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TITLE: VISIBILITY AND MANAGEMENT OF OPERATING AND SUPPORT
COSTS, SYSTEM II (VAMOSC II)

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Visibility and Management of Operating and Support Costs, System II (VAMOSC II)

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UNCLASSIFIED REPORT

ABSTRACT:

The purpose of this abstract is to describe the Visibility and Management of Operating and Support Cost System under development by the United States Air Force.

The Department of Defense has long recognized that the total cost of fielding new weapon systems is not nearly expressed in initial design, development, and acquisition costs. Inquiry has shown that Operating and Support (O&S) costs exceed the initial acquisition costs and thus, must be considered in the decision matrix when new or modified weapon systems are proposed. There has been, however, no clear visibility of O&S costs available for use in the decision process.

As a result, the Office of the Secretary of Defense directed the military services to develop a system to present Visibility and Management of Operating and Support Costs (system to be known by the acronym VAMOSC). This direction was provided in a Management by Objective (MBO) Initiative 9-2 and contained three parts; O&S costs by weapon system, to portray costs by major subassembly or components, and to portray these costs in standard accounting elements across all weapon systems. *were directed*

The Air Force System will be comprised of three parts: (1) a weapon system portrayal for aircraft at the MDS level called, Weapons Systems Support Cost (WSSC); (2) a second element which addresses O&S costs for Communications-Electronic (C-E) equipment at the TMS level; and (3) a component of the VAMOSC system that will report O&S costs for subassemblies of MDS or TMS systems, called the Component Support Cost System (CSCS).

The Air Force VAMOSC II effort is scheduled for full implementation in mid-1982.

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EXECUTIVE SUMMARY

FOR

VAMOSC II

23 MAR 1981

TABLE OF CONTENTS

- PART I REQUIREMENT
- PART II OBJECTIVE
- PART III SYSTEM UTILITY
- PART IV EVOLUTION OF THE CURRENT SYSTEM
- PART V SYSTEM DESCRIPTION

PART I. THE REQUIREMENT

The Visibility and Management of Operating and Support Costs (VAMOSC II) project began as a DOD initiative of 1975. At that time DOD issued Management By Objective (MBO) 9, with the stated goal of reducing operating and support (O&S) costs. A subset of MBO 9 is MBO 9-2 which is titled DOD Requirements for Visibility and Management of Support Costs. In October 1975, a DOD memorandum to all military departments stated:

"We are embarked on a long term effort to identify Operating and Support (O&S) costs by weapons system. Over the past fifteen months we have evaluated the needs for support cost visibility and developed an approach to make visible the costs DOD incurs in operating and supporting its weapon systems. The enclosed paper, MBO 9-2, describes these needs, provides guidance to achieve support cost visibility, and describes the characteristics of a management information system that is required to give DOD long term historical O&S cost perspective."

MBO 9-2 pointed out that historically, DOD components did not consider the O&S costs as a major decision element in the design, development and procurement of a new weapon system. The MBO further states:

. . . the decision to buy a new weapon system implicitly commits the DOD to support the weapons system over its operating lifetime. In all likelihood, the costs of this support will - for major systems - exceed the initial cost of acquisition. Thus from the viewpoint of the total cost impact on DOD, it is clear that . . . operating and support costs of current systems be identified and examined with a view toward controlling the costs of new systems entering the operating inventory and providing a baseline for hard decisions on affordability and operation and support concepts.

In order to clearly define what is meant by O&S costs, MBO 9-2 first defines the Life Cycle Cost (LCC) of a system as: "The LCC of a system is the total cost to

1. Sec Def Memorandum, 16 Oct 1975, subject: Visibility and Management of Support Costs (MBO 9-2).

the government of acquisition and ownership of that system over its full life. It includes the cost of development, acquisition, operation support and where applicable, disposal (DODD 5000.28)". A further breakdown, illustrated graphically breaks Life Cycle Costs into the following segments:

Acquisition Costs			Ownership Costs		
Research and Development Costs	Test and Evaluation Costs	Production Costs	Operations Costs	Recurring Support Costs	Support Investment Costs

Thus, the VAMOSC II effort will focus on the cost of ownership of Air Force Weapons Systems. These costs (known collectively as O&S costs) are defined as follows:

- Operations Cost. Those costs incurred in the operation of a weapon system in the active or reserve operating inventory. These costs generally are variable with the rate of operation.

