





"AUTONOMOUS AIRBORNE SYSTEMS – TRENDS, CHALLENGES & OPPORTUNITIES"

JUNE 2 - 3, 2022 | HAL MANAGEMENT ACADEMY, BENGALURU - INDIA





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Government of India Undertaking, Ministry of Defence

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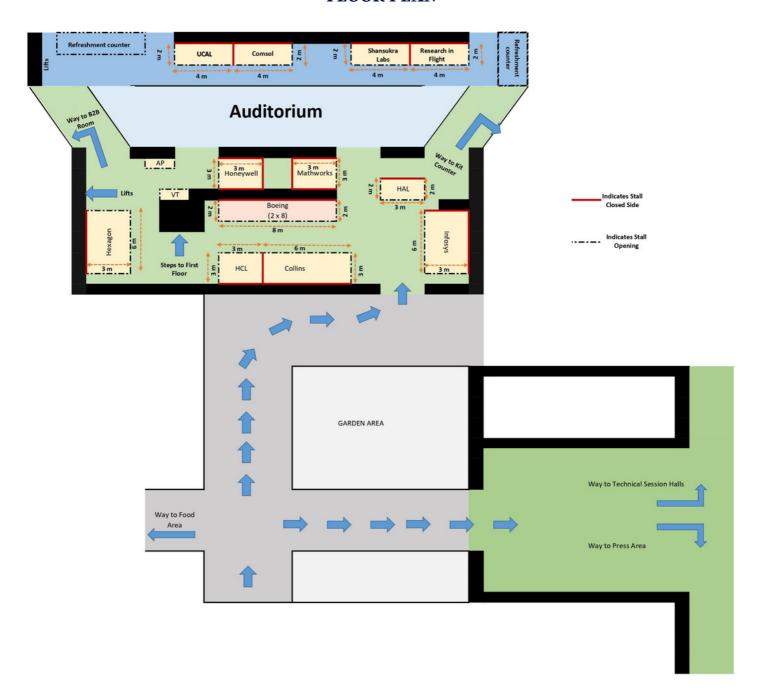
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#### **FLOOR PLAN**









#### INTRODUCTION

SAE has had a long association with aerospace for over a hundred years. Back in 1916, the Society of Automobile Engineers, the American Society of Aeronautic Engineers, the Society of Tractor Engineers and others interested in the growing mobility Industry came together to form the "Society of Automotive Engineers". The term "Automotive" was intended to represent any form of self-propelled vehicle.

Today, SAE International has a thriving community of members from the Aerospace Industry, and a commanding position in the area of Aerospace Standards with a high percentage of aerospace standards being maintained, managed and disseminated by SAE International through various Aerospace Standards Technical Committees. SAE International also organizes various aerospace specific activities for its members.

SAEINDIA, the largest strategic alliance partner of SAE International, SAEINDIA expanded into Aerospace in 2009 by establishing the Aerospace Board on 17 December 2009. The timing of this expansion was driven by the emerging unprecedented growth in the Aerospace Industry in India.

#### **AEROSPACE IN INDIA**

India has had an Aerospace Industry since 1940 when Hindustan Aircraft was created as a private company. Independent India expanded aerospace activities by taking over the management of this company and creating Hindustan Aeronautics Limited, and also establishing several key agencies such as the Defence Research and Development Organization, National Aerospace Laboratories and Indian Space Research Organization. These agencies formed the core of Indian aerospace and were involved in the development and manufacture of aerospace products during the 20th century.

With the advent of the 21st century and the liberalization of the Indian economy, many private companies are able to operate in the Indian Aerospace Industry and contribute to the global aerospace marketplace. Recent additions include multinational companies (such as Airbus, BAE Systems, Boeing, Dassault, General Electric, Lockheed Martin, SAFRAN and United Technologies Aerospace Systems), private Indian manufacturers (such as Godrej, Larsen & Toubro, Mahindra Aerospace, Tata Advanced Systems Limited, and Tata Automation Limited), as well as engineering service providers (such as Cyient, HCL Technologies, Infosys, Tata Consultancy Services, and Tech Mahindra). The prospect of emerging opportunities in the aerospace sector has also spawned new educational programs at many colleges and universities.

The dramatic growth of the aerospace sector in India is driven by increasing demand on the civil aviation sector, the urgent need for modernization on the defence sector, and policy changes introduced by the Government of India. At the present time, the sun is shining brightly on the civil aviation sector in India. The advent of increasing economic prosperity (indicated by growth in the GDP), and the increasing need for mobility of business personnel has led to a boom in India's civil aviation. Since 2007, many of the airports have been modernized and today India has some of the most modern and efficient world-class airports. The number of airlines and aircraft operating in the Indian skies has also increased significantly, and projections are that this will continue to grow to meet the increasing demand. This, in turn, leads to a greater need for airport services as well as aircraft maintenance, repair and overhaul facilities.

The Defence side of aerospace has also been growing dramatically in India. The Government of India has been pursuing a dual approach to meeting the country's defence equipment needs. While many people talk about the need to develop indigenous products (for India, by India), a more objective analysis shows that producing the variety of complex equipment needed will require substantial upgrades to a broad spectrum of skills and capabilities in different areas such as R&D, engineering, manufacturing, materials, infrastructure, etc.

The Government of India (through the Ministry of Defence) has defined the Defence Acquisition Procedure (DAP) 2020 to simplify the defence procurement procedure and to achieve the objective of self-reliance. There will be no offset clause in government-to-government, single vendor and IGAs. Under the offset clause, foreign companies are required to invest part of their deal value in the country and meant to improve domestic defence manufacturing. Indigenous Content of various categories has been increased by 10%. This has been done to support the Make in India initiative. The recent changes to the Civil Aviation Policy and rules on Foreign Direct Investment also are expected to influence the growth of the aerospace sector significantly.

Each of these avenues (civil aviation, indigenous products, products from MNCs, and policy changes) has led to new set of opportunities for aerospace enthusiasts in India. These opportunities cut across the industry and will have a positive impact on various elements of the Aerospace Industry.







#### SAEINDIA AEROSPACE FORUM

The Aerospace Forum (previously known as Aerospace Board) of SAEINDIA was created to engage and support this increasing aerospace footprint in India. The Aerospace Forum was officially inaugurated on 17 December 2009, at a simple function in Bangalore, with Dr. Bala K. Bharadvaj of Boeing as the Chair person.

In subsequent months, the Aerospace Forum set about creating a team of dedicated individuals to represent a broad spectrum of the industry, and defining the strategy and direction of this Board. This team defined the overall objective for the Aerospace Board to "Develop a strong community of interest, leading to a healthy aerospace ecosystem in India." This objective was deliberately chosen to be broad since it was felt that the aerospace story was still unfolding and SAEINDIA should have the flexibility to engage in a wide range of activities. These activities were grouped into the following areas:

- · Assist with Education
- · Provide opportunities for increasing Knowhow
- · Increase access to Standards
- Increase awareness and influence of Policy
- · Enable Networking.

These Objectives remain relevant even today, and continue to guide the activities of the Aerospace Forum.

The first event of the Aerospace Forum was held on 26 March 2010 at the National Aerospace Laboratories in Bangalore. It was a highly successful event on multiple counts:

- Brought leaders from DPSUs, Government Labs, Indian industry, and MNCs together on the same platform
- Enabled active exchange of ideas
- · Demonstrated the enthusiasm and willingness of the different groups to work together

Over the past decade, many events and activities have been organized by the Aerospace Forum – some independently, but quite a few in collaboration with other like-minded groups. A selected list of these events is listed below:

- "Intelligent Asset Management" by Dr. Richard Greaves, at Bangalore (May 2011)
- "Value Management" by Dr. Edward J Hoffman from NASA, jointly with PMI (2011)
- "National Aerospace Conference & Exposition 2012" at Chennai, with Anna University (Aug 2012)
- New Vistas of Indian Aerospace & Defense" with Indo-French Chamber of Commerce (Feb 2013)
- "Standards workshop" conducted by SAE International in Bangalore and Hyderabad (June 2012)
- "Propel High with Project Management" conference, jointly with PMI India (July 2014)
- "International Workshop on Integrated Vehicle Health Management for Aerospace Applications" & International Technical Committee meetings for HM-18 E-32 at Bangalore (Oct 2014)
- "Make In India Transformational Driver for Aerospace & Defense" (July 2015)
- Blue Ribbon CXO Conclave in Bangalore (Sep 2015)
- Celebrating 5th Anniversary of formation of Aerospace Forum (Dec 2015)
- Various events in conjunction with the visit of Board of Directors of SAE International (Jan 2016)
- Contributing to "Skill India" initiative, working with KPMG (May-June 2016)
- Aerospace Then, Now and Future (Feb 2017)
- Systems Engineering for Prognostics and Health Management Systems (May 2018)
- Digital Revolution In Aerospace & Defense Industry (Feb 2019)
- AeroCON 2020 (Nov 2020)
- AeroTHON 2021 (Jun 2021)
- Aerostandards Workshop 2021 (Sep 2021)
- Aatmanirbhar Bharat In Aerospace 2021 (Nov 2021)
- SAEINDIA Aerospace Roundtable (Mar 2022)

#### **Summary:**

In summary, the Indian aerospace industry is poised to grow significantly in the years ahead. At the same time, there is need for significant advances in skills and capability at various levels. With many Indian and multi-national organizations located in India, there is a great opportunity for SAEINDIA to engage the aerospace professionals directly and in collaboration with other organizations with similar objectives.

We look forward to greater participation from members, and expand our footprint in aerospace by welcoming new members







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#### ABOUT AEROCON

#### 2ND EDITION OF INTERNATIONAL AEROSPACE CONFERENCE IN INDIA CONFERENCE THEME : AUTONOMOUS AIRBORNE SYSTEMS – TRENDS, CHALLENGES & OPPORTUNITIES

AeroCON is a prestigious biennial International Aerospace Conference organized by SAEINDIA in collaboration with SAE International. The International Aerospace Conference: AeroCON 2022 is planned to be held in Bengaluru, India on 2 & 3 June, 2022. The theme of AeroCON 2022 is autonomous airborne systems focusing on various research trends, challenges, and opportunities. It is a knowledge-sharing platform on autonomous airborne systems bringing together the best of industry, academia and research to lay the roadmap for the future of Aerospace & Defence. The increase in demand for large aircraft from Indian airline carriers is leading to focus on Powered by Hour Contracts (PBH). Many Indian aerospace services and manufacturing activities are expected to be driven by PBH. Similarly, India's defence capital expenditure is continuously growing, providing immense opportunities in defence aerospace. This provides unique opportunity for both start-ups and incumbents. The Indian Aerospace & Defence (A&D) market is projected to reach ~USD 70 billion by 2030, driven by the burgeoning demand for advanced infrastructure and government thrust. [Source: IBEF]

Artificial intelligence (AI) and advanced control systems will continue to evolve in the next few years and will play an important role in autonomous systems. Autonomous airborne systems are revolutionizing the aviation industry more specifically in Unmanned Aircraft Systems (UAS) or Drones. These technologies will continue to evolve and will play an important role improving safety and efficiency of operations in both civil and military aviation. The European Union Aviation Safety Agency (EASA) defined a pragmatic AI roadmap consisting of 3 levels namely assisting functions (Level 1), human machine collaboration (Level 2) and more autonomy of the machine (Level 3). Can we accelerate the journey of autonomous airborne systems? Do you want to know the current trends, challenges and opportunities for autonomous airborne systems? Come and join us at AeroCON 2022, a unique event providing a global networking opportunity for Aerospace Professionals both from industry and academia besides the reputed National Defence Laboratories.

