会议手册
EVENT GUIDE

SAE 2019
航空技术论坛
AVIATION TECHNOLOGY FORUM

6月4-5日 · 上海银星皇冠假日酒店
JUNE 4-5, CROWNE PLAZA SHANGHAI

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SAE International 国际自动机工程师学会是航空航天、汽车、商用车及工程农用机械领域权威性专业学会。相对于其他机构，SAE 制定的车辆和航空航天标准在行业内占据绝对优势。同时，SAE 还提供全球最丰富的航空航天、汽车、商用车及工程农用机械领域的工程信息，并拥有全球性的车辆及航空航天工程师社交网络。

我们通过全面的项目、产品和服务，为行业提供信息、工具和技术，以帮助专业人士更好地完成工作，并保证下一代业内工程师能够获得良好的职业发展。

自 1905 年起，SAE 就开始建立航空航天、汽车、商用车及工程农用机械领域的工程师网络，整合他们所需要的技术资源，以满足他们终生学习的需要，推动行业技术的进步与发展。

SAE International 第一任副主席是一个名叫亨利 • 福特（美国福特汽车公司创始人）的才志兼备的工程师，在最早的发展阶段，SAE 就获得了奥维尔 • 莱特（飞机发明人之一）等人的支持。在此基础上，我们建立了一个紧密合作、信息互通的广泛的中立性平台，并制定了许多首创标准。今天，SAE 已经成为了全球公认最权威的航空、汽车、商用车及工程农用机械工程知识来源，而信息共享仍然是我们的基本原则。

A professional society, SAE International is the authority on vehicle engineering. We develop more vehicle technical standards—and more aerospace standards—than any other organization. We offer the largest library of vehicle engineering content. And, we bring together the largest global network of engineers in the world.

Through a comprehensive collection of programs, products and services, we supply the information, tools, and technical know-how to help today's professionals do their jobs better while we ensure the development of the next generation of mobility engineers.

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.

中国商用飞机有限责任公司（简称“中国商飞公司或公司”）是中央管理的我国民用飞机产业核心企业和骨干中央企业，经国务院批准成立，由国务院国有资产监督管理委员会、上海国盛（集团）有限公司、中国航空工业集团公司、中国铝业集团有限公司、中国宝武钢铁集团有限公司、中国中化股份有限公司共同出资组建，总部设在上海。

中国商飞公司是实施国家大型飞机重大专项中大型客机项目的主体，也是统筹干线飞机和支线飞机发展、实现我国民用飞机产业化的主要载体，主要从事民用飞机及相关产品的科研、生产、试验试飞，从事民用飞机销售及服务、租赁和运营等相关业务。中国商飞公司下辖中国商飞设计研发中心（上海飞机设计研究院）、中国商飞总装制造中心（上海飞机制造有限公司）、中国商飞客户服务中心（上海飞机客户服务有限公司）、中国商飞北京研究中心（北京民用飞机技术研究中心）、中国商飞民用飞机试飞中心、中国商飞基础能力中心（上海航空工业（集团）有限公司）、中国商飞新闻中心（上海《大飞机》杂志社有限公司）、中国商飞四川分公司、中国商飞美国有限公司、商飞资本有限公司、商飞集团财务有限责任公司（筹）等成员单位，在北京、美国洛杉矶、法国巴黎设有北京办事处、美国办事处、欧洲办事处等办事机构，在上海设立金融服务中心。中国商飞公司参股中俄国际商用飞机有限责任公司、成都航空有限公司和浦银金融租赁股份有限公司。

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.

中国航空发动机集团（简称：中国航发）是中央直接管理的国有特大型企业，由国务院、北京市人民政府、中国航空工业集团公司、中国商用飞机有限责任公司共同出资组建。中国航发下辖 20 余家直属企事业单位，拥有 3 家主板上市公司，现有职工近 10 万人，拥有包括 6 名院士、200 余名国家级专家学者在内的一大批高素质、创新型科技人才。建有国际先进、亚洲领先的国防科技重点实验室，具备较强的科研生产制造能力，以及较为完整的军民用航空发动机、燃气轮机及其衍生产品的研发制造体系与试验检测能力。

中国航发秉承动力强军、科技报国的集团使命，坚持动力为本、质量制胜、人才强企、合作共赢的经营方针，致力于航空发动机的自主研发，深入推进军民融合发展。主要从事军民用飞行器动力装置、第二动力装置、燃气轮机、直升机传动系统、航空发动机技术衍生产品的设计、研制、生产、维修、营销和售后服务等业务；客户涉及航空、航天、船舶、兵器、能源及空天等多个领域。公司设计生产的涡喷、涡扇、涡轴、涡桨、活塞等航空发动机、燃气轮机和直升机传动系统等产品，广泛配装于各类军民用飞机、直升机和大型舰艇、大型发电机组上，为我国国防武器装备和国民经济发展做出了突出贡献。

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.

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Shanghai Aircraft Design and Research Institute

中国航发商用航空发动机有限责任公司
AECC Commercial Aircraft Engine Co., Ltd.

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SAE Industrial Consulting Services (Shanghai) Co., Ltd.

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全国航空器标准化技术委员会

6 月 4 日 星期二 Tuesday, June 4	
9:30 - 9:50	**欢迎致辞** WELCOME SPEECH
9:50 - 10:20	**主旨演讲** KEYNOTE
10:20 - 10:30	**McFarland 颁奖** MCFARLAND AWARD PRESENTATION
10:30 - 11:00	茶歇 TEA BREAK
11:00 - 12:40	**新型飞机开发** NEW AIRCRAFT DEVELOPMENT
12:40 - 13:30	午餐 LUNCH
13:30 - 15:00	**发动机 - 机身一体化** ENGINE - AIRCRAFT INTEGRATION AND SYSTEM DEVELOPMENT
15:00 - 15:30	茶歇 TEA BREAK
15:30 - 17:10	**城市空中交通** URBAN AIR MOBILITY
6 月 5 日 星期三 Wednesday, June 5	
9:00 - 10:30	**先进材料与制造技术** ADVANCED MATERIALS AND MANUFACTURING PROCESSES
10:30 - 11:00	茶歇 TEA BREAK
11:00 - 12:40	**飞机设计与制造中的人工智能** ARTIFICIAL INTELLIGENCE IN AIRCRAFT DESIGN AND MANUFACTURING
12:40 - 13:30	午餐 LUNCH
13:30 - 15:10	**数字化设计与生产** DIGITAL DESIGN AND MANUFACTURING
15:10 - 15:30	茶歇 TEA BREAK
15:30 - 17:00	**全球工业安全生产** IMPLEMENTING SAFETY IN A GLOBAL INDUSTRY

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TUESDAY, JUNE 4

9:30	**WELCOME SPEECH** **Billy XU** SAE International **Xinmin ZHOU** COMAC **Dr. Naijiang YU** AECC-CAE
	KEYNOTE
9:50	**Prospects of Intelligent Flight of Commercial Aircrafts** **Yong CHEN** COMAC **ABSTRACT** AI and 5G technologies are changing the world in an unprecedented speed. Intelligent flight brings the opportunity to embrace the challenge for commercial aircraft, by empowering onboard systems with intelligent sensing, autonomous decision and efficient controlling capabilities, combined with high speed air space and ground data communications, making an integrated smart interoperability between the aircraft and ground, that brings safer, more economical, more comfortable and greener travel and operation experience to passengers, crews, maintenance, air traffic control, airports, airlines and other related stakeholders.
10:20	**McFarland Award Presentation**
10:30	Tea Break
	NEW AIRCRAFT DEVELOPMENT
11:00	**The Technical Application of Advantage Material and Process on Commercial Aero-engine** **Dr. Jianwei CHANG** AECC-CAE **ABSTRACT** Advantage commercial aero-engine shall conform to the requirements of low cost, high reliability and low emission. The contribution proportion of material and manufacturing process technology to the performance improvement of aero-engine is about 50%. In terms of engine weight reduction, the contribution proportion of material and manufacturing process is about 70%. This presentation introduces the technical feature, development prospect and typical applications of new materials (such as composite, intermetallic compound alloy),and new manufacturing process (such as additive manufacturing, precision casting and inertia welding), also the quality control requirements of material and manufacturing process.
11:25	**MBSE in COMAC** **Haomin LI** COMAC **ABSTRACT** This presentation first introduce the foundation and methodology of MBSE, and then demonstrate MBSE implementation in the CR929 program of COMAC, last propose the challenges and opportunities of MBSE in the future.
11:50	**Regional Aviation Market Update, Asia** **Fernando Grau** Embraer **ABSTRACT** The regional and domestic developments of the AsiaRegional 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 Asia aviation market.

6 月 4 日 星期二	
9:30	**欢迎致辞** **徐秉良** SAE International **周新民** 中国商飞 **于乃江 博士** 中国航发商发
主旨演讲	
9:50	**商用飞机智能飞行前景展望** **陈 勇** 中国商飞 **摘要** 人工智能、5G 通信等技术正在以前所未有的速度改变世界，智能飞行为商用飞机运行带来拥抱变革的契机，通过为飞机系统赋能智慧感知、自主决策和高效控制能力，结合空天地一体的高速数据连接，飞机和地面形成集成的一体化智能互操作能力，共同为乘客、机组、维修、空管、机场、航空公司等相关方带来更安全、更经济、更舒适、更绿色的出行和运行体验。
10:20	**McFarland 颁奖**
10:30	茶歇
新型飞机开发	
11:00	**商用航空发动机先进材料工艺技术应用** **常建卫 博士** 中国航发商发 **摘要** 先进的商用航空发动机要求低成本、高可靠性和低排放。其中，在航空发动机性能提高中，材料及工艺的贡献率约为 50%，在发动机减重方面，材料和工艺的贡献率约为 70%。本文介绍了新材料（如复合材料、金属件化合物等），新工艺（如增材制造、精密铸造、惯性摩擦接等）的技术特点、发展趋势和典型应用，以及商用航空发动机材料工艺的质量控制要求。
11:25	**商飞的 MBSE** **李浩敏** 中国商飞 **摘要** 本次演讲首先介绍 MBSE 的基础和方法，之后展示 MBSE 在中国商飞 CR929 项目中的应用，最后提出 MBSE 未来将面临的挑战和机遇。
11:50	**亚洲支线飞机市场最新动态** **Fernando Grau** 巴航工业 **摘要** 亚洲航空市场的自主发展与不断扩大的中产阶级需求将改变大城市与城市群的需求分布，发展成“点对点”和高度连接的区域性航线网络；未来的亚洲市场不仅需要更高效的飞机和更短的线路，而是整个航空生态都需要创新的解决方案来应对快速增长的亚洲市场上涌现的大量机遇。

