MORS

Affordability Analysis
How Do We Do It?

1 -4 October 2012 | Arlington, VA

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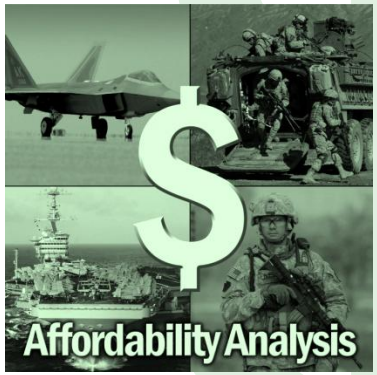

Agenda

- Background
- Overview
- Conclusion & Recommendations
- Participants
- Results
  - ❖ Key Takeaways
  - ❖ Overarching Objectives
  - ❖ Working Group Findings
  - ❖ Synthesis Group Perspective
- Conclusion & Recommendations

BACKGROUND: Reason for Workshop

- MORS Special Meeting on Risk, Trade Space and Analytics in Acquisition (September 2011)
  - ❖ Discovered that affordability analysis was ill-defined.
  - ❖ Recommended
    - ➢ Developing and formalizing affordability analysis processes, including recognizing the difference between cost and affordability analyses
    - ➢ Affordability analysis should include mission-based, portfolio-based, and capability-based analyses.

- NDIA & INCOSE Affordability Working Groups
  - ❖ Have developed definitions for affordability
  - ❖ But now have approached MORS for defining affordability analyses
  - ❖ Both WGs involved on the planning committee

- MORS Sponsors
  - ❖ Approved for MORS Year, June 2012 – June 2013

BACKGROUND: MORS Overview

- Military Operations Research Society (MORS)
  - ❖ MORS is a professional society of multi-disciplined Operations Research Analysts to enhance the quality of unclassified and classified analysis related to national security.

- MORS Sponsors
  - ❖ Assessment Division (N81), Chief of Naval Operations
  - ❖ Center for Army Analysis (HQDA/Programs, G-8)
  - ❖ Studies and Analyses, Assessments and Lessons Learned (HQ USAF/A9)
  - ❖ Marine Corps Combat Development Command
  - ❖ Cost Analysis and Program Evaluation (CAPE), Office of the Secretary of Defense
  - ❖ Science & Technology Directorate, Department of Homeland Security

- Other Supporters
  - ❖ Joint Staff – J8

- Workshop Proponent
  - ❖ Assistant Secretary of Defense for Acquisition

OVERVIEW: Workshop Purpose

- Provide a forum for discussing Defense Department (i.e., Army, Navy, Marine Corps, Air Force, and Joint) approaches to *affordability analyses throughout the life cycle*.

- Provide an opportunity for operators, engineers, decision makers, academicians, and military and civilian operations research analysts
  - ❖ To examine topics, methodologies, analyses, and innovations pertinent to all aspects of analysis for affordability as a function of total ownership cost and system performance

- Balance "voyage of discovery" without "distracting from the work already completed" – moving forward

OVERVIEW: Industry Marketing Partners

- Advertise to their members and on their website
- Member participation on planning committee and during the workshop

NDIA
National Defense Industrial Association
Promoting National Security Since 1919

Military Applications Society
MAS

INCOSE
International Council on Systems Engineering

SCEA
The Society of Cost Estimating and Analysis

- Supporting Government Group
  - ❖ Acquisition Modeling & Simulation Working Group
  - ❖ Link to the MORS Workshop on their website

OVERVIEW: Workshop Kick-Off

- Monday afternoon before workshop
- Set expectations and provide a foundation, guidance & opportunity

MORS Affordability Analysis Workshop Kick-Off

TIME	SESSION	TOPIC	PRESENTER
1330	Overview	Welcome	Kirk Michealson, Workshop Chair
1335	Workshop Expectations	Workshop & WG Chairs	Kirk Michealson, Workshop Chair
			WG 1 - Bob Koury, Price Systems
			WG 2 - COL Steve Stoddard, CAA
			WG 3 - Dan Klingberg, Raytheon
			WG 4 - Bill Kroshl, JHU/APL
			WG 5 - Phil Fahringer, Lockheed Martin
1405	The FOUNDATION	Terminology Overview	Glossary Team Lead - Frank Serna, Draper
1445	**BREAK**		
1500	The GUIDANCE	"Better Buying Power" Memos	Dr. Mark Husband, DAU
1545	The OPPORTUNITY	Affordability Thinking	Patti Scaramuzzo, Lockheed Martin
1645	Wrap-Up		Kirk Michealson, Workshop Chair
1700	**END OF WORKSHOP KICK-OFF**		

