

PROGRAMME

Sustainable (Aero)Space

Protecting our
Environment with
Technological
Innovations

19 - 21 September 2022
ARTHOTEL Herrsching
at Lake Ammersee

4TH GLOBAL AEROSPACE SUMMIT 2022

PARTNERS





4TH GLOBAL AEROSPACE SUMMIT 2022

Both space and aviation have driven global economic growth and made enormous technological leaps in recent years. Not least since the 2030 Agenda for Sustainable Development of the United Nations, the sustainable use of technology has become increasingly important in both segments. Technological novelties must go hand in hand with ecological progress. The solutions are many and varied.

Green fuels or additive manufacturing promise energy gains, efficient flight routing ensures route savings and Earth observation alerts us to worrying climate changes. When it comes to climate protection, we have already come a long way.

However, do we also succeed in exploiting our ideas? What helps us to turn ideas into products and services?

The 4th Global Aerospace Summit will bring together experts from the field of “Green Aerospace” to discuss the technological status quo and explore new practices for sustainable (aero)space solutions.

19 SEPTEMBER 2022

01.30 pm

Welcome

Prof. Klaus Drechsler, Member of the Executive Board of Munich Aerospace / Technical University of Munich (Host)

SESSION I: INTERNATIONAL IMPULSES: SUSTAINABLE AEROSPACE SOLUTIONS IN THE RLS PARTNER REGIONS

01.40 pm

Sustainable Aviation Challenges & Opportunities

Maurílio Albanese Novaes Júnior, Chief Technology Officer, Embraer

DLR Research Towards Sustainable Aviation

Dr. Olaf Heintze, Aeronautics Division Development, German Aerospace Center (DLR)

Research and Education Initiatives in Sustainable Aerospace at Concordia University

Prof. Christian Moreau, Research Director, Concordia Institute of Aerospace Design and Innovation, Montreal

Prof. Carole El Ayoubi, Education Director, Concordia Institute of Aerospace Design and Innovation, Montreal

03.00 pm

Coffee Break

19 SEPTEMBER 2022

03.30 pm

SESSION II: SUSTAINABILITY - NEW OPPORTUNITIES FOR THE (AERO)SPACE INDUSTRY

MTU's Technology Agenda Claire - A Path Towards Climate Neutrality

Fabian Donus, Innovative Propulsion Director, MTU Aero Engines

Sustainable Innovation from an Aviation Point of View

Johannes Stuhlberger, R&T Engineering, Airbus Group

Powering New Ways to Fly: Electrical Power and Propulsion Systems for Advanced Air Mobility

Max Scheulen, Global Head of System Architecture, Rolls Royce Electrical

Hydrogen – Space is not the Limit

Elisabeth Loeffelholz von Colberg, Business Manager Hydrogen, Ariane Group

19 SEPTEMBER 2022

05.00 pm **SESSION III: GREEN INNOVATIONS IN AVIATION AND SPACE**

Fostering Space Tech Startups for a Sustainable Future

Stephanie Wissmann, CMO SpaceFounders

Why Sustainable Aerospace Requires Cross-Domain Collaboration

Dr. Florian Dötzer, Managing Director TUM Venture Lab-Aerospace

New (Aero)Space - Game Changer for Global Challenges

Thorsten Rudolph, Managing Director AZO/ESA BIC

Discussion

06.00 pm *Dinner*

07.30 pm **Thought Leadership Keynote: Protecting Critical Infrastructure in the Face of New Threats: Cyberattacks, Climate Change, and more**

