

**INCOSE TECHNICAL BOARD**  
**LIAISON ADVISORY STATEMENTS**

**(INCOSE-TA-2003-011-01)**

**Approved by the INCOSE Technical Board on August 11, 2003**

**A. Name of Liaison Effort –**

COSYSMO (Constructive Systems Engineering Cost Model)

**B. INCOSE Liaison Representative –** Chris Miller and Garry Roedler

**C. INCOSE point of contact and participants -**

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**D. Description of proposed standard or liaison activity**

Establish and maintain a liaison between INCOSE with the University of Southern California Center for Software Engineering (USC CSE) supporting the development of a systems engineering cost modeling effort. COSYSMO is an acronym for CONstructive SYStem engineering cost MODEL. This member of the USC COCOMO II family of cost estimation models is being developed to estimate the system engineering costs. The COSYSMO development effort needs systems engineering experts to be successful. Therefore, this involves consistent and dedicated participation in the model development activities.

**E. INCOSE's level of participation**

This liaison activity provides the COSYSMO project with an official access point to the INCOSE membership. As the official INCOSE representatives to the COSYSMO Working Group and INCOSE representative, we:

- Participate in all working group meetings
- Participate in early Delphi activities to establish an a priori model
- Continuously and thoroughly review interim work products produced by the COSYSMO working group

- Provide the Technical Board, Measurement WG, and the Center of Excellence with progress and status information on a regular basis and promptly inform the Technical Board of issues.
- Encourage INCOSE members to provide data to USC to support development and refinement of the model's cost and size drivers

**F. Justification, including relevance to INCOSE and its members**

COCOMO's revolutionary impact on the software engineering community represents the best argument for INCOSE participation in this activity. Prior to the existence of COCOMO, using parametric modeling to estimate software development projects was unheard of. Today, a software project manager would be chastised, if their estimates are not generated (or validated) by a parametric model.

There is currently no publicly available parametric model that supports systems engineering. USC CSE is developing the COSYSMO model for its affiliates and plans to make it publicly available. The INCOSE community will be affected by its release and needs to participate to ensure the model truly reflects systems engineering tasks and drivers across the life cycle. USC CSE has asked for our active participation in this activity, in order to produce valuable model for the SE community. INCOSE's participation in this activity will help avoid having of a poor quality or non-representative model imposed on the systems engineering community. The proposed liaison has actually been in place at the Measurement Working Group (MWG) and Processes and Improvement TC (PITC) level for the past 16 months.

The bottom line is, this activity requires low effort (i.e., modeling performed by USC CSE) and with our participation can yield high value (i.e., supplying INCOSE/SE community with an invaluable resource).

**G. Objectives satisfied or to be satisfied**

This liaison will directly satisfy one of the key Corporate Advisory Board (CAB) objectives for 2003, namely: Establish an SE Relevant Parametric Cost Estimating Tool.

There are no formal deliverables planned for this activity. The primary product will be the systems engineering cost model provided by USE CSE.

The objectives of this activity are to:

- Ensure technical integrity of the model
- Assist in the production an SE Cost Model that:
  - o provides a foundation of data that contributes to the management activities of systems engineering
  - o reflects real SE needs
  - o exists in the public domain (i.e., No cost)
- Demonstrate INCOSE Leadership to solve challenging SE issues

## **H. Dependencies, risks, and issues**

Early work products (prior to INCOSE involvement) suffered from inadequate systems engineering experience on the COSYSMO working group. Therefore continual involvement by the systems engineering community is required in order to avoid USC developing a model that does not accurately reflect systems engineering (i.e., software centric model), but is advertised as a valuable resource by USC CSE. Without INCOSE continued support there is a risk that the SE community embraces a COSYSMO model that does not fill the intended need.

## **I. Anticipated schedule**

The COSYSMO working group has established four working sessions to be held each year. These working sessions are held in conjunction with existing conferences and seminars, as follows

- INCOSE IW in February (location varies)
- USC CSE Annual Research review in March (Los Angeles, CA)
- PSM Users Group Conference in July (location varies, usually held in CO)
- COCOMO User Forum in October (Los Angeles, CA)

The COSYSMO model is scheduled for initial release in fall 2005

Evaluation of early usage, model refinements and potential extensions of the model may be scheduled after initial release.

## **J. Relationship to existing/planned collaborations and other standards activities**

- INCOSE MWG – many of the same people are involved in both efforts. Therefore, having the INCOSE MWG and PITC Co-Chair sharing liaison responsibilities helps to communicate the status of the project.
- PSM – Practical Software and Systems Measurement is participating on the working group and INCOSE has a liaison with PSM. Based on the sound technical content of PSM's measurement guidance, the INCOSE MWG has collaborated with PSM for many years on various products. There is a natural relationship and some overlap between PSM, INCOSE MWG, and COSYSMO activities.
- SE COE – The Center of Excellence's Value of SE task is tackling a slightly different problem than the estimation of systems engineering. However, there are many similarities including need of much of the same data. Eric Honour, Value of SE lead, is actively collaborating with us via established MWG events (i.e., IS, IW, MWG telecons)

## **K. Relationship to INCOSE Technical Operating Plan, if any**

This effort is aligned with many of the strategic and operating objectives listed on page 5 of the INCOSE Technical Board Handbook (dated January 2001).

## **L. Expected Duration of Effort**

Initial Model Development:

The COSYSMO model is scheduled for release in fall 2005. There will also be work needed to evaluate early use of the model and determine whether further refinement is

needed. Finally, allowing for potential schedules slips, the project will probably extend through 2006.

Follow-on Model Extensions/Upgrades:

The current COSYSMO plan includes potential model revisions to extend the model application for additional domains. Schedule and duration is TBD.

**M. INCOSE privileges and other benefits (e.g. price discounts, name/logo on cover, etc.)**

- As stated above, this activity requires low effort (i.e., modeling performed by USC CSE) and with our participation can yield high value (i.e., supplying INCOSE/SE community with a valuable SE cost modeling capability).
- Participation in the development of the model means the production of a model that meets INCOSE needs
- INCOSE's participation is heavily advertised by USC CSE (Their point of view is that INCOSE's name lends credibility to the model)

**N. Draft Joint Working Agreement (or plan for developing), as required**

N.1 Signatures

N.2 Date signed

N.3 Location of Agreement

**O. Key Issues and INCOSE Advisories**

O.1 Issue #1 – Ownership of the COSYSMO model and baseline data.

O.1.1 Committee Position - The COSYSMO model and baseline data are not INCOSE products

O.1.2 INCOSE Advisory – Initially this may seem as a detractor. But considering the long-term maintenance costs of this model (e.g., the cost of subsequent calibration activities), this is actually a positive for INCOSE; i.e., we get the opportunity to significantly influence the content and development of the model, provide the model to our members, get visibility for working with the team, yet not have to fund the project or its maintenance. Additionally, the precedent for maintaining an open publicly available model has been set with COCOMO. So the lack of control with respect to the model and its data should not be much of a concern.

Approved by the INCOSE Technical Board William F. Mackey, Chairman

Date: August 11, 2003