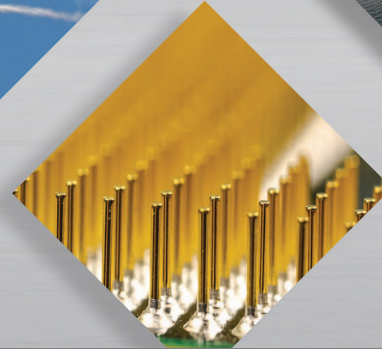




The Swiss Chapter of the International
Council on Systems Engineering
SYSTEMS ENGINEERING IN THE REAL WORLD

SSSE



September, 8th Kongresshaus Zurich
SSWISSED15

The Swiss Society of Systems Engineering Day

SWISSED15 is the second Annual Symposium of the Swiss Systems Engineering Society (SSSE), also acting as the Swiss Chapter of the International Council on Systems Engineering (INCOSE).

We are offering a 1-day event bringing together first-class presenters and practitioners from across Europe, to share knowledge and experiences on how to plan, develop and manage systems in an efficient and successful way.

Systems Engineering (SE):

- enables identification of requirements
- is key to realising integration, verification and validation
- provides a structured and auditable approach
- supports interface management
- manages risks
- optimises system lifecycles
- takes an overarching perspective
- considers the whole system
- fosters an interdisciplinary approach

Who will benefit from attendance?

- Those working with complex systems
- Those who want to find out how Systems Engineering can be of use to them
- Organisations looking to be able to generate innovative solutions to technical problems
- Practitioners needing to keep up to date with the latest developments in Systems Engineering or wanting to participate actively in the evolution of the discipline
- Students who want to further their knowledge and employment perspective

This symposium is right for you if you are, for example, a Systems Engineer, Technical Project Manager, Lead Architect, Chief Engineer, Requirements Engineer, Business Analyst or simply ... the person who seems to know everything about the project!



About INCOSE:

The International Council of Systems Engineering (INCOSE) is a not-for-profit membership organisation founded to develop and disseminate the interdisciplinary principles and practices that enable the realisation of successful systems. INCOSE has grown significantly since its formation in 1990. Today, there are over six thousand members representing a broad spectrum – from student to senior practitioner, from technical engineer to programme and corporate management, from science and engineering to business development. Members work together to advance their technical knowledge, exchange ideas with colleagues, and collaborate to advance systems engineering.



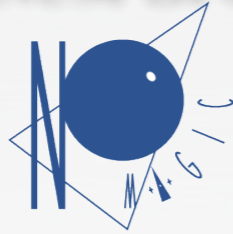
About SSSE:

The SSSE was formed in 2011 and is a group of highly active Engineers from a broad range of industries all with a shared passion for doing Systems Engineering more effectively and efficiently. Past presentations from events are online at <http://www.ssse.ch/events/past>.

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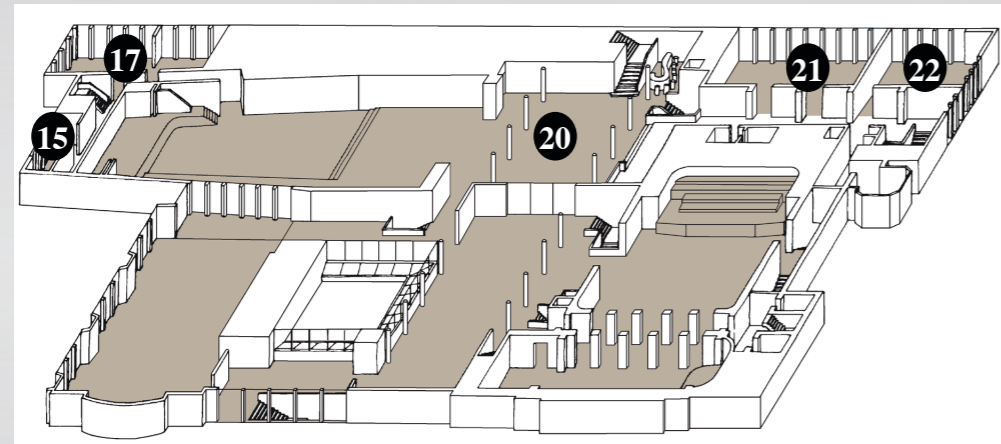
Together ahead. RUAG



08:00	Doors open, registration, coffee			
08:50	Welcome, Introduction by the SSSE President			
09:00	Keynote 1: Tim Weilkiens, oose, Requirement Engineering with MBSE			
09:55	Coffee and Tea			
	Kammermusiksaal	Vortragsaal	Seezimmer 3	Seezimmer 5
10:25	Dr. David Endler Freelance SE Consultant "Integration of Specialty Engineering Activities"	Mike Johnson RUAG Space "Systems Engineering of Space Telescopes"	Stefan Hänggi Armasuisse "Systems Engineering Challenges of Defense Acquisition Projects"	Dr. T.Stöckli, D. Hösli Helveting Sponsored Presentation "Challenges in Systems Engineering and a Pragmatic Solution Proposal"
11:00	Walk between lectures			
11:10	Dr. Kevin Howard Optima Systems Consultancy "Generalised Engineering Maturity Measure "	Dr. Anton Ivanov EPFL Space Center (eSpace) "Concurrent Design for Space"	Dr. Marc Honikel Rheinmetall "Systems Engineering at Rheinmetall Air Defense"	Omar Naas NoMagic Sponsored Presentation "Real world application of MBSE at Bombardier Transportation"
11:45	Lunch			
13:00	Dr. Gerhard Székely Hochschule Luzern "Integrating SE into Industry"	Dr. Laurent Balmelli Sana Elias Group "Modeling for Aerospace: How and When Do we Need it, and at What Cost?"	Luciano Guarnuto Schindler Elevators "Mastering complexity with structure"	Colin Williams IBM Sponsored Presentation "IBM helps European companies make complex System Engineering Crystal clear"
6				

