EVENT GUIDE
Includes Final Program
and Exhibit Directory

SAE INTERNATIONAL® COMAC AECC

SAE 2018 AVIATION TECHNOLOGY FORUM

航空技术论坛

June 5 - 6, 2018
Renaissance Shanghai Pudong Hotel

www.sae.org/attend/aviation-technology-forum

INSPIRING BUILDING ADVANCING

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Since 1905, SAE has connected automotive, aerospace, and commercial vehicle engineers to each other and the technical resources needed to foster a lifetime of learning, solutions to improved vehicle technology, and the advancement of the mobility industry.

SAE International—whose first vice president was an up-and-coming engineering talent by the name of Henry Ford and included early supporters like Orville Wright—was based on providing a platform for collaborative and informed dialog and the impetus of its earliest standardization efforts. Today, the sharing of information remains at its core, with SAE being acknowledged globally as the ultimate knowledge source for mobility engineering.

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WHATS INSIDE

SAE 2018 Aviation Technology Forum

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HOSTS INTRODUCTION

SAE International is a global association of more than 145,000 engineers and related technical experts in the aerospace, automotive and commercial-vehicle industries. SAE International's core competencies are life-long learning and voluntary consensus standards development.

SAE International has been facilitating the development of global standards for the aerospace industry since its introduction of the first interchangeable spark plug standard. And while known for producing the most mobility engineering standards, the fueling of a century worth of aerospace industry advancement has helped earn SAE the position of being the world's largest, most respected aerospace (SDO).

Global standards are essential for aircraft certification airworthiness and interoperability. As the leading aerospace SDO, SAE International works with industry, government, and regulatory agencies throughout the world to create an extensive family of international standards that form the technical basis of regulations and government requirements.

SAE's global standard development role can be seen in its technical committee rosters, which include 15,000^{+} experts from 56 countries—with European committee participation instances alone around 4,000. In Aerospace, Its 289 committees and task force—representing industry (airframers, suppliers, operators, MROs), regulatory authorities, military agencies, researchers, and consultants—serve the full spectrum of aerospace businesses in both the commercial and military sectors thereby meeting the engineering, advanced technology, safety, regulatory, and defense needs of a world market.

Commercial Aircraft Corporation of China, Ltd. (COMAC or the "Company") is a centrally managed core enterprise in civil aircraft industry of China and a central backbone enterprise, which is formed with the approval of the State Council, jointly invested by State-Owned Assets Supervision and Administration Commission (SASAC) of the State Council, Shanghai Guo Sheng (Group) Co., Ltd., Aviation Industry Corporation of China (AVIC), Aluminum Corporation of China, China Baowu Steel Group Corporation Limited, and Sinochem Corporation, and headquartered in Shanghai.

COMAC functions as the main vehicle in implementing large passenger aircraft programs in China. It is also mandated with the overall planning of developing trunk liner and regional jet programs and realizing the industrialization of civil aircraft in China. COMAC is engaged in the research, manufacture and flight tests of civil aircraft and related products, as well as marketing, servicing, leasing and operations of civil aircraft. COMAC owns the following member organizations: COMAC Design and Research Center (Shanghai Aircraft Design and Research Institute), COMAC Assembly Manufacturing Center (Shanghai Aircraft Manufacturing Co., Ltd.), COMAC Customer Service Center (Shanghai Aircraft Customer Service Co., Ltd.), COMAC Beijing Research Center (Beijing Aeronautical Science & Technology Research Institute), COMAC Flight Test Center, COMAC Capability & Supporting Center (Shanghai Aviation Industrial (Group) Co., Ltd.), COMAC Press Center, COMAC Sichuan Branch, COMAC American Corporation, COMAC Capital Co., Ltd., and COMAC Finance Limited Liability Company (Prepare). The company also has its Beijing Office, American Office and European Office in Beijing, Los Angeles and Paris respectively, and sets up a Financial Services Center in Shanghai. COMAC is a shareholder of China-Russia Commercial Aircraft International Co., Ltd., Chengdu Airlines Co., Ltd. and SPDBank Financial Leasing Co., Ltd.

Aero Engine Corporation of China (AECC) is an extra-large Chinese government-owned corporation directly under the central government which is funded by the State Council, Beijing Municipal Government, Aviation Industry Corporation of China and Commercial Aircraft Corporation of China Ltd. The corporation consists of over 20 directly affiliated enterprises and institutions and 3 Main Board listed companies. Currently, it has nearly 100,000 employees, among whom there is a large number of high-quality and innovative technical talents including 6 academicians and over 200 national experts and scholars. Equipped with key laboratories for national defense science and technology remaining in leading position in Asia and the world, it has strong research and production capacity and relatively complete R&D manufacturing systems and testing ability for military and civil aviation engines, gas turbines and its derivative products.

Committed to the mission of vitalizing the army through aerospace power and invigorating the country through science and technology, AECC adheres to the power-oriented concept, winning by quality tactic, talent thriving enterprise strategy and win-win cooperation principle and is dedicated to the independent research and development of aircraft engine and in-depth development of civil-military inosculation. It is mainly engaged in the design, development, production, maintenance, marketing and after sales service of military and civilian aircraft powerplant, second powerplant, gas turbine, helicopter transmission system, and derivative products of aeroengine technologies with its business operating in a number of fields including aviation, aerospace, ship, weapons, energy and space. The aero engine, gas turbine and helicopter transmission system products including turbojets, turbofans, turboshafts, turboprops and pistons designed and produced by AECC has been widely equipped on all kinds of military and civilian aircrafts, helicopters, large naval vessels and large generating units, making it a great contributor to the development of China's national defense weapons and equipment and national economic development.

ORGANIZERS

COMAC Shanghai Aircraft Design and Research Institute,
COMAC Shanghai Aviation Industrial (Group) Co., Ltd.
AECC Commercial Aircraft Engine Co., Ltd.
AECC China Aviation Power Machinery Research and Institute
SAE Industrial Consulting Services (Shanghai) Co., Ltd.

EVENT OVERVIEW

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June 5, Tuesday

9:00 - 10:15	**WELCOME AND INTRODUCTION** **KEYNOTE PRESENTATIONS**
10:15 - 10:40	Tea Break
10:40 - 12:00	**REGIONAL JET COMPARISONS** Leaders from global aircraft manufacturers will provide their insight into the industry, and their outlook on what the future holds for the Chinese and global regional airplane markets.
12:00 - 13:00	Lunch & Networking Break
13:00 - 14:15	**PANEL - ELECTRIC AIRCRAFT, FLYING CARS AND URBAN MOBILITY** Personal transportation vehicles and components, focusing on CTOL and VTOL hybrid flight vehicles, roadable airplanes and flying cars. Required technologies, alternative system configurations, designs under development, prototype hardware, and in-flight performance will be discussed.
14:15 - 14:30	Tea Break
14:30 - 16:10	**IOT, INDUSTRY 4.0 AND BIG DATA** The power and potential of how we can use the Internet of Things (IoT), to collect and turn 'big data' into knowledge to create bold, transformative opportunities and mitigate complex, systemic challenges for our aerospace community. From the digital twin through predictive maintenance, this session will address technologies that are a subset of Industry 4.0 initiatives.
16:10 - 16:30	Tea Break
16:30 - 18:00	**PANEL - GLOBAL STANDARDS HARMONIZATION AND SAFETY ISSUES** This panel will highlight where standards and regulations affect the design process and provide insight into how to prevent design issues before they affect the overall certification process. It will focus on the use of global standards and their application.

June 6, Wednesday

9:00 - 11:00	**ADVANCED MATERIALS AND MANUFACTURING PROCESSES** This focus of this session is the latest technology developments in materials and manufacturing used for aerospace design and manufacturing, from structures to skin, to include new alloys and composites using robotic techniques.
11:00 - 11:30	Tea Break
11:30 - 13:00	**ADDITIVE MANUFACTURING** The session provides project presentations in the application of Additive Manufacturing to aircraft design and manufacturing, including the solutions realized by the implementation of the technology. The session will focus on the features, benefits and capabilities of the various technologies.
13:00 - 14:00	Lunch & Networking Break
14:00 - 16:00	**ADDITIVE MANUFACTURING (CONTINUED)**
16:00 - 16:30	Tea Break
16:30 - 17:30	**PANEL - SYSTEMS AND PROCESS ENGINEERING** Product Lifecycle Management (PLM) builds coherent data structures by consolidating systems to allow global organizations work as a single team to design, produce, support and retire products, while capturing best practices and lessons learned along the way. PLM empowers organizations to make unified, information-driven decisions at every stage in the product lifecycle. PLM solutions establish a cohesive digital platform to optimize relationships, through coordinated data flow to right people at the right time to maximize value.

