

12th September - Kongresshaus, Zurich

SWISSED16

The Swiss Society of Systems Engineering Day



SWISSED16 is the third Annual Symposium of the Swiss Society of Systems Engineering (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.

SSSE

INCOSE
International Council on Systems Engineering

WHAT IS SYSTEMS ENGINEERING?

- Enables identification of requirements
- 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 SHOULD ATTEND SWISSED16?

- 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

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 SSSE AND INCOSE

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>.

SSSE



INCOSE is a not-for-profit membership organisation founded in 1990 to develop and disseminate the interdisciplinary principles and practices that enable the realisation of successful systems. Today, there are over ten 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.

SSSE



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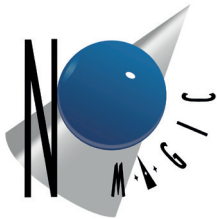


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Together ahead. RUAG

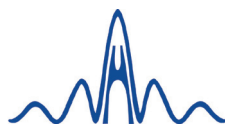


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TECHNICAL PROGRAMME

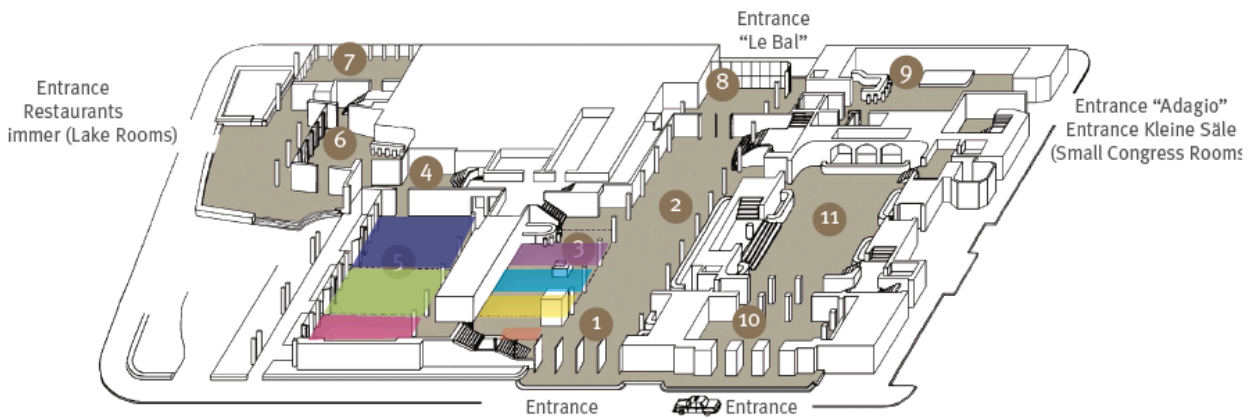
DOORS OPEN AT 8:00 FOR REGISTRATIONS AND REFRESHMENTS

TIME	LECTURES AND PRESENTATIONS				
8:50	WELCOME: Introduction by the SSSE President				
9:00	KEYNOTE SPEAKER I: Prof. de Weck, MIT, Systems Engineering: Journey from Adolescence to Adulthood (1991-2016)				
9:55	REFRESHMENTS				
	MEDICAL DEVICES	AEROSPACE AND DEFENCE	AGILE SYSTEMS ENGINEERING	IoT AND INDUSTRY 4.0	TRANSPORT AND GENERAL SE TOPICS
10:25	Pierfelice Ciancia <i>FRIKART Engineering</i> Application of MBSE to a start-up in the medical device domain: the added value.	Stefan Hänggi <i>Armasuisse</i> The need for Domain-specific, rich visual Systems Engineering languages	Tim Weilkiens & Alexander Stein <i>DOSE</i> The Muddle of Agile Systems Engineering	Dr. Yang Hu, Dr. Thomas Palmé & Dr. Olga Fink <i>Zurich University of Applied Sciences (ZHAW)</i> Deep Fault Detection	Gerd Maier Stadler Altenrhein AG <i>SIEMENS (SPONSORED)</i> Supporting conformity of product requirements and compliance documents with SIEMENS Teamcenter
11:00	INTRODUCTION TO SWISSSED 16 SPONSORS				
11:40	Mariana Reyes Perez <i>QIAGEN</i> The Role of Systems Engineering in the GeneReader NGS System		Colin Hood <i>Colin Hood SE Ltd.</i> The V-Model is Dead. Long Live the V-Model!	Didier Pagnoux <i>Altran</i> The Industrial Consortium S3P (Smart, Safe, and Secure Platform) to build an IOT Platform	OPEN DISCUSSION <i>Guest Panel</i> How does implementing Systems Engineering enhance an organization's competitiveness?
12:15	LUNCH				
13:15	Daniel Lucas-Hirtz and Christophe Benz <i>Sonova AG</i> Less requirements, more agreement: delta tree platform governance at Sonova AG	Andreas Märki <i>RUAG Space</i> Lean Back and Ask Basic Questions - e.g. on Lunar Laser Ranging	Dr. Laurent Balmelli <i>Sodius Corp (SPONSORED)</i> Introducing the Next Collaboration Platform to Accelerate Model-Driven Engineering Data Flows	Richard Crisp <i>IBM</i> Predictable Development for the Internet of Things	Lilach Goren Huber <i>Zurich University of Applied Sciences (ZHAW)</i> Predictive Maintenance of Hull and Propeller for Marine Vessels"
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TECHNICAL PROGRAMME (CONTINUED)

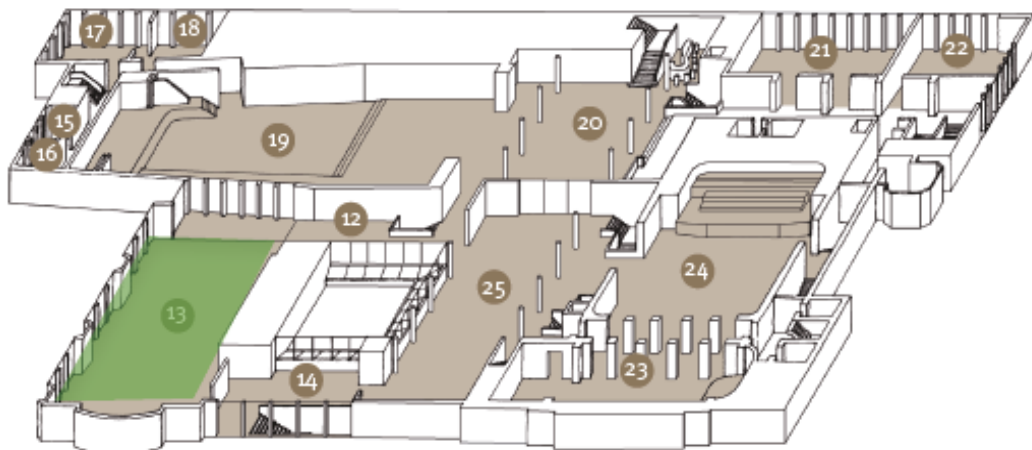
	MEDICAL DEVICES	AEROSPACE AND DEFENCE	AGILE SYSTEMS ENGINEERING	IoT AND INDUSTRY 4.0	TRANSPORT AND GENERAL SE TOPICS
14:00	Szymon Kostrzewski <i>KB Medical</i> Systems Engineering for AQrate SYSTEM	Mathias Burkhalter, Oliver Kunz, and Bengy Wüthrich <i>RUAG Space</i> Agile development in the space business	Christian Bühlmann <i>Supercomputing Systems AG</i> Kenjutsu on legacy systems	Hedley Apperly <i>PTC (SPONSORED)</i> Agile Systems Engineering	Markus Walker and Mike Johnson <i>Schindler AG and Roche Diagnostics International</i> Applying Pragmatism to Systems Engineering
14:35	REFRESHMENTS				
15:00	KEYNOTE SPEAKER II: Mr D. Bishop, Cambridge Consultants, Barriers to the Adoption of System Engineering in the Healthcare Industries				
16:05	Rolf Knobel <i>Roche Diagnostics International</i> Development of High Integrity Diagnostics Results Calculation Algorithms	Sonia Ben Hamida <i>Ecole Centrale Paris</i> Towards a Design-to-Value approach in early design stages	Markus Schacher & Rolf Gubser <i>KnowGravity</i> Integrated Modelling for Engineering Complex Heterogeneous Systems	Bruce Douglas <i>IBM (SPONSORED)</i> Safety and Security in the IoT	Prof. Jörg Sekler <i>FHNW - School of Engineering</i> The Systems Engineering Landscape from the Perspective of a Swiss University of Applied Sciences (UAS)
16:50	OPEN DISCUSSION <i>Guest Panel</i> What are the future challenges for implementing SE in the medical device industry?	Dr. Anton Ivanov <i>EPFL Space Engineering Center</i> Hyperspectral remote sensing with small satellites	Aiste Aleksandraviciene & Aurelijus Morkevicius <i>No Magic</i> Deploying Model-Based Systems Engineering: Best Practices	Max Edelmann <i>FHNW - School of Engineering</i> Industry 4.0 in R&D & Continuing Education at the University of Applied Sciences Northwestern Switzerland	Dr. Laurent Balmelli <i>Sodius Corp</i> Driving Collaborative Innovation across System Engineering Modeling Activities
17:25	STUDENT PRIZE AND CLOSING				
	APÉRO				

