
Leveraging engineering services
in the next generation
of the product development process
Invitation for the IDEaliSM
Smart Engineering event
November the 16th, 2017
German Aerospace Center (DLR), Hamburg
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IDEALISM

IDEALISM

Integrated & Distributed Engineering Services Framework for MDO

The IDEaliSM consortium cordially invites you to join the projects' "Smart Engineering" event

Register now at:
www.idealism.eu/smart-engineering

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Learn more about High Performance Engineering.

The ITEA innovation project IDEaliSM is organizing a project symposium and innovation market to show recent advances in engineering services and multi-disciplinary design optimization. It is the perfect event to learn all about the state-of-the-art in engineering services, automation of simulation workflows and optimization within multidisciplinary design teams.

The service-oriented process methodology developed in IDEaliSM consists of tools and methods enabling the integration of companies' legacy processes throughout complete value chain; from original equipment manufacturers to tier 1 and 2 suppliers. The presented engineering capabilities thereby enable companies in high-tech engineering to capitalize their corporate design knowledge and allow for significant cost or time-to-market reductions in the design of product families.

Presentations will focus on next generation of engineering workflows for CAD/CAE and PLM and standards interoperability using IT standards like UML/XML and ISO 10303 (STEP). The practical use cases guiding the event represent actual industrial challenges ranging from the design of aerospace vehicles to automotive cockpit design.

Target audience:(chief) technology officers, vice-presidents and directors of engineering, managers (IT, PLM, ILS, CAD, ERP, MRP), system integrators, supervisors and others with an interest in the deploying the next generation of engineering capabilities.

Expected benefits:To develop an understanding on promising novel concepts for integrating and effectively re-using knowledge within engineering intense organizations in the high-tech industry.

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Use cases

Aircraft design challenge

A: Accelerated aircraft MDO concept design study

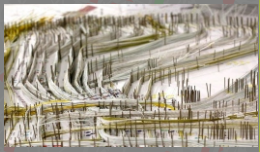
AIRBUS DEFENCE & SPACE

B: Accelerated development of an aircraft rudder

FOKKER AEROSTRUCTURES IDEC

10-day harness

Aerospace: wire harness layout in 10 days



FOKKER ELMO

Cockpit in 3 weeks

Automotive: cockpit wire harness design in 3 weeks

DRÄXLMAIER

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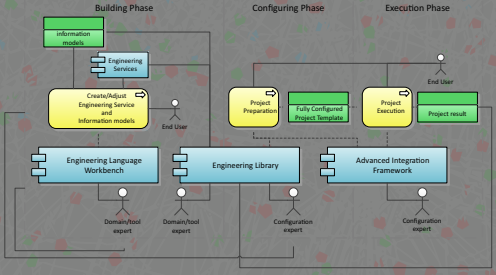
The IDEaliSM innovations

1. A framework to create and execute hybrid workflows, natively integrating interactive engineering processes, simulation workflows, tools and data

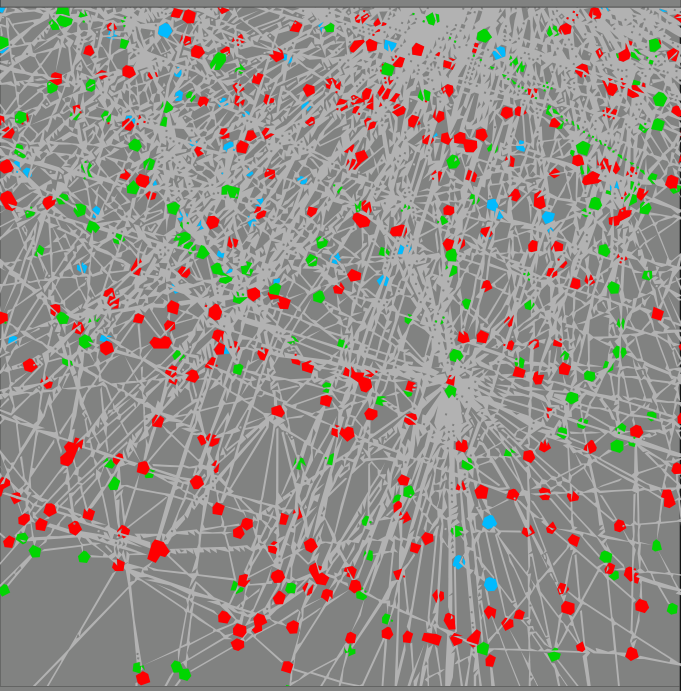
2. Adaption of interfaces and exchange formats to enable plug-and-play integration and interoperation of components, in-house tools, and engineering services