In Association with



#### **MESSAGE FROM CHAIR - PATRON**

डॉ जी. सतीश रेंड्डी Dr G. Satheesh Reddy FNAE, HFCSI, FRIN (London), FMACANUD (Russia), FA&SI, FRA&S (UK). HFPMAI, FSSWR, FIET (UK), FIE. FAPAS, FIETE, AFAIAA (USA)



सचिव, रक्षा अनुसंघान तथा विकास विभाग एवं अध्यक्ष, डीआरडीओ

Secretary, Department of Defence R&D & Chairman, DRDO





#### **MESSAGE**

- 1. I am extremely delighted to note that AeroCON 2022, the biennial International Aerospace Conference of SAEINDIA, is being organized on 2-3 June 2022. With the theme as "Autonomous Airborne Systems", the conference is promising a galaxy of eminent speakers and technical paper presentations by subject matter experts. The conference has been laid out to bring together the best of industry, academia and research in the field of autonomous airborne systems. Technologies for enhanced autonomy will be crucial for mission effectiveness and operations in the near future. The technology development pace for the autonomous systems is going to revolutionize the aerospace industry.
- 2. I am sure the deliberations and forethoughts during this conference will translate to the roadmap for the future of Aerospace & Defence in India, and be a key enabler for Aatmanirbharta in advanced technologies for autonomous systems. I congratulate all organizers and SAE members associated with AeroCON 2022 for their untiring efforts in organizing this conference. I wish the conference a grand success.

(Dr G. Satheesh Reddy)

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#### **MESSAGE FROM PRESIDENT - SAEINDIA**



Mrs. Rashmi Urdhwareshe Director (Retired)- ARAI

It is my honour and privilege to Co-Chair of the Steering Committee of AeroCON 2022, a Prestigious Biennial International Aerospace Conference organized by SAEINDIA, in collaboration with SAE International. The conference is being held in HAL Management Academy, Bengaluru, India on 2nd 8 3rd June 2022. The theme of AeroCON 2022 is Autonomous Airborne Systems and addresses research trends, challenges and opportunities in this area.

The conference is mentored by Dr. Satheesh Reddy, Secretary, Department of Defence R&D and Chairman, Defence Research and Development Organisation (DRDO) as the Patron and steered by Mr. Ahmed Elsherbini, MD & Chief Engineer, Boeing India Engineering and Technology Center, as the Chair of the Steering Committee. The Steering Committee has senior leaders, from across the Aerospace and Engineering Services Industry and academia.

I am very happy to inform that, the conference has accepted good number of technical papers, after stringent peer review covering a wide range of topics in aerospace. The authors are from across various aerospace and engineering services and academia. We also have an illustrious list of speakers, who will be delivering keynote speeches and deliberating in panel discussions. I am sure that the conference will serve as a knowledge-sharing platform, bringing together the best of industry, academia, research to lay the roadmap for the future of Aerospace & Defence.

I want to take this opportunity to thank all the members of the Steering and Organising Committees and SAEINDIA Office, for their passion and dedication in organising this conference.

On behalf of the SAEINDIA, I wish all the delegates and invitees, for a successful conference.

With Best Wishes,
Mrs. Rashmi Urdhwareshe,
President, SAEINDIA,
Co-Chair, Steering Committee, AeroCON 2022.







#### **MESSAGE FROM CHAIR - STEERING COMMITTEE**



Mr. Ahmed Elsherbini Managing Director & Chief Engineer, Boeing India

I am deeply honored and feel privileged to chair the steering committee of the second edition of AeroCON 2022 - the prestigious biennial International Aerospace Conference organized by the Society of Automotive Engineers India (SAEINDIA), in collaboration with SAE International. The conference will be held in Hindustan Aeronautics Limited (HAL) Management Academy, Bengaluru, India for two consecutive days, June 2-3, 2022.

The conference is steered by a prestigious steering committee with Dr. Satheesh Reddy, Secretary, Department of Defence R&D and Chairman, Defence Research and Development Organisation (DRDO) as the Patron and Mr. Ravishankar Mysore, as the Chair, SAEINDIA Aerospace Forum. The steering committee has senior leaders from across the aerospace and engineering services industry and academia.

As the event brings together the best minds from the industry, academia, and research domains for unlocking trends, challenges, opportunities on Autonomous Airborne Systems — the event theme — I am excited about the contribution these conversations will make to the burgeoning aerospace and defense sectors in the country. It will open new avenues of ideation, exploration, and implementation critical to enhance the manufacturing, skilling, engineering, IT, and technology areas in the Indian aerospace and defense sectors.

This year's theme at AeroCON aligns deeply with Boeing's vision of protecting, connecting, and exploring humans with purposeful innovation, persistence, and intelligence, from seabed-to-space. We believe that the true value of autonomy lies in the ability to help our customers stay on missions longer, and provide more immediate, actionable knowledge – prioritizing manpower for the most important actions and decisions.

At Boeing, we enjoy a deep and enduring partnership with SAE India, as we extend our shared vision of helping advance the aviation and defense industry in India, for India, and for the world.

I would like to take this opportunity to thank all the members of the organizing committee of SAE India for their persistence and contribution in creating a strong foundation for the industry with a focused conference.

I am equally delighted and encouraged by the contributions that have come from major aerospace and engineering services companies and academic institutions for this important industry event. I am confident that together we will shape the future of the country's aerospace and defense sectors.

On behalf of the organizing committee, I wish all the delegates and invitees a successful AeroCON 2022.

With best wishes,

Mr. Abmed Elsberbini,

Managing Director, Boeing India Engineering & Technology Center (BIETC), and Chief Engineer, Boeing India







#### **MESSAGE FROM CHAIR - ORGANIZING COMMITTEE**



**Mr. Ravishankar Mysore**Vice President (Retired), Collins Aerospace

It is my honour and privilege to Chair the Organising Committee of AerCON 2022, a prestigious biennial International Aerospace Conference organized by SAEINDIA in collaboration with SAE International. The conference is being held in HAL Management Academy, Bengaluru, India on 2 & 3 June, 2022. The theme of AeroCON 2022 is Autonomous Airborne Systems and addresses research trends, challenges, and opportunities in this area.

The conference is steered by a prestigious Steering Committee with Dr. Satheesh Reddy, Secretary, Department of Defence R&D and Chairman, Defence Research and Development Organisation (DRDO) as the Patron and Mr. Ahmed Elsherbini, MD & Chief Engineer, Boeing India Engineering and Technology Center as the Chair of the Steering Committee. The Steering Committee has senior leaders from across the Aerospace and Engineering Services Industry and academia.

I am very happy to inform that the conference has attracted over 30 technical papers covering a wide range of topics in aerospace. The topics covered are AI/ML, Modelling and Simulation, Aero Engines, Additive Manufacturing, Testing & Validation, Aerodynamic Design, AR/VR, Composites & Advanced Materials, Safety & Reliability, Integrated Vehicle Health Management, Blockchain, Electric Mobility, Autonomous Air borne Systems, Actuation Systems & Avionics. The authors are from across various aerospace and engineering services and academia. We also have an illustrious list of speakers who will be delivering key note speeches and deliberating in panel discussions on AI/ML, Autonomous Systems, Systems Engineering, IVHM and Unmanned Aircraft Systems. I am sure that the conference will serve as a knowledge-sharing platform on all these topics bringing together the best of industry, academia and research to lay the roadmap for the future of Aerospace & Defence.

It is very heartening and encouraging to note that the conference is sponsored by major Aerospace and Engineering Services companies and academic institutions.

I want to take this opportunity to thank all the members of the Organising Committee and SAEINDIA Office for their passion and dedication in organising this conference.

On behalf of the Organising Committee, I wish all the delegates and invitees a successful conference.

With Best Wishes,

Mr. Ravishankar Mysore

Chair, SAEINDIA Aerospace Forum

Chair, Organising Committee, AeroCON 2022







#### MESSAGE FROM TECHNICAL COMMITTEE



**Dr. Ramakrishnan Raman** Fellow, Honeywell



**Prof. Hemendra Arya**Dept of Aerospace Engineering, IIT Bombay

We are extremely delighted to present the AeroCON 2022 technical program, that has meticulously shaped up over the past 10 months. AeroCON, the flagship biennial premier international aerospace conference organized by SAEINDIA Aerospace Forum, serves as a platform to exchange ideas, information and opinions, share research findings and experiences in aerospace engineering. A wide array of topics pertinent to aerospace are covered in this edition of the conference, including autonomous airborne systems, AI-ML, actuation systems, avionics systems, modeling & simulation, safety & reliability, and additive manufacturing.

The call for papers and presentations was released in July 2021. Over 125 refereed paper abstracts and 11 oral presentation abstracts were received, and subjected to multi-stage process of abstract acceptance, full paper submission, peer reviews and finally with thirty-three papers being accepted in Feb 2022.

A total of thirty peer reviewed technical papers will be presented in this edition of the conference, in addition to three oral-only presentations. All the presented peer reviewed papers will be published in SAE Mobilus. The paper submission and evaluation management were on SAE MyTechZone, and we are extremely thankful to Ms. Brandie Schandelmeier for constant support throughout. We thank the submission track chairs for managing the entire peer review process: (from IIT Bombay) Dr. Makarand Kulkarni, Dr. Dhwanil Shukla, Dr. Harshad Khadilkar, Dr. Arpita Sinha, Dr. Leena Vachhani, Dr. Chandra Sekher, Dr. Arnab Maity, Dr. Shashi Ranjan Kumar, and (from Tata Consultancy Services) Mr. Subbarao CV. We are grateful to over 70+ reviewers from academia and industry across the world for their efforts in reviewing the paper submissions and providing valuable reviews in time. Further, we thank all the authors who submitted their work for consideration in this premium aerospace conference. Best Paper Award selection process was also conducted to determine the best papers.

We are glad to note that the conference is being held as a physical event, significantly enhancing the learning that happens through face-to-face interactions during the event. In addition to the technical paper presentations, the conference features many speakers of international repute in the plenary session presentations and panel discussions. We thank all the plenary speakers and panelists for enriching the conference technical program.

We hope you will cherish this exciting conference with many stimulating discussions over keynotes, panels and technical sessions. Thank you!







