RedCabin

Agenda Draft

International Conference

# AIRCRAFT CABIN ADDITIVE MANUFACTURING

## Now and the future

3–4 March 2020 | ZAL Tech Center, Hamburg

Hosted by Lufthansa Technik

Co-Hosted by stratasys

Early Confirmed Speakers:

Lufthansa Technik · stratasys · MagneticMRO · ZAL · Additive Flight Solutions · AIRBUS · DIEHL Aviation · SAE International · SATAIR · materialise · ETIHAD Aviation Group · EOS · ASTM

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Aircraft Cabin Additive Manufacturing delivers a unique interactive platform to listen to discussions on additive manufacturing case studies, material usage, machine vendors updates, industrialization challenges and certification and regulation challenges.

## EARLY CONFIRMED SPEAKERS

**KLAUS BRAEUTIGAM**
Technology Lead Additive Manufacturing, Fleet Services
*Lufthansa Technik AG*

**DR. AENNE KOESTER**
Head of Additive Manufacturing Center
*Lufthansa Technik*

**SCOTT SEVCIK**
VP Aerospace Business Segment
*Stratasys*

**DR. THORSTEN SCHAROWSKY**
Senior Development Manager Additive Manufacturing
*CoC Aircraft Manufacturing & MRO, ZAL*

**TAN CHUAN CHING**
General Manager
*Additive Flight Solutions*

**MARC LEE**
Senior Commercialisation Manager, Industry Development Office
*NAMIC*

**BERNHARD RANDERATH**
VP Design, Engineering and Innovation
*Etihad Aviation Group*

**PÄRTEL-PEETER KRUUV**
Interior Project Manager
*Magnetic MRO*

**MARKUS GLASSER**
Senior Vice President
*EOS*

**JURGEN LAUDUS**
Vice-President Manufacturing
*Materialise*

**NILS FRAUEN**
Sales Manager Central Europe
*Diehl Aviation*

**DR. DIETMAR VÖLKLE**
*Vice President Research*
*Diehl Aviation*

**MOHSEN SEIFI**
Director Global Additive Manufacturing Programs
*ASTM International*

**GERD BÜTTNER**
ZIDAR - Scientific Computing Architect, Roadmap Leader Data Processing
*Airbus*

**FELIX HAMMERSCHMIDT**
Head of Additive Manufacturing Solutions
*ASYM SATAIR*

**LIONEL RIDOSZ**
Additive Manufacturing Director
*Safran Group*

**MIKE JAGEMANN**
*Head of XB-1 Production*
*Boom Supersonic*

**DR. PHILIPP IMGRUND**
*Head of AM Process*
*Fraunhofer Institution for Additive Manufacturing Technologies IAPT*

**GREGOR REISCHLE**
Head of Additive Manufacturing
*TÜV SÜD*

## PREVIOUS ATTENDEE INCLUDE

- CATHAY PACIFIC
- ETHIOPIAN
- AIR FRANCE
- STELIA
- ETIHAD AIRWAYS ENGINEERING
- MAGNETIC MRO
- EOS
- GE ADDITIVE
- AIRBUS
- RECARO
- SAFRAN
- and more

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## CO-HOST

Stratasys is a global leader in additive manufacturing or 3D printing technology and is the manufacturer of FDM® and PolyJet™ 3D Printers. The company's technologies are used to create prototypes, manufacturing tools, and production parts for industries, including aerospace, automotive, healthcare, consumer products and education.

For 30 years, Stratasys products have helped manufacturers reduce product-development time, cost, and time-to-market, as well as reduce or eliminate tooling costs and improve product quality. The Stratasys 3D printing ecosystem of solutions and expertise includes: 3D printers, materials, software, expert services, and on-demand parts production. Online at: *www.stratasys.com, blog.stratasys.com* and *LinkedIn.*

## SPONSORS

EOS is the world's leading technology supplier in the field of industrial 3D printing of metals and polymers. Formed in 1989, the independent company is a pioneer and innovator for comprehensive solutions in additive manufacturing. Its product portfolio of EOS systems, materials, and process parameters gives customers crucial competitive advantages in terms of product quality and the long-term economic sustainability of their manufacturing processes. Furthermore customers benefit from deep technical expertise in global service, applications engineering and consultancy.