12:15	**Engaging with The FAA for Certification** **Sarbhpreet S. Sawhney** FAA **ABSTRACT** The future Aircraft Certification Safety System will be fundamentally different than it is today. FAA will operate under a systems approach that considers how decisions and information across the product lifecycle impact safety risks. This approach will be supported by rigorous practices to assess risks and provide feedback on the Aircraft Certification Safety System's performance. FAA will assure compliance to regulations by methodically leveraging stakeholders' certification and compliance assurance systems where warranted. This will be enabled by early, collaborative engagement among FAA and our stakeholders and through oversight of applicants' compliance assurance systems. By engaging in dialogue early, FAA and applicants/holders will more efficiently accommodate new products and systems, and identify gaps in existing regulations and policy. This early engagement will consider implications on global operations through close coordination with FAA's Flight Standards Service (Flight Standards) and foreign CAAs. A more agile and responsive regulatory and policy framework will accommodate innovation through selectively developed performance-based regulations and policy. Regulations and policy will be tailored to society's expectations of safety by aviation product, per the Safety Continuum. The Innovation Center concept will provide a single-entry point for emerging technologies, production methods, and business models into the Aircraft Certification Safety System. It will also provide a forum for FAA and stakeholders to engage on such innovations and explore the need for new regulations and policy. FAA will work with stakeholders to develop consensus standards and foster a collective understanding of the implications of new policy. These operations will be supported by a FAA workforce that is empowered with the knowledge, tools, and authority to make informed decisions under this systems approach. Employees will collaborate extensively to draw from the expertise across FAA and stakeholders. They will be supported by training and career opportunities that foster growth, promote engagement, and drive the success of Transformation.
12:40	Lunch
ENGINE - AIRCRAFT INTEGRATION AND SYSTEM DEVELOPMENT	
13:30	**Propulsion Aerodynamic Design and Integration of Commercial Transports with High Bypass Ratio Engines** **Kurt Acheson** Boeing Commercial Airplanes **ABSTRACT** The aerodynamic integration of modern high bypass ratio engines presents significant challenges given growth in engine size and weight. To achieve success at the airplane level requires a multi-disciplinary approach with a clear understanding of aircraft design constraints and customer requirements. Emphasis solely on minimizing fuel burn is insufficient since operational and ownership expenses are also significant contributions to the overall cost of ownership. To realize the full potential of low specific fuel consumption high bypass ratio engines necessitates close integration with engine and nacelle suppliers as well as vendors of tertiary systems in an effort to find the optimal balance of performance, weight, noise, reliability, maintainability, producibility and cost.
14:00	**EMC Harness Model Design Validation Applied to Helicopter Engine** **Charles Jullien** Safran Electrical & Power **ABSTRACT** With electrical function increase, the problem of evaluating the performance of a wiring harness for a complex aeronautical system is adressed. This evaluation has been made possible first by the various studies carried out in recent years on the topics of crosstalk and harness modelling. In general, model bricks and simulation tools set up by the measurement of the impedances of certain equipment to produce realistic simple "component" models of equipment or functions, or improved models by increasing the number of inductive, capacitive or resistive type components. In addition, performing simulation tools are be used. This also allowed evaluating new cabling technologies to design a prototype helicopter engine harness validated by qualification tests measures.

12:15	**同美国联邦航空管理局协作开展认证工作** **Sarbhpreet S. Sawhney** 美国联邦航空管理局 **摘要** 未来的飞机认证安全系统将与现在有本质不同。FAA 将以一种系统方法进行运作，该方法将考虑整个产品生命周期内的决策和信息如何对安全风险产生影响。该方法将通过严格验证，评估风险并针对飞机认证安全系统性能提供反馈。FAA 会有系统地利用利益相关方的资质并在授权情况下采用合规保证系统确保遵守规范。想要真正实现这一点，需要 FAA 和我们的利益相关方的早期参与和共同协作，也需要申请机构通过合规保证系统进行监督。 通过早期参与项目，FAA 和申请方 / 利益相关方能够更有效地适应新产品和新系统，并且从现有规范和政策中寻找欠缺之处。这种早期参与通过同 FAA 飞行标准服务（飞行标准）和国外 CAA 紧密协调，能够将对全球运营的影响考虑在内。更为灵活、响应度高的规范和政策架构一般经过有选择性的开发，且可以根据性能和表现更好地促进创新。规范和政策将依照“安全连续要求（Safety Continuum）”会根据社会对于航空产品安全的期待进行针对性调整。创新中心的概念会为新兴技术、生产方法和业务模型进入飞机认证安全系统提供一个单入口点。它也会为 FAA 和利益相关方提供一个讨论的平台，以便他们参与此类创新并探索对于新的规范和政策的需求。FAA 将会同利益相关方一起开发统一标准，并形成对于新政策实施的共识。 这些运营将得到 FAA 人力支持，这是一个富有知识、工具和在此系统方法下有权利作出知情决策的团队。员工将广泛协作，从 FAA 和利益相关方汲取专业经验。他们会接受培训，获得很多职业发展机会，这些都会对于带动增长、提高参与度和促成转变带来推动作用。
12:40	午餐
	发动机 - 机身一体化
13:30	**商用飞机大涵道比发动机的空气动力推进设计和集成** **Kurt Acheson** 波音商用飞机 **摘要** 发动机尺寸的扩大和重量的增加给现代大涵道比发动机的动力集成带来了重大挑战。想要在航空领域占据一席之地，需要对飞机设计的局限和客户需求有更加清晰的认识，并采用多学科方法。营运和所有权方面的花费占总成本的很大一部分，所以仅将重点放在减少燃料消耗方面是远远不够的。想要充分发挥低燃耗大涵道比发动机的功用，则需要同发动机和机舱供应商及第三系统供应商紧密合作，努力找到性能、重量、噪声、可靠性、可维护性、可生产性和成本之间的最佳平衡。
14:00	**直升机发动机 EMC 线束模型设计验证** **Charles Jullien** 赛峰电气与电源公司 **摘要** 随着电学功能的提升，为复杂航空系统评估线束性能的难题已经解决。此类评估的实现首先得益于近些年来针对串扰和线束设计进行的研究。一般而言采用的方法是通过测量特定设备的电阻搭建模型和仿真工具，进一步为某设备或功能制作现实可行的简单“成分”模型，或者通过增加感性分量、电容分量或电阻分量改善模型。另外现在也使用了性能仿真工具。这样也可以实现新的布线技术评估，从而设计出直升机发动机线束原型，利用资质测试方法进行验证。

14:30	**Application and Challenges of ARP4754A Compliance in Electronic Engine Control System** **Qin ZHU** AECC-CAE **ABSTRACT** The current trend in Electronic Engine Control System (EECS) development is an increasing level of complexity and integration. This high complexity yields increased possibilities for development errors causing or contributing to EECS failures. Therefore, development assurance techniques become necessary to establish the required confidence that the errors have been adequately identified and corrected, and to achieve the safety objectives of CCAR33. Currently, regulatory authorities are considering recognizing SAE ARP4754A as an acceptable method for establishing a development assurance process for EECS. This presentation will discuss the application and challenges of ARP4754A compliance in Electronic Engine Control System based on engineering cases, including but not limited to: the fundamental objectives for using this guidance; the difficulty in showing compliance in EECS; the potential solution and implementable approach.
15:00	Tea Break
	URBAN AIR MOBILITY
15:30	**Urban Aviation - Embracing the New Mode of Transport** **Dr. Weiliang LOU** IET **ABSTRACT** The world is becoming more urbanised; globally, millions of people are moving into cities in hope of accessing richer platforms for their education, careers and personal lives. As this is happening, urban planners must think of new transportation solutions to maintain or improve city mobility and, simultaneously, reduce all sources of emissions. For some cities, expanding the existing transportation infrastructures, such as roads, metro lines and railways, is an unattractive option due to very high capital costs, long project lead times and severe disruptions to surrounding households and businesses. Meanwhile, in the automotive and aviation industries, there have been significant advances on several fronts: firstly, the electrification of vehicles is becoming popular, driven by improvements in battery technology, electric propulsion systems and ground infrastructure; secondly, safer and efficient fleet management and vehicle operations are possible due to advances in communications technology, vehicle autonomy and GPS, particularly 5G; and thirdly, advances in composite materials and manufacturing methods enable better performing vehicles with lower unit costs. The time is now ripe, more than ever, for the development of a low altitude mass transportation system for passengers and light freight – Urban Aviation (UA). Like no other, UA adds a third dimension to urban transportation systems. The vision is that UA will be integrated into the existing mobility system, creating a time efficient mode of transport and a safe, enjoyable flight experience for individuals and groups, families and businesses, commuters and tourists. It creates new opportunities for travellers for whom personal comfort and speed are at a premium, as well as for emergency and inspection services. The beginnings of the evolution of this industry are already visibly taking shape. Right now, the market is open to potential players from various backgrounds, and it is not clear who will seize the prize. All major aircraft manufacturers, Boeing and Airbus alike, have been very active in this field since 2014 and have brought forth several, different prototypes. At the same time, start ups like Lilium have made a name for themselves with very innovative ideas and a completely new take on what an aircraft can be. The winners in this emerging market will be those who address UA's complex, interdisciplinary needs in close collaboration with manufacturers, service providers, regulators, urban planners and city authorities.

14:30	**发动机电子控制系统中的 ARP4754A 合规性应用和挑战** **祝 钦** 中国航发商发 **摘要** 当前发动机电子控制系统（EECS）开发呈日益复杂和集成的趋势。这种高度复杂性提高了开发错误的几率，会引起或推动 EECS 故障。因此，想要建立起足够的的信心，确保错误能够得以充分发现和纠正并实现 CCAR33 中的安全目标，开发保证技术变得尤为必要。当前，监管机构正在考虑认可 SAE ARP4754A 作为建立 EECS 开发保证流程的可行方法。 本次演讲将会基于工程实例讨论 EECS 中 ARP4754A 合规的应用与挑战，包括但不限于：遵守该指南的根本目标；在 EECS 中遵守该指南的难点；可能的解决方法和可实行的途径。
15:00	茶歇
城市空中交通	
15:30	**城市航空——拥抱新型交通** **Weiliang LOU 博士** IET **摘要** 世界愈加城市化，全球有上百万人口搬进城市，希望能够接触到教育、职业和个人生活更为丰富的平台。随着这一趋势，城市规划师们必须思考新的交通方案来维持或改善城市交通，同时减少各类排放。对于一些城市来说，扩大现有交通基础设施（如道路、地铁线路和铁路）成本过高，耗时过长，还会出现对周围家庭和商业的严重扰乱，因而并非特别有吸引力的选择方案。 同时，汽车和航空领域在几个方面出现了重大发展：首先，受电池技术、电力推进系统和地面基础设施改善的推动，车辆和飞机的电动化日益流行；第二，由于通讯技术、车辆 / 飞机自动化和 GPS，尤其是 5G 的发展，更加安全和高效的车辆 / 飞机管理和运行得以实现；第三，复合材料和制造方法的改进使得车辆和飞机性能提升、单位成本下降。 想要发展面向乘客和轻型货运的低空公共交通系统，也就是城市航空（UA），正是最佳时机。 UA 的特殊之处在于它为城市交通系统增添了第三重维度。UA 能够结合到现有的交通系统中，打造出省时的交通模式，并且为个人、团体、家庭和企业、通勤者和游客提供安全舒适的飞行体验。这为重视个人舒适和速度的旅行者以及应急服务和检验服务提供了新的机遇。 这一行业演变的开端已经开始成型。现在，它的市场已经向不同背景的潜在参与者打开，虽然并不清楚谁能成为赢家。所有的主要飞机制造商，如波音和空客，自 2014 年起已经积极参与到这一领域中，并且推出了一些不同的原型。同时，Lilium 等初创公司也通过创新理念和对于飞机的新定义打响了名声。这一新兴市场的赢家将会是能够解决 UA 复杂、跨领域需求的公司，且能够同制造商、服务提供商、监管者、城市规划师和城市当局进行紧密合作。

15:55

The Need for Development Assurance in Today's Rapidly Evolving Aerospace Landscape

Andy Wallington Electron International II Inc

ABSTRACT

SAE ARP4754/ EUROCAE ED79 was originally published in November 1996 following a request from the FAA to define the appropriate nature and scope of system-level information for demonstrating regulatory compliance for highly integrated or complex avionic systems.

The document revision SAE ARP4754A/ EUROCAE ED79A was published in December 2010 in response to changes in the industry in the intervening years since ARP4754/ ED79 publication, most especially the increasing level of integration between aircraft functions and the systems that implement them. The SAE S-18 committee responsible for aircraft and systems development and safety assessment are currently working on revision B to ARP4754/ ED79, which is slated to be published, along with its companion document, ARP4761 revision A, in 2020.

The ARP4754/ ED79 document is written in the context of 14CFR Part 25 and EASA CS-25. At the time of its original publication it was acknowledged that '....it may be applicable to other regulations, such as Parts 23, 27, 29, 33 and 35....'. In today's changing automotive environment there are increasing needs for a generic standard for the automotive industry, hence the development of SAE AS7209.

16:20

Key Technology Research of Hybrid Electric Propulsion System

Dr. Yuping QIAN Tsinghua University

ABSTRACT

Aiming at the key technical issues of high power density motors, high energy density batteries and high efficiency thermal management in hybrid electric propulsion systems for electric aviation. The presentation systematically reviews the achievability of the technology and proposes the technical route.

