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STRATEGOS Webinar

System of Systems Engineering Nowadays

Jan. 11, 2021, 15:00-18:00, System Engineering Introduction, Prof.Garron & D'Ambrogio
Jan. 14, 2021, 15:00-18:00, Systems Thinking & Risk Assessment, Ing.Ward & Leardi
Jan. 18, 2021, 15:00-18:00, Systems Engineering Processes & Standards, Ing.Ward
Jan. 19, 2021, 15:00-18:00, System Requirements and Architectures, Ing.Tirone

POC: Prof.Alfredo Garro, INCOSE, AISE & Prof. A.Bruzzone, Simulation Team
Virtual Workshop on STRATEGOS Webinars MS Teams

Jointt Cooperation

System of Systems Engineering (***SOSE***) *is a crucial emerging approach that is crucial to develop successful new systems. Indeed, the Systemic View is fundamental to develop New System Concepts and Architectures*

By ***SOSE***, it turns possible to analyze and manage ***Complexity*** & ***Risks***. Indeed, ***Systems Engineering*** *(SE)* is a discipline that makes possible to succeed in developing a new ***System of Systems*** such as a ***Satellite***, a ***Plane*** or an ***Urban Mobility Solution*** and it is based on specific ***Methods***, ***Techniques***, ***Tools*** ***as well as on Standards***, ***Principles*** *and* ***Concepts***. ***SoSE*** is heavily used for DoD applications, but is increasingly applied to non-defense related problems such as ***Intelligent Buildings***, ***Ship Buidling***, ***Energy***, ***Aerospace***, ***Global Communication Networks***, ***Healthcare***, ***Space Exploration*** and many other challenging areas. **SOSE Webinars** explore foundations of ***Systems Engineering*** in connections with **STRATEGOS**, addressing **Decision Support** over **Complex Systems**. *Each Webinar provides CFP 3 Credits for Ordine degli Ingegneri*

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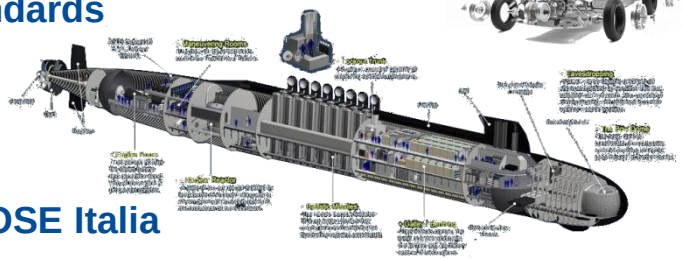
Agenda

Jan. 11, 2021, 15:00-18:00, **Introduction to System Engineering (SE)**
Prof. Alfredo Garro, AISE-INCOSE Italia President, Prof. Andrea D'Ambrogio, AISE Director for Academy

Jan. 14, 2021, 15:00-18:00,**Systems Thinking and Risk Assessment**
Ing. David Ward, AISE-INCOSE Italia Vice President & Ing. Carlo Leardi, Event Director of AISE

Jan. 18, 2021, 15:00-18:00, **Systems Engineering Processes and Standards**
Ing. David Ward, AISE-INCOSE Italia Vice President



Jan. 19, 2021, 15:00-18:00, **System Requirements and Architectures**
Ing. Lucio Tirone, EMEA Sector Director of INCOSE

This Webinar is a Joint Cooperation between **STRATEGOS** *&* **AISE-INCOSE Italia**

AISE Associazione Italiana System Engineering
INCOSE International Council on Systems Engineering

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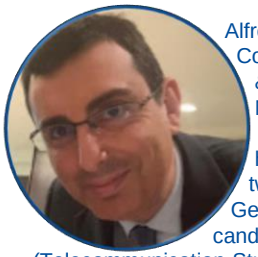