Materialise incorporates three decades of 3D printing experience into a range of software solutions and 3D printing services, which together form the backbone of the 3D printing industry. Materialise's open and flexible solutions have enabled players in a wide variety of industries, including healthcare, automotive, aerospace, art and design, and consumer goods, to build innovative 3D printing applications that aim to make the world a better and healthier place. Headquartered in Belgium, with branches worldwide, Materialise combines the largest group of software developers in the industry with one of the most complete 3D printing facilities in the world. For additional information, please visit: *www.materialise.com.*

## SPONSORS

Etihad Airways Engineering is part of the Etihad Aviation Group (EAG), offering industry leading aircraft maintenance and engineering solutions including airframe maintenance, component repair, overhaul services and technical training, with a team of more than 3,000 professionals from around the world. We are also the first MRO in the world outside Europe approved by European Aviation Safety Agency for Production Organisation Approval, under EASA Part 21G. Our investment in new technology, skills and MRO capability has enabled us to offer services for Boeing 787 and Airbus A380 aircraft and we are building our capability for new platforms like the Airbus A350 and the Boeing 777X to support the world's leading fleets. aviation growth markets, Etihad Airways Engineering is spearheading Abu Dhabi's vision of being a global aerospace hub and playing a crucial role in supporting economic growth and diversification in the United Arab Emirates.

DyeMansion is the global leader in Additive Manufacturing finishing systems that turn 3D-printed raw parts into high-value products. From perfect fit eyewear to personalized car interiors, DyeMansion's technology makes 3D-printed products become a part of everyday life. Starting in 2015 with the first industrial coloring solution for powder bed fusion parts, the company extended their portfolio with advanced part cleaning and surfacing solutions for a wider range of 3D-printing technologies in the field of plastics. Today, DyeMansion's Print-to-Product workflow combines industry-leading hardware with the widest range of color options on the market.

Siemens Digital Industries Software helps manufacturers become Digital Enterprises by enabling them to digitalize and integrate their entire industrial value chain through PLM solutions, Manufacturing Operations Management (MOM) solutions, and Factory Automation (TIA) equipment. The integration of PLM, MOM and Automation is made possible with the comprehensive suite of Siemens Industry Software. Siemens CAx platform NX enables and provides all of the necessary capabilities, from design to simulation to print to post-print validation, in a single integrated system. Siemens Digital Industries Software is industrializing additive manufacturing so you can not only prototype, but also manufacture ground-breaking products with this exciting technology.

**For sponsorship such as exhibition, logo display, evening event sponsoring and speaking, please contact:**

Andreas Wibowo, *Andreas.Wibowo@redcabin.de* | direct line: +49 30 99 40 489 11

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## MEDIA PARTNERS

Aircraft Interiors International is celebrating its 20th Anniversary during 2018 and over the last 20 years it has grown to become the industry's premier publication. With an ABC audited circulation of just short of 14,000 buyers and key decision makers, the hard copy format is extremely valued by readers for detailed content, sense of style and easy-to-read format, and appreciated by advertisers for consistently generating strong sales leads and wider brand recognition.
Industry news is delivered through our weekly email service linked to our website *www.aircraftinteriorsinternational.com.*

You are welcome to take a complimentary copy during the Conference.

No matter where in the world you board an aircraft it is quite likely that some Hamburg is flying with you. Hamburg is the 3rd largest civil aviation site, worldwide cabin competence center and home of the renowned Crystal Cabin Award. More than 40,000 highly qualified specialists are working here on the future of aviation. Hamburg Aviation is the region's network dedicated to advancing one of the world's most important locations for civil aviation, cutting-edge education and pioneering research.

TCT Magazine – The magazine for design-to-manufacturing innovation

TCT Magazine is the cornerstone of The TCT Group's media arm, the world's premier communications portfolio for 3D technologies (3D printing, additive manufacturing, 3D scanning, metrology, 3D services, design and more) communities. From its roots as a 'rapid prototyping' newsletter, TCT Magazine has expanded to become the foremost authority on the technologies that are shaping the way things are made.

## MEDIA PARTNERS

3D Printing Industry (3DPI) is a global media company providing a dedicated resource for anyone interested in 3D printing and 3D scanning — two fields of technology that are rapidly growing in relevance and application across industrial and consumer sectors. These two technologies are playing a key role in the advent of a DigiCal world, where physical meets digital. The mission of 3DPI is to report on and create original content centered around the latest developments in 3D printing and 3D scanning to keep our large and growing audience abreast of technology breakthroughs, the latest applications and the opinions of industry insiders.
3DPI works with a dedicated team of experienced writers with a keen interest in 3D printing and 3D scanning. Our Media is also open to the community and external contributors willing to share their passion and insight into 3D printing and 3D scanning. We believe that this open mindset will encourage dissemination of innovation and ideas. It echoes the open source approach that has been so successful in the software industries over the last 30 years.

