performer: IDA

Dr. Stephen J. Balut, (703) 845-2527

Resources:

FY	*Dollars*	*Staff-years*
	$45,000	0.3

Schedule:

Start	*End*
Oct 96	Sep 97

Data Base: *Title:* DoD Cost Research Projects

Description: Summary descriptions of cost research projects (an example is this description)

Automation: None

Publications: *The 1997 IDA Cost Research Symposium*, Dr. Stephen J. Balut, August 1997, Unclassified, Pending

Category: II.A.1

Keywords: Government, Reviewing/Monitoring, Forces, Weapon Systems, Life Cycle, Data Collection, Data Base

THE ARMY FORCE COST MODEL

I. BACKGROUND

The Army Force Cost Model[1] (FCM) can be used to estimate the costs to form, operate, move, inactivate, and modify a standard Army unit. The FCM is a major component of the Army's Force and Organization Cost Estimating System (FORCES). The model was developed by the Army Cost and Economic Analysis Center (CEAC), starting in 1988, as a follow-on to the Force Cost Information System and Army Force Planning Cost Handbook that were developed during the 1970s.

II. PURPOSE

The FCM was needed by CEAC to answer the question "how much does it cost to buy and operate an Army Division." This is a question frequently asked by the Army Deputy Chief of Staff, Operations, and also by the U. S. Congress. The model was designed to answer the more general question "how much does it cost to buy and operate an Army unit," where the unit is not limited to a Division but can be selected and described by the user. The largest standard unit that can be addressed by the FCM is the Division. The model can estimate the costs of more than one unit at a time. The FCM does not address all of the organizations and cost elements contained in the Army budget. In this light, the FCM is not really an Army "force" cost model. It is rather an Army "unit" cost model.

Although not part of the original purpose, the FCM has been expanded to provide answers to questions about the costs to:

- move units during deployments and reorganizations,
- operate units at a higher tempo during contingencies,
- inactivate a unit, and
- modify a unit through modernization or reorganization.

The FCM is routinely used by the Army cost community and also other Army offices. For example, analysts at the Army Forces Command use it to estimate the costs to modify and modernize Army units (e.g., changing from an M-1 Battalion to an M1A1 Battalion). The Army Budget Office uses FCM to estimate the operating and transportation costs of units to be deployed on contingency operations. The Army Concepts Analysis Agency uses FCM in conjunction with its force development model.

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[1] *An Introduction to the Force Cost Model,* US Army Cost and Economic Analysis Center, October 1994.

The FCM is also used by offices outside the Army for a variety of purposes, including support of studies of readiness and force levels.

III. STRUCTURE

The FCM consists of two main parts: first, the "estimating" part that allows a user to estimate the cost of a unit that he describes, and second, the "maintenance" part that allows the model maintainer to update the databases used by the "estimating" part (see Figure 1). The databases contain unit composition (e.g., assigned equipment, personnel, operating tempo) and costs and/or cost factors for pieces of equipment, categories of personnel, types of ammunition, clothing allowances, etc.

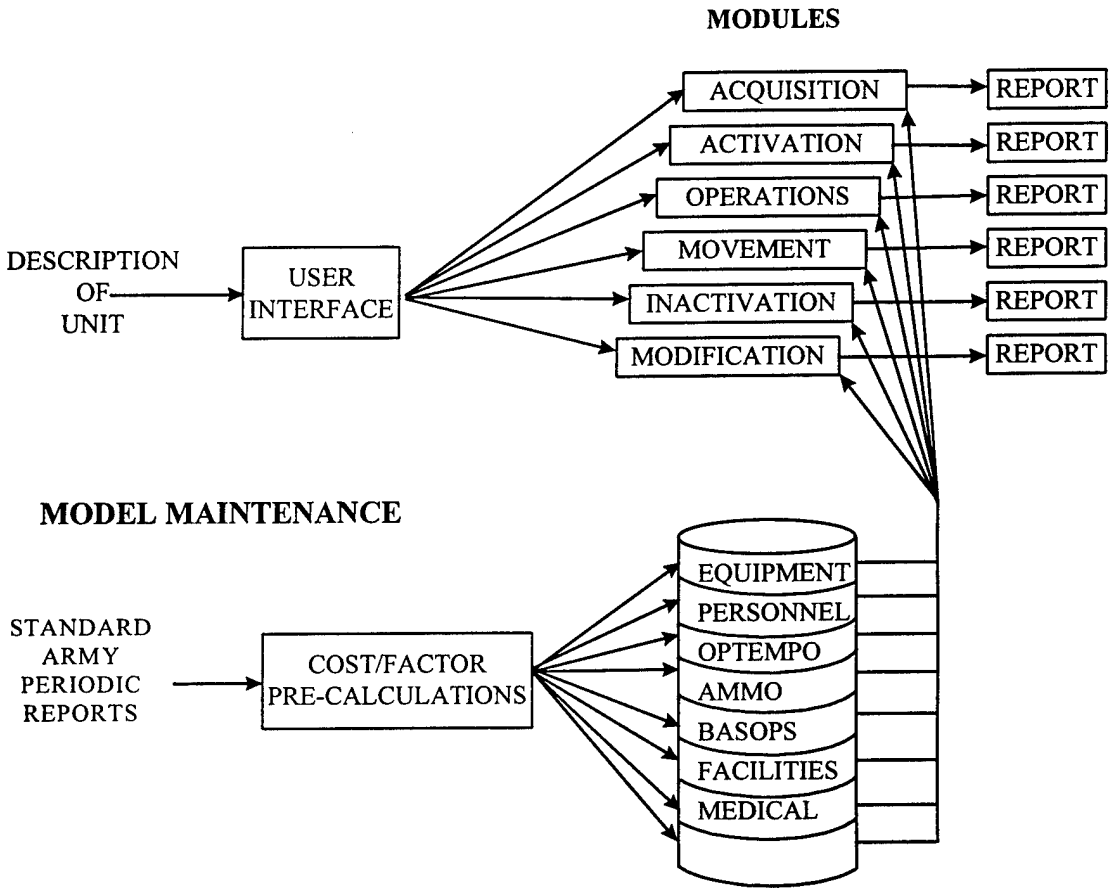


Figure 1. FCM Structure

A. Estimating

The estimating part of the FCM contains a user interface to allow the user to describe the unit (type of unit, Authorized Level of Organization (ALO), location, Major Command (MACOM) assignment, C-rating, component (e.g., active, reserve), and six separate modules that calculate the costs of interest to the user and also produce reports that describe the unit and unit costs. The function of each module is described below.

1. *Acquisition*: Estimates the costs to procure all material and personnel associated with the unit.

2. *Activation*: Estimates the costs to activate a unit at a specified location.

3. *Operations*: Estimates the direct and indirect costs to operate a unit during peacetime in a specific location.

4. *Movement*: Estimates the costs to move an entire unit from one location to another.

5. *Inactivation*: Estimates the costs and possible savings resulting from inactivating and dissolving a unit without replacement.

6. *Modification*: Estimates the costs to modify the composition, location, or operation of a unit.

Each module produces a report that documents the unit description supplied by the user and the associated costs at an appropriate level of detail.

B. Maintenance

The FCM develops estimates of costs by applying costs or cost factors that are pre-calculated and stored in databases. The costs and cost factors are derived from data extracted from standard Army reports, such as the Tables of Organization and Equipment (TOE), the VAMOSC system, Supply Bulletin SB 700-20, and others. These periodic reports are collected by the model maintainer and used annually to revise and update costs and cost factors contained in the databases.

IV. ASSUMPTIONS

The FCM cost estimating methodologies (as described in the next section) are based on the following assumptions.

- Historical relationships between costs and cost drivers will remain constant over the forecasting period. Trends in costs (e.g., rising medical costs) are not taken into consideration.
- Equipment acquisition costs are based on average costs. Cost progress is not taken into account in the calculations.
- The costs of Army officers, warrant officers, and enlisted personnel above grade E-3 are sunk. The costs of changes in unit strength (number of personnel assigned to the unit) involve only the costs associated with enlisted personnel in grade E-3 and below. (The one exception to this is when specific changes in the number of officers, warrant officers, or enlisted above grade E-3 are entered by the user while using the Modification module.)
- If a unit is inactivated, assigned personnel will be reassigned, not discharged.

V. METHODOLOGY

All estimating calculations are performed in the modules listed previously. The nature of the calculations mainly involves multiplication of quantities of items times the cost per item, and summing across items. In certain cases, factors are applied to estimate partial costs. The methodology used by each module is described below.

1. *Acquisition*

Given the user's description of a particular unit, the acquisition module simply extracts different categories of costs for this type of unit from underlying databases and adds them up. These costs are precomputed and stored. The categories of costs included in the total are:

- Equipment acquisition
- Personnel pay and allowances
- Consumables and reparable parts stockage
- Ammunition initial issue
- Common Table of Allowance (CTA) field equipment and medical supplies
- Technical and doctrinal publications
- Training through initial MOS
- Training ammunition and missiles
- Organizational Clothing and Individual Equipment (OCIE)
- Class 1, 2, 3 Basic Load
- Replenishment spares and repair parts
- Recruiting

2. *Activation*

The activation module computes two types of costs and accepts a third type as follows.

a. Transportation of material. Precomputed tonnages of equipment by type (e.g., track, wheeled) are multiplied by the cost per mile by type by transportation option (e.g., truck, bus, rail , air) and summed. Port handling rates are added to these sums if the unit will be activated overseas.
b. Transportation of personnel. The numbers of officers, warrant officers, and enlisted are multiplied by the applicable rotational Permanent Change of Station (PCS) cost factors and summed.
c. Military Construction. These costs are determined outside the model and added off-line by the user.

3. *Operations*

The cost to support an annual training cycle of a unit is estimated as the sum of four parts: direct OPTEMPO, indirect OPTEMPO, Personnel, and Other Unit Support. The methodology used in each case is described in the following sections.

a. Direct OPTEMPO

Direct OPTEMPO costs are computed using the following equation.

$$ADOC = [\sum D*O*(R_{ij}+C_{ij}+P_{ij})]*NOS + TA\&M$$

where:

ADOC = Annual Direct OPTEMPO Costs
D = Density (quantity of items assigned to the unit)
O = OPTEMPO (usage per item per year, e.g., miles per year; hours per year; etc.)
R_{ij} = Cost factor for reparables (e.g., dollars per mile; dollars per hour; etc.) in MACOM i at C-rating j
C_{ij} = Cost factor for consumables (e.g., dollars per mile; dollars per hour; etc.) in MACOM i at C-rating j
P_{ij} = Cost factor for POL (e.g., dollars per mile; dollars per hour) in MACOM i at C-rating j
NOS = Non-OSMIS cost factor (scaling factor to account for items not in OSMIS)
TA&M = Training Ammo and Missile costs (precomputed)

and the summation is over all items of equipment in the unit.

b. Indirect OPTEMPO

Indirect OPTEMPO costs differ from one location to the next and also according the major command to which they are assigned. These costs are calculated using the following equation.

$$IOC_{ij} = S_j*(T_i+SE_i+M_i+E_i+C_i+Pe_i+A_i+CL_i+O_i)$$

where:

IOC_i = Indirect OPTEMPO costs at location i and Authorized Level of Organization (ALO) j

S_j = Unit strength (number of people assigned) at ALO j

T_i = Transportation costs per capita at location i

SE_i = Supplies and Equipment costs per capita at location i

M_i = Mission travel costs per capita at location i

E_i = Equipment leases per capita at location i

C_i = Contractor services per capita at location i

PE_i = Purchased equipment per capita at location i

A_i = Administrative travel per capita at location i

CL_i = Civilian labor per capita at location i

O_i = Other costs per capita at location i

c. Personnel

Personnel costs include all pay and allowances for all personnel assigned to the unit plus the costs associated with attrition. The latter costs include replacement training, clothing initial issue, and PCS costs for both military and dependents. The following equation is used.

$$PC_i = P_i + A_i*(T + C + PCS_i)$$

where:

PC_i = Annual personnel costs for the unit while at location i

P_i = Annual pay and allowances for all personnel assigned to the unit at location i (precomputed)

A_i = Attrition factor for the unit at location i

T = Annual cost of training through initial MOS for the unit (precomputed)

C = Clothing initial issue costs (precomputed)

PCS_i = Annual PCS costs for the unit at location i (precomputed)

d. Other Unit Support

Other Unit Support is calculated using the following equation.

$$OUS_i = S_j*(B_i + R_i + M_i + F_i + H_i)$$

where

OUS_i = Annual "other unit support" costs at location i

S_j = Unit strength (number of people assigned) at ALO j
B_i = Annual base operations costs per capita at location i
R_i = Annual RPMA costs per capita at location i
M_i = Annual medical support costs per capita, below general hospital, at location i
F_i = Annual family housing operations and maintenance costs per capita at location i
H_i = Annual per capita costs of family housing leases at location i

4. *Movement*

Movement costs are calculated in the same manner as activation costs (described previously) except only the costs of moving military personnel are calculated for tactical moves. That is, the costs of moving dependents are not included for tactical moves. The user specifies the starting location, the ending location, and type of move (tactical or administrative).

