New Production Technologies in Aerospace Industry

November 23rd and 24th 2016 at the Hannover Centre for Production Technology PZH (Garbsen, Germany)
Dear Ladies and Gentlemen,

Over the last decades important developments have been conducted focusing on the aerospace industry resulting from its importance as a strategic key technology.

High market requirements such as a decreasing fuel consumption and an increasing net load and range of aircrafts lead to a rising demand for lightweight and high-strength structures at the same time.

Beside the development of new materials and structures, a continuous adaptation of the manufacturing processes is necessary. With innovative machine tools and new technologies, modern production engineering makes an essential contribution to the further development of the aerospace industry.

To proceed with remarkable discussions on this topic and to ensure continuation of exchange between industrial experts and scientists at an international level, the Institute of Production Engineering and Machine Tools of the Leibniz Universität Hannover (IFW) and the Machining Innovations Network e.V. (MIN) have been organizing the „Machining Innovations Conference for Aerospace Industry“ since 15 years.

On behalf of the Organizing Committee we cordially invite you to the “16th Machining Innovations Conference for Aerospace Industry – MIC2016 on 23rd and 24th November 2016 in Garbsen, Germany. As in recent years, the conference will bring together industrial experts and scientists from all over the world to report about trends, current results, innovations and challenges in the aerospace industry. The focuses of this year’s conference will be the machining of structural aircraft components, machine tool technology and virtual production. The conference will also include an exhibition of renowned companies and a guided tour through the IFW-laboratory, where current research topics will be presented. Furthermore we invite you to a conference dinner in the evening of November 23rd at the VIP-Lounge of the Hannover 96 soccer stadium, the HDI-Arena.

We proudly present the agenda of this year’s conference. To register and for further information please visit our website: www.mic-conference.com

We look forward to welcoming you at the MIC2016.

Yours sincerely,

Dipl.-Ing. Gerd Weber
Chairman of the Machining Innovations Network e.V.,
Head of Varel/Bremen Site at Premium AEROTEC GmbH

Prof. Dr.-Ing. Berend Denkena
Member of the Board of the Machining Innovations Network e.V.,
Head of Institute of Production Engineering and Machine Tools,
Leibniz Universität Hannover
Conference Structure

November 23rd

- Auditorium: Welcome & Keynote Speeches
- Auditorium: Session 1 (Industry)
- Seminar room: Session 2 (Scientific)
- Machine Tool Technologies
- IFW-Laboratory: Technology Demonstrations
- Virtual Production
- HDI-Arena: Evening Gala

November 24th

- Auditorium: Welcome & Keynote Speeches
- Auditorium: Session 3 (Industry)
- Seminar room: Session 4 (Scientific)
- Machining of Structural Aircraft Components

Overview of the PZH
## Program | November 23\(^{rd}\)

### Welcoming Speech (Auditorium)

<table>
<thead>
<tr>
<th>Time</th>
<th>Speech</th>
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<tbody>
<tr>
<td>09:00 a.m.</td>
<td>Introduction Speech for the Machining Innovations Conference 2016  &lt;br&gt;Prof. Dr.-Ing. Berend Denkena, Head of the Institute of Production Engineering and Machine Tools, Leibniz Universität Hannover and Member of the Board of the Machining Innovations Network e.V.</td>
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### Keynote Speeches (Auditorium)

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>09:15 a.m.</td>
<td>Innovative Machining Solutions for Aircraft Parts by Use of Technology Cycle and Additive Manufacturing  &lt;br&gt;Dr.-Ing. Masahiko Mori, President, DMG Mori Co., Ltd.</td>
</tr>
<tr>
<td>09:50 a.m.</td>
<td>Customer Support Technology  &lt;br&gt;Shinichi Inoue, President, Makino Milling Machine Co., Ltd.</td>
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<th>Time</th>
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<tr>
<td>10:25 a.m.</td>
<td>Coffee Break</td>
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### Session 1: Machine Tool Technology & Virtual Production (Auditorium)