Alfredo Garro, degree in Computer Engineering and PhD in SE & Computer Science, is Professor of Computer Systems Engineering at the Department of Computer Engineering, Modeling, Electronics & Systems (DIMES) of the UNICAL. From January to September 2016 he was Visiting Professor at NASA Johnson Space Center in Houston (TX, USA), Software, Robotics and Simulation (ER) division. He is currently President (two-year presidency 2020-2021) of AISE, Chapter "Italy" of INCOSE. In AISE he held the position of Vice President in the 2 years period 2018-2019 and Technical Director in the two-year period 2016-2017. In October 2016 he participated in the Training Program 2016 at CERN in Geneva among t he 10 Italian Engineers selected by the National Council of Engineers (CNI) out of 539 candidates. From September 1999 to September 2001 he was Researcher at the CSELT in Turin (Telecommunication Studies Center and Laboratories) of the Telecom Italia group. From 2001 to 2005 he collaborated with the Institute of Computing and High Performance Networks (ICAR) of the National Research Council (CNR). From January 2005 to December 2011, he was a Researcher of Computer Systems Engineering at the Department of Electronic, Computer and Systems Engineering (DEIS) of UNICAL. He is the author of over 100 publications in international journals, book chapters, international and national conferences. In 2014 he founded the System Modeling and Simulation Hub (SMASH Lab) Departmental Research Laboratory of which he is currently responsible. He is vice chair of the Space Reference Federation Object Model (SRFOM) Product Development Group (PDG) of the Simulation Interoperability Standards Organization (SISO) where he works on the definition of simulation standards for distributed computing environments with particular reference to the aerospace domain. He was National Coordinator for Italy and member of the Executive Committee of the European ITEA2 MODRIO (Model Driven Physical Systems Operation) project. He is a member of the "Francesco Severi" National Institute of Higher Mathematics. He is a member of the National Cyber Security Laboratory of CINI (National Interuniversity Consortium for Information Technology) and of the Cyber Security Technology District (DCS). He is Senior Member of the IEEE (Institute of Electrical and Electronic Engineers) and of the following Societies: IEEE Computer Society, IEEE Reliability Society, IEEE Aerospace and Electronic Systems Society.

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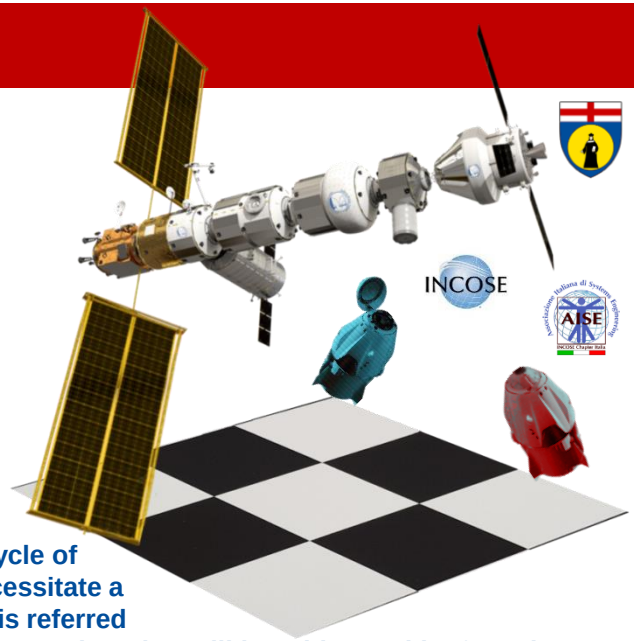
STRATEGOS Webinar

System of Systems Engineering Nowadays

Systems Engineering Fundamentals

An Introduction to Systems Engineering



Day 1, Jan. 11, 2021, 15:00-18:00 as STRATEGOS Webinars MS Teams

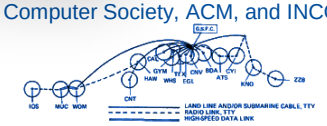
Prof. Alfredo Garro, AISE-INCOSE Italia President, UNICAL, alfredo.garro@unical.it

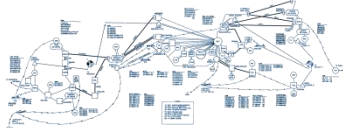
Prof. A.D'Ambrogio, AISE Academic Director, Tor Vergata Univ., dambro@uniroma2.it

