AEROSTANDARDS 2021
International Aerospace Standards Workshop
A Virtual Event
23rd & 24th September 2021

Contents

SAEINDIA and Indian Aerospace

Background

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 (DRDO), National Aerospace Laboratories (NAL) and Indian Space Research Organization (ISRO). 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 aerospace organizations can 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 Collins Aerospace), private Indian manufacturers (such as Godrej, Larsen & Toubro, Mahindra Aerospace, Tata Advanced Systems Limited, and Tata Automation Limited), as well as vibrant 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 Bharadvaj of Boeing as the chairman.

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 continue to define and guide the activities of the Aerospace Forum. The first event of the Aerospace Forum was held on 26 March 2010 at National Aerospace Laboratories (NAL) 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-1& 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 in Feb 2017.
- Systems Engineering for Prognostics and Health Management Systems on 30th May 2018.
- Digital Revolution In Aerospace & Defense Industry on 19th February 2019
- Flying through turbulence … Reimagining Aerospace Industry, A premier International Aerospace conference conducted jointly with SAE International, AeroCon 2020, Nov 5-6, 2020
- Indian Manufacturing Event, A virtual Indian conference, AIDAT and SAE joint Event, Jan 23, 2021
- Flying out of Turbulence - Reimagining Aerospace Industry, Indian Aerospace Conference on eve of Aero Show India, Feb 1, 2021

SAEINDIA team is also collaborating with SAE International in developing aerospace standards. The Indian team is actively contributing to G-31 Electronic Transactions for Aerospace (ETA) technical committee, G-34 Artificial Intelligence in Aviation Committee and HM -1 Integrated Vehicle Health Management committees. SAEINDIA Aerospace Forum member Dr Ravi Kumar G. V. V. chairs the G-31 technical committee who is the first Indian citizen to chair the aerospace standards committee. He also won the James M. Crawford Executive Standards committee for his outstanding contributions to aerospace standards development. Similarly, Dr Dinesh Manoharan is sponsoring a standard document on blockchain for UAS in the G-31 technical committee.

As we look ahead, the SAEINDIA Aerospace Forum will continue to contribute immensely to the aerospace ecosystem in India in many ways. Keeping this in mind, the Aerospace Forum is currently organized into the following focused teams:

— Membership & Recognition
— Academia & Faculty Development
— Professional Development Programs for Industry Members
— Events and Expositions
— Policy Development and External Collaboration

Summary

In summary, the Indian aerospace industry is poised to grow significantly in the years ahead. At the same time, there is a 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

SAEINDIA Aerospace Forum Members

Aerospace Forum Chair  Mr. Ravishankar Mysore Formerly Vice President, Engineering, Collins Aerospace	Aerospace Forum Co-Chair  Dr. Y. Srinivasarao Scientist, RCI Labs	Aerospace Forum Past Chairman  Mr. J Munirathnam Founder CEO Javaji M Consulting
Aerospace Forum Member  Dr. G V V Ravikumar AVP & Head Advanced Engineering Group, Infosys; Chair, G-31 Technical Committee, SAE International	Aerospace Forum Member  Mr. Krupal Aerpula Engineering Leader, Boeing India Pvt. Ltd	Aerospace Forum Member  Mr. Damodaran Subramanian Former Managing Director SAFRAN Engineering Services India
Aerospace Forum Member  Prof. C.S. Karunakaran Assistant Professor, Hindustan Institute of Technology and Science	Aerospace Forum Member  Dr. Ganga Reddy A&D Mechanical Delivery Head, HCL	Aerospace Forum Member  Mr. D. Uma Maheshwar Executive Chief Consulting Engineer GE Aviation-India
Aerospace Forum Member  Mr. Vasanth Kini Managing Director Titanium Industries India Pvt Ltd	Aerospace Forum Member  Dr. Ramakrishnan Raman Principal Systems Engineer Honeywell	Aerospace Forum Member  Dr. Dinesh Manoharan Manager, Aerospace & Defense, UCAL
Aerospace Forum Member 	Aerospace Forum Member 	Aerospace Forum Member 

Dr. Yogesh Sathe Head Aerospace Engineering, Eaton India Innovation Center	Mr. Sandeep Birje Specialist Engineer – Aerospace, Eaton	Mr. Sathish Thokala AeroDef & Space Industry Manager, MathWorks
Aerospace Forum Member  Mr. V Shripathi Technical Manager, Aerospace, Indo-Pacific, Hexagon	Aerospace Forum Member  Vinay Roy Head of Design Engineering, Moog India Technology Center	Aerospace Forum Member  Mr. Pullaiah Dussa Director, Engineering Competence Centre, Thales India

AERO STANDARDS WORKSHOP 2021

SAEINDIA in collaboration with SAE International is organizing Aerospace Standards Workshop 2021 to create awareness about the global aerospace standardization activities namely ANSI UAS Roadmap V2, SAE International, SAE-ITC, etc. This workshop provides an opportunity for Aerospace practitioners, professionals, academia and students on various aerospace standards committees related to advanced technologies like Unmanned Aircraft Systems Advanced Air Mobility, Artificial Intelligence, Blockchain, etc. The aim of this workshop is to help aerospace professionals by involving them in global standards development. Integrate and connect Indian aerospace professionals with the global aerospace community via Aerospace standards committees. SAEINDIA is organizing the workshop on 'The International Aerospace Standards workshop 2021 on 23-24 September 2021.

