



FINAL PROGRAM

ISABE 2022

PROPULSION TECHNOLOGIES
FOR A **GREENER FUTURE**

25th ISABE Conference

25-30 September 2022

Ottawa, Canada



Local Organizer



National Research
Council Canada

Conseil national de
recherches Canada





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WELCOME TO OTTAWA, CANADA

As the ISABE Vice-President, it is my privilege to welcome you to Ottawa, Canada for ISABE 2022 on its special golden jubilee anniversary. As a proud supporter of ISABE since its formation fifty years ago, my organization, the National Research Council of Canada, would like to extend a special welcome to all delegates of ISABE 2022.

With the 5th largest Aerospace industry, Canada is an Aerospace nation. The Canadian Aerospace industry is well diversified in the Civil, Defence and Space sectors, generates over \$31 billion in revenue each year, and employs 215,000 highly qualified professionals in every region of the country. Canadians are immensely proud of their aerospace heritage from the Avro Arrow, to the Canadarm. Canada is also a major player in the gas turbine segment, being home to the world's #1 manufacturer of turboprop and turboshaft engines, Pratt & Whitney Canada. Given our climate, Canada can also claim to be the engine icing certification capital of the world.

As Canada's Capital city, Ottawa is a hub for the Aerospace, Defence and Security sectors. Seven of the world's top ten Aerospace and Defence companies have their Canadian headquarters in Ottawa and it is home to Canada's armed forces, aerospace regulators, and the testing facilities of the National Research Council of Canada.

At ISABE 2022, it is my hope that you will have productive technical discussions, as well as plenty of opportunities to reconnect with old friends and make new acquaintances—all adding up to an enriching and memorable time.



During your stay with us, please take a moment to explore the City of Ottawa and its surrounding areas. With museums, galleries and landmarks like the Rideau Canal (a UNESCO World Heritage site) or the historic Byward Market within walking distance, you will have plenty to choose from. At the same time, you are never far from nature. You may also just be in time to treat yourself to our brilliant fall colours—a classic Canadian scenery at the nearby Gatineau Park.

Once again, we are delighted to welcome you to Ottawa for the 25th ISABE conference, and invite you to experience the best that the city has to offer during your stay.



DR. IBRAHIM YIMER

Ibrahim Yimer

ISABE Vice-President
*Director-General, Aerospace,
National Research Council
of Canada*



LIST OF SPONSORS

PLATINUM



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ISABE COMMITTEE

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GREENING AVIATION SEMINAR

HYDROGEN & DECARBONISATION SCENARIOS



SATURDAY 24, SEPTEMBER 2022

Hotel Novotel, Montréal Aéroport
2599 Boul. Alfred Nobel
Montreal, Quebec H4S 2G1

FEE:

- US\$490
- US\$100 for Students & ISABE Conference Delegates

TUESDAY 27, SEPTEMBER 2022

Shaw Centre
55 Colonel By Drive
Ottawa, Ontario K1N 9J2

FEE:

- US\$490
- US\$100 for Students
- Complimentary for all ISABE Conference Delegates

Image courtesy of EU H2020 project ENABLEH2

PROGRAMME

From ISABE Education, CNRC and Cranfield University

- Introduction & Welcome
- Hydrogen Airliners - *Pilidis*
- Hydrogen and Low NOx - *Sethi*
- Contrails & Abatement - *Nalianda*
- Hydrogen R&D - *Sethi*
- Aircraft Electrification - *MacRae*
- Decarbonising a Country - *Pilidis*
- Discussion Session



Natesa MacRae
H₂ Technologies lead for CNRC's Low Emission Aviation Program and senior researcher in aircraft electrification and green engineering.



Devaiah Nalianda
Lead Propulsion System Performance & Integration at Cranfield. Thought leadership in contrail formation and abatement.



Pericles Pilidis
Led the gas turbines and propulsion team at Cranfield to thought leadership in the use of hydrogen for greening aviation.



Vishal Sethi
Head of Cranfield Low Emission Technologies & Combustion Group, Leader EU EnableH₂ and many other hydrogen projects.

 National Research Council Canada  Conseil national de recherches Canada



ISABE Short Courses



CONFERENCE SCHEDULE

TIME	SUNDAY SEPTEMBER 25, 2022	MONDAY SEPTEMBER 26, 2022
7:30		
8:00		Registration & Breakfast
8:30		
9:00		Conference Opening Chief Guests: Mr. Iain Stewart (President, NRC), Mr. Mike Mueller (President, AIAC), and Mr. Jim Watson (Mayor, Ottawa). Rm 206-208
9:30		
10:00		Coffee Break (Rideau Canal Atrium)
10:30	Business Pre-Meeting (By invitation only)	
11:00	Rm 210	Technical Session 1-1
11:30		
12:00		Lunch (Ottawa Salon)
12:30		
13:00		Dr. Jean Thomassin, Pratt & Whitney Canada "PW's pragmatic approach to sustainability: Focus to sub-100 PAX airplanes". Rm 206-208
13:30		
14:00		Dr. Stéphane Orcel, Safran Aircraft Engines "Facing Environmental Challenges: A Market Vision for Aeronautical Propulsion". Rm 206-208
14:30		
15:00	ISABE 2022 Business Meeting (For board members only)	Coffee Break (Rideau Canal Atrium)
15:30	Rm 210	
16:00		Technical Session 1-2
16:30		
17:00		Dr. James Kenyon, NASA Glen Research Center Keynote. Rm 206-208
17:30	Registration & Welcome Reception Open Bar (For all attendees)	
18:00	Rideau Canal Atrium	
18:30		
19:00		
19:30		
20:00		Industry Dinner (For all attendees) Canadian Aviation and Space Museum
20:30		
21:00		Buses depart from the Shaw Centre at 1800 hrs and 1845 hrs.
21:30		
22:00		



CONFERENCE SCHEDULE (CONTINUED)



TIME	TUESDAY SEPTEMBER 27, 2022	WEDNESDAY SEPTEMBER 28, 2022	
7:30	Registration & Breakfast	Registration & Breakfast	
8:00	Prof. Pericles Pilidis, Cranfield University "H. I. H. Saravanamuttoo Lecture: A Perspective on Hydrogen for Aviation". Rm 206-208	Ms. Lisa Teague, Rolls-Royce Corporation "Development of sustainable technologies at Rolls-Royce". Rm 206-208	
8:30			
9:00	Dr. Frank Rick, MTU Aero Engines "MTU's thrust for a sustainable future". Rm 206-208		
9:30			
10:00	Coffee Break (Rideau Canal Atrium)		
10:30			
11:00	Technical Session 2-1		
11:30			
12:00	Lunch (Ottawa Salon)		Technical and Recreational Tours
12:30			Montreal Technical Tour: Bus departs from the Shaw Centre at 0800 hrs.
13:00	Dr. Joao Luiz F. Azevedo, ICAS "Progress in Aeronautics: Some Reflections on the Recent ICAS Congresses". Rm 206-208	Ottawa Technical Tour: Bus departs from the Shaw Centre at 0900 hrs.	
13:30			
14:00	Prof. Jean-Francois Brouckaert, Clean Sky Joint Undertaking "Clean Aviation: Towards Climate Neutrality in 2050". Rm 206-208	1000 Islands Tour: Bus departs from the Shaw Centre at 0900 hrs.	
14:30			
15:00	Coffee Break (Rideau Canal Atrium)		
15:30			
16:00	Technical Session 2-2		
16:30			
17:00	Mr. Stephen Clark, Boeing "Boeing's Sustainability Commitment". Rm 206-208		
17:30			
18:00			
18:30			
19:00			
19:30			
20:00	ISABE Board & Invited Speakers Dinner (By invitation only) Westin Ottawa - TwentyTwo		
20:30			
21:00			
21:30			
21:30			
22:00			