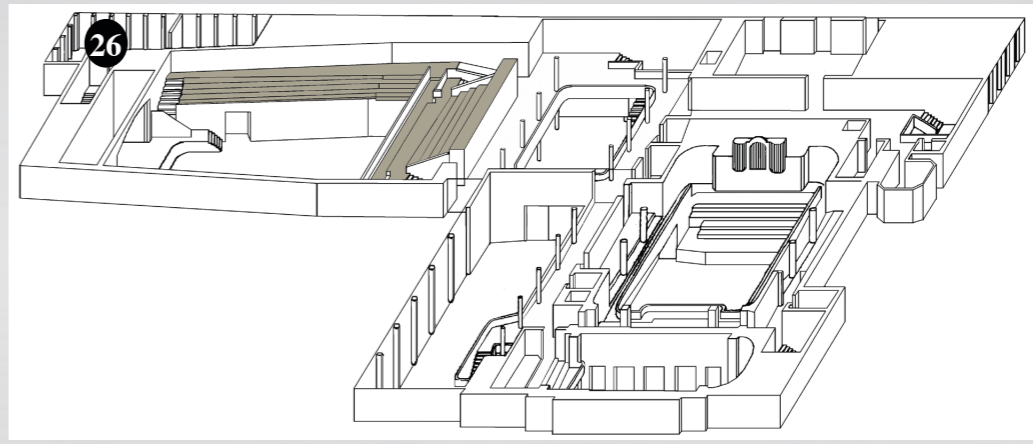
13:35	Walk between lectures			
13:45	Sven-Olaf Schulze Unity AG "Does Industry 4.0 need Systems Engineering?"	Dr. Randolph Odi SR Technics "The challenges of Systems Engineering within a maintenance and repair organisation."	Dr. Gael Close Melexis "Deploying Systems Engineering Methods: a Case Study in Automotive Sensors Development"	Nikolaus Langner BeOne "Systems architecture design"
14:20	Coffee and Tea			
14:50	Keynote 2: Prof. Larry Leifer, dancing with ambiguity: the future of d.systemswiss			
15:45	Walk between lectures			
15:55	Peter Müller Siemens "Tunnel control system of the Gotthard Base Tunnel"	Dr. Benjamin Kruse ETH Zürich "Libraries for Model-Based Mechatronic Concept Design in SysML"	Angus McIntyre Thales UK "Process Implementation Verification System (PIVS) "	Max Eigenmann "Acquisition, Engineering career orientation"
16:30	Walk between lectures			
16:40	Patrick Almy Weisskopf Engineering "Introduction of a Nation Wide ETCS System in Denmark"	Pierfelice Ciancia FRIKART Engineering "Model-based Systems Engineering applied to an ERP system"	Andreas Trautmann RUAG Space "Complexity vs. Human Factors in System Engineering"	Thomas Riesen Noser Engineering "IoT becomes Reality"
17:15	Student prize and closing			
7				

MEETING ROOM LEVEL



- 20 **Kongressaal-Foyer** (Convention Hall-Foyer)
- 21 **Kammermusiksaal** (Chamber Music Room)
- 22 **Vortragssaal** (Lecture Room)
- 17 **Seezimmer 3** (Lake Room 3)
- 15 **Seezimmer 1** (Lake Room 1)

GALLERY LEVEL



- 26 **Seezimmer 5** (Lake Room 5)

Tim Weilkiens | oose

RETHINK 4.0 – REQUIREMENT ENGINEERING WITH MBSE

Abstract

It is time for a change. Since many years we know that requirements are important and that it is a big problem in many projects. However the requirements engineering discipline does not really change yet. Today's requirements engineering publications look more or less the same than 10 years ago. Let's RETHINK! It is trendy to name something 4.0. However I will really show you 4 versions of requirements engineering. Requirements 1.0 and 2.0 is well-known and still common in projects. Many projects work hard to introduce an effective Requirements 3.0. And Requirements 4.0 will probably be the future. Requirements 4.0 is simple and no rocket-science. The challenge of the new approach is the different mindset and will be the first step to a new way of handling requirements. RETHINK! 1, 2, 3, and 4 – Confused? You will know what these numbers mean after the presentation. And you will learn something about models, SysML, collaborative engineering environments, requirements, base architectures, zigzags and of course get an idea of future requirements engineering with MBSE.



Biography

Tim Weilkiens is a managing director of the German consulting company oose, a consultant and trainer, and an active member of the OMG including the working group about SysML. Tim has written sections of the SysML specification and many book about modeling including "Systems Engineering with SysML" (Morgan Kaufmann) and "Model-Based System Architecture" (Wiley). He is involved in many MBSE activities and co-founder of the INCOSE MBSE Challenge Team SE² Telescope Modeling that has written the MBSE Cookbook. Tim is the editor of the pragmatic and independent MBSE methodology SYS-MOD – the Systems Modeling Toolbox.

Prof. Larry Leifer | Stanford University

DANCING WITH AMBIGUITY: THE FUTURE OF D.SYSTEMSWISS

Abstract

Over the past thirty years, a powerful methodology for innovation has emerged. It integrates human, business and technical factors in problem forming, solving and design: "Design-Thinking." This human-centric paradigm integrates expertise from design, social sciences, business and engineering. It is best implemented by high performance project teams applying diverse points-of-view simultaneously. It creates a vibrant interaction environment that promotes iterative learning cycles driven by rapid conceptual prototyping. The paradigm has proven successful in the creation of innovative products, systems, and services. Design-thinking works. Industry is subscribing to boot camps and executive education workshops. Teams of industry, government and education experts are tackling complex problems and finding powerful solutions. The time is right to apply rigorous academic research to understand how, when and why design thinking works and fails. It is time to create next generation design thinking behaviors and supporting tools. We can nurture a corpus of behaviors that increase the probability of finding a path to innovation in the face of uncertainty.