Objectives:

- Create awareness on global aerospace standardization activities of SAE International, ANSI, SAE-ITC and other standards organizations.
- Provide opportunity to aerospace practitioners, professionals, academia, and students on various aerospace standards committees related to various aerospace technologies.
- Help in aerospace professionals career development by involving them in global standards development
- Integrate and connect Indian aerospace professionals with the global aerospace community through aerospace standards committees and other knowledge-sharing activities.

Target Participants:

Aerospace professionals, practitioners, research, academia, and students.

Topics

- Additive Manufacturing
- Advanced Air Mobility & Supply Chain
- Aerospace Actuation, Control and Fluid Power Systems
- Aerospace Couplings, Fittings, Hose, Tubing Assemblies
- Aircraft & Systems Development and Safety Assessment
- Artificial Intelligence in Aviation
- Counterfeit Electronic Parts
- Cyber-Physical Systems Security
- Electronic Transactions for Aerospace
- Electrified Propulsion
- Integrated Vehicle Health Management
- Modeling, simulation and Training
- Polymer Matrix Composites
- Standardization of UAV Sub-Systems
- Unmanned Aircraft Propulsion

Curtain Raiser event was held on 7th August 2021 with below key speakers.

- Dr. S. N. Omkar, Chief Research Scientist (CRS), IISc, Bengaluru, India talk on **Standardization of UAV Sub-Systems – India**
- Dr. Parimal Kopardekar, Director, NASA Aeronautical Research Institute (NARI), NASA Ames, USA. Topic: **Advanced Air Mobility (AAM) & Supply Chain**

AERO STANDARDS 2021 ORGANIZING COMMITTEE

 **Mr. Ravishankar Mysore** **Chair, SAEINDIA Aerospace Forum**	 **Dr. Ravi Kumar G. V. V.** **Head Advanced Engineering Group, Infosys** **Convenor, Aero Standards 2021**
 **Dr. Dinesh Manoharan** **Manager, Aerospace & Defense, UCAL** **Co-Convenor, Aero Standards 2021**	 **Mr. Krupal Aerpula** **Engineering Leader, Boeing India Pvt. Ltd** **Member, Aero Standards 2021**
 **Dr Ganga Reddy** **A&D Mechanical Delivery Head, HCL** **Member, Aero Standards 2021**	 **Dr. Ramakrishnan Raman** **Principal Systems Engineer, Honeywell** **Member, Aero Standards 2021**
 **Vinay Roy** **Head of Design Engineering, Moog India Technology Center** **Member, Aero Standards 2021**	 **Dr. Yogesh Sathe** **Head Aerospace Engineering, Eaton India Innovation Center** **Member, Aero Standards 2021**
 **Prof. C.S. Karunakaran** Assistant Professor, Hindustan Institute of Technology and Science **Member, Aero Standards 2021**	 **Mr. Sathish Thokala** AeroDef & Space Industry Manager, MathWorks **Member, Aero Standards 2021**
 **Mr. V Shripathi** Technical Manager, Aerospace, Indo-Pacific, Hexagon	 **Satish Sastry** Engineering Director, Site Lead, Hyderabad

Member, Aero Standards 2021	Collins Aerospace **Member, Aero Standards 2021**
 **Mr. Sandeep Birje** Specialist Engineer – Aerospace, Eaton **Member, Aero Standards 2021**	 **Mr. Pullaiah Dussa** Director, Engineering Competence Centre, Thales India **Member, Aero Standards 2021**

AERO STANDARDS 2021 TECHNICAL ADVISORS

 **Dr. Omkar** **Chief Research Scientist, Indian Institute of Science, Bangalore, India**	 **Dr. Parimal Kopadekar** **Director, NASA Aeronautical Research Institute, USA**