TIME	THURSDAY SEPTEMBER 29, 2022	FRIDAY SEPTEMBER 30, 2022
7:30	Registration & Breakfast	Registration & Breakfast
8:00	Dr. Adam Dissel, Reaction Engines "Thermal Management Breakthroughs for Propulsion: From Sustainable Aviation to High Mach Flight". Rm 206-208	Dr. Henrik Runnemalm: GKN Aerospace Engine Systems "Propulsion Solutions for Sustainability: Focus on Subsystems and Competency". Rm 206-208
8:30		
9:00	Dr. Arne Seitz, Bauhaus Luftfahrt "Towards Climate-Neutral Aviation: Revolutionary Options for Aircraft Motive Power". Rm 206-208	Mr. John Jastremski, MDS Aero Support "Deconstructing Propulsion Validation: The Impact of Disruptive Technologies on Engine Test". Rm 206-208
9:30		
10:00	Coffee Break (Rideau Canal Atrium)	Coffee Break (Rideau Canal Atrium)
10:30		
11:00	Technical Session 4-1	Technical Session 5-1
11:30		
12:00	Lunch (Ottawa Salon)	Lunch (Ottawa Salon)
12:30		
13:00	Dr. Suzanne Kearns, University of Waterloo "Developing a sustainable workforce within aviation and aerospace to drive future innovation". Rm 206-208	Dr. Frank Haselbach, Airbus "Towards Sustainable Aviation". Rm 206-208
13:30		
14:00	Dr. Fassi Kafyeke, Bombardier "Advances in Aviation Technology for Decarbonization". Rm 206-208	Technical Session 5-2
14:30		
15:00	Coffee Break (Rideau Canal Atrium)	Conference Closing PKey Conference Takeaways Panel Handover of ISABE Presidency Sneak peak of 26th ISABE Conference. Rm 206-208
15:30	Technical Session 4-2	
16:00		
16:30	Ms. Christine Andrews, GE Aviation "GE's Path Towards Sustainable Future of Flight". Rm 206-208	Farewell Coffee
17:00		
17:30		
18:00	Young Professionals Networking Event (For all students and young professionals)	
18:30	Open Bar, Shaw Centre–Trillium Ballroom	
19:00		
19:30		
20:00		
20:30	ISABE Gala Banquet and Awards Ceremony (For all attendees)	
21:00	Shaw Centre - Trillium Ballroom	
21:30		
22:00		



CONFERENCE DETAILS

CONFERENCE LOCATION

The 25th ISABE Conference will be held at the Shaw Centre in the middle of Ottawa's commercial heart. Ottawa is Canada's capital city. The city centre is well connected to Ottawa International Airport, about 20 minutes by bus or 15 minutes by taxi. Ottawa has direct international flights to many cities.

COVID-19 Entry to Canada Advisories:

Find out more about Covid-19 requirement for Canada

Find out more about the Conference Venue at: www.shaw-centre.com and www.ottawatourism.ca





SOCIAL EVENTS

INDUSTRY DINNER

Monday, September 28th, 2022

Canadian Aviation and Space Museum

Stunning elegance amid a world-renowned aerospace collection.

- Open to all conference registrants
- Canadian aviation history
- 8 km from downtown Ottawa, buses will be provided from the Shaw Centre



INVITED SPEAKERS DINNER

Tuesday, September 27th, 2022

Westin Hotel–TwentyTwo

- By Invitation only (Board Members, Invited Speakers and Award Recipients, and their Accompanying Partners)
- **TwentyTwo at The Westin Ottawa | An experience above all**



ISABE GALA BANQUET

Thursday, September 29th, 2022

Shaw Centre–Trillium Ballroom

This bright open space provides stunning views of the historic Rideau Canal and a 200 degree view of downtown Ottawa.

- Open to all conference registrants
- Reception and Formal Dinner
- ISABE Awards Presentation





ACCOMPANYING PERSONS PROGRAM

Those who are accompanying delegates to ISABE 2022 can register for the Accompanying Persons Program. The program features excursions in and around the Ottawa area, as well as tours at some of the main cultural and social sites. Registration as an accompanying person also includes access to the welcome reception, the industry dinner and the closing banquet dinner. Those accompanying board members or keynote speakers are in addition invited the board dinner.

The program itinerary is summarized below:

Sunday (25 Sep 2022):

Evening: Welcome reception at the **Shaw Centre**.

Monday (26 Sep 2022):

Late Morning/Early Afternoon: Welcome Meet & Greet and **Ottawa River Cruise**.

Evening: Industry dinner at the **Canadian Aviation & Space Museum**.

Tuesday (27 Sep 2022):

Late Morning/Early Afternoon: Byward Market Guided **Food Tour**.

Evening: At leisure to experience central Ottawa's wide range of eateries.

Those accompanying board members or keynote speaker are invited to dinner at **Twenty-Two Restaurant**.

Wednesday (28 Sep 2022):

Late Morning/Early Afternoon: Excursion to 1000 Islands, including **boat cruise and lunch**.

Evening: At leisure to experience Ottawa's wide range of eateries.

Thursday (29 Sep 2022):

Morning: A visit to the **National Gallery of Canada**.

Afternoon: At leisure to explore Ottawa.

Evening: Closing banquet dinner at the **Shaw Centre**.

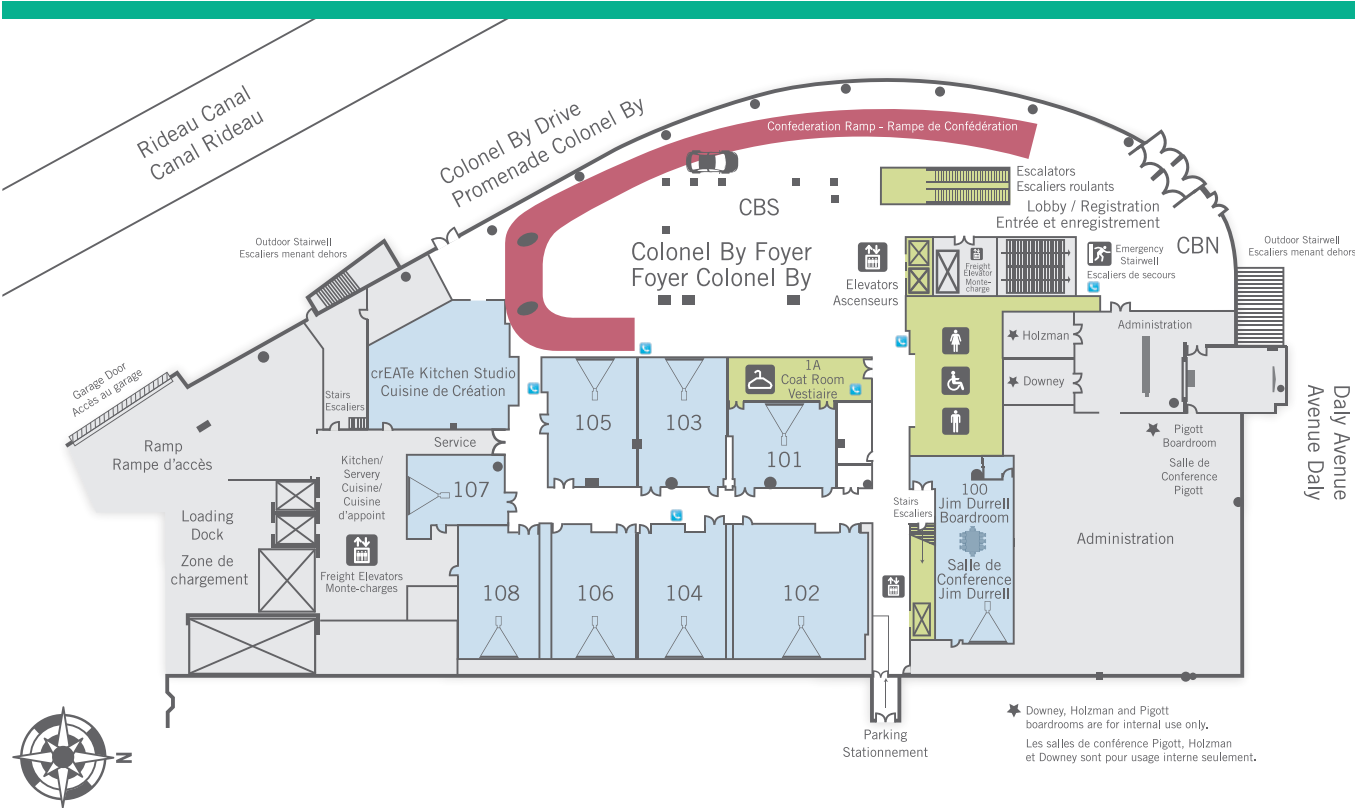
Registration is now open!
Register here.



