



EVENT GUIDE

Includes Final Program
and Exhibit Directory

SAE 2016 AVIATION TECHNOLOGY FORUM

航空技术论坛

June 13 - 14, 2016


Shanghai, China

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HOSTS INTRODUCTION



SAE International is a global association of more than 143,000 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 12,000 experts from 56 countries—with European committee participation instances alone totaling 3,678. Its 150+ committees—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) is a state-owned limited liability company, which is formed with the approval of the State Council and 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 Limited (CHALCO), Baosteel Group Corporation, and Sinochem Corporation.

COMAC was held on May 11th, 2008, and headquartered in Shanghai. Mr. Jin Zhuanglong serves as Chairman and Secretary of the Party Committee of COMAC, and Mr. He Dongfeng as President.

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. The company has nine member organizations: Design, Research and Development Center of COMAC (Shanghai Aircraft Design & Research Institute), Manufacturing and Final Assembly Center of COMAC (Shanghai Aircraft Manufacturing Co Ltd.), Customer Service Center of COMAC (Shanghai Aircraft Customer Service Co., Ltd.), Beijing Research Center of COMAC (Beijing Aeronautical Science & Technology Research Institute), Civil Aircraft Flight Test Center of COMAC, Capability & Supporting Center of COMAC (Shanghai Aviation Industrial (Group) Co., Ltd.), News Center of COMAC (Shanghai Commercial Aircraft Magazine Co., Ltd.), COMAC Sicuan Branch (In Preparation), and COMAC America Corporation. COMAC has also had its Beijing Office, U. S. Office and European Office in Beijing, Los Angeles and Paris respectively, and set up a Financial Service Center in Shanghai. COMAC is a shareholder of Chengdu Airlines Co., Ltd. and SPDB Financial Leasing Co., Ltd.

JUNE 13, 2016 Monday	
9:00-9:15	Welcome Speech
9:15-10:00	Keynote The application of Additive Manufacturing (3D Printing) Technology in Civil Aviation
Tea Break	
10:30-11:30	Keynote Accident Investigation Leading to Design, Manufacture, and Maintenance of Better Aircraft
Lunch	
12:30-14:30	Modeling and Simulation This session focuses on the latest technology developments in modeling and simulation for aircraft systems. Topics will include fusion of technologies, virtual flight test, and multi-disciplinary simulation.
Tea Break	
15:00-16:30	Energy Conservation - Emissions Reduction This session covers advances in design for reduced aircraft emissions, including engine designs, advanced battery management, and fuels.

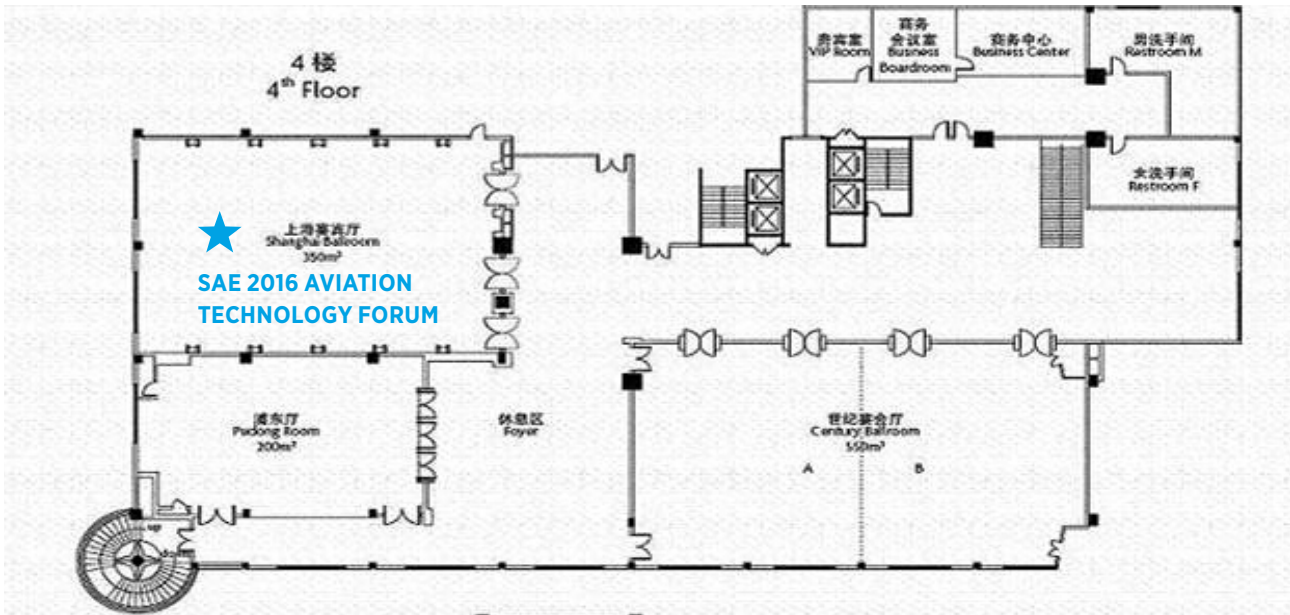
JUNE 14, 2016 Tuesday	
9:00-10:00	Global Standards Harmonization and Safety Issues This session highlights where problems occur during the design process and provides insight into how to prevent design issues before they affect the overall certification process.
Tea Break	
10:30-12:00	Aircraft Manufacturing This session focuses on the latest technology and processing in manufacturing aircraft, including the use of robotic techniques and proper drilling and machining techniques.
Lunch	
13:00-14:00	Advance Materials This session will focus on the latest technology developments in materials used for aerospace design, from structures to skin, to include new alloys and composites.
14:00-15:00	Additive Manufacturing Panel Presentations 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 and benefits and capabilities of the technologies.
Tea Break	
15:30-17:00	Additive Manufacturing Panel This is an interactive discussion with the presenters in the previous session, debating the benefits of Additive Manufacturing, and how the technology will evolve to meet the ever-changing needs of the industry.