AERO STANDARDS 2021 Program

The following is the schedule of the overall AERO STANDARDS 2021 event

Day 1 - September 23, 2021, 17:00 - 20:30 (IST)					
Start time	**Duration**	**Topic**		**Speaker**	
17:00	5 min	Invocation			
17:05	10 min	Inaugural Address		**Ravishankar Mysore** Chair at Aerospace Forum, SAE India	
17:15	20 min	Keynote Address		**Dr. Bala Bharadvaj** Former Managing Director, Boeing India Engineering & Technology Center, Honorary Member and Advisor, SAEINDIA	
17:35	25 min	Overview of SAE International's Aerospace Standards Programs & NADCAP programs		**David Alexander** Director, Aerospace Standards, SAE International	
Break for Parallel Session Transition (15 min)					
Start time	**Duration**	**Parallel Session I**		**Parallel Session II**	
		Topic	**Speaker**	**Topic**	**Speaker**
18:15	30 min	SAE HM-1 Integrated Vehicle Health Management Committee	**Rhonda Walthall** Chair, SAE HM-1 Committee; Fellow of Collins Aerospace	SAE E-40 Electrified Propulsion	**Richard Ambroise** Chair, SAE E 40; Head of Propulsion, Airbus
18:45	30 min	SAE G-31 Electronic Transactions for Aerospace Committee	**Dr. Ravi Kumar G. V. V.** Chair, G-31 Electronic Transactions for Aerospace Committee; AVP and Head Advanced Engineering Group, Infosys	SAE G-19 Counterfeit Electronic Parts Committee	**Bill Scofield** Chair, SAE G-19; Component Engineer, Boeing
19:15	30 min	SAE G-32 Cyber Physical Systems Security Committee	**Chris Sundberg** Chair, SAE G-32; Product Cyber Security Engineer, Woodward Inc.	SAE A-6 Aerospace Actuation, Control and Fluid Power Systems	**Ian Halley** Chair, SAE A-6, Technical Fellow, Boeing
19:45	30 min	SAE G-34/EUROCAE WG-114 Artificial Intelligence in Aviation Committee	**Mark Roboff** Chair, SAE G-34/EUROCAE WG-114; CEO, Sky Thread Aero	SAE G-35 Modelling, Simulation & Training	**Dr. Andreas Schweiger** System Architect at Airbus Defence and Space GmbH
20:15	15 min	**Summary of Day 1 & Wrap Up**			

<table>
<tr><th colspan="6">Day 2 - September 24, 2021, 17:00 - 20:30 (IST)</th></tr>
<tr><th>Start time</th><th>Duration</th><th colspan="4">Topic</th><th>Speaker</th></tr>
<tr><td>17:00</td><td>5 min</td><td colspan="4">Welcome to Day 2</td><td></td></tr>
<tr><td>17:05</td><td>20 min</td><td colspan="4">SAE-ITC Standardization Activities</td><td>Michael McNair
VP of Aerospace, SAE-ITC</td></tr>
<tr><td>17:25</td><td>20 min</td><td colspan="4">Keynote Address: Role of standardization to improve efficiencies and quality</td><td>Dr. Ravi Rajamani
Fellow of SAE International; Visiting Professor at Cranfield University, UK</td></tr>
<tr><td>17:45</td><td>20 min</td><td colspan="4">Overview of SAE International’s UAS Activities</td><td>Dr. Mark DeAngelo
Aerospace Engineer and Pilot, Aerospace Initiatives Manager, SAE International</td></tr>
<tr><td>18:05</td><td>20 min</td><td colspan="4">Overview of ANSI Standardization Roadmap for UAS V2 & FAA Perspective</td><td>Ritesh Ghimire
Custodian of the ANSI UAS Roadmap V2 on the FAA's behalf; Aerospace Engineer, FAA UAS Integration Office,U.S. FAA</td></tr>
<tr><td>18:25</td><td>10 min</td><td colspan="4">How to Get Involved in SAE Aerospace Standards Development</td><td>Kerri Rohal
SAE International</td></tr>
<tr><td colspan="7">Break for Parallel Session Transition (15 min)</td></tr>
<tr><th rowspan="2">Start time</th><th rowspan="2">Duration</th><th colspan="2">Parallel Session I</th><th colspan="2">Parallel Session II</th></tr>
<tr><th>Topic</th><th>Speaker</th><th>Topic</th><th>Speaker</th></tr>
<tr><td>18:50</td><td>30 min</td><td>SAE S-18/EUROCAE WG-63 Aircraft & Systems Development and Safety Assessment Committee</td><td>Bob Voros
Chair, SAE S-18; Manager of Engineering Processes, System Safety Lead, Merlin Labs</td><td>AMS AM Additive Manufacturing</td><td>Bill Bihlman
President, Aerolytics</td></tr>
<tr><td>19:20</td><td>30 min</td><td>SAE E-39 Unmanned Aircraft Propulsion Committee</td><td>Michael Kass
Chair, SAE E-39; Senior Research Engineer, U.S. Dept. of Energy</td><td>AMS P17 Polymer Matrix Composites Committee</td><td>Shannon Jones
Chair, AMS-P17, Staff Engineer, Bell Flight</td></tr>
<tr><td>19:50</td><td>30 min</td><td>A Perspective from BIS on Standards</td><td>Ravindra Beniwal
Member Secretary, UAV Committee, Beauro Indian Standards (BIS)</td><td>G-3, Aerospace Couplings, Fittings, Hose, Tubing Assemblies</td><td>Joseph Bebey
Chair SAE G-3, Sn. Hydraulics Engineering, Boeing</td></tr>
<tr><td>20:20</td><td>10 min</td><td colspan="4">Wrap up & Vote of Thanks</td></tr>
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AERO STANDARDS 2021 Speakers:

Speaker	Profile
 **Dr. Ravi Rajamani** Fellow of SAE International, Visiting Professor at Cranfield University, UK https://www.sae.org	**Dr Ravi Rajamani** is an independent consultant and research professor at University of Connecticut working on applying model-based and data analytics techniques to aerospace other complex systems, especially in the areas of controls, diagnostics, and prognostics. He has six books to his name including Electric Flight Technology: The Unfolding of a New Future. In addition to these books, Dr Ravi is the author of many book chapters, journal papers, and conference proceedings. and is a named inventor on several patents. Prior to his current job, Dr Ravi Rajamani worked at Meggitt, United Technologies Corporation, and the General Electric Company. He has a PhD from University of Minnesota and an MBA from University of Connecticut. Before that, he obtained a BTech from IIT, Delhi, and an MSc from IISc, Bangalore. He is active in the PHM Society, and within various SAE technical committees dealing with AI and digital transformation, prognostics & health management, and electric propulsion. He currently serves as the Editor in Chief of the SAE International Aerospace Journal and is part of the editorial board of two other journals. In addition, Dr Ravi Rajamani has a visiting professorship at Cranfield University in the UK.
 **David Alexander** Director, Aerospace Standards of SAE International https://www.sae.org	**David Alexander** has been with SAE International and its affiliates for 17 years and is based in London, UK. In May 2016, he assumed the role of Director, Aerospace Standards. In this role, Alexander is responsible globally for the strategy and operations of the SAE Aerospace and Systems Management Standards programs comprising of over 7,600 consensus standards maintained by more than 180 technical committees. This includes the management support for the SAE Aerospace Council and SAE Executive Standards Committee and involves leveraging standards to work across the SAE International portfolio supported by SAE staff in London, Paris, Shanghai and across the US, program activities include relationships with industry, associations, aviation authorities and government stakeholders around the world and strategy for standardization in areas as diverse as artificial intelligence, electric aircraft, additive manufacturing, human factor sandquality. Prior to joining the SAE Aerospace Standards operation, David worked on the Nadcap accreditation programme through SAE's affiliate organisation PRI, and he holds a BA (Hons) degree from the University of Manchester.
 **Dr Ravi Kumar G. V. V.**	**Dr. Ravi Kumar G. V. V.** is Associate Vice President and Head Advanced Engineering Group of Engineering Services, Infosys. He has led many innovation and applied research projects over the past 25 years. His areas of expertise include mechanical structures and systems, knowledge-based engineering, composites, artificial intelligence, robotics, autonomous systems, AR, VR, and Industry 4.0. He is involved in the development of commercial products like AUTOLAY , Nia Knowledge and KRTI 4.0. He contributed to many Industry 4.0 implementation projects and played a key role in the development of Industry 4.0 maturity index under the umbrella of Acatech, Germany. He is involved in various initiatives of the World Economic Forum (WEF) fourth industrial revolution technologies in production. He is the Chair of G-31 and member of HM-1 technical committees of SAE International contributing to various aerospace standards development. Dr. Ravi Kumar has published over fifty technical