SITE MAP



Entrance Level

- 5 Gartensaal (Garden Room) A - Trakt 1
- 5 Gartensaal (Garden Room) B - Trakt 2
- 5 Gartensaal (Garden Room) C - Trakt 3
- 3 Tagungszentrum (Convention Center) 1 - Trakt 4
- 3 Tagungszentrum (Convention Center) 2 - Committee
- 3 Tagungszentrum (Convention Center) 3 - Trakt 5
- Garderobe



Meeting Room Level - First Floor

- 13 Panoramasaal (Panorama Room)

KEY NOTE SPEAKERS



Olivier L. De Weck
Massachusetts Institute of Technology

BIOGRAPHY: Prof. de Weck's main field of research is in Engineering Systems. He focuses on how complex man-made systems such as aircraft, spacecraft, consumer products and critical infrastructures are designed, manufactured and operated and how they evolve over time. His main emphasis is on the strategic properties of these systems that have the potential to maximize lifecycle value. His research group has developed quantitative methods and tools that explicitly consider manufacturability, flexibility, and sustainability among other characteristics. Significant results include the Adaptive Weighted Sum (AWS) method for resolving tradeoffs amongst competing objectives, the Delta-Design Structure Matrix (DSM) for technology infusion analysis, Time-Expanded Decision Networks (TDN) and the SpaceNet and HabNet simulation environments. These methods have impacted decision-making for complex systems in space exploration (NASA, JPL), terrestrial exploration (BP) as well as sophisticated electro-mechanical products (e.g. Xerox, Pratt & Whitney, DARPA).

SYSTEMS ENGINEERING: JOURNEY FROM ADOLESCENCE TO ADULTHOOD (1991-2016)

ABSTRACT: The International Council on Systems Engineering (INCOSE) was founded in 1991 to satisfy a need for engineers who could think across disciplines about the "whole system", instead of just one discipline at a time. This was also the first year the famous "V-Model" was published. This talk will address a seemingly simple question. Is Systems Engineering (SE) any further along today than it was 25 years ago? What are the deeper scientific principles, methods and tools that now form the underpinnings of the discipline?

In this seminar I will trace the evolution of Systems Engineering over the last 25 years. I will do this by relating the evolution of systems engineering to my own professional journey from a practitioner of Systems Engineering on the Swiss F/A-18 and James Webb Space Telescope (JWST) programs to a scholar of Systems Engineering. I will argue that an empirical approach involving data mining, pattern recognition and generalization may be more promising than trying to derive systems engineering fundamentals from "first principles" (without data) as was attempted in the - largely ignored - General Systems Theory of the 1960s. Some recent research results involving engineering change cascades, multi-domain network flow representations and the ability to accelerate the design of complex systems by a factor of 5 based on a new Model-based Systems Engineering (MBSE) approach will be presented and discussed. My message will be that systems engineering fundamentals are much further along than many believe and that the discipline is indeed transitioning into adulthood.

KEY NOTE SPEAKERS



Duncan Bishop
Cambridge Consultants Ltd.

BIOGRAPHY: Duncan Bishop has spent 20 years in the management of complex, interdisciplinary, development projects, where he has a special interest in design processes for healthcare. His experience includes the development of both healthcare products and their manufacturing systems, in drug delivery, diagnostics, medical instruments and surgical implants. Prior to joining Cambridge Consultants, Duncan spent 19 years in the Engineer Branch of the Royal Air Force, where he was trained in systems engineering at the Royal Air Force College Cranwell and the City University. His duties included the maintenance, development and testing of aircraft and airborne weapons.

BARRIERS TO THE ADOPTION OF SYSTEM ENGINEERING IN THE HEALTHCARE INDUSTRIES

ABSTRACT: The increasing complexity of medical devices, and drug delivery systems, would lead one to believe that a systems engineering approach would offer significant advantages in the development process. In particular, most, if not all, medical device developments are true multi-disciplinary undertakings, rather than the more familiar variations on engineering disciplines. However, whilst there are medical device companies that have embraced, or at least, are starting to adopt, systems engineering principles, there are many others who have not seen systems engineering as the answer to increasing development timescales, cost and risk.

This paper examines the adoption of system engineering principles by the healthcare industry, and in particular, focuses on the barriers to that adoption (real or perceived), which may include cultural, regulatory, cost of tools, and custom and practice influences on the choice of development process. The paper will also consider the response of system engineers to this type of development environment, and how they might overcome those barriers.



PRESENTATIONS: MEDICAL DEVICES



Pierfelice Ciancia
FRIKART Engineering GmbH

BIOGRAPHY: Pierfelice Ciancia completed his Masters and his Bachelor Degrees in Electronic Engineering and his post-Master Degree in Systems Engineering at the University of Rome Tor Vergata, in Italy. He is now involved in Model-based Systems Engineering applied to Health and Medical systems. He works as a Systems Engineering consultant for Frikart Engineering GmbH.

APPLICATION OF MBSE TO A START-UP IN THE MEDICAL DEVICE DOMAIN: THE ADDED VALUE!

ABSTRACT: Model-based Systems Engineering can provide added value to start-ups in the medical device domain as well as to domains where Systems Engineering is traditionally applied.

In this presentation, a case study concerning a system developed to empower arm rehabilitation after stroke will be presented. A model-based systems engineering methodology has been applied to the original system concept, from business processes definition to system architecture design. The application of SE has led to the definition of new functionalities. A functional architecture has been defined and the first physical architecture concept has been adapted to the new business requirements coming out of the business processes analysis.

In conclusion, the effect of applying MBSE methodologies even to start-ups will be presented.



