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SWISS Systems Engineering Day

4th September - Lake Side, Zürich

INCOSE International Council on Systems Engineering

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Conquering Complex Conundrums Through Systems Engineering Education

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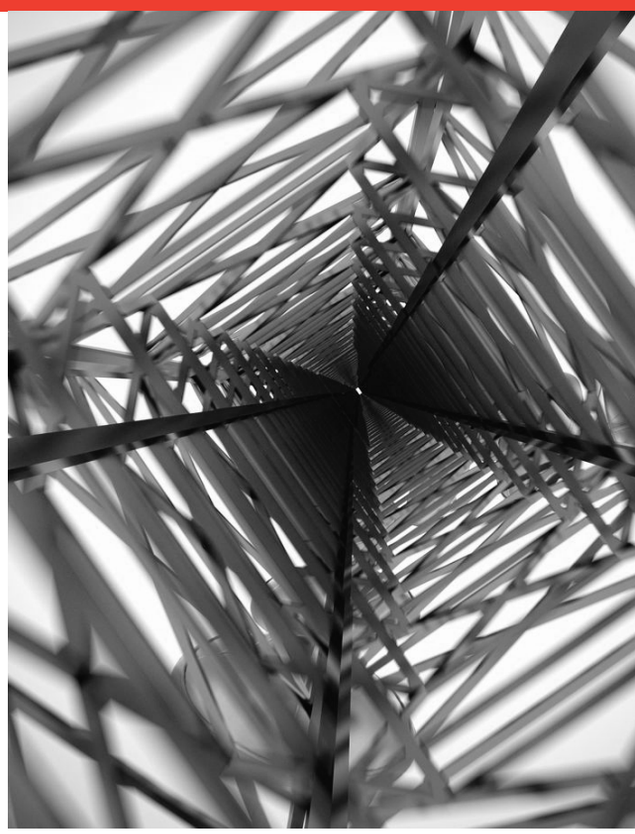
ABOUT SWISSED



SWISSED17 is the fourth 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.

SYSTEMS ENGINEERING

ENABLES KEY IDENTIFICATION OF REQUIREMENTS

REALISING INTEGRATION, VERIFICATION AND VALIDATION

PROVIDES A STRUCTURED AND AUDITABLE APPROACH

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MANAGES RISKS

OPTIMISES SYSTEM LIFECYCLES

TAKES AN OVERARCHING PERSPECTIVE

CONSIDERS THE WHOLE SYSTEM

FOSTERS AN INTERDISCIPLINARY APPROACH

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TECHNICAL PROGRAMME

ASEP/CSEP EXAM BEGINS AT 8:00. REFRESHMENTS AVAILABLE FOR NON-PARTICIPANTS

TIME/ROOM	TIERRA	VIENTO	AQUA	FUEGO
7:45	Doors Open, Registration & Refreshments			
08:00		ASEP/CSEP EXAM		
09:00	**Dieter Scheithauer** *Requirement Engineering Revisited*		**Andreas Trautmann** *Encouragement for Systems Engineers*	**Marc Zeller** *Development of complex safety-critical systems using model-based safety engineering: An industrial perspective*
09:35	**Eckhard Jokisch** *Specification - the Everyday Madness*		**Bernard Rygaert** *Key Aspects for Successful Systems Engineering*	**Alessandro Busachi Ceng Mimeche & Co.** *Modelling Applications of Additive Manufacturing in Defence Support Services for the Royal Navy*
10:10	**Thomas Dr. Hott** *The foundation stone for project success : The system-oriented WBS, devised by a lead systems engineer*		**Niels Malotaux** *How Systems Engineers learnt to meet all deadlines*	**Andreas Korff and Claudio Zuccaro** *How to design product lines by means of MBSE*
10:45	REFRESHMENTS			
11:05	Welcome & Introduction by SSSE President (AQUA)			
11:15	Keynote Speaker: Dave Snowden (AQUA)			
12:10	LUNCH			
13:30	Keynote Speaker: Joe Kasser (AQUA)			
14:25	**Gael F. Close & Co.** *Practical Systems Engineering for Microsystems Development: a Toolbox for Design, Verification and Industrialization*	**Patrick Link and Michael Lewrick** *Combination of Design Thinking and System Thinking to handle complexity in early stage innovation projects*	**Stefan Eisenring** *Successful Outsourcing in Medical Device Industry*	**Colin Hood** *Software are not the only Fruit: Modelling Mechatronic Systems*

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ASEP/CSEP EXAM BEGINS AT 8:00. REFRESHMENTS AVAILABLE FOR NON-PARTICIPANTS

	TIERRA	VIENTO	AQUA	FUEGO
15:00	**Andreas Poller** *A conceptual framework for implementing deep geological disposal of radioactive waste using object-process methodology (OPM)*	**Sonia Ben Hamid** *Innovate by Designing for Value*	**Dr. David Endler** *Safety Assessment for Medical Test Lab*	**David Almer** *Model Based Systems Engineering overview and practices*
15:35	REFRESHMENTS			
15:50		**Alexander Stein and Tim Weilkiens** *Agile for Systems Engineering - 3 Things you can Take Away*	**Maik Auricht and Ital Bolliger** *Digital Transformation in the Medical Device Business*	**Markus Schacher and Rolf Gubser** Model-based Engineering of Product Lines
16:25		**Alba Pennisi & Matthias Heinz** *Modeling "Agile" at Bombardier Transportation*	**Christoph Zinn** *How the Complexity of In-Vitro Diagnostic Medical Devices can Pose Challenges for Development Projects*	**Aiste Aleksandravičiene and Aurelijus Morkevicius** *An Approach: Model-Based Requirements Engineering*
17:00	STUDENT PRIZE AND CLOSING			
	APÉRO			

- SE PRAGMATISM
- SE METHODOLOGIES
- DESIGN THINKING & SE
- SE EXPERIENCE
- SYSTEMS MODELLING
- AGILE
- MEDICAL

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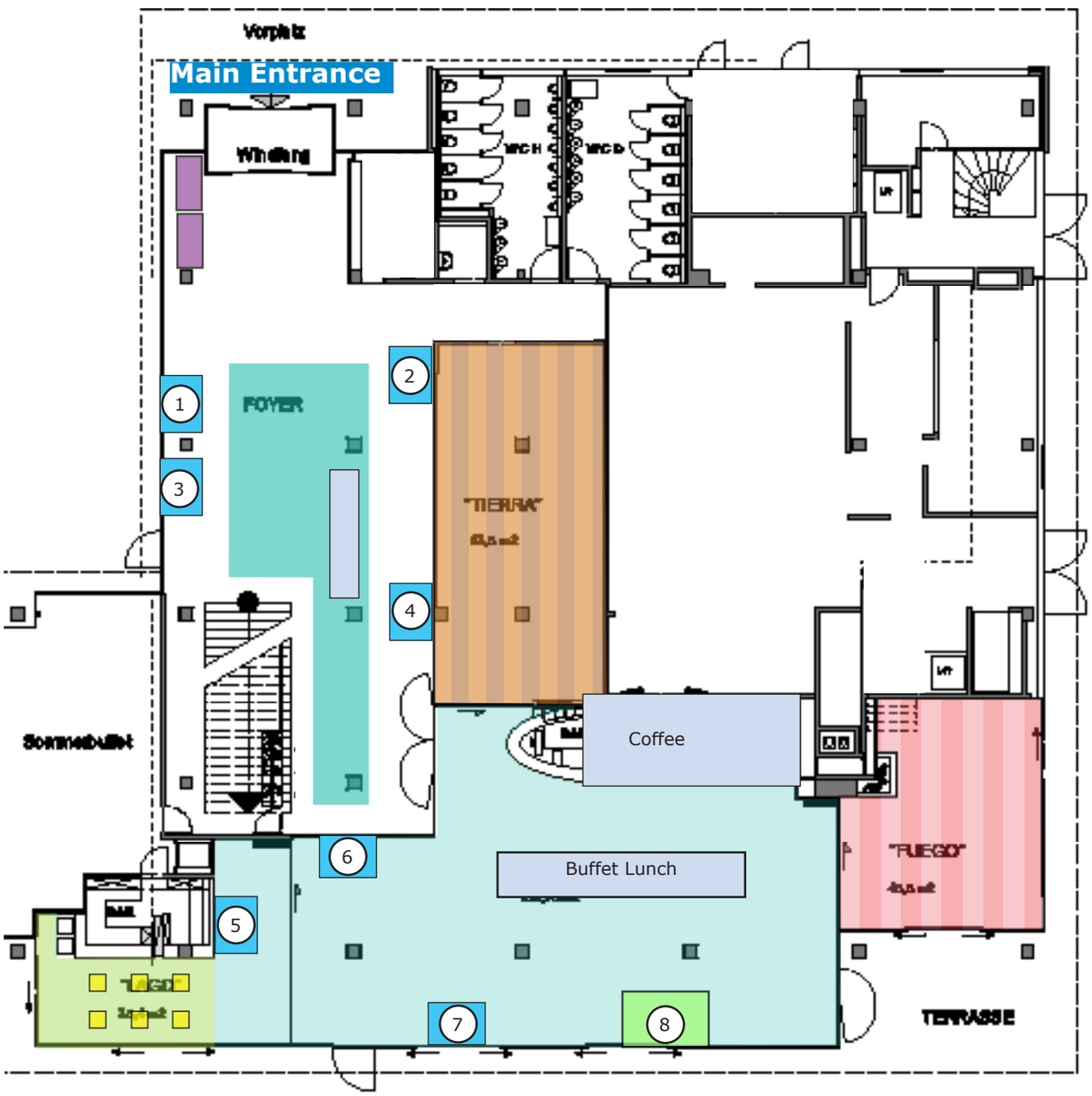
SITE MAP