Chair, G-31 Electronic Transactions for Aerospace Committee; AVP and Head Advanced Engineering Group, at Infosys https://www.infosys.com	papers and five patents. He has a PhD and an MTech in Applied Mechanics from IIT Delhi, and a BE (Honors) from BITS Pilani, India. He won many awards including James M. Crawford Executive Standards Committee Outstanding Achievement award from SAE International and Corporate Excellence Award from American Society of Engineers of Indian Origin.
 **Mark Roboff** Chair, SAE G-34/EUROCAE WG-114; CEO of Sky thread https://www.skythread.aero/	**Mark Roboff** is CEO of SkyThread.aero, a new venture building the future of digital connectivity for the aviation industry. Previously, Mark was General Manager for Digital Transformation, Aerospace & Defense at DXC and prior to that, he served as Global Solutions Leader, Aerospace and Defense (A&D,) at IBM. Mark has over 15 years' experience in aviation digital transformation—both as a software engineer and as a business and technology executive. Mark is a recognized thought leader on Artificial Intelligence and Machine Learning as well as MRO data, processes, and analytics. Mark has worked on and contributed to many of the industry's largest digital MRO platforms, and he has also worked with dozens of airlines across the globe on prognostics, predictive maintenance, and the optimization of maintenance execution. Mark is also the chair of the SAE-G34/EUROCAE WG-114 Joint International Committee for AI in Aviation, and is leading 500+ aerospace engineers, software developers, data scientists, safety experts, and regulators to define a means of compliance for AI certification. Mark is also a voting member on the SAE G-31 Electronic Data Transactions committee, the S-18 System Safety committee, the Digital and Data Steering Committee, and is also a member of the Prognostics and Health Management (PHM) Society. In addition to the above, Mark is host of the new aviation technology podcast "Future Flying" (available on all major podcast streaming platforms,) which explores how new technologies will disrupt and transform aviation and its impact on society.
 **Dr. Mark DeAngelo** Aerospace initiatives Manager at SAE International; Aerospace Engineer and Pilot at SAE International https://www.sae.org	**Dr. Mark P. DeAngelo** is an aerospace engineer and Aerospace Initiatives Manager for SAE International with over 13 years of experience. He is the SAE spokesperson for advanced air mobility (AAM) standards and integration activities, collaborating with SAE, NASA, FAA, ICAO, international civil aviation authorities and industry. Some of his significant activities involve the standardization of the emerging and advanced technologies such as unmanned aircraft systems (UAS), autonomy, artificial intelligence (AI), electric aircraft, hybrid propulsion, among others. Dr. Mark P. DeAngelo co-chairs the Airworthiness Group (WG-1) and co-authors the ANSI UAS Standards Collaborative Roadmap to support rapid development of needed standards to facilitate the safer and faster integration of UAS into the national airspace system (NAS). He participates on numerous international aerospace standards committees, the NASA Transformative Vertical Flight, NASA AAM, many speaking roles at aerospace conferences and workshops. He actively supports the G-34 Artificial Intelligence in Aviation Outreach Committee and its podcast. He earned a B.S., M.S., and Ph.D. in aerospace engineering from Penn State University. His M.S. thesis included optimal aerial search techniques, and his Ph.D. dissertation included aircraft localization without GPS using self-reliant sensors and computer vision machine learning. He also holds an FAA Part 61 Private Pilot Certificate. His hobbies include photography with publication in the Smithsonian Air & Space Magazine, Miami New Times, and awards from the Pittsburgh Post-Gazette and Point Park University.

 **Michael Kass** Chair, SAE E-39 and Senior Research Engineer at U.S. Dept. of Energy https://www.energy.gov/	**Mike Kass** is a distinguished engineer in the Engines Research Group at Oak Ridge National Laboratory. He has over 20 years of experience in the fields of dynamometer-based engine testing, combustion/emissions research, engine materials and alternative fuels, including small reciprocating engines used in UAV applications. Mr. Kass holds a PhD in Metallurgical Engineering from the University of Tennessee, is a Fellow of SAE International and is the current committee chair for E-39 which is dedicated to developing standards and recommended practices for UAV engines.
 **Ravishankar Mysore** Chair at Aerospace Forum, SAE India https://www.saeindia.org	**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 to 1400 engineers 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.
 **Bob Voros** Chair, SAE S-18 and System Safety Lead Merlin Labs	Robert Voros recently became the System Safety Lead at Merlin Labs, developing levels of autonomy for existing aircraft. He was previously the manager of Engineering Processes for Textron Aviation Inc. (Cessna and Beechcraft) and acted as a subject matter expert for Development Assurance & System Safety. At Textron Aviation, Robert managed the team integrating and improving Engineering Process involving its Organization Designation Authorization, development assurance process (based on SAE ARP4754A), & system safety process (based on SAE ARP4761). He was also a key interface on these topics to both industry organizations and Certification Authorities at the local and policy levels. Since 2017, Robert has been serving as the Chairperson for the SAE International, S-18 Aircraft and System Development and Safety Assessment Committee. The S-18 committee brings together qualified specialists for the advancement of aerospace safety and to support effective safety management through the development of technical reports which are key to the civil certification of aircraft. With more than 20 years of experience, Robert has held a variety of positions of increasing responsibilities, starting at Cessna Aircraft Company as a flight control system design engineer. He has supported the type certifications and system safety assessments of multiple Part 23 and Part 25 aircraft for new and amended type certificates. In this time, he has also achieved a Design For Six Sigma Black Belt, patents,

