



Fraunhofer



# ICTM Conference

February 16–17, 2022 | Digital Event

[www.ictm-aachen.com](http://www.ictm-aachen.com)

## Foreword



### Welcome to the 6<sup>th</sup> Conference of the ICTM – International Center for Turbomachinery Manufacturing Aachen

Sustainability and efficiency are one of the most important focus areas in aviation to stay competitive. The effects of the coronavirus pandemic, climate change and digitalization on industry and society are increasing market drivers in the engine and stationary turbomachinery manufacturers and suppliers and focus areas for research and development. Both evolutionary and revolutionary concepts are needed to achieve the specified goals of conserving resources and meeting emission goals. Companies therefore need new approaches along the entire life cycle to meet future challenges in manufacturing and repairs.

The ICTM Conference brings together experts and decision makers from both industry and research. High-profile keynote speakers will provide insight into the aforementioned challenges and discuss approaches to solutions and paths forward.

In addition, experts from industry and research will shed light, for example, on how digitized manufacturing environments and innovative process designs for both conventional and additive manufacturing can lead to increases in quality and efficiency while taking technological, economic and ecological constraints into account.

As an additional highlight of the conference, we will be proud to share insights into new developments in manufacturing technology during a digital tour through our R&D shop floors.

For the very first time in its more than 10 years history we are looking forward to meeting you digitally at the ICTM Conference 2022 and discuss the latest trends in turbomachinery.

Prof. Constantin Häfner  
Fraunhofer ILT

Prof. Thomas Bergs  
Fraunhofer IPT

## The Topics

### The Topics at a Glance

- Future of aviation and stationary turbomachinery manufacturing
- Digitalization
- Advanced machining
- Additive manufacturing
- Materials & process qualification
- Digital shop-floor tour at the Fraunhofer facilities

### Speakers

- Design and manufacturing experts of turbomachinery OEM
- Specialists of machine tool and equipment suppliers
- Experts for digitalization and Industrie 4.0
- Experts for Additive Manufacturing
- Representatives of Fraunhofer institutes

### Adressee

- Specialists and managers of turbomachine manufacturers, aeronautics and power generation, machine tool and equipment suppliers
- Design and manufacturing engineers
- Stakeholders for laser and machining technologies

### Language

Lectures are presented in English.

### Early Bird Registration!



Those bookings by January 23, 2022 will be able to take advantage of 100 euros early bird discount on the conference fee.

# PROGRAM 1<sup>ST</sup> DAY

**Developments and trends to meet the future challenges in manufacturing aero-engines and stationary turbines**

Wednesday, February 16, 2022

## Session 1 – Keynotes

- 12:30 Welcome and introduction**  
Prof. Thomas Bergs, Fraunhofer IPT
- 12:40 Sustainable component manufacturing for sustainable power in air, land and sea – a key element of future NetZero solutions**  
Dr. Gregor Kappmeyer, Rolls-Royce Deutschland Ltd & Co KG
- 13:10 Upcoming challenges in power generation and the role of stationary gas turbines and the role of stationary gas turbines**  
Prof. Thomas Thiemann, Siemens Energy Global GmbH & Co. KG



Wednesday, February 16, 2022

## Break

## Session 2 – Digitalization

- 13:55 Turning data into value**  
Dr. Sascha Gierlings, Fraunhofer IPT
- 14:20 Steps towards digitalization of airfoil production**  
Dr. Oliver Arnold, MTU Aero Engines AG
- 14:45 Monitoring of influences on accuracy and quality using the example of tool wear and reacting correctly in the process by means of sensor-based technology cycles**  
Michael Kirbach, Deckel Maho Pfronten GmbH

## Break

## Session 3 – Advanced Machining & Live-Demonstrations

- 15:25 Life-cycle assessment of turbomachinery parts**  
Kilian Fricke, Fraunhofer IPT
- 15:50 Advanced cutting tool technologies for aerospace industry**  
Dr. Daisuke Murakami, Sumitomo Electric Industries, Ltd.
- 16:15 Data-driven quality assurance in turbomachinery manufacturing**  
Tommy Venek, gemineers GmbH
- 16:45 Digital live presentation by Fraunhofer IPT**  
Process demonstrations from the shop floor



# PROGRAM 2<sup>nd</sup> DAY

## Developments and trends to meet the future challenges in manufacturing aero-engines and stationary turbines

Thursday, February 17, 2022

### Session 4 – Additive Manufacturing & Live-Demonstrations

#### 9:00 Introduction

Jasmin Saewe, Fraunhofer ILT

#### 9:05 Laser Metal Deposition of aerospace alloys for jet engine components

Dr. Andreas Segerstark, GKN Aerospace Sweden AB

#### 9:30 Additive Manufacturing of rocket engine components using direct energy deposition (DED) processes

Dr. Steffen Bayer, Ariane Group SAS

#### 9:55 Gantry-based LPBF machines – towards manufacturing of large-scale turbomachinery components

Tim Lantzsch, Fraunhofer ILT

#### 10:20 Digital live presentation by Fraunhofer ILT

Process demonstrations from the shop floor

#### Break

### Session 5 – Materials & Process Qualification

#### 11:05 Material characterization for turbomachinery applications – L-PBF IN718 creep behaviour near yield stress

Michele Sale, TEC Eurolab s.r.l.

#### 11:30 What can be done to get more aero-engine and stationary turbine components approved for serial production using Additive Manufacture?

Richard Kellet, AddUp SAS

#### 11:55 Innovative superalloy powders designed for AM and high temperature use in turbine applications

Adeline Riou, Aubert & Duval S.A.



