

Ownership Costing

Current Status of Tools, Data Sources, and the Operating & Support Guide



Business Managers' Conference

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15 May 2003

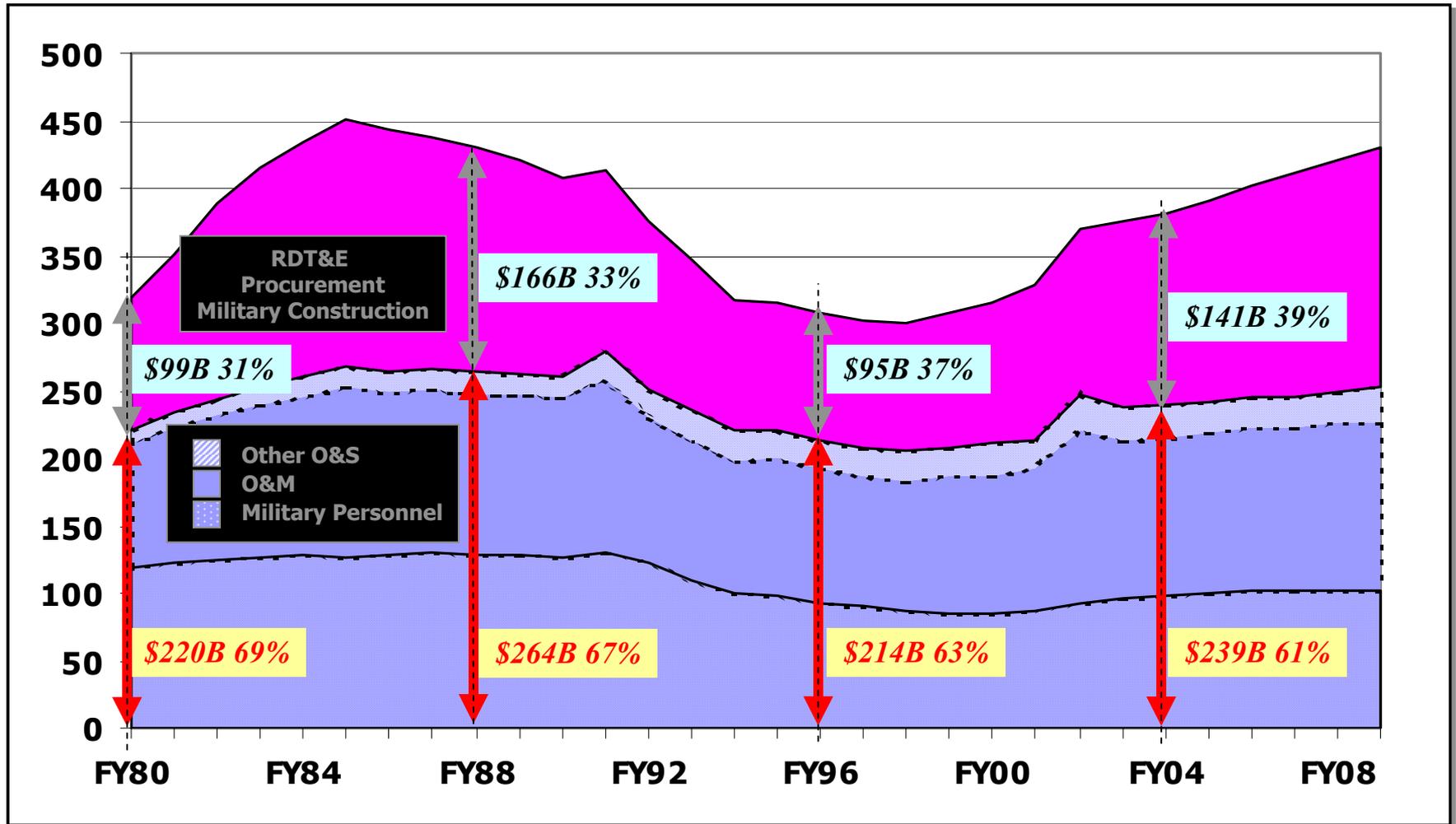
Agenda

- **Operating & Support (O&S) Costs Definition**
 - O&S Quantities
 - O&S Estimate Duration
- **OSD CAIG O&S Cost Element Structure**
- **OSD CAIG O&S Guidance**
- **O&S Estimating Concepts**
 - Personnel Costs
 - Maintenance Costs
- **O&S Data Sources—Visibility and Management of Operating & Support Costs (VAMOSOC) System**
- **O&S Applications & Future Efforts**

