



NAFEMS-INCOSE Systems Modeling and Simulation Working Group Terms of Reference / Charter

1 PURPOSE

Systems Engineering has recognized the importance of models in a wide range of roles. Early in the development of a system, models may be used to understand the user domain, to define functions and concepts, and to capture system requirements across the levels of a system architecture. Such models may specify functional, interface, performance, and physical requirements, as well as other non-functional requirements such as reliability, maintainability, safety, and security. Engineering Simulation has been an essential part of product development engineering across many industries and disciplines for decades. This work is typically performed by technical specialists with deep knowledge in their respective domains, and with expertise in specialized mathematical and analytical tools. Combining the modeling and simulation perspectives of both Systems Engineering and Engineering Simulation can improve communications and coordination across the product development life cycle.

The Systems Modeling & Simulation Working Group (SMSWG) is a collaboration between [NAFEMS](#) (The International Association for the Engineering Modelling, Analysis and Simulation Community) and [INCOSE](#) (the International Council on Systems Engineering). The mission of the SMSWG is to develop a vendor-neutral, end-user driven consortium that not only promotes the advancement of the technology and practices associated with integration of engineering simulation and systems engineering, but also acts as the advisory body to drive strategic direction for technology development and international standards in the space of complex engineering.

2 GOAL

The SMSWG supports activities that bridge engineering simulation and systems engineering to optimize the integration of Systems Engineering and Engineering Simulation solutions for both OEM and supplier. This includes education, communication, promotion of international standards, and development of requirements that will have general benefits to the Engineering Simulation and Systems Engineering communities.

3 SCOPE

Systems Modeling and Simulation (SMS) is the use of interdisciplinary functional, architectural, and behavioral models (with physical, mathematical, and logical representations) in performing Model-Based Systems Engineering (MBSE) to specify, conceptualize, design, analyze, verify and validate an organized set of components, subsystems, systems, and processes. MBSE is the formalized application of modeling to support system requirements, design, analysis, verification and validation activities beginning in the conceptual design phase and continuing throughout development and later life cycle phases.

4 SKILLS AND EXPERTISE REQUIRED

The SMSWG is composed of experts in the area of SMS who contribute their time and knowledge on a voluntary basis. Members of the SMSWG are responsible for identifying the outputs and directing the activities of the working group and the associated SMS Community.

The SMSWG communicates to the wider engineering community via the Systems Modeling and Simulation Community. The SMS Community consists of individuals who are either NAFEMS or INCOSE members who have an interest in the topic of Systems Modeling and Simulation but who are not necessarily experts in this area. The SMSWG organizes meetings with the SMS Community to keep them informed of developments in the field of SMS and to keep members of the SMS Community abreast of SMSWG activities.



NAFEMS-INCOSE Systems Modeling and Simulation Working Group Terms of Reference / Charter

The outputs of the SMSWG are created by current working group members or by experts from the wider community. Where an output is produced by an external expert, the SMSWG is responsible for ensuring that the output is technically accurate and relevant to the NAFEMS and INCOSE membership.

At the discretion of the SMSWG, focus teams may be formed to direct and deliver a specific activity, with the approval of any deliverables by the SMSWG. Each focus team should be led by a current member of the SMSWG.

5 OUTCOMES (PRODUCTS/SERVICES)

Working group outputs in the area of Systems Modeling and Simulation include:

- guidance in the form of processes and methods;
- support for flagship NAFEMS & INCOSE events including the NAFEMS World Congress and the INCOSE Symposium. Such support will include invitations to each organization's meetings on subjects of mutual interest;
- providing content that should be hosted on both NAFEMS and INCOSE websites. Such content would include presentations shared at meetings and a synopsis of the SMSWG's activity;
- provide assistance, support and promotion for international standards relevant to SMS;
- develop and publish jointly a glossary of terms in use across the field of SMS;
- develop a competency framework for practitioners of SMS.

The outputs of the joint SMSWG are strengthened by carrying both the NAFEMS and INCOSE branding. Potential outputs should be discussed with the NAFEMS Technical Officer and INCOSE Director for Transformational Enablers to ensure a smooth publication process.

6 APPROACH (SMSWG BYLAWS)

6.1 SMSWG MEMBERS

- Members of the SMSWG are listed on meeting minutes as present or sent apologies.
- If a member of the SMSWG does not contribute for more than 9 months, they will be warned that their membership of the working group may be terminated. An individual's membership of the SMSWG may be terminated after 12 months of non-contribution, at the discretion of the Chair.
- At least two-thirds of the SMSWG shall have active membership with either NAFEMS or INCOSE, verified by the NAFEMS TWGM and by the INCOSE central office. See the Roles and Responsibilities section of this document for contact details.
- At the discretion of the SMSWG Chair, participation in a working group meeting may include up to three individuals from a member organization to reduce the workload on individuals.
- The number of members on the SMSWG should ideally range from between 10-20.
- Both the executive from NAFEMS and INCOSE organizations should be represented in the membership of the SMSWG.



NAFEMS-INCOSE Systems Modeling and Simulation Working Group Terms of Reference / Charter

- The SMSWG should aim to have equal representation from both INCOSE and NAFEMS organizations. If either of the sponsoring organizations is represented in the SMSWG with less than 1/3 of the membership, action should be taken to address this imbalance.

