



25th AIAA International Space planes and Hypersonic Systems and Technologies Conference

Sheraton Grand, Rajaji Nagar
Bangalore, India

May 28 – June 01, 2023

Conference Information Brochure

**25th AIAA International Space Planes and Hypersonic Systems and Technologies Conference
Program Schedule**

Sunday, 28 May 2023

PLN1 1730 - 1920 hrs	Welcome Address and Inaugural Panel Discussion: Scientific and Technological Challenges in Hypersonics	Grand Ballroom
<p>Moderator: Prof. Jagadeesh Gopalan, Chairman, Centre of Excellence in Hypersonics, Indian Institute of Science, India.</p> <p align="center">Panelists:</p> <p>Dr. Kevin Bowcutt, Principal Senior Technical Fellow and Chief Scientist of Hypersonics, The Boeing Company, USA. Dr. Samir Kamat, Secretary Department of Defence R&D and Chairman Defence Research and Development Organisation(DRDO), Government of India.</p> <p>Dr. G. Satheesh Reddy, Scientific Adviser to Raksha Mantri, Ministry of Defence, Government of India. Shri. S Somanath, Secretary Department of Space, Chairman Space Commission & Indian Space Research Organisation(ISRO), Government India</p>		
1920 - 1930 hrs	Exhibition Inauguration by Mr. Anil Parab, Whole-time Director, Heavy Engineering and L&T Valves, Larsen and Tubro	Grand Ballroom Foyer
DINNER01 1930 - 2200 hrs	Inaugural Dinner	Grand Ballroom

Monday, 29 May 2023

PLN2 - I 0800 - 1000 hrs	Country Reports - I	Grand Ballroom
<p>India: Prof. Jagadeesh Gopalan, Chairman, Centre of Excellence in Hypersonics, Indian Institute of Science, India Australia: Prof. Anand Veeraragavan, Associate Professor, School of Mechanical and Mining Engineering, The University of Queensland, Australia</p>		
1000 - 1030 hrs	Monday Morning Tea	Grand Ballroom Foyer
PLN2 - II 1030 - 1230 hrs	Country Reports - II	Grand Ballroom
<p>Israel: Prof. Dan Michaels, Associate Professor, Technion – Israel Institute of Technology, Israel. Japan: Dr. Kouichiro Tani, Head of Kakuda Space Center, JAXA (invited), Japan.</p>		
LUNCH01 1230 - 1330 hrs	Monday Lunch	Grand Ballroom Foyer
1330 - 1730 hrs	MONDAY SESSIONS	
Grand Ballroom 1	Grand Ballroom 2	Jupiter
HYP01 Missions and Vehicles I	HYP02 Propulsion Systems	HYP03 Computational Fluids I
		Neptune
		HYP04 Test and Evaluation I

Tuesday, 30 May 2023			
PLN3 0800 - 0930 hrs	Panel Session: Long Duration Hypersonic System Design		Grand Ballroom
<p>Moderator: Dr. Anand Veeraragavan, Associate Professor, School of Mechanical and Mining Engineering, The University of Queensland (invited)</p> <p style="text-align: center;">Panelists: Dr. Angus Hendrick, Technical Director, Conventional Prompt Strike Mr. Chris Kostyk, Aerospace Engineer, NASA Armstrong Flight Research Center Dr. Valerio Viti, Aerospace and Defense Team Manager, Principal Engineer, Ansys, Inc. Shri. Satya Swaroop Panda, Director Engineering, Collins Aerospace</p>			
1000 - 1200 hrs	TUESDAY SESSIONS I		
Grand Ballroom 1	Grand Ballroom 2	Jupiter	Neptune
HYP05 Missions and Vehicles II	HYP06 Propulsion Components I		HYP08 Test and Evaluation II
LUNCH02 1200 - 1300 hrs	Tuesday Lunch		Grand Ballroom Foyer
1300 - 1500 hrs	TUESDAY SESSIONS II		
Grand Ballroom 1	Grand Ballroom 2	Jupiter	Neptune
HYP09 Hypersonic Fundamentals I	HYP10 Propulsion Components II	HYP11 Computational Fluids II	HYP12 Test and Evaluation III
EXCURSION1 1500 - 1800 hrs	IISc Hypersonic Labs Visit, Tea Transportation provided to/from the Conference venue		
CULTURAL Evening 1845 - 2000 hrs	Felicitations & Cultural Evening Performance by Laya Lavanya Karnataka Classical Percussion Ensemble Bharatnatyam by Bhanumati's Bharatanjali		Grand Ballroom
DINNER02 2000 - 2230 hrs	Hypersonics Banquet		Grand Ballroom Foyer

Wednesday, 31 May 2023

PLN4 0800 - 0930 hrs	Panel Session: Latest Developments in Hypersonics from India			Grand Ballroom
<p>Moderator: Prof. Srisha Rao M V, Associate Professor, Department of Aerospace Engineering, Indian Institute of Science</p> <p align="center">Panelists: Dr. S. Unnikrishnan Nair, <i>Director VSSC</i> Shri G A S Murthy, <i>Director DRDL</i> Dr. V Ashok, <i>Deputy Director – Aero, VSSC</i> Dr. T K Ganesh Anavardham, <i>Project Director HSTDV, DRDL</i> Dr. Ajith Chaudary, <i>Project Director, HCM, DRDL</i> Mr. Laxmesh B H, <i>VP, Head of Missiles & Aerospace Business, L&T Defence</i></p>				
0930 - 1000 hrs	Wednesday Morning Tea			Grand Ballroom Foyer
1000 - 1230 hrs	WEDNESDAY SESSIONS I			
Grand Ballroom 1	Grand Ballroom 2	Jupiter	Neptune	
HYP13 Hypersonic Fundamentals II	HYP14 Propulsion Components III	HYP15 Computational Fluids III	HYP16 Thermal Management Systems	
LUNCH03 1230 - 1330 hrs	Wednesday Lunch			Grand Ballroom Foyer
1330 - 1700 hrs	WEDNESDAY SESSIONS II			
Grand Ballroom 1	Grand Ballroom 2	Jupiter	Neptune	
HYP17 Hypersonic Fundamentals III	HYP18 Other Advanced Propulsion Topics		HYP20 Materials and Structures	
1700 - 1730 hrs	VALEDICTORY FUNCTION			Grand Ballroom
1730 - 1800 hrs	Wednesday High Tea			Grand Ballroom Foyer