The National Additive Manufacturing Innovation Cluster (NAMIC), led by NTUitive, was launched in October 2015 to address the challenges, and accelerate Singapore's industrial adoption of Additive Manufacturing (AM). It identifies and nurtures promising AM technologies and start-ups, jumpstarts public-private cross-collaborations, acting as a connector between industry, research performers and public agencies. NAMIC also assists companies seeking to lower the barriers towards AM adoption through joint project funding and leveraging on its investor networks. It focuses on industry sectorial applications and needs, such as standards development and certification, in conjunction with the translational research and commercialization strategies, to help companies co-create innovative processes, products and services. NAMIC focuses on sectors where Singapore has developed capabilities with competitive advantages, with a view to the future, such as Aerospace, Bio-Medical, Clean Technology, Offshore Marine, Maritime, Precision Engineering, Electronics, Building Construction and Design. Since its inception, it has engaged and partnered with several thousand organizations globally and in Singapore, raising more than $46 million in private and public funding to support over 180 projects covering industry technology development, translation, commercialization, standards development, training and certification, across various industry verticals."

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## THIS IS WHAT EXPERTS OF OUR PAST EVENTS EXPERIENCED

"For airlines it was great opportunity to listen to top airline cabin development presentations."

*Manager Products & Serv. Strategy, CS & Products Services, ANA*

"Very constructive atmosphere, good presentations, very good level of discussions and participants, speednetworking is a good idea and workshops a good alternative to presentations only."

*Director Liaison Office Abu Dhabi, Diehl Aerospace Abu Dhabi*

"Great content, great participants, great location."

*Executive Vice President Res. & Dev., Recaro Aircraft Seating*

"Got to be the best event I have attended. Personal, open, great group willing to discuss and share common experiences/challenges and opportunities."

*Design Director, Factory Design*

"Fantastic conference. Very effective to meet with existing relations and meet new ones. Well organized. Good topics for workshops. Very friendly atmosphere from everybody. Very honest and open discussions."

*General Manager, ADSE*

"Versatile program with speeches and interactive modules. International/interdisciplinary audience."

*Director Strategic Partnering, BMW Design Works*

"Different approach, more practically than other conferences. Better direct contacts with participants and airlines. Workshops good. More open discussion. Good organisation, hospitality."

*Business Development Director, Metzeler Schau*

# AIRCRAFT CABIN ADDITIVE MANUFACTURING Now and the future

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## CONFERENCE DAY 1 | TUESDAY 3 MARCH 2020

*08:00 Registration*

**08:30 Welcome note by the Chairman Mohsen Seifi –** Director Global Additive Manufacturing Programs, *ASTM International*, **RedCabin and Lufthansa Technik as a conference host**

**08:45 Additive Manufacturing: Lufthansa Technik's approach**

- Technology incubator: Additive Manufacturing Center at Lufthansa Technik
- Case: How to produce approved customized and improved cabin parts
- Benefits of these cabin parts over the expected lifetime

**Klaus Braeutigam –** Technology Lead Additive Manufacturing, *Fleet Services Lufthansa Technik AG*

**09:15 3D Printing Technologies and its impact on future Aircraft operation**

- The Etihad Aviation Group has undertaken significant investments in new digital and manufacturing technologies.
- With it latest innovation introducing an Intelligent Cabin, Etihad targets to manufacture cabins and it parts in new and different 3D printing technologies.
- As a consequence Etihad received as the first Airline MRO EASA approval for SLS technology certified on an EOS machine, the world class leader of Additive Manufacturing machines.
- On this conference Etihad and EOS outline a new digital printing vision operating, maintaining and retrofitting future Aircraft.

**Bernhard Randerath –** VP Design, Engineering and Innovation, *Etihad Aviation Group*

**Markus Glasser –** Senior Vice President, *EOS*

09:45 SPEED NETWORKING

Get in touch with the other conference guests in quick paced one-on-one meetings – make sure you bring a stack of business cards. The session is followed by a short break.

