GSAW 2006

Determining the "to be" cost of using COTS SW

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OVERVIEW

- **Background/Goal of Work**

- **Methodology**

- **Government Challenge**

- **Big Questions**

- **Summary**

Determining the "To – Be" cost of using COTS Software

BACKGROUND

1. **How much is it going to cost to use COTS SW in our systems?**

2. **How can we effectively evaluate contractor estimates to ensure all applicable costs of using COTS SW are accounted for?**

GOAL OF WORK

1. **Establish breadth of COTS usage costs in evaluating contractor estimates.**

2. **Apply cost estimating components (i.e., SLOC, ELOC, $/SLOC) to evaluate contractor estimates.**

Determining the "To – Be" cost of using COTS Software

Methodology:

- Established a core set of questions that capture the major cost areas associated with COTS software and determine if contractor estimates include all applicable costs related to the use of COTS SW products

Questions addressed:

- How the costs of COTS SW is characterized?
- What method the contractor used to categorize these costs?
- How does the Government assess the costs of COTS SW to our programs?

What we found:

- No single "correct" answer
- Able to establish meaningful RFP criteria to evaluate contractor proposals

Challenge

Finding specific costs in a Contractor's estimate?

- **Acquisition**
  - **Make / Buy Trades**
  - **COTS product evaluation**

- **Development**
  - **Wrapper code**
  - **Integration with other COTS, new and reuse code**

- **Test and Verification**
  - **Test of integrated software functionality (prototypes)**

- **Sustainment & Operations**
  - **New versions updates, COTS replacement**

Contractors use different categories to organize cost

Challenge Cont'd

Finding specific costs in a Contractor's estimate?

Example 1

GOAL #1	COTS Eval Acquistion	Prototypes Test & Verification	Wrapper Code Development	Version Update Sustainment & Operations
Systems Engineering	X			X
Design Code	X	X	X	
Test			X	
Operations	X			X

GOAL #2		
SLOC	Hours	$/SLOC
500K		$147

Example 2

GOAL #1	COTS Eval Acquistion	Prototypes Test & Verification	Wrapper Code Development	Version Update Sustainment & Operations
Systems Engineering	X	X		X
Design Code		X	X	
Test		X		
Operations	X		X	X

GOAL #2		
SLOC	Hours	$/SLOC
400K		$205

**Contractors have many choices –
No "single" correct answer**

Big Questions

1. **COTS Quantification – How much new, reuse, and COTS SW is needed to satisfy functionality?**

Software Functionality	NEW	REUSE	COTS
Functionality #1	100%		
Functionality #2	20%	30%	50%
Functionality #3		75%	25%
Functionality #4	25%	50%	25%

2. **COTS Identification – What is the process for selecting COTS products?**

- **Satisfies "end system" functionality**
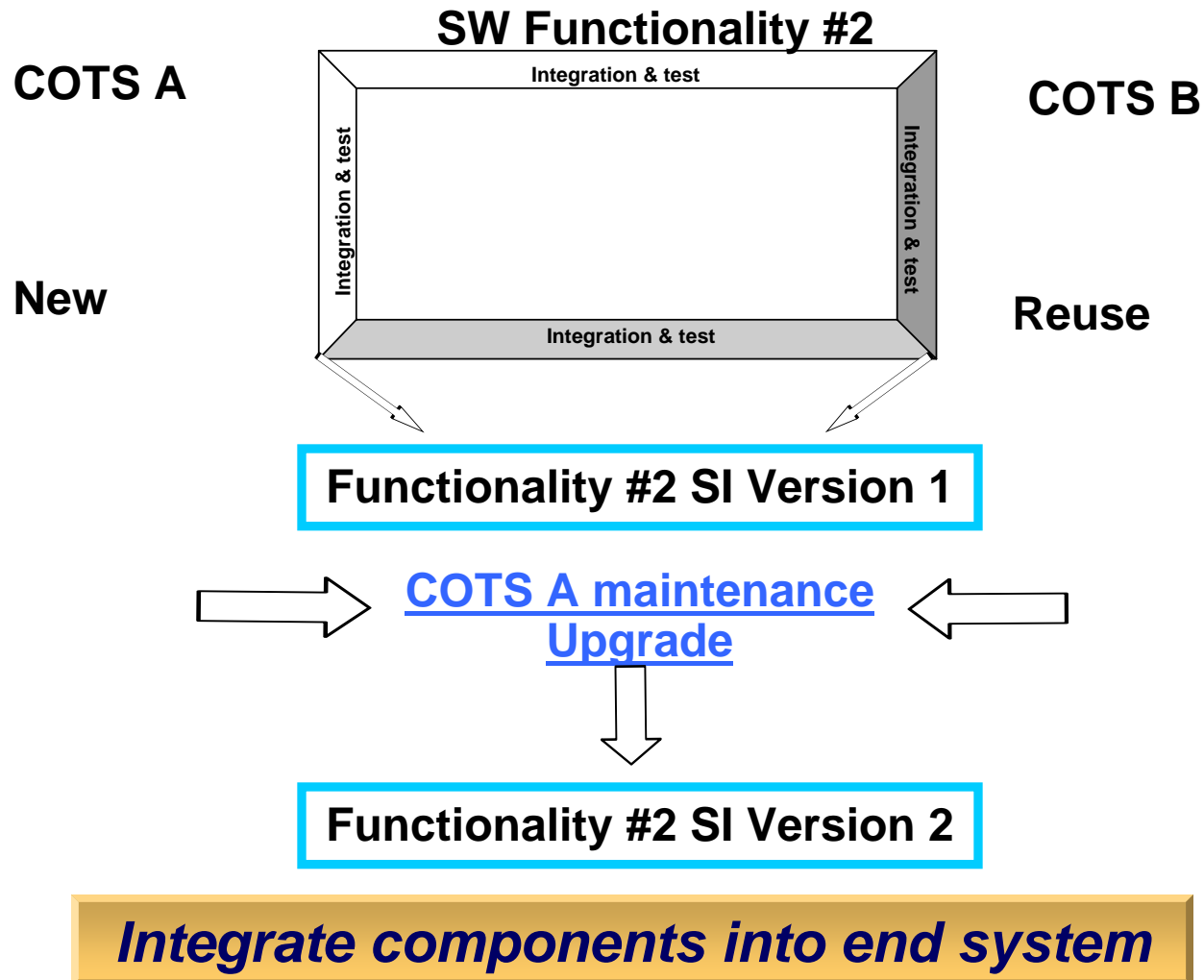- **Ensures interoperability**