The purpose of this session is to provide an open exchange of ideas. Remarks made by participants or members of the audience cannot be quoted or attributed to the individual or their company unless express permission has been granted by the individual and their company. Any record of remarks, discussion, or photographs may not be used unless express permission has been granted by the individual and their company.

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FLOOR PLAN

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Tuesday, June 5

Welcome and Introductions

9:00

James Sherman, *Forum Committee Chair - SAE International*
Guanghui WU, *Academician of Chinese Academy of Engineering*
Vice President / C919 Chief Designer - COMAC
Qiao XIANG, *Academician of Chinese Academy of Engineering*
General Manager Assistant - AECC

Keynote

9:15

Future Intelligent Civil Aircraft
Yong CHEN, *Chief Engineer / ARJ21 Chief Designer - COMAC*

ABSTRACT

In light of the continual changes in resource and environment problem, global market demand, policies and regulations as well as technological development, future civil aircraft projects will be confronted with opportunities and challenges. Green Aviation will become the main stream of development; complex development process, limited entry due to industry barrier, and the trend of energy conservation and emission reduction remain to be the grand challenges for the civil aviation industry. We hold that the future civil aircraft development will be centered around three key areas including new configuration, high-speed aircraft and new energy, and it will be based on technological innovations such as intelligent cabin design, new aerodynamic technologies, new materials and improved system-level technologies. To get on top of future civil aircraft development, COMAC has brought up with certain future product concepts.

9:45

Introduction to Commercial Aero Engine
Mingfan JIANG, *Vice President - AECC-CAE*

ABSTRACT

The presentation will introduce the background to the establishment of commercial aero engine in China, the development of AECC Commercial Aircraft Engine Co., Ltd and the company's product plan. He will provide a comprehensive interpretation of the company's commercial aircraft engine project by expanding on the commercial aircraft engine technologies, testing & verification capabilities, customer service system, business philosophy and business models of the company.

Regional Jet Comparisons

10:40

Development of Regional Jet: Market-driven Technological Progress
Yong CHEN, *Chief Engineer / ARJ21 Chief Designer - COMAC*

ABSTRACT

The market decides what kind of technology is needed. Products that the market likes will continue to develop and improve its technology over time. For technologies that failed to win the market's recognition, however advanced, the product will inevitably fail. Such cases are common in the civil aircraft industry.

How did the regional jet serve as a niche product in the air transport market, and how did the development of technology lead to the development of regional jet, which in turn led to the development of the regional transport market? It is airlines' impetus to provide passengers with faster and more convenient travel experience on regional flights that drives the development of regional aircraft technology. This drive has advanced the development of regional jets since the appearance of the first generation of 50-seat passenger jets at the beginning of this century. In terms of seat numbers, range, and width of aircraft fuselage, the regional jets have grown from 50-seaters to 100-seaters, their maximum range even reached 5,000km, and they have approached perfection on hub spokes and low-density long-haul routes. In respect to cockpit and cabin comfort, pilots and passengers are continuously provided with the same comfort and maneuverability as narrowbody trunk liners. In the regional transport market which has been encroached upon by narrowbody aircraft, the development of technology has enabled regional jet to maintained its specific position in the system and its commonality with the narrowbodies. The need of the regional transport market development in the future is more efficient, economical, and environment-friendly passenger transportation, which brings forth new opportunities for the regional jet.

11:00

The Technology Supporting the Development of the Chinese Regional Aviation, and the Opportunities That are Awaiting for Disruption

Fernando Ariño Grau, *Market Intelligence Director - Embraer*

ABSTRACT

The regional and domestic developments of the Chinese Regional aviation, along with the expanding demand from the growing middle class will reshape the demand distribution from big cities and city clusters, to point to point and ultra connected regional airline networks; not only demand for more efficient aircraft in short routes will be required, but the entire ecosystem of airspace and airports will require new and innovative solutions for the many opportunities awaiting for disruption in the fast growing Chinese aviation market.

11:20

Developing Regional Operations

Christopher McGregor, *Flight Safety Officer, Head of Flight Safety - ATR*

ABSTRACT

We continue to see regional aviation demand growing. A revolution has taken place whereby a few clicks on our smartphone or tablet will book a ticket to almost every corner of the globe. We can track flights, compare schedules, compare prices in minutes. The level of connectivity and affordability is something the aviation industry can be proud of. This growing demand is reflected not just in numbers of passengers but in the service being offered which demands reliability, access and in a changing demographic, ease of mobility. And of course society rightly demands that this growth be environmentally friendly. At the same time we see demand for experienced flight crew and maintenance staff growing. A recent report is forecasting that we will need over 600,000 new pilots worldwide between now and 2035 to maintain current growth in the commercial aviation sector. Similar numbers of skilled technicians are also needed. At times we look to technology and ever increasing levels of automation. However there is often a suspicion of automation within the travelling public or a lack of understanding of its role within the aviation system. If asked I suspect not many passengers would know the first autopilot was developed in 1912 nor the first automated take-off and landing was in 1947. But of course the levels of automation and technology we have today are necessary to meet the demand. My presentation will therefore look at current technological developments in the regional aviation sector, training developments with a focus on the new technological opportunities and ATR's perspective on the regional aviation sector to meet the growing demand.

11:40

Regional Aircraft Innovation - Providing New Choice to Global Market

Xiaojun HAN, *Deputy Chief Engineer - AVIC XAC Commercial Aircraft Co., Ltd*

ABSTRACT

Large growth of aviation transportation has been witnessed in the last decades, but the development of the regional aviation market, especially the regional turboprop market in China is remain inadequate and unbalanced. Even though the turboprop is well suited for operating on regional routes, the aging fleets and traditional design will not be able to fulfill the demand of the market and customer. With its rich experience and unique understanding towards the Chinese regional market, AVIC XAC Commercial Aircraft Co., Ltd (XCAC) has successfully helped the local operators to establish and run series of regional routes in China with its MA60 regional turboprop. Furthermore, XCAC is now working along with its partners from all over the world to design and build a brand-new turboprop aircraft, the MA700. The MA700, as the first fly-by-wire commercial turboprop, will innovatively change the current design and meet the latest requirements of the aviation industry will fulfill the growing expectation of the customer.

Panel Discussion - Electric Aircraft, Flying Cars and Urban Mobility

13:00

MODERATOR

James Sherman, *Forum Committee Chair - SAE International*

PANELISTS

Dr. Ravi Rajamani, *Principal Consultant - drR2 Consulting*
Dr. Kathy KANG, *Deputy Chief of System Engineering & Director of More Electric System Dept. - COMAC*
Johnny Doo, *President - International Vehicle Research, Inc.*

IoT, Industry 4.0 and Big Data

14:30

Predicting the Future – 4.0 up in the Air

Sven Taubert, *Program Leader & Site Manager - Innovation Business & Product Development - Lufthansa Technik*

ABSTRACT

Maintenance tasks often planned far in advance. Most checks are repeated in periodic intervals depending either on the flight hours or cycles. The main categorization is done in A, B, C and D checks. This system in in place and got optimized by more than half a century. Today, nearly all industries are looking into data driven business models, big data analytics and prediction. This presentation is showing some of the current processes, giving an impression how the future could look like but also pointing out some mayor challenges which are rarely on the technical side.

14:50

Building China's Digital Aviation Ecosystem

Grace JIANG, *Director of Digital Technology - AVIAGE SYSTEMS*

ABSTRACT

The Industrial Revolution 4.0 is marked by emerging technology breakthroughs in a number of fields, including robotics, artificial intelligence, The Internet of Things and 3D printing. These digital technologies also impact the aerospace industry. The presentation will list the digital technologies in the aerospace industry, then describe the aviation market outlook for those technologies and conclude with the Digital Aviation Ecosystem to realize a truly connected aircraft.