*10:15 Networking coffee break*

Interactive sessions: PANEL DISCUSSION

**10:45 Certification for additive manufacturing cabin parts**

MODERATED BY: **Mohsen Seifi –** Director Global Additive Manufacturing Programs, *ASTM International*

PANELISTS: **Stefan Ritt –** VP EMEA Operations, *Speed 3D*

**Jānis Jātnieks –** CEO, *Baltic 3d*

**Gregor Reischle –** Head of Additive Manufacturing, *TÜV SÜD*

**11:15 Role of additive manufacturing for Cabin MRO/ Refurbishment**

- Possible drawbacks and current limitations of additive technologies
- Possible collaborations between OEM-s and MRO-s in order to create controlled legislational environment for AM in 145 facilities

- Mindset and acceptance of the technology by customers/engineers/mechanics
- Real-life setbacks Magnetic MRO has faced while implementing AM
- Professional vs amateur – using consumer grade equipment and what was learned from it

**Peeter Kruuv –** Interior Project Manager, *Magnetic MRO*

**11:45 Additive Manufacturing - A Game Changer for the MRO Business**

- Overview of today's applications of AM within after sales with a focus on cabin applications
- Technology outlook and how it will shape the future of customization and manufacturing for in-service aircraft

**Felix Hammerschmidt –** Head of Additive Manufacturing Solutions, *ASYM SATAIR*

*12:15 Networking Luncheon*

## Interactive sessions: WORKING GROUPS

13:45 Discuss the latest challenges and developments in AM with moderators and peers in these highly interactive sessions. You are welcome to share your ideas and experiences in the working groups. The audience will be divided into 3 groups. Each group will attend all 3 interactive working groups.

## WORKING GROUP – 1

### Robot guided additive manufacturing for large scale cabin parts

Additive manufacturing is in the conventional printing limited to the machine size and the movement of the extruder. To overcome those limitations a robot, guiding the extruder, is used for additive manufacturing. This offers a large build volume due to the accessibility of the robot, all degrees of freedom of the robot end effector, the possibility to print on uneven surfaces and build non planar layers. Being an already old technology for metal repairs, this technology starts to gain interest also for polymer additive manufacturing offering new potentials in additive manufacturing.

**Challenges and opportunities of this technology will be introduced and discussed in this workshop**

- Applications of Robot guided additive manufacturing
- Large scale printing: advantages and challenges
- Online monitoring and path tracing
- Scalability of robot guided manufacturing
- Visit of a robot cell for additive manufacturing

MODERATED BY: **Dr. Thorsten Scharowsky –** Senior Development Manager Additive Manufacturing, *CoC Aircraft Manufacturing & MRO, ZAL*

## CONFERENCE DAY 1 | TUESDAY 3 MARCH 2020

### WORKING GROUP – 2

**Using blockchain in 3d printing industry and how it can be applied in the aerospace sector**

- Introduction to NAMIC and the AM overview in Singapore
- Introduction to Blockchain technology
- Blockchain technology and applications in the Aerospace industry
- Inherent risk of Blockchain technology
- Challenges to implementation

**Marc Lee –** Senior Commercialisation Manager, Industry Development Office, *NAMIC*

**Ali Baghchehsara –** Managing Director, *LISA Deutschland GmbH*

### WORKING GROUP – 3

**Stratasys case study on 3d printing for cabin parts**

The adoption process for cabin parts – thresholds, enablers, and best practices. This working group will discuss case studies of different processes by which polymer additive cabin parts have been adopted. This will form the basis for a discussion on what adopter needs are for internal alignment, qualification, and certification. The group will then discuss how these needs are being met today, and what the industry can do to accelerate or simplify this journey.

**Scott Sevcik –** VP Aerospace Business Segment, *Stratasys*

*15:45 Networking coffee break*

### 16:15 CONTINUING WITH WORKING GROUPS 1, 2 AND 3

**17:15 Results**
Each moderator of the Interactive working group is presenting the outcomes of their session

17:30 Closing remarks and Welcome dinner by our co-host Stratasys

END OF DAY 1

## CONFERENCE DAY 2 | WEDNESDAY 4 MARCH 2020

*08:30 Registration*

**08:50 Opening remark by the Chairman Mohsen Seifi –** Director Global Additive Manufacturing Programs, *ASTM International*

**09:00 Increasing resource efficiency of aviation by innovative materials and bionic design for metal components made by additive manufacturing**

- Development of a high-strength Al-Si-Sc alloy for Laser Beam Melting, optimization of process parameters for increased productivity and resource efficiency
- Bionic design concepts for enhancement of lightweight production
- Impact on resource efficiency over the aircraft life cycle