Biography

Larry Leifer is a Professor of Mechanical Engineering in the School of Engineering at Stanford University. He has served as founding director of the Stanford Veterans Administration Rehabilitation Engineering R&D Center; Smart Product Design Lab; Center for Design Research (CDR); Stanford Learning Lab; and Hasso Plattner Design Thinking Research Program at Stanford. His top R&D priorities in the moment include, d.swiss, human-robot tea work experience design, and the notion of a pan-disciplinary PhD program in Design. He has been granted an honorary doctorate by the Royal Institute of Technology, Stockholm; and is an honorary fellow of the Design Society.



Dr. David Endler | Freelance SE Consultant

INTEGRATION OF SPECIALITY ENGINEERING ACTIVITIES



Abstract

Within the field of specialty engineering activities, sometimes called cross-functional activities, such as reliability, maintainability, safety, security, etc. there are best practices available. Very often, those best practices are only shared within this target audience. At the same time, traditional systems engineering process descriptions do not explicitly include specialty engineering activities. However, both roles of Systems Engineer and Specialty Engineers control a source of requirements for systems development. How can these two roles work together with seemingly contradictory requirements for cost, functionality, and specialty engineering interests?

Biography

Dr. David Endler joined INCOSE in 2006 and is a Systems Engineer with proven experience in various large programs (airframe manufacturer, federal competence center for procurement of complex systems, aircraft system suppliers), definition and improvement of system development processes (aircraft system suppliers, wind turbine OEM, submarine manufacturer), expert for system safety and training provider for Systems Engineering courses. He is Technical Director of GfSE (German Chapter of INCOSE) and member of ISO JTC1 / SC7 / Working Group 7 "Life Cycle Management".



Mike Johnson | RUAG Space

SYSTEMS ENGINEERING OF SPACE TELESCOPES

Abstract

Space telescopes have for many years given to the Human Race some of the most awe inspiring images and insight into deep space, our galaxy, our local planets and of course our humble dwelling, planet Earth. Images can say more than 10,000 words, they inspire people to learn more about their place in the Universe, ever increasing our desire to develop better technologies to see further out, probe further out and to ourselves go further out away from home.

This short presentation gives an overview and insight into the development of the Telescope Assembly for the CaSSIS Instrument, part of ESA's ExoMars Trace Gas Orbiter mission, due to launch to the red planet in 2016.

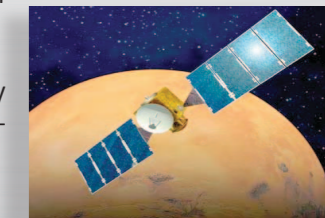
The presentation focuses on the application of systems engineering to the various life cycle stages of the Telescope Assembly's development, reflecting on the constraints, successes and failures from a systems perspective.

Biography

Mike Johnson CSEP, has predominantly worked in product development roles at RUAG and Thales in the Space and Defence Industries respectively, since completing his Masters degree in 2005 at St Andrews University.

Since 2012 he has led the Systems Engineering group in the business unit Optoelectronics and Instrument and is involved with improving processes and giving educational courses to Employees, in addition to leading the technical development of Space projects.

Mike is one of the founders of the Swiss Society of Systems Engineering (SSSE) and regularly organizes Swiss lectures and seminars.



Stefan Hänggi | armasuisse
SYSTEMS ENGINEERING CHALLENGES OF DEFENSE ACQUISITION PROJECTS



Abstract

Defense Acquisition Projects are becoming more and more complex. Projects lasting more than 10 years until the required operational capability is delivered with acquisition costs in the range of billions of CHF are a reality. To ensure project success, dependable Systems Engineering (SE), over the full life cycle, is essential.

The Federal Office for Defense Procurement, which provides the link between the need of the Armed Forces and the contracting industry, faces very particular SE challenges, such as increasing system complexity.

The author presents an overview of the current SE process that armasuisse has implemented to meet some of these challenges. He exemplifies the process and demonstrates a decomposition approach into key parameters. Lastly, a general, simple methodology is presented to estimate the SE complexity of defense acquisition projects.

Biography

Stefan Haenggi is a Defense Acquisition Project Manager at armasuisse in Bern. armasuisse is the Federal Office for Defense Procurement and the center of expertise in the evaluation and procurement of technologically complex systems for the Swiss Armed Forces. He currently works within the competence center "Command and Control & Reconnaissance Systems".

His technical specialty is wireless systems engineering with more than 15 years of experience in the design of communication systems in Switzerland and USA (Florida Space Coast and Silicon Valley). He received a bachelor degree in information technology from the Zurich University of Applied Sciences. Since 2006, he also is an Expert-Adviser for BS and MS Diploma Thesis Evaluation at the HSR Hochschule für Technik Rapperswil) in the field of wireless communication. He is a co-author of 12 international patents.

Dr. Thomas Stöckli | Daniel Hösli | Helveting Sponsored Presentation
CHALLENGES IN SYSTEMS ENGINEERING AND A PRAGMATIC SOLUTION PROPOSAL

Abstract

The engineering process defines the methodology projects are being executed in engineering organizations. We have identified a series of obstacles that can lead to inefficiency, even though the processes were originally defined with the intention to streamline the projects. a) Different types of projects: A cost reduction project for instance differs completely from an innovation project. b) Long cycle-times: in the hectic day-to-day business improving the process has low priority or gets forgotten. The engineers will therefore always be tied to a non-optimized process. c) No room for agility d) Lack of knowledge. We will also show how different planning scenarios can be elaborated with PQForce and how project changes can thus be tracked in an agile environment.

In this presentation we elaborate on a few of the obstacles in the engineering process and show how PQForce helps to overcome them in order to speed up the engineering projects.

Biography

Thomas Stöckli has a Ph D in experimental physics and has authored numerous papers in the field of nanotechnology and potential industrial applications. He has been working for engineering service providers for more than 10 years and has delivered solutions to many development challenges, especially in the field of robotics and life sciences. Thomas Stöckli has built up the process engineering unit for a market leader in the semiconductor industry where he has introduced lean engineering tools in order to be able to react quickly to rapidly changing boundary conditions, that are so particular to this industry. He enjoys being challenged with engineering problems and to deliver tailored solutions to best satisfy a very diverse circle of customers.