DoD Funding Trends

FY04\$
Billions

DoD TOA adjusted¹ for funding policy changes



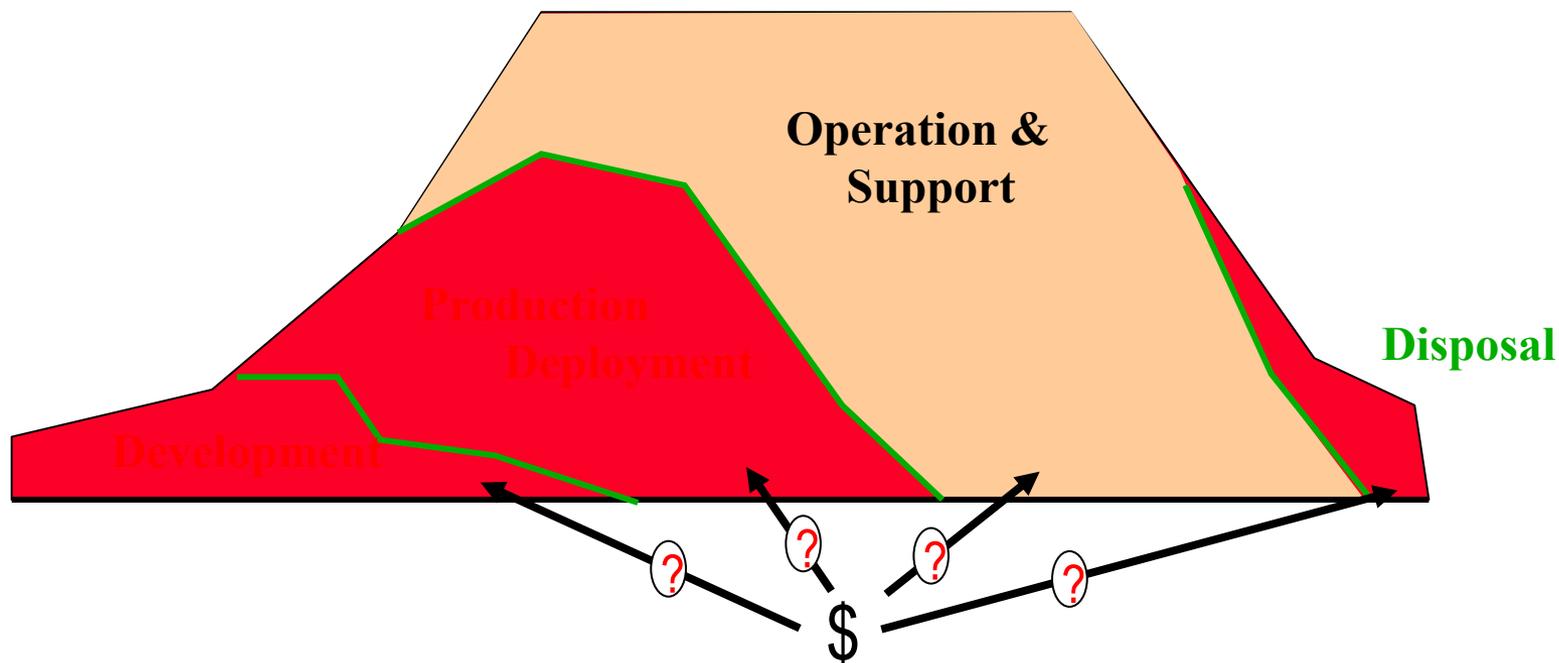
1. "Normalizing the Future Years Defense program for Funding Policy Changes, 2000", IDA Paper P-3543

Weapon Life Cycle Phases

O&S is a PHASE in a system's life cycle:

Starts: when the *first operating unit is activated*

Ends: when the *last operational item is deactivated*



Every cost that can be associated with a weapon should have a home in one of the four phases of a system's life cycle

Scope Of O&S Costs

CAUTION: Many terms in production cost WBS look like O&S.

- | | | | |
|---|--|-----------------------------------|---|
| | • Production Tooling & Facilities | • Initial Spares | ← |
| | • Hardware Production | • Initial Item Management | |
| | • Software Production | | |
| → | • Support & Test Equipment
(Initial) | • Shipping and Storage Containers | |
| | | • Installation | |
| | | • Site Activation | |
| → | • Technical Data (Initial) | • System Program Management | ← |
| → | • Initial Training | | |
| | • Training Devices | • Initial Warranty | ← |

Providing the initial support environment is not an O&S cost

O&S Cost Definition (DoD 5000.4-M)

Formal definition:

All

**personnel, equipment, supplies, software, services
(includes contract support)**

Associated with

**operating, modifying, maintaining, supplying, training, and
supporting**

a System

in the DoD Inventory

- **Includes costs attributable (directly and indirectly) to the specific defense program**
 - i.e., costs that would not occur if the program did not exist

What Does It Take To Operate And Support A System?

