

35th European Rotorcraft Forum



September 22 - 25, 2009, Hamburg, Germany

Preliminary Programme



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– Lilienthal-Oberth e.V. (DGLR)**

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35th European Rotorcraft Forum

September 22 - 25, 2009, Hamburg, Germany

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**Hamburg 22 - 25 September 2009
Radisson SAS Hotel**

IMPRINT

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nautics (DGLR)
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MESSAGE FROM THE PRESIDENT OF THE DGLR



Prof. Joachim Szodruch
President DGLR

I am very pleased to invite you to attend the 35th European Rotorcraft Forum, to be held in Germany and hosted by the German Society of Aeronautics and Astronautics (DGLR).

This prestigious event is gaining increasing recognition in the field of rotorcraft. We are therefore proud to present a technical programme of around 100 high quality papers in a series of lectures held in three parallel sessions.

The Forum will be held in the Hanseatic City of Hamburg. With 1.8 million inhabitants, it is the second largest city in Germany and as one of the 16 federal states of the Federal Republic of Germany, Hamburg is both a city and a state.

Economically and culturally, Hamburg is also the centre of the whole Northern Germany. 3.5 million people live in the greater region of Hamburg – for them Hamburg is a shopping and cultural metropolis.

As a trade centre, Hamburg has always been outward-looking, and this has shaped the mentality of its inhabitants. Hamburg was literally the gateway to the world. Continuing this tradition presently Hamburg is - besides Seattle and Toulouse – one of the three leading locations for civil aviation worldwide and thus a perfect place for an international aeronautical conference.

I am looking forward to meeting you in September at the 35th ERF Congress in Hamburg.

Prof. Joachim Szodruch, President of DGLR

WELCOME FROM THE ORGANISING COMMITTEE



Dr. Klausdieter Pahlke
Chair Programme Committee

Welcome to the European Rotorcraft Forum 2009. The ERF is one of the premier events in the rotorcraft community's calendar bringing together experts from manufacturers, research centres, academia, operators and regulatory agencies and offering excellent networking opportunities with attendees from many disciplines and countries. Within the technical programme about 100 authors from all over the world will present and discuss recent results and technology advances aiming to foster the exchange of information and views.

This Forum will be the 35th in a series of meetings, which take place annually across Europe, rotating around the United Kingdom, Germany, France, Italy, The Netherlands and Russia. The first ERF was held in Southampton, England, in 1975 and this year the 35th European Rotorcraft Forum will take place in Hamburg, Germany, from 22nd to 25th September 2009.

Ideally located in the heart of the city of Hamburg is the Radisson SAS Hotel, the venue chosen for this Forum.

In the name of the ERF International Committee:
Welcome to the 35th European Rotorcraft Forum, welcome to Hamburg.

The National Organising Committee

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GENERAL INFORMATION

Venue

Radisson SAS Hotel Hamburg, Marseiller Strasse 2, D-20355 Hamburg, Germany (phone: +49 (0) 40 35020, E-mail: info.hamburg@radisson.com).

Ideally located in the heart of the city, the Radisson SAS Hotel is the tallest hotel of Hamburg, standing at impressive 120 metres. Its unique architecture and height have made the hotel a city icon and authentic landmark and offer guests stunning views of Hamburg. A multi-functional conference/meeting space on a separate floor allows hosting events up to 1,000 people, which makes the Radisson SAS Hotel in Hamburg the appropriate venue for the 35th ERF in 2009.

Forum Registration

Please find the registration form in the web www.ERF2009.org - Online registration will save 10 Euro to the respective fees listed below.

On-site: Radisson SAS Hotel Hamburg, 1st Floor, Foyer of Congress Area

The registration desk will be open during the following hours:

| | | |
|-----------|-------------------|-------------------|
| Monday | 21 September 2009 | 16:30 - 18:00 hrs |
| Tuesday | 22 September 2009 | 08:00 - 17:00 hrs |
| Wednesday | 23 September 2009 | 08:00 - 17:00 hrs |
| Thursday | 24 September 2009 | 08:00 - 15:30 hrs |

Registration Fees

| | Payment before: 15 August 2009 | Payment after: 15 August 2009 |
|---|-----------------------------------|----------------------------------|
| Online registration will save 10 Euro | | |
| ♦ Chairmen/Speakers | 690,00 € | 740,00 € |
| ♦ Members of the CEAS¹⁾/RHS²⁾/AHS³⁾ | 750,00 € | 790,00 € |
| ♦ Non Members | 790,00 € | 840,00 € |
| ♦ Students Members⁴⁾ | 95,00 € | 115,00 € |
| ♦ Students Non Members⁴⁾ | 115,00 € | 135,00 € |
| ♦ Accompanying Persons | 160,00 € | 190,00 € |

1) **CEAS:** Confederation of European Aerospace Societies, (AAAF, AIAE, AIDAA, DGLR, FTF, NVvL, RAeS, SVFW)

2) **RHS:** Russian Helicopter Society

3) **AHS:** American Helicopter Society

4) Undergraduate Students, max. age 28 years, please send a copy of your Student ID-Card with your registration form.