Thursday, 1 June 2023

EXCURSION2 0800 - 1900 hrs	Conference Excursion to Mysore Reporting time at 0730 hrs
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HYP01 1330 – 1730 hrs	Missions and Vehicles I						Sessions' Details		Grand Ballroom 1
<p>1330 hrs AIAA-2023-3000 Aerodynamic analysis of a flap-based deployable re-entry system in different flight conditions E. Gaglio, Scuola Superiore Meridionale, Napoli, Italy; A. Cecere, R. Guida, S. Mungiguerra, R. Savino, Università degli Studi di Napoli Federico II, Napoli, Italy; N. Chaqueo Jara, Universidad Tecnica Federico Santa Maria, Valparaiso, Chile; et al.</p>	<p>1350 hrs AIAA-2023-3001 Safe and Adaptive Trajectory Reshaping of Constrained Re-entry Flight: Recovery Ensemble Control A. Selim, Roketsan Roket Sanayii ve Ticaret AS, Ankara, Turkey; I. Ozkol, Istanbul Teknik Universitesi Ucak ve Uzay Bilimleri Fakultesi, Istanbul, Turkey</p>	<p>1410 hrs AIAA-2023-3002 Potential Aerodynamics Benefits of the Camber-Morphing Wing D. Charles F, P. Kumar, S. Muzzammil, A. Prabhu, K. Shanker, RV College of Engineering, Bangalore, India</p>	<p>1430 hrs AIAA-2023-3003 Experimental Studies to Design a Robust and Optimal Scramjet Engine Intake Configuration N. Joseph, S. S, F. K J, S. Chandran R, M. B, Vikram Sarabhai Space Centre, Thiruvananthapuram, India</p>	<p>1450 hrs AIAA-2023-3004 System Overview of the STAJe- 1 Payload J. Kunze, A. Paull, The University of Queensland, Saint Lucia, Australia</p>	<p>1510 hrs AIAA-2023-3005 From conceptual to preliminary design: Aerodynamic characterization of MR5 civil high-speed aircraft O. Gori, N. Viola, Politecnico di Torino, Torino, Italy; P. Roncioni, M. Marini, Centro Italiano Ricerche Aerospaziali, Capua, Italy; D. Pepelea, M. Stoican, Institutul National de Cercetari Aerospatiale Elie Carafoli, Bucharest, Romania</p>	<p>1530 hrs AIAA-2023-3006 An Approach of Evolving Vehicle Architecture in Reusable Spaceplane Design as a Means of Affordability and Flexibility in Access to Space J. Singh, Tata Motors Limited, Pune, India</p>			
HYP02 1330 – 1730 hrs	Propulsion Systems						Sessions' Details		Grand Ballroom 2
<p>1330 hrs AIAA-2023-3007 Preliminary Study on SABRE Engine A. Hale, MET Institute of Engineering, Nashik, India</p>	<p>1350 hrs AIAA-2023-3008 Flame-Stabilization of Liquid Hydrocarbon Fuel and Gaseous Surrogates in a Scramjet Combustor J. van der Lee, D. Michaels, J. Lefkowitz, Technion Israel Institute of Technology, Haifa, Israel</p>	<p>1410 hrs AIAA-2023-3009 JAXA RD1 Flight Experiment on Supersonic Combustion : Part 1. Overview K. Tani, M. Takegoshi, K. Takasaki, S. Tokudome, Uchu Koku Kenkyu Kaihatsu Kiko, Kakuda, Japan</p>	<p>1430 hrs AIAA-2023-3010 Influence of Inflection Mach Number and Base Nozzle Length on the Shock Vector Control of a Planar Nozzle with Double Divergence A. Das, T. Mankodi, U. Saha, Indian Institute of Technology Guwahati, Guwahati, India</p>	<p>1450 hrs AIAA-2023-3011 JAXA RD1 Flight Experiment on Supersonic Combustion: Part 2 Combustion Test Result M. Takahashi, K. Kobayashi, M. Takegoshi, T. Saito, T. Onodera, T. Isono, Uchu Koku Kenkyu Kaihatsu Kiko Kakuda Uchu Center, Kakuda, Japan; et al.</p>	<p>1510 hrs AIAA-2023-3012 Numerical Analysis of an integrated Scramjet vehicle at Hypersonic Speed A. Singh, Vikram Sarabhai Space Centre, Thiruvananthapuram, India</p>	<p>1530 hrs AIAA-2023-3013 Numerical Investigation of Flame Flashback Phenomenon in a Strut-Cavity Based Scramjet Combustor S. Pranaykumar, D. Ghosh, Indian Institute of Technology Kharagpur, Kharagpur, India</p>	<p>1550 hrs AIAA-2023-3014 Nitrogen Oxide Formation Pathways in Gaseous Detonations A. Dahake, R. Singh, A. Singh, Indian Institute of Technology Kanpur, Kanpur, India</p>	<p>1610 hrs AIAA-2023-3015 Intake starting characteristics of a scramjet combustor M. Mahato, S. Chimakurthy, C. Jalla, R. Pahade, S. Chattopadhyay, G. T K, DRDL, Hyderabad, India; et al.</p>	

