

ICAS 2002

23rd International Congress of Aeronautical Sciences

Final Programme



TORONTO - CANADA
8 to 13 September, 2002

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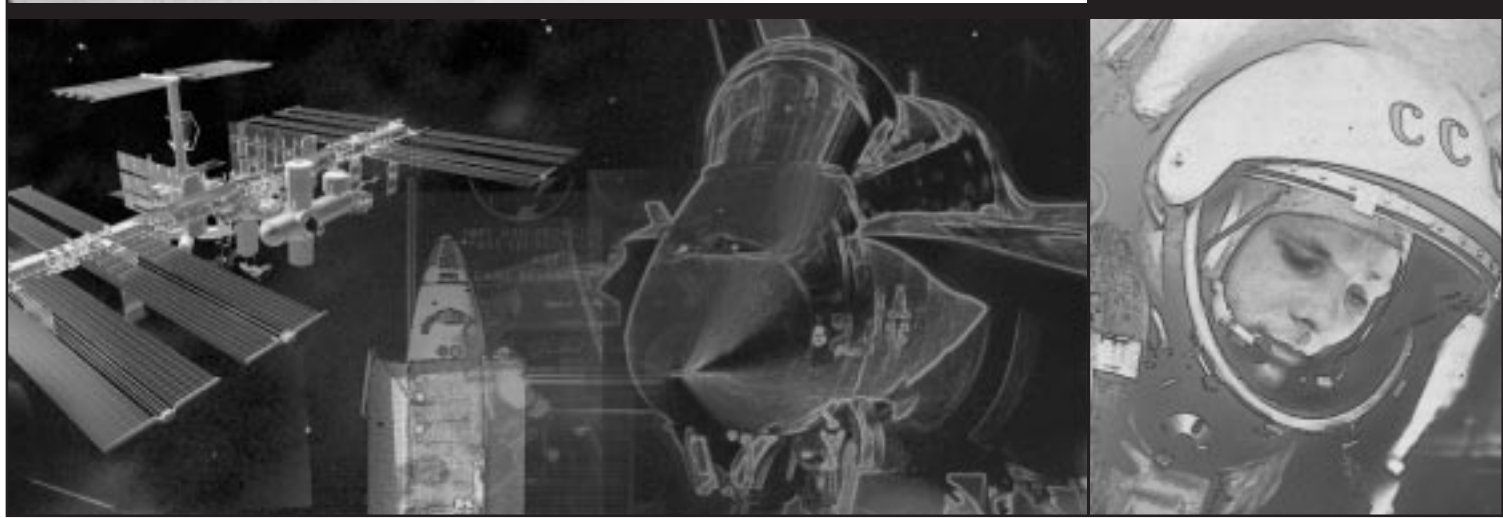
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Message from the President of the International Council of the Aeronautical Sciences

Canada hosted the 10th ICAS Congress in Ottawa in 1976 and it was with great pleasure that the International Council of the Aeronautical Sciences accepted the invitation of CASI to come again to Canada to hold its 23rd Congress in Toronto in September 2002.

At the inaugural meeting of ICAS in 1957, the vision set out by Theodore von Karman and the Founding Fathers was that the ICAS Congress should provide aeronautical scientists and engineers from all over the world with a forum in which they could meet to learn about new discoveries in aeronautical science, technology and products, exchange ideas and experiences and develop a friendly professional network free from cultural, political and ideological constraints. ICAS has served that vision well and over the years has increasingly established itself as the foremost international forum for aeronautical science and engineering. Today, special attention is being given to students and young engineers and scientists and the opportunity that the ICAS Congress provides for them to meet with colleagues from all over the world. We also must prepare for the increasingly global nature of our industry and the increasingly international nature of all aspects of aeronautical products, from research through development, production, operations, training and maintenance.

The global changes in the structure of the industry along with new priorities in R&T topic areas such as information technology, electronics, microsystems and system of systems solutions are challenges for our established scientific and engineering community. The ICAS Executive Committee and the Programme Committee are seriously watching these changes and are adjusting to today's and future requirements to support a healthy collaboration between academia, research and industry.

The Call for Papers for the 23rd Congress –for the first time web-based- attracted over 570 submissions from 32 countries. From these, the ICAS Programme Committee, chaired by Billy Fredriksson of Sweden, had the difficult task of selecting about 350 papers for presentation. The calibre of the authors and the quality of their submissions was well up to the high standards set by previous ICAS Congresses and, as is evident from the programme set out in the following pages, ICAS 2002 promises to be a highly stimulating and rewarding event.

The City of Toronto will provide a most attractive venue for the Congress and, on behalf of ICAS, I must thank the Canadian Aeronautics and Space Institute for undertaking the substantial organisational task that is entailed in hosting this event. I am personally delighted that CASI proposed Toronto for 2002. Let me extend my grateful thanks to all authors who are sharing their work and ideas with us as well as to all session chairs who are bringing in their expertise. I have no doubt that, for everyone who participates in the Congress, it will be a meeting to remember.

Wolfgang Schmidt, President of ICAS



Message from the President of CASI

It is my great pleasure to invite you to the 23rd Congress of the International Council of the Aeronautical Sciences in beautiful Toronto, Canada.

The industry worldwide has never faced a more daunting challenge than it does now as we struggle with major challenges on a wide variety of fronts, from trade to terrorism. As much as it has been deeply affected by recent economic and political events, the aerospace sector remains a potent force for growth and advancement. This 23rd Congress affords us all the opportunity to regroup and move forward.

Canada, with its vast open spaces, its deep roots in aviation, and its leading-edge capabilities in aerospace is a country well-suited to host the 2002 Congress. Toronto is the commercial capital of the country -- a bright, modern, multicultural city renowned for its warm hospitality and its cosmopolitan atmosphere. Delegates will enjoy a wide variety of technical tours and sightseeing opportunities. For accompanying persons, Toronto is a wonderful city to explore with a marvellous mix of museums, art galleries, historical and cultural points of interest, and shopping to rival any major city in the world. Just as important, Toronto has a well-deserved reputation as one of the safest, cleanest cities in North America.

We are looking forward to welcoming you to the 23rd ICAS Congress in Toronto, Canada.

Fassi Kafyeke, President of the Canadian Aeronautics and Space Institute



THE INTERNATIONAL COUNCIL OF THE AERONAUTICAL SCIENCES (ICAS)

The International Council of the Aeronautical Sciences (ICAS) is a non-government, non-profit making, scientific organization which was established in 1957 to encourage the free interchange of information on aeronautical subjects. The recognized National Associations of the World dedicated to the advancement of the science and engineering of aviation and space are eligible for membership of ICAS and full participation in its activities. ICAS today numbers 32 societies from as many countries. In addition, it is supported by aerospace companies, scientific and technical institutions acting as associates. The objective of ICAS is to organize on this international basis a worldwide forum for the discussion and international interchange of aeronautical problems and subjects, and promote international co-operation in the study of such problems in aeronautical science and technology where there is a common interest. ICAS holds an International Congress in the fields of Aeronautical Sciences on a biennial basis. The venue is chosen by the General Assembly and changes from Congress to Congress.

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OUTLINE TECHNICAL PROGRAMME

23rd ICAS Congress, 8-13 September, 2002, Toronto, Canada

Monday 9 September	From 8:00 REGISTRATION										
	08:30-9:00 OPENING SESSION										
	09:00-10:00 ICAS DANIEL & FLORENCE GUGGENHEIM MEMORIAL LECTURE : CIVIL AIRCRAFT PROPULSION : THE LAST 50 YEARS										
	10:00-10:30 BREAK										
	10:30-12:30	Multidisciplinary Design Optimization I ^{1.1}	Propellers and Rotors ^{2.1}	Structures Materials I ^{3.1}	Aeroelasticity I ^{4.1}	Flight Dynamics of Spacecraft and Missiles ^{5.1}	Integrated Product Development I ^{6.1}	Structures and Safety ^{7.1}	Student session I ^{8.1}		
	12:30-14:00 LUNCH										
	14:00-15:30	Aircraft Design ^{1.2}	Low Speed Applications I ^{2.2}	Structural Analysis Numerical Simulation ^{3.2}	Structural Dynamics I ^{4.2}	Flight Dynamics of Light Aircraft ^{5.2}	Manufacturing I ^{6.2}	Aerospace Education Systems and International Cooperation ^{7.2}	Student session II ^{8.2}		
15:30-16:00 BREAK											
16:00-18:00	Unmanned Air Vehicles ^{1.3}	High Speed Applications I ^{2.3}	Structural Integrity Damage Tolerance ^{3.3}	Structural Dynamics II ^{4.3}	Aircraft Control and Handling ^{5.3}	Manufacturing II ^{6.3}	Weather and Natural Hazards ^{7.3}	Student session III ^{8.3}			
Tuesday 10 September	8:30-9:30 GENERAL LECTURE I - AEROSPACE IN 2020 : A EUROPEAN VISION										
	9:30-10:00 BREAK										
	10:00-12:30	Multidisciplinary Design Optimization II ^{1.4}	Low Speed Applications II ^{2.4}	Structural Design Optimisation ^{3.4}	Aeroelasticity II ^{4.4}	Robust Control ^{5.4}	ISOABE II ^{6.4}	Avionic Systems I ^{7.4}	Aircraft Noise I ^{8.4}		
	12:30-14:30 LUNCH - JOHN GREEN LECTURE - CFD IN CANADIAN AEROSPACE										
	14:30-16:00	Unconventional Aircraft ^{1.5}	High Speed Applications II ^{2.5}			Flight Dynamics of Small Vehicles ^{5.5}	Management of R & D ^{6.5}	Safety - Flight Control Systems ^{7.5}	Aircraft Noise II ^{8.5}		
	16:00-16:30 BREAK										
16:30-18:30	Supersonic and Military Aircraft ^{1.6}	CFD for Complex Flows ^{2.6}	Flow Mechanisms ^{3.6}	Aeroelasticity III ^{4.6}	Flight Dynamics of UAV's ^{5.6}	Aircraft Component Design ^{6.6}	Safety - Human Factors ^{7.6}	Structures & Materials II ^{8.6}			

OUTLINE TECHNICAL PROGRAMME

23rd ICAS Congress, 8-13 September, 2002, Toronto, Canada

Wednesday 11 September	8:30-9:30 GENERAL LECTURE I I - DEVELOPMENT AND APPLICATION OF TECHNOLOGY FOR THE SONIC CRUISER										
	09:30-10:00 BREAK										
	10:00-12:30	CFD Algorithms I ^{1.7}	Unsteady Application ^{2.7}	Wind Tunnel Testing and Experimental Technique ^{3.7}	ISOABE I ^{4.7}	Flight Control ^{5.7}	System Testing ^{6.7}	Development in ATM ^{7.7}	Works in Supersonic Transports ^{8.7}		
	12:30-14:00 LUNCH										
	14:00-15:30	High Speed Aerodynamic Analysis ^{1.8}	Flow Instabilities ^{2.8}	Configuration Testing I ^{3.8}	Hybrid Materials ^{4.8}	Combustion ^{5.8}	Avionic Systems II ^{6.8}	Safety as a Global Issue ^{7.8}	Student session IV ^{8.8}		
	15:30-16:00 BREAK										
16:00-18:00	CFD Algorithms II ^{1.9}	Design Applications and Acoustics ^{2.9}	Flow Control ^{3.9}	Structures and Materials III ^{4.9}	Engine Modeling and Optimization ^{5.9}	Integrated Product Development II ^{6.9}	Wake Vortex ^{7.9}	SAE Session I ^{8.9}			
Thursday 12 September	8:30-9:30 GENERAL LECTURE III - MARKET DRIVERS AND INNOVATION BEHIND THE AIRBUS PRODUCTS										
	9:30-10:00 BREAK										
	10:00-12:30	CFD for Design ^{1.10}	Flow Control by Boundary Layer ^{2.10}	Configuration Testing II ^{3.10}		Inlets, Propellers and Compressor CFD ^{4.10}	System Design I ^{5.10}	Mission Management Issues ^{6.10}	Student Finalists ^{7.10}		
	12:30-14:00 LUNCH										
	14:00-15:30	CFD Validation ^{1.11}	Other Aerodynamic Methods ^{2.11}	Unsteady Aerodynamics ^{3.11}	HISTORY ^{4.11}	Turbines ^{5.11}		Aircraft Emission ^{7.11}	SAE Session II ^{8.11}		
	16:00-16:30 BREAK										
	16:00-17:00 VON KARMAN LECTURE										
17:00-17:30 CLOSING CEREMONY											
Friday 13 September	TECHNICAL VISITS										

Monday, 9 September

8:30 - 9:00

Opening Ceremony and Welcoming Addresses

F. KAFYEKE - President of CASI • W. SCHMIDT - President of ICAS
A. CARTY - President of NRC • T. BRZUSTOWSKI - President of NSERC

9:00 - 10:00

ICAS Daniel and Florence Guggenheim Memorial Lecture

Chairman : W. SCHMIDT - President of ICAS

ICAS 2002-0.1

Civil Aircraft Propulsion : The last 50 years

Pr. H.I.H. SARAVANAMUTTOO, Carleton University, CA

Monday 10:30 - 12:30

Session 1.1 Multidisciplinary Design Optimization I

Chairmen :
V. BALABANOV, VRD Inc., US
C. AUMASSON, ONERA, FR

ICAS 2002-1.1.1 A Probabilistic Methodology for the Treatment of System-of-System Problems and Application to Future Aviation Transportation Architectures

D. DELAURENTIS, H. PFAENDER, D. MAVRIS,
D. SCHRAGE, Georgia Institute of Technology, US

ICAS 2002-1.1.2 Evaluation and Implementation of Multidisciplinary Design Optimization (MDO) Strategies

G. RENAUD, G. SHI, IAR/NRC, CA

ICAS 2002-1.1.3 Evaluation of Three Decomposition MDO Methods

S. CHEN, F. ZHANG, M. KHALID,
IAR/NRC, CA

ICAS 2002-1.1.4 Conceptual Aircraft Design - A Genetic Search and Optimization Approach

N. ALI, Ryerson University, CA

Session 2.1 - Propellers and Rotors

Chairmen :
E. SAMPATACOS, BOEING, US
A. NUGROHO, IAS, IN

ICAS 2002-2.1.1 CFD Analysis of Low Speed And Cruise APIAN Configuration Powered by High Speed Propellers

M. AMATO, CIRA, IT
M.A. AVERARDO, Alenia, IT

ICAS 2002-2.1.2 Computational Simulation of Propellers in Cruise

E.A. ROMANDER, NASA ARC, US

ICAS 2002-2.1.3 Rotorcraft Aerodynamic and Aero-acoustic Modeling using Vortex Particle Methods

D.G. OPOKU, F. NITZSCHE, Carleton University, CA, D.G. TRIANTOS,
S.G. VOUSINAS, National Technical University of Athens, GE

ICAS 2002-2.1.4 A Rapid Numerical Method for 3D Aerodynamics Design of a Compressor Stage

N. CHEN, W. HUANG, Z. ZHANG, CAS, CN

Session 3.1 - Structures Materials I

Chairmen :
S.V. HOAS, Concordia Univ., CA
R. BUETJE, EADS, DE

ICAS 2002-3.1.1 Geometrically Linear/Nonlinear Sandwich Structures with Anisotropic Face Sheets : Foundation of the Theory and Behavior

L. LIBRESCU, Virginia Polytechnic Institute and State University, US

ICAS 2002-3.1.2 Failure Prediction of Stringer Stiffened Composite Panels with Impact Damage under Axial Compression

P.T. CURTIS, DSTL, UK, C. SOUTIS, Y. ZHUK,
I. GUZ, Imperial College of Science, UK

ICAS 2002-3.1.3 A Linear 3-D Finite Element Unit Cell Model for Fibre Waviness in Composite Materials

A.J. GUNNION, M.L. SCOTT, RMIT, AU
R.S. THOMSON, Cooperative Research Centre fo Advanced Composite Structures Ltd., AU, D. HACHENBERG, Airbus Deutschland GmbH, DE