	several published papers, and authored a chapter in The World of Civil Aerospace. Robert earned a Bachelor of Science degree in Mechanical Engineering from Rose-Hulman Institute of Technology.
 **Mike McNair** VP of Aerospace at SAE-ITC https://www.sae-itc.com/	**Mike McNair** is currently serving as the Vice-President for Aerospace with SAE Industry Technologies Consortia (SAE ITC). The aerospace portfolio in combination with other SAE ITC programs provide coverage across both manned and unmanned aviation, supply chain, parts qualification, digitalization, advanced manufacturing, and space. Mike's background includes all product life cycle phases. He has previously led autonomy, artificial intelligence, and human-machine collaboration efforts at Bell (Textron); robotics, unmanned systems, and advanced manufacturing at The University of Texas at Arlington Research Institute; and air and ground unmanned systems architecture and software as a part of the US Army Future Combat Systems program while at SAIC. His experience also includes management and development experience in immersive flight simulators, hand-held gas detectors, satellite control systems, and other applications. Mike holds degrees with Texas A&M University and the George Washington University and is a current Project Management Institute Project Management Professional
 **Dr Bala Bharadvaj** Former Managing Director, Boeing's Engineering & Technology Center in Bengaluru, India https://www.boeing.com	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.
 **Bill Bihlman** President at Aerolytics	**Bill Bihlman** is founder of Aerolytics, a management consultancy dedicated to aerospace materials, manufacturing, and supply chain. He started his career in 1995 as an engineer at Raytheon Aircraft, eventually serving as Project Engineer. Bill is actively involved with SAE AMS (Aerospace Material Specifications) additive manufacturing (AM) development. His IE PhD dissertation addressed the impact of AM on the aerospace supply chain. He also has a BSME and MSME from Purdue, and an MBA and MPA from Cornell University. Bill is a licensed pilot, and a life-long aviation enthusiast.
 **Richard Ambroise** Chair, SAE E 40; Head of Propulsion at Airbus https://www.airbus.com	Richard Ambroise was graduated in electronics engineering. Richard worked in different positions in different industries (automotive, space, telecommunication and electronic components). In a middle of his career, he had worked on a PhD with Motorola on power electronic components. At this stage, Richard became able to make a comprehensive link between the physics of materials and the behavior of an electronic item under all foreseeable conditions. Over the last 15 years, in Airbus in Propulsion Center of Competence (CoC), Richard set and deploy electrical skills in electronic engine control department to address in service issues and set the maturity of new product development (NEO) at the expected level. End of 2019, Richard joint Airbus Alpha Exo team as Head of Propelling of Electrified Flight Demonstrator. Airbus Exo Alpha is an innovative start-up at the heart of Airbus delivering flying demonstrators. We operate outside the industry established procedures to rapidly explore potentially disruptive and risky ideas. We have an end-to-end responsibility (Time, Quality & cost) starting from Top Project Objective definition to the delivery of the outcomes of the ground and flight tests. Based on his experience in standardization in E-36 committee (Electronic Engine Control), he is convinced on the need to create and animate a community on Electrified Propulsion. Supported by the SAE direction, Richard became the E-40 founding chairman of the "Electrified Propulsion" committee created in November 2018. His major contribution to our industry has been recognized by the SAE Kolk Award in 2018. Over the last years, across various continents, he discovered different cultures, different way of working. Richard is a passionate person. He plays violin, rebuild classic cars and appreciate food and wine.

 **Bill Scofield** Chair, SAE G-19; Component Engineer at Boeing https://www.boeing.com	**Bill** has been with The Boeing Company for thirty-six years. Upon graduation from Washington State University with a degree in electrical engineering he started his career in 1985 as an electrical component engineer. Bill has supported many key Boeing programs including F-22, Teledesic, and the Ground-based Midcourse Defense program. In late 2002 Bill joined Boeing Research and Technology and began to support industry activities including the SAE and International Electrotechnical Commission (IEC). Bill is currently the Chairman of several SAE committee's including SAE G-32 committee responsible for the publication of JA 7496,
 **Ian Halley** Chair, SAE A-6, Technical Fellow at Boeing https://www.boeing.com	**Ian Halley** is a Boeing Technical Fellow specializing in the design and analysis of Flight Control and Vehicle Management Systems. Ian was a past chairman for the SAE A-6A3 Flight Control and Vehicle Management Systems Committee and is currently serving as the committee chairman of the SAE A-6 Actuation, Control and Fluid Power Systems Committee. Ian is a private pilot and holds a BSME from the University of Illinois, a MEM from Washington University and a MSSE from Missouri University of Science and Technology.
 **Dr. Andreas Schweiger** Head of Regulatory Affairs at CAE	**Dr. Andreas Schweiger** is a system architect at Airbus Defence and Space GmbH in Germany with a track record of 13 years of professional expertise in the aerospace domain. He is leading several research and technology projects in cooperation with universities and research institutes in the areas of software engineering, software quality, systems engineering, and cyber security for avionics. Mr. Schweiger shares his expertise as a leadership member of SAE International G-32 (Cyber Physical Systems Security) and SAE International G-35 (Modelling, Simulation and Training for New Emerging Technologies and Concepts). In addition, he is a committee member of SAE International G-34 (Artificial Intelligence in Aviation), SAE International E-36 (Electronic Engine Controls Committee), and SAE International S-18 (Aircraft and System Development and Safety Assessment Committee). Latest research results are developed and communicated by him through teaching regular university lectures. Mr. Schweiger advances research by having initiated the scientific workshop on Avionics Systems and Software Engineering (AvioSE, https://aviose-workshop.github.io/), where he is part of the program committee. Furthermore, he supports the scientific workshop on Open Model Based Engineering Environment (open MBEE, https://www.openmbee.org/models2020.html) as a program committee member. He has been awarded a diploma and PhD in computer science by the Technical University of Munich (Germany).