HYP03 1330 – 1730 hrs	Computational Fluids I							Jupiter
<p>1330 hrs AIAA-2023-3016 Shock Stand-Off Distance and Development of a Supersonic Turbulent Boundary Layer: CFD Analysis of a Diamond-shaped 2D Fin C. Morency, K. Jansen, University of Colorado Boulder, Boulder, CO</p>	<p>1350 hrs AIAA-2023-3017 Assessment of Modified γ-model for Hypersonic Boundary Layer Transition Prediction Considering Leading Edge Bluntness D. R C, A. K, R. G, Indian Institute of Technology Madras, Chennai, India</p>	<p>1410 hrs AIAA-2023-3018 Framework to Characterize Aeroacoustic Loads Beneath High-Speed Boundary Layers S. Kaluva, R. Kumar, N. Vadlamani, Indian Institute of Technology Madras, Chennai, India</p>	<p>1430 hrs AIAA-2023-3019 Investigation of Flow Phenomena in the Optimization of Supersonic Intake Design with a RANS Solver J. Singh Sandhu, M. Bhardwaj, A. Sharma, N. Ananthkrishnan, Yanxiki Tech, Pune, India; I. Park, Agency for Defense Development, Daejeon, South Korea</p>	<p>1450 hrs AIAA-2023-3020 A Shock Fitting Technique For Hypersonic Flows Using Hexahedral Meshes K. Baliga, R. Krishnamurthy, Program Development Company LLC, India, Bangalore, India; M. Spel, R. Tech Research and Technology, Verniolle, France; S. James, V. Sudharshanam, Program Development Company LLC, India, Bangalore, India</p>	<p>1510 hrs AIAA-2023-3021 Inverse Method-of-Characteristics Algorithms for Unsteady Gas Flows with Shifting Thermochemical Equilibrium A. Jayamani, F. Lu, The University of Texas at Arlington, Arlington, TX</p>	<p>1530 hrs AIAA-2023-3022 Aerodynamic Shape Optimization of a Hypersonic Missile Geometry B. Prasad, M. Padmanabha, p. goyal, J. Sivasubramanian, M. S. Ramaiah University of Applied Sciences, Bangalore, India</p>	<p>1550 hrs AIAA-2023-3023 Computation Fluids Dynamics Simulation of Aero-Thermal Environment for Apollo Era Flight Test, FIRE-II using Adaptive Grid Refinement and Two Temperature Model S. Shrivastava, I. Verma, D. Mahapatra, P. Injeti, S. Patwardhan, S. S, ANSYS Inc, Pune, India; et al.</p>	

HYP04 1330 – 1730 hrs	Test and Evaluation I							Neptune
<p>1330 hrs AIAA-2023-3024 Design and Viscous Correction of an Axisymmetric Contoured Nozzle for Perfect Gas to the T2 Hypersonic Shock Tunnel R. Vilela, A. Fraile Junior, L. Ribeiro, R. Santos, P. MATOS, I. Rego, Instituto de Estudos Avancados, Sao Jose dos Campos, Brazil; et al.</p>	<p>1350 hrs AIAA-2023-3025 Commissioning of a Supercritical Ethylene Fuel Injection System in the T4 Hypersonic Impulse Facility. M. Trudgian, H. Russell, T. Vanyai, A. Veeraragavan, The University of Queensland Centre for Hypersonics, Brisbane, Australia</p>	<p>1410 hrs AIAA-2023-3026 Measuring the Free-Stream Turbulence Spectrum in the Shock Tunnel HELM using the Focused Laser Differential Interferometry (FLDI) T. Sander, L. Jakobs, C. Mundt, Universitat der Bundeswehr Munchen Fakultat fur Luft- und Raumfahrttechnik, Neubiberg, Germany</p>	<p>1430 hrs AIAA-2023-3027 A New Combustion-Driver 1.1 m Diameter Hypersonic Shock Tunnel to Simulate Mach 10 Flight Conditions M. Minucci, L. Galembeck, D. Carinhana Jr., I. Rego, G. Ponchio Camillo, M. Borges, Institute for Advanced Studies, Sao Jose dos Campos, Brazil; et al.</p>	<p>1450 hrs AIAA-2023-3028 Shock tube and gas dynamic design considerations and implementation for extended test times J. Higgs, F. Arafin, J. Pellegrini, A. Aguilera, K. Rouviere, R. Rahman, University of Central Florida, Orlando, FL; et al.</p>	<p>1510 hrs AIAA-2023-3029 Tomographic Reconstruction of Hypersonic Winged-Aircraft Model Flowfields in Large-Scale Hypersonic Wind Tunnel Experiment H. Takahashi, J. Oki, T. Hirotoni, H. Taguchi, Japan Aerospace Exploration Agency, Chofu, Japan</p>	<p>1530 hrs AIAA-2023-3030 Numerical Analysis of Oxygen Rich Hot Gas Disposal during Ground Test of Semi-cryogenic Engine Subsystem A. Singhal, D. Agarwal, T. Tharakan, S. Kumar S, Liquid Propulsion Systems Centre, Valiamala, India</p>	<p>1550 hrs AIAA-2023-3031 Measurements of Free stream Density Fluctuations in the T4 Stalker Tube R. Ananthapadman aban, A. Veeraragavan, T. McIntyre, V. Wheatley, D. Mee, The University of Queensland, Saint Lucia, Australia</p>	