The lesson provides an introduction to Systems Engineering (SE) fundamentals and the INCOSE approach to become a certified Systems Engineering professional. Moreover, the long-lasting close interaction between modeling and simulation (M&S) and Systems Engineering disciplines will be discussed. This relationship is leading to a more Integrative approach, namely M&S based systems engineering, which emphasizes the extensive employment of M&S approaches throughout the life cycle of systems engineering efforts. In addition, simulations are also man-made systems, and thus they necessitate a systems engineering approach to be developed. Utilization of SE for developing simulationsystems is referred to as simulation systems engineering. Both M&S based systems engineering and simulation systems engineering will be addressed by focusing on the comparison, integration and augmentation of the most relevant standards and processes in the M&S and systems engineering domains.

Alfredo Garro, degree in Computer Engineering and PhD in SE & Computer Science, is Professor of Computer Systems Engineering at the Department of Computer Engineering, Modeling, Electronics & Systems (DIMES) of the UNICAL. From January to September 2016 he was Visiting Professor at NASA Johnson Space Center in Houston (TX, USA), Software, Robotics and Simulation (ER) division. He is currently President (two-year presidency 2020-2021) of AISE, Chapter "Italy" of INCOSE. In AISE he held the position of Vice President in the 2 years period 2018-2019 and Technical Director in the two-year period 2016-2017. In October 2016 he participated in the Training Program 2016 at CERN in Geneva among the 10 Italian Engineers selected by the National Council of Engineers (CNI) out of 539 candidates. From September 1999 to September 2001 he was Researcher at the CSELT in Turin (Telecommunication Studies Center and Laboratories) of the Telecom Italia group. From 2001 to 2005 he collaborated with the Institute of Computing and High Performance Networks (ICAR) of the National Research Council (CNR). From January 2005 to December 2011, he was a Researcher of Computer Systems Engineering at the Department of Electronic, Computer and Systems Engineering (DEIS) of UNICAL. He is the author of over 100 publications in international journals, book chapters, international and national conferences.

Andrea D'Ambrogio is Professor of Software and Systems Engineering at the University of Rome Tor Vergata. He has formerly been research associate at the Concurrent Engineering Research Center of the West Virginia University (USA) and Director of the post graduate Master degree in "Systems Engineering", established at the University of Rome Tor Vergata in 2012. Andrea D'Ambrogio's research interests are in the software and systems engineering field, specifically in the areas of systems and software performance &dependability engineering, model-driven systems and software engineering, business process management, and distributed simulation. In such areas he has participated to several projects at both European and overseas level and has authored more than 150 journal/conference papers. Andrea D'Ambrogio is Vice President of Conferences and member of the Board of Directors of the Society for Modeling & Simulation International (SCS), and is member of IEEE, IEEE Computer Society, ACM, and INCOSE.





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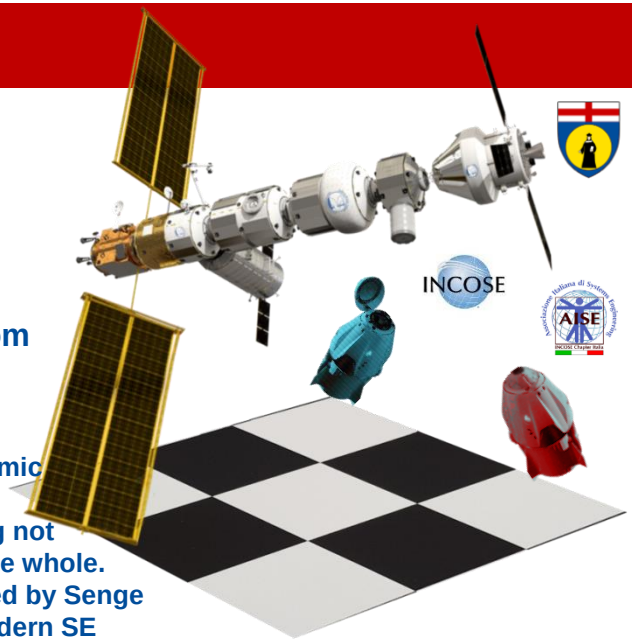
STRATEGOS Webinar