Entrance Level



Rooms & areas

- Lunch area / coffee area
- Apero area
- Aqua - Track 3 (Keynote)
- Viento - Track 2 (Exam)
- Tierra - Track 1
- Fuego - Track 4

Objects

- Welcome desks
- Workplace (6 desks with 12 chairs)
- Buffet / Bar

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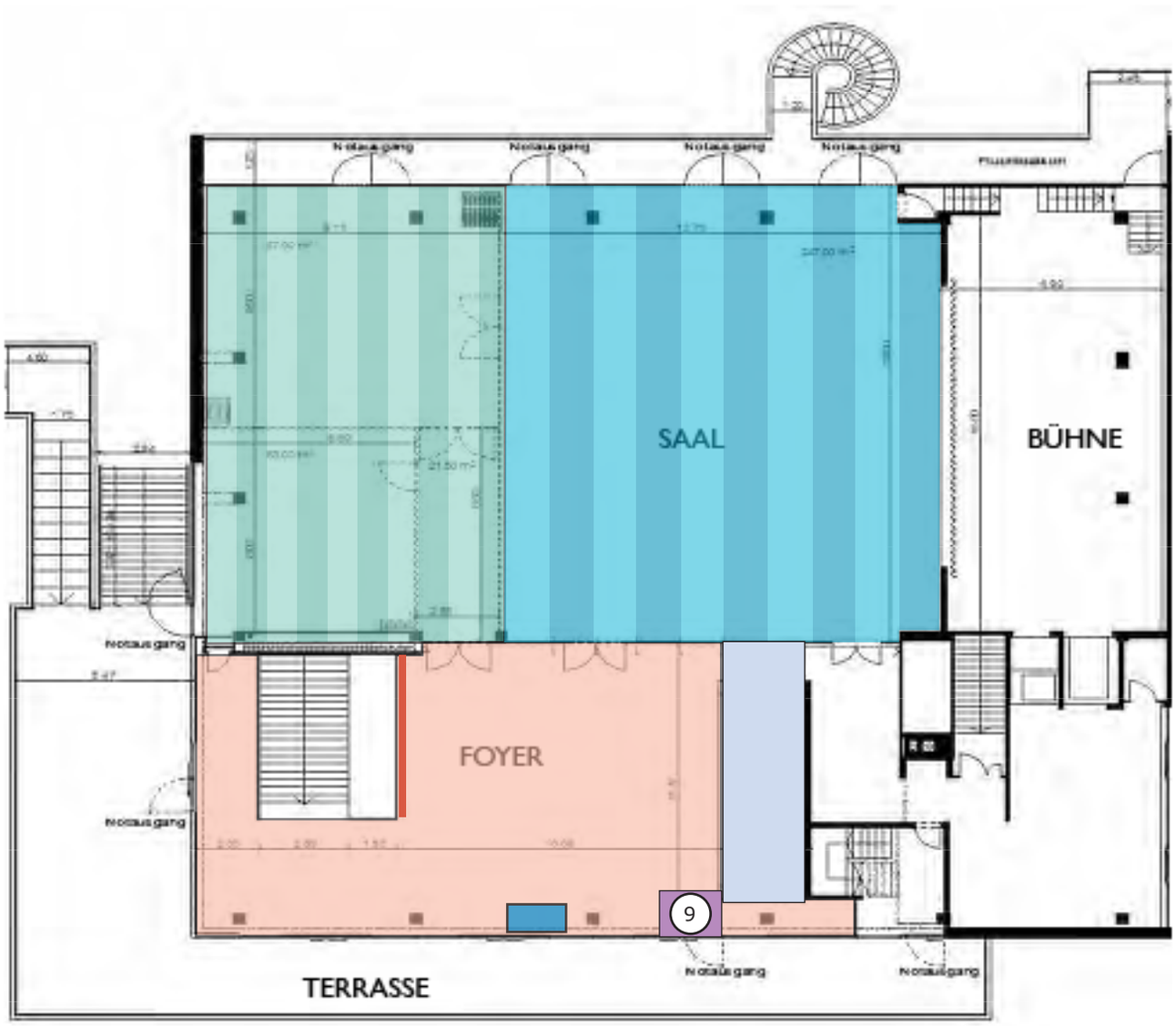
SITE MAP

First Floor



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DAVE SNOWDEN

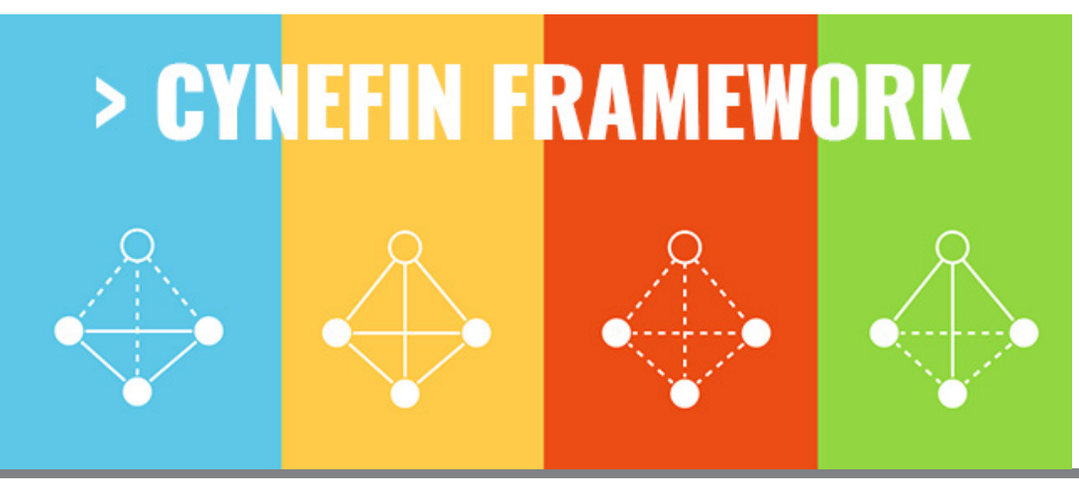
KEY NOTE SPEAKER

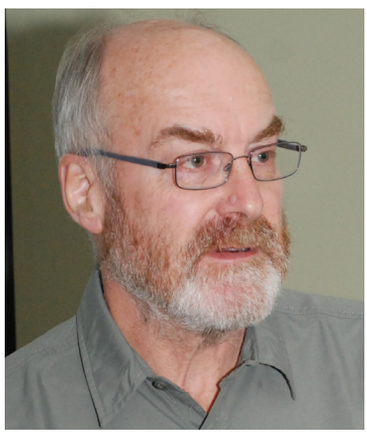
MANAGING COMPLEXITY IN SYSTEMS

ABSTRACT: The Cynefin framework has now been used around the world in contexts as diverse as the boardrooms of international fashion houses, software development teams and SWAT teams on the city streets. Decision-makers have applied it across all levels of organisation and in almost every industry.

