



29th European Rotorcraft Forum

Programme

16 - 18 September 2003
Friedrichshafen,
Germany



INTRODUCTION

Welcome to the 29th European Rotorcraft Forum. The Forum will be held in Friedrichshafen, Germany, from Tuesday 16th to Thursday 18th September 2003.

About 100 authors from all over the world will present and discuss papers on recent advances in research, development, design, manufacturing, testing and operation of rotorcraft aiming to foster the exchange of information and views between manufacturers, research centres and laboratories, operators, and agencies. This will be the 29th such Forum since the event started in Southampton in 1975; it has subsequently been held annually in turn in the UK, Germany, France, Italy, The Netherlands and, since 1995, in Russia. The most recent Forum was held in Bristol in 2002.

NATIONAL ORGANISING COMMITTEE

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GENERAL INFORMATION

Venue

Graf-Zeppelin-Haus, Olgastrasse 20, D-88045 Friedrichshafen, Germany

The venue chosen, the Graf-Zeppelin-Haus Friedrichshafen, offers excellent conference facilities. The city of Friedrichshafen, well known for its trade fairs and the Zeppelin, offers an interesting mixture of high technology, international flair and a unique recreation area. The panoramic situation on Lake Constance, bordering onto Germany, Austria and Switzerland makes Friedrichshafen one of the most interesting conference venues in Germany.

Forum Registration

Graf-Zeppelin-Haus, Foyer

Telefon: +49 (0) 7541 378031, Fax: +49 (0) 7541 378032

The registration desk will be open during the following hours:

Monday	15 September 2003	17:30 - 19:00 hrs
Tuesday	16 September 2003	07:30 - 18:00 hrs
Wednesday	17 September 2003	07:30 - 17:30 hrs
Thursday	18 September 2003	07:30 - 17:30 hrs

Registration Fees

	Payment before: 27 August 2003	Payment after: 27 August 2003
?? Chairmen/Speakers	590,00 €	630,00 €
?? Members of the CEAS¹⁾/RHS²⁾/AHS³⁾	630,00 €	680,00 €
?? Non Members	680,00 €	750,00 €
?? Students⁴⁾	250,00 €	280,00 €
?? Accompanying Persons	150,00 €	180,00 €

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.

All participants (including chairmen and speakers) must complete and return the enclosed Registration Form. Payments must be made in "Euro", preferably by bank transfer to DGLR account No. **3 403 718, Hypo Vereinsbank (BLZ 380 200 90)**, D-53175 Bonn, Germany, reference: **Participant's Name and 29th ERF.**

GENERAL INFORMATION (Cont'd)

The following Credit Cards are accepted: **American Express, Mastercard, VISA**

Registration fee includes:

?? Welcome Drink on Monday, 15 Sep	?? Civic Reception by
?? ERF Proceedings*	the Mayor of Friedrichshafen
?? Attendance at ERF Sessions*	?? Forum Dinner
?? Refreshments and Lunch on 3 days	?? Technical Visit

* Not included in the registration fee for accompanying persons

Cancellation

Substitutions may be made up to the day of the Forum. Please notify the Conference Secretariat of name changes as soon as possible. For cancellations received up to **15 August 2003** there will be a 50% refund. If notice is received after that date there will be no refund.

Accommodation

Block reservations at special rates during the Forum have been made for participants at the hotels below. Deadline for all reservations is **1 August 2003**.

Please make your reservation as early as possible by using the enclosed fax-leaflet. Hotel bookings will be handled by the TOURIST- Information Friedrichshafen and will be acknowledged by return fax.

Hotels

Seehotel **** (A Category)

Bahnhofplatz 2
88045 Friedrichshafen

City Krone**** (A Category)

Schanzstrasse 7
88045 Friedrichshafen

Hotel Föhr (B Category)

Albrechtstrasse 73
88045 Friedrichshafen

Hotel Zeppelin (C Category)

Eugenstrasse 41/1
88045 Friedrichshafen

Hotel Wohlwender (C Category)

Olgastrasse 64
88046 Friedrichshafen

Buchhorner Hof **** (A Category)

Friedrichstrasse 33
88045 Friedrichshafen

Goldenes Rad **** (A Category)

Karlstrasse 43
88045 Friedrichshafen

Hotel Goldener Hirsch (C Category)

Charlottenstrasse 1
88045 Friedrichshafen

Hotel Schwanen (C Category)

Friedrichstrasse 32
88045 Friedrichshafen

GENERAL INFORMATION (Cont'd)

Language

English will be the official language during the Forum. There will be no simultaneous translation during the sessions.

Proceedings

Every registered participant will receive a CD-ROM with the papers available and a hard copy of the Paper Abstracts when checking in at the Registration Desk. A complete CD-ROM will be sent to all registered delegates about one month after the event.

Luncheons

Lunches will be served in the Hugo-Eckener-Saal of the Graf-Zeppelin-Haus. They are included in the registration fee.

Travel Advice

Friedrichshafen can be easily reached by air, rail and road. Please find travel information on the last pages.

Exhibition

Space for a limited exhibition shall be available conveniently located at the conference area. The exhibition will be open during the entire Forum. Companies and organisations exhibiting will be included in the final programme.