5. *Inactivation*

Inactivation costs are the net result of savings from not operating the inactivated unit and the added personnel and equipment operating costs at units where the people and equipment are to be transferred.

Savings in direct and indirect OPTEMPO and "other unit support" are calculated using the same methodologies as described above for the Operations module. One percent of the total value of the unit's equipment is added to complete deferred maintenance on the unit's equipment prior to transferring the equipment to another unit. Also, the cost to move the unit's equipment to a new unit is calculated using the methodology described previously for the Movement module. After equipment is moved to another unit, the receiving unit's operating cost will increase. These costs are not calculated by the inactivation module but rather must be calculated off-line and added.

Regarding personnel costs, it is assumed that Army endstrength will not change if a unit is inactivated. That is, personnel will be reassigned, not discharged. Under this assumption, the personnel-related costs of inactivation include PCS costs to move personnel to new units and differences in pay and allowances at the new units as compared to the old unit.

6. *Modification*

The Modification module uses the methodologies of the Acquisition and Operations modules to calculate the cost effects of changing equipment or personnel in a unit.

VI. DATA

In order to estimate costs as described above, the FCM requires data from many periodic standard Army reports. The following is a list of some of the key reports used by the FCM.

- TOE maintained by the Army Force Management Support Activity, Ft. Belvoir, VA.
- Supply Bulletin SB 700-20, prepared by the Logistics Support Activity, Redstone Arsenal, AL.
- Operating and Support Management Information System (OSMIS) factors, published by the Army Cost and Economic Analysis Center (CEAC).
- OPTEMPO factors obtained from the Battalion Level Training Model (BLTM) maintained by the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS).
- Personnel costs extracted from the Army Manpower Costing System (AMCOS) operated by CEAC.
- Base Operating and Support Costs (BASOPS) provided in cost factor handbooks prepared by various MACOMs.
- Facilities costs provided in cost factor handbooks prepared by various MACOMs.
- Indirect OPTEMPO costs published by CEAC.
- Ammunition costs extracted from the Training Ammunition Management Information System (TAMIS) maintained by ODCSOPS.
- Port handling rates provided by the Military Traffic Management Command (MTMC), Falls Church, VA.

VII. STRENGTHS AND WEAKNESSES

a. Strengths

- Unclassified. This allows wide distribution of the model and also open distribution of the estimates produced by the model.
- Widely accepted. The model has gained acceptance by the Army cost community and also offices outside the Army.
- Quick turnaround. The model structure and methodology allow very rapid turnaround on questions regarding the costs of units.
- Underlying data contained in standard Army reports. No special reporting requirements were placed on Army offices to support the FCM. All data are extracted from standard reports prepared for other purposes.
- Underlying data updated annually. This practice ensures the underlying data are no more than one year out of date.

b. Weaknesses

- Data requirements. The model depends on a very large amount of data that is obtained from many Army offices. The data are contained in standard reports that are prepared by these offices for other purposes. If reporting purposes at those offices change or go away, or the standard reports are canceled or modified, CEAC will be faced with finding new sources of data or modifying the model to operate without it.
- Updating. The FCM has been distributed widely (advertised and distributed on the Internet). CEAC is not able to keep track of all offices that have the model. Because of this, CEAC cannot contact all users to alert them to updates and changes to the FCM.
- Improper or unintended use. The FCM is readily available to anyone, including those who may not understand the model and its limitations. This can lead to misuse or incorrect interpretation of model outputs.
- Does not capture all costs. The model does not allocate certain Army infrastructure costs (e.g., logistics, training bases) to units. Because of this, the model outputs can be misinterpreted.
- Not able to estimate all of the costs of contingency operations. The FCM is not designed to estimate the costs associated with a contingency operation such as Bosnia. The demand for such cost estimates is increasing.

VIII. PLANNED IMPROVEMENTS

The Army has tentative plans to improve the FCM, depending on availability of funds to support the research required.

- Extend the FCM to allow estimation of the costs of a possible contingency operation.
- Introduce indirect cost factors to distribute Army infrastructure costs to units.
- Reduce the dependence on other organizations for underlying data.
- Develop training and education programs for those unfamiliar with the FCM.

THE IDA FORCE COST MODEL

I. BACKGROUND

A. Brief Description

The IDA Force Cost Model (FCM) is a forces-based, multiyear, marginal cost model. The Future Years Defense Program (FYDP) is the data source. Using this, the FCM estimates the mission, Service, and Department of Defense (DoD) budget changes resulting from a change in force structure. The resulting outputs (marginal costs) are displayed at the Service and appropriation level of detail. Personnel changes are also calculated and displayed by Service and type of personnel (active, guard, reserve; and officer, enlisted, civilian). The model relies on factors created directly from FYDP data for Operations and Support (O&S) costs and personnel numbers. Procurement appropriation changes are calculated using learning curve functions (first unit cost and slope) derived from FYDP data for the affected force element system. Other appropriations' changes are based upon time series relationships to the total defense budget. Marginal cost calculations can be added to the existing baseline to create a revised FYDP position.

B. Model Origin and Uses

The FCM is an outgrowth of the JCS Forces Planning Model, a cost and effectiveness model that IDA developed for the Joint Staff in the mid-1980s. The FCM represents the cost portion of the work that was written in Fortran for a VAX computer. The FCM concepts were translated to the PC using Microsoft Excel and the C programming language. The Forces Planning Model is described in IDA Paper P-2337, January 1991, Volumes I-III. The PC version of the FCM was developed with funding from OUSD(A&T)/API/AR and is one of several models that make up the Force Acquisition Cost System (FACS), described further in *A User's Guide for the Force Acquisition Cost System (FACS)*, IDA Paper P-2550, January 1991.

The FCM is often referred to as the FACS model. In fact, it is only one of the models in FACS. The FACS, particularly FCM, is currently used by the following offices to develop costs of force changes:

- OUSD(A&T)/API/AR (Acquisition Program Integration, Acquisition Resources)
- OD(PA&E)/Force and Infrastructure Cost Analysis Division
- OD(PA&E)/Force Structure Division
- HQ USAF/XPY (Plans and Programs, Analysis Division)
- HQ USMC/C&A (Deputy Chief of Staff, Programs and Resources, Cost and Analysis Section)
- HQ USN (DCNO/Resources, Warfare Requirements, N80, Programming Division) and,
- the Joint Staff (J-8)/ Program Budget Analysis Division.

II. PURPOSE

The purpose of the FCM is to estimate changes in costs when changes are made to the force structure of the FYDP. The FCM was developed to assist OUSD(A&T) personnel in long-range planning of acquisition programs. By varying the forces in years beyond the FYDP period, analysts observe how procurement programs could be structured and whether or not they are affordable in the overall context of DoD funding projections. Separate calculations are made to estimate the research and development, investment, and O&S costs, and for manpower changes that occur when forces are modified. The FCM provides results that, while not budget quality, are sufficiently accurate for long-range planning purposes.[1]

A significant benefit of FCM is its ability to response to "what if" questions in a timely manner. The calculation of the budget and manpower changes following a force change takes only seconds to minutes, depending upon the number of force changes entered.

III. ASSUMPTIONS

The primary assumption in the FCM is that the FYDP is a good source of cost data. While some may disagree with this assumption, it permits cost calculations to be

[1] Other FACS models developed to assist the analyst in making force-related decisions concerning future programs include an age model to provide information about the average age of combat systems; a procurement only model which provides greater detail on individual procurement programs, including cost/quantity calculations and learning curve graphs; and an RDT&E model that allows planning of R&D budgets. An additional, non-FYDP based tool is a new systems model. This allows the analyst to design a new aircraft, ship, or tank by specifying certain physical and design characteristics. The new systems model then displays a development cost, production cost, and operating cost for the new system.

made that can be traced to a known data source that has been consistently developed and is recognized to represent the programmatic views of each service and agency.

Another important assumption incorporated into the FCM is that the cost factors for O&S, investment, and development derived from the FYDP are valid for estimating the costs associated with future force structure changes. These factors are derived in various ways from the current and historical FYDP. In addition, it is assumed that an accurate representation of the cost-quantity relationship for items to be procured can be derived from the Procurement Annex.

Considerable effort has been made to ensure that the cost factors used by the model are always readily available for review and modification. In some instances, separate O&S cost calculations using parametric equations derived from historical data are made to provide another cross-check to the estimates made with the factors derived from the current FYDP.

The use of FYDP-developed cost factors assumes a linear relationship between the forces and dollars contained in a given FYDP program element. Further, it assumes the costs in the FYDP are all variable with force structure. For example, if there are 20 B-52 aircraft in a program element with $2000 for Operations and Maintenance (O&M), we conclude that each B-52 consumes $100 of the O&M total. In reality, there are other users of O&M within the B-52 program and the reduction of one B-52 probably would not result in a reduction of exactly $100.

Another aspect of the assumption that all FYDP costs are variable is apparent when one examines the cost associated with a specific force change. FYDP costs reflect an amount appropriate for the entire year while force structure and personnel values reflect a snapshot of the end-year position. Since force changes occur throughout the year, costs need to be adjusted to account for the period of the year they will be operated.

To allay this concern, the FCM user can spread the costs applied to the force reduction over several years. For example, the default position is that 50 percent of O&M is saved/added in the first year of the force change and 50 percent is saved/added in the second year. This assumption is applied to the direct costs associated with a force change and recognizes that direct costs are, in fact, variable with force changes. Since indirect costs may not exhibit this same characteristic, the user can vary the percentage split by year and reduce the percentage to total less than 100 percent. In this manner, the user acknowledges the reality that indirect costs have a fixed component and may not be totally variable with force changes. By spreading less that 100 percent of the cost

calculated, a fixed percentage of the costs will not be added to that force change alternative.

All costs are assumed to be either direct or indirect. Indirect costs are associated with the direct force structure through a separate program called AMORD, the Advanced Mission-Oriented Resources Display[2]. Using this computer program, all indirect costs are allocated to the combat forces using a variety of basis variables, depending upon the nature of the funding to be allocated. Since these indirect values are also assumed to be totally variable, the user must decide through other means the percentage of the indirect cost that should be assumed fixed and modify the percentage of the costs used in the analysis as described previously. By default, 50 percent of the indirect costs are assumed to vary with force structure changes, and 50 percent are assumed fixed.

IV. STRUCTURE

The current force structure, as contained in the FYDP, serves as the baseline for all model analyses. The user first selects one of 13 mission areas and changes quantities for one or more force elements during the current FYDP or extended planning periods. Next, the user identifies the calculation assumptions to be used for the analysis and initiates the calculation sequence. Even though no changes to the default conditions are required, the user may change any of the pre-processor computed cost or personnel factors to be used for the calculation, if desired.

Typical outputs from the model are tables that describe the force change, cost change, personnel quantity change, procurement detail cost change, and, for Army unit changes only, a transition cost.

The force change is a simple comparison of the "base case" or beginning force structure and the user-changed "revised case," resulting in a "delta case."

Cost output can be viewed for each case: base, delta, or revised. The base case represents the FYDP position. The delta case is the marginal cost of the specified force change, and the revised case is the algebraic sum of the other two cases.

Personnel outputs are identical in concept, i.e., a base, delta, and revised case.

Detailed Procurement outputs are available to display the change in procurement quantity and cost for the delta case. This is necessary because the change in procurement quantity is often greater than the change made to the force structure, except for Navy

2 Developed by IDA for the Office of the Director, Program Analysis and Evaluation (OASD(PA&E)).

ships. For Army units, the procurement costs are calculated using a series of factors representing the average procurement cost of the primary items of equipment in that type of unit, displayed by the appropriate Army procurement appropriation.

A. Cost Output

Cost outputs are displayed by mission area, by service, and by appropriation for that service. All tables can be viewed in constant dollars or then-year dollars. Charts of the time series data are also available. Cost tables are divided into direct and direct plus indirect sections with identical breaks by appropriation. The value of the assigned indirect support can be determined by subtracting the direct value from the direct plus indirect value.