6.2 JOINING THE SMSWG

- Potential new members should submit a curriculum vitae or other summary of background to the NAFEMS Technical Working Group Manager (TWGM) indicating their knowledge and experience in the area of SMS. This will be reviewed by the working group and if approved, the person will be invited to attend meetings and participate in the group's activities. It is expected that SMSWG members will hold a senior technical position and have significant expertise in the area of SMS.

6.3 MEETING LOGISTICS

- Minutes will be taken for all meetings and actions will be identified. The minutes should be circulated within a month (ideally less) of a meeting date. The TWGM will produce the meeting minutes unless another meeting attendee is selected by the Chair.
- To enable international involvement in the group, group meetings will be split between physical meetings and web-based meetings. Meeting joining instructions will be circulated to the SMSWG by the TWGM in advance of each meeting, with physical meetings also providing a web-based connection and collaboration method (e.g., GlobalMeet, WebEx).
- The SMSWG should aim to meet at least 6 times a year but no less than 4. A bi-monthly (once every two months) reoccurring meeting date will be set by the SMSWG on approval of these Terms of Reference. The bi-monthly reoccurring meeting date can be modified upon agreement with the SMSWG.

6.4 LEADERSHIP ROLES

- The positions of Chair and Vice-Chair are open for review every three years on the anniversary of the initial appointment. There is no requirement for the role to be rotated. Only current members of the SMSWG may vote or be nominated as Chair. SMSWG members wishing to stand for the role of Chair (and the standing Chair if he or she would like to retain the position) should seek a nomination from at least one other member of the group and should communicate this to the TWGM along with information outlining their suitability for the role. The responsibilities of the SMSWG Chair are defined in Section 10.
- The Chair of the SMSWG should ideally be an industrial user of SMS technology.
- Vendors are discouraged from taking on a leadership role within the SMSWG.

6.5 DECISION MAKING

- Where a vote is required it will be carried out via email to the Chair or, if the position of Chair is being voted on, to the TWGM.
- Only current members of the SMSWG are allowed to vote. Each organization that has a representative in the working group will have one vote. If an organization has more than one person participating in the working group, the vote will be shared between the participants.
- If required, the casting vote will be held by the Chair.



NAFEMS-INCOSE Systems Modeling and Simulation Working Group Terms of Reference / Charter

- Where discussion is required, voting may take place either at a web-based meeting or within a set time of the minutes being issued and the call for a vote. Members unable to attend can register their vote directly with the Chair in advance.

6.6 COMMUNICATIONS

- SMSWG communication should be carried out using the SMSWG email address (smswg@nafems.org). It is the responsibility of the NAFEMS TWGM to ensure that the SMSWG email distribution list is current. Personal distribution lists are discouraged as they require constant updates.

6.7 SMS COMMUNITY

- The SMS Community aims to meet at least 4 times a year.
- The SMSWG is responsible for identifying the topics for SMS Community meetings.
- Communication to the SMS Community should be made using the SMS Community email address (sms_community@nafems.org).
- Requests to join the SMS Community can be made directly to the TWGM (trudy.hoye@nafems.org) or sent via the contact form.

7 MEASURES OF SUCCESS

The success of the SMSWG will be measured in terms of:

- SMSWG Outputs include but are not limited to:
 - Publications
 - Webinars
 - “How to...” Guides
 - Training Courses
- SMSWG Activity & Engagement including but not limited to:
 - Number of SMSWG meetings
 - Number of attendees per meeting
 - % of SMSWG members who attended zero meetings in the last 12 months
 - Number of individuals leaving the group
 - Number of new membership enquiries
- SMS Community Activity & Engagement including but not limited to:
 - Number of SMS Community meetings
 - Number of new SMS Community membership requests
 - Number of SMS Community members leaving the group

8 RESOURCE REQUIREMENTS

The group is administered by the NAFEMS Technical Working Group Manager.

Logistical support for the group, consisting of providing a web-based meeting platform, scheduling meetings and web-hosting of working group output is provided by NAFEMS.



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Funding is available from NAFEMS and INCOSE to support the development of working group outputs. This funding can take the form of contracts for authors, contracts for the individuals tasked with reviewing, travel and subsistence support of targeted NAFEMS/INCOSE events. Applications for funding should be made jointly to the NAFEMS Technical Officer and the INCOSE Assistant Director for Transformational Enablers.

Funding provided by NAFEMS and INCOSE should be discussed and recorded at working group meetings to maintain transparency.

9 DURATION

The SMSWG will continue in perpetuity until terminated by the NAFEMS CEO and/or the INCOSE Technical Director.

10 APPROVAL (MEMBER ROLES & RESPONSIBILITIES IN ADDENDUM)

Technical Director, INCOSE Date

CEO, NAFEMS Date

Revision History

Date	Revision	Description	Author
24 Jan 2020	1.0	Initial Version	
14 Feb 2020	2.0	Updated to match INCOSE Charter format. Moved Member Roles & Responsibilities to Addendum document	Chris Hoffman

11 ABBREVIATIONS

- INCOSE International Council on Systems Engineering
- MBSE Model Based Systems Engineering
- NAFEMS International Association for the Engineering Modelling, Analysis and Simulation Community
- SMS Systems Modeling and Simulation
- SMSWG Systems Modeling and Simulation Working Group
- TWGM Technical Working Group Manager