16:45

UAM Efforts Driving Innovation and Change

Christine DeJong GAMA

ABSTRACT

Urban air mobility is one of the biggest shifts in aviation in decades. New technology is advancing the way airplanes are designed, operated and maintained. UAM technologies are innovating the way services are conducted around the world, as well as evolving the infrastructure that supports it. These advancements also bring along exciting challenges that the global industry is well positioned to overcome. This presentation will explore the various efforts underway to safely charter through these new territories.

15:55	**当今快速发展的航空航天领域对发展保障的需求** **Andy Wallington** Electron International II Inc **摘要** SAE ARP4754/ EUROCAE ED79 原本发布于 1996 年 11 月，其出台是为了响应 FAA 要求，为高度集成或复杂航电系统合规明确系统层面信息的本质和范围。 SAE ARP4754A/ EUROCAE ED79A 的修订版于 2010 年 12 月发布，其中针对自 ARP4754/ ED79 发布以来行业内发生的诸多变化进行了调整，这些变化主要集中在飞机各功能及其实施系统整合度的提高。负责飞机及系统开发与安全评估的 SAE S-18 委员会目前正在对 ARP4754/ ED79 进行第二次修订（修订 B），计划和其配套文件 ARP4761 修订 A 于 2020 年一起发布。 ARP4754/ ED79 是在 14CFR 第 25 章和 EASA CS-25 的背景下编纂的。当初发布时曾表明该法规“…可能适用于其他法规，如第 23、27、29、33 和 35 章…”。而当今日新月异的汽车行业更需要一个通用的标准，因此我们决定开发 SAE AS7209。
16:20	**混合电力推进系统的关键技术研究** **钱煜平 博士** 清华大学 **摘要** 重点讨论电动航空中混合电力推进系统的高功率密度电动机、高能量密度电池和高效率热管理。本次演讲系统总结了该项技术的可行性并提出技术路径。
16:45	**城市空中交通推动创新与变革** **Christine DeJong** GAMA **摘要** 城市空中交通（UAM）是几十年来航空领域最大的改变之一。在飞机的设计、操作和维护方面，新技术都在不断发展。UAM 技术带动了全世界的服务形式创新，也推动了相关基础设施变革。这些发展也带来了一些激动人心的挑战，有待全球航空产业加以攻克。

“A very informative and interesting course, highlighting the importance of the role of the Self Release Delegate.”

— David, Manufacturing Quality Engineer, Cross Manufacturing

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WEDNESDAY, JUNE 5

ADVANCED MATERIALS AND MANUFACTURING PROCESSES

9:00

Additive Review, Perspective and Challenges

Juan Carlos Munguia Castañeda M Aerospace RTC

ABSTRACT

Getting Started on Additive Manufacture Technology? Want to know more about current process and challenges to make your ideas come true on aviation? Then this conference is for you due it is design to help you get an overview on how additive manufacturing is apply on the Aerospace Sector, as well as to take a look at the most common challenges that occurred using Additive Manufacturing Technology as a Qualification Perspective and also try to understand how´s does the future look like with this technology.

9:30

Flexible Automated Fastening with Robotic Systems – PowerRACe as Customized Solution for Aerospace Applications

Walter ZHOU Broetje-Automation Group (Shanghai)

ABSTRACT

Automated drilling and fastening of different aircraft type components has been a major field of development for several decades. Due to the high performance and accuracy requirements in the aerospace industry, most of the machine solutions have been focused on heavy equipment and linear solutions in the past.

The aerospace industry has shown a significant increase in demand for more flexible systems pushing robotic solutions in the past years. Nevertheless the requirements on quality, repeatability, accuracy and cycle time for the process have been a challenge that standard robotic equipment is not able to overcome.

This paper will discuss the development, capabilities and technical solution of the Broetje-Automation aerospace robot identified as Power RACe.

The custom designed Power RACe is specifically built for automated drilling and fastening for the aerospace and aeronautical industry. Thanks to its unconventional configuration it has a higher payload capacity than standard robotic solutions, thus provides more accuracy and higher throughput compared to known robotic applications.

10:00

Unique Patent - Microwave Graphitization Technology in Advanced Material

Dr. Ben WANG UHT Unitech Company Ltd.

ABSTRACT

One of few original-technology holders in the world with self-made equipment and the capability of stable and mass production of the medium and high modulus carbon fibers. We have great advantage in stability and cost. All the technical parameters of our products meet the T800, T1000, and M40 standard. Three major problems which hindered the development of a high grade product were solved during development. These included the availability of internationally controlled and expensive graphitization equipment, some difficulties that arose in fiber strand chemical technology, low production yield and high cost.

10:30 Tea Break

ARTIFICIAL INTELLIGENCE IN AIRCRAFT DESIGN AND MANUFACTURING

11:00

Coming Impact of Artificial Intelligence in Aerospace

Sky Matthews IBM's Watson

ABSTRACT

AI is impacting almost every field and industry and it has some compelling value propositions to improve efficiency in both engineering and operations of aerospace systems. We will discuss current applications of AI in various aspects of aircraft operations, including scheduling and pricing, weather prediction, aircraft maintenance and repair. New AI applications for engineering are helping engineers deal with the enormous amount of data, and make better design decisions. We will cover applications of AI in Engineering, give practical examples in use today, and provide advice on overcoming the challenges and risks to start getting the benefits of AI.

6 月 5 日 星期三

先进材料与制造技术

9:00	**增材制造的总述、前景和挑战** **Juan Carlos Munguia Castañeda** M Aerospace RTC **摘要** 刚刚开始接触增材制造？想要了解更多当前的流程和挑战，让你的想法在航空领域得以实现？那么这场大会非常适合你，能够帮你综合了解增材制造是如何应用于航空领域，同时审视增材制造用作资格视角产生的挑战，并力图理解掌握了该项技术的未来是什么模样。
9:30	**运用机器人系统进行灵活自动化铆接——航空航天应用中的定制化解决方案 PowerRACe** **周国华** 上海宝尔捷自动化 **摘要** 几十年来，不同机型配件的自动钻铆技术一直是发展的重要领域。由于航空航天产业对于性能和精确性要求极高，过去大多数机器解决方案均指向重型设备和线性方案。 过去这些年，航空业对于系统灵活性的要求越来越高，这极大推动了机器人解决方案的发展。但是在标准机器人设备领域，流程的质量、重复性、精确度和周期却是难以克服的难关。 本次演讲将讨论宝尔捷自动化航空机器人即 Power RACe 的发展、性能和技术解决方案。 定制设计的 Power RACe 专为实现航空航天工业的自动钻铆搭建。非传统配置使得它的额定载重量相比于标准机器人方案更高，因而比现有的机器人应用更加精确、且具有更高的生产能力。
10:00	**独特的专利——先进材料的微波石墨化技术** **王智永 博士** 永虹先进材料股份有限公司 **摘要** 世界上只有为数不多的原创技术持有者拥有自制设备和稳定、大规模生产中高模量碳纤维的能力，我们就是其中之一，且在稳定性和成本方面有巨大优势。我们的产品的全部技术参数均符合 T800，T1000 和 M40 标准。在发展过程中我们也克服了三大关键障碍，才最终制造出这样的高端产品。其中包括如何获得受国际管制且价格昂贵的石墨化设备，原丝化工技术中出现的挑战，以及高成本低产量的问题。
10:30	茶歇

飞机设计与制造中的人工智能

11:00	**人工智能未来对航空领域的影响** **Sky Matthews** IBM Watson 研究中心 **摘要** 人工智能几乎对所有领域和行业都产生了影响，现在对于提升航空系统工程和操作效率也具备了极富吸引力的价值主张。我们会讨论当前人工智能在飞机各项操作方面的应用，包括调度和定价、天气预测、飞机维护和维修。人工智能在工程方面的全新应用能够帮助工程师处理海量数据，做出更好的设计决策。我们会谈到人工智能在工程方面的应用，列举当前应用的实例，并且为更好地运用人工智能、克服其带来的挑战和风险提供建议。

11:25	**Digital Aviation Ecosystem Connecting 4As: Airlines, Airports, Aircrafts and ATM** **Grace JIANG** AVIAGE SYSTEMS **ABSTRACT** Three major elements of digital ecosystem to connecting 4As: Digital technologies, Data and Connectivity. The speech will emphasize those digital elements and their impacts to promote efficiency and productivity for Aviation Industry and therefore accelerate aerospace to digital transformation. Digital technologies like 3D print, AR/VR, big data analytics provide fundamental innovations for airlines and aircrafts. Connectivity provides real time digitalized services, on board analysis, added in entertainment, connected field services and after-market optimization, which connects the operation of 4As and completes the cycle of digital aviation ecosystem.
11:50	**Industry 4.0 in MRO - Digitalization without Beta Versions** **Sven Taubert** Lufthansa Technik **ABSTRACT** Topics like Digitalization and Industry 4.0 are currently on everyone's minds. New economy companies revolutionizing more and more classical business models. Aviation, like other safety sensitive industries, is working hard to keep up. Unlike services from the big role models out of e.g. Silicon Valley, aerospace products cannot and will not shipped in Beta status. This presentation will show examples how Lufthansa Technik, as world's leading MRO supplier, is addressing these challenges.
12:15	**Health-Readiness for the Next Generation of Manufacturing Systems** **Dr. Ravi Rajamani** drR2 Consulting **ABSTRACT** Unscheduled downtime in manufacturing systems is a major source of lost productivity, profits, and ultimately, process quality and reliability. Prognostics and health management (PHM) systems can help mitigate some of the underlying issues causing unscheduled downtime. While some large corporations are making great strides in incorporating PHM features into their advanced industrial installations, small- and medium-sized manufacturers (SMM) face distinct challenges when determining where and how to integrate these advancements into their manufacturing operations. A collaboration between government, industry, and academic organizations is aiming an effort to develop guidance for the incorporation of PHM using health-ready components and systems in the manufacturing arena. This is based on the pioneering work SAE International has done in the mobility industry with JA6268: Design & Run-Time Information Exchange for Health-Ready Components. In this talk, we will describe what this effort encompasses and the progress that has been made to date.
12:40	Lunch
	DIGITAL DESIGN AND MANUFACTURING
13:30	**Global Landscape and China's Development Direction of 3D Printing** **Dr. Weidong HUANG** Northwestern Polytechnical University **ABSTRACT** In terms of the global landscape for 3D printing, if it is divided into innovation, equipment manufacturing and industrial application, the United States takes the lead in innovation and industrial application by itself and equipment manufacturing jointly with Germany. It can be concluded that the United States is dominant globally in the field of 3D printing. China's 3D printing has reached an internationally advanced level overall: the invention patents China possesses is far more than the sum of the other countries around the world. It is highly innovative. However, the vast majority of invention patents are limited to the technical details on the progress. The absolute advantage on the number of patents has not been transformed into the advantage of technology value. China's 3D printing equipment of various types has reached the international advanced level, among which SLM equipment and Sand 3D printing equipment have reached the world-class level. China's 3D printing industry leads the world in terms of application scale and development speed, and is now the second largest in the world. However, there is still a huge gap between China and the United States. The further development direction of 3D printing in China is to build an effective national innovation system and make breakthroughs in major original innovations; Learn from the craftsman spirit of Germany, achieve the best quality of equipment, and develop rich materials and reliable technology related to advanced equipment; Guided by innovative design and aiming at the revolutionary progress of products, the industry promotes the application of additive manufacturing.