#### **STEERING COMMITTEE MEMBERS**



Mr. Ahmed Elsherbini Chair - Steering Committee Managing Director & Chief Engineer, Boeing India



Mrs. Rashmi Urdhwareshe Co-Chair - Steering Committee President - SAEINDIA & Director (Retired) - ARAI



**Dr. Bala K Bharadvaj** Co-Chair - Steering Committee MD (Retired), Boeing Engineering & Tech Center



**Dr. Girish S Deodhare**Director General
Aeronautical Development Agency



Mr. Regu Ayyaswamy Senior Vice President & Global Head (IoT) Tata Consultancy Services



Mr. Ashok Verghese Director Hindustan University



**Dr. Padmanabhan M K** CEO, UCAL Technologies



**Mr. Sathish Menon** Vice President Thales



**Dr. Niranjan Kalyandurg** India Aerospace Leader Honeywell Technology Solutions



**Dr. Ravi Rajamani** Principal Consultant DrR2 Consulting



Mr. Gopikrishnan Konnanathi SVP & Global Head Engineering Services, Infosys



Mr. Shyam Karigiri Managing Director Moog India Technology Center



Mr. Ravikiran.P Director, Aerospace & Defence Dassault Systemes



Mr. Sridhar Dharmarajan EVP & MD Hexagon



**Dr. Omkar** Chief Research Scientist



**Dr. Sameer Prabhu** World Wide Industry MD Mathworks



Mr. Uma Maheshwar D Chief Consulting Engineer GE Aviation



Mr. Abhishek Sinha COO & Board Member L&T Technology Services Limited



Mr. Lalan Singh Senior Manager Application Engineering ANSYS



Mr. Shaju George Vice President HCL Technologies



**Mr. Savyasachi Srinivas** Executive Director Collins Aerospace



Air Cmde (Retd.) R Subbarao Associate Vice President Air Works Group



Mr. Sandeep Kumar K S CEO Safran Engineering Services India



**Mr. Jitendra J Jadhav** Director National Aeronautics Laboratory







#### **ORGANIZING COMMITTEE MEMBERS**



Mr. Ravishankar Mysore Chair, Organizing Committee Vice President (Retired), Collins Aerospace



**Dr. Ravikumar G V V** Co-Chair, Organizing Committee Associate VP & Head Advanced Engineering Group, Infosys



Mr Damodaran Subramanian Chair, SAEINDIA Bengaluru Section Former MD, Safran Engineering Services



Mr. Vasanth Kini Chair, Industry Interface Committee Managing Director, Titanium Industries



Mr. Javaji Munirathnam Co-Chair, Industry Interface Committee Founder & CEO, JM Consulting



Mr Satish Sastry Chair, Finance Committee Director, Site Lead, Collins Aerospace



Mr. Yogesh Sathe Co-Chair, Finance Committee Head Aerospace Engineering, Eaton



**Dr. Ramakrishnan Raman** Chair, Technical Committee Fellow, Honeywell



Prof. Hemendra Arya Co-Chair, Technical Committee Dept of Aerospace Engineering, IIT Bombay



Mr. Sathish Thokala Chair, Paper Publication Committee AeroDef and Space, Manager, Mathworks



**Dr. Dinesh Manoharan**Co-Chair,Paper Publication Committee
Operations Head,
Aersopace & Defense Divison, UCAL



Mr. Shripathi V Chair, Academia Interface Committee Sr.Manager, Aerospace & Defense, Hexagon



Prof. Karunakaran C S Co-Chair, Academia Interface Committee Director, Mahaguru Institute of Tech.



Mr. Krupal Aerpula Chair, Event Management Engineering Leader, Boeing India



Dr. Ganga Reddy Co-Chair, Event Management Operations Director, Aerospace & Def, Engg R&D, HCL



Mr. Vinay Roy Chair, MKT, & Comms. Committee Head, Commercial Actuation Eng, Moog India



Mr. Sandeep M Birje Co-Chair, Marketing & Communication Committee Specialist Engineer, Eaton



Mr. Pullaiah Dussa Chair, Awards & Recognition Committee Director, Engineering Competence Center, Thales India



Mrs. Jeba Margret Annam Co-Chair, Awards & Recognition Committee Technical Lead, Boeing







#### **INAUGURATION - JUNE 2, 2022**

WELCOME ADDRESS



Mrs. Rashmi Urdhwareshe President, SAEINDIA

AEROCON 2022 EVENT OVERVIEW



Mr. Ravishankar Mysore Chair, Organizing Committee

MESSAGE FROM PATRON
-AEROCON 2022



Dr G. Satheesh Reddy Chairman, DRDO

SAE INTERNATIONAL ADDRESS



Mr. Murli Iyer Global Advisor SAE International

**EVOLUTION** 



Dr. Bala K. Bharadvaj Immediate Past President, SAEINDIA

**CHIEF GUEST ADDRESS** 



Dr. Girish Deodhare Distinguished Scientist, Director General, Program Director (Combat Aircraft) & Director, ADA

AUTONOMOUS AIRBORNE SYSTEMS – ADVANCES & OPPORTUNITIES



Mr. Balaguruna Chidambaram Director of Autonomous Technologies and Airspace Efficiency, Boeing Research and Technology







### PROGRAM AGENDA

DAY 1: JUNE 2, 2022			
TIME	SESSION		
9:00 AM - 10:30 AM	Inaugural Session		
10:30 AM – 11:00 AM	Tea Break & Networking		
11:00 AM – 12:00 PM	Technical Session Track 1 – Artificial Intelligence (AI) & Machine Learning (ML) – I (Main Hall)		
11.00 AM - 12.00 FW	Technical Session Track 2 – Modeling & Simulation – I (Session Hall)		
12:00 PM - 1:00 PM	Plenary Session 1 – AI & Autonomous Systems in Aerospace		
1:00 PM - 2:00 PM	Lunch, Networking and Expo Visit		
2:00 PM - 3:00 PM	Technical Session Track 3 – Artificial Intelligence (AI) & Machine Learning (ML) – II (Main Hall)		
2.00 1 M 3.00 1 M	Technical Session Track 4 – Modeling and Simulation – II (Session Hall)		
3:00 PM - 4:00 PM	Plenary Session 2 – Systems Engineering in Aerospace		
4:00 PM - 4:30 PM	Tea Break & Networking		
4:30 PM – 5:30 PM	Technical Session Track 5 - Composites & Advanced Materials (Main Hall)		
1.00 TM 0.00 TM	Technical Session Track 6 - Aero Engines & Aero Manufacturing (Session Hall)		
6:30 PM	Reception & Gala Dinner		

DAY 2: JUNE 3, 2022			
TIME	ME SESSION		
9:00 AM – 10:20 AM	Technical Session Track 7 – Autonomous Systems & UAVs (Main Hall)		
5.00 AM 10.20 AM	Technical Session Track 8 – Safety, Reliability & IVHM (Session Hall)		
10:20 AM – 11:00AM	Tea Break & Networking		
11:00 AM - 12:30PM	Plenary Session 3 – Advances in IVHM		
12:30 PM - 1:30PM	Lunch, Networking and Expo Visit		
Technical Session Track 9 – Aerodynamics Design & Additive Manufacturing (Main			
1:30 PM — 2:30 PM	Technical Session Track 10 – Aerodynamics Design & Additive Manufacturing (Session Hall)		
2:30 PM – 3:30PM	Plenary Session 4 — Unmanned Aircraft Systems		
3:30 PM – 4:00PM	Tea Break & Networking		
4:00 PM - 5:00PM	Valedictory Session		





## **TECHNICAL SESSIONS**





## **TECHNICAL SESSION - DAY 1 (JUNE 2, 2022)**

## TRACK 1: ARTIFICIAL INTELLIGENCE (AI) & MACHINE LEARNING (ML) - I (MAIN AUDITORIUM)

TIME	PAPER NO.	PAPER DESCRIPTION	PRESENTER
11:00 -11:20AM	22AC-0049	Connected IGGS with Real time Data Access & AI-ML Approach for Predictive Prognostics Maintenance	Naveen Kumar, Shivaprasad Kotnadh, Arvind MorkondaHaribapu, Rajesh Kanneboyina, Manjunatha Rao  Honeywell Technology Solutions Lab
11:20-11:40AM	22AC-0099	Requirements to code review bot for safety critical software	Shadab Hossain, M Kameshwari Prasad, Bhavana Mohan Taggarsi  Honeywell Technology Solutions Lab
11:40-12:00AM	22AC-0133	PHM system with comprehensive data analytics to provide localized reasoning for a failure prediction	Ajay Sundaramurthy  Goodrich Aerospace Services Pvt, Ltd

## TRACK 2: MODELING & SIMULATION – 1 (PRERNA HALL)

TIME	PAPER NO.	PAPER DESCRIPTION	PRESENTER
11:00-11:20AM	22AC-0046	Design and Computational Investigations of Aerobot for Titan with maneuverability using momentum wheel and propeller equipped with droppable weather stations	Manoj Kumar Raja, Haribalan Saravana Mohan, Sabari Thangavel, Vijayanandh Raja, Raj Kumar Gnanasekaran, Abinash Nataraj Sivasankaran   Kumaraguru College of Technology
11:20-11:40AM	22AC-0072	Modeling nonlinearities and predicting contact nonlinearity behavior in vibration problems using FE analysis	Subrahmanyam Veerarapu, Pavan Kumar Vinjanampati   Collins Aerospace
11:40-12:00AM	22AC-0073	Methodology for performing submodel analysis for random vibration problems using modal analysis results	Subrahmanyam Veerarapu, Pavan Kumar Vinjanampati   Collins Aerospace





## **TECHNICAL SESSION - DAY 1 (JUNE 2, 2022)**

## TRACK 3: ARTIFICIAL INTELLIGENCE (AI) & MACHINE LEARNING (ML)- 2 (MAIN AUDITORIUM)

TIME	PAPER NO.	PAPER DESCRIPTION	PRESENTER
2:00-2:20PM	<b>22</b> AC-0153	A Framework for Teaching Safety Critical Control and Artificially Intelligent Systems to Undergrads	Dr. Yogananda Jeppu, Dr. Ramakrishnan Raman   Honeywell Technology Solutions Lab.
2:20-2:40PM	22AC-0171	Artificial Intelligence in Air Cargo System	Venkatesh Chitragar, Sayooj Adavalath Puthiyaveettil, Vinayak Vijaya Chandran, Vishnu Gopan   Collins Aerospace
2:40-3:00PM	22AC-0041	SRGAN-TQT, an Improved Motion Tracking Technique for UAVs with Super-Resolution Generative Adversarial Network (SRGAN) and Temporal Quad-Tree (TQT)	Deeptej More, Sagar Acharya, Suryansh Aryan   Manipal Institute of Technology, Manipal