Software Functionality	COTS	%	COTS	%	COTS	%
Trade 1 - Functionality #2	A	15%	C	15%	D	20%
Trade 2 - Functionality #2	D	20%	B	20%	E	10%
Trade 3 - Functionality #2	A	40%	B	10%	C	0%
Trade 4 - Functionality #2	C	5%	D	30%	E	15%

Understand Contractors selection process and how functionality is met

The Big Questions

3. **COTS Implementation & Maintenance – What is the process for implementing and maintaining COTS SW?**

SW Functionality #2

COTS A

COTS B

Integration & test

Integration & test

Integration & test

Integration & test

New

Reuse

Functionality #2 SI Version 1

COTS A maintenance Upgrade

Functionality #2 SI Version 2

Integrate components into end system

The Big Questions

4. **COTS Risks / Benefits - What are the risks and benefits of each COTS SW product chosen? Including the risks of:**

- **Identifying, selecting, implementing, and maintaining each COTS SW product**

- **Outline the risk mitigation process**

- **Interactions with user community**
  - **Ability and willingness to adapt to changes in business practices**

Early risk identification

The Big Questions

5. **Identify & quantify cost components – What methodology is used to estimate the cost of each COTS SW product?**

- **New & reuse (including "glue code" & "wrappers")**

  •SLOC & ELOC

- **For each COTS product:**

  - **Identification & selection**

  - **Licensing & training**

  - **Implementation/integration, testing & maintaining (upgrades, interoperability issues, regression testing, etc.)**

  •Labor hours & vendor costs

> *Cost components are a combination of SLOC, ELOC, labor hours & vendor costs*

Summary

- **Methodology successfully implemented on existing software-intensive program**
    - **Provides Gov't and Contractor with common ground to categorize COTS SW**
    - **Encourages communication between Gov't and Contractor**
    - **Dialogue used to develop RFP criteria**
    - **Objective way of evaluating COTS SW costs in contractor estimates**
- **Areas of improvement**
    - **Identification**
        - **Develop common Gov't-to-Contractor identification for "percent of functionality" (i.e., requirements, size, etc.)**
    - **Translating COTS risk into cost**

Classifying the costs is key to executing a fair and comprehensive evaluation of COTS cost estimates