Registration and Payment

All participants (including chairmen and speakers) have to register online or by using the Registration Form (www.ERF2009.org). Payments must be made in "Euro", preferably by credit card or bank transfer to

DGLR account No. 3 403 718

Hypo Vereinsbank (IBAN DE86 3802 0090 0003 4037 18)

Bank Code 380 200 90

BIC/SWIFT: HYVEDEMM402 /

Reference: **Participant's Name and ERF 2009**. Visa and MasterCard are accepted.

Registration includes: attendance at the Forum, lunches, ice breaker on Monday, reception on Tuesday, dinner on Wednesday (not included in student fee), coffee breaks, book of abstracts, proceedings on DVD, Forum bag and name badge.

Language

Conference language is English. Presentations and discussions are therefore in English. There will be no simultaneous translation during the sessions.

Book of Abstracts

All registered participants will receive a Book of Abstracts when checking in at the registration desk at the venue.

Proceedings

All registered participants will receive a DVD with the available papers in the mid of November. They will be distributed on the postal way.

Lunches and Coffee Breaks

A buffet type lunch will be served in the restaurant area of the Radisson SAS Hotel on the ground floor. Lunch vouchers for each day will be handed out with the conference bag at the registration desk. Coffee breaks are served in the exhibition area of the conference (Foyer of session rooms) at the first floor. Please see the programme at a glance for times of lunches and coffee breaks.

Exhibition

Space for a limited exhibition will be available conveniently located at the Foyer of the session rooms on the first floor. The exhibition will be open during the entire Forum. Companies and organisations exhibiting will be included in the final programme.

Tour Reservations

An accompanying persons programme has been arranged, as listed below. Participants who wish to book these tours should complete the accompanying persons programme section in the registration form (www.ERF2009.org). Booking on site is according to availability also possible.

Hotel Reservation

INTERPLAN Congress, Meeting & Event Management AG has reserved blocks of rooms at the hotels listed on the following pages from Tuesday, 22 September to Friday, 25 September, where rates have been especially negotiated for ERF 2009 delegates. Bookings will be taken on a first-come, first-served basis. If the hotel of your request is fully booked, an alternative reservation will be made at another hotel. Those who wish to book the accommodation via INTERPLAN should complete the hotel reservation form (<http://www.ERF2009.org>). You can find the location of the hotels in the map below. Please fax or mail the form to Interplan not later than **18 August 2009**.



- 1 Hotel Radisson SAS
- 2 Grand Elysée Hotel
- 3 Hotel InterContinental Hamburg
- 4 Hotel Alster-Hof
- 5 Hotel Baseler Hof
- 6 NH Hotel Hamburg Norge

Insurance

Participants are advised to take out their own travel insurance and to extend any private policies for personal possessions they may bring with them. The Forum does not cover participants against cancellations of bookings or loss/theft of belongings.

Cancellation of Registration

After you have received the confirmation notice from the DGLR, cancellation is subject to the following charges. Bank charges will be deducted from any refund. Notification of cancellation must be reported in writing to DGLR. It must be received by 31 August 2009 in which case registration fee will be refunded except for a cancellation fee of EUR 40. In case the cancellation is received after the 31 August 2009, no refund would be given.

Air Travel and Access to the Venue

By taxi from the Airport

The Hamburg Airport is located in about 8 km distance to the convention venue. The costs for a taxi taking you to the Radisson venue are about 20 EUR and it takes approximately 20 minutes.

Public transportation from the Airport

Approximately 35 min, 2,40 EUR:

Normal bus no. 10 until S-Bahn station "Ohlsdorf", there you have to take the U-Bahn U1 with destination "Wandsbek Markt" until the station "Stephansplatz", which is within 2 minutes walking distance to the Radisson.

Approximately 25 min, 3,50 EUR:

Fast bus no. 39 with destination "Teufelsbrück Fähre" until station "Lattenkamp" there you have to take the U-Bahn U1 with destination "Wandsbek Markt" until station "Stephansplatz", then 2 minutes walk to the Radisson.

By car

The Radisson has its own garage with a capacity of 900 parking-lots.

Passport and Visa

In Germany, everyone must have a valid identity card or passport. It is the responsibility of each delegate to obtain all the necessary documents, including visa if necessary. Participants requiring visas should apply to a German consular office or diplomatic mission in their respective country well in advance to departure.

Useful Hints

Currency

The currency used in Germany is European EURO (EUR, €). Notes are available in units of EUR 5, 10, 20, 50, 100, 200, and coins in units of Cent 1, 2, 5, 10, 20, 50 and EUR 1 and 2. Traveler's cheques and currencies from most countries can be exchanged for European EUR at major banks and hotels. Only European EUR is accepted at regular stores and restaurants.

Credit Cards

International credit cards such as MasterCard, Visa, American Express and Diners Club are widely accepted at hotels, department stores, large shops and restaurants.

Climate

Hamburg is not renowned for dry weather. It is often windy as the wind blows nearly unobstructed from the north sea. The overall result is that the air has a refreshing effect and is rarely unpleasant (unless you have non-suitable clothing). The average daytime temperature in Hamburg for September is a comfortable 18° C (65° F). Participants are recommended to bring normal summer clothing with adequate clothings for cooler and rainy days / evenings.