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<tr>
<th>Time</th>
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<tr>
<td>11:00 a.m.</td>
<td>Trends in Aerospace Machining  &lt;br&gt;Prof. Dr.-Ing. Frank Brinken, Vice Chairman of the Board, Starrag Group Holding AG</td>
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<tr>
<td>11:30 a.m.</td>
<td>Grinding Machines for Manufacturing of Turbine Components – Flexible Machine Concepts, Software and Clamping Solutions  &lt;br&gt;Dirk Wember, Chief Executive Officer, HAAS Schleifmaschinen GmbH</td>
</tr>
<tr>
<td>12:00 p.m.</td>
<td>Innovation for Aerospace Production  &lt;br&gt;Dr.-Ing. Kai Litwinski, Head of Computation and Optimization, Dr.-Ing. Edmond Bassett, Head of Technology Development, Gildemeister Drehmaschinen GmbH</td>
</tr>
<tr>
<td>12:30 p.m.</td>
<td>Lunch Break and Technology Demonstrations in the IFW-Laboratory</td>
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<tr>
<td>02:30 p.m.</td>
<td>Additive Manufacturing – a disruptive Technology in Aerospace?  &lt;br&gt;Klaus Müller, Senior Advisor Aerospace &amp; MRO Advisory, ICF International</td>
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<tr>
<td>03:00 p.m.</td>
<td>Challenges in Establishing Aerospace Machining Capabilities – A Journey of Bharat Forge  &lt;br&gt;Guru Biswal, Vice President Aerospace, Bharat Forge Ltd</td>
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<td>03:30 p.m.</td>
<td>Coffee Break</td>
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<tr>
<td>04:00 p.m.</td>
<td>Manufacturing Service for Aviation Industry in China  &lt;br&gt;Prof. Wuyi Chen, Chief Technical Expert, AVIC Intl. Application Center for Aerospace Manufacturing Technologies</td>
</tr>
<tr>
<td>04:30 p.m.</td>
<td>Requirements for Productive Machining of Titanium Structural Components  &lt;br&gt;Dr.-Ing. Jan Dege, Head of NC-Technologies, Premium AEROTEC GmbH</td>
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<tr>
<td>05:00 p.m.</td>
<td>End of the parallel sessions  &lt;br&gt;Short Poster Overview in the Auditorium followed by the Poster Session in PZH Spine</td>
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Session 2: Scientific Presentations including Topics of Session 1 (Seminar room)

11:00 a.m. Laser scored Machining of Fiber reinforced Plastics to prevent Delamination  
Prof. Dr.-Ing. W. Hintze, Head of the Department of Production Management and Technology, TU Hamburg-Harburg

11:30 a.m. Online Tool Wear Measurement for Hobbing of highly loaded Gears in geared Turbo Fans  
Prof. Dr.-Ing. F. Klocke, B. Döbbeler, S. Goetz*, J. Staudt

11:50 a.m. Simulation based Planning of Machining Processes with Industrial Robots  
J. Brüning*, Prof. Dr.-Ing. B. Denkena, M.A. Dittrich, H.-S. Park

12:10 p.m. Assessing the Accuracy of five Axis Machines by Linking Machine Measurement Data to test Work Pieces  
Dr. G.H.J. Florussen*, H.A.M. Spaan

12:30 p.m. Lunch Break and Technology Demonstrations in the IFW-Laboratory

02:30 p.m. Multi-point Clamping with automatic Collision Avoidance for Aircraft structural Parts Machining  
Dr. H. Liu*, L. Zhao, T. Li, B. Hou, Y. Ma, Y. Wang

02:50 p.m. Improving the sensory Capabilities of an electromagnetic guided Rotary Table for the Use in Machine Tools  
Prof. Dr.-Ing. B. Denkena, T. Brühne*

03:10 p.m. Automated Dressing of Graphite Electrodes for electrical Discharge Machining (EDM) of seal Slots in Turbine Components  
Prof. Dr.-Ing. E. Uhlmann, D. C. Domingos*

03:30 p.m. Coffee Break

04:00 p.m. A new physics-based Model to predict Forces and Chip Morphology in the Machining of a Ti-6Al-4V Alloy for Aeronautical Applications  
Z. Atmani, O. Fergani*, M. Zenasni, K. Sorby, Dr.-Ing. T. Welo

04:20 p.m. Effect of α and β Volume Fraction on Machining Characteristics of Titanium Alloy Ti6Al4V  
S. Patil*, S. Kekade, K. Phapale, S. Jadhav, A. Powar, A. Supare, Dr. R.K.P. Singh

04:40 p.m. Effect of Water Oil Water Mist Spray Cooling on Drilling of Ti6Al4V Titanium Alloy using easter Oil based Cutting Fluid  
S. Nandgaonkar*, T.V.K. Gupta, S. Joshi

05:00 p.m. End of the parallel sessions  
Short Poster Overview in the Auditorium followed by the Poster Session in PZH Spine

*first and presenting author
The guided tour will be implemented parallel to the lunch break in the laboratory of the Institute of Production Engineering and Machine Tools. Current research topics for tool and machine tool manufacturers as well as technology users will be presented in three tours.