11:25	**航空数字生态系统联接 4As: 航空公司、机场、飞机和 ATM** **蒋 萍** 昂际航电 **摘要** 连接 4A 的三大主要数字生态系统元素：数字技术，数据和连接性。本次演讲将着重强调数字元素以及它们对于航空产业提高效率和生产力的影响，从而进一步加速航空事业的数字化。3D 打印、AR/VR、大数据分析等数字技术为航线和飞机提供了根本的创新可能。连接性能够连结 4A 的运行并且完成数字飞行生态系统的循环，为实时数字化服务、机上分析、附加娱乐、现场服务互联和售后市场优化提供保障。
11:50	**MRO 中的工业 4.0——没有 Beta 版本的数字化** **Sven Taubert** 汉莎技术有限公司 **摘要** 当前，数字化和工业 4.0 等话题已经深入人心。新的经济公司不断颠覆传统商业模式。航空业和其他对安全性敏感的行业一样，也在努力跟上这一潮流。不同于来自硅谷等地的模范公司推出的服务，航空产品在 Beta 阶段不能进行运输。这场演讲将展示一些案例，介绍汉莎技术公司作为世界顶尖的 MRO 提供商是如何面对这些挑战的。
12:15	**下一代制造系统的健康预备** **Ravi Rajamani 博士** drR2 Consulting **摘要** 制造系统的计划外停工期是生产力、利润，以及最终的工艺质量和可靠性下降的主要原因之一。预诊与健康管理（PHM）系统有助于减轻造成计划外停工的某些潜伏问题。尽管一些大公司已在其先进工业设备中成熟采用 PHM，但中小型企业往往难以决定在何处、以什么方式将 PHM 纳入制造流程。一个政府、行业与学校间的合作项目旨在帮助企业在制造系统中纳入健康管理模块与系统，该合作基于 SAE International 在《JA6268：健康预备部件的设计与运行时间信息交换》标准上所做的开创性工作。该报告将介绍这项工作的具体内容已经目前取得的工作成果。
12:40	午餐
	数字化设计与生产
13:30	**3D 打印的世界格局与中国发展方向** **黄卫东 博士** 西北工业大学 **摘要** 关于 3D 打印的世界格局，如果按创新、装备制造和产业应用三大方向分类，则美国独占创新和产业应用的两个领先，与德国共同占据装备制造的一个领先，可以认为美国在 3D 打印领域具有全球性的压倒优势。中国 3D 打印在总体上处于世界先进水平：当前中国 3D 打印发明专利在数量上已经远远超过了全球其他国家的总和，创新活跃度非常高，但绝大多数发明专利还局限于技术细节上的进步，专利数量上的绝对优势还没有形成技术价值上的优势；中国多种类型的 3D 打印装备已经达到国际先进水平，其中 SLM 设备和砂型 3D 打印设备已经达到世界一流水平；中国 3D 打印产业应用规模发展速度领先全球，目前已处于世界第二，但同美国的差距还十分巨大。中国 3D 打印进一步发展方向是：建设有实效的国家创新体系，在重大原始创新上取得突破；学习德国的工匠精神，把装备质量做到极致，同时围绕先进装备开发丰富的材料与可靠的工艺技术；产业界以创新设计为引领，以产品的革命性进步为目标，推进增材制造的产业应用。

13:55	**Deployment of Additive Manufacturing in Aerospace Design and Manufacturing** **Alexandre Baudot** Honeywell Integrated Technology (China) **ABSTRACT** Advancements in metal additive manufacturing (AM) equipment, materials and processes have led to expanded applications in the highly regulated Aerospace sector. Direct printing production parts requires following a clear path toward certification of these components. Low volume demand has been one of the areas of focus in the past, as have been complex new products. AM can disrupt a firmly established supply chain. Today, Honeywell has made the transition from using AM strictly for tooling and prototypes to manufacturing certified commercial and defense aerospace hardware. In order to meet the challenge of creating a steady source of supply, a stable supply-chain has to be developed that can reliably deliver 100's or even 1000's parts per year.
14:20	**Prevailing Trends in Manufacturing for Commercial Aerospace** **Bill Bihlman** Aerolytics LLC **ABSTRACT** This presentation will cover the current and future state of manufacturing for commercial aerospace, including both the aerostructure and aeroengine. The following questions will be addressed: • How do the airframe and gas turbine compare in terms of architecture and function? How does this compare to automotive? What are the implications? • What ultimately drives design and material selection, and how does this vary by aerostructure, engine and component? • How much material is consumed, and how does this segment by commodity? How and why will this change during the next decade? • Why have composites displaced aluminum in widebody aircraft? Will the next generation narrowbody be carbon fiber as well? • What are the key manufacturing trends globally? Are there fundamental differences between the US vs EU approach? • What are the implications of these technologies on the supply chain?
14:45	**"Good Vibrations" Achieve Higher Productivity, Higher Quality and Higher Tool Lifetime** **Markus Dirscherl** LTI Motion **ABSTRACT** With 1 billion rivets per year for aircraft structural components, the drilling of rivet holes is a key step in the production and assembly of airplanes. The performance of the aircraft structural components depends significantly on the quality of the produced borehole. Furthermore, these boreholes are created at the end of the value chain and errors cause significant additional costs. In addition to the high quality requirements, the costs per borehole are an important profitability factor. To improve quality and minimize costs, fully automated robots and CNC machines are used. LTI Motion has been awarded with an Innovation Award for its magnetically levitated drilling spindle, revolutionizing the drilling of aluminum, titanium and carbon fiber in aviation. The fully automatic innovative drilling process is up to 3 times faster, with better quality and lower tool costs. The lecture explains the functioning of the magnetically-levitated drilling spindle, which can be freely programmed in 6 degrees of freedom, and explains why this significantly improves quality and costs. The integrated sensors also enable innovative functions (Condition Monitoring / Predictive Maintenance), such as the automatic adaptation of the drilling parameters to different materials as well as intelligent process monitoring such as tool wear monitoring or collision protection.
15:10	Tea Break

13:55	**航空设计和制造中增材制造的运用** **Alexandre Baudot** 霍尼韦尔综合科技（中国） **摘要** 金属增材制造（AM）的设备、材料和流程不断进步，拓展了这项技术在一向监管严格的航空领域内的应用。直接印刷生产部件的实现取决于认证流程的清晰化。过去的主要关注重点是少量需求和复杂的新产品。AM 会扰乱稳定的供应链。当前，霍尼韦尔公司已经完成升级，从只将 AM 用于工具作业和原型，转向得到生产认证的商用和国防航空硬件。为了迎接打造稳定供应源的挑战，必须开发一个稳定的供应链，保证每年交付上百甚至上千个部件。
14:20	**商业飞机生产的主要趋势** **Bill Bihlman** Aerolytics LLC **摘要** 该演讲将介绍目前与未来商业飞机制造的主流趋势，包括飞机结构与发动机两方面，其中重点讲解以下几个问题： • 如何从架构和功能的角度对机身与燃气涡轮进行比较？如何将其与汽车进行比较？我们能得出什么结论？ • 什么才是设计与材料选择的最终驱动力？它又是如何根据飞机结构、发动机和部件而改变的呢？ • 耗费了多少材料？如何以商品为单位对其进行分割？在未来十年中将如何变化，为什么变化？ • 为什么宽体飞机中复合材料取代了铝？下一代窄体飞机也会采用碳纤维材料吗？ • 全球飞机制造中有哪些重要趋势？美国与欧盟的技术之间有根本性的不同吗？ • 这些技术对供应链意味着什么？
14:45	**“有益的振动”实现高效、高质量、及高工具寿命制孔工艺** **Markus Dirscherl** LTI Motion **摘要** 本次演讲将讨论现阶段振动辅助制孔技术在特殊机加工进程中的应用。每年有 10 亿铆钉用于飞机结构部件，铆钉孔的钻削是飞机生产和装配的关键步骤。飞机结构部件的性能在很大程度上取决于钻孔的质量。 此外，这些钻孔是在价值链的末尾创建的，错误会导致显著的额外成本。除了高质量要求外，每个钻孔的成本也是一个重要的盈利因素。为了提高质量和降低成本，采用全自动机器人和数控机床。LTI Motion 公司因其磁悬浮钻床主轴而获得创新奖，从而彻底改变了航空业中铝、钛和碳纤维的钻削。全自动创新钻孔工艺可以提高速度高达 3 倍，质量更好，工具成本更低。 本次演讲解释了磁悬浮钻轴的功能，它可以进行 6 自由度自由编程，并解释了为什么这显著提高质量和成本。磁悬集成传感器还具有创新功能（状态监测 / 预测性维护），如自动适应不同材料的钻井参数，以及智能过程监测，同时提供刀具磨损监测或碰撞保护。
15:10	茶歇

IMPLEMENTING SAFETY IN A GLOBAL INDUSTRY

15:30

An Improved Method for Security Simulation Analysis Based on System Extended Model

Jia SONG AVIC China Aero-Poly Technology Establishment

ABSTRACT

With the increasing complexity of aviation systems, strict safety analysis is urgently needed. Between the mainstream methods of simulation analysis and formal verification techniques, the former cannot solve the problems of fault traversing, while the latter requires safety engineer mastering the principles, the specifications and skills of formal modeling and verification. This paper proposes an improved method of security simulation analysis based on system extended model, which integrated system normal behavior and fault behavior model. For common systems, the safety analysis and verification were performed through fault injection. For systems with strict security requirements, based on the system expansion model, the formal model transformation was directly implemented, and the problems of repeated manual modeling and manual setting of linear temporal logic specifications were solved, thus the automatic conversion of the simulation verification model to the formal verification is realized. At the end of the paper, the safety analysis and verification results by the improved method of the typical electromechanical system, were consistent with the ones of traditional method, then the feasible conclusions of the improved method are obtained.

16:00

Aircraft Safety Requirement Analysis Method in The Framework of MBSE

Yani ZHANG AVIC China Aero-Poly Technology Establishment

ABSTRACT

Safety is an important issue in civil/military aircraft design. With the increasing complexity of aircraft requirements, functions and design, safety design is facing many challenges. In recent years, Model-based Systems Engineering (MBSE) has become a recognized and complex-oriented design method. Many literatures have discussed the relationship between MBSE and safety design, but the main concern is the integration of MBSE and safety analysis, while little attention has been paid to the origin of safety work - safety requirements. In this paper, a method of safety requirement analysis based on MBSE is proposed. It is discussed how to synchronously identify the potential functional hazards and impacts of aircraft in the framework of MBSE, and how to put forward safety design requirements. This paper adopts DoDAF view modeling method and SYSML modeling language of the US Department of Defense to establish the mapping relationship between aircraft use scenarios and "use-function"; at the same time, it studies the mapping relationship between SYSML modeling language and safety modeling language Altarica, in order to synchronously integrate the hazard analysis model based on the operational view and system view established by DoDAF, and drive the safety requirement analysis. Finally, this paper illustrates the implementation process of this technology with a practical case.

16:30

Landing under Extreme Conditions: Early Safety Screening by Means of the 'Pilot - Automaton - Aircraft - Operating Environment' System Dynamics Model

Dr. Ivan BURDUN AIXTREE S.A.S.
Dr. Alexander GREBENKIN MIEA PJSC

ABSTRACT

Aircraft dynamics at landing is characterized by multi-peak superposition of external forces and moments. Landing under extreme conditions requires accurate control of the flightpath and velocity vector. Potentially unsafe landing situations are a result of complex cross-couplings of several heterogeneous phenomena. The latter include: aerodynamics (standard and non-standard configurations), gravity (weight, moments of inertia, and the center of gravity), propulsion (direct and reverse thrust, including asymmetries), undercarriage reactions and tires-runway contacts (including effects of speed-dependent rolling friction, aquaplaning, and wet, icy and other contaminated runway surface conditions), direct lift and drag control, wheels braking (torques, anti-lock control, nose wheel steering), strong varying wind (crosswind, tailwind, windshear, etc.), heavy rain, poor visibility, piloting techniques and pilot errors (in aircraft attitude/energy control), mechanical and logical failures of onboard subsystems. Consequently, the number of off-nominal landing test cases comprising several risk factors can increase dramatically.

