

FRIDAY, DECEMBER 05, 2008

#### ADDITIONAL NDT APPLICATIONS I

Chair: X. Maldaque, Université Laval, Québec City (Canada)

- 26 **New NDT Approach for Adhesive Composite Bonds**  
13:40 B. Valeske, Fraunhofer IZFP, Saarbrücken (Germany);  
C. Bockenheimer, R. Henrich, Airbus Deutschland,  
Bremen (Germany)
- 27 **NDT Applications in Fuselage Component Development Tests**  
14:00 R. Franke, IMA Dresden (Germany);  
T.-Y. Han, N. Meyendorf, Fraunhofer IZFP, Institutsteil  
Dresden (Germany)
- 28 **The Forum for NDT Aerospace Boards – An Introduction from the Secretary**  
14:20 J.R. Thompson, BINDT, Northampton (United Kingdom)
- 29 **Evaluating Low Cost Portable Shearography on Aircraft Components**  
14:40 D. Findeis, J. Gryzagoridis, B. Pitman, Mechanical  
Engineering University, Kapstadt (South Africa)
- 15:00 Coffee Break
- #### ADDITIONAL NDT APPLICATIONS II
- Chair: G. Anton, Universität Erlangen-Nürnberg (Germany)
- 30 **State of the Art in Structural Health Monitoring**  
15:20 C. Boller, Fraunhofer IZFP, Saarbrücken (Germany);  
N. Meyendorf, Fraunhofer IZFP, Institutsteil Dresden  
(Germany)
- 31 **Reliability of NDT Techniques described by POD within a Modular Model**  
15:40 C. Müller, U. Ewert, M. Pavlovic, K. Takahashi, BAM,  
Berlin (Germany); R. Henrich, A. Kück, U. Schnars, Airbus  
Deutschland, Bremen (Germany)
- 32 **Phased-Array-US-Testing of Aluminum Plates for Aircraft Applications – Field Report about Specifications, Calibration and Daily Use**  
16:00 C. Henkel, A. Wienerreuther, AMAG Rolling, Ranshofen  
(Austria)
- 16:20 Closing Remarks and Discussion

#### Exhibition

An exhibition linked to the conference subjects will be open to conference delegates. Interested companies or institutes are invited to present their NDT equipment, NDT methods and newest developments for NDT in Aerospace. More information and form for ordering exhibition space please find at [www.ndt-aerospace.fraunhofer.de](http://www.ndt-aerospace.fraunhofer.de)

#### GENERAL INFORMATION

##### Call for Posters

On Thursday, December 4<sup>th</sup>, a poster session will be held. All symposium participants are welcome to contribute posters that are associated with relevant topics on NDT in aerospace. Posters will be displayed during the symposium. Selected posters will be presented during the poster session. A short abstract (1 page) is required for submission. This abstract or a manuscript (about 8 pages) will be published in the symposium proceedings as well. For poster submission please see the website [www.ndt-aerospace.fraunhofer.de](http://www.ndt-aerospace.fraunhofer.de) Deadline for submission of poster and abstract: October 15<sup>th</sup>, 2008.

##### Venue

Stadthalle Fürth, Rosenstr. 50, 90762 Fürth, Germany  
[www.stadthallefuerth.de](http://www.stadthallefuerth.de)

##### Language

All technical papers will be presented in English, simultaneous translation will not be provided.

##### Proceedings

The proceedings will include all papers presented during the conference (if manuscripts have been submitted in time) and will be available at the conference.

##### Manuscripts

Guidelines for preparing and submitting manuscripts are published on the conference website.