3. A set of ontologies and graph-based design languages to re-use knowledge and automate often repetitive engineering tasks

4. Process optimization based on data dependency tracking, management of changes, and a single source of data



Programme



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08:30 - 09:00 REGISTRATION AND COFFEE

09:00 - 09:30
KEYNOTE SPEAKER
Richard Cobben, Vice President Engineering, Technology & Quality Fokker Aerostructures

09:30 - 09:50
Welcome: An overview of the IDEALISM project
Stefan van der Elst, KE-Works

09:50 - 10:30
IDEaliSM solution through an aerospace case study
Erwin Moerland, DLR
Tobie van den Berg, Fokker
Sebastian Deinert, Airbus Defence and Space
Cristina Fernández, IDEC, S.L.

10:30 - 11:00 COFFEE BREAK

11:00 - 11:30
Hybrid business workflows in KE-chain
Stefan van der Elst, KE-Works

11:30 - 12:00
Cloudification of simulation workflows in MDO
Roberto d'Ippolito, NOESIS

12:00 – 12:30
Standards for data exchange,sharing & archiving
Kjell Bengtsson, Jotne

12:30 - 13:30 LUNCH

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13:30 - 14:00
Demonstration of automotive case study
Martin Motzer, DRÄXLMAIER Group

14:00 - 14:30
Design Languages to create engineering services
Stephan Rudolph, IILS

14:30 - 15:00
State-of-the-art and future opportunities
Gianfranco La Rocca, TU Delft

15:00 - 15:30 COFFEE BREAK

15:00 - 17:00
INNOVATION MARKET
all SME's and use-case representatives

Innovation Market, provides a platform to get in touch with the IDEaliSM participants in a relaxed atmosphere.
Ask detailed questions on how the IDEaliSM solutions might be helpful for your company or start new collaborations.

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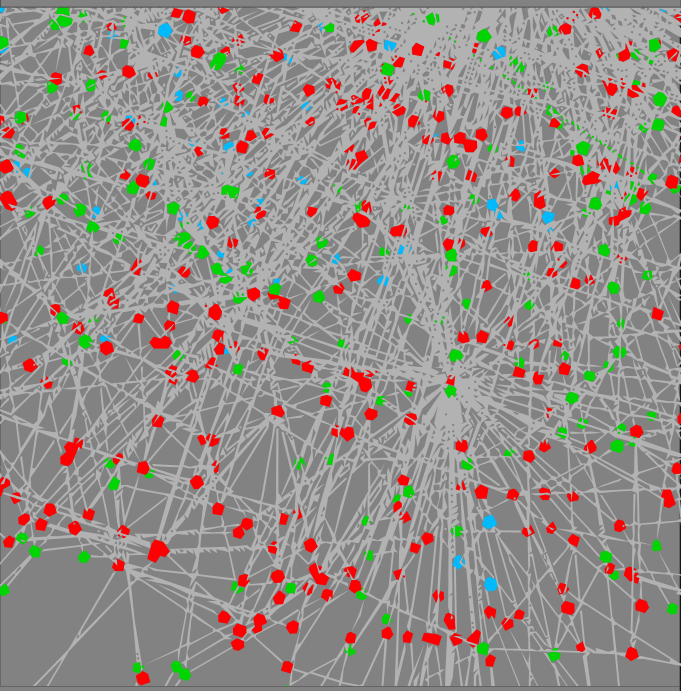
Presenters



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Keynote Speech
(09:00 - 09:30)

Presenter:
Richard Cobben, Vice President Engineering, Technology & Quality Fokker Aerostructures

Richard Cobben will present the challenges arising in industry due to the ever increasing demands on reduction in development costs and and time-to-market for the aircraft and its components. Realizing a streamlined integration of multidisciplinary design competences within the virtual enterprise is seen as major step forward in delivering innovative aircraft products in a time- and cost-efficient manner.