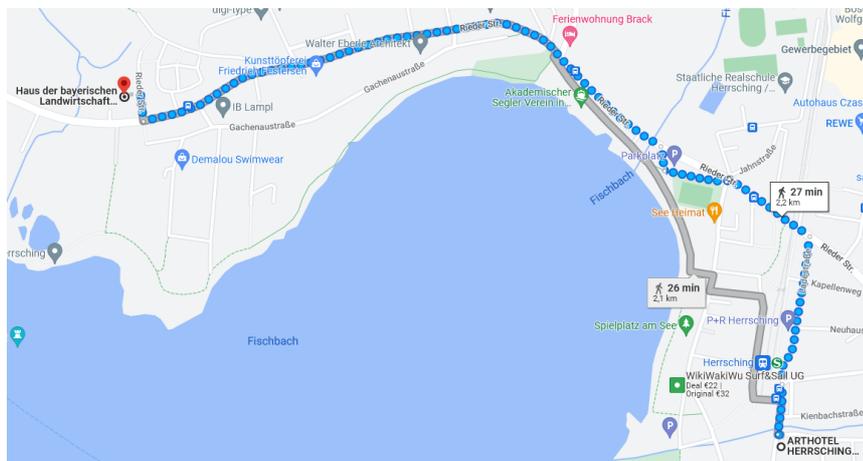
Prof. Ulrike Lechner, Scientific Advisory Board Research Institute code at Bundeswehr University

Lecture at Haus der bayerischen Landwirtschaft (Bus shuttle provided)

Departure times of the bus shuttle:

07.00 pm: Arthotel → Haus der bayerischen Landwirtschaft

08.45 pm: Haus der bayerischen Landwirtschaft → Arthotel



Haus der bayerischen
Landwirtschaft,
Rieder Str. 70,
82211 Herrsching am
Ammersee

20 SEPTEMBER 2022

09.00 am **Welcome**

Prof. Robert Luckner, Member of the Scientific Advisory Board of Munich Aerospace / Technical University of Berlin (Host)

SESSION IV: SCIENCE-INDUSTRY COOPERATION IN GREEN AEROSPACE

Leveraging Disruptive Technologies for Sustainable Air Transport

Axel Krein, Executive Director, EU R&I programme "Clean Aviation"

Application of Smart, Digital and Green Industry 5.0 Technologies into Pratt and Whitney Canada and Siemens Energy

Prof. Hany Moustapha, ETS Montréal

Manufacturing Technologies and Materials for Sustainable Aviation of Tomorrow

Dr. Simon Kothe, Head of Central Office of Fraunhofer AVIATION & SPACE

Discussion

10.05 am *Coffee Break*

20 SEPTEMBER 2022

10.30 am **SESSION V: CURRENT SOLUTIONS FOR THE AEROSPACE OF TOMORROW**

Aspects of Equity and Sustainability of Emerging Mobility

Prof. Constantinos Antoniou, Chair of Transportation Systems Engineering, Technical University of Munich

Reducing CO2 Emissions Through Flight Management Systems

Prof. Luis Rodrigues, Department of Electrical and Computer Engineering, Concordia University

Sustainability at Munich Airport

Fiona Starke, CSR Manager, Munich Airport

Hydrogen as a Fuel in Aviation - Opportunities and Challenges

Tobias Korbanek, Project Manager Hydrogen Applications and Hybrid-Electric Drivetrain Testing, IABC

Measurements and Mitigation Options of the Non-CO2 Effects from Aviation

Dr. Tina Jurkat-Witschas, Researcher and Project Manager, Institute of Atmospheric Physics, German Aerospace Center (DLR)

12.10 pm *Lunch*

20 SEPTEMBER 2022

01.30 pm **SESSION VI: MUNICH AEROSPACE R&I REPORTS**

1 ROBUST AND EFFICIENT REALTIME FLIGHT PATH OPTIMIZATION
 Prof. Matthias Gerds (UniBwM)

2 MODELLING, SIMULATION, OPTIMISATION AND CONCEPTS OF URBAN AIR MOBILITY TRANSPORT SYSTEMS
 Dr. Kay Plötner (Bauhaus Luftfahrt), Lukas Preis (Bauhaus Luftfahrt)