ICAS 2002-3.1.4 Load Response and Failure of Thick RTM Composite Lugs

M. WALLIN, O. SAARELA, Helsinki Univ. of Technology, FI, F. PENTO, Patria Finavicom, FI

Session 4.1 - Aeroelasticity I

Chairmen :
A.LINDELL, Manager Loads and Dynamics, CA
B.WINZELL, FOI, SE

ICAS 2002-4.1.1 Numerical Simulation of Active Control of Transonic Flutter

C.B. ALLEN, University of Bristol, UK

ICAS 2002-4.1.2 Stability Analysis in the Time-Domain Applied to Adaptive Transport-Aircraft Wings

W. SEND, DLR, DE

ICAS 2002-4.1.3 Nonlinear Aeroelastic Signal Analysis of an Airfoil-Aileron Combination

H. ALIGHANBARI, Ryerson University, CA

ICAS 2002-4.1.4 On the Nonlinear Dynamics Approach of Modeling the Bifurcation for Transonic Limit Cycle Flutter

H. MATSUSHITA, T. MIYATA, L.E. CHRISTIANSEN, T. LEHN-SCHIOLER, Fukui University, JP

Session 5.1 Flight Dynamics of Spacecraft and Missiles

Chairmen :
B.DAVIS, MATRA Bae, UK
P. SACHER, ASTRIUM, DE

ICAS 2002-5.1.1 (I.L.) The Effect of Aircraft Biases on the Delivery of an Enhanced Laser Guided Weapon

J. RALPH, University of Liverpool, UK
K.L. EDWARDS, QinetiQ Ltd, UK

ICAS 2002-5.1.2 3D-Simulation of Nonlinear Dynamics for a Reentry Vehicle

N. GOTO, T. KAWAKITA, Kyushu Univ., JP

ICAS 2002-5.1.3 (St.)
Ascent Trajectory Optimization of Space Plane Using Genetic Algorithm Combined with Gradient Method
N. YOKOYAMA, University of Tokyo, JP

ICAS 2002-5.1.4 Design of Missile's Guidance System Based on Combination of Optimal Preset and a Transcription of Functional Guidance

M.R. JAHED-MOTLAGH, University of Sciences and Technology, IR

Session 6.1 Integrated Product Development I

Chairman :
G. HOLMBERG, SAAB, SE

ICAS 2002-6.1.1 (I.L.)
Joint Strike Fighter (JSF) Development Focusing on Reduced Lifecycle Costs
M.L. FORTSON, Lockheed Martin Aeronautics Company, US

ICAS 2002-6.1.2 A Framework for Achieving Lifecycle Value in Aerospace Product Development

A. STANKE, E. MURMAN, MIT, US

Session 1.2 Aircraft Design

Chairmen :
R.E. MCKINLEY, NASA LRC, US
U. EDLUND, SAAB, SE

ICAS 2002-1.2.1 Preliminary Design Phase 928JET - Keeping the 728JET Family Commonality

J. HENKNER, Fairchild Dornier GmbH, DE

ICAS 2002-1.2.2 Development and Integration of a New High Performance Wingtip Device for Transonic Transport Aircraft

G. HELLER, Fairchild Dornier GmbH, DE

ICAS 2002-1.2.3 Wing Shape Optimization using a Constraint NURBS Surface Geometrical Representation

J.Y. TREPANIER, CERCA, CA

Session 2.2 Low Speed Applications I

Chairman :
R. KIND

ICAS 2002-2.2.1 Numerical Prediction of the Airfoil Ice Accretion Growth

T. WAN, Tamkang University, TW

ICAS 2002-6.1.3 (St.)
A Systems Approach to Mission Capability Analysis of Air Ambulance Helicopters
M. KUSUMO, A.K. SINHA, RMIT, AU

ICAS 2002-6.1.4 Process Modeling and Reengineering on Aircraft Product Lifecycle

D. CUI, China Aviation Institute Corp., CN
L. ZHANG, Beijing Univ. of Astro & Aero, CN
M. LIU, Shenyang Aircraft Research Inst., CN

Session 7.1 Structures & Safety

Chairman :
J.E. MOON, QinetiQ, UK

ICAS 2002-7.1.1
Assessment of Explicit F.E. Capabilities for Full Scale Coupled Fluid/Structure Aircraft Ditching Simulations
R. ORTIZ, G. PORTEMONT, J.L. CHARLES,
J.F. SOBRY, ONERA, FR

ICAS 2002-7.1.2 Reliability Based Calendric Inspection Schedule for Aircraft Structures with Corrosion Fatigue

W. BINTUAN, S. ITO, NAL, JP

Monday 14:00 - 15:30

ICAS 2002-2.2.2
Numerical Study of Reynolds number Effects on the Aerodynamics of the Deltawing with Rounded Leading Edge
K. KAARLONEN, S.LAINE, E. SALMINEN,
T. SIIKONEN, Helsinki Univ. Of Tech., FI

ICAS 2002-2.2.3 (St.) Numerical Predictions of Wing-Tip Effects on Lift-Induced Drag

P. BOURDIN, ONERA, FR

Session 3.2 Structural Analysis Numerical Simulation

Chairmen :
S. PAIPETIS, Univ. of Patras, GE
Y. XIONG, GE GRD, US

ICAS 2002-3.2.1
Efficient Non-linear Modeling of Fuselage Panels
M. PRICE, A. GIBSON, C.G. AMSTRONG,
Queen's University Belfast, UK

ICAS 2002-3.2.2
Nonlinear Buckling Predictions of Curved Panels Under Combined Compression and Shear Loading
M. DOMB, Bombardier Aerospace, CA

ICAS 2002-3.2.3
Analytical Approach to Composite Beam Analysis
O. RAND, Technion - Israel Institute of Technology, IL

ICAS 2002-7.1.3
Securing of the Safety and Economy of Acrobatic Airplane Service
Z. MALER, Moravan a.s., CZ

Session 8.1 Student Session I

Chairman :
S. LAINE, IST, FI

ICAS 2002-8.1.1 (St.)
The Investigation of Multi-disciplinary and Multi-objective Optimization Method for the Aircraft Configuration Design
X. LU, CN, G. ZHENGHONG, Northwestern Polytechnical University, CN

ICAS 2002-8.1.2
Hybrid Two-level Genetic Optimization Algorithm with different fidelity Models for Aerodynamic Design Problems
V. CHERNYSHEV, RU

ICAS 2002-8.1.3 (St.)
Simulation of Turbulent Airfoil Flow
A. EKMEDZIC, University of Belgrade, YU

ICAS 2002-8.1.4 (St.)
Optimization of Flapping Wing Motion
K. ITO, University of Tokyo, JP

Session 4.2 Structural Dynamics I

Chairmen :
J.J. MEIJER, NLR, NL
J. SCHWEIGER, EADS, DE

ICAS 2002-4.2.1
Free Flexural Vibration of Rectangular Plates Having Single Cracks
S.D. YU, Ryerson University, CA

ICAS 2002-4.2.2
Limit Cycle Oscillations of an Airfoil with Piece-Wise Continuous Restoring Forces
Ben H.K. LEE, NRC, CA

ICAS 2002-4.2.3 (St.)
Application of Aeroelastic Tailoring to Arrow Wing Configuration
H. ARIZONO, Kyushu University, JP

Session 5.2 Flight Dynamics of Light Aircraft

Chairmen :
F. THOMAS, DLR, DE
P. WADDICK, Cirrus Design Corp., US

ICAS 2002-5.2.1
Three Surfaces Aircraft Model Flying Qualities Comparison: Flight Tests and Numerical Results
D.P. COIRO, A. DE MARCO, N. GENITO,
Universita Federico II, IT

ICAS 2002-5.2.2
A Low Cost Flight test Instrumentation Package for Light Airplanes
B. EGGLESTON, W.D. McKINNEY, N.C.
CHOI, Found Aircraft Canada, CA

ICAS 2002-5.2.3
Theoretical Experimental and In-Flight Spin Investigations for an Executive Light Airplane
Z. GORAJ, A. BARON, Institute of Aviation, PL

Session 6.2 - Manufacturing I

Chairman :
K. FOWLER, BAe Dynamics, UK

ICAS 2002-6.2.1 (I.L.)
Some Manufacturing Activities in Japanese Aeronautical Industries
Y. Y. SUGIMURA, Japan Aircraft Development Corporation, JP

ICAS 2002-6.2.2 (St.)
Deign of Assembly Operations for the Defense Aerospace Industry
A. VAUGHN, J.T. SHIELDS, MIT, US

ICAS 2002-6.2.3
Cost and Cycles Reduction Based on

Material Process Simulation
D. DELOISON, D. GUEDRA-DEGEORGES,
A. ABISROR, G. MARIN, EADS CRC, FR

Session 7.2 **Aerospace Education Systems and International Cooperation**

Chairmen :
M. ONORATO, Politecnico di Torino, IT
L. BALTHAZOR, Univ. of Portsmouth Busing School, UK

ICAS 2002-7.2.1 (I.L.)
The Way of Harmonization and Cooperation in Aerospace Education
B. LASCHKA, T.U. MUNCHEN, DE

ICAS 2002-7.2.2 (I.L.)
The Contribution of University to the Aerospace Research and Technologies
E. VALLERANI, P. SANTINI, Univ. La Sapienza, IT

ICAS 2002-7.2.3 (I.L.)
The Global Role of the US-Top Universities for the Provision of the Human Resources in Engineering Science to the Aerospace Community
B. LUSIGNAN, Center for International Cooperation in Space, US

Session 8.2 **Student Session II**

Chairman :
I. POLL, Cranfield Univ. UK

ICAS 2002-8.2.1 (St)
A Semi-Analytical Numerical Method of Determining Stress Intensity Factors for Multiple Sites Damage Structure
L. WU, China Aviation Society, CN

ICAS 2002-8.2.2 (St)
Hypothesis on the Enhancing of the Probability of Survival of Space and Transatmospheric Vehicles in Space Debris and Micrometeoroids Contaminated Environment
G. SEMBENINI, Turin Polytechnic University, IT

ICAS 2002-8.2.3 (St)
Experimental Study of the Structure and Development of a Wingtip Vortex in the Near-Field
C. WRIGHT, Utah State University, USA

ICAS 2002-8.2.4 (St)
Wave Development on Thin Layers of Anti-Icing Fluid
J.E. DILLINGH, Twente University, NL

Monday 16:00 - 18:00

Session 1.3 **Unmanned Air Vehicles**

Chairmen :
Mac SINCLAIR, MS Aero, CA
P. HORST, TU Braunschweig, DE

ICAS 2002-1.3.1
Advanced Technologies for Next Generation UAV's
S. TSACH, IAI, IL

ICAS 2002-1.3.2
A System Approach to the Design of Multi-Mission Airframe for Unmanned Air Vehicle Systems
A.K. SINHA, R. KUSUMO, RMIT, AU

ICAS 2002-1.3.3
"HELIPLAT®: Structural Analysis of High Altitude Very-Long Endurance Solar Powered Platform for Telecommunication and Earth Observation Applications
G. ROMEO, G. FRULLA, Turin Polytechnic University, IT

ICAS 2002-1.3.4
Designing and Development of Unmanned Aerial Vehicle
M. ASIM, ABID, Pakistan Air Force, PK

Session 2.3 **High Speed Applications I**

Chairmen :
D. BALL, BOEING, US
C. WEILAND, ASTRIUM, DE

ICAS 2002-2.3.1 (St.)
Efficient Wing Design for Complex AIRCRAFT Configuration Using CAD Unstructured CFD and Inverse Problems
T. FUJITA, Tohoku University, JP

ICAS 2002-2.3.2
Numerical Optimization of the Wing of a Supersonic Airplane
S. TAKOVITSKY, TsAGI, RU

ICAS 2002-2.3.3
Computation Investigation in Reusable Space Transport Systems at Supersonic Speed
A. HENZE, RWTH-Aachen, DE

ICAS 2002-2.3.4
LVX - An Integrated Aerodynamic Design and Analysis Method
M. MENDENHALL, M.C. HEGEDUS, Nielsen Engineering & Research, US

Session 3.3 **Structural Integrity Damage Tolerance**

Chairmen :
G.N. ZAMULA, TsAGI, RU
P. HORST, TU Braunschweig, DE

ICAS 2002-3.3.1
Service Life of Airplane Structures
G. NESTERENKO, TsAGI, RU

ICAS 2002-3.3.2
Modeling of Full-Scale Aircraft Structural Tests
R.L. HEWITT, NRC, CA

ICAS 2002-3.3.3 (St.)
Analytically - Experimental Study of Damage Tolerance of Aircraft Structures
B.I. NESTERENKO, Moscow Institute of Physics & Technology, RU

ICAS 2002-3.3.4
Fatigue Life Evaluation of Critical Locations in Aircraft Structures Using Virtual Fatigue Test
J. TIKKA, Patria Finavitec Oy, FI

Session 4.3 **Structural Dynamics II**

Chairmen :
B. WINZELL, FOI, SE
O. SENSBURG, DE

ICAS 2002-4.3.1
Effects of Preswitt and presetting Angles on Free Vibration of Elastically Tailored Rotating Blades Modeled as Thin Walled Beams
L. LIBRESCU, Virginia Polytechnic Institute, US

ICAS 2002-4.3.2
Review and Outlook on Active and Passive Aeroelastic Design Concepts for Future Aircraft
J. SCHWEIGER, J. COOPER, EADS, DE

ICAS 2002-4.3.3
"Smart Spring" Concept for Helicopter Vibration and Noise Control
D. ZIMCIK, C. YONG,
V. WICKRAMASINGHE, NRC, CA

ICAS 2002-4.3.4
Transonic Static Aeroelastic Simulations of Fighter Aircraft
J.J. MEIJER, NLR, NL

Session 5.3 **Aircraft Control and Handling**

Chairmen :
C. FIELDING, BAe Systems, UK
Z. CHEN, Beijing Univ., CN

ICAS 2002-5.3.1
Feedback Stabilized Bifurcation Tailoring Applied to Aircraft Models
G. CHARLES, M.H. LOWENBERG, X.F. WANG, D.P. STOTEN, Univ. of Bristol, UK

ICAS 2002-5.3.2
Aerodynamic and Flight Dynamic Real-Time Analysis during Spin and Carefree Maneuvering Tests of the Saab JAS39 Gripen
M. STAAF, SAAB Aerospace, SE

ICAS 2002-5.3.3
Development of a Handling Qualities Evaluation Toolbox on The Basis of Gibson's Criteria
H. HENDARKO, Institute of Technology of Bandung, ID

ICAS 2002-5.3.4
High AOA Approach and Landing Control Low Design for the X-31 A-Vector Project
A. KNOLL, EADS Military, DE

Session 6.3 **Manufacturing II**

Chairmen :
T. CAROLAN, BOEING, US
O. MASEFIELD, Eclipse Aviation, US

ICAS 2002-6.3.1
Development and Testing of Friction Stir Welding (FSW) as a Joining Method for Primary Aircraft Structure
B. CHRISTNER, Eclipse Aviation, US

ICAS 2002-6.3.2
Creep Forming of AlMgSc Alloys for Aeronautic and Space Applications
S. JAMBU, B. LENCZOWSKI, R. RAUH, EADS CRC, DE
K. JUHL, Airbus Germany GmbH, DE

ICAS 2002-6.3.3
A Unique Spray Forming Process for High Temperature Materials for Aerospace Applications
G. ZHANG, Z. LI, S. TIAN, M. YAN, Beijing Institute of Aeronautical Materials, CN

ICAS 2002-6.3.4
New Approaches in Textile and Impregnation Technologies for the Cost Effective Manufacturing CFRP Aerospace Components
A. GESSLER, J. FILSINGER, EADS, DE

Session 7.3 **Weather and Natural Hazards**

Chairmen :
P. LAROCHE, ONERA, FR
R. GENT, QinetiQ, UK

ICAS 2002-7.3.1
Recent Development in Scaling Methods for Icing Wind Tunnel Testing at Reduced Scale
R.J. KIND, Carleton University, CA
M.M. OLESKIW, NRC, CA

ICAS 2002-7.3.2
Coping with Wake Vortex
K.U. HAHN, DLR, DE

ICAS 2002-7.3.3
On Ice Blockage of Vent Tubes in the Wing Fuel Tanks of the Epsilon Aircraft
J.M. MELO DE SOUSA, Instituto Superior Tecnico, PT - O.D.C.S. FERREIRA, B.M.M. FUNDANGA, Academia da Força Aera, PT