An alternative parametric method for calculating O&S costs is available for some force change options. This method is not dependent on current FYDP values. Instead, it is represented by an equation that was developed based on an analysis of similar systems. For example, a bomber aircraft is described by its characteristics of fly-away cost, zero fuel weight, and the number of personnel assigned per aircraft from the program element. Using this approach, it is possible to estimate the O&S costs of new aircraft based on the historical relationships established by the parametric analysis. Parametric data are available for some force systems. When no data is available for a particular force system, a table of those system names is created to let the user know that parametric data did not exist.

B. Personnel Output

Personnel output data are displayed by mission, by service, and by type of personnel. Types of personnel include active or reserve, officer or enlisted, and civilian. These data are shown in a similar manner to the cost data described previously: by base or delta or revised. Personnel data are also shown based on the direct and direct plus indirect split.

C. Other Output

Other output tables display the force delta by system, the procurement cost change by system, the procurement quantity change by system, a list of systems changed that are not currently in procurement, and a list of systems changed for which there is insufficient lead time to procure the system. For example, some ships take five years to build. If the user requests a force change three years in the future, the procurement of a system to

satisfy that request could not be ready in that amount of time. This table will alert the user to review the force change. If the force change is a reduction in Army units, a table displays the transition costs for the Army. Criteria for calculating the transition costs for a specific force reduction are made by the user. Similar transition cost calculations are not available for the other services.

V. METHODOLOGY

The method used by the FCM is simple in concept. Forces, and their equipment, organized by Defense Mission Category (DMC) are modified by the user.

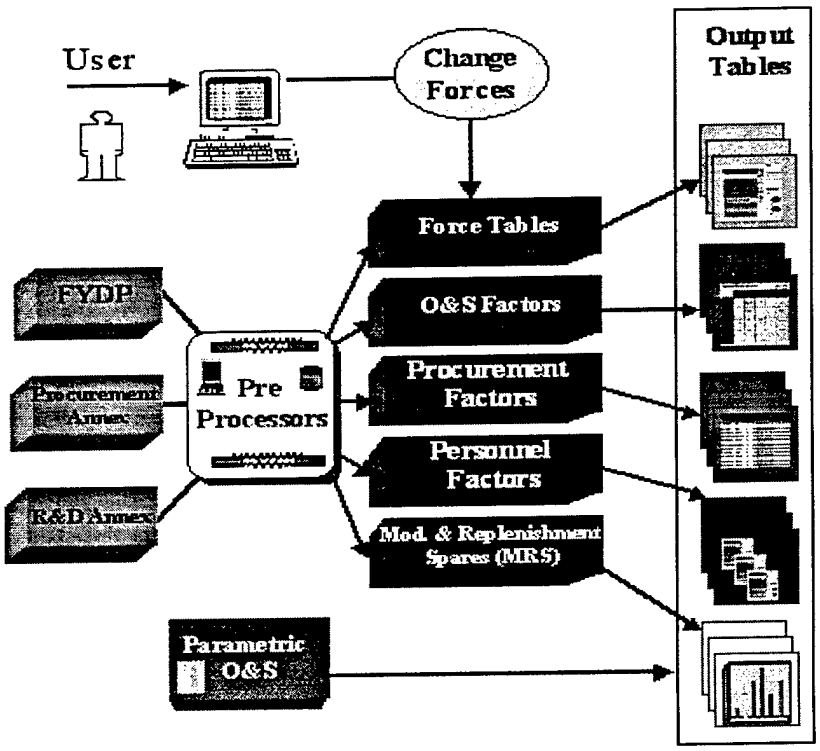


Figure 1. FCM Inputs and Outputs

When forces are changed, cost factors are used to calculate the marginal cost associated with the change. Results are displayed by appropriation category. Costs are maintained by service and aggregated to produce a DoD total. These marginal cost

estimates (delta costs) are added to the baseline costs to produce the revised costs by appropriation and service.

The following paragraphs describe the calculations necessary to produce a force cost estimate based on a change to the force structure. First, the base case data are prepared using a series of pre-processor programs written by IDA and documented in IDA Document D-704, *Pre-Processors of the Force Acquisition Cost System (FACS)*, July 1992. The procedures used to calculate the cost factors, first unit cost and slope, and personnel factors are discussed in the following sections.

A. Force Structure Change Calculations

The Force Cost Model is made up of a series of Microsoft Excel tables. The baseline force structure table is compared to the revised case created by the user to produce a table of force changes. This is a simple row by row, column by column comparison of the two cases to produce the third case. The resulting table of force changes (***force_delta_quantity***) is saved as the basis for further calculations.

Each force structure entry is identified by a key field that contains the mission identifier, the service, the resource identification code for the force system, and the program element number. This key field is used to locate appropriate information in other tables to perform the required calculations.

B. O&S Cost Calculations, Personnel Quantity Calculations

The FCM calculates O&S costs using two separate methods. The first, or factor method, uses cost factors derived from the FYDP and calculates the direct and direct plus indirect (total) costs associated with each force change. Separate factors are used for calculating the changes to the O&M, Military Personnel (MilPers), and Other Operations appropriations for each force structure system or unit. The second, or parametric method, estimates O&S costs based on the relationship of selected system characteristics to their historical O&S costs.

Using the factor method, O&S cost changes are calculated by multiplying the individual O&S cost factors that represent the cost per force element by the change in the number of force elements.

An example of the calculation is:

$$O\&M[j] = force\_delta\_quantity[j] * force\_O\&M\_factor[j]$$

*MilPers[j] = force_delta_quantity[j] * force_MilPers_factor[j]*

Files containing the O&M and MilPers cost factors per force element for both direct and direct plus indirect are available for review or modification prior to each calculation of the model. These files are prepared by the pre-processor at the same time as the force files. They can be viewed or modified using the Edit menu option from the FCM menu bar.

In general, the direct costs are derived from the primary program elements for the force element and the indirect costs are the result of allocations made from support missions to the combat missions using the AMORD procedure. These indirect costs are for functions that include management headquarters, base operations, central supply operations, and logistics and personnel support.

The second or parametric method of calculating O&S costs utilizes files containing the characteristic values for each type of equipment (such as B-52 bombers or B-1 bombers) and files containing the regression equation coefficients for each class of equipment (such as bombers or fighters). An example of the calculation is:

parametric O&S = force_delta_quantity[j] * characteristic weight[j] * weight coefficient

+ force_delta_quantity[j] * characteristic value[j] * value coefficient

+ force_delta_quantity[j] * characteristic MilPers[j] * MilPers coefficient

+ force_delta_quantity[j] * characteristic overhaul value[j] * overhaul coefficient

Both parametric and factor-derived O&S cost estimates are dependent in some way on the AMORD. All current Defense Program resources are processed by the AMORD prior to the development of the cost factors used by the FCM. In contrast, the regression equations used for the parametric estimates were developed using historical FYDP data processed by the AMORD routines. Without the use of the AMORD program, neither procedure could be performed in its present manner. The AMORD procedure is discussed in more detail later.

For a given force change, as shown previously, the model multiplies the force change times the corresponding force O&M and MilPers factors, sums the changes by service and mission, and places these values in the cost output table. Similarly, personnel quantity calculations are completed. Cost and personnel factors are found in the appropriate tables based on a key field for the changed force element.

These calculations are straight forward, but the development of the cost factors used by the FCM is much more complicated and it is important to discuss the preparation methodology here. These factors, as mentioned previously, are calculated outside of the FCM as a preprocessing step for the development of the model data.

With each release of the FYDP, new factors for the model are calculated. For program elements (PE) containing a single force element, the methodology is quite simple. The O&M dollars in the PE are divided by the number of force quantity to get an O&M cost per force item. MilPers dollar factors are computed similarly as are the personnel quantity factors. The equations are:

$$force\_O\&M\_factor[j] = PE\_O\&M[j] / force\_quantity[j]$$

$$force\_MilPers\_factor[j] = PE\_MilPers[j] / force\_quantity[j]$$

When there are multiple force elements in a PE, the development of the factors is more involved. This situation exists for most naval systems, all ground units, and most air systems. For example, the Navy Carrier PE has several classes of carriers shown in the force structure. Each class of carrier has a different O&S cost associated with it.

To allocated the O&M and MilPers dollars (and similarly for personnel) among the various force elements in the same PE, a weighting scheme is used to describe each force element. In order to divide the resources among the forces in the PE, each is assigned an O&M weight and a MilPers weight. These weight values represent a surrogate for the system's cost relative to other force items within the same PE. For the previous example, the O&M weight of a Nimitz class carrier is different from the O&M weight of the Enterprise class carrier.

Predominantly, the weights used are the VAMOSC (Visibility and Management of O&S Costs) values for O&M and military personnel. These values were selected as representative of the historical cost of each ship or aircraft force element and thus portray the relative cost of the systems. For ships, the Navy contractor who prepares VAMOSC data supplied a ten-year average of costs by class of ship. The same contractor provided a set of data based on a single point that is used for Navy aircraft since an average was not available. For Air Force aircraft, the Air Force office responsible for VAMOSC data provided a four-year average of VAMOSC data by system.

For Army weights, the 1996 version of the Army's Forces Model was used to generate O&M and MilPers costs for each type of battalion in the FYDP data. For Marine Corps land unit weights, the *Marine Corps Cost Factors Manual* (MCO

P7000.14) was used for personnel costs. Equipment cost by unit was used as a surrogate for the O&M cost. For Special Operations Command (SOCOM) units, SOCOM provided O&M and MilPers costs per assigned unit or cost for equipment, as appropriate.

The preprocessing methodology is straightforward and relatively simple. For O&M factors for a given PE, the number of units (meaning aircraft type or ship type or ground forces unit type) of each particular type in the PE is multiplied by that number's respective O&M weight. The resulting unit times weight values are summed to a total weight per PE. The O&M dollars in the PE are divided by this sum for a O&M cost per unit weight. This O&M cost per unit weight is multiplied by each unit's weight to result in an O&M cost per unit of equipment or force unit. In equation form, this is the following:

$$total\_PE\_O\&M\_weight = \Sigma force\_quantity * force\_O\&M\_weight$$

$$O\&M\_\$\_per\_unit\_weight = O\&M\_\$ / total\_PE\_O\&M\_weight$$

$$force\_O\&M\_factor = force\_O\&M\_weight * O\&M\_\$\_per\_unit\_weight$$

The MilPers cost per unit of equipment or force unit is calculated in exactly the same manner. Similarly, the personnel quantity factors are created using the MilPers weight to provide the relative scale of personnel assigned to each force element. For example, if the MilPers weight value is higher for a Nimitz carrier than for an Enterprise carrier, more personnel will be assigned to the Nimitz carrier personnel factor.

These factors provide the means to calculate the O&M, MilPers, and personnel quantities associated with each change in the forces. However, other studies have shown that an addition or deletion of a unit does not necessarily result in the immediate change in the budget. To account for this, the FCM uses a procedure called SPREAD to distribute the cost or savings of force changes over two or more years. For each service, the O&M, MilPers, and Other costs can be spread in any ratio over a period of up to four years.

For *direct* costs, the FCM by default assumes that O&M changes occur 50 percent in the first year and 50 percent in the second year. MilPers costs and Personnel quantity changes are assumed to occur 80 percent the first year and 20 percent the second year by default. These values can be changed by the user to spread the cost or savings over a different number of years or in a different ratio.

Indirect costs are, by default, spread 25 percent to the first year and 25 percent to the second year. Thus only 50 percent of the indirect costs are assumed to be variable (50

percent are assumed to be fixed) with a change in forces. This technique serves as a surrogate for addressing the fixed/variable ratio of the costs. Again, these values are accessible to the user for change.

C. Procurement Costs Calculations

To calculate the procurement costs for a force change, the program must calculate the total change made to the particular force element over time. In other words, given a force change in year one and beyond, the model must interpret the number of systems to buy that will cover the increase in force structure from year to year. This calculation must be done separately for procurement since the force change only depicts the change in operating systems. For example, if the force delta shows a change of 48 units in all years between the revised and base cases, then the only procurement change occurs in the first year when forces are increased from zero to 48. In all other years, procurement changes will be zero.

Assuming this change of 48 is in fighter aircraft, the model applies a procurement factor to the calculated number of systems to be procured to account for attrition, spares, training aircraft, and pipeline aircraft. For Air Force fighter aircraft, this factor is 1.42 and for Navy fighters, the factor is 1.51. For airlift or bomber aircraft, the procurement factor is 1.1; for ships, the factor is 1.0. Army aircraft and all Army weapon and tracked vehicle equipment items are not shown in the FYDP. In equation form, this is:

systems_procured = round_up(force_delta_quantity * procurement_factor)

In the example,

systems_procured = round_up(48 * 1.42) = 69

The model's procurement preprocessor calculates a pseudo-first unit cost and slope for each system currently in production. The term *pseudo-first unit cost* is used since the values are generated from the data in the Procurement Annex to the FYDP rather than from the actual production program for each system. Given these first unit cost and slope values and the procurement profile from the Procurement Annex, the model uses cost progress curve equations to calculate the cost for this lot that is now larger by 69 aircraft.