PRESENTATIONS: MEDICAL DEVICES



Mariana Reyes Perez

QIAGEN Instruments AG

BIOGRAPHY: Dr.-Ing. Mariana Reyes Perez has an Engineering Degree in Mechatronics, and a Doctoral Degree in the field of Systems Engineering. Her professional experience includes Research and Development in the field of Systems Engineering as well as Lecturer. Since 2014, she works as Systems Engineer in QIAGEN Instruments AG.

THE ROLE OF SYSTEMS ENGINEERING IN THE GENEREADER NGS SYSTEM

ABSTRACT: "The GeneReader NGS System" aims to sequence selected genes that are highly relevant for human disease diagnosis and therapy. This "System" consists of 5 subsystems, i.e. target enrichment, library preparation, clonal amplification, sequencing and bioinformatics analysis. The System's development involved the work of different disciplines in different countries. In order to master the complexity of its development process, system engineering tools and principles were used. This presentation will show the role of Systems Engineering in the development of the GeneReader NGS System. It will start with a brief introduction of the "System", a brief explanation about why Systems Engineering was used, and finally, how was implemented.



PRESENTATIONS: MEDICAL DEVICES



Daniel Lucas-Hirtz

Sonova AG

BIOGRAPHY: Daniel Lucas-Hirtz, Senior Requirements engineer at Sonova AG PC member Industry track IEEE RE ISPMA personal member, Swiss Requirements Day board member (2013-15), SPECIEF founder & board member (France), IREB supporting member, JLDP PC member.

LESS REQUIREMENTS, MORE AGREEMENT: DELTA TREE PLATFORM GOVERNANCE AT SONOVA AG

ABSTRACT: "System Requirements" have many goals:

- Product manager wants to drive the product's vision
- Project manager wants to plan costs, dates and risks
- Developers want detailed definition of new features
- V&V team wants to test the complete system
- QA wants legal requirements compliance
- We all want to reuse features in next products

We've experienced how, when taken together, these expectations have led to a monolithic monster which, willing to achieve all targets, has failed them all.

At Sonova, within System Design team, in charge of next generation hearing system platform, we've therefore decided to document agreement incrementally:

- A platform is delivered in system releases
- A system release is a set of deltas from a given base release
- A delta is the incrementally maturing unit of commitment to deliver additional value in a release
- The set of deltas are depicted in a one page delta tree, showing deltas, their dependencies, their maturities, and their releases
- A delta has an initial brief scope which is to be incrementally refined in detailed system requirements
- A product is based on system requirements with possible variants

After 3 years' experience for Sonova's key platform project, we present how we have set up and run this process, what we have gained from it, some challenges we have been through, and some ahead of us.



Christophe Benz

Sonova AG

BIOGRAPHY: Christophe Benz currently works as a Requirements Engineer for the Sonova Group in Stäfa. He has been involved with different development projects in the medical device industry for the last 9 years. In his role as a Requirements and Systems Engineer he is responsible for developing concepts and specifications, performing risk analysis and setting up change management processes.

PRESENTATIONS: MEDICAL DEVICES



**Szymon
Kostrzewski Phd**
KB Medical SA

BIOGRAPHY: Before founding KB Medical, Szymon Kostrzewski completed PhD studies in medical robotics at the Warsaw University of Technology in 2011. He conducted research at renowned institutions including the Stanford University, EPFL in Switzerland and the National Aeronautics and Space Research Centre DLR in Germany. He is author of multiple patents and received numerous awards for his research. Dr. Kostrzewski is member of the Scientific Advisory Board at the Warsaw University of Technology and International Electrotechnical Commission working on new standards in medical robots.

SYSTEMS ENGINEERING FOR AQRATE SYSTEM

ABSTRACT: AQrate Robotic Assistance system is indicated for precise positioning of surgical instruments and spinal implants during general spinal surgery. It is a completely new robotic system which was developed and certified by a start-up company in a very short time frame.

The presentation gives an overview of the approach to systems engineering during the development process and discusses practical experiences that were gained.



PRESENTATIONS: MEDICAL DEVICES



ROLF KNOBEL

*Roche Diagnostics
International*

BIOGRAPHY: Rolf Knobel is a trained physicist from ETH Zürich. He is working for Roche Diagnostics for 27 years. He has built up and led the molecular diagnostics system integration department. He has been instrument architect in several systems development projects. He is working as algorithms developer and application specialist for result calculation. At the moment he is process manager for systems architecture in the lead systems engineer department. He holds a double digit number of patents in the area of automation, processing and calculation. Rolf Knobel is married and has one daughter and two sons. He is a correspondence chess Grandmaster.

DEVELOPMENT OF HIGH INTEGRITY DIAGNOSTICS RESULTS CALCULATION ALGORITHMS

ABSTRACT: The laboratory diagnostics environment is dominated by cost pressure and excellent performance expectations. The development of new applications has to deal with regulatory constraints and time pressure.

Result calculation plays a key role in the development of a new product because it can be introduced faster than new instruments and disposables. An interdisciplinary team approach with molecular biology, technical engineering and software expertise is essential.

The presentation displays the process of diagnostics result algorithm calculation development in Roche Diagnostics.



PRESENTATIONS: AEROSPACE AND DEFENCE



Stefan Hänggi

Armasuisse

BIOGRAPHY: Stefan Hänggi 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 Switzerland and USA (Florida and Silicon Valley). He received a bachelor degree in information technology from the Zurich University of Applied Sciences. He is a co-author of 12 international patents.

THE NEED FOR DOMAIN-SPECIFIC, RICH VISUAL SYSTEMS ENGINEERING LANGUAGES

ABSTRACT: It is very common that large, complex projects involve many stakeholders over the full lifecycle. As example in the defence context, people from the top political leadership of a government to engineers designing a system component. In order to plan, build and run a successful system, sharing of SE information among all stakeholders is a key issue. Current SE languages, as example LML, SysML and UML are very powerful, but are readable and understandable from only a small percentage of all stakeholders.

According to my experience, there is a need for domain-specific, rich visual SE languages, in particular in the area of requirement engineering and architectural design. I will try to present domains which have great success in using rich visual representations and address possible ways to extend that to other domains.



PRESENTATIONS: AEROSPACE AND DEFENCE



Andreas Märki

OEI Opto AG

BIOGRAPHY: Andreas Märki works since more than 20 years in the Swiss space industry. He was group leader of the first group with the expression "Systems Engineering" in its name, and now he is expert in Opto-Mechatronics. He intensively worked on laser communication, first between two satellites, then from space to ground where the beam propagates partially through the atmosphere - exactly as in the LLR.

In the mechanical engineering Andreas may have some gaps - but please decide yourself at the end of the presentation.

This talk is based on private investigations.

LEAN BACK AND ASK BASIC QUESTIONS E.G. ON LUNAR LASER RANGING

ABSTRACT: If engineers stick to initial assumptions a project may deliver wrong results. This is demonstrated on the example of the Lunar Laser Ranging (LLR):

LLR has been performed the first time in 1962. It got then well known by NASA's Apollo program in 1969 and accuracies in the 2-3cm level were reported. In this session the theoretical background and the results of 4 LLR stations are presented. When leaning back and comparing the results with the basic theory one can see that only one of these stations performed as expected; the other three stations could not achieve the envisaged signal return what should have led to a different interpretation of the measurement results.

In the light of current anniversary another example of asking a basic question is shown. Here mechanical engineers are challenged.



PRESENTATIONS: AEROSPACE AND DEFENCE



Mathias Burkhalter
RUAG Space

BIOGRAPHY: Mathias Burkhalter works since more than 17 years in RUAG Space. He is Teamleader Systems Engineering in the product unit Mechanisms at RUAG Space. He received the Diploma in Mechanical Engineering from the ETH in Zürich in 1999.