HYP05 1000 – 1200 hrs	Missions and Vehicles II						Grand Ballroom 1	
1000 hrs AIAA-2023-3032 Study of Unstart characteristics in Scramjet using Back Pressure fluctuations at isolator throat for low and high enthalpies. N. Reddy, C. C. G. N, MS Ramaiah University of Applied Sciences, Bangalore, India	1020 hrs AIAA-2023-3033 Effects of Aerothermal Shape Distortion on Hypersonic Vehicle Performance in Cruise L. Pollock, J. Moran, A. Neely, University of New South Wales Canberra at ADFA, Canberra, Australia	1040 hrs AIAA-2023-3034 Conceptual Study into Wave Ingesting Propulsion for Hypersonic Flight I. Jahn, University of Southern Queensland, Toowoomba, Australia	1100 hrs AIAA-2023-3035 Aerodynamic Characterization of Hypersonic Launch Vehicle laden with exposed Scramjet based Cruise Vehicle M. Mahato, S. Sarikonda, R. Balasubramanian, A. K. G. T.K, S. Chattopadhyay, DRDL, Hyderabad, India	1120 hrs AIAA-2023-3036 SHAR for a TSTO launcher N. Relangi, L. Peri, A. Ingenito, SCUOLA DI INGEGNERIA AEROSPAZIALE, SAPIENZA, ROMA, Italy				
HYP06 1000 – 1200 hrs	Propulsion Components I						Grand Ballroom 2	
1000 hrs AIAA-2023-3037 Influence of Active Cooling on Engine Performance by Mitigating Aero-thermo-elastic Deformation of a Hypersonic Inlet J. Horing, I. Boyd, K. Maute, University of Colorado Boulder, Boulder, CO	1020 hrs AIAA-2023-3038 Experimental and Numerical Investigation of Leading-Edge Bluntness on Shock Boundary layer Interaction Inside a Scramjet Inlet at Mach 6 T. Vamsi krishna, J. Sreekumar, Indian Institute of Technology Kanpur, Kanpur, India; D. SLN, Vikram Sarabhai Space Centre, Thiruvananthapuram, India; M. Sugarno, Indian Institute of Technology Kanpur, Kanpur, India	1040 hrs AIAA-2023-3039 Numerical study on unstart detection and quantification of scramjet engine K. Hyunwoo, J. Kang, H. Sung, Korea Aerospace University, Goyang, South Korea	1100 hrs AIAA-2023-3040 Understanding the total pressure losses nature in a Scramjet Combustor S. Palateerdham, L. Peri, A. Ingenito, SCUOLA DI INGEGNERIA AEROSPAZIALE, SAPIENZA, ROMA, Italy; Y. Pal, Hindustan University, Chennai, India; S. Mahottamananda, Crescent Institute of Science and Technology, Chennai, India	1120 hrs AIAA-2023-3041 Numerical Simulations on a Liquid Jet in Supersonic Crossflow using a Homogeneous Mixture Model with AMR Y. Donggyu, H. Sung, Korea Aerospace University, Goyang, South Korea	1140 hrs AIAA-2023-3042 Analysis of unsteady pressure measurements in the unstart of a Mach 6.58 hypersonic intake N. V, S. Rao, Indian Institute of Science, Bangalore, India			

HYP08 1000 – 1200 hrs	Test and Evaluation II						Neptune	
<p>1000 hrs AIAA-2023-3043 An Overview of Recent Advances in Flow Characterization Utilizing Laser-Based Diagnostics in the ONR-UTA Arc-Heated Hypersonic Wind Tunnel L. Maddalena, V. Gopal, The University of Texas at Arlington, Arlington, TX</p>	<p>1020 hrs AIAA-2023-3044 Deep Learning based Absorption Tomography for Combustion Diagnostics A. Mahanti, S. K., D. Mishra, R. Sadanandan, Indian Institute of Space Science and Technology, Thiruvananthapuram, India</p>	<p>1040 hrs AIAA-2023-3045 Optical Emission Spectroscopy and Thomson Scattering Diagnosis on Laser-Induced Ablated Plume from HfB₂-SiC Material J. George, MetroLaser Inc, Laguna Hills, CA; Y. Wu, C. Limbach, Texas A&M University, College Station, TX</p>	<p>1100 hrs AIAA-2023-3046 One-dimensional Interferometric Scattering Velocimetry for High-speed Flows Y. Krishna, A. Sekar, Indian Institute of Space Science and Technology, Thiruvananthapuram, India; G. Magnotti, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia; A. Vaidyanathan, Indian Institute of Space Science and Technology, Thiruvananthapuram, India</p>					
HYP09 1300 – 1500 hrs	Hypersonic Fundamentals I						Grand Ballroom 1	
<p>1300 hrs AIAA-2023-3047 Heat flux prediction of hypersonic flow over a 34° compression corner using OpenFOAM® A. Makhija, K. Bodi, Indian Institute of Technology Bombay, Mumbai, India; D. Chakraborty, Mahindra University, Hyderabad, India</p>	<p>1320 hrs AIAA-2023-3048 Numerical simulation of heat transfer for a diamond airfoil in hypersonic flow A. Makhija, K. Bodi, T. Chandra Sekar, Indian Institute of Technology Bombay, Mumbai, India</p>	<p>1340 hrs AIAA-2023-3049 A Method for Solving Oblique-Shock/Expansion-Fan Interaction N. Doshi, Indian Institute of Technology Kharagpur, Kharagpur, India; M. Devaraj, G. Jagadeesh, Indian Institute of Science, Bangalore, India</p>						