3 SMALL AERO ENGINES – PERFORMANCE AND EMISSIONS USING DROP-IN FUELS Dr. Christian Helcig (TUM)

4 DATA-DRIVEN AVIATION MANAGEMENT Prof. Maximilian Moll (UniBwM)

5 INTELLIGENT CONTROL OF HIGHLY OVER-ACTUATED FLIGHT SYSTEMS
 Jonas Eichelsdörfer (TUM), Simon Hafner (TUM), Sondes Morchedi (UniBwM)

03.30 pm *Coffee Break*

04.00 pm **6 MACHINE LEARNING FOR NETWORK MANAGEMENT AND RESOURCE ALLOCATION IN FUTURE SATELLITE SYSTEMS (NEMARA-AI)**
 Dr. Thomas Delamotte (UniBwM), Manuel M. H. Roth (DLR), Daniel Weinzierl (UniBwM)

7 MULTIACCESS AND SECURITY CODING FOR MASSIVE IOT SATELLITE SYSTEMS
 Dr. Hannes Bartz (DLR)

8 IMONITOR: AI FOR MONITORING CHANGES AND FOOD SUPPLY FROM SPACE
 Dr. Sudipan Saha (TUM)

9 GNSS RECEIVER ALGORITHMS FOR ADVANCED GALILEO SERVICES
 Thomas Sichert (IABG)

10 HYBRID LIGHTWEIGHT STRUCTURES BY ADDITIVE MANUFACTURING
 Nandakishor TM (UniBwM), Ziad Mohammed El Sayed (TUM)

07.00 pm **Dinner at Kloster Andechs**

Departure times of the bus shuttle:
 06.40 pm: Arthotel → Kloster Andechs
 08.45 pm: Kloster Andechs → Arthotel

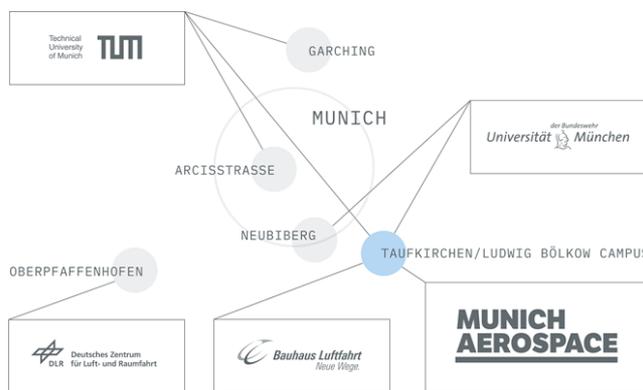


21 SEPTEMBER 2022

Welcome

Munich Aerospace

- 09.30 am** **CubeSats for Global Wildfire Detection**
Lucas Krempel, Payload Development Lead, OroraTech
 - 10.00 am** **Patent Workshop for Munich Aerospace Fellows: How a Technical Solution of a Problem Can Become a Commercial Asset**
Borys Hagemann, Kanzlei Schiweck Weinzierl Koch
 - 12.00 pm** *Joint Closing Lunch*
 - 02.00 pm** **Ludwig Bölkow Campus Site Visit**
Please register for the Campus Tour at info@munich-aerospace.de.
- Departure times of the bus shuttle:*
 12.45 pm: Haus der bayerischen Landwirtschaft → Arthotel
 01.00 pm: Arthotel → Ludwig Bölkow Campus
- 04.00 pm** *End of Event*



Ludwig Bölkow Campus, Willy-Messerschmitt-Straße 1, 82024 Taufkirchen

"The Ludwig Bölkow Campus forms a unique ecosystem of science, business and startups - which puts us in a position to develop a large variety of future technologies such as data-driven AI solutions for the registration of autonomous systems and their supporting software to physical products[...]."