His specific project experience covers a wide range of projects in the space business. His experience covers multidisciplinary systems engineering in the fields of mechanisms, actuators and structures developments. He is strongly involved in Research and Development projects. His project experience covers satellite structure, rocket fairing projects, satellite mechanisms and mechanisms for scientific instruments.

Some examples of projects are, IASI SCAU Mechanism (for Metop satellite), Small GEO satellite, Launcher Fairing activities, Planck Payload Module, Cargolifter CL 160, ATV spacecraft structure.

AGILE DEVELOPMENT IN THE SPACE BUSINESS

ABSTRACT: RUAG Space in Zürich has a significant footprint in the aerospace business and especially in the field of space mechanisms. The RUAG mechanisms portfolio covers a wide range from actuators, solar array drive mechanisms, antenna and thruster-pointing mechanisms up to multi-functional mechanisms for scientific instruments.

The increasing commercial pressure in the space business results in the necessity to have attractive products and to adapt development strategies to remain competitive in the future. In this context RUAG is exploring a new industrial development approach for space mechanisms. The approach has three cornerstones. The first is the early and deep involvement of the suppliers in the development, the second is the set-up of a dedicated development logic and the third is to have an extensive and well-structured concept phase. A core element of the development logic is to set up a team, which is enabled to develop an unconventional solution without being influenced and limited by existing rules.

At the same time this idea for an alternative development approach came up, RUAG started to think about a successor of the established SARA21 actuator, which is successfully used in many space applications as e.g. antenna pointing mechanisms. Consequently, the two objectives were combined and the "Future Actuator Project" was born.

The technical requirements for the next generation actuator were derived from market surveys, customer feedback and performance parameter evaluation.

In brief the main targeted improvements were:

- Higher torsional stiffness
- Higher detent torque
- Smaller step size
- Same or smaller mass and dimensions than the currently available SARA21 actuator while keeping an attractive price for the customer.

The presentation shows the new development approach and first breadboard (BB) testing results of the Future Actuator (FA) development performed by RUAG Switzerland.

PRESENTATIONS: AEROSPACE AND DEFENCE



Sonia Ben Hamida
Airbus Safran Launchers

BIOGRAPHY: Sonia Ben Hamida has been working as a system engineer since 2011 at Airbus Safran Launchers (ASL), the European leader in space transport. First, she took part in the Single European Sky Air traffic management Research (SESAR) program for 2 years. Then, she started a Ph.D. in partnership with the SystemX research institute and the École CentraleSupélec - one of the top French research institutes in system design. Her research focuses on how to design value proposition for new businesses under uncertainty. Sonia holds an engineer's degree in aerospace from the French Civil Aviation grande école. She published in the Conference on Systems Engineering Research (CSER), CERN PURES SAFE, the International Conference on Engineering Design (ICED) and the International Design Engineering Technical Conferences (IDETC). She is a member of the French INCOSE chapter and the Design Society. She will defend her Ph.D. early 2017. She is currently involved in ASL's advanced projects.

TOWARDS A DESIGN-TO-VALUE APPROACH IN EARLY DESIGN STAGES

ABSTRACT: During this presentation, I will introduce our Design-to-Value approach at Airbus Safran Launchers, a new mindset for advanced projects to take the customers on board.

Why Design-to-Value? Our goal is to support decision-making to design value proposition for new businesses. The challenge is to better connect decisions made in engineering and business domains, i.e. to put in balance stakeholders' benefits against both economic viability and technical feasibility. We focus our work on early stages of design where most impactful decisions are made.

We will look at the following questions:

- What's the ecosystem of actors?
- Where's the value? For whom?
- What are the competing offers?
- What are the most valuable concepts with regard to the possible value propositions?

We will go through the three steps the Design-to-Value approach is based on:

1. ValSearch: Analyzing the market by applying qualitative analysis based on the Business Model ontology.
2. ValUse: Designing value proposition for systems and services by adapting affordance-based design.
3. ValXplore: Exploiting knowledge gained during trade space exploration to help the decision makers form their preference.

I will illustrate the approach through Airbus Safran Launchers' advanced projects.

PRESENTATIONS: AEROSPACE AND DEFENCE



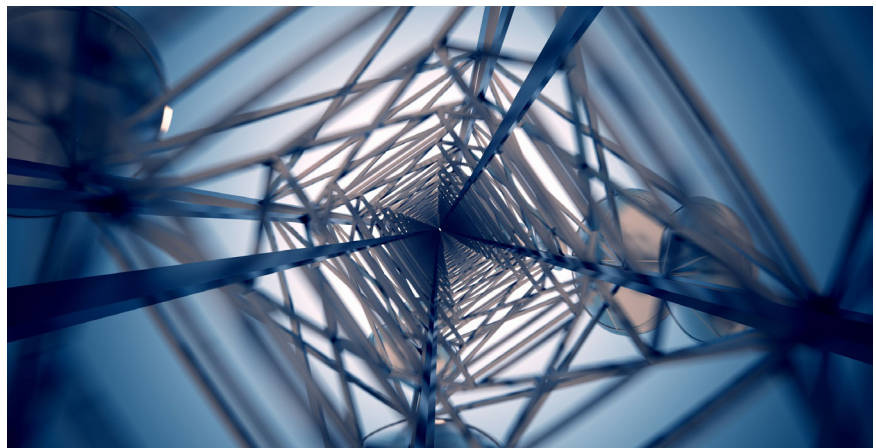
Dr. Anton Ivanov
*EPFL Space Engineering
Center*

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.

HYPERSPECTRAL REMOTE SENSING WITH SMALL SATELLITES: SYSTEMS ENGINEERING ASPECTS

ABSTRACT: This work presents a novel mission concept called SOLVE (Satellites Observing Lake and Vegetation Environments). The project aims at frequent observation of target scenes multiple times a day with a few days revisit time. Observations are carried out by a miniature hyperspectral camera in the spectral range between 375 and 1075 nm. We also utilize compressive sensing approach for our camera, which will reduce significantly data volume for download at cost of increasing on-ground data processing and modelling effort. The space segment will consist of 6 of more small satellites (less than 50 kg).

We have performed a study in a highly distributed manner with small enterprises, scattered across Switzerland. We will present the approach, process and tools utilized to make this study a very efficient demonstration of Concurrent Engineering approach.



PRESENTATIONS: AGILE SYSTEMS ENGINEERING



Tim Weilkiens

oose.

BIOGRAPHY: I am a managing director of the German consulting and training company oose, a consultant and trainer, and active member of the OMG and INCOSE community. As a consultant, I have advised a lot of companies in different domains.

THE MUDDLE OF AGILE SYSTEMS ENGINEERING

ABSTRACT: The term "Agile" seems to be well-known. Nevertheless, we will have a look on what "Agile" really means. What - except the Oxford Dictionary - is the source of the term "Agile".

Speaking of agile many people think of Scrum. A famous agile framework that has its origin in systems engineering, but is well-established in software engineering and many people think it is not possible to apply it in systems engineering. Another muddle of terms: do we engineer systems in an agile way or do we engineer agile systems.

If you are already deep in the muddle you can also think about the difference of agile and lean. And how the hell fits Kanban into that picture.