A study of complex landing situations under extreme conditions for a fly-by-wire commercial aircraft is presented. A virtual flight test and safety assessment technology is employed for early screening of large multifactorial landing domains where other research methods may exhibit combinatorial and technical limitations leading to cost and schedule overruns. A high-fidelity mathematical model of the 'pilot - automaton - aircraft - operating environment' system dynamics serves as an autonomous high-throughput fast-time flight research tool. A generalized flight situation model and semi-empirical models of key risk factors (extreme operating conditions) are introduced. A robust technique for aircraft landing control (including manual and automatic elements) is demonstrated to minimize the risks of runway lateral excursions and overruns. Requirements are formulated with regard to the aircraft parametric definition and real flight data mandatory for validation purposes. Recommendations are made on future developments, applications and constraints of the system dynamics model in takeoff and landing studies for safety prediction and protection.

全球工业安全生产	
15:30	**基于系统扩展模型为安全仿真分析打造的改进方法** **宋 佳** 中国航空综合技术研究所 **摘要** 随着航空系统日趋复杂，严格的安全分析势在必行。主流方法有仿真分析和形式验证——前者无法解决故障穿越的问题，而后者对安全工程师要求极高，工程师需要掌握原理、形式化建模的规范和技巧及验证。本论文基于系统扩展模型提出了安全仿真的改进方法，将系统正常行为同故障行为模型结合。对于常见系统而言，安全分析和验证是通过故障注入完成的。而对于具备严格安全要求的系统，形式模型转化直接以系统扩展模型为基础得以完成，重复的手动建模和手动设定线性时序逻辑规格的问题由此得到解决，进而实现仿真验证模型向形式验证的自动转换。论文末尾呈现了采用改进后典型机电一体化系统所得出的安全分析与验证结果，发现同传统方法得出的结果一致，由此得出改进方法可行的结论。
16:00	**MBSE 框架下的飞机安全要求分析方法** **张雅妮** 中国航空综合技术研究所 **摘要** 在民航和军用飞机设计中，安全是一个关键的命题。飞机的要求、功能和设计均日趋复杂，安全设计也因此面临多重挑战。近年来，基于模型的系统工程（MBSE）成为一种应对复杂性的设计方法并广受认可。许多论文探讨了 MBSE 和安全设计之间的关系，但大多主要关注 MBSE 和安全分析的结合问题，少有研究着眼于安全工作的根源——安全要求。本论文基于 MBSE 提出了一种安全要求分析方法。论文在 MBSE 框架下讨论了如何同步识别功能隐患和飞机的影响，并且探讨了如何提出安全设计要求。论文采用了美国国防部的 DoDAF 视图建模方法和 SYSML 建模语言，建立了飞机使用情境和“使用功能”之间的映射关系；同时，论文也研究了 SYSML 建模语言和安全建模语言 Altarica 之间的关系，从而同步整合以 DoDAF 建立的操作视图和系统视图为基础形成的风险分析模型，并推动安全要求分析。最后，论文列举了一项实例论证该项技术的应用过程。
16:30	**极端情况下的降落：通过“驾驶 - 自动化 - 飞机 - 操作环境”系统动力学模型进行早期安全筛查** **Ivan BURDUN 博士** AIXTREE S.A.S. **Alexander GREBENKIN 博士** 莫斯科机电与自动化研究所 **摘要** 飞机着陆动力学的特点是外力矩和受力的多峰叠加。在极端情况下着陆对航线和速度矢量的精准控制有很高要求。存在危险性的着陆情境是几种多相物理效应进行复杂交叉耦合的结果。后者包括：空气动力学 (标准或非标准配置)、重力 (重量、惯矩和重心)、推进 (直接和反向推力 , 包括不对称)、底盘反应和轮胎 - 跑道接触 (包括速度相关的滚动摩擦、漂滑现象、湿、冰和受污染的跑道表面效果)、直接升力和牵曳控制 (借助扰流板等)、车轮刹车 (扭矩、防抱死控制、前轮转弯)、强变风场 (侧风、顺风、风切变等)、大雨、能见度低、驾驶技术和飞行员失误 (姿态控制)、机载子系统的机械和逻辑故障。因此，具有多重风险的非常态着陆情境数量可能大幅上升。 有一项对于极端运行条件下现实着陆案例的研究选取了配备电传飞控系统的商用飞机作为研究对象。在进行广泛的非常规着陆情境早期筛查中采用的是虚拟靶试和安全评定技术，相比之下，其他研究方法可能出现组合、预算和安排上的限制。“驾驶 - 自动化 - 飞机 - 操作环境”系统动力的高保真数学模型是自动夏令时高通量飞行研究工具。研究中介绍了一般飞行情境模型和关键运行条件的半经验模型，并提出强劲的航向控制系统（包括手动和自动元素）以防范测跑道偏离。基于飞机“参数定义”和真实飞行数据记录形成要求，这对于系统动态模型的检验和确认而言也是必须具备的。研究为系统动力模型的未来发展、应用和限制提出建议。

徐秉良

SAE International
中国区总经理

Billy XU

General Manager, China
SAE International

周新民

中国商用飞机有限责任公司
党委常委、副总经理

周新民，1991 年 8 月参加工作，1999 年 6 月入党，硕士研究生，工程硕士。曾任 372 厂工艺员、室副主任；昌河飞机工业（集团）有限责任公司工艺处 CAM 室主任，直升机公司工程技术处副处长，直升机公司工程技术部部长，工程技术部部长兼总工艺师、党支部书记，副总工程师兼工程技术部部长、总工艺师，副总经理兼总工程师、科技委主任、总法律顾问，董事、总经理、党委副书记、科技委主任、江西昌河航空有限公司监事，董事长、党委书记、科技委主任、总法律顾问。现任中国商用飞机有限责任公司党委常委、副总经理。

曾获江西省劳动模范、全国五一劳动奖章等荣誉称号。

第十三届全国人民代表大会代表。

Xinmin ZHOU

Member of the Standing Committee of COMAC & Vice President
Commercial Aircraft Corporation of China, Ltd.

Mr. Zhou Xinmin, started his career in August 1991, joined the Communist Party of China (CPC) in June 1999, and graduated as a master postgraduate and a master of engineering. He served successively as Technologist and Deputy Director of Technology Office of Factory 372; Director of CAM Office of Technology Division of AVIC Changhe Aircraft Industry (Group) Corporation Ltd. (CHAIC); Deputy Director of Engineering Technology Division of Helicopter Company; General Manager of Engineering Technology Department of Helicopter Company; General Manager & Chief Technologist and Secretary of Party Branch of Engineering Technology Department of CHAIC; Deputy Chief Engineer & General Manager and Chief Technologist of Engineering Technology Department of CHAIC; Vice President & Chief Engineer, Director of Science and Technology Committee, and Chief Law Officer of CHAIC; Director, President, Deputy Secretary of the Party Committee, and Director of Science and Technology Committee of CHAIC, and Supervisor of Jiangxi Changhe Aviation Industry Co., Ltd.; and President, Secretary of the Party Committee, Director of Science and Technology Committee, and Chief Law Officer of CHAIC. He is currently a Member of Standing Committee of the Party Committee and Vice President of Commercial Aircraft Corporation of China, Ltd. (COMAC).

He was once awarded with the Model Worker of Jiangxi Province, and National May 1st Labor Medal.

He is a delegate to the 13th National People's Congress.

于乃江 博士

中国航发商用航空发动机有限责任公司
副总设计师、科技委副主任

于乃江，工学博士，自然科学研究员，享受国务院特殊津贴专家，上海市五一劳动奖章、航空报国金奖获得者，2017 年入选闵行区领军人才培养计划、2018 年入选上海市领军人才培养计划。曾组织参与了太行发动机原型机及其部分派生型号研制，获国防科技进步特等奖。现任中国航发商用航空发动机有限责任公司副总设计师、科技委副主任、长江 1000 项目常务副总师。

Dr. Naijiang YU

Deputy Chief Designer / Deputy Director of Science and Technology Commission
AECC Commercial Aircraft Engine Co., Ltd.

Yu Naijiang, doctor of engineering, researcher of natural science, expert of special allowance of the State Council, winner of the May 1st Labor Medal of Shanghai and the Gold Prize of Aviation Service for country, was selected in the leader training plan of Minhang District in 2017 and leader training plan of Shanghai in 2018. He has organized and participated in the development of Taihang engine prototype and some derivative types, and won the first prize in national defense science and technology progress. He is currently deputy chief designer, deputy director of the Science and Technology Commission of AECC CAE, and executive deputy chief designer of the CJ-1000 series Project.

陈 勇

中国商用飞机有限责任公司
工程总师、ARJ21 飞机总设计师

陈勇，现任 ARJ21 飞机总设计师，中国商用飞机有限公司工程总师、科技委常委，主管公司标准规范手册编制、专业能力建设以及 ARJ21 项目适航取证、批产运营、持续改进等工作。毕业于西北工业大学飞机设计专业。具有 30 年飞机设计经验，先后从事过 8 个飞机项目的设计工作。目前担任工信部民机预研飞机组组长，兼任上海交通大学博士生导师、西北工业大学硕士生导师。

Yong CHEN

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

Chen Yong is Chief Designer of ARJ21, Chief Engineer and member of Standing Committee of Science and Technology at COMAC in charge of the development of corporate standards, specifications and manuals; expertise building; airworthiness certification, production approval, operation and continuous improvement for ARJ21 project. Chen studied aircraft design at Northwestern Polytechnical University. Throughout his career of 30years, he has been worked on 8 aircraft design projects. He is now head of civil aircraft advanced research team at Ministry of Industry and Information Technology, Doctoral Supervisor at Shanghai Jiaotong University and Master's Supervisor at Northwestern Polytechnical University.

盛世藩 博士

获奖者

上海飞机设计研究院
海外专家、高级技术研究员

盛博士为中国商飞上海飞机设计研究院海外专家 / 高级技术研究员，拥有超过 30 年的项目管理、建议开发、系统工程、质量管理、信息技术及软件工程经验，目前的主要工作包括组织发展、能力建设、性能测量、系统工程、系统集成和培训研讨会开发方面的战略规划。盛博士已在美国土木工程师协会期刊（Journal of the American Society of Civil Engineers）和国际土木工程大会（International Conference on Civil Engineering）陆续发表了 6 篇论文，并在 1978 年、1994 年和 2010 年分别获得三个研究模型的专利版权。盛博士是美国波多里奇国家质量奖（Malcolm Baldrige National Quality Award）的裁判和评审员，曾在加州波多里奇质量检测董事会（California State Baldrige Quality Examiner Board）任职，专业流程与战略规划方向。此外，盛博士最近还入选了中国“千人计划”及上海科技领域“千人计划”专家引进项目。

Dr. Richard (Rich) SHENG

Award Winner

Oversea Expert / Senior Technical Fellow
Shanghai Aircraft Design and Research Institute

Rich is currently an Oversea Expert/Senior Technical Fellow for The COMAC Shanghai Aircraft Design and Research Institute and his main job functions are strategic planning for organizational development, capability building, performance measurement, system engineering, system integration, and training course development. He has over 30 years of experience in Project Management, Proposal Development, System Engineering, Quality Management, Information Technology, and Software Engineering fields. Rich has published six papers in the Journal of the American Society of Civil Engineers and the International Conference of Civil Engineering. He had his three research models patented and copyrighted in 1978, 1994, and 2010. He is also a nationally certified Malcolm Baldrige judge and examiner, specializing in Processes and Strategic Planning; served on California State Baldrige Quality Examiner Board. Rich also speaks fluent Mandarin and English and has good communication skills in both writing and speaking. Recently he has become China National 1000 Plan Expert and also Shanghai 1000 Plan Expert in the Science and Technology field.

Forest R. McFarland 奖

该奖项旨在表彰为 SAE 工程技术会议委员会（EMB）作出杰出贡献的个人，获奖者通过技术会议、学术大会及职业发展项目或工程技术会议委会员的运营促进、加强技术信息交流，从而对工程技术会议委会员的项目规划、开发和信息传播方面具有重大贡献。

Forest R. McFarland 奖项设立于 1979 年，由 SAE 工程技术会议委员会进行管理。该奖项是以已故 Forest R. McFarland 先生的名字命名。Forest R. McFarland 是一名杰出的会议组织者、乘用车活动主席和工程持术会议委员会的成员。该奖项的基金来自于 McFarland 先生的向 SAE 的捐赠。

Forest R. McFarland Award

This award recognizes individuals for their outstanding contributions toward the work of the SAE Engineering Meetings Board (EMB) in the planning, development, and dissemination of technical information through technical meetings, conferences, and professional development programs or outstanding contributions to the EMB operations in facilitating or enhancing the interchanges of technical information.

