PRELIMINARY PROGRAM

ITBMS 2022

7-10 June 2022- Bagnères de Bigorre, France

ONERA
THE FRENCH AEROSPACE LAB

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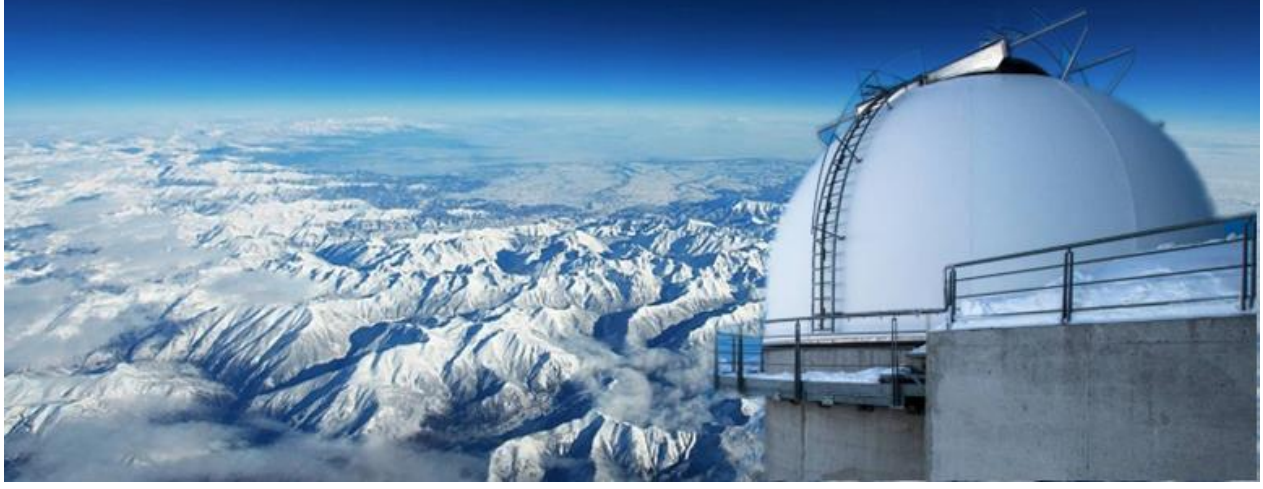

PROGRAM

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DAY 1 – Tuesday, June 7	
09:00 – 10:00	Registration
10:00 – 10:15	Welcome address and workshop organization Nicolas Riviere

 KEYNOTE 1 10:20 – 11:00	**Study of the atmospheric turbulence based on the observations at the P2OA** Marie Lothon & Fabienne Lohou LAERO, Toulouse University, France The Pyrenean Platform for the Observation of the Atmosphere (P2OA) is composed of an altitude platform and a plain site, 28 km apart as a crow flies. The environmental platform, at the top of the Pic du Midi de Bigorre (2870 m.a.s.l.), gathers the instrumentation for aerosols, greenhouse and reactive gazes, whereas the Centre de Recherches Atmospherique (600 m.a.s.l.) located on the Lannemezan Plateau is mainly devoted to the instrumentation for atmospheric dynamics. Both sites are also instrumented for atmospheric electricity studies. Besides long term measurements, the P2OA hosts limited duration field campaigns. These campaigns can contribute to the study of atmospheric processes, to the validation of new instrumentations or to any other action which could take advantage of the permanent observations…

SESSION 1 11:00 – 12:40	**Thermal modeling and data**
#202204151709	Exploitation of physical virtual mockups of terrain from SE-3D-DB product Alain Le Goff, Gwendal Thomas
#202203281637	Thermal Infrared Camera System Design for High-Dynamic Range Imaging Benjamin Saute, Stéphane Boubanga-Tombet, Philippe Lagueux
#202203072039	Coupling of ShipIR with Ansys Fluent CFD David A. Vaitekunas
ThermoAnalytics TOTAL THERMAL SOLUTIONS	ThermoAnalytics: corporate presentation

12:40 – 14:00	Lunch

 KEYNOTE 2 14:00 – 14:40	**Turbulence profile with MATISSE and applications** Marie-Thérèse Velluet in collaboration with C. Robert, C. Bellisario, L. Labarre ONERA - The French Aerospace Lab, France Optical turbulence in the atmosphere reduces the performance of electro-optical systems. This includes passive and active imaging, free-space optical communication, directed energy laser systems. Since the evaluation of vertical turbulence profiles is implemented in Matisse, it is possible to get an idea of the impact of turbulence on performance of such a system under specific environmental conditions depending on the location, time of day, type of soil, terrain… This keynote presents this new functionality and gives some examples on how the derived turbulence parameters can inform the user about the degradation of the system performance.