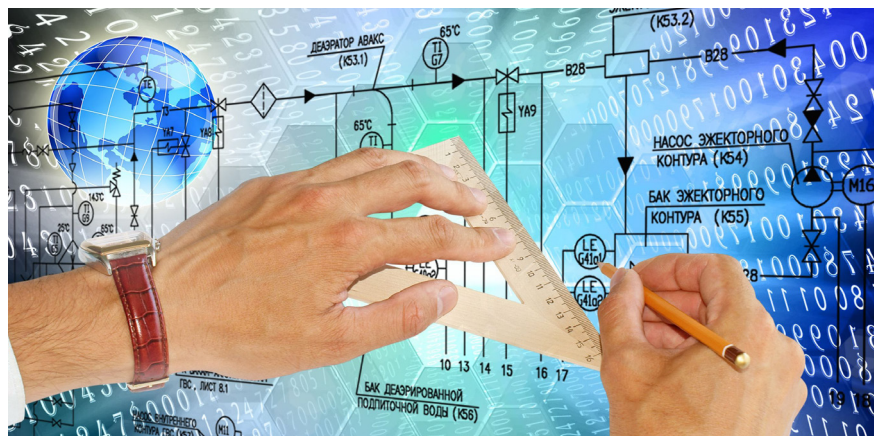
When we have cleaned up the muddle, we will look forward and cover scenarios and some hurdles of applying agile methods to systems engineering.



Alexander Stein

oose.

BIOGRAPHY: I am part of oose, a consulting and training company in Hamburg, Germany. In the last 8 years I helped single teams and whole companies within the realms of information technology, software development and beyond to apply agile development as a competitive advantage.



PRESENTATIONS: AGILE SYSTEMS ENGINEERING



Colin Hood

Colin Hood Systems Engineering

BIOGRAPHY: Since 1977, Colin Hood has been part of the evolution of the control systems from relay based systems, the Programmable Logic Controller (PLCs) up to modern software controlled systems. Colin Hood has been a systems engineer since 1985. In various industries Colin Hood has been responsible for the analysis, design, implementation, testing and delivery of complex mechatronic systems. Colin Hood's methods have always involved the pragmatic application of Requirements Management & Engineering. Colin Hood supports the organisational change process when implementing new methods or tools. This mostly results in a cultural change within the affected organisation.

THE V-MODEL IS DEAD. LONG LIVE THE V-MODEL!

ABSTRACT: A V-model documents relationships between information, and does not restrict the sequence of creation of information.

People who thought that a V-model is not useful or necessary are often dissatisfied with restrictions that they themselves have added to a V-model, rather than the original intention and essence of a V-model.

Some people think of a waterfall model when a V-model is mentioned. And it seems that most people have not read the original article, from which the waterfall model was extracted, from Dr. Winston W. Royce which warns against the simplistic one way step-by-step development with no iterations. Dr. Royce in his article **MANAGING THE DEVELOPMENT OF LARGE SOFTWARE SYSTEMS** highly recommends an iterative and incremental approach. In 1970 Dr. Royce was already practicing some essential elements of what today is known as agile.

A V-model represents graphically; ownership of and relationships between information.

A V-model is a static model and does not restrict sequence of creation of artefacts.

The V-model is state-of-the-art.

PRESENTATIONS: AGILE SYSTEMS ENGINEERING



**Dr. Laurent
Balmelli**
Sodius Corp

BIOGRAPHY: Dr. Laurent Balmelli received both his engineering and doctorate degrees from Ecole Polytechnique Fédérale de Lausanne (EPFL) in 1996 and 2000, respectively. He had 12-year tenure at IBM comprising 6 years in the Research Division (T.J. Watson Center, New York) and 6 years in Business Divisions including as member of the IBM CTO office. He is a co-author of the SysML language and holds 10 U.S. and Worldwide patents. He works today at Sodius Corp., a company specialized in high-technology solutions for Systems Engineering as strategic advisor to the CEO. He is also appointed as guest professor in Keio University in Tokyo, Japan and lecturer at EPFL, Switzerland.

INTRODUCING THE NEXT COLLABORATION PLATFORM TO ACCELERATE MODEL-DRIVEN ENGINEERING DATA FLOWS

ABSTRACT: Models are used from conceptual design down to the realization of engineering system. For example, SysML and requirement models (e.g. in IBM DOORS) are used to represent the product concept during early phases while Mathworks Simulink models are instrumental to perform simulations leading to manufacturable entities. In turn these entities are represented in a Bill of Material model (e.g. in PTC Windchill).

In this presentation our company announces a new tooling platform that allows engineers to deal more effectively with models across the engineering development process. In effect, we explain how engineers and managers can increase their return on investment in engineering modeling activities using our platform.

Our platform addresses the needs to distribute and gather design reviews across distributed stakeholders (internal or external to their enterprise) in a cost-effective manner and across a diverse set of artifacts attached to multiple projects. In addition, our platform allows users to define business rule-based model transformation easily to implement inter-discipline data exchange or tool data migrations across projects or product generations.

PRESENTATIONS: AGILE SYSTEMS ENGINEERING



Christian Bühlmann

Super Computing Systems AG

BIOGRAPHY: Christian Bühlmann began his engineering career in the field of communication devices for ASCOM in 1997. After a degree in software engineering from FH Rapperswil he gained experience in two major software projects (Notariatssoftware, Digitales Medienarchiv SRF), followed by engineering and project management for ZKE Netz (Vernetzung der Zugkontrollenrichtungen der SBB + BLS).

Since 2010 department head at Supercomputing Systems AG, he focuses on public transport projects, refit of legacy technology and highly available systems.

KENJUTSU ON LEGACY SYSTEMS

ABSTRACT: Cutting legacy systems to separate valuable elements from end-of-life components and gain better layering.

Integrating legacy back into working systems can save investments and provide smooth migration paths at low risks.

Systems refit allows to bring modern technology and connectivity into the public transport sector, where 90ies fashion is still omnipresent.

Two cases will be presented where the goal of prolonged lifetime of legacy hardware and a stealth migration were successfully achieved:

- Passenger information displays on bus-stops in Lucerne
- Ticket vending machines in Zug and Geneva

These projects evolved from an agile analysis, risk-reduction and prototyping phase into planned development and rollout.

Agile methods lead to quick and solid results during integration, deployment and stabilization.

PRESENTATIONS: AGILE SYSTEMS ENGINEERING



Markus Schacher
KnowGravity



Rolf Gubser
KnowGravity

BIOGRAPHY: Markus Schacher and Rolf Gubser are both co-founders of KnowGravity and co-authors of OMG-specifications and books. By providing UML training since 1997, they are professional modelers for several decades and help their customers as trainers and consultants to apply various modelling techniques in a beneficial way to leverage their modeling culture.

INTEGRATED MODELLING FOR ENGINEERING COMPLEX HETEROGENEOUS SYSTEMS

ABSTRACT: The design of complex heterogeneous systems is by nature an multi-disciplinary task: A common language must be defined, mechanical and electrical components as well as some control logic must be designed; physical behavior and properties as well as market and user needs must be analyzed; the risks implied by safety-critical systems must be evaluated and brought to an acceptable level; realized systems must be verified against their requirements and validated with respect to the effects in their environment.

The Systems Modeling Language (SysML) jointly designed by the International Council on Systems Engineering (INCOSE) and the Object Management Group (OMG) offers some coverage for those aspects. However, although being a broad-spectrum language, SysML is currently not able to deal with aspects such as strategy development, safety analysis or systems verification and validation in an appropriate way. Fortunately, as an UML profile that uses OMG's Unified Modeling Language (UML) as its host-language, SysML may be complemented by other UML profiles dedicated to specific domains.