OVERVIEW: Plenary Session

- Keynotes and Proponent / Host Welcomes
  - Government / Proponent – Ms. Katrina McFarland, Assistant Secretary of Defense for Acquisition
  - Industry / Host: Dr. Ray O Johnson, Senior Vice President and Chief Technology Officer, Lockheed Martin Corporation

- Plenary Panel
  - OSD(ATL) Affordability Lead: Dr. Phil Anton, OSD(ATL)
  - CAIG Representative: Mr. Steve Miller, OSD(CAPE)
  - AoA Representative: Dr. Jerry Diaz, AF/A5RP, USAF AoA SME
  - J8 (JCIDs / CBAs): Brig Gen Scott Stapp, J8 Director of Requirements
  - NDIA SE Affordability WG Lead: Frank Serna, Draper Labs, NCID SE Co-Chair
  - INCOSE Affordability WG Lead: Joe Bobinis, Lockheed Martin Senior Fellow

- ISMOR Affordability Overview (Lunchtime Presentation)
  - ISMOR – International Symposium on Military Operational Research
  - Gene Visco, MORS FS, Representative to ISMOR

OVERVIEW: Working Groups

- WG 1: People, Authorities, Organizations, Methods and Tools
- WG 2: Development Planning and the Early Life Cycle
- WG 3: Post-Milestone A and the Remaining Life Cycle
- WG 4: Affordability and Logistics / Sustainment Considerations
- WG 5: Expanding the Affordability Definition and Trade Space: Providing a More Holistic Life Cycle Cost and Operational Outcomes View
- Synthesis Group

OVERVIEW: Workshop Leadership

MORS Affordability Analysis Workshop, Synthesis & Working Group Chairs

GROUP	CO-CHAIR	NAME	ORGANIZATION
Overall Workshop	Industry	Kirk Michealson	Lockheed Martin
	Academia	Jack Keane, FS	JHU/APL
	Government	LTC John (Scott) Billie	Army Logistics University
Synthesis Group	Industry	Greg Keethler	Consultant
	Government	Jerry Diaz	USAF
WG 1 People, Tools	Industry	Bob Koury	Price Systems
	Government	Ed Blankenship	HQMC P&R PA&E
WG 2 DP	Industry	Rick Null	Lockheed Martin
	Government	COL Steve Stoddard	Center for Army Analyses
WG 3 Post MS A	Industry	Dan Klingberg	Raytheon
	Government	David Panhorst	Army ARDEC
WG 4 Sustainment	Industry	Bill Kroshl	JHU/APL
	Government	Dan Nussbaum	NPS
WG 5 Trade Space	Industry	Phil Fahringer	Lockheed Martin
	Government	Mike Knollmann	ASD(A) JOS

OVERVIEW: Overarching Objectives

- What is the difference between cost / cost-benefit / cost-effectiveness analyses and affordability analyses?
- What is the state of the practice of affordability analyses? Identify key issues and shortfalls.
- What are the examples of how operations analysis analytical rigor has been applied to support affordability analyses?
- What are the future challenges?
- What is needed from the operations analyst to conduct affordability analyses?
- What should be considered for affordability analyses across the life cycle?
- What is the affordability of a force structure in a mission context? Can we afford the capability?

RESULTS: Conclusions and Recommendations

- Define affordability analysis portfolios
- Develop an affordability analysis "how to manual" or framework
  - ❖ Complete the people, authorities, skills, processes, methods, data and standards matrix
  - ❖ Complete the drivers, strategies, information needs, metrics and analyses across the life cycle matrix
  - ❖ Establish a relationship between resources and readiness
  - ❖ Learn other organizations (i.e., FEDEX, UPS, etc.) best practices
- Identify accountability across the life cycle
- Present Development Planning Working Group Results to Government and Industry Development Planning Working Groups
- Create dynamic and interactive visualizations to provide a better understanding of the affordability trade space