 **Ritesh Ghimire** Custodian of the ANSI UAS Roadmap V2 on the FAA's behalf; Aerospace Engineer, FAA UAS Integration Office, U.S. FAA https://www.faa.gov/	**Ritesh Ghimire** has been actively supporting the FAA, UAS industry, ANSI, NASA, and leading the outreach of the ANSI UAS Standardization Roadmap, to support the FAA's global leadership. He is the custodian of the ANSI UAS Standardization Roadmap. He has been actively supporting development of industry standards needed for type certification of UAS. He is the recipient of many awards, including ANSI's 2020-2021 Leadership and Service Awards in the Meritorious Service Award Category. Ritesh, a U.S. Army veteran with a B.S. and M.S. in Aerospace Engineering, has been working at the FAA UAS Integration Office as an Aerospace Engineer developing UAS policies and certifying UAS. He worked at the FAA Aircraft Certification Office on type certification of transport and small category aircraft. He also worked at business jets and small aircraft manufacturer as well as at an aerospace research institute. Ritesh has been supporting various UAS programs like Boeing MQ-25 and Kaman K-max as the UAS Integration Lead. He was also involved in the certification of UAS from Boeing, General Atomics, Lockheed Martin, Northrop Grumman, Google-Titan, etc.
 **Joe Bebey** Chair SAE G-3, Sn. Hydraulics Engineering at Boeing https://www.boeing.com/	**Joe Bebey** is currently the Lead Design and Certification engineer for the hydraulic and mechanical flight control systems on the Boeing H-47 Chinook Helicopter program. His engineering product team is responsible for sustaining the design, supply chain, manufacturing, and customer support activities on a 50 year-old continuously manufactured and evolving aircraft platform. He has worked in the Aerospace business for 40 years and has extensive engineering experience in hydraulic and mechanical flight control system design. Joe has been an active member of the SAE G-3 Committee on Aerospace Couplings, Fittings, Hose and Tubing Assemblies for over 30 years and is currently the committee Chair. His degrees include a BSME and an MS in Engineering Management from Drexel University.
 **SHANNON JONES** Chair, AMS-P17, Staff Engineer at Bell Flight https://www.bellflight.com/	**Shannon Jones** is a Staff Engineer in the Non-Metallic Materials and Processes Engineering Group at Bell Flight. He is Chairman of the SAE AMS P17 Committee that covers polymer matrix composites and associated materials, Chairman of the Performance Review Institute P17 Qualified Products Group, Chairman of the CMH-17 Task Group tasked with developing statistically valid core material properties, and is a member of the CMH-17 steering committee. Additionally, he is involved in the CMH-17 community, as an acting/voting member in the M&P, Data Review, Statistical, and Sandwich Working Groups. He also supports a wide range of FAA funded research programs tied to composites and bonding being performed by academia through participation as an industry oversite member. Prior to joining Bell Flight in 2020, he worked at Cessna Aircraft (later Textron Aviation) in Non-metallic M&P disciplines supporting a variety of structural composite and bonded structures areas. He has a MS in Mechanical Engineering and a BS in Aerospace Engineering from West Virginia University.