Electricity

220-230 volts AC, 50-60 Hz

Business Hours

Bank: Mo + Thu 9:00 – 13:00 / 14:00 – 18:00
Tue + Wed 9:00 – 13:00 / 14:00 – 16:00
Fri 9:00 – 13:00
Closed on weekends and holidays

Post: Office (e.g. Schlüterstr. 51 – 53)
Mo - Fri 8:00 – 18:00
Sa 8:00 – 12:00

Shops: Mo - Sa 10:00 – 20:00 (typical time)

Restaurants: 11:00 – 23:00 (typical time)

Time

CET with daylight saving time at this period.

Mobil phones

For the use of mobile phones in Hamburg, Germany, they must be designed for the GSM frequency-bands 900 MHz or 1800 MHz. Additionally the use of UMTS mobile phones in the area of the venue is possible but there is no coverage guaranteed all over Germany.

PROGRAMME AT A GLANCE

Monday, 21 September 2009

| | |
|-------------|--|
| 16:30-18:00 | Registration |
| 18:00-19:00 | Ice Breaker - <i>Radisson Hamburg, Foyer Ball Hall A-D</i> |

Tuesday, 22 September 2009

| | | | |
|-------|--|---|---|
| 08:00 | Registration | <i>Foyer</i> | |
| 09:00 | Opening Ceremony | <i>Ball Hall A-B</i> | |
| 09:30 | Keynote Address | <i>Ball Hall A-B</i> | |
| 10:30 | Coffee / Tea | | |
| 11:00 | <i>Ball Hall A-B</i> Aerodynamics 1 <i>Wake models</i> | <i>Ball Hall C-D</i> Acoustics | <i>Salon Rostock</i> Safety 1 |
| 12:30 | Lunch | | |
| 14:00 | <i>Ball Hall A-B</i> Aerodynamics 2 <i>Wake models</i> | <i>Ball Hall C-D</i> Test & Evaluation 1 | <i>Salon Rostock</i> Safety 2 |
| 15:30 | Coffee / Tea | | |
| 16:00 | <i>Ball Hall A-B</i> Aerodynamics 3 <i>CFD Rotor</i> | <i>Ball Hall C-D</i> Test & Evaluation 2 | <i>Salon Rostock</i> Aircraft Design |
| 17:30 | End of Sessions | | |
| 19:30 | Reception | <i>tbd.</i> | |

PROGRAMME AT A GLANCE

Wednesday, 23 September 2009

| | | | |
|-------|--|---|---|
| 08:00 | Registration | | |
| 08:30 | <i>Ball Hall A-B</i> Aerodynamics 4 <i>CFD Rotor</i> | <i>Ball Hall C-D</i> Active Rotors 1 | <i>Salon Rostock</i> Operational Aspects |
| 10:00 | Coffee / Tea | | |
| 10:30 | <i>Ball Hall A-B</i> Aerodynamics 5 <i>CFD Full Helicopter</i> | <i>Ball Hall C-D</i> Active Rotors 2 | <i>Salon Rostock</i> Flight Mechanics 1 <i>Math. Models</i> |
| 12:30 | Lunch | | |
| 14:00 | General Session - tbd. | | |
| 15:00 | AHS Best Paper | | |
| 15:30 | Coffee / Tea | | |
| 16:00 | <i>Ball Hall A-B</i> Aerodynamics 6 <i>CFD Full Helicopter</i> | <i>Ball Hall C-D</i> Dynamics 1 | <i>Salon Rostock</i> Flight Mechanics 2 <i>External Loads</i> |
| 17:30 | End of Sessions | | |
| 19:30 | Conference Dinner | | <i>Süllberg</i> |

PROGRAMME AT A GLANCE

Thursday, 24 September 2009

| | | | |
|-------|---|---|---|
| 08:00 | Registration | | |
| 08:30 | <i>Ball Hall A-B</i> Aerodynamics 7 <i>Experimental Studies</i> | <i>Ball Hall C-D</i> Dynamics 2 | <i>Salon Rostock</i> Flight Mechanics 3 |
| 10:00 | Coffee / Tea | | |
| 10:30 | <i>Ball Hall A-B</i> Aerodynamics 8 <i>Applications</i> | <i>Ball Hall C-D</i> Rotorcraft History | <i>Salon Rostock</i> Flight Mechanics 4 <i>Crew Station & Human Fact.</i> |
| 12:30 | Lunch | | |
| 14:00 | General Session - „New Engine Technologies for Helicopters“ | | |
| 15:00 | Coffee / Tea | | |
| 15:30 | <i>Ball Hall A-B</i> Aerodynamics 9 <i>Applications</i> | <i>Ball Hall C-D</i> Simulation & Training | <i>Salon Rostock</i> UAV |
| 17:00 | Close of Conference | | |

Friday, 25 September 2009

| | | |
|--------|----------------|--------------------------|
| 10:00- | Technical Tour | <i>Lufthansa Technik</i> |
| 13:00 | | |

SOCIAL PROGRAMME

Monday, 21 September

Welcome Reception

18:00 - 19:00 hrs

(included in Delegate, Student and Accompanying Person's fee, complimentary drink and snack)
Delegates, Students and Accompanying Persons are invited to attend the Welcome Reception at the Radisson SAS in the Foyer of the session rooms on the first floor

Tuesday, 22 September

Forum Reception

19:30 – 21:30 hrs

(included in Delegate, Student and Accompanying Person's fee - but registration for it is obligatory)
Delegates, Students and Accompanying Persons are invited to attend the Congress Reception location tbd. Complimentary finger food and drink will be served.