In this presentation we will show, based on an elevator case study, how OMG's Business Motivation Model (BMM), Semantics of Business Vocabularies and Business Rules (SBVR), UML Testing Profile (UTP) and a UML profile for risk analysis (RIAL) may be combined with SysML to form an integrated model that covers all relevant aspects to engineer complex heterogeneous systems.

PRESENTATIONS: AGILE SYSTEMS ENGINEERING



Aiste **Aleksandraiciene** *No Magic*

BIOGRAPHY: Aiste Aleksandraviciene is a Solution Architect at No Magic Europe and takes responsibility for organising webinars, producing and maintaining training material as well as educating No Magic clients on modeling languages, methods, and tools via customer support, social networks, etc. Her expertise area is model-based systems engineering (MBSE) with special focus on managing system requirements. Also, Aiste actively collaborates with her colleagues in writing papers to promote the MBSE culture in systems engineering. Before joining the Solution Architects team, Aiste worked as the Documentation Manager and has over 5 years of practice as a technical writer.

DEPLOYING MODEL-BASED SYSTEMS ENGINEERING: BEST PRACTICES

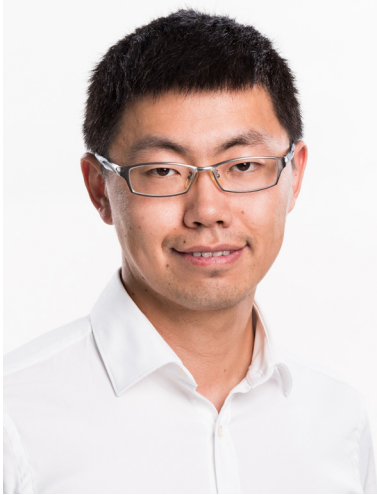
ABSTRACT: Engineers thought understanding the benefits of model-based systems engineering (MBSE) find hard to sell the idea of MBSE adoption in their organisations. Such bottom-up manner typically has to overcome a variety of obstacles: believing in MBSE is not enough, when you need to persuade the management and motivate colleagues from other departments.

This is the case, when you need a transparent vision, which helps answer the questions like how long does it take to adopt MBSE? How much does it cost? What are the main phases/ milestones of the adoption? How many people and what parties are involved in the process? What are the leading roles? what are possible risks? How much effort does the adoption require in overall?

When asked such questions, we as MBSE consultants suggest a typical tool independent scenario and guidelines for successful organisational transformation from document-based to model-based systems engineering by following the best practices of MBSE adoption in worldwide-known organisations.



PRESENTATIONS: IoT AND INDUSTRY 4.0



Dr. Yang Hu

*Institute for Data Analysis
and Process Design (IDP),
Zurich University of Applied
Sciences*

BIOGRAPHY: Yang Hu received the Ph.D. degree in the Energy Department, Politecnico di Milano, Milan, Italy in 2015, he is now a research associate in Zurich University of Applied Sciences. His research interests are in computational techniques in prognostics and health management, degradation mechanism modeling, machine learning, and uncertainty modeling and management.

DEEP FAULT DETECTION

ABSTRACT: Falling costs and increased reliability of sensing devices and data transmission has allowed condition monitoring to become near ubiquitous for many complex engineered systems. The data collected is usually high-dimensional and in high frequency sampling. Therefore, it is difficult or resource demanding to handle the raw condition monitoring data with traditional model- and knowledge-based approaches.

Due to the availability of massive amounts of data, new approaches that are able to extract the relevant features from raw data are required, for the purpose of detecting the fault onset and subsequently extract the health indicators to determine the remaining useful life.

In this talk, we will present an approach for automatically learning the relevant features and detecting faults without reliance on expert knowledge. This objective is achieved by stacked denoising autoencoder based on extreme learning machines. The approach is applied to a case study of a power plant generator and compared to other commonly applied approaches for fault detection that include dimensionality reduction and manual feature selection.

The proposed approach demonstrates an excellent ability to extract the relevant features even in the presence of many non-informative signals, and learn them without any expert knowledge. In the different parts of the monitored signals, the proposed approach is able to detect the onset of the anomalous conditions and trigger an early warning.

PRESENTATIONS: IoT AND INDUSTRY 4.0



Didier Pagnoux

Altran

BIOGRAPHY: Didier Pagnoux has been Altran World Class Center IoT Director since July 2014. After a first period spent as an officier in French overseas troops, Didier Pagnoux started a new career in telecommunications and entrepreneurship, in France and US. He joined a company specialized in trading rooms infrastructures in Paris, then he founded a security appliances designing company in California. Didier Pagnoux came back in France in 2007 to lead Ercom, a telecommunication and security engineering company. His main achievement was to transform Ercom into a product company, he successfully conducted three fundraisings and led the company to profitability within two years. Didier Pagnoux is graduated from ESM Saint-Cyr and ESCP Paris.

THE INDUSTRIAL CONSORTIUM S3P (SMART, SAFE, AND SECURE PLATFORM) TO BUILD AN IoT PLATFORM

ABSTRACT: Thanks to always smaller and cheaper electronics, software is about to be embedded into tenths of billions devices every year. Compared to a total of few billions, cumulated over the past 15 years. This is not a seamless evolution, this is a revolution impacting all industrial sectors: consumer, home automation, transport, energy, healthcare, ...

This is providing software vendors with a combination of technical challenges and business opportunities. Dependability (including security and privacy) remains a major concern. If security and safety are not properly addressed, it can be a showstopper.

Currently 2 solutions are available at the moment: Google (Android) in a quasi-monopolistic position and a myriad of proprietary, non-interoperable solutions addressing niche markets. S3P aims at providing a smart, safe, and secure alternative by creating an ecosystem of providers, at national then at European level, cooperating for stronger positions in the worldwide competition.

A variety of technical challenges are adressed within the consortium and will be discussed in the presentation: Proven separation mechanisms for programs and data; remote administration and update; re-usable secure components; high-level application models and consistent programming paradigms; deterministic behavior and latency bounds; support across hardware evolutions; hardware platform heterogeneity.

In the presentation Altran will present the use cases we are working on within S3P. On one hand an E-Health platform that will be certified ISO13485 and an Industry 4.0 application for digital, virtual and resources efficient factories. Our industry 4.0 use case is based on LORA low power transmission technology.

PRESENTATIONS: IoT AND INDUSTRY 4.0



Richard Crisp

IBM

BIOGRAPHY: Richard Crisp is Director of Systems Engineering in the IBM Watson Internet of Things Division. Richard was previously in the IBM Rational business and before joining IBM worked in Industry for 25 years applying Systems thinking to the design and development of complex products.

PREDICTABLE DEVELOPMENT FOR THE INTERNET OF THINGS

ABSTRACT: The European Union has been funding a 82m Euro project comprising 70 partners in 10 countries addressing the challenges of improving Engineering Lifecycle management and better managing data and information across the lifecycle. The project looked at transitioning from paper techniques to a digital approach to supporting the V Lifecycle to improve collaboration, productivity and efficiency, enabling new engineering methods. This was realised by developing a standardised Interoperability Specification validated by an Open Collaboration and Integration Platform to connect tools and expose and link data in a digital environment, as opposed to moving data around the eco-system into one central repository.

Due to the need for strong governance and safety critical demands of the Aerospace Industry we will discuss an Aerospace use case led by Airbus.