Richard Cobben, as Vice President Technology,is responsible for development of people, processes and systems for the engineering organization as well as for innovation and the execution support of large scale non-recurring programs.
Richard has over 25 years of international experience in general and program management functions building customer relationships, leading teams and executing complex projects in both civil and defense aerospace industry.
Since 2007, Richard is an Executive Member of the Fokker Aerostructures management team and is responsible for the Technology and Export Compliancy department.

Richard holds Master Degrees in Mechanical Engineering and in Logistics & Information Systems.

The IDEaliSM solution explained using an aerospace case study
(09:50 – 10:30)

Presenters:
Mr. Erwin Moerland, German Aerospace Center (DLR)
Dr. Tobie van den Berg, Fokker
Ms. Cristina Fernández , IDEC, S.L
Mr. Sebastian Deinert, Airbus Defence and Space

The service-oriented process methodology developed in IDEaliSM will be presented using a representative aerospace case study. The IDEaliSM framework enabling the application of the service-oriented process spans the complete cycle of creating engineering services, making these services available within a network of competences and integrating these in hybrid workflows supporting the product development process. After a brief introduction in the prerequisites for setting-up such a complex system of distributed competences, a practical application to an industrial design problem will be demonstrated. The demonstrator clearly shows the connection of the original equipment manufacturers and the involved tier-suppliers in the product development process.

Erwin Moerland leads the Collaborative Engineering group within the Institute for Systems Architectures in Aerospace of the German Aerospace Center (DLR) in Hamburg. In his position, he gained profound experience in collaborative engineering, multidisciplinary design optimization and knowledge management. In 2011, he received his master's degree in Aerospace Engineering from Delft University of Technology, where he graduated with distinction. As PhD candidate, his research concentrates on advancing collaboration and interdisciplinary communication in multidisciplinary aircraft design. Within the IDEaliSM project, Erwin is co-responsible for the overall coordination of the project and coordinates the German partners within the consortium.

Dr. Tobie van den Berg is a Knowledge Based Engineering specialist at GKN Fokker's Knowledge Tools & Methods department. In his position he works on the industrial application of Knowledge Based Engineering, Multidisciplinary Design Optimization and Knowledge Management techniques. He holds a MSc degree and a PhD degree in Aerospace Engineering from Delft University of Technology in the Netherlands. Within the IDEaliSM project, Tobie is the lead for use case 1B 'Rudder in a Month'.

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Ms. Cristina Fernández Roa, is a project manager at IDEC S.L., a composite structures supplier for the most important European aeronautical manufacturers. She has 6 years of experience in the aeronautical sector, being involved in Manufacturing Engineering, Stress Department and R&T Department. In 2011, she received her master's degree in Industrial Engineering from the University of Mondragon (Spain). Within the IDEaliSM project, Cristina is the technical coordinator for IDEC, as well as the Spanish coordinator for the project

Dr. Sebastian Deinert works at the MDO department of Airbus Defence and Space and has an aerospace engineering background. He started at the company as a Ph.D. student performing research on multidisciplinary design optimization focusing on aeroelastic analysis and shape optimization. After completing his thesis, he joined the company as a multidisciplinary analysis and optimisation engineer..

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Applications based on hybrid workflows
(11:00–11:30)

Presenter: Mr. Stefan van der Elst, KE-works

Hybrid workflows support organizations in the more effective use of engineering tools and services for multiple product development programs. This presentation will give an introduction into applications that offer a native combination of manual tasks and interactions with automated simulation workflows and engineering services. The presentation will present a practical example application based on the project use cases which has been developed with the application platform KE-chain.

Mr. Stefan van der Elst is managing director at KE-works BV and holds a MSc degree in Aerospace Engineering. In 2008 he co-founded KE-works, specializing in the development and implementation of custom engineering applications to accelerate design and manufacturing processes. He has over 10 years of experience in business process improvements and in the development and integration of engineering applications mainly for the aerospace, automotive and construction & infra industries. He has been involved in several national and international research and innovations projects in the fields of smart engineering, smart manufacturing and MDO. Within the IDEALISM project Stefan is responsible for the overall coordination of the project. He has a strong passion for operational excellence and likes to bring game changing software solutions to the design and manufacturing industry.

Cloudification of simulation workflows in MDO
(11:30 – 12.00)

Presenter: Mr. Roberto d'Ippolito, Noesis Solutions N.V.