HYP10 1300 – 1500 hrs	Propulsion Components II						Grand Ballroom 2	
<p>1300 hrs AIAA-2023-3050 Supersonic combustion supported by flameholders L. Vialta, Instituto Tecnológico de Aeronautica, Sao Jose dos Campos, Brazil; P. Matos, L. Barreta, D. Carinhana, F. Eugênio Ribeiro, Instituto de Estudos Avancados, Sao Jose dos Campos, Brazil</p>	<p>1320 hrs AIAA-2023-3051 Effect of Leading Edge Bluntness on Aerothermal Characteristics of Osculating Cone Waveriders A. Ghosh, A. Rao, S. Rao, Indian Institute of Science, Bangalore, India</p>	<p>1340 hrs AIAA-2023-3052 Design Methodology for Selecting a Single Expansion Ramp Nozzle Geometry that can Complete a Mission between Machs 3 and 7 D. Cerantola, J. Gagnon, D. Handford, P. Dass, Space Engine Systems, Edmonton, Canada</p>	<p>1400 hrs AIAA-2023-3053 Characterization of Shock-Induced Mixing Enhancement for Transverse Injection in Scramjet Engines C. Fujio, H. Ogawa, Kyushu Daigaku, Fukuoka, Japan</p>	<p>1420 hrs AIAA-2023-3054 Supersonic Mixing Characteristics of an Internal Cross-Flow Effervescent Ramp Injector S. Dharan, A. Vaidyanathan, Indian Institute of Space Science and Technology Department of Aerospace Engineering, Thiruvananthapuram, India; D. SLN, Vikram Sarabhai Space Centre, Thiruvananthapuram, India</p>				
HYP11 1300 – 1500 hrs	Computational Fluids II						Jupiter	
<p>1300 hrs AIAA-2023-3055 Shape Optimization of Hypersonic Inlet using a new Clustering-based Hybrid Optimizer. K. Bahuguna, Indian Institute of Science, Bangalore, India; R. Kolluru, Cambridge Centre for Advanced Research and Education in Singapore Ltd, Singapore, Singapore; S. Raghurama Rao, Indian Institute of Science, Bangalore, India</p>	<p>1320 hrs AIAA-2023-3056 Effect of shock structure on instability in HLL-family schemes A. Gogoi, Aeronautical Development Agency, Bangalore, India; J. Mandal, Indian Institute of Technology Bombay, Mumbai, India; A. Saraf, Aeronautical Development Agency, Bangalore, India</p>	<p>1340 hrs AIAA-2023-3057 Turbulent flow computations in three dimensions on a hybrid Cartesian point distribution using meshless solver LSFD - U A. Khillare, M. Yousuf, N. Munikrishna, B. Narayanarao, Indian Institute of Science, Bangalore, India</p>	<p>1400 hrs AIAA-2023-3058 Two dimensional laminar flow computations on unstructured meshes using defect corrected Staggered Update Procedure S. Subudhi, B. Narayanarao, Indian Institute of Science, Bangalore, India</p>	<p>1420 hrs AIAA-2023-3059 DSMC simulation of Rarefied Hypersonic flows over wall mounted geometries K. Paripurnam, R. Kalluri, Birla Institute of Technology & Science Pilani, Hyderabad, India</p>				

HYP12 1300 – 1500 hrs	Test and Evaluation III						Neptune	
<p>1300 hrs AIAA-2023-3060 Boundary Layer Transition Studies on a Winged Body Reentry Vehicle through Heat Flux Measurements in Shock Tunnel R. Ravichandran, A. Ahmed, S. R, A. Kumar, D. SLN, M. B, Vikram Sarabhai Space Centre, Thiruvananthapuram, India; et al.</p>	<p>1320 hrs AIAA-2023-3061 Numerical characterization of the LAERTE intake flowfield and effect on combustion. G. Pelletier, G. Vilmar, a. Vincent-Randonnier, C. Brossard, Office National d'Etudes et de Recherches Aérospatiales, Palaiseau, France</p>	<p>1340 hrs AIAA-2023-3062 Numerical analysis of FBG response to blast wave inside shock tube G. Hegde, G. Hegde, G. Jagadeesh, S. Asokan, Indian Institute of Science, Bangalore, India</p>	<p>1400 hrs AIAA-2023-3063 Investigation of the unsteadiness during starting transient operation of a zero secondary flow ejector. M. Raju, Vikram Sarabhai Space Centre, Thiruvananthapuram, India</p>	<p>1420 hrs AIAA-2023-3064 Dynamic Analysis of Shock Propagation from Shock Tube for Blast Testing A. Jraisheh, J. Chutia, A. Pathak, V. Kulkarni, Indian Institute of Technology Guwahati, Guwahati, India</p>				
HYP13 0930 - 1230 hrs	Hypersonic Fundamentals II						Grand Ballroom 1	
<p>0930 hrs AIAA-2023-3065 Study of Shock/Boundary-Layer Interactions Generated by a Sharp Fin Mounted above a Body of Revolution D. Otten, Lockheed Martin Missiles and Fire Control, Dallas, TX; J. Higgs, The University of Texas at Arlington College of Engineering, Arlington, TX</p>	<p>0950 hrs AIAA-2023-3066 Numerical Study of Spanwise Dual Jet Injection in a Supersonic Crossflow S. Maikap, A. Rajagopal, Indian institute of technology Jodhpur, Jodhpur, India</p>	<p>1010 hrs AIAA-2023-3067 Performance of the Hypersonic Intake in Varied Free-Stream Conditions A. Ray, A. De, Indian Institute of Technology Kanpur, Kanpur, India</p>	<p>1030 hrs AIAA-2023-3068 Effects of enthalpy on convective Heating of a large angle blunt cone in Martian atmosphere S. Bhaduri, A. De, M. Sugarno, Indian Institute of Technology Kanpur, Kanpur, India; D. SLN, Vikram Sarabhai Space Centre, Thiruvananthapuram, India</p>	<p>1050 hrs AIAA-2023-3069 A parametric study on a cone-cavity model in a laminar hypersonic flow S. Nanda, Technion Israel Institute of Technology, Haifa, Israel; K. SK, Indian Institute of Technology Madras, Chennai, India; J. Cohen, Technion Israel Institute of Technology, Haifa, Israel</p>	<p>1110 hrs AIAA-2023-3070 Phenomenological Introduction of Standoff Distance of Sonic Ring Impelling Entropy Waves and Aerodynamic Heating of Hypersonic Vehicles V. Sanal Kumar, Vikram Sarabhai Space Centre, Thiruvananthapuram, India; D. Vinay, R. Sharma, S. Sharma, Amity University, Noida, India; V. Rajendran, The University of New South Wales Canberra, Canberra, Australia; R. Sarswat, Amity University, Noida, India; et al.</p>	<p>1130 hrs AIAA-2023-3071 On oscillations in cylinder wakes at high speeds M. Talluru, S. Gai, University of New South Wales Canberra at ADFA, Canberra, Australia</p>	<p>1150 hrs AIAA-2023-3072 Response of a cantilevered plate to shock impingement in hypersonic flows K. Ahuja, S. Rao, Indian Institute of Science, Bangalore, India</p>	