 **Kerri Rohal** SAE International	**Kerri Rohall** is the Standards Manager at SAE International. With almost 20 years at SAE, she started as an Aerospace Standards Specialist working directly with our standards committees. In Kerri's current role, she is responsible for the management of the Standards Specialists team, covering both Aerospace and Ground Vehicle sectors, ensuring adherence to our polices and procedures and coordinating the proactive production of SAE Technical Standards. Kerri has a Bachelor's degree from Clarion University.
 **Christopher Sundberg** Chair, SAE G-32; Product Cyber Security Engineer, Woodward Inc https://www.woodward.com	**Christopher Sundberg**, GICSP is a Product Cybersecurity Engineer in the Corporate Technology Office for Woodward, Inc. Mr. Sundberg is responsible for security architecture, secure development lifecycle, and product security compliance across a wide variety of cyber-physical devices sold by Woodward, Inc. Mr. Sundberg's work history spans over 30 years concentrating on wireless communication and embedded systems development. Background include cyber-physical systems, industrial control networks, vehicle networking, and emerging digital technologies such as artificial intelligence, cloud architectures, and IIoT. Mr. Sundberg has actively participated in the development of the SAE G-32 Cyber-Physical Systems Security standard, serving on the Software Assurance sub-group, curator for the G-32 Weekly Security Items newsletter, as well as liaison to a number of other SAE committees (SAE G-34 / Eurocae WG-114-Artificial Intelligence (AI) in Aviation, G-31 Electronic Transactions for Aerospace, S-18 Aircraft and System Development and Safety Assessment Committee).
 **Ravindra Beniwal** Member Secretary, UAV Committee, Bureau of Indian Standards (BIS)	**Ravindra Beniwal**, Scientist-C is presently working in the Transport Engineering Department (TED) of the Bureau of Indian Standards (BIS), Govt. of India. He is a graduate in Mechanical Engineering (honors) from Rajasthan Technical University, Kota. He has experience of more than five years working in BIS including the Standards Formulation activity, Product Certification (Conformity Assessment) activity, activities related to Enforcement and Consumer Affairs and dealing with various subjects related to Mechanical, Civil, Transport Engineering and Medical disciplines. At present he is working as Member Secretary to technical committees TED 14 (Aircraft, Space Vehicles, Air Cargo Handling and Aircraft Electrical Equipment), TED 24 (Transport Packages, Packaging Codes, Freight Containers and Pallets), TED 16 (Bicycles), TED 28 (Intelligent Transport Systems), and TED 31 (Vehicle Inspection & Certification Sectional Committee); in liaison with international technical committees ISO TC 20 (Air & Space Vehicles), ISO/TC 204 (Intelligent Transport Systems), ISO/TC 122 (Packaging), ISO/TC104 (Freight containers), and ISO/TC 192 (Gas turbines). He has also worked as Member Secretary for various other technical committees namely TED 17 (Shipbuilding), TED 18 (Inland, Harbor Crafts and Fishing Vessels) and TED 19 (Marine Engineering and Safety Aids) in liaison with international level technical committees ISO/TC 8 (Ships and Marine Technology), ISO/TC 188 (Small Craft) and IEC TC 80 (Maritime Navigation and Radiocommunication Equipment and Systems). He is an avid reader and has also authored a no. of Blogs & Articles, which have been published in various print media and online forums. His other hobbies include

	Etymology, Running, Cricket, Chess, Tennis and following Macroeconomic Development & Geopolitical issues
 **Rhonda Walthall** Chair, SAE HM-1 Committee; Fellow at Collins Aerospace	**Rhonda Walthall** is a Technical Fellow at Collins Aerospace in Charlotte, NC, a division of Raytheon Technologies (RTX). In her role, she focuses on Design for Prognostics and Health Management (PHM) and supporting women in STEM roles. She is an industry recognized leader in the development of standards and best practices for PHM solutions. She holds four PHM-related patents and one Invention Disclosure. She has authored numerous aerospace technical standards, conference papers, chapters, and SAE Edge™ Research Reports. Recently, she was the co-editor of "Flight Paths to Success: Career Insights from Women Leaders in Aerospace." Rhonda earned her Bachelor of Science degree in Aeronautical and Astronautical Engineering from Purdue University and her master's degree in Business Administration from Pepperdine University. Rhonda started her career as a Flight Test Engineer for the McDonnell Douglas Aircraft Company and then went to work for Northwest Airlines as an Engine Condition Monitoring Engineer. In 2003, she joined RTX as a Systems Engineer. Over the next 17 years, she held roles of increasing responsibility from Lead Systems Engineer to Integrated Product Team Leader to Manager of the Aircraft Systems Health Management program. In 2018, she was promoted to Technical Fellow. Rhonda is a member of the SAE International Board of Directors and the Audit & Risk Committee. She has held numerous SAE leadership roles, including Chair of the Integrated Vehicle Health Management Steering Group, Chair of the HM-1 Committee for Integrated Vehicle Health Management, Chair of the E-32 Committee for Propulsion System Health Management, and Chair of the G-31 Committee for Electronic Transactions in Aerospace. She has served on numerous awards committees, including chairing the Fellows Selection Committee, and has participated in the planning and execution of numerous conferences. Rhonda is the first female Fellow of the PHM Society. She is member of the Board of Directors, past Vice President, and conference keynote speaker. She is a member of the Maintenance Programs Industry Group and the ANSI Unmanned Aircraft Systems Steering Committee. She is a member of the Industrial Advisory Council for the Purdue School of Aeronautics and Astronautics, a 25-year member of Women in Aviation International, a 17-year member of Toastmasters International, and a member of the Society of Women Engineers (SWE). Rhonda received several prestigious awards including Society of Women Engineering (SWE) Prism Award (2021) Outstanding Aerospace Engineer Award from Purdue University (2020), SAE Rodica Baranescu Award for Technical Excellence & Leadership (2018), and SAE James M. Crawford Technical Standards Award for Outstanding Achievement (2016).