Dave Snowden, the founder of Cognitive Edge and creator of the Cynefin framework will be presenting his perspective on managing complexity in systems engineering.

The original use in Knowledge Management (Complex Acts of Knowing) was recently assessed as the third mist cited article in the field and the HBR cover article on its application ot Leadership has won multiple awards. It was assessed as the first practical application of complexity science to business issues. It was more recently used in the Prince II Agile publication with direct application to project management. A new multi-client programme is about to commence to develop methods and tools for a new release of Prince II looking at the wider body of knowledge and practice. Complexity is a major paradigm shift from systems thinking which has dominated the last few decades and works from a basis in natural science, and an ecological not an engineering metaphor of the organisation and its market.





DAVE SNOWDEN

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 holds visiting Chairs at the Universities of Pretoria and Hong Kong Polytechnic University as well as a visiting fellowship at the University of Warwick. He is a senior fellow at the Institute of Defence and Strategic Studies at Nanyang University and the Civil Service College in Singapore.

In 2006 he was Director of the EPSRC (UK) research programme on emergence and in 2007 was appointed to an NSF (US) review panel on complexity science research.

He previously worked for IBM where he was a Director of the Institution for Knowledge Management and founded the Cynefin Centre for Organisational Complexity; during that period he was selected by IBM as one of six "on-demand" thinkers for a world wide advertising campaign. Prior to that he worked in a range of strategic and management roles in the service sector.

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DR. JOE KASSER

KEY NOTE SPEAKER

ENABLING COMPLEX DEVELOPMENT THROUGH SYSTEMS THINKING

ABSTRACT: Systems thinkers see things from different perspectives which allows them to identify issues other people cannot. This gives their project team the advantage of enabling complex developments.

Traditional systems thinking has focused on functional and operational perspectives of systems as typified by the often seen causal loops. While systems thinking provides an understanding of the situation, holistic thinking goes beyond systems thinking to identify solutions. This allows the holistic thinker to create innovative solutions while their colleagues are still reacting to problems.

In the past teaching and learning systems thinking has been difficult and has mainly focused on causal loops. That has now changed, expanding the concepts developed under a grant to Cranfield University from the Leverhulme Trust in 2007, the nine Holistic Thinking Perspectives have provided a standard set of perspectives and a way to use them that have helped many workshop and seminar participants to improve their problem solving skills by improving their thinking.

DR. JOE KASSER
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. His previous academic positions include being a Leverhulme Visiting Professor at Cranfield University, England and the Deputy Director and an Associate Research Professor at the Systems Engineering and Evaluation Centre in the University of South Australia.

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DIETER SCHEITHAUER

SE PRAGMATISM

REQUIREMENT ENGINEERING REVISITED

ABSTRACT: The imagination of a universal verbal or graphical language for expressing requirements would be reasonable, if the claim for the unity of science based on a universal language capable to express everything consistently would be valid. There is no proof for the unity of science, compared to several indications that the envisaged universal language is out of human reach. Consequently, the impact of the concrete process context cannot be ignored for expressing requirements appropriately.

The presentation discusses the various roles of requirements throughout the systems engineering process. Incidentally, the confusion induced by different definitions of the term requirement in ISO standards is resolved. Theory and practice of systems engineering benefit from a less dogmatic and more pragmatic view on requirement engineering.

DIETER SHCEITHAUER
H.I.T.S Engineering

Dieter Scheithauer provides systems engineering training, coaching and consulting services under the brand H·I·T·S Engineering.

He has studied electrical engineering with the focus on automatic control, and received the academic degrees Diplom-Ingenieur in 1980, and Doktor-Ingenieur in 1987.

He has more than thirty years of engineering experience in the field of automatic control, with the development of high-integrity technical systems including safety critical control systems, and defining, implementing and executing effective and efficient systems engineering processes.

He is a former president, and an honorable member of GfSE e.V. - The German Chapter of INCOSE. He was certified as INCOSE CSEP in 2010, and as INCOSE ESEP in 2012.

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ECKHARD JOKISCH

SE PRAGMATISM

SPECIFICATION - THE EVERYDAY MADNESS

ABSTRACT: Who is writing specifications and why? What are the obstacles that keeps engineers doing things that are proven to simply be inefficient?

It all starts with unhealthy requirements: through architecture by guts feeling, implementation based on best intention, and verification based on "yeah, well, it should work". Trainings and educations are often inefficient due to the lack of sustainable habitual transformation and the wrong people sent to the trainings by their bosses.

This presentation is about breaking the habit of having systems engineers doing all the work. It is about *whom* do we need to educate *how* to make engineering much less complex and much more reliable.

ECKHARD JOKISCH
Orange Moon Ltd.

Eckhard Jokisch has collected more than 17 years of requirements management and requirements engineering.

The focus is in the automotive industry and in the medical devices industry. He is passionate about simplification and precision in language. Throughout his career he has developed several methods to transform existing processes into much more efficient ways to deliver results.

Since a few years he is implementing transformational learning into engineering courses Eckhard Jokisch has not only a sharp analytic mindset but also is intrigued on how people are acting and why they are acting like they do.

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DR. THOMAS HOTT

SE PRAGMATISM

THE FOUNDATION STONE FOR PROJECT SUCCESS: THE SYSTEM-ORIENTED WBS, DEVISED BY A LEAD SYSTEMS ENGINEER

ABSTRACT: Many project jeopardising problems can be already avoided, or induced, as early as during the project initialisation & planning phase. Avoiding requires a sound understanding of the system (end product) to be created, the full-scope-of-work and full-scope-of-skills, as well as realistic estimates regarding overall costs and timeline.

The way to achieve this is a Work Breakdown Structure, devised by a lead systems engineer and not by pure project managers. It requires systems thinking, technical understanding and the application of certain development principles - and furthermore, congruency among all planning and reporting structures.

Based on real life experiences and examples from different industries this talk will explain the essentials for devising a useful, system-oriented WBS and how to create congruency among system architecture, organisational structure, time schedule, budget plan and reporting.

DR. THOMAS HOTT
Alten Switzerland

Dr. Thomas Hott studied physics in Heidelberg and made his PhD in 1997 in the field of particle physics. In the following 8 years he worked as Technical Coordinator for the installation & integration of several large-scale experiments at the particle accelerators at DESY (Hamburg) and CERN (Geneva).

In 2006 he joined again DESY as Technical Coordinator for the construction of the European X-ray Free-Electron Laser facility, where he established the central systems engineering and integration group, leading it until the end of 2011. In 2012

Thomas Hott moved to industry, joining Vesdo as senior consultant and member of the management (a company specialised in anti-counterfeiting measures for the pharmaceutical industry). Since May 2016 he is head oft the business unit for Systems Engineering & Scientific Computing at the ALTEN Switzerland AG in Cham.