15:10

Teradata PHM Solution

Shengyang YUAN, *Senior Solution Consultant - Teradata*

ABSTRACT

The solution consists of three parts:

- The aircraft status tracking and monitoring, including Analyse asset demography , Scrutinize asset operations & pathologies
- Maintenance planning and management, Fine tune / tailor the maintenance program, Predict spare parts demand and align supply & inventories, Accelerate MRO tasks completion
- Operation management, including Planning and controlling MRO costs over the asset life, Upgrading and extending asset capabilities

15:30

Transforming Aircraft Lifecycle with IoT, AI, and Big Data

Victor Yee, *Senior Technical Sales Consultant, IBM WIoT - IBM*

ABSTRACT

The aviation market is under constant pressure to bring smarter, more functionally rich products to market faster. This rising complexity brings a growing challenge dealing with growing amounts of software that dominates more systems in an aircraft. This chase after leapfrogging efficiency of aviation lifecycle has been a major ongoing industry challenge for the last decade. Nevertheless, with the last decade there have been major breakthroughs in IT technology which is a foundational element for product lifecycle: major advancement in big data analytics, along with IoT architectures that brings large amounts of data from equipment. With innovative technologies that digitize, integrate and analyze lifecycle data, engineering and other lifecycle activities. Also, the advancements in AI opens significant opportunities to generate insights from large amounts of unstructured data across the lifecycle, such as requirements, RFP documents, maintenance logs etc.

We refer to the overall framework of IoT with engineering data and analytics across the lifecycle as Digital Twin. Digital Twinis a complete digitization of a physical asset or system used to drive business values. Generally, Digital Twin is a digital engineering framework that spans the entire product lifecycle from design through manufacturing, usage and maintenance. One of the core principles of digital twin frameworks is digital continuity, meaning linking all product lifecycle stages into a digital threads. Digital Twins aim to produce tangible business outcomes for product lifecycle stakeholders. For engineering, facilitate rapid design validation and agile processes, assisted engineering decisions, and continuously learning from actual product usage via analytics of sensory IoT data. All that facilitates product innovation. For operators, digital twins help optimize product utilization in terms of cost and reliability. To accomplish all that, Digital Twins leverage the advancement of IoT, big data analytics, and AI.

In this talk we will discuss the logical architecture, use cases and benefits of digital twin as a digital lifecycle framework. . We will also give examples of how this vision is realized in practice. We will discuss use cases demonstrating how the advanced technologies such as AI, IoT, and advanced analytics are utilized to realize this vision.

15:50

Professionalism & Dataism - From Genetic Engineering to System Integration

AJ WANG, *Chief Scientist / Chair Professor - Shanghai Jiao Tong University*

ABSTRACT

Introduction of a new aviation propulsion system has always been a slow and long journey, mainly due to the complexity of multi-disciplinary and cross functional created characteristics by its nature. Majority of technical and operational problems that advanced aero engines encountered were resulted of coupling and interaction of integrated system, not to mention many other unknown reasons. In general, it was classified as “Outliers” – Problems are outside the domain that current technology can not predict.

The era of I-4.0, Big Data, Digital Twin (or Cyber Physical Simulation), and PHM (Prognostic Health Monitor) revolutionally shift the technology gear from conventional wisdom to dataism. However, dataism, the sufficient condition for correlation, only makes half of the story by itself. “Professionalism”, as always, provides the necessary condition for the other half, i.e., causation.

Evolution of aero engine, and correlations among genetic engineering, system integration and dataism will be addressed in this presentation.

Panel Discussion - Global Standards Harmonization and Safety Issues

16:30

MODERATOR

Bradley Perrett, *Asia-Pacific Bureau Chief - Aviation Week*

PANELISTS

David Alexander, *Aerospace Standards Director - SAE International*

Dr. Shunan DAI, *Chief Engineer - Shanghai Aircraft Airworthiness Certification Center of CAAC*

Amer Younossi, *Acting Deputy Manager, International Division, Aircraft Certification Service - FAA*

Saulo Da Silva, *Chief Global Interoperable Systems Section - ICAO*

Wednesday, June 6

Advanced Materials and Manufacturing Processes

9:00

Artificial Intelligence and Machine Learning in Automation

Roberto LU, *Vice President of Corporate Technology, Advanced Manufacturing Technology - TE Connectivity*

ABSTRACT

Modern manufacturing is very different from the Ford Model T, which you can order any car you like as long as their colors are all black! In our modern automation, flexibility together with speed are essential, given that they conflict to each other naturally. In addition to the flexibility and speed, or Mass Customization, artificial intelligence has been gaining practical value and in use in many industries and business practices. Artificial Intelligence with Machine Learning is revolutionize our industry today. There are multiple data sources quoted that many today's jobs will disappear in less than 10 years and new types of jobs will be needed. Why is artificial intelligence and machine learning important to automation? Imaging that computing power can automatically managing complicated automation tasks with intelligence via self learning? What are the devices may help us to enable such learning? This presentation will illustrate couple examples with initial successes.

9:30

Industrial Production for Al-Li Solutions: A Solid Platform for Future Developments

Patrick Chane-Yene, *Customer Application Engineering amd Business Development Manager Asia - Constellium*

ABSTRACT

Recent commercial aircraft and space programs such as Airbus A350XWB, Bombardier CSeries, Falcon SpaceX and COMAC C919 selected Al-Li technology for primary structure parts.

Industrial quantities of sheets, plates and extrusions have been delivered for the major commercial aircraft and space programs. Al-Li solutions evolved from niche market to industrial production and are the gateway to develop further metallic cost/performance enhancements.

Three different approaches will be discussed to reach these objectives.

- First, the weight of material will be considerably reduced by improving the existing robust properties of Al-Li technology including fatigue, fatigue crack growth or corrosion, tailoring these properties to special applications, and designing with these new parameters.
- Second, a reduction in manufacturing time will be achieved by rethinking the assembly routes, applying leaner manufacturing processes, especially for special material properties.
- Lastly, reducing the number of parts in the assembly line with the integration of design features using monolithic structures or grain orientation friction stir welding.

10:00

Application of Light Weight Materials and Process Technology on Commercial Aeroengine

Jianwei CHANG, *Senior Engineer and Deputy Director at Department of Material and Process at Design & Research Center - AECC-CAE*

ABSTRACT

In the property improvement of a new generation aircraft engine, the contribution from materials and processes accounts for more than 50%. In the aspect of the weight losing in an engine, manufacturing technologies and materials contribute more than 70%. Light weight material and process technologies include using high strength-ratio materials, such as composite, titanium alloys, intermetallics, etc., optimized structural design, such as hollow blade, blisk, etc., advanced manufacturing technologies, such as precision casting processes of complex thin-walled casings, welding technologies of rotors, additive manufacturing, etc. In addition, to meet the airworthiness requirement, commercial aircraft engines shall also carry out the whole lift monitoring and examination of the special processes in the manufacturing of the materials and parts.

10:30 **Airworthiness Means of Compliance Study for Composite Wing Structure of Commercial Aircraft**

Dr. Chuanjun LIU, *Deputy Chief Engineer - BASTRI-COMAC*

ABSTRACT

Airworthiness means of compliance technologies were investigated, including the relevant regulation requirements and the corresponding methods for substantiation. Six selected key subjects (i.e. static strength, fatigue & damage tolerance, allowables & design values, environmental effects, thermal stress and fire protection) for composite wing structure of commercial aircraft are used to demonstrate the application of the approval.

Additive Manufacturing

11:30 **Additive Manufacturing's Role in the Future of Aerospace**

William Bihlman, *Founder and President - Aerolytics LLC*

ABSTRACT

Commercial aviation has some of the highest barriers-of-entry of any industry due to the rigorous standards set forth by the US FAA (Federal Aviation Agency) and its European counterpart, EASA (European Aviation Safety Agency). At the same time, aircraft manufacturers such as Boeing and Airbus need to make their products increasingly advanced to met ongoing customer demands. Lightweighting is central theme. Additive manufacturing offers the potential the meet many of these new design challenges. The technology, however, is still maturing. This presentation will answer the following salient questions:

- What are the fundamental drivers of this technology?
- What are salient differences between aerospace and other industrial products?
- What are the main targets/articles most likely to be displaced?
- Are the current challenges intractable, or will they be overcome with maturation?

12:00 **Ready for Take-Off? Advancing Additive into Aerospace**

Paula Hay, *Executive Director, Additive Design and Manufacturing - UTAS*

ABSTRACT

The frequency of flight-worthy additive part approvals is increasing. Some are aesthetic, but more functional and structural components are emerging, and most all major aerospace companies are pursuing additive manufacturing. However, while each sees significant opportunities, there are challenges in making the business case. This presentation will look at the goals and challenges as additive in aerospace becomes a reality.

12:30 **AM Informatics – Enabling Digital Thread and Digital Twin Strategy for Additive Manufacturing**

Richard Painter, *VP Business Development, APAC - Granta Design*

ABSTRACT

AM programs generate vast amounts of data on material properties, process parameters, tests and simulation to qualify and certify parts. This raises many questions: what data to retain? How to analyze the data? How to keep the digital thread and data connectivity of the entire product lifecycle?

AM informatics addresses those questions with a framework using the latest technology to capture, manage, and analyze complete AM process information on powders, builds, machine parameters, and parts. This allows for instant analysis of the data to understand the optimal process parameters and enables connectivity and traceability of part design, manufacturing, testing and in-service usage.

Digital twin, the concept of keeping a virtual representation of physical products to predict performance, requires instant access to relevant data. AM informatics is prepared to deliver data when and where it is needed, for simulation or design. In addition, it provides a platform to compare empirical data with simulation data (e.g., for and from Abaqus) supporting in-depth study of the parameters affecting part quality and material model calibration.

Ultimately, to efficiently certify high quality AM parts, AM informatics plays a pivotal role by capturing and mining material and process information, supporting the digital thread and digital twin data exchange. This presentation will discuss and present the methodology and technology needed to implement AM informatics.

Additive Manufacturing (CONTINUED)

14:00

The GE Additive Experience

Burggraf Udo, *Sr. Global & Key Account Manager - GE Additive*

ABSTRACT

The presentation describes the additive journey of GE starting with the LEAP fuel nozzle to GE's Advanced Turbo Prop Program. Focus is set on the powder bed based direct metal laser melting systems. A number of EASA/FAA qualified additively manufactured engine and airframe/systems parts are shown and basic approaches on how to qualify AM - parts are addressed.

14:30

Challenges and Future Development Trends of the Application Research of Metal Additive Manufacturing Technology on Aero-engines

Liming LEI, *Deputy Chief Engineer, Manufacturing and Director of Process Research Center - AECC-CAE*

ABSTRACT

The demand for advanced aero-engines with high-performance, multi-functional integration and lightweight components is more and more urgent, bringing great challenges to traditional manufacturing processes. The metal additive manufacturing technology utilizes the discrete-stacking principle to realize the direct manufacturing from the three-dimensional model to solid parts through layer-by-layer stacking. This technology has the advantages such as high material utilization, low machining allowance, low production cost, short manufacturing cycle, high flexibility and efficiency and complex components forming, becoming an effective way to solve critical technical problems in high-end manufacturing fields such as aero-engine industries.

The proposed presentation will introduce the major categories and technical characteristics of metal additive manufacturing technology, summarize the application status of the respective technology in aero-engines, and outline the research progress of AECC-CAE in the field of metal additive manufacturing. Finally we will point out the difficult challenges and future development trends of metal additive manufacturing technology researches and applications.

15:00

When Innovation Meets Regulations, Airworthiness of Additively Manufactured Flight Hardware

Kevin Poon, *Senior Enterprise Account Manager, Aerospace - Stratasys*

ABSTRACT

Additive manufacturing is one of the innovations that attract a lot of attention in the aerospace industry these days. It enables light weighting, complex geometries, and a flexible supply chain in terms of lowered cost and lead time. However, for in-flight hardware, just like traditionally manufactured components, additively manufactured parts are subject to the same certification requirements. This presentation is intended to provide the audience with the current status and latest developments regarding the certification path of additively manufactured parts for inflight hardware.

15:30

Additive Manufacturing Applications at Honeywell Aerospace: Driving Growth with Additive Manufacturing

Rodolphe Bardou, *Director of Production Support Engineering - Honeywell | HTS China | Aerospace*

ABSTRACT

This presentation aims ate providing information on adoption and application of this disruptive technology into the Aerospace industry.

Panel Discussion - Systems and Process Engineering

16:30

MODERATOR

Mike Ingram, *Vice President of Strategy and Growth - AVIAGE SYSTEMS*

PANELISTS

Victor Yee, *Senior Technical Sales Consultant, IBM WIoT - IBM*
Dr. Zhiqiang ZHU, *Executive Vice President - AVIAGE SYSTEMS*
Sven Taubert, *Program Leader & Site Manager - Innovation Business & Product Development - Lufthansa Technik*
Dr. Haomin LI, *Systems Engineering Chief Engineer / Senior Manager of Systems Engineering & Requirements Validation IPT of Wide Body Program - COMAC*

James Sherman

Forum Committee Chair
SAE International

Mr. James Sherman has over 23 years of business development, project management and engineering experience with expertise in developing technology for aerospace, automotive, military, and consumer products.

For the last seven years, Mr. Sherman's has been developing technical conference programs for the automotive and aerospace communities. He is the SAE International events focal point for electronics and aerospace applications and provides leadership in developing new programs for all mobility sectors. He has also been a moderator and panelist at AUVSI EXPOnential, ITS World Congress, Consumer Electronics Show, and SEMA events.

Over nine years of Mr. Sherman's experience has been in the area of ground vehicle power management and propulsion systems. Mr. Sherman provided leadership for the team that delivered the Exportable Power Systems for a HMMWV, Paladin, and Stryker vehicles. Mr. Sherman also provided technical leadership in developing a complete line of power management products for military vehicles.

Mr. Sherman provided technical leadership for the team that delivered the world's first hybrid electric vehicle drive train for heavy duty applications (transit bus, class 5/6 truck, and military vehicles). Mr. Sherman also managed a program to develop, build and integrate a comprehensive system test facility for commercial and military products, including individual component test, component integration test, system test, and verification/ validation test.

Prior to working on ground vehicles, Mr. Sherman held a variety of engineering positions within the areas of systems, software and test equipment development of aerospace products, including the C-17, F-18, V-22, CFM-56 engine, SAAB 2000, T-700, and various R&D projects.

Mr. Sherman has a Bachelor of Science in Electrical Engineering from Pennsylvania State University, a Master of Science in Electrical Engineering and a Master of Business Administration from Binghamton University.

Guanghui WU

Academician of Chinese Academy of Engineering
Vice President / C919 Chief Designer
Commercial Aircraft Corporation of China, Ltd.

Mr. Wu Guanghui, born in February 1960 in Wuhan of Hubei Province, holds a Doctorate Degree. He graduated from Nanjing Aeronautical Institute majoring in aircraft design with a Bachelor's Degree of Engineering in 1982; and from Beijing University of Aeronautics and Astronautics majoring in aircraft design with a Doctorate Degree of Engineering in 2008.

Mr. Wu joined Xi'an Aircraft Design Institute in 1982, serving successively as Designer, Deputy Director and Director of General Design Department, and in 2003 Vice President of the First Aircraft Design Research Institute of AVIC I. Since 2006, while at First Aircraft Design and Research Institute, he has served successively as President, Chief Designer of ARJ21. He was appointed as Vice President of COMAC, Chief Designer of C919 in March 2008.

He was awarded the Prize for Outstanding Contributions in High-tech Project by the CPC Central Committee, the State Council and the Central Military Commission and won a gold medal in 2007. He received the Special Government Allowance awarded by the State Council. He was awarded with Special National Prize for Process in Science and Technology in 2011, and occupied the No. 1 position. He became an academician of the Chinese Academy of Engineering in 2017.

Member of the 11th and 12th National Committee of the Chinese People's Political Consultative Conference (CPPCC).

Qiao XIANG

Academician of Chinese Academy of Engineering
General Manager Assistant
Aero Engine Corporation of China

Ms. Qiao XIANG, the Academician of Chinese Academy of Engineering, she now takes the position of General Manager Assistant, Deputy Director of Technology Department of Aero Engine Corporation of China (AECC), the Vice Chief Designer of China National Aero-Engine & Gas Turbine Project (abbr. as "Two Engines"). She also is the member of Environment and Resources Protection Committee of the 13th National People's Congress of China.

Academician Xiang has long been engaged in research on Aero-Engine technology and engineering management. As the first accomplisher, she was won one Second Class Prize of National Science and Technology Progress Award of China, Five First Class Prize of Military, Ministerial and Provincial-Level Science and Technology Awards, Twelve First Class Prize of National, Ministerial and Provincial-Level Management Innovation Awards. She has published more than 90 papers, 7 books, and holds 29 Invention patents, 13 Design Patents. She also has won many honors, like China National Model Worker, the Leading Academic of Military Scientific and technological, etc.

Yong CHEN

Chief Engineer / ARJ21 Chief Designer
Commercial Aircraft Corporation of China, Ltd.

Chen Yong, currently works as the Chief Designer of ARJ21, Chief Engineer of Commercial Aircraft Corporation of China, Ltd. and member of the standing committee of Science and Technology Commission. He has led project development technology and is responsible for the organizing of design and development, airworthiness certification, batch operation and continuous improvement. He is graduated from Northwestern Polytechnical University with a degree in aircraft design. He has 30 years of experience in aircraft design and been engaged in the design work for 7 aircraft programs. He is the doctoral supervisor at Shanghai Jiao Tong University and master's supervisor at Northwestern Polytechnical University.

Mingfan JIANG

Vice President
Aero Engine Corporation of China - Commercial Aircraft Engine

Mr Mingfan Jiang is currently Deputy General Manager and Director of CJ-1000A/AX Engine Project of AECC Commercial Aircraft Engine Co., Ltd., and is mainly responsible for the R&D, production, procurement, supplier and resource expansion work. He is also in charge of the materials technology capacity and standard system building. Before he joined AECC, he served as the Director of Nondestructive Testing Center at AVIC Chendu Aircraft Industrial (Group) Co., Ltd., and the Deputy Director (in charge of Quality) of Design & R&D Center at AECC Commercial Aircraft Engine Co., Ltd.

Fernando Ariño Grau

Market Intelligence Director
Embraer Commercial Aviation

Mr. Grau holds a Bachelor of Science degree in Aircraft Design from the Brazilian Aeronautical Institute of Technology (ITA) and a MBA degree in International Business Administration from Rutgers, The State University of New Jersey.

With more than 20 years of experience in aviation, of which 18 years of experience in China, Mr. Grau is responsible for market intelligence activities associated with Embraer sales efforts in Asia Pacific, mainland China, Hong Kong and Macau, as well as Mongolia.

Mr. Grau joined Embraer in 1997 as product development engineer for the ERJ family of regional jets and the Super Tucano military trainer programs, working in the area of dynamic loads, with focus on landing gear loads, aircraft structural-aerodynamic natural vibrations and weapons separation loads.

Two years later he moved on to assume the role of assistant to the president of a cargo airline operating a fleet of 6 Boeing 727 airplanes in domestic and international freight services. Mr. Grau gained hands on experience in a number of commercial issues, like fleet planning, route selection, price formation, operational cost analysis as well as management reporting on KPIs of the airline.

Mr. Grau re-joined Embraer as Sales Engineer & Market Analyst and shortly afterwards was posted to China, starting October 2000, to support the company's newly established representative office in Beijing, handling, back then, both commercial and executive jets sales campaigns.

He holds dual citizenship, Spanish and Brazilian, is domiciled in China with his Brazilian wife and his two sons, both born in Beijing. He is an avid photographer, enjoying both traditional film and digital media, loves piano music, Spanish food/cooking, and outdoor activities like fishing, trekking and sailing.

Christopher McGregor

Flight Safety Officer, Head of Flight Safety
ATR

Christopher leads the ATR Flight Safety department. He is responsible for the development and implementation of the Flight Safety strategy within ATR. His professional aviation career spans over 25 years in Engineering, Customer support and Flight Safety. Christopher is a Fellow of the Royal Aeronautical Society (FRAeS). He graduated from Heriot-Watt University, Edinburgh.

Xiaojun HAN

Deputy Chief Engineer
AVIC XAC Commercial Aircraft Co., Ltd

Mr. Han Xiaojun has extensive experience in program management, design management and aircraft certification. He is currently the program leader of MA700, which is the next generation turboprop that is under development by XCAC, and also supervising the program management and supply chain management functions of XCAC.

Mr. Han Xiaojun's previously acted as the supervisor of the Airworthiness department of XAC, and his expertise and dedication lead to the successful Type Certification campaign and AEG Audit of MA600 program.

Mr. Han Xiaojun started his career as an avionics engineer after his graduation from Harbin Engineering University and became the supervisor of the Avionics Design department.

Ravi Rajamani

Principal Consultant
drR2 Consulting

Dr. Ravi Rajamani established drR2 consulting in 2016 to leverage more than 25 years of experience and expertise in data analytics and model-based design to help clients in aerospace and other industries solve diagnostics and prognostics issues. Prior to this, Ravi was an Engineering Director with Meggitt for 5 years, following an 11-year tenure with United Technologies Corporation, first at the Research Center, and then with its Pratt& Whitney division. Before that he was with the General Electric Company for 10 years. He was closely associated with its Research Center and its Power Generation business; but worked with all other businesses as well. Before joining Meggitt, his primary work was in the area of controls and diagnostics of gas turbines for aerospace and industrial applications. At Meggitt, Ravi worked on a variety of technology initiatives, with a focus on diagnostics and prognostics and on model-based design. Ravi has a BTech (ME) from IIT Delhi, an MS (Automation) from IISc, Bangalore, and a PhD (EE) from the University of Minnesota. He also obtained an MBA from the University of Connecticut. He has published four book chapters; numerous papers in refereed journals and conference proceedings; has been invited to speak at conferences and institutions around the world; and has 26 patents to his name. He is active within SAE's Propulsion Health Management (E-32) and Integrated Vehicle Health Management (HM-1) committees, currently serving as the chair of HM-1. He is also active in the PHM Society, serving on its board of directors, and he was the general chair of the 2014 European PHM conference in Nantes, France. In April 2016, Ravi was named a Visiting Professor of Aerospace, Transport and Manufacturing at Cranfield University in Cranfield, UK. He is a chartered engineer and a fellow of the IMechE in the UK. He also serves as a board member of the Edison Tech Center in Schenectady.

Kathy KANG

Deputy Chief of System Engineering & Director of More Electric System Dept.
Commercial Aircraft Corporation of China, Ltd.

Dr. Kang has 15 years experiences in aircraft system development and product design, specializing in aircraft power supply system: Starter/Generator control system, Power conversion and power distribution system design.

Her major is power system, electric machine and power electronics respectively for her bachelor, Master and Doctor Degree. Since 2013, She has been leading the efforts for more electric aircraft (MEA) system design and integration, which covers key technology studies, development of the tools and methodologies for system integration, including but not limited to e-ECS, e-actuator, WIPS , E-brake system , system simulation and system integration.

Between 2002~ 2013, she was working for Honeywell Aerospace, Electric Power System sector, as an design engineer, participated in the product development for A380, A350 and other military aircraft, mainly responsible for secondary power distribution system design, Auxiliary power generation control system design, and system integration for the first flight of A380, airworthiness verification test for A350 startup system.

Before working in aircraft industry, Dr. Kang had been in power industry for 20 years, mainly working on the application of power electronics in power automation system, developed the products such as FACTS (Flexible AC Transmission system), Static Reactive power compensator etc for Singapore power industry.

In addition to the key technology studies for the next generation aircraft system, Dr. Kang is currently leading the efforts for more electric aircraft laboratory construction: starting from concept design, preliminary and detailed design phase, now come to the system integration in the lab for COMAC. And as an deputy chief system engineer, she is also responsible for the system engineering practice for COMAC across different business unit and various products of COMAC.

Johnny Doo

President
International Vehicle Research, Inc.

Mr. Doo is the President of International Vehicle Research, Inc., focusing on innovative manned and unmanned flight vehicle technology and product development while supporting global rescue and disaster relief initiatives.

He has over 30 years of experience in design & development, program management and business development of aviation products from high performance piston aircraft, personal and business jets, regional aircraft to aircraft engines.

He was previously the Executive V.P. of Marketing & Business Development, as well as EVP of Advanced Technology at Continental Motors Group, he also had the responsibility as the V.P. of Engineering & Product Integrity for the leading general aviation engine company.

Prior to Continental Motors, he was the Vice President at Diamond Aircraft in Canada, responsible for the new generation personal jet program. He built an integrated program team, established the development, certification and production plan and led the successful development of the all-composite single-engine personal jet.

Mr. Doo has a broad range of technical and program management experiences with Mooney Aircraft, Fairchild Aircraft and Sino Swearingen Aircraft in aircraft design, aerodynamics, structures, powerplant, flight testing and certifications.

He has a Bachelor's degree in Mechanical Engineering and a Master's degree in Aerospace Engineering. He is also the co-author of the book "WIG Craft and Ekranoplan – Ground Effect Craft Technology". He is currently heading the NASA coordinated Transformative Vertical Flight Public Services working group.

Sven Taubert

Program Leader & Site Manager - Innovation Business & Product Development
Lufthansa Technik

Since 04.2010 Dipl. Ing. Aerospace Engineering (Universität Stuttgart & Tokyo University)

07.2010 - 09.2014 Changing Jobs for Airbus within the Cabin & Cargo Research and Technology parameter. Last Job:

- Project Manager within Cabin & Cargo R&T Management:
- Toulouse focal point for Cabin & Cargo related research activities

Since 11.2013 Corporate Innovation Manager at Lufthansa Technik AG responsible for:

- the Cabin 4.0 R&D Program, developing products & technologies within various fields of Digitalization (Connectivity, Internet of Things, Machine Learning, Augmented Reality) taking advantage of state of the art collaboration approaches.
- Site Manager of Lufthansa Technik at the Hamburg Center of Applied Aeronautical Research – an eco-system of academic & research institutions, start-ups and major corporations of the aviation sector.
- Lufthansa Group Program Manager for All/ More Electric Aircraft & permanent member of the SAE “Electric Aircraft Steering Group” and “Digital and Data Steering Group”.
- the internationalization efforts in the field of innovation & product development – especially in Asia

Grace JIANG

Director of Digital Technology
AVIAGE SYSTEMS

Grace is the Director of Digital Technologies, responsible for the company’s digital products management, business development and execution. The AVIAGE SYSTEMS' brand brings together the civil avionics products and services offered by both GE and AVIC, along with our industry leading IMA and Digital open architecture platforms, and continues to innovate system solutions in preparation for the next generation of commercial aircraft.

Grace joined AVIAGE SYSTEMS in 2017 as the digital leader. She defines and executes the development and strategies for AVIAGE SYSTEMS digital solutions. She is responsible for the existing digital projects and some projects in pursuit including intelligent aircraft project. She also provides professional consulting service to present customers for digital solutions. She is also the AVIAGE SYSTEMS’ representative for Industry Internet Consortium.

Prior to joining AVIAGE, Grace worked for Boeing for 17 years with rich experience as a senior manager in areas across Information Technology, Digital Aviation, Factory Automation, Production Control and Suppliers Management. She successfully led IoT Smart Supply Chain project and My Boeing Fleet Digital Channel project. She was also the St. Louis Site leader for RFID deployment. Grace received Asian American Engineer of the year Award. (US National award). She was also a WOC Technology All Star Award winner.

Shengyang YUAN

Senior Solution Consultant
Teradata Information Systems

Data Analysis and Solutions Expert. Years of experience in data mining and consulting in manufacturing, telecommunications, and retail industries.

Specializing in data modeling and business consulting. Served on major customers such as SAIC Passenger Car, Toyota Motor, Geely Automobile, Commercial Aircraft, Zhejiang Mobile, Wal-Mart, Metro, etc. .

Victor Yee

Senior Technical Sales Consultant, IBM WIoT
IBM

Mr. Victor Yee belongs to the Tiger team of the IBM Watson IoT Business Unit; serving customers across China. His duty involves promoting business development for sales, providing pre-sales consultant, recommending Internet of Things (IoT) industrial solutions, deploying model-based development (MBD) services, and helping customers achieve engineering transformation for better innovation and competitiveness.

Within the company, Victor has taken the responsibilities of establishing industry-wide solutions for continuous engineering products. That includes positioning of key technologies (such as digital twins, cognitive engineering, and industrial internet) in the market, preparing content and materials for seminars and training. Given his extensive knowledge and experience in the aviation industry, Victor is often invited to consult with customers and co-developed landing solutions. He also collaborates with other IBM experts to deliver solution specific to organizational needs.

Victor has brought with him over 15 years of experience in systems software and management in the aerospace industry. Prior to joining IBM, he was appointed as a chief engineer for United Technologies Aerospace Systems (UTAS) – sensors division. At that time, he had the responsibility to oversee project certification effort, managing product field issues, and providing guidance over the entire life-cycle systems/software development activities. He had also been put in charge of design approvals for safety-of-flight, major design reviews and entrusted to lead multiple safety-critical projects on various aircraft platforms.

At IBM, Victor acts as the technology advisor for aerospace customers. He provides consultation on MBSE practices and enablement of systems engineering practices. He helps accelerate the adaptation of MBSE at companies and formulates SE solutions that best fit the client needs.

AJ WANG

Chief Scientist / Chair Professor
Shanghai Jiao Tong University

Current positions:

- Member of 1000 Talents Plan by the Organization Department of the Central Committee of the CPC, Chair Professor of Zhiyuan College, Shanghai Jiao Tong University
- Chief Scientist of Aero-engine Research Institute of Shanghai Jiao Tong University
- Visiting Professor of Central South University
- Chief Scientist of Aero-engine Technology University Alliance

Positions held before returning to China

- Chief Engineer of Aeromechanics, GE Aviation and Design Board member
- Part-time Professor of University of Cincinnati

He founded the Aero-engine Research Institute of Shanghai Jiao Tong University and Aero-engine Research and Development Training Test Base after returning to China

Bradley Perrett

Asia-Pacific Bureau Chief
Aviation Week

Bradley Perrett, based in Beijing, covers China, Japan, South Korea and Australia. He is a Mandarin-speaking Australian who has lived in China since 2004.

Before joining Aviation Week in 2006 he was a macroeconomics, politics and aerospace journalist with Reuters. Perrett holds a bachelor's degree in law from Macquarie University, Sydney.

David Alexander

Aerospace Standards Director
SAE International

David Alexander has been with SAE International and its affiliates for 12 years and is based in London, UK. In May 2016, he assumed the role of Director, Aerospace Standards. In this role, David is responsible globally for the operation of the SAE Aerospace Standards program and its staff, the management support for the SAE Aerospace Council and for liaisons with key organisations around the world. This also involves leveraging standards to work across the SAE International portfolio.

Supported by SAE staff in London, Paris, Brussels, Shanghai and across the US, this includes the relationships with industry, associations, aviation authorities and government stakeholders around the world: with the SAE Shanghai office, Alexander has developed SAE's relationships with CAAC, COMAC, AEEC, CAPE, and other key aerospace organisations in China.

Alexander maintains the SAE focal representation with EASA, and coordinates the new standards development activities within the SAE Aerospace Standards team, having previously establishing the strategic IVHM and Electric Aircraft Steering Groups with industry leaders. He also facilitates the General Assembly of the International Aerospace Quality Group (IAQG).

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 in French & Russian studies.

Shunan DAI

Chief Engineer
Shanghai Aircraft Airworthiness Certification Center of CAAC

Dr. Dai Shun an graduated from BeiHang University on July 1997. Now he is Chief Engineer of Shanghai Aircraft Airworthiness Certification Center of CAAC. He has engaged in the Civil Aircraft Type Certification over a long period of time. As a Certification Engineer, he has involved in the many activities of Type Certification, such as ARJ21-700 and C919 airplanes. As responsible person, he worked on the development of some regulations, Advisory Circulars (AC) and Aviation Procedures (AP), such as 《Continued Airworthiness and Safety Improvements for Transport Category Airplanes》. As a researcher fellow, he was responsible for several research projects, such as 《Study on Unmanned Aircraft System airborne collision severity and safety risk analysis》.

Amer Younossi

Acting Deputy Manager, International Division, Aircraft Certification Service
US Federal Aviation Administration

Amer Younossi is currently the Acting Deputy Manager of the International Division within the FAA Aircraft Certification Service. This organization applies a systems approach to establish, build, and maintain confidence in foreign aviation authorities' certification systems. It leverages partners' systems and maximizes acceptance of certification approvals to minimize inefficient duplication of effort. It also promotes knowledge sharing to advance foreign safety assurance systems and actively shapes global standards through international institutions such as ICAO. Previously, Amer was the Deputy Division Manager for the FAA Safety Management and Research Planning Division. This organization is responsible for managing the transformation of FAA to a safety management construct and to consider SMS requirements for the US aviation industry. It is also responsible for managing the FAA Aviation Safety Organization's Research and Development Program; and the development of a Safety Performance Management Framework for the FAA. Furthermore, Amer was the lead for the US State Safety Program (SSP) and initiated the Safety Management International Collaboration Group (SM ICG); currently comprised of FAA, European Aviation Safety Agency, ICAO and seventeen other civil aviation authorities that are the global leaders in safety management development. He also served as the US representative to the ICAO's Safety Management Panel responsible for the development of Annex 19. Prior to that position, Amer was a major contributor to the development and incorporation of safety management and system safety concepts into various oversight programs at the FAA Flight Standards Service. Prior to his employment at the FAA, Amer worked for the US Department of Defense, where he was the Lead Engineer for Technology and Risk Management for the National Missile Defense Program. Amer holds a Master of Science degree in Mechanical and Aerospace Engineering and Bachelor of Science degree in Mechanical Engineering from the University of Virginia. He also has Bachelor of Science in Physics from the American University.

Saulo Da Silva

Chief Global Interoperable Systems Section
International Civil Aviation Organization

Mr. Da Silva or Saulo, as you wish, started his career as an air traffic controller and during his time as a controller he went to the university and became an electronic/telecommunications engineer. After 12 years as a controller he got bored and moved to airspace planning and air traffic management at the Brazilian ANSP. During his time he was responsible for the introduction of the satellite navigation in the Brazilian airspace and airports in 1995. He was a crew member of the flight inspection unit that evaluated the performance of several approach and departure procedures using GNSS and the performance of ground navaids. He helped the Brazilian ANSP to implement the first ATFM Unit and to restructure the Brazilian airspace to cope with the demand.

He joined ICAO in 2007 as an ATM technical officer, and was secretary of the Air Traffic Management Requirements and Performance Panel (ATMRPP) and the Separation and Airspace Safety Panel (SASP). He was chief of the Air Navigation Implementation Section for 2 years and is currently the Chief of the Global Interoperable Systems Section responsible for the developments related to the Global Air Navigation Plan, System Wide Information Management and Cybersecurity for Aviation.

Roberto LU

Vice President of Corporate Technology, Advanced Manufacturing Technology
TE Connectivity

Dr. Roberto Lu serves as the Vice President, Technology in Advanced Manufacturing at TE Connectivity. TE Connectivity (NYSE: TEL) is a $12 billion global technology leader. Our connectivity and sensor solutions are essential in today's increasingly connected world. We collaborate with engineers to transform their concepts into creations – redefining what's possible using intelligent, efficient and high-performing TE products and solutions proven in harsh environments.

Dr. Lu works closely with the company's manufacturing and operation leaders to advance TE's overall manufacturing capabilities in stamping, molding, automation, and alternative manufacturing. He charters TE global manufacturing technology strategies and roadmaps, which guide the company's advanced manufacturing technologies, initiatives, and the overall development of new manufacturing processes. Manufacturing technologies from Dr. Lu's team reaches more than 70 TE factories in EMEA, Americas, and Asia.

Dr. Lu joined TE Connectivity from The Boeing Company, where he served as a Technical Fellow in Boeing Research and Technology. He part-time taught undergraduate and graduate level courses at the University of Washington as an Affiliate Assistant Professor. Prior to that, he held senior engineering positions at the Pilkington and Intermet companies.

He earned a Bachelor of Science degree in Materials Science from Feng Chia University in Taiwan, first Master's degree in Mechanical Engineering from Marquette University in Milwaukee, Wisconsin, second Master's degree in Industrial and Systems Engineering from Virginia Tech in Blacksburg, Virginia, and third Master's and PhD degrees in Industrial and Systems Engineering from University of Washington in Seattle, Washington. He is a licensed and registered Professional Engineer in US. He has more than 100 combined journal, conference, and patent publications.

Patrick Chane-Yene

Customer Application Engineering amd Business Development Manager Asia
Constellium

Patrick Chane-Yene is Customer Application Engineer Asia for Constellium, leading producer of Aluminum semi-products.

As a French engineer, Patrick Chane-Yene came to China more than 10 years ago to provide technical and management support. His fields of work include Aerospace, Space, Marine, Defense, Transportation and Industry.

In the aerospace industry, he is involved in European, American, and Asian programs for the development of advanced aluminum solutions.

Jianwei CHANG

Senior Engineer and Deputy Director at Department of Material and Process at Design & Research Center
Aero Engine Corporation of China - Commercial Aircraft Engine

Mr. Chang Jianwei is a Senior Engineer and Deputy Director at Department of Material and Process at Design & Research Center of AECC Commercial Aircraft Engine Co., Ltd. He received a BD and MS of Non-ferrous Metallurgy at Central South University in 2001 and 2004 respectively, before he went to Shanghai Jiaotong University where he was granted with a PhD of Material Processing in 2008 and a Post-PhD of Mechanical Engineering in December 2010. He then joined AECC where he was responsible for materials and process for aircraft engines. He participated in more than 10 projects, few of which he served as a leader, supported by Key Scientific and Technological Projects of Science and Technology Commission of Shanghai Municipality, 863 Program, National Science Funding Committee, 973 Program, China Postdoctoral Science Foundation and Shanghai Postdoctoral Science Foundation, etc. He is the author of 25 published papers, which studied anode materials for Li-ion batteries, corrosion and protection of magnesium alloys, magnesium alloy function materials, materials and process for aircraft engines.

Chuanjun LIU

Deputy Chief Engineer
Beijing Aeronautical Science & Technology Research Institute

Dr. Chuanjun LIU, Deputy chief engineer, BASTRI-COMAC. Chief design of composite wing, a technology readiness wing program of COMAC. Ownership of the EASA stress signature delegation for ATA 55. Lead stress/ structure engineer in Airbus Germany for A350XWB VTP and HTP. One of the main authors of Airbus Reference Structural Design Principles for composite structures. Working experience on many Airbus models, including A380, A318 business jet and A350XWB, etc. More than 25years experience on composites and composite structures, expert in structural nonlinear FEM modelling, particularly parametrical modelling, plenty experience in failure prediction, geometrical nonlinearity, contact, etc. Expert in lightning strike protection for composite structures.

William Bihlman

Founder and President
Aerolytics LLC

William Bihlman founded Aerolytics - a management consultancy - in 2012. Its focus is marketing strategy for aerospace materials and structures firms. He is a regular conference speaker, including North America, Europe, Asia and the Middle East. Bill started his career in 1995 as an engineer with Raytheon Aircraft. Subsequently, he was Senior Consultant with AeroStrategy. He is currently a PhD student in Industrial Engineering at Purdue University - his research focus is additive manufacturing and the aerospace supply chain. Bill holds a BS and MS in Mechanical Engineering from Purdue University, an MBA and MPA from Cornell University, and is a licensed private pilot.

Paula Hay

Executive Director, Additive Design and Manufacturing
UTC Aerospace Systems

Paula Hay is Executive Director for Additive Design and Manufacturing for UTC Aerospace Systems. Paula is responsible for advancing the use of additive across UTAS.

During her 20 years with United Technologies Aerospace Systems, Paula has held positions of increasing responsibility in engineering, program management, business development, and operations. Before joining UTAS, Paula was a Captain in the Air Force working on launch vehicle programs.

Paula holds a Bachelor's degree in Aeronautical and Astronautical Engineering from Purdue University as well as Master's degrees in Mechanical Engineering and Technology Management, both from Rennselaer Polytechnic Institute.