##### Contact and Information

Website of the symposium: [www.ndt-aerospace.fraunhofer.de](http://www.ndt-aerospace.fraunhofer.de)

##### Programme

Fraunhofer Development Center X-ray Technology  
Dr. Randolph Hanke, Dr.-Mack-Str. 81, 90762 Fürth, Germany  
Phone: +49 911 58061-7510, Fax: +49 911 58061-7599  
E-mail: [randolf.hanke@iis.fraunhofer.de](mailto:randolf.hanke@iis.fraunhofer.de)

##### Conference Secretariat

German Society for Non-Destructive Testing (DGZfP e.V.)  
Steffi Schäske, Max-Planck-Straße 6, 12489 Berlin, Germany  
Phone: +49 30 67807-120, Fax: +49 30 67807-129  
E-mail: [tagungen@dgzfp.de](mailto:tagungen@dgzfp.de)

##### Hotel Reservation: Fürth Tourist-Information

Bahnhofsplatz 2, 90762 Fürth, Germany  
Phone: +49 911 740 6615, Fax: +49 911 740 6617  
E-mail: [renate.schneider@fuerth.de](mailto:renate.schneider@fuerth.de)  
Reservation form please find at [www.ndt-aerospace.fraunhofer.de](http://www.ndt-aerospace.fraunhofer.de)

#### GENERAL INFORMATION

##### Registration

until **November 15<sup>th</sup>, 2008** please send to  
German Society for Non-Destructive Testing (DGZfP e.V.)  
Max-Planck-Str. 6, 12489 Berlin, Germany  
Phone: +49 30 678 07-121/122  
Fax: +49 30 678 07-129  
E-mail: [tagungen@dgzfp.de](mailto:tagungen@dgzfp.de)  
Internet: [www.ndt-aerospace.fraunhofer.de](http://www.ndt-aerospace.fraunhofer.de)

##### Participation fees

Participant	470 €*
(Early Registration until September 20 <sup>th</sup> , 2008)	
Participant	500 €*
Students without university degree	180 €*
Presenting author/poster presenter	250 €*
(only one person per paper)	

\* including all conference activities, proceedings, social programme, coffee breaks, lunch, ticket for public transport

##### Payment

The payment of the participation fees is requested only in EUR and has to be done after receipt of invoice until November 15<sup>th</sup>, 2008 the latest (receipt of payment). All payments after this date have to be done by credit card (Visa or Mastercard) or cash at the registration desk.

##### Bank transfer

DGZfP e.V., Berliner Volksbank, Kekuléstr. 2-4,  
12489 Berlin, Germany  
Acc. No. 5940 040 002, BLZ (code) 100 900 00  
For international bank transfer please use our  
International Bank Account Number (IBAN)  
DE 57 100 90 000 59 400 400 02  
SWIFT Code (BIC): BEVODE BB  
Please quote **name of participant** and code »Aerospace«.

##### Cancellation

until October 31<sup>st</sup>, 2008 (receipt at DGZfP): 25,00 €  
after October 31<sup>st</sup>, 2008: 50 % of the participation fee

##### Social Programme and Meetings

**Open Meeting** of the Forum of National Aerospace NDT Boards  
Wednesday, December 3<sup>rd</sup>, 15:30

**Champagne Reception**, Wednesday, December 3<sup>rd</sup>, 18:00

**Christkindlesmarkt in Nuremberg**,  
Thursday, December 4<sup>th</sup>, 18:00

**Conference Dinner**, Thursday, December 4<sup>th</sup>, 20:30



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PRÜFUNG E.V.



Fraunhofer  
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Röntgentechnik

## INVITATION PROGRAMME

### International Symposium on NDT in Aerospace



December 3<sup>rd</sup> to 5<sup>th</sup>, 2008  
Fürth, Germany, Stadthalle

Our Sponsors:



## PREFACE

The widespread use of modern materials, especially in the aerospace industry, has given rise to many new questions regarding their reliability and methods for their non-destructive testing and characterization. The substitution of singular materials, like aluminum, by composite materials, especially carbon fiber reinforced plastics, requires the development of advanced testing methods.

In April 2005 the project „Development Center for Non-destructive Testing of New Materials in Aerospace“ („ZeLuR“)\* was authorized at the „Technikum Neue Materialien“ in Fürth. This project with a term of 4 years is funded by the Free State of Bavaria with the aid of the Objective 2 Programme Bavaria 2002 – 2006 of the European Union.