### TRACK 4: MODELING & SIMULATION – 2 (PRERNA HALL)

TIME	PAPER NO.	PAPER DESCRIPTION	PRESENTER
2:00-2:20PM	22AC-0084	Modeling and Dynamic Analysis of a Self-Regulating Valve	Manoj Kumar Mallesh, Sunil Chandregowda, Dr. Ganga Reddy C   HCL Technologies, Ltd
2:20-2:40PM	22AC-0090	Non-parametric Optimization of Heat Sinks for Power Dense Motor Controllers	Divyanshu Bhardwaj, Sauradeep Datta, Kishor Borkar   Eaton India Innovation Center
2:40-3:00PM	22AC-0117	Mathematical Modeling & Simulation of Thermal Heat Load for Cabin & Cockpit of Aerial Vehicle	Saurabh Suman, Yogendra Singh Kushwah   Subros Limited







## **TECHNICAL SESSION - DAY 1 (JUNE 2, 2022)**

TRACK 5: COMPOSITES & ADVANCED MATERIALS (MAIN AUDITORIUM)			
TIME	PAPER NO.	PAPER DESCRIPTION	PRESENTER
4:30-4:50PM	<b>22</b> AC-0037	Tuning of blade natural frequencies outside high excitation region by using Ceramic Particle Reinforced Composite Materials for a typical Gas Turbine Engine Compressor Blade	Ravi Putrevu, Sreedhar Kari   Infosys Limited
4:50-5:10PM	22AC-0024	Optical Black Coatings On Carbon Fiber Reinforced Composite Sandwich Structure With Aluminum Honeycomb Core For Satellites Applications.	Sudharshan J, P Harsh Chaurasi, Ramesh S   Presidency University
5:10-5:30PM	22AC-0149	Research on the Performance of Composite Cantilever Beam Under Special Environmental Condition	Md. Helal Miah, Dharmahinder Singh, Gurmail Singh Malhi   Chandigarh University

TRACK 6: AERO ENGINES & AERO MANUFACTURING (PRERNA HALL)			
TIME	PAPER NO.	PAPER DESCRIPTION	PRESENTER
4:30-4:50PM	22AC-0158	Design and Simulation of Isolated AC-DC Flyback Conversion System for High Energy Ignition Unit of Gas Turbine Engine	Abarna J, Poonam Kumar, Vishwanatha AN   Gas Turbine Research Establishment
4:50-5:10PM	22AC-0018	Robust Design of Aero Engine Installation Components	Sreedhar Kari, Ravi Kumar G. V. V.   Infosys Limited
5:10-5:30PM	<b>22</b> AC-0089	SMART Manufacturing with Augmented Reality	Parimal Sahu   Collins Aerospace







## **TECHNICAL SESSION - DAY 2 (JUNE 3, 2022)**

TRACK 7: AUTONOMOUS SYSTEMS & UAVS (MAIN AUDITORIUM)			
TIME	PAPER NO.	PAPER DESCRIPTION	PRESENTER
9:00-9:20AM	22AC-0115	Medicinal Delivery Operation using blockchain enabled Unmanned Aircraft Systems	Padmanabhan   M K, Virginia Tech India; Ravi Kumar G. V. V.   Infosys; Dinesh Manoharan, Prithviraj R, Rajesh S   UCAL Fuel Systems Ltd
9:20-9:40AM	22AC-0030	A hybrid sensor-fusion system to locate the Electric gridlines by UAV for range extension in Urban areas	Lokendra Pavan Kumar Pappala, Srujan Enagandula, Andeepkumar Manoharan   ZF - TRW
9:40-10:00AM	22AC-0123	Autonomous UAV solution for ecological mapping and surveillance.	Monisha Devi, Keerthana Neigapula, Sumit Anand, Anawil Tiwari, Siddharth Kumar   National Institute Of Technology, Agartala
10:00-10:20AM	22AC-0097	System of Systems Modelling to empower decision makers in drone-based services - an application in Agriculture	Mudit Mittal, Stueti Gupta   BlueKei Solutions Pvt. Ltd.

TRACK 8: SAFETY, RELIABILITY AND IVHM (PRERNA HALL)			
TIME	PAPER NO.	PAPER DESCRIPTION	PRESENTER
9:00-9:20AM	22AC-0110	Reliability Apportionment Using Quality Function Deployment	Vijay S Phalle, Nagaraju Soma   Eaton India Innovation Center
9:20-9:40AM	22AC-0031	OS Independent Tool Qualification in Safety Critical Systems	Shashi Kumar P, Ganesh Kumar Manchala, Madhuri Eswara, Komalatha Channamallu, George Koilpillai   Honeywell Technology Solutions Lab.
9:40-10:00AM	22AC-0127	Resilient navigation platform to enabling secure & safe BVLOS navigation UAS operations	Sri Purisai, Omer Sharar   infiniDome
10:00-10:20AM	22AC-0027	Next-Gen Maintenance Framework for Urban Air Mobility Vehicles	Sandeep Kulkarni, Renju Panicker, Murali Kadeppagari, Imtiaz Elahi   Honeywell Technology Solutions Lab





## **TECHNICAL SESSION - DAY 2 (JUNE 3, 2022)**

## TRACK 9: AERODYNAMICS DESIGN & ADDITIVE MANUFACTURING (MAIN AUDITORIUM)

TIME	PAPER NO.	PAPER DESCRIPTION	PRESENTER
1:30-1:50PM	22AC-0082	Effect of Varying Diffuser vane height on CC3 NASA 4:1 Centrifugal Stage Performance	Shailesh Kumar, Hasham Chougule, Qizar Abdullah, Shraman Goswami   Honeywell Technology Solutions Lab.
1:50-2:10PM	22AC-0134	Vibration frequency of cantilever beam using Harris corner detection method	Lokendra Singh   IIT Mandi
2:10-2:30PM	22AC-0079	Additive Manufacturing of Threaded Parts for Aerospace applications	Dr. Kishora Shetty, Harsha Ramachandra Murthy   Boeing International Corp India Pvt Ltd

TRACK 10: ACTUATION SYSTEMS & AVIONICS (PRERNA HALL)			
TIME	PAPER NO.	PAPER DESCRIPTION	PRESENTER
1:30-1:50PM	22AC-0068	Characterization of clearances and its optimization for vibration control of linear hydraulic Actuators	Pavan Kumar Vinjanampati, Vimal Tirupati, Subrahmanyam Veerarapu   Collins Aerospace
1:50-2:10PM	22AC-0144	Temperature Estimation of Electric Motors of Electric Actuators	Krishna Kumar Rajamoni, Suresh Talore, Amol Navadkar   Collins Aerospace
2:10-2:30PM	22AC-0139	Operating the Navigation Database Server from Ground Station	Sudheer kollapudi   Collins Aerospace





## **SPEAKERS PROFILE**









Mrs. Rashmi Urdhwareshe President, SAEINDIA

Mrs. Rashmi Urdhwareshe retired as Director ARAI (Automotive Research Association of India, Pune) in June 2020. Having started her career as Trainee Engineer, Mrs. Urdhwareshe rose through the ranks to take the coveted position as Director of ARAI in year 2014. ARAI is the prestigious autonomous R&D and Homologation Institute located in Pune. During her illustrious tenure as Director, ARAI scaled new heights in technology, business excellence and R&D. Under her leadership Center of Excellence in E-Mobility, Homologation and Technology Centre and several key facilities were created to provide dedicated services to the automotive and other engineering sectors at national and international level.

Mrs. Urdhwareshe has a distinguished academic and professional career. She holds master's degree in E&TC and several other professional qualifications such as Diploma in Corporate Directorship (from WCCG), Six Sigma Black Belt (from ASQ), etc. Her 37+ years of industrial experience and expertise includes wide range of subjects in automotive domain (like vehicular safety, Air quality and exhaust measurements, Standards/ Regulations, R&D and technology, Green mobility, Alternate fuels, Quality Systems and Business Excellence, etc.)

Mrs. Urdhwareshe has served as the Chair / Vice Chair of various national/ international bodies. She is currently President of SAEINDIA (Society of Automobile Engineers India). She is also Senior Advisor to Pune Knowledge Cluster (PKC), which is set up under the directions of Principal Scientific Advisor, Government of India.

With huge experience and wide expertise, Mrs. Rashmi has also taken up Advisory and Mentorship roles for Corporates, Educational/ Research programs and Government Agencies. Mrs. Urdhwareshe is Co-author of Book on Total Quality Management.

She is a recipient of several awards in the areas of women Empowerment, Corporate Leadership, Engineering Excellence, E-mobility, Business Excellence, Quality Excellence and many more. For her lifetime contributions towards development of Automotive Technology, she is honored with Nari Shakti Puraskar 2019, at the hands of Hon'ble President of India on 8th March 2020.

Mrs. Rashmi's other interests are instrumental music, writing technical articles, reading and extensive travelling.









**Mr. Ravishankar Mysore** Chair, SAEINDIA Aerospace Forum

Mr. Ravishankar Mysore, is the Chair for SAEINDIA Aerospace Forum since Feb 2021 and has been associated with the SAEINDIA since 2016. He has over 32 years of industry experience in Engineering and retired as Vice President-Engineering, Global Engineering and Technology Center, Collins Aerospace. The center grew from 100 engrs to 1400 engrs under his leadership with capabilities in mechanical, electrical, electronics, software, materials, reliability and systems engineering. The center works with all the strategic business units of Collins Aerospace in the areas of product design, development, sustenance engineering and technology development.

Ravi began his career with Larsen Toubro Ltd and worked for Bharat Earth Movers Limited, Tata Consultancy Services and Infosys Technologies Ltd before joining Goodrich, now Collins Aerospace.

Ravi has a Bachelor's Degree in Mechanical Engineering from National Institute of Technology, Surathkal and a Master's Degree in Mechanical Engineering from the Indian Institute of Science, Bangalore. He was one of the founding members of NASSCOM Engineering Services forum and served on the forum from 2005 to 2007.









**Mr. Murli M. Iyer** Global Advisor, SAE International

Mr. Murli M. lyer holds an MBA in International Business from the Rochester Institute of Technology, New York, an Advanced Honors Degree in Russian Language & Literature, and a Bachelors Degree in Science from India.

Mr. Iyer has worked and consulted for over thirty years with a number of organizations in the areas of international business development, corporate planning, strategic marketing, and cross-cultural negotiation. Additionally, he has served as a Russian Interpreter with several Indian, Russian, and U. S. agencies.

He has taught courses in International Business, Cross-cultural communication, and Russian language at the Rochester Institute of Technology, St. John Fisher College, Rochester, New York, and Legacy International, Bedford, Virginia.

Mr. lyer has traveled extensively in Western and Eastern Europe, Mexico, Middle East, Central Asia, North and South Africa, and ASEAN region. As Executive Advisor on Global Affairs, he is responsible for developing SAE's strategic alliances with overseas partners and providing support and advice to SAE President and the Chief Executive Officer on strategic global issues. Mr. lyer played a key role in establishing several of SAE's overseas chapters, strategic partnerships, and affiliate societies in various countries including SAEINDIA. He serves as a board member on the boards of SAEINDIA and SAEINDIA Foundation.