VENUE MAP

SHAW CENTRE

LEVEL 1



SHAW CENTRE

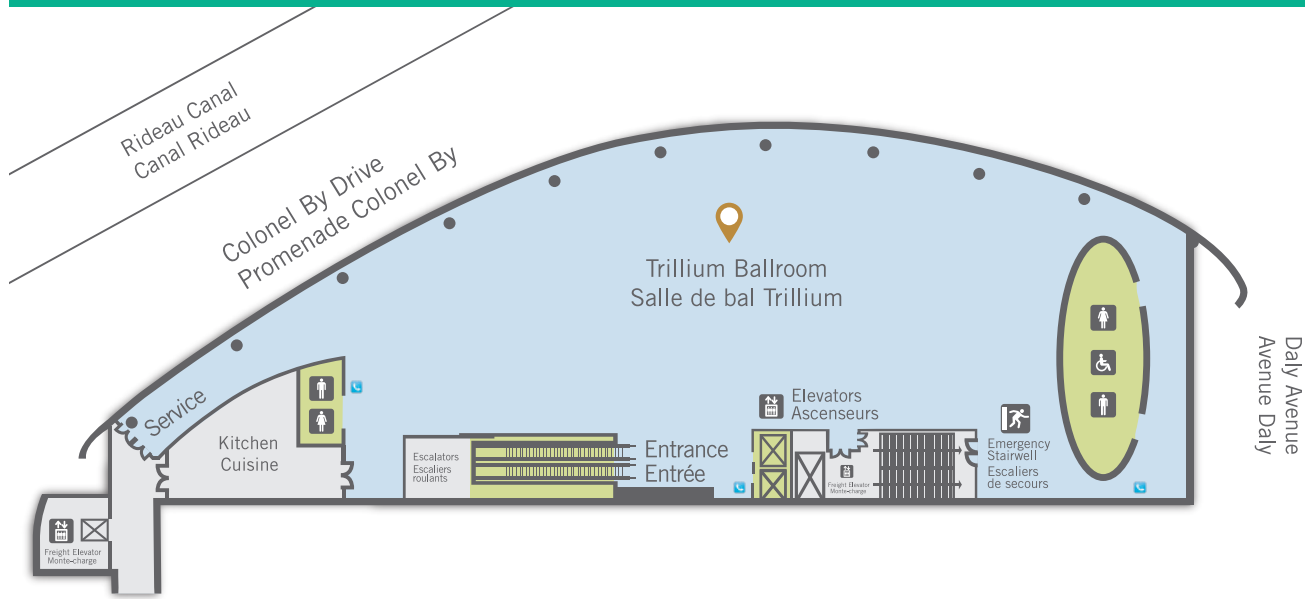
LEVEL 2



- 📍 **Board meeting:** Room 210
- 📍 **Registration:** Rideau Canal Atrium
- 📍 **Meeting and Exhibiting Space:** Room 201
- 📍 **Lunch:** Ottawa Salon
- 📍 **Break rooms for technical paper presentation:** Rooms 202, 204, 209, 210, 211, 212
- 📍 **Opening Reception, Breakfast and Coffee Breaks:** Rideau Canal Atrium
- 📍 **Keynotes:** Rooms 206 and 208

SHAW CENTRE

LEVEL 4



 **Banquet:** Trillium Ballroom





DISTINGUISHED INVITED SPEAKERS



DR. JEAN THOMASSIN

Executive Director,
New Products and
Services Introduction

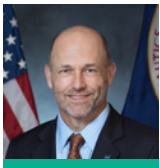
PRATT & WHITNEY CANADA



DR. FRANK RICK

Director Design

MTU AERO ENGINES



DR. JAMES KENYON

Director, Glenn Research Center
NASA



MR. MIKE MUELLER

President and CEO

**AEROSPACE ASSOCIATION
OF CANADA (AIAC)**



DR. HENRIK RUNNEMALM

Vice President, Global
Technology Centre - Sweden

GKN AEROSPACE



DR. FASSI KAFYEKE

Fellow Research
Innovation and
Collaborations

BOMBARDIER



DR. JEAN-FRANÇOIS BROUCKAERT

Head of Technology Office

**CLEAN AVIATION JOINT
UNDERTAKING**



DR. ADAM DISSEL

President

REACTION ENGINES



MR. JOHN JASTREMSKI

President and Chief
Executive Officer

MDS AERO



PROF. PERICLES PILIDIS

Professor, Centre for
Propulsion Engineering

CRANFIELD UNIVERSITY



MS. LISA TEAGUE
Head Emerging Technologies
& Innovation
ROLLS-ROYCE LIBERTYWORKS



DR. STÉPHANE ORCEL
Vice President, Product
Strategy & Market
SAFRAN AIRCRAFT ENGINES



DR. SUZANNE KEARNS
Founding Director, Waterloo Institute
for Sustainable Aeronautics (WISA)
UNIVERSITY OF WATERLOO



MR. STEPHEN CLARK
Vice President for Propulsion
and Boeing Distinguished
Technical Fellow
BOEING



DR. FRANK HASELBACH
Head of Propulsion Engineering
AIRBUS



MS. CHRISTINE ANDREWS
Hybrid Electric
Systems Leader
GE AVIATION



DR. JOAO LUIZ F. AZEVEDO
President, Executive Committee
**INTERNATIONAL COUNCIL OF
THE AERONAUTICAL SCIENCES**



DR. ARNE SEITZ
Deputy Head of Visionary
Aircraft Concepts
BAUHAUS LUFTFAHRT

**REFER TO WEBSITE FOR
UP-TO-DATE INFORMATION.**



SPEAKER INSTRUCTIONS

Please follow the instructions below when preparing and presenting your presentations for ISABE 2022

- 30-min speaking sessions have been assigned to all speakers (excluding Keynotes). Please keep your presentation to 15–20 min. The remaining time will be for: a short Q&A period, presenter changeover, and audience room change.
- Presenters will be given a 5 min, 3 min and 1 min warnings when approaching 20 min total speaking time. Speaking time will be strictly monitored to maintain scheduling across the parallel sessions.
- If using slides, the preferred format is 16:9, however, 4:3 is also supported.
- You are to bring your slides to the speaker preparation room no later than the morning of your presentation. Slides will then be uploaded to the conference computer.
- Please report to your scheduled room 5–10 minutes before your session start and introduce yourself to your session chair.
- All rooms will be provided with a laser pointer.
- **Meet with session chairs during the coffee breaks preceding the start of each session to load your presentations. For the Friday afternoon technical session, please meet with your session chairs from 1230–1300.**

If you have any questions, please contact us at NRC.ISABE2022-SIMA2022.CNRC@nrc-cnrc.gc.ca



ISABE TECHNICAL TOURS

The Local Organising Committee is pleased to offer our ISABE2022 delegates the following three tours on Wednesday, 28 Sep 2022. These tours, led by local experts, will highlight some of the unique attractions of Ottawa and Canada.