The calculation is the algebraic difference between two calculations of lot cost: the current program lot cost and the revised program lot cost to procure the additional quantity of 69 aircraft.

$$Procurement\_cost = a\,(T_k^{\,b+1} - T_i^{\,b+1}) - a\,(T_j^{\,b+1} - T_i^{\,b+1})$$

where: T = *quantity,* a = *first unit cost,* $b = ln(slope)/ln(2)$

In the example,

$$T_k = T_j + 69$$

In addition to the cost of procurement calculated above, a small amount is also added for initial spares costs.

Calculated results—by mission, service and appropriation—are available in preformatted output tables. They are also stored by individual system for display if desired.

Costs for the procurement of major systems are estimated using the first-unit cost and slope factors derived from the Procurement Annex data. Other key parameters are either calculated by the pre-processor or added manually. These other parameters are:

- Procurement Factor - A multiplier applied to the requested force change to cause additional quantities to be procured that will satisfy the requirements for training, maintenance pipeline, attrition reserve, and force structure. The procurement factors used in the model are derived from official sources. When a factor is not available, the pre-processor enters the value 1.
- Lead Time - The time required to procure an end-item of equipment measured from the time resources are applied. Times are expressed in years and are derived from official sources, or entered by the pre-processor based on the cost of the system when an actual lead time is not known.
- First-Unit Cost and Slope (Exponent) - The parameters that describe the learning curve represented by the system's cost quantity relationship in the Procurement Annex. The first-unit cost and slope are calculated by the procurement preprocessor.
- Initial Spares Factor - A factor used to estimate the cost of initial spares for each new system. The factor is calculated by the procurement pre-processor and is the percentage of total program cost programmed for initial spares.

The procurement calculation occurs in several steps. First, the force quantity change is multiplied by the procurement factor for each year that a change was requested, and lead time is applied to generate a revised procurement plan. Costs are calculated for the baseline procurement plan and then for the revised procurement plan; the resulting difference is the marginal cost change for the new quantity.

Total procurement costs are calculated for a given number of systems, N, by taking the number N to the BETA power, where BETA = 1 + ln(SLOPE)/ln(2), and then multiplying this quantity by the first-unit cost. The cost for initial spares is calculated and the resulting costs are added to the appropriate appropriation category in the DMC that contained the system for the generated request. The FCM aggregates procurement costs by appropriation category for each model run. Cost changes generated for each system are preserved and written to a separate file for viewing if desired. Cost factors used in the calculations, described previously, are available for review or modification when using the model.

The procurement module of the FCM assumes that procurement of any system will be decreased in any year when its corresponding force structure is reduced. In some instances, it may be desirable to continue procurement even though the corresponding force structure may be reduced (lead time for procurement will be considered). To a limited degree, this position can be accommodated by not selecting procurement to be calculated when the model's "Set Default" options are selected. When the Procurement option is selected, procurement costs for the revised procurement plan will be calculated. When the Procurement option is not selected, no costs will be calculated for any procurement.

In addition to the procedure for procurement of individual systems and equipment, an entire unit's worth of equipment may be procured for Army and Marine Corps forces. When the number of an Army or Marine Corps unit type is increased, a procurement action is initiated that will add procurement dollars sufficient to procure the items in the table of equipment for the unit. No procurement costs are changed when a unit is decreased.

D. Other Appropriation Calculations

Additional calculations are made to account for costs related to other investment accounts caused by a force change. Other investment costs are made up of Other Procurement and support investment costs.

Generally, a cost-quantity relationship does not exist in the Procurement Annex for most items procured by the Other Procurement appropriations. Cost factors are used to estimate the changes that occur in the Other Procurement appropriations when a force structure change is made. These factors are calculated in the appropriations pre-processor and represent the ratio of Other Procurement to total costs less Research, Development,

Test and Evaluation (RDT&E), Military Construction (MilCon), and Other Procurement. The factor is applied after all other procurement calculations have been made by the FCM.

Support investment cost changes consist of cost estimates for changes in modifications, replenishment spares (MRS), and support equipment and facilities. They are calculated using the factors developed in the pre-processor. The factors are applied to the cost changes calculated by the FCM for direct O&M costs. This procedure assumes that the cost changes for MRS are a function of the operating tempo of the forces. In this instance, operating tempo is represented by the O&M funding change.

Cost calculations for MRS are made each time the model calculates results. Separate tables are prepared to itemize the MRS costs if requested from the Set Default options menu prior to calculation. Choosing the MRS option will cause the separate cost table to be generated. When the MRS option is not selected, no table is prepared even though the calculations are made and added to the normal cost output tables. Calculation time is reduced when the MRS table is not prepared.

Other appropriations that change with each change of forces in the FCM are RDT&E and MilCon accounts. The model assumes that these accounts are a relatively constant percentage of service total funding. A ten-year moving average of RDT&E and MilCon as a percentages of total service TOA (total obligation authority) is calculated by the preprocessors. When forces are changed, the RDT&E and MilCon accounts are calculated using the appropriate percentage for these accounts relative to the changes in O&S and procurement calculated by the model.

E. Data Update and Accuracy

The FCM is updated and reissued with each release of the FYDP. Upon receipt of the electronic FYDP information, preprocessor programs are used to convert these data to the appropriate form for FCM. This process usually takes 4 to 10 working days, depending upon the number of changes discovered in the data structure. Changes only in data values result in a quick turnaround. However, quite often there are fundamental changes in data structure in the FYDP that can require coding changes in the preprocessor programs, thus requiring more time to release the update.

The advent of faster personal computers has greatly increased the speed of turn-around. The preprocessor that takes the longest time to run is the AMORD program that

allocates the indirect support to the direct force missions. This program is also the target of the most questions about the accuracy of the FCM.

The primary tool used to develop O&S cost relationships for forces is the AMORD program. AMORD accomplishes two fundamental steps that are necessary for the O&S calculations. First, the PEs of the Defense Program are separated into unique combat (direct) or support mission (indirect) categories. Second, all resources of the indirect mission categories are allocated among the direct mission categories. This is done at the PE level of detail. The AMORD output is then used to relate the O&S resources assigned to a direct PE, with the forces included in that PE, and to create the O&S factors that represent the O&S costs of each force element.

The cost factors used for direct O&M and MilPers per force element are calculated by relatively simple procedures of dividing the dollars in the program element by the number of force systems in that program element. Thus the values for these direct factors are as accurate as the FYDP, given the assumption that all of these dollars are variable with the forces.

The accuracy of the cost factors for indirect costs requires some discussion. All support costs are allocated to the direct combat missions or direct defense-wide missions. Since it is known that not all support is variable, the SPREAD procedure mentioned earlier allows the analyst to use personal judgment regarding the proper split.

The accuracy of the model output has been validated with studies done by several of the user organizations. The accuracy of the FCM is generally considered to be sufficient to support programming decisions but not necessarily of budget quality.

VI. STRENGTHS AND WEAKNESSES

A major strength of the FCM is its ability to rapidly evaluate alternative force structures. The ability to provide decision makers with a quick answer of the marginal costs of various force alternatives was a primary development objective of the model.

Until recently, a major weakness of the FCM was the accuracy of the cost factors in the model's land forces portion. These factors have been improved by using data output from the Army Forces Model as weighting factors in the model preprocessors. Likewise, information provided recently by SOCOM has greatly improved the accuracy of cost calculations for the Special Operations forces.

Another weakness of the FCM is related to the use of the FYDP data. As previously mentioned, some believe the FYDP to be a good programming document but a poor descriptor of actual costs.

An additional weakness has been the software used to display the FCM. Currently, the model is in Microsoft Excel, Version 4.0. Excel has gone through three updates since the FCM was first written and several more since the last update. Software updates are currently planned for the near future.

VII. AREAS FOR IMPROVEMENT

Currently, there are no plans to change the sources of data for the FCM. The major improvement to the FCM will be made to the software used to display and calculate the results. By moving to the 32-bit operating system and more modern software like version 5.0 of Microsoft Visual Basic, the FCM can be delivered as a self-contained executable program. New displays will take advantage of advances in Windows-based software to display tabs for multiple selections. For instance, spreadsheet displays will now be able to show forces with tabs for the baseline, delta, and revised cases simultaneously.

No changes are anticipated to the basic assumptions, methodologies, and data sources used for FCM but the "look and feel" of the model will continue to be improved.

THE AGING MODEL

I. BACKGROUND

The Aging Model calculates and displays the historical and projected inventory, average age, remaining life, age distribution, and capital value for most major DoD military hardware systems for the period 1975 to 2050. The data from 1975 to 1996 reflect actual system inventories. For the period 1997 to 2050, the data reflect projections using known Defense Program Projection (DPP) procurement profiles, system-specific factors for total life, annual usage, and attrition. The age values are displayed in either calendar years or flight hours, where appropriate. All displays include graphs and tables of the data. Information for the model is maintained on each individual system (tail number or hull number) for aircraft and ships. For land systems, such as tanks, the systems are grouped by type and year of manufacture.

The model can also compare inventory information with FYDP force-level information. Changes to the data for planning purposes can be made to forces or inventory, with the result reflected in the other. The model can automatically calculate the required procurement profile to meet desired system goals of average age and/or quantity at a future date. Data for active, National Guard, and reserve equipment items can be viewed separately or together. Activity rates and attrition rates can be set individually for each component. Each individual aircraft has its actual history of usage stored for computing useful life.

This model represents a significant improvement over an earlier age model developed as a part of the Force Acquisition Cost System for OUSD(A&T)/API in the late 1980s. In the earlier model, no data were available for individual pieces of equipment but were aggregated by type, model, and series. The results of this earlier model were necessarily more general in nature than can be obtained now with individual data. The availability of better data sources and the use of faster computers with greater storage capacity made the move to this more detailed model both possible and practical.

II. PURPOSE

The purpose of the Aging Model is to calculate the average age and future inventory of combat systems with sufficient accuracy to permit decision makers to know when an average system will be too old to perform its mission; when the system inventory will be depleted below acceptable levels; when a replacement system needs to be considered; and what would be the future mix of systems under various assumptions of usage.

Data for the model are the actual inventory of systems as reported by the Military Departments at the end of each fiscal year. These data, where appropriate, include the actual usage at that point in time and allow the model to account for the variances between individual systems within a group.

The model is accurate to the degree necessary to perform its task of force planning. Future force retirements depend upon usage and the model's random selection for attrition. These projections are considered to be robust, given the number of systems used in the calculations.

The model produces a rapid turn-around to hypothetical questions. Within seconds the user can answer questions of future inventories when given various scenarios of retirements, attrition rate changes, or changed utilization rates.

III. ASSUMPTIONS

The main assumption for the Aging Model is the half-year life of systems. Even when the actual date of commission of a system is available, we assume the system entered the inventory at the mid-year point. We also assume all losses are at a mid-year point.

We also assume that all systems in a class of systems experience the same average usage. Actual data were used to produce a year-by-year average usage by class, and an average of that is used in the model. All variables (life span, usage, and attrition rate) are user changeable.

IV. STRUCTURE

All inputs to the model are user selections that define the systems of interest for analysis. The main screen is a graphical user interface affording all the choices that are available. An example is shown in Figure 1.

