



Agile Systems and SE

Agile Systems and SE

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WG PURPOSE/MISSION

Develop a body of knowledge that will inform systems engineering on how to deal with unpredictable, uncertain, and evolving environments

WG GOAL(S)

- Agile systems-engineering and agile-systems engineering fundamentals.
- Agile acquisition processes.
- Supplier Quick Reaction Capability (QRC).
- Design that can respond effectively to the pace of technology and changing user expectations.
- International engagement.

WG SCOPE

Fundamentally necessary and sufficient INCOSE-relevant architectural concepts and concept-employment principles that enable any system or process to be agile.



Agile Systems & SE WG IW19 Workshop

Mon 28: 13:00-18:00

IW19 Agile Systems & SE WG Workshop will review projects in process, collaborations in process, consider new projects, and discuss whatever you like. See WG Connect Site IW19 folder in shared documents for agenda and GlobalMeet link. Monday 0900-1700, Pacific Time.





Architecture

Architecture



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WG PURPOSE/MISSION

The purpose of the AWG is to expand the practice of architecture and advance the body of knowledge. Architecture is an integral part of the concepts and practice considered by Systems Engineering (SE) and other disciplines/specialities, and it must evolve with ongoing advancements whatever their origin. Therefore a standing working group is needed to facilitate and focus ongoing advances in all levels and types of Architecture and to support collaboration across INCOSE, across disciplines/specialities and with other international bodies that have a common interest.

WG GOAL(S)

The primary stakeholders of the AWG are practitioners, researchers, domain experts and tool developers in all levels and types of Architecture. The AWG seeks to accomplish standing goals and goals are established each year at the INCOSE IW.

Within the context of Systems Engineering, the AWG pursues the following standing goals:

- Advance and evolve the body of knowledge on architecture
- Promote the use and practice of architecture
- Share best practices for the use of architecture
- Expand the effort in architecture related standards and specifications.

These goals are conducted in association with other bodies where appropriate. For example, over several years the ISO working groups JTC1/SC7/WG42 and TC184/SC5/WG1 have been 'customers' for AWG input and collaborations with the IEEE, OMG and FEAPO have been established.

WG SCOPE

The AWG will address Architecture in relevant areas (such as Traditional Systems, Enterprises and Software) as it relates to Systems Engineering applied to all levels and types of systems.



Architecture Workng Group worksession

Mon 28:08:00-17:00

This meeting will update members on AWG activities, conduct input session for works in progress, and plan future efforts. (Detailed agenda to follow in late December) Topics include Smart Manufacturing Architecture work session, describing architectures using algebraic specifications, enhancement of the Workbench presented last year, architecture styles input summary, update on architecture related international standards.





Automotive







MEMBERS ~100

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http://www.incose.org/docs/defa ult-source/wgcharters/automotiv e.pdf?sfvrsn=8



WG PURPOSE/MISSION

To promote the application and advance the practice of Systems Engineering in the automotive industry, encompassing OEMs, suppliers and service providers in the private, commercial and industrial vehicle sectors. Emphasis will be put on the current needs and future challenges of the industry, covering issues related to product development (complexity, safety and security, diversity, reuse) as well as to business and organizational aspects (new business models, new services and smart or multi?modal transportation systems).

WG GOAL(S)

Missions

To broaden and improve the application of Systems Engineering to the vehicle development process by tailoring standard SE processes and known best practices to the needs and specificities of the industry. To build a common, shared Systems Engineering expertise and body of knowledge for their application by actors across the automotive industry.

Objectives

To provide value?added services to our members through the production of quality deliverables, the organization of quality events and efficient administration of the group.

To grow the number of members of the group up to a level of self?sustainment an increase the diversity of the leadership team by: o Performing outreach actions

o Helping members learn from each other and from the experience of INCOSE experts

o Making sure that the needs of the members are covered by activity plans and are taken into account by INCOSE.

To support INCOSE's strategy to establish collaborations and partnerships with professional associations by initiating connections between the group and the different associations of the automotive industry.

WG SCOPE

From a global perspective, the Automotive Working Group will address the challenges faced by the actors of the industry when trying to implement SE or improve their application of SE. Previous work conducted by the Automotive Interest Group identified a series of topics covering a large spectrum of automotive concerns. These topics were grouped into generic SE themes (see below): organizational, SE processes, MBSE, architecture frameworks, safety and security, links with specialty domains and systems of



systems. The products of the working group (deliverables, events, etc.) will address the needs of the whole automotive industry supply chain, comprising the private, commercial and industrial vehicles sectors. They are intended to be valuable, useful products for both beginners and established SE practitioners.

AWG Scope (initial survey):

Acquisition: Contract-based processes (enabled by Requirements) Cooperation with suppliers in a MBSE scheme Lessons learned in implementing SE Lean Systems Engineering & Agility **MBSE & ARCHITECTURE FRAMEWORKS** State of the art in system modeling Mapping of tools used in the industry Link with Simulation Link with Safety Modeling for communication purposes **Common Automotive Architecture Framework Ontologies & Formal methods** Standards : lobbying @ OMG SYSTEMS ENGINEERING PROCESSES Requirements Engineering "top to bottom" Architecture-Driven design Reuse / Integration of COTS in a SE approach / Towards an "Automotive Systems List" **Product Line Management Eco-Design OUTREACH, TRAINING & OTHER SPECIFICITIES** Connection between INCOSE and other Automotive Associations

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Link between Systems and SW Engineering Electric/Electronic Architecture Management from a SE perspective *Ad-hoc* Systems Engineering Training Supports **SAFETY AND SECURITY** Impacts of ISO 26262 on Systems Engineering and vice-versa Systems and Safety/Security Engineering (unified) processes **SYSTEMS OF SYSTEMS** The automobile product in new mobility concepts and smart transportation systems

Engineering Systems and Services





Automotive WG

Sat 26 : 11:00-12:00 Welcome & Kick-off, start listing miscelaneous topics complementary to decided IW19 sessions

Automotive WG

Sat 26 : 16:00-17:00 AWG management & 2019 plans

Automotive WG

Sun 27 : 10:00-12:00 AWG working meeting, content confirmed/refined during kick-off: SE@SAE / OMG Safety & Reliability Profile

Automotive WG

Sun 27 : 16:00-17:00

Automotive SE Vision sub-group: Status and start executive summary work. Check final meeting attribute: access maybe limited to sub-group members.

Automotive WG: Cross WG about ITS architecture frameworks

Mon 28: 13:00-15:00

ITS standards (Architecture Frameworks) like CVRIA: Adoption by industry domains (awareness, position -pros&cons-, ease, ...). Working meeting with Transportation WG, Infrastructure WG and System of Systems WG

Automotive WG: System and Software

Tue 29:08:00-10:00

Echange between Automotive WG & Softwtare and Systems Interface WG (SaSIWG), general, and in particular : Autosar, MBSE-MBSW, CI

Automotive WG

Tue 29:13:00-14:00 AWG : Miscelaneous topics and Wrap-up







Competency

Competency





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CO-CHAIR Mimi Heisey (mimi.heisey@lmco.com)

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WG PURPOSE/MISSION

The Competency Working Group was established to improve the practice of Systems Engineering through the development and adoption of competency definitions and associated assessments that address competency management resources that practitioners need.

WG GOAL(S)

- Develop a globally accepted role based competency framework that is tailorable to the needs of our customer organizations:
- Ensure that the competency framework is consistent with the INCOSE Certification Process and the SE Handbook as well as industry and government standards.
- Address SE Competencies as it relates to Soft Skills (Professional Competencies).
- Maintain and update the Competency Framework as additional competency areas are evaluated for inclusion in the framework.
- Develop an Assessment Guide that provides the competency framework user with a way to evaluate knowledge, skills and abilities of candidate SEs to perform a specific role.
- Collaborate with the Professional Development Initiative to ensure products support training needs analysis.
- Discuss, collaborate, and share in person and online with Working Group members that represent a wide diversity of interests and needs.
- Create products, present panels and or papers, develop and review international standards.
- Share information across Working Groups.
- Evaluate current products against new advancements in SE scope and methodologies such as Model Based SE to ensure that they maintain relevancy.

WG SCOPE

Our scope is focused on the development and continual improvement of the SE Role Based Competency Framework and



Assessment Guide through collaboration with users, academia, industry and Working Groups as it relates to changes in SE processes and methods employed throughout a product or system lifecycle.

- Maintain a broad membership to enhance knowledge base.
- Evaluate competency alignment with other organizations/functions such as Program Management.
- Ensure consistency of product with INCOSE SE Handbook and Certification.
- Produce papers for publication.
- Provide training related to framework content and assessment capabilities.
- Collaborate with the INCOSE Professional Development Initiative with training needs assessments.



Competency WG Strategy Session

Sun 27 : 13:00-15:00

Meeting to discuss next steps for the new Competency Framework and to lay out a strategy for work to be done at IW2019 and IS2019. The next big step is developing the Assessment Guide.

Competency WG Sessions

Mon 28 : 09:00-10:00

Competency working sessions to start development of the Assessment Guide and to discuss next steps for the Competency Framework, including secession planning.

Competency WG Sessions

Mon 28: 10:30-12:00

Competency working sessions to start development of the Assessment Guide and to discuss next steps for the Competency Framework, including secession planning.

Competency WG Sessions

Mon 28 : 13:00-15:00

Competency working sessions to start development of the Assessment Guide and to discuss next steps for the Competency Framework, including secession planning.

Competency WG Sessions

Mon 28 : 15:30-17:00

Competency working sessions to start development of the Assessment Guide and to discuss next steps for the Competency Framework, including secession planning.

Competency WG Sessions

Tue 29:09:00-10:00

Competency working sessions to start development of the Assessment Guide and to discuss next steps for the Competency Framework, including secession planning.





Competency WG Sessions

Tue 29:10:30-12:00

Competency working sessions to start development of the Assessment Guide and to discuss next steps for the Competency Framework, including secession planning.







Complex Systems

Complex Systems

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WG PURPOSE/MISSION

The purpose of the Complex Systems Working Group is to enhance the ability of the systems engineering community to deal with phenomenology associated with complex and complex adaptive systems. The Complex Systems Working Group works at the intersection of complex systems sciences and systems engineering, focusing on systems beyond those for which traditional systems engineering approaches and methods were developed.

WG GOAL(S)

- Communicate complexity characteristics to systems engineering practitioners
- Provide knowledge and expertise on complex systems in support of other INCOSE working groups working in their systems engineering areas
- Facilitate the identification of tools and techniques to apply in the engineering of complex systems
- Provide a map of the current, diverse literature on complex systems to those interested in gaining an understanding of complexity.

WG SCOPE

The Complex Systems Working Group focuses on the challenges and opportunities presented by systems with large numbers of components, with even greater numbers of interactions distributed in scope across multiple scales and/or across large areas. Systems of interest are characterized by rich interdependence among diverse components, non-linearity, open systems boundaries, networks of causality and influence (vice linear causal chains), emergence, varied and changing system goals, self-organization, and multi-level adaptation. These traits limit the utility of traditional systems engineering paradigms, which are generally centralized, goal oriented, requirements driven, and reductionist in approach. These traits, however, are increasingly the norm and not the exception. The Complex Systems Working Group collaborates with the Systems Sciences Working Group to define the scientific basis of these characteristics.

Further, complexity is a characteristic of more than just a technical system being developed. The socio-technical ecosystem in which a system under development will be employed exhibits these attributes, as does the environment that gave rise to the challenge or opportunity to which the system was developed in response. Further, the design and development of technical systems is a complex endeavor itself. It is critical for systems engineers to understand the nature of the systems with which they are working,



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and of which they are a part, to be effective.



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Critical Infrastructure Protection and Recovery

Critical Infrastructure Protection and Recovery CHAIR

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WG PURPOSE/MISSION

The purpose for the Critical Infrastructure Protection and Recovery (CIPR) Working Group (WG) is to provide a forum for the application, development and dissemination of systems engineering principles, practices and solutions relating to critical infrastructure protection and recovery against manmade and natural events causing physical infrastructure system disruption for periods of a month or more.

Critical infrastructures provide essential services underpinning modern societies. These infrastructures are networks forming a tightly coupled complex system cutting across multiple domains. They affect one another even if not physically connected. They are vulnerable to manmade and natural events that can cause disruption for extended periods, resulting in societal disruptions and loss of life.

The inability of critical infrastructures to withstand and recover from catastrophic events is a well-documented global issue. This is a complex systems problem needing immediate coordinated attention across traditional domain and governmental boundaries. For example, the US President issued Presidential Policy Directive PPD-21 that addresses "a national unity of effort to strengthen and maintain secure, functioning, and resilient critical infrastructure." This includes an imperative to "implement an integration and analysis function to inform planning and operations decisions regarding critical infrastructure." This working group will seek to support this and other policies with international reach.

INCOSE, as the premier professional society for systems engineering, can provide significant contributions toward critical infrastructure protection and recovery.

WG GOAL(S)

This WG will provide and support opportunities to exchange knowledge and systems engineering information and solutions within the scope of the CIPR WG, both within INCOSE and with external organizations sharing similar interests and goals. The opportunities include systems engineering products (e.g. architectures, requirements, IV&V, etc.). This information will be disseminated through publications (papers, articles, briefings) and supporting meetings, conferences, panels, and other means.



Specific areas of knowledge include the following.

a) The events capable of causing infrastructure disruption for periods of a month or more, to include all aspects of their characteristics and impacts.

- b) The socio-technical factors related to CIPR.
- c) The overarching structure and inter-connectedness among the critical infrastructure domains.
- d) The interaction among infrastructure systems under various degraded states of operation.
- e) Possible conceptual and design solutions, and related information.
- f) Strategies for verification and validation of solutions.

The CIPR WG will provide a collection of systems engineering and related products that provide understanding and solutions for domain stakeholders impacted by the events. This can include products developed by several working groups and initiatives, such as Architecture, Complex Systems, Model-Based Systems Engineering (MBSE), Decision Analysis, Enterprise Systems, Natural Systems, Resilient Systems, Risk Management, Cost Engineering, Human System Interaction, In-Service Systems, Reliability Engineering, Requirements, System of Systems, System Safety Integration, Automotive, Healthcare, Infrastructure, Power & Energy Systems, Transportation Systems, and Anti-terrorism. Other working groups also have knowledge to contribute as well. The CIPR WG will endeavor to integrate and coordinate among standards, regulations and best practices of the impacted industries. It will also provide the organizing and development functions to establish new concepts and standards addressing CIPR. Stakeholders with interest in CIPR are international and include all levels of government, defense and security agencies, critical infrastructure domain businesses and agencies, and society in general (e.g. regions, communities and citizens).

WG SCOPE

Certain manmade and natural events have a known potential to affect societies at a national, continental or even global scale. Such events can cause extreme harm well beyond those experienced from regional catastrophic events, especially when the effects will take longer than a month to recover. Three examples of events with the potential to cause critical infrastructure collapse include Solar Storms caused by Coronal Mass Ejections (CME), Electromagnetic Pulse (EMP) and Cyber Events (intentional and otherwise). The CIPR WG will pursue its goals by addressing these three classes of events, and other classes of events with similar potential, when identified.

The CIPR WG will promote and apply systems engineering principles with emphasis on policy, analysis and concepts useful to understand, protect and recover existing operational infrastructure, and to provide strategies, standards and concepts for more



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resilient approaches. It will promote and perform activities supporting the stated goals.

This scope is synergistic with other INCOSE WGs identified above (e.g. MBSE, System of Systems, Resilient Systems, Power & Energy, etc.). For example, the application of model-based approaches will be essential to analyze the problem and to communicate alternative conceptual solutions. Therefore, this WG will seek interest and participation from INCOSE members and the other INCOSE WGs. It will also reach out to engage international and governmental organizations, professional groups, critical infrastructure providers, and others stakeholders. MOUs, contracts and other kinds of agreements may be sought with external organizations as needed to further the effort. These agreements, if any, will be established according to INCOSE guidelines, processes and procedures.

The critical infrastructure domains addressed by the CIPR WG include the following. Other domains may be addressed as the need is identified.

1) Chemical and other industrial bases

2) Communications

- 3) Electrical & Energy production and distribution
- 4) Emergency Services
- 5) Financial Services
- 6) Food and Agriculture
- 7) Government Services & Facilities
- 8) Healthcare and Public Health
- 9) Information Technology
- 10) Nuclear Reactors, Materials, and Waste
- 11) Transportation
- 12) Water storage, treatment and distribution
- 13) Waste handling and disposal (water, refuse, hazardous)
- 14) Society at large







CIPR Working Group - 2018 Recap and Plans for 2019

Sun 27 : 13:00-15:00

CIPR working group discussion / recap of 2018 achievements and planning for 2019 goals and activities.

CIPR Working Group Modeling Activities - Microgrids; Resilient Hospitals Sun 27 : 15:00-17:00

Discussion of CIPR working group modeling activities that includes involvement and outreach to P&E and OOSEM working groups. Plans for path forward for the current two modeling efforts, and discussion of other modeling efforts to undertake in 2019.

CIPR Working Group - 2019 Publications Planning

Mon 28 : 10:00-12:00

CIPR Working Group discussion and planning for 2019 publications. These include: 1) CIPR Primer 2) Appendix to InfraGard's "Powering Through 2.0" 3) CIPR-themed volume of INCOSE INSIGHT

CIPR Working Group - Inter-working group collaboration

Mon 28 : 13:00-15:00

Open meeting to discuss inter-working group collaboration and project plans. Members / representatives from any of the working groups are invited.

CIPR Working Group - EnergyTech 2019 Planning

Mon 28: 15:00-17:00

Meeting between CIPR, OOSEM, and P&E working groups to discuss and plan EnergyTech 2019.

CIPR Working Group - Leadership Meeting

Tue 29 : 10:00-12:00 CIPR Leadership planning meeting.

CIPR Working Group open session

Tue 29 : 13:00-15:00





Empowering Women as Leaders in Systems Engineering

Empowering Women as Leaders in Systems Engineering **CHAIRS**

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WG PURPOSE/MISSION

EWLSE's vision is to live in a world where men and women are equally represented as leaders in systems engineering. Our mission is to create a systems engineering environment welcoming to all; promote the demonstrated value of women as systems engineers and leaders; engage women in engineering and systems engineering at all levels of education around the world; and enable increased participation and retention of women in systems engineering leadership. Our purpose is to increase participation of women in systems engineering leadership, broaden awareness of the current state of women in systems engineering and engineering leadership through research, remove obstacles for women seeking leadership roles in related engineering fields, enable success through collaboration with professional societies, industry, government, academia, and individual advocates, and to celebrate the benefits of diversity throughout our culture.

WG GOAL(S)

Our goals are to:

- 1. be the systems integrators of efforts to raise international awareness of the value of empowering women as leaders in engineering and systems engineering around the globe;
- 2. develop engaging content and delivery approaches for promoting successful strategies for women navigating the journey to systems engineering leadership across cultures, geographic locations, and domains; and
- 3. drive the evolution to an open welcoming professional environment that stimulates institutions to offer and interested, motivated, and qualified applicants to seek leadership opportunities in systems engineering.

WG SCOPE

Our scope is empowering leaders in systems engineering where all feel welcome and find systems engineering a place where they can belong, contribute, and change the world.



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Empowering Women Working Meeting - Open to All

Tue 29 : 08:00-10:00

All those who share a vision of balanced gender representation in engineering, please consider attending this working session that is open to all. The Empowering Women as Leaders in Systems Engineering (EWLSE) group will be working on a set of activities for the coming years. After an introduction and review of EWLSE activities in progress and the INCOSE IW agenda, members will work on the following activities: planning for a new book on systems engineering to be published by Springer Hill and written and edited by women as one of a series of engineering books authored by women, defining resources to support systems engineering mentoring and obtaining leadership goals for all, and planning for external and internal (within INCOSE) outreach in 2019 and 2020. We will spend the last 15 minutes on wrap-up and collecting everyone's input for an INCOSE Newsletter article on lessons learned. Our outreach meeting follows this meeting, after the morning break! And then we will gather at a few tables at the final IW day INCOSE lunch for socializing and networking.

Empowering Women Outreach Meeting - Open to All

Tue 29 : 10:30-12:00

All those who want to learn about how to teach engineering to females - and males too - by going through a series of example activities demonstrating recommended approaches, please come to this meeting and experience the recommendations for yourself. We need teams of men and women to participate in this fun event. Teams will share their insights at the conclusion of the session. Please consider attending our working meeting that precedes this outreach meeting, before the morning break, and joining us as we gather at a few tables at the final IW day INCOSE lunch for socializing and networking.





Enterprise Systems
Enterprise Systems





MEMBERS

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WG PURPOSE/MISSION

The purpose of the INCOSE Enterprise Systems Working Group (ESWG) is to advance and to promote the application of Systems Thinking, Systems Science and Systems Engineering to understanding and managing the enterprise as a system.

Enterprises are highly complex, sociotechnical systems of systems that depend on the intelligent interaction, creation, management and use of various forms of knowledge throughout their organizational policies, processes and structures. Failure to design, to operate and to remediate enterprises as systems, is the primary underlying cause of the gross inefficiencies, unintended consequences and systemic failures that routinely inflict substantial economic loss and societal harm.

Systems engineering (SE) is an interdisciplinary methodology for understanding, designing and enabling system solutions for complex problems, and as such it is uniquely suited to offer understanding and solutions in the domain of enterprises. However, as applied to sociotechnical systems such as enterprises, SE must include an understanding of basic social sciences, human factors and other "soft" disciplines that may be unfamiliar to systems engineers who are more accustomed to focusing on physical, electronic and technical systems.

WG GOAL(S)

The ESWG will work to build a generic understanding of the elements and sub-systems and their various roles comprising enterprises, and a set of systems engineering methodologies for applying this generic understanding to analyzing specific organizations and their problems. This will involve establishing cross disciplinary teams and consultations involving systems engineers, enterprise architects, people from the life and social sciences, and practitioners in areas such as management consulting, organizational knowledge management, business process reengineering, and change management, amongst others.

Over the short term, the ESWG will seek to assemble existing knowledge and theories relating to the enterprise as a system for inclusion in the SEBOK that is accessible to systems engineers. Over the intermediate term, the WG will collect and assess



methodologies and templates to guide systems engineering approaches for intangible and tacit aspects of the enterprise as a system.

Over the long term, the ESWG will compile a comprehensive Enterprise System Management addition to the INCOSE Handbook and training and certification packages for Enterprise Systems Management.

WG SCOPE

It is the intent of the ESWG to focus narrowly on the enterprise embodiment of SE and to work closely with other WGs that can and will inform this area – System Sciences WG, Complex Systems WG, System of Systems WG, Human Systems WG, Enterprise Architecture WG, and others.

The initial scope of the ESWG will be to survey relevant scientific foundations, to assess and prioritize concepts, and to match them with systems engineering concepts and principles for incorporation in an Enterprise Systems Management Body of Knowledge. Among others, the following scientific domains appear to be directly relevant.

Major disciplines:

- Business Management
- · Organizational Behavior
- Psychology, Sociology, Gaming Theory
- · Other Social Sciences, more generally
- · Systems Engineering

Specialized fields

- · Systems Thinking and Systems Analysis
- · General systems theory
- Soft Systems Methodology
- · Second order cybernetics





- Social Systems Theory
- Complexity Science

This WG's scope is significant as it attempts to engage with issues from an emergent field of complex (adaptive) systems (social, technical and economic) focusing on the implementation of processes involved in this multi-disciplinary field. The skill set required is considerable due to an approach that includes social science, engineering, processes and management, practical and theoretical comprehension for an applied outcome. These are not commonly combined skills sets and no real formal training exists, yet the need for such combinations is known.



Enterprise Systems Working Group

Tue 29: 13:00-15:00

Proposed agenda: • Review ESWG vision/mission/charter statement • Identify related WGs inside INCOSE and possible external collaborative partners • Commission mini-CFP for "paperless presentations" within an Enterprise-Systems domain/emphasis at IS2019 (due Feb. 15th!) • Identify & delegate next-stage tasks to build momentum for ESWG







Healthcare

Healthcare





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WG PURPOSE/MISSION

To improve Healthcare delivery, medical devices and services development, and Healthcare SE education by bringing together systems engineers and systems thinkers to identify, develop, and tailor best practices for the Healthcare industry. We will achieve that by

- Articulating the value and application of systems engineering to Healthcare through simple examples and easily deployable guidelines, and
- Providing a forum for developing and sharing best practices, meeting world class experts in Systems Engineering and Healthcare (and across other industries).

The creation of our group was driven by the fact that many if not most of the organizations in the biomedical and Healthcare industries do not necessary recognize or understand the value of systems engineering and could thus benefit from the application of INCOSE principles.

WG GOAL(S)

Our five-year strategic objectives are to:

- Increase the systems engineering and systems thinking capabilities of the Healthcare delivery, medical devices manufacturers, and HCIT suppliers and users to enable improved Healthcare outcomes and value
- Increase individual & corporate INCOSE membership from the Healthcare industry
- Engage leaders in the Healthcare industry seek to raise the use of systems engineering practices by engaging INCOSE support and services
- Publish impactful information on systems engineering in the Healthcare industry and serve as the clearinghouse of Healthcare needs and systems engineering best practices
- Accelerate the transformation of Healthcare systems engineering to a model based discipline

<u>5-year Vision</u>

Systems Engineering for Medical Device Technology: HWG is the recognized 'clearinghouse' best practices for systems



engineering for Healthcare device and services development

- Capturing and documenting systems engineering theory customized to the Healthcare industry, as well as critical best practices (as captured in a Healthcare domain extension to SEBoK, among other places)
- Capturing and documenting 'state of the art' Agile, Lean Startup, and Iterative Development practices in Healthcare
- Healthcare specific guidance to ISO/IEC 29110 Systems and Software Engineering Lifecycle Profiles for Very Small Entities (VSEs)

Systems Engineering for Healthcare Delivery: Build on the UK RAE/RCS systems thinking process and develop a strategy for broader deployment.

Systems Engineering Education for the Healthcare Industry: HWG is the recognized source for the definition of systems engineering competencies and methods in Healthcare and the source for a suite of Healthcare-related systems engineering education products for use by the community.

WG SCOPE

The scope of our working group covers

- Manufacturers of devices and providers of services (Clinical and Research use only devices, in-vitro and in-vivo products, pharmaceuticals, and biologics),
- All points-of-care through the entire Healthcare delivery life-cycle,
- Academic Medical Centers (AMCs),
- Regulatory agencies,
- Healthcare insurance providers, and
- Healthcare advocacy groups.

While these organizations may be served by other INCOSE working groups, it is believed that our working group will uniquely





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address the breadth of their needs.



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Lean Systems Engineering

Lean Systems Engineering



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Art Hyde (arthyde55@gmail.com)



INCOSE CONNECT ADDRESS



350 Provencal road

INCOSE WEB PAGE



https://www.incose.org/incose-m ember-resources/working-group s/transformational/lean-systemsengineering



WG PURPOSE/MISSION

The Lean Systems Engineering Working Group provides a forum for discussion and information distribution of Lean Systems Engineering best practices, methods, tools and processes to promote the efficient concepting, designing, launching and Life Cycle Management of new products and services that are market leading and compelling to the Enterprise stakeholders and external experiencers.

WG GOAL(S)

It is our goal to strengthen the practice of Systems Engineering (SE) by exploring and capturing the synergy between traditional SE and Lean New Product Creation. To do this, we will advance the Body of Knowledge of Lean Thinking into SE practices to integrate people, processes, and tools for the most effective delivery of value to program stakeholders.

Our goal is 2019 is to progress the development of the Lean Systems Design framework to the point it can be implemented by Enterprises to efficiently develop human centered market leading products and services.

WG SCOPE

Key workstreams to deploy these innovations include proposing Lean SE amendments to the INCOSE SE Handbook, developing and disseminate training materials and publications on Lean SE within the INCOSE community, industry, and academia.

Present major effort is the development of a new Lean Product Creation framework built on the lean enablers previously published by this work group and added to by integrating Design Science and Agile Development methodologies.

• The LSE WG collaborates with the Agile Development Working Group at present, but we recognize collaboration with more WGs is needed to achieve our goal.



Lean Systems Engineering Work Group Discussion: Lean Systems Design & Sandia National Lab Le

Mon 28: 13:00-15:00

Gain input to presentations and initiative workplan.







Measurement







CHAIR Paul Frenz (paul.frenz@gd-ms.com)

MEMBERS 20

CO-CHAIR Beth O'Donnell (elizabeth.l.odonnell@gmail.com)

INCOSE CONNECT ADDRESS



https://connect.incose.org/Worki ngGroups/Measurement/Pages/ Home.aspx

INCOSE WEB PAGE



https://www.incose.org/incose-m ember-resources/workinggroups/process/measurement



WG PURPOSE/MISSION

Promote shared understanding, education and advancement of measures, measurement practices, measurement tools/support, and the overall measurement process as applied to systems engineering

WG GOAL(S)

The measurement working group supports a wide variety of measurement initiatives including supporting INCOSE measurement products (Measurement Primer, Metrics Guidebook, Technical Measurement Guide, SE Handbook) as well as joint measurement products (SE Leading Indicators Guide, PSM Guide).

WG SCOPE

The Measurement Working Group supports a wide variety of measurement initiatives including supporting INCOSE measurement products (Measurement Primer, Metrics Guidebook, Technical Measurement Guide, SE Handbook) as well as joint measurement products (SE Leading Indicators Guide, PSM Guide).



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Model-Based Conceptual Design

Model-Based Conceptual Design





MEMBERS 50

CO-CHAIRS

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INCOSE CONNECT ADDRESS



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https://www.incose.org/incose-m ember-resources/working-group s/transformational/model-basedconceptual-design



WG PURPOSE/MISSION

Most of the cost for a design is locked in during the concept phase of development. The MBCD WG will deliver guidelines and best practices to leverage MBSE for optimal concept analysis and selection.

WG GOAL(S)

- Revitalize WG
- Development of a deliverable/product demonstrating quantitative value added to system conceptual design.

WG SCOPE

- Concept Modeling
- Concept Refinement
- Concept Selection





MBCD WG Kickoff

Sat 26 : 13:00-15:00

As the MBCD WG is being rebooted, this working session will be to share the deliverables for MBCD over the next few years and the pilot project used for MBCD development. Following the overview, the WG will start to breakdown the pilot project and work through defining the various aspects of MBCD.

MBCD WG Kickoff

Sun 27 : 13:00-15:00

Continue work to breakdown MBCD effort on pilot project and identify future activities for the next year.

Model Based Enterprise Capabilities Matrix

Mon 28 : 13:00-15:00

Modell-Based Enterprise Capabilities Matrix Challenge Team will review the draft completely populated Matrix and associated User's Guide. This workshop portion will present the products, discuss INCOSE adoption, and give participants the opportunity to discuss application and use







Natural Systems







MEMBERS 23

CO-CHAIRS

Curt (curtmcn@gmail.com) Randy Anway (randy@new-tapestry.com)

INCOSE CONNECT ADDRESS



https://www.incose.org/incose-m ember-resources/workinggroups/analytic/natural-systems

INCOSE WEB PAGE



https://sites.google.com/site/inc osenswg/



WG PURPOSE/MISSION

Evaluate changes to Systems Eng. processes & communications to take advantage of Natural Systems, including broader relationships between SE---Science--Tech.

WG GOAL(S)

- 1. Assess State-of-the-Discipline regularly.
- 2. Cultivate a NS Community of Practice.
- 3. Share Best Practices & Success Stories.
- 4. Investigate enhancements to SE practices.
- 5. Grow in numbers and scope.

WG SCOPE

The Natural Systems Working Group includes members from industry, academia, and government. Our work focuses on tools for bio-inspired design and their application to the SE process.



Sat 26 : 10:30-12:00 What do we mean by natural systems? How can knowledge of this help an SE?

NSWG Communities of Practice Working Session

Sat 26 : 13:00-15:00 Overview of natural systems and design communities of practice, creation/ curation of bio-inspired community map

Complexity and Natural Systems

Sat 26 : 15:30-17:00 Joint meeting with Complex Systems Working Group

NASA Challenge for natural systems

Sun 27 : 10:30-12:00 Review NASA challenge for nature inspired solutions, and proposed solutions.

NSWG/Systemology Joint Session: NS Tools in the SE Process

Sun 27 : 13:00-15:00 The NASA Vine Systemology Cluster has produced a list of 25 tools for bio-inspired design. Join us to discuss how these could be mapped to the SE process.

NSWG Future Planning

Tue 29 : 10:00-12:00 Discuss ongoing and future working group projects

Science Basis for Systems Mimicry

Tue 29 : 13:00-15:00

Discussion with Len Troncale on Isomorphic Patterns for SE Systems Mimicry/Systems Pathology from Studies of Natural Systems



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Oil & Gas







MEMBERS 40

CO-CHAIRS

Chris Bellows (christopher.bellows@bp.com) Alisha Pate (alishapate@chevron.com)

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https://connect.incose.org/Worki ngGroups/Oil-and-Gas/SitePages/Home.aspx

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https://www.incose.org/incose-m ember-resources/workinggroups/Application/oil-and-gas

Page 2/4



WG PURPOSE/MISSION

To advance Systems Engineering into the Oil and Gas sector in order to enhance the sector's ability to adapt to rapidly changing environments.

WG GOAL(S)

Create guidelines and best practices for applying Systems Engineering in the Oil and Gas sector.

WG SCOPE

The entire Oil and Gas supply chain, from owner operators through to EPCs, service providers, equipment suppliers and standards bodies.





INCOSE Oil & Gas Working Group

Tue 29:08:00-12:00

To introduce the Oil and Gas Working Group, have subgroup sessions, and discuss plans for 2019. 8-8:30 O&G WG Overview 8:30-9:30 Subgroup 3 - Standards 9:30-10 Requirements Quality 10-10:30 ReqIF Interchange Open Discussion 10:30-11:30 2019 Planning - Value of SE - O&G Competencies - 2019 Candidate Projects 11:30-12 Summary and Closing





PM-SE Integration

PM-SE Integration





MEMBERS 90

CO-CHAIRS

Jean-Claude Roussel (jc.roussel6231@gmail.com) Tina Srivastava (tinaps@alum.mit.edu) Gary Smith (gary.r.smith@airbus.com)

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https://connect.incose.org/Worki ngGroups/pm-se%20integration /SitePages/Home.aspx

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http://www.incose.org/Chapters Groups/WorkingGroups/process /pm-se-integration



WG PURPOSE/MISSION

Identify and promote opportunities associated with the effective integration of the Systems Engineering and Project/Program Management disciplines.

- Explore the linkages necessary to create effective integration and collaboration between systems engineers and program managers.
- Be the intersection point where systems engineers, program/project managers collaborate and integrate their efforts.

WG GOAL(S)

- Facilitate collaboration between systems engineering and program management communities.
- Demonstrate the value of integrating systems engineering and program management to develop better solutions that drive strategic business results and outcomes.
- Produce useful deliverables that support effective integration and practice of collaborative systems engineering and program management.
- Provide thought leadership on open integration challenges between program management and systems engineering.
- Bring external thinking into the systems engineering and program management communities to facilitate thinking outside of the box.
- Represent a think tank for free thinking and engagement around critical issues associated with program management and systems engineering.
- Draft guidelines and/or influence existing ones (e.g. PMBok,SEBoK, etc.) based on experience and exchanges on PM/SE integration and collaboration.

WG SCOPE

Our scope encompasses activities relating to defining, capturing, evolving, and communicating PM/SE integration best practices. This may include training material, guideline material, recommendations for industry best practices and standards, and shared output with industry working groups from other organizations.

Additionally, also in scope is joining efforts with other INCOSE working groups such as Requirements, Risks, Leans SE, Agile SE, etc... where appropriate, to ensure subject matter expertise is seamlessly integrated into various aspects of the systems engineering process. Exploration of common problems and/or practices also falls within scope.



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PM-SE Integration WG meeting

Sun 27 : 10:30-12:00







Product Line Engineering
Product Line Engineering





MEMBERS 178

CO-CHAIRS

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https://www.incose.org/incose-m ember-resources/workinggroups/analytic/product-lines



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WG PURPOSE/MISSION

- Promote PLE (Product Line Engineering) and related SE (Systems Engineering) best practices
- Coordinate activities around PLE at INCOSE level and share results

WG GOAL(S)

- Help our members acquire Know?How:
- Compare to the State?of?Art
- Share concerns, experiences, good practices, and traps to avoid
- Provide guidelines to set up and evolve PLE in organizations

WG SCOPE

- All types of Systems, Markets, & Organizations
- All the SE Processes (needs, requirements, architecture, integration and tests, ...)
- All maturity levels of PLE, from opportunistic to completely Integrated and anticipated strategies





Produce Line Engineering - working meeting

Sun 27 : 10:00-11:00

Continue the development of the PLE supporting artifacts to enable broad industry understanding and adoption of Product Line Engineering principals to gain dramatic cost avoidance and efficiencies in product and systems development.

Product Line Engineering Working Group – Work Products

Sun 27 : 15:00-17:00

Working session to assess the progress and support the development of PLE working products.





Requirements

Requirements





CHAIR Lou Wheatcraft (louw@reqexperts.com)



CO-CHAIRS

Mike Ryan (M.Ryan@adfa.edu.au) Rick Zinni (rzinni@harris.com) Kathy Baksa (kathryn.baksa@pw.utc.com) Jerremy Dick (gbjedi@gmail.com) Jason Baker (Jason.Baker@deepwater.com)

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https://connect.incose.org/Worki ngGroups/Requirements/Pages/ Home.aspx





https://www.incose.org/incose-m ember-resources/workinggroups/process/requirements



WG PURPOSE/MISSION

The purpose of the Requirements Working Group (RWG) is to advance the practices, education and theory of requirements development and management and the relationship of requirements to other systems engineering functions.

WG GOAL(S)

Expand and promote the body of knowledge of requirements and its benefits within the systems engineering community.

WG SCOPE

Activities relating to best practices for requirements development and management throughout the product lifecycle including:

Elicitation Analysis Elaboration Management Expression Verification

Allocation nt Change Ma Validation

Allocation Traceability Change Management Validation



Requirements WG @ IW2019

Sat 26 : 10:30-12:00 10:30-11:00 Closed session to discuss IW Agenda 11:00-12:00 RWG kick-off, Welcome, 2018 in review

Requirements WG @ IW2019

Sat 26 : 13:00-15:00 Overview to the RWG "Guide to Writing Requirements" and whitepaper "Integrated Data as a Foundation of SE."

Requirements WG @ IW2019

Sat 26:15:30-17:00 Insights into the Requirement Development & Management in an MBSE world - presentation & discussion (MBSE Related).

Requirements WG @ IW2019

Sun 27 : 08:00-10:00 08:00-09:00 "Augmenting requirements with models" – presentation & discussion (MBSE Related) 09:00-10:00 "Managing the risks of requirement uncertainty" – presentation & discussion

Requirements WG @ IW2019

Sun 27 : 10:30-12:00 Work on developing the new "Guide to Developing & Managing Requirements" - (MBSE Related)

Requirements WG @ IW2019

Sun 27: 13:00-15:00 Joint meeting with the TIMLM WG on the SE Tools Database (SETDB) Tool Vendor Questionnaire- (MBSE Related)

Requirements WG @ IW2019

Sun 27:15:30-17:00 Joint meeting with the TIMLM WG on the SE Tools Database (SETDB) Tool Vendor Questionnaire- (MBSE Related)



Requirements WG @ IW2019

Mon 28 : 08:00-10:00

08:00-09:00 "Utilizing MBSE for Requirements Engineering and V&V Activities" – presentation & discussion (MBSE Related) 09:00-10:00 "Actionable Requirements Definition Using an EARS Opinionated Object Process Model" – presentation & discussion (MBSE Related)

Requirements WG @ IW2019

Mon 28 : 10:30-12:00

10:30-11:30 "Requirements Efficiency: External Questionnaire Results" – presentation & discussion (MBSE Related) 11:30-12:00 Ask the experts/Other topics as they evolve

Requirements WG @ IW2019

Mon 28: 13:00-15:00 13:00-15:00 Joint meeting with the IV&V WG on developing the Guide to Validation & Verification

Requirements WG @ IW2019

Mon 28 : 15:30-17:00 "Sharing requirements – a case study using REQIF" - presentation & discussion (MBSE Related)

Requirements WG @ IW2019

Tue 29 : 08:00-10:00 Discuss updates to the "Guide for Writing Requirements"

Requirements WG @ IW2019

Tue 29 : 10:30-12:00

10:30-11:30 "Model-Based Requirements Engineering" – presentation & discussion (MBSE Related) 11:30-12:00 Closed session update WGIS, 2019 planning

Requirements WG @ IW2019

Tue 29:13:00-14:30

13:00-14:00 "Improving Requirement Quality using MBSE" - presentation & discussion (MBSE Related) 14:00-14:30 Ask the experts/Other

topics as they evolve







Resilient Systems

Resilient Systems





CHAIR John Brtis (jbrtis@johnsbrtis.com)



CO-CHAIR Scott Jackson (jackson@burnhamsystems.net)

INCOSE CONNECT ADDRESS



Later





Later



WG PURPOSE/MISSION

The mission of the Resilient Systems Working Group is to establish an understanding and approach to systems resilience -- a new subdomain of systems engineering.

Resilience is the ability to provide required capability in the face of adversity.

The means of achieving resilience include **avoiding**, **withstanding**, **recovering** from, and **evolving** and **adapting** to adversity.

WG GOAL(S)

In 2019

- 1. Paper on domain considerations for resilience.
- 2. Book chapter on domain considerations for resilience.
- 3. Position on capturing resilience requirements.
- 4. Clarified relationship of resilience, security, and safety.
- 5. Consensus on core resilience vocabulary.
- 6. Major update to the SEBOK section on resilience.
- 7. Major update to the SEH Resilience section.

WG SCOPE

Later.





Resilient Systems Working Group

Sat 26 : 13:00-15:00

This will be a face-to-face tag-up for the working group members. We plan to have a few -- very short -- TedTalk type presentations. We will discuss the WG's current major projects of updating the SEBOK section on resilience, and the book chapter on which the WG is collaborating. We will be reaching out to other WGs in our community of interest to attend and make short presentations.

RSWG Collaboration Meeting

Tue 29 : 13:00-15:00

Discuss Collaboration with other Working Groups





SE Quality Management

SE Quality Management



Barclay Brown (barclay@barclaybrown.com)





MEMBERS 20

CO-CHAIRS

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INCOSE CONNECT ADDRESS



https://connect.incose.org/Worki ngGroups/SEQM/SitePages/Hom e.aspx





None





WG PURPOSE/MISSION

Quality Management is one of the six Organizational Project-Enabling Processes described in the INCOSE Handbook v4 (Section 7.5) and in ISO/IEC/IEEE 15288:2015.

The overall purpose of the Systems Engineering Quality Management Working Group is to **foster the definition**, **understanding and practice of quality management in the systems engineering profession**.

This purpose will be achieved by the establishment of quality management as a cornerstone of professional development that adds value to the systems engineering profession, and engineering in general, through the following initiatives:

- Developing and elaborating systems engineering as a leadership discipline with quality management as a foundational competency,
- Enabling systems engineers to develop and expand the skills to manage process quality and increase profitability,
- · Considering the organization as a system, fully integrating the process, the person and the job description, and
- Raising the level of professionalism, corporate and technical influence, job satisfaction and the career path trajectory.

WG GOAL(S)

The purpose of the working group will be realized through the accomplishment of the following goals. Where appropriate, these goals will be further elaborated and planned using Technical Program Plans.

- a) Initial publication of a key definitional article on systems engineering quality management (submitted to IS 2019)
- b) Training SEQM Working Group leaders in quality management (begun Q3 2018 and continuing)
- c) Delivery of regular webinars and tutorials on SEQM (starting Q1 2019 and ongoing)
- d) Development of SEQM leadership training for the INCOSE members. The Training WG will be informed of the training offered by SEQM so that is may be included on any INCOSE-wide training plans (begun Q1 2019 and continuing)
- e) Enable and encourage SEQM WG leadership to achieve certification as SE Quality Managers (SEQM) from the Quality Management Institute (at no cost) (begun Q3 2018 and continuing)

f) Launch of research projects to further develop SEQM and document quantitative results from the application of quality management in systems engineering (Q2 2019)



g) Build a continuing presence of SEQM thought at the INCOSE IW and IS, through submitted papers, panels and tracks (IS2019 and continuing)

h) Developing SE-QM leadership descriptions and overview material, targeted for inclusion in key INCOSE publications such the handbook and SEBok (Q3 2019)

i) Collaboration where appropriate with other INCOSE Working Groups including the Competency WG to include SEQM in their frameworks, the Process Improvement WG to include SEQM in processes and the Enterprise Systems WG on the paradigm of "organization as system" (Q3 2019)

WG SCOPE

Quality management, as addressed in this working group, is distinct from other aspects of quality such as quality assurance, quality control and acceptable quality levels. Quality management is also distinct from the SE disciplines of verification and validation of systems.

This working group aims to address quality management as a leadership and management discipline, as applied within systems engineering. This follows the approach to quality management described in the works of Deming, Crosby and Juran, but limits the application to the engineering and systems engineering disciplines.

The working group will also address the connections of quality management to other areas of systems engineering, notably systems thinking and organizational leadership.





SEQM (Systems Eng Quality Management) WG 1

Sat 26 : 13:30-15:30

Working session for SEQM members to review training tracks, develop working scenarios for projects and to discuss presentations for IS 2012. Introduce the topic/issue of Staff Turnover and how SE/QM can address it (Part 1 and 2)

Systems Engineering Quality Management

Sun 27:13:00-16:00







Space Systems





MEMBERS

Approximately 200 on SSWG email reflector list

CO-CHAIRS

David Kaslow (david.kaslow@gmail.com) Alejandro Levi (alejandro.g.levi@ieee.org)

INCOSE CONNECT ADDRESS



https://connect.incose.org/Worki ngGroups/SpaceSystems/Pages/ Home.aspx

INCOSE WEB PAGE



http://www.incose.org/Chapters Groups/WorkingGroups/govern ment/space-systems



WG PURPOSE/MISSION

To expand the body of knowledge of systems engineering as it is applied to space systems

WG GOAL(S)

To increase the quality and scope of the technical and professional information available to its members and to enhance the interchange of that information between its members

WG SCOPE

The application of systems engineering to space systems in government, industry, and academia



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Space Systems WG

Sun 27 : 10:00-11:00 To determine the road ahead







System Safety







MEMBERS

CO-CHAIRS

Duncan kemp (duncan.kemp735@mod.gov.uk) Meaghan O'Neil (Meaghan.Oneil@gmail.com)

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WG PURPOSE/MISSION

The purpose of the INCOSE System Safety Working Group (SSWG) is to accelerate the maturity of the practice of system safety engineering as part of the wider systems engineering practice.

WG GOAL(S)

The goals of the SSWG are to:

- Understand the state of the art and state of the practice in system safety management in different sectors and geographies
- Understand the implications of the changing nature of systems from a safety perspective
- Understand the overall relationship and coupling between different players in the supply chain, including regulators, asset owner operators and product/service suppliers
- Identify ways to make the practice more effective, efficient and timely
- Build a network of system safety experts, enabling them to share experience
- Collaborate with related external organizations

WG SCOPE

This WG will address activities relating to best practices for systems safety engineering throughout the systems lifecycle. Including:

- A whole range of system types including products, services, capabilities and systems of systems
- Practice across multiple sectors

• Perspectives from a range of different players in the supply chain







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Systems and Software Interface

Systems and Software Interface





CHAIRS

Sarah Sheard (sarah.sheard@gmail.com) Mike Pafford Edmund Kienast



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https://connect.incose.org/Worki ngGroups/systems%20and%20s oftware/SitePages/Home.aspx

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https://www.incose.org/docs/def ault-source /wgcharters/sysswif_ wgcharter.pdf?sfvrsn=4



WG PURPOSE/MISSION

Purpose: INCOSE SaSIWG: (Systems and Software Interface Working Group) To understand, clarify, and work to resolve issues with the systems-software interface that challenge our ability to engineer today's and tomorrow's systems. These interfaces include physical, logical, data, and human aspects.

WG GOAL(S)

Develop a set of principles and/or guidance for identifying and reducing system-software interface risk

WG SCOPE

Address, at a high level, the process and technical interfaces between systems and software





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Systems of Systems Engineering

Systems of Systems Engineering





MEMBERS 12 Core, 30 Regular

CO-CHAIRS

Judith Dahmann (jdahmann@mitre.org) Alan Harding (alan.d.harding@baesystems.com)

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https://connect.incose.org/Worki ngGroups/SystemofSystems/Pag es/Home.aspx

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https://www.incose.org/incose-m ember-resources/working-group s/analytic/system-of-systems

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WG PURPOSE/MISSION

The purpose of the working group is to advance and promote the application of Systems Engineering to Systems of Systems (SoS), often referred to as SoS Engineering (SoSE).

BKCASE describes SoS Engineering as "an opportunity for the systems engineering community to define the complex systems of the 21st Century. While systems engineering is a fairly established field, SoSE represents a challenge for the present systems engineers at the global level. In general, SoSE requires considerations beyond those usually associated with engineering to include socio-technical and sometimes socio-economic phenomena."

SoS and SoSE are topics that interest a significant number of INCOSE members globally, both individuals and organizations. Therefore we believe that a WG forum to share understanding of SoS and SoSE issues, good practice and background, and contribute to maturing BKCASE will provide a service to the wider INCOSE community.

WG GOAL(S)

The goal of the working group is to expand and promote the body of knowledge of SoS and SoSE its benefits within the Systems Engineering community.

WG SCOPE

This WG addresses the application of Systems Engineering to all types of Systems of Systems (SOS) in all domains. We see diversity



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as particularly important in this knowledge area, as do the WG members.

Activities will generally cover the following:

- Understand and share what we mean by SoS in our various contexts
- Develop guidance and advice
- Inform and up-skill practitioners
- Exert influence on BKCASE, Standards, SE Vision 2025 etc.
- Develop the practice of SE for SoS.
- Work in partnership with other groups addressing aspects of SoS (e.g. INCOSE WGs, IEEE, NDIA).
- Understanding and applying insights from relevant research





System of Systems Working Group

Sun 27 : 13:00-17:00

1300-1500 SOS Business Meeting to review SoSWG progress since IS18 1. Webinars (Hoehne) 2. Case Studies (Wilson, Cook (remote?)) 3. SoS value to INCOSE (Harding) 4. Update on Cooperation with Automotive (Hoehne) 5. Mission Engineering (Miller) 1500-1530 Break 1530-1700 SEBOK Update Discussion (Dahmann, lead)

System of Systems Working Group

Mon 28:09:00-17:00

SoSWG Working sessions 0900-1000 SoS Standards (Yokell, lead) 1000-1200 Reserve 1300-1500 SoS Competencies (Harding lead, Wilson support) 1530-1700 Assurance (Kemp/Wilson co-lead, with safety and security)

Automotive WG: Cross WG about ITS architecture frameworks

Mon 28: 13:00-15:00

ITS standards (Architecture Frameworks) like CVRIA: Adoption by industry domains (awareness, position -pros&cons-, ease, ...). Working meeting with Transportation WG, Infrastructure WG and System of Systems WG

System of Systems Working Group

Tue 29:08:00-12:00

0800-1000 Ontology (Nillson) 1030-1200 Closing Business Meeting and Planning (Dahmann/Harding)





Systems Science






CHAIR James Martin (martinqzx@gmail.com)

MEMBERS 250

CO-CHAIRS

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INCOSE CONNECT ADDRESS



https://connect.incose.org/Worki ngGroups/SystemsScience/Page s/Home.aspx

INCOSE WEB PAGE



https://sites.google.com/site/sys sciwg/



WG PURPOSE/MISSION

Promote the advancement and understanding of <u>Systems Science</u> and its application of <u>Systems Theories</u> to SE.

WG GOAL(S)

- 1. Encourage advancement of Systems Science principles and concepts as they apply to Systems Engineering.
- 2. Promote awareness of Systems Science as a foundation for Systems Engineering.
- 3. Highlight linkages between Systems Science theories and empirical practices of Systems Engineering.

WG SCOPE

- 1. Systems science
- 2. Systems philosophy
- 3. Systems thinking
- 4. Systems theories and research
- 5. Systems laws and principles





Systems Science WG

Sat 26 : 10:00-17:00

Systems Principles Action Group Report (Rousseau/Calvo) New Definitions of SE & System (Martin/McKinney) Systems Research & Development: a) SSM-TRIZ methodology (Phillips), 2 hrs b) Systems Principles for Designing Human Activity Systems (Calvo/Rousseau), 1-2 hrs

Systems Science WG

Sun 27:08:00-17:00

Sys Sci for Sys Engr (SS4SE), 7 hrs a) Systems science integration (G Smith) b) Systems science enterprise (J Martin) c) Systemology -Principles and Laws (Rousseau/Calvo/Billingham) d) Systemic transformations (Swami) e) SE foundations (Swami/Schindel) f) Isomorphies & grand sequence (Troncale/Smith) g) System life cycle processes (Smith/Lomax)

Systems Science WG

Mon 28 : 08:00-17:00 Systems Literacy (Tuddenham), 3 hrs System Patterns & Languages (Schindel?) Category Theory (Lloyd?)

Systems Science WG

Tue 29 : 08:00-15:00

Systems Research & Development, c) Human agency in social systems (Gabriel), 2 hrs d) Pathologies of SE Projects (Troncale), 3 hrs e) Systems Mimicry/Pathology from Natural Systems (Troncale/Anway) – Joint with NSWG, 2 hrs

Science Basis for Systems Mimicry

Tue 29: 13:00-15:00

Discussion with Len Troncale on Isomorphic Patterns for SE Systems Mimicry/Systems Pathology from Studies of Natural Systems







Systems Security Engineering

www.incose.org/iw2019

Systems Security Engineering

CHAIR Rick Dove (dove@parshift.com)





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https://connect.incose.org/Worki ngGroups/SystemsSecurityEngin eering/Pages/Home.aspx

INCOSE WEB PAGE



https://www.incose.org/incose-m ember-resources/working-group s/analytic/systems-securityengineering



WG PURPOSE/MISSION

Identify effective system security principles consistent with new reality, and integrate responsibility into the SE community.

WG GOAL(S)

- SE responsibility for system security.
- SE influence on security and standards.
- SE concepts for next gen security.
- International engagement.

WG SCOPE

System Engineering enablement of next generation system security strategies: adaptive, resilient, evolutionary.





Systems Security Engineering WG IW19 Workshop

Sat 26 : 10:30-17:00

IW19 Systems Security Engineering WG Workshop will review projects in process, collaborations in process, consider new projects, and discuss whatever you like. See WG Connect Site IW19 folder in shared documents for agenda and GlobalMeet link. Saturday 1030-1700, Pacific Time.







Tool Integration and Model Lifecycle Management

www.incose.org/iw2019

Tool Integration and Model Lifecycle Management CHAIR

John Nallon (jfnallon@outlook.com)



MEMBERS 125

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WG PURPOSE/MISSION

The Tool Integration and Model Lifecyle Managament Working Group provides a forum for discussion and information dissemination on best practices, methods and processes that promote the development, validation and deployment of standards to advance data exchange capability of digital data created during the product development lifecycle.

WG GOAL(S)

- To characterize systems engineering tool integration and interoperability requirements.
- To specify requirements and assess solutions for model life cycle management and data exchange.
- To provide forums for discussion and information dissemination regarding tool integration, process implementation and effectiveness of data exchange standards.
- To promote the development, validation and deployment of standards that advance the interoperability of systems engineering tool sets.
- To address model lifecycle management concerns and to establish scenarios and best practices that address the needs of the community.
- To determine efficient modeling structures to use including the repository, the models, and data within the models.

WG SCOPE

Our scope is focused on the integration and interoperability of tools, data exchange, and model lifecycle management of models as they relate to Systems Engineering processes and methods throughout a product or system lifecycle.

- The TIMLM WG collaborates with PDES Inc. to discuss, research, validate and promote the development of data exchange standards to incorporate digital artifacts and data exchange standards modernization. Standards include data exchange standards such as ISO10303-AP233, AP239, AP242, AP243, LOTAR, and various OMG and OSLC standards.
- The TIMLM WG also collaborating with Product Performance International and all INCOSE Working Groups to develop, support and maintain a Systems Engineering Tools Database for the systems engineering community. The SETDB will be available from the INCOSE Website to all members.



TIMLM WG - SETDB Opening Session

Sat 26: 10:30-11:00 Opening Session for the Systems Engineering Tools Database Project. Status for 2018, Agenda for IW2019 and plans for 2019.

SETDB System Model (SysML) Review

Sat 26 : 11:00-12:00 Review of the SETDB SysML System Model

SETDB Operational Concept Review

Sat 26 : 13:00-14:00 Review of the SETDB Operational Concept and documentation.

SETDB System Requirements Review

Sat 26 : 14:00-17:00 SETDB Requirements, capture, analysis and validation

MoSSeC (AP243) Standard and Model Interoperability Review

Sun 27:09:00-10:30

The globalization of the aerospace and defence industries is driving large volumes of work to model and simulate product performance and behavior using geographically distributed teams across their supply chain. The modelling and simulation technical data is used to justify change decisions and to validate the product throughout development, certification and in-service. There are mature standards for exchange of the modelling and simulation technical data, but these either do not include traceability to the systems engineering and product data management context, or are inefficient for data sharing. This context information can be summarized as "who", "what", "where", "when", "how", "why", and the goal of the MoSSEC project is to provide the standard for sharing this information. The MoSSEC project will be agnostic of the type of modelling and simulation, and it is the intention that the modelling and simulation data will continue to be exchanged with the technical standards in use today (e.g. AP209, AP210, AP242, FMI). This presentation will describe the rationale and context for the work, provide the status and future plans of the project (developed as part of the ISO suite of STEP standards)."

SETDB Tool Categories and Taxonomy

Sun 27:09:00-12:00 SETDB Tool Category review and development

SETDB Tool Vendor Survey Development

Sun 27 : 13:00-17:00 Initiate Tool Vendor Survey development for tool data capture by working groups.

Systems Engineering Tools Database SE Project Planning

Mon 28 : 10:30-12:00 Establish a multiple year SETDB Technical Project Plan

Systems Engineering Tools Database SE Project Planning

Mon 28 : 13:00-15:00 Establish a multiple year SETDB Technical Project Plan

TIMLM WG : LOTAR for MBSE - The Digital Lifecycle

Mon 28 : 13:00-15:00 The MBSE for PDES adventure, the LOTAR MBSE project, the Aerospace and Defense PLM Action Group MBSE Project, and the PDES-INCOSE MoU will be discussed.

Systems Engineering Tools Database SE Project Planning

Mon 28 : 15:30-17:00 Establish a multiple year SETDB Technical Project Plan

TIMLM WG : LOTAR for MBSE - The Digital Lifecycle

Mon 28 : 15:30-17:00

The MBSE for PDES Adventure, the LOTAR MBSE project, the Aerospace and Defense PLM Action Group MBSE Project, and the PDES-INCOSE MoU will be discussed.



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SETDB Operations and Maintenance Procedures

Tue 29 : 08:00-10:00 Development of SETDB Operations and Maintenance SOPs

SETDB Test Planning

Tue 29 : 10:30-12:00 Establishment of SETDB Test Plans

SETDB Wrap Up and Next Steps

Tue 29 : 13:00-15:00 SETDB Wrap Up and Next Steps









Training

www.incose.org/iw2019







John Clark (john.clark@incose.org)



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INCOSE WEB PAGE



https://www.incose.org/incose-m ember-resources/workinggroups/analytic/training



WG PURPOSE/MISSION

The purpose of the Training Working Group (TWG) is to provide SE training to INCOSE members and others if needed. This Training WG will provide that opportunity and will support the mission, vision, and goals of INCOSE.

WG GOAL(S)

The specific goals for the Training WG are to:

- Determine our member's needs
- Develop or solicit training modules
- Solicit training volunteer instructors
- Provide training as a benefit to INCOSE members





• Coordinate training throughout INCOSE to expand training opportunities

The objectives of the Training WG are to:

- Identify, develop, solicit, coordinate, schedule, and present SE training based on ISO 15288, ISO TR 24748, INCOSE SE Handbook, and other SE sources.
- Recommend standardized approaches for SE training.
- Enhance the working group members' knowledge of SE training.
- Develop an integrated approach and strategy for continuous improvement of SE training to the organization.
- Provide representatives to other INCOSE WGs to obtain and provide consistent SE training application.
- Investigate training system development for SEs (e.g., how to develop training within an SE environment, how to develop a recommended set of SE activities to support the use of MIL-HDBK-29612 training system development procedures)
- Develop various training delivery infrastructures such as video, web, and in-company training
- Provide training for members in INCOSE governance roles

The vision of the Training WG is to be the acknowledged leader in advancing INCOSE SE training throughout the SE community. The mission is to elicit stakeholders' needs and provide value-added training solutions for the INCOSE members.







WG SCOPE

The Training WG will address SE training as it relates to SE throughout the system life-cycle. SE training will be a free volunteer effort provided as a benefit to all members. This training will exclude actual US DoD projects because of ITAR regulations, copyrighted material unless authorized in writing by the author, and labor financial compensation. Other training within scope includes, but is not limited to, Working Group leadership.



Training Working Group

Tue 29:11:00-12:00

· Determine our member's needs · Develop or solicit training modules · Solicit training volunteer instructors · Provide training as a benefit to INCOSE members · Coordinate training throughout INCOSE to expand training opportunities