OPTION 1

Mirabel Aerospace Centre Technical Tour

Description: A select tour of Canada's premier aerospace facilities, including Pratt & Whitney Canada Flight Operations. The Montreal area is home to Canada's largest aviation cluster and is recognized by ICAO as a World Capital of Civil Aviation.

Schedule: Full Day, Wednesday, 28 September 2022

Location: Montreal

Transport: Bus departing from Shaw Centre, Ottawa

Lunch: Box Lunch will be provided

Limit: 40 persons (first-come first-serve)

Extra Fee: None

Other Requirements: Security pre-approval, Protective Personnel Equipment (will be provided if required).

OPTION 2

National Research Council, Aerospace Research Centre Technical Tour

Description: A select tour of Canada's premier national research organization's world renowned aerospace test facilities, including propulsion test cells, aerodynamic tunnels and flight research hangar. The tour will feature opportunities to interact with NRC's world-class experts.

Schedule: Full Day, Wednesday, 28 September 2022

Location: Ottawa

Transport: Bus departing from Shaw Centre, Ottawa

Lunch: Box Lunch will be provided

Limit: 40 persons (first-come first-serve)

Extra Fee: None

Other Requirements: Security pre-approval, Protective Personnel Equipment (will be provided if required).

OPTION 3

Thousand Islands Recreational Tour

Description: This is for those preferring a non-technical leisurely tour, or those wishing to accompany their partners registered to the accompanying persons program. Step aboard Kingston's Island Star, and kick off the season with a memorable and entertaining "Heart of the Islands" luncheon cruise throughout the world's famous scenic 1000 Islands region.

Schedule: Full Day, Wednesday, 28 September 2022

Location: Kingston, Ontario

Lunch: Lunch served on boat

Limit: 25 persons (first-come first-serve)

Extra Fee: USD \$165 (No additional costs for registered accompanying persons). Payment can be made on the ISABE registration portal (www.isabe.org)

Other Requirements: None.

Note: All tours may be subject to change/cancellation.

MONDAY 26 SEPTEMBER

Technical Session 1-1: BLI Integration

Session Chair(s): Martin Neuteboom (NRC)

Room 202

10:30	11:00	11:30
ISABE 2022 294	ISABE 2021 199	ISABE 2021 003
Assessment of the effects from the fuselage aft-body region in a boundary layer ingestion airframe concept	Exploratory Analysis of the Installation Effects in a Propulsive Fuselage	Voltage synchronisation for hybrid-electric aircraft propulsion systems
Ashik Vincent Palathingal, Jesuino Takachi Tomita, Cornelius Henricus Venner, Cleverson Bringhamti, Fabiola Paula Costa	Emily Raijmakers, Biagio Della Corte, Arvind Gangoli Rao	Kingsley Ibrahim, Suresh Sampath, Devaiah Nalianda

Technical Session 1-1: Liquid Fuel Combustion

Session Chair(s): Andrew Corber (NRC)/Mohsen Broumand (NRC)

Room 204

10:30	11:00	11:30
ISABE 2021 066	ISABE 2022 302	ISABE 2021 013
Flame Structure Comparison using Jet-A and an isoparaffinic fuel in a lean direct injection flame tube combustor	Predicting droplet size and velocity of flow-blurring injection utilizing artificial neural networks	Numerical Investigation of the Breakup Mode and Trajectory of Liquid Jet in a Gaseous Crossflow at Elevated Conditions
Yolanda Hicks, Kathleen M. Tacina, Tyler G. Capil	Erfan Vaezi, Yeganeh Kashani, Mohammad Reza Morad, Afshin Banazadeh, Miguel R. O. Panão	Yu Zhu, Shu Guo, Ruiqiang Bai, Dongbo Yan, Xiaoxiao Sun, Vishal Sethi, Pierre Gauthier

Technical Session 1-1: Compressor Performance

Session Chair(s): Volker Gummer (Munich Technical University)

Room 209

10:30	11:00	11:30
ISABE 2021 193	ISABE 2022 225	ISABE 2022 231
Improvements in a Multistage Axial-Flow Compressor Design and its Operation on a Small Gas Turbine Performance	Investigation on Flow Interactions in a Contra-Rotating Axial Compressor with Inflow Non-Uniformities	Identification and Classification of Operating Flow Regimes and Prediction of Stall in a Contra-Rotating Axial Fan using Machine Learning
Ruben Bruno Diaz, Jesuino Takachi Tomita, Cleverson Bringhamti, Diogo Ferraz Cavalca	Srinivas Prakash Diwanji, A.M. Pradeep	Akshay Kumar, Akshay Kumar, M.P. Manas, A.M. Pradeep

Technical Session 1-1: H2 Propulsion–Cranfield Perspectives

Session Chair(s): Simon Evans (Pratt & Whitney)/Natesa MacRae (NRC)

Room 210

10:30	11:00	11:30
ISABE 2021 181	ISABE 2022 313	ISABE 2021 001
Impact of Tank Gravimetric Efficiency on Propulsion System Integration for a First Generation Hydrogen Civil Airliner	Hydrogen Propulsion for Civil Aviation: An Introduction Scenario	Propulsion System Integration for a First Generation Hydrogen Civil Airliner?
Jon Huete, Devaiah Nalianda, Pericles Pildis	Isidoros Pantelis, Jon Huete, Devaiah Nalianda, Elżbieta Jarzębowska, Pericles Pildis	Jon Huete, Devaiah Nalianda, Pericles Pildis

Technical Session 1-1: Turbine Tip Clearance

Session Chair(s): Ron Plybon (GE Aviation Retired)/Javis Ruiz (SAFRAN AIRCRAFT ENGINES)

Room 211

10:30	11:30
ISABE 2021 060	ISABE 2021 028
Aeroengine transient performance simulation integrated with generic heat soakage and tip clearance model	Potential of Surrogate Modeling in Compressor Casing Design Focusing Rapid Tip Clearance Assessments
Zhuojun Li, Yiguang Li, Suresh Sampath	Tobias Schmidt, Marco Konle, Volker Gümmer

Technical Session 1-1: Aeromechanics, Flutter, Vibration, and Fatigue

Session Chair(s): Toshinori Watanabe (The University of Tokyo)

Room 212

10:30	11:00	11:30
ISABE 2022 289	ISABE 2022 229	ISABE 2022 205
Low Cycle Fatigue Analysis of Turbine Disc–Implement of Low Cycle Fatigue Analysis on Gas Turbine Discs in Preliminary Design	Metal Particle Damper Characteristics for Gas Generator Cycle Air Turbo Ramjet Engine	Tensile and Fatigue Performance in Tension-Tension of Additively Manufactured Composite Materials for Engine Applications
Florence Bérard, Hany Moustapha, Acher-Igal Abenham, Pascal Doran, Benoit Blondin	Ryojiro Minato, Hikaru Sasaki, Daisuke Nakata, Masaharu Uchiumi	Julieta Barroeta Robles, Priti Wanjara, Richard G. Cole, Javad Gholipour, Fabian Sanchez, Andrew Spineanu, Anas Chkaifi