Prof. Rudolf F. Schwarz
Managing Director iABC

ABOUT THE SPEAKERS

AI - Dö



Maurílio Albanese Novaes Júnior as a senior executive with 18+ years of experience is currently the Chief Technology Officer at **Embraer**. He started as Product Strategist in the Market Intelligence and Strategic Planning Team. He later held the position of Sales Support and Market Analysis Manager for Executive Aviation, based in Singapore. Later, as Conceptual Design Manager, he led several conceptual design projects (technical studies and business cases) for Commercial, Executive, Agricultural and Defense Business Units. Maurílio holds a master degree in Aeronautical Engineering from Instituto Tecnológico de Aeronáutica & Executive Leadership Development Program from Fundação Dom Cabral in Brazil.



Professor Constantinos Antoniou (PhD MIT) is a Full Professor of the Chair of Transportation Systems Engineering at the **Technical University of Munich**, Bavaria, Germany. His research focuses on modelling and optimization of transportation systems, data analytics and machine learning for transportation systems, and human factors for future mobility systems.



Dr. Hannes Bartz received his Dr.-Ing. degree in electrical engineering from the Technical University of Munich in 2017. In his dissertation he developed efficient algebraic decoding schemes for error-correcting codes in subspace and rank metric. In July 2017 he joined the Information Transmission Group department at the **German Aerospace Center** (DLR) where he worked code-based post-quantum cryptosystems. Since April 2021 he is leading the Quantum-Resistant Cryptography (QRC) group within the Satellite Networks department.



Dr. Thomas Delamotte received the Ph.D. degree in communications engineering from the **Bundeswehr University Munich** in 2019. Since 2016, he has been coordinating the Research Group "Digital Satellite Payloads and Satellite Monitoring" from the Chair of Signal Processing with the same university. He is currently engaged in several national and international research projects focusing on the application of advanced signal processing techniques and waveform designs for next-generation high-throughput satellite systems. He is a member of the satellite expert working groups from the NetworkEurope European Technology Platform and the IEEE Future Networks initiative.



Fabian Donus joined **MTU Aero Engines** as an Aerospace Engineer after graduation in 2008 and worked several years as a gas turbine performance engineer on the development of the first generation Geared Turbofan. Donus changed to the advanced design department as focal point for revolutionary engine concepts and temporarily worked at the corporate strategy department to build-up the "InnoLab", MTUs incubator for radical innovations. Since 2021 he acts as the Innovative Propulsion Director responsible for sustainability in aviation.



Dr. Florian Dötzer is Managing Director of **TUM Venture Lab Aerospace**. He is actively promoting high-technology innovations through his role as advisor for multinational companies and mentoring startups at German Accelerator, Slingshot and AdMaCom. In Singapore, he was active as industry liaison for Technische Universität München's Singapore office. He held various positions at Altran Group, Airbus and BMW Group in Munich, Delhi, Bangalore and Hamburg.

ABOUT THE SPEAKERS

Dr - He



Professor Klaus Drechsler is Full Professor of the Chair for Carbon Composites at **Technical University of Munich** and member of the Executive Board of **Munich Aerospace**. He is the Lead Scientist of the first international e-learning and research network programme "Global Aerospace Campus", which was launched in 2016 as part of the Regional Leaders' Summit and addresses scientists and experts from the Bavarian partner regions. The programme reaches up to 10,000 learners worldwide. In 2019, Drechsler was appointed Director of the Fraunhofer Institute for Casting, Composite and Processing Technology (IGCV).



Professor Carole El Ayoubi ing., PhD, is a Senior Lecturer in the Department of Mechanical, Industrial and Aerospace Engineering at **Concordia University**. She is Director of two undergraduate programs; mechanical and aerospace engineering, as well as the director of education at the Concordia Institute of Aerospace Design and Innovation. Dr. El Ayoubi is dedicated to the cultivation of multidisciplinary teaching methods and support excellence in aerospace training at Concordia University. She has experience as an aerodynamics engineer at Pratt & Whitney Canada, and her area of research is focused on the aerothermal design of gas turbines.