Richard Painter

VP Business Development, APAC
Granta Design

Richard has extensive experience of business development and sales worldwide in software and hardware companies. He was International Sales Director for PAFEC, the British CAD/CAM software company, and while at Molecular Simulations Inc. (MSI), he grew a sales force serving European markets for R&D in the life sciences, materials industries, and chemicals. Richard has also worked or consulted on managing and expanding sales operations, sales and marketing strategy and general business management at companies including Genomica, Scimagix, and KPMG Management Consulting. His experience includes involvement in IPOs and acquisitions. He is a graduate in Chemical Engineering from University College, London.

Burggraf Udo

Sr. Global & Key Account Manager
GE Additive

Master degree in aerospace engineering from the university of Stuttgart in 1991.

8 years of international project management at the german aerospace research center (DLR)

8 years of professional experience in aerospace engineering services at Engineering and Design AG (EDAG) serving at last as EVP aerospace and member of the group's executive board.

Several years of professional experience in consulting work supporting European SMEs in the aerospace market.

Today acting as business development manager aerospace for Concept Laser GmbH a GE Additive company.

Liming LEI

Deputy Chief Engineer, Manufacturing / Director of Process Research Center
Aero Engine Corporation of China - Commercial Aircraft Engine

Mr. Lei Liming is a Professorate Senior Engineer, Deputy Chief Engineer and Director of Process Research Center at AECC Commercial Aircraft Engine Co., Ltd. His main area of expertise is development of materials for aircraft engines and manufacturing of key components. In recent years, his focus is on application of AM in aircraft engines. In addition, Mr. Lei works part-time as a member of National Technical Committee on Addictive Manufacturing, Commission of Physical Detection of Division of Materials of China Society of Aeronautics and Astronautics (CSAA), Commission of Physical Metallurgy Verification of Aviation Industry Corporation of China (AVIC). He is also a reviewer of prominent journals like Journal of Materials Engineering, Journal of Aeronautical Materials, Aeronautical Manufacturing Technology. Over the years, Mr. Lei has led several key projects supported by Ministry of Industry and Information Technology (MIIT) and Science and Technology Commission of Shanghai Municipality (STC). Additionally, under his leadership, his team has applied laser AM in developing components such as spray nozzles, turbo cooling leaves, combustion chamber liner, aircraft engine mounts required by domestic commercial aircraft engine projects, which has expanded the application of AM in China's commercial aircraft engines, paving the way for AECC to take the lead in China's AM industry. He is now working on several key research projects on AM supported by MIIT, MOST and STC.

Areas of expertise: materials for aircraft engines (titanium, high-temperature alloys, etc.), manufacturing of key components (especially metal AM) and engineering applications.

Kevin Poon

Senior Enterprise Account Manager, Aerospace
Stratasys

Kevin Poon is the Manufacturing Solutions Manager at Stratasys APJ, in charge of bringing the additive manufacturing solutions into the Asia Pacific region. Since joining Stratasys in 2015, Kevin has been working closely with major accounts in Asia such as Cisco, Schneider Electric, Foxconn, Flextronics, COMAC and China Eastern Airlines in helping them implement additive manufacturing in their facilities in Asia. Prior to joining Stratasys, Kevin has 13 years of experience in the semiconductor equipment industry, serving in regional product marketing and business development roles at KLA-Tencor, and Applied Materials. Kevin holds a Master of Engineering degree in Mechanical Engineering from Cornell University, USA, and a Bachelor of

Applied Science degree in Mechanical Engineering from the University of British Columbia, Canada.

Rodolphe Bardou

Director of Production Support Engineering
Honeywell | HTS China | Aerospace

Rodolphe Bardou, Director of Production Support Engineering ({PSE}, Aerospace, Honeywell Integrated Technology Solutions

Rodolphe Bardou is the Engineering Director for Honeywell Aerospace's Production Support Engineering team in China.

His team leads Flawless Launch deployment and APQP activities, design for manufacturability (DFM), design-for-cost (DFC), Manufacturing Readiness Level (MRL) for Honeywell's New Product Development projects and factory support in China, working with both design and supplier teams to ensure highest level of producibility for new and legacy products. In this role Rodolphe also leads Honeywell's China Additive Manufacturing Lab in Shanghai and collaborates with the global Aerospace team and various Honeywell businesses to develop and apply this technology to Honeywell products.

Prior to this role, Rodolphe was the Honeywell Aerospace Mechanical System Engineering and Application (MSEA) Director in China where he led the team's strategy and growth, programs pursuits and execution of aircraft programs since 2013. Prior to joining Honeywell, Rodolphe worked in Liebherr where he led the integration of the ARJ21 and C919 Cabin Environment Control, Bleed Air, Anti-icing, Cabin Pressurization and LP/HP ducting Systems (AMS), and was also responsible for oversight of the China based final assembly lines for ARJ21 and A320 programs for Liebherr Aerospace systems' AMS and Landing Gear.

Rodolphe holds an Engineering degree in Propulsion Systems and Energy from the INSA (National Institute of Applied Sciences) in France. He is also Six Sigma Green Belt certified.

Mike Ingram

Vice President of Strategy and Growth
AVIAGE SYSTEMS

Mike is the Vice President of Strategy & Growth (SnG), responsible for the AVIAGE SYSTEMS's product management, business development, sales and marketing teams. He is responsible for growing the business beyond the company's single program, the COMAC C919. The AVIAGE SYSTEMS's brand brings together the civil avionics products and services offered by both GE and AVIC, along with our industry leading IMA and Digital open architecture platforms, and continues to innovate system solutions in preparation for the next generation of commercial aircraft.

He joined AVIAGE SYSTEMS in 2012 as the Tier 1 Avionics System Team leader responsible for the negotiations of the COMAC C919 technical baseline of the master contact. In 2014, he became the 3-party (GE, AVIC, AVIAGE) Customer Interface Team (CIT) Leader and then the acting R&D Leader within the engineering organization until taking on his current role in 2015.

Prior to joining AVIAGE, Mike was the Director of Product Management and Senior Director of Engineering at Avidyne Corporation for their Integrated Flight Display products. He owned the P&L for multiple products throughout their whole life-cycle. He joined Avidyne in 2000 and over the 12 years led dozens of TSO and STC product development cycles which included the system integration for the Eclipse Aviation AVIO and the Korean KAI KC-100 cockpits.

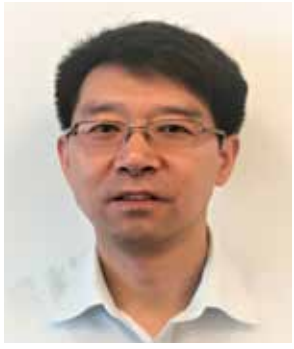
Zhiqiang ZHU

Executive Vice President
AVIAGE SYSTEMS

Dr. Zhiqiang Zhu is Executive Vice President of AVIAGE SYSTEMS which is a US$1.3B JV between GE and AVIC with a vision to grow as a global tier 1 civil avionics leader by integrating its world-class talents, cutting-edge innovations, and powerful partnership. Starting this role in 2012, Dr. Zhu is in charge of company operation and IT. Operation area covers supply chain, quality management system, manufacture, customer service and MRO, and for IT area mainly focus on IT infrastructure and maintenance, information security and product security, IoT, big data analysis and application. He is also responsible for new commercial program pursuit and engagement in China, partners and public relationships. Meanwhile he served as a corporate strategy committee member and joint strategic growth group consultant.

Dr. Zhu has 18+ years of experience in electronics system design and 16+ years of experience in business management respectively in avionics industry. He began his career as a software engineer at AVIC subsidiary in 1984. Prior to joining AVAIGE SYSTEMS, he led a team of 400 people, engaged in development of advanced electronic, electronic project design, manufacture and systems integration, covering computer architecture, chip development, high reliable bus, hydraulic and motor servo, and gyro control electronics etc.

Dr. Zhu holds a Bachelor and Master degree in computer science and a PhD degree in Navigation, Guidance and Control from Northwestern Polytechnical University. He is also a member of Chinese aviation association.



Haomin LI

Systems Engineering Chief Engineer
Senior Manager of System Engineering & Requirements Verification IPT of CR929
SAE S-18 Aircraft and Systems Development and Safety Assessment Committee Member
Commercial Aircraft Corporation of China, Ltd.

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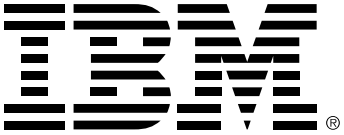

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