System of Systems Engineering Nowadays

Systems Thinking and Risk Assessment

An Introduction to Systems Engineering



Day 2, Jan. 14, 2021, 15:00-18:00 as STRATEGOS Webinars MS Teams

Ing. D.Ward, AISE-INCOSE Italia Vice-President, TMC Italia, david.ward@tmceurope.com
Ing. Carlo Leardi, AISE Events Director, Tetra Pack, carlo.leardi@incose.org

Systems Thinking: **In this short overview of systems thinking a baseline is drawn for its basic Contextualisation and Understanding in SE and beyond. We focus on the role of the SE from a Systemic or Systems Thinker perspective. Systems Thinking is a paradigm especially useful for synthesizing complex systems combining a systemic approach with synthesis and establishing an understanding not only of the system's constituent parts but also the relationships that bond them together to create the whole. Starting from von Bertalanffy's General Systems Theory (1950) proceed to look at definitions provided by Senge (1990) et al., before looking at the marriage between the Systemic and Systematic approaches in modern SE**

Risk Assessment & Risk Management: **Risk can take many forms and turns during the life cycle of a system and includes Technical, Cost, Schedule and Programmatic viewpoints. Risk management is a process that identifies, assesses and monitors the impact of risks during the entire system life cycle. In this brief seminar we look at the negative and positive impact of risk, thus mitigating harmful outcomes/scenarios and/or leveraging system risk probability to exploit opportunities in improving system reliability and robustness. Specific risk standards such as ISO/IEC31000 (Risk Management) and ISO/IEC31010 (Risk Assessment Techniques) are also linked with the system life cycle model and specific SE standards such as the ISO/IEC/IEE15288 (System & SW life cycle processes), ISO/IEC/IEEE29148 (Requirements) and the INCOSE Handbook processes.**

David Ward. Passionate about anything that facilitates the progress of design and engineering dedicated to mankind. Defined by others as a 'Systems Engineering Evangelist' applied in enterprises of any shape , size and type. He believes firmly in nurturing the talent of the individual and personal development. By trade he ia Mechanical Engineer with a PhD gained later in life and he has worked in 7 different industries, 12+ companies (from the micro to the corporate) and humbly with over 100 different nationalities. He continues to enjoy work even after retirement in 2019 and 48+ years of service that concluded with the role of Systems Engineering manager. He currently works as a parttime consultant with TMC.

Carlo Leardi graduated I n Electronic Engineering in Genova. His professional background starts with quality assurance responsibility evolving in the last years to full verification, validation and testing commitment within complex systems development projects in the following areas: automotive, freight railways and packaging industry. As a passion before and today as a full job, he is dealing with Quantitative Systems Engineering on a day-to-day application and coaching of a full range of statistical and simulation methodologies supporting the decisional process. He published several articles in Engineering and Systems Engineering journals. He is one of the founders and past President of INCOSE Italian Chapter & founder of AISE and he taught in System Engineering Masters at Rome Tor Vergata

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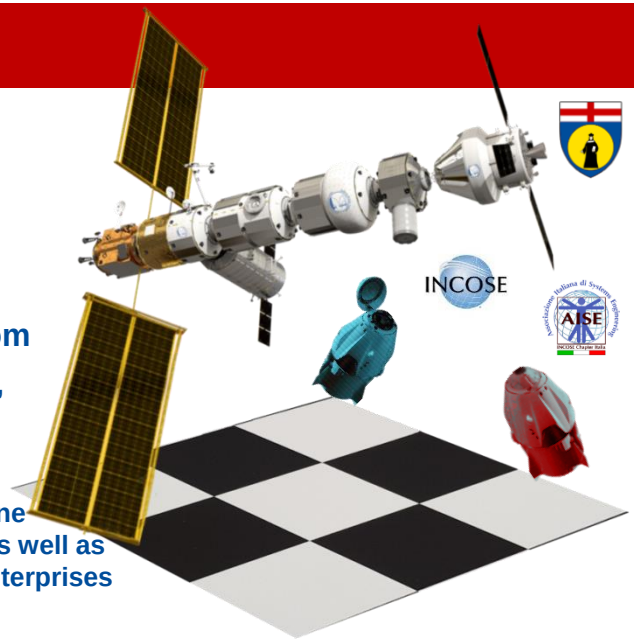