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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MONDAY, JUNE 13

WELCOME SPEECH

09:00 **Billy XU**, General Manager, SAE International China
Guanghui WU, Vice President, COMAC (See Speaker's Bio on Page 12)

KEYNOTES

09:15 **The Application of Additive Manufacturing (3D Printing) Technology in Civil Aviation**
Kecen HAN, Vice President of COMAC Shanghai Aircraft Design and Research Institute
 (See Speaker's Bio on Page 12)

ABSTRACT

By developing itself from “rapid prototype application” to “practical production application” in civil aviation over the past 30 years, additive manufacturing (3D printing) has become one of the most important technologies in supporting the development of the aerospace industry. This presentation will introduce the applications of foreign civil aircraft and C919 aircraft, the applications of additive manufacturing (3D printing) in the field of civil aviation and its trend of development by taking into account the increasing need for the technology in the field of civil aviation.

10:30 **Accident Investigation Leading to Design, Manufacture, and Maintenance of Better Aircraft**
John Goglia, Board Member, US National Transportation Safety Board (See Speaker's Bio on Page 13)

ABSTRACT

Since the earliest days of aviation, accident investigations have served to establish not only the probable cause for a crash but have also been critical in determining issues with the manufacture, maintenance or operation of the aircraft that contributed to the accident. In many cases, beyond probable and contributing causes for the accident at hand, the investigations uncovered problems in areas that weren't even related to the accident but were nonetheless significant findings as they could have led to future incidents and accidents. These problems rarely made it into the accident reports but were disseminated to the parties – and sometimes the industry as a whole – for appropriate follow up and action.

Now, with the accident rate so low, the opportunity for the intensive scrutiny that an accident investigation brings is reduced and the opportunity to find these ancillary issues is also reduced. Of course the challenge for the industry is to find these underlying problems before they become the cause of an incident or accident. John Goglia will be discussing some ways to uncover these underlining issues.

MODELING AND SIMULATION

12:30 **Model Based R&D for Aircraft**
Yinming SHI, Technical Supervisor, Simulation & Testing Solutions of China Region, Siemens PLM Software (See Speaker's Bio on Page 13)

ABSTRACT

Since the aircrafts become more and more complex, both from system side and structure side, Model based R&D for aircraft is obtaining more and more attention both from engineers and management. The presentation introduces 1) Model based R&D for concept design, mainly focus on architecture driven system simulation; 2) Model based R&D for detailed design, mainly focus on the structure stress verification, and fluid or pneumatic component design. 3) Model based R&D for virtual integration/Virtual test clarify the difference between design simulation and virtual integration/virtual test. Some application examples will be shown. 4) model based R&D for prototype test introduces some aircraft test example and how test results are being used for simulation. Test is also a kind of digitalization method after prototypes are available.