**Dr. Bala K. Bharadvaj** Immediate Past President, SAEINDIA

A globally recognized Aerospace Expert with more than four decades of experience, Dr. Bharadvaj holds solid academic credentials in Aerospace Engineering and Management - B.Tech. from IIT Madras (India); M.S. & Ph.D. from Georgia Institute of Technology, Atlanta (USA), and an MBA from University of California, Irvine (USA).

During his distinguished career of 40+ years, operating both from the US and India, Dr. Bharadvaj has excelled as a Researcher, Technologist, Systems Thinker, Strategic Planner, Program Manager, and Inspirational Leader. He has held numerous leadership positions at Boeing, retiring recently as the Managing Director of Boeing's India Engineering & Technology Center, the largest such Boeing Center outside the US.

Dr. Bharadvaj was also a member of the faculty of Aerospace & Mechanical Engineering at Boston University for several years and an Adjunct Professor at other universities in the US.

Dr. Bharadvaj has been an active member of the broader technical community for many years and has contributed to the American Institute of Aeronautics & Astronautics (AIAA), NASSCOM, SAE International and SAEINDIA. He established the Aerospace segment within SAEINDIA in 2009 and has brought together various industry leaders in India to strengthen aerospace activities in SAEINDIA. He was President of SAEINDIA during 2018-2020 and is currently an Advisor to the Managing Committee and Chairman of the Building Committee.

Dr. Bharadvaj has been recognized with several prestigious awards for his many contributions over the years. Notable ones include:

- Team Excellence Award and Group Achievement Award from NASA (National Aeronautics & Space Administration) in the US.
- Quality Hero, Process Management Role Model, CEO Recognition, and Chairman's Safety Award from The Boeing Company
- Awards and recognition from a broad array of organizations such as Sigma-Xi Scientific Research Society, Beta-Gamma Sigma Business Honor Society, American Society of Engineers of Indian Origin, Industrial Engineering & Operations Management Forum, and most recently an "Honorary Doctor of Science" from Hindustan Institute of Technology & Science, Chennai, India.

He is an Associate Fellow of AIAA, and an Honorary Member of SAEINDIA. He is also an Invited Member of the Research Council of the National Aerospace Laboratories.

Dr. Bharadvaj is an active writer and speaker at various Industry, Academic and Government forums, and shares his knowledge and experiences with a wide audience.









Dr. Girish Deodhare

Distinguished Scientist, Director General, Program Director (Combat Aircraft) & Director, ADA

Dr. Girish Deodhare is distinguished scientist, director general, program Director (Combat Aircraft) & Director Aeronautical Development Agency in Bangalore. He graduated with B.Tech. degree in Electrical Engineering and M.Tech. Degree in Control and Instrumentation, from IIT Bombay in 1984 and 1986 respectively. He earned his PhD in Control Theory from the University of Waterloo in Canada, in 1990. He started his career in DRDO as Scientist in Centre for AI and Robotics (CAIR), Bangalore. Later joined the Aeronautical Development Agency. He led the National Control Law (CLAW) team for LCA. He is involved in the design and development of flight control systems for the Indian Light Combat Aircraft using both classical and modern control synthesis techniques.

#### **Awards and Honours:**

- Distinguished Alumnus Award, IIT Bombay, 2016.
- DRDO Award for Performance Excellence, 2013 (in a team of 18).
- National Aeronautical Prize awarded by Aeronautical Society of India for contributions to "FBW Control Law for LCA", 2002.
- Technology Shield from National Aerospace Laboratories for "Outstanding Achievement in LCA CLAW Design, Certification and Successful Flight Test", 2001
- Marconi International Fellowship's Young Scientist Award for the year 1996
- INAE "Young Engineers Award for the year 1996.
- DRDO Technological Award for the year 1994

#### **Publications:**

More than 40 publications in peer reviewed International Journals and Conferences.









Mr. Balaguruna Chidambaram

Director of Autonomous Technologies and Airspace Efficiency, Boeing Research and Technology

Mr. Balaguruna Chidambaram (Bala) is the Director of Autonomy and Airspace Operational Efficiency in Boeing Research and Technology. He also has an Enterprise role in Autonomy across Boeing, coordinating developmental activities on various platforms. In his 25 year career at Boeing, Bala has held leadership roles in diverse areas, including modeling and simulation, electro-hydraulic actuation systems, software standards for vehicle health management, and secure connectivity solutions. His teams have supported platforms including the C-17 Globemaster III, the CH-47 Chinook, the V-22 Osprey, the International Space Station, the 787 Dreamliner, the 777X, and various Unmanned Vehicles. Bala has a Bachelor's degree in Engineering from the Indian Institute of Technology, Madras, a Ph.D. in Engineering from the University of California at Berkeley, and an M.B.A. in Finance from the University of California at Los Angeles.









Mr. Sridhar Dharmarajan
EVP & Managing Director, Hexagon

Mr. Sridhar Dharmarajan (DS) is the Executive Vice President & Managing Director — India, Manufacturing Intelligence division, Hexagon. In his role, he is responsible for India sales operations of the Metrology and Production Software portfolios, as well as MSC Software and Q-DAS. He also oversees the MSC Software Indo-Pacific regional business operations across India, ASEAN, Australia and New Zealand.

He joined MSC Software Corporation in 2007 establishing the company's first sales office in the Region. Over the past decade, he has built and retained high performing teams. He has been responsible for the company's market leadership and 10x growth. Before MSC Software Corporation, between 2002-2006, Mr. Dharmarajan was responsible for successfully setting up the MatrixOne operations in India.

He is also a successful entrepreneur who has set up two companies - Bluefont Technologies and Pixtel communications (Pixtel was sold to Mindtek, Taiwan) in the early 2000's. It is during this time Mr. Dharmarajan acquired an in-depth knowledge of setting up and running a software company end-to-end. Mr. Dharmarajan started his career with Wipro Infotech. After leaving Wipro, he was handpicked to be a part of a core team to establish SDRC (now Siemens PLM) in India. During his eight-year tenure at SDRC, he was the recipient of numerous technical and sales excellence awards and played a vital role in the success of SDRC in the country.

Mr. Dharmarajan has completed his MS in Mechanical Engineering from Indian Institute of Science Bangalore. He is based in Bangalore and calls the Garden City his home.









**Mr. Savyasachi Srinivas**Executive Director, Collins Aerospace

Mr. Savya Srinivas leads the Engineering organization in India for Collins Aerospace in Bangalore and Hyderabad locations. This includes the legacy UTAS Global Engineering Center (GEC) and legacy Rockwell Collins India Design Center (IDC). India is home to over 3000 engineers.

In his current role, Savya is responsible for overall strategy and operations of the sites that he leads. Savya leads the engineering teams that provide support to Collins Aerospace business units. His teams execute both regional and international programs that support both internal and external customers globally.

Savya possesses global work experience in Aerospace and Defense Corporations in United States and India with ability to lead cross-functional and geographically spread teams, where he has led the development of large-scale systems for mission critical applications in Aerospace, Aviation and other Engineering domains.

Savya started his career as a Systems Engineer at Lockheed Martin in the US and grew up the ranks to lead functional and program teams that supported the development and deployment of large scale ATM, and other mission critical systems. Subsequently, he moved to India and joined Thales where he became the Director of engineering supporting platforms in Avionics, Cabin Systems, ATM and IT. He joined Rockwell Collins in 2013 as the Director of the India Design Center supporting all business units of RC in multiple Avionics and Non-Avionics domains. He subsequently held the role of Senior Director of Asia Pacific Engineering, leading RC sites in India, Australia and Singapore.

Savya focuses on creating an environment that fosters innovation and capability expansion and is committed to adding increased value to the enterprise. Savya holds a bachelor's degree in Mechanical Engineering from Bangalore University, a master's degree in Industrial Engineering from University of Arizona, and a master's degree in Technical Management from Johns Hopkins University.









**Mr. George Koilpillai** Chief Engineer Software, Honeywell

Mr. George Koilpillai has a Master degree in Aero from IIT, Chennai and 33 years of Industrial experience in the field of Aerospace. George has led engineering development of avionics products for many aircraft programs in the domain of Communication, Navigation, Guidance and Surveillance. George has also led systems engineering to define safety critical functions of large avionics platforms, integrate and validate the avionics functions in the integration benches and flight testing. He was led the engineering efforts for customizing and integrating Honeywell Inertial navigation system in the Indian indigenous artillery platforms and in installing GPS based landing system at Chennai airport.

George in his current role as the Software Chief at Honeywell has the design authority for the Verification and validation functions for the Honeywell Aero engineering development programs. In this role, George explores application of emerging technologies for improving product quality and development cycle time.









**Dr. R Narayan**Deputy Director (Retired), LPSC, ISRO

Dr. R. Narayan Retired as Deputy Director, LPSC, Bengaluru in 2020. He has 36 years of experience in Liquid Propulsion Systems Centre, Indian Space Research Organization, out of which over 25 years in a leadership role in various positions ranging from Division head, Group Director to Deputy Director role. He is an expert in spacecraft propulsion systems (monopropellant and bi-propellant) and has played a stellar role in the systems reliability area certifying over 50 spacecraft propulsion systems for flight.

Dr. Narayan Ramachandran is an accomplished Mechanical Engineer with a Ph.D. in Sensors from VTU Belgaum. He has over 25 articles published in various national and international journals. He had certified the First indigenous communication satellite INSAT 2A in 1992. The First Electric Propulsion System (EPS) package was flown in GSAT 9 under his leadership. Chandrayaan, Mars Orbiter Mission (MOM), and Spacecraft Recovery Experiment (SRE) were certified propulsion packages after an exhaustive review, simulation tests, and FMECA. There were around 50 propulsion packages cleared for various missions from 1984 to 2017 and Delivered 10 packages from 2017 to 2020. He has Effectively contributed as part of a team effort for remote filling of propellants at Spacecraft level in SDSC, SHAR, and CSG, Kourou. Failure Analysis (FA) of various components and subsystems carried out by him as Chairman of FAC and reconstructed failure phenomena, implemented effective changes to make Subsystem more robust and fault-tolerant capable of following mandatory protocols.









**Dr. Abhay Pashilkar** Program Director, NAL

Dr. Abhay Pashilkar joined the Flight Mechanics & Control Division, National Aerospace Laboratories after his M.E. from the Indian Institute of Science, Bangalore, in 1993 and B.Tech (Hons) from IIT Kharagpur both in Aerospace Engineering. Since 1993, he has worked on national projects like the LCA and SARAS. He has a Ph.D from the Indian Institute of Science in 2002. Pashilkar was with the NTU, Singapore for his post-doctoral fellowship from 2003 till 2005. Pashilkar was the Group Head, Flight Simulation in the division from 2008 till 2016 and its Deputy Head from 2014 till 2021. From 2018 he is heading the Systems Engineering Division of NAL and is presently the Program Director for Civil Aircraft Projects at CSIR-NAL. He is a recipient of the 2001 CSIR Young Scientist Award and the 2003 INAE Young Engineer Award. He coordinated the "Mirage FoC Upgrade Project" which received the CSIR Technology Shield for 2019 from the Honorable President of India.