Established in 1979, this award is administered by the EMB and honors the late Forest R. McFarland who was himself an outstanding session organizer, a chairman of the Passenger Car Activity and a member of the EMB. Funding for this award is through a bequest by Mr. McFarland to SAE and consists of a framed certificate presented at the SAE World Congress.

常建卫 博士

中国航发商用航空发动机有限责任公司
材料工艺部副部长

常建卫是中国航发商用航空发动机有限公司设计和研究中心材料和流程部门的高级工程师和副总监。他在 2001 年和 2004 年于中南大学分别取得了有色金属冶金的本科和硕士学位，之后进入上海交通大学深造，于 2008 年获得材料加工博士学位，后于 2010 年 12 月成为机械工程专业博士后。他之后加入 AECC，负责飞机发动机材料和流程。他参加过由上海市科技委员会重大科技项目、863 计划、国家自然科学基金委员、973 计划、中国博士后科学基金会和上海博士后科学基金会支持的 10 多个项目，也担任过个别项目的项目主管。他发表了 25 篇论文，内容涉及锂电池阳极、镁合金腐蚀和保护、镁合金功能材料、飞机发动机材料和流程等众多领域。

Dr. Jianwei CHANG

Deputy Director at Department of Material and Process at Design & Research Center
AECC Commercial Aircraft Engine Co., Ltd.

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.

李浩敏

中国商飞 CR929 副总设计师
SAE S-18 民用飞机与系统开发和安全性评估委员会 委员

李浩敏，研究员、硕士、CR929 飞机副总工程师，SAE 2-18 民用飞机与系统开发和安全性评估委员会委员。曾获部级科技奖三等奖（第一名）。

负责 C919 飞机的系统综合和 CR929 飞机的顶层设计。制定了 C919 飞机水平功能和要求，建立了 C919 飞机需求管理系统。建立了 CR929 项目中的系统工程流程。

翻译了两本有关需求工程的书籍并出版数篇有关 SE 的论文。

Haomin LI

CR929 Deputy Chief Designer, Commercial Aircraft Corporation of China, Ltd.
SAE S-18 Aircraft and Systems Development and Safety Assessment Committee Member

Haomin Li, fellow, master, CR929 aircraft deputy chief engineer, Member of SAE S-18 civil aircraft and systems development and safety assessment committee. Third prizes (ranked first) of science and technology awards at the ministry level twice.

Responsible for the system synthesis of C919 aircraft and the top-level design of CR929 aircraft. Defined the C919 aircraft level functions and requirements, established the C919 aircraft requirements management system. Established the system engineering process in CR929 program.

Translated two books about requirements engineering, and published several papers about SE.

Fernando Grau

巴航工业
亚太及中国市场情报总监

Grau 先生在航空领域有二十余年的经验，其中 18 年是在中国，负责巴西航空工业公司在亚太、中国大陆、香港、澳门和蒙古地区同市场信息相关的销售业务。

1997 年，Grau 先生进入巴西航空工业公司，担任地区喷气客机 ERJ 系列和“超级巨嘴鸟”军事培训项目的产品开发工程师，负责动态载荷领域，专攻落地齿轮负载、飞机结构性气动固有振动和武器分离载荷。

两年后，他继续担任一家货运航空公司总裁助理，管理国内和国际货运服务的一队波音 727 飞机。Grau 先生通过解决几项商业问题获得了第一手经验，包括舰队规划、航线选择、价格构成、运行成本分析和航线 KPI 管理报告。

Grau 先生再次进入巴西航空工业公司担任销售工程师和市场分析师，随后很快于 2000 年被派往中国任职，支持公司在北京新建的代表办公室，当时同时负责商业和行政专机推广。

他拥有西班牙和巴西双重国籍，同巴西籍妻子和两个儿子定居在中国，两个孩子都出生在北京。他酷爱摄影，喜欢传统电影也热爱数字媒体，喜欢钢琴曲、西班牙美食 / 烹饪，以及钓鱼、徒步和帆船等户外运动。

Grau 先生拥有巴西航空理工学院飞机设计专业理学学士学位和美国罗格斯新泽西州立大学国际商业管理专业 MBA 学位。

Fernando Grau

Director of Market Intelligence for Asia Pacific & China
Embraer

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 Singapore 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.

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.

Sarbhpreet S. Sawhney

美国联邦航空管理局
亚太地区高级代表

Sarbhpreet S. Sawhney 是亚太地区高级代表，常驻新加坡，就任于美国联邦航空管理局（FAA）航空安全与飞机认证服务办公室。他负责处理同合作民用航空机关的双边关系，并同地区航空主管部门和组织建立战略合作伙伴关系，以推动适航性和航空安全提案方面的协作。

在此之前，Sarbhpreet 担任飞机认证服务国际部经理，领导机构和 FAA 层面的国际战略发展。他领导了战略提案的实施，提升了同外国航空主管部门双边合作关系的效率和效果。

Sarbhpreet 于 2002 年进入 FAA，任认证工程师一职。他在 FAA 工作期间曾负责适航性政策、安全监管和国际关系立场相关工作。他领导了飞机认证政策和规则制定项目，并支持了航空安全相关立法发展。

在进入 FAA 之前，他就职于亚特拉斯航空，担任航空工程师和经理一职，负责波音 747-200/-400 承运工程和维护项目。

Sarbhpreet 拥有纽约大学工学院机械工程理学学士学位和管理学理学硕士学位。他也持有 FAA 机身和动力装置许可证。

Sarbhpreet S. Sawhney

Senior Representative, Asia-Pacific
FAA

Sarbhpreet S. Sawhney is the Senior Representative assigned to the Asia-Pacific region and based in Singapore for the FAA's Office of Aviation Safety, Aircraft Certification Service. He is responsible for managing bilateral relationships with partner civil aviation authorities and establishing strategic partnerships with regional aviation authorities and organizations to promote collaboration in airworthiness and aviation safety initiatives.

Prior to this, Sarbhpreet served as the Manager of the International Division for the Aircraft Certification Service and provided leadership in the development of international strategy at the organization and FAA level. He led the implementation of strategic initiatives to improve efficiency and effectiveness of bilateral partnerships with foreign aviation authorities.

Sarbhpreet joined the FAA in 2002 as a certification engineer. He has served in airworthiness policy, safety oversight and international relations positions throughout his career with the FAA. He has led aircraft certification policy and rulemaking programs and supported development of aviation safety related legislation.

Prior to the FAA, he was with Atlas Air Inc., where he was an aerospace engineer and Manager responsible for Boeing 747-200/-400 freighter engineering and maintenance programs.

Sarbhpreet holds a Bachelor of Science in Mechanical Engineering and a Master of Science in Management, both from the New York University Tandon School of Engineering. He is also holds FAA Airframe and Powerplant licenses.

Kurt Acheson

波音商用飞机
推进集成首席工程师

Acheson 先生来自波音商用飞机，是推进集成首席工程师。他是流体力学和吸气式推进系统领域的专家，在复杂系统集成、进气口 / 尾喷口 / 引擎舱的气动设计、计算流体动力学、风洞试验和全尺寸试验方面也有丰富专业经验。在航空领域从业三十年来，他设计了许多飞机，包括军用平台，且为波音 787 梦想飞机（Dreamliner）、747-8 洲际型（Intercontinental）、737 MAX 等商用运输飞机的改进发展做出贡献，当前也致力于新机型新中间市场（Middle-of-the-market）的开发。

Kurt Acheson

Propulsion Integration Lead Engineer
Boeing Commercial Airplanes

Mr. Acheson of Boeing Commercial Airplanes is a Propulsion Integration Lead Engineer. He is a specialist in fluid mechanics and air breathing propulsion systems with expertise in complex systems integration, aerodynamic design of inlets/nozzles/nacelles, computational fluid dynamics, wind tunnel testing, and full scale testing. In his 30 years in aerospace, he has worked on a number of aircraft to include military platforms, and contributed to development of commercial transport aircraft such as the 787 Dreamliner, 747-8 Intercontinental, 737 MAX, 777X and the New Middle-of-the-market Airplane currently in development.

Charles Jullien

赛峰电气与电源公司
EMC 工程师

Charles Jullien 拥有蒙彼利埃科学大学计算物理学专业硕士学位，2013 年获得雷恩电子与通讯研究院电子与通讯博士学位。自 2012 年 11 月以来，他任职于法国布拉尼亚克赛峰电气与电源公司。他是 EWISe 部门研究与技术部的 EMC 团队中的一员，2015 年以来，他进入 EMC 电器线束建模专家协会。他的研究兴趣包括航空线束和屏蔽线束的电磁耦合建模。

Charles Jullien

EMC Engineer
Safran Electrical & Power

Charles Jullien received the Master's Degree in computational physics from Université des Sciences de Montpellier and the Ph.D. degree in electronics and telecommunication from the Institut d'Electronique et de Telecommunications de Rennes in 2013. Since November 2012, he is currently with Safran Electrical & Power, Blagnac, France. He is working in the EMC team of R&T Department of EWISe Division and, since 2015, he is currently expert society in EMC electrical harness modeling. His research interest includes modeling electromagnetic coupling in aeronautical harness and over shielding harnesses.

祝 钦

中国航发商用航空发动机有限责任公司
适航中心首席工程师

祝钦是中国航发商用航空发动机有限责任公司（简称中国航发商发）适航中心的首席工程师，负责 SAE ARP4754A，RTCA DO -178C 合规 , CCAR33.75 和开发保证系统的流程改进与执行。

祝钦于 2018 年加入中国航发商发。在此之前，她在霍尼韦尔公司和昂际航电工作了 13 年。祝钦在系统与软件开发和 CAAC/FAA/EASA TC/STC/TSO 项目认证上有丰富经验。她现在是 SAE S-18 委员会一名有投票权的成员，并且参与系统和安全相关标准的制定。

Qin ZHU

Principal Engineer of Airworthiness Center
AECC Commercial Aircraft Engine Co., Ltd.

Qin Zhu is the Principal Engineer of Airworthiness Center in AECC-CAE, she takes responsibility of SAE ARP4754A, RTCA DO -178C Compliance, CCAR33.75 and Process Improvement and Execution of Development Assurance System.

Qin Zhu joined AECC-CAE in 2018. Prior to joining AECC-CAE, she worked for Honeywell and AVIAGE SYSTEMS for 13 years. Qin Zhu has rich experience in System and Software Development and Certification of CAAC/FAA/EASA TC/STC/TSO Programs. She is currently a voting member in SAE S-18 Committee and is participating in the development of System and Safety related standards.

Weiliang LOU 博士

IET
创始人

Weiliang Lou 是 IET 有限公司的创始人。IET 是一家位于英国的航空航天工程咨询公司，向全球客户提供工程服务、高管培训和专业资源。

在创办 IET 之前，Lou 的工作经历主要集中于欧洲航空航天业。他曾是空客集团的编程主管；罗罗公司审计团队成员、制造工程主管和新产品开发经理；以及 MTU 航空航天发动机技术经理。

Lou 持有中国浙江大学的机械工程学士与硕士学位，以及柏林技术大学飞机推进工程博士学位。

Dr. Weiliang LOU

Founder
IET

Weiliang Lou is the founder of IET Limited. IET is an aerospace engineering consultancy firm based in the United Kingdom and provides engineering services, executive training and professional resources globally.

Prior to that, Weiliang spent his professional life in the aerospace industry in Europe, was Head of Programmes at Airbus Group; Panellist of the Company audit team, Chief of Manufacturing Engineering and New Product Introduction Manager at Rolls Royce; and Technology Manager at MTU Aero Engines.