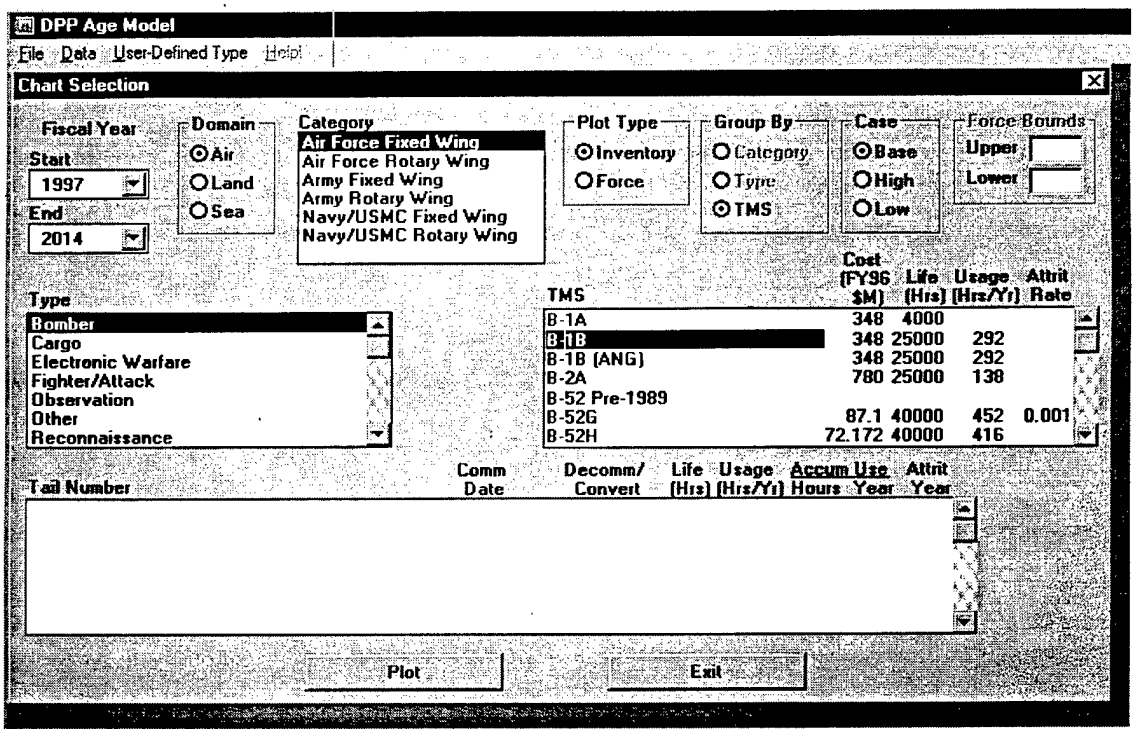


Figure 1. Age User Interface Selection Screen

The universe of available inventory information is divided into three domains (air, land, and sea). Each domain is divided into categories. For air these categories are the department and either fixed or rotary wing, e.g., Air Force Fixed Wing or Air Force Rotary Wing. Each category is divided into appropriate types, e.g., for Air Force Fixed Wing, the types include bomber, cargo, electronic warfare, fighter/attack, observation, reconnaissance, rescue, tankers, trainers, special operations, and "other." Each type is divided into classes. For aircraft the class is more properly called the type-model-series, TMS, or the model-design-series, MDS. The TMS data are available at the individual tail number. For ships the class data are available at the individual hull number.

After selecting a time period of interest (any years from 1975 through 2050), the domain, the type, the category and then the classes, the user can then see the model's output as an area chart of the inventory profile of those classes over the selected time period. The user can group the data at any level (category, type, or class) and can also select more than one entry at any level. Accompanying the chart is a data grid showing the number of systems, by class, year-by-year. Figure 2 depicts the inventory of the B-1B from 1980 to 1997.

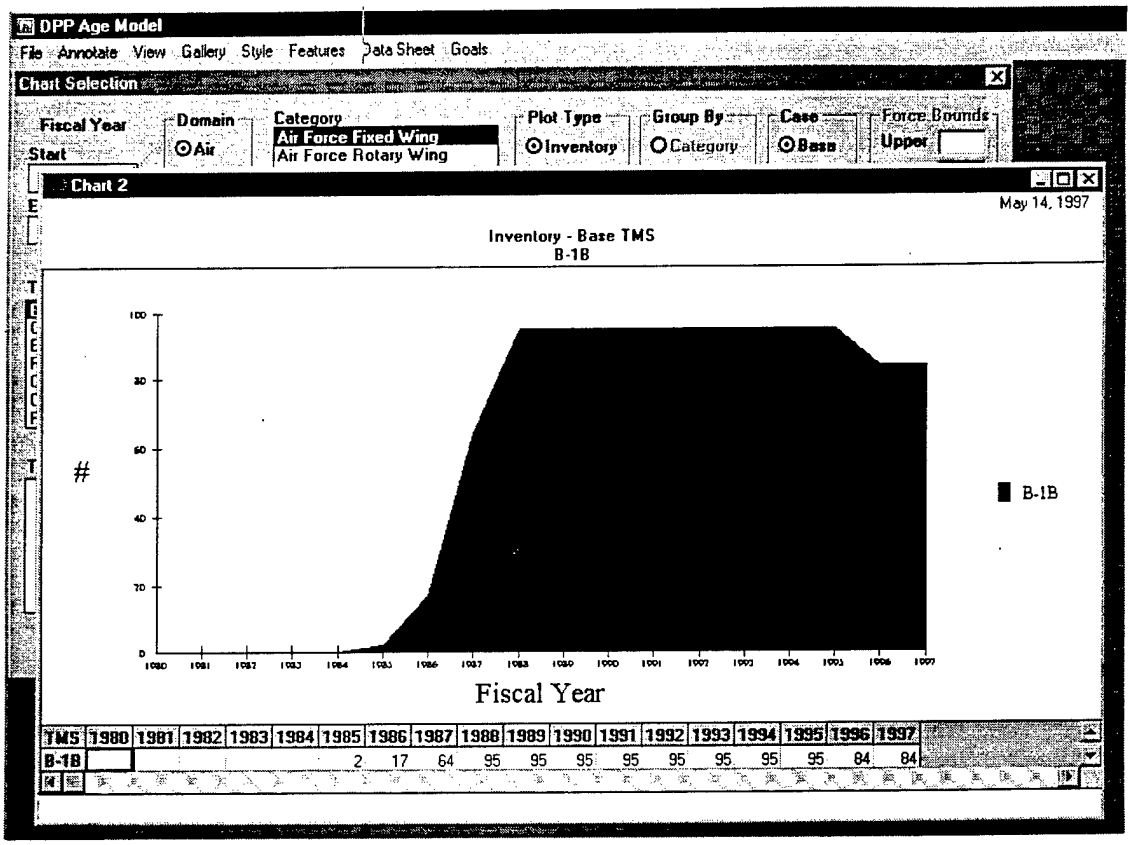


Figure 2. Typical Inventory Graph

The user has further choices of changing the useful life, attrition rate, or annual usage for any class to evaluate "what if" excursions before creating the output plot.

Following the display of the output, there are several choices. The user can change the data grid information to see the effect of additional retirements or simulate extension of system life. Normally, system life is extended by changing the life value on the user interface screen for a given class.

Once the inventory chart is available, the user can select, through drop-down menus, a display of remaining life or average age. With either of these choices, the graph changes to a line chart, and the data grid changes to show the remaining life or average age year by year. Figure 3 depicts the average age chart for the B-1B example from 1980 to 1997.

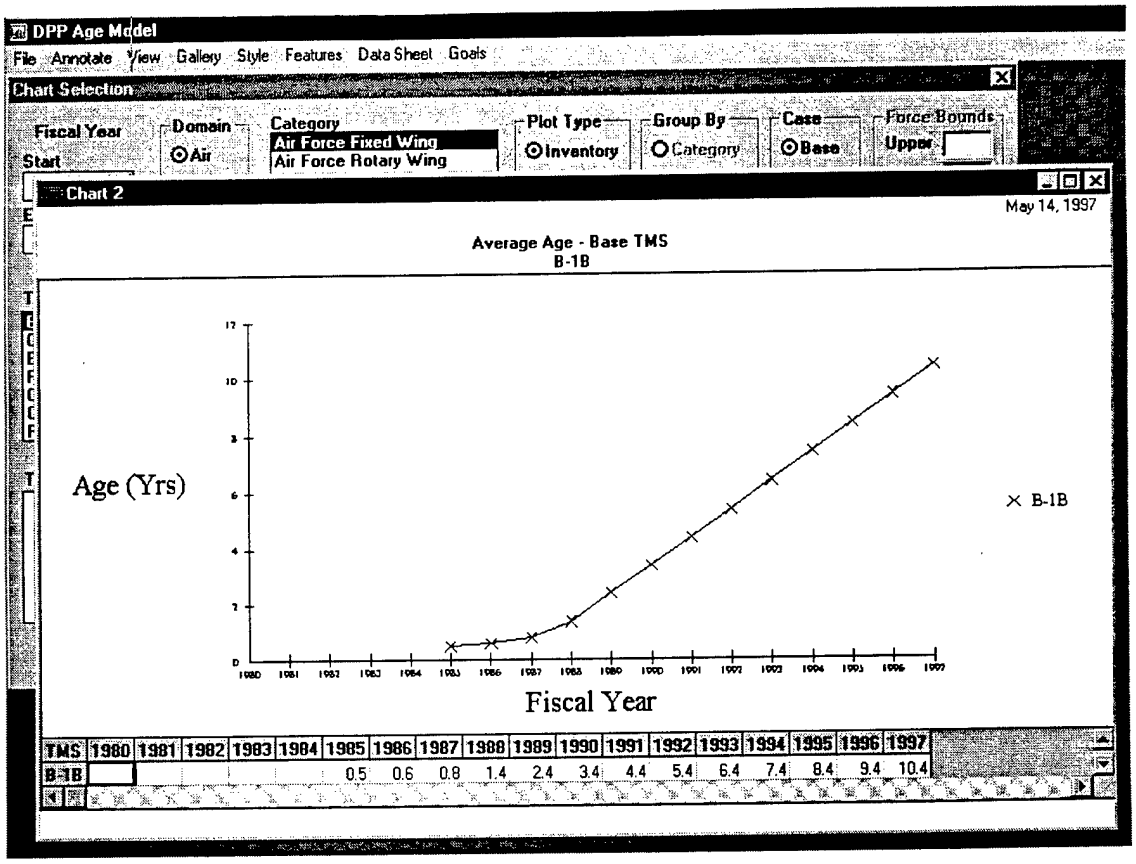


Figure 3. Typical Average Age Chart for Systems

Another option is to view the age distribution. This displays the percentage of the selected systems that are in certain age brackets. For example, how many F-15 aircraft are between one and eight years old? How many are between nine and fifteen years old? This display can also be by flight hours or years for aircraft, or for a single year or multiple years. Figure 4 depicts the multiple year display for the B-1B example.

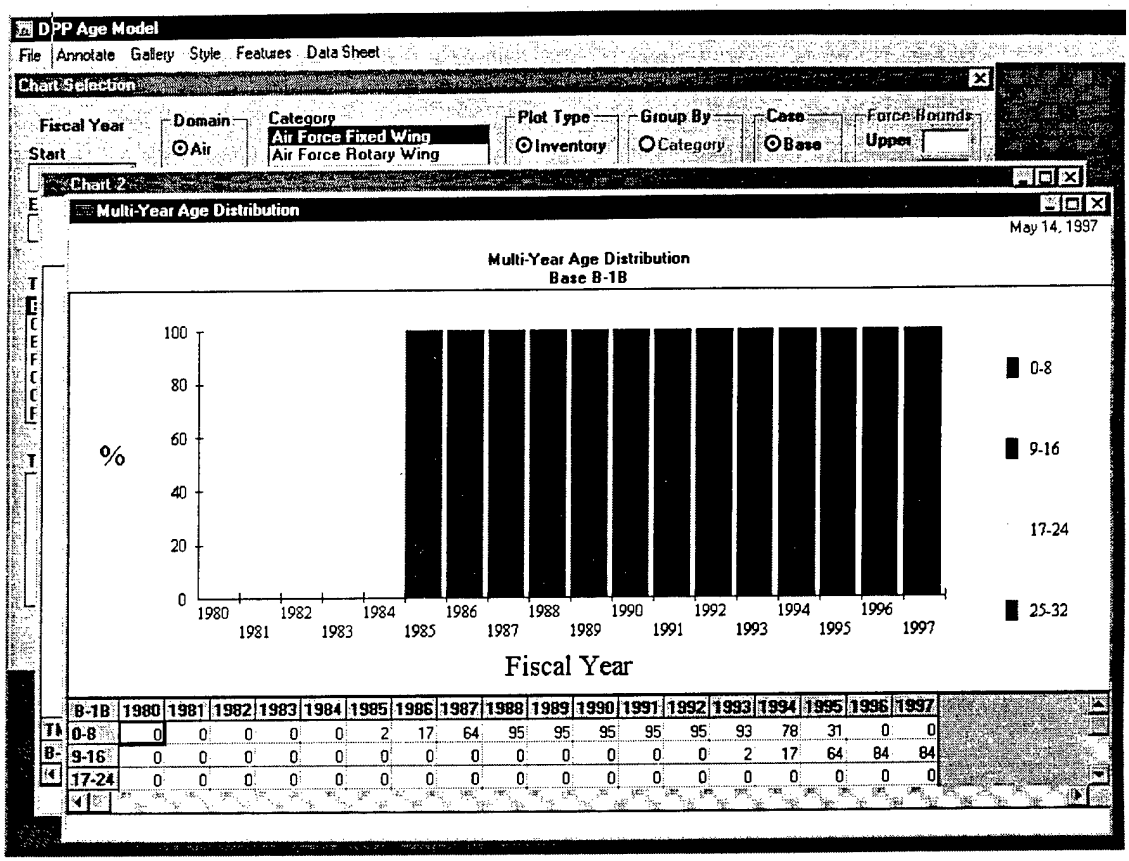


Figure 4. Typical Multi-Year Age Distribution Chart

Another available choice is the asset value of the selected systems. This can be displayed in a gross value (acquisition cost for the number of systems) or a net value (depreciated acquisition cost).