- Recurring Support Costs. Those costs directly associated with the maintenance of a weapon system after it becomes operational. These costs are generally variable with the rate of operation, but may also vary due to maintenance strategy changes.

- Support Investment Costs. Those costs such as initial training, data acquisition, initial provisioning, and support equipment costs, that are not dependent on the tempo of operations, but are related to the fact that a weapon system exists in the service inventory and is operated and supported by that service.

In order to collect costs which fulfill the requirements in the above definitions further cost categorization was necessary. This breakdown was provided by the DOD Cost Analysis Improvement Group (CAIG). A document, titled Aircraft Operating and Support Cost Development Guide, supplies the framework for development of operating and support costs under the VAMOSC II project.

PART II. OBJECTIVES

To satisfy the requirements in Part I of this summary, a number of objectives must be met. These objectives are:

a. To provide the DOD and USAF with visibility of operating and support (O&S) costs at the Mission Design Series (MDS) and component levels for aircraft and the Type Model Series (TMS) and component levels for ground communications-electronics equipment.

b. To provide the means to collect, maintain and portray historical O&S cost data for weapon systems in terms of cost elements most useful to DOD and AF management requirements, that is, relatable to the Cost Analysis Improvement Group (CAIG) format.

c. To expand Air Force weapon system O&S cost management information systems (MIS) to obtain detailed data on weapon systems, subsystems, and replaceable component maintenance costs for use in making equipment replacement or modification decisions. Maintenance cost elements (labor, material, and support) must be identified for the subsystem and replaceable components which comprise system maintenance costs.

d. To provide improved logistics support cost information for use in acquisition planning, trade-off analysis studies and budget requirements submissions.

e. To provide the capability to display this information in standard report formats and also provide demand type reports reflecting only particular user requirements to fulfill a specific purpose.

f. To contribute to the reduction of initial support costs by providing the capability to assimilate, portray, and retain for historical reference, the cost of resources (labor, material, services and overhead) directly and indirectly associated with base and depot logistics of aircraft subsystems and components.

g. To maintain a historical data base for a minimum of ten years.

h. To provide cost information to improve logistics policy decisions.

i. To identify system component reliability, effectiveness and costs so that high support cost items may be identified and addressed.

PART III. SYSTEM UTILITY

A. The projected uses for information generated by the VAMOSC II system fall into eight major categories. These categories are the final result of a series of analyses and do not necessarily reflect a computed end product of VAMOSC. However, they would use as a basis for the end products the data produced by the VAMOSC system.

1. Force/Support Program Balance. In building the Five Year Defense Program (FYDP) a balance of funding decisions must be made between force modernization and the operation & support of current forces. The magnitude of the operations and support costs of new system can be more realistically predicted if historical records of current costs are available.

2. Weapon System Comparisons. Credible estimates of the O&S cost impact of new systems and historical perspective of the O&S costs of current systems will permit DOD to better discriminate between competing systems and the costs of the mix of systems to be operated by defense.

3. Support Resource Planning. A key use of O&S cost data is for support resource planning and programming. By establishing a system to accumulate incurred O&S costs by weapon system and undertaking the task of identifying the cause and effect relationships between weapon system design and O&S costs, the services and OSD will be better able to defend to the DSARC and the Congress, the operations, maintenance and personnel support resource demands of new systems.

4. Design Trade Studies to Set Reliability and Maintainability (R&M) Goals. Operating and support cost data can be used in making decisions between alternatives at the subsystem and component levels of weapon systems. Maintenance cost for subsystems related to R&M characteristics will provide a basis for these comparisons.

5. Logistic Support Alternatives. A weapon system cost visibility system will assist in determining the most efficient level (organization, intermediate and depot maintenance) at which to accomplish the repairs by providing historical cost data which can be related to a Service's Logistics concept.