Professor Matthias Gerdts received his doctoral degree in 2001 and his habilitation in 2006 from the University of Bayreuth. After research stays at the University of California, University of Hamburg, University of Birmingham and University of Würzburg, he is a full professor for engineering mathematics at the Department of Aerospace Engineering at the **Bundeswehr University Munich** since 2010. His primary research interests are optimal control and methods, differential-algebraic equations, model-predictive control, and sensitivity analysis with applications in automotive systems, robotics, and aerospace engineering.



Dr. Olaf Heintze is assigned to the Divisional Board Member Aeronautics, Dr. Markus Fischer, for aeronautics division development matters at the **German Aerospace Center (DLR)**. After completing his doctorate in the USA, he joined DLR, then coordinated research in a medium-sized aerospace company before returning to DLR, first to the Aeronautics Program Directorate as a research area coordinator and then to the Divisional Board Aeronautics.



Dr. Christian Helcig is the Chief Engineer at the Chair of Turbomachinery and Flight Propulsion at the **Technical University of Munich**. His research interest is sustainable aviation, including advanced aerodynamic designs, heat transfer methods, sustainable flight propulsion, and aviation fuels. Christian Helcig is the TUM organizer for the "European Consortium for Advanced Training in Aerospace," which gives him a broad overview of the aviation industry's challenges and needs. In 2021 he joined Munich Aerospace as a research group leader for the "Performance and Emissions of Helicopter Engines using Drop-In Biofuels".

ABOUT THE SPEAKERS

Ju - Lo



Dr. Tina Jurkat-Witschas studied Physics at the University of Heidelberg and Conception, Chile and did her PhD in airborne measurements of jet engine exhaust gases. She is employed as a scientist at the **German Aerospace Center (DLR)** since 2010, working in the field of aircraft emissions and contrails and aircraft icing. She has participated in and coordinated national and international flight campaigns related to aircraft emissions and contrails. Since 2021 she is leading the research group H2CONTRAIL investigating the impact of hydrogen engines on contrail properties.



Tobias Korbanek holds a diploma degree in aerospace engineering from the Technical University of Dresden. During his studies he had student-stations at Rolls Royce Deutschland. He joined **IABG** in 2008 as a test engineer for full scale fatigue tests on Airbus A380 and others. Korbanek re-focused 2019 within IABG on the concept development for hybrid-electric propulsion systems testing applications. Currently he is developing a hydrogen testing project for cryogenic-systems with a focus on large systems and high-risk-testing environments.



Dr. Simon M. Kothe worked as a Scientific Researcher at the Institute for Production Management and Technology at Technical University Hamburg and became Group Manager and Deputy Head of Department at the Automation and Production Technology Department of Fraunhofer IFAM in Stade in 2011. After working as a patent engineer at VKK Patent Attorneys in Hamburg, Kothe returned to Fraunhofer IFAM in Bremen in 2018 as Head of Department Business Development. Since 2021 he is also Head of Central Office of **Fraunhofer AVIATION & SPACE**.



Axel Krein is the Executive Director of Clean Sky since 2019, and since its establishment in 2021 the Executive Director of the **Clean Aviation** Joint Undertaking. Clean Aviation develops and demonstrates revolutionary new technologies and aircraft concepts to support the EU's climate neutrality goals for aviation in the context of the Horizon Europe framework programme for Research & Innovation and the European Green Deal. Prior to Clean Sky, Axel held various positions in Airbus, including Senior Vice President Cyber Security Program (2014 - 2019); Senior Vice President Research & Technology (2007 - 2014); Senior Vice President Strategic Development (2004 - 2007); and Senior Vice President and Chief Information Officer (2000 - 2004).



Lucas Krempel holds a master's degree in Physics from the Technical University of Munich. Next to the studies he was student lead of the CubeSat mission MOVE-II that has been operational in space since 2018. From 2019 onwards he has been part of **OroraTech**. Currently he is leading the payload development, enabling the satellites to detect wildfires from space.