- **Tool Manufacturer**
  - Model-based production of grinding and cutting tools

- **Machine Tool Manufacturer**
  - Feeling machine tool components and flexible sensoric machine

- **Machining Experts**
  - Pre-, in- and post process monitoring of machining processes

Guided tours start every 15 minutes between 12:30 p.m. and 02:30 p.m.

All the presentations are held in English.
Location: HDI-Arena
Interact with other participants, exchange ideas and enjoy an excellent conference dinner in a very special atmosphere. On the evening of November 23rd we invite you to a conference dinner at the HDI-Arena – the soccer stadium of Hannover 96. A personal stadium tour gives interesting insights behind the scenes of this fascinating place. While enjoying regional delicacies in this very special atmosphere, you will be able to discuss with other conference participants.

Address
HDI-Arena
Robert-Enke-Straße 1
30169 Hannover
www.hannover96.de/hdi-arena.html

Program Overview

07:30 p.m. Opening of the Evening Gala
08:00 p.m. Dinner Speech: Bionics, Yesterday, Today and Tomorrow
Prof. Dr.-Ing. Ingo Rechenberg, Head of the Institute of Bionics and Artificial Evolution, Technical University of Berlin
08:30 p.m. Dinner
09:30 p.m. Guided Tour through the HDI-Arena
10:30 p.m. Get together
12:00 a.m. End of the first conference day

Transfer
On November 23rd a shuttle service will be provided between the conference venue (PZH), the offered hotels and the venue of the evening event (HDI-Arena). Following are the planned routes:

Centre for Production Technology (PZH) ➤ Hotels
Hotels ➤ Evening Event HDI-Arena
Evening Event HDI-Arena ➤ Hotels

The exact schedule will be available in the conference documents.
Program | November 24th

▶ Welcoming Speeches (Auditorium)
08:50 a.m.  Introduction Speech for the Second Day  
Gerd Weber, Chairman of the MIN e. V., Head of Varel Plant,  
Machining Innovations Network e. V. and Premium AEROTEC GmbH

09:05 a.m.  Greeting from Leibniz Universität Hannover  
Prof. Dr. iur. Volker Epping, President, Leibniz Universität Hannover

▶ Keynote Speeches
09:15 a.m.  ADI Factory 4.0 Strategy – Maximizing OEE & Machining Analytics  
John Wall, Vice President and General Manager, Aerospace Dynamics Inc.,  
Division of PCC Aerostructures

09:50 a.m.  Re-Thinking Traditional Manufacturing Processes to overcome  
Aircraft Business Challenges  
Dr.-Ing. Christoph Gey, Vice President Material Science, Kennametal Inc.

10:25 a.m.  Coffee Break

▶ Session 3: Machining of Structural Aircraft Components (Auditorium)
11:00 a.m.  Machining of Aerospace Materials and the Requirements on the Cutting Grades for  
an Efficient Manufacturing Process  
Dr.-Ing. Uwe Schleinkofer, Manager R&D Cutting Tools, Ceratizit Austria GmbH

11:30 a.m.  Achieving High-Efficiency Cutting  
Dr.-Ing. Niklas Kramer, Products and Industry Segments Director Central Europe,  
Carsten Günther, Industry Segment Manager Aerospace, Sandvik Coromant Germany

12:00 p.m.  Development of New Designs for Composite Machining  
Paul Kleven, R&D Engineer and Project Manager, Seco Jabro™

12:30 p.m.  Lunch Break

01:30 p.m.  Manufacturing Trends of Aerospace Metallic Parts  
Daniel Krabbe, Manufacturing Technical Leader, Empresa Brasileira de Aeronáutica S.A.

02:00 p.m.  With High Speed Successful to the Future...  
Bekir Kilic, Member of the Excutive Board, SolidCAM Israel

02:30 p.m.  Low Noise Shrink-Fit Chucks to avoid Tool Pull-Out  
Ulrich Zierer, Technical Director, Bilz Werkzeugfabrik GmbH & Co. KG

03:00 p.m.  End of the MIC 2016
Session 4: Scientific Presentations including Topics of Session 3

11:00 a.m. Virtual Machining: Capabilities and Challenges of Process Simulations in the Aerospace Industry
Jun.-Prof. Dr.-Ing. P. Wiederkehr, Institute of Machining Technology, TU Dortmund

11:30 a.m. A new Approach for a flexible Powder Production for additive Manufacturing
S. Dietrich*, M. Wunderer, A. Huissel, Dr.-Ing. M. F. Zäh

11:50 a.m. Automated Fiber Placement Head for Manufacturing of innovative Aerospace stiffening Structures
Prof. Dr.-Ing. B. Denkena, C. Schmidt, P. Weber*

