OFFICE OF THE SECRETARY OF DEFENSE
COST ASSESSMENT AND PROGRAM EVALUATION

Sustainment Cost Policy, Collection, and Reporting

October 22, 2020

Division Director, Land and Naval Warfare Cost Assessment

The overall classification of this briefing is:
UNCLASSIFIED

Outline

- New 2020 CAPE O&S Cost Guide
- EVAMOSC
- Update: Sustainment Cost Reporting

O&S Cost Guide

Published September 2020 located at two public locations:
CAPE - https://www.cape.osd.mil/files/OS_Guide_Sept_2020.pdf
CADE - https://cade.osd.mil/content/cade/files/csdr/guidance/OS_Guide_Sept_2020.pdf

O&S Cost Guide Changes

OSD CAPE

- Guide not just for traditional MDAPs
- Emphasis on critical importance of product support in acquisition and handoff in reporting between Integrated Logistic Support and O&S
- Taxonomy update to link EVAMOSC, cost reporting, and cost estimating
  - Need to be able to track cost over time
- Element 6.0 Indirect Support will **NOT** be required in acquisition cost estimating, but will be included in where appropriate
  - Indirect costs need to be included in comparative assessments (BCAs, CBAs, etc.)
  - Appendix provides cost element structure with definitions
- Inflation vs price escalation considerations in O&S
  - Thorough discussion/definition/examples will be in the updated Inflation and Escalation Best Practices for Cost Analysis
- Fixed vs Variable costs WRT O&S cost elements
- O&S cost reporting best practices (CSDRs, 1921-M/R, etc.)
- Nominal appropriation breakout for each O&S element

O&S Cost Guide Changes (cont)

OSD CAPE

- Provided more background information on different types of maintenance and supply chain management
- Defined CLS, ICS, PBL, IPS, etc. Now includes a glossary
- All of Software Maintenance is now captured under 5.2 and new detailed WBS element structure in appendix
- New tutorial on O&S cost estimating to conform to the new DoD Cost Estimating Guide
- Updated listing of statutory provisions pertaining to O&S costs and sustainment issues
- New discussion on O&S metrics
- New recommended analytic approach for sustainment reviews

Cost Element Structure and Definition Changes

OSD CAPE

- 6.0 Indirect Support and 5.2 Software Maintenance already discussed
- Removed 2.1 Operating Material
  - Energy (direct fuel, electricity, etc.) is now 2.1
  - Training Munitions and Expendable Stores is now 2.2
- Renamed 3.1 Consumable Material and Repair Parts to 3.1 Consumables and modified definition
  - Lubricants and other consumable language removed from unit operations and included under 3.1 Consumables
  - Removed 2.1.3 Other Operational Material and placed content in 3.1 Consumables
- Specified in element 4.2 Support Equipment Replacement and Repair for unit level only
- Removed 3.5 Other Maintenance and 4.5 Information Systems
- 5.1 Hardware Modifications
  - Excludes capability improvements not in original requirements or design specifications
  - Includes mods for service life maintenance, but excludes mods for service life extension
  - Excludes retrofit mods that update early systems to latest production configuration
- The Guide acknowledges that the current VAMOSC systems cannot remove capability improvements for Hardware Modifications and Software Maintenance

O&S Cost Element Structure (First/Second Level)

OSD CAPE

1.0 Unit-Level Manpower

- 1.1 Operations Manpower
- 1.2 Unit-Level Maintenance Manpower
- 1.3 Other Unit-Level Manpower

2.0 Unit Operations

- 2.1 Energy (Direct Fuel, Electricity, etc.)
- 2.2 Training Munitions & Expendable Stores
- 2.2 Support Services
- 2.3 Temporary Duty (TDY) Travel
- 2.4 Second Destination Transportation

3.0 Maintenance

- 3.1 Consumables
- 3.2 Depot Level Reparables
- 3.3 Intermediate Maintenance (External to Unit-Level)
- 3.4 Depot Maintenance

4.0 Sustaining Support

- 4.1 System-Specific Training
- 4.2 Support Equipment Replacement and Repair
- 4.3 Sustaining/Systems Engineering
- 4.4 Program Management
- 4.5 Data and Technical Publications
- 4.6 Simulator Operations and Repair
- 4.7 Other Sustaining Support

5.0 Continuing System Improvements

- 5.1 Hardware Modifications
- 5.2 Software Maintenance

- The previous edition of this guide included 6.0 Indirect Support as a cost element.
- This element is no longer considered as part of the O&S cost element structure

EVAMOSC

What is EVAMOSC?