Workshops (by invitation only)

HART Workshop

An international workshop on **Rotor Blade-Vortex Interaction (BVI) Air Load and Acoustics Prediction** will be hosted by the HART Team on September 15, 2003 at the conference centre. Point of contact: Dr. Yung H. Yu, US-Army-NASA; e-mail: yyu@mail.arc.nasa.gov

Noise Regulation Workshop

A workshop on **Key Issues for Land Use Planning Development Related to Rotorcraft Operations in Noise Sensitive Areas** will be arranged in context with the Forum. Through invited papers from experts in rotorcraft noise sources, operations, subjective acoustics and regulations, this special session will attempt to recognize the different needs and then propose different ways to answer to public expectations in a more efficient way, while ensuring a wealthy economic helicopter market. Appropriate rating metrics, noise measuring techniques, low noise flight procedures, trajectory and noise control systems on ground, as well as operational regulations, are in the scope of this special session.

Point of contact: Gilles Arnaud, Eurocopter; e-mail: gilles.arnaud@eurocopter.com

Liability

The organising committee and the DGLR cannot be held responsible for any personal injury, loss, damage, accident to private property or additional expenses incurred as a result of any delays or changes. Luggage is at owner's risk throughout the Forum.

PROGRAMME AT A GLANCE

Tuesday 16 September 2003

07:30	Registration		FOYER
09:00	Opening Ceremony		Ludwig-Dürr-Saal
09:30	Keynote Address		Ludwig-Dürr-Saal
10:00	General Session		Ludwig-Dürr-Saal
12:00	Lunch		
13:00	AHS BEST PAPER		Ludwig-Dürr-Saal
14:00	Ludwig-Dürr-Saal SESSION 1: Acoustics 1	Alfred-Colsman-Saal SESSION 2: Dynamics 1	Theodor-Kober-Saal SESSION 3: Safety & Airworthiness
15:30	Coffee		
16:00	Ludwig-Dürr-Saal SESSION 4: Acoustics 2	Ludwig-Dürr-Saal SESSION 5: Dynamics 2	Theodor-Kober-Saal SESSION 6: Aircraft Design 1
17:30	End of Session		
19:00	Reception by the Mayor Friedrichshafen		„Zeppelin Museum“

PROGRAMME AT A GLANCE (Cont'd)

Wednesday 17 September 2003

07:30	Registration		FOYER
08:30	Ludwig-Dürr-Saal SESSION 7: Aerodynamics 1 (HART II)	Alfred-Colsman-Saal SESSION 8: Flight Mechanics 1	Theodor-Kober-Saal SESSION 9: Aircraft Design 2
10:00	Coffee		
10:30	Ludwig-Dürr-Saal SESSION 10: Aerodynamics 2	Alfred-Colsman-Saal SESSION 11: Flight Mechanics 2	Theodor-Kober-Saal SESSION 12: Testing & Evaluation 1
12:30	Lunch		
14:00	General Session		Ludwig-Dürr-Saal
15:00	Coffee		
15:30	Ludwig-Dürr-Saal SESSION 13: Aerodynamics 3	Alfred-Colsman-Saal SESSION 14: Dynamics 3	Theodor-Kober-Saal SESSION 15: Testing & Evaluation 2
17:30	End of Sessions		
19:30	Conference Dinner		MS Schwaben

PROGRAMME AT A GLANCE (Cont'd)

Thursday 18 September 2003

07:30	Registration		FOYER
08:30	Ludwig-Dürr-Saal SESSION 16: Aerodynamics 4	Alfred-Colsman-Saal SESSION 17: Structures & Material 1	Theodor-Kober-Saal SESSION 18: Modelling & Simulation 1
10:00	Coffee		
11:00	Ludwig-Dürr-Saal SESSION 19: Aerodynamics 5	Alfred-Colsman-Saal SESSION 20: Structures & Material 2	Theodor-Kober-Saal SESSION 21: Modelling & Simulation 2
12:30	Lunch		
14:00	General Session		Ludwig-Dürr-Saal
15:00	Coffee		
15:30	Ludwig-Dürr-Saal SESSION 22: Aerodynamics 6	Alfred-Colsman-Saal SESSION 23: Structures & Material 3	Theodor-Kober-Saal SESSION 24: Avionics
17:30	Close of Conference		

Friday 19 September 2003

Technical Visits

Tuesday 16 September 2003

07:30	Registration	Registration Desk
09:00	Opening Ceremony	Ludwig-Dürr-Saal
09:30	Keynote Address: Success through Cooperation	Ludwig-Dürr-Saal
10:00	General Session 1: Aspects of Future Civil Helicopter Operations	Ludwig-Dürr-Saal
12:00	Lunch	Hugo-Eckener-Saal

Tuesday 16 September 2003 (Cont'd)

13:30	AHS BEST PAPER		Ludwig-Dürr-Saal
	Ludwig-Dürr-Saal	Alfred-Colsmann-Saal	Theodor-Kober-Saal
	Session 1: Acoustics 1 Chairman:	Session 2: Dynamics 1 Chairman:	Session 3: Safety & Airworthiness Chairman:
14:00	(1) Influence of a Helicopter Tail Rotor Shroud on the Interaction Noise Due to the Main Rotor Vortices M. Weisgerber, G. Neuwerth	(4) Fundamental Understanding and Prediction of Rotor Vibratory Loads in High-Speed Forward Flight J. Sitaraman, A. Datta, J. Baeder, I. Chopra	(7) Loss-of-Oil Behavior of Eurocopter Gearboxes from AS350 to EC225 M. Blanc, E. Mermoz
14:30	(2) Improvement of DLR Rotor Aero-acoustic Code (APSIM) and its Validation with Analytic Solution J. Yin, J. Delfs	(5) Aeroelastic Stability Analysis of Wind-Turbines Using an Eigenvalue Approach M. H. Hansen	(8) Airframe Life Extension Versus Re-Airframing: Economic and Airworthiness Considerations M. L. Overd
15:00	(3) Airfoil-Vortex Interaction Simulation Using the Compressible Vorticity Confinement Method R. Morvant, K.J. Badcock, G. N. Barakos	(6) New General Code for Helicopter Dynamics Optimisation P. Cranga, T. Krysinski, H. Strehlow, G. Ferraris	(9) HeliSafe®- A New Concept to Reduce Fatal and Severe Injuries in Helicopter Accidents U. Heßmer
15:30	Coffee		