13:00	<p>The Impact of Fusion of Technologies on Aerospace Design Processes <i>Linghui ZHANG, Asia-Pacific Technical Manager, The MathWorks, Inc. (See Speaker's Bio on Page 13)</i></p> <p>ABSTRACT</p> <p>Aerospace systems are getting increasingly complex and require high integrity and advanced technology. Technologies are fusing together to transform industries, applications, and markets. Typically it is the fusion of four fundamental building blocks of technology: Sensing, Computing, Communication & Control. As more and more sophisticated applications in aerospace are built with the combination of four elements, it becomes challenging to design, test & verify these multi-domain systems. Model-Based Design enables design, simulation, implementation, earlier verification & validation for complicated systems based on executable specification and has been widely adopted in different applications. Specially, Model-Based Design shows significant benefits in aerospace applications since modeling and putting together all of the components into a virtual system for simulation testing happen before prototype hardware is built.</p>
13:30	<p>Aircraft Virtual Flight Test and Certification Technology: Validation and Application Experience <i>Ivan BURDUN, President & Directeur Scientifique, AIXTREE S.A.S (See Speaker's Bio on Page 14)</i> <i>Alexander GREBENKIN, Head of Department, MIEA JSC (See Speaker's Bio on Page 14)</i></p> <p>ABSTRACT</p> <p>An overview is given of 35+ years' experience in the development, validation and application of a 'pilot - automaton - aircraft - operating environment' system dynamics model. The model is employed as a virtual flight test and certification (VFTC) technology aimed to screen aircraft safety performance in multifactor (off-normal, complex) operational domains from the outset.</p> <p>The technology is helpful to examine the system's 'alternative futures' - exacerbated what-if alterations of a baseline (test/certification, or operation/accident) scenario. The output is a situational tree incorporating thousands of hypothetical, yet realistically complex derivative cases. They represent cross-coupling effects of plausible combinations of several risk factors (including pilot errors, demanding weather, onboard hardware failures and software flaws) on the system behavior. The overall objective is to reduce the demand for resources (budget, time, cadre, etc.) and substantially increase the volume of predictive knowledge on flight safety in off-normal conditions - before a test article is built/flown.</p> <p>A fully automated VFTC cycle is exemplified for medium-range and regional airplanes. Reconstructed test and accident cases are demonstrated in comparison with real flight data for model validation. Multifactor operational hypotheses and fast-time simulation results are presented for all flight phases - from takeoff to landing, e.g.: 'Landing approach, landing and ground-roll with two hydraulic systems failed (inoperative or slower actuated primary and secondary aerodynamic controls, undercarriage and thrust reversers), crosswind, variations of approach speed, slats/flaps settings, center of gravity, mass, runway condition (dry/wet, water/ice covered) and aerodrome elevation'.</p> <p>Key issues of the technique implementation, including input requirements, application advantages and limitations, are discussed.</p>
14:00	<p>The Impact of Modern Multi-Disciplinary Simulation on Improving Aircraft System Design <i>Deryl Snyder, Vice President of Global Business Development, CD-adapco (See Speaker's Bio on Page 14)</i></p> <p>ABSTRACT</p> <p>Innovations in the aerospace industry are transforming the very nature of air-transportation. Until recently, leveraging multi-disciplinary simulation early in the design process to improve performance was largely unfeasible. Due to rapid improvements in High Performance Computing and modern simulation methods, organizations are now looking to simulation tools to drive innovation into the design process. But this kind of innovation is often difficult to implement and organizations struggle to realize the promise of multi-disciplinary simulation. In this presentation we will discuss how leading aerospace companies are realizing the benefits of simulation-driven design to improve performance and differentiate their products.</p>

ENERGY CONSERVATION - EMISSIONS REDUCTION

15:00 **Green Aviation for Sustainable Future—Boeing & COMAC Joint Effort on Conversion of Waste Oil to Aviation Biofuels**

Zhongmin HU, Director of Advanced Structure & Process Laboratory for Commercial Airplanes, COMAC BASTRI (See Speaker's Bio on Page 15)

ABSTRACT

Boeing and COMAC set up the Aviation Energy Conversation & Emissions Reduction Technology Center (AECER) in 2012 to collaboratively develop advanced technologies to support sustainable growth of China's aviation industry through energy conservation and emissions reduction. The AECER center has been focusing its research efforts on aviation biofuels, air traffic management, cabin environment and green aviation manufacturing & recycling activities. This presentation covers the joint efforts of Boeing and COMAC carried out in aviation biofuel activities. After three year collaborative work, the joint center has been developed a new cost-effective processing technology to convert waste oils into aviation biofuels, established a pilot plant to produce aviation biofuel for a combustor test and other applications. A survey of waste oil feedstock in Shanghai, Jiangsu and Zhejiang areas has also been carried out for future planning of biofuel production.