Elisabeth Loeffelholz von Colberg studied as Dipl.-Wirtsch.-Ing. & Master of Science in Strategic Project Management and started her professional career at Tesat-Spacecom afterwards. Following several career steps at Airbus Defence and Space and ArianeGroup, she was always associated to space. Today at **ArianeGroup** Elisabeth is a Business Manager for Hydrogen in Germany. She is responsible for business development for hydrogen and for coordinating ArianeGroup's hydrogen activities in Germany.

ABOUT THE SPEAKERS

Lu - Ro



Professor Robert Luckner is currently at the **Technische Universität Berlin** at the Institute of Aeronautics and Astronautics. Until retirement in March 2019, he was university professor for Flight Mechanics, Flight Control and Aeroelasticity at the Institute of Aeronautics and Astronautics at TU Berlin. He was principal engineer in the domain 'Flight Control' at Airbus, Hamburg, where he worked from 1984-2004. He was Chair of the CEAS Technical Committee "Guidance Navigation and Control" (2007-17), Chair of the DGLR Technical Committee L6 "Flight Mechanics, Flight Guidance and Control" (1994-2020) and he was member of the "A380 Wake Vortex Group" (2003-06). He is Associate Fellow AIAA, member of the DGLR Senate, and member of the Scientific Advisory Board of **Munich Aerospace** since 2021.



Professor Christian Moreau is a Professor in the Mechanical, Industrial and Aerospace Engineering Department at **Concordia University** since 2013. He is the holder of the Canada Research Chair Tier 1 in Thermal Spray and Surface Engineering and Research Director of the Concordia Institute for Aerospace Design and Innovation (CIADI). Since 2017, he leads the NSERC Canada Research Strategic Network on Green Surface Engineering for Advanced Manufacturing (Green-SEAM). He is also Director and Co-founder on the Concordia Research Centre on Thermal Spray and Surface Engineering (TSSE).



Professor Hany Moustapha is Professor and Director of the Aerospace Programmes (AEROETS) at **ÉTS Montréal**. He is the Canadian industry and academic member of NATO's Aviation Technology since 2000 and founder and cofounder of the Montreal Aerospace Institute (MAI, 2001), the Consortium for Research and Innovation in Aerospace in Québec (CRIAQ, 2002), Aero Montreal Cluster (2005), the Green Aviation Research and Development Network (GARDN, 2007), AEROETS (2010), Aerospace 4.0 (2016) and Innovation 4.0 Network of eight Canadian universities (2019).



Dr. Kay Plötner heads the team Economics and Transportation at **Bauhaus Luftfahrt** since 2016, anticipating future developments of the air transport system. The team is researching integration solutions for metropolitan and rural regions, taking into account economics, ecology, equity and urban planning. As head of the Munich Aerospace research group "Modelling and Simulation of Urban Air Mobility", exchange of latest urban and regional air mobility research has been fostered by him. Before Kay Plötner joined Bauhaus Luftfahrt in 2010, he studied and completed his doctorate in aerospace engineering at the Technical University of Munich.



Professor Luis Rodrigues performs research on control systems and machine learning applied to aerospace systems at **Concordia University** in Montreal. He has authored or co-authored over 120 journal and conference publications, four aerospace opinion articles in the Hill Times, and is first author of the book "Piecewise Affine Control: Continuous Time, Sampled Data, and Networked Systems". One of Dr. Rodrigues' publications, entitled "Trajectory Planning and control of a quadrotor choreography for real-time artist-in-the-loop performances", received the Unmanned Systems journal's best paper award in the 2018-2019 applications category. Professor Rodrigues is a life member of the AIAA and a senior member of the IEEE.