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Enterprise VAMOSC (EVAMOSC) is a **data platform** for actual O&S cost data of major weapon systems that leverages recent improvements in the DoD's O&S **data landscape** in order to meet emerging requirements for senior leader decision support and the O&S data community.

EVAMOSC will serve as the DoD's **authoritative source of O&S cost data** for major weapon systems. The system will operationalize data definitions, taxonomy, and business rules collaboratively defined by the DoD Cost Community and codified in policy.

EVAMOSC closely aligns with recent congressional interest in understanding sustainment costs. Sustainment cost data is largely collected in numerous, unconnected, disparate data sources across the DoD. EVAMOSC will collect sustainment cost data for all major weapons systems in a single system. Cost elements definitions will be standardized and well-documented to improve the DoD's understanding of readiness and sustainment cost.

EVAMOSC data will be valuable to a wide range of experts across the DoD, including cost estimators, program review experts, and sustainment experts.

Why do we have EVAMOSC?

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Sec. 836, NDAA '18:

"The Director of Cost Assessment and Performance Evaluation shall be responsible for ***developing*** and ***maintaining*** a database on:

- operating and support estimates,
- supporting documentation, and
- *actual operating and support costs for major weapon systems*."

Section 832, NDAA '19:

1. Develop a common data repository for all sustainment-related data in a manner similar to DAVE.
2. Create and *implement common data definitions, structure, and business rules for sustainment cost data*.
3. Provide a consistent, predictable funding stream for O&S cost databases, prioritizing department-wide accessibility.
4. Develop a *common data structure, taxonomy, dictionary* for all three VAMOSC systems.
5. Establish a common logon for the VAMOSC systems and CADE.

Sec. 879, NDAA '19:

Provide a briefing for fiscal years 2020, 2021, and 2022 on the current product support estimates for each *major weapon system* by year for the entire life cycle, funding requested, and *expenditures*. The Briefing is to include summary of *improvements made to data collection and cost estimating*.

D,CAPE has a statutory requirement to develop an enterprise O&S cost database, or Enterprise VAMOSC (EVAMOSC) system. This requirement represents an opportunity to address capability gaps and serve a wider user community.

Current Service VAMOSC View

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CAPE 2014 O&S CES	Air Force	Army	Naval VAMOSC					
	AFTOC	OSMIS	Aircraft	Ships	MSC	Shipboard Systems	Weapons	USMC GE
1. Unit Level Manpower	X	X	X	X	X			
2. Unit Operations	X		X	X	X	X	X	
2.1 Operating Materiel	X		X	X	X	X	X	
2.1.1 Energy (Fuel, Electricity, etc.)	X	X	X	X	X	X		
2.1.2 Training Munitions and Expendable Stores	X	X	X	X	X		X	X
2.1.3. Other Operational Material	X			X	X			
2.2 Support Services	X			X	X			
2.3 Temporary Duty	X		X	X	X			
2.4 Transportation	X		X		X		X	
3. Maintenance	X	X	X	X	X	X	X	
3.1. Consumable Materials and Repair Parts (CONs) (Unit Level)	X	X	X	X	X	X	X	
3.2. Depot Level Reparables (DLRs) (Unit Level)	X	X	X	X	X	X	X	in 3.4
3.3 Intemediate Maintenance (External to Unit Level)		N/A	X	X	X	X		
3.4 Depot Level Maintenance	X	X	X	X	X	X	X	X
3.5 Other Maintenance	X	X	X		X		X	
4. Sustaining Support	X		X	X	X	X	X	
4.1 System Specific Training	X	X	X	X	X	X		
4.2. Support Equipment Replacement and Repair	X		X		X		X	
4.3. Sustaining/Systems Engineering	X	X	X	X	X	X	X	
4.4. Program Management	X	X	X		in 4.3		X	
4.5. Information Systems								
4.6. Data and Technical Publications	X		X	X				
4.7. Simulator Operations and Repair	X		X					
4.8. Other Sustaining Support	X		X	X	X		X	
5. Continuing System Improvement	X		X	X	X	X	X	
5.1. Hardware Modifications	X	X	X	X	X	X	X	
5.2. Software Maintenance	X		X	X	X	X	X	

