

Using the New 881 WBS/CES for ERP Acquisition: Lessons Learned

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The logo for LMI (Logistics Management Institute) is displayed in a dark blue, serif font. A decorative graphic consisting of multiple parallel, wavy lines in a lighter blue shade curves across the bottom of the slide, starting from the left and ending on the right.

LMI

Topics

- New 881 Comparison
- Problem Areas
- Risk and Uncertainty

History

- MIL-HDBK-881A is being updated by committee
- A revision that addresses ERPs is currently in draft
- The customer wanted to avoid revising the LCCE later

New 881 Comparison – Acquisition

Automated Information System vs Electronic/Automated Software System

- **Segment 1...n [Level 2]**
 - **Custom Application Software**
 - Hardware
 - Software CSCI
 - Integration, assembly test & checkout
 - **Enterprise Service Element**
 - Hardware
 - Software
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 - **Enterprise Information System**
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 - **External System Interface Development**
 - Hardware
 - Software
 - Integration, assembly test & checkout
 - **System level integration**
- **Prime Mission Product [Level 2]**
 - Subsystem 1
 - PMP Applications Software
 - PMP System Software
 - Integration, Assembly and Checkout
- **Platform Integration**

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Much Greater Level of Detail

New 881 Comparison – Acquisition

Automated Information System vs Electronic/Automated Software System

- **System Engineering [Level 2]**
 - **Program Management**
 - **Acquisition Logistics**
 - **Change Management**
 - **System Test and Evaluation**
 - DTE
 - OTE
 - Mockup & SIL
 - T&E Support
 - Test Facilities
 - **Training**
 - Equipment
 - Services
 - Facilities
- **SE/PM [Level 2]**
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- **SE/PM [Level 2]**



New SEPM Level Breakouts

- **System Test & Evaluation**
 - DTE
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 - T&E Support
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- **Training**
 - Equipment
 - Services
 - Facilities

New 881 Comparison – Acquisition

Automated Information System vs Electronic/Automated Software System

- **Data**

- technical publications
- engineering data
- management data
- support data
- data depository

- **Peculiar Support Equipment**

- Test sets & tools
- Packaging

- **Common Support Equipment**

- Test sets & tools
- Packaging

- **Data**

- technical publications
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- **Operational Site Activation [Level 2]**
 - **Site Type 1**
 - **Deployment hardware and software**
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 - **User Training**
 - **Data Migration**
 - **Management/Engineering Support**
 - **Interim Logistics Support**
 - **SE/PM**
 - **Sys Ops/Sustain Engr**
 - **HelpDesk**
 - **System Database Admin**
 - **Deploy HW/SE Refresh**
 - **Software Maintenance**
 - **Follow-On Training**
 - **Accreditation**
 - **IV&V**
- **Operational Site Activation**
 - **System Assembly, Installation and Checkout on Site**
 - **Contractor Technical Support**
 - **Site Construction**
 - **Site/Ship/Vehicle Conversion**
- **Industrial Facilities**
- **Initial Spares**

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- **Site/Ship/Vehicle Conversion**

- **I**

Much Greater Level of Detail

Important Categories at Level 5
of WBS....

And for each Site Type

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 - Site Construction
 - Site/Ship/Vehicle Conversion

And since this WBS only covers acquisition (ends at 1.x)
Advice is to replicate ILS categories to the O&S elements

Topics

- New 881 Comparison
- Problem Areas
 - SE vs PM vs AL

New 881 Comparison – Acquisition

Automated Information System vs Electronic/Automated Software System

Remember this SE/PM Breakout?

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- **SE/PM [Level 2]**



New SEPM Level Breakouts

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Program Management

The business and administrative planning, organizing, directing, coordinating, controlling, and approval actions designated to accomplish overall program objectives which are not associated with specific hardware elements and are not included in systems engineering.