Weiliang received his B.Sc. and M.Sc. in Mechanical Engineering from Zhejiang University and his Ph.D. in Aircraft Propulsion Engineering from the Technical University Berlin.

Andy Wallington

Electron International II Inc
项目经理

Andy Wallington 是 SAE 安全技术项目委员会主席，《ARP4754B 民航飞机及系统开发指南》的文献赞助人，并积极参与《AS7209 开发保证目标标准》的编纂。自 2005 年起就是 S-18 委员会的活跃成员。他参加了多个认证机构与行业工作小组。他曾是 RTCA SC-200 和 SC-205 委员会的成员，分别负责 DO-297 和 DO-178C 标准的开发。作为一名经验丰富的飞机及系统安全与适航性认证工程师，Andy 目前正和 EII International 与 FACRI 合作，以顾问的身份对其飞行控制与 FMS 项目提供支持。

Andy Wallington

Program Manager
Electron International II Inc

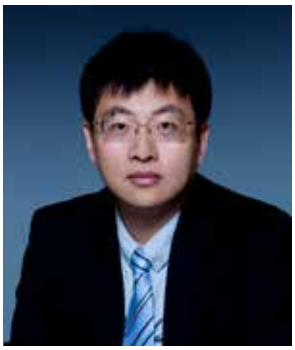
Andy Wallington is the SAE Technical Program Committee Safety Chair. He is the document sponsor for ARP4754B, Guidelines for Development of Civil Aircraft and Systems and has been actively involved in the development of AS7209, Development Assurance Objectives Standard. He has been an active member of the S-18 committee since 2005

Andy participates in various certification authority and industry working groups. He was a member of the RTCA SC-200 and SC-205 committees responsible for DO-297 and DO-178C respectively

An experienced aircraft and system safety and airworthiness certification engineer, Andy is currently working with EII International, in collaboration with FACRI, as a consultant on their Flight Controls and FMS programs

钱煜平 博士

清华大学
车辆与运载学院助理研究员



钱煜平，工学博士，清华大学车辆与运载学院助理研究员。

研究领域：用于电动航空和飞行器的电动推进导管风扇系统，电动 / 混合推动系统的热管理。

钱煜平博士自 2016 年起主管同亚琛工业学院的合作研究项目“基于燃气涡轮的电动推动系统设计和分析”。该项目通过研究电力和能源二元混合的不同程度开发出一种迭代设计方法。此外，他们还共同开发出一种全新的设计和仿真程序 / 软件，可用于电动航空的混合电力推动系统。

Dr. Yuping QIAN

Assistant Researcher Fellow at the School of Vehicle and Mobility
Tsinghua University

Yuping QIAN, Assistant Researcher Fellow at the School of Vehicle and Mobility, Tsinghua University.

Research areas: Electric ducted fan propulsion for electric aviation and flying vehicles, and thermal management in electric/hybrid propulsion system.

Since 2016, working as project leader of the joint research project "Gas Turbine Based Hybrid Electrical Propulsion System Design and Analysis" with RWTH Aachen University. It developed an iterative design method through bivariate mixing degrees of power and energy. Further, a new design and simulation program/software was jointly developed for hybrid electric propulsion system in electric aviation.

Christine DeJong

GAMA
全球创新与策略总监

Christine DeJong 在 2019 年 1 月加入 GAMA，担任全球创意和政策总监，负责支持新型技术和创新计划。Christine 同各国航空领域的专家共同合作，引领我们进入了航空领域的新时代。Christine 同全球关键的航空领域利益相关者共同协作，包括监管方、政府部门、飞机运营方、制造商和标准制定机构，努力推行新的飞行能力和技术。Christine 支持 GAMA 电动创新委员会 (EPIC) 的贡献，助力航空创新的设计和运营，如混合动力和电动飞机以及增强自动化等。

Christine DeJong

Director of Global Innovation and Policy
GAMA

Christine DeJong joined GAMA as Director of Global Innovation and Policy in January 2019, a role in which she is responsible for supporting emerging technologies and innovation initiatives. Christine is working with the world's aviation experts to introduce the next era of aviation. Through collaboration with key global aviation stakeholders including regulators, government bodies, aircraft operators, manufacturers and standards development organizations, Christine works to enable new flight capabilities and technologies. Christine supports the GAMA Electric Propulsion Innovation Committee (EPIC) which is empowering the design and operation of new aviation innovations including hybrid and electric aircraft and increased automation.

Juan Carlos Munguia Castañeda

M Aerospace RTC 工程总监
SAE 航空材料规范增材制造委员会 成员

Juan Carlos Munguia Castañeda 是克雷塔罗航空大学的一名航空工程师，拥有墨西哥 CETYS 大学的航空设计理科硕士学位并且得到伦敦帝国理工学院创新和创业认证。他是 M Aerospace RTC 的联合创始人和工程总监，并且作为 SAE AMS 成员在增材制造技术发展方面深耕五余年。他曾任柯林斯航空的设计工程师和赛峰航空集团的结构工程师。

Juan Carlos Munguia Castañeda

Director of Engineering, M Aerospace RTC
Member, SAE AMS AM Committee

Juan Carlos Munguia Castañeda is an Aeronautic Engineer from the University of Aeronautics in Querétaro with an MSC on Aerospace Design by Centro de Enseñanza Técnica y Superior Campus Mexicali and an Innovation and Entrepreneurship Certificated from the Imperial London College. He is co-founder and Engineering Director of M Aerospace RTC and have being working for more than 5 years on the Additive Manufacture Technology Development working as a SAE AMS Member, his previous works were as a Design Engineer at Collins Aerospace & also as a Structural Engineer for Safran Aerospace Group.

周国华

上海宝尔捷自动化
副总裁

Walter Zhou 是上海宝尔捷自动化副总裁，于 2017 年 10 月加入宝尔捷自动化集团。Walter 的职责是在中国推进面向航空公司的市场营销。他重点关注 AC 组装线设计和项目整合，工作职责涵盖从规划咨询到维护服务的广泛内容。Walter Zhou 开发了在中国的关键客户，如中国商飞（COMAC）和航空工业（AVIC），也参与了中国主要市场的成长进程。他在处理同航空业客户和政府官员关系上有丰富经验，与各个合作伙伴建立了良好的关系，保证了宝尔捷业务的顺利开展。

Walter Zhou 毕业于上海外国语大学和上海电机学院，就读专业分别为英语和电测。Walter 1990 年毕业后进入上海电气集团（简称上海电气，中国最大的装备制造集团），并在集团多个业务部门任职，在自动化方面积累了丰富经验。他参与的工作包括 Co-robot、MES 系统、上海电气自动化设计研究所非标自动化生产总装线、C919 中机身装配线和襟翼装配线，以及英航中国的前机身 CR929 标底。

Walter Zhou 在上海电气担任过多项职位，后被任命为上海电气自动化项目部副总裁。现在，Walter Zhou 担任上海宝尔捷自动化副总裁，负责市场营销和销售。

Walter ZHOU

Vice President
Broetje Automation (Shanghai)

Walter Zhou, vice president of Broetje Automation (Shanghai), joined Broetje -Automation Group in October 2017. Walter's role is to develop marketing and sales among aerospace companies in China. He mainly focuses on AC assembly line designing and project integration. His working scope covers from planning and consulting to maintenance and service. Walter Zhou has developed key customers in China, such as COMAC and AVIC. Walter has also involved in the growing up of China major market. He is well experienced in dealing with customers of aerospace industry and government officials. He has established good relationship with different partners to ensure the smooth operation of Broetje's business.

Walter Zhou graduated from Shanghai International Studies University and Shanghai College of Electromechanical, majored in English and electrometrical correspondingly. Walter joined Shanghai Electric Group Company (hereinafter called SEC, the largest equipment manufacturing group in China) after his graduation in 1990. He has worked in various business units in this company group, and has abundant experience in automation. He has worked for Co-robot, MES, Non-standard automatic production final assembly line in Shanghai Electrical Automation D&R Institute, C919 Middle fuselage assembly and flap assembly line, CR929 pre-tender in FWD fuselage in BA China.

In SEC, Walter Zhou has taken various roles in different sectors and finally was nominated as vice president of Automation Project Department of SEC. Now, Walter Zhou is vice president of Broetje Automation (Shanghai), responsible for marketing and sales.

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王智永 博士

永虹先进材料股份有限公司
首席执行官

2007 年，王智永博士毕业于台湾清华大学材料工程，王博士进入台湾工研院作为研究员，其间开发了碳纤维超高温石墨化技术，尔后成立永虹科技公司，运用他在高性能碳纤维、复合材料、微波工程领域的专业，致力发展具价格竞争优势的中高阶碳纤维。王智永现任永虹先进材料 (股) 执行长及台湾先进复合材料协会 SAMPE 第十届理事，至今发表国内外期刊论文 6 篇，并取得国内外专利 24 件。

Dr. Ben WANG

CEO
UHT Unitech Co., Ltd.

Holding Ph.D. degree of Material Science and Engineering from National Tsing Hua University, Ben Wang served as researcher in Industrial Technology Research Institute after graduation during which he developed microwave ultra high temperature graphitization (abbreviated as MW-UHT). Then he founded UHT Unitech Co. Ltd., making use of his specialty in high performance carbon fiber, composites and microwave engineering to develop price competitive high-end carbon fiber. Currently, Ben Wang is the CEO of UHT Unitech Co., Ltd. and the tenth Director of SAMPE Taiwan. He has published 6 journals and obtained 24 patents domestically and internationally.

Sky Matthews

IBM Watson 研究中心
物联网部门首席技术官

Sky 是 IBM 的一名杰出工程师，现任 IBM Watson 研究中心物联网部门的首席技术官，负责物联网相关的技术战略和方向。Sky 曾与众多行业的客户合作开发复杂嵌入式系统，其中包括电信设备、航空航天与国防、汽车和电子行业。其目前的专业领域包括人工智能以及物联网、区块链、数字孪生、边缘计算和雾计算架构的分析。他还经常发表有关人工智能物联网应用的演讲。此前他曾是 IBM Rational 系统工程与嵌入式软件的首席技术官。目前的工作地点为加利福尼亚北部的科研三角园区。

Sky Matthews

CTO, Internet of Things Division
IBM's Watson

Sky is an IBM Distinguished Engineer and the CTO for IBM's Watson Internet of Things division. He is responsible for technical strategy and directions related to the Internet of Things within IBM. Sky has lengthy experience working with clients in complex and embedded systems development across many industries, including telecom equipment, aerospace/defense, automotive, and electronics. His current areas of focus include Artificial Intelligence and analytics for IoT, blockchain, digital twin, and edge and fog computing architectures. He is a frequent speaker on the application of AI in IoT. Prior to his current role, he was the CTO for the Systems Engineering and Embedded Software portfolio in IBM Rational. Sky is based in Research Triangle Park, North Carolina.

蒋 萍

昂际航电
航空和数字业务发展总监

蒋萍是昂际航电公司航空和数字业务发展总监，负责公司的航空、数字产品业务发展策略制定和实施。昂际航电，是由GE和中航工业合资组建的全球化公司，基于业界领先的综合模块化航电（IMA）和数字化开放架构平台不断创新，为下一代的商用飞机提供民用航电系统解决方案。

在加入昂际航电之前，蒋萍曾在美国波音工作 17 年。曾在很多部门任高级经理，包括电脑部门，工厂控制部门， 工业自动化部门，和航空数字化部门。 她曾经领导 My Boeing Fleet (波音售后数字化服务项目) 和物联网智能供应链项目。她是波音公司在美国工业互联网同盟的代表。她也是2008-2012 波音圣路易斯 RFID 射频技术的推广人。由于她的出色表现，她曾获得全美亚裔最佳工程师奖和科技全明星奖。

Grace JIANG

Director of Aviation & Digital Business Development
AVIAGE SYSTEMS

Grace is the Director of Aviation & Digital Business Development in AVIAGE SYSTEMS. She is responsible for the company's business development strategies for avionics products and digital solutions. 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.