Wednesday, 23 September

Conference Dinner

19:30 – 22:30 hrs

(included in Delegate's and Accompanying Person's fee - students have to purchase a ticket for 79,00 Euro)
The Conference Dinner will be held in the ball hall of the Süllberg located with a fantastic view to the river Elbe. The banquet will serve a menu including beverage until the end of the dinner (softdrinks, beer and wine are included - hard drinks are not included). The dinner is accompanied by pleasant piano music. A bus transfer is organised. Meeting point is the Radisson SAS at 19:00 hrs. Buses will return at 22:30 hrs from the Süllberg with destination Radisson SAS.

ACCOMPANYING PERSONS PROGRAMME

Tuesday, 22 September

12:45—15:45 hrs

Hamburg's Maritime Side

20 € per person

This tour will be dedicated to Hamburg's maritime tradition. Meeting point is at the registration desk on the first floor at the Radisson SAS. At the landing piers you get on board of a typical hanseatic boat. The local guide presents to you Hamburg from the river side. The Radisson serves as starting and end point.

Wednesday, 23 September

9:45—12:45 hrs

Hamburg's Gala sightseeing tour

20 € per person

Hamburg is yours to explore! Meeting point is at the registration desk on the first floor at the Radisson SAS. At the landing piers you get on bus taking you to the most interesting and charming places of Hamburg. The Radisson serves as starting and end point.

Thursday, 24 September

9:45—13:00 hrs

Hamburg's Art Gallery

20 € per person

This English guided tour shows you the current exhibition of Hamburgs famous art gallery. Meeting point is at the registration desk on the first floor at the Radisson SAS. The Radisson serves as starting and end point.

TECHNICAL TOUR

Friday, 25 September
9:30 - 13:30 hrs

Lufthansa-Technical-Base **10 € per person**

Schedule

9:30 hrs departure from the Radisson SAS

The visit starts at 10:00 hrs at the Visitor-Service-Center which is located in front of the main entrance of the Lufthansa-Technical-Base

Participants will be welcomed by the staff and will be provided with some introductory information about Lufthansa in general, regarding the latest development.

A technical film shows the work that is performed by Lufthansa Technic.

After the film the engine-workshop will be presented.

Later on the participants will see the new painting-plant.

Finally the hangar for aircraft-overhaul is shown, where the dimension and intensity of aircraft maintenance necessary to provide high safety standards becomes obvious.

Please note that taking photos during the tour on the Lufthansa Technik Base is strictly forbidden.

SPONSORING AND EXHIBITION PARTICIPATION

There will be the opportunity to become an official sponsor and therefore partner of the European Rotorcraft Forum ERF 2009 in the Congress Center of the Radisson SAS Hotel, Hamburg. This offers you an even greater possibility to present your company at this internationally most important convention and exhibition in the field of rotorcraft.

Please see the opportunities (www.ERF2009.org) or contact directly the DGLR.

Your chance to present your company on site: *Exhibition booth*

There is further the opportunity to exhibit your products at your own stand in the foyers of our session room in the Radisson SAS Hotel in Hamburg. This will provide an exclusive method of presenting and promoting products and services to all convention delegates and their guests and/or to enjoy the benefits of a permanent meeting point at the venue.

Technical Programme

Tuesday, 22 September 2009

| | | | |
|-------|--|---|--|
| 08:00 | Registration | | |
| 09:00 | Opening Ceremony | | |
| 09:30 | Keynote Addresses | | |
| 10:30 | Coffee / Tea | | |
| 11:00 | Aerodynamics 1 Wake Models | Acoustics | Safety 1 |
| | 1266 Rotorcraft Wake Modeling: Past, Present and Future KOMERATH, Narayanan; SMITH, Marilyn J. | 1199 Comprehensive approach for noise reduction in helicopter cabins CAILLET, Julien ; MARROT, F.; UNIA, Y.; AUBOURG, P-A. | 1180 The European Helicopter Safety Team (EHEST): 2008 Achievements MASSON, Michel; VAN HIJUM, M.; EVANS, A. |
| | 1221 Review of Wake Modeling Methods for Flight Dynamics Applications VAN HOYDONCK, Wim | 1224 Genetic Optimizations of EC-135 Noise Abatement Flight Procedures using an Aeroacoustic Database GUNTZER, Frédéric; SPIEGEL, Pierre; LUMMER, Markus | 1197 Numerical Analysis on Water Impact MAJAMÄKI, Jyrki |

