Conference Paper

Method of Modeling and Measuring Military Manpower Costs

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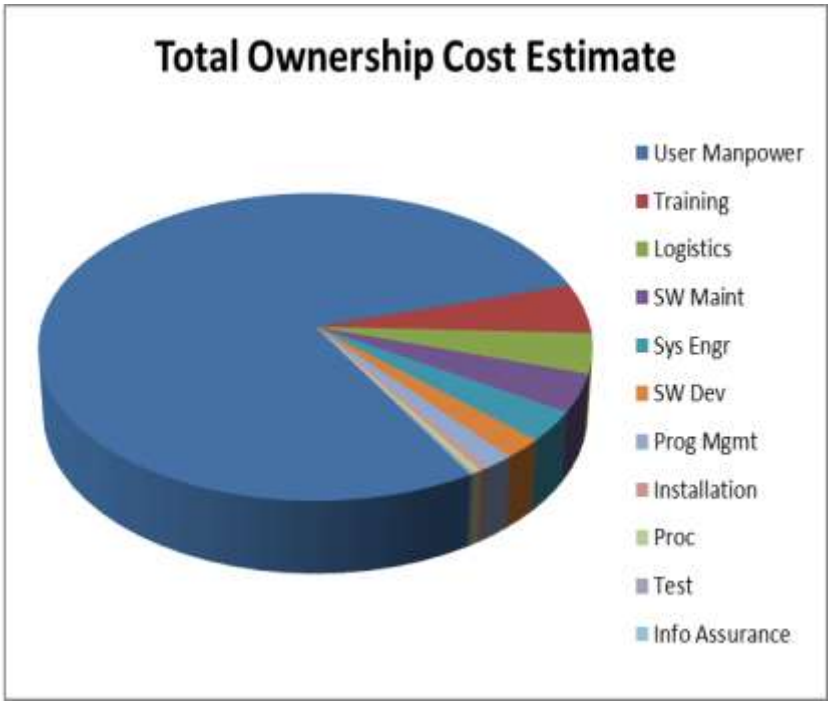
Problem Statement

- For a Major ACAT 1A program, military manpower costs was the leading cost driver affecting the program's Total Ownership Cost (TOC)

– System documentation lacked periodicity and frequency of User's system usage --> each User was estimated at 100% utilization

  - User base > 1,000 FTEs* in a given year
  - System Usage cost > $1B* over its projected lifecycle

- The program tried to ascertain how much of the system usage was actually being spent by its user base in order to re-baseline the programs #1 cost driver—Military Manpower Costs.



Disclaimer: *FTE figures and cost estimate are not actuals from any actual program. They are used to for ILLUSTRATION PURPOSES ONLY

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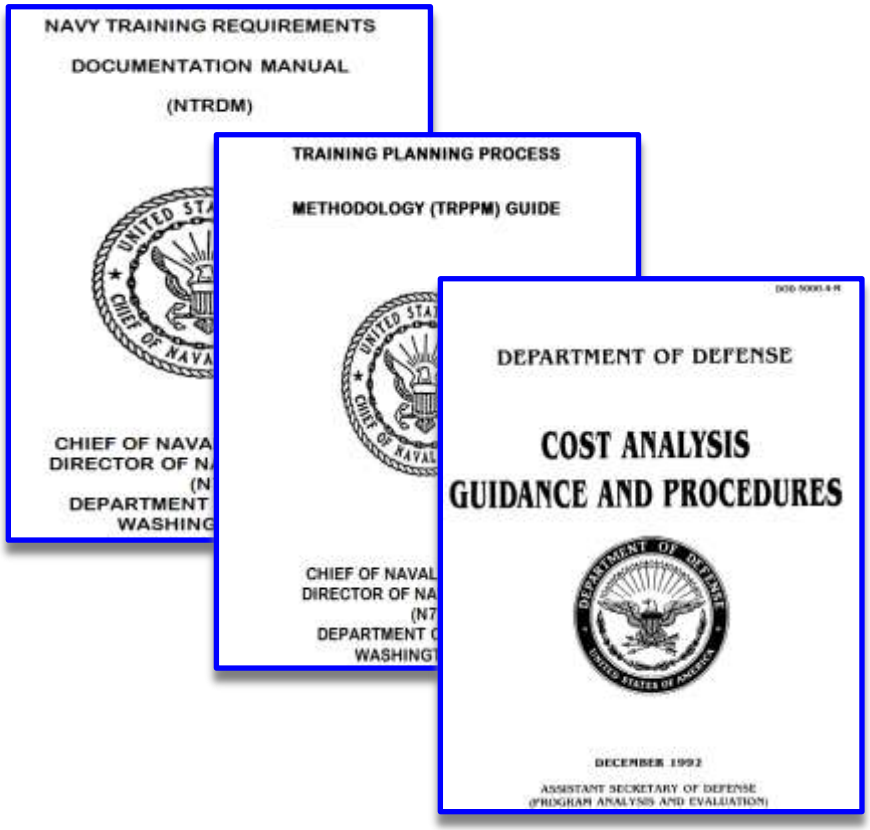
Establish a Baseline Estimate