ICAS 2002-7.3.4
Wind Tunnel Simulation of Ice Accretion on Tail Unit
Z. PATEK, Aeronautical and Research Institute, CZ - M. HOLL, VZLU, CZ

Session 8.3 **Student Session III**

Chairman :
LMBC CAMPOS, SP

ICAS 2002-8.3.1 (St)
Re-Entry Motion of an Axialsymmetric Vehicle and its Analysis with Tridimensional Animations
A. GUIDI, University of Naples "Federico II", IT

ICAS 2002-8.3.2 (St)
Captive Carry Testing as a Means for Rapid Evaluation of UAV Handling Qualities
C. MUNRO, P. KRUS, Linköping University, SE
E. LLEWELLYN, University of Bristol, UK

ICAS 2002-8.3.3 (St)
Small Leading Edge Flap for Post Stall Flow Control on a 45 deg Delta Wing
T. MATSUNO, S. YOKOUCHI, Y. NAKAMURA, Nagoya University, JP

ICAS 2002-8.3.4 (St)
Thermodynamic Design of an Alternative Monopropellant for Emergency Power Units
S. MATSUMURA, J.J. RUSEK, Purdue Univ., US

ICAS 2002-8.3.5 (St.)
Laser Virometry Based Detection of Delaminations in Aerospace Composites
Y. AMRAOUI, N. LIEVEN, Univ.of Bristol, UK

Tuesday, 10 September

8:30 - 9:30 **General Lecture I**

Chairman : J. HEFNER - NASA, US

ICAS 2002-0.2 **Aerospace in 2020 : European Vision**

H. VON BOSE, European Commission, BE

Tuesday 10:00 - 12:30

Session 1.4 **Multidisciplinary Design Optimization II**

Chairmen :
J. GIESING, BOEING, US
G. DIRKS, AIRBUS, DE

ICAS 2002-1.4.1
A New Effective Multidisciplinary Design Optimization Algorithm
W. LI, Northwestern Polytechnical University, CN

ICAS 2002-1.4.2
Multidisciplinary Optimization of Aerospace Vehicles Parameters by the Local Distributed Criteria Method
A. FILATYEV, A.A. GOLIKOV, A.P. KOSYKH, G.G. NERSESOV, TsAGI, RU

ICAS 2002-1.4.3
With Public Domain Software to Integrated Design and Analysis Tools
M.C. HAUPT, W. HEINZE, P. HORST, Technical University Braunschweig, DE

ICAS 2002-1.4.4
UAV Conceptual Design Optimization with a Computer Bases Sealing Tool
F. SCHIECK, TU of München, DE
N. DELIGIANNIDIS, T. GOTTMANN, J. VAN TOOR, EADS Military Aircraft, DE

ICAS 2002-1.4.5
A Configurable Framework for Multidisciplinary Analysis Integration and Management
J.Y. TREPANIER, CERCA, CA

Session 2.4
Low Speed Applications II

Chairmen :
K. NAKAHASHI, Tohoku Univ. JP
C. WEISHAUPL, TU Munchen, DE

ICAS 2002-2.4.1
An Overview of the RTO Symposium on Vortex Flow and High Angle of Attack Aerodynamics
J.M. LUCKRING, NASA LRC, US

ICAS 2002-2.4.2
Investigation of High-Lift, Mild-Stall Wings
F. KONG, J. HUA, J.W. XIANG, Beijing University of Aero. & Astro., CN

ICAS 2002-2.4.3
X-31A VECTOR High Angle of Attack Descent Euler and Navier Stokes Simulations of an Unsteady Manoeuvre
S.M. HITZEL, E. WEIDE, U. TREMEL, H. RIEGER, EADS Military Aircraft, DE

ICAS 2002-2.4.4
Validation of CIRA Flow Solver ZEN for SCT Low-Sped High-Lift Computations
V. BRANDI, M. AMATO, P. CATALANO, CIRA, IT

ICAS 2002-2.4.5
Inverse Design of High Lift Systems
D. JONES, I. FEJTEK, Bombardier Aeros., CA

Session 3.4
Structural Design Optimisation

Chairmen :
V. GIAVOTTO, Politecnico di Milano, IT
T. AOKI, University of Tokyo, JP

ICAS 2002-3.4.1 (I.L.)
Design Rules for a CFRP Outer Wing
H. WILMES, DLR, DE

ICAS 2002-3.4.2
Optimal Design of Fuselage Structures
G. ELLIOTT, L.J.J. KOK, Bombardier Aeros., CA

ICAS 2002-3.4.3
The CFRP Sandwich Panel for Aircraft Nose Structure
Y. HIROSE, , K. KOSUGI, M. NISHITANI, H. SASHIKUMA, Kawasaki Heavy Indus., LTD., JP

ICAS 2002-3.4.4
Multilevel Optimization of Aerospace and Lightweight Structures
M. FISCHER, D. KENNEDY, C.A. FEATHERSTON, Cardiff University, UK

ICAS 2002-3.4.5
Service Life of a Titanium Main Wing Box for Second Generation Supersonic Commercial Transport
T.S. RODEHENKO, K.S. SCHERBAN, TsAGI, RU

Session 4.4 - Aeroelasticity II

Chairmen :
J. OLSON
K. ISOGAI, Kyushu, Univ. JP

ICAS 2002-4.4.1 (I.L.)
Aileron Flutter Calculation for a Supersonic Fuselage-Wing Configuration
G. YANG, S. OBAYASHI, Tohoku Univ., JP
J. NAKAMICHI, NAL, JP

ICAS 2002-4.4.2
Aeroservoelastic Robust Model Development from Flight Data
M.J. BRENNER, NASA Dryden Flight Research Center, US

ICAS 2002-4.4.3
An Expert Data Mining System for Flutter Boundary Prediction
Y.S. WONG, O. VOITCU, C.A. POPESCU, University of Alberta, CA

ICAS 2002-4.4.4
Supersonic Flutter and Post-Flutter Active Control of Cross-Sectional Aircraft Wing
P. MARZOCCA, Virginia Polytechnic Institute and State University, US

ICAS 2002-4.4.5
Investigation of Shock-Induced LCO of a Wing/Store Configuration Using the Transonic Small Disturbance Method
F. EASTEP, N.S. KHOT, PS. BERAN, J.V. ZWEBER, AFRL/VASD, US

Session 5.4
Robust Control

Chairmen :
J.P. SUZUKI, University of Tokyo, JP
J.P. JUNG, ONERA, FR

ICAS 2002-5.4.1 (I.L.)
Linear Parameter Varying Control and its Application to Aerospace Systems
G. BALAS, University of Minnesota, US

ICAS 2002-5.4.2
Robustification of an H2 Autopilot for Flexible Aircraft by Self-Scheduling Based on Multi-model Eigenstructure Assignment
C. DÖLL, SUPAERO/ONERA, FR
S. CHABLE, C. CHIAPPA, SUPAERO, FR

ICAS 2002-5.4.3
Robust Flight Control : A Real Time Simulation Investigation
D. HARMAN, H.H.T. LIU, University of Toronto, CA

ICAS 2002-5.4.4
Design of Stabilizing and Locally-Robust Nonlinear Controllers for a Class of Nonlinear Systems
A. SARAF, University of California, US

ICAS 2002-5.4.5
Lateral Flight Control Design Using Optimal H_∞ Controllers
A. STOICA, University "Politehnica" of Bucharest, RO

Session 6.4

ISOABE II

Chairmen :
K. BROICHAUSEN
J. SWIHART

ICAS 2002-6.4.1 (I.L.)
Ultra Efficient Engine Technology Program
R. SHAW, NASA, US

ICAS 2002-6.4.2 (I.L.)
Program Overview and Intermediate Achievements of ESPR Project
Y. FUJITSUNA, ESPR, JP

ICAS 2002-6.4.3 (I.L.)
Air Intakes : Role, Constraints and Design
G. LARUELLE, EADS LV, FR

ICAS 2002-6.4.4 (I.L.)
Modeling of Nox Formation in Gas Turbine Combustors
N. RIZK, ROLLS ROYCE, US

ICAS 2002-6.4.5 (I.L.)
T.B.D
W. SMITH, PRATT & WITHNEY, US

Session 7.4
Avionic Systems I

Chairmen :
F. ABBINK, NL
S. LEVEDAG, DLR, DE

ICAS 2002-7.4.1 (I.L.)
A Fast and Precision Initial Alignment Method for Strapdown Inertial Navigation System on Stationary Base
X. WANG, G. SHEN, Beijing University of Aeronautics & Astronautics, CN

ICAS 2002-7.4.2
Fast Calibration Technique for a Gimbaled Inertial Navigation System
Y.J. SHIN, J.H. PARK, Agency for Defense Development, KR - C.J. KIM, Korea Aerospace Research Institute, KR

ICAS 2002-7.4.3
Non Linear Structures for Stabilization and Precession Axis Coupling of the Orientation and Stabilization Gyrosystems
R. LUNGU, University of Craiova, RO

ICAS 2002-7.4.4
Simulation of Terrain Reference Navigation System Based on Image Matching from Digital Video Camera
M. ZASUMA, Warsaw University of Technology, PL

ICAS 2002-7.4.5
Low Cost 3D Display System for Small Aircraft
S. SPERL, TU München, DE

Session 8.4
Aircraft Noise I

Chairmen :
M. GRUENEWALD, EADS CRC, DE
C.A. POWELL, NASA LRC, US

ICAS 2002-8.4.1 (I.L.)
Flow and Noise Control: Toward a Closer Linkage
R.H. THOMAS, M.M. CHOUDHARI, NASA LRC, US
R.D. JOSLIN, Office of Naval Research, US

ICAS 2002-8.4.2
Jet Noise Reduction Technology Development at General Electric Aircraft Engines
S. MARTENS, GE Aircraft Engines, US

ICAS 2002-8.4.3
Optimization of Acoustic Liner Design for Axysymmetric Mixer-Ejector Nozzles under ESPR Program
M. SALIKUDDIN, GE Aircraft Engines, US

Tuesday 12:30 - 14:30

John Green Lecture

Chairmen : W. SCHMIDT - President of ICAS
F. KAFYEKE - President of CASI

ICAS 2002-0.3
CFD in Canadian Aerospace

F. MAVRIPLIS, Bombardier Inc., CA

Tuesday 14:30 - 16:00

Session 1.5
Unconventional Aircraft

Chairmen :
I. KROO, Stanford Univ., US
J. THORBECK, TU Berlin, DE

ICAS 2002-1.5.1
Does the Air Transport Market Need "Unconventional Aircraft Configurations" ?
D. SCHMITT, A. STROHMAYER, TU of München, DE

ICAS 2002-1.5.2
The Dolphin : A New 100 Seat Aircraft in Lifting-Fuselage Layout
A. BOLSUNOVSKY, TsAGI, RU
S.I. BOGDANOV, S.G. DZHANGAROV, A.M. KARKLIN, IRKUT-AviaSTEP, RU

ICAS 2002-1.5.3
Design Method for Blended-Body Concept of Regional Transport
T.E. PAMBAGJO, K. NAKAHASHI, K. MATSUSHIMA, Tohoku University, JP

Session 2.5
High Speed Applications II

Chairmen :
QIAO, Northwestern Polytechnical Univ., CN
A. JAMESON, Stanford Univ., US

ICAS 2002-2.5.1
A CFD Approach Towards Modeling Unsteady flows Past Airfoils
M. MAMOU, M. KHALID, NRC, CA

ICAS 2002-2.5.2
Recent Examples on Design Aerodynamics for Transport Aircraft
J. HUA, F.M. KONG, J.J. WANG, H. ZHAN, CSAA, CN

ICAS 2002-2.5.3
Advanced Numerical Simulations on

Structured Grids for Transport Aircraft, Using an Efficient Object Oriented Solver
L. BARRERA, Ch. BENOIT, M.-C. LE PAPE, R. HOUEVILLE, EADS Airbus, FR

Session 5.5
Flight Dynamics of Small Vehicles

Chairmen :
N. CHOKANI, North Carolina Univ. US
J. DE LAURIER, Univ. Of Toronto, CA

ICAS 2002-5.5.1 (I.L.)
Flight Dynamics of Small Vehicles
C.M. HO, H. NASSEF, C.M. HO, University of California Los Angeles, US
Y.C. TAI, California Inst. of Technology, US

ICAS 2002-5.5.2
Modeling of the Nonlinear Dynamic Behavior of a Micro-Aerial-Vehicle (MAV) in an Environment of Turbulent Atmosphere
T. KORDES, Technical University of Braunschweig, DE - M. BUSCHMANN, P. VÖRSMANN, Inst. of Aerospace Systems, DE

ICAS 2002-5.5.3
A Study of Flight Dynamics and Automatic Control of Enthomopters
K. SIBILSKI, Air Force Institute of Technology, PL
J. PIETRUCHA, M. ZLOCKA, Warsaw University of Technology, PL

Session 6.5
Management of R & D

Chairmen :
D. WILLIAMS, QinetiQ, UK
R. SPITZER, NASA LRC, US

ICAS 2002-6.5.1 (I.L.)
The EADS Corporate Research Center - New Dimension for the Future
D. MUELLER-WIESNER, J.-Y. MONDON, K. SCHYMANIETZ, J.-M. THOMAS, EADS, FR

ICAS 2002-8.4.4
On the Effect of Non-Uniform Wall Impedance on the Acoustics of Nozzles
L.M.B.C. CAMPOS, IST, PT

ICAS 2002-8.4.5
Comparison of Two CFD-Based Methods for the Prediction of the Tone-Noise Generated by the Fan-OGV Interaction Case
D. BERGE, Snecma Moteurs, FR

ICAS 2002-6.5.2
A Modular Approach to the Aircraft product Development Capability
G. HOLMBERG, Saab AB, SE

ICAS 2002-6.5.3
Balancing Accuracy of Calculations and Probability of Assumptions in the Technology Integration
G.A. DIRKS, EADS Airbus GmbH, DE

ICAS 2002-6.5.4
Fostering Innovation Across Supplier Networks Challenges and Opportunities
K. BOZDOGAN, MIT, US

Session 7.5
Safety - Flight Control Systems

Chairmen :
HOWITT, QinetiQ, UK
A. WATANABE, NAL, JP

ICAS 2002-7.5.1
Automatic Air Collision Avoidance System
B.G. SUNDQVIST, Saab AB, SE

ICAS 2002-7.5.2
Trajectory Generation and Display for Relative Navigation of Transportation Aircraft
B. OUATTARA, EAMAC, NE
A.K. ACHAIBOU, F. MORA-CAMINO, CNRS
J. SLAMA, COPPE/UFRJ

ICAS 2002-7.5.3
The Hierarchical Availability Analysis for Flight Control System
S. WANG, M. CUI, D. KONG, Beijing University of Aeronautics & Astronautics, CN

Session 8.5 Aircraft Noise II

Chairmen :
C.A. POWELL, NASA LRC, US
M. GRUENEWALD, EADS CRC, DE

**ICAS 2002-8.5.1 (I.L.)
Noise Reduction Engine Technology
for the 21st Century**
W.L. WILLSHIRE, NASA LRC, US

**ICAS 2002-8.5.2
A Propeller Noise Cancellation Using
a Multipole Secondary Source**
M. KUSNI, Institute of Teknologi of Bandung, ID

**ICAS 2002-8.5.3
Advanced Active Concepts for Low Noise
Rotorcraft**
M. GRUENEWALD, EADS CRC, DE

**ICAS 2002-6.6.4
Combined Dynamic Simulation, Structural
Analysis, and Experimental Methodology
for Ensuring Safety of an Embarked
Helicopter Securing System Probe
Installation**
R. LANGLAIS, Carleton University, CA
P. KEARY, Kaman Aerospace Corp., CA

Flight Tests
K. RINOIE, Y. SUNADA, Univ. of Tokyo, JP

**ICAS 2002-7.6.3
Promoting Autonomous Control in Civil
Transports as a Proposal for the Flight
Command System**
J. SUMITA, Nishinippon Inst. of Technology, JP

**ICAS 2002-7.6.4
Relationship Between Quality Assurance
and Safety**
O. TURCSANYI, MALEV, HU, R. MALIK,
University ELTE, HU

Session 8.6 Structures & Materials II

Chairmen :
P.T. CURTIS, DSTL, UK
R.L. HEWITT, NRC, CA

**ICAS 2002-8.6.1
Patch Repair of Cracks in the Upper
Longeron of an F-16 Aircraft of the Royal**

Netherlands Air Force
J.A.M. BOOGERS, NLR, NL

**ICAS 2002-8.6.2
An Approach to Modeling and Predicting
Impact Damage in Composite Structures**
S.P. RAJBHANDARI, M.L. SCOTT, RMIT, AU
R.S. THOMSON, Cooperative Research Centre
for Advance Composite Structures Ltd., AU
D. HACHENBERG, AIRBUS, DE

**ICAS 2002-8.6.3
EB Vastrestraint Test Method and an
Application**
M.C. KUSHAN, Osmangazi University, TR
M. ERDEM, TUSAS Engine Industries Inc., TR
T. SARACYAKUPOGLU, Air Supply
Maintenance Command, TR

**ICAS 2002-8.6.4
Accelerated Life Testing for Aerial
Mechanical Products**
S. WANG, Beijing Univ. of Aero. & Astro, CN

Tuesday 16:30 - 18:30

Session 1.6 Supersonic Military Aircraft ?