6. Affordability Studies. The determination of new system Life Cycle Costs may indicate that a weapon system, though highly effective in achieving its mission is not practical because of its high cost of acquisition and/or operation and support. The combination of a knowledge of actual weapon system O&S coupled with estimates of downstream cost impacts of new and current systems will permit DOD to make credible system affordability studies. In this light, VAMOSC II data can be utilized as a data base to be used with numerous modeling techniques used for O&S cost predictions.

7. Warranty/Contractor Support Analysis. Estimates of current government costs for repair of comparable equipment are necessary to evaluate contractor warranty proposals. Source selection between contractors imposes similar requirements. Historical data on which to base warranty estimates should make them more realistic.

8. Equipment Maintenance Management. Maintenance requirements are peculiar to and therefore, must be determined for each weapon system. Historical

data indicating the type, frequency and magnitude of repairs to components of a weapon system are essential to revision of maintenance programs for existing systems. For new systems/subsystem/components, initial maintenance programs could be established and costs predicted based on actual experience with an existing similar system.

PART IV. EVOLUTION OF THE CURRENT SYSTEM.

In order to satisfy the requirements and objectives of MBO 9-2, several distinct but related efforts were undertaken by various Air Force agencies as detailed by the following chronology:

1975. MBO 9-2 was published by DOD. At this time, an AFLC data system, K051, Logistics Support Cost Ranking System, had been in existence since 1967. While it was not developed in response to the MBO, it was to become the core of the component cost subsystem of VAMOSC II called the Component Support Cost System (CSCS).

1976. A. In response to the MBO, HQ USAF/ACMC developed an aircraft cost system called the Operating and Support Cost Estimating reference (OS CER). This system produced an annual report in the cost categories defined by the Cost Analysis Improvement Group (CAIG).

B. Also in response to the MBO, USAF issued PMD L-Y 6118(I). In response to the PMD, HQ USAF/LEYE began development of the Communication-Electronics Meteorological System through a contractual effort.

1977/78 A. During this time the problems and shortfalls of all three systems were identified and actions were taken to upgrade each system.

1. PMD A-M 7067.(I) was issued. From this, DPD HAF-D-79-124-1 was issued entitled, Visibility and Management of Support Costs, System II (VAMOSC II). This DPD brought the aircraft costs, communications electronics costs and component costs systems under the overall umbrella of the VAMOSC II effort. It centralized the development of the VAMOSC systems at Headquarters AFLC/LO.

2. Also during this time, PMD L-Y 7049 was issued, titled Visibility and Management of Support Costs - Subsystem/Component Level. From this, DPD HAF-D-78-08-01-1 was issued, titled Component Support Cost System (CSCS).

B. Thus, at this time, direction from HQ USAF had been received to enhance the 3 existing O&S cost systems and combine them under the effort known as VAMOSC II. The resulting systems and their Data System Designators (DSDs) are:

1. Weapons System Support Cost System (WSSC), DSD D160
2. Communications-Electronics System (C-E), DSD D160A
3. Component Support Cost System (CSCS), DSD D160B

A description of each of the three systems follows:

PART V. SYSTEM DESCRIPTION

A. Weapons System Support Cost System (WSSC), DSD DI60.

1. General Information. The Weapon System Support Cost System is designed to collect O&S costs at the weapon system level. These costs are portrayed in the Cost Analysis Improvement Group O&S cost guide format. The report portrays the O&S dollars for the preceding fiscal year. Approximately 70 aircraft Mission Design Series (MDS) are reported. The information for the report is gathered from a number of automated management information systems as well as a number of manual inputs. The inputs to the WSSC system and a brief description of the type of information extracted from these systems follows:

a. H069R Accounting and Budget Distribution System. Operations and maintenance dollars expended for a given fiscal year. It includes such costs as salaries, materials, base operating support costs, and investment items.

b. G033B Aerospace Vehicle Inventory Status/Utilization Report. Flying hours, possessed hours, possessing organization, location and other data on all aircraft by tail number in the USAF active inventory.

c. D022A Central Fuels Management System. Cost of fuel issued by aircraft MDS.