HYP14 0930 - 1230 hrs	Propulsion Components III						Grand Ballroom 2	
<p>0930 hrs AIAA-2023-3073 Atomization and Mixing of Liquid and Aerated jet injected behind Curved Pylon in Supersonic Cross-flow A. Sekar, Indian Institute of Space Science and Technology Department of Aerospace Engineering, Thiruvananthapuram, India; Y. Krishna, Specrule Scientific Pvt Ltd, Thiruvananthapuram, India; A. Vaidyanathan, Indian Institute of Space Science and Technology Department of Aerospace Engineering, Thiruvananthapuram, India</p>	<p>0950 hrs AIAA-2023-3074 Scramjet Energy Transfer in a Strut Based Pre-Combustor R. C, D. Ghosh, Indian Institute of Technology Kharagpur, Kharagpur, India</p>	<p>1010 hrs AIAA-2023-3075 Identification of Scramjet Inlet Unstart Characteristics by Dynamic Mode Decomposition T. Stokes, R. Acharya, The University of Tennessee Space Institute, Tullahoma, TN</p>	<p>1030 hrs AIAA-2023-3076 Experiments on mass injection-induced unstarting flows M. MS, N. Thakor, M. Devaraj, S. S., Indian Institute of Science, Bangalore, India</p>	<p>1050 hrs AIAA-2023-3077 Influence of cavitation on the fundamental flame studies of surrogate fuels: A potential realization towards supersonic combustion. b. Rajaghatta Sundararam, MS Ramaiah University of Applied Sciences, Bangalore, India; P. Panda, Indian Institute of Science, Bangalore, India; D. S Arulumallige, V. M Shelar, MS Ramaiah University of Applied Sciences, Bangalore, India</p>	<p>1110 hrs AIAA-2023-3078 Scramjet Engine Intake Studies in High Enthalpy Impulse Facility A. Ahmed, N. Ameen K. S. R, B. Mathew K, D. SLN, M. B, Vikram Sarabhai Space Centre, Thiruvananthapuram, India; et al.</p>			

HYP15 0930 - 1230 hrs	Computational Fluids III							Jupiter
<p>0930 hrs AIAA-2023-3079 On Residual Estimate of Local Truncation Error A. Paudel, B. Narayanarao, Indian Institute of Science, Bangalore, India</p>	<p>0950 hrs AIAA-2023-3080 Hypersonic simulation of a free-flying ring interfering with a two-dimensional curved shock wave M. Chemak, ISAE-ENSMA, Futuroscope Chasseneuil, France; M. Spel, R.Tech, Verniolle, France; S. James, Program Development Company, Kodihalli, India; P. Eiseaman, Program Development Company, White Plains, NY</p>	<p>1010 hrs AIAA-2023-3081 Numerical Investigation of Heat flux in Shock Wave-Turbulent Boundary Layer Interaction using RANS and WMLES K. J. S. G. Narayana, MS Ramaiah University of Applied Sciences, Bangalore, India</p>	<p>1030 hrs AIAA-2023-3082 Aerothermal analysis of the KRUPS space capsules S. Poovathingal, T. Stoffel, B. Tacchi, A. Martin, University of Kentucky, Lexington, KY</p>	<p>1050 hrs AIAA-2023-3083 Hypersonic Aerodynamic Characterization of a Winged Body Re-entry Configuration Using Chemical Non-Equilibrium CFD Simulations A. Nagpal, V. G. Vikram Sarabhai Space Centre, Thiruvananthapuram, India</p>	<p>1110 hrs AIAA-2023-3084 Prediction of Heat Transfer and Skin Friction for the HIFIRE-1 Flight Research Vehicle V. V. J. Sivasubramanian, M. S. Ramaiah University of Applied Sciences, Bangalore, India</p>	<p>1130 hrs AIAA-2023-3085 Prediction of drag over a bluff body by coupling of artificial neural network with CFD based upstream energy deposition method A. Pathak, P. Khare, J. Chutia, A. Jraisheh, V. Kulkarni, Indian Institute of Technology Guwahati, Guwahati, India</p>	<p>1150 hrs AIAA-2023-3086 Linear Stability Analysis of a Hypersonic Boundary Layer on a Flat Plate J. Sivasubramanian, M. S. Ramaiah University of Applied Sciences, Bangalore, India</p>	