Dr. Kevin Howard | Optima Systems Consultancy
GENERALISED ENGINEERING MATURITY MEASURE



Abstract

A perennial problem with technical developments is the consistent and repeatable assessment of progress and risk across complex programmes that allows like-for-like comparison between disparate activities such that resources and technical effort may be optimised. Optima has developed the Generalised Engineering Maturity Measure (GEMM) to provide an unambiguous and consistent measure for technical projects that can be applied across all classes of development activities. GEMM helps to understand the status of developments at review points against defined expectations; to set expectations for the next review point; and to identify domain shortfalls to help focus effort and mitigate programme risk. We have successfully deployed these measures and metrics in both Defence Procurement and in the Civil Sector for an International IT business. Output from GEMM is presented graphically to help both understand the performance of the technical activities and to help focus efforts to best effect.

Biography

Dr Kevin Howard is Engineering Director for Optima Systems Consultancy providing strategic guidance to the business in its application of Systems Engineering across defence and civilian consultancy. Previously, he was Vice President for Systems Engineering at AGT based in Zurich and head of Systems and Sensors for Thales Missile Electronics. He has reached this position through a practical engineering route in positions of Chief Engineer for various major programmes across defence and civilian world including armoured fighting vehicle, space borne radars, and software data fusion engines. He is a strong proponent of Model Based Systems Engineering that can connect the issues of this disparate problem space and help determine an optimum approach to specific problems and this is supported by a PhD in optimising complex systems by minimising their entropy. He is Member of IET and INCOSE, Visiting fellow at Bristol University and a Guest lecturer at Cranfield University.



Dr. Anton Ivanov | EPFL Space Center (eSpace)
CONCURRENT DESIGN FOR SPACE

Abstract

Concurrent Design is a part of the systems engineering process, which has been widely adopted in space mission design. In this presentation the setting up of a facility in a university will be described. We discuss the hardware, software and knowledge management procedures. The focus is to create an Integrated Design Model (IDM) for nanosats and microsats. We also discuss how to utilize CDF concept after the design phase for validation and verification. The Internet of Things represents the future of connected objects. Space service providers and satellite manufacturers have a role to play in this trend. Cubesats have the potential to be flexible and performant space relay platforms at low development costs. We conducted a systems engineering study to assess the performance of a system with minimal satellite and ground station to optimise costs relative to existing M2M systems.

Biography

Dr. Anton Ivanov is a scientist with the EPFL Space Center (eSpace) in Lausanne Switzerland. He is the project manager for the CubETH Cubesat project, study leader for the CHEOPS satellite and is responsible for the Minor in Space Technologies. After receiving his PhD in Planetary Science from Caltech in 2000, Dr. Ivanov joined the Jet Propulsion Laboratory to contribute to Mars Global Surveyor, Mars Odyssey, Mars Express and Mars Science Laboratory projects. In 2007, Dr. Ivanov joined Swiss Space Center to lead development of the Concurrent Design Facility.



Dr. Marc Honikel | Rheinmetall
SYSTEMS ENGINEERING AT RHEINMETALL AIR DEFENSE



Abstract

Systems Engineering is a standard engineering discipline especially for companies in the defense sector. The Systems Engineer is at the forefront continuously in contact with governmental institutions, military, industry and science. His engineering capability covers a broad spectrum of activities, ranging from the definition of a single component to the development and management of complex systems of systems.

With roles and capabilities of Systems Engineering so well defined, what is the point of this presentation? First, the presentation gives an insight to the life behind the job description showing the tasks of a Systems Engineer at Rheinmetall Air Defense. Second, the challenge of covering Safety in the development process will be highlighted. It is in the nature of the products that safety receives high attention during their life cycle. Third, an example of a relatively new challenge is presented: Cyber Defense and its effects on systems engineering.

Biography

Marc Honikel has a Masters degree in Electrical Engineering (Dipl.-Ing.) from TH Karlsruhe (KIT) and a PhD (Dr. sc. techn.) from ETH Zurich. He is head of the department Systems Engineering and Fire Control at Rheinmetall Air Defence in Zurich and is head of the Center of Competence Fire Control of the Rheinmetall division Electronic Solutions.

He has 13 years engineering experience serving as systems engineer at Rheinmetall in Zurich and at Rheinmetall Canada. During this time he worked on various C4I projects for ground based air defence. His experience covers all aspects from low level system definition, algorithmic modeling and design to very high level specifications and concepts. Has technical product manager for command and control systems, he defined ground based and navy systems for the upcoming product generation.



Omar Naas | NoMagic Sponsored Presentation
REAL WORLD APPLICATION OF MBSE AT BOMBARDIER TRANSPORTATION

Abstract

Constantly changing requirements for new developments and their approval, as well as the documentation for existing systems, require new approach for functional and safety analysis of railroad systems. The usual, continuous text-based methods quickly reach their limits. The focus is increasingly on model-based systems engineering approaches, particularly with respect to serviceability, assuring consistency and supporting in change impact analysis.

This presentation demonstrates a real world application of MBSE at Bombardier Transportation for modeling the functionality of railroad systems and integrating it with requirements and safety analysis.

Biography

Omar Naas studied electrical engineering at the Zurich University of Applied Sciences. He is a modeling expert at Bombardier Transportation and his primary focus is on applying MBSE techniques to the design and development of railway vehicles. This includes defining and harmonizing the system modeling method, providing training and coaching in SysML, MagicDraw and the MBSE methods for all Bombardier Transportation sites. Omar has over 15 year experience in modeling mechatronic systems. He has worked in various industries such as robotics, automotive and railway industry.