Implications:

- Inconsistent data coverage and content
- Short term (<5 years) EVAMOSC goal to address Army and ground vehicle systems
- EVAMOSC will also implement cost element and O&S data definitions published in updated CAPE O&S Cost Estimating Guide

What is the Consolidated VAMOSC Tool (CVT)?

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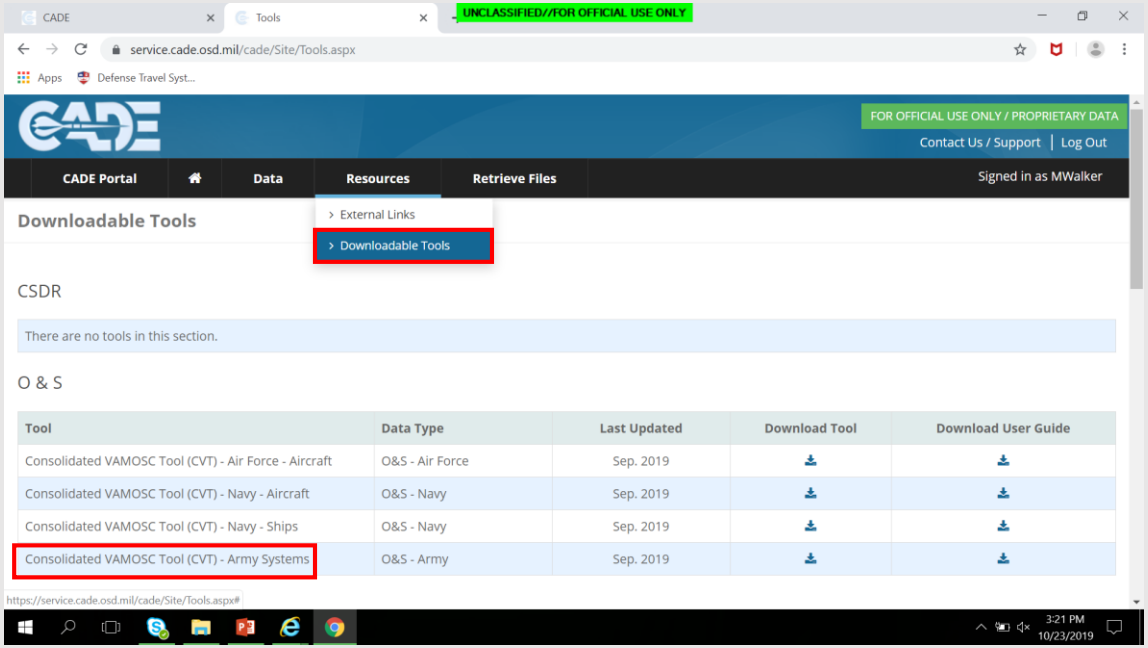
- Phase I of EVAMOSC: CVT allows access to each service's VAMOSC data with one login and aligned the data into a common data structure and taxonomy



Within CADE Portal:

-> Data and Analytics
-> Resources
-> Downloadable Tools

CVTs available for:

- USAF Aircraft
- USN Aircraft
- USN Ships
- USA Systems

CVT Army Systems (Cost in $M)

Data Source: OSMIS Data as of March 2019

System	M109A6, PALADIN
Data View	Total
TY or CY	TY
Table BY	2018
FY	2019

After download, User selects:

1) MDS
2) Data View (w or w/o CONOPS)
3) TY$ or CY$
4) Base Year of Appropriate Inflation Table
5) Choose Constant Year