Tuesday 16 September 2003 (Cont'd)

	Ludwig-Dürr-Saal	Alfred-Colsmann-Saal	Theodor-Kober-Saal
	Session 4: Acoustics 2 Chairman:	Session 5: Dynamics 2 Chairman:	Session 6: Aircraft Design 1 Chairman:
16:00	(10) Description and Validation of the ONERA Computational Method for the Prediction of Blade-Vortex Interaction Noise P. Beaumier, Y. Delrieux	(12) Design Optimization for Improved Tiltrotor Whirl Flutter Stability E. L. Hathaway, F. Gandhi	(15) Design Issues for a Semi-rigid Lifting Rotor for Light Autogyro Application P. Bunniss
16:30	(11) Acoustic Validation of a New Code Using Particle Wake Aerodynamics and Geometrically-Exact Beam Structural Dynamics D. Opoku, F. Nitzsche	(13) Design of Experiments Approach to Helicopter Rotor Optimization M. S. Murugan, R. Ganguli	(16) Calculation of ADS-33 Quickness Parameters with Application to Design Optimization R. Celi
17:00		(14) Nonlinear Flapping Oscillations in Helicopter Rotors R. Ramos, D. de Andrade	(17) Reducing the Vulnerability of Military Helicopters to Combat Damage P. Collis, C. McAulay
17:30	End of Sessions		
19:00	Reception by the Mayor of Friedrichshafen		Zeppelin Museum , Friedrichshafen

Wednesday 17 September 2003

07:30	Registration			Registration Desk
	Ludwig-Dürr-Saal	Alfred-Colsmann-Saal	Theodor-Kober-Saal	
	Session 7: Aerodynamics 1 (HART II) Chairman:	Session 8: Flight Mechanics 1 Chairman:	Session 9: Aircraft Design 2 Chairman:	
08:30	<p>(18) HART II: Prediction of Blade-Vortex Interaction Loading</p> <p>J. W. Lim, C. Tung, Y. H. Yu, C. Burley, T. Brooks, D. Boyd, B. van der Wall, O. Schneider, M. Raffel, P. Beaumier, Y. Delrieux, K. Pengel, E. Mercker</p>	<p>(21) HAT– A Handling-qualities Analysis Toolbox for Rotorcraft and Aircraft</p> <p>I. Shaik, W. v. Grünhagen, M. Hamers, H.-J. Pausder</p>	<p>(24) Experimental Studies of Fin and Tail Rotor Interaction Conducted on a Mil Moscow Helicopter Plant Rotor Test Bench</p> <p>V. A. Ivchin, M. A. Gringauz</p>	
09:00	<p>(19) Final Analysis of HART II Blade Deflection Measurements</p> <p>O. Schneider, B. van der Wall</p>	<p>(22) Handling Qualities Assessment of the Effects of Tailboom Strakes on the Bell 412 Helicopter</p> <p>A. W. Gubbels, J. R. P. S. Carigan</p>	<p>(25) Tiltrotor Whirl Flutter, Noise and Performance: the ADYN Project</p> <p>A. Pisoni</p>	
09:30	<p>(20) Rotor Wake Definition for Accurate BVI and Broadband Noise Prediction - Results from the HART-II Study</p> <p>C. L. Burley, T. F. Brooks, B. van der Wall, H. Richard, M. Raffel, P. Beaumier, J. Bailly, J. W. Lim, Y. H. Yu, C. Tung, K. Pengel, E. Mercker</p>	<p>(23) Civil Tiltrotor Handling Qualities</p> <p>M. A. Meyer, G. D. Padfield, H. Haverdings, A. Taghizad, M. Naddei</p>	<p>(26) <i>Smart Fuel</i> Third Generation Digital Liquid Management System</p> <p>H. D. Schnell</p>	
10:00	Coffee			

Wednesday 17 September 2003 (Cont'd)