Additional user options include the ability to change the appearance of the chart by changing chart style (bar, line, or tape versus area), line style, adding grids, or annotating the chart with arrows, lines, or text. Either the chart or the data grid can be saved to an Excel file. A printout of the chart and data grid can also be made.

A significant feature of the model is the option to set a goal for future inventory. The user can define an inventory goal for a future year, with or without an average age constraint, and the model will calculate the procurement profile of a replacement class required to meet the goal. The user defines the new system in terms of the first six years of the procurement profile, the maximum rate of production, and the maximum number of years of production. Older systems can be automatically retired as new systems enter

service, or not retired after all. If the selected parameters do not allow meeting the goal, a message is provided.

The user also has the option to define a new grouping of classes of systems. This "user-defined type" allows the user to group, for example, all F-15 and F-16 aircraft into a type called "fighter wings." Then the user need only select that type on a future iteration of the model rather than selecting the 16 to 20 different classes of F-15 and F-16 again. In this manner, any special grouping of systems within a category can be created and studied.

V. METHODOLOGY

A. Algorithms

The following describe the main algorithms used in the model. The first calculation is the determination of the retirement or decommission year for a system.

1. Decommission year

```
if decommission year given, then use it
else if attrition year given and attrition year < decommission
  year then use it
else
   (life in years for Sea, life in hours for Air)
   if vehicle life supplied then use it
   else use class life
   if Air domain then
      if vehicle usage supplied then use it
      else use class usage
      if usage > 0 then
      if accumulated use year given then
         if life (years) > accumulated use then
            life (years) = accumulated use year - commission
              year + (life (hours) - accumulated use) / usage
         else it already passed its useful life - assume it
          lives to current year
            life (years) = current year - commission year
         else
            life (years) = life (hours) / usage
         else
            life (years) = 0
  end if (Air Domain)
decommission year = commission year + life (years)
```

The second algorithm determines the year-by-year inventory, average age and remaining life:

2. Inventory / Average age / Remaining Life

```
For each vehicle/vessel/aircraft in group
 yr1 = graph start year
 if commission year > yr1 then yr1 = commission year

 yr2 = graph end year
 if decommission year - 1< yr2 then yr2 = decommission year - 1
 if attrition year < yr2 then yr2 = attrition year - 1

 For each year from yr1 to yr2
   Add 1 to inventory in year

   Average Age:
   if age in years Then
      age = Year - commission year
         else age in hours
      if accumulated use year not given then
         age = (Year - commission year) * usage
      else if Year < accumulated use year Then
         age = (Year - commission year) * accumulated use /
            (use year - commission year)
      else
         age = (Year - accumulated use year) * usage +
            accumulated use
   if age > 0 Then total age in Year = total age in Year + age


   Remaining Life:
   if remaining life in years then
      remaining life = commission year + life (years) - Year
                  else remaining life in hours
      remaining life after use year = (commission year + life
         (years) - accumulated use year) * usage
   if accumulated use year not given then
      remaining life = (commission year + life (years) - Year)
         * usage
   else if Year < accumulated use year then
      remaining life = (use year - Year) * accumulated use /
         (accumulated use year - commission year) + remaining
         life after use year
   else
```

```
        remaining life = remaining life after use year - (Year -
           accumulated use year) * usage
      if remaining life > 0 Then total remaining life in Year =
         total remaining life in Year + age
   loop (next year)
  loop (next vehicle)

  Divide by total inventory in group in year to get average age
   and remaining life
```

The third algorithm describes the calculation of the age distribution:

3. Age Distribution

```
  Given single year
  For each vehicle/vessel/aircraft in group
   yr1 = graph start year
   if commission year > given year or decommission year <= given
     year or attrition year <= given year then skip vehicle

   see age calculation above
   if distribution in hours then divide age by some factor to
     give suitable number of bins
     start with factor = 1000 to get 1000-hour bins
   Add one to bin representing the calculated age
  loop (vehicle)
```

The fourth algorithm is of the attrition calculation:

4. Attrition

```
Given: class, attrition rate (%/year), class life (hours), class
   usage (hours)
   Initialize random number sequence using attrition rate and
      total number of vehicles in class
   Set cumulative attrition rate = 0
   Null out all vehicle attrition years

   For each year from graph start year to graph end year
    Count number of vehicles in inventory
      Year >= commission year and Year >= convert year and Year <
         decommission year and not attritted
    Calculate cumulative attrition rate
      cum rate = cum rate + attrition rate * number in inventory
    While cum rate >= 1
      Set n = random number between 1 and number in inventory
      Attrit the nth still active vehicle in the class
      Reduce number in inventory by 1
```

```
        Reduce cum rate by 1
    Loop
```

The final algorithm concerns the calculation of procurement profiles to meet a future inventory goal:

5. Goals

```
Given: Inventory goal, option age goal, goal year, production ramp
to maximum, earliest production year, lead time (years), maximum life
(years or hours), usage (hours/year), attrition rate

First determine the year that results in the earliest start for
production in order meet the inventory goal

    For each year from absolute earliest production year to goal
      year
      if current inventory is short of goal then
        Determine number of years of added production to meet
          shortfall
        if Year - # production years < current earliest
          production year then we have a new earliest production
          year

Add new vehicles starting in calculated earliest production
 year, ramping to maximum for # production years

For each year from current last year of production to goal year
 if Air domain then calculate attrition
 if inventory goal in goal year not met then
   Produce maximum vehicles (or ramp # if still in ramp years)
     in current Year
 else
   if age goal given then
     Determine average of existing inventory plus all newly
       produced vehicles
     if age goal met then exit for loop
   else
     exit for loop
loop

Attempt to reduce production in final year to hit goal exactly
 if age goal not given or age goal met then
   Reduce final year production by the amount that the total
     inventory exceeds to inventory goal
   if age goal given and age goal not met then
     Can't be done - add them back
```

B. Data Update

The Aging Model is updated when end-of-year data are provided by the military departments.

The Navy Aircraft Inventory Reporting System (AIRS) quarterly data are provided to OSD; however, the model has been updated only annually. The Air Force provides data usually within three months of the fiscal year end. This updating of aircraft related data is the most time consuming. Each tail number must be checked between the existing data set and the new data. New systems are added and old systems deleted each year. Those that have not been added or deleted must have their usage value updated. Future retirements are generally a matter of policy, and the decommission dates must be entered or changed to emulate those policy decisions. This is all done outside of the model.

Ship data are updated with the release of the Navy Ship and Aircraft Supporting Data Tables (SASDT). The SASDT document shows the planned retirements, activations, and transfers to the Naval Reserve Forces (NRF) for the FYDP period. *Jane's Fighting Ships* is also used as a source of some information.

Army system data are updated on a less periodic schedule. When inventory data are available, the system is updated.

The DPP data are also used as a source of information to adjust the activation and retirement of systems in future years. Procurement plans are converted into system commission dates, and force reductions are converted into system retirement dates.

VI. STRENGTHS AND WEAKNESSES

The major strength of the Age Model is the detailed nature of the supporting data. Since every aircraft and ship is included by serial number with actual usage information, the results are believed to be accurate. This is moderated by the inexact nature of the future annual usage of the systems and the unknown (and randomly simulated) actual attrition.

Another strength is the rapid response to various scenarios. Changing the retirement profile, extending the life, or changing the usage or attrition rates is easily accomplished on either the user interface screen or on the data grid.

A particularly useful output of the model is the age distribution across multiple years. With this capability, the user can easily comprehend the aging of the fleet of systems.

A weakness of the model is the time required to update the projected decommissioning dates *in the database* when a change in policy is made. The change can be made easily on the data grid during a model run, but to actually change the underlying database is more complex.

VII. AREAS FOR IMPROVEMENT

The major area for improvement is the upkeep of the underlying data. Currently, the process to update the data or to change the data to reflect policy implications is time and attention intensive.

THE DEFENSE RESOURCE MANAGEMENT MODEL

1. BACKGROUND

Brief Description: The Defense Resource Management Model (DRMM) is a unit-based, multi-year force cost and capability model. The model estimates a wide range of peacetime defense program costs based on a force description that consists of units, personnel, equipment, and war reserve material stockpile data. DRMM also estimates several measures of force capabilities but these capabilities are not discussed in this paper. DRMM can be used to estimate the costs of a portion of a military force or an entire defense program. DRMM's cost modeling is based on force and cost data whose level of detail is tailored to match the data available and the nature of the estimating problem. The cost model consists of a set of cost estimating functions that users apply to portions of a defense budget to reflect their understanding of how costs are related to force characteristics.

Model Origins and Uses: DRMM was developed in 1993, based on work that had been done on a similar predecessor used for a joint US-Egyptian study in 1990 and 1991. The model is a joint product of IDA and the General Research Corporation under the supervision of the OSD(PA&E/RAMD).

2. PURPOSE

Model Purpose: The DRMM model was developed to assist the emerging democracies of Eastern Europe acquire basic force-costing skills to support Ministry - and General Staff-level resource management decision processes. Many countries also see DRMM as a mechanism for developing defense budgets based on a well-defined defense program.

The fundamental purpose of the cost modules of DRMM is to relate a large portion of a country's defense budget to concrete force characteristics. The model is be able to estimate the multi-year budget impacts of changes in:

- force size;
- unit staffing, including active, reserve, and civilian components;
- unit equipment, including mix and peacetime training rates;
- equipment modernization; and
- war reserve stockpiles.

In response to the budgeting realities of the region, the model was expanded to allow users to systematically restore funding levels to required levels in areas of their budgets that have been significantly underfunded during times of extreme budget pressures. The model also includes basic analysis tools such as general purpose report and graphic output generators, and various analysis tools such as the one that assists in estimating the replacement costs of capital assets.

Although designed to support program-level cost analyses, DRMM is being used to formulate defense budgets because it surpasses the tools currently in use in many countries. Although DRMM is as accurate as some cost models now being used in US Service budget offices, it would be impractical to use DRMM for US budget formulation because of the size of the US force, the detail required for budget-level estimates, and the availability of data. The latter problem also imposes limitations on DRMM's potential for US program-level cost analysis.

After a base case has been built (analogous to a US FYDP position), DRMM can easily generate programmatic cost estimates of alternative force compositions.

3. ASSUMPTIONS

The most fundamental assumption underlying DRMM cost calculations is that there are repeatable, linear relationships between costs and the cost drivers and that historical costs are an acceptably accurate base to use to forecast future costs.