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ANDREAS TRAUTMANN

SE EXPERIENCE

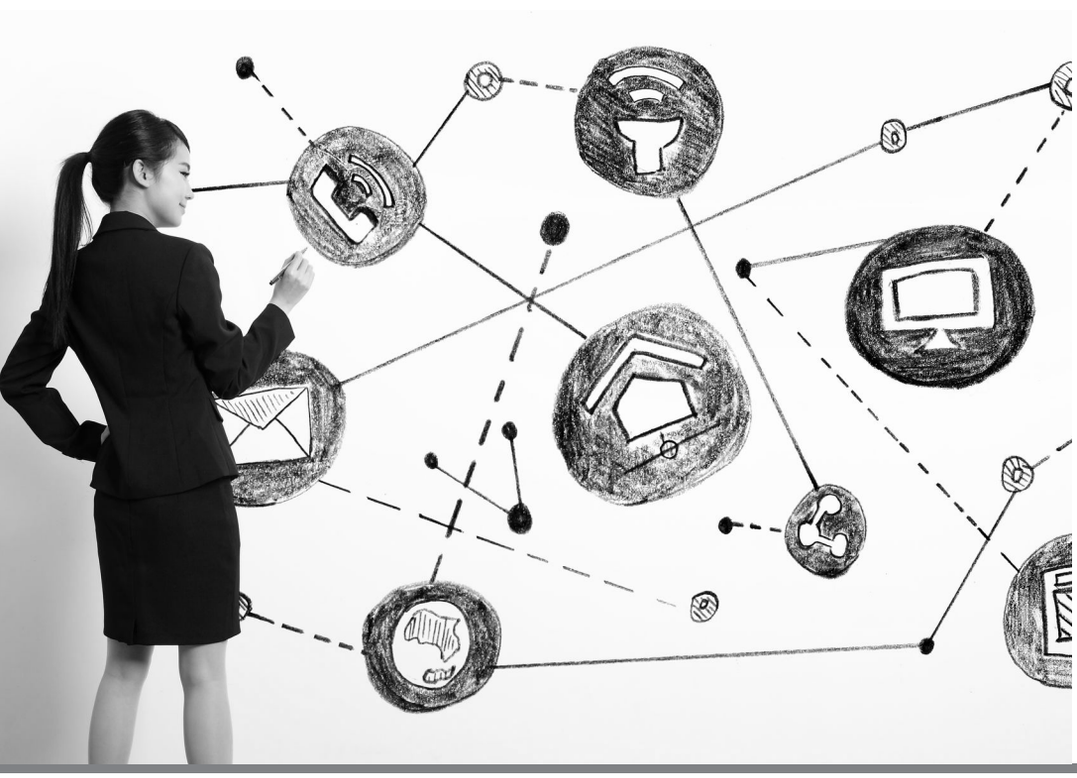
ENCOURAGEMENT FOR SYSTEMS ENGINEERS

ABSTRACT: A lot has been said and presented over the years on Systems Engineering processes, tools, general know-how, state-of-the-art as well as some of Systems Engineering obstacles and hindering elements in our practical daily life.

Andreas, in his presentation, tries to show what might lie behind some of the elements which we often experience day to day while doing System Engineering in projects, but only sometimes feel we understand and have a solution for.

He will penetrate into the secrets of social factors and more general misunderstandings which we all know about and are looking for help with.

Can we understand and overcome them?



ANDREAS TRAUTMANN
Global Verification and Validation

Andreas Trautmann has an industry experience of over 25 years and has been working in the regulated industry for over 18 years.

As a Director for Global Verification and Validation he lead the international company wide Verification and Validation (V&V) activities for the Biotech Global Player QIAGEN in the Automated Systems business branch residing in Hombrechtikon, Switzerland and in Washington, USA.

Before he had worked for 9 years in the Aerospace industry at EADS and Airbus in Germany as a department and project leader in development, integration and testing of complex safety critical aerospace avionic systems.

He began his engineering career 1994 in the automotive industry at the car manufacturer Audi after having studied Aerospace Engineering at the University of Stuttgart in Germany. He currently works as Consultant, Coach and Interim Manager with partner companies.

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BERNARD RYGAERT

SE EXPERIENCE

KEY ASPECTS FOR SUCCESSFUL SYSTEMS ENGINEERING

ABSTRACT: Systems Engineering is complex. However, we should base our daily work on pillars which are simple, effective and which help us to guarantee success. By simple we mean based on how the brain functions, which is intuitive. By effective we mean doing more with less, and by guaranteeing success we mean enabling constant validation to make sure we rest on track.

This talk shall present and discuss findings over the last 25 years of consulting in Systems Engineering in various domains. These outcomes became useful principles which were implemented for more rewarding and effective working behavior while helping customers to find their successful way more easily in their complex surrounding.

The baseline of the findings can be summarized in a system model composed of three layers as follows:

1. The system which represents the customer needs
2. The system which represents the conceptual solution (i.e. those concepts which will fulfill the system needs)
3. The system which represents the technical solution (i.e. Physical, Mechanical, Electronics, Software, etc.)

In the talk I will be pleased to present these foundations and its values including customer cases and discussion of these findings.

BERNARD RYGAERT
EVOCEAN

Bernard Rygaert has worked in Modelling and Systems Engineering since leaving Engineering studies in Louvain, Belgium in the early nineties. His work has always been focused on getting work done faster, relying on lessons learned and finding the right level of abstraction.

After spending the last years at IBM as a Senior Consultant for Model Driven Systems and Software Engineering he has joined EVOCEAN early 2017 as a Senior Consultant and Managing Partner at EVOCEAN France SAS in order to help to shape the future better.

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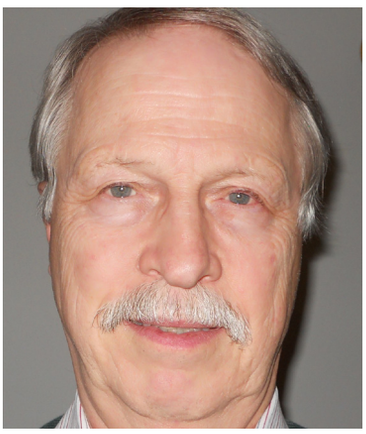
NIELS MALOTAUX

SE EXPERIENCE

HOW SYSTEMS ENGINEERS LEARNT TO MEET ALL DEADLINES

ABSTRACT: Engineers developing a space instrument complained they got too little time to do their job properly, having impossible schedules. All engineers were thoroughly trained Systems Engineers. They rightfully told me: "We have 27 years' experience and we're very good at it. What do you think you can add to that?"

A short exercise convinced them that one skill was still lacking: 'How to be on time'. Presenting, planning, scheduling, and time synchronizing as a design problem, quickly made it easy for these experienced engineers to tune their delivery time, designing how to be on time, every time.



NIELS MALOTAUX
N.R. Malotaux Consultancy

Niels Malotaux is an independent project coach for delivering Quality On Time: the right results within the time agreed, no excuses needed. Coaching areas include: requirements, delivering predictably on time, and reviews & inspections. Projects start delivering Quality On Time within a few weeks, and easily take 30% less time.

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MARC ZELLER

SYSTEMS MODELLING

DEVELOPMENT OF COMPLEX CRITICAL SYSTEMS USING MODEL-BASED SAFETY ENGINEERING: AN INDUSTRIAL PERSPECTIVE

ABSTRACT: The development of today's safety-critical systems therefore underlies a series of legislative and normative regulations making safety an important non-functional property of embedded systems. Thereby, one of the main requirements from industrial perspective is a sophisticated analysis of the system in terms of safety.

However, nowadays the system complexity is rapidly increasing and along with that the effort needed for safety assessment is increasing drastically in order to guarantee the high quality demands. However, this trend is contrary to industry's aim to reduce development costs and time-to-market of new products. Therefore, enhanced safety analysis techniques are required that scale to the increasing system complexity.

Model-based development is currently one of the key approaches to cope with increasing development complexity, in general. Applying model-based approaches during the development of complex products means the use of adequate models for different aspects of the system. Such models ease the development, increase the quality and enable a systematic reuse.

In this presentation, we illustrate a set of practical challenges in developing safety-critical systems and show how the adoption of model-based engineering for the development of safety-critical systems can cope with these challenges while decreasing the development costs and the time-to-market.

MARC ZELLER
Siemens AG

Marc Zeller works as a research scientist at Siemens AG, Corporate Technology, in Munich since 2014. His research interests are focused on the model-based safety and reliability engineering of complex software-intensive embedded systems.

Marc Zeller studied Computer Science at the Karlsruhe Institute of Technology (KIT) and graduated in 2007. He obtained a PhD from the University of Augsburg in 2013 for his work on self-adaptation in networked embedded systems at the Fraunhofer Institute for Embedded Systems and Communication Technologies ESK in Munich.

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ALESSANDRO BUSECHI CENG MIMECHE AND CO.

SYSTEMS MODELLING

MODELLING APPLICATIONS OF ADDITIVE MANUFACTURING IN DEFENCE SUPPORT FOR THE ROYAL NAVY

ABSTRACT: Wire+Arc Additive Manufacturing (WAAM) is a highly promising Additive Manufacturing (AM) technology which combines off-the-shelf welding equipment and industrial robot. WAAM technology is considered the most promising AM technology for large metal (Titanium, Aluminium and Stainless Steel) structural components.