Areas of interest: Modelling, Systems Simulation, Control of aerospace vehicles and Systems Engineering









**Dr. Devanandham Henry**Principal Consultant, BlueKei Solutions Pvt Ltd

Dr. Devanandham Henry holds a B.Tech in Aeronautical Engineering from Madras Institute of Technology, Chennai, an M.Tech in Aerospace Systems Engineering from IIT-Bombay, and a Ph.D. in Systems Engineering from Stevens Institute of Technology, USA. Dr. Henry started his career as a Scientist at the Aeronautical Development Agency, Bangalore where he worked on the design and development of the Air Force and Naval versions of the Indian Light Combat Aircraft - Tejas. In the US, he was a Research Engineer with the Systems Engineering Research Center and an Assistant Professor of Systems Engineering. He has worked on a number of systems engineering-related projects sponsored by various agencies including the U.S. Department of Defence and the International Council on Systems Engineering (INCOSE). He is currently the Principal Consultant (Systems Engineering) at BlueKei Solutions Pvt. Ltd. He conducts training and workshops on various systems engineering topics and carries out projects related to systems engineering implementation and workforce development.









**Grp.Capt. Aslam Khan**Grp.Capt (Retd), HCL Technologies

Grp.Capt. Aslam currently heads Strategic Business Initiatives for HCL's Aerospace & Defence business unit, a position he has held since July of 2016. Prior to his current assignment, Aslam led the HCL engineering teams that work with our A&D OEM & Tier-1 customers for multiple A&D system engineering projects. He has also worked as a Multi Services Delivery head for HCL's Large engagements covering engineering, R&D and IT in Europe, North America & India.

Aslam started his A&D career as a Commissioned Officer with Indian Air Force in 1987, working extensively on Flight Test Engineering and Air Worthiness Certification of military aircraft including ADA LCA program. He served as 'Chief of Engine — R-29 Engine' in 4 Base Repair Depot, AF, Kanpur and he was responsible for Maintenance, Repair and Overhaul [MRO] of R-29 aero engine fleet.

Aslam holds a first class Master's Degree in Aerospace Engineering from IIT Kanpur and Bachelor's Degree in Mechanical Engineering from Mumbai University and a Diploma in Flight Test Engineering [Fixed Wing] from Indian Air Force Test Pilots School, Bangalore.

He has good working experience with Indian defence establishments, R&D Labs and DPSUs and represents HCLs A&D business in Indian Industry forums like NASSCOM, CII.









**Mr. Gopikrishnan Konnanath** SVP & Global Head Engineering Services, Infosys

Mr. Gopi has over 25 years of professional experience in technology delivery space with an exceptional track record of incubating and scaling business units within Infosys. Infosys is a world leader in the Software & Services business with Global revenues of USD 15 Billion with over 250,000 employees across 50+ countries.

As the global head for Engineering Services and Blockchain, Gopi is part of the senior leadership team at Infosys with the responsibility to represent the firm to Clients, Investors, Governments and other Stakeholders.

#### His responsibilities include:

- Direct P&L responsibility for the Engineering Services and Blockchain business at Infosys. This is more than USD 1.25 B in service line revenues with an extremely high growth rate and a strong deal pipeline.
- Lead for corporate strategy for localization across Europe setting up innovation Hubs in the geography and driving force behind "Be the Navigator" a grassroots movement which takes innovation out of lab coats and to the masses

Prior to taking over as Global Head for Engineering Services, he was the Global Head for Enterprise Applications Services for Oracle, with the additional responsibility of incubating and stabilizing blockchain services at Infosys. Gopikrishnan Konnanath, with his many years in Infosys has played a variety of leadership roles including client

management, delivery management and practice management while delivering business results to clients, though various technology and consulting interventions and leveraging the partner ecosystem.

He has a bachelor's degree in Engineering in the field of Electronics & Communication from Mangalore University and has attended various leadership programs including global leadership program at Stanford School of Business.

As an advocate of driving social responsibilities, Gopi is a managing trustee for an organization that focuses on making social changes, including support for child education, welfare and infrastructure. Gopi is also the Advisory Board Member at WHU - Otto Beisheim School of Management, Germany.









Dr. Kota Harinarayana

SERB Distinguished Fellow, CSIR-NAL Former Chief Scientist & Program Director, Indian LCA of HAL

Dr. Kota Harinarayana graduated from BHU in Mechanical Engineering, postgraduate in Aero Engineering at IISc, Bangalore, Ph.D. at IIT Bombay and holds a bachelor's degree in law. As Programme Director and Chief Designer of Light Combat Aircraft, he successfully directed the project leading to flight testing and clearance for limited series production. Thanks to his efforts, India succeeded in developing a state-of-art, high technology fighter aircraft of world class. He is the Fellow of Aeronautical Society of India (former President of the Society), National academy of sciences and Indian National Academy of Engineering. He received distinguished alumnus award from Indian Institute of Science and from IIT Bombay . He was awarded National Aeronautics Prize and FIE Foundation Award. He received SBI-Pragna Puraskar, received the Dr. Y. Nayudamma Memorial Award. He received the DRDO Technology Leadership Award and was honoured with Padma Shri by Government of India in 2002. Indian National Academy of Engineering conferred up on him, the life time contribution award in engineering, for the year 2006. He was formerly Vice-Chancellor of University of Hyderabad, 2005, Chairman, Research Council, Centre for wind energy technology, Chennai, Distinguished Guest Professor, Department of Aerospace Engineering, IIT-Bombay, Indian Technical coordinator for India-Trento/Italy S&T program, Pratt & Whitney Chair professor at Univ of Hyderabad; Dr D S Kothari, DRDO Chair at ADA, Bangalore.









**Dr. Kallappa Pattada**Director, Boeing Research and Technology

Dr. Kallappa Pattada is the Director of Boeing Research and Technology- India (BR&T-I) and a leader at the Boeing india Engineering and Technology Center. He joined Boeing in 2014. Currently, he manages a diverse portfolio of research and technology development work in Aerodynamics, Structures, Materials, Manufacturing, Artificial Intelligence, and Air Traffic Management. Additionally, he manages the Product bench marking & Value Analysis Lab.

Kallappa has 3 decades of experience in the aerospace, defense and automotive industry. Prior to Boeing he worked at General Motors and Pratt & Whitney in USA and Maruti-Suzuki Motors in India. He has worked in R&D, engineering and manufacturing. He has 14 patents in diverse areas such as Rotordynamics, Mechanical Design, Electric Motors and Machine Learning. He has a Ph.D. from The Pennsylvania State University, USA and a Bachelor's degree in Mechanical Engineering from Indian Institute of Technology, Kanpur.









**Dr. Sundar Krishnaswam**y Consulting Engineer – Data Sciences, GE

Dr. Sundar Krishnaswamy is a consulting engineer at GE Aviation. He has been with GE Aviation since 2000. Sundar is a certified Six Sigma black belt, and in his role as a black belt, Sundar has conducted several waves of Six Sigma Green belt as well as Black Belt training programs. In his current role, Sundar has been engaged in adopting data sciences and analytics for supporting the fielded products and has been a contributor to the development of some of the analytics for hot section components. Sundar is the Chair of "Data Science and Applied Statistics" competency for GE Aviation and leads the Analytics Process Map development and the review process. Sundar is actively engaged in expanding the application of data science methods in supporting MRO and supply chain operations. Sundar has a Ph.D in combustion and propulsion, has over 10 peer reviewed journal publications, a trade secret to his name and is a senior member of AIAA.









**Mr. Adishesha C Sivaramasastry** Technical Fellow, Director Technology, Collins Aerospace

Mr. Adishesha (Adi) is a Technical Fellow in Collis Aerospace, a subsidiary of Raytheon Technologies. At present he is responsible for deploying Systems Engineering processes & practices, development of advanced technologies and driving Innovation across Global Engineering & Technology Centers. He has made significant contributions to development of Aircraft Sensors and Connectivity Solutions.

Over 30 years in the industry Adishesha has contributed to the country's most prestigious missions of ISRO and DRDO in the capacities of System Manager, Deputy Project Director and Deputy Mission Director before he switched over to the businesses in Philips and Honeywell.

Adishesha holds a Bachelors in Instrumentation from Bangalore University and Masters in Electronics '7 Controls from BITS, Pilani (On campus program). He is a Senior Member of IEEE, Fellow of Institute of Engineers (India), Member of RTCA & SAE standards committees and Reviewer for IEEE, PED & SAE international Journals. He has 24 patents, 2 Trade Secrets and 20 publications.

He is recognized with several awards for technical leadership, Product development and Innovation, including – DRDO award for Path breaking Research & Technology development given away by Prime Minister of India.

His current interests include introducing new age technologies like Smart sensors, AI/ML, Data Analytics and Wireless communication for real time monitoring and prediction of Aircraft health, leading to IVHM.









**Mr. Prashantsingh Bhadoria** Deputy General Manager, HAL

Mr. Prashantsingh Bhadoria, completed his B Tech From MGM College of Engineering Nanded Maharastra in 1999. In 2000 he joined HAL as Executive Trainee and currently he is working as Deputy General Manager (Design) in Electrical and Avionics team. He also double banks as the Project Manager for HTT 40 and AMCA programme.

He did his MS (Aerospace Vehicle Design- Avionics) from Cranfield University, UK.He is PMP certified and has also completed IMPA Level C certification. He has recently also done course in Project Management of engineering projects from DELftX, Ireland. He is recipient of the following awards,

- Bharat Ratna APJ KALAM AWARD 2016 from Aesi.
- Winner of Course Directors Award at Cranfield University: 2011
- · Winner of Fan Makers Award for Best Project in Avionics (IVHM design for BAe 146 aircraft): 2011

He has presented various papers which include

- Integrated Vehicle Health Management Systems for Military trainer
- Aircraft crash data recorder systems and automated exceedance warning tools for flight de brief systems.
- Vision of National Aerospace Industry
- Prototype to Production Concept for Military Aircraft
- Trends in military trainers
- · Customised Military Qualification for indigenous projects.

He is currently engaged in the design and development of HTT 40 which is HALs ambitious project in the Basic trainer category. The aircraft made its first flight in a record time of less than a year from the completion of the detailed design phase.

He is also heading the project team from HAL in the AMCA project which is being developed in partnership with ADA.









**Dr. M. K. Padmanabhan** CEO, UCAL Technologies

Dr. M. K. Padmanabhan is a Technocrat with more than 35 years of experience in domains that span Enterprise creation and management, Education and Applied Research, Governance and Policy implementation.

Presently, from 2016, he is the Director of Virginia Tech India Center for Research and Education, a Not-for-Profit entity duly Registered under Indian Companies Act.

During the period 2010-2016, he was involved in several initiatives that can broadly be classified as Education Management. In this period, he served a 3-year term as the Vice Chancellor (Pro Voce) of a large multi-disciplinary Education and Research University. The University has Departments in Engineering, Medical Sciences, Arts & Science and Management.