Backup Charts

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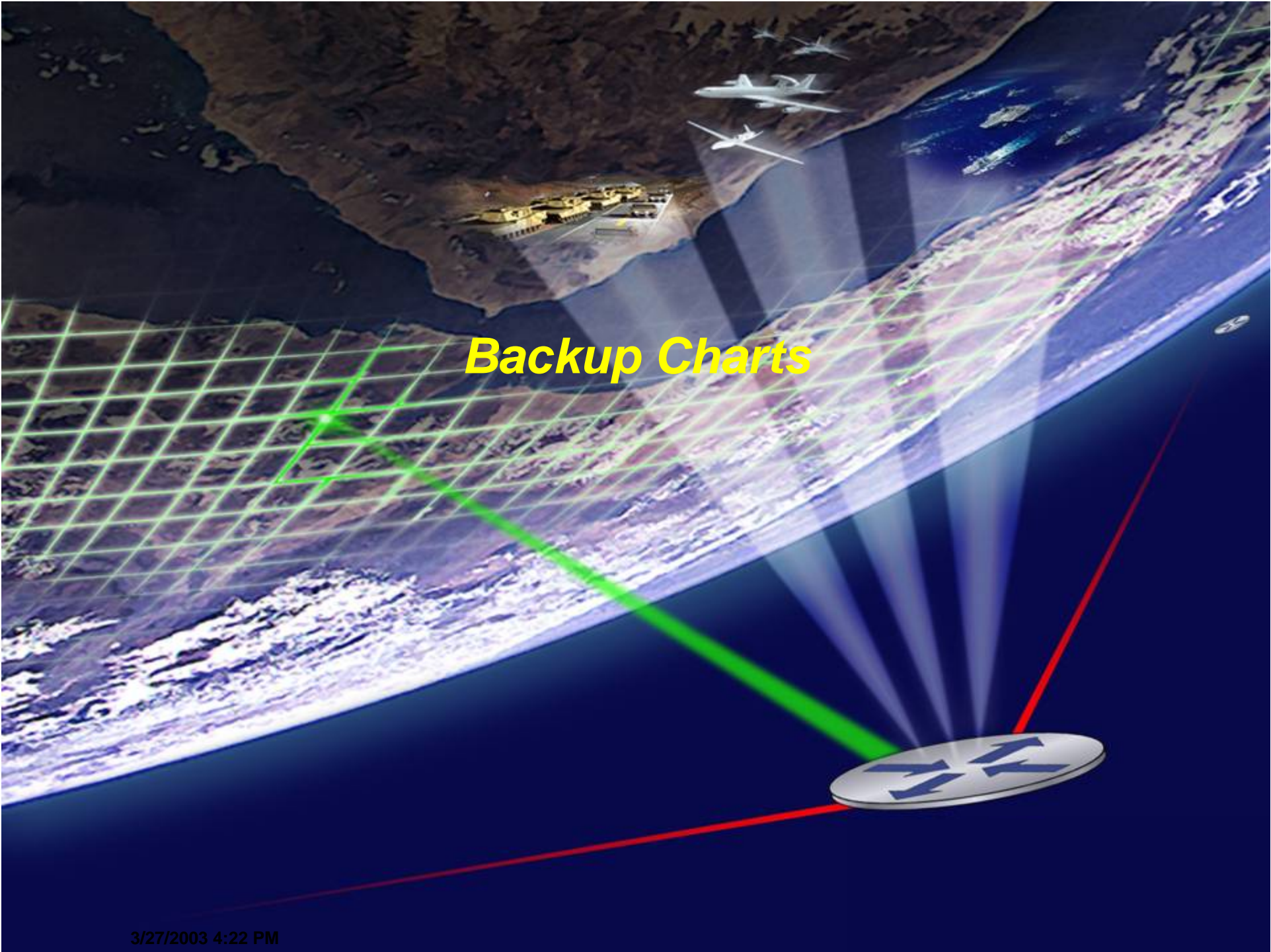
Questions

1. **COTS Quantification. For each "end system" function, quantify the amount of "end system" SW functionality that will be satisfied by new, reuse and COTS SW. Contractors are requested to provide a format that can be shared by the Government with all contractors.**

2. **COTS Identification. Outline the process for identifying and selecting each COTS SW product, including the steps used to determine how each COTS SW product satisfies the "end system" functionality. In addition, provide a detailed explanation of the plan to ensure interoperability between COTS products during and after the selection process.**

3. **COTS Implementation and Maintenance. Outline the process for implementing and maintaining each COTS SW product. Address how conflicts among components associated with COTS software are minimized; concentrate on the integration process of those components into the "end system". Address how COTS changes from outside vendors will be handled and your plans for managing vendor relationships.**

Questions

4. **COTS Risks/Benefits. Identify risks and benefits associated with each COTS SW product as well as the risks associated the process for identifying, selecting, implementing, and maintaining each COTS SW product. Identify risk mitigation processes for each risk and identify how interactions with the user community and their need to adapt to changes in business practices will be handled.**

5. **COTS Methodologies. Outline the methodology used to estimate the cost of each COTS SW product and the cost associated with the process for identifying, selecting, implementing, licensing, testing, training, maintaining (to include responding to vendor upgrades and regression testing), and integrating each COTS SW product. Identify all assumptions associated with the inclusion of each COTS SW product into a software system and provide the cost drivers and cost estimating relationships (CERs) for those systems. Be sure to clearly identify how the costs associated with each instance of "glue code" and/or "wrappers" are determined in your cost estimating procedure.**