Unit Operating Material

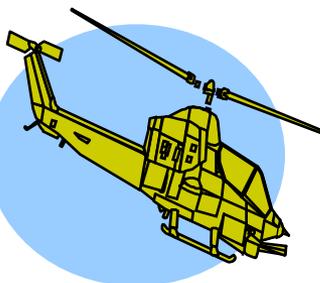
Fuel



Operating Consumables

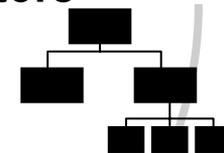


Training Material

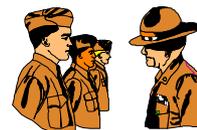


Unit Personnel

Operators



Support



Maintainers

Equipment Maintenance

Repair Parts

Repair Services

Maintenance Equipment

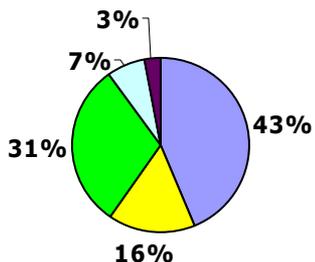
Material Pipeline



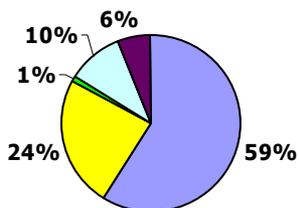
Personnel Pipeline

Program Technical Support

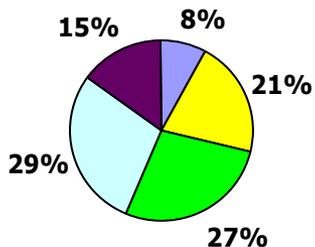
O&S Cost Patterns Vary - Widely



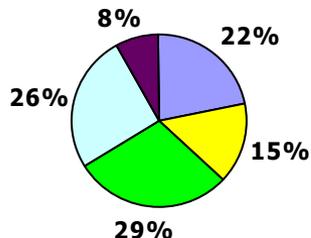
Ships



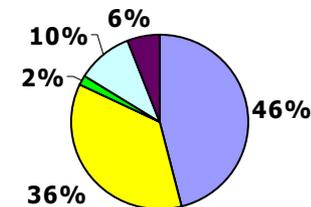
Land Vehicles



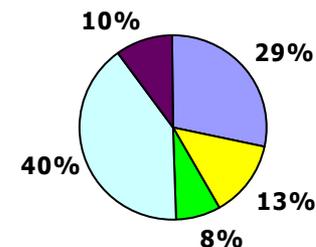
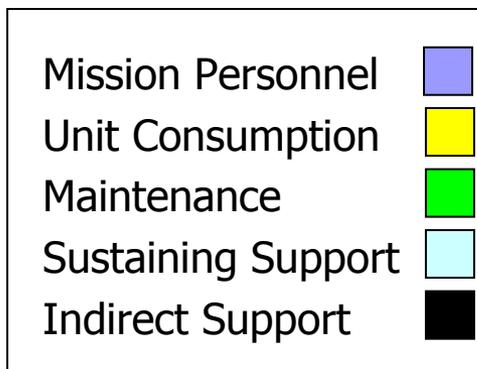
Tactical Missiles



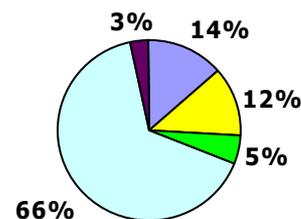
Fixed Wing Aircraft



Rotary Wing Aircraft



c Systems



Space Systems

O&S Costs and Appropriations

	MilPers	O&M	Procurement	RDT&E	MilCon
Unit Personnel	Military Personnel in Operating Units	Civilians and Contractors Working In Units			
Unit Operations		Fuel, Purchased Services, TDY/TAD	Training Ammo, Rockets, Bombs, Missiles		
Maintenance	Military Personnel in Intermediate or Depot Units	Consumable Supplies, Depot Level Reparables, Civilians, Contractors, Contract Services, Transportation			
Sustaining Support	Replacement Training	Replacement Training	Replacement Support Equipment		
Continuing Support	Simulator Operations	Simulator Operations	Modification Kit Production	Software Updates, New Subsystem	
Indirect Support	Base Ops	Base Ops, Medical, etc	Base Ops		Base Ops