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|-------|--|--|---|
| | 1311 Development of a Free Vortex Wake Model in State-Space Form BETONEY, Patrick; CELI, Roberto; LEISHMAN, J. Gordon | 1291 Separation of Main and Tail Rotor Noise Sources from Ground-Based Acoustic Measurements using Time-Domain De-Dopplerization GREENWOOD, Eric; SCHMITZ, Frederic H. | 1211 Trailing Edge Flap Failure Modes And Effects Analysis CAMERON, Neil |
| 12:30 | Lunch | | |
| 14:00 | Aerodynamics 2 Wake Models | Test & Evaluation 1 | Safety 2 |
| | 1155 Root Corrections for Dynamic Wake Models PETERS, David A.; BURKETT, Andrew; LIEB, Sydnie | 1220 Innovative flight test instrumentation for in-flight noise measurement of a Dauphin's Fenestron BINET, Laurent ; TRISTRANT, Dominique ; CAMUS, Jean C.; PERTHUIS, Laurent; PESENTI, Daniel | 1238 Preliminary investigation on the consequence of a bullet impact on helicopter components PREVITALI, Francesco; ANGHILERI, M.; CASTELLETTI, L. M.-L.; MILANESE, A. |
| | 1183 The Effect of Rotor Design on the Fluid Dynamics of Helicopter Brownout PHILLIPS, Catriona; BROWN, Richard E. | 1196 Advanced optical rotor blade deformation measurements on a flying helicopter BODEN, Fritz; TORRES, Anwar; MAUCHER, Christoph | 1305 New floatation devices to avoid helicopters' total inversion after capsizing DELORME, Louis; DENANTE, Marc; DE-GELAS, Axelle; SANTUCCI, Philippe |

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|-------|---|--|---|
| | 1204 Unsteady Simulations of Rotorcraft in Ground Effect using a Fast Panel-Fast Vortex Formulation D'ANDREA, A.; VERNA, A. | 1188 1.5µm lidar sensor for helicopter blade tip vortex detection AUGERE, Béatrice; VALLA, M. | 1227 Brownout/Whiteout Support Systems MÜNSTERER, Thomas |
| 15:30 | Coffee / Tea | | |
| 16:00 | Aerodynamics 3 CFD Rotor | Test & Evaluation 2 | Aircraft Design |
| | 1165 Industrial validation of numerical aerodynamics about rotor heads: Towards a design optimisation at EUROCOPTER. LE CHUITON, Frederic; KNEISCH, T.; SCHNEIDER, S.; KRÄMER, Ph. | 1182 An Experimental Study of the Structural Damping of the Aeronautical Construction from Composite Laminated Materials RASUO, Bosko | 1169 The TIGER Attack Helicopter: Technical / Program achievements and perspectives BOURZEIX, F.; JOUAN, M.; LHEUREUX, Antoine |
| | 1187 CFD Requirements for Efficient Smart-Rotor Analysis STEIJL, R.; WOODGATE, M.; BARAKOS, George | 1308 Aircraft Electromagnetic Vulnerability Operative Model (MOVEA) RENARD, M.; TRISTANT, F.; TERRADE, F.; MOREAU, J. P.; ROUQUETTE, J. A.; PONCON, M.; GUILLET, S.; GIRARD, C.; VIGUIER, M.; LALANDE, P.; LAROCHE, P.; PARMANTIER, J.-P.; JUNQUA, I.; ISAAC, F.; GUIBERT, L. | 1177 Aerodynamic Design Optimization of Helicopter Rotor Blades in Hover Performance Using Advanced Configuration Generation Method VU, Ngoc Anh; KANG, Ho-Jung; AZAMATOV, Abdulaziz I.; LEE, Jae-Woo; BYUN, Yung-Hwan |

| | | | |
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| | 1215 Time-accurate fluid-structure coupling for helicopter rotor flows BIAVA, M.; MASARATI, P.; VIGEVANO, Luigi | 1294 An overview of SHOL testing within the Royal Netherlands Navy HOENCAMP, Alrik | 1172 High-Fidelity Optimization Framework for Helicopter Rotors IMIELA, Manfred |
| 17:30 | End of Sessions | | |
| 19:00 | Reception | | |

Technical Programme Wednesday, 23 September 2009

| | | | |
|-------|--|---|---|
| 08:00 | Registration | | |
| 08:30 | Aerodynamics 4 CFD Rotor | Active Rotors 1 | Operational Aspects |
| | 1216 Unsteady Criteria for Rotor Blade Airfoil Design KLEIN, A.; ALTMIKUS, A.; LUTZ, T.; RICHTER, K.; KRÄMER, E. | 1200 SMART Rotor Development and Wind Tunnel Test STRAUB, Friedrich; ANAND, V. R.; BIRCHETTE, Terry; LAU, B. H. | 1304 Evaluation of Helicopter Encounters with Wake Vortices MATAYOSHI, Naoki; OKUNO, Yoshinori |
| | 1184 The effect of blade aerodynamic modelling on the prediction of the blade airloads and the acoustic signature of the HART II rotor KELLY, Mary E.; BROWN, R. E. | 1309 Rotor Power Reduction using Multiple Spanwise-Segmented, Optimally-Actuated Trailing-Edge Flaps LEON, Olivier; GANDHI, Farhan | 1181 Optimization of Simultaneous Non-Interfering Rotorcraft Approach Trajectories HARTJES, Sander; VISSER, Hendrikus G.; PAVEL, Marilena D. |