MONDAY 26 SEPTEMBER

Technical Session 1-2: Hybrid Electric Propulsion I

Session Chair(s): Joachim Kurzke (Freelancer)/Christoph Bode (TU Braunschweig)

Room 202

15:30	16:00	16:30
ISABE 2021 020	ISABE 2022 219	ISABE 2022 202
A study on the possibility of the application of hybrid propulsion system architectures for military air vehicles	Studies on an Electric Hybrid Adaptive Cycle Engine	Multidisciplinary Conceptual Design for a Hybrid-Electric Commuter Aircraft
Stephan G. Scheidler, Moritz G. Kolb	Philipp Jäger, Marcel Stöbel, Michael Krummenauer, Reinhard Niehuis	Christos P. Nasoulis, Vasilis G. Gkoutzamanis, Anestis I. Kalfas

Technical Session 1-2: Materials and Structures

Session Chair(s): Sjunnesson Anders (GKN)/Laura Cordes (DLR)

Room 204

15:30	16:00	16:30
ISABE 2022 251	ISABE 2021 090	ISABE 2021 009
Investigation of Damage Behaviour and Response Surface Optimisation of Auxetic Structures for Application in Fan- and Compressor Casings and Containment Layers	On the EBC Phase Determination	Receipt ceramic material based on aluminium oxide using sol-gel technology
Stefan Schröter, Volker Gümmer	Michael Glavicic, Li Li, Stephanie Gong, Kelly Kranjc	Buriachek Oleg, Zhuravel Vladimir

Technical Session 1-2: Sustainable Aviation and Climate Change

Session Chair(s): Simon Evans (Pratt & Whitney)

Room 209

15:30	16:00	16:30
ISABE 2021 197	ISABE 2021 152	ISABE 2021 180
Sensitivity study of engine design parameters on climate change	A quantum mechanical study to determine the thermo-chemistry of the jet engine exhaust gases in order to suppress contrails	Sustainable Product Development in Aeroengine manufacturing: Challenges, Opportunities and Experiences from GKN Aerospace Engines
H.S. Saluja, F. Yin, A. Gangoli Rao	Sarah Qureshi, Rumana Qureshii, Azra Yaqub	Ola Isaksson, Sophie I. Hallstedt, Johanna W. Nylander, Petter Andersson, Sören Knuts

Technical Session 1-2: Film Cooling

Session Chair(s): Zekai Hong (NRC)

Room 210

15:30	16:00	16:30
ISABE 2022 269	ISABE 2022 290	ISABE 2021 078
Improving Adiabatic Film Cooling Effectiveness by Varying the Compound Angles of Effusion Cooling Holes along Main Flow Direction	Aerothermal Analysis of Film Cooling	Numerical Study on the Effect of Impinging Shocks on Film Cooling Effectiveness in a Dual Bell Nozzle
Yeongmin Pyo, Patrick Richer, Bertrand Jodoin, Sean Yun, Zekai Hong, Mohsen Broumand	Katharina Stichling, Hans-Jörg Bauer	Abhilash Suryan, Akhil Sivadas, Martin Raju, Lijo Vincent, Heuy Dong Kim

Technical Session 1-2: Turbine Leakage Reduction

Session Chair(s): Hiroshi Hamazaki (IHI Corporation)

Room 211

15:30	16:00	16:30
ISABE 2021 170	ISABE 2021 182	ISABE 2021 081
Experimental investigation on the effect of downstream casing coolant injection on loss in linear turbine cascade with tip clearance	Effects of a Squealer-Winglet geometry on the aerodynamic performance of a Hydraulic Axial Turbine used in turbopumps	Aerodynamic loss generation in a low-pressure turbine stage with high lift blading
Dunam Hong, Seung Jin Song	Daniel da Silva Tonon, Jesuino Takachi Tomita, Ezio Castejon Garcia, Cleverson Bringhenti, Luiz Eduardo Nunes Almeida	Chunill Hah, James Loellbach

Technical Session 1-2: Hypersonic Vehicle Propulsion

Session Chair(s): Seong Man Choi (Chonbuk National University)/Andrew Neely (UNSW Canberra)

Room 212

15:30	16:00	16:30
ISABE 2021 143	ISABE 2021 103	ISABE 2022 253
Multi-platform app-embedded model for hybrid air-breathing rocket-cycle engine in hypersonic atmospheric ascent	Testing a Ceramic Matrix Composite Regenerative Heat Exchanger in a Supersonic Combustor	Choosing Propulsion System Composition and Parameters for a Supersonic Cruising Aircraft
Spyros Tsentis, Vasilis Gkoutzamanis, Aggelos Gaitanis, Anestis Kalfas	Inyoung Yang, Kyung-jae Lee, Yang-ji Lee, Sang-hun Lee, Se-young Kim	Mikle Shevchenko, Kislov Oleh, Yurii Ulitenko

TUESDAY 27 SEPTEMBER

Technical Session 2-1: Engine Performance–Systems I

Session Chair(s): Angelos G. Varelis (Pratt & Whitney)/Anestis Kalfas (Aristotle University of Thessaloniki)

Room 202

10:30	11:00	11:30
ISABE 2021 167	ISABE 2021 019	ISABE 2021 174
Interaction of combined module variances and influence on the overall performance of an turbofan engine	A Method for Two-Phase Flow Simulation in Engine Performance Tools	Organic Rankine Cycle for Turboprop Engine Application
Jan Goeing, Lars Hinz, Sebastian Lueck, Max Bien, Jens Friedrichs	Martin Obermueller, Dieter Peitsch, Arne Weckend, Holger Schulte	Georgios E. Pateropoulos, Theofilos G. Efstathiadis, Anestis I. Kalfas

Technical Session 2-1: Robust Compressor Design

Session Chair(s): Jesuino Takachi Tomita (ITA)

Room 204

10:30	11:00	11:30
ISABE 2022 292	ISABE 2022 208	ISABE 2021 127
Change in Performance and Rotordynamic Characteristics due to Compressor Fouling in Aero Gas Turbines	Sand Erosion Modeling in Generic Compressor Rig Testing	Unsteady Simulations of Migration and Deposition of Fly-Ash Particles in the First-Stage Turbine of an Aero-Engine
Cesar Andres Valdes Vasquez, Suresh Sampath	Lei-Yong Jiang, Xijia Wu, Qi Yang	Zihan Hao, Xing Yang, Zhenping Feng

Technical Session 2-1: Combustor Aerodynamics

Session Chair(s): Hamza Abo el ella (NRC)/Ines Gohl (University of Bundeswehr Munich)

Room 209

10:30	11:00	11:30
ISABE 2021 160	ISABE 2021 062	ISABE 2021 129
The Numerical Aerodynamic Investigation of Swirling Inlet flow in a Vaporizer Tube Micro-Gas Turbine Combustor	Assessment of the Fluid Network for the Effusion Holes in a RQL (Rich-burn, Quickquench, Lean-burn) Gas Turbine Combustor	Combustion Analysis of Strut based Flame Stabilizer for Scramjet Combustor with Dummy Struts
Bronwyn. C. Meyers, Jan-Hendrik Grobler, Glen. C. Snedden	Changju Thomas Wey	Prasanth P. Nair, Vinod Narayanan, Abhilash Suryan

Technical Session 2-1: Diagnostics

Session Chair(s): Zekai Hong (NRC)