During 2000-2010, Paddu founded Plexion Technologies, funded by JP Morgan, a Technology company dealing with Design and Manufacture of Aerospace systems. It has later been acquired by a large Global conglomerate in 2008 and he worked as its CEO for a further period of two years.

Prior to this, Paddu spent nearly 20 years with Indian Space Research Organisation as Scientist/Engineer. During this period, he was deputed to NASA, USA for a period of 5 years to work as the Project Manager of an Indo US Spacelab 3 Program on board the Space Shuttle, Challenger.

Paddu has a PhD in Aerospace Engineering from Indian Institute of Technology, Bombay. Paddu's other interests and participation includes Community Development and has been part of several Rural upliftment Programs. Well connected with NGO's, Rotary and Lions community in India, South East Asia and Japan, he enjoys working hands-on with local communities on projects relating to Poverty alleviation, Local Societal issues etc. He is also Founding member of a Skill Training Initiative of Govt of India.









**Mr. Vipul Singh**CEO, Aarauv Unmanned Systems

Mr. Vipul is co-founder and CEO of Aarav Unmanned Systems (AUS) which is drone-solutions start-up leading commercial segment in India with its vertical integrated end to end solutions. Vipul has a background in Aerospace engineering and have been very active with policy suggestions and industrial committees for the drone ecosystem in India. He is also the Vice President of the Drone Federation of India.

AUS originated from IIT Kanpur in 2013 and established itself to be the leader of the commercial segment in India by continuously setting new technological benchmarks. AUS is currently also serving the SVAMITVA project and multiple private enterprises in the mining and infrastructure sector.









**Mr. Sunil Motwani**Country Manager, Mathworks

Mr. Sunil Motwani is Country Manager, at MathWorks India office managing sales related activities for commercial customers in India. He has been at MathWorks since 2008 from the time it started operations in India. Prior to joining MathWorks, Sunil worked at Hewlett Packard & Agilent Technologies managing sales of test instruments for various industry segments in India including Aerospace & Defense, Communications, Semiconductor, Automotive and Industrial Automation. He has more than 25 years of experience in sales of technology products across various regions within India having been based at Mumbai, Delhi, Hyderabad & Bangalore during this time.

Sunil has a Bachelor's Degree in Electronics Engineering from Visvesvaraya National Institute of Technology (VNIT), Nagpur and a Post-Graduate Diploma in Software Technology from National Centre of Software Technology (NCST), Mumbai.









**Dr. Madhusudan Joshi**Deputy General Manager & Head, Electrical & Electronics, ICAT

Dr. Madhusudan Joshi has received his Doctoral Degree from Instrument Design and Development Centre, Indian Institute of Technology, Delhi in the field of Cryptology using optoelectronic techniques. He started his career with Automotive Research Association of India, Pune in Oct' 2003. He has 17+ years of work experience with the automotive industry.

Dr. Joshi is the Head of Electronics & Electrical Group business unit at ICAT. He has worked R & D projects related to information processing, information security, design and development of - intelligent speed adaptation for automotives, anti-glare headlighting systems for vehicles for vehicles, EV & HEVs etc.

He has published more than 40+ research papers in International Journals, Conferences and Symposiums. He has also a co-applicant in 06 Patents (in progress) and 02 copyrights in different areas of his work. He is also an active member of Standards Committees on ITS, Automotive lighting, Automotive Air Conditioning, UAVs, Automotive Electronics & EMC. He is the convener of BIS sub-panels related to ITS & EVs.









**Mr. C S Sharma**Joint Director, QCIN

Mr. C S Sharma is serving as a Joint Director and Head- PMU (UAS) in Quality Council of India. By qualification he is an Electronics & Communications engineer and MBA in Finance. He is having more than 22 years of varied experience in 3rd party Certification/Accreditation, Total Quality Management, System & Product certification, Auditing, Lean Management, Risk management, Resource management, Business Excellence, International cyber laws, Best Practices & Benchmarking, Skill Training, Personnel Credentialing systems and Conformity Assessment solutions.

He is qualified lead assessor for various management systems like Quality, Environment, Health & Safety, Energy, Social Accountability, Global Reporting Initiative (GRI), Information Security and Skill Certification, with an experience of more than 1500 assessment man-days across India and overseas.

Mr. Sharma is a qualified APAC peer evaluator for personnel certification programme for Asia Pacific region accreditation bodies, and member of various BIS committees for standard development. He also led the Asia's' 1st accredited certification of Educational Organization Management System in National Accreditation Board for Education and Training (NABET).

Presently, he is managing various conformity assessment schemes in QCI like UAS, ICMED, RMCPCS, AYUSH, STAR, Hygiene Rating Scheme etc.









**Mr. P. Thangavel**Chief Manager, HAL

Mr. P. Thangavel is a Chief Manager (Design), Project Management Group (UAV), Aircraft Research and Design Centre, HAL, Bangalore. He is a Mechanical Engineer with Masters in Design and Production Engineering. He also holds an M.Sc. in Thermal Power.

He is a Certified Project Management Professional with more than 20 years of experience in HAL working in various disciplines including design, manufacturing, product support, project management, etc in the areas of UAVs, Engines, and helicopters.

For the last 10 years, he has been involved in the design, development, and project management of various types of Fixed Wing UAV projects in HAL.



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# **SPONSORS PROFILE**







#### TITLE - SPONSOR PROFILE



Boeing has been a trusted partner of India's aerospace sector for more than 75 years, both as the mainstay of India's growing commercial aviation sector and in the modernization and mission readiness of the country's defence forces. Boeing is focused on delivering value to Indian customers with advanced technologies and committed to creating sustainable value in the Indian aerospace sector — developing local suppliers, shaping academic and research collaborations with Indian institutions, and facilitating road maps for airspace management. Boeing's business strategy is aligned to the country's aspiration to "Make in India" and "Skill India," through investments in manufacturing, skill development and innovation.

Today, Boeing's sourcing from India stands at SI billion a year from a network of more than 275 suppliers. Boeing currently employs 4,000 people in India, and more than 7,000 people work with its supply chain partners. At Boeing India Engineering & Technology Center (BIETC) over 3,000 engineers, innovators, and technologists undertake high-quality, advanced aerospace work and offer engineering expertise to Boeing's defense, space, and commercial businesses, spanning engineering design of structures and systems, manufacturing support, developing systems to test our aircraft, and providing digital solutions to our airline customers. BIETC currently houses Boeing's Engineering, Test, Research and Technology, Information Technology and Digital Analytics teams in Bengaluru and Chennai. A joint venture with Tata Group produces AH-64 Apache helicopter fuselages in Hyderabad for customers around the globe. Boeing India employees serve communities and citizenship programs to inspire change and make an impact on more than 500,000 lives. For more information, visit www.boeing.co.in.



# **Boeing India Engineering & Technology Center**

#### **About Us**

The Boeing India Engineering & Technology Center (BIETC) in India is leveraging a talented pool of 3000+ engineers and innovators across Bengaluru and Chennai to drive growth and innovation in aerospace. Boeing has had an engineering presence in the country since 2009, and BIETC was formally established in 2016.

The center currently houses Boeing's Engineering, Test, Research and Technology, Information Technology and Digital Analytics teams.

These technologists undertake high-quality, advanced aerospace work and offer engineering expertise to Boeing's defense, space, and commercial businesses, spanning engineering design of structures and systems, manufacturing support, developing systems to test our aircraft, and providing digital solutions to our airline customers.

Cutting-edge R&D in traditional and emerging areas is performed at the center, including next-generation airplane health management, environment-friendly coatings, advanced networks and secure-communications where teams leverage new-age technologies such as Artificial Intelligence, Machine Learning, Internet-of-Things, Cloud, Model-Based Engineering, and Additive Manufacturing to enhance quality, safety, and productivity.

#### **Facts and figures**

- Shaping the future of aerospace: 3,000+ engineers develop technologies in India, for India, and for the world
- Commitment to India: \$200 M+ invested in Bengaluru campus, one of the largest for Boeing, outside of the U.S.
- Innovation at the core: 20+ University and R&D partnerships
- Nurturing local talent: Skill-focused growth for diverse pool of employees. Women now comprise more than a quarter of our workforce.
- Helping make India Aatmanirbhar in aerospace and defence: Local engineering support at the airbases for Boeing's in-country platforms









#### PLATINUM - SPONSOR PROFILE



From the smallest details to the highest pursuits, Collins Aerospace is dedicated to redefining aerospace.

With our customers, we relentlessly tackle the toughest challenges in our industry. And, every day, we imagine ways to make the skies and the spaces we touch smarter, safer and more amazing than ever.

Together, we chart new journeys and reunite families. We protect nations and save lives. And we explore the unknown.

We believe in the power of intelligence and partnership to guide our customers into the future.

The paths we pave together lead to limitless possibility. And the bonds we form propel us all higher again and again.

We are constant in our evolution.

We are connected to our customers—always.

We are compelling as we boldly step forward.

WE ARE REDEFINING AEROSPACE.

At Collins Aerospace, we're working side-by-side with customers to unleash the exciting possibilities we see before us. With a comprehensive portfolio, extensive capabilities and broad expertise, we're crafting intelligent solutions to meet the demands of a rapidly evolving global market — all representing the best in innovation and technology for the industries we serve.



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COLLINS AEROSPACE IS A LEADER IN TECHNOLOGICALLY ADVANCED, INTELLIGENT SOLUTIONS THAT HELP REDEFINE THE AEROSPACE AND DEFENSE INDUSTRY.

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TO SOLVING CUSTOMERS' TOUGHEST
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Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector, and mobility applications.

Our technologies are shaping production and people-related ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that use data from design & engineering to production and metrology to make manufacturing smarter. We work with our customers to improve productivity by embedding quality throughout the product lifecycle.

Our technology enables manufacturers to take control of quality right from the beginning through all various stages of their processes. Through an unparalleled portfolio of digital manufacturing technologies spanning CAE solutions for Design & Engineering, CAD CAM and complementary software for Production applications, Metrology hardware and software solutions, as well as data management and analytics tools, we empower technology users through their processes with deep and actionable insights into product quality, ensuring that quality drives productivity.



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As you look towards developing increasingly sustainable and higher performance aircraft, you will need to combine faster innovation with greater cost control and efficiency. This will only be achieved through a focused deployment of digital transformation that delivers measurable improvement from design, through to the shop floor.

Hexagon's unique mix of design and engineering, production, and metrology has been fuelling aerospace with digital and real-world solutions for over 50 years.

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### Honeywell

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Honeywell transforms the way the world works, solving our customers' toughest challenges through relentless innovation that is grounded in a heritage of invention.

Honeywell (www.honeywell.com) is a Fortune 100 technology company that delivers industry-specific solutions that include aerospace products and services; control technologies for buildings and industry; and performance materials globally. Our technologies help aircraft, buildings, manufacturing plants, supply chains, and workers become more connected to make our world smarter, safer, and more sustainable.