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| | 1272 Reverse- and Cross-Flow Aerodynamics for High Advance Ratio Flight KOUKOL, Benjamin; SMITH, Marilyn J.; QUACKENBUSH, Todd; WACHSPRESS, Dan | 1160 Aerodynamic and Acoustic Study of an Active Twist Rotor using a Loosely Coupled CFD/CSD Method BOYD, Jr. Douglas D. | 1232 Optimal Management System for Disaster Relief Helicopter Operation KOBAYASHI, Keiji; OKUNO, Yoshinori; KURITA, Keiji; ANDOH, Shinichiro; NAGATSUKA, Mitsuru |
| 10:00 | Coffee / Tea | | |
| 10:30 | Aerodynamics 5 CFD Full Helicopter | Active Rotors 2 | Flight Mechanics 1 Math. Models |
| | 1206 Advanced rotorcraft aeromechanic studies in the French-German Shanel project COSTES, Michel; RADDATZ, J.; BORIE, S.; DALASCIO, A.; EMBACHER, M. | 1157 Improvement of Noise Reduction and Performance for a Helicopter Model Rotor Blade by Active Twist Actuation BAILLY, Joëlle; DELRIEUX, Yves | 1161 Development of EC135 Turbulence Models via System Identification SEHER-WEISS, Susanne VON GRUENHAGEN, Wolfgang |
| | 1271 Vorticity-Transport and Unstructured RANS Investigation of Rotor-Fuselage Interactions SMITH, Marilyn J.; BROWN, Richard E.; KENYON, Adam R. | 1163 Structural design and testing of Active Twist Blades – A comparison RIEMENSCHNEIDER, J.; OPITZ, S.; WIERACH, P.; MERCIER DES ROCHETTES, H.; BUCHANIEK, L.; JOLY, D. | 1167 On Time-Domain Parameter Estimation Techniques Applicable to First-Principle Rotorcraft Models BOTTASSO, C. L.; LURAGHI, Fabio; MAISANO, G. |

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| | <p>1230 Unsteady computations of rotor-fuselage interaction</p> <p>POTSDAM, Mark; SMITH, Marilyn; RENAUD, Thomas</p> | <p>1217 Benefit Studies for Rotor with Active Twist Control Using Weak Fluid-Structure Coupling</p> <p>ZHANG, Qinyin, HOFFMANN, F.</p> | <p>1166 Efficient Rotorcraft Trajectory Optimization using Comprehensive Vehicle Models by Improved Shooting Methods</p> <p>BOTTASSO, C. L.; MAISANO, G.</p> |
| | <p>1207 Numerical Simulation of Air Flow Past a Full Helicopter Configuration</p> <p>KHIER, Walid</p> | <p>1297 Helicopter blade twist control through SMA technology: optimal shape prediction, twist actuator realisation and main rotor enhanced performance computation</p> <p>AMEDURI, S.; PAGANO, A.; ALTMIKUS, A.; COKONAJ, V.; PRACHAR, A.; ZACHARIADIS, Z.; DRIKAKIS, D.</p> | <p>1306 Linear Time Invariant (LTI) Models for Integrated Flight and Rotor Control</p> <p>PRASAD, J.V.R.; OLCER, F. E.; SANKAR, L. N.; HE, Chengjian</p> |
| 12:30 | Lunch | | |
| 14:00 | General Session | | |
| 15:00 | AHS Best Paper | | |
| 15:30 | Coffee / Tea | | |

| 16:00 | Aerodynamics 6 CFD Full Helicopter | Dynamics 1 | Flight Mechanics 2 External Loads |
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| | <p>1205 Influence of rotor wakes on helicopter aerodynamic behaviour</p> <p>BORIE, Sylvie ; MOSCA, J. ; ALLIOT, P. ; SUDRE, L. ; BENOIT, C. ; PÉRON, S.</p> | <p>1292 Comparison of Rotor Structural and Aerodynamic Loads Using the HART II Test Data</p> <p>JUNG, S.-N. ; PARK, J.-S. ; YOU, Y.-H. ; YU, Y.-H. ; KIM, J.-W. ; PARK, S.-H. ; KIM, D.-H.</p> | <p>1190 Helicopter Sling Load Pendulum Damping</p> <p>BRENNER, Hanno</p> |
| | <p>1310 Advances in CFD and Actuator Disk Modelling for Helicopter Aerodynamics</p> <p>FILIPPONE, Antonio ; MIKKELSEN, Robert</p> | <p>1302 Using Multibody Dynamics for the Simulation of Flexible Rotor Blades – Getting the Mechanical Coupling Right?</p> <p>ARNOLD, Juergen</p> | <p>1191 Helicopter Sling Load Positioning</p> <p>BRENNER, Hanno</p> |
| | <p>1179 Current state and progress in research of rotorcraft aerodynamics at TsAGI</p> <p>CHERNYSHEV, S. L. ; GOLOVKIN, Michael A.</p> | <p>1312 Nonlinear Helicopter Ground Resonance Analysis Using Coupled Multibody Dynamics and Finite Element Methods</p> <p>MOKRANE, Ali ; BUNNIS, P. B. ; LIEVEN, N. A. J.</p> | <p>1212 UH-60 External Load Handling Qualities Evaluation</p> <p>LUSARDI, Jeff ; BLANKEN, Chris</p> |
| 17:30 | End of Sessions | | |
| 19:30 | Conference Dinner | | |