Chairmen :
D. MAVRIS, Georgia Insti. of Technology, S
F. JOUAILLEC, ONERA, FR

**ICAS 2002-1.6.1 (I.L.)
Supersonic Experimental Airplane
Program and Related Activities in Japan**
K. SAKATA, NAL, JA

**ICAS 2002-1.6.2
Assessment of the Feasibility of
Innovative Reusable Launchers**
M. POGOSYANN, SUKHOI, RU

**ICAS 2002-1.6.3
Supersonic Business Jet Aircraft Design**
D. BRAY, N.J. LAWSON, S.J. HARDING,
Cranfield University, UK

**ICAS 2002-1.6.4
Gripen Future Development**
G. SJUNNESSON, Saab Aerospace, SE

Session 2.6 CFD for Complex Flows

Chairmen :
P. LAKE, CSIR, SA
R.M. DESLANDES, EADS, DE

**ICAS 2002-2.6.1
Evaluation of the Ability of Euler to
Predict Store Trajectories From Attack
Aircraft**
A. CENKO, R. NIEWOEHNER, C. RYCKEBUSCH,
NAVAIR, US

**ICAS 2002-2.6.2
IAR Stores Clearance CFD Approach:
From Development to Automated
Engineering Tool**
F. FORTIN, A. BENMEDDOUR, A. TAHI,
NRC, CA,

**ICAS 2002-2.6.3
Three Dimensional Viscous Flow
Simulations over a Complete Satellite
Launcher Using Overset Grids**
J.L.F. AZEVEDO, CTA/IAE/ASE-N, BR

**ICAS 2002-2.6.4
Parametric Analysis of Aerodynamic
Characteristics of Launch Vehicles with
Strap-on Boosters**
A. NEJAT, T. KHADIVI, Aerospace Research
Institute, IR

Session 3.6 Flows Mechanisms

Chairmen :
J. MONK, CSIR, SA
C. MARESCA, Univ. de la Méditerranée, FR

**ICAS 2002-3.6.1
Flow Mechanisms Able to Generate
Wing Rock**
L. E. ERICSSON, AIAA, US
M.E. BEYERS, NRC, CA

**ICAS 2002-3.6.2
Comparison of Experimental and
Numerical Predictions of the
Enhancement of Supersonic Mixing from
Castellated Nozzles**
A. SADDINGTON, N.J. LAWSON, K. KNO-
WLES, Cranfield University, UK

**ICAS 2002-3.6.3
Using of the Low Turbulence Wind
Tunnel for Investigation of Three-
Dimensional Unsteady Flow in Curved
Tubes**
D. HANUS, P. ANDERLE, Czech Technical
University in Prague, CZ

**ICAS 2002-3.6.4
Spiral Vortices Detection on a Rotating
Disk**
G. CARDONE, G.M. CARLOMAGNO,
University of Napoli, IT

Session 4.6 Aeroelasticity IV

Chairmen :
H. HOENLINGER, DLR, E
F. EASTEP, Wright-Patterson, US

**ICAS 2002-4.6.1 (I.L.)
Problems of Airship Aeroelasticity**
G.A. AMIRYANTS, V.D. GRIGORIEV,
F.Z. ISHMURATOV, N. BESSERT, TsAGI, RU

**ICAS 2002-4.6.2
Fluid-Structure Coupling using CFD and
Multibody Simulation Methods**
W. KRUEGER, R. HEINRICH, M. SPIECK, DLR, DE

**ICAS 2002-4.6.3
Rigid Bodies Impacts on Water Surface.
Numerical and Experimental Activity**
M. ANGHILERI, Politecnico di Milano, IT

**ICAS 2002-4.6.4
In-Flight Gust and Load Measurements
on an Airship for Model Building and
Comparison with the Transport Airship
Requirements**
R. KOENIG, DLR, DE

Session 5.6 Flight Dynamics of UAV's

Chairmen :
M. FRANCIS, Lockheed Martin, US
J. HOWITT, QinetiQ, UK

**ICAS 2002-5.6.1 (I.L.)
Application of ESTOL Flight Control
Technology to UCAV Design**
A. KNOLL, B. FISCHER, EADS, DE

**ICAS 2002-5.6.2
An Autonomous Control Technique for
Launching Ship Based Unmanned Air
Vehicles (UAVs) in Extreme Conditions**
C. BIL, RMIT University, AU

**ICAS 2002-5.6.3
Design and Analysis of a Shipboard
Recovery System for a Shrouded Fan
UAV**
G. AVANZINI, Politecnico di Torino, IT

**ICAS 2002-5.6.4
Real-time Ship Motion Criteria for
Maritime Helicopter Operations**
J.L. COLWELL, CASI Member, CA

Session 6.6 Aircraft Component Design

Chairmen :
G. REID, QinetiQ, UK
R. DEN HERTOOG, Stork, NL

**ICAS 2002-6.6.1 (I.L.)
Aerodynamic Design of the A380
High-Lift Wing**
D. RECKZEH, EADS Airbus GmbH, DE

**ICAS 2002-6.6.2
Developing a New Flap for a Light Utility
Transport Airplane**
B. EGGLESTON, W.D. MCKINNEY, J. BANASZEK,
N.S. CHOI, Found Aircraft Canada Inc, CA

**ICAS 2002-6.6.3 (St.)
Aerodynamic Analysis of a Biplane
Amphibious Light Aircraft**
G.N. SANTOS, University of Sao Paulo, BR

Session 7.6 Safety - Human Factors

Chairman :
P. LEBLAYE, ONERA, R

**ICAS 2002-7.6.1
Expanded Accommodation Analysis and
Rapid Prototyping Technique for the
Design of a Crew Station Cockpit**
E.R. WINKLER, Boeing, US - L. ONYEBUECKE,
O. AMEYE, Tennessee State University, US

**ICAS 2002-7.6.2
Efficient Eye Scanning for Reducing Pilot
Workload - Single Pilot IFR and VFR**

Wednesday, 11 September

8:30 - 9:30 General Lecture II

Chairman : J. P. MAREC - ONERA, FR

ICAS 2002-0.4

Development and Application of Technology for the Sonic Cruiser

D. P. MOONEY, Boeing Commercial, US

Wednesday 10:00 - 12:30

Session 1.7 CFD Algorithms I

Chairmen :
J. HUA, Beijing Univ. of Aero & Astro, CN
W. HABASHI, Mc Gill Univ., CA

**ICAS 2002-1.7.1
Calculation of Incompressible/
Compressible Viscous Flows by a
Viscous-Inviscid Splitting Method**
J. SU, NRC, CA

**ICAS 2002-1.7.2
A Hybrid Unstructured Grid System for
Viscous and Inviscid Aerodynamic
Analysis**
A. OCHI, E. SHIMA, Kawasaki Heavy
Industries, JP

**ICAS 2002-1.7.3
An Accurate and Efficient Algorithm for
the Navier-Stokes Design Problem**
M. NEMEC, D.W. ZINGG, University
of Toronto, CA

**ICAS 2002-1.7.4
An Accurate Multiblock 3D Eno Driven
Navier-Stokes Solver for Complex
Aerodynamic Configurations**
S. SEROR, T. RUBIN,, S.SEROR, IAI, IL

**ICAS 2002-1.7.5
On Stochastic Modeling of Laminar
Turbulent Transition**
R. RUBINSTEIN, NASA LRC, US

Session 2.7 Unsteady Applications

Chairmen :
D.D. LIU, Arizona State Univ., US
J. BECKER, EADS, DE

**ICAS 2002-2.7.1
CFD Simulations of the Unsteady High
Alpha Aerodynamics of Delta Wings**
Y. LE MOIGNE, A. RIZZI, Royal Institute of
Technology, SE

**ICAS 2002-2.7.2
Prediction of Unsteady Flows Around
Rotating Blades**
J.M. BOUSQUET, ONERA, FR

**ICAS 2002-2.7.3 (St.)
Modeling of Unsteady Aerodynamic
Characteristics of Delta Wings.
Comparison with Water and Wind
Tunnel Results**
C. JOUANNET, P. KRUS, Linköping Univ., SE

**ICAS 2002-2.7.4
Transonic Aileron Buzz Boundary**

**Prediction Using Hopf-Bifurcation
Analysis Method**
Q. LIU, B. JUNQIANG, Northwestern
Polytechnical University, CN

**ICAS 2002-2.7.5
CFD Prediction of Stability and Control
Derivatives of Turboprop Aircraft Using a
Cartesian Grid Based Euler Code**
G. WALLER, Bombardier Aerospace, CA

Session 3.7 Wind Tunnel Testing and Experimental Technique

Chairmen :
X. BOUIS, ONERA, FR
K. ASAI, NAL, JP

**ICAS 2002-3.7.1
High Reynolds Number Simulation in a
Transonic Wind Tunnel by Surface Suction**
J.E. GREEN, ARA, M. ELLIOTT,
P.W.C. WONG, ARA, UK

**ICAS 2002-3.7.2
Experimental Investigations on the
Adaptation Accuracy of Adaptive Slots in
Wind Tunnel Test Section Walls**
O. MEYER, S. BLUME, W. NITSCHKE,
TU Berlin, DE

ICAS 2002-3.7.3
Validation of a Wall Interference Correction Procedure
G. LOMBARDI, M.V. SALVETTI, Univ. of Pisa, IT
M. MORELLI, CSIR, SA

ICAS 2002-3.7.4 (St.)
Pitch Oscillations of a Rectangular Wing Section in Transonic Flow
C. HILLENHERMS, W. SCHROEDER, W. LIMBERG, Aerodynamisches Intitute der RWTH Aachen, DE

ICAS 2002-3.7.5
Numerical and Experimental Investigation of the Flowfield in a Blow Down Wind Tunnel
A. REBAINE, M. KHALID, C. BROUGHTON, F. ELLIS, NRC, CA

Session 4.7
ICAS - Isoabe I

Chairmen :
B. WALLACE, NRC, CA
G. LARUELLE, EADS LV, FR

ICAS 2002-4.7.1 (I.L.)
Novel Injection Scheme for Jet Interaction Flows
J. SCHETZ, V. VITI, Virginia Tech., USA

ICAS 2002-4.7.2 (I.L.)
NASA's future Aeropropulsion Vision
A. SEHRA, NASA GRC, USA

ICAS 2002-4.7.3 (I.L.)
CLEAN : the European Environmentally Friendly Engine Demonstrator
BROICHHAUSEN, G. WILFERT, MTU-AE, DE

ICAS 2002-4.7.4 (I.L.)
Diagnostics of Leakages in Gas Turbines
Y.I. LI, P. PILIDIS, E. KLEINAKIS, P. KOTSIOPOULOS, Cranfield University, UK

ICAS 2002-4.7.5 (I.L.)
Evolution and Future Technology Challenges for Small Gas Turbines
H. MOUSTAPHA, Pratt & Withney, CA

Session 5.7
Flight Control
Chairmen :
S. LEVEDAG, DLR, DE
B. BRÄNNSTRÖM, FMV, SE

ICAS 2002-5.7.1
Minimizing the Risk of Collateral Damage with the Kalman-Levy Filter
J.F. RALPH, University of Liverpool, UK
K.L. EDWARDS, QinetiQ Ltd, UK

ICAS 2002-5.7.2
Nonlinear Control Law Design for Auto-Flare
F. MORA-CAMINO, LAAS-CNRS and ENAC, FR

ICAS 2002-5.7.3
Detection and Isolation of Control Surface Effectiveness Loss in Aircraft By Using Filter Bank Approach
Z. CHEN, W. LI, Beijing Univ. of Aero. & Astro., CN

ICAS 2002-5.7.4
Control Law Synthesis for Aircraft Autopilot with Nonlinear Elements
R. SZABOLCSI, Miklos Zrinyi National Defense University, HU

ICAS 2002-5.7.5
A Fuzzy Logic Autopilot Development for a Light Twin Engine Aircraft in the Approach Flight Condition
V. ROSSI, G.M. SAGGIANI, Univ. of Bologna, IT

Session 6.7
System Testing

Chairmen :
P. KLUIT, NLR, NL
M. FROMENT, AIRBUS, FR

ICAS 2002-6.7.1
An Integrated Modular Test Rig for Landing Gear Fatigue and Strength Testing
R.K. SCHMIDT, Messier Dowty Inc., CA

ICAS 2002-6.7.2
Virtual Laboratories for Space Robotics
K. SCHILLING, Univ. of Applied Sciences, DE

ICAS 2002-6.7.3
Load Simulator Based on The Principle of Hydrostatic Secondary Control
Z. JIAO, X. WANG, M. IVANTYSYNOVA, Beijing University of Aero & Astro, CN

Session 7.7 - Development in ATM
Chairman :
C. PUSCH, EUROCOPTER, R

ICAS 2002-7.7.1 (St)
A Contribution to Proactively Planning and Managing Airport Apron Traffic Using a Stochastic Modeling Approach
T. BUSACKER, M. FRICKE, Berlin University of Technology, DE

ICAS 2002-7.7.2
An Object Oriented Methodology for Managing the Complexity of ATM Systems
B. LASMICARRE, ONERA, FR

ICAS 2002-7.7.3
A Cost/Benefit Analysis on Airbus Functionalities for a Future ATM- System
H. SCHNIEDER, D. SCHÄFER, Airbus, DE

ICAS 2002-7.7.4
Personal Air Transportation System
J. ROHACS, Budapest University, HU

Session 8.7
Works in Supersonic Transports

Chairmen :
J. SWIHART, US
C. MICHAUT, ONERA, FR

ICAS 2002-8.7.1 (I.L.)
Aerodynamic Design Opportunities for Future Supersonic Aircraft
R.M. WOOD, NASA LRC, US

ICAS 2002-8.7.2 (I.L.)
A Common Industry / Research Establishment / University Approach on the Future Supersonic Aircraft
S CANDEL, Laboratoire EM2C, CNRS, FR
D. JEANDEL, LMFA CNRS, FR

ICAS 2002-8.7.3
Leading Edge Vortex Flaps for Supersonic Transport Configuration - Effects of Flap Configurations and Rounded Leading Edges
K. RINOIE, K. MIYATA, Univ. of Tokyo, JP
D.Y. KWAK, M. NOGUCHI, NAL, JP

ICAS 2002-8.7.4
Technological and Design Challenges for Supersonic Business Jet
S. LÉBOURG, DASSAULT AVIATION, FR

ICAS 2002-8.7.5
T.B.D
P. HENNE, Gulfstream Aerospace Corporation, US

Session 2.8 - Flow Instabilities

Chairman :
R. HENKE, AIRBUS, DE

ICAS 2002-2.8.1
Experimental and Numerical Study on Transition Characteristics at Supersonic Speed
H. SUGIURA, NAL, JP