15:30 **Advanced Health Management of Li-Ion Battery Storage**

Mike Boost, Vice President of Technology and Research, Securaplane Technologies, Meggitt (See Speaker's Bio on Page 15)

ABSTRACT

Lithium battery systems are steadily making inroads into aviation. Securaplane has been using lithium chemistry in aviation battery systems for over a decade and has consistently pushed performance through innovative technology combined with voice of the customer. In parallel, several OEM lithium battery suppliers are pursuing equal aspirations. Consequently, while keeping a watchful eye on safety, the steady maturation of lithium battery systems is increasing focus towards raising performance capabilities of the lithium system. With the combination of electronics and environmental controls to the advancement of cells, new features of lithium battery systems exist that were previously not typical in conventional aviation batteries. Further, the pace of feature release indicates that there is significantly more innovative potential forthcoming. Advances in health management, packaging, current control, maintenance needs, and crew workload reduction are just some of the examples where progress is being made. In many cases direct savings impact can be registered by the operator. This presentation reviews the progression of a number of lithium battery system performance parameters and their realizable impact on aviation.

16:00 **LEAP-1C Engine Program**

John LIU, LEAP-1C Program Director, GE Aviation (See Speaker's Bio on Page 15)

ABSTRACT

This presentation will first give a brief overview of CFM organization structure and product line. The focus will be on LEAP engine programs: history, development status, marketplace, technology features, advanced manufacturing technology, and production readiness and challenges. Special attention will be given the technologies improving fuel consumption and emission reduction. The integration of LEAP-1C integrated propulsion system with C919 aircraft will be presented.

TUESDAY, JUNE 14

GLOBAL STANDARDS HARMONIZATION AND SAFETY ISSUES

9:00 **Technical Standard Orders (TSO) Certification Consideration in China for Integrated Modular Avionics (IMA) Hardware Elements**

*Frank XIAO, Safety & Certification, Chief Engineer Office, Aviage Systems
(See Speaker's Bio on Page 16)*

ABSTRACT

Along with the rapid development of the civil aviation industry in China, more and more Chinese aviation system designers and manufacturers intend to apply for China Technical Standard Order (CTSO) authorization. Meanwhile, the increasing potential business opportunities for civil aviation products that are intended to be utilized or installed in aircrafts under different airworthiness authorities may drive to expedite the scope expansion of the current bilateral airworthiness agreement or similar agreements between Civil Aviation Administration of China (CAAC) and Federal Aviation Administration (FAA)/ European Aviation Safety Agency (EASA).

This paper provides an overview of the China Technical Standard Order (CTSO) and the related regulations, certification procedures and guidance issued by CAAC. In addition, it introduces the processes of validation of design approval and the export/import airworthiness certification on TSO articles under the current bilateral airworthiness agreement between China and U.S. / E.U.

Integrated Modular Avionics (IMA) systems, usually hosting many functions that were historically in the functionally and physically separated systems, are made up of hardware and software components which may be authorized by TSO authorization. This paper summarizes some of the certification consideration on the use of CTSO authorized components in IMA system development and certification process, which is based on the practice of the very first IMA system integration program that adopted RTCA/DO-297 and FAA AC 20-170.

At last, this paper shares the experience and practice of the first CTSO-C153 certification project for IMA hardware elements in China. Some major certification consideration is demonstrated in the paper, such as the minimum performance standard (MPS), functional TSOs, environmental qualification tests per RTCA/DO-160, configuration management, etc.

9:30 **ARP4754A Application Issues – A Worldwide Conundrum**

Eric Peterson, Vice President, Electron International, Inc. / Vice Chairman, SAE S-18 Aircraft & Systems Development and Safety Assessment Committee (See Speaker's Bio on Page 16)

ABSTRACT

Aviation industry committees and rule making bodies have established a hierarchy of preferred development practices for airplane and system design activities. These are highlighted in documents like ARP4754A, DO-254 and DO-178. These practices aim to ensure a resultant airplane and its systems meet the safety and certification criteria. The application of these practices is far from straightforward however, and the success criteria varies by airplane and system manufacture and certification authority. This presentation will highlight some of the current industry issues and their effects encountered by during the application of ARP4754A. Potential solutions to the issues will be postulated with audience interaction encouraged.