O&S Costs \neq O&M + MilPers

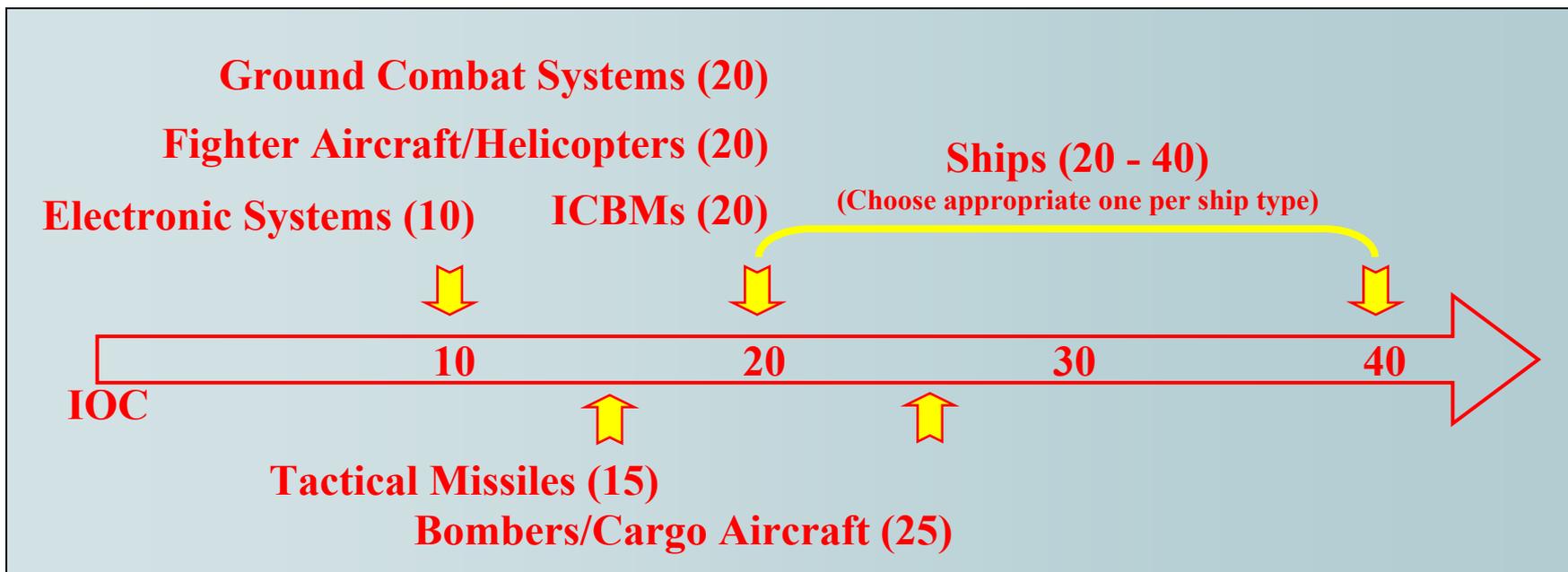
OSD(CAIG)

O&S Cost Estimate Quantities

- **The Total Production Quantity is based on Operational and Other Requirements**
 - Authorized equipment quantities in operational units
 - Training
 - Test (DT&E/TO&E)
 - Backup inventory (depot “float”) and attrition
- **O&S Costs are based on the Total Authorized Equipage in Operational and Training Units**
 - Attrition and other non-operational/non-training assets not included (except for modifications)

O&S Cost Estimate Durations

The O&S Cost Estimate Period is typically based on the System's Nominal Service Life



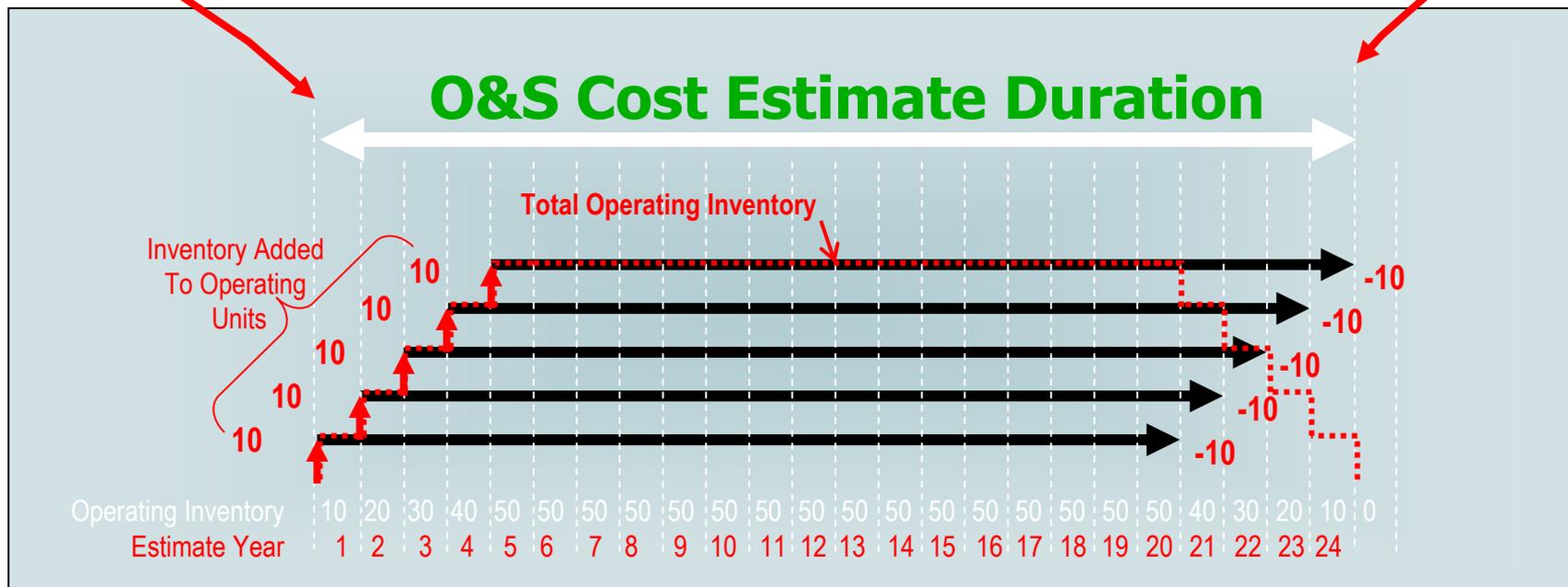
The OSD CAIG O&S Handbook has typical service lives for different systems.