Dr. Gerhard Székely | Hochschule Luzern
INTEGRATING SE INTO INDUSTRY



Abstract

Multi-discipline teams are required with specialists in each field. This process started in military machinery a bit more than 100 years ago, followed by civil applications such as energy systems, large airplanes and is now true even for kitchen machines. Nowadays, systems engineering is standard for many large & complex products. It is also spreading to smaller companies. This presentation will show some challenges in introducing systems engineering in companies. The major focus rests on a number of questions often posed by senior management, such as:

- Why do we need systems engineering at all in a small company?
- Do we need all those complex tools and gadgets with high license fees?
- How shall we start the implementation?
- Do we need another process description?
- Finally, the most difficult question: How do we check the benefit (especially short term)?

Biography

Gerhard S. Székely (born 1968) studied Mechanical Engineering (Aerospace) at the Technical University Munich. He then finished his studies with a PhD work on numerical stochastic structural mechanics at the Institute of Engineering Mechanics, Innsbruck University. He then commenced 1999 as Structural Analysis / FEM engineer at RUAG Space, co-responsible for CAE. From 2001 to 2011, he lead the engineering and analysis group within the Mechanisms department. 2012 he became senior manager for Engineering and Development within the newly built business unit Mechanisms. At the same time, he became leader for all systems engineering aspects within RUAG Space Zurich – in terms of a crossfunctional lead. In addition, he acted as expert and problem solver in critical situations for many space mechanisms. Since June 2015, Gerhard Székely is lecturer at the Lucerne University of Applied Sciences and Arts.



Dr. Laurent Balmelli | Sana Elias Group
MODELING FOR AEROSPACE: HOW AND WHEN DO WE NEED IT, AND AT WHAT COST?

Abstract

In this presentation we explore the use of visual models to integrate systems engineering activities across the product development lifecycle. In this context models are used to represent graphically different facets of the product, its operational environment, stakeholders, etc. Models are also used to design and simulate functions, as well as assess performances. Because models are fulfilling multiple roles, model transformation and exchange are key operations for the integration of systems engineering tasks. Through this discussion we explore how models are created, transformed and leveraged across development stages, organizational units or in-between actors across the supply chain. We look at examples of systems as designed and manufactured in industries such as aerospace, automotive and others.

Biography

Rich experience in technology, product design and innovation. International business experience with serving clients in the US, Japan, Switzerland, India and West Africa (Nigeria). Long experience with IBM serving clients in the technology and finance industries world-wide (US, Japan, India, Europe). At the Sana Elias Group, Laurent has been advising clients on strategy and technology. For example he is helping ventures and companies understand their markets and devise product strategies. He is also an expert in the domains of product design & innovation, in the application of the Business Model Canvas and Value Proposition Canvas, in addition to researching Blue Ocean strategies for clients. At Keio University in Tokyo, he is teaching a class on complex, multi-disciplinary product design innovation every year since 2007. The class, aimed at graduate students, contains 13 lessons over the span of two weeks.



Luciano Guarnato | Schindler Elevators
MASTERING COMPLEXITY WITH STRUCTURE



Abstract

When we speak about a system in the elevator world, we try to visualize a picture. This is best accomplished in 3D space using powerful modeling software. To create this 3D picture, much planning, structure, complexity, and communication is required.

To design an elevator system, everyone must collaborate at an early stage, to optimize and simulate the critical conditions virtually. 3D modeling allows different configurations to be evaluated to detect any issues during development by understanding interfaces, communications, and complexities of the system. This is to avoid unexpected behaviors of the system. When we produce a system and the components are distributed across the world, it is most important that the planning, product structure, and communication is correct.

Biography

Luciano Guarnato has more than 20 years' experience in the 3D CAD environment with focus on construction and engineering. From user, to trainer, to consultant... handling complex applications using 3D CAD is his competency and expertise. Luciano contributes to develop and implement the 3D methodology across worldwide R&D centers in the Schindler Elevator Group. Located in the Lead Research and Development Center in Switzerland, he regularly provided guidance to colleagues in China, India, Sao Paolo and North America. During previous employment engagements, Luciano designed, implemented, and managed various projects for system modelling and analysis methodologies. His experience of 20 years gives him invaluable knowledge he has gained through diverse projects and work environments.



Colin Williams | IBM Sponsored Presentation
IBM HELPS EUROPEAN COMPANIES MAKE COMPLEX SYSTEM ENGINEERING CRYSTAL CLEAR.

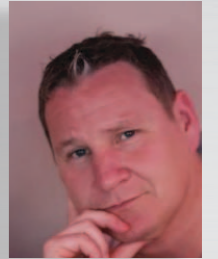
Abstract

Colin will present a case study that was run as a world wide joint industry project for improving the success of delivering complex oil and gas platforms using Systems Engineering methodologies for the operator and its suppliers to cost-effectively increase the efficiency of working in a mutli vendor project model. What attendees will learn is:

- How systems engineering can become a critical factor within large project organisations
- How systems engineering can remove project over runs by increasing the quality of the specification requirements in contracts
- How systems engineering can remove quality issues found or not found in the test, inspections and hand- over phases
- How an integrated engineering environment can support system engineering methodologies and keep a high focus on the need for improved engineering data and workforce collaboration

Biography

Colin is one of IBMs experts within the field of engineering transformation. He is advising clients on how to improve operational excellence with the use of systems engineering best practices. Colin has a focus on asset intensive industries that invest in large capital investment projects and over the past decade has been collaborating with a number of world wide organsiations on how to increase accountability of asset stewardship, improve efficiency's in capital projects and align better hand over into operations. Within his scope of driving change he is also actively advising engineering teams on how adapt to the new age of digital engineering that is becoming a growing challenge for many. Colin is bringing in System Engineering knowledge and is illustrating how best practices can provide extreme added value around the complexity of running a complex projects in a multi supplier eco system.



Sven-Olaf Schulze | Unity AG DOES INDUSTRY 4.0 NEED SYSTEMS ENGINEERING?