d. E506 Aerospace Maintenance Manpower Information System (AMMIS). Aircraft maintenance man-hours by Command, by Base, and by work center.

e. E300Z Advanced Personnel Data System. Air Force personnel data such as grade/rank, location, unit of assignment, date arrived on station, Air Force Speciality, Functional Account Code, etc.

f. H036C Visibility and Management of Operating and Support Costs. (While this system has the same title as VAMOS, it is not the system. It was developed by HQ AFLC to feed the OSCER system with depot maintenance costs.) Depot costs of PDM, and repair, of aircraft and support equipment at the MDS and TMS level.

g. Training Munitions Cost. Cost of munitions required for aircrew training.

h. Medical Cost Factor. Average annual cost of medical treatment rendered to a member of the USAF.

i. Aircraft Security Data. Information concerning aircraft requiring physical security.

j. Aircrew Composition. Listing of crew members by AFSC which is required for a complete aircrew for a given MDS for a given major command.

k. Acquisition and Training Cost Factors. Average cost of acquiring and training a member of the Air Force.

l. Permanent Change of Station (PCS) Cost. Average cost of PCS moves by type of move for Air Force personnel.

m. Directorate Factors Table. Percentage factors used to prorate expenditures incurred among the major directorates within AFLC Air Logistics Centers.

n. BOS Factors Table. Percentage factor for prorating depot and base BOS expenditures to the WSSC processes.

o. Second Destination Transportation Costs.

p. Budget Program Activity Code (BPAC)/MDS Conversion Table.

q. Engineering Support Costs.

r. OAC/OBAN - GELOC Conversion Table. Used to identify a geographic location through the OAC/OBAN.

s. Pay Tables. Used to determine current pay rates for Air Force personnel.

2. Cost Categories Reported in WSSC. DOD Level Report. All costs by MDS.

COST CATEGORY

a. Unit Mission Personnel
Aircrew
Maintenance (FMS, AMS, etc.)
Other

e. Installation Support Personnel
Base Operating Support
Real Property Maintenance
Medical

b. Unit Level Consumption
POL
Maintenance Material
Training Ordnance

f. Indirect Personnel Support
Misc Operations & Maint
Medical O&M Non-pay
PCS

c. Depot Level Maintenance
Airframe Rework
Engine Rework
Component Repair
Support Equipment
Software
Modifications
Other Depot
Contracted Unit
Level Support

g. Depot Non-maintenance
General Depot Support
Second Destination Trans

h. Personnel Acquisition & Trng
Acquisition
Individual Training

d. Sustaining Investments
Replenishment Spares
Replacement Support Equipment
Modification Kits

B. Communications-Electronics System (C-E), DSD DI60A

1. General Information. The Communications-Electronics Cost System is designed to collect and portray costs at the Type Model Series (TMS) level. These

costs are portrayed in an adapted Cost Analysis Improvement Group (CAIG) format as well as a number of other formats. The reports portray costs by fiscal year. Approximately 300 TMSs meet the basic criteria for costing by the subsystem. The information for the report is gathered from a number of automated management information systems as well as a number of manual inputs. The inputs to the C-E system and a brief description of the type of information extracted from these systems follows:

- a. D039 Equipment Item Requirements Computation System File. Inventory information and purchase price.
- b. G033E C-E Status and Inventory Reporting System. Inventory information.
- c. C003K Engineering/Installation Management. Mobile depot maintenance costs.
- d. D04I Recoverable Consumption Item Requirements System. Recoverable subassembly information (price, condemnations).
- e. H036B Depot Maintenance Industrial Fund Accounting Production Report. Costs for depot maintenance.
- f. D056A Product Performance System File. Maintenance man-hours.
- g. O013 Packaging and Transportation Data Maintenance System. Packaged weights to items.
- h. F006 Command Civil Engineer and Military Family Housing Cost System. Real property maintenance costs and electric power utility rates.
- i. DI60 MPC Personnel Extract File. C-E organization personnel costs.
- j. DI60 Military Pay Table. Pay and Allowances for military personnel.
- k. DI60 Civilian Pay Table. Pay and benefits for civilian personnel.
- l. DI60 ASO Extract File. Expenditure information.
- m. DI60 Advanced Training Costs File.
- n. DI60 PCS and Medical Cost Factor.
- o. DI60 Contract Engineering Support Costs.
- p. FAC Table. Identifies personnel by category.
- q. PAS Organization Table. C-E organization identification.
- r. EEIC Table. Identifies relevant ASO information.
- s. TMS-NSN Table. Equipment information.
- t. Unit TMS Factor. TMS information by organization.

u. OAC/OBAN Table. ASO identification.

v. Unit Factor Table. ASO and MPC identifying information.