	Ludwig-Dürr-Saal	Alfred-Colsmann-Saal	Theodor-Kober-Saal
	Session 10: Aerodynamics 2 Chairman:	Session 11: Flight Mechanics 2 Chairman:	Session 12: Testing & Evaluation 1 Chairman:
10:30	(27) High Resolution Wake Modelling Using a Semi-Lagrangian Adaptive Grid Formulation A. J. Line, R. E. Brown	(31) Simulation of Tiltrotor Motion M. Miller, J. Narkiewicz	(35) FHS, the New Research Helicopter: Ready for Service H. Kurscheid, J. Kaletka, U. Butter
11:00	(28) Main/Tail Rotor Interaction under Ground Effect Using DLR 3D Free Wake Code J. Yin, J. Delfs	(32) Use of Bifurcation Analysis in the Design and Analysis of Helicopter Flight Control Systems R. G. Bedford, M. H. Lowenberg	(36) First Evaluation of the FHS Experimental Capabilities M. Hamers, M. Gläßer
11:30	(29) Experimental Characterisation and Comparison of a Model Helicopter Rotor Tip Vortex and Fixed Wing Tip Vortex T. Denton, J. Martins, G. Ratner, P. Skinner	(33) Numerical Simulation of Critical and Transient Conditions of Helicopter Spatial Motion and their Adaptation in Flight Tests A. O. Garipov, A. M. Girfanov, S. A. Mikhailov, E. I. Nikolaev	(37) Recent IBC Flight Test Results for the CH-53G Helicopter U. T. P. Arnold
12:00	(30) For the Rotor Vortex Structure Analysis V. Anikin, B. Kritsky	(34) Development of Ideal Main Rotor Theory and its Application to Aerodynamic Analysis A. S. Braverman	(38) Requirements Verification Using a Model Based Approach B. Freyenberg-Richter, A. Piechullek-Königer, T. Sutor
12:30	Lunch		
14:00	General Session 2: Rotorcraft History in Germany		Ludwig-Dürr-Saal
15:00	Coffee		

Wednesday 17 September 2003 (Cont'd)

	Ludwig-Dürr-Saal	Alfred-Colsmann-Saal	Theodor-Kober-Saal
	Session 13: Aerodynamics 3 Chairman	Session 14: Dynamics 3 Chairman:	Session 15: Testing & Evaluation 2 Chairman:
15:30	(39) Application of CFD to the Fuselage Aerodynamics of the EC145 Helicopter. Prediction of Unsteady Phenomena and of the Time-averaged Influence of the Main Rotor A. D'Alascio, A. Berthe	(43) Closed-Loop Aeromechanical Stability Analysis for a Helicopter with Higher Harmonic Control M. Lovera, P. Colaneri, C. Malpica, R. Celi	(47) Comparison of Helicopter Flight Data Measured with INS/GPS Sensors with Numerical Simulations K. Gajda, J. Narkiewicz
16:00	(40) Calculations of Aerodynamic Interaction between Helicopter Rotor and Fuselage by Free Wake Method Q. Zhao, G. Xu, C. Li, J. Zhao	(44) Advanced Vibration Reduction by IBC Technology D. Roth	(48) Analytical Method to Determine Dynamic Forces on Sub-Scale Helicopter Blades at ONERA, France P. Crozier
16:30	(41) Application of Cartesian Background Grid in Combination with Chimera Method to Predict Aerodynamics of Helicopter Fuselage W. Khier	(45) NASA/Army/MIT Active Twist Rotor Closed-Loop Control Test for Vibration Reduction S. Shin, C. E. S. Cesnik, S. R. Hall	(49) Wind Tunnel Testing of a Helicopter Fuselage and Rotor in a Ship Airwake R. G. Lee, S. J. Zan
17:00	(42) Navier-Stokes Computations of a Complete Helicopter Configuration Accounting for Main and Tail Rotors Effects T. Renaud, C. Benoît, J.-C. Boniface, P. Gardarein	(46) Reduction of Vibrations Transmitted to Helicopter Airframes Using Active Gearbox Struts L. Dozio, E. Bianchi, G. L. Ghiringhelli, P. Mantegazza, F. Cenedese	(50) Active Tab, a New Active Technique for Helicopter Noise Reduction N. Kobiki, A. Takeshi, K. Natsuki, S. Shigeru, T. Anzhong
17:30	End of Session		
19:30	Conference Dinner		Motorship „MS Schwaben“

Thursday 18 September 2003

07.30	Registration		Registration Desk
	Ludwig-Dürr-Saal	Alfred-Colsmann-Saal	Theodor-Kober-Saal
	Session 16: Aerodynamics 4 Chairman:	Session 17: Structures & Materials 1 Chairman:	Session 18: Modelling & Simulation 1 Chairman:
08:30	(51) Dynamic Stall on a Supercritical Airfoil W. Geissler, G. Dietz, H. Mai	(54) Finite Element Simulation of a Helicopter Crash Impact S. A. Mikhailov, S. K. Chernikov, D. V. Nedelko, A. M. Fajzullin, A. N. Tupolev, E. K. Zavoisky	(57) Latest European Achievements in Tilt-Rotor Piloted Simulation and Handling Qualities Assessments P. Rollet, P. Hellio
09:00	(52) The Application of Air-jet Vortex Generators to Control the Flow on Helicopter Rotor Blades under Quasi-steady and Unsteady Conditions C. Singh, D. J. Peake, F. Coton, R. Galbraith, A. Kokkalis	(55) Analysis and Full-Scale Crash Test of the NH90 Transport Helicopter Fuselage D. Müller, R. Oster, J.-P. Scheitle	(58) Fuzzy Logic Control with Genetic Algorithm for the Tiltrotor Aircraft H. Chen, Y. Zhang
09:30	(53) Experimental and Numerical Investigation of the Influence of Airfoil Disturbance on Rotor Performance T. Czechyra, P. Bibik, J. Narkiewicz	(56) Identification of Constitutive Model Parameters for Crashworthiness of Composite Structures Using Multiobjective Optimisation M. Anghileri, L. Lanzi, F. Mentuccia	(59) Measuring Simulation Fidelity through an Adaptive Pilot Model G. D. Padfield, M. D. White
10:00	Coffee		

Thursday 18 September 2003 (Cont'd)