RESULTS: Participants

- Good representation across government and industry

GOVERNMENT		
Organization	#	%
OSD	11	19.0%
Joint Staff	4	6.9%
Army	18	31.0%
Air Force	9	15.5%
Navy	2	3.4%
Marine Corps	7	12.1%
NASA	2	3.4%
Other	5	8.6%
TOTAL -	**58**	**37.7%**

Workshop	
TOTAL -	**154**

INDUSTRY		
Organization	#	%
Boeing	7	10.1%
Lockheed Martin	31	44.9%
Northrop Grumman	4	5.8%
Raytheon	5	7.2%
Other	18	26.1%
Consultant	4	5.8%
TOTAL -	**69**	**44.8%**

FFRDC		
Organization	#	%
IDA	8	80.0%
MITRE	2	20.0%
TOTAL -	**10**	**6.5%**

ACADEMIA		
Organization	#	%
ALU	2	16.7%
DAU	1	8.3%
JHU/APL	6	50.0%
NPS	1	8.3%
Stevens	1	8.3%
USC	1	8.3%
TOTAL -	**12**	**7.8%**

FOREIGN NATIONALS		
Organization	#	%
Canada	3	60.0%
Israel	1	20.0%
UK	1	20.0%
TOTAL -	**5**	**3.2%**

NOTE: Total Percentages are the organization percentages of the workshop total number (154), while organization percentages are percentages within the group (e.g., government, industry, academia, FFRDC & Foreign)

RESULTS: Key Takeaways

- Affordability analysis lacks clarity of definition, sufficiency criteria, and regulatory policy.
- Tools and methodologies are not considered problem areas.
- Affordability is not an inherent "attribute" of a program or requirement, but an informed judgment when compared to something else.
- Two "interpretations" of affordability
  - "little a" – being frugal, cost efficient in executing programs
  - "Big A" – for the cost, does the capability provide value in the context of other things needed
- Key Takeaways:
  - Affordability context, levels and portfolios need to be consistently defined
  - An affordability analysis process / framework needs to be established
  - Accountability for affordability is needed across the life cycle

RESULTS: Affordability Portfolios

- Affordability is inseparable from prioritization.
- Affordability analysis occurs at different levels.
  - ❖ Each level specific context and set of assumptions, constraints and procedures
  - ❖ The level determines the scope of analysis, as well as the actors and decision makers
  - ❖ Two distinct levels: portfolio level and system level
- The portfolio level enables trades between different sets of systems and their overall capability contribution towards achieving mission success.
- Operations Analysts posses the skills and tools to enable "optimization" of portfolios, however there is insufficient definition of what portfolios exist, what is trade-able across them, how costs are allocated and a common measure.
  - ❖ Should be mission focused
  - ❖ Recommend review Capability Based Planning Portfolios, Joint Capability Areas and OSD(CAPE) Defense Planning Projection Portfolios

RESULTS: Affordability Process / Framework

- Affordability is not a number, but a decision and may vary by stakeholder / decision maker
  - ❖ I.e. affordability is in the eye of the beholder
- Requirements are treated as something that is done mostly pre-Milestone A and then static, i.e., "never" changing nor affected by budget considerations.
  - ❖ "Bow waves" are created that present challenges to affordability.
  - ❖ Beyond the FYDP no one seems to be held accountable for these "bow waves"
- Affordability analysis must be conducted using the full range of costs, analysts should provide ranges of costs.
- There is a linkage of key data and information needed across the life-cycle ➔ A consistent framework for the conduct of affordability analysis is needed.
  - ❖ A "how to do it" manual with the framework needs to be created describing the tenets of affordability analysis, some examples, tools, and process suggestions.

RESULTS: Affordability Accountability

- No one person is responsible life cycle cost across the acquisition stovepipes.
  - ❖ Results are that decisions are made without full accounting of true and complete costs.
  - ❖ Full O&S costs are typically not accounted for in the development or requirements phases, creating that unseen "bow wave."
  - ❖ Postures subsequent phases for failure and problem resolution is more expensive the later it occurs.
  - ❖ The Bottom Line: It results in apparent "affordability" in FYDP, i.e., may be able to buy, but then do not have funds to maintain or drive.

- Roles and responsibility / accountability must be defined. Program decisions need to consider:
  - ❖ Full life-cycle costs,
  - ❖ An accountability trace for key decisions must be maintained, and
  - ❖ Identification and elimination of the "bow wave" is essential.
  - ❖ Who ensures these occur?