Technical Programme

Thursday, 24 September 2009

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|-------|--|---|---|---------------------------|
| 08:00 | Registration | | | |
| 08:30 | Aerodynamics 7 Experimental Studies | | Dynamics 2 | Flight Mechanics 3 |
| | 1175 Experimental study of interference of rotor models and tilt rotor airframe in hovering TARASOV, Nikolay | 1154 A Modelling framework for the calculation of structural loads for fatigue life prediction of helicopter airframe components BAKKER, Richard, J. J.; BOS, M.; MÜNNINGHOFF, N.; VAN TONGEREN, H.; VAN DER VEN, H. | 1158 Helicopter Design for Handling Qualities Enhancement YILMAZ, Deniz; PAVEL, Marielena D.; YAVRUCUK, Ilkay | |
| | 1303 Generation of an Advanced Helicopter Experimental Aerodynamic Database RAFFEL, Markus; DE GREGORIO, F.; GIBERTINI, G.; DE GROOT, K.; KOKKALIS, T.; SERAUDIE, A.; SHENG, W.; VAN DER WALL, B. | 1198 Active Cabin Vibration Control for Jet-Smooth Helicopter Ride HOFFMANN, Falk; KONSTANZER, P.; PRIEMS, M.; CHEMIN, J. | 1229 The Nonlinear Optimal Controller Design of Helicopter using the State Dependent Matrix Exponential Method HONG, Ji-Seung; KIM, Chang-Joo | |

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| | <p>1186 An Experimental Study of Rotor/Fuselage Interaction</p> <p>TANABE, Y.; SAITO, S.; KOBIKI, N.; MUROTA, K.; SUGAWARA, H.; HAYASHI, K.; HIRAOKA, K.</p> | <p>1171 Optimal Control Procedures for Alleviation of Tiltrotor Vibratory Loads</p> <p>MOLICA COLELLA, Marco; BERNARDINI, G.; GENNARETTI, M.</p> | <p>1219 System Digital Mock-Up: A New Approach for the Design and Development of Helicopter Avionic Systems</p> <p>GUILLON, Eric ; BRISSET, N.; DAMIANI, N.; GOASDOUÉ, M.</p> |
| 10:00 | Coffee / Tea | | |
| 10:30 | <p>Aerodynamics 8 Applications</p> | <p>Rotorcraft History</p> | <p>Flight Mechanics 4 Crew Station & Human Fact.</p> |
| | <p>1185 Towards Increased Industrial Application of Rotor Aeroelastic CFD</p> <p>DIETZ, Markus; DIETERICH, Oliver</p> | <p>Introduction and overview of early European vertical flight attempts</p> <p>LEISHMAN, Gordon</p> | <p>1214 Pilot Assistance for Rotorcraft</p> <p>HAISCH, Stefan; HESS, Stefan; JANK, Swen; KREITMAIR-STECK, W.</p> |
| | <p>1298 Unsteady effects of the seperated flow at the tail section of a helicopter fuselage</p> <p>VOGEL, Florian; BREITSAMER, Christian; ADAMS, Nikolaus A.</p> | <p>1194 Helicopter Development in Germany 1931-1945</p> <p>STEPHAN, Michael</p> | <p>1193 Active sidesticks used for VRS avoidance</p> <p>ABILDGAARD, Max; VON GRÜNHAGEN, Wolfgang; BINET, Laurent ; TAGHIZAD, Armin</p> |

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| | 1203 Rotorcraft Performance Enhancements Due to a Lower-Surface Effector | 1313 90 years of research on helicopters at NLR BAKKER, Kees | 1208 Experimental identification of rotorcraft pilots' biodynamic response for investigation of PAO events MATTABONI, M.; QUARANTA, G.; MASARATI, P.; JUMP, M. |
| | 1176 Numerical Investigation of Rotor Downwash Effect on Free-Flight Rockets Launched From a Helicopter LEE, Bum Seok; HA, Hyun Seok; JUNG, Mun Seung; KWON, Oh J. | 1210 UK rotorcraft history GIBBINGS, David | 1210 Multi sensor data acquisition and fusion to increase situation awareness for a helicopter pilot LÜKEN, Thomas; DÖHLER, Hans-Ulrich |
| 12:30 | Lunch | | |
| 14:00 | General Session | | |
| 15:00 | Coffee / Tea | | |
| 15:30 | Aerodynamics 9 Applications | Simulation & Training | UAV |
| | 1195 Progress Towards Modeling the Effects Of Ice Accretion On Rotorcraft Performance BAIN, Jeremy; SANKAR, Lakshmi N.; EGOLF, T. Alan; FLEMMING, Robert J.; KREEGER, R. E. | 1164 Flight Mechanics Model Development for a KA32 Training Simulator VAN DER VORST, J.; ZEILSTRA, K. D. S.; JOEN, D. K.; CHOI, H. S.; JUN, H. S. | 1162 VTUAV, Fire Scout Fatigue Usage Spectrum Development MOON, Suresh; SIMMERMAN, Clyde; FLORES, Enrique |