Abstract

The next industrial revolution has started – Industry 4.0. The paper will provide an overview about the history of the industrial evolution and will provide an insight into the Industry 4.0 aim taking into account the Internet of Things (IoT) and Internet of Data for product, systems and enterprises. Based on the challenges related to enabling systems the interfaces and impact to the development phase will be shown. Hence due to the complexity increase a need of Systems Engineering over the life-cycle for the systems of interest, enabling systems, cooperating system will be shown to ensure the happiness and satisfaction of the market and customer. Smart systems in any case need enhanced modular & intelligent Product Design to satisfy the stakeholder requirements.

Based on an example the process and impacts on design will be given which will start at the order and individual configuration from the end user to delivery to home.

Biography

Sven-Olaf Schulze holds a diploma in Aerospace and Space with a focus on aircraft structure and light weight design. He has been working in the space/aerospace industry since 1996 with project responsibilities in Ariane 4, Ariane 5, ISS, MIR, Airbus A380 and A400M. In 2010 he joined the wind industry at Suzlon Energy GmbH as the Vice President of Systems Engineering. Currently he is working since 3 years as Senior Expert at UNITY AG. He held a lecture in systems engineering at the University of Applied Science in Hamburg from 2007 until 2012. Furthermore Sven-Olaf was the vice president of the German Chapter of INCOSE (International Council on Systems Engineering, GfSE) since 2003 and a nominated ambassador for INCOSE. He has been the president of the German Chapter of INCOSE since 2008. Since 2012 he is a TÜV Rheinland certified GfSE Systems Engineering Assessor and member of the German SE-ZERT testing committee.



Dr. Randolph Odi | SR Technics THE CHALLENGES OF SYSTEMS ENGINEERING WITHIN A MAINTENANCE AND REPAIR ORGANISATION

Abstract

From its inception as the maintenance, repair and overhaul arm of Swissair, SR Technics has now become a leading independence airline maintenance provider with around 3300 FTE and CHF bn 1.1 revenue in 2014. To respond to the continuing challenges of the business environment and ever competitive MRO market, SR Technics seeks continually to differentiate its products and service offering. One key approach has been to diversify into more complex cabin modifications which drawing on the strength of its Aircraft Services Engineering business unit combined to its all round capabilities in production and maintenance. This presentation shall highlight the challenges faced by SR Technics as it continues to advance in that area and show the benefits that can be drawn from adopting sound systems engineering approach and principles to its design for complex cabin modifications.

Biography

Dr Randolph Odi is currently the Head of Design Office Zurich at SR Technics where he is also a Certification and Verification Engineer for stress and structures. Before joining SR Technics, he has worked as a System Engineer at RUAG Space AG, in the Mechanism Business Unit. Randolph has worked for 5 years as Aerospace Engineer for a small Swiss consultancy firm, on JSF F35, Ariane 5 and A400M programmes. Prior to that he spent 5 years as Stress Engineer and Team Lead at Airbus in the UK and Germany, mainly working on A380 and A400M programmes.

Randolph holds a Bachelor's Degree in Aeromechanical Systems Engineering and a PhD from Cranfield University (UK). In his spare time, he enjoys playing the guitar and supporting Liverpool FC.



Dr. Gael Close | Melexis

DEPLOYING SYSTEMS ENGINEERING METHODS: A CASE STUDY IN AUTOMOTIVE SENSORS DEVELOPMENT



Abstract

A modern car contains more lines of software code than a new 787 Airliner. It is therefore not surprising that the Systems Engineering methods and techniques to manage complexity developed initially in the Aeronautics and in the Software engineering community are rapidly gaining grounds in the Automotive Industry.

While Systems Engineering is well established in the design of (physically) large systems, its adaptation for micro-systems and systems-on-chip is more recent. The design of smart sensors is increasingly driven top-down considerations and most critically functional safety requirements.

This presentation will present as a case study, the deployment of Systems Engineering inside Melexis, a provider of microelectronic sensors and actuators for the automotive market. Practical aspects of the deployment will be touched upon, including: diffusion of the Systems Engineering mindset into existing procedures, the selection of appropriate methods and tools, training, and pilot projects.

Biography

Gael F. Close received the B.Sc. (Eng.) degree in electrical engineering from the University of Liège, Liège, Belgium, in 2003 and the M.S. and Ph.D. degrees in electrical engineering from Stanford University, Stanford, CA, in 2004 and 2008, respectively. From 2008 to 2011, he was a Research Staff Member with the IBM Research Laboratory, Zurich, Switzerland developing phase-change memory chips. Since 2011, he has been with Melexis, Bevaix, Switzerland as System Architect designing integrated sensors for automotive applications. He has published 20 papers in international conferences and peer-reviewed journals, covering semiconductor technology, integrated circuits, and recently systems engineering aspects.



Nikolaus Langner | BeOne

SYSTEM ARCHITECTURE DESIGN

Abstract

Niko will give an introduction to various state-of-the-art architecture frameworks and discusses differences between “engineering” and “architecting”. Furthermore, means of quality assurance for elaborated architectures will be presented.

Biography

Nikolaus Lagner, an IT Architect is focusing on pragmatic end-2-end systems and solutions design. He has a strong background of data communication and system programming with 2 decades commitment and curiosity designing solutions to complex requirements within a variety of branches.



Peter Müller | Siemens

TUNNEL CONTROL SYSTEM OF THE GOTTHARD BASE TUNNEL



Abstract

The Gotthard Base Tunnel is one of the largest projects in Switzerland. It's the longest railway tunnel in the world (57km), crossing through the Swiss mountains. The Tunnel control system is the core element for supervision and controlling of all installed Subsystems such as electrical power 50 Hz, 16.7 Hz, ventilation, doors, lightning, etc

The biggest challenge in this project was to integrate 20 different subsystems into one overall control system. Another scope of delivery is the emergency incident system. This system supports the evacuation management in case of a dangerous occurrence or technical defects. The tunnel control system is connected to a full integrated maintenance management tool. Parallel to the Tunnel control system, the railway control system which operates the trains through the tunnel is also a scope of delivery by Siemens.