This project is addressing the various demands of different methods for the non-destructive testing of those new materials in the aerospace industry. Its focus is on the most commonly used techniques in this area, namely x-ray, ultrasonic, optical and thermal inspection and testing.

To strengthen the scientific foundation of these new NDT methods and applications this symposium will be held in December 2008.

### Scope of Conference

This symposium intends to address scientific issues in the field of Non-Destructive Testing in Aerospace.

During the two days, different aspects and methods will be presented and discussed. You will have the opportunity to attend sessions addressing thermography, ultrasound, optics and all aspects of X-ray testing as well as structural health monitoring, reliability and adhesive bonding. Moreover the latest results of the project „ZeLuR“ specifically designed to address various aspects of NDT in aerospace will be presented.

You will also have the opportunity to exhibit and present your own NDT related Research and Development results in a poster session during the conference.

\* This Project is co-financed by the European Union and the Free State of Bavaria.

Dr.-Ing. Matthias Purschke  
German Society for  
Nondestructive Testing

Dr. Randolph Hanke  
Development Center X-ray Technology  
EZRT

## WEDNESDAY, DECEMBER 03, 2008

- 15:30 **Open Meeting of the Forum of National Aerospace NDT Boards**, Stadthalle Fürth  
18:00 **Champagne Reception**  
*Location: Fraunhofer EZRT, Fürth  
Dr.-Mack-Str. 81, 90762 Fürth, Germany  
<http://www.iis.fraunhofer.de/EN/bf/xrt/index.jsp>  
Introductory Lecture on a Topic in Aerospace and Visit of Fraunhofer EZRT*

## THURSDAY, DECEMBER 04, 2008

- 08:00 **Reception and Registration**  
09:00 **Introduction**  
**ULTRASOUND**  
*Chair: R. Oster, Eurocopter Deutschland, München (Germany)*
- 1 Characterization of Aerospace Materials by using Air-Coupled Guided Waves and Nonlinear Ultrasound**  
09:15 I.Y. Solodov, G. Busse, IKT, Universität Stuttgart (Germany)
- 2 Advanced Solutions for Ultrasonic Inspection of Aircraft Engine Run Hardware**  
09:35 S. Rabinovich, S. Saitowitz, ScanMaster Systems Ltd., Kadima (Israel); C. Köhler, Vogt Werkstoffprüfsysteme, Burgwedel (Germany)
- 3 Sampling Phased Array**  
09:55 A. Bulavinov, Fraunhofer IZFP, Saarbrücken (Germany)
- 4 Implementation of Innovative Ultrasound CFRE-Inspection Systems for Industrial Applications**  
10:15 G. Engl, R. Meier, T. Rehfeldt, intelligenteNDT Systems & Services, Erlangen (Germany); S. Gripp, intelligenteNDT Systems & Services, Karlstein (Germany)
- 5 Advanced Ultrasonic NDT of Aero Engine Components using Validated Simulation Techniques**  
10:35 M. Spies, Fraunhofer ITWM, Kaiserslautern (Germany)
- 10:55 Coffee Break
- THERMOGRAPHY**  
*Chair: G. Busse, IKT, Universität Stuttgart (Germany)*
- 6 Infrared Thermography: Principle and Applications to Aircraft Materials**  
11:15 X. Maldague, W. Ben Larbi, A.H. Bendada, C. Ibarra-Castaneda, M. Klein, J.-M. Piau, M. Susa, Université Laval, Québec City (Canada); M. Grenier, Olympus NDT Canada, Québec (Canada)