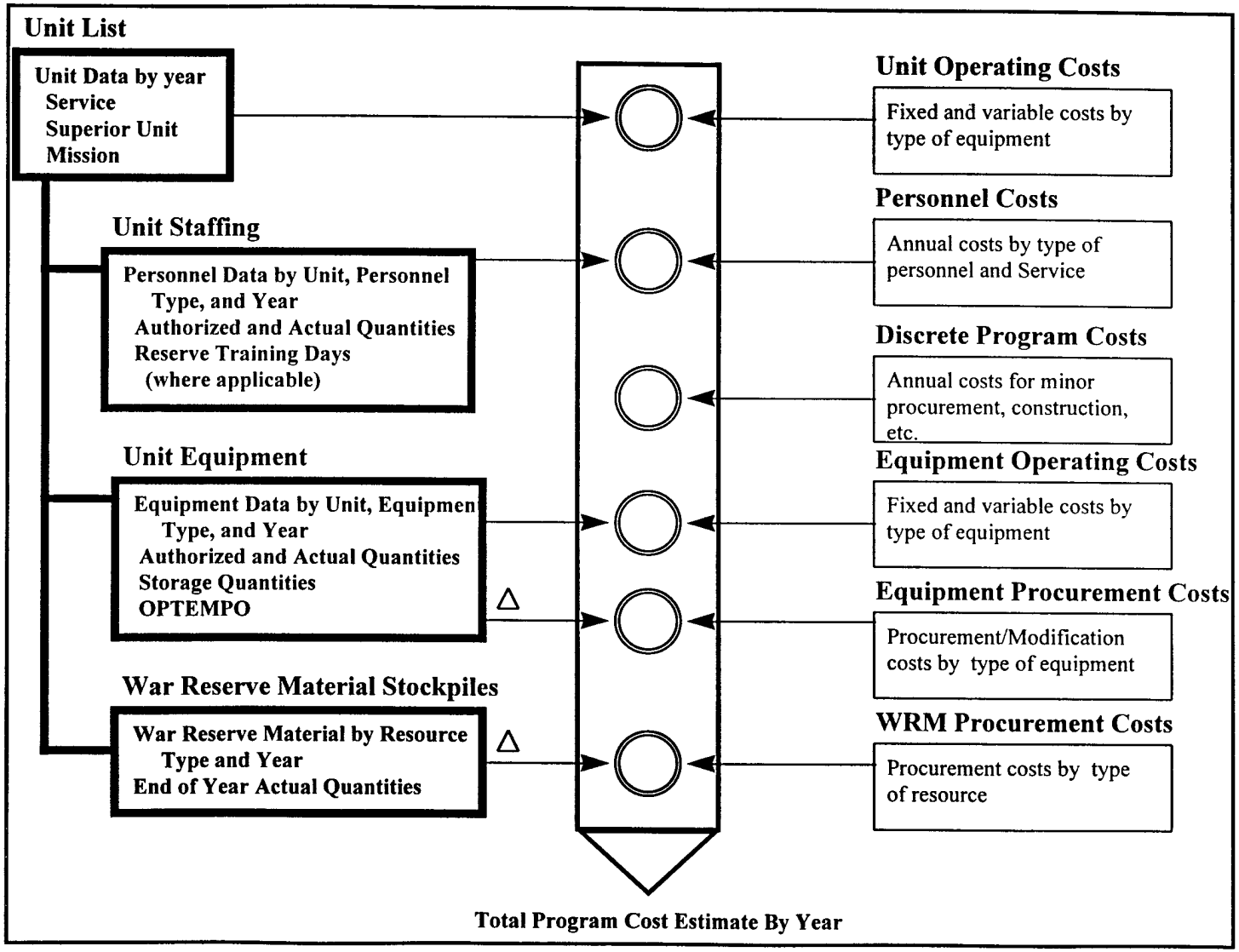
DRMM's calculations are based on the assumption that users can represent historical inflation behavior through sets of inflation factors sufficiently accurate to convert historical cost data to current and future year actual costs. This assumption encounters its greatest strain in applications where annual inflation is high.

DRMM calculates costs of units based on descriptive data about individual units and does not explicitly represent the effects that activities external to the unit have on that units costs. Where these relationships are known, they are embodied as costs within the units where the true cost drivers reside, much like the current US Defense Working Capital Fund (DWCF) causes the shift of support unit expenses to consuming units. Examples of this are indirect expenses such as medical costs assumed to vary with the number of personnel or fuel bought centrally but consumed throughout the force by equipment and units.

At this time, equipment procurement costs are calculated using average procurement costs, not cost progress curve assumptions. Current DRMM users do not develop their own equipment but buy relatively small quantities and seldom during the early stages of production periods when cost progress curves effects are most important.

4. STRUCTURE

DRMM cost calculations are based on a unit by unit force description. A schematic of the model's basic architecture is included in Figure 1. The model consists of a force description that originates with a list of units.


Unit List
Unit Data by year
Service
Superior Unit
Mission
Unit Staffing
Personnel Data by Unit, Personnel Type, and Year
Authorized and Actual Quantities
Reserve Training Days
(where applicable)
Unit Equipment
Equipment Data by Unit, Equipment Type, and Year
Authorized and Actual Quantities
Storage Quantities
OPTEMPO
War Reserve Material Stockpiles
War Reserve Material by Resource Type and Year
End of Year Actual Quantities
Unit Operating Costs
Fixed and variable costs by type of equipment
Personnel Costs
Annual costs by type of personnel and Service
Discrete Program Costs
Annual costs for minor procurement, construction, etc.
Equipment Operating Costs
Fixed and variable costs by type of equipment
Equipment Procurement Costs
Procurement/Modification costs by type of equipment
WRM Procurement Costs
Procurement costs by type of resource
Total Program Cost Estimate By Year

The units can occur in the model at any organization level. Each unit belongs to a service[1] and each unit, other than the highest unit, has a parent, or superior, unit. If a user desires, units are associated with mission areas.[2] Optionally, units may have an activity metric[3] that can be used to model variable unit operating costs. Each unit may exist for any number of years and its unit activity level may change by year.

Each unit may have active duty and reserve personnel[4] assigned to the unit. Personnel quantities may vary by year, and reserve personnel annual training days can vary from year to year if desired.

Each unit may have any type of equipment[5] assigned to the unit. Unit equipment quantities may vary by year, and equipment can have OPTEMPO data for up to three separate activity metrics.[6] Actual quantities of assigned equipment are recorded by year, and a portion of the equipment may be identified as "In Storage."

War reserve material is entered in the model by resource type.[7] WRM can be assigned to any unit (combat or support). DRMM tracks changes in the total amount of WRM by resource and by year.

DRMM users may apply any or all of these force characteristics to define cost relationships. Cost relationships fall into one of six basic cost areas: Personnel Costs, Equipment Operating Costs, Unit Operating Costs, Equipment Procurement Costs, WRM Procurement Costs, and Discrete Program Costs. Additionally, DRMM records inflation data that it uses to convert the price levels of historical cost data and the cost estimates it produces.

A. Personnel Costs

Users create cost factors using individual cost accounts[8] to represent the different components of personnel costs. Cost factors may be created for each type of personnel and can vary by service. Each factor is entered as a standard or normal cost. Standard costs can be modified year by year,

---

1 Users define the list of services used in each DRMM application.

2 Users create a two-level hierarchy of mission and submission areas. A typical set of first-level missions is Combat, Combat Support, and Central Support. Submission areas may include functions such as Land Combat, Air Defense, Artillery, Central Medical, and Administration.

3 Users create the list of activity metrics. For units, a typical activity metric is "Field Training Exercises."

4 Users create the list of personnel they can assign to units. Typical personnel types are active duty officers, active duty enlisted, civilians, reserve officers, and reserve soldiers. Additional subcategories can be created for special pay categories, such as active duty officer pilots or active duty officers at sea, if desired.

5 Users create the list of equipment items they can assign to units.

6 Users create the list of activity metrics. For equipment, typical activity metrics are training kilometers, rounds fired, flying hours, and steaming days.

7 Users create the list of WRM resource. Typical resources are fuel, ammunition (by type), and spare parts (by equipment item).

8 Users create the list of cost accounts. Typical cost accounts for personnel costs are pay, uniforms, food, and medical costs. US DoD personnel can think of cost accounts as appropriations and subappropriations (e.g., Military Personnel, O&M - Fuel, etc.).

as needed, to reflect fundamental changes in cost behavior or an explicit decision to fund a portion of the costs at less than standard. Deviations from standard costs often reflect budget limitations in historical years and can also be used to represent "get well" plans for program years.

B. Equipment Operating Costs

Users create equipment operating cost factors using individual cost accounts[9] to represent the different components of costs. Cost factors may be created for any equipment type. Each factor created is recorded as either a fixed or variable cost. Variable costs may be recorded for up to three different metrics, and the metrics, are uniquely specified for each type of equipment. Multiple cost factors may be created for each metric, and multiple fixed costs may be created if needed. Each equipment operating cost factor is entered as a standard or normal cost. Standard costs can be modified year by year, as needed, to reflect fundamental changes in cost behavior or an explicit decision to fund a portion of the costs at less than standard. Deviations from standard costs often reflect budget limitations in historical years and can also be used to represent "get well" plans for program years.

C. Unit Operating Costs

Users create unit operating cost factors using individual cost accounts[10] to represent the different components of costs. Cost factors are created for unit types, and then unit types are associated with specific units by year. This allows the creation of a set of generic unit costs that can be used for several like units and also allows the modification of unit cost behavior should a fundamental aspect of the unit changes. Each factor created is recorded as either a fixed or variable cost. Variable costs may be recorded for a single unit activity metric, and the metrics are uniquely specified for each type of unit. Multiple cost factors may be created for fixed and variable costs if needed. Unit costs are typically modeled as fixed annual costs. Each unit operating cost factor is entered as a standard or normal cost. Standard costs can be modified year by year, as needed, to reflect fundamental changes in cost behavior or an explicit decision to fund a portion of the costs at less than standard. Deviations from standard costs often reflect budget limitations in historical years and can also be used to represent "get well" plans for program years.

D. Equipment Procurement Costs

Users create equipment procurement costs using cost accounts[11] to represent the different components of procurement costs. Procurement costs are recorded as a time-phased vector of costs related to the year in which an item first appears in the inventory. Costs may occur from eight years prior to delivery to a year after delivery.

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9 Typical cost accounts for equipment operating costs are fuel, parts, and ammunition.

10 Typical cost accounts used with unit operating costs are heat, electricity, building maintenance, and communications costs.

11 Typical cost accounts used with equipment procurement costs are aircraft procurement, land vehicle procurement, support equipment, and initial spare parts.

E. Discrete Project Costs

Users enter project costs directly for specific programs using cost accounts[12] to represent the costs within the defense budget that cannot be modeled as a function of units, personnel, equipment, or WRM resources. Project costs may vary by year, depending on the nature of the program.

F. Inflation Data

Users create inflation factors that are used to convert the price levels of historical and estimated future cost data. A general deflator stream is used for all price-level adjustments unless the user chooses to create separate deflators. Unique deflator vectors can be created for any cost account. Typically, users create unique deflators for pay cost accounts and fuel.

The cost calculation process combines force and cost factor data to estimate the costs. The results are stored in data tables with enough information to provide reports and graphs by service, unit, cost account, and mission area, as well as in a wide variety of other formats. Additional reports and analyses are built into the model to estimate the total value and annual replacement requirements for capital equipment and to estimate the cost of filling all WRM requirements. Because cost data are entered on the basis of standard, normal, or required funding levels as well as the actual budget amounts, users can easily determine the funds required to provide for a "fully funded" defense program.

5. METHODOLOGY

DRMM makes calculations of cost using force and cost factor information previously entered. DRMM provides the capability to do many types of cost calculations, but only those that have been selected and used in an application of DRMM are actually run. The following paragraphs describe all of the possible types of calculations.

After users have entered units, personnel, equipment data, cost factors, etc., the DRMM calculation is a nine-step process:

1. The user selects the price level[13] for the cost calculation and starts the calculation.
2. The cost factors are converted from their historical price levels to the price level selected for the calculation.
3. Personnel costs are calculated and stored in a personnel cost result table
4. Equipment Operating costs are calculated and stored in an equipment operating cost result table.
5. Unit Operating costs are calculated and stored in a unit operating cost result table.

---

12 Typical cost accounts used with project costs are minor procurement, construction, scholarships, and foreign travel.

13 I.e., the base year for constant price calculations.

6. Equipment Procurement costs are calculated and stored in a separate cost result table, if both equipment and equipment procurement cost data have been entered.
7. WRM Procurement costs are calculated and stored in an equipment procurement cost result table.
8. Discrete Budget Project costs are converted to the selected price level and stored in a separate project cost result table.
9. Proportional costs are calculated based on the basic calculations of steps 2 through 8 and proportional cost relationships defined. Proportional costs are stored in the cost result tables that the proportion is based on. For example, if National Insurance is defined as 10 percent of salary, these costs are stored with the personnel cost calculations.

A. Price Level Adjustments

As users enter cost factors, information is accepted and retained by DRMM in terms of any price level. When calculations are run, the annual compound inflation rates in the inflation table are recalculated to align them with the price level specified. The compound rates are then used to convert cost factor data from their originally recorded price level to the calculation price level. As cost result tables are produced, all cost entries are recorded in the selected price level. At a later time when users want reports of costs expressed as inflated costs, DRMM converts the constant price results to inflated costs again using the table of inflation data.

B. Personnel Cost Calculations

There are four different personnel calculation methodologies available within DRMM. Any or all methodologies can be used within the same DRMM application. Total personnel costs are the sum of the four subcalculations. Personnel costs can be calculated based on:

1. The average quantity of personnel between the end of the prior year and the end of the current year[14] (i.e., half year active personnel costing).
2. The quantity of personnel at the end of the current year (i.e., full year active personnel costing).
3. The average quantity of personnel between the end of the prior year and the end of the current year and the number of reserve training days (i.e., reserve half year costing).
4. The quantity of personnel at the end of the current year and the number of reserve training days (i.e., reserve full year costing).