Cost IPT typically agrees on the service life assumption. (May differ)

O&S Cost Estimate Durations

Starts with IOC of first operational unit activated

Ends at end of equipment service life of last operational unit activated



OSD CAIG Operating & Support Cost Element Structure (CES)

Roles of an O&S Cost Structure

- **Establishes DoD Policy on the Scope of O&S Costs**
- **Provides a Common DoD Structure to the Cost Estimates**
 - OSD(CAIG) Reviews on MDAPs
- **Creates a Common Structure for Service Cost Data “VAMOSC” Systems**
 - Complementing Service-Unique Data Structures

O&S Estimating Structure (*Draft*)

1.0 Unit Personnel

Costs of operators, maintainers, and other support personnel assigned to operating units. Includes military, civilian, and contractor personnel.

2.0 Unit Operations

Costs of unit operating material (e.g., fuel and training material), unit support services, and unit travel. Excludes all maintenance and repair material.

3.0 Maintenance

Costs of all maintenance other than maintenance personnel assigned to operating units. Includes contractor maintenance.

4.0 Sustaining Support

Costs of support activities other than maintenance which can be attributed to a system and are provided by organizations other than operating units.

5.0 Continuing System Improvements

Costs of hardware and software modifications to keep the system operating and operationally current. Excludes all costs of modification programs that qualify as Major Defense Acquisition Programs as well as any modifications or upgrades included in the acquisition cost estimate.

6.0 Indirect Support

Costs of support activities that provide general services that cannot be directly attributed to a system. Indirect Support is generally provided by centrally managed activities that support a wide range of activities.

O&S Estimating Structure (*Draft*)

Second Level

1. Unit Personnel

- 1.1 Operations Personnel
- 1.2 Unit Maintenance Personnel
- 1.3 Other Direct Support

2. Unit Operations

- 2.1 Operating Material
- 2.2 Support Services
- 2.3 Temporary Duty

3. Maintenance

- 3.1 Organizational Maintenance
- 3.2 Intermediate Maintenance
- 3.3 Depot Maintenance

4. Sustaining Support

- 4.1 System Specific Training
- 4.2 Support Equipment Replacement
- 4.3 Sustaining Engineering and Program Management
- 4.4 Other Sustaining Support

5. Continuing System Improvements

- 5.1 Hardware Modifications
- 5.2 Software Maintenance and Modifications

6. Indirect Support

- 6.1 Installation Support
- 6.2 Personnel Support
 - 6.2.1 Personnel Administration (Personnel Acquisition , Individuals Overhead -TPPS)
 - 6.2.2 Personnel Benefits (Family Housing, Commissaries, Child & Family Support, DoD Schools)
 - 6.2.3 Medical Support
- 6.3 General Training and Education
 - 6.3.1 Basic & Initial Skill Training
 - 6.3.2 Educational Activities

Top Level O&S Estimating Structures

New Version*

1992 Version

1. Mission Personnel
2. Unit-Level Consumption
3. Intermediate Maintenance
4. Depot Level Maintenance
5. Contractor Support
6. Sustaining Support
7. Indirect Support

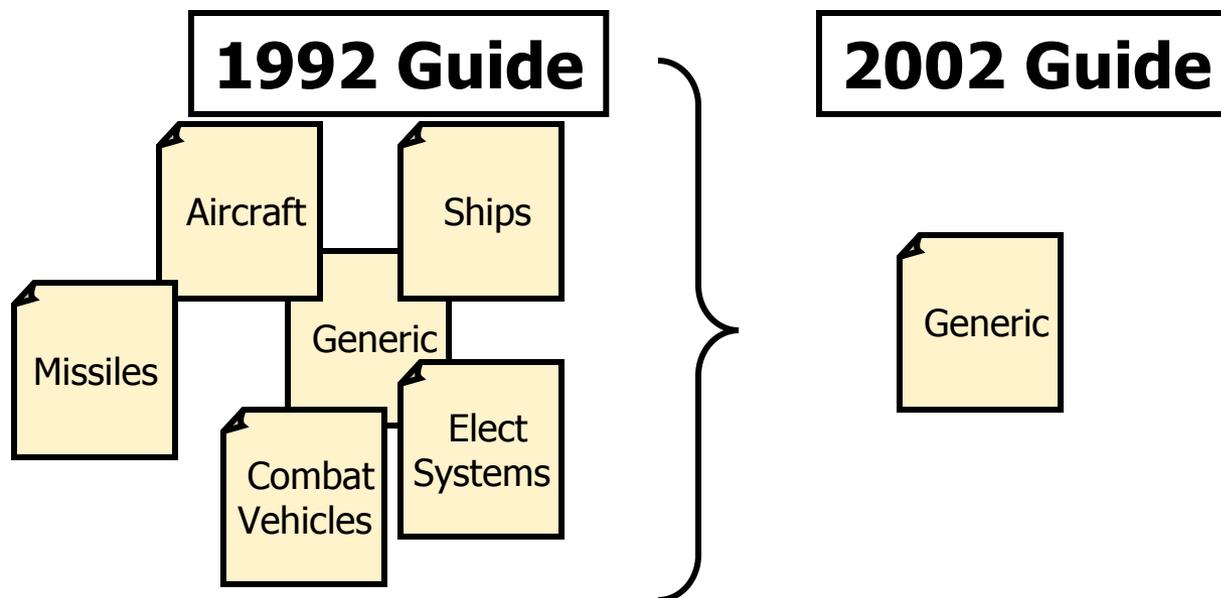
	Unit Personnel	Unit Operations	Maintenance	Sustaining Support	Continuing Improvements	Indirect Support
1. Mission Personnel	●					
2. Unit-Level Consumption		Non-Maint Ops Fuel, Ammo, TDY	Maint Mat'l Consumables Reparables			
3. Intermediate Maintenance			●			
4. Depot Level Maintenance			●			
5. Contractor Support	●	●	As Applicable	●	●	
6. Sustaining Support				Tng, SE/PM Spt Equip Repl	Modifications Software Support	
7. Indirect Support						As Applicable