	Ludwig-Dürr-Saal	Alfred-Colsmann-Saal	Theodor-Kober-Saal
	Session 19: Aerodynamics 5 Chairman:	Session 20: Structures & Materials 2 Chairman:	Session 21: Modelling & Simulation 2 Chairman:
10:30	(60) TILT Rotor AEROdynamics: A Comparative Study of Prediction Methodologies Using the PROPWING Database A. Visingardi, S. G. Voutsinas, A. Saporiti	(64) High Energy Absorbing Structure for Rotorcraft Crashworthiness K. Abe, M. Toyama, H. Matsumoto, N. Higuchi, S. Sakai, M. Kanemasu	(67) Unsteady Aerodynamic Model of a Cargo Container for Slung Load Simulation J. G. A. da Silva, E. P. N. Duque, L. S. Cicolani
11:00	(61) A Time-dependent-Coefficient Reduced-Order Model for Unsteady Aerodynamics of Proprotors M. Gennaretti, L. Greco	(65) A Design Solution for a Crashworthy Landing Gear Based on a New Trigger Mechanism for the Plastic Collapse of Metallic Tubes A. Airoidi	(68) Use of Potential Flow State-Space Inflow Modeling for Mass Source Rotors K. Yu, D. A. Peters
11:30	(62) Efficient Rotor Aerodynamics Predictions with an Euler Method M. Biava, A. Pisoni, A. Saporiti, L. Vigevano	(66) Preliminary Study on Structural Properties of Active Twist Blades J. Riemenschneider	(69) Neural Networks for BVI System Identification H. Gläsel, S. Rudolph, J. Kahl, O. Dieterich
12:00	(63) Chimera Simulations of Multibladed Rotors in High-Speed Forward Flight with Weak Fluid-Structure-Coupling K. Pahlke, B. van der Wall		(70) Autogyro Inverse Simulation for Handling Qualities Assessment M. Bagiev, D. G. Thomson, S. S. Houston
12:30	Lunch		
14:00	General Session 3: Advanced Rotorcraft		Ludwig-Dürr-Saal
15:00	Coffee		

Thursday 18 September 2003 (Cont'd)

	Ludwig-Dürr-Saal	Alfred-Colsmann-Saal	Theodor-Kober-Saal
	Session 22: Aerodynamics 6 Chairman:	Session 23: Structures & Materials 3 Chairman:	Session 24: Avionics Chairman:
15:30	(71) Numerical Optimization of Helicopter Rotor Aerodynamic Performance in Hover A. Le Pape, P. Beaumier	(75) Post-Buckling Design and Testing of Composite Stiffened Cylindrical Shells under Torsion L. Lanzi, C. Bisagni, P. Cordisco	(77) Ergonomic Components of Helicopter New Generation Information Systems A. V. Chuntul
16:00	(72) Improving Reduced Aerodynamic Models Using Computational Fluid Dynamics J. Beedy, G. Barakos, K. Badcock, B. Richards	(76) Industrial Applications of Shearography for Inspection of Aircraft Components R. Krupka, T. Walz, A. Ettemeyer	(78) Design of a Primary Fly-by-Light Control System W. Eichberger
16:30	(73) CFD Simulation of Fire Extinguishing System: Two Gases Mixture inside the Engine Bay A. Berthe, A. D`Alascio		(79) A Comparison of Flight Guidance Symbolologies for Obstacle Avoidance during Helicopter NOE Flight V. Gollnick, R. Gaffal
17:00	(74) The Analytical Definition of Rotor Streamtube to Step in 3D Navier-Stokes Flow Numerical Solution for Helicopter in Hover I. T. Karamisir		(80) COFEUX - An In-flight Validation of the Operational Concept for the Control of Air-to-Ground Weapons on Army Helicopters C. Cabirol
17:30	Close of Conference		

SOCIAL PROGRAMME

Welcome Drink

Monday 15 September

17:30 hrs

For early registrants welcome drinks will be served in the Foyer of the Graf-Zeppelin-Haus until 19:00 hrs, giving you the opportunity to meet prior to the Forum.

Civic Reception

Tuesday 16 September

19:00 hrs

This will be held in the "Zeppelin Museum" and will be hosted by the Mayor of Friedrichshafen. Drinks and snacks will be served. Accompanying persons are welcome to attend.

Conference Dinner

Wednesday 17 September

19:30 hrs

An informal dinner will be held on the MS Schwaben (Motorship). The "Dreiländer-Bodensee" buffet will offer you a variety of regional cold and warm specialities.

SIGHTSEEING PROGRAMME

Friedrichshafen

Tuesday 16 September

10:30 - 16:00 hrs

Your Price: —

A guided city tour through Friedrichshafen.

Meersburg-Mainau

Wednesday 17 September

08:30 - 16:00 hrs

Your Price: 38,00€

Minimum Participants: 25

Alternate : Bregenz-Austria

Your Price: 23,60€

Minimum Participants: 6

Castle Neuschwanstein

Thursday 18 September

08:30 - 18:00 hrs

Your Price: 58,00€

Minimum Participants: 25

Alternate : Lindau

A guided city tour through Lindau.