ICAS 2002-2.8.2 (St.)
Three Dimensional Co-Operative Instabilities in Wake Vortex Pairs
R. STEIJL, H.W.M. HOEIJMAKERS, University of Twente, NL

ICAS 2002-2.8.3
Prediction of Laminar-to-Turbulent in Incompressible Flow Past 3 Dimensional Cavity
R. COOPER, R.K. COOPER, E. BENARD, S. RAGHUNATHAN, Queen's University, UK

Session 3.8
Configuration Testing I

Chairmen :
G. EITELBERG, DNW, NL
P.G. MARTIN, DSTL, UK

ICAS 2002-3.8.1
Testing of a Modern Transport Aircraft Configuration in ETW Close to MACH = 0.9
J. QUEST, M.C.N. WRIGHT, ETW GmbH, DE

ICAS 2002-3.8.2
Investigations on the Turbulent Wake Vortex Flow of Large Transport Aircraft
C. BREITSAMTER, C. BELLASTRADA, B. LASCHKA, TU München, DE

ICAS 2002-3.8.3
Aerodynamic Characteristics of Spin Phenomena for Delta Wing
Y. NAKAMURA, Nagoya University, JP

Session 4.8
Hybrid Materials

Chairmen :
J. HANSEN, Univ. Of Toronto, CA
T. ISHIKAWA, NAL, JP

ICAS 2002-4.8.1
Diagonal Tension in Fibre-Metal Laminates
C. POON, NRC, CA

ICAS 2002-4.8.2
Plasticity Correction Factors for Buckling of Flat Rectangular Glare Plates Loaded in Compression or Shear
T.C. WITTENBERG, Delft Univ. of Technology, NL
A. DE JONGE, Fokker Aerostructures B.V., NL

ICAS 2002-4.8.3
A Higher Order Theory for Fiber-Metal Laminates
X. WU, NRC, CA

Session 5.8
Combustions

TBD

ICAS 2002-5.8.1 (I.L.)
Combustion Technology Challenges for Small Aviation Gas Turbines
P. SAMPATH, Pratt and Withney, CA

ICAS 2002-5.8.2
Suppression of Thermoacoustic Instabilities using Passive Flow Control
C.O. PASCHEREIT, SCHUERMAN, ALSTOM Ltd, CH

ICAS 2002-5.8.3
Stress Intensity Factor Calculations for Cracks Emanating from Bolt Holes in a Jet Engine Compressor Disc
W. BERES, NRC, CA - A.K. KOUL, Life Prediction Technologies, CA

Session 6.8
Avionic Systems II

Chairmen :
W. KUBBAT, TU Darmstadt, DE
M. NAGAYASU, NAL, JP

ICAS 2002-6.8.1
Optical Design of Two Field of View Infra-Red Objective in 3-5 Micron Band for Focal Plane Array Detector.
H. ASGHAR, Advance Engineering Research Organization, Wah Cantt Pakistan, PK

ICAS 2002-6.8.2
A Mission Planner and Navigation System for the ARARA Project
O. TRINDADE, L.C.P. BARBOSA, L.O. NERIS, L.A.C. JORGE, University of Sao Paulo, BR

ICAS 2002-6.8.3
Semi-Automatic 3D Flight Simulator Scenarios Reconstruction from Structured Sequence of Aerial Photos
A. LIVERANI, F. PERSIANI, G. PIRACCINI, M. TAPPI, Universita di Bologna, IT

ICAS 2002-6.8.4
Robust Integrated INS/Radar Altimeter Accounting Faults at the Measurement Channels
C. HAJYIEV, R. SALTOGLU, Istanbul Technical University, TR

Session 7.8
Safety as a Global Issue

Chairman :
A. MAUMUS, AIRBUS, FR

ICAS 2002-7.8.1 (I.L.)
Helicopter Flight Safety Enhancement : A Eurocopter Continuing Action
J.M. POURADIER, EUROCOPTER, FR

ICAS 2002-7.8.2 (I.L.)
Military Aircraft
L. GARCIA, Lockheed Martin Aeronautics Company, US

ICAS 2002-7.8.3
King Air 350 Flight Test Data Gathering and Level D Simulator Model Development
K. HUI, IAR/NRC, CA - R. SRINIVASAN, L. AURITI, J. RICCIARDI, NRC, CA

Session 8.8
Students IV

Chairman :
A. GALASSO, IT

ICAS 2002-8.8.1 (St)
The Case for a Practical Small Supersonic Transport
T. DOWNEN, M. DAOUK, T. DOWNEN, L. JAMONET, MIT, US

ICAS 2002-8.8.2 (St)
Downwash Flow Investigations for Passenger Airplane
N. BRAGIN, TsAGI, RU

ICAS 2002-8.8.3 (St)
Accessibility and Maintainability Studies Through Digital Humans in a Digital Mock-up Context
M. GALLIZIO, Politecnico di Torino, IT

Wednesday 14:00 - 15:30

Session 1.8
High Speed Aerodynamic Analysis
Chairmen :
F. KAFYEKE, Bombardier Aerospace, CA
H. W.M. HOEIJMAKERS, Twente Univ., NL

ICAS 2002-1.8.1
Simulation Techniques in Hypersonic Aerothermodynamics
V.V. RIABOV, Univ.of New Hampshire, US

ICAS 2002-1.8.2
A Study on Reduction of Aerodynamic Heating Load by Opposing Jet in Hypersonic Flow
K. HAYASHI, Kyushu University, JP
K. KARASHIMA, Nishinippon Institute of Technology, JP

ICAS 2002-1.8.3
TBD

ICAS 2002-1.9.1
Simulations of Statistical mean Behaviors and Coherent Structures of Incompressible Turbulent Flows Using Unilateral-Average Based Governing Equations
G. GAO, Florida Atlantic University, US

ICAS 2002-1.9.2
An Evaluation of Several Low-Re Turbulence Models - Axisymmetrix

Separating and Swirling Flows - Vortex Generator Jet and Diffusing S-Duct Flows
M. YARAS, A.D. GROSVENOR, Carleton University, CA

ICAS 2002-1.9.3
A Fully Coupled Newton-Krylov Solver for Turbulent Aerodynamic Flows
T. CHISHOLM, D.W. ZINGG, University of Toronto, CA

ICAS 2002-1.9.4
Sensitivity and Uncertainty Analysis of Aerodynamic Flows
D. PELLETIER, E. TURGEON, J. BORGGAARD,

Ecole Polytechnique de Montréal, CA

Session 2.9
Design Applications and Accoustics
Chairmen :
C. CLARKSON, BAe Systems, UK
P. SPALART, BOEING, US

ICAS 2002-2.9.1
On the Transmission of Sound Across a Non Isothermal Boundary Layer
L.M.B.C. CAMPOS, IST, PT
M.H. KOBAYASHI, Technical Univ. of Lisbon, PT

ICAS 2002-2.9.2
Relationship Between Instability Waves and Noise of Low Supersonic Jets
C. MILLET, G. CASALIS, ONERA, FR

ICAS 2002-2.9.3
Supersonic Air Intake Application of a Design Method for Problems Involving Shock Boundary Layer Interaction
A.G.T. CROSS, BAe Systems, UK

ICAS 2002-2.9.4
Simplified Design Method for a Symmetrical Wing Body Fairing
B.W. VAN OUDHEUSDEN,
L.M.M. BOERMANS, Delft Univ., NL

Session 3.9
Flow Control
Chairman :
B. BRÄNNSTRÖM, FMV, SE

ICAS 2002-3.9.1
Transition Measurement and Analysis on a Swept Wing in High Lift Configuration
A. SERAUDIE, J. PERRAUD,
F. MOENS, ONERA, FR

ICAS 2002-3.9.2
Enhanced Maneuverability By Active Vortex Control With Moveable Blowing Jet
X. HUANG, E. HANFF, NRC, CA

ICAS 2002-3.9.3
Effects of Three Kinds of Control Method on Closed Type Supersonic Cavity Flows
E. MORISHITA, T. OKUNUKI, H. ITOH,
University of Tokyo, JP

ICAS 2002-3.9.4
Flow Control Downstream of a Backward Facing Step : A DPIV Study
P.G. SPAZZINI, DI CICCÀ, IUSO, KING,
CNR - CSDF, IT

ICAS 2002-3.9.5
Active Control of Oscillations : a Theory and its Application to Buffet and to Compressor Surge
A. LE POURHIET, M. CORREGE,
D. CARUANA, ONERA, FR

Session 4.9
Structures Materials III
Chairmen :
V. VENKAYYA, Pratt & Whitney, US
S. LEE, Concordia Univ., CA

ICAS 2002-4.9.1
Experimental Buckling Tests and Numerical Analyses of Stiffened Cylindrical Shells in Composite Materials
C. BISAGNI, P. CORDISCO, L. LANZI,
Politecnico di Milano, IT

ICAS 2002-4.9.2
Integrated Numerical Analysis Concept for Composite Damage Tolerance
S. MAISON-LE POEC, EADS CRC, FR

ICAS 2002-4.9.3
Design and Development of Optic Fiber Smart Structures in Aerospace Vehicles
Z. KHAN, National University of Sciences and Technology, PK

ICAS 2002-4.9.4
Analysis of Triax Composites for Satellite Applications
S.V. HOA, Concordia University, CA

Session 5.9
Engine Modeling and Optimisation
Chairmen :
U. HALL, Chalmers Univ. of Technology, SE
D. RUDNITSKI, NRC, CA

ICAS 2002-5.9.1
New Technologies for Efficient and Environmentally Friendly Aero Engines
H. SCHEUGENPFLUG, MTU Aero Engines GmbH, DE

ICAS 2002-5.9.2
Conceptual Design of Aircraft Engine using Multidisciplinary Optimization Technique
T. ASAKO, H. MIYAGAWA, Ishikawajima-Harima Heavy Industries Co, JP
S. MIYATA, K. KUDO, Engineous Japan, JP

ICAS 2002-5.9.3
Modeling Propulsion System of a Subsonic Civil Jet Aircraft for Multidisciplinary Conceptual Design Optimization
V. SANGHI, Gas Turbine Research Establishment, IN
S.K. SANE, Indian Institute of Technology, IN

ICAS 2002-5.9.4
Adaptive Selection of Pareto-Optimal Engine Technology Solution Sets
B. ROTH, M. GRAHAM, D.MAVRIS, Georgia Institute of Technology, US
N. MACSOTAI, GE Aircraft Engines, US

Session 6.9
Integrated Product Development II
Chairman :
BOZGUDAN, MIT, US

ICAS 2002-6.9.1 (I.L.)
International Cooperation in the Development of New Technology for Commercial Transports
M. FRIEND, BOEING Phantom Works, US

ICAS 2002-6.9.2
Challenges in International Co-Design and Development of a New Family of Airliners
M. REHMET, WOLF, Fairchild Dornier GmbH, DE

ICAS 2002-6.9.3
Value Stream Analysis and Mapping for Product Development
H. McMANUS, R.L. MILLARD, MIT, US

ICAS 2002-6.9.4
A Value-Based Approach for Commercial Aircraft Conceptual Design
J. MARKISH, K. WILLCOX, MIT, US

Session 7.9
Wake Vortex

Chairmen :
M. YARAS, Carleton Univ. CA
M. KOERNER, DLR, DE

ICAS 2002-7.9.1
Capacity and Wake Vortices
J. HALLOCK, US DOT Volpe National Transportation Center, US - C. TUNG, NASA Ames, CA
S. SAMPATH, European Research Office, UK

ICAS 2002-7.9.2
Safety-Separation Assessment of Satellite-Based en-route ATC Versus Conventional en-route ATC
S. STROEVE, M.H.C. EVERDIJ, M.N.J. VAN DER PARK, NLR, NL

ICAS 2002-7.9.3
A Model for Simulation of Flight Passages Through Trailing Tip Vortices
Y.C.J. SEDIN, I. GRASJÖ, E. KULLBERG,
R. LARSSON, Saab Aerospace, SE

ICAS 2002-7.9.4
On Wake Vortex Response for all Combinations of Five Classes of Aircraft
L.M.B.C. CAMPOS, IST, PT - J.M.G. MARQUES, Technical Univ. of Lisbon, PT

Session 8.9
SAE I – US Supersonic Aircraft Technology Development Programs
Chairman :
R.A. MERCURE, NASA, US

ICAS 2002-8.9.1 (I.L.)
DARPA's Quiet Supersonic Platform (QSP) Program
R. WLEZIEN, NASA, US

ICAS 2002-8.9.2 (I.L.)
NASA's Supersonic Commercial Aircraft Technology Development – Background and Current Status
R.A. MERCURE EM2C, CNRS, FR

ICAS 2002-8.9.3 (I.L.)
Northrup Grumman's Flight Test on Sonic Boom Mitigation
C. BOCCADORO, Northrop Grumman, US

ICAS 2002-8.9.4 (I.L.)
Lockheed Martin's History of Supersonic Aircraft
R. BAUMGARTNER, Lockheed Martin, US

Thursday, 12 September

8:30 - 9:30
General Lecture III

Chairman : S. KOBAYAKAWA - MHI, JP

ICAS 2002-0.5
Market Drivers and Innovation behind the Airbus Products

P. JARRY, Airbus France, FR

Thursday 10:00 - 12:30

Session 1.10
CFD for Design

Chairmen :
J. ALONSO, NASA, US
M. KOERNER, DLR, DE

ICAS 2002-1.10.1
Using Computational Fluid Dynamics for Aerodynamics - A critical Assessment
A. JAMESON, Stanford University, US

ICAS 2002-1.10.2
Low-Sonic-Boom Design Methodologies for Future Supersonic Aircraft
S.X.S. BAUER, NASA LRC, US

ICAS 2002-1.10.3
The elsA Object Oriented Computational Tool for Industrial Applications
M. GAZAIX, ONERA, FR

ICAS 2002-1.10.4
Numerical Optimization Design of Wings by Solving Adjoint Equations
Z. QIAO, A.M. YANG, B. ZHU, Northwestern Polytechnical University, CN

ICAS 2002-1.10.5
MEGAFLOW - A Numerical Flow Simulation Tool for Aircraft Design
N. KRÖLL, C.C. ROSSOW, D. SCHWAM-BORN, DLR, DE - K. BECKER, Airbus-Deutschland, DE

Session 2.10 - Flow Control by Boundary Layer

Chairmen :
D. PEAKE, ARC, UK
Y. NAKAMURA, Nagoya Univ., JP

ICAS 2002-2.10.1
Experimental Study of Characteristics of Micro-Hole Porous Skins for Turbulent Skin Friction Reduction
D.P. HWANG, NASA GRC, US

ICAS 2002-2.10.2
Simulation of Flows with Passive Porosity
N. FRINK, S.X.S. BAUER, C.A. HUNTER,
NASA LRC, US

ICAS 2002-2.10.3
Active Separation Control System Improved for Control Time and Separation Effect
H. HASEGAWA, Japan Society for

Aeronautical and Space Sciences, JP
K. MATSUUCHI, University of Tsukuba, JP

ICAS 2002-2.10.4
PIV Investigation of a Turbulent Boundary Layer Manipulated by Wall Transversal Oscillations
G.M. DI CICCÀ, G. IUSO, M. ONORATO,
P.G. SPAZZINI, Turin Polytechnic University, IT

ICAS 2002-2.10.5
Flow Control over the Wing of a Fighter-type Configuration Using Boundary Layer Suction
M.R. SOLTANI, Sharif Univ. of Technology, IR

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Chairmen :
R. HENKE, AIRBUS, DE
J. TEMPLIN, CA

ICAS 2002-3.10.1
Development of High-Lift Systems for the Bombardier CRJ-700
F. KAFYEKE, F. PEPIN, C. KHO, Bombardier Aerospace, CA

ICAS 2002-3.10.2
The Effect of Wing Tip Blowing on the Vortex Drag
F.M. COIMBRA, University of Sao Paulo, BR
F.M. CATALANO, Aerodynamic Labor. USP, BR

ICAS 2002-3.10.3
Testing of a Dash 8 Q400 in the NASA Ames 80X120' Wind Tunnel
J.D. LYE, Bombardier Aerospace, CA
S. BUCHHOLTZ, Sverdrup Technology (under contract to NASA), CA
D. NICKISON, NASA Ames, CA