OBJECTIVES: Cost & Affordability Analysis

- Cost analysis is a dollar breakdown of the implementation effort, tactical in nature, and tool oriented.

- Affordability analysis is strategic in nature; looks at trade demands, dollars per capability, return on investment; and requires a behavioral change in culture.

- Cost analysis, cost benefit analysis and capabilities based assessment each contribute to affordability analyses.
  - ❖ Cost analysis provides the basis for costs used in an affordability analysis.
  - ❖ Cost benefit analysis additionally provides solution advantages, quantifiable and non-quantifiable, which affordability analyses incorporate as value or military worth of the acquisition program.
  - ❖ Capability gaps, priorities and risk output from capabilities based assessments serve as foundational elements in an affordability analysis.

OBJECTIVES: State of the Practice

- Weak although there are pockets of successful affordability efforts.

- Process, people and tools "stoplight" evaluation:
  - ❖ Processes would be RED (broken or nonexistent / not formalized),
  - ❖ People as YELLOW (some shrinkage of the analytic base occurring and the need for the combination of analytic capability and acquisition knowledge / experience), and
  - ❖ Tools as GREEN (sufficient tools available).

OBJECTIVES: Analytical Rigor

- Analytic rigor in affordability analysis has not been institutionalized and
  - There is no agreement for standards for the tools needed,
  - The framework necessary, and
  - Consistent methods.

- A rhetorical question was asked, "Is the focus by leadership on rigor and quality or getting to / through the Milestones?".

- Some examples which could provide potential insights:
  - Defense Planning Project from OSD(CAPE) – 25-year time horizon
  - Joint Light Tactical Vehicle (JLTV) Program for Army and Marine Corps – real trades to make the vehicle viable
  - 3-Dimensional Expeditionary Long-Range Radar (3DELRR) Program for the Air Force – good collaboration between the Service and industry
  - JSF Cost Forecasting Methodology from Canada – peer review process to forecast sustainment costs
  - Fully Burdened Cost of Fuel methodology from the Army – compares affordability savings to warfighting capability gains

OBJECTIVES: Needs for the Operations Analyst

- Good understanding of what affordability analysis really is and the associated the deliverables – i.e.,
  - ❖ Clear guidance to include delivery of products that include a portfolio view, the total ownership costs over the long-term (post-FYDP years), and trade space between cost, quantity, performance, schedule, and risk.
- Good communications with decision makers.
  - ❖ To conduct useful affordability analysis, analysts need to understand the needs of the decision makers.
- Basic operations analysis skill-set with a good understanding of
  - ❖ The acquisition process and
  - ❖ Decision analysis skills in order to analyze comparative choices.

OBJECTIVES: Considerations Across Life Cycle

- The biggest improvement in affordability analysis across the life cycle can be made by following a robust sustainment maturity model.
- Affordability / sustainment cost targets.
  - ❖ Who is/should be responsible for establishing sustainment cost targets?;
  - ❖ How to establish affordability target for sustainment? (Look at current programs?);
  - ❖ Should we have a cost baseline for lifecycle cost?
  - ❖ How do you assess new systems?
- Does the target change over the life cycle?
  - ❖ Different methods for estimating the sustainment cost at different points in the life cycle may be employed, but the overall target should remain the same – unless the operating concept changes, or the program is re-baselined.
  - ❖ It is recommended to develop risk adjusted O&S cost estimates. Then as the program matures, the analyst can try to narrow down the confidence intervals.

OBJECTIVES: Capability / Cost for Affordability

- Investment cost and resulting capability are key elements of an affordability analysis.
  - ❖ A simple cost and capability quantitative relationship may be expressed as "bang for the buck."
  - ❖ How much is spent to achieve the capability.
- Can the Cost as an Independent Variable (CAIV) be adapted for affordability analysis?
  - ❖ CAIV curve identifies diminishing returns, the point at which more investment results in small increases in capability.
  - ❖ The amount of capability achieved for the cost invested may be a qualitative estimate by subject matter experience or may be derived from detailed modeling, simulation and analysis.
- Develop a trace back capability through Joint Capability Areas (JCAs) and Uniform Joint Task Lists (UJTLs)

WG FINDINGS: WG 1 – People, Methods, Tools

- Created an Affordability Analysis Taxonomy and Level Pyramid
- Suggested a "Generic" Affordability Process
- Started an Affordability Analysis Matrix for the different levels with
  - People
  - Authorities
  - Skills
  - Processes
  - Methods
  - Measures
  - Data
  - Standards
  - NOTE: The matrix needs to be completed & reviewed in follow-up work