2. Cost Categories Reported in C-E. All cost by TMS.

Cost Category

- | | |
|---|---|
| a. Unit Mission Personnel
Operations
Maintenance
Administrative
Supply Support Personnel | f. Indirect Personnel Cost
Misc Operations and Maint
Permanent Change of Station |
| b. Unit Level Consumption
Fuel
Maintenance Material
Utilities | g. Depot Non-Maintenance
Material Management (Inc.
Procurement)
Material Distribution
Engineering Support
Transportation and Packaging |
| c. Depot Level Maintenance | h. Advanced Training |
| d. Replacement Investment | |
| e. Installation Support
Base Operating Support
Real Property Maintenance
Communications
Medical (Health Care) | |

C. Component Support Cost System (CSCS), DSD DI60B.

1. General Information. The Component Support Cost System will provide the capability to assimilate, portray and retain for historical reference, the quarterly cost of resources directly and indirectly associated with base and depot logistics support of aircraft subsystems and components. The inputs to the CSCS system and examples of information retrieved from them are as follows:

- a. D002A Standard Base Supply System. Count of DCC cards at base, supply consumable material.
- b. D024A Propulsion Unit Data Collection Status Reporting. Number of engines NRTSed to depot.
- c. D033 AFLC Retail Stock Control and Distribution. Exchangeables issued to depot on aircraft maintenance.
- d. D056A/B/C Product Performance System. On/off equipment man-hours and maintenance actions etc.
- e. D071 Stock Number User Directory. Stocklist changes and NSN Noun/Unit Cost.
- f. DI43B/F History Accumulation Subsystem. Number of NRTS and base condemnations for NSNs.

g. G004L Job Order Production Master System. Serviceable and condemnation production for NSNs.

h. G019F MISTR Contract Schedule and Repair. Serviceable and condemnation production for NSNs

i. G033B Aerospace Vehicle Inventory Status/Utilization. Aircraft flying hrs, sorties, landings, and locations.

j. H036B Depot Maintenance Industrial Fund (DMIF) Cost Accounting Production Report. Depot average repair costs and labor hours.

k. O013 Packaging and Transportation Data Maintenance. Packaged weight data.

l. H069R Accounting and Budget Distribution System. Supply and maintenance costs.

m. D220 AFLC Provisioning System. Provides NSN/WUC information for new items being added to the inventory.

n. D046 Base Account Screening Exercise. Provides interchangeable and substitute information for master stock numbers.

2. Cost categories reported by CSCS.

Cost Category

- a. Base TCTO Costs by MDS
- b. Base Support General Costs by MDS.
- c. Base Labor Costs by WUC within MDS.
- d. Base Direct Material Costs by WUC within MDS.
- e. Base Maintenance Overhead Costs by WUC within MDS.
- f. Second Destination Transportation Costs by WUC within MDS.
- g. Base Exchangeable Repair Costs by WUC within MDS.
- h. Base Exchangeable Modification Costs by WUC within MDS.
- i. Base Condemnation Spares Costs by WUC within MDS.
- j. Base Supply Management Overhead Costs by WUC within MDS.
- k. Depot TCTO Costs by MDS.
- l. Depot "Support General" Costs by MDS.
- m. Depot Labor Costs by WUC within MDS.

- n. Depot Direct Material Costs by WUC within MDS.
- o. Depot Other Costs by WUC within MDS.
- p. Depot Exchangeable Repair Costs by WUC within MDS.
- q. Depot Exchangeable Modification Costs by WUC within MDS.
- r. Depot Condemnation Spares Costs by WUC within MDS.