ICAS 2002-3.10.4
Overview of Rotary Vortex Flow Field for the F/A-18 Aircraft
H.J. CAI, M.E. BEYERS, NRC, CA

ICAS 2002-3.10.5
Estimation of Spin Characteristics of Aerobatic Aircraft by Means of Spin Rotation Modeling in Horizontal Wind Tunnel
N. SOHI, SibNIA, RU
Y.A. PRUDNIKOV, Y.N. TEMLYAKOV, Siberian Aeronautical Research Institute, RU

Session 4.10
Testing Materials & Joints

Chairmen :
J.E. SIMMONS, BOEING, US
P. BATRHOLEMEW, QinetiQ, UK

ICAS 2002-4.10.1
New Lightweight Alloys in Aircraft Construction
B. LENCZOWSKI, EADS CRC Germany, DE

ICAS 2002-4.10.2
An Evaluation of the Physical Properties of Nd: YAG Laser Welded High Strength 6000 Series Aluminum Alloys
B.R. LEIGH, Bombardier Aerospace, CA
C. POON, NRC, CA, H.W. KERR, W.H.S. LAWSON, University of Waterloo, CA

ICAS 2002-4.10.3
Non Destructive Investigation Tools : Value Creation for Structural Test Monitoring
O. PETILLON, D. SIMONET, EADS CRC, FR

ICAS 2002-4.10.4
Bearing Strength of Bolted Joints in CFRP Wing Fittings
G. ROMEO, Turin Polytechnic University, IT

ICAS 2002-4.10.5
Development Approach and Testing of an Unmanned Aerial Vehicle
A.F. ACCARDO, Univ. of Naples "Federico II", IT

Session 5.10
Inlets, Propellers and Compressor CFD

Chairmen :
J. SOKHEY, ROLLS ROYCE, US
A. WADIA, GE Aircraft Engines, US

ICAS 2002-5.10.1
On Hammershock Propagation in a Supersonic Flow Field
A.R. PORRO, NASA GRC, US

ICAS 2002-5.10.2
Compressor Technology from Innovation to Economics
K. BROICHHAUSEN, MTU, DE

ICAS 2002-5.10.3
A Stage Calculation in a Centrifugal Compressor
C. WALLIS, GE Aircraft Engines, US

ICAS 2002-5.10.4
The Aerodynamic Design of an Optimized Propeller for a High Altitude Long Endurance UAV
J. MONK, Aerotek, CSIR, ZA

ICAS 2002-5.10.5
Intake Downwash for Rear Fuselage Mounted Engines
R. SLINGERLAND, N.L.S. MOONEN, TU Delft, NL

Session 6.10 - System Design I

Chairmen :
R. SMYTH
U. CARL

ICAS 2002-6.10.1 (St.)
Formulation of a Multidisciplinary Design Optimization Process for Embedded Sensor System Design
E.A. ABOIT, RMIT, AU

ICAS 2002-6.10.2
Active Fault-Tolerant Control System Design for a Two-Engine Bleed Air System of Aircraft

G. LIU, School of Aerospace Engineering, Ryerson University, CA
J. JIANG, University of Western Ontario, CA
C.H. LAM, Honeywell Engines & Systems, CA

ICAS 2002-6.10.3
The Design and Development of the Airbus A380 Main Landing Gears
P. VANDERPOL, Landing Gear Goodrich Corporation, CA

ICAS 2002-6.10.4
Systems Integration – Airbus Approach
R. SMYTH, AIRBUS France, FR

Session 7.10 **Mission Management Issues**

Chairmen :
U. EDLUND, SAAB, SE
N. SCHMIDT, Royal Australian Air Force, AU

ICAS 2002-7.10.1
Development of Approach Procedure Design Criteria for Systems Based on Global Navigation Satellite System (GNSS) with Ground Based Augmentation System (GBAS)

R. DOERRIES, M. FRICKE,, H. SCHULZ, TU Berlin, DE

ICAS 2002-7.10.2
Relational Model and Data Link for Aircraft control during Landing and Take-Off
K. YAZDANIAN, ONERA, FR

ICAS 2002-7.10.3
System Approach to Evaluate Mission System Design
S. KAINIKARA, A.K. SINHA, R. KUSUMO, RMIT, AU

ICAS 2002-7.10.4
A System Approach Mission Based Flight Performance of Air Ambulance Helicopters
D. KACHAB, R. KUSUMO, RMIT, AU
P. HOGAN, K. LAYCOCK, Air Ambulance Victoria, AU

ICAS 2002-7.10.5
An Operational Evaluation of a Take-off Performance Monitoring Algorithm
D. ZAMMIT-MANGION, University of Malta, MT
M. ESHELBY, Cranfield University, UK

Thursday 14:00 - 15:30

Session 1.11
CFD Validation -
Chairman :
M. WARFIELD, BOEING, US

ICAS 2002-1.11.1
Validation of Navier-Stokes Methods for Airfoil High-Lift Analysis
M. LANGLOIS, F. MOKHTARIAN, Bombardier Aerospace, CA

ICAS 2002-1.11.2
Short Turnaround Time Turbulent Flow Computations for Complete Aircraft Configurations
J.W. VAN DER BURG, E.T.A. VAN DER WEIDE, NLR, NL

ICAS 2002-1.11.3
A Method for Drag Decomposition from CFD Calculations
R. TOGNACCINI, CIRA, IT

Session 2.11 **Other Aerodynamics Methods**

Chairmen :
D. ZINGG, Univ. Of Toronto, CA
J.W. VAN DEN BURG, NLR, NL

ICAS 2002-2.11.1
Optimization of Airfoil and Wing Using Genetic Algorithms
F. ZHANG, S. CHEN, M. KHALID, NRC, CA

ICAS 2002-2.11.2
Computational Study of the Aerodynamic Characteristics Of Axi-Symmetric Bodies In Transonic Flow
E. PRIYONO, Nurtanio University, ID
H. DJOJODIHARJO, Bandung Institute of Technology, ID

ICAS 2002-2.11.3
Numerical Simulation of Flows into Inductive Plasmatrons
S.V. UTUZHNIKOV, Moscow Institute of Physics and Technology, UK

Session 3.11 **Unsteady Aerodynamics**

Chairmen :
R.A. GALBRAITH, University of Glasgow, UK
F. QUAGLIOTTI, Politecnico di Torino, IT

ICAS 2002-3.11.1
Wind Tunnel Testing of Unsteady Loads on a Helicopter Fuselage in a Ship Air Wake
R. LEE, S.J. ZAN, NRC, CA

ICAS 2002-3.11.2
Derivation of unsteady aerodynamic models from wind tunnel multi-axis test rigs
H.L. KYLE, University of Bristol, UK

ICAS 2002-3.11.3
Clarification of Unsteady Characteristics in Separated Flow over an Axisymmetric Paraboloid
T. ISHIDE, Kizarazu National College of Technology, JP
N. NISHIKAWA, F. MIKAMI, Chiba Univ., JP

Session 4.11 - History

Chairmen :
F. THOMAS, DLR, DE
B. KISALA, AIAA, US

ICAS 2002-4.11.1 (I.L.)
Discovering the Secrets of the Wright Brothers
K. HYDE, The Wright Experience, US

ICAS 2002-4.11.2 (I.L.)
Test and Evaluation of the Wright Brothers Aircraft, Propellers and Engines
K. KOCHERSBERGER, Rochester Institute of Technology, US

ICAS 2002-4.11.3 (I.L.)
Pioneers of Flight in Canada
B. EGGLESTON, Venture Flight, CA
R.H. WICKENS, retired, CA

Session 5.11 **Turbines**

Chairmen :
R. CEDAR, GE Aircraft Engines
Ch. MARI, Snecma Moteurs

ICAS 2002-5.11.1
Research on Application of Ceramic Turbine to Jet Engine
H. HASEGAWA, Y. TSUKAMOTO, Japan Defense Agency, JP - T. HANADA, K. TAKITA, Mitsubishi Heavy Industries Ltd, JP

ICAS 2002-5.11.2
Performance Characteristics of a Reduced Solidity Low Pressure Turbine
W. SOLOMON, GE Aircraft Engines, US

ICAS 2002-5.11.3
Flowfield Unsteadiness and Turbulence in Multistage Low Pressure Turbines
D.E. HALSTEAD, GE Aircraft Engines, US

ICAS 2002-5.11.4
Impact of Flow Quality in Transonic Cascade Wind Tunnels : Measurements in an HP Turbine Cascade at Design and Off-Design Conditions
D. CORRIVEAU, S.A. SJOLANDER, Carleton University, CA

Session 7.11 **Aircraft Emission**

Chairmen :
S. UENO, Yokohama National Univ., JP
W. WODDS

ICAS 2002-7.11.1
Propulsion System Optimization for Minimum Global Warming Potential
M. WHELLENS, Cranfield University, UK

ICAS 2002-7.11.2
Emission Scattering Simulation for Airport Region
J. ROHACS, Budapest University, HU

ICAS 2002-7.11.3
Environmental Economical and Technical Aspects of a CRYOPLANE in the Preliminary Design Phase
J.A. KRIJNEN, Delft University, NL

Session 8.11 **SAE II – Environmental Considerations for Supersonic Commercial Aircraft**

Chairman :
R.A. MERCURE, NASA, US

ICAS 2002-8.11.1 (I.L.)
Environmental Issues Addressed and Progress Made under the High Speed

Civil Transport (HSCT) Program
A. WILHITE, University of Alabama, US

ICAS 2002-8.11.2 (I.L.)
Sonic Boom Prediction and Mitigation
K.J. PLOTKIN, Wyle Lab. US

ICAS 2002-8.11.3 (I.L.)
NASA's Ultra Efficient Engine Technology (UEET) Program – Environmental Elements
C.L. PEDDIE, NASA GRC, US

ICAS 2002-8.11.4 (I.L.)
Concorde's Legacy : Changes in the Environmental Scene. From 1976 to Today
G.M. LILLEY, NASA LRC, US

Thursday, 12 September

16:00 - 17:00
ICAS VON KARMAN LECTURE

Chairman : B. FREDRIKSSON
Chairman of the ICAS Programme Committee

ICAS 2002-0.6

The Canadian and Australian F/A-18 International Follow-on Structural Test Program

D. L. SIMPSON, NRC, CA,
G. GRAHAM, Dept. Of National Defence, CA
L. MOLENT, A.D. GRAHAM, DSTO, AU,
N. SCHMIDT, RAAF, AU

17:00 - 17:30
Closing Ceremony

19:00 - 22:00

Congress Banquet

Presentation of MAURICE ROY Medal to JACQUES BALAZARD, FR
and the Mc CARTHY AWARDS to the best Student Papers

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	ICAS 2002-3.9	D. MAVRIS	ICAS 2002-1.6
K. BROICHHAUSEN	ICAS 2002-6.4	R.E McKINLEY	ICAS 2002-1.2
R. BUETJER	ICAS 2002-3.1	J.J. MEIJER	ICAS 2002-4.2
L.M.B.C. CAMPOS	ICAS 2002-8.3	R. MERCURE	ICAS 2002-8.11
U. CARL	ICAS 2002-6.10		ICAS 2002-8.9
T. CAROLAN	ICAS 2002-6.3	C. MICHAUT	ICAS 2002-8.7
R. CEDAR	ICAS 2002-5.11	M. MONK	ICAS 2002-3.6
Z. CHEN	ICAS 2002-5.3	J. MOON	ICAS 2002-7.1
N. CHOKANI	ICAS 2002-5.5	N. NAGAYASU	ICAS 2002-6.8
C. CLARKSON	ICAS 2002-2.9	K. NAKAHASHI	ICAS 2002-2.4
B. DAVIS	ICAS 2002-5.1	M. NAKAMURA	ICAS 2002-2.10
J. DE LAURIER	ICAS 2002-5.5	A. NUGROHO	ICAS 2002-2.1
R. DEN HERTOEG	ICAS 2002-6.6	J. OLSON	ICAS 2002-4.4
R.M. DESLANDES	ICAS 2002-2.6	S.V. PAIPETIS	ICAS 2002-3.2
G. DIRKS	ICAS 2002-1.4	D. PEAKE	ICAS 2002-2.10
K. EARLY	ICAS 2002-4.7	I. POLL	ICAS 2002-8.2
F. EASTEP	ICAS 2002-4.6	C.A. POWELL	ICAS 2002-8.4
U. EDLUND	ICAS 2002-1.2		ICAS 2002-8.5
	ICAS 2002-7.10	C. PUSCH	ICAS 2002-7.7
G. EITELBERG	ICAS 2002-3.8	M. QIAO	ICAS 2002-2.5
C. FIELDING	ICAS 2002-5.3	F. QUAGLIOTTI	ICAS 2002-3.11
K. FOWLER	ICAS 2002-6.2	M. RAW	ICAS 2002-1.9
M. FRANCIS	ICAS 2002-5.6	G. REID	ICAS 2002-6.6
P. FROMENT	ICAS 2002-6.7	A. RIZZI	ICAS 2002-1.9
A. GALASSO	ICAS 2002-8.8	D. RUDNITSKI	ICAS 2002-5.9
R.A. GALBRAIGHT	ICAS 2002-3.11	P. SACHER	ICAS 2002-5.1
R. GENT	ICAS 2002-7.3	E. SAMPATACOS	ICAS 2002-2.1
V. GIAVOTTO	ICAS 2002-3.4	N. SCHMIDT	ICAS 2002-7.10
J. GIESING	ICAS 2002-1.4	J. SCHWEIGER	ICAS 2002-4.2
M. GRUENEWALD	ICAS 2002-8.4	O. SENSBURG	ICAS 2002-4.3
	ICAS 2002-8.5	M. SIMMONS	ICAS 2002-4.10
W. HABASHI W.	ICAS 2002-1.7	R. SMYTH	ICAS 2002-6.10
U. HALL	ICAS 2002-5.9	J. SOKHEY	ICAS 2002-5.10
J. HANSEN	ICAS 2002-4.8	P. SPALART	ICAS 2002-2.9
R. HENKE	ICAS 2002-2.8	R. SPITZER	ICAS 2002-6.5
	ICAS 2002-3.10	J.P. SUZUKI	ICAS 2002-5.4
H.W.M. HOEIJMAKERS	ICAS 2002-1.8	J. SWIHART	ICAS 2002-6.4
G. HOLMBERG	ICAS 2002-6.1		ICAS 2002-8.7
H. HÖNLLINGER	ICAS 2002-4.6	J. TEMPLIN	ICAS 2002-3.10
P. HORST	ICAS 2002-1.3	F. THOMAS	ICAS 2002-4.11
P. HORST	ICAS 2002-3.3		ICAS 2002-5.2
J. HOWITT	ICAS 2002-5.6	J. THORBECK	ICAS 2002-1.5
	ICAS 2002-7.5	S. UENO	ICAS 2002-7.11
J. HUA	ICAS 2002-1.7	J.W. VAN DEN BURG	ICAS 2002-2.11
T. ISHIKAWA	ICAS 2002-4.8	M. VENKAYYA	ICAS 2002-4.9
K. ISOGAI	ICAS 2002-4.4	P. WADDICK	ICAS 2002-5.2
A. JAMESON	ICAS 2002-2.5	A. WADIA	ICAS 2002-5.10
F. JOUAILLEC	ICAS 2002-1.6	M. WARFIELD	ICAS 2002-1.11
J.P. JUNG	ICAS 2002-5.4	A. WATANABE	ICAS 2002-7.5
F. KAFYEKE	ICAS 2002-1.8	C. WEILAND	ICAS 2002-2.3
R. KIND	ICAS 2002-2.2	C. WEISHAUPL	ICAS 2002-2.4
B. KISALA	ICAS 2002-4.11	D. WILLIAMS	ICAS 2002-6.5
P. KLUIT	ICAS 2002-6.7	B. WINZELL	ICAS 2002-4.1
M. KOERNER	ICAS 2002-1.10		ICAS 2002-4.3
	ICAS 2002-7.9	W. WODDS	ICAS 2002-7.11
I. KROO	ICAS 2002-1.5	Y. XIONG	ICAS 2002-3.2
W. KUBBAT	ICAS 2002-6.8	M. YARAS	ICAS 2002-7.9
S. LAINE	ICAS 2002-8.1	G.N. ZAMULA	ICAS 2002-3.3
P. LAKE	ICAS 2002-2.6	D. ZINGG	ICAS 2002-2.11
P. LAROCHE	ICAS 2002-7.3		