WG FINDINGS: WG 2 – Development Planning

- Drivers of "un-affordable" solutions
  - ❖ Mistakes and poor decisions
  - ❖ Focus concentrated on acquisition costs and FYDP concerns while minimizing or ignoring O&S costs
  - ❖ Lack of sound architecture practices limit capability trade space understanding

- Additional recommendations
  - ❖ A distribution or range of costs should be used when estimating, single point estimates could flaw the overall analyses
  - ❖ Document the ground rules and assumptions for the estimates
  - ❖ Include a comprehensive range of "what if" or sensitivity analyses
  - ❖ Identify drivers of uncertainty and apply lessons learned and past program performance history to isolate, control and reduce uncertainty
  - ❖ Introduce analytic methods such as stochastics, Monte Carlo randomness and probability theory to address uncertainty concerns
  - ❖ Address risk by analyzing severity or risks and probability of occurrence

WG FINDINGS: WG 3 – Post-Milestone A

- Started an Affordability Analysis Information Needs Matrix for each of the life cycle phases with
  - Drivers
  - Strategies
  - Information Needs
  - Metrics
  - Analyses
  - NOTE: The matrix needs to be completed & reviewed in follow-up work

- Additional recommendations
  - Model based visualization should be incorporated in contractor statements of work to improve development cycle time and affordability of development programs. It provides early insight into testability, manufacturability and sustainability.
  - Operations and support Concept of Operations (CONOPS) were developed as part of AoA and should be transitioned to the contractor once an award is made to provide continuity and an evolution path for future phases of O&S analysis.

WG FINDINGS: WG 4 – Logistics / Sustainment

- Several recommendations were made;
  - ❖ Logisticians need a seat at the Milestone Decision Authority (MDA) decision table to raise the level of attention for sustainment
  - ❖ Standard process and methodology would help with sustainment affordability
  - ❖ Incentivizing optimizing across the Enterprise is needed
  - ❖ Leveraging supply chain innovation to manage sustainment costs
  - ❖ Learning best practices at UPS, FEDEX, Amazon
  - ❖ Accountability for lifecycle costs
  - ❖ Deriving better affordability metrics
  - ❖ Relating resources to readiness for current systems

WG FINDINGS: WG 5 – Trade Space

- Reinforced the need for dynamic and interactive visualization applications to be developed and presented to leadership vice PowerPoint slides.
  - These visualizations must enable leadership to interact within the entire trade space so individually they can identify what they feel is "the most affordable solution".
  - The goal would be to display multiple outcomes and parameters simultaneously being interactive for decision makers

WG FINDINGS: Synthesis Group

- Inflexibility of performance requirements inhibits the pursuit of affordability.
  - ❖ The functional proponents frequently provide minimum performance parameters that may be either beyond the laws of physics or unattainable from a fiscal perspective.
  - ❖ If fixed point standards are relaxed to a performance range, then the range may provide the opportunity to radically reduce the development and procurements costs of a given system – while still meeting the fundamental mission needs.

- Inaccurate costs can lead to bad affordability trades.
  - ❖ Inaccurate / incomplete costs and bad decisions (i.e., decision makers not reviewing / not believing cost estimates) can lead to bad affordability trades.
  - ❖ The trade space can be unnecessarily limited by incomplete and imperfect costing

RESULTS: Conclusions and Recommendations

- Define affordability analysis portfolios
- Develop an affordability analysis "how to manual" or framework
  - ❖ Complete the people, authorities, skills, processes, methods, data and standards matrix
  - ❖ Complete the drivers, strategies, information needs, metrics and analyses across the life cycle matrix
  - ❖ Establish a relationship between resources and readiness
  - ❖ Learn other organizations (i.e., FEDEX, UPS, etc.) best practices
- Identify accountability across the life cycle
- Present Development Planning Working Group Results to Government and Industry Development Planning Working Groups
- Create dynamic and interactive visualizations to provide a better understanding of the affordability trade space