HYP16 0930 - 1230 hrs	Thermal Management Systems							Neptune
<p>0930 hrs AIAA-2023-3087 Film Cooling Effectiveness on Radiative Heat Transfer in Hypersonic Flows J. Sreekumar, T. Vamsi Krishna, M. Sugarno, Indian Institute of Technology Kanpur, Kanpur, India</p>	<p>0950 hrs AIAA-2023-3088 Thermal Design of a Purged Cryogenic CFRP Tank and TPS Test Demonstrator for RLV T. Reimer, C. Rauh, Deutsches Zentrum für Luft- und Raumfahrt eV, Stuttgart, Germany</p>	<p>1010 hrs AIAA-2023-3089 Design, Manufacturing and Assembly of the STORT Hypersonic Flight Experiment Thermal Protection System T. Reimer, G. Di Martino, I. Petkov, L. Dauth, L. Baier, A. Gülhan, Deutsches Zentrum für Luft- und Raumfahrt eV, Stuttgart, Germany</p>	<p>1030 hrs AIAA-2023-3090 Transient Heat Transfer in a Scramjet Forebody under Varying Hypersonic Flow G. Nagarajan Kirupakaran, Indian Institute of Science, Bangalore, India; G. K V, BrahMos Aerospace Private Limited, Hyderabad, India; D. Mahapatra, Indian Institute of Science, Bangalore, India</p>	<p>1050 hrs AIAA-2023-3091 Manufacturing and Testing of a Purged Thermal Insulation Concept for Reusable CFRP Cryotanks C. Rauh, T. Reimer, German Aerospace Center (DLR), Stuttgart, Germany</p>	<p>1110 hrs AIAA-2023-3092 Flow and Heat Transfer Instabilities in a Helical Regenerative Cooling Channel S. Lonkar, S. Kumar, H. Nalawade, P. Panda, Indian Institute of Science, Bangalore, India</p>	<p>1130 hrs AIAA-2023-3093 Numerical Investigations on Supercritical Heat Transfer Characteristics of JP-10 C. Bhoir, N. Thakor, G. Jagadeesh, E. Arunan, Indian Institute of Science, Bangalore, India</p>		

HYP17 1330 - 1700 hrs	Hypersonic Fundamentals III							Grand Ballroom 1
<p>1330 hrs AIAA-2023-3094 Oscillating shock wave boundary layer interactions on a cantilever plate M. Talluru, L. McQuellin, A. Neely, University of New South Wales Canberra at ADFA, Canberra, Australia</p>	<p>1350 hrs AIAA-2023-3095 Experimental Investigation of the Shock Wave/Boundary Layer Interaction at a Compression Corner Model A. Lara, T. Rolim, L. Barreta, P. MATOS, R. Santos, R. Vilela, Instituto de Estudos Avancados, Sao Jose dos Campos, Brazil; et al.</p>	<p>1410 hrs AIAA-2023-3096 Investigation of Natural Transition on a Sharp Leading Edge Flat Plate in a Hypersonic Shock Tunnel A. Bajpai, G. Jagadeesh, Indian Institute of Science, Bangalore, India</p>	<p>1430 hrs AIAA-2023-3097 Use of GNSS Signals to Reconstruct the Shape of the Plasma Sheet Surrounding the Re-Entry Vehicles G. Palmerini, P. Kapilavai, Sapienza Università di Roma, Roma, Italy</p>	<p>1450 hrs AIAA-2023-3098 Noise Prediction for Mach 8 Waverider vehicle during Take-Off and Landing G. Piccirillo, N. Viola, R. Fusaro, Politecnico di Torino, Torino, Italy</p>	<p>1510 hrs AIAA-2023-3099 Optimal layout of the fuel system of aircraft J. Qiu, Commercial Aircraft Corporation of China Ltd, Pudong, China</p>	<p>1530 hrs AIAA-2023-3100 Effect of Isolator length in Nozzle - Isolator interaction in co-flow set up recurrent in hypersonic propulsion systems A. Himakar, R. K. S. Rao, Indian Institute of Science, Bangalore, India</p>		