12:10 p.m. Graphical Evaluation Method for Void Distribution in direct Energy Deposition

12:30 p.m. Lunch Break

01:30 p.m. High Speed Cutting of Carbon Fiber reinforced Plastics
Prof. Dr.-Ing. E. Uhlmann, S. Richarz, F. Sammler*, R. Hufschmied

01:50 p.m. Investigation of Chip Formation and Workpiece Load when Machining Carbon-Fiber-reinforced-Polymer (CFRP)
M. Zimmermann, L. Heberger*, F. Schneider, C. Effgen, Prof. Dr.-Ing. Jan C. Aurich

02:10 p.m. Automated and cost-efficient Production of hybrid Sheet Moulding Compound Aircraft Components
M. Fette*, M. Hentschel, F. Köhler, Prof. Dr.-Ing. J. Wulfsberg, A. Herrmann

02:30 p.m. Influence of the Quality of Rivet Holes in Carbon Fiber reinforced Polymer (CFRP) on the Connection Stability
L. Heberger*, B. Kirsch, T. Donhauser, S. Nissle, M. Gurka, S. Schmeer, Prof. Dr.-Ing. J. C. Aurich

03:00 p.m. End of the MIC 2016

*first and presenting author
Conference Venue

Hannover Centre for Production Technology (PZH)
of the Leibniz Universität Hannover
An der Universität 2
30823 Garbsen

www.pzh-hannover.de

- Host
  The conference is hosted by the Machining Innovations Network e.V. in cooperation with the Institute of Production Engineering and Machine Tools of Leibniz Universität Hannover, Germany.

Gerd Weber
Chairman of the Board of Machining Innovations Network e.V.
and Head of the Varel/Bremen site at Premium AEROTEC GmbH

Prof. Dr.-Ing. Berend Denkena
Board Member of Machining Innovations Network e.V. and Head of Institute of Production Engineering and Machine Tools of Leibniz Universität Hannover
Accommodation and Hotel Offers

For your stay in Hannover, we reserved hotel accommodations near the conference venue or the dinner location. Please address all hotels directly for bookings. The room rates are listed below. Please indicate the keyword "MIC2016" for booking.

- **Hotel-Restaurant Bullerdieck****
  Bürgermeister-Wehrmann-Straße 21
  30826 Garbsen-Frielingen
  Phone: +49 5131 458-0
  info@bullerdieck.de
  Distance to PZH: 8 km
  Distance to HDI-Arena: 20 km
  Rate: 89 EUR
  (Single/per night, incl. breakfast)

- **Hotel Amadeus****
  Fössestraße 83
  30451 Hannover
  Phone: +49 511 219760
  info@hotelamadeus.de
  Distance to PZH: 10 km
  Distance to HDI-Arena: 5 km
  Rate: 75 EUR
  (Single/per night, incl. breakfast)

- **Hotel Globotel***
  Porschestraße 8
  30827 Garbsen
  Phone: +49 5131 492-0
  info@globotel.de
  Distance to PZH: 1 km
  Distance to HDI-Arena: 12 km
  Rate: 65 EUR
  (Single/per night, incl. breakfast)

- **City Hotel Hannover***
  Limburgstrasse 3
  30159 Hannover
  Phone: +49 511 3607-0
  info@cityhotelhannover.de
  Distance to PZH: 12 km
  Distance to HDI-Arena: 1 km
  Rate: 69 EUR
  (Single/per night, incl. breakfast)
16th Machining Innovations Conference for Aerospace Industry

Prices for participation

650 EUR per person (+ VAT)
Participation on November 23rd and 24th 2016

550 EUR for members of the Machining Innovations Network e.V. (+ VAT)
Participation on November 23rd and 24th 2016

400 EUR per person (+ VAT)
Participation only on November 23rd 2016

400 EUR per person (+ VAT)
Participation only on November 24th 2016

For further information about the conference and to register please visit the website www.mic-conference.com

Contact
For organisational issues and further information please contact:

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Fax +49 4451 91845-399
info@machining-network.com

Abdelhamid Bouabid
Institute of Production Engineering and Machine Tools
Phone: +49 511 762-18006
Fax: +49 511 762-5115
bouabid@ifw.uni-hannover.de

The number of participants is limited. The participation fee includes conference documents, two lunches, the conference dinner, coffee and soft drinks during the breaks and shuttle service between the conference venue and the evening event. All presentations will be translated simultaneously into German and English.

The certificate of participation and an invoice will be sent to you after receiving your registration. If you cancel your registration until October 31st 2016, we will refund the participation fee deducting an administrative charge of 50 EUR. Otherwise, the participation fee must be paid in full.
www.mic-conference.com