Your Price: 16,00€

Minimum Participants: 6

TECHNICAL VISITS

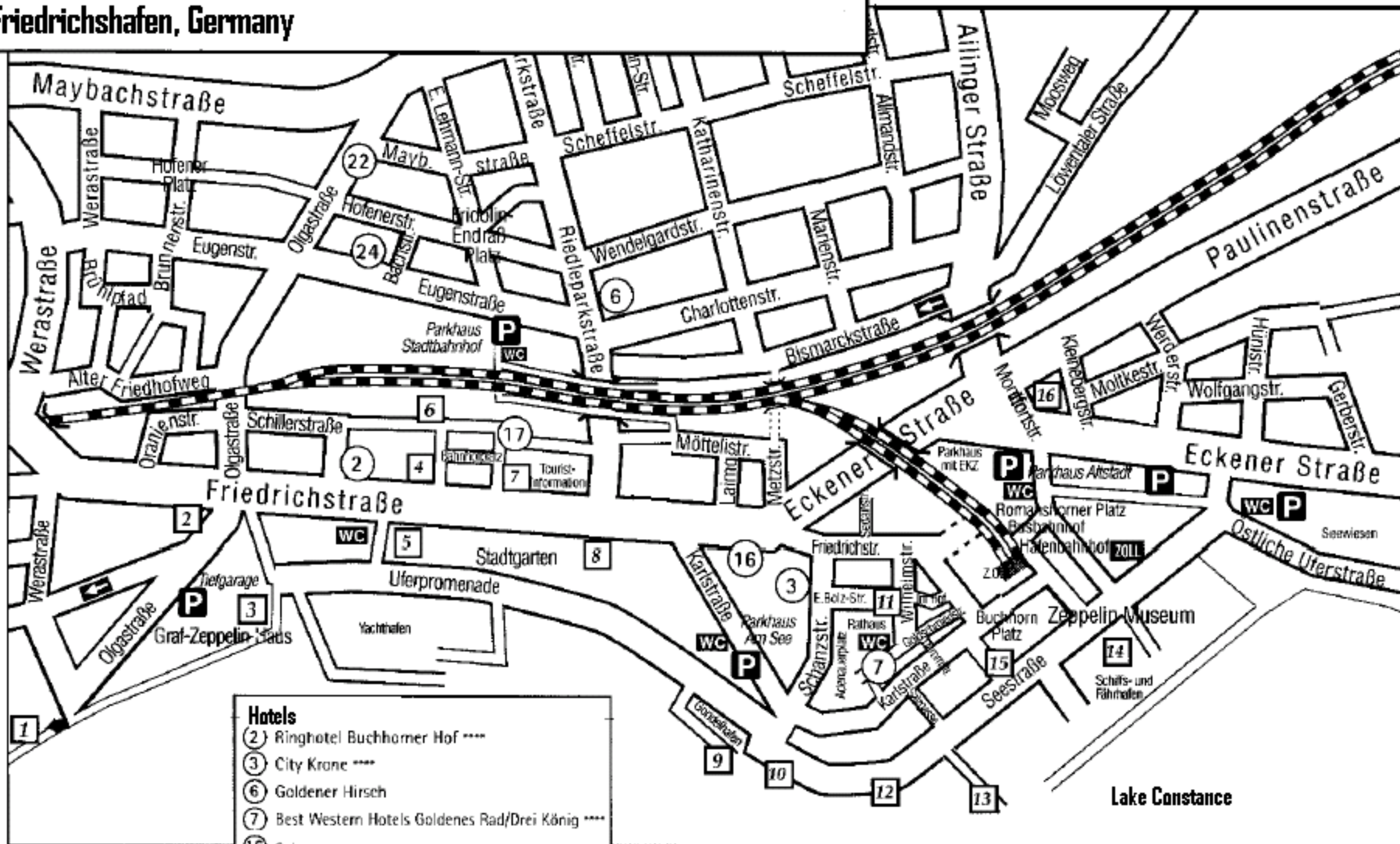
Friday 19 September 2003

? **Astrium GmbH**
88039 Friedrichshafen
Scientific and Earth Observation Satellites
Microwave Instruments

? **MTU Friedrichshafen GmbH**
88040 Friedrichshafen
MTU offers propulsion and drive systems for a multitude of applications.
From workboats through passenger ferries to yachts, very different marine areas are served. In individual segments, as for example with high-speed ferries or mega yachts, our company has achieved a leading position worldwide.
Naval applications are another major focus of MTU's activities.

There will be the opportunity to visit two more factories, pointed out in the final Programme.

Friedrichshafen, Germany



Hotels

- (2) Ringhotel Buchhorn Hof ****
- (3) City Krone ****
- (6) Goldener Hirsch
- (7) Best Western Hotels Goldenes Rad/Drei König ****
- (16) Schwänen
- (17) Seehotel Friedrichshafen ****
- (22) Wohlwender
- (24) Zeppelin

Hotel Föhr is in the vicinity of the Venue (5 minutes walk)

Informations

- | | | | |
|------------------|-------------------------|-----------------------|-----------------------------|
| (1) Schloßkirche | (5) Zeppelin-Denkmal | (9) Bootsvermietung | (13) Aussichtsturm |
| (2) Schulmuseum | (6) Stadtbahnhof | (10) Panoramatafel | (14) Schiffs- und Fährhafen |
| (3) Venue | (7) Tourist-Information | (11) Rathaus | (15) Zeppelin Museum |
| | (8) Zeppelin-Brunnen | (12) Bootsrundfahrten | (16) Kino |

Mit dem PKW

Aus Richtung Stuttgart:

- > A81 und A98 bis zum Autobahnende
- > Stockach, B31n (in Richtung Lindau) bis Friedrichshafen

Aus Richtung Ulm:

- > B30 über Ravensburg nach Friedrichshafen

Aus Richtung München:

- > A96 Richtung Lindau, Abfahrt Sigmarszell/Friedrichshafen
- > B31 bis Friedrichshafen