HYP18 1330 - 1700 hrs	Other Advanced Propulsion Topics							Grand Ballroom 2
<p>1330 hrs AIAA-2023-3101 Study of Aerospike Nozzle and its Thrust Vectoring Characteristics V. Nagaral, R. R, G. Narayana, MS Ramaiah University of Applied Sciences, Bangalore, India</p>	<p>1350 hrs AIAA-2023-3102 Numerical Studies of Wall Temperature effects on Shock-Wave/Turbulent Boundary Layer Interaction over Annular Conical Plug Nozzle H. Gahnolia, R. Pal, A. Roy, Indian Institute of Technology Kharagpur, Kharagpur, India</p>	<p>1410 hrs AIAA-2023-3103 Enhancing the Detonability of H₂-O₂/Air Mixtures by Using O₃ and H₂O₂ for Application in Detonation Engines R. Singh, A. Dahake, A. Singh, Indian Institute of Technology Kanpur, Kanpur, India</p>	<p>1430 hrs AIAA-2023-3104 A Neural Network Based Design of a Planar Double Divergent Nozzle K. Shrivastava, A. Das, U. Saha, Indian Institute of Technology Guwahati, Guwahati, India</p>	<p>1450 hrs AIAA-2023-3105 In Silico Studies on Truncated Aerospike Nozzle with Optimum Cowl Length for Single Stage to Orbit Vehicles S. Sundaria, A. Bhagat, Amity University, Noida, India; V. Sanal Kumar, Vikram Sarabhai Space Centre, Thiruvananthapuram, India</p>	<p>1510 hrs AIAA-2023-3106 Addition of Hydrogen to Enhance Ignition Characteristics and Performance of a Rocket Propellant for Application in Detonation Engines R. Singh, A. Dahake, A. Singh, Indian Institute of Technology Kanpur, Kanpur, India</p>	<p>1530 hrs AIAA-2023-3107 Effect of Ozone and Inert Diluents on RP1/RP2 - O₂ Gaseous Detonations for Applications in Detonation-based Rocket Engines S. Naraboina, R. Singh, A. Dahake, A. Singh, Indian Institute of Technology Kanpur, Kanpur, India</p>	<p>1550 hrs AIAA-2023-3108 Sub-scale experimental test of Hybrid Rocket engine using LOX and 3D printed fuel S. Patial, A. Rai, D. Sojitra, G. Ayyappan, A. Vaidyanathan, Indian Institute of Space Science and Technology Department of Aerospace Engineering, Thiruvananthapuram, India; D. Bhalla, Vikram Sarabhai Space Centre, Thiruvananthapuram, India</p>	

HYP20 1330 - 1700 hrs	Materials and Structures						Neptune	
1330 hrs AIAA-2023-3109 A Study on Multi-wall Carbon Nanotubes for Aviation Vehicle Structure Suitability in Flight Regimes S. Tarale, S. B, BMS College of Engineering, Bangalore, India	1350 hrs AIAA-2023-3110 Study On Fundamental Lamb Wave Mode Distortions Generated Using Piezoelectric Transducer S. Neharkar, B. C.R, Indian Institute of Space Science and Technology, Thiruvananthapuram, India	1410 hrs AIAA-2023-3111 Linear Lamb Wave Based Technique for Damage Detection in stiffened composite plate using Machine learning S. Kumar, V. MISHRA, M. SUNNY, Indian Institute of Technology Kharagpur, Kharagpur, India	1430 hrs AIAA-2023-3112 Effect of Crack on Strength and Stiffness of Composite Structures using VAM K. Sahu, Indian Institute of Science, Bangalore, India	1450 hrs AIAA-2023-3113 Strength Estimation of Fiber Metal Laminated Plates (GLARE) with Crack by VAM R. Kaushik, Indian Institute of Science, Bangalore, India				

IISc Hypersonic Labs' Visit

May 30th 2023

1500 hrs to 1800 hrs

Turbulent Shear Flow Physics and Engineering Laboratory (TSFPEL)

The Turbulent Shear Flow Physics and Engineering Laboratory at IISc is engaged in experimental research over a wide range of Mach numbers, starting from a low subsonic value and going up to Mach 10. Four different wind tunnels allow us to span this Mach number range. The largest of the four facilities is the Roddam Narasimha Hypersonic Wind Tunnel (RNHWT), a 0.5 m diameter enclosed free-jet facility, which can be operated between Mach numbers 6 and 10. The RNHWT facility will be showcased during the tour.



Combustion Research and Advanced Diagnostics Laboratory (CRADL)

Combustion Research and Advanced Diagnostics Laboratory (CRADL) deals with supersonic combustion experiments. This facility can handle mass flow rate of fuel from 0.6 to 1.5 kg/s. Static temperature and pressure varies from 800 K to 1050 K and 0.5 bar to 1 bar respectively. Total temperature and pressure are in the range of 1600 K to 1800 K and 5.3 bar to 10 bar. In these conditions, a run time of 13 seconds can be achieved. To operate at higher Mach numbers, liquid fuel heater can be incorporated which uses Methane or hydrogen as fuel.



Laboratory For Hypersonic and Shockwave Research (LHSR)

Laboratory for Hypersonic and Shockwave Research (LHSR) is a place of interdisciplinary research varying from hypersonic aerodynamics to various applications of shock waves. Shock tubes form an important asset of the lab for carrying out experiments and shock tunnels that can operate in the range of Mach 6 to Mach 14 with specific enthalpy reaching as high as 5 MJ/kg help in achieving desired flow conditions. The tunnel test sections can accommodate models as large as 100 mm in diameter and 1 m in length. The Free Piston Driven Shock Tube (FPST) that uses free piston to compress gas in the driver tube is a state of the art facility that helps achieve higher enthalpies. Impact of shock waves on chemical kinetics of fuels, materials response, medical applications, industrial technology development etc., have been some of the interdisciplinary areas of the research of this lab. In this visit various facilities of the lab shall be shown.



Cultural Evening

May 30th 2023

1845 hrs to 2000 hrs

Get enchanted into the range of traditional, fusion and folk melodies played by “*Laya Lavanya Karnataka Classical Percussion ensemble*” consisting of Flute, Violin, Mrudangam, Tabla, Phakwaj, Rhythm pad, Morching, Kanjari and Konnakhol.



Get mesmerized at the three compositions directed by Shri. Sheela Chandrasekhar in Bharatanatyam, one of the traditional dance forms of India by “*Bhanumati’s Bharatanjali*”.

The troupe would perform three compositions 1) Poorvarangavidhi, 2) Subrahmanya Namaste, and 3) Sandisha me Shanthim enacting both the beauty in traditions and the vision of modern India by Mahatma Gandhi, Father of Nation, India





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