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| | <p>1209 Numerical Investigation into the Unsteady Aerodynamics of a Ducted Tail Rotor under Cross-Wind Conditions KAINZ, M. ; DANNER, F. ; LE CHUITON, F. ; KAU, H.-P.</p> | <p>1223 An Object-Oriented Framework for Blade Element Rotor Modelling and Scaleable Flight Mechanics Simulation THEOPHANIDES, Michael; SPIRA, Daniel</p> | <p>1168 Inertial Navigation of an Autonomous Rotorcraft Vehicle using Stereo-Vision BOTTASSO, C. L.; LEONELLO, Domenico</p> |
| | <p>1296 Simulated aerodynamic loading of an SH-60B helicopter in a ship's airwake KÄÄRIÄ, Christopher; FORREST, J. S.; PADFIELD, G. D.; OWEN, I.</p> | <p>1218 The Effect of Simulator Motion on Pilot Control Behaviour for Agile and Inert Helicopter Dynamics NIEUWENHUIZEN, Frank M.; ZAAL, Peter M. T.; TEUFEL, Harald J.; MULDER, Max; BULTHOFF, Heinrich H.</p> | <p>1173 Propulsion system optimization for the muFly micro-helicopter SCHAFROTH, Dario; BERMES, Christian; BOUABDALLAH, Samir; SIEGWART, Roland</p> |
| | <p>1307 Development of A Reduced Order Modeling Framework for Flight Mechanics Oriented Modeling of On-Blade Control Concepts HE, Chengjian; ZHAO, Jिंगgen; BAIN, Jeremy; SANKAR, Lakshmi; PRASAD, J. V. R.</p> | <p>1192 Acceptance testing of a rotorcraft flight simulator for research and teaching: the importance of unified metrics WHITE, Mark; PERFECT, Philip; PADFIELD, Gareth; GUBBELS, Arthur W.; BERRYMAN, Andrew</p> | <p>1290 Design Optimization of Composite Wings for the KARI-SUAV Tiltrotor Aircraft Considering Whirl Flutter Stability PARK, Jae-Sang; JUNG, Sung-Nam; LEE, Myeung-Kyu; KIM, Jai-Moo</p> |
| 17:30 | Close of Conference | | |

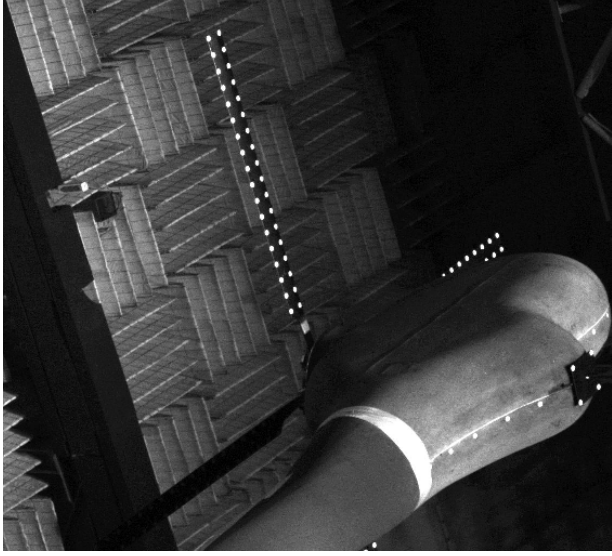
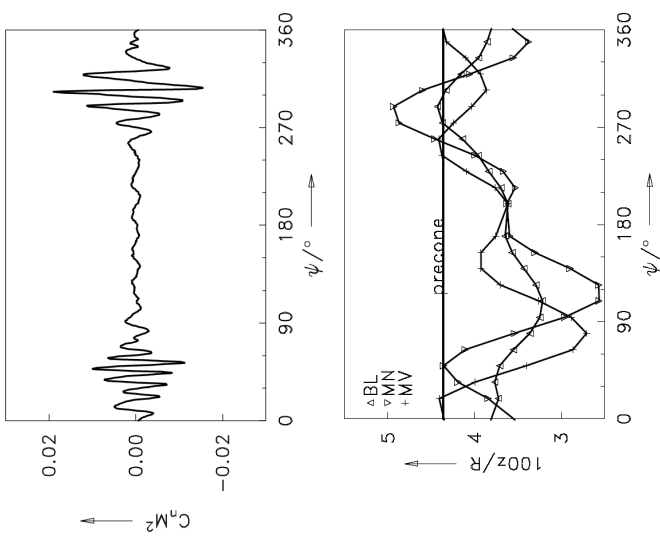
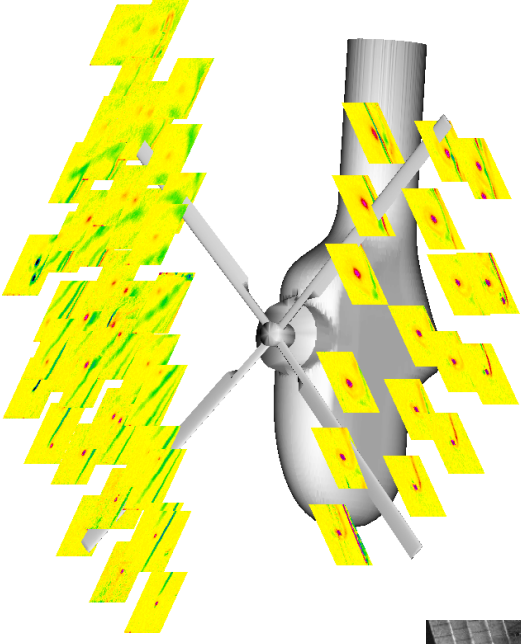
Invitation to the 8th International HART II Workshop

35th European Rotorcraft Forum, Hamburg, Germany, September 25, 2009, 9am-1pm

In: Radisson SAS Hotel, Room tbd.

Organized by DLR, AFDD, NASA, ONERA, DNW

- Higher Harmonic Control
- Wind tunnel data
- Rotor data
- Blade deformation
- Blade pressure
- Rotor acoustics
- Flow visualization
- 3C-PIV wake data



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35th European Rotorcraft Forum