In recent years WAAM is gaining the interest of the UK Naval Command Headquarters (NCHQ) and Defence Support Service (DS2) providers for de-localised manufacturing in the fronT-end of a support system. This is mainly due to reduce the Logistic Delay Time and increase the responsiveness to operation tempo of a platform.

In order to evaluate the impact of WAAM technology in the context of Defence Support Services, a Decision a Decision Support System has been developed to assess the cost, time and benefits of AM applications in DS2. This presentation aims at presenting a software prototype "Additive Manufacturing - Decision Support System" developed using a systems approach.

ALESSANDRO BUSACHI CENG MIMECHE & CO.
Cranfield University

Alessandro Busachi CEng MIMechE is a PhD Researcher of Cranfield University working on a PhD titled "Modelling Applications of Additive Manufacturing in Defence Support Services" sponsored by Babcock International.

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ANDREAS KORFF AND CLAUDIO ZUCCARO

SYSTEMS MODELLING

HOW TO DESIGN PRODUCT LINES BY MEANS OF MBSE

ABSTRACT: Almost all systems exist as product lines. Model-based product line engineering (MBPLE) extends SysML-based MBSE to take product variability into account. One valid approach is based on orthogonal variability modelling (OVM) according to ISO 26550. In this presentation we consider what is expected by modelers:

- Design product lines with the target to reduce internal variability without impacting external variability
- Assure consistency with other design artifacts
- Consistency of product line and variability model
- Create product models based on variability decisions
- Consider parametric variability
- We will show how to tackle these needs and apply them on exemplary models.

ANDREAS KORFF

Parametric Technology GmbH

Andreas Korff has over 25 years of experience in the development of complex, real-time, safety- and mission-critical systems. Within PTC, his role as Director Business Development for MBSE involves him in the successful coordination of market trends, customer needs and the capabilities of PTC products and staff about model-based systems and software development in EMEA. Being member of OMG, PROSTEP, GI, GfSE and INCOSE, he has written numerous articles, submissions and books and book contributions about UML, SysML, product line engineering and modelling methodologies. Within the Object Management Group, he contributes to several Revision Task Forces, like for OMG SysML.

CLAUDIO ZUCCARO

Parametric Technology GmbH

Claudio Zuccaro is professor for systems engineering at the University of Applied Sciences Munich in Germany since 2014. Before it, he gathered 16 years of professional experience in industrial R&D (telecommunication and space industry), 8 years thereof in management positions in systems engineering. He is member of the advisory board of the Gesellschaft für Systems Engineering (German chapter of INCOSE) and member of the extended board of QZV in Munich supporting SMEs in the field of quality management. His research and teaching focuses are systems engineering in general and model-based systems engineering and its application in industrial R&D in particular.

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MARKUS SCHACHER AND ROLF GUBSER

SYSTEMS MODELLING

MODEL BASED ENGINEERING OF PRODUCT LINES

ABSTRACT: In industrial settings, product lines are a common means to increase product versatility yet reducing production and operational costs. To design complex products consisting of hardware and software, SysML is today's favourite modelling language. However, SysML currently provides no dedicated means to express variability of product lines.

This presentation describes the key principles of product line engineering (PLE) and introduces "Orthogonal Variability Modeling (OVM)" that complements SysML as well as other UML-based modelling languages to support PLE. It also shows how specific product instances may be derived from generic product line models and what artefacts may be derived to automate product building, configuration and operation.

Some examples from a elevator product line developed at Schindler will illustrate the principles.

MARKUS SCHACHER
Know Gravity

Markus Schacher and Rolf Gubser are both founding members of KnowGravity Inc. and co-authors of a number of OMG specifications and books. By providing the first UML training in Switzerland back in 1997 they are professional modelers for several decades. As trainers, consultants and doers, they help their customers to apply various modelling techniques in a beneficial way in order to leverage their modeling culture.

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DAVID ALMER

SYSTEMS MODELLING

MODEL BASED SYSTEMS ENGINEERING OVERVIEW AND PRACTICES

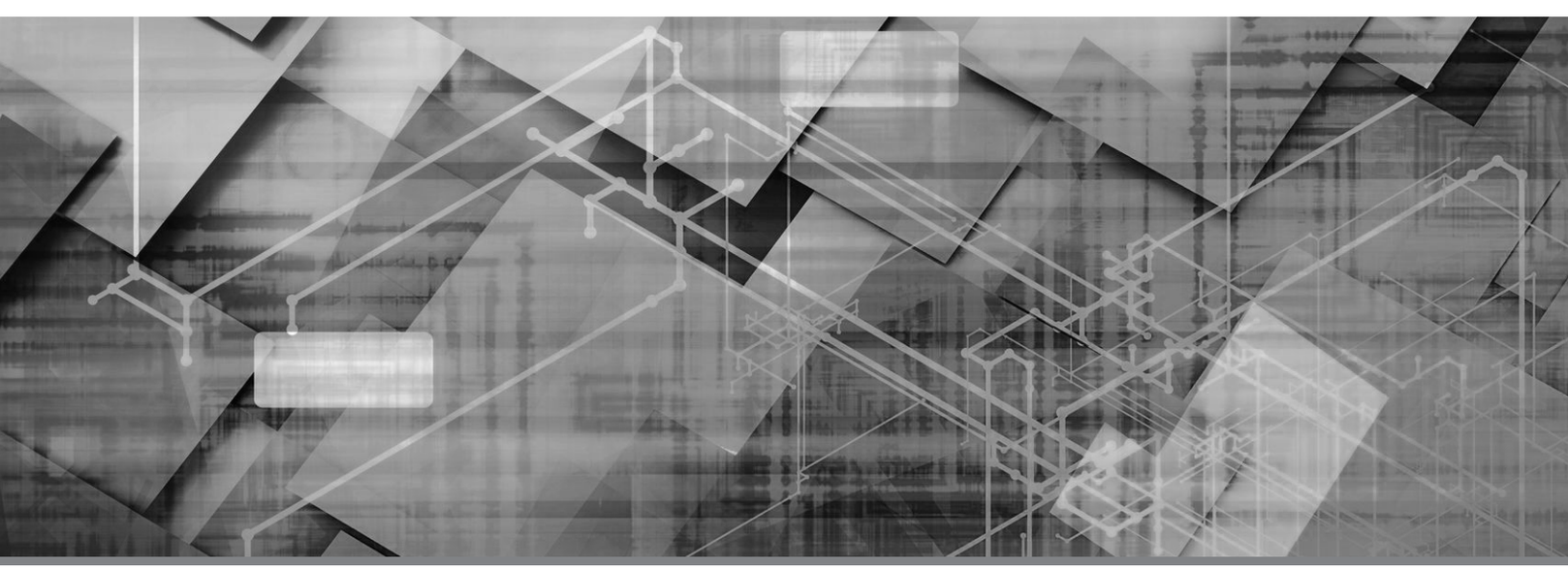
ABSTRACT: One of the challenges of Systems Engineering is to support the different parts of the RLFP Chain by using several software having a continuity from the requirements level to the validation with behavioral models.

In this presentation, an applicative case will be presented. From the requirements definition through the functional and logical models to the Physical model in order to close the loop between the behavioral simulation to the verification of the requirements.

The application will be supported by several software interconnected in order to give continuity to the realization of the systems engineering structure. This is the methodology called by Siemens SDPD (Systems Driven Product Development) and based in Siemens PLM Software.

DAVID ALMER
Siemens Industry Software AG

David Almer performed his engineering degree in Lyon (France) in modeling and simulation of behavioral systems. After a short time in Toshiba as R&D Engineer, he joined a start up founded by his professor of the Engineering school. This start up (Imagine) founded and developed a multi physics software for Simulation called AMESim which today belongs to the Siemens PLM Software portfolio. Thanks to the integration to Siemens, David started to be involved in the Systems Engineering domain by working in the implementation of the Systems engineering chain RFLP (Requirements, Fonctions, Logics & Physics). He belongs today to the Center Of Excellence of Siemens PLM Software division as Systems Simulation Manager.