Room 210

10:30	11:00	11:30
ISABE 2021 130	ISABE 2022 213	ISABE 2021 007
Towards Quantitative Wall Shear Stress Measurements: Considering the Flow Behavior of Liquid Crystals	Investigation of flow migration downstream of the rotor in the Large Scale Turbine Rig using foreign gas tracing	Infrared signal of the lobed mixer with external air mixing
Stefanos Melekidis, Stefanos Melekidis, Marcus Ebert, Jonas Schmid, Hans-Jörg Bauer	Hellen Erik N. De Winter, Johannes Eitenmüller, Sebastian Leichtfuß, Heinz-Peter Schiffer, Christoph Lyko, Gregor Schmid	Seong Man Choi, H.S. Jang, H.H. Park

Technical Session 2-1: Compressor Duct Design

Session Chair(s): Johan van der Spuy (Stellenbosch University)

Room 211

10:30	11:00	11:30
ISABE 2022 249	ISABE 2022 209	ISABE 2021 042
On the Loss Behavior of a Split Blade VIGV Configuration at Varied Stagger Angle Combinations	Experimental Investigation of Bleed Air Extraction for different stator and stage setups	On the Effect of Inter Compressor Duct Length on Compressor Performance
Roman Gawin Frank, Niklas Seer, Hanno Wegner, Reinhard Niehuis	Daniel Kessler, Jens Friedrichs, Bernd Becker, Patrick Grothe	Thomas Dygutsch, Aaron Kasper, Christian Voss

ISABE Short Course

Instructors: Natesa MacRae, Devaiah Nalianda, Pericles Pilidis, Vishal Sethi

Please note that the H.I.H.S. Memorial Lecture (0800-0900) in the plenary room (Rm 206-208) is intended to be an introductory lecture for this seminar. The seminar is open to all ISABE conference attendees, and will run in parallel next to all other plenary and technical sessions for the rest of the day (0900-1700), along with the same coffee and lunch breaks.

Room 212

9:00-17:00
GREENING AVIATION SEMINAR
<ul style="list-style-type: none"> • Introduction & Welcome • Hydrogen Airlines - Pericles Pilidis • Hydrogen and Low NOx - Vishal Sethi • Contrails & Abatement - Devaiah Nalianda • Hydrogen R&D - Vishal Sethi • Aircraft Electrification - Natesa MacRae • Decarbonising a Country - Pericles Pilidis • Discussion Session

TUESDAY 27 SEPTEMBER

Technical Session 2-2: Compressor Leakage Reduction

Session Chair(s): Franz Heitmeir (Graz University of Technology)/Jesuino Takachi Tomita (ITA)

Room 202

15:30	16:00	16:30
ISABE 2021 113	ISABE 2022 223	ISABE 2022 216
Numerical Analysis of the Influence of Near-Endwall Camber Line Distribution on Leakage Losses of Axial Compressor Shrouded Stators	Influence of the Ending Position of Controllable Speed Casing on the Tip Flow in a Compressor Rotor	Platform Leakage and Blade Tilting in Axial Compressor CFD Simulations
Ilaria De Dominicis, Antonija Simunovic, Sebastian Robens, Volker Gümmer	Jiayi Zhao, Wan-yang Wu, Jing-jun Zhong	Jannik Petermann, Bernd Becker, Volker Gümmer

Technical Session 2-2: Turbomachinery Design Tools

Session Chair(s): Yiguang Li (Cranfield University)/Johan van der Spuy (Stellenbosch University)

Room 204

15:30	16:00	16:30
ISABE 2021 071	ISABE 2021 041	ISABE 2022 279
Interactive Learning Platform for Axial Compressor Preliminary Design	Reflection on the Pitch-Chord and Meanline Radius Ratios in Design and Performance of Centrifugal Turbines	Turbine rotor design–3D stress analysis automation
George Patton de Oliveira Silva, Igor de Oliveira, Cleverson Bringhamti, Jesuino Takachi Tomita	Liu Yu, Patrick Hendrick, Zheng Ping Zou, Frank Buysschaert	Antoine Desponts, Hany Moustapha, Acher-Igal Abenhaim, Othmane Leghzaoui, Benoit Blondin, Pascal Doran

Technical Session 2-2: Safety & Durability

Session Chair(s): Lei-yong Jiang (NRC)

Room 209

15:30	16:00	16:30
ISABE 2022 285	ISABE 2022 277	ISABE 2021 142
Assessment of weld manufacturability of alternative jet engine structural components through digital experiments	CFD Investigation of aircraft propulsion fire suppression system	Effect of Fuels, Aromatics and Preparation Methods on Seal-Swell
Julian Martinsson Bonde, Arindam Brahma, Massimo Panarotto, Ola Isaksson, Timos Kipouros, P. John Clarkson, Jonas Kressin, Petter Andersson	Akhil Dinesh, Suresh Sampath, Michael Diakostefanis	Asnida Anuar, Vamsi Krishna Undavalli, Bhupendra Khandelwal, Simon Blakey

Technical Session 2-2: Aeromechanical Optimization

Session Chair(s): Toshinori Watanabe (The University of Tokyo)/Christoph Bode (TU Braunschweig)

Room 210

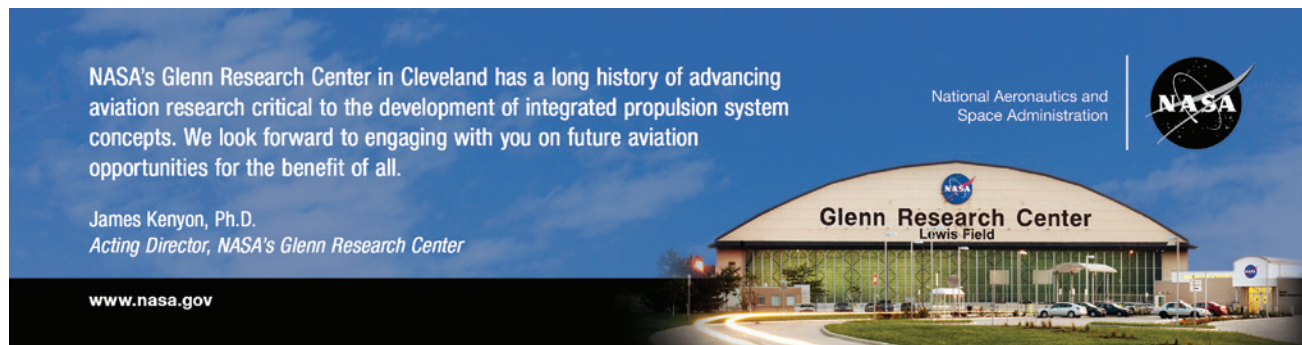
15:30	16:00	16:30
ISABE 2022 235	ISABE 2022 245	ISABE 2022 275
Introduction and Evaluation of an Aerostructural Coupling Approach for the Design of Shape Adaptive Compressor Blading	Near-stall modelling of a pitching airfoil at high incidence, Mach number and reduced frequency	Aeromechanical optimization of an axial compressor stage
Marcel Seidler, Jens Friedrichs, Zhuzhell Montano Rejas, Johannes Riemenschneider	Christoph Brandstetter, Sina Stapelfeldt	Seif Elmasry, Bernd Beirow, Felix Figaschewsky, Thomas Giersch

Technical Session 2-2: Hybrid Electric Propulsion II

Session Chair(s): Joachim Kurzke (Freelancer)/Christine Andrews (GE Aviation)