**Dr. Philipp Imgrund –** Head of AM Process, *Fraunhofer Institution for Additive Manufacturing Technologies IAPT*

**09:30 Boom Aerospace and the use of additive in developing the XB-1**

- The Boom Aerospace and XB-1 story
- Range of examples from functional prototyping, to tooling, to flight hardware where Boom is using Stratasys 3D printing

**Mike Jagemann –** Head of XB-1 Production, *Boom Supersonic*

**10:00 Polymer ALM for aerospace: keys success factors for a large scale serial production**

- Polymer Material and process qualification for aerospace parts
- ALM: providing service to Safran Seat's customers
- Middle/long term view: partnerships to improve cost structure
- Future industrial implementation

**Lionel Ridosz –** Additive Manufacturing Director/Additive Manufacturing Expert, *Safran Group*

*10:30 Networking Coffee Break*

**11:00 Value proposition of AM to Airlines**

- Where and when do AM make the business case to the airlines?
- What other hurdles to clear, or groundwork to lay to drive adoption?
- Use cases by AFS to the airlines especially in aircraft interior

**Tan Chuan Ching –** General Manager, *Additive Flight Solutions*

**11:30 Additive Manufacturing for Cabin Interior Applications**

The additive manufacturing influence within aerospace is growing constantly. But due to aerospace requirements, only few certified processes and materials are available yet. Nevertheless current developments show an increasing number of certified parts made with additive manufacturing. Diehl Aviation will take the audience on a journey from prototypes to serial production parts.

**Dr. Dietmar Völkle –** Vice President Research, *Diehl Aviation*

## CONFERENCE DAY 2 | WEDNESDAY 4 MARCH 2020

**12:00 Serial production in additive manufacturing for aerospace**

For years, additive manufacturing in the aerospace industry has been steadily maturing as a serial production technology. As we move from prototyping to end-use part manufacturing, we encounter a new set of variables. Achieving repeatable and reliable production means bringing these factors under our control. What are these new variables and how can they be controlled? Jurgen Laudus, Vice President Manufacturing at Materialise, will discuss how Materialise tackles this and illustrate with case studies.

**Jurgen Laudus –** Vice President Manufacturing, *Materialise*

*12:30 Networking Luncheon*

### Interactive sessions: WORKING GROUPS

13:30 Discuss the latest challenges and developments in AM with moderators and peers in these highly interactive sessions. You are welcome to share your ideas and experiences in the working groups. The audience will be divided into 3 groups. Each group will attend all 3 interactive working groups.

### WORKING GROUP – 1

**Cabin part development strategy**

- Challenges in parts approvals due to parts criticality
- AM cabin parts from OEM and MRO perspective
- Centralized or decentralized production

**Dr. Aenne Koester –** Head of Additive Manufacturing Center, *Lufthansa Technik*

### WORKING GROUP – 2

**Challenges of the Spare Part business in a distributed additive manufacturing environment**

The working group will focus on the challenges of manufacturing spare parts in distributed print centres.
These challenges include aspects like:

- Which information is required in which format
- Which certification criteria have to be considered (e.g. printing process, 3d-printer, external print centre,….)
- Which information must be stored for the documentation of the print process
- How is a part identified during its product life cycle in order to proof that it was produced by the right process, on the right machine, and is an official licenses part
- Can the physical stock of an OEM be reduced by using local print centres
- Changes in the Business model ( e.g. a licence to print will be provided instead of a physical part)

**Gerd Büttner –** ZIDAR – Scientific Computing Architect Roadmap Leader Data Processing, *Airbus*

**Dr. Martin Holland –** Business Development, *PROSTEP AG*

## CONFERENCE DAY 2 | WEDNESDAY 4 MARCH 2020

WORKING GROUP – 3

**Future additive manufacturing applications for cabin interior**
What to expect: The workshop will use a collaborative working approach to evaluate new additive manufacturing applications for the cabin interior of commercial aircrafts. Together we will assess ideas and identify upcoming technological challenges.