Includes, for example: Cost, schedule, performance measurement management, warranty administration, contract management, data management, vendor liaison, subcontract management, etc. Support element management, defined as the logistics tasks management effort and technical control, and the business management of the support elements. The logistics management function encompasses the support evaluation and supportability assurance required to produce an **affordable and supportable** defense materiel system

Planning and management of all the functions of logistics. Examples are,

- Maintenance support planning and support facilities planning; other support requirements determination; support equipment; supply support; packaging, handling, storage, and transportation; provisioning requirements determination and planning; training system requirements determination; computer resource determination; organizational, intermediate, and depot maintenance determination management; and data management.

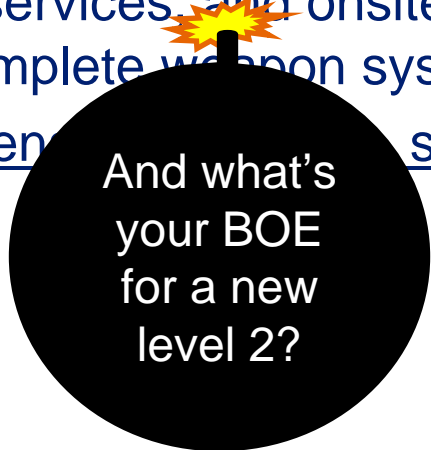
Change Management

- I.3.5 Change Management (For Automated Information Systems). Change management refers to the broad processes for managing organizational change. Change management encompasses planning, oversight or governance, project management, testing, and implementation.



Acquisition Logistics

- Logistics management, engineering and field support for total system. Includes, for example: Support evaluation and supportability assurance required to produce an **affordable and supportable system**
- Evaluation supportability goals and the adequacy of the support package for the systems, (e.g., deliverable maintenance tools, test equipment, technical publications, maintenance instructions, and personnel skills and training requirements, etc.)
- Logistics field support, which delineates in general terms the sustainment, engineering services, and onsite operational and logistics support for the complete weapon systems.
- Logistics support for maintenance and system operation, supply support, PHS&T



And what's
your BOE
for a new
level 2?

PM + SE + CM + AL Resolution



They're just
GUIDELINES
really...

Topics

- New 881 Comparison
- Problem Areas
 - SE vs PM vs AL
 - SE Acq/ILS/OS

System Engineering

1.6 SE and PM in Acquisition

1.15.1.6.1. SE and PM in ILS

And in 1.15.2.6.1

And in 1.15.3.6.1

And in 1.15.4.6.1

2.1 SE and PM in O&S

System Engineering

1.6 SE and PM in Acquisition

1.15.1.6.1. SE and PM in ILS

And in 1.15.2.6.1

And in 1.15.3.6.1

And in 1.15.4.6.1

2.1 SE and PM in O&S

If this is estimated by counting heads by govt and contractor

And these are estimated as a percentage of effort

Then how do you know you didn't double count?

They're just GUIDELINES really...



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- New 881 Comparison
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 - COTS configuration not called out

Acquisition

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Among all these subcats, no
“COTS Configuration”

We put it in IATC of custom
software for each segment
block

Topics

- New 881 Comparison
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 - SW licenses

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Acquisition ... Or Site Activation?

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 - **Sys Ops/Sustain Engr**
 - **HelpDesk**
 - **System Database Admin**
 - **Deploy HW/SE Refresh**
 - **Software Maintenance**
 - **Follow-On Training**
 - **Accreditation**
 - **IV&V**

Really blows up your 1.15. element

Topics

- New 881 Comparison
- Problem Areas
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 - SE Acq/ILS/OS
 - COTS configuration not called out
 - SW licenses (where do they go)
 - Accreditation (IV&V) needs to be by segment

Accreditation:

Not in PMP

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 - Hardware
 - Software
 - Integration, assembly test & checkout
 - **System level integration**

Accreditation:

Not in PMP ... OR T&E

Segment 1...n

– Custom App

- Hardware
- Software C
- Integrator

– Enterprise S

- Hardware
- Software
- Integrator

– Enterprise I

- Hardware
- Software
- Integrator

– External Sys Developer

- Hardware
- Software
- Integrator

– System level

• System Engineering [Level 2]

• Program Management

• Acquisition Logistics

• Change Management

• System Test and Evaluation

– DTE

– OTE

– Mockup & SIL

– T&E Support

– Test Facilities

• Training

– Equipment

– Services

– Facilities

Accreditation:

Not in PMP ... OR T&E BUT SITE ACTIV.