Biography

Peter Müller, Senior Project Manager Siemens Schweiz AG, Mobilty division. Large experience in Project Management started 1988 in projects for Hydrogen and Ozone plants, worldwide. Since 2003 working for Siemens in railway projects. The Project Tunnel control system for the Gotthard Base Tunnel started 2008.



Dr. Benjamin Kruse | ETH Zürich

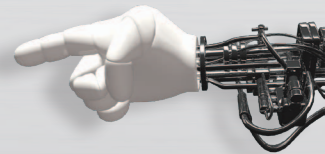
LIBRARIES FOR MODEL-BASED MECHATRONIC CONCEPT DESIGN IN SysML DEVELOPMENT

Abstract

To support the development of increasingly complex multi-disciplinary systems, efficient model-based knowledge handling already during concept design is advantageous, yet lacking in its practical application. One approach for this is the usage of design libraries, to not only reuse established design knowledge, but also raise model formality and allow computer-based modeling support. The presented library incorporates National Institute of Standards and Technology Functional Basis into SysML for an operator and flow based functional modeling on activity diagrams. Hereby elementary functions are represented by combining predefined sets of operators (verbs) as SysML activities and flows (nouns) as the pin types. Recent findings about this library's usability indicate its benefits for inexperienced modelers especially through an enhanced model formality and usage of the functional basis.

Biography

Born in 1985, studied mechanical engineering with a major in aeronautics at the Technische Universität München. Afterwards he started there a doctorate at the Virtual Product Development Group before coming to the newly founded Engineering Design and Computing Laboratory at the ETH in 2012 to continue his research.



Angus McIntyre | Thales UK
PROCESS IMPLEMENTATION VERIFICATION SYSTEM (PIVS)



Abstract

Thales UK reviewing the interaction between engineering and quality when looking at Process Improvement. As a quality engineer who moved there from an engineering background, I often think about the film the "Life of Brian" by in relation to engineering's view of Quality. There is a famous scene where the characters ask "What have the Romans ever done for us?" with the main character's assertion that they have done nothing but then lots of different benefits to their day to day existence are pointed out. In this talk I want to give an example of where there is something that Quality are doing for not only the engineering discipline but all of the disciplines in Thales.

The talk will focus on the use of the Process Improvement Verification System (PIVS), which Thales has introduced worldwide. The talk will give feedback from our lesson learnt experience to see what Thales UK have undertaken to help ease the introduction of PIVS into the lives of engineers within Thales.

Biography

Angus McIntyre is currently the CMMI (Capability Maturity Model Integration) Subject Matter expert for Thales UK. His job covers the setting up and review of the Thales Company's CMMI initiative. This involves the review of the process improvement and covering how well these improvements have been incorporated into the company. This is in the form of review informally and formally through the use of the CMMI Institute endorsed SCAMPI (Standard CMMI Appraisal Method for Process Improvement) methodology. Angus also is involved in the facilitating of root cause analysis using the 8D technique from Lean Sigma. He is the UK trainer for the PIVS tool the means by which Thales verifies adherence of the company management system. Furthermore he is involved in undertaking CMMI assessments both inside and outside of Thales UK, most recently in China but also France and the Netherlands.



Max Eigenmann | Acision
ACQUISITION, ENGINEERING CAREER ORIENTATION

Abstract

The results of a recent study investigating why engineers leave their occupations are presented. Engineers early in their career were asked to reveal their inclination towards remaining or leaving their occupations in engineering for management, by asking their opinions on skill development, skill diversity, career alternatives within and outside of engineering, salary satisfaction, autonomy and impact. The underlying questionnaire is built on the proven psychological construct of occupational commitment. The results provide a basis for engineers to reflect critically on how their careers are developing and provide employers possibly with a different perspective on how to view engineering talent. In addition an introduction to the Protean Career and Boundaryless Career models is given often brought into association with Millennials and Generation Y.

Biography

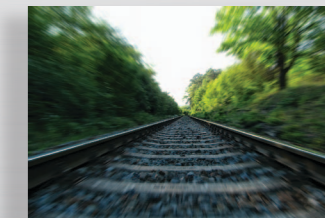
1996: MSc in Mechanical Engineering ETHZ

1996 – 2015: Aerospace Stress Engineer working on projects such as Rosetta, A380, A350, Pilatus Trainer Aircraft, Optical Mechanisms for Exoplanet and environmental exploration (SAFARI, EUCLID, EnMap)

2002 – 2005: Freelance Stress Engineer

2005 – Present: Founder and owner of Engineering Consultancy & Recruitment Firm acision GmbH providing R&D engineering services to RUAG, Pilatus, ETHZ, PSI and others.

2012 – 2015: Masters of Advanced Studies in Management, Technology & Economy MAS MTEC ETHZ.



Patrick Almy | Weisskopf Engineering

INTRODUCTION OF A NATION WIDE ETCS SYSTEM IN DENMARK



Abstract

Denmark is the first country to implement European Train-Control System (ETCS) in a nationwide railway signalling scheme. But it didn't stop there for the Danes. They chose to implement a new approach to scheduling, which is based on service intentions instead of rigid time tables. With this approach the computation complexity could be significantly reduced, allowing to recalculate the complete railway network in very short intervals. At the same time the focus on service intentions makes sure that the focus stays on customer needs when dealing with disturbances in the railway network.

Biography

Patrick Almy is Managing Director and Partner at the Swiss transport telematics consulting firm "Weisskopf Engineering AG". He focuses on technical and organisational themes in the field of electronic ticketing systems for public transport companies. During his long career in traffic telematics for public transport, he worked in different roles and gained a lot of practical experience: software development both as developer and development project manager, bid project management in international tenders, management of a system architecture team, director of product line management and market strategy. Among other things, he also worked as project manager in innovative eTicketing projects such as Easy Ride (Geneva / Basel), intermobilPASS (Dresden) and was a member of the core team BIBO (BeIn-Beout) at the SBB. In Denmark he works for the Danish railway network provider Banedanmark, where he is part of the TRIS (Train Information System) management team.