- Leverage existing data if available that describes the system's manpower requirements such as:
  - Cost Analysis Requirements Description document (CARD)
  - Navy Training Systems Plan (NTSP)
  - Training Planning Process Methodology (TRPPM)

- These documents were used to establish the program's baseline User base estimate

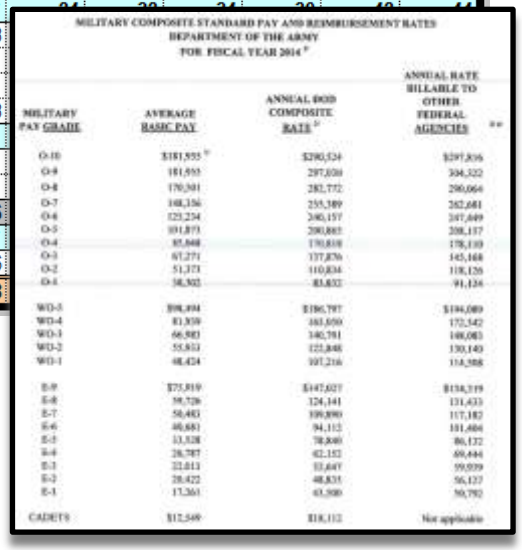


Establish a Baseline Estimate (cont'd)

- Documents such as the NTSP/CARD/TRPPM lay the framework for the total expected Billets required to Maintain, Administer, Watch, and Operate a program's system
- A program's installation profile is used to determine when system utilization occurs
- Military Composite Rates determine the cost of required billets

AFLOAT / ASHORE	Ship Class	Ship Type	DSGNTR/ RATING	NEC / DESIG	FUNCTION	GRADE	PAY GRADE	FTE Total Billet QTY
Afloat	Force	CVN	CDR/1310	O	Watch Officer	CDR	O-5	1
Afloat	Force	CVN	CTT2	9102	Operator	2	E-5	2
Afloat	Force	CVN	IT1	27XX	Sys Admin	1	E-6	1
Afloat	Group	DDG						
Afloat	Group	LPD-17						
Afloat	Unit	FFG						
Afloat	Unit	LCS						
Afloat	Unit	LCS						
Afloat	Unit	MCM						
Afloat	Unit	PC						
Afloat	Unit	PC						
Afloat	Submarine	SSN						
Afloat	Submarine	SSGN						
Ashore	Training	TTE						
Ashore	Training	TTE						

Site Type	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020
Afloat	**22**	**54**	**101**	**143**	**175**	**181**	**186**
Force	***5***	***7***	***9***	***10***	***10***	***10***	***11***
CVN	5	7	9	10	10	10	11
Group	***1***	***15***	***36***	***59***	***73***	***76***	***77***
DDG	1	15	34	53	63	65	66
LPD-17			2	6	10	11	11
Unit	***16***						
FFG	3						
LCS							
MCM							
PC	13						
Submarines							
SSN							
SSGN							
Ashore	**6**						
Training	***6***						
TTE	6						
Grand Total	**28**						


MILITARY COMPOSITE STANDARD PAY AND REIMBURSEMENT RATES
DEPARTMENT OF THE ARMY
FOR FISCAL YEAR 2014 *

MILITARY PAY GRADE	AVERAGE BASIC PAY	ANNUAL DOD COMPOSITE RATE **	ANNUAL RATE BILLABLE TO OTHER FEDERAL AGENCIES **
O-10	$181,955 *	$290,524	$297,836
O-9	181,955	297,020	304,522
O-8	170,101	282,772	290,064
O-7	148,356	255,389	262,681
O-6	123,234	240,157	247,449
O-5	101,871	200,883	208,137
O-4	85,848	170,818	178,110
O-3	67,271	137,876	145,168
O-2	51,371	110,834	118,126
O-1	38,302	83,832	91,124
WO-5	$98,494	$186,797	$194,089
WO-4	83,309	163,650	170,942
WO-3	66,903	140,791	148,083
WO-2	55,933	122,848	130,140
WO-1	48,424	107,216	114,508
E-9	$75,919	$147,027	$154,319
E-8	58,726	124,141	131,433
E-7	50,483	109,890	117,182
E-6	40,681	94,113	101,404
E-5	33,528	78,800	86,122
E-4	28,787	62,152	69,444
E-3	22,613	53,647	59,939
E-2	20,422	48,835	56,127
E-1	17,261	43,500	50,792
CADETS	$12,549	$18,112	Not applicable

