



1 PURPOSE

This INCOSE Affordability Working Group (AFFWG) is an association of INCOSE members who are focused on Systems Engineering for Design for Affordability. The AFFWG will examine and provide both Methods and Analysis Techniques to incorporate Affordability as an Architectural Objective in the Systems Engineering Enterprise and Discipline. The Charter shall also include innovation techniques to accomplish the overarching objective.

2 GOAL

The AFFWG has a goal of advancing the state of the practice for Design for Affordability. This goal focuses on the value of the system across the Total Life Cycle and includes approaches for: (1) automation technology to reduce staffing, (2) new operational or support concepts; (3) reuse or refurbishment of existing systems, (4) downsizing a system in performance to reduce cost, (5) scalable architectures for variable cost-performance points, (6) Analysis of the Variables that contribute to Systems Engineering Trade Space that effect “cost of function”, Robust Engineering Theory as it contributes to theory and methods for “loss of economic value”, “system robustness”, and the concept of system “ideality”, etc. This goal also includes identifying and providing guidance for the relevant trades across the life cycle, especially during the system definition timeframe, that impact the system affordability.

3 SCOPE

- (What) Implementation of a strategy for Acquisition of complex Systems -Delivers capability in increments, recognizing up front the need for **future capability improvements**. -Success depends on phased **(life cycle) definition of capability** needs and systems that provide increasing capability over time.
- (How) Holistic Engineering Model Utilization of Enterprise Architecture shall underpin all information architecture development -Each integrated solution architecture shall have three views: operational, systems, and technical.
- (How) Product Life Cycle planning, development, implementation, and management. -Performance-Based Life-Cycle Product Support represents the latest evolution for delivering required life cycle readiness, reliability, and ownership costs.

Total Ownership Cost (TOC) is an integrative measure that is the only complete measurement of AffordabilityDesign to Cost (DTC) only represents design requirements; Design to Unit Production Cost (DTUPC) only represents production requirements; Life Cycle Cost (LCC) only represents the support requirements. TOC is used as representative for all life cycle phases and provides a “measure” of the integrative function to determine design effectivity from a complete System Life Cycle Context- It is also a demonstration that treating primary and enabling functions



INCOSE Affordability Working Group (AFFWG) Charter

of a system during Design, as separate systems...Cannot provide a complete method for "Affordability of Systems".

The Measureable goals of this project are:

- 1) To improve and make system Affordability a SE method within Complex Systems and Complex Projects; using TOC as a measure of design effectiveness.
- 2) Elaborate tailored guidance for Systems Engineering Teams to apply, in the context of a Concept, Design, Production and/or Support Life Cycle phase.
- 3) Elaborate tailored guidance to apply to Architectural Analysis and trades across the life cycle.
- 4) To contribute to affordability standardization in the context of Systems Engineering

4 SKILLS AND EXPERTISE REQUIRED

- Representatives of industrial and/or individuals member of INCOSE. Workload is estimated to 3 day per month. Academia representation will also be required to represent the latest thinking of Complex, and Dynamic Systems thinking.
- Logistics Engineering Expertise will be required to represent the Enabling Systems Functional Analysis
- Operational Analyst Expertise will be required to represent the Environmental Functional Analysis.
- Cost Engineering Expertise will be required to represent the Cost as an Independent Variable and "Value" Analysis functions.

5 MEMBERS, ROLES AND RESPONSIBILITIES

List the names of members and briefly describe their responsibilities.

- Lead: Joseph S. Bobinis, PMP
 - o Working Group Chair
 - o The lead shall be responsible for status reporting to the Assistant Director for Knowledge.
- Co-Lead(s): Jay Haimowitz
 - o Industry and DoD Policy Sub group
 - o The co-lead shall be responsible to act in the absence of the lead
- Board Sponsor(s)/Champion(s): TBD
 - o TBD
 - o The Board sponsor shall be responsible for resource advocacy and status reporting to the INCOSE BOD and external stakeholders.)
- Members <individual member names may be listed here and/or listed in individual Technical Project Plan(s) (TPP) that align to this WG/Initiative. **See List of Members on Last Page of Charter as of 11/1/2010.**

6 OUTCOMES (PRODUCTS/SERVICES)

This working group will work on projects that apply to within a Complex Systems context with the intent to account for Less Complex Product sectors and applications as well.

It will be organized by work packages by countries in order to provide an efficient work environment.

Each work package will be composed of:

- A work package leader
- Representatives of SE enterprise from various Industries and Services
- Representatives of End user Communities
- Representatives of industrial members
- Systems engineering experts

The coordination of the work done in work packages is done in plenary meetings.

The deliverables are the following:

- Project roadmap
- Lessons learned
- Deployment packages (tailored: processes; good practices; check lists; templates)
- Pilot projects or case studies
- Mapping of tailored activities with INCOSE SE Handbook and ISO Standards (15288; 26262; 62304)
- Supplements to the INCOSE SE Handbook
- Technical communication to INCOSE membership through papers, insight, journals, webinars

7 APPROACH

Define the general approach that will guide this WG/Initiative including:

- Monthly Telecoms of the entire WG/Initiative team
- Decisions will be made via membership input with the Chair having all final decision authority
- To accomplish these goals some of the fundamental Systems engineering methodologies need to be examined to account for changes in Systems over the last 50 years.
- A more agile and enterprise level method for Systems Engineering may be required to address the variables that drive Affordability
- 2011 Long Term milestones with method and conceptual (whitepapers & presentations)

8 MEASURES OF SUCCESS

1. Active Membership:



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Potential measures include

- Size of membership
- Number of enterprises involved in the project, especially those involved in complex systems (possibly by sector or domain)

2. Work product usefulness to systems engineering community in especially Complex Projects and DoD Projects.

Potential measures include

- Number of developed deliverables used by INCOSE SE End Users
- Significant Publications at the National/International Level
- Industry Adaptation of Methods

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9 RESOURCE REQUIREMENTS

Meetings: Working group meetings or telecons (every month)
Targeted sector/domain plenary telecons; e.g., DoD (every 2 months)
INCOSE International Symposium,
INCOSE International Workshop,
Others as required

Communications:
INCOSE TLT (through Associate Director)
Membership through Webinars
Other INCOSE WGs, particularly SE Enablers
External organizations

10 DURATION

Charter will remain in effect until rescinded by the signatory.

11 SIGNATURES

Joseph S Bobinis

Date 11/11/2010



INCOSE Affordability Working Group (AFFWG) Charter

1st Level of Approval

Date August 23, 2011

Technical Director, INCOSE

2nd Level of Approval (Note this will be added by the INCOSE Technical Director when deemed appropriate.)

Chairman, INCOSE Board of Directors

Date

Revision History

<u>Date</u>	<u>Revision</u>	<u>Description</u>	<u>Author</u>
11/15/2010	1.0	Initial Draft.	JS Bobinis; Sr. Fellow LMC