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4th September - Lake Side, Zürich
SWISSED17
SWISS Systems Engineering Day

AISTE ALEKSANDRAVICIENE AND AURELIJUS MORKEVICIUS

SYSTEMS MODELLING

AN APPROACH: MODEL BASED REQUIREMENTS ENGINEERING

ABSTRACT: Requirements definition is one of the most important and critical phases of modeling any system. Mistakes made in requirements phase are much more painful than the ones produced in any later phase of system development. Multiple studies showed that more than 80% of all system defects occur because of misleading requirements specification. This proves the value and motivates the use of requirements engineering.

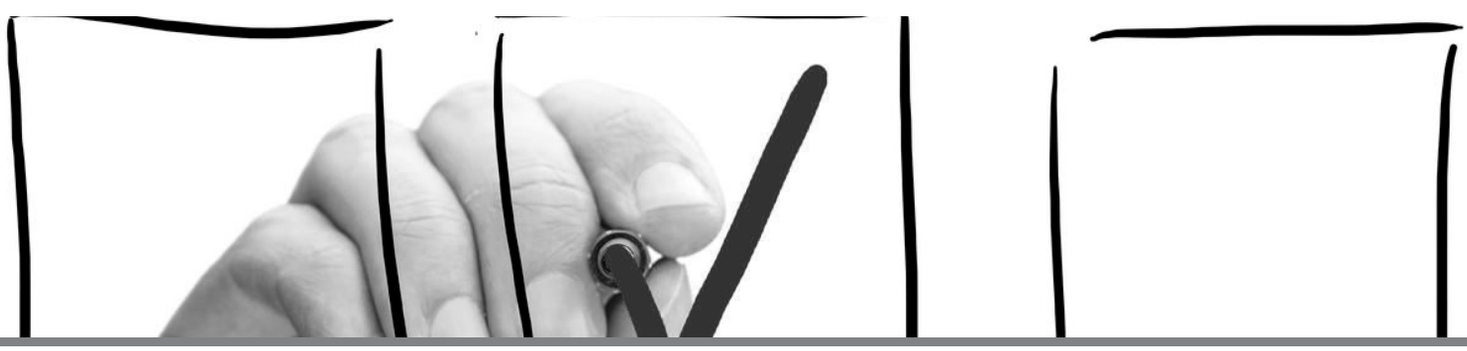
This presentation shortly introduces a SysML-compatible approach for Model-Based Systems Engineering (MBSE) and then focuses on a single part of it - the one for requirements engineering.

Starting from stakeholder needs elicitation and finishing with the detailed system requirements specification, the approach proposes ways and means for requirements categorization, grouping, horizontal and vertical traceability, metrics, and quantitative verification. Unambiguous modeling workflow and requirements traceability gives this approach a big advantage over similar methodologies and frameworks.

All the cases are illustrated by real-world examples extracted from the models of complex systems, created with widely known CASE tool.

AISTE ALEKSANDRAVICIENE
No Magic

Aiste Aleksandraviciene holds a Master degree in Systems Engineering from Kaunas University of Technology and is an OMG certified systems modeling professional (OCSMP). Currently, she is a Solution Architect at No Magic Europe and takes responsibility for producing training material, organizing webinars, writing papers and making presentations at systems engineering community events to promote the MBSE culture. Her expertise area is model-based systems engineering with special focus on managing system requirements.



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COLIN HOOD

SYSTEMS MODELLING

SOFTWARE ARE NOT THE ONLY FRUIT: MODELLING MECHATRONIC SYSTEMS

ABSTRACT: This presentation and discussion explores how we use modelling in mechatronic systems.

Traditionally modelling has been used to describe requirements and systems and to predict performance in all areas of engineering, including mechanical, chemical, and electrical. Later electronics was added to this list, and more recently (within the last 40 years) software.

Currently, there seems to be a fashion to consider modelling in software engineering to the exclusion of more traditional disciplines. Good methods used for years have been collected together under the umbrella of Agile. Many people think agile is just for software, however a great example of agile's wider application is Joe Justice using these methods to develop and build a car in one week.

Software is not the only show in town. Systems engineers know that a system including software needs electronics and mechanical parts in order to have an effect on real-life systems e.g. cars and satellites.

A model is an abstract representation of a part of reality, and there are various languages and tools with which we might describe these models.

This presentation considers these languages and tools and how it is necessary to have an holistic model transcending engineering disciplines.

COLIN HOOD
Colin Hood - SE Ltd.

Colin Hood started work in the electrical and electronics industry in 1977, and has been a systems engineer since 1985. He has worked as trainer and coach for requirements engineering since 1987.

Colin Hood together with partners of Colin Hood Systems Engineering supports customers world-wide to successfully improve quality and delivery through system engineering techniques in several industries. Colin Hood is author of many books on requirements and requirements tools. Colin Hood is co-founder of the International Requirements Engineering Board (IREB), and is co-author of the syllabus and examination of the qualification of Certified Professional in Requirements Engineering (CPRE). Colin Hood has been a member of INCOSE since 1999.

GAEL F. CLOSE & CO

SYSTEMS METHODOLOGIES

PRACTICAL SYSTEMS ENGINEERING FOR MICRO-SYSTEMS DEVELOPMENT: A TOOLBOX FOR DESIGN, VERIFICATION AND INDUSTRIALISATION

ABSTRACT: The traditional Systems Engineering body of knowledge is typically discussed in the context of large systems in Defense and Aerospace industry. For smaller companies in other industries, it is often not clear how to tailor and practically apply these techniques.

Microsystems, despite their small physical scale, are facing a growing complexity due to the concentration of functions and concerns (e.g. safety, security ...) spanning multiple technologies (integrated circuits, MEMS, optics, magnetics ...). The realization of successful micro-systems products requires a holistic view cutting across these domains. A Systems Engineering tailored to Microsystems is needed.

This talk will address this point by presenting the Systems Engineering methodologies in use at Melexis, a developer of automotive microelectronic systems (sensors and actuators).

Practical use cases will be discussed showing the added value of Systems Engineering for microsystems throughout the product life cycle: from concept design to industrialization.

These uses cases and the overarching Systems Engineering framework were published inside an internal handbook. This hand-book compiles relevant Systems Engineering techniques and serves as the main educational resources for diffusing Systems Engineering knowledge inside the organization.

The talk will be specially of interest to a Swiss audience. Many Swiss SME are wondering how methods developed for airplane development can be applied at the micro-scale. This point was evident at the round table at SWISSED16.

GAEL F. CLOSE
Melexis

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 magnetic sensors for high-volume automotive applications.

He has published 20 papers in international conferences and peer-reviewed journals, covering semiconductor technology, integrated circuits, and systems engineering aspects.

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ANDREAS POLLER

SYSTEMS METHODOLOGIES

A CONCEPTUAL FRAMEWORK FO IMPLEMENTING DEEP GEOLOGICAL DISPOSAL OF RADIOACTIVE WASTE USING OBJECT-PROCESS METHODOLOGY

ABSTRACT: Switzerland has radioactive waste, which shall be disposed of in deep geological repositories. The safe, timely and reliable implementation of deep geological repositories that provide safety for up to a million years shows a number of traits that are pertinent to what is called an engineering system: the distinctive societal, political, economic, scientific-technological dimensions along with the use of natural system components; the co-working of many scientific and engineering disciplines, each having its own traditions regarding methods, tools and terms; the very long project duration (about 150 years); the impracticality to formally validate the ultimate disposal system; and the pioneer character of the project.

Object-process methodology (OPM) is currently being examined for its potential to document the architecture of the entire project in an unambiguous manner, thus providing a common basis for discussion and reporting in the course of concept and design development. The talk will give some background information on deep geological disposal followed by a description of the overall project architecture using OPM.

ANDREAS POLLER
Nagra

Andreas Poller has over 15 years of experience in mathematical modelling of flow and transport phenomena in the framework of radioactive waste disposal. Since 2009, he has been active in the management of safety assessment modelling, in safety methodology development and in safety reporting at the Swiss National Cooperative for the Disposal of Radioactive Waste (Nagra). In 2016, he was also given responsibility for requirements engineering and management at Nagra.