Consolidated VAMOSC Tool (CVT) Example

OSD CAPE

CVT Data Tab

CVT Army Systems (Cost in $M)

Data Source: OSMIS Data as of March 2019

FOUO (FOR OFFICIAL USE ONLY) applicable to all VAMOSC data within this excel file

System	M109A6, PALADIN
Data View	Total
TY or CY	TY
Table BY	2018
FY	2019

Consolidated VAMOSC Tool (CVT), Army Systems Data in $M

Element	Cost Element Description	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1.0	Unit-Level Manpower	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
1.1	Operations	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
1.2	Unit-Level Maintenance																							
1.3	Other Unit-Level																							
2.0	Unit Operations	6.472	28.099	58.491	56.609	58.572	61.503	58.220	41.840	18.744	26.568	20.627	23.631	25.000	19.939	45.759	56.326	47.858	73.059	42.171	32.681	37.796	56.356	
2.1	Operating Materiel	6.472	28.099	58.491	56.609	58.572	61.503	58.220	41.840	18.744	26.568	20.627	23.631	25.000	19.939	45.759	56.326	47.858	73.059	42.171	32.681	37.796	56.356	
2.1.1	Energy (Fuel, Electricity, etc.)	0.000	0.118	0.223	0.274	0.206	0.251	0.295	0.248	0.142	0.169	0.203	0.275	0.283	0.220	0.394	0.286	0.534	0.347	0.351	0.412	0.417	0.389	
2.1.2	Training Munitions and Expendable Stores	6.472	27.981	58.268	56.335	58.366	61.251	57.925	41.592	18.602	26.399	20.425	23.355	24.717	19.719	45.365	56.040	47.324	72.713	41.820	32.269	37.380	55.967	
2.1.3	Other Operational Material																							
2.2	Support Services																							
2.3	Temporary Duty																							
2.4	Transportation																							
3.0	Maintenance	4.888	5.311	16.806	19.3																	20.537	28.071	
3.1	Consumable Materials and Repair Parts	2.179	3.653	10.657	9.75																	10.458	12.978	
3.2	Depot Level Reparables	2.709	1.659	6.149	9.59																	10.079	14.175	
3.3	Intermediate Maintenance (Ext to Unit-Level)	0.000	0.000	0.000	0.00																	0.000	0.000	
3.3.1	I-Level Consumable Materials & Repair Parts																							
3.3.2	I-Level Government Labor																							
3.3.3	I-Level Contractor Maintenance																							
3.3.4	Other I-Level Maintenance																							
3.4	Depot Maintenance	0.000	0.000	0.000	0.00																	0.000	0.918	
3.5	Other Maintenance																							
3.6	Other Contractor Maintenance																							
4.0	Sustaining Support	0.000	0.000	0.000	0.00																	0.071	0.000	
4.1	System Specific Training	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.063	0.086	0.071	0.000	
4.1.1	System Specific Operator Training																							
4.1.2	System Specific Maintenance Training																							
4.1.3	System Specific Other Support Training																							
4.2	Support Equipment Replacement and Repair																							
4.3	Sustaining/Systems Engineering																							
4.4	Program Management																							
4.5	Information Systems																							
4.5.1	Tech Refresh																							
4.5.2	License Fees																							
4.5.3	Maintenance																							
4.6	Data and Technical Publications																							
4.7	Simulator Operations and Repair																							
4.8	Other Sustaining Support																							
5.0	Continuing System Improvement																							
5.1	Hardware Modifications																							
5.2	Software Maintenance																							
	Total Reported	11.359	33.411	75.298	75.961	75.794	82.017	87.615	89.005	66.120	64.672	94.080	133.321	127.180	93.666	69.976	67.988	67.106	90.967	58.534	46.922	58.405	84.427	

Element	Non-Cost Element Description																							
A.1	Number of Systems	228	329	496	66																	894	874	
B.1	Flying Hours (FH)																							
B.2	Steaming Hours (SH)																							
B.3	Steaming Hours Underway (SHU)																							
B.4	Steaming Hours Not Underway (SHNU)																							
B.5	Miles Driven		162,685	299,670	367,4																	131,106	128,502	
C.1	Fuel Consumed (Gallons M)																							
C.2	Fuel Consumed Underway (Gallons M)																							
C.3	Fuel Consumed Not Underway (Gallons M)																							
C.4	Fuel Consumed Auxiliary (Gallons M)																							