---

[14] Users set the calculation methodology for each personnel type they create. For example, when the personnel type Active Officers is created, users mark a check box signifying whether half year or full year costing is to be used. Full year costing is typically used for special personnel costs such as "Separation Bonuses" where the relevant cost driver is the number of retirees in each year, not the average between the current and prior years.

1. Active Half Year Personnel Costing

$$ActHalfYrCost_y = \sum_{\forall s} \sum_{\forall p} \sum_{\forall a} Cf_{a\,p,s} * P_{a\,p,s,y} * (Q_{p,s,y} + Q_{p,s,y-1})/2$$

where:

$ActHalfYrCost_y$	is the total personnel cost in year *y*, for personnel types that are full-time personnel and have been identified[15] for costing based on the average quantity during the year.
$Cf_{a\,p,s}$	is the annualized standard cost factor for cost account[16] *a*, for personnel type *p*, and service *s*.
$P_{a\,p,s,y}$	is the percentage of the standard cost $Cf_{a,p,s}$ that applies in year *y*.[17]
$Q_{p,s,y}$	is the number of personnel at the end of year *y*, for personnel type *p*, and service *s*.
$Q_{p,s,y-1}$	is the number of personnel at the end of year *y-1*, for personnel type *p*, and service *s*.

2. Active Full Year Personnel Costing

$$ActFullYrCost_y = \sum_{\forall s} \sum_{\forall p} \sum_{\forall a} Cf_{a\,p,s} * P_{a\,p,s,y} * Q_{p,s,y}$$

where:

$ActFullYrCost_y$	is the annual personnel cost in year *y*, for personnel types that are full-time personnel and have been set for full-year costing.
$Cf_{a,p,s}$	is the annualized standard cost factor for cost account *a*, for personnel type *p*, and service *s*.
$P_{a\,p,s,y}$	is the percentage of the standard cost $Cf_{a,p,s}$ that applies in year *y*.
$Q_{p,s,y}$	is the number of personnel at the end of year *y*, for personnel type *p*, and service *s*.

3. Reserve Half Year Personnel Costing

$$ResHalfYrCost_y = \sum_{\forall s} \sum_{\forall p} \sum_{\forall a} (Cf_{a,p,s} * P_{a\,p,s,y}) * (D_{p,s,y}/360) * (Q_{p,s,y} + Q_{p,s,y-1})/2$$

where:

$ResHalfYrCost_y$	is the annual personnel cost in year *y*, for personnel that have been identified as reserve personnel types whose costs are to be based on the average quantity during the year.

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15 Each personnel type created is classified as one where costing is based on either end of year quantities or the average quantity during the year.

16 Typical personnel cost accounts are pay, food, uniforms, and medical costs.

17 Annual funding levels are entered on an exception basis. Where no entry is made, the funding level is assumed to be 100% and the standard cost is applied.

$Cf_{a\,p,s}$ is the annualized standard cost per day for cost account *a*, for personnel type *p*, and service *s*.

$P_{a\,p,s,y}$ is the percentage of the standard cost $Cf_{a,p,s}$ that applies in year *y*.

$D_{p,s,y}$ is the number of reserve training days in year *y*, for personnel type *p*, and service *s*.

$Q_{p,s,y}$ is the number of personnel at the end of year *y*, for personnel type *p*, and service *s*.

$Q_{p,s,y-1}$ is the number of personnel at the end of year *y-1*, for personnel type *p*, and service *s*.

4. Reserve Full Year Personnel Costing

$$ResFullYrCost_y = \sum_{\forall s} \sum_{\forall p} \sum_{\forall a} Cf_{a,p,s} * P_{a,p,s,y} * D_{p,s,y} * Q_{p,s,y}$$

where:

$ResFullYrCost_y$ is the annual personnel cost in year *y*, for personnel that have been identified as reserve personnel types whose costs are to be based on the end of year quantity.

$Cf_{a,p,s}$ is the annualized standard cost for cost account *a*, for personnel type *p*, and service *s*.

$P_{a,p,s,y}$ is the percentage of the standard cost $Cf_{a,p,s}$ that applies in year *y*.

$D_{p,s,y}$ is the number of reserve training days in year *y*, for personnel type *p*, and service *s*.

$Q_{p,s,y}$ is the number of personnel at the end of year *y*, for personnel type *p*, and service *s*.

C. Equipment Operating Cost Calculations:

There are four different equipment operating cost calculation methodologies available within DRMM. Any or all methodologies can be used within the same DRMM application for any equipment item. Total equipment operating costs are the sum of the four subcalculations.

1. Fixed, annual costs
2. Variable costs based on equipment activity level
3. Storage costs
4. Overhaul costs

Fixed equipment operating costs in DRMM should be thought of as costs that depend only on the quantity of equipment in the force in a year, and variable costs are costs that depend on the amount of equipment usage (e.g., OPTEMPO). In a strict sense, both types of costs are forms of variable costs in that they are not absolutely fixed, irrespective of equipment inventories.

1. Equipment Fixed Operating Costs

$$EquipFixedOpsCost_y = \sum_{\forall e} \sum_{\forall a} Cf_{a,e} * P_{a,e,y} * Q_{e,y}$$

where:

$EquipFixedOpsCost_y$	is the fixed portion of equipment operating costs in year, *y*.
$Cf_{a,e}$	is the standard cost per year for cost account *a*, for equipment type *e*.
$P_{a,e,y}$	is the percentage of the standard cost $Cf_{a,e}$, that applies in year *y*.
$Q_{e,y}$	is the number of actually assigned equipment items of type *e*, not in storage, in year *y*.

2. Variable Costs Based On Equipment Activity Level

$$VariableEquipOpsCost_y = \sum_{\forall e} \sum_{\forall m} \sum_{\forall a} Cf_{a,m,e} * P_{a,m,e,y} * O_{e,m,y}$$

where:

$VariableEquipOpsCost_y$	is the variable portion of equipment operating costs in year *y*.
$Cf_{a,m,e}$	is the standard cost per year for cost account[18] *a*, related to activity metric *m*, for equipment type *e*.
$P_{a,m,e,y}$	is the percentage of the standard cost $Cf_{a,m,e}$, that applies in year *y*[19].
$O_{e,m,y}$	is the amount of activity[20] for equipment type *e*, and metric *m*, in year *y*.

3. Equipment Storage Costs

$$EquipStgCost_y = \sum_{\forall e} \sum_{\forall a} Cf_{a,e} * P_{a,e,y} * Q_{e,y}$$

where:

$EquipStgCost_y$	is the annual cost to maintain an equipment item in storage in year *y*.

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18 Typical equipment operating cost cost accounts are fuel, ammunitions, and parts.

19 Funding levels are seldom used with variable equipment operating costs since the relationship between the activity level and the variable cost is assumed to be immutable. That is, if an aircraft is said to fly 1,000 hours and a fuel cost per flying hour has been entered as $1,000, the amount that must be included in the budget will be almost always be $1,000,000. An exception could occur if WRM reserve fuel was used.

20 The common US terminology is OPTEMPO although DRMM is not limited to using only OPTEMPO metrics such as kilometers and flying hours for calculating these costs. For example, some countries have established "Trained Crews" as an activity metric for some types of equipment and then entered costs that vary with the number of trained crews.

$Cf_{a,e}$	is the standard cost per year for cost account *a*, for equipment type *e*.
$P_{a,e,y}$	is the percentage of the standard cost $Cf_{a,e}$, that applies in year *y*.
$Q_{e,y}$	is the number of actually assigned equipment items of type *e*, not in storage, in year *y*.

4. Equipment Overhaul Costs

$$EquipOverhaulCost_y = \sum_{\forall e} \sum_{\forall a} Cf_{a.e} * P_{a,e,y} * O_{e,y}$$

where:

$EquipOverhaulCost_y$	is the cost for a overhaul costs in year *y*.
$Cf_{a,e}$	is the standard cost per overhaul funded with cost account *a*, for equipment type *e*.
$P_{a,e,y}$	is the percentage of the standard cost $Cf_{a,e}$, that applies to overhauls for equipment type *e*, and cost account *a*, in year *y*.
$Q_{e,y}$	is the number of overhauls for equipment items of type *e*, in year *y*.

D. Equipment Procurement Cost Calculations

DRMM calculates equipment procurement costs based on the net increase in equipment inventories from one year to the next and a time-phased vector of procurement costs entered relative to the delivery year. This permits users to establish procurement costs that comply with current US full funding policies or incremental funding policies used in other countries.

$$EquipProcCost_y = \sum_{\forall e} \sum_{\forall a} PC_{fy,e,a} * Min(0,(Q_{r,y} - Q_{r,y-1}))$$

where:

$EquipProcCost_y$	is the total equipment procurement cost in year, *y* for all equipment.
$PC_{fy,e,a}$	is the procurement cost that must be paid in the funding year[21] (*fy*), for one piece of equipment of type *e*, for cost account *a*. Funding years (*fy*) are established in the vector of procurement costs defined for each type of equipment. Procurement costs are established year by year relative to the delivery year of the equipment. If a funding amount is established two years prior delivery, DRMM assigns costs to the year two years prior to the year in which quantities increased in the inventory. When costs are established in more than one year, DRMM adds costs in each of those years.
$Q_{e,y}$	is the total actual quantity of equipment of type *e*, at the end of year *y*.
$Q_{e,y-1}$	is the total actual quantity of equipment of type *e*, at the end of year *y-1*.

21 This can include any years in the range *(y - 7)* to *(y + 1)*, where *y* is the year the equipment is delivered to the force.

E. WRM Resource Procurement Cost Calculations:

DRMM calculates WRM resource procurement costs based on the net increase[22] in resource inventories from one year to the next. WRM procurement costs are assumed to be incurred in the year in which the inventory increases.

$$WRMProcCost_y = \sum_{\forall r} \sum_{\forall a} PC_{a\,r} * Min(0,(Q_{r,y} - Q_{r,y-1}))$$

where:

$WRMProcCost_y$	is the total WRM procurement cost in year *y* for all resources.
$PC_{a\,r}$	is the procurement cost for one item[23] of resource type *r*, for cost account *a*.
$Q_{r,y}$	is the total actual amount of a resource *r*, at the end of year *y*.
$Q_{r,y-1}$	is the total actual amount of a resource *r*, at the end of year *y-1*.

E. Proportional Cost Calculations:

DRMM permits users to model some costs as being directly proportional to the results of another calculation. For example, if National Insurance is 22% of military salaries, a Proportional Cost Factor can be created that produces a cost estimate that is directly proportional to a defined subset of the other cost calculations. The proportional relationship can change by year.

$$PropCost_{y,a1} = \sum_{\forall a2} CR_{a2,y} * R_{a1,a2,y}$$

where:

$PropCost_{y,a1}$	is the total proportional cost created for a cost account *a1*, in year *y*.
$CR_{a2\,yr}$	is the cost result for cost account *a2*, for year *y*.
$R_{a1,a2,y}$	is the ratio that determines the relationship between the cost result, $CR_{a2,y}$, and the proportional cost being estimated, $PropCost_{y,a1}$.

22 Only increases in WRM stockpiles are considered. Decreases are ignored.

23 Users may define the metric that scales a resource when a resource is created. For example, if small caliber ammunition is created as a resource, its metric may defined as boxes, 1,000 rounds, or any other basis of procurement or issue that applies to that resource in that country.

6. DATA ENTRY AND MAINTENANCE

The model is used to represent a defense program that evolves over time, much as the US FYDP data changes. It can also generate excursions, called Alternatives, that can be used to evaluate and analyze prospective changes to that program. As each year transitions from a "budgeting year" to a historical year, data for that year is sometimes updated to reflect actual program execution vice its planned content.

DRMM permits data entry in several ways. Data entry screens exist for each type of force data. Experienced users have written conversion programs that convert their country's force and cost data to DRMM formats.

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Stephen J. Balut

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Institute for Defense Analyses
1801 N. Beauregard Street
Alexandria, VA 22311-1772

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9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Dr. David McNicol
OSD(PA&E)
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13. ABSTRACT ***(Maximum 200 words)***

This document contains a catalog of cost research projects discussed at the IDA Cost Research Symposium held on 22 May 1997. Participants included representatives of offices and organizations that sponsor and conduct the research. The purpose of this annual symposium is to facilitate the exchange of research findings and other information in order to avoid wasteful duplication of effort and enhance each organization's ability to conduct research planning for the future. Each project summary included in this document presents the project title, a descriptive summary, classification, sponsor, performer, researchers, schedule, data bases, publications, and keywords. The research directors of the offices and organizations that participated report that catalogs associated with prior symposia (1989 through 1996) have been useful in facilitating the exchange of data, data sources, findings, and reports, thereby contributing to improved efficiency in the cost analysis function within the Department of Defense.

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