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PATRICK LINK AND MICHAEL LEWRICK

DESIGN THINKING & SE

A COMBINATION OF DESIGN THINKING AND SYSTEMS THINKING TO HANDLE COMPLEXITY IN EARLY STAGE INNOVATION PROJECTS

ABSTRACT: The combination of Systems Engineering with Design Thinking and Lean Start-up in the upfront Innovation phase (Pre-Development-Phase) supports the in-depth problem understanding, the handling of complexity and the creation of a sustainable concept.

The Design Thinking mind-set and its problem solving cycle based on fast iteration and customer interaction. The importance of a well-defined concept including product/service conception, business design and clear determination of the customer needs is fundamental before the development starts.

Design Thinking and Systems Engineering are both problem solving methods that try to cope with the increasing complexity. Both approaches are on a first sight completely different but on a closed look they become more and more complementary and share many thoughts. Combining both approaches and switching the thinking mode is essential when dealing with ambiguity.

PATRICK LINK
Lucerne University of Applied Sciences and Arts, School of Engineering & Architecture

Since 2009 Patrick is Professor for Product Innovation in the study program "Industrial Engineering|Innovation" at the Lucerne University of Applied Sciences and Arts (LUASA) School of Engineering and Architecture. He studied Mechanical Engineering and got his doctorate in the field of innovation management at the BWI ETH Zurich. After that, he worked for Siemens in various positions. His research and teaching interest are in the field of agile product management, Design Thinking and Entrepreneurship and the combination of these approaches, for example Design Thinking, Systems Thinking and Data Analytics. Together with Larry Leifer from Stanford University and Michael Lewrick from Swisscom, he is the Co-editor of the book "Das Design Thinking Playbook"

DR. MICHAEL LEWRICK
Swisscom Ltd.

Michael has been a visiting scholar to Stanford University several times. His research interests centres on the management issues related to the development and commercialisation of technological and business model innovation. Specific areas of focus include developing capabilities for innovativeness and business success. Over 50 first author publications have been produced in this area. He worked for Siemens, Allianz and Fraunhofer-Gesellschaft in various positions. Before joining Swisscom he was a Managing Partner at consulting company, focusing on innovation and knowledge strategies, and the management of change. Currently, Michael holds the position of Chief Innovation Officer at Swisscom Enterprise Customers in Switzerland.

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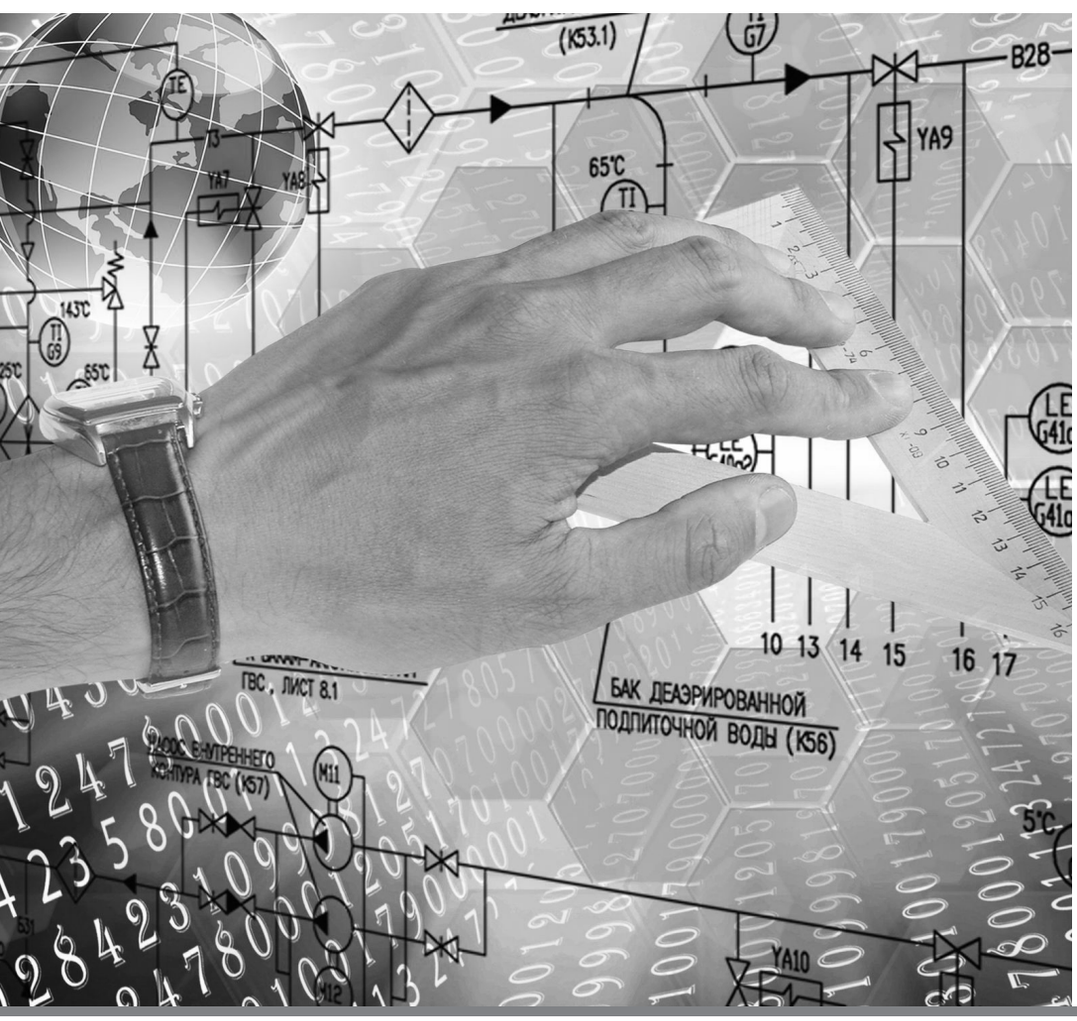
SONIA BEN HAMIDA

DESIGN THINKING & SE

INNOVATE BY DESIGNING FOR VALUE

ABSTRACT: Why Design-to-Value? 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.

Our goal is to support decision-making to design value proposition for new businesses. We focus our work on early stages of design where most impactful decisions are made.



SONIA BEN HAMIDA
Ecole CentraleSupelec

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 PURESAFE, 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. end of 2017. She is currently working on Airbus Safran Launchers' concept studies, with the Business, Innovation and Strategy departments.

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STEFAN EISENRING

MEDICAL

SUCCESSFUL OUTSOURCING IN MEDICAL DEVICE INDUSTRY

ABSTRACT: In the field of medical devices make-or-buy decisions are very crucial. These decisions have a huge impact on the quality assurance and consequently on the life cycle costs of the medical device. Make-or-buy decisions can be made in any stage of a product's life cycle: starting from outsourcing the conception, development, production, support and finally the retirement or the disposal of the product.

Systems engineering during the agreement process lays the cornerstone for a successful medical device life cycle. This presentation will show on case studies how major pitfalls can be avoided when the decision was made to "buy" a service during conception, development, production and support of a medical device.

STEFAN EISENRING
Jossi AG

Stefan Eisenring received his diploma in Mechanical Engineering in 2001 and has been a Certified Systems Engineering Professional since 2013. He has been working in research and development of complex and interdisciplinary products ever since. He has over ten years working experience in the medical device industry, acting as systems engineer, risk manager, project manager, acquirer and supplier.

Currently, he works as project manager for Jossi AG, the leading system partner for engineering, industrialization and production in Switzerland.

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DR. DAVID ENDLER

MEDICAL

SAFETY ASSESSMENT FOR MEDICAL TEST LAB

ABSTRACT: DLR :envihab consists of eight separate modules to conduct cardiovascular, bone and muscle research and has laboratories for studying the effects of oxygen reduction and pressure decrease on test subjects.

To operate the labs, it was required that we establish a hazard assessment to show compliance to safety requirements. The approach chosen to derive safety requirements applicable for this special use will be explained in this presentation.

Main hazards are caused by the ventilation system which can be set to support different air mixtures (e. g. increase nitrogen and decrease in oxygen). To meet safety requirements, functionality and item independence approaches were used to define the system's architecture.

As some of the devices used in the system architecture were built for use in different industries, a comparison of different safety standards (IEC 61508 and IEC 60601) was established.