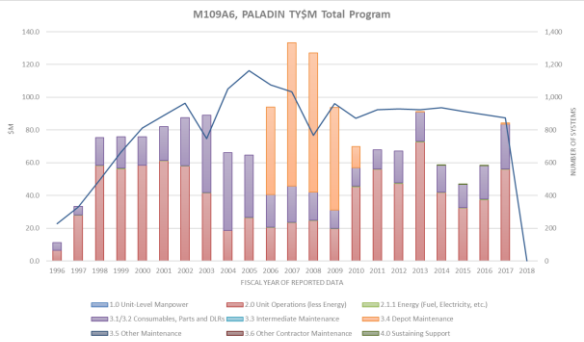
Metric	Metric Description																							
M-1	Total Cost Reported per System ($M)	0.05	0.102	0.152	0.11																	0.065	0.097	
M-2	Total Cost Reported per FH ($)																							
M-3	Total Cost Reported per Mile ($)		205.37	251.27	206.7																	445.48	657.01	

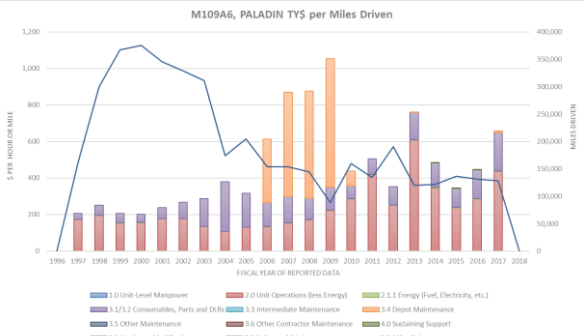
CAPE '14 Cost Estimate Structure (CES)