Engineering design in automotive, aerospace and many other industries is facing the curse of dimensionality. Numerical models for CAD and CAE users are growing in size and complexity becoming, as a consequence, more computationally demanding. More engineering attributes (structural, acoustic, dynamic etc) require increasing computational resources to chase the 'digital cloning' paradigm that modern CAD and CAE tools promise. How useful are your computational resources if you need to solve a multi-attribute optimization process where scalability, availability of resources and computational capacity depends not only from the software used but also from the optimization procedure and the sequence of tools used for the analysis? In other terms, can we optimize the computational infrastructure at runtime to deliver optimal performance and resource usage given the simulation workflow and optimization procedure at hand? Within the IDEALISM project, Noesis Solutions and K. U. Leuven DistriNet have pushed forward the state of the art in the process integration and design optimization (PIDO) paradigm by researching and developing an intelligent and flexible technology that optimizes a cloud infrastructure (private, public or hybrid) to boost the computational time while reducing the idle time of the computational resources for one or more simulation workflows for Multi Disciplinary Optimization (MDO).

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Mr. Roberto d'Ippolito is the Research and Innovation manager for Noesis Solutions N.V. . He acquired his M.Sc. degree in Aerospace Engineering from the University of Naples (Italy) and holds a solid background knowledge on a number of topics, ranging from material science (production processes, manufacturability, material modeling etc.) to ICT (Cloud, Web technologies, collaboration approaches etc.) and mechanical engineering (CAE, CAD, decision support systems and optimization) as well as experience with marketing, dissemination, planning of post-project trajectories, resource and risk management. He's currently managing new research and innovation programs and projects in international, industrial, multi-disciplinary and multi-site partnerships. Key research topics involve product design and optimization in automotive and aerospace, modeling and simulation, information and communication technology for engineering and manufacturing, with particular focus on both product and product development process (PDP) improvements (design optimization and robust design optimization).

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Standards for data exchange, sharing & archiving
(12:00-12:30)

Presenter: Mr. Kjell A. Bengtsson, JOTNE

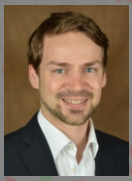
In the IDEALISM project, we use several standards and formats, both Product Data related standards such as ISO 10303 (STEP), VEC (Electrical), CPACS (Concept design) and IT standards like UML, XML and Ontologies. This presentation will give a short introduction to how to use standards and how they can support organizations to increase collaboration through interoperability and integration aspects like data exchange, sharing and archiving. In addition, it will highlight how standards based solutions can be implemented and how the IDEALISM project partners have contributed to new versions of the standards.

Mr. Kjell A. Bengtsson is a Vice President in Jotne, has a Mechanical Engineering background and a diploma in Marketing. He started out at Volvo Car and General Electric doing CAD/DB applications and later management positions, and is now VP at Jotne EPM Technology, a world leader in PLCS/STEP/Express applications. Kjell has been exposed to the STEP, PLCS and other related (ISO TC84/SC4) standards for the last 25 years and is actively involved in neutral database implementation projects in the most complex defense and aerospace sector projects. Kjell is a Member of the Board of the PDES, Inc organization and supports other industry organizations like NIFRO, FSI, ASD, NATO IIG and more.

Demonstration of automotive use case study
(13:30 - 14:00)

Presenter: Dr. Martin Motzer, DRÄXLMAIER Group

Within the IDEaliSM project DRÄXLMAIER is leading the automotive use case "Cockpit in 3 weeks". The overall innovation goal of this use case is to develop an automotive cockpit wire harness within 3 weeks. The challenge in the automotive cockpit development is to integrate mechanical, electrical and electronic components inside the provided installation space including the interconnecting wire harnesses. This presentation will give an introduction to this automotive use case and show the opportunities given through the application of the IDEaliSM Advanced Integration Framework and automation techniques implemented in engineering services.



Dr. Martin Motzer is a consultant for product development at the DRÄXLMAIER Group, an automotive supplier for the premium segment. Martin obtained a German diploma and a PhD, both in Aerospace Engineering from the University of Stuttgart. During his doctoral studies Martin conducted research on the automation of aircraft cabin architecture design through design languages. He is interested in design process automation, object oriented modeling and programming, systems engineering as well as data integration. At DRÄXLMAIER, Martin is focusing on IT-systems and IT-processes in the automotive wire harness domain and the application of automation design techniques in the development of electrical harness systems. As a Certified Project Management Associate (IPMA) Martin is leading projects with internal and external partners.