SESSION 2 14:40 – 16:00	**Turbulence**
#202204141851	Imaging turbulence simulation validated by differential tilt variance based on LED grid measurements on several record dates Daniel Wegner, Katrin Braesicke
#202204140951	Turbulence mitigation in imagery including moving objects from a static event camera Nicolas Boehrer, Robert P. J. Nieuwenhuizen, Judith Dijk
TELOPS	TELOPS: corporate presentation

16:00 – 16:20	Coffee Break

KEYNOTE 3 16:20 – 17:00	**Observation of flow turbulence using aero-optical techniques: from schlieren to holographic interferometry** David Donjat in collaboration with Olivier Léon ONERA - The French Aerospace Lab, France This keynote discusses the way fluid dynamicists at ONERA take advantage of aero-optical effects to visualize and quantatively study turbulent flows in transparent media. These techniques will be reviewed and recent application cases studied at ONERA will be more particularly discussed.

SESSION 3 17:00 – 18:30	**Turbulence**
#202204011522	Simulation of anisoplanatic optical turbulence using IMOTEP and Generative Adversarial Networks G. Monnier, M. Béquignon, B. Camus
#202203300933	The EDA TURBO project: Software-based atmospheric turbulence mitigation Rilene Goelzer, Julia Hofmann, Szymon Gladysz
ROUND TABLE	Turbulence: From physical description to restoration tools... Image data experiences geometric distortions and spatial-temporal varying blur due to the strong effects of random spatial and temporal variations in the optical refractive index of the photon path. Simultaneously removing these effects from an image is a challenging task. This round table on turbulence is a form of academic discussion. Participants agree to discuss and debate on the effects of atmospheric turbulence severely degrading image quality in the form of geometric distortions and space-time varying blur, especially in long-distance surveillance applications. Atmospheric turbulence occurs due to the turbulent flow of air cells as described by fluid dynamics and is observed throughout the extent of the atmosphere. It is particularly evident in the troposphere layer because of continuous and rapid changes of temperature and pressure near the ground surface of the earth and the air directly above it. Hence, turbulence at ground levels, known as the atmospheric boundary layer, are more severe, particularly in hot and dry environments, and their effects are more pronounced compared to that of upper layers. To address this problem, several approaches including hardware-based adaptive optics techniques and image-processing-based methods were developed to restore captured images. Due to the continuous change in the turbulence profile and the random evolution of turbulent eddies, the optical transmission path is continuously degraded. From physical description to restoration tools... The ITBMS conference will address both theoretical and experimental approaches to start discussions with the attendees.
18:30	End of the day

19:00 – 23:30	Social Event

DAY 2 – Wednesday, June 8	
Pic du Midi PYRÉNÉES FRANCE 08:00 – 13:00	**PIC du MIDI Observatory** Visit The Pic du Midi de Bigorre or simply the Pic du Midi (elevation 2,877 m (9,439 ft)) is a mountain in the French Pyrenees. The Pic du Midi Observatory (French: Observatoire du Pic du Midi) is an astronomical observatory located at 2877 meters on top of the Pic du Midi de Bigorre in the French Pyrenees. It is part of the Midi-Pyrenees Observatory (French: Observatoire Midi-Pyrénées; OMP) which has additional research stations in the southwestern French towns of Tarbes, Lannemezan, and Auch, as well as many partnerships in South America, Africa, and Asia, due to the guardianship it receives from the French Research Institute for Development (IRD).
13:00 – 14:30	Lunch
SESSION 4 14:30 – 16:10	**Targets and signatures**
#202201171330	The Impact of Exhaust Plumes on the Infrared Signature of Combat Vehicles – an Experimental and Analytical Study Anna Pohl, Yvonne Paulley, Ove Gustafsson, Sebastian Möller, Jonas Allvar, Anthony Smith
#202204141738	Static versus Dynamic Plume Infrared Signature: Measurements and Simulations Valérie Rialland, Stéphane Langlois, Roland Domel, Sylvain Rommeluere, Juliette Aubrée, Adrien Langenais, Claire Lavigne, Yves Fabignon
#202204091536	Optical complex index profiling with supercontinuum lidar measurements Olivier Pujol
SURFACE OPTICS CORPORATION	SURFACE OPTICS: corporate presentation
16:10 – 16:40	Coffee Break
SESSION 5 16:40 – 18:10	**Thermal modeling and data**
#202204131907	Automated simulation-generated EO/IR image library for artificial intelligence applications Corey D. Packard, Mark D. Klein, Timothy S. Viola, David C. Bell, Peter L. Rynes
#202204200356	A Study on the Heat Flow Analysis of Infra-Red Signature Suppression systems for Naval Ships Seoktae Yoon, Yongjin Cho
#202203072040	Impact of Infrared Signature Suppression on EO-IR Soft-Kill (Follow-Up) David A. Vaitekunas, Srinivasan Ramaswamy, Pavel Aleksandrov
18:10	End of the day