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 and Production control. She successfully led IoT Smart Supply Chain project and My Boeing Fleet Digital Channel project. She was also the St. Louis Site leader for Radio Frequency Identification (RFID) deployment. Grace received Asian American Engineer of the year Award. (US National award). She was also a WOC Technology All Star Award winner.

Sven Taubert

汉莎技术有限公司
企业预测与市场情报主管

Sven Taubert 是汉莎技术有限公司（Lufthansa Technik）的航空工程师，作为企业预测与市场情报团队的主管，负责全球趋势、新技术发掘与竞争对手分析。他于 4 年前加入这家全球领先的 MRO 服务供应商，此前曾是德国汉堡应用航空学研究中心的一个战略性机舱研究项目的领队，并在汉莎机构担任现场经理。更早之前曾在空客公司从事技术研究。他曾参与过多种领域的工作，如 3D 打印、数字化、物联网、人工智能、网联、交互表面与人本设计。他曾于德国斯图加特大学和日本东京大学学习，持有航空航天工程学位。他还是 SAE 电动飞机转向小组的活跃成员。

Sven Taubert

Head of Corporate Foresight & Market Intelligence
Lufthansa Technik

Sven Taubert is an aerospace engineer working at Lufthansa Technik where he leads the Corporate Foresight and Market Intelligence team. He and his team are responsible for worldwide trends, technology scouting and competitor analyses. He joint Lufthansa Technik, the world's leading provider of MRO services, four years ago. Prior to his current position, he was responsible for a strategic cabin research program and site manager of the Lufthansa facilities at the Center of Applied Aeronautical Research in Hamburg, Germany. Previously, Sven was working the research and technology on behalf of Airbus. He gained experience in various fields like 3D printing, digitalization, internet of things, artificial intelligence, connectivity, interactive surfaces and human centered design. He studied at the University of Stuttgart, Germany and Tokyo University, Japan. He holds an aerospace engineering diploma. He is an active member of the SAE Electric Aircraft Steering Group.

Ravi Rajamani 博士

drR2 Consulting
首席咨询师

Ravi Rajamani 博士是一位独立咨询师，在航空推进与能源的各个领域具备多年经验，尤其是数据分析、基于模型的控制方法、诊断和预测。他也是航空系统系统工程方法方面的专家。他曾出版过包括《电动飞行技术：开创新未来》在内的三本书；为多本书撰写章节，执笔文献、会议论文和专利。在担任当前职位之前，Ravi 曾就任于美捷特集团、美国联合技术公司和通用电气公司。他获得了明尼苏达大学的博士学位和康涅狄格大学的 MBA 学位。他 的本科和硕士学位分别获得于位于印度德里的印度理工学院和班加罗尔的印度科技学院。他积极参与多个 SAE 技术委员会，着重关注 PHM 和电力推进相关问题。他也在 PHM 协会中积极发挥作用，担任理事职位。Ravi 担任克兰菲尔德大学和康涅狄格大学的客座讲师。他经选举成为国际自动机工程师学会（SAE International）和 IMechE 会员。

Dr. Ravi Rajamani

Principal Consultant
drR2 Consulting

Dr. Ravi Rajamani is an independent consultant who has accumulated years of experience in the all areas of aerospace propulsion and energy, specifically in data analytics and model-based methods for controls, diagnostics, and prognostics. He is also an expert on system engineering methods for aerospace systems. He has three books to his name including Electric Flight Technology: The Unfolding of a New Future; many book chapters, journal and conference papers, and patents. Prior to his current job, Ravi worked at Meggitt plc, United Technologies Corporation, and the General Electric Company. He has a PhD from University of Minnesota and an MBA from University of Connecticut. His bachelor's and master's degrees were from the Indian Institute of Technology, Delhi, and the Indian Institute of Science, Bangalore, both in India. He is active within various SAE technical committees dealing with PHM and electric propulsion. He is also active in the PHM Society, serving on its board of directors. Ravi has visiting positions at Cranfield University and at University of Connecticut. He has been elected a fellow of SAE International and of IMechE.

黄卫东 博士

西北工业大学 教授
西安铂力特公司 终身首席科学家

黄卫东，西北工业大学教授，西安铂力特公司终身首席科学家，国家杰出青年科学基金获得者，长江学者，国家科技部 3D 打印专家组首席专家，中国机械工程学会增材制造分会副理事长，3D 打印领域世界首本国际杂志《3D Printing and Additive Manufacturing》编委。

Dr. Weidong HUANG

Professor, Northwestern Polytechnical University
Lifelong Chief Scientist, Xi'an Bright Laser Technologies Co., Ltd. (BLT)

Weidong Huang is a professor at Northwestern Polytechnical University and a lifelong chief scientist of BLT. He has won the National Science Fund for Distinguished Young Scholars and has been listed as Chang Jiang scholar. He is also the chief scientist of the 3D printing panel, Ministry of Science and Technology, the Deputy Director of the Additive Manufacturing Committee, Chinese Mechanical Engineering Society, and also an editor of 3D Printing and Additive Manufacturing, the world's first international magazine in the field of 3D printing.

Alexandre Baudot

霍尼韦尔综合科技（中国）
增材制造经理

Alexandre Baudot 负责领导霍尼韦尔中国的增材制造（3D 金属打印）相关业务。从 2015 年开始，他建立并发展了霍尼韦尔上海增材制造基地。该基地目前正与欧洲、美国和印度的增材制造基地开展广泛合作，业务包括原型和模具制造、创新材料研发、打印工艺开发和优化、以及开发用于飞机生产的零部件等。

Alexandre Baudot 在汽车和航空航天工程领域拥有 13 年的多语言项目和基地领导经验，拥有完整的研发周期开发、工程、制造和供应链项目执行经验。

Alexandre Baudot

Additive Manufacturing Manager
Honeywell Integrated Technology (China)

Alexandre Baudot lead the Additive Manufacturing (3D metal printing) activities for Honeywell China. Starting in 2015, he has built and developed Honeywell Shanghai Additive Manufacturing site. The site is now manufacturing prototyping & tooling, developing new innovative materials, developing and optimizing printing processes, developing parts for production installed on aircraft in extensive collaboration with Europe, US and India AM sites.

Multilingual Program & Site leader with 13-year experience in the Auto & Aerospace Engineering Industries, he has experience with full R&D cycle development, engineering, manufacturing and supply chain program execution.

Bill Bihlman

Aerolytics 管理咨询公司
创始人兼总裁

Bill Bihlman 于 2012 年建立 Aerolytics 管理咨询公司，主要从事航空材料与结构公司的市场策略咨询，他还是北美、欧洲、亚洲和中东各大论坛的活跃演讲人。Bill 于 1995 年开始职业生涯，第一份工作是 Raytheon Aircraft 公司的工程师，此后担任过 AeroStrategy 的高级顾问。

目前正在普度大学攻读工业工程博士学位，重点研究领域是增材制造与航空供应链。他持有普度大学的机械工程学士与硕士学位、康奈尔大学的 MBA 和 MPA 学位，以及私人飞行员驾照。

Bill Bihlman

Founder and President
Aerolytics LLC

Bill 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.

Markus Dirscherl

LTI Motion
技术中心机床主管

- 大学研究生产和自动化
- 在工程、机械工具和机器人方面拥有 30 年经验
- 担任机床能力中心负责人 7 年之久

Markus Dirscherl

Head of Competence Centre Machine Tools
LTI Motion

- University studies production and automation
- 30 years of experience in engineering, machine tools and robots
- 7 years Head of Competence Centre Machine Tools

宋 佳

中国航空综合技术研究所
设备产品部门安全验证工程师

宋佳是中国航空综合技术研究所设备产品部门的安全验证工程师。她毕业于北京交通大学机械与电子控制工程学院，于 2011 年获控制科学与工程本科学历，2014 年获同专业硕士学历。她在机电和航空电子系统的安全性和可靠性（包括系统故障注入）有五年仿真和验证方面的经验。她当前的主攻领域是基于模型的安全和可靠性仿真与验证。

Jia SONG

Safety Verification Engineer of Equipment Product Department
AVIC China Aero-Poly Technology Establishment

Jia Song, is a safety verification engineer of Equipment Product Department in AVIC China Aero-Poly Technology Establishment. She was awarded a Control Science and Engineering bachelor degree in 2011 and a Control Science and Engineering master degree in 2014 from School of Mechanical, Electronic and Control Engineering, Beijing Jiaotong University. She has five years simulation and verification experience on safety and reliability of electromechanical and avionics system(including system fault injection). Her current research domain is model-based safety and reliability simulation and verification.

张雅妮

中国航空综合技术研究所
安全工程高级工程师

张雅妮是中国航空综合技术研究所安全工程高级工程师。她于 2004 年获得北航的自动化科学与电子工程本科学位，后于 2007 年获得北航的计算机科学与工程研究生学位。她投身航空嵌入式软件开发和软件安全有十多年的时间，当前研究方向为安全工程和基于模型的系统工程。

Yani ZHANG

Senior Engineer in Safety Engineering
AVIC China Aero-Poly Technology Establishment

Yani Zhang, is a senior engineer in safety engineering within AVIC China Aero-Poly Technology Establishment. She was awarded in 2004 with a bachelor in the Automation Science and Electrical Engineering from the Beihang University and in 2017 a master of entineering in Computer Science and Engineering from the Beihang University. She has been engaged in airborne embedded software development and software safety for more than ten years, and current research directions are safety engineering and model-based system engineering.

Ivan BURDUN 博士

AIXTREE S.A.S.
总裁兼科学总监

Ivan Burdun 博士曾在前苏联、英国、美国、俄罗斯和法国进行飞行安全应用研究和学术工作，积累了 40 年的跨文化经历。他的专长包括高精度数学建模、快速模拟、人工智能，以及非常态（多因素）和未知飞行状况下“领航 / 自动化 – 飞机 – 操作环境”知识挖掘和图谱。这方面的专业知识已经应用到 30 种机型和设计项目中：固定、旋转和倾转旋翼；次音速、超音速和特超音速。Burdun 博士当前的工作重点是有人和无人车辆与群体机器人操作安全预测和保护的智能技术：虚拟试飞和检定、系统动力中不可逆一场的鉴别和规避、知识核心自动化和认知界面。

Dr. Ivan BURDUN

President & Directeur Scientifique
AIXTREE S.A.S.

Dr. Ivan BURDUN has 40 years of cross-cultural experience of applied research and academic work for flight safety in ex-USSR, UK, USA, Russia, and France. His competences include high-fidelity mathematical modeling, fast-time simulation, artificial intelligence, and knowledge mining and mapping of the 'pilot/automaton - aircraft - operating environment' system behavior in off-nominal (multifactorial) and unknown flight situations. This know-how has been applied to 30 aircraft types and design projects: fixed-, rotary- and tiltrotor-wing; sub-, super- and hypersonic. Dr. BURDUN's current work is focused on intelligent technologies for operational safety prediction and protection in manned and unmanned vehicles and robotic swarms: virtual flight testing and certification, identification and avoidance of irreversible anomalies in the system dynamics, knowledge-centric automation, and cognitive interface.

Alexander GREBENKIN 博士

莫斯科机电与自动化研究所
部门主管

Alexander Grebenkin 博士在非定常气动力、自动飞行控制、飞行动力学建模与模拟（M&S）领域拥有 30 年以上的工作经验。1987 年获得空气动力学和飞行操作的博士学位。1993-2011 年就职于俄国 Egoryevsk 航空技术学院。2000 年获得空气动力学和飞行操作的科学博士学位。2001-2011 年于图波列夫飞机设计局的稳定与控制部门担任首席设计工程师（兼职），负责飞行建模与模拟以支持飞机认证项目。自 2011 年起担任莫斯科机电与自动化研究所（MIEA）PJSC 的部门主管。当前的研究方向包括空气动力学、飞行建摸模拟、遥控自动驾驶系统、自动控制算法合成。

Dr. Alexander GREBENKIN

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