Design languages to create engineering services
(14:00-14:30)

Presenter: Dr. Stephan Rudolph, IILS

In the IDEALISM project, graph-based design languages are applied to create fully automated engineering services. Examples are automated finite element analyses and automated routing of electrical wire harnesses within complex geometries. The representation of knowledge in UML (Unified Modelling Language) allows for abstract representations of both geometry and the physics of a design problem, independent from specific CAD-systems or solvers. Using plugins, the knowledge can be mapped to any CAD format. The presentation on design languages will illustrate the application of graph-based design languages based on ontologies and rules. It will also highlight the benefit of these for both horizontal integration (i.e. definition, creation and execution of engineering services) and vertical integration (i.e. combination of these engineering services into multi-disciplinary optimization workflows) within the IDEALISM project.

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Dr. Stephan Rudolph graduated in Aerospace Engineering at the University of Stuttgart during which he has been abroad at the Ecole Nationale Superieure de Constructions Aeronautiques (ENSICA) in Toulouse, France, and at the Massachusetts Institute of Technology (MIT) in Cambridge, USA. After receiving his PhD from Stuttgart University on design evaluation, he was a Post Doc in the Systems and Design Group at the Massachusetts Institute of Technology (MIT). Habilitated in the area of Engineering Design Methodology at Stuttgart University, Stephan is currently teaching courses on algorithms and data structures, design languages and digital engineering.

Stephan's research interests include the search for a unified theory for design and practical design methods, applications of similarity theory to design as well as development of graph-based design languages for the computer-assisted exploration of complex and multi-disciplinary engineering systems such as satellites, cars and aircraft. Stephan's publication list consists of more than 110 entries and a book.

State-of-the-art and future opportunities
(14:30-15:00)

Presenter: Dr. Gianfranco La Rocca, TU Delft

At the beginning of the project, the IDEALISM partners performed a thorough analysis of the state-of-the-art in three specific areas: product develop processes, integration frameworks, and design languages & standards. The major roadblocks were identified and set as objectives to guide the technical developments within IDEALISM. This presentation will give a brief overview of those roadblocks and discuss the potential of the results generated within IDEALISM to address them and move forward the state-of-the-art. In particular, it will be illustrated how the top ranking IDEALISM's ERAs (Exploitation Related Achievement) provide specific solutions to streamline and accelerate the product development process of complex products and enable the integration and collaboration of multidisciplinary teams of experts.

Dr. Gianfranco La Rocca holds a Master of Science degree in Aerospace Engineering from the University of Pisa, Italy and a PhD from Delft University of Technology in Delft, the Netherlands. He is Assistant Professor at the TU Delft Faculty of Aerospace Engineering, where he teaches courses on aircraft design and advanced design methods. Dr. La Rocca's research activities and expertise include the development of knowledge engineering applications to support multidisciplinary design optimization (MDO), conceptual aircraft design and systems engineering. In the last 15 years, Dr. La Rocca has been involved in a number of national and European projects related to aircraft design and design tools development to support distributed MDO. He is (co-)author of more than 60 publications and regular reviewer for a number of international scientific journals.

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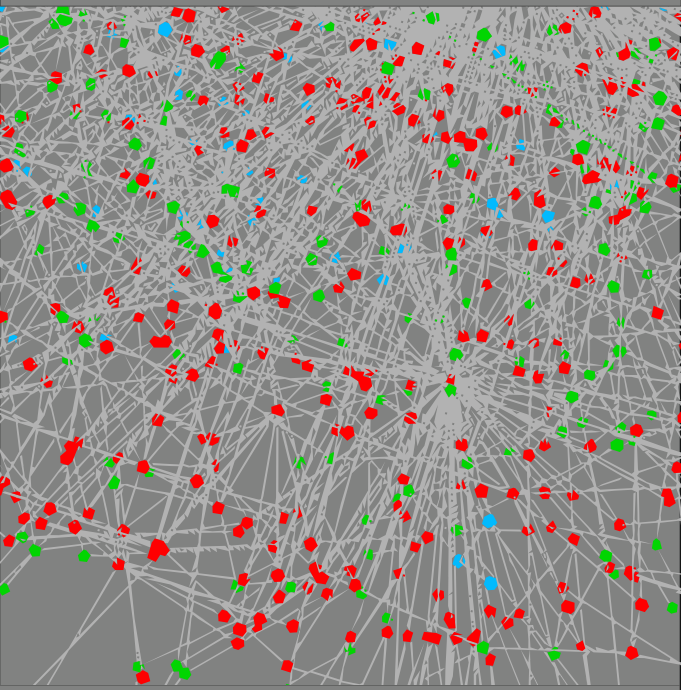
Companies



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AIRBUS

Airbus Defence and Space is Europe's number one defence and space enterprise, the second largest space business worldwide and among the top ten global defence enterprises.