**Nils Frauen –** Sales Manager Central Europe, *Diehl Aviation*

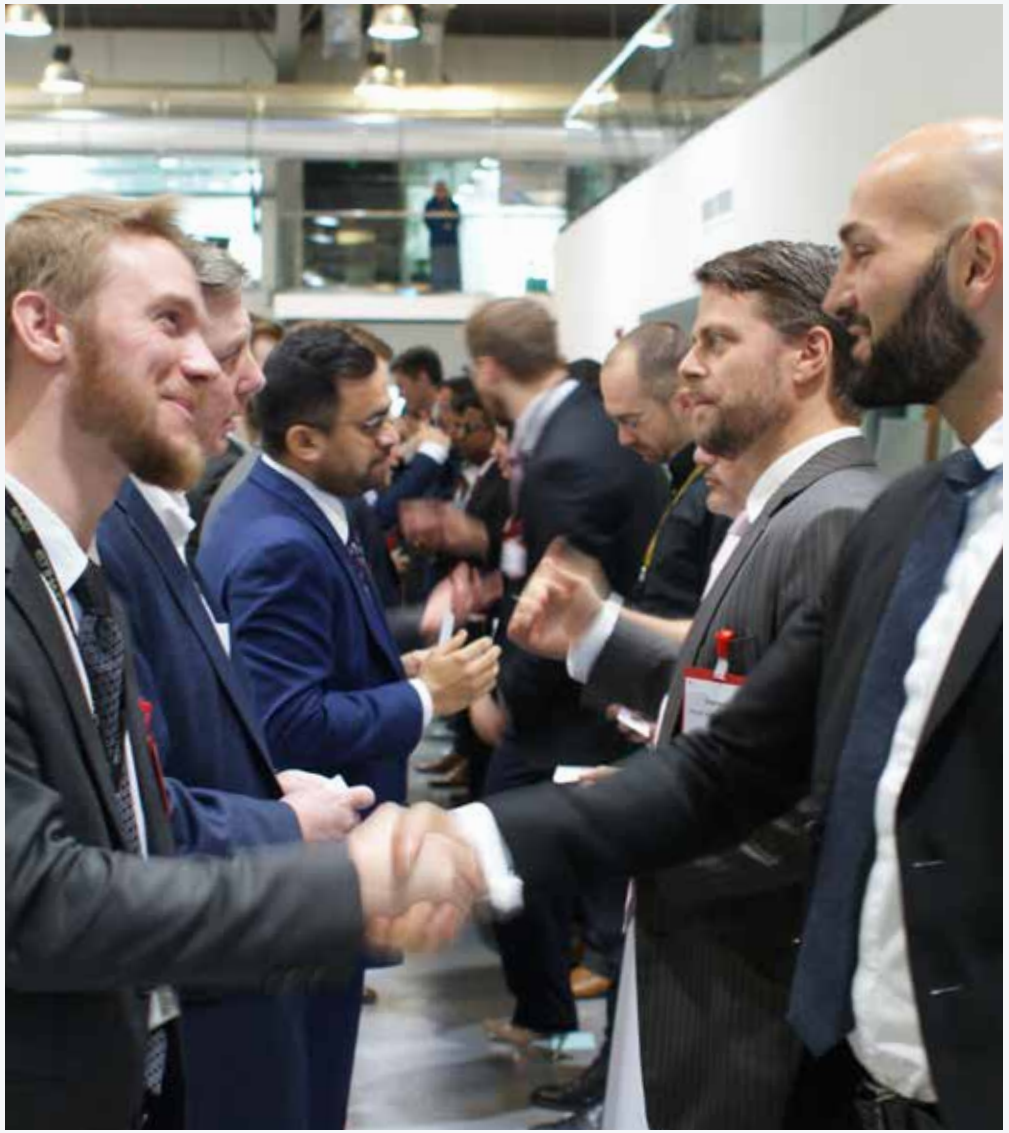
*15:30* *Networking Coffee Break*

16:00 CONTINUING WITH WORKING GROUPS 1, 2 AND 3

**17:00 Results**
Each moderator of the Interactive working group is presenting the outcomes of their session

17:30 Closing remarks by RedCabin and Summit chairman

END OF CONFERENCE



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| | |
|---|---|
| 2 DAY CONFERENCE INVESTEMENT* | 2.995 € + VAT |

* Investment per delegate

AIRLINES PLEASE CONTACT US FOR LIMITED VIP TICKETS!

**The delegate fee includes the following services:**

- Catering during the entire conference
- Access to the purchased conference packages
- Conference documentation
- Evening event

**Payment Terms**
Payment is due on receipt of the invoice.

**Conference venue:**
**ZAL TECH CENTER**
Hein-Sass-Weg 22 | 21129 Hamburg, Germany

**For further information or registration please call:**
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