DAY 3 – Thursday, June 9

KEYNOTE 4 08:30 – 09:00	**To be confirmed** Sukanta Basu Faculty of Civil Engineering and Geosciences, TU Delft, The Nertherlands …

SESSION 7 09:00 – 10:10	**Imaging simulation techniques**
#202204071018	Tuning of physical infrared scene simulation using real images Dominique Maltèse, Diane Morchain, Emmanuel Carnis, Jean Latger, Thierry Cathala
#202204071017	Evolution of SE-Workbench-EO for Artificial Intelligence application Alain Le Goff, Jean Latger, Thierry Cathala
Davis	Davis Engineering: corporate presentation

10:10 – 10:30	Coffee Break

SESSION 8 10:30 – 12:30	**Active imaging and laser**
#202203091054	Enhancing Sparse LiDAR Data Captured on an Airfield Using 3D Aircraft Models Kevin Theuma, Kenneth Chircop, Jason Gauci, David Zammit-Mangion
#202204211000	MATLIS software: End-to-end 3D LiDAR simulation for performance analysis Paul-Édouard Dupouy, Nicolas Riviere, Anita Schilling, Erwan Viala, Ahmed Moussous
#202204041334	3D LiDAR acquisition with increased resolution at long range using Compressive Sensing Erwan Viala, Paul-Édouard Dupouy, Nicolas Rivière, Laurent Risser
#202204010959	3D laser imaging in turbid water: Simultaneous modeling of surface and volume scattering Kevin Walcarius, Thibault Dartigalongue, Malik Chami
#202204220851	Multi-band 3D-LiDAR applied to classification and segmentation Nicolas Riviere, Paul-Édouard Dupouy, Ahmed Moussous, Erwan Viala, Anita Schilling

12:30 – 14:00	Lunch

SESSION 9 14:00 – 14:50	**Targets and signatures**
#202203240808	Modelling of aging of spectral properties of camouflage mean Frantisek Racek, Teodor Balaz, Jaroslav Krejci
#202202231425	A European Terrain Database Judith Dijk, Andrea Masini, Philippe Barillot

SESSION 10 14:50 – 15:40	**Impact of climatic conditions**
#202204211621	MATISSE-v3.6: Using Numerical Weather Prediction for contrast prediction Luc Labarre, C. Bellisario, L. Croizé, C. Lavigne, C. Malherbe, F. Tarroux, J.C. Krapez, J. Pierro, U. Tricoli, Y.Hurtaud
#202204071708	Bayesian inference of fog visibility from LiDAR point clouds and correlation with probabilities of detection Karl Montalban, Christophe Reyman, Dinesh Atchuthan, Paul-Édouard Dupouy, Nicolas Riviere, Simon Lacroix
OKTAL-SE Synthetic Environment	OKTAL-SE: corporate presentation

15:40 – 16:10	Coffee Break

SESSION 11 16:10 – 17:30	**Impact of climatic conditions**
#202204211436	Application of the Rayleigh-Debye-Gans model for Fractal Aggregates (RDG-FA) for lidar relevant parameters of soot particles Romain Ceolato, Lucas Paulien, Andres E. Bedoya-Velasquez, Frederic Fossard, Vincent Mouysset, Sidonie Lefebvre, Claudio Mazzoleni, Christopher Sorensen, Matthew J. Berg, Jerome Yon
#202203282149	Ambient Aerosol Characterization with Digital Holography: Fundamentals and Field Instrumentation Matthew J. Berg, Osku Kemppinen, Jesse Laning, Ryan D. Mersmann
#202204190050	Characterization of semi-arid environments in South Australia for validation and verification of infrared synthetic scene generation Mark Pszczel
17:30	End of the day

DAY 4 – Friday, June 10

SESSION 12	**Training sessions**		
09:00 – 12:00	OKTAL-SE	ThermoAnalytics	Davis Engineering