AIRCRAFT MANUFACTURING

10:30 **Fundamentals of Commercial Airplane Final Assembly Variations and Uncertainties**

Roberto LU, Vice President of Corporate Technology, Advanced Manufacturing Technology, TE Connectivity (See Speaker's Bio on Page 17)

ABSTRACT

There are various size of commercial airplanes in both Boeing and Airbus. This presentation outlines mostly Boeing commercial airplane final assembly fundamental processes and related manufacturing technologies. The key differentiator on the manufacturing side is ability to handle uncertainties from the point of design near completion, the starting of the production, and the health of the production system during ramping up.

<p>11:00</p>	<p>Experimental Studies on the Performance of Different Structure Drills in Drilling CFRP/Al Alloy <i>Lin ZHANG, Nanjing University of Aeronautics and Astronautics (See Speaker's Bio on Page 17)</i></p> <p>ABSTRACT</p> <p>Composite/aluminium alloy hybrid-structure aircraft components have a lot of advantages because of their greater specific strength compared to that of unitary material. But it is a great challenge to make a robust design for this integrated drilling process through the laminar materials with the different physical and mechanical properties of their layers. Defects like composite shrinkage cavity, tear along the fiber direction, fiber fuzzing, larger aluminum burr and hole wall surface roughness are occurred during drilling CFRP/Al laminated material. These defects would reduce the structural stiffness, leading to variation in the dynamic performance of the structure. The key to ensure the quality and accuracy of the hole is to choose the appropriate tool and process parameters. In this paper, contrast experiments, in which carbon fiber reinforced composite materials (CFRP) and 7075 aluminum alloy stacked materials were drilled with three awls twist drill and twist drill respectively, were conducted to study how process parameters and tools affect hole accuracy, roughness, burr height as well as cutting force. The results show that comprehensive cutting ability of the three awls twist drill is significantly higher than that of the twist drill when drilling CFRP/Al stacks. The best process parameters using three awls drill were at the speed of 4000r/min, the feed rate of 0.04mm/r, with which the aperture accuracy can reach H8 and composite's shrinkage can be controlled in less than 5µm. On the premise of ensuring the quality and accuracy, the cutting tool can be used for 400 holes at least.</p>
<p>11:30</p>	<p>Dual Robot Synergistic Drilling & Magnetic-Riveting System for Aircraft Wing Assembly <i>Dawei LI, Nanjing University of Aeronautics and Astronautics (See Speaker's Bio on Page 17)</i></p> <p>ABSTRACT</p> <p>A dual robot synergistic system, which incorporates two sets of robot positioning systems, two sets of multi-functional end effectors, offline programming technology, integrated control system and other auxiliary devices, is developed to greatly automate the drilling and riveting processes in an aircraft wing component assembly. Each robot positioning system, integrated with a specific end effector, could work independently and cooperate harmoniously on either side of the parts, which brings about greater flexibility and larger workspace. Besides, clamping the parts from both sides during processing will improve the system rigidity and preclude gaps between laminated materials, which will result in better quality of drilling and riveting. Due to the stringent positioning accuracy of the holes and joints, we have developed a unique algorithm, based on the error similarity in the joint space of each robot, which is verified to maintain the robot positioning accuracy within ±0.2mm. To further meet the special requirements of seal, strength and longevity, we initially integrate low-voltage magnetic riveting technology on both end effectors, which could maintain the backlash force within the sustainable level of each robot and produce joints with better quality even than traditional riveting methods, in addition, it also provides a reliable way to join the composite materials. The independently-developed offline programming technology is used to plan the trajectory for each robot, as well as the processing sequences for each end effector and other auxiliary devices, adjust interference areas through simulation, and finally export a collide-free NC codes for the following processing stage. With a three-layer structure, the integrated control system is capable of coordinating and controlling all the hardware in a desired working sequence. To further guarantee the final quality of the holes and joints, several online detection measures have also been taken, including referencing detection, normal calibration, TCP calibration, etc. Besides, through years' research, we have also developed a reliable and practicable process specification about drilling using dual side clamping. The field tests show that, this dual robot synergistic system could produce each hole to a positioning precision within ±0.5mm, a perpendicular accuracy within 0.3°, a diameter tolerance of H8, a countersink depth tolerance of ±0.05mm, and it could drill and rivet up to 3 joints per minute.</p>