** Separately record contract and organic components where applicable*

OSD CAIG Operating & Support Guidance

Streamlining the O&S Guidance

- Focus on generic O&S functions at top level.
- Expand definitions of cost elements to show how they apply to different types of systems.
- Resolve unique cases in the Cost IPT forum.



Implementing the O&S Guidance

- **Applying the O&S CES to a Cost Estimate**
 - The Cost IPT will tailor the structure to the specific cost analysis:
 - The scope of post-deployment modifications (*element 5.1*) considered relevant
 - Indirect Costs (*element 6*) as applicable
 - O&S Structure should be included in the CARD
- **Using the O&S CES in the Service Cost Data Systems**
 - Retain Service-specific CES in O&S Data Systems
 - Crosswalk from Service CES to OSD(CAIG) CES

Status of O&S Guidance

- **Revised OSD CAIG O&S CES:**
 - Reviewed by the Service VIEW Group reps & OSD(CAIG) at a January 10, 2002 meeting.
 - Utilized in the Defense Acquisition University (DAU)'s course "O&S Cost Estimation" (BCF 215).
- **Remaining section of O&S Cost Estimating Guidebook being revised to conform with current acquisition policy.**
 - **Awaiting Final Reissuance of DoD 5000 series.**

Proposal:

Promulgate the revised OSD(CAIG) O&S Cost Estimating Guidebook--with the updated CES--per an OSD(CAIG) memo via the website: <http://dcarc.pae.osd.mil/>

Operating & Support Estimating Concepts

Composite Standard Rate Components (Active Military)

DoD Financial Management Regulation, Volume 11A, Chapter 6, Appendix I (DoD 7000.14R).

The Annual Department of Defense (DoD) Composite Rate shall be used when obtaining reimbursement for services provided to another DoD activity, or when determining the cost of military personnel for management studies.

- (1) BASIC PAY
- (2) RETIRED PAY ACCRUAL
- (3) BASIC ALLOWANCE FOR QUARTERS/ VHA
- (4) BASIC ALLOWANCE FOR SUBSISTENCE/ SIK
- (5) INCENTIVE AND SPECIAL PAYS
- (6) PERMANENT CHANGE OF STATION
- (7) MISCELLANEOUS

Composite Rates For Civilians

- **Basic Pay**
- **Overtime, holiday, night differentials, incentive awards and all other personnel compensation above basic rates paid directly to civilian employees.**
- **Government costs for civilian benefits, such as**
 - Retirement
 - Health benefits
 - Life insurance
 - Quarters or uniform allowances

Manpower Estimate Report (MER)

- **Primary Source of Manpower Quantities For O&S Estimates at Major Decision Milestones**
- **Usually Documented in the Cost Analysis Requirement Description**
- **Not Available At Earliest Phases Of An Acquisition**

“Traditional” Levels Of Maintenance

- **Organizational (O-Level)**
 - Maintenance and repair performed within the activity's capability by the organization that uses the system
- **Intermediate (I-Level)**
 - Maintenance and repair which the organizational level is incapable of performing, but which does not go to depot level
- **Depot (D-Level)**
 - Major overhaul or complete rebuild of parts, assemblies, subassemblies, and end items
 - Including the manufacture of parts, modification, testing, and reclamation as required
 - Requires more extensive shop facilities and personnel of higher technical skill than are normally available at organizational and intermediate maintenance activities