System of Systems Engineering Nowadays

Systems Engineering Processes and Standards

An Introduction to Systems Engineering

Day 3, Jan. 18, 2021, 15:00-18:00 as STRATEGOS Webinars MS Teams

Ing. D.Ward, AISE-INCOSE Italia Vice President, TMC Italia, david.ward@tmceurope.com

Systems Engineering Processes: **The success of system engineering is often subject to the '3P' law, namely Project, Process and People. In this seminar we look at the 4 categories of SE process as described in the ISO/IEC/IEEE15288 standard and INCOSE handbook: 1.Technical, 2.Technical Management, 3.Acquisition and 4.Organisational Project-enabling. We briefly examine what these processes are for, how and when they are elicited and how to tailor them. In particular we will examine The processes in connection with the generic system life cycle model and linkages to the V-model as well as discuss one specific tailoring tool known as the IPO diagram. The critical role of People and their Enterprises & Organization Footprint will also be briefly examined.**

Systems Engineering Standards: **The success of Systems Engineering is also reliant on the development, deployment and adherence to specific standards. In this seminar we provide not only an overview of some of the key SE standards but also the journey taken by them so far. Standards such as ISO/IEC/IEE15288 (System & SW life cycle processes), ISO/IEC/IEEE29148 (Requirements), ISO/IEC42010 (System Architecture), ISO/IEC/IEEE24748-X with different dashes starting with the application of SE standards, are addressed together with connections to SE BoK (SE Body of Knowledge document) and the INCOSE Handbook. We also look at the life cycle of a standard, from cradle-to-grave, why standards harmonization is essential for industry, how standards are used as a trade barrier and when and why standards are not always compulsory. We will examine how to get temporary access to standards through the Online Browsing Platform (OBP) provided by ISO to peek at standards before their purchase and understand the status of standards in terms of life cycle.**

David Ward. Passionate about anything that f acilitates the progress of design and engineering dedicated to mankind. Defined by others as a 'Systems Engineering Evangelist' applied in enterprises of any shape, size and type. He believes firmly in nurturing the talent of the individual and personal development. By trade he ia Mechanical Engineer with a PhD gained later in life and he has worked in 7 different industries, 12+ companies (from the micro to the corporate) and humbly with over 100 different nationalities. He continues to enjoy work even after retirement in 2019 and 48+ years of service that concluded with the role of Systems Engineering manager.
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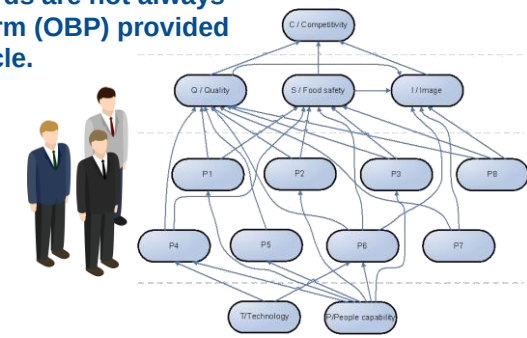