RESERVE PAPERS

NAME	AFFILIATION	COUNTRY	TITLE
H. ACAR	Istanbul Technical University	TR	The Effect of the Angle of the Inclined Flat Plate on the Deflexion of a Plane Wall Jet
F.F. AFAGH	Dept. of Mechanical & Aerospace Eng.	CA	Modeling of Helicopter Rotor Blades with Integrated Active Fibers
C. ALLEN	UNIVERSITY OF BRISTOL	UK	An Unsteady Flow-Solver with Algebraic Grid Motion for Aeroelastic Simulations
J. BAYANDOR	RMIT University	AU	Aerodynamic Design and Optimisation of a Performance Enhancing Propulsor for an Advanced Propulsive System
A. BENGIN	Faculty of Mechanical Engineering	YU	An Algorithm for the Calculation of Aerodynamic Wing-Propeller Interaction
E. BERTON	LABM-CNRS	FR	Centrifugal and 3D effects on the near tip section of rotating blades
E. BIGARELLI	Instituto Tecnológico de Aeronáutica - CTA/ITA	BR	Normal Force Calculations for Rocket-Like Configurations
L.M. CAMPOS	I.S.T.	PT	On Safe Separation Between Aircraft and Related Requirements on Position Accuracy
A. CHEREVATSKY	Israel Military Industries Ltd.	IL	Motor Case for Rocket Trajectory Corrected System
D.H.CHESTER	Senior Engineer, Aircraft Structures Dept.4441, IAI Ltd.	IL	Pre-Stressed Symmetric Composite-Beams in Aircraft - Analysis and design Implications
D.H.CUI	Aircraft Design	CN	Bend/Twist Coupling Effects for Unsymmetrical & Unbalanced Laminates Used in Aircraft Wing Structure
D. CVETKOVIC	Faculty of Mechanical Engineering	YU	Numerical model of single main rotor helicopter dynamics
D. CVETKOVIC	Faculty of Mechanical Engineering	YU	Algorithm for Automatic Generation of the Technical Documentation of Helicopter Composite Tail Rotor Blades in TIS
A. DABAYEH	Senior Aeronautical Engineer	CA	Extension of Repair Lifetime for the CP140 by Cold Working of Fatigued Holes
D. ERDEM	Msc.	TR	Interaction of Two Parallel Rectangular Jets
J.P. FIELDING	Cranfield University	UK	Development of Environmentally-Friendly Technologies and Configurations for Subsonic Jet Transports
J.M. FLORYAN	University of Western Ontario	CA	Design of Surface Roughness for Passive Flow Control
A. GIBSON	The Queen's University of Belfast	UK	An Investigation into the Effects of Experimental Errors on the Correlation Between Fea and Test Results for a Welded Fuselage panel
Z. GORAJ	Warsaw University of Technology	PL	Extreme Loads of a Trainer Jet Following a Sudden Deflection of Control Surface
D. GREENWELL	QinetiQ plc	UK	An Engineering Model of Delta Wing Vortex Breakdown
E. HANSEN	Bombardier Aerospace	CA	Fast and Accurate Surface and Grid Creation on a Complete Aircraft for a Cartesian Grid Based Euler Solver
I. JANICEK	Institute of Aerospace Engineering	CZ	Technological Trends in Simulation Technology in Aviation & Pilot Training
H. MUHAMMAD	Aerospace Eng.Dept.,Inst. of Tech. Bandung	ID	Aerodynamic Model Identification of the N-250 Aircraft
H. HOSSEIN	National University of Sciences & Technology	PK	Separation Control by Alternating Tangential Blowing/Suction at Multiple Slots
F.B. HSIAO	National Cheng Kung University	TW	Experimental Study of Turbulent Wake flow Development Behind a Finite Wing with High Angle of Attacks
X. HUANG	The Institute for Aerospace Research, NRC	CA	Centre-Body and Leading-Edge Bevel Effects on Delta Wing Aerodynamics at High Incidence
M. HUZMEZAN	Deptment of Electricam and Computer Engineering, University of British Columbia	CA	Reconfigurable control of an experimental Unmanned Air Vehicle (UAV)
S. KAINIKARA	RMIT University	AU	A System Approach to Identify Aerospace Research Capabilities at University
H. KANNEMANS	National Aerospace Laboratory NLR	NL	A Method to Derive the Usage of Hydraulic Actuators from Flight Data
M.S.KAVSAOGLU	Middle East Technical University	TR	Solution of an Airfoil-Flap Configuration by Using a Chimera Grid System
M.S.KAVSAOGLU	Middle East Technical University	TR	Multi Block Navier Stokes Solutions of Low Aspect Ratio Rectangular Flat Wings in Compressible Flows.
KHAN	Pakistan Air Force	PK	Flight Trajectories Optimization
Z. KHAN	National University of Sciences and Techn.	PK	The Influence of Multiple Nested Layer Waviness on Compression Strength of Carbon-Epoxy Composite Laminate
K.H. KIM	Sejong-Lockheed Martin Aerospace Research Center	KO	The Study of Monotonicity of AUSM - Type Schemes in Shock Discontinuities and Development of M-AUSMPW +
J. LALIBERTE	Carleton University/IAR-SMPL	CA	Numerical Modelling of Low-Velocity Impact Damage in Fibre-Metal Laminates
M.T. LEE	National Cheng Kung University	TW	The Development of a Low Cost Autonomous Unmanned Aerial Vehicle
T.M. LEE	RMIT University	AU	Signal Subspace Identification & Noise Reduction of Flight Test Data with Truncated Singular Value Decomposition
H.H.T. LIU	Toronto University	CA	Control Integration Process in Aircraft Systems Development
H. LOU	Polytechnic University, Turin, Italy	IT	A Simple and Nonlinear Aerodynamic Modeling for Delta With with LEV Breakdown Involved
E. LY	National Aerospace Laboratory of Japan (NAL)	JP	Time Linearised Transonic Small Disturbance Codes Including Entropy and Vorticity Effects
R. MARSILIO	Aerospace Department - Politecnico di Torino	IT	Implementation and Validation of the Spalatr-Allmaras Turbulence Model for High Speed Flows

H. MECHLER	Lehrstuhl für Luftfahrttechnik, TU München	DE	Integrated Parametric Aircraft Design
I. MEMON	College of Aeronautical Engineering	PK	Fatigue life prediction of 3-D problems by Damage Mechanics approach for two block loading
J.J. MIAU	National Cheng Kung University	TW	Normal and Side Forces Amplification by Lateral Jet Issued from an Ogive Cylinder
M. MOELYADI	Aerospace Eng.Dept.,Institute of Technology Bandung	ID	Improvement of Transonic Aerofoil Aerodynamic Performance with Trailing Eddge Modifications using Wedge Configuration
S. MONDOLONI	CSSI	US	Common Trajectory Modeling for air Traffic Management Decision Support Tools
R.K. NANGIA	Nangia Aero Research Associates	UK	On Design of Unconventional High Aspect Ratio "Joined-Wing" Type Aircraft
C. PAGWIWOKO	University of Science Malaysia, School of Aerospace Eng.	MY	Dynamic Modeling and Time Domain Simulation of Non-Linear Flutter with the Existence of Free-Play Mechanism
M. PARASCHIVOIU	University of Toronto	CA	A fully-implicit multi-model formulation for compressible flows on 3D unstructured Meshes
H.M.PASARIBU	Aerospace Eng.Dept.,Institute of Technology Bandung	ID	Analysis of Flight Performance and Stability of Family of Transport Airplane Designs with Fuselage Commonalities
A. PISTEK	Institute of Aerospace Engineering, Brno University of Technology, Czech Republic	CZ	Development of a New Generation of Aircraft for Pilot Training
A. PISTEK	Institute of Aerospace Engineering, Brno University of Technology, Czech Republic	CZ	Matrix Formulation of Wing Loading Distribution
E. PRASETYO	Indonesian Aerospace, Bandung, Indonesia	ID	The Application of Hybrid Laminar Flow Control and Variable Camber Flap as a Flow Control on the Wing for Regional Aircraft Family
Z. QIAO	Northwestern Polytechnical University	CN	Numerical Simulation of Navier-Stokes Equations for Helicopter rotor in forward flight Using Moving Chimera Grids
B. RASUO	University of Belgrade	YU	An Experimental Methodology For Evaluating Survivability of an
Z. REN	Beijing Univ. of Aeronautics and Astronautics	CN	Torque Control System Based on Compound Control Strategies for Aerodynamic Load Simulator
A.D.ROGERS	Department of Mechanical Engineering, University of New Brunswick	CA	Predicting cure kinetics for a non-isothermal cure process with a conventional isothermal DSC technique.
M. ROSEN	Ryerson University	CA	Exergy-based Loss Analysis of a Turbojet Over a Flight Cycle
T. RYZHOVA	Central Aerohydrodynamic Institute (TsAGI)	RU	Development of Ultrasonic Method of Radial Clearance Assessment for Bolted joints at Restricted
W. SANG	Northwestern Polytechnical University	CN	Numerical Simulation of the Store Separation Using Unstructured Cartesian Grid
S. SANKARAN	Hindustan College of Engineering	IN	Numerical Investigation on the Flow Characteristics of a Supersonic Jet Impinging on an Axi-Symmetric Deflector
M. SCOTT	RMIT University	AU	Innovative Techniques for the Finite Element Analysis and Optimisation of Composite Structures
M. SCOTT	RMIT University	AU	Calculating the Cost of a Carbon Composite Structure from Within a Finite Element Model
S.A. SJOILANDER	Carleton University	CA	Impact of Flow Quality in Transonic Cascade Wind Tunnels : Measurements in an HP Turbine Cascade at Design and Off-Design Conditions
H.Y. SUTARTO	Bandung Institute of Technology	ID	Robust Model Updating of an Aeroelastic Typical Wing Section System Using Experimental Data
J. SYMS	National Research Council Canada	CA	Validation of Analytic Tool for Subscale Propeller Tests
M. TARKAN	Middle East Technical University	TR	Active Vibration Control of a Smart Plate
W. TI	Chinese Flight Test Establishment	CN	Flight Test Management and Command Guidance System for Flight Test
W. WADEHN	Research Assistant	HU	Structural Concepts and Aerodynamic Design of Shock Control Bumps
T. WAN	Department of Aerospace Engineering, Tamkang University	CN	Aircraft Landing Performance Analysis under the influence of Heavy Rain and Gust Wind
X. WU	National Research Council of Canada	CA	Thirty years of retrogression and reaging
Y. YAMAN	Middle East Technical University	TR	Active Vibration Control of a Smart Plate
S. YARUSEVYCH	University of Toronto	CA	Influence of Acoustic Disturbances on Airfoil Performance in Low Reynolds Number flows
Q. YUJI	Beijing Univ. of Aeronautics and Astronautics	CN	Waverider Design Based on the OA (Osculating Axisymmetric) Concept and Inverse Method of Characteristics
Z.M.ZAIN	Mara University of Technology	MY	Design Issues Relating to Ultralight Helicopters with Large Compounds Rotors Operating in Ground Effect

POSTERS

	NAME	AFFILIATION	COUNTRY	TITLE	TOPICS
M.	ASIM	Pakistan Air Force	PK	Designing and Development of Unmanned Aerial Vehicle	1
P.	BALABUYEV	Antonov Aeronautical Scientific	UA	AN-70 Stoll Propfan Aircraft Performance at High Angles of Attack	2
E.	BERTON	CNRS	FR	Centrifugal and 3D effects on the near tip section of rotating blades	2
LM.BC.	CAMPOS	IST	PT	On Safe Separation Between Aircraft and Related Requirements on Position Accuracy	8
F.M.	CATALANO	University of Sao Paulo	BR	Viscous and Wave Drag Optimization for a Transport Aircraft Mission Adaptive Wing	2
Y.Y.	CUI	Beijing Aeronautical Tech. Research Center	CN	Analysis of Preventive Maintenance Program Improvement for In-service Aircraft	8
N.	DE DIVITIIS	Department of Mechanics and Aeronautics	IT	Aerodynamic Modeling and Performance Analysis of a Shrouded Fan Unmanned Aerial Vehicle	2
J.	GAO	Northwestern Polytechnical Univ.	CN	Using Data Mining Method for Analyzing OTS Capture Zone	6
M.S.	KAVSAOGLU	Middle East Technical University	TR	Multi Block Navier Stokes Solutions of Low Aspect Ratio Rectangular Flat Wings in Compressible Flow	2
J.	LALIBERTE	Carleton University	CA	Numerical Modelling of Low-Velocity Impact Damage in Fibre-Metal Laminates	3
K.	LI	Beijing Univ. of Aeronautics and Astronautics	CN	Real-time, Distributed, Parallel Simulation of Hydraulic System Based on Linux in the Network	6
Z.	LI	Chinese Flight Science Technology Institute	CN	The Verification of Flight Test for Airborne Electro-Optical Detecting Systems	6
H.H.T.	LIU	Toronto University	CA	Control Integration Process in Aircraft Systems Development	6
Z.	MALER	Moravan a.s.	CZ	Securing of the Safety and Economy of the Acrobatic Airplane Service	9
B.	NAGABHUSHAN	Saint Louis University	US	Design Trends and Global Developments of Modern LTA Vehicles	1
R.K.	NANGIA	Nangia Aero Research Associates	UK	On Design of Unconventional High Aspect Ratio "Joined-Wing" Type Aircraft	2
E.	PRASETYO	Indonesian Aerospace	ID	The Application of Hybrid Laminar Flow Control and Variable Camber Flap as a Flow Control on the Wing for Regional Aircraft Family	2
V.	RIABOV	Univ. of New Hampshire	US	Computational and Analytical Methods in the Aircraft Design Curriculum	1
T.	RICHTER	Lehrstuhl für Luftfahrttechnik	DE	Integrated Parametric Aircraft Design	1
T.B.	RYZHOVA	TsAGI	RU	Development of Ultrasonic Method of Radial Clearance Assessment for Bolted joints at Restricted	3
G.M.	SAGGIANI	University of Bologna	IT	A Fuzzy Logic Autopilot Development for a Light Twin Engine Aircraft in the Approach Flight Condition	5
R.	SLINGERLAND	Delft University	NL	Intake Downwash for Rear Fuselage Mounted Engines	4
H.	SONG	Chinese Flight Science Technology Institute	CN	Avionics Data Communication Networks Modling and Analysing	
G.	SURACE	Polytechnic of Turin	IT	Experimental assessment and analysis of the crew-workload	9
R.B.	TAHIR	Ryerson Polytechnic University	CN	Comparison of 1D and 2D Numerical Models for Predicting Hypersonic Inlet Flow Startling	2
	TARKAN	Middle East Technical University	TR	Active Vibration Control of a Smart Plate	3
W.	WADEHN	University of Stuttgart	DE	Structural Concepts and Aerodynamic Design of Shock Control Bumps	7
G.	WALLER	Bombardier Aerospace	CA	CFD Prediction of Stability and Control Derivatives of Turbo-prop Aircraft Using a Cartesian Grid Based Euler Code	5
Y.	WANG	PR. China Civil Aviation Flight College	CN	A Method of Estimating Airplane Turbulence Using Wing Data	9
C.	YAN	PR. China Civil Aviation Flight College	CN	Reduced Thrust Take-off	8
S.	YARUSEVYCH	University of Toronto	CA	Influence of Acoustic Disturbances on Airfoil Performance in Low Reynolds Number Flows	2
Q.	YUJI	Beijing Univ. of Aero. & Astro.	CN	Waverider Design Based on the OA (Osculating Axisymmetric) Concept and Inverse Method of Characteristics	2
G.	ZDOBYSLAW	Warsaw University of Technology	PL	New Technology of Flow Pattern Control in Case of an Airfoil	5

GENERAL INFORMATION

LOCATION AND DATES

The 23rd Congress of the International Council of the Aeronautical Sciences will be held at the Royal York Hotel in Toronto, Canada from Sunday 8th to Friday 13th September.