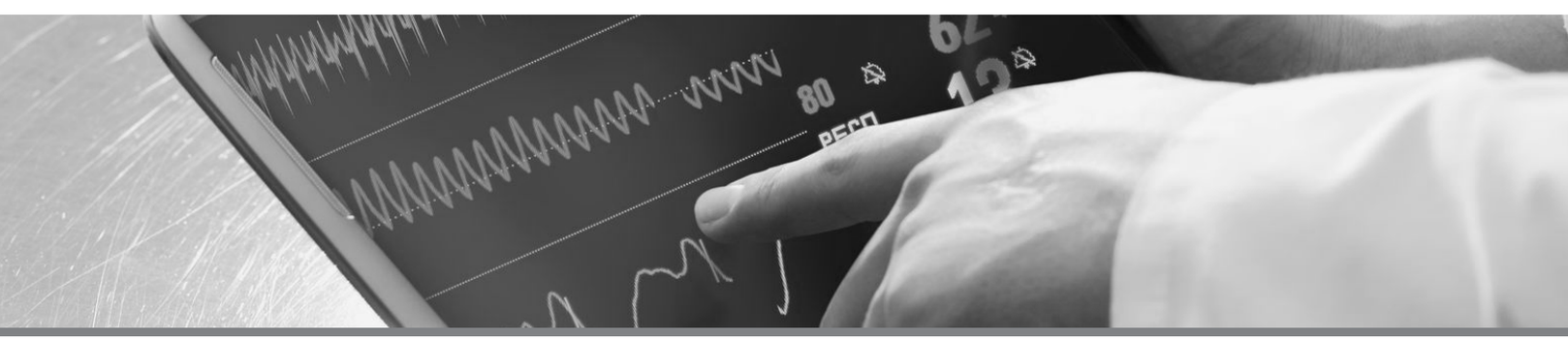
The assessment is based on a functional analysis and considers external interfaces as well as system states and modes. Fault trees were established to show compliance to safety requirements.

DR. DAVID ENDLER
oose eG,

Dr. David Endler is working as a SE consultant and is an independent member of oose eG. In January 2017, he was appointed INCOSE Deputy Technical Director. Currently, he is involved in defining SE processes for a submarine OEM.

In the past, he has been working on many large scale projects, e.g. lead systems engineer for major aircraft systems, safety and certification responsible for air traffic management systems. He has experience from many industries such as aerospace, automotive, renewable energies and marine systems.

Dr. Endler holds a PhD in Physics from University of Hamburg. He holds the INCOSE CSEP and
SE-Zert Level A certificate.



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MAIK AURICHT AND ITAL BOLLIGER

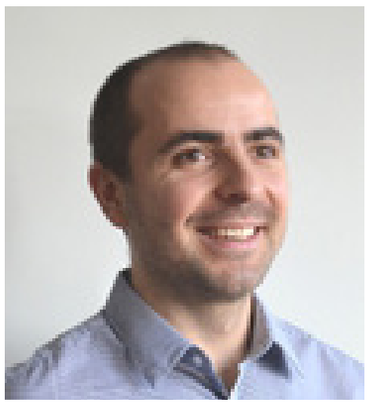
MEDICAL

DIGITAL TRANSFORMATION IN THE MEDICAL DEVICE BUSINESS

ABSTRACT: High consumer expectations for better healthcare and advances in technology that improve quality of life are creating favorable market conditions for medical device companies. But increasing regulatory scrutiny is putting medical device manufacturers under the gun on total quality and safety.

At the same time Medical Device Manufactures are challenged to manage the complexity of mechatronics systems while managing cost and time to market.

This divergence requires new approaches to drive innovation to secure competitive advantage and acceptance by the market and regulatory bodies. More of the same is no longer enough.



MAIK AURICHT
Dassault Systemes Deutschland GmbH

Maik Auricht studied Automotive Engineering at the Technische Universität Berlin in 2011. From 2011 till 2014 he worked as a Research Assistant at the TU Berlin and became Chief Engineer in 2014. Since 2016 he works as a Solution Architect with specialization in Systems Engineering at Dassault Systèmes.

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CHRISTOPHER ZINN

MEDICAL

HOW THE COMPLEXITY OF IN-VITRO DIAGNOSTIC MEDICAL DEVICES CAN POSE CHALLENGES FOR DEVELOPMENT PROJECTS

ABSTRACT: Like in many other industries, large system projects in the health care sector come with various project risks that result from the complexity of the product to be developed. Some of these project risks are common to many other types of technical systems, but some result from particular factors of the medical device sector.

Principles of Systems Engineering can provide mitigations for such project risks. These mitigations can be based on the setup of the organization, the setup of the project, or in the development framework applied to the project. Some measures that can help reduce the project risk of system development projects for complex, in-vitro diagnostic (IVD) medical devices, are proposed here. Also some challenges are discussed that result out of the contribution of the bio-chemical system components that are vital to many in-vitro diagnostic medical devices.

CHRISTOPHER ZINN
Roche Diagnostics Ltd.

Christoph Zinn graduated in Neurobiology in Erlangen and Munich, and did a PhD at the Tübingen Hearing Research Centre, on neural control of the micromechanics of the inner ear. His professional experience includes both work in a pre-clinical research company, and as manager in a festival for Early Music. He joined Roche Diagnostics in 2009, where his interest in Systems Engineering was stimulated by various roles in several medical device development projects, related to requirements engineering, verification and validation, system architecture, or product risk management.

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ALEXANDER STEIN AND TIM WEILKIENS

AGILE

AGILE FOR SYSTEMS ENGINEERING: THREE THINGS YOU CAN TAKE AWAY

ABSTRACT: Many people believe that complexity is just the next level of complicated. But complex and complicated are entirely different concepts and demand for various ways to deal with them successfully.

In addition, today we often face a mix of situations from both areas. The software development discipline has learned a couple of things about Agile in the last decades while handling the shift from complicated to the complex systems. These learnings work not only for software development but can be transferred to other fields.

In this talk, we will show you three agile practices applicable to systems engineering. We totally recommend you to try this in your projects!

ALEXANDER STEIN
oose Innovative Informatik eG

Alexander is part of oose, a consulting and training company in Hamburg, Germany. In the last 8 years, he helped single teams and whole companies within the realms of information technology, software development and beyond to apply agile development as a competitive advantage. He co-organizes Hamburg's Kanban user group and is an active member of the local agile community in general.

TIM WEILKIENS
oose Innovative Informatik eG

Tim is managing director of the German consulting and training company oose, a consultant and trainer, and active member of the OMG and INCOSE community. He has written sections of the initial SysML specification and he is still active in the ongoing work on SysML. He is involved in many MBSE activities and you can meet him at several conferences about MBSE and related topics. As a consultant, he has advised a lot of companies in different domains. The insights into their challenges are one source of his experience that he shares in his books and presentations.

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ALBA PENNISI & MATTHIAS HEINZ

AGILE

MODELLING `AGILE' AT BOMBARDIER TRANSPORTATION

ABSTRACT: The benefit of the Agile SCRUM framework is well-known mainly in Software engineering. Nevertheless, it is also becoming popular that its principles can be applied to many other domains as well as System Engineering.

In this presentation, a case study will be presented where a team of Model Based System engineers at Bombardier Transportation applied Scrum to model the functionalities of a real railroad application integrating it with requirements definition.

In conclusion, the benefit of applying both, MBSE and SCRUM, will be discussed and proved.

ALBA PENNISI
Bombardier Transportation Switzerland AG

Alba Pennisi is an expert model based system engineer at Bombardier Transportation. In this last year, she took part, as SCRUM team member, to the definition of the functional architecture of the Talent 3 train at Bombardier Transportation. Besides that, Alba holds a PhD in automation and robotics and has several years of experience defining processes and methodologies in the railway industry.

MATTHIAS HEINZ
Bombardier Transportation Switzerland AG

Matthias Heinz is recognized at Bombardier Transportation as Vehicle and System Integration Expert. He has a working experience in different fields of the railway domain in Vehicle and Project Engineering, Homologation Support and Requirements Management Process/ Methods using DOORS. Within the Talent 3 project, beside the modeling activities, he was responsible to set up the whole web-based environment to apply the SCRUM for the distributed team.

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