

1 PURPOSE

The main purpose of the Configuration Management Working Group (WG) is to ensure that the state of the art and the body of knowledge in CM be used to enhance the state of the art and the body of knowledge of SE; and vice versa. The CM WG will lead this effort within INCOSE; in liaison with external CM related experts, standardization bodies and other organizations and communities, as appropriate.

2 GOALS

To grow and fully integrate the CM discipline within SE including all relevant areas of SE (e.g. modeling and simulation-based approaches for SoS).¹

To develop a community of CM-specialists within INCOSE (pool of knowledge) through various efforts including, but not limited to:

- Developing papers to be presented during International Symposia,
- Establishing project specific working relations with other professional societies and institutions with like interests in CM; a living N2 document shall be maintained to show relationship to other CM focused organizations. ,
- Advancing the body of knowledge regarding CM and its integration into SE and subsequently contributing to the SEBoK/SE Handbook,
- Initializing project specific working relationships with other INCOSE WGs; a living N2 document shall be maintained to show interaction with other INCOSE WGs.

To promote, encourage, supervise and perform research to extend the CM scope for SE (directing the cutting edge of SE related CM research) through various efforts including, but not limited to:

- Extending CM along the full lifecycle, including In Service and Asset Management,
- Extending CM across all elements of the System of Interest (SoI) and into Systems of Systems SoS,
- Tailoring and automation of CM,
- Tracing and reusing across multiple programs,
- Variability of systems, and
- Integration of Software CM.
- Emphasize the need for CM requirements to be established early in the System life-cycle (e.g., as part of Operability and Maintainability requirements);
- Relationship between CM and other management domains (e.g. Asset Management, Inventory Management, Integrated Logistics Support);
- Selling the business case for CM;
- CM of modelling and simulation based approaches to SE;
- Reduce risks related to digitalization and in general emerging behaviors of systems and SoS;
- CM in relation with Artificial Intelligence and Augmented/Virtual Reality;

¹ At the IS2016 the paper “The enabling role of Configuration Management (CM) for the Systems Engineering of tomorrow’s complex Systems and Systems of Systems” by Airbus was presented.

3 SCOPE

This WG will address processes, methods and tools; organizational aspects; business and information requirements; as well as human aspects (competencies) related to CM.

The WG will address the interdependencies between the CM process in accordance with ISO/IEC 15288 including:

- other Technical Management processes;
- Technical Processes;
- Organizational, project-enabling processes.

For IT aspects (like exchange standards, tools and data) collaboration with the WG Tool Integration and Model Lifecycle Management will be established.

Collaboration with other relevant WGs/Initiatives (e.g. related to Requirements, MBSE, Ontology for SE, Digital Artifacts, SoS, etc.) and with external experts and bodies or organizations will be explored and established as appropriate.

The WG will also reach out to various industries, government and academia to widen their representation within the WG and secure exploration of CM aspects in these different application domains.

Furthermore, the WG will emphasize the supervision and other kinds of pro-active involvement in CM related research projects (including Ph.D. and Master level projects with universities) and report back to this WG on any such planned and on-going research and related outcomes (e.g. related to CM for SoS, MBSE, Software, Industry 4.0, etc.).

The WG will actively participate in reviewing and providing feedback including concrete inputs for the evolution of CM related standards (e.g. SAE 649, ISO 10007) and specifications/guidelines (e.g. CM2-500); and the INCOSE SE Handbook and SEBoK.

Finally, the WG will publish CM related practice and research papers (at conferences and in journals within various communities, e.g. INCOSE, CM2/IpX, CMPIC, IEEE, ITIL...); produce Guide(s) as INCOSE WG Products (e.g. similar to the Requirements WG's 'Guidelines for Writing Textual Requirements'); and continuously collect lessons learned (based on bad CM practice or "horror stories." communicated diplomatically; and good CM practice).

4 SKILLS AND EXPERTISE REQUIRED

There are no fixed requirements regarding the necessary technical background and qualification of WG members; however, most members will have a CM and/or SE related background, but at different levels of depth and experience.

It is hoped that the WG will attract members not only from different technical fields, but also from a wide range of application domains (e.g. various industries, including software tool providers, and academia), and from a large number of countries and cultures. The WG embraces the rich diversity we can find in today's world and welcomes anyone interested to join the WG – irrespective of their origin, faith, beliefs, nationality, gender, sexual orientation, age, culture, language, profession, etc.

All active members of all INCOSE Working Groups must be INCOSE individual members or identified as a POC in an approved MOU. More than one nation must be represented for the Working Group to keep its charter from INCOSE. More than 5 members must be active to maintain INCOSE's charter.