Maintenance Terminology

Functions Performed	On/Off Equipment	Level	Echelon	
Adjustments, Repairs by Replacement, Scheduled & Preventative Services, Cleaning, Lubrication, Tightening	On-Equipment	Organization (O-Level)	1st Echelon	Individual
	On-Equipment		2nd Echelon	Owning Unit
Diagnosis, Fault Isolation, Repair by Replacement, Calibration, Battle Damage Assessment	Off-Equipment	Intermediate (I-Level)	3rd Echelon	Forward Deployed Support Unit
Repair of assemblies, components and modules	Off-Equipment		4th Echelon	Theater Support Unit
Rebuild Major Components, System Inspection & Overhaul	Off-Equipment	Depot (D-Level)	5th Echelon	Depot

Operating & Support Data Sources

O&S Cost Data

- **1974 OSD asked Services to develop an Information System to report actual O&S Costs**
- **Services established the “Visibility And Management Of Operating and Support Costs (VAMOSC)” Databases**
 - **Army: OSMIS**
(Operating & Support Management Information System)
 - **Navy: VAMOSC**
 - **USMC: VAMOSC**
 - **Air Force: AFTOC**
(Air Force Total Ownership Cost)

VAMOSOC Data Sources

- **All Services developed Information Systems on Historical O&S cost data for weapon systems:**
 - drawn from various Service reporting systems;
 - easily retrieved and displayed;
 - organized in a standard format:
 - 1.0 Unit Personnel
 - 2.0 Unit Operations
 - 3.0 Maintenance
 - 4.0 Sustaining Support
 - 5.0 Continuing System Improvements
 - 6.0 Indirect Support

How Do I Get VAMOSC ?

OSD CAIG

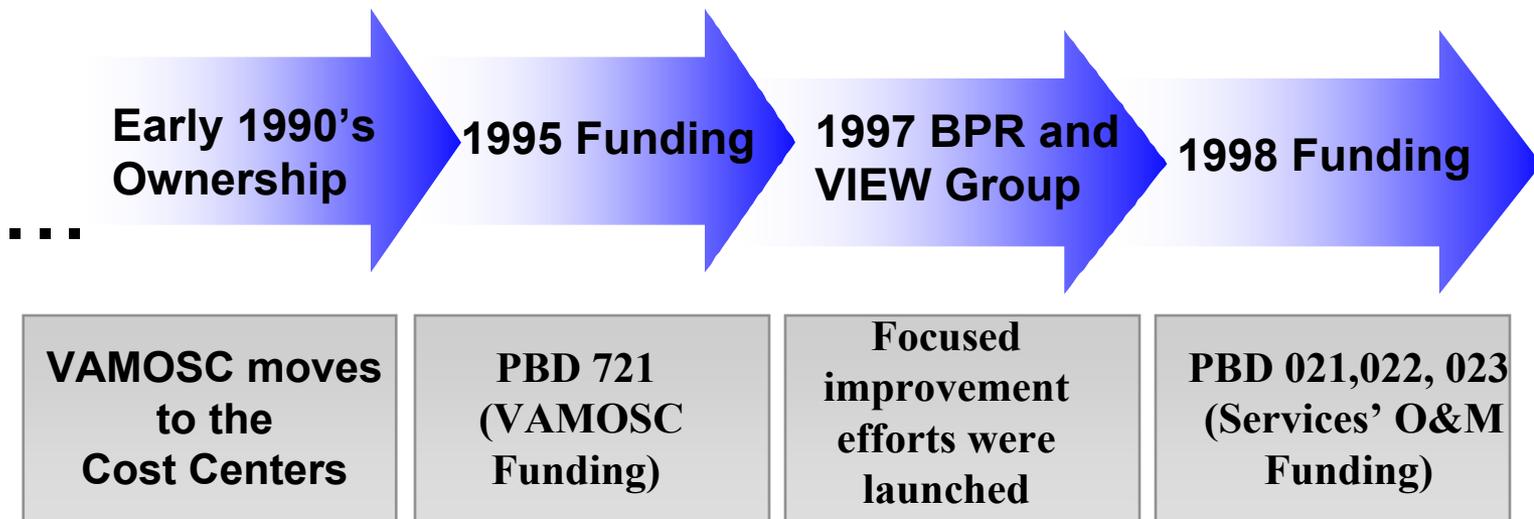
<http://www.dcarc.pae.osd.mil/>

- NAVY VAMOSC <http://www.navyvamosc.com/>
- USMC VAMOSC <http://www.usmcvamosc.com/>
- Army OSMIS
<http://www.osmisweb.com/OSMISWeb/>
- Air Force TOC <https://aftoc.hill.af.mil/>

VAMOSC Recent Milestones



O&S Cost Database of Weapon Systems Established in mid-1970s



VAMOSOC PROGRAMS

	ARMY OSMIS	NAVY * VAMOSOC	Air Force AFTOC
Managed by:	SAFM- CES	NCAD, FMB-6	AFCOA
FY2002 Budget	\$3.0M	\$2.9M	\$xM
# of Workyears (Ktr/In-House Sppt)	21/5	12.4/3	x
# of Data Sources	30	130	x
# of Systems	1,058	947**	x
# of Years	10	19	x

* Naval VAMOSOC contains Ship, Aviation, Weapons, and Marine Corps components.