## THURSDAY, DECEMBER 04, 2008

- 7 State of the Art in Thermal Imaging**  
11:35 A. Dillenz, e/de/vis, Stuttgart (Germany)
- 8 NDI of Safety Relevant Aerostructures by Use of Portable Ultrasound Excited Thermography**  
11:55 M. Hauf, Eurocopter Deutschland, München (Germany)  
R. Stößel, EADS Deutschland, München (Germany)
- 9 Active Thermography for Quantitative Analysis of Defects in Composites**  
12:15 G. Hendorfer, FH Oberösterreich, Wels (Austria)
- 10 Aerospace Applications of Lockin-Thermography with Optical, Ultrasonic and Inductive Excitation**  
12:35 A. Gleiter, C. Spießberger, IKT, Universität Stuttgart (Germany)
- 12:55 Lunch
- X-RAY (RADIOSCOPY, CT, DETECTORS)**  
*Chair: R. Hanke, Fraunhofer IIS, EZRT, Fürth (Germany)*
- 11 The Next Generation of Photon Counting X-Ray Detectors**  
14:00 M. Campbell, EP Division CERN, Genf (Switzerland); G. Anton, Universität Erlangen-Nürnberg (Germany)
- 12 Inline Turbine Blade Inspection**  
14:20 S. Neuhäusler, MTU Aero Engines, München (Germany)
- 13 Quantitative X-Ray Determination of CFRP Micro Structures**  
14:40 M.P. Hentschel, A. Lange, B.R. Müller, O. Wald, BAM, Berlin (Germany)
- 14 Mobile X-Ray Inspection of Light Weight Materials**  
15:00 U. Ewert, BAM, Berlin (Germany)
- 15 Radiological NDT for the Aircraft Industry**  
15:20 C. Bueno, GE Global Research, Niskayuna (USA)
- 15:40 Coffee Break
- 16:00 **Poster Session**  
*Chair: J. Kastner, FH Oberösterreich, F&E, Wels (Austria)*
- 18:00 **Visit to the famous Christkindlesmarkt in Nuremberg, afterwards Dinner in the famous restaurant „Bratwurst-Röslein“**  
([www.christkindlesmarkt.de/english/](http://www.christkindlesmarkt.de/english/))

## FRIDAY, DECEMBER 05, 2008

- THE PROJECT „ZeLuR“**  
*Chair: U. Ewert, BAM, Berlin (Germany)*
- 16 Inline Testing Methods for Industrial Production**  
09:00 U. Haßler, I. Bauscher, S. Oeckl, Fraunhofer IIS, EZRT, Fürth (Germany)
- 17 Tools and Measures for High Precision Quantitative Computed Tomography (QCT) with Light Weight Composite Materials**  
09:20 T. Fuchs, F. Nachtrab, T. Schön, Fraunhofer IIS, EZRT, Fürth (Germany)
- 18 Computed Tomography Metrology in Industrial Research & Development**  
09:40 S. Kasperl, M. Krumm, Fraunhofer IIS, EZRT, Fürth (Germany); M. Maisl, Fraunhofer IZFP, Saarbrücken (Germany)
- 19 Components and Methods for Nano-CT**  
10:00 N. Uhlmann, M. Salamon, Fraunhofer IIS, EZRT, Fürth (Germany); F. Porsch, Fraunhofer IZFP, Saarbrücken (Germany)
- 20 Mobile Computed Tomography**  
10:20 M. Eberhorn, Fraunhofer IIS, EZRT, Fürth (Germany)
- 21 Multi-Modality Approaches for Complex Test Requirements**  
10:40 L. von Bernus, Q NET Engineering, Saarbrücken (Germany); B. von Stackelberg, Fraunhofer IIS, EZRT, Fürth (Germany)
- 11:00 Coffee Break
- OPTICS**  
*Chair: C. Boller, Fraunhofer IZFP, Saarbrücken (Germany)*
- 22 Shearography NDT of Aerospace Structures**  
11:20 J. Newman, Laser Technology Inc., Norristown (USA)
- 23 Lock-In Interferometry: Principle and Aerospace Applications**  
11:40 G. Busse, H. Gerhard, P. Menner, IKT, Universität Stuttgart (Germany)
- 24 ESPI of Aerospace Composites Using Digital Shearography**  
12:00 J. Gryzagoridis, D. Findeis, Mechanical Engineering University, Kapstadt (South Africa)
- 25 Quality Control with Shearography and Digitizing**  
12:20 R. Berger, Steinbichler Optotechnik, Neubeuern (Germany)
- 12:40 Lunch