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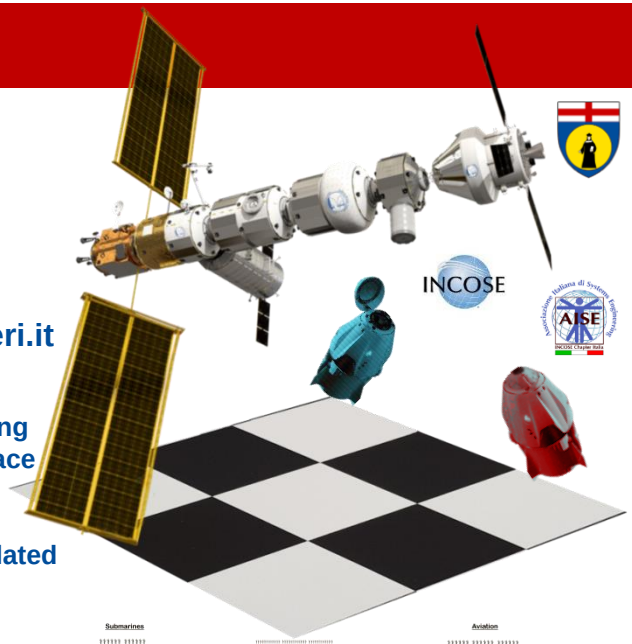
STRATEGOS Webinar

System of Systems Engineering Nowadays

System Requirements and Architectures

An Introduction to Systems Engineering

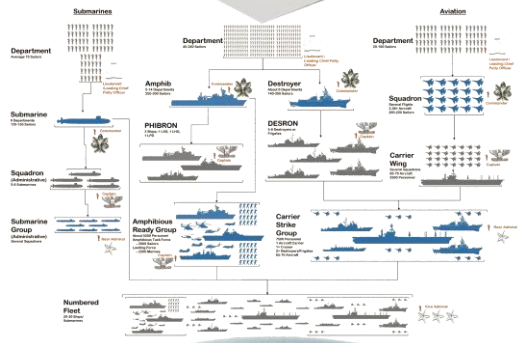


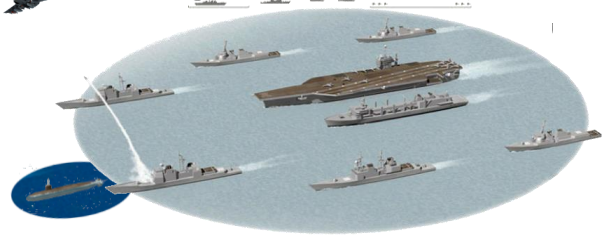
Day 4, Jan. 19, 2021, 15:00-18:00 as STRATEGOS Webinars MS Teams

Ing. Lucio Tirone, INCOSE EMEA Sector Director, Fincantieri, lucio.tirone@fincantieri.it

The development of Systems Architectures is a top-down process, which starts with an understanding of the problem space, and proceeds with the characterization of the solution space. The solution space is composed of four domains, which are iteratively and recursively explored, until all levels of the System Architecture are fully synthesized: the Requirements Domain, the Operational Domain, the Functional Domain and the Physical Domain. The course will explore the main methods and tools related to all four Domains, with the aim of providing useful guidelines for their coherent development.

Lucio Tirone is the Head of Systems Engineering in Fincantieri. He graduated in Electronics Engineering at the University of L'Aquila, Italy, and in over 20 years of field expertise he gradually extended his electromagnetic background towards broad spectrum aspects of Systems Engineering in various national and international projects in the Defense, Aerospace and Transport domains. Lucio Tirone became a member of INCOSE in 2011, and achieved the CSEP (Certified Systems Engineering Professional) Certification in 2012. He is also OMG-Certified Systems Modeling Professional and certified IBM Rational Systems and Software Engineering Sales Professional. He was a co-founder of the Italian Association of Systems Engineering (AISE) in 2014, and served as its President between 2016 and 2017. He is currently the Director of the EMEA (Europe, Middle-East and Africa) Sector of INCOSE. Lucio Tirone has been a lecturer in Systems Architecture/Design courses in the context of several Level II Master Degrees in Systems Engineering (with the University of Tor Vergata in Rome, in the DLTM (Distretto Ligure delle Tecnologie Marine) in La Spezia/Genova, the Italian Joint Armed Forces Telecommunications School, in Chiavari).





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