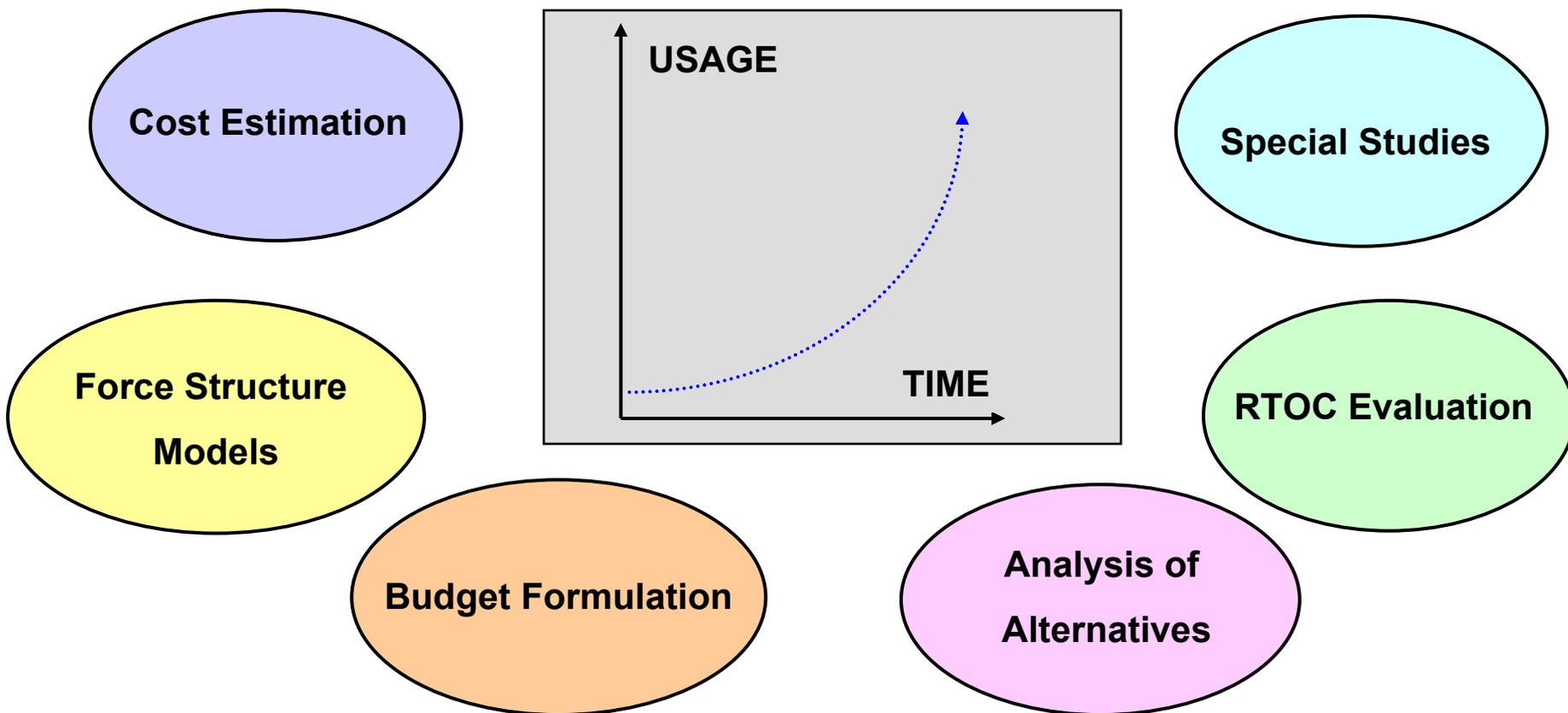
** Plus 1000's of aircraft subsystems

When Using VAMOSC Data

- **Know the scope of the data!**
 - What data are included
 - What data are not included
 - Scope of VAMOSC data DOES NOT EQUAL O&S
- **What Does The Data Really Represent**
 - Labels can be misleading
 - Know what they mean - on-line definitions (ask)
- **The source of associated inventory and OPTEMPO data**

Operating & Support Application & Future Efforts

VAMOSC Recent Applications



The Service VAMOSC Systems are widely used modern databases.



VAMOSC Improvement Efforts



DAU O&S Cost Analysis Course

- **BCF 215**

- Operating and Support (O&S) Cost Analysis

- **Provides concepts and methodologies needed to develop operating and support (O&S) cost estimates, total ownership cost reduction studies, Cost As an Independent Variable (CAIV) management processes, and other relevant management decisions.**
 - **Objectives:**
 - recognize the full spectrum of costs included in O&S cost estimates;
 - plan and perform an O&S cost estimate;
 - obtain and normalize O&S data;
 - apply appropriate cost estimating methods and models;
 - document cost models and cost estimates; and
 - apply economic analysis tools to evaluate alternative courses of action.