Honeywell Aerospace products and services are found on virtually every commercial, defense and space aircraft. The Aerospace business unit builds aircraft engines, cockpit and cabin electronics, wireless connectivity systems, mechanical components and more. Its hardware and software solutions create more fuel-efficient aircraft, more direct and on-time flights and safer skies and airports.

Every commercial aircraft flying in India today has Honeywell technologies on board. Honeywell is the leading supplier of avionics, auxiliary power units (APUs) and service provider for APU repair and overhaul on commercial aircraft on most airlines in India. Honeywell works with all of the country's major airlines in helping them reduce costs, improve safety, and efficiency.

In addition, Indian engineers play a key role in technology development for Honeywell's global aerospace business. A team of dedicated aerospace engineers work on solutions for India and the world as part of Honeywell Technology Solutions (HTS), the global technology development and engineering arm of Honeywell.

For more information, visit www.honeywell.com or follow us at @Honeywell\_Aero



We are solving our customer's toughest challenges through relentless innovation that is grounded in a heritage of invention.

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Our solutions create healthier air travel, more fuelefficient and better-maintained aircraft, more direct and on-time flight arrivals, safer skies and airports and more comfortable flights, along with several innovations and services that reflect exciting and emerging new transportation methods such as autonomous and supersonic flight.

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#### **GOLD - SPONSOR PROFILE**



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As a leading global technology company, HCL takes pride in its diversity, social responsibility, sustainability, and education initiatives. For the 12 months ended March 31, 2022, HCL had consolidated revenue of USSI1.48 billion. Its nearly 209,000 ideapreneurs operate out of 52 countries "





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MathWorks - Accelerating the Pace of Engineering and Science

MathWorks is the leading developer of mathematical computing software. Engineers and scientists worldwide rely on its products to accelerate the pace of discovery, innovation, and development.

MATLAB®, the language of engineers and scientists, is a programming environment for algorithm development, data analysis, visualization, and numeric computation. Simulink® is a block diagram environment for simulation and Model-Based Design of multidomain and embedded engineering systems. The company produces over 120 additional products for specialized tasks such as image and signal processing, control systems, robotics, and deep learning.

MATLAB and Simulink are used as fundamental modeling and simulation tools for research and development wherever engineering and science is applied. This includes industries and applications such as automotive, aerospace, energy, medical devices, communications, electronics, financial services, industrial automation and machinery, earth and ocean sciences, biotech and pharmaceutical, and software and internet.

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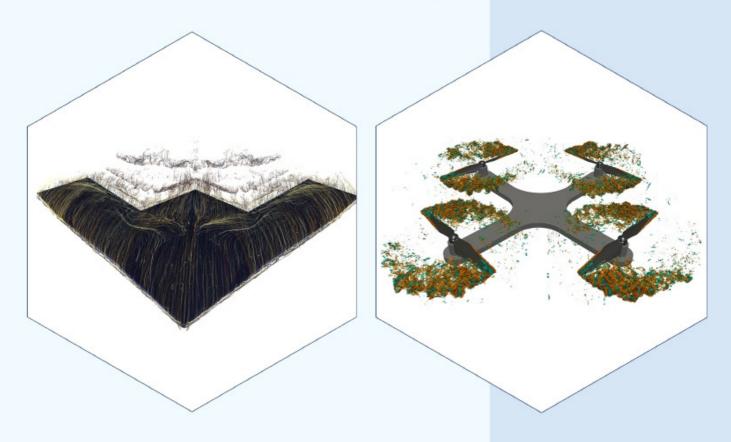
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Incubated in 2015, SankhyaSutra Labs has its R&D centre in Bangalore with target customers across the globe. The name SankhyaSutra literally translates to 'numerical algorithms' in Sanskrit. SankhyaSutra Labs is a subsidiary of Jio Platforms Limited, which is a wholly-owned subsidiary of Reliance Industries Ltd.

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UCAL is a public limited company with more than 5 decades of standing. Since 1992, UCAL has been offering comprehensive Fuel Management Solutions for the Automotive Sector.

UCAL Technologies is the aerospace division of UCAL with significant experience in Aerospace Design, Analysis, Manufacturing, and Testing including flying machines such as Unmanned Aerial Vehicles for various applications in the field of agriculture, natural resources evaluation, and such related applications.

UCAL has state-of-the-art Aerospace Metallic and Composite Manufacturing and Autonomous System Lab and Testing facilities.

Advanced technology is at the forefront of our thought processes; we endeavor to offer new and better solutions, every time we deliver.

#### **ABOUT**



UCAL has been in the design, development and manufacturing of Fuel management systems for more than five decades. Since 1992, UCAL has been meeting the demands of various Automotive vehicle manufacturers. UCAL Technologies is a part of UCAL group specializes in Aerospace and Defence - Design, Analysis, Manufacturing and Testing



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The Research in Flight company was established in Auburn, Alabama in 2012 with the aim of developing new aerodynamic and hydrodynamic analysis tools for aerospace engineering applications. The nucleus of this startup is the FlightStream® numerical flow solver that allows for rapid analysis of flow results over advanced geometries without requiring expensive volume grids. Research in Flight has been listed as one of the NASA SBIR office commercial success stories for 2021.

The FlightStream® solver is versatile and foundational in its ability to work with unstructured surface meshes and have solver run times of only seconds. Research in Flight has received extensive funding from NASA and US Air Force SBIR/STTR activities. It has also been developed for specialized applications for the UAM/eVTOL industry under the NASA Transformational Tools and Technologies program. It is currently funded as part of the NASA Ames STTR program as well as the US Air Force AFWERX activities.

Research in Flight offers FlightStream® in the form of software licenses, specialized modules driven by customer needs as well as training, support and services centered around FlightStream®. For more details, please visit our exposition booth to speak with our engineers and visit our website: https://researchinflight.com.







## MOOG

Moog is a global designer, manufacturer and integrator of precision motion control products and systems, and is a world leader in flight control systems and critical component control applications. Moog has been in India for more than two decades, and Moog India Technology Center (MITC) in Bangalore established in 2009 includes a staff of 200+ employees providing engineering, design, test and certification support for mission critical aerospace and defense systems.



Moog India Technology Center, Bangalore

MITC Provides Software, Electronics, Mechanical Design, Test Equipment Support and Qualification Testing for Commercial & Business Jets



Moog provided lateral control electronics (LCE) for Boeing 747-8, Level A software for flight control systems on the Gulfstream G280/G650 business jets, system analysis and independent verification and validation (IV&V) to support the overall system certification. MITC was also engaged in supporting Boeing B787-9, Airbus A350-900, A350-1000, Embraer E190/E175, COMAC C919, Gulfstream G500/G600/G650 aircraft programs in mechanical detailed design and electronics system design activities. Moog is also supporting expansion of MRO facilities for Wide Body Commercial Aircraft ATA Chapter 27 LRUs in Middle East & Asia Pacific regions.





Boeing 787-9 Test Rigs

## Design of Moog Components for Commercial and Business Jets





Hydraulic Flight Control Actuator & Additive Manufactured Manifold

MITC team extensively supports design and analysis of commercial flight control actuation system hardware consisting of primary flight surfaces on the airplane, as well as the spoilers and horizontal stabilizer, and includes a mix of electrohydraulic (EH) and electromechanical (EM) servoactuators and all associated control electronics. The team also supports design and realization of 3D printed prototype manifolds and actuators using Additive Manufacturing Technology. Presently, extensive testing, process certification of these products is in progress.

#### **System Level Testing**



COMAC C919 Iron Wing Test Rig

Over the years, Moog has grown from a high technology component manufacturer to become a leading supplier of integrated flight control systems. COMAC C919 Iron Wing is fully commissioned and System Level Hardware/Software testing is being carried out at our facility. We are positioned today on virtually every aircraft in the marketplace, supplying reliable flight control systems and specialized control products that are highly supportable and add significant value for our customers.

#### **Moog Bangalore Contacts:**



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We build bespoke teams around your domain and technology requirements drawn from our talent pool of over 592,195 global professionals including 35.6% women from 153 nationalities. Our domain expertise has been built upon decades of experience working across industries and this knowledge underpins our suite of solutions.

Our organization structure is domain led and empowered to help provide Customers a single window to industry specific solutions. Agile industry units have embedded capabilities to enable rapid responses that provide a competitive edge to our Customers. This is coupled with a unique Global Network Delivery Model $^{\text{m}}$  (GNDM $^{\text{m}}$ ), spanning 46 global locations, that is today recognized as the benchmark of excellence in technology deployment.

We have made significant investments in Digital platforms and products spanning Technology Products, Horizontal Platforms and Products, Vertical Platforms and Products.

Solutions based on Internet of Things (IoT) have become strategic to business model innovation, higher productivity and sustainability. We believe in looking beyond what is necessary to what's now possible with IoT to build purpose-driven, adaptable and resilient enterprises in an inter-connected ecosystem of suppliers, partners, and end customers. TCS brings together the drive for innovation, technical and engineering excellence and deep contextual knowledge across industries to help you build a boundaryless organization, enable quick and automated actions, and create rich experiences with a clear purpose.







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HINDUSTAN INSTITUTE OF TECHNOLOGY & SCIENCE (HITS), is a leading prestigious and recognized institution in India, located at Chennai, Tamil Nadu. Commenced in 1985, it offers a wide spectrum of Undergraduate, Postgraduate, Diploma, Research & Doctoral Programmes in diverse fields of Engineering, Technology, Architecture, Management, Law, Fashion Design, Aviation, Applied Sciences, Allied Sciences, and Arts and Sciences. HITS is recognised as Deemed to be University by UGC in 2008 and received Category-II status from MHRD which empowers HITS with Academic Autonomy. The technical courses at UG and PG levels are approved by AICTE. NBA has certified five undergraduate programmes offered by Aeronautical Engineering, Automobile Engineering, Computer Science and Engineering, Civil Engineering, and Mechanical Engineering under Tier I category. HITS is a part of the most illustrious Hindustan Group of Institutions (HGI) which caters to the academic needs of over 15,000 students.

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Phone: +91-4427474262

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Website: www.hindustanuniv.ac.in

Contact Person: Dr.R.Asokan, Professor & Head, School of Aeronautical Sciences



# MOBILITY ENGINEERING



## **SAEINDIA**

SAE has had a long association with aerospace for over a hundred years. Back in 1916, the Society of Automobile Engineers, the American Society of Aeronautic Engineers, the Society of Tractor Engineers and others interested in the growing mobility Industry came together to form the "Society of Automotive Engineers". The term "Automotive" was intended to represent any form of self- propelled vehicle.



- ME Quarterly technical magazine, brought out by SAEINDIA
- Collaboration with TBMG of SAE International, 8 advancements in the Automobile, Aerospace, and Off-Highway sectors globally
- ME Reaches GM, VP, and CXO's of Automobile /Aerospace/Off-Highway Industry
- ME Reaches out to 150 plus leading companies in the mobility domain.
- ME Connect with prospective customers through SAEINDIA's networking opportunities
- Reaches out to over 5,000 professional members & 30,000 engineering student members from 650+ AICTE approved Engg. colleges & Deemed Universities.