### Session 6 – Closing

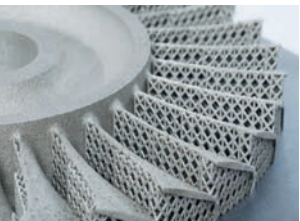
#### 12:20 ecoDESIGN and sustainable productivity

Torsten Moll, Fraunhofer-Gesellschaft

## ICTM Aachen

### International Center for Turbomachinery Manufacturing

The ICTM Aachen is a joint initiative of the Fraunhofer IPT, the Fraunhofer ILT, the WZL of RWTH Aachen University as well as the DAP of RWTH Aachen University. It offers an integrated and interdisciplinary platform focusing on production and repair technologies primarily, providing R&D solutions in the full range of competencies of the participating research institutes. As turbomachinery manufacturing is a highly interdisciplinary market the ICTM Aachen also pursues R&D approaches geared to design trends and the use of advanced materials.



# ICTM Partner Community

The workgroup of industry partners and R&D institutions of the ICTM Aachen.

The ICTM Partner Community is a workgroup of industry partners and R&D institutions of the ICTM Aachen. It conducts collaborative R&D with regard to manufacturing and repair of turbomachinery in the context of advanced machining, additive manufacturing and digitalization.



## Collaborative R&D

Based on the fixed annual contributions of each of the ICTM industry partners a set of collaborative R&D projects is conducted. These projects allow high synergies and significant benefits of cooperation in particular for pre-competitive issues. All of the collaborative R&D projects are defined and conducted integrating all partners to input their particular demands and participate in the results. The Projects are selected by the ICTM Community on the annual R&D meeting. Aim of the ICTM Aachen is to speed up technological innovations and to transfer them into industrial applications. It employs the full technology portfolio of all of its members to provide excellent R&D for turbomachinery manufacturing.



*NetZero manufacturing in turbomachinery becomes an essential element of future products for power plant solutions. It becomes an integral part of a company's NetZero strategy and focuses on environmental compliance of future products throughout its entire life cycle.«*

**Dr. Gregor Kappmeyer**

Associate Fellow, Rolls-Royce Deutschland Ltd & Co KG

*»Making digitalization usable for more competitiveness. Digitalization offers new opportunities for better and more sustainable value creation in production. One of the major challenges is to make the benefits of these technologies accessible to its users and to spread them across the board, so that the greatest possible scaling effect for more competitiveness is created.«*

**Michael Kirbach**

Head of Aerospace Excellence Center,  
DECKEL MAHO Pfronten GmbH

*»International cooperation in Aachen. The ICTM Partner Community is an innovation-driven network of high-tech companies specialized in turbomachinery design as well as manufacturing and Avio Aero shares its mission and purpose. The participation improved our knowledge in several areas, most notably in advanced conventional machining and innovative digital tools for process monitoring.«*

**Marco Cherubini**

Chief Manufacturing Engineer, Avio Aero

# Terms and Conditions

The ICTM Conference is organized by the Fraunhofer Institutes ILT and IPT. The conference focuses on current and future trends and developments for the manufacturing and repair of aero engine and stationary turbomachinery components. Use the opportunity during the digital tour through the institutes to get an overview about the latest R&D activities.

## Early Bird Registration

Those bookings by January 23, 2022 will be able to take advantage of 100 euros early bird discount on the conference

## Registration Fee

The registration fee for the ICTM Conference 2022 is 480 euros (free of tax under § 4 UStG) per person. This includes the digital conference participation and the conference proceedings.

## Registration

Please register online at [www.ictm-aachen.com](http://www.ictm-aachen.com)



## Registration Deadline

Please register by February 11, 2022 at the latest.

## Cancellation

In case of cancellation before January 26, 2022 the fee will be refunded less 100 euros handling charges. Otherwise the full fee will be charged and we will send the proceedings to you or welcome a substitute participant instead.



## Fraunhofer ILT

With more than 500 employees and more than 19,500 m<sup>2</sup> net floor space the Fraunhofer Institute for Laser Technology ILT is worldwide one of the most important development and contract research institutes of its specific field. The activities cover a wide range of areas such as the development of new laser beam sources and components, precise laser based metrology and industrial laser processes. Furthermore, Fraunhofer ILT is engaged in laser plant technology, process control, modelling and simulation as well as in the entire system technology. Fraunhofer ILT offers feasibility studies, process qualification and laser integration in customer specific manufacturing lines. In the areas of aerospace and stationary turbomachinery the applications include laser drilling, welding, surface treatment and especially additive manufacturing, such as laser powder beam fusion LPBF and laser material deposition LMD (or direct energy deposition DED) for manufacturing and repair applications.

## Fraunhofer IPT

The Fraunhofer IPT combines knowledge and experience from all areas of production technology. Our range of expertise is geared to the current challenges of particular industries, technologies and product areas, with a strong focus on aerospace and stationary turbomachinery. In order to achieve the company's ambitious sustainability goals in terms of higher efficiency and lower emissions in the coming years, it is essential to work at full speed to develop and implement new concepts. Production engineering approaches for the integration of more resistant and lighter materials, new designs as well as digitization concepts are absolutely essential here. Our range of R&D services extends from process design and prototype production of individual components to the development of comprehensive manufacturing concepts. We develop processes, products and concepts up to high Technology Readiness Levels (TRL) and access a state-of-the-art machine park with digitally networked 5G infrastructure.

## Contact

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