Pierfelice Cancia | FRIKART Engineering

MODEL-BASED SYSTEMS ENGINEERING APPLIED TO AN ERP SYSTEM

Abstract

Model-based Systems Engineering methodology has been applied to an ERP (Enterprise Resource Planning) system in order to define System Requirements starting from existing Business Processes. A formal language (BPMN) has been used in order to describe very complex processes and another modeling language (SysML) has been used for the system behavior analysis and architecture design. Using "top-down" analysis, six steps have been defined during the work, from the description of the Business Processes to the definition of the System Requirements. The main target of the whole project was to upgrade the existing ERP system. Due to the high level of complexity of the processes (involving many actors, organizations and systems) it turned out to be necessary to adopt a systematic approach, using formal languages. A bridge from Business processes and System Architecture has been built.

Biography

Pierfelice Cancia completed his studies in Systems Engineering at the University of Rome Tor Vergata in Italy. He is now involved in Model-based Systems Engineering and has worked on the Functional Requirements definition of an ERP system for an important Italian organization. His experience includes also working in the System Analysis (Use Cases Analysis, Concept of Operations, Subsystem requirements management) for a world-class Intelligent Transport System (ITS). Pierfelice is a member of the INCOSE Italia Chapter. Before studying Systems Engineering, he completed his Master's and my Bachelor's Degree in Electronic Engineering.



Andreas Trautmann | RUAG Space
COMPLEXITY VS. HUMAN FACTORS IN SYSTEM ENGINEERING DEVELOPMENT



Abstract

The complexity of systems today in a wide variety of industries has increased and will further increase. Many methods and models have been developed over the decades to help dealing with the complexity by providing systematic toolboxes in form of workflows, processes, tools, etc. . Nevertheless the impact of human factors on the final results and on how successful systems in general are specified, designed, integrated, tested, manufactured still is widely underestimated. In this presentation Andreas is showing the relation of system complexity on one side and human factors on the other side in the form of a few simple examples, which show, that technical and process knowledge as well as methods and models alone are not enough when it comes to being successful in complex system engineering and that the management of system complexity is an art in itself.

Biography

Andreas Trautmann has an industry experience of nearly 22 years and has been working in the regulated industry for over 16 years now. As department leader he currently is responsible for the MAIT (Manufacturing, Assembly, Integration and Test) for Space subsystems at RUAG Space in Zurich. Since 2012 he set up a new process and role model for these MAIT activities implementing a framework allowing an effective and efficient state-of-the-art process for a stringent approach to procurement, manufacturing, assembly, integration and testing. Before his current position he has been Director for Global Verification & Validation and lead the transnational companywide V&V activities for the Biotech Global Player QIAGEN leading teams in Hombrechtikon, Switzerland and in Washington, D.C., USA. Before he has worked for 9 years in the Aerospace industry at EADS Military Aircraft and Airbus in Hamburg Germany as a group and project leader.



Thomas Riesen | Noser Engineering
IOT BECOMES REALITY

Abstract

The presentation IoT(Internet of Things) becomes Reality starts with a short history and shows that IoT is more an evolution than a revolution. But there are many reasons for IoT approaches and associated business cases. First of all, we should find a clear customer value and a good understanding of how a company can generate additional revenues by offering a new product which includes digital services. By combining the physical value of a product with digital services there can evolve an increased customer benefit and a whole new complexity of the product. This can lead to an extensive reshape of an organisation. Important aspects of an IoT approach like connectivity, security and cloud applications are explained with the help of real projects.

Biography

Thomas Riesen holds a Bachelor's degree in Electronics as well as a Master's degree in Business Administration. He works as Business Unit Manager at Noser Engineering. Internet-of-Things and the related technology concepts are important in the daily work of Thomas Riesen since more than 14 years. He is initiator of My Lock which is – in fact – a typical example of IoT. My Lock is an electronic locking solution with innumerable applications and allows sharing of access rights by use of the Smartphone. Data from the lock is transferred to a cloud application and processed to enable digital services to the users.

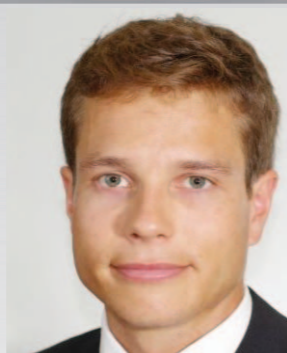




STEFAN AESCHBACHER
PostAuto Schweiz AG



ANNE BRUSEBERG
The Ergonomen Usability AG



GREGOR SCHÜTZ
ABB



MARKUS WALKER
Schindler Elevator Corp



FRANK RITZ
Ritz Engineering



ANTONIO CASCIELLO
RUAG Space



PHILIPPE HENNEAU
Schindler Elevator Corp



36 MIKE JOHNSON
RUAG Space



SEBASTIAN KLAVES
Siemens Schweiz AG



DENNIS LANDMANN
BeOne Schweiz AG



EMANUEL MONDGENAST
BeOne Schweiz AG

AND ALSO SPECIAL THANKS GOES TO:

BEATRICE EGGER WALKER

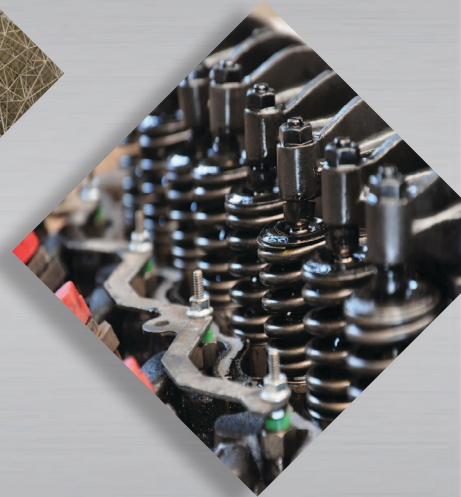
KATHERINE JOHNSON

MARILYN ROUX

PERSONAL NOTES

PERSONAL NOTES

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