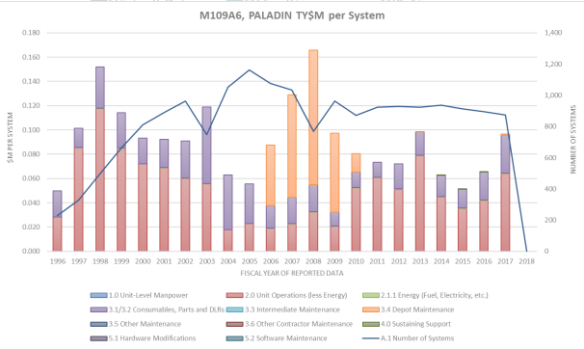
Non-Cost Data

O&S Cost Metrics

CVT Visualizations



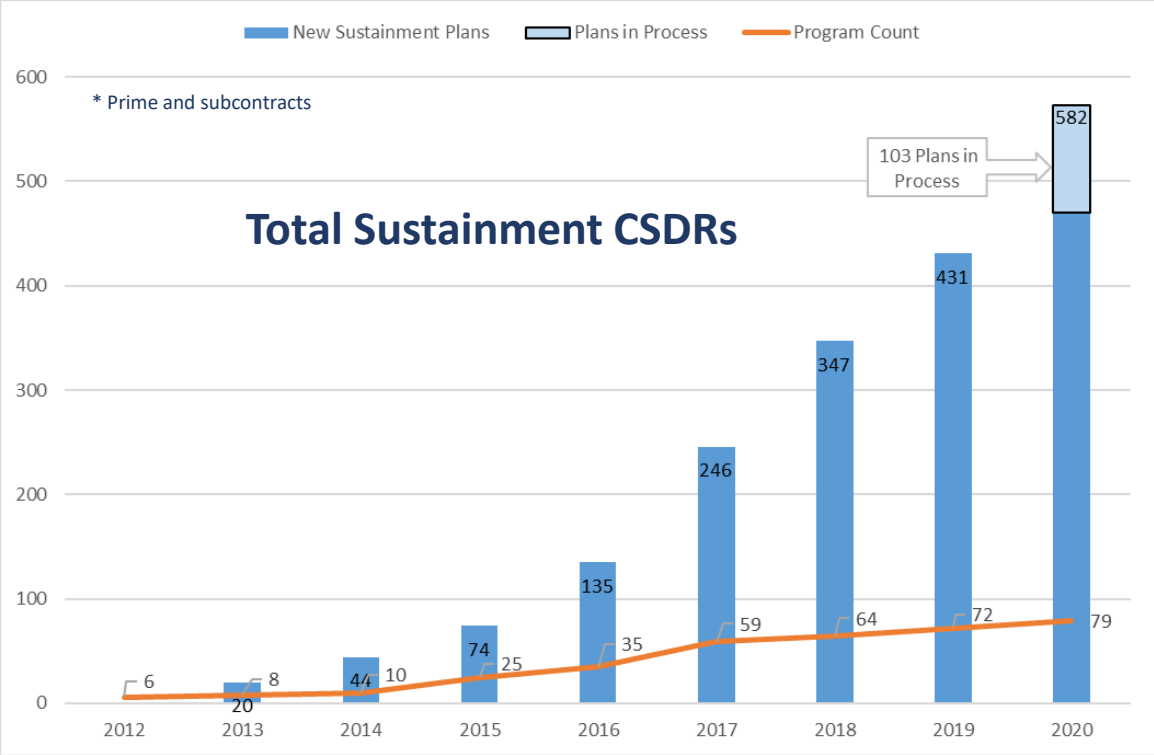




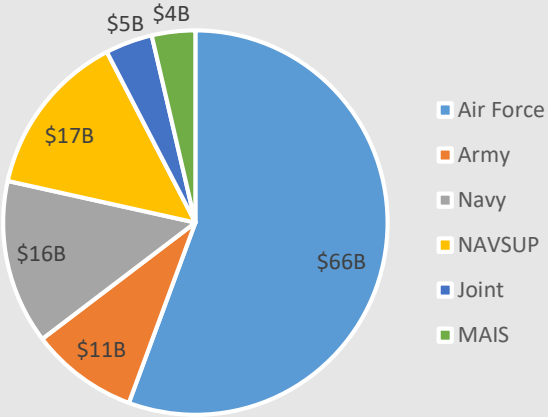
Update: Sustainment Cost Reporting

Sustainment Cost Reporting

OSD CAPE



Value of these 79 Programs = $118B



- Cost and Schedule Data Reporting (CSDR) is required on all Sustainment contracts over $50M (TY$), and for all Programs over $100M and includes contractors and government
- CSDR sustainment standard plan WBS consistent with O&S cost element structure
- Additional reports for sustainment include:
  - Maintenance and Repair Parts Data Report
  - Software Maintenance Report

Army Organic FlexFile Solution

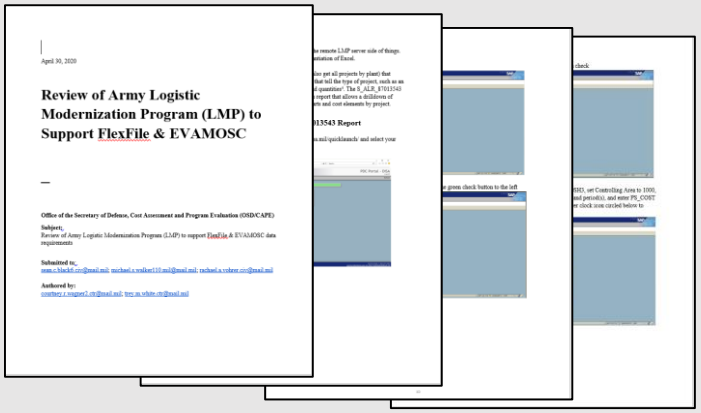
OSD CAPE

Army uses a single, customized SAP instance at depots and arsenals

Army's organic industrial facilities have multiple CSDR requirements tied to Public-Private Partnerships (P3s)

Army Materiel Command (AMC) and CAPE have developed an "enterprise" FlexFile approach:

- FlexFile DID Compliant
- Uses "base LMP" reports, available at all facilities
- Pushbutton approach, using enterprise instructions
- Currently in use for 2 organic CSDR requirements


April 30, 2020

Review of Army Logistic Modernization Program (LMP) to Support FlexFile & EVAMOSC

Office of the Secretary of Defense, Cost Assessment and Program Evaluation (OSD/CAPE)

Subject,
Review of Army Logistic Modernization Program (LMP) to support FlexFile & EVAMOSC data requirements

Submitted to:
sean.c.blackft.civ@mail.mil; michael.a.walker110.mil@mail.mil; rachael.a.rohrer.civ@mail.mil

Authored by:
courtney.r.wagner2.civ@mail.mil; troy.m.white.civ@mail.mil

FlexFile approach offers ERP-level granularity

- NSN-level Material Cost Reporting
- Cost Center-level labor costs (hours, rates, overheads)
- Unit or sub-lot level reporting

Back Up Slides

Title 10 United States Code Section 2441 Sustainment Reviews

OSD CAPE

Each military department shall conduct a sustainment review of each major weapon system no later than five years after IOC and throughout the life cycle of the weapon system

Each sustainment review is required to include the following:

- An independent cost estimate for the remainder of the life cycle of the program
- A comparison of actual costs to the amount of funds budgeted and appropriated in the previous five years, and if funding shortfalls exist, an explanation of the implications on equipment availability
- A comparison between the assumed and achieved system reliabilities
- An analysis of the most cost-effective source of repairs and maintenance
- An evaluation of the cost of consumables and depot-level reparables
- An evaluation of the costs of information technology, networks, computer hardware, and software maintenance and upgrades
- As applicable, an assessment of the actual fuel efficiencies compared to the projected fuel efficiencies as demonstrated in tests and operations
- As applicable, a comparison of actual manpower requirements to previous estimates
- An analysis of whether accurate and complete data are being reported in the cost systems of the military department concerned, and if deficiencies exist, a plan to update the data and ensure accurate and complete data are submitted in the future

O&S AND INDIRECT

OPERATING AND SUPPORT

OPERATIONAL
- 1.1 Operations Manpower
- 1.3 Other Unit-Level Manpower
- 2.2 Training Munitions and Expendable Stores

DoD REIMBURSEMENT

OPTEMPO PROGRAMS
- 2.1 Energy
- 3.1 Consumables
- 3.2 Depot Level Reparables

- 3.4 Depot Maintenance
- Variable Contractor Logistics Support

LOGISTICS FACTORS
- 1.2 Unit-Level Maintenance Manpower
- 2.3 Support Services
- 2.4 Temporary Duty Travel
- 2.5 Second Destination Transportation
- 3.3 Intermediate Maintenance
- 3.4 Depot Maintenance
- 4.1 System-Specific Training
- 4.2 Support Equipment Replacement and Repair
- 4.3 Sustaining/Systems Engineering
- 4.4 Program Management
- 4.5 Data and Technical Publications
- 4.6 Simulator Operations and Repair
- 4.7 Other Sustaining Support
- 5.2 Software Maintenance

- 5.1 Hardware Modifications

- Indirect Cost Elements

OPERATING AND SUPPORT

DIRECT OPERATING
- 1.1 Operations Manpower
- 1.3 Other Unit-Level Manpower
- 2.2 Training Munitions and Expendable Stores
- 2.3 Support Services

TOTAL MAINTENANCE
- 1.2 Unit-Level Maintenance Manpower
- 3.3 Intermediate Maintenance
- 3.4 Depot Maintenance
- 4.2 Support Equipment Replacement and Repair
- 4.3 Sustaining/Systems Engineering
- 4.4 Program Management

PARTS COST
- 3.1 Consumables
- 3.2 Depot Level Reparables

- 2.4 Temporary Duty Travel
- 2.5 Second Destination Transportation
- 4.1 System-Specific Training
- 4.5 Data and Technical Publications
- 4.6 Simulator Operations and Repair
- 4.7 Other Sustaining Support

- 5.2 Software Maintenance

- 2.1 Energy
- 5.1 Hardware Modifications