$$\text{Function}) \times \text{Ship Inventory Obje}$$

Leveraging these data sources establishes the baseline manpower estimate

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Conduct the Manpower Survey

- This formula is what drives many User based cost estimates:

$$Function) \times Ship\ Inventory\ Obje$$

- The missing variable in the equation above is “system utilization”
  - System Utilization Definition - Depicts the frequency in which a User uses, configures, manipulates, analyzes, administers, and/or maintains the system while on **“underway”** AND is **specific** to the system being estimated, where:

$$) \times Ship\ Inventory\ Objective \times Billet$$

- A manpower survey was conducted to determine the amount of System Utilization for a given User
  - Specify User’s Function (i.e., Watch Officer, Sys Admin, Maintainer, etc.)
  - Indicate Ship Class the User Supported (i.e., CVN, FFG, Training site)
  - Determine % of time using, configuring, manipulating, analyzing, administering, and or maintaining the **specific system** while **underway** (i.e., not in-port)

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Normalize Survey Inputs

- Consolidate inputs from the manpower survey by ship class and function to determine average system utilization
  - Be sure to factor:
    - System usage while "underway"
    - User's system operation over a 24 hour period*

Responses	Ship Class	User	% of System Utilization While Underway
1	DDG	Watch Officer	20%
2	DDG	Sys Admin	10%
3	DDG	Operator	60%
	DDG	Maintainer	10%
	CVN	Watch Officer	60%
11			
12			
13			
300			

	Number of Responses	Average % of System Utilization While Underway	Shift Length as a Percent of 24 hours	Billet System Utilization
CVN	77			
Watch Officer	18	51%	25%	9%
Sys Admin	22	33%	25%	6%
Operator	15	68%	25%	12%
Maintainer	22	14%	25%	2%
DDG	94			
Watch Officer	12	35%	25%	6%
Sys Admin	18	31%	25%	5%
Operator	47	43%	25%	8%
Maintainer	17	10%	25%	2%
LPD-17	35			
Watch Officer	5	48%	25%	8%
Sys Admin	25	68%	25%	12%
Operator	3	37%	25%	6%
Maintainer	2	26%	25%	5%
FFG	64			
Watch Officer	18	45%	25%	8%
Sys Admin	14	43%	25%	8%
Operator	25	71%	25%	12%
Maintainer	7	23%	25%	4%

* User's shift length was assumed to 6 working hours out of a 24 hour period

$$) \times Ship\ Inventory\ Objective \times Bille$$

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Benefits and Challenges

Benefits
Survey can be developed in a short amount of time
Economic Analysis and program ROI decisions
Establish ACAT designation based on a sound methodology
Challenges
Fleet Coordination can be time consuming and may involve multiple individuals
Obtaining an adequate number of responses can be difficult
Follow-up to clarify erroneous responses is practically impossible

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Summary

- Very successful collaboration between the program office and the fleet
  - Survey was simplistic and easy to understand
  - Received over 300 responses from the system's User community

- Survey is now being utilized to re-baseline the program's cost estimate and is also being leveraged to baseline other analogous programs TOC estimate

	Estimate Prior to Manpower Survey	Estimate Using Results of Manpower Survey
User Base:	> 1,000 FTEs	**~90 FTEs**
User Specific Cost Estimate:	$1B	**$90M**
Potential Impact on ACAT Designation:	ACAT 1 threshold	**ACAT III threshold**

For further information . . .

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Back-up Slides

ACAT Thresholds

ACAT IA*	**> $32M** in FY2000 constant dollars for all expenditures, for all releases, regardless of appropriation or funding source, directly related to the AIS definition, design, development, and deployment incurred in any single fiscal year
	> $126M in FY2000 constant dollars for all expenditures, for all releases, regardless of appropriation or funding source, directly related to the AIS definition, design, development, and deployment incurred from the beginning of the Materiel Solution Analysis Phase through deployment at all sites
	> $378M in FY2000 constant dollars for all expenditures, for all releases, regardless of appropriation or funding source, directly related to the AIS definition, design, development, deployment, operations, maintenance, and incurred from the beginning of the Materiel Solution Analysis Phase through sustainment for the estimated useful life of the system.
ACAT III**	**$15M ≤** Program costs/year **≤ $32M** in FY2000 constant dollars
	$30M ≤ Total Program costs/year **≤ $126M** in FY2000 constant dollars
	Total life-cycle costs **≤ $378M** in FY2000 constant dollars

*Source : DoDI 5000.02E, CH 144A Reference K
**Source : SECNAV INST 5000