PRESENTATIONS: IoT AND INDUSTRY 4.0



Hedley Apperly
VP Solution Management

BIOGRAPHY: Hedley Apperly is the VP of Solution Management at PTC responsible for model-based systems & software engineering. He has undergraduate qualifications in production & manufacturing engineering, a first class BSc in computing & an MA in strategic marketing. He has more than 20 years' experience in bringing innovative and successful products to market. Hedley is an author and visionary on methodologies, modeling and reuse, having co-authored *Component Based Development for Enterprise Systems* (1998 Cambridge University Press), *Component Based Software Engineering: Putting the Pieces Together* (1999, Addison-Wesley) and *Service- and Component-based Development* (2002, Addison Wesley.) He also serves on the OMG Board of Directors.

AGILE SYSTEMS ENGINEERING

ABSTRACT: This session introduces Agile Systems Engineering using PTC's Model-based Systems Engineering approach. A real world automotive example is used to demonstrate these ground breaking Agile concepts for cross-discipline system architectures, simulation for stakeholders, connectivity to product data and modular system design for parallel scrum teams & product line variability.



PRESENTATIONS: IoT AND INDUSTRY 4.0



Bruce Douglas
IBM

BIOGRAPHY: Embedded Software Methodologist. Ironman triathlete. Systems engineer. Ultramarathon cyclist. Contributor to UML and SysML specifications. Writer. Black Belt. Neuroscientist. Classical guitarist. Bruce Powel Douglas, who has a doctorate in neurocybernetics from the USD Medical School, has over 35 years of experience developing safety-critical real-time applications in a variety of hard real-time environments. He is the author of over 6000 book pages from a number of technical books including Agile Systems Engineering, Real-Time UML, Real-Time UML Workshop for Embedded Systems, Real-Time Design Patterns, Doing Hard Time, Real-Time Agility, and Design Patterns for Embedded Systems in C. He has contributed to a number of standards including the UML, SysML, UML Profile for Schedulability, Performance and Time, UML Fault Tree Analysis Profile, and the UML Security Analysis Profile (in development). He is the Chief Evangelist at IBM Internet of Things (IoT), where he is a thought leader in the systems space.

SAFETY AND SECURITY IN THE IoT

ABSTRACT: Back when embedded systems were largely isolated away, their safety and security were relatively easy to ensure. However, with the advent of massively connected and distributed systems, issues of reliability, safety and security are raised in new and important ways. This is true in virtually all IoT applications, whether they are phone-based IoT apps, connected medical devices, remotely monitored power substations or modern automobiles. In the IoT age, it has become far more important that we can reason about the safety and security of such systems throughout the product engineering lifecycle. To this end, the author has created a UML Fault Tree Analysis Profile and another UML Profile for Security Analysis (both of which are in the process of being standardized within the Object Management Group) that provide model-based tools for reasoning about these qualities of service during requirements specification, systems engineering, architecture, embedded software, and IoT development. In addition, the Harmony Process, also created by the author, incorporates best practices during the engineering lifecycle to take advantage of these technologies.



PRESENTATIONS: IoT AND INDUSTRY 4.0



Max Edelmann
Institute of Automation

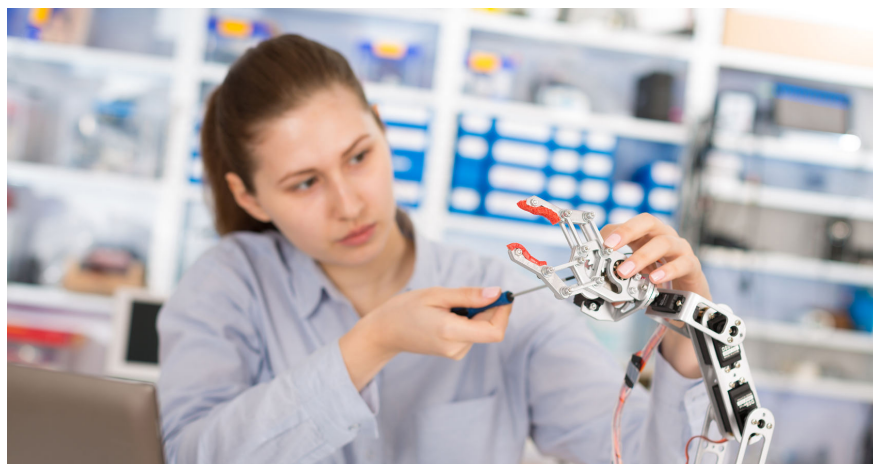
BIOGRAPHY: Max Edelmann received the BSc FHNW in Systems Engineering in 2011 and the MSc FHNW in Engineering with specialization in Industrial Technologies from the University of Applied Sciences Northwestern Switzerland in 2014. His MSc-Thesis was awarded in the field of Systems Engineering and in the field of Automatic Control. Since 2011 he joined the Institute of Automation as R&D-Engineer and worked in several I4.0-Projects.

INDUSTRY 4.0 IN R&D AND CONTINUING EDUCATION AT THE UNIVERSITY OF APPLIED SCIENCES NORTHWESTERN SWITZERLAND

ABSTRACT: Switzerland's universities of applied sciences are strong partners to the Swiss economy. The University of Applied Sciences and Arts Northwestern Switzerland FHNW comprises nine schools, each consisting of various institutes. FHNW Schools provide academic degree courses, continuing education, applied research and development, and services to third parties.

The School of Engineering is located at the campus in Brugg/Windisch and offers a well-established bachelor's degree in systems engineering.

Moreover FHNW launched an interdisciplinary core competence team to address the needs of enterprises facing the challenges of digitalization, known as Industry 4.0. An Overview of latest activities in this field and a new continuing education course will be highlights of this presentation.



PRESENTATIONS: TRANSPORT AND GENERAL SE TOPICS



Gerd Maier
Stadler
Altenrhein AG
SIEMENS

BIOGRAPHY: Gerd Maier has a Masters degree in precision mechanics (Dipl. Ing.) from FH Furtwangen (black forest). He has 25 years experience in railway industries. Starting his professional career at SIEMENS Erlangen as commissioning engineer, he placed vehicles into service. He led type tests and homologations for metro's, locomotives and trains. Since 2010 he leads at STADLER in Altenrhein the development and implementation of a requirement and verification management system to manage requirements and compliance documents.

SUPPORTING CONFORMITY OF PRODUCT REQUIREMENTS AND COMPLIANCE DOCUMENTS WITH SIEMENS TEAMCENTER

ABSTRACT: Until a railway vehicle gets the homologation to operate in public service, legal and product requirements have to be implemented and certified with documents. There are different sources of the requirements: Legal, customer or inhouse requirements. In the recent years, the number of those increased a lot. The presentation demonstrates, how it is at STADLER possible, to manage with the support of SIEMENS Teamcenter the conformity of product requirements and compliance documents. The project new high speed train EC250 for SBB is the base for the presentation.



PRESENTATIONS: TRANSPORT AND GENERAL SE TOPICS



Lilach Gorben Huber

*Zürcher Hochschule für
angewandte Wissenschaften
and Mespas AG*

BIOGRAPHY: I obtained a PhD in Physics at the Weizmann Institute of Science, Israel in 2011 and then worked as physicist and algorithm developer in a start-up company for optical remote sensing of wind using LiDAR technology. Currently I work as a research associate at the Institute for Data Analysis and Process Design of the Zürcher Hochschule für angewandte Wissenschaften (ZHAW), Winterthur, Switzerland. My research specializes on data analysis and methods for predictive maintenance and optimization of physical asset management. I have worked on various projects together with Swiss companies and public utilities. Some examples are: am-tec Switzerland, Swissport, SR Technics, Metair AG, Stadtwerk Winterthur, IWB.