ABOUT THE SPEAKERS

Ru - Wi



Thorsten Rudolph founded **AZO** **Anwendungszentrum GmbH** **Oberpfaffenhofen** in 2004 as the first Bavarian Space incubator and has been its managing director ever since. In cooperation with institutional and industrial partners in Germany, Europe and around the globe, he built the largest innovation network for the satellite downstream business. AZO supported more than 1000 startups and established the ESA BIC Bavaria as a benchmark for entrepreneurship in the space sector on behalf of the European Space Agency (ESA). Together with his team, he helped his clients to build innovation and startup ecosystems, launched accelerator programmes and funding mechanisms for the new space economy in Europe.



Dr. Sudipan Saha is a postdoctoral researcher at the AI4EO Future Lab at the **Technical University of Munich**, working with Prof. Xiao Xiang Zhu. He received a Ph.D. degree in Information and Communication Technologies from the University of Trento and Fondazione Bruno Kessler (FBK), Trento, Italy in 2020 working with Dr. Francesca Bovolo and Prof. Lorenzo Bruzzone. He is the recipient of FBK Best Student Award 2020. His research interests are related to multi-temporal and multi-sensor remote sensing image analysis, uncertainty quantification, image segmentation, and deep learning.



Max Scheulen is the Global Head of System Architecture - Electrical at **Rolls-Royce** and leads the department for Safety, Architecture and Simulation in Munich and Erlangen. In these roles, he coordinates the development of the architectural solutions for hybrid-electric propulsion systems on a global level. Max Scheulen entered Rolls-Royce in October 2019 when the Siemens internal startup was acquired. Previously, he held multiple management positions in the aviation and automotive industry and was responsible for the development of hybrid-electric systems and powertrains. He is a physicist and received his diploma from the University of Karlsruhe in 2007.



Fiona Starke holds a bachelor's degree in International Business Administration and a master's degree in Sustainable Development. She joined **Munich Airport** in 2017 and has been part of the Strategic Sustainability Management team of MUC since 2019. As CSR manager, she coordinates the implementation of the sustainability strategy and is leading projects in various fields of sustainable business development. Furthermore, she supports the pursuit of Munich Airport's goal to reach climate-neutrality in 2030 and net zero emissions in 2050 the latest.



Johannes Stuhlberger graduated from Aerospace Engineering in Munich. For more than 30 years he is working in the aerospace industry in various engineering and management positions and numerous locations. He was plant manager and responsible for profit and loss. In more than 10 years within **Airbus** CTO or technology department he invented as head of global innovation networks the hybrid electric roadmap for Airbus and derived the scouting for innovative technologies. He brought various demonstrators for alternative hybrid and electric propulsion and alternative fuels in flight. For more than a decade he has been caring for solutions to reduce the environmental impact of airbus products and services. The main focus now is on mid to long term innovative technology trend scouting.



Stephanie Wissmann is CMO at **SpaceFounders**, the first independent European space accelerator. She is a research associate at the Entrepreneurship Unit "founders" at the **Bundeswehr University Munich**, a lecturer at Munich Business School and co-founder of a biotech startup. Stephanie Wissmann is committed to promoting startup ecosystems to strengthen innovation and sustainability.

DIRECTIONS

Event Location

ARTHOTEL Herrsching
Zum Landungssteg 1
D-82211 Herrsching

Contact

Phone: +49 8152 96810
Email: info@arthotel-herrsching.de

Arrival by car:

Parking facilities directly in front of the hotel and in the hotel's own underground car park + Route planner with the destination "Zum Landungssteg 1, 82211 Herrsching.

Arrival by public transport:

from Munich Airport

From Munich Airport, take S-Bahn line S8 in the direction of the main railway station (Hbf) to the terminus "Herrsching". Journey time approx. 80 minutes. The S-Bahn station is diagonally opposite the ARTHOTEL Herrsching.

from Munich Central Station or Munich-Pasing

Change there to the S-Bahn line S8 in the direction of Herrsching and travel to the terminus "Herrsching". The journey takes about 40 minutes. The S-Bahn station is diagonally opposite the ARTHOTEL Herrsching.

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