ADVANCE MATERIALS

13:00 Airworthiness Means of Compliance Study for Composite Wing Structure of Commercial Aircraft

Dongsheng LI, *President, Beijing Aeronautical Science and Technology Center, COMAC*
(See Speaker's Bio on Page 18)

ABSTRACT

Concerning four selected key subjects (i.e. fatigue & damage tolerance, allowables, lightning direct effects, environmental effects and thermal stress) for composite wing structure of commercial aircraft, airworthiness compliance technologies were investigated, including the relevant regulation requirements and the corresponding methods for substantiation.

13:30 Progress in Research and Development of Titanium Alloy Materials for Aviation

Jixiong LIU, *Project Director of Research Institute, BaoTi Group Co.,Ltd.*
(See Speaker's Bio on Page 18)

ABSTRACT

Titanium (meaning titanium and its alloys) has three principal virtues: (1) high strength/weight ratio, (2) good corrosion resistance and (3) excellent high temperature mechanical properties which make titanium became more and more widely recognized in aeronautical applications. Focused on the market requirements of aerospace titanium alloy materials, including titanium alloys for aircraft and engines, this report introduced titanium for aeronautical materials, semi-finished product types, development of preparation technics and technological progress. BAOTi group, China's largest production and scientific research base of titanium alloys, the paper also reveals the titanium for aeronautical products, standards, and certification achieved. Finally, the speech ended in the looking forward of the development trend of titanium alloy materials for aviation.

ADDITIVE MANUFACTURING PANEL PRESENTATIONS

14:00 AM Key Technology Study and Industrial Application Update

Aiguo XU, *Senior Manager Technical Sales and Business Consulting Director, A&D, Dassault Systemes* (See Speaker's Bio on Page 18)

ABSTRACT

Addressing Key AM Challenges come from material properties, design and process. Share few projects progress to cover material, topology optimization, lattice optimization, residual stress analysis, etc.

14:10 3D Printing – Enabling A New Concept of Engineering

Dries Vandecruys, *Senior Project Leader, Materialise* (See Speaker's Bio on Page 19)

ABSTRACT

Materialise has been an industry leader for the past 26 years and believes that 3D printing can, through continuous innovation, make the world a better and healthier place. As a neutral software platform provider, we believe that 3D printing can offer a lot of benefits to for example the aerospace industry. Throughout the presentations we want to point out a few key points that deserve attention when we are talking about 3D printing: the power of designing for AM, the cost and opportunity benefits that this technology is able to offer and the crucial choice of the right application. We would like to share our own experience in design and production for aerospace by showing and discussing several ground breaking examples.

14:20	<p>Challenge of Additive Manufacturing & Innovative Design <i>Bo ZOU, Chairman of Shanghai Union Technology Co., Ltd. (See Speaker's Bio on Page 19)</i></p> <p>ABSTRACT</p> <ol style="list-style-type: none"> 1. Overview and current status of additive manufacturing and forming technology 2. Application of concept laser in aerospace 3. Prediction of additive manufacturing applied in aerospace 4. Future of additive manufacturing
14:30	<p>Additive Manufacturing <i>Rodolphe Bardou, Director of Production Support Engineering, Aerospace, Honeywell Integrated Technology China Co, Ltd. (See Speaker's Bio on Page 19)</i></p>
14:40	<p>Additive Manufacturing in Aerospace, Tooling and Production Parts <i>James YAO, Aerospace & Automotive Vertical Sales Manager, Stratasys (See Speaker's Bio on Page 20)</i></p>

ADDITIVE MANUFACTURING PANEL

15:00	<p>This is an interactive discussion with the presenters in the previous session, debating the benefits of Additive Manufacturing, and how the technology will evolve to meet the ever-changing needs of the industry.</p> <p>Moderator :</p> <p><i>Roberto LU, Vice President of Corporate Technology, Advanced Manufacturing Technology, TE Connectivity</i></p> <p>Panelists :</p> <p><i>Aiguo XU, Senior Manager Technical Sales and Business Consulting Director, A&D, Dassault Systemes</i> <i>Dries Vandecruