



2021
Annual **INCOSE**
international workshop
Virtual Event
January 29 - 31, 2021

Automotive

www.incose.org/IW2021

CO-CHAIRS

Gary Rushton (General Motors)
Alain Dauron (Renault)

INCOSE WEB PAGE



<https://connect.incose.org/WorkingGroups/Automotive/Pages/Home.aspx>

INCOSE CONNECT ADDRESS



<http://www.incose.org/docs/default-source/wgcharters/automotive.pdf?sfvrsn=8>

Charter Summary



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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 and increase the diversity of the leadership team by:
 - Performing outreach actions
 - Helping members learn from each other and from the experience of INCOSE experts
 - 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.

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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 table 1): 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.

Table 1. AWG Scope

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SE TOPICS
ORGANIZATIONAL
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
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

OUTCOMES (PRODUCTS/SERVICES)

Deliverables and associated action plans of the group will predominantly stem from the list of topics defined and maintained by the group (see the examples on section 3). Some of these topics could be the object of roundtables, panels, webinars or specific working meetings to be programmed during the international workshop or symposium.

Some examples of outputs for the two-year period to come include:

- Report on the state of SE practice in the industry (currently under development)
- Entity-relation diagram of the AWG with respect to other INCOSE entities
- World map of automotive initiatives (projects, associations) with AWG member participation, to show the complementary value brought by the group and identify reach out contacts
- Member survey on MBSE tools
- INCOSE and SE value propositions (short guides)
- Case studies from other industries
- Newsletters (3 to 4-month periodicity)
- Consolidated mailing list, AWG connect site, LinkedIn page.



IW OUTCOMES

AWG had 3 efficient meetings during IW21:

General meeting: We reviewed the main 2020 activities and deliveries, then we addressed several topics:

- proposal for a new AWG subgroup on SE process modeling including Safety and Cyber Security,
- Status & next steps for the recent FISITA - INCOSE contact, starting by the reinforcement of Automotive attendance in System Modeling and Simulation WG (SMS, NAFEMS-INCOSE),
- Exchange about the Automotive section in SE Handbook v5, and about the Automotive SE Vision document -long format & executive summary, 2025 & 2035)
- Introduce the 2 other meetings in IW21, and highlight 2021 activities

Tier I / Tier II Modeling Sharing Demonstration: David Hetherington presented us the work led with several students on the integration of elementary SysML models of electronic components in a wider scope model, illustrating several key topics of models sharing. He explained the interesting program for 2021-2022, with similar expected involvement of some students in a Capstone Project, introduced by a [video](#) and a brochure, and the idea of a paper submitted for IS22. Several attendees volunteered to participate this MBSE action.

Automotive WG : working with other domain specific reference architectures: Yann Chazal and Andreas Hein led this session, and invited Boris Brankovic (Salzburg University of Applied Sciences) who presented reference architectures in several domains (Automotive, Smart Grid, Industry 4.0, in addition to intelligent cooperative transportation) raising special interest from the Automotive industry. The discussions considered different ways to derive benefits from these reference architectures, leading to the need for using them in modelling activities. B. Brankovic showed recent progress to clarify the process to make this possible, but efforts could still be divided to make this fully operational. Next steps in this direction will be orchestrated by the AWG and of course opened to the other WG.

IW Outcomes



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Day	Time (Easter Standard Time)	Time (Central Europe)
Friday, January 29	8:00AM - 9:30AM	14:00-15:30
Saturday, January 30	8:00AM - 9:00AM	14:00-15:00
Saturday, January 30	11:30AM -1:00PM	17:30-19:00

PLANNED ACTIVITIES AFTER IW

- Work on an updated short version of the Automotive SE Vision (tbc "2025 update or 2035 preliminary" context)
- Updates of the Automotive Application Section for SE Handbook v5
- Models in the Supply Chain (Tier1/Tier2): Capstone Project with students at George Mason University
- INCOSE/SAE/IEEE/FISITA Collaboration
- Reference Architectures follow-up, to be proposed also as a Cross Working Group collaboration (AWG, Transportation, Infrastructure, SoS, Smart Cities)
- SE process modeling including Safety and Cyber Security (starting sub-group)

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PLANNED WORK PRODUCTS AFTER IW

- SE Handbook Section 6.1.2 updates
- (tbc) updated "Automotive SE Vision document executive summary"