Segment 1...n [System] E

- Custom Application of
 - Hardware
 - Software
 - Integration, assembly test
- Enterprise System
 - Hardware - DTE
 - Software - OTE
 - Integration, assembly test - Mockup
- Enterprise Information System
 - Hardware - T&E S
 - Software - Test F
 - Integration, assembly test
- External System Interface Development - Equip
 - Hardware - Servic
 - Software - Faciliti
 - Integration, assembly test
- System level integrator

Operational Site Activation [Level 2]

- Site Type 1
 - Deployment hardware and software
 - Site Activation
 - User Training
 - Data Migration
 - Management/Engineering Support
 - Interim Logistics Support
 - SE/PM
 - Sys Ops/Sustain Engr
 - HelpDesk
 - System Database Admin
 - Deploy HW/SE Refresh
 - Software Maintenance
 - Follow-On Training
 - Accreditation
 - IV&V

Accreditation:

PMP

OR

T&E

AND

SITE ACTIV.

AND

O&S

Segment 1...n [System] Engineering & LS

- Custom Application Management Type 1
 - Hardware
 - Software CSCI
 - Integration, assembly test & checkout
- Enterprise System Test and Evaluation
 - Hardware - DTE
 - Software - OTE
 - Integration, assembly test & checkout - Mockup & SIL
- Enterprise Information System
 - Hardware - T&E Support
 - Software - Test Facilities
 - Integration, assembly test & checkout - Training
- External System Interface Development
 - Hardware - Equipment
 - Software - Services
 - Integration, assembly test & checkout - Facilities
- System level integration

2. Operations and Maintenance

- **Systems Engineering/Program Management**
- **System Operations / Sustaining Engineering**
- **Help Desk**
- **System Database Administration**
- **Deployment Software/Hardware Refresh**
- **Software Maintenance**
- **Follow on Training**
- **Accreditation**
- **Independent Verification and Validation**



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 - Test – no AT, FOT per GAO

Test and Evaluation

- **System Engineering [Level 2]**
- **Program Management**
- **Acquisition Logistics**
- **Change Management**
- **System Test and Evaluation**
 - DTE
 - **AT** 
 - OTE
 - **Mockup & SIL**
 - **FOT** 
 - T&E Support
 - Test Facilities
- **Training**

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 - Test – no AT, FOT per GAO
 - Training multiples

Multiple Follow-On Training Events with Multiple Blocks

- **Operational Site Activation [Level 2]**

- **Site Type 1**

- Deployment HW & SW
- Site Activation
- **User Training**
- Data Migration
- Management/Engineering Support
- Interim Logistics Support
 - SE/PM
 - Sys Ops/Sustain Engr
 - HelpDesk
 - System Database Admin
 - Deploy HW/SE Refresh
 - Software Maintenance
 - **Follow-On Training**
 - Accreditation
 - IV&V

- 2. O&M**

- SE/PM
- Sys Ops / Sustain Eng
- Help Desk
- SysDb Admin
- Deploy HW/SW Refresh
- SW Maint.
- **Follow on Training (Post-FOC)**
- Accreditation
- IV&V