DLR

DLR is the national aeronautics and space research centre of the Federal Republic of Germany. Its extensive research and development work in aeronautics, space, energy, transport and security is integrated into national and international cooperative ventures.
The mission of the Institute of Systems Architectures in Aerospace (DLR-SL) is fostering interdisciplinary and system-level research at DLR

DRÄXLMAIER

The DRÄXLMAIER Group supplies premium automobile manufacturers worldwide with complex wiring harness systems, central electrical and electronic components, exclusive interiors, and storage systems for electric mobility. The combination of core competencies in the interior, electrical, electronic and storage systems areas makes DRÄXLMAIER unique in the industry.

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Fokker

GKN AEROSPACE

Fokker is a leading global aerospace specialist in aerostructures, electrical systems, landing gear and aircraft fleet support. Fokker's main advantage is its capability to approach aircraft systems design from the perspective of an aicraft OEM.

Fraunhofer LBF

Fraunhofer LBF looks back on more than 75 years of experience in the field of structural durability. Since 15 years this expertise has been expanded by smart structures, plastics and system reliability. Fraunhofer LBF develops, evaluates and realizes customized solutions for safety relevant products with a team of more than 450 employees and in doing so, the full added value chain is considered, from the idea to the product, from the material to the system and over the full life-cycle.

IDEC

IDEC is an innovative engineering and manufacturing SME which provides complete solutions in the field of out of autoclave advanced composites. Design, analysis, validation, development, prototyping and industrialization are the strengths to satisfy aeronautical and also other industrial sectors.

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IILS is an SME, software vendor, service provider and expert in the successful industrialization of modern knowledge-based design automation techniques using graph-based design languages. To support this innovative approach in design automation, the DC43 tool suite (DesignCockpit43®) was developed.

Jotne EPM Technology is a leader in product data exchange and sharing, its data products have successfully reduced development, and product lifecycle costs through the use of intelligent data management in the areas of Defense, Aerospace and OpenBim.

KE-works is an SME specialized in the development of custom web-based engineering applications to increase productivity design and manufacturing processes.
Our applications are based on our in-house developed web-based platform KE-chain, which is offered as a service (aPaaS).
Within IDEALISM the KE-chain platform offers end users a web-based portal to the high level business processes, the optimization and simulation workflows and the individual engineering tools thereby increasing the interoperability and reuse of tools throughout the design chain.

KU LEUVEN

The research group imec-DistriNet of the KU Leuven university has extensive expertise in secure and distributed software, including: middleware for cloud computing, security middleware and software security.
For Idealism, KU Leuven provides its extensive expertise on workflow middleware, cloud computing with infrastructure-as-a-service and platform-as-a-service paradigms and tune them to perfectly fit the MDO context.
KU Leuven will especially focus on the smart scaling and cloudification of optimization workflows over both private and public clouds.

noesis

Noesis Solutions is a simulation innovation partner to manufacturers in automotive, aerospace and other engineering-intense industries. Specialized in simulation process integration and numerical design optimization (PIDO), its flagship software Optimus helps customers adopt an 'Engineer by Objective' development strategy
The 'Engineer by Objective' approach empowered by Optimus starts from the functional performance targets identified as critical factors for a successful new product. Optimus enables engineering teams to explore the entire design space, and perform multidisciplinary design optimization directing simulations toward the best-performing product design candidates.
In Idealism, Noesis participates as key system integrator by providing simulation workflows and optimization services in support of innovative product design patterns developed within the project.

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TU Delft

TU Delft is the largest and oldest Dutch public technological university. With eight faculties and numerous research institutes, it hosts > 19,000 students (undergraduate and postgraduate), > 3,300 scientists and > 2,200 support and management staff.

University of Stuttgart
Germany

Focusing on the natural sciences, the University of Stuttgart has as one of their strategic goals the development of digital means to support the engineering product life-cycle. The Similarity Mechanics Group at the Institute for Statics and Dynamics of Aerospace Structures focuses on development of novel digital engineering techniques based on the similarity theory of physics and graph-based design languages.