Aus Richtung Zürich:

- > N7 bis Kreuzlingen/Konstanz
- > Autofähre Meersburg
- > B31 bis Friedrichshafen

Aus Richtung St. Gallen:

- > N1 bis Romanshorn
- > Autofähre Friedrichshafen

Aus Richtung Österreich:

- > über München
- > A96 Richtung Lindau
- > Abfahrt Sigmarszell/Friedrichshafen
- > oder über Arlberg/Bregenz/Lindau

Mit der Bahn

In Deutschland:

- > InterRegio- bzw. Regionalexpress-Anschluss aus Richtung Basel, Freiburg, Offenburg, Karlsruhe, Stuttgart, Ulm, Augsburg bis Stadtbahnfriedrichshafen

Aus der Schweiz:

- > SBB-Strecke Basel/Lindau
- > oder bis Romanshorn und mit der Bodenseefähre im Stundentakt nach Friedrichshafen

Aus Österreich:

- > über München/Ulm
- > oder ÖBB-Strecke über Bregenz/Lindau bis Friedrichshafen.

Mit dem Flugzeug

Deutsche Lufthansa:

- > Direktflüge ab Berlin Tegel, Hamburg
- > ab Köln und dem Drehkreuz Frankfurt
- > Hamburg via Berlin Tegel
- > Über Frankfurt kann die Anreise aus aller Welt erfolgen.

Crossair:

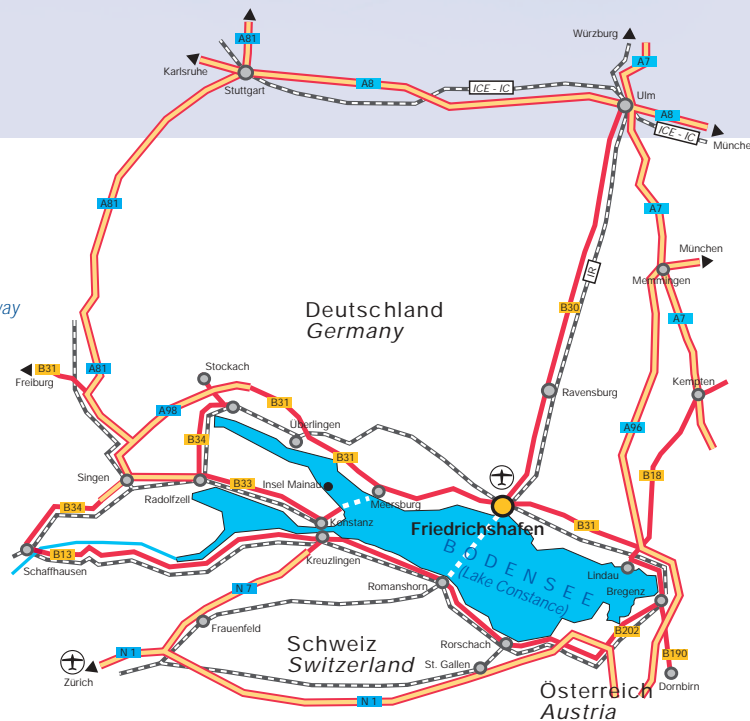
- > Direktflüge von zahlreichen EuroCross Destinationen via Basel nach Friedrichshafen.

Auskünfte über nicht aufgeführte Flugverbindungen erhalten Sie in Ihrem Reisebüro am Heimatort. Als Alternative zum Flughafen Friedrichshafen steht der Flughafen Zürich (Schweiz) zur Verfügung. Vom Flughafen Zürich besteht eine Direktverbindung mit Bahn und Fähre nach Friedrichshafen.



The quickest way to Friedrichshafen

Der schnellste Weg nach Friedrichshafen



By Car

From Stuttgart:

- > A81 and A98 to the end of the motorway
- > Stockach, B31n (direction Lindau) to Friedrichshafen

From Ulm:

- > B30 via Ravensburg to Friedrichshafen

From Munich:

- > A96 direction Lindau, exit Sigmarszell/Friedrichshafen
- > B31 to Friedrichshafen

From Zürich:

- > N7 to Kreuzlingen/Konstanz
- > Car ferry to Meersburg
- > B31 to Friedrichshafen

From St. Gallen:

- > N1 to Romanshorn
- > Car ferry Friedrichshafen

From Austria:

- > via Munich
- > A96 direction Lindau
- > Exit Sigmarszell/Friedrichshafen
- > or via Arlberg/Bregenz/Lindau

By Air

Lufthansa:

- > Direct flights from Berlin Tegel, Hamburg
- > from Köln via Frankfurt
- > Hamburg via Berlin Tegel
- > via Frankfurt for international arrivals.

Crossair:

- > Direct flights from many EuroCross destinations via Basel to Friedrichshafen.

Information on air connections that have not been mentioned can be obtained from your local travel agency. As an alternative to Friedrichshafen airport there is Zurich airport (Switzerland). There is a direct connection by rail and ferry from Zurich airport to Friedrichshafen.

By Train

In Germany:

- > InterRegio or Regional express connections from Basel, Freiburg, Offenburg, Karlsruhe, Stuttgart, Ulm, Augsburg to main station Friedrichshafen

From Switzerland:

- > SBB line Basel/Lindau
- > or via Romanshorn then with the Bodensee ferry, hourly service to Friedrichshafen

From Austria:

- > via München/Ulm
- > or ÖBB line via Bregenz/Lindau to Friedrichshafen.