- **SE[Level 2]**

- PM

- AL

- CM

- **System Test & Eval**

- DTE

- OTE

- Mockup & SIL

- T&E Support

- Test Facilities

- **Training**

- **Equipment**

- **Services**

- **Facilities**

Topics

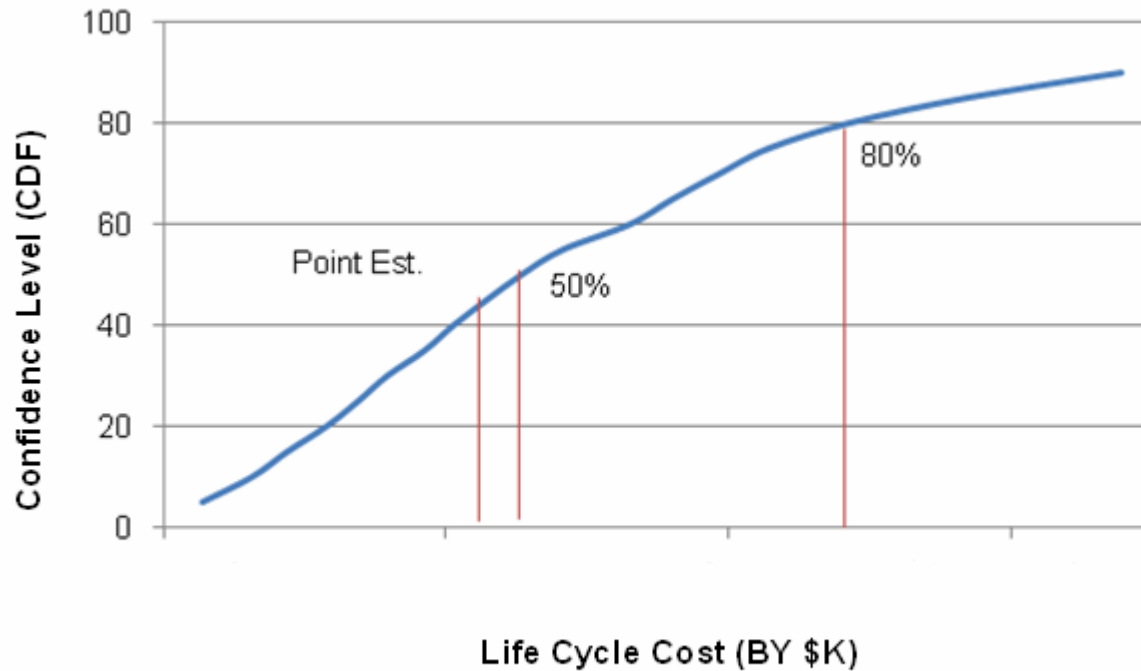
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 - Training multiples
- Risk and Uncertainty

Our Risk Approach

- Risk Categories
 - RICE Risk... High, parametrically based on other ERP RICE overruns (75%)
 - Software building Risk... High, lognormal distribution based on other ERP schedule overruns (68%)
 - Dr. Wilson Rosa, AFCAA, key data provider
 - See his 2010 SCEA/IPSA presentation
 - Training, SE/PM Risk ... Low, people count risk
 - “Normal” Risk for many other categories
- Key: Covariance Risk
 - Schedule risk in RICE objects covariance with schedule objects (50%)

Proposed Uncertainty Approach

Milestone B vs Milestone C as a realization of uncertainty



QUESTIONS

FOR MORE INFO:

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Abstract

- MIL HDBK 881's work breakdown structure/cost estimating structure (WBS/CES) is under revision, and one of the key new WBSs is an automated information systems WBS for enterprise resource planning (ERP). We used the draft 881 to create the program office estimate for the US Coast Guard's CG-LIMS system. Even with help from key committee members in defining the categories, we encountered some difficulties in assigning ERP costs to their proper categories, in accounting for all the ERP costs, and interpreting some of the newer subelements. The new ERP WBS is far more detailed than the previous WBS for AIS, allowing for less interpretation and less ambiguity from the estimator. What it lacks so far however is years of use and definition of the categories. We discuss the lessons we learned in applying the new WBS: where cost elements are not called out and could be omitted; where there are difficulties assigning costs to a single category and what we did to resolve those questions. We will also discuss our approach to risk estimation within the WBS. This discussion will be useful to estimators and program offices planning to undertake ERP programs.