Room 211

15:30	16:00	16:30
ISABE 2021 157	ISABE 2022 236	ISABE 2022 297
Modelling Degradation Mechanisms in Hybrid-Electric Aircraft Propulsion Systems	Degradation of Turbo-electric Distributed Propulsion Systems	Development of Test Facility for Hybrid Electric Aviation Propulsion: A Conceptual Review
Maximilian Bien, Jan Göing, Jens Friedrichs, Karl Ziaja, Francesca di Mare, Norman Blanken, Yongtao Cao, Axel Mertens, Bernd Ponick, Lukas Schuchard, Matthias Voigt, Ronald Mailach	Anmol Midha, Suresh Sampath	Doug Marsh, Adam Elliot, Michael Lam, Patrick Sylvain, George Hajecek, Osvaldo Arenas, Shaji Manipurath



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James Kenyon, Ph.D.
Acting Director, NASA's Glenn Research Center

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THURSDAY 29 SEPTEMBER

Technical Session 4-1: Turbine Cooling

Session Chair(s): Heinz-Peter Schiffer (Technische University Darmstadt)

Room 202

10:30	11:00	11:30
ISABE 2021 032	ISABE 2021 117	ISABE 2021 128
Experimental investigation on the influence of the trailing edge shape in a film cooled transonic high pressure turbine cascade	A Mathematical Study of Rotor Thermal Bow in Gas Turbines	Effects of alternating elliptical chamber on jet impingement heat transfer in gas turbine leading edge at different cross flow velocity ratio
Ines Gohl, Martin Bitter, Dragan Kozulovic, Hiroki Sato, Reinhard Niehuis	Evan Oscar Smith, Kaisar Al Shami, Andrew Neely	Kun Xiao, Juan He, Zhenping Feng

Technical Session 4-1: Combustor Concepts

Session Chair(s): Mohsen Broumand (NRC)

Room 204

10:30	11:00	11:30
ISABE 2022 215	ISABE 2022 230	ISABE 2021 061
Design of Porous Media for Optimal Combustion Liner Transpiration Cooling	Numerical and experimental investigation of non-reactive flow characteristics of a multi swirl lean direct injection burner	Performance characteristics of miniature gas turbine with a pulse combustor
Mathieu Hinse, Mohsen Broumand, Patrick Richer, Bertrand Jodoin, Sean Yun, Zekai Hong	Perikathra Sarath, Raparti Jogesh Aditya, and T.M. Muruganandam	Takashi Sakurai, Shunsuke Nakamura, Takehiro Sekiguchi, Sora Inoue

Technical Session 4-1: Engine Integration–Ejector Nozzle

Session Chair(s): Yiguang Li (Cranfield University)/Glen Snedden (UKZN)

Room 209

10:30	11:00	11:30
ISABE 2021 036	ISABE 2021 141	ISABE 2021 196
Experimental and numerical investigation of mixer ejector nozzles for very small turbojet engines	Comparison of Active Flow Control Measures in an Advanced S-Shaped Engine Intake by using a Turbo-Compressor	Feasibility study of engine bay ventilation with intake air driven by ejector nozzle
Ralf Schmidt, Andreas Hupfer, Volker Gümmer	Philipp Max, Michael Krummenauer, Marcel Stöbel, Reinhard Niehuis, Dragan Kozulovic	Abhijit Dhamanekar, Aishwarjya Gogoi

Technical Session 4-1: Engine Performance–Systems II

Session Chair(s): Sjunnesson Auders (GKN)/Rastko Hadzic (NRC)

Room 210

10:30	11:00	11:30
ISABE 2021 093	ISABE 2021 151	ISABE 2022 254
Jet Engines Performance Accounting	Conceptual Gas Turbine Design: The Role of Turbine Maps	Virtual Gas Turbines: A Novel Flow Network Solver Formulation for the Automated Design-Analysis of Secondary Air System
Javier Ruiz-Domingo	Joachim Kurzke	Davendu Kulkarni, Luca di Mare

Technical Session 4-1: Engine Oil Cooling

Session Chair(s): Michele Capurro (NRC)

Room 212

10:30	11:00	11:30
ISABE 2021 080	ISABE 2022 281	ISABE 2022 203
Experimental investigation of the oil jet heat transfer on a rotating cylinder for an aero engine gearbox	Development of topology optimization technique for air-cooled oil cooler: 3-D examination under laminar condition	Experimental investigation of the oil jet heat transfer on meshing spur gears
Christian Kromer, Christian Kromer, Emre Ayan, Corina Schwitzke, Hans-Jörg Bauer	Tsukasa Ishii, Toshinori Watanabe, Takehiro Himeno	Emre Ayan, Christian Kromer, Corina Schwitzke, Hans-Jörg Bauer

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THURSDAY 29 SEPTEMBER

Technical Session 4-2: Fan for BLI

Session Chair(s): Valerie Desilets (Bombardier) (-)/Hamza Abo el ella (NRC)

Room 202

15:30	16:00
ISABE 2022 217	ISABE 2021 045
Exploring the Operational Strategy of an Electrically-Driven Variable Pitch BLI-Fan	Design of sub-scale fan for a boundary layer ingestion test with by-pass
Maximilian Mennicken, Rainer Schnell, Max Arzberger	Hans Martensson, Marcus Lejon, Debarshee Ghosh, Mikael Åkerberg, Faezeh Rasimarzabadi, Martin Neuteboom

Technical Session 4-2: Engine Exhaust

Session Chair(s): Glen Snedden (Cranfield University)/Seong Man Choi (Chonbuk National University)

Room 204

15:30	16:00
ISABE 2022 227	ISABE 2022 242
Effect of nozzle chevron technology on the near-field contrail properties behind an aircraft engine using a CFD-microphysics coupling	Numerical Investigation of Flow Characteristics Inside an Exhaust Duct System
Sébastien Cantin, Adrien Misandeau, Mohamed Chouak, François Garnier	Sindhuja Priyadarshini, Vinayak S. Kamath, Rajat Arora, Ramraj H Sundararaj, T. Chandra Sekar, Abhijit Kushari

Technical Session 4-2: Combustor-Turbine Interaction

Session Chair(s): Ron Plybon (GE Aviation Retired)/Sean Yun (NRC)

Room 209

15:30	16:00
ISABE 2021 021	ISABE 2021 067
Numerical Study of Combustor Turbine Interactions Considering a Two Stage High-Pressure Turbine	The Effect of Combustor Inlet Swirl on the Performance of a Micro Gas Turbine
Kenji Miki, Thomas Wey, Jeffrey Moder	Sybrand Johannes van der Spuy, L.J. Ferreira

Technical Session 4-2: STOVL Propulsion

Session Chair(s): Rastko Hadzic (NRC)/Heeho Park (Hanwha Aerospace)

Room 210

15:30	16:00
ISABE 2022 284	ISABE 2022 241
Multi-objective multi-disciplinary optimisation of proprotors	Performance of a Turbojet Engine with Fluidic Thrust Vectoring
Shahfiq Shahjahan, Rens MacNeill, Dries Verstraete	Ramraj Harikanth Sundararaj, T. Chandra sekar, Rajat Arora, Abhijit Kushari

Technical Session 4-2: Fuel Cell for Aviation

Session Chair(s): Osvaldo Arenas (NRC)

Room 211

15:30	16:00
ISABE 2022 256	ISABE 2022 291
On the importance of condensation for the thermodynamic cycle of fuel cell turbochargers in aviation	Hydrogen fuel cells for aviation?—A potential analysis comparing different thrust categories
Tim Wittmann, Sebastian Lück, Tim Hertwig, Jens Friedrichs	Marc Schmelcher, Jannik Häßy

Technical Session 4-2: Variable Pitot Inlet

Session Chair(s): Christian Tiedemann (DLR)