5 OUTCOMES (PRODUCTS/SERVICES)

Based on the goals of this WG described above, this WG aims to:

- Create and maintain a knowledge base, with the aim of collecting lessons learned from the members' experience in specific projects, in various domains. The analysis of the lessons learned will facilitate the identification of common, recurring CM issues and the formulation of best practices from a system-view standpoint all resulting in an update to SEBoK and/or the SE Handbook.
- One special issue of Insight (SE magazine) about CM.
- Take the INCOSE SE Handbook (SEH) latest version as a baseline and look to further integrate the CM aspects into the next version of SEH, while liaising with other relevant WG's, e.g., requirements, ontologies, MBSE, MBCD, etc. (to establish end-to-end lifecycle).
- With direction from the INCOSE Standards Department and INCOSE's POC to SAE Engage with the SAE G-33 Committee for participation in development of SAE/EIA 649 (series).
- Establish a Memorandum of Understanding with IpX/CM2 for participation in development of CM2-500.
- Continue to evaluate need for additional MoUs to support the CM Working Group as well as potential to leverage existing MoUs (e.g. PDES, OMG)
- Establish and manage over time a CM related research portfolio.
- Regularly publish CM related practice and research papers at the INCOSE Symposium, INCOSE INSIGHT, and/or INCOSE SE Journal.
- Produce formal INCOSE products in the form of Guide(s) or similar documents for the benefit of INCOSE members and the larger community after having each plan approved according to INCOSE TEC-107.
- A listing of CM standards, overlap, scope, etc. (a map of how they relate to each other) (e.g. IEEE 828-2012, emerging standard TC20-SC14, etc.)

6 WAY OF WORKING

The leadership of the CM Working Group will:

- Coordinate INCOSE IS and IW as well as web conference meetings.
- Maintain a list of WG members using the GDPR compliant INCOSE system (INCOSE members registered as CM WG member);
- Make best use as suitable and appropriate of the existing INCOSE infrastructure (e.g. IT, website, discussion groups, data repositories, leadership, Admin);
- Maintain living N2 documents with relations to other CM organizations and INCOSE working groups.
- Arrange for the necessary context to enable the exchange with associate members, i.e. 'not Regular INCOSE Members of the WG including framework agreements between INCOSE and such bodies or organizations, or suitable means to exchange relevant data;

- Recruit and support champions to lead specific activities;
- Communicate to non-members & members with the CM WG public page

The membership of the CM Working Group will:

- Meet face to face at international workshops and international symposia (always with Web Conference connection for those attendees not able to join physically);
- Regular virtual meetings via Web Conference (e.g. every 2-3 weeks);
- Those INCOSE members attending a work meeting will decide on the priority of activities that are on-going or planned, depending on the interest and the availability of relevant key participants, as well as any relevant other factors;
- Foster strong cross collaboration with other INCOSE working groups to cross pollinate CM topics within/across the broader INCOSE community.
- Create and Maintain future work products (e.g. Guidelines related to CM aspects) in compliance with INCOSE policies & procedures;
- Carry out assignments outside of meetings (e.g. review CM standards and other resources, document the approach to CM in disciplines other than Systems Engineering, collect lessons learned from specific projects);
- Avoid unnecessary overlaps and duplications of activities or deliverables or products between this WG and other INCOSE WGs or external bodies or organizations;
- Communicate to WG CM members and interested INCOSE members via:
 - o INCOSE Connect hosted WG CM website
 - o WG CM threaded discussions (mechanism to be explored and led by communications chair)
 - o INCOSE tutorials and webinars
- This Charter of the WG CM will be changed as needed and agreed by the majority of the WG members and approved by INCOSE.

7 MEASURES OF SUCCESS

Success will be measured by several means including but not limited to:

- Number of goals achieved by each IS and IW
- Number of active members engaged at each IS and IW
- Number of countries represented by active members
- Number of INCOSE products/services (papers, panels, tutorials, webinars, guidelines, etc) delivered

8 RESOURCE REQUIREMENTS

To be developed.

9 DURATION

The formal submission of this charter to establish the WG will take place the latter half of 2018.

Every year the CM WG will review and update the charter content.



10 APPROVAL

1st Level of Approval
Technical Director, INCOSE

Date 12/10/2018

Revision History

| <i>Date</i> | <i>Revision</i> | <i>Description</i> | <i>Author</i> |
|-------------|-----------------|--------------------|------------------------|
| 10 Dec 2018 | 1.0 | Initial version. | Various WG CM members. |
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