Defence Acquisition Lifecycle Services

Delivering essential, independent, expert services to Defence Acquisition

OSCAM Presentation to April 2011 SCAF Workshop
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0. Agenda

1. What is OSCAM?
2. What is System Dynamics?
3. OSCAM Development
4. Using OSCAM
5. Applications of OSCAM
6. Key Success factors
1. Defence Acquisition Lifecycle Services

**In-Service - Change response during the life of the solution**

“by managing the on-going configuration of requirements, including safety and environmental advice and support, and evaluating change options, including cost and risk analysis”

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1. In-Service Cost and Risk Analysis

**Knowledge Based Estimating (KBE)**

- Knowledge
- Skills
- Data
- Tools
- People
- Processes

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1. In-Service Cost and Risk Analysis

Knowledge Based Estimating (KBE)

Knowledge  Skills
People  Processes

1. OSCAM – the Operating and Support Cost Analysis Model

- Joint UK/US program to develop a family of tools used for analysis of equipment in-service support costs
- The UK Suite of Models:
  - OSCAM Ship
  - OSCAM Shipboard System
  - OSCAM Land
- The US Suite of Models:
  - OSCAM Ship v8.0
  - OSCAM Air v3.0
  - OSCAM EFV
  - OSCAM USAF
  - OSCAM JSF
  - OSCAM Shipboard System v7.0
- The OSCAM models are built using System Dynamics Theory
2. What is System Dynamics?

- System Dynamics models the relationships, behaviors, and influences of entities in the system being studied.
- The OSCAM models use System Dynamics to model each month of the life cycle of the platform.
- This provides a more powerful technique than traditional methods like Excel based models.
- System Dynamics promotes an understanding of O&S processes, O&S costs, and the interdependencies that exist.

Example:
- Drivers for oil production

3. OSCAM Development

Influence diagrams developed in a workshop environment using customer subject matter experts to ensure that the real world is modelled.
3. OSCAM Development

Influence diagrams interpreted into software code for example PowerSim

3. Typical Structure of an OSCAM Model
4. OSCAM ‘Walkthrough’

Deployment of equipment over the life cycle within different categories
4. OSCAM ‘Walkthrough’

Population of parameters with deviation from default data set identified

Comprehensive help system to aid learning and accelerate deployment of model including details of influence diagrams
4. OSCAM ‘Walkthrough’

Ability to consider complex influences including obsolescence effects

Unique compiled simulation software to accelerate analysis
4. OSCAM ‘Walkthrough’

Cost Breakdown structure for all cost and non-cost results through life

Graphical representation of the results for ease of interpretation

Sensitivity analysis of selected input parameters with defaults values for the change
4. OSCAM ‘Walkthrough’

Graphical representation of sensitivity analysis

Uncertainty analysis of selected input parameters with defaults minimum and maximum values
4. OSCAM ‘Walkthrough’

**S-curve graphical representation of uncertainty analysis.**

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4. How is OSCAM different?

- OSCAM models are a **time based simulation** which makes it more powerful than Excel based models
  - OSCAM can discretely model depot maintenance periods and account for **Obsolescence**, for example, because of the time based approach
- **Model openness**
  - OSCAM is **not a black box** model
  - OSCAM users have complete **insight** into the equations and relationships that are used via the built-in help functions and model structure document
  - The model facilitates **understanding** of O&S processes, O&S costs, and the interdependencies that exist
4. How is OSCAM different?

- Powerful user interface
  - Easy handling of scenario data with audit trail
  - Powerful analytical tools for comparing results and performing uncertainty analysis
  - Interactive influence diagrams provide insight of relationships and structure in the model
- Historical databases
  - For US users VAMOSC based historical datasets are provided with the OSCAM Ship, OSCAM Sys, and OSCAM Air models. Historical datasets are prepared for most platforms in the VAMOSC database
- Supports a team approach
  - OSCAM encourages a team approach; it can be used throughout the life cycle by logisticians, cost analysts, engineers, etc., because the results offer both cost and non-cost outputs

5. Applications of OSCAM

- Source Selection
- Analysis of Alternatives
- Milestone Estimates
- Breakeven Analysis
- Budgeting
- Parametric Cost Tool (PCT)
- Data Management Tool (DMT)
- Contract Usage
5. Breakeven Analysis Example

- Model: OSCAM Ship
- A study required the breakeven point between two options to be determined based on a changing cost per barrel of fuel
- Advantage of Using OSCAM:
  - Since OSCAM results show expected expenditures year by year, it was easy to use this information, coupled with the acquisition information to find the year where option A became cheaper than option B for the fuel price in the baseline estimate
  - Once the baseline was established, re-running the simulation for multiple fuel prices to see the impact on the breakeven point took only seconds to complete

5. OSCAM Applications

- Joint Strike Fighter (JSF) O&S Estimates
  - The JSF Program Office validated OSCAM as the official O&S tool to support cost estimates for the production, sustainment, and follow-on development of aircraft.
  - OSCAM provides a common baseline for reconciliation purposes. It is a way of sharing and understanding costs, with partner-specific estimates.
  - Cost estimators from each partner country are currently being trained in the use of OSCAM JSF.
- Source selection Dry Cargo Ship
  - A Cargo ship program office mandated that OSCAM form the basis for its O&S estimate and each of the bidder’s O&S estimates. OSCAM was used to develop and maintain the program office’s cost estimate, validate each of the cost proposals, compare proposals and to perform sensitivity analysis.
  - OSCAM provided an extremely rapid method for the source selection team to analyze the proposals
6. Key Success Factors

• OSCAM is in widespread use across the US Navy for O&S cost analysis.

• Key reasons for this are:
  • OSCAM provides a common structure for developing cost estimates that conforms with DoD policies and allows for easy handover between analysts
  • OSCAM provides flexibility in the level of detail used, allowing the detail of the analysis to grow as the program matures
  • OSCAM is designed to work with the data that is routinely collected by the US Navy, providing the analyst with a wealth of actual and analogous data
  • OSCAM is designed to reflect the approach used by cost analysts and provides them with enough information to support and defend their estimates
  • The user interface allows the system dynamics model to be used without being an expert in system dynamics and has a wealth of analytical tools