Room 212

15:30	16:00
ISABE 2021 012	ISABE 2021 034
A Review of Technologies for the Adjustment of the Leading-Edge of Variable Pitot Inlets for SST	Development of a TRL 3 Concept for Variable Pitot Inlets for SST Using a Safe Design Approach
Stefan Kazula, Klaus Höschler	Stefan Kazula, Klaus Höschler



FRIDAY 30 SEPTEMBER

Technical Session 5-1: Engine Inlet

Session Chair(s): Suresh Sampath (Cranfield university)

Room 202

10:30	11:00	11:30
ISABE 2022 228	ISABE 2022 278	ISABE 2021 195
Numerical and experimental design of a radial displaceable inlet distortion device	Streamline-Traced, External-Compression Supersonic Inlets for Mach 2	Design and Development of an engine inlet distortion measurement
Bojan Kajasa, Timea Lengyel-Kampmann, Robert Meyer	John W Slater	Aishwarjya Gogoi, Rohit Vashistha

Technical Session 5-1: CFD Methods

Session Chair(s): Kenji Miki (NASA)/Lei-Yong Jiang (NRC)

Room 204

10:30	11:00	11:30
ISABE 2022 255	ISABE 2021 116	ISABE 2021 006
Comparison of Different CFD Unsteady Methods for the Performance Analysis of a Transonic Axial Compressor	Enhanced Modeling of Turbulent Decay in Steady State Mixing Plane Simulations	A hybrid LES/FW-H simulation for the fan/compressor trailing-edge broadband noise reduction with serrated configuration
Lucilene Moraes da Silva, Tomas Grönstedt, Luiz Henrique Lindquist Whitaker, Jesuino Takachi Tomita, Marcelo Assato, Vitor Alexandre Carlesse Martins	Alexander Führung, Nemo Juchmann, Dragan Kožulović, Christoph Bode, Stephan Behre, Peter Jeschke	Zhang Liangji, Tong Fan, Xiang Kangshen, Chen Weijie, Qiao Weiyang

Technical Session 5-1: Engine Thermal Management

Session Chair(s): Zekai Hong (NRC)

Room 209

10:30	11:00	11:30
ISABE 2021 100	ISABE 2021 094	ISABE 2021 190
Multi-Domain Conjugate Heat Transfer (CHT) Analysis Using General Grid Interface (GGI)	Turbofan Transient Heat Transfer Analysis	Estimation of performance of turbofan engine bay ventilation and cooling system
Farzad Ashrafi, Sri Sreekanth	Javier Ruiz-Domingo, Farid Benyoucef	Aishwarjya Gogoi, Rohit Vashistha, Himanshu Yadav, G.P. Ravishankar

Technical Session 5-1: Turbine Endwall

Session Chair(s): David Cadrecha Robles (ITP AERO)

Room 210

10:30	11:00
ISABE 2022 282	ISABE 2022 296
Design optimization of axial turbine disc and attachment for aeroengine	Investigation of a novel flow metric for the design and evaluation of non axisymmetric turbine endwall contours
Najeh Najeh, Pascal Doran, Benoit Blondin, Hany Moustapha	Jonathan Olaf Paul Bergh, Glen Snedden

Technical Session 5-1: Aircraft-Propulsion Integration

Session Chair(s): Stephan Scheidler (ESG)

Room 211

10:30	11:00
ISABE 2021 145	ISABE 2022 262
Aerodynamic Installation Effects of Over-the-wing Mounted Ultra-high bypass Engines	Effects of bypass ratio for civil turbofans using thrust reversers
Vinicius Tavares Silva, Anders Lundblad, Carlos Xisto	Jingjie Huang, Pericles Pilidis

Technical Session 5-1: Test Rig Developments

Session Chair(s): Laura Cordes (DLR)

Room 212

10:30	11:00	11:30
ISABE 2022 250	ISABE 2022 212	ISABE 2022 211
Highly accurate loss determination at the Large Scale Turbine Rig (LSTR) with varying rotor tip configurations	An altitude capable rig for studying engine inlet velocity profile effects Boundary layer generator	Experimental Characterisation of Test Facility Control Elements for Mass Flow Determination
Johannes Eitenmüller, Sebastian Leichtfuß, Heinz-Peter Schiffer, Christoph Lyko, Gregor Schmid	Faezeh Rasimarzabadi, Catherine Clark, Martin Neuteboom, David Orchard, Hans Martensson	Constanze Schiewe, Stephan Staudacher

FRIDAY 30 SEPTEMBER

Technical Session 5-2: Test Rig Characterisation

Session Chair(s): Reinhard Niehuis (Bundeswehr University Munich)/Ines Gohl (University of Bundeswehr Munich)

Room 202

14:00	14:30
ISABE 2021 144	ISABE 2022 207
Design and development of a variable area nozzle for a test rig for fan intake interaction	Design and development of a combined intake fan test rig to enable investigations of stable operating ranges
Patrick Brunow, Jonas Grubert, Jens Friedrichs, Jens Ortmanns	Jonas Grubert, Lionel Meillard, Peter Winkelmann, Patrick Brunow, Jens Friedrichs, Rainer Schnell, Jens Ortmanns

Technical Session 5-2: Emissions

Session Chair(s): Takashi Sakurai (Tokyo Metropolitan University)/Sean Yun (NRC)

Room 204

14:00	14:30
ISABE 2021 108	ISABE 2022 222
An Alternative Approach to Evaluate Fuel/Air Mixing Quality	Effects of flame-flame interaction on emission characteristics in gas turbine combustors
Lei-Yong Jiang	Sanghyeok Kwak, Jaehong Choi, Myunguen Ahn, Seongpil Joo, Min Chul Lee, Youngbin Yoon

Technical Session 5-2: Combustion Instability

Session Chair(s): Yolanda Hicks (NASA)

Room 209

14:00	14:30
ISABE 2022 295	ISABE 2022 272
Detection and Analysis of Combustion Instabilities in Pre-cooled Turbojet Engine Model Ram Combustor by Using Autoencoder	Numerical Study on Thermo-Acoustic Instability in a Simplified 2D Gas Turbine Afterburner
Koichi Omi, Kotaro Yoshihara, Daiki Ito, Hideyuki Taguchi, Shinji Nakaya, Mitsuhiro Tsue	Muthaiah M, Varunkumar S

Technical Session 5-2: Unmanned Air Vehicle Propulsion

Session Chair(s): Osvaldo Arenas (NRC)

Room 210

14:00	14:30
ISABE 2021 097	ISABE 2021 050
Redesign of a Micro Turbine for Sub-400N Thrust Class Engines	Experimental Study on Efficiency Enhancement of Tesla Turbine by Cascade Addition
Glen Snedden	Koji Okamoto, Jumpei Nakamura, Kazuo Yamaguchi, Susumu Teramoto

Technical Session 5-2: Turbomachinery Blade Design

Session Chair(s): Hamza Abo el ella (NRC)

Room 211

14:00
ISABE 2022 232
Robust Optimization Used in the Redesign of a Low-Speed Compressor Tandem Stator
Samuele Giannini, Mattia Straccia, Volker Gümmer

Technical Session 5-2: Lubrication Systems

Session Chair(s): Suresh Sampath (Cranfield)

Room 212

14:00	14:30
ISABE 2021 046	ISABE 2021 022
Conception and Assessment of Test Rig for Characterisation of Air-oil Heat Exchangers in Oil Systems for Aero Engines	Rotation and curvature correction for SST turbulence model applied on the prediction of pressure losses through air-oil centrifugal separators for modern aero-engines
Joëlle Vincké, Olivier Berten, Patrick Hendrick	Mariano Di Matteo, Olivier Berten, Patrick Hendrick



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