Back-Ups

SPECIFIC WORKING GROUP OBJECTIVES

- WG 1 People, Authorities, Organization, Methods & Tools Objectives
  - ❖ Identify the state of the art in affordability analysis
  - ❖ Highlight team composition (with roles & responsibilities)
  - ❖ Recommend tools, and methods that contribute to good affordability analysis
  - ❖ Identify skills sets needed
  - ❖ Determine if techniques are quantitative, qualitative or both
  - ❖ Recommend affordability "measures"

WORKING GROUP 1 Participants (20)

Name	Organization	EMAIL	Citizenship
Paul Ferguson	Lockheed Martin	paul.h.ferguson@lmco.com	US
Tom Donnelly	SAS Institute	tom.donnelly@jmp.com	US
R. Jay VanHouten	Raytheon Missiles	vanhouten@raytheon.com	US
Ed Jakubiak	Northrop Grumman	edward.jakubiak@ngc.com	US
Tolga R. Yalkin	PBO	tolga.yalkin@parl.gc.ca	CAN
Marguerite Broadwell	NASA	marguerite.broadwell@nasa.gov	US
Binyam (Ben) Solomon	DRDC-CORA	binyam.solomon@forces.gc.ca	CAN
Jenny Irvine	Lockheed Martin	jenny.irvine@lmco.com	US
Jason Templet	TRADOC	jason.templet@us.army.mil	US
Jason Bell	MCCDC/OAD	jason.bell2@usmc.mil	US
Ed Blankenship	HQMC P&R	edward.r.blankenship@usmc.mil	US
Gene Visco	Lockheed Martin	eugene.visco@lmco.com	US
Rodney Yerger	JHU APL	rodney.yerger@jhuapl.edu	US
Patrick Hopfinger	JHU APL	patrick.hopfinger@jhuapl.edu	US
Barbara Bicknell	Lockheed Martin	barbara.a.bicknell@lmco.com	US
Bob Koury	PRICE Systems	bob.koury@pricesystems.com	US
Steve Houston	Boeing	stephen.g.houston@boeing.com	US
Lisa Oakley	Mitre	loakley@mitre.org	US
Matt Anderson	Boeing	matthew.a.anderson@boeing.com	US
Dominick Wright	IDA	dowright@ida.ord	US

SPECIFIC WORKING GROUP OBJECTIVES

- WG 2 Development Planning & Early Life Cycle Objectives
  - ❖ Determine prior to Milestone A, what is required for a first-cut affordability analysis (i.e., Pre-MDD and Post MDD to Pre-Milestone A)
  - ❖ Identify how affordability analysis supports the Development Planning process
  - ❖ Identify which components of life cycle costs tend to generate unaffordability pre-Milestone A
  - ❖ Determine decisions that are key to affordability
  - ❖ How do we adequately consider Total Ownership Cost prior to Milestone A

WORKING GROUP 2 Participants (25)

- Frank Decker TRADOC Analysis Center (TRAC)
- Bob Epps Lockheed Martin
- Brian Gladstone, IDA
- Roger Haiar Lockheed Martin Aeronautics
- George Harris, AMSO, Center for Army Analysis
- Donna Jones Defense Intelligence Agency
- John Keough The Boeing Company
- Jeff Loren DRC HPTG
- Michael Mignone DIA
- Mark Mulligan, OSD(CAPE)
- Annie Patenaude, Synthesis Group
- Dennis Pippy SAF/AQ – AFHSIO
- Gene Porter IDA
- Mike Remias Lockheed Martin
- Jim Rodrigue Raytheon
- JD Shumpert, Northrop Grumman
- Mario Solano, HQMC, I&L Logistics Ops
- Aileen Sedmak, OASD(SE)
- Dana Trzeciak, PAIO

Working Group Leadership

- Col Steve Stoddard (CAA)
- Rick Null (Lockheed Martin)
- Harry Conley (AFMC/A5C)
- Dr. Becky Mackoy (TRADOC Analysis Center)
- Alix Minden (LMCI Engineering)

SPECIFIC WORKING GROUP OBJECTIVES

- WG 3 Post-Milestone A & the Remaining Life Cycle Objectives
  - ❖ After Milestone A, determine the scope of affordability and what factors are most important
  - ❖ Identify what information is available to conduct affordability analyses and should-cost incentives
  - ❖ Identify how Total Ownership Cost and affordability analysis are adequately considered with both the system of interest, other systems that integrate, and the enabling systems
  - ❖ With missions evolving over time, recommend how we account for that and still keep the design affordable