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Registration Form

29th European Rotorcraft Forum, 16-18 September 2003, Graf-Zeppelin-Haus Friedrichshafen, Germany

NAME _____ **FIRST NAME(s)** _____

TITLE _____ **TELEPHONE** _____ **FAX** _____

COMPANY / ORGANIZATION _____ **E-Mail:** _____

ADDRESS _____

Payment by **bank transfer** for the sum of EURO _____ to DGLR „29 ERF“ through Hypo Vereinsbank, Bonn, Germany, Account No. **3403718**, Bank-No. (**BLZ 380 200 90**). Please print the name of the participant and “29 ERF” on the transfer form.

Credit Card-payment for the sum of € _____ American Express Mastercard VISA

Card Number _____ **Expiration Date** _____

REGISTRATION FEE (please mark your fee category)	Payment Before 27 August 2003	Payment After 27 August 2003
<input type="checkbox"/> Chairmen & Speakers	590 €	630 €
<input type="checkbox"/> Members of CEAS / RHS/ AHS	630 €	680 €
<input type="checkbox"/> Non-Members	680 €	750 €
<input type="checkbox"/> Students*	250 €	280 €
<input type="checkbox"/> Accompanying Spouses	150 €	180 €

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

The registration fee includes one set of the Forum Proceedings (not for Accompanying Persons), Welcome Drinks, Refreshments, Reception, Lunch on 3 days, Forum Dinner. For **Cancellations** received up to 15 August 2003 there will be a 50% refund. If notice is received after that date there will be **no refund**.

Signature _____

Date _____

Reservation for the Social Programme requested

Please print number of Participants:

_____ **Civic Reception**

Tuesday, 16 September 2003

_____ **Forum Dinner**

Wednesday, 17 September 2003

_____ **City Sightseeing Tour**

Tuesday, 16 September 2003

_____ **“Meerburg-Mainau” Tour**

Wednesday, 17 September 2003

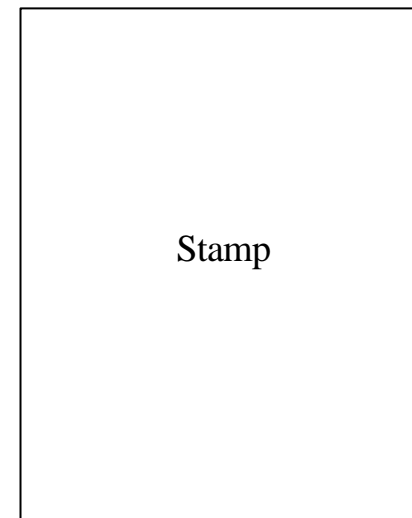
_____ **“Castle New Schwanstein”**

Thursday, 18 September 2003

_____ **Technical Tour**

Friday, 19 September 2003

Please note that the tours can only be organized if there is sufficient response. Participants are kindly asked to mark the number of attending persons for each event.



Postcard

DGLR

**Deutsche Gesellschaft für Luft- und
Raumfahrt - Lilienthal-Oberth e.V.
Godesberger Allee 70**

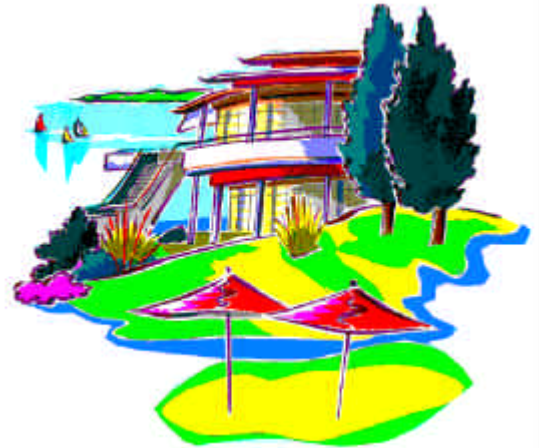
**D-53175 Bonn
Germany**

Room-Reservation

by FAX: +49 (0)7541 72588

TEL: + 49 (0) 7541 30010

29th European Rotorcraft Forum
September 16th – 18th, 2003
Friedrichshafen



Tourist Information
Inge Klein / Brigitte Glatzel
Postfach 24 60

D-88014 Friedrichshafen

Category	Room price incl. breakfast and tax	Single	Double	3 Bed
A	Bath or Shower/WC	€ 95-130	120-165	140-180
B	Shower/WC	€ 65- 95	90-120	115-140
C	Shower/WC	€ 45- 65	60- 90	90-115

_____ Single Room _____ Double Room _____ 3 Bed Room _____ Category

If the requested room-category is not available, please reserve category: _____

Hotel choice - If you prefer a specific hotel, please let us know: _____

Please, book your room in time as the room-quota is only available until 4 weeks before the event starts. After that, room requests can only be fulfilled according to daily availability.

Arrival: _____ **Departure:** _____

Full address:

If company -address, please,
give name of the company: _____

First and Surname: _____

Address: _____

Postal code and town: _____

Country: _____

Dialling code country: _____

Dialling code town: _____

Tel.: _____

Fax: _____

Creditcard No.: _____

Company: _____

Expiry date: _____

Date: _____

Signature: _____

Arrival by:

Train _____

Car _____

Plane _____

Bus _____

The Tourist-Information only acts as an agent between the guest and the accommodation facility. I accept that upon receipt of my written reservation that this is a binding agreement between guest and accommodation facility. Cancellations must be made early enough to allow the accommodation management to re-let the room, otherwise a cancellation fee will be applicable.