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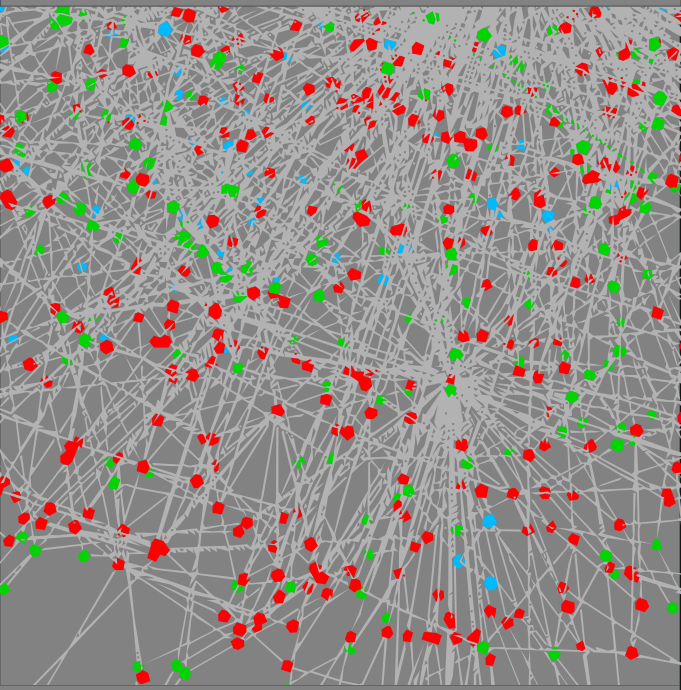
Organisational information



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ZAL TechCenter
(Center for Applied Aeronautical Research)

The „Smart Engineering„ event will be held at the ZAL TechCenter in Hamburg

Guided by the motto, "Research and develop under one roof" the ZAL TechCenter opened at the beginning of 2016. What makes the research center is the opportunity it offers interested players to integrate their activities with partners on a spatial level, becoming part of an international aviation research network. With a working area of more than 26,000 square meters, the ZAL TechCenter provides space for around 600 workplaces in offices, laboratories, and hangars. Equipped with a sophisticated research and test infrastructure for selected aspects of aviation, the site empowers the industrialization of new technologies.

Hein-Saß-Weg 22, 21129 Hamburg

Detailed route and map will be available upon your registration for the event.

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Where to stay

In order to make your experience efficient and pleasant, we recommend these hotels:

The Rilano Hotel Hamburg
4-star superior hotel in Hamburg's Finkenwerder district on the banks of the Elbe river, 5-10 minutes walking distance from the ZAL

A: Hein-Saß-Weg 40, 21129 Hamburg
T: +49 40 300 849 0
E:info-hamburg@rilano.com
W: https://www.rilano-hotel-hamburg.de/

Hotel Am Elbufer
a small hotel with family atmosphere and relaxing view to the Elbe river, 10-15 minutes walking distance from the ZAL

A: Focksweg 40a, 21129 Hamburg
T: +49 40 742 191 0
E: info@hotel-am-elbufer.de
W: https://www.hotel-am-elbufer.de/

Hotels on the north side of the Elbe river near ferry boat
stops "Teufelsbrück" or "Landungsbrücken" are also advised

Traveling time to ferry boat stop "Teufelsbrück": 10 minutes walk + 5 minutes on the ferry boat 64 (Rüschpark -> Teufelsbrück)

Traveling time to ferry boat stop "Landungsbrücken": 10 minutes walk + 28 minutes on the ferry boat 62 (Finkenwerder -> Landungsbrücken Brücke 1)

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Contact information

More information as well as the registration form can be found at:
www.idealism.eu

For all questions and remarks, please feel free to contact us at:
idealism-event@dlr.de

Disclaimer

The research conducted in IDEaliSM has been labelled and supported by ITEA (second instalment, call 8).

ITEA is the EUREKA Cluster programme supporting innovative, industry-driven, pre-competitive R&D projects in the area of Software-intensive Systems & Services (SiSS). ITEA stimulates projects in an open community of large industry, SMEs, universities, research institutes and user organisations.

In Germany, the project is sponsored by the Federal Ministry of Education and Research

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