WORKING GROUP 3 Participants (20)

James Callow	Boeing
Lorri Crittenden	Lockheed Martin
Steven Glenn	Raytheon
Daniel Klingberg	Raytheon
Peter McLoone	Lockheed Martin
Anjali Milano	JHU/APL
Thomas Mulczynski	Naval Center for Cost Analysis
Steve Orth	Raytheon
David Panhorst	US Army Armaments
Bruce Riggins	Boeing
Garry Roedler	Lockheed Martin
Jared Sullivan	Northrop Grumman
Dan Cernoch	Lockheed Martin
Gary Downs	Lockheed Martin
Charlie Stirk	CostVision
Jim Bexfield	self
Everet Johnson	TRADOC Analysis Center
Crash Konwin	Booz Allen
Marlena McWilliams	PRICE Systems
Sam Wright	AFMC/A9A

SPECIFIC WORKING GROUP OBJECTIVES

- WG 4 Affordability and Logistics / Sustainment Objectives
  - ❖ Identify what needs to be considered to address logistics & sustainment, as well as manufacturing and supply chain, costs across the life cycle related to affordability analysis
  - ❖ Determine how uncertainty and the differences in sustainment strategies affect affordability
  - ❖ Identify any strategies that are particularly beneficial from an affordability perspective
  - ❖ What are the logistics and sustainment-related cost models? Are they useable for affordability analyses across the life cycle? If so, how? If not, why not?
  - ❖ What are the existing Cost Metadata Standards/Specifications that will support credible and consistent Operations and Sustainment Cost estimations? Is there a need for them? How does this help affordability analyses?
  - ❖ What is the cost of sustaining an affordable force structure?
  - ❖ What about the affordability of non-life cycle sustainment capabilities?

WORKING GROUP 4 Participants (28)

Donald Bates	U.S. Army Logistics Innovation Agency	William Kroshl	JHU/APL
Marguerite Broadwell	NASA-HQ	Elizabeth Linder	ASC/ENMS
Aaron Burciaga	HQMC, Installations & Logistics, LX	Keith MacFarlane	Army Materiel Systems Analysis Activity
Daniel Cernoch	Lockheed Martin	Jose Mata	Army G4
Douglas Cho	AF/A9RI	Arlene Moore	NASA-HQ
Richard Cline	The Boeing Company	Samuel Nantze	TRADOC Analysis Center
Walt Cooper	Technomics	Daniel Nussbaum	Naval Postgraduate School
Andrew Courtice	AFLCMC/WIIM	Greg Parlier	MEI Technologies
Noreen Dahl	Headquarters Marine Corps, PA&E	Jerry Scriven, Jr.	Army Logistics University
Paul Desmier	DRDC Center for Operational Research and Analysis	Irit Talmor	CEMA/RAFAEL
Charlotte Evering	US AMSAA	Rachel Watts	Booz Allen Hamilton
David Frye	Lockheed Martin Aeronautics	Troy Wilke	Army Materiel Systems Analysis Activity
Mark Hopson	TRADOC Analysis Center (TRAC)	Samuel Wright	AF/A4L Fleet Viability Board
Dale Johnson	Lockheed Martin Corporate	Tolga Yalkin	Canadian Parliamentary Budget Office

SPECIFIC WORKING GROUP OBJECTIVES

- WG 5 Expanding the Affordability Trade Space: More Holistic Life Cycle Cost & Operational Outcomes View Objectives
  - ❖ Identify best methods and practices to examine the trade space associated with affordability with respect to readiness and capability
  - ❖ Determine the impact of the capability on the operational outcome and at what total cost
  - ❖ Determine how an affordable solution includes understanding of what risks are being accepted in terms of meeting performance outcomes
  - ❖ Can we afford the ability to perform the mission? Can we afford the mission?

WORKING GROUP 5 Participants # 1 (38 total)

Prefix	Badge First Name	Badge Last Name	Suffix	Registrant Organization Name
Dr.	Steven	Bankes	PhD	Ph.D, BAE Systems
Mr	Donald	Bates		U.S. Army Logistics Innovation Agency
Mr.	Joseph	Beauregard		OUSD(AT&L)
LTC	John	Billie		Army Logistics University
Mr.	Joseph	Bobinis		Lockheed Martin IS&GS Defense
Mr.	Theodore	Brown		Systems Planning and Analysis, Inc.
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