REGISTRATION FEES (CANADIAN DOLLARS)

Category

Member (Early-before June 15)*	\$ 850
Member *	\$1050
On-site Member*	\$1150
Non-Member (Early-before June 15)	\$1050
Non-Member	\$1250
On-site Non-Member	\$1350
Student**	\$ 250 (without CD-ROM)
Day Delegate	\$ 400 (without CD-ROM)
Accompanying Person***	\$ 160

CONDITIONS

* Members of any ICAS Member Associations. Membership number must be supplied. Early means before June 15.

** The Student verification section of the registration form must be completed and signed. Student registrations without this section completed will be returned.

*** Each accompanying person must be registered.

Registration fee includes

Full Delegates – Attendance at the Congress sessions and Technical Tours (subject to availability), refreshments and light lunch each day, Reception on Sunday, Buffet Supper on Monday, Green Lecture lunch on Tuesday, book of abstracts, proceedings on CD-ROM and registration kit.

Students – Attendance at the Congress sessions and Technical Tours (subject to availability), refreshments and light lunch each day, Reception on Sunday, Buffet Supper on Monday, Green Lecture lunch on Tuesday, book of abstracts and registration kit.

Day Delegates – Attendance at the Congress sessions, refreshments and light lunch on day of attendance, book of abstracts and registration kit.

Paper Hard Copies – Hard Copies are not included in the registration fees. Nevertheless they will be available on site at the cost of CAN \$ 4/ per paper.

Accompanying Persons – Attendance at Reception on Sunday, City Bus Tour of Toronto and Buffet Supper on Monday, and registration kit.

Volatility in the aeronautics and travel industries may necessitate changes to the events and amenities included in the registration fees.

REGISTRATION AND PAYMENT

All participants are required to complete the registration form found in this Program. Payment of the full registration fee must be included with your registration form. Registrations are transferable.

For further information, please contact:

23rd ICAS Congress
Canadian Aeronautics and Space Institute
1685 Russell Road, Unit 1-R, Ottawa, ON K1G 0N1 Canada
Telephone: (613) 234-0191 Fax: (613) 234-9039
E-mail: casi@casi.ca Web: www.casi.ca

METHODS OF PAYMENT

All payments should be made in Canadian Dollars.

Cheque:

Cheques should be made payable to CASI and enclosed with this registration form. Please add \$10 if your cheque is not drawn on a Canadian bank.

Bank Transfer:

Account No: 00006 – 003 – 1102631
Bank: Royal Bank of Canada
Address: 90 Sparks Street
Ottawa ON Canada K1P 5T6
(613) 564-3100

Credit Card:

Visa, MasterCard and American Express are accepted.

Confirmation will be sent to you as soon as your registration form and payment are received and processed.

CANCELLATION OF REGISTRATION

Written notification of cancellation must be received by 15th August 2002 in which case registration fees will be refunded less a cancellation fee of \$50.

Cancellations received after 15th August 2002 are non-refundable.

REGISTRATION DESKS

PREPAID Registrations: Mezzanine Level, Canadian Foyer ON-SITE Registrations: Convention Level, Toronto Room

Business hours

Sunday	14:00 – 19:00 hours
Monday	07:00 – 17:00 hours
Tuesday – Thursday	07:30 – 17:00 hours

SOCIAL PROGRAM

Sunday 8th September Reception 19:00 – 21:00 hrs
(included in Delegate and Accompanying Persons fee)
 Delegates and Accompanying Persons are invited to attend a Reception
Extra tickets \$25

Monday 9th September Buffet Supper 19:00 – 22:00 hrs
(included in Delegate and Accompanying Persons fee)
 Delegates and Accompanying Persons are invited to attend a buffet supper
Extra tickets \$70

Tuesday 10th September Lunch & John Green Memorial Lecture 12:30 – 14:30 hrs
(included in Delegate fee)
 Delegates are invited to attend a lunch followed by the Memorial Lecture
Extra tickets \$50

Thursday 12th September ICAS 2002 Dinner 19:30 hrs
 The Awards dinner will be held in the Royal York Hotel, preceded by a cash bar,
 and will include a three-course dinner with wine
\$95 per person

ACCOMPANYING PERSONS PROGRAM *(subject to minimum numbers of participants)*

Monday 9th September Morning Tour 09:00 – 12:00 hrs
Sights of Toronto Bus Tour *(included in fee)*

The morning tour will pass by the Roy Thompson Concert Hall, Casa Loma, City Hall, Yorkville district, Eaton Centre, Royal Ontario Museum, Ontario Art Gallery, Chinatown, Skydome and CN Tower, etc.

Lunch 12:00 – 14:00 hrs
 Lunch on Boat Tour of Toronto Harbour and Islands or at CN Tower
\$35 per person

The afternoon is available for local shopping or sightseeing

Tuesday 10th September All-day Tour 09:00 – 15:00 hrs
Niagara Region \$95 per person

Includes stops at Town of Niagara-on-the-Lake, Butterfly Conservatory, Niagara Gorge, Whirlpool and Horseshoe (Canadian) Falls, historic sites, Shaw Theatre, Botanical Gardens and Niagara Parks. Time is available for a ride on the Maid of the Mist boat, or tunnels behind the Falls. Lunch is included.

Wednesday 11th September Half-day Tour 09:00 – 14:00 hrs
Morning - Black Creek Pioneer Village \$65 per person
Lunch - at the Village

The village site was an operating farm from early 1800's. Now contains the original farm buildings plus original homes, school and flour mill with demonstrations of various small stores and businesses from the early 1800's.

Wednesday 11th September Half-day Tour 11:00 – 16:00 hrs
Lunch - Doctor's House, Kleinburg \$65 per person
Afternoon - McMichael Gallery

Kleinburg is a picturesque small town on the outskirts of Toronto. It is famous as the site of the McMichael Collection including paintings by the Canadian Group of Seven artists and also native works of art.

The Gallery is housed in an imposing log timbered structure set in a forested ravine area surrounded by trails.

Wednesday 11th September Combined All-day Tour 09:00 – 16:00 hrs
Morning - Black Creek Pioneer Village \$100 per person
Lunch - at the Village
Afternoon - McMichael Gallery

See descriptions above. Transportation between attractions will be provided.

Friday 13th September All Day Tour 09:00 – 15:00 hrs
Niagara Region \$95 per person

Includes stops at Town of Niagara-on-the-Lake, Niagara Gorge, Whirlpool and Horseshoe (Canadian) Falls, winery visit, historic sites, Shaw Theatre, Botanical Gardens and Niagara Parks. Time is available for a ride on the Maid of the Mist boat, or a visit to the tunnels behind the Falls. Lunch is included.

TECHNICAL TOURS

Technical Tours 1, 2 and 3 are included in the registration fee for Full Delegates and Students. Lunch is included in each Tour, and will be served at one of the facilities visited. Technical Tours are offered subject to availability and minimum numbers of participants - please check with the Registration Desk on Thursday September 12.

Friday 13 September 08:30 to 15:00 hrs

The following Tours have been arranged with the kind cooperation of Bombardier Aerospace, Defence Research and Development Canada, Flight Safety Canada Inc., MacDonald Dettwiler, Pratt & Whitney Canada Inc., and University of Toronto Institute for Aerospace Studies.

TECHNICAL TOURS I

Bombardier Aerospace and University of Toronto Institute for Aerospace Studies

Participants will have the opportunity to see the final development engineering and assembly lines for the Bombardier Dash-8 turbo-prop family and the Global Express business jet. This is followed by a visit to the UTIAS laboratories to see the research flight simulator facility, aerospace materials test lab, CFD lab and ornithopter work.

TECHNICAL TOURS II

Flight Safety Canada, Defence Research and Development Canada, and University of Toronto Institute for Aerospace Studies

Participants will have the opportunity to see Flight Safety training simulators for all Bombardier (deHavilland) aircraft; DRDC facilities including the human centrifuge, high altitude simulator, diving research facility and virtual reality lab; and at the UTIAS laboratories, the research flight simulator facility, aerospace materials test lab, CFD lab and ornithopter work.

TECHNICAL TOURS III

Pratt & Whitney Canada and MD Robotics

At P&WC participants will see assembly and test areas for civilian turbofan engines, and receive a briefing on the use of CFD applications. The visit to MD Robotics will include the International Space Station Remote Manipulator System manufacturing area.

Monday 16 September (post-Congress tour) 08.30 to 16:00 hrs

The Institute for Aerospace Research of the National Research Council Canada invites delegates to visit their laboratories in Ottawa. Persons may register at the NRC booth in the Canadian Room of the Royal York Hotel during the conference. Visitors will be responsible for their own travel to Ottawa and their hotel accommodation in Ottawa.

The visit will cover the major facilities of the three IAR laboratories: the Aerodynamics Laboratory, the Flight Research Laboratory, and the Structures, Materials and Propulsion Laboratory located at the Uplands Airport Campus and the Montreal Road Campus. Transportation from one Laboratory to the other will be provided, along with a light lunch. There will be a limit of 25 participants for this visit.

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HOTEL INFORMATION FORM

23rd Congress of the International Council of the Aeronautical Sciences
8th September - 13th September 2002, Toronto, Canada

Please complete the form in BLOCK CAPITALS
Mail/fax the form to the hotel of your choice, Reference ICAS

On receipt of this application, a provisional booking will be sent to you BY THE HOTEL
with details of payment and cancellation charges
Telephone: (613) 234-0191 Fax: charges.

Guest: Surname Guest First Name:

Share With: Surname First Name:

Organization:

Mailing Address:

City: Prov./State: Postal/Zip Code:

Country:

Telephone (work): Telephone (home):

Fax: E-mail:

Arrival Date: **Departure Date:** **Number of Nights:**

Number of Rooms: Single: Double: Twin: **Total Number to be Accommodated:**

Credit Card : **Expiry date :** **Cardholder name:**

The Fairmont Royal York Hotel has set aside a quantity of rooms for ICAS delegates and accompanying persons.
Mention code ICAS when you register. This will entitle you to the special Conference rates below (CAN.\$).

Conference hotel	Description	Rating	Single	Double/Twin	Deluxe
FAIRMONT ROYAL YORK 100 Front Street West Toronto, ON M5J 1E3 Tel: 416-863-6333 or 1-800-441-1414 Fax: 416-368-9040	A grand hotel in the heart of the city. Airport connections, on subway, close to main railway station and bus station, convenient to all main shops, entertainment, restaurants.	****	CAN. \$208	CAN. \$208	Single/double Occupancy CAN. \$228
			confirmed rate for ICAS	confirmed rate for ICAS	confirmed rate for ICAS

Delegates may wish to contact other hotels - a wide variety of style and rates is available. Two are shown below.

Hotel	Description	Rating	Availability and prices
Royal Meridien King Edward Hotel 37 King Street East Toronto ON M5C 1E9 Phone: (416) 863-3131 Fax: (416) 367-5515	One of Toronto's most elegant hotels in style, service, ambience and décor. Located downtown, 7-10 minute walk from Conference Hotel.	****	Contact hotel for rates and availability Approximate rate CAN. \$285 and up
Quality Inn Downtown 111 Lombard Street Toronto ON M5C 2T9 Phone: (416) 367-5555 Fax: (416) 367-3470	Downtown near Eaton's Centre, City Hall 12-15 minute walk from Conference Hotel, 10 minutes by subway.	**	Contact hotel for rates and availability Approximate rate CAN. \$139 and up

REGISTRATION FORM

23rd Congress of the International Council of the Aeronautical Sciences
8th September - 13th September 2002, Toronto, Canada

PLEASE RETURN TO: Canadian Aeronautics and Space Institute

1685 Russell Road, Unit 1R, Ottawa, ON, Canada K1G ON1
Telephone: (613) 234-0191 Fax: (613) 234-9039
E-mail: casi@casi.ca Website: www.casi.ca

Personal Details

Please type or print clearly

Surname: Other Names:

Title: Prof. Dr. Mr. Ms. Other: Position:

Organization:

Department:

Address:

City: Prov./State:

Postal/Zip Code: Country:

Telephone: Fax:

E-mail:

Member Association (if applicable): Membership No:

Special Dietary or Other Requirements:

Students

I verify that this delegate is a full-time student studying at:

Institution: in the department of :

Signed: Date:

Name: Position:

Accompanying persons

(1) (2) (3)

REGISTRATION FEES INCLUDE

FULL DELEGATES	Attendance at the Congress sessions and Technical Tours (subject to availability), refreshments and light lunch each day, Reception on Sunday, Buffet Supper on Monday, Green Lecture lunch on Tuesday, book of abstracts, proceedings on CD-ROM and registration kit.
STUDENTS	Attendance at the Congress sessions and Technical Tours (subject to availability), refreshments and light lunch each day, Reception on Sunday, Buffet Supper on Monday, Green Lecture lunch on Tuesday, book of abstracts and registration kit.
DAY DELEGATES	Attendance at the Congress sessions, refreshments and light lunch on day of attendance, book of abstracts and registration kit.
ACCOMPANYING PERSONS	Attendance at Reception on Sunday, City Bus Tour of Toronto and Buffet Supper on Monday, and registration kit.

(1) REGISTRATION FEES (Canadian dollars)

Type	Number	Before June 15	After June 15	On site	Total (\$) Cdn
Member*	\$850	\$1,050	\$1,150
Non-Member*	\$1050	\$1,250	\$1,350
Student*	\$250	—	—
Day Attendance	\$400	—	—
Accompanying Person	\$160	—	—
CD-ROM	—	—	\$100

(* Please refer to General Information for Conditions)

(2) CONGRESS FUNCTIONS

Date	Function	Cost	No. of Tickets	Total \$
Sun 8 Sept	Reception	Included for delegates & accompanying persons		
	Extra Tickets	\$25.	x _____ =	\$ _____
Mon 9 Sept	Buffet Supper	Included for delegates & accompanying persons		
	Extra Tickets	\$70.	x _____ =	\$ _____
Thur 12 Sept	ICAS 2002 Dinner	\$95	x _____ =	\$ _____
			Sub-total _____	\$ _____

(3) ACCOMPANYING PERSONS

Mon 9 Sept	AM - Toronto Sights Bus Tour	Included in fee. Please indicate if you will participate.	Yes ____	No ____
	Noon - Boat Cruise or CN - Tower & Lunch	\$35.	x _____ =	\$ _____
Tue 10 Sept	All-day tour Niagara Falls	\$95.	x _____ =	\$ _____
Wed 11 Sept	A) Morning tour Pioneer - Village, lunch	\$65.	x _____ =	\$ _____
	B) Afternoon tour-Lunch, McMichael Collection	\$65.	x _____ =	\$ _____
	C) All-day tour-Pioneer Village, Lunch, McMichael Collection	\$100.	x _____ =	\$ _____
Fri 13 Sept	All-day tour-Niagara Falls	\$95.	x _____ =	\$ _____
			Sub-total _____	\$ _____

(4) TECHNICAL TOURS

Subject to availability	1st Choice	2nd Choice	3rd Choice
Friday 13 Sept	•Bombardier, University of Toronto Institute for Aerospace Studies	_____	_____
	•Flight Safety, Defence and Civil Institute of Environment Medicine, University of Toronto Institute for Aerospace Studies	_____	_____
	•Pratt & Whitney Canada	_____	_____

SUMMARY OF PAYMENT

Total Payment Enclosed (1) + (2) + (3) + (4) = \$ _____

Methods of Payment: All payments should be made in Canadian dollars.

- Cheque** Cheques should be made payable to CASI and enclosed with the registration form. Please add \$10.00 if your cheque is not drawn on a Canadian bank.
- Bank Transfer** Payment can be made by bank transfer into account 00006003-act.1102631, Royal Bank, 90 Sparks Street, Ottawa, ON K1P 5T6.
- Credit Cards** Visa, MasterCard and American Express only.
 Visa Mastercard American Express

Card No: _____ Expiry Date: ____/____

Signature: _____

Written notification of cancellation must be received by 15 August 2002. Fees will be refunded less \$50.00. After 15 August, registration fees will be non-refundable.
Note: All prices include Canadian federal tax (GST) of 7%. GST #R106842149