PREDICTIVE MAINTENANCE OF HULL AND PROPELLER FOR MARINE VESSELS

ABSTRACT: The operation of large ocean going vessels requires an enormous amount of energy in the form of light and heavy oil. This entails the largest cost factor of the vessel operation, with over 20M\$ annually, and causes huge emissions of NOx, SOx and CO2.

In an on-going CTI-Project together with MESPAS AG we are developing a new software module for ship operators, which will enhance the competitiveness of the company in the international market. The new software focuses on optimizing the maintenance of the vessel hull and propeller in order to reduce the vessel fuel consumption. One aspect of this optimization, which gains importance in recent years, concerns the maintenance of the ship hull and propeller in order to reduce their friction due to biological organisms that attach to the ship body and propeller. This effect is termed "fouling" and leads to an increase in the fuel consumption of the vessel over the time.

Since the hull and propeller condition cannot be directly observed, we developed a statistical model for the hull condition over time. The model is based on large quantities of data, collected on board as well as through satellite systems and weather monitoring services. The model allows an estimate and a prediction of the hull and propeller fouling condition as function of time. On the basis of the model we developed a data-based optimization framework for the scheduling of various maintenance actions over a desired period of time in the future, that offers decision support for the ship operator regarding the relative efficiency and financial benefit of different maintenance schedules.

PRESENTATIONS: TRANSPORT AND GENERAL SE TOPICS



Markus Walker
Schindler AG



Mike Johnson
*Roche Diagnostics
International*

BIOGRAPHY: Markus Walker and Mike Johnson are part of the founding committee of the SSSE. They are working for Schindler AG and Roche Diagnostics International respectively, in Systems Engineering leadership roles.

SUMMARY OF "APPLYING PRAGMATISM TO SYSTEMS ENGINEERING"

ABSTRACT: At the INCOSE International Symposium in June 2016, a Panel session led by members of the SSSE tried to address pragmatism in Systems Engineering. In the presentation for SWISSED, a summary of the Panel session shall be presented, followed by questions from the audience to further the discussion of this key subject.

Systems Engineering should be applied pragmatically. Both, too little as well as too much is not beneficial. If Systems Engineering is seen as a Risk Mitigation framework then tailoring can be seen in the context of overall risk assessment and pragmatism may be more tangible.

- What is meant by tailoring and what are its limitations?
- Does the implementation of Systems Engineering methodologies without product owners lead to process-locked solutions?
- How can tailoring of SE methodologies lead to effective and efficient solution-oriented processes?
- Does thinking of SE as a risk mitigation framework help us apply tailoring more effectively? Esp. in decentralized organizations?
- How can SE methodologies be efficiently tailored for small entities?
- How can management trust the people responsible for tailoring the processes?
- Is tailoring essentially a people-centric process?

PRESENTATIONS: TRANSPORT AND GENERAL SE TOPICS



Jörg Sekler

*FHNW - Hochschule für
Technik*

BIOGRAPHY: Jörg Sekler studied Electrical Engineering (BSc.), Systems Engineering (with a MSc.-degree in Physical Systems Technology) as well as Technical Physics/Microtechnology (3rd cycle University courses). For many years he was specializing in Scientific Instrumentation for both industrial but also space applications at a contract aR+D center. Several space missions used his expertise in the miniaturization of high-rel sensors and instruments using novel measuring techniques. Nowadays, he is full professor at FHNW - University of Applied Sciences, where he teaches e.g. industrial Systems Engineering.

THE SYSTEMS ENGINEERING LANDSCAPE FROM THE PERSPECTIVE OF A SWISS UNIVERSITY OF APPLIED SCIENCES (UAS)

ABSTRACT: Although Systems Engineering education in Switzerland is - at the university level - a rather young discipline, at least at the various engineering faculties, this interdisciplinary degree program has been introduced already in the late 1960's. That time, some visionary persons in the Rhine valley pursued the idea to create a new top-class type of interstate university college at the borders between Switzerland, Liechtenstein and also nearby Austrian Vorarlberg state. Among the first professors hired in view of its formal creation in 1970, some were engaged directly from the US, where this study branch already existed since a few decades.

Nowadays, after the creation of the Universities of Applied Sciences and consequent mergers of previously independent colleges from 2003 about, this orientation of study exists at 7 locations of Swiss UAS (at bachelor degree level), but also at the 2 Federal Institutes of Technology (at a few master respective doctoral levels) and at some technical colleges (higher vocational degree). Every single UAS offers another profile of specialisation within its aR&D-institutes.

This talk will give an overview of the educational landscape in Systems Engineering in Switzerland and does discuss the specific strengths of the fourfold mission in practical oriented teaching at UAS level together with a focus on applied research and development.

PRESENTATIONS: TRANSPORT AND GENERAL SE TOPICS



**Dr. Laurent
Balmelli**
Sodius Corp

BIOGRAPHY: Dr. Laurent Balmelli received both his engineering and doctorate degrees from Ecole Polytechnique Fédérale de Lausanne (EPFL) in 1996 and 2000, respectively. He had 12-year tenure at IBM comprising 6 years in the Research Division (T.J. Watson Center, New York) and 6 years in Business Divisions including as member of the IBM CTO office. He is a co-author of the SysML language and holds 10 U.S. and Worldwide patents. He works today at Sodius Corp., a company specialized in high-technology solutions for Systems Engineering as strategic advisor to the CEO. He is also appointed as guest professor in Keio University in Tokyo, Japan and lecturer at EPFL, Switzerland.

DRIVING COLLABORATIVE INNOVATION ACROSS SYSTEM ENGINEERING MODELING ACTIVITIES

ABSTRACT: Visual models are used in Systems Engineering to support design activities across the stakeholders of complex systems. Models, such as Integrated Architecture Frameworks in defense or SysML models in aerospace, allow engineers to understand emerging system-level requirements and mitigate development risk. Hence early examination of a system through model artifacts is a critical process to yield success.

In this presentation, we discuss how to achieve robust, accurate models through collaborative processes and cross domain federation. In particular, we explain how innovation best practices, such as cross-discipline coordinated design reviews and system behavioral validation, can be embedded in the design process to increase the quality and accuracy of the design artifacts.

During the discussion, we will present several realizations of such a collaboration platform and demonstrate how they are used in real world applications.

Monday 4th September - Zürich

SWISSED17

The Swiss Society of Systems Engineering Day

KEY NOTE SPEAKERS



Dave Snowden

*Founder and Chief Scientific Officer
Cognitive Edge*

Founder and chief scientific officer of Cognitive Edge. His work is international in nature and covers government and industry looking at complex issues relating to strategy, organisational decision making and decision making. He has pioneered a science based approach to organisations drawing on anthropology, neuroscience and complex adaptive systems theory. He is a popular and passionate keynote speaker on a range of subjects, and is well known for his pragmatic cynicism and iconoclastic style.



Joseph Kasser

*Visiting Associate Professor
National University of Singapore*

Dr. Joseph Kasser was a practising systems engineer and manager for 30 years before joining academia. He is a recipient of NASA's Manned Space Flight Awareness Award (Silver Snoopy) for quality and technical excellence for performing and directing systems engineering and many other awards and commendations. He is an INCOSE Fellow, holds a Doctor of Science in Engineering Management from The George Washington University, and is both a Chartered Engineer and a Certified Manager. He is currently a Visiting Associate Professor at the National University of Singapore.

INCOSE Representatives will be joining SWISSED17 and giving people the opportunity to take the ASEP / CSEP exam at the beginning of the conference.

**Please contact us if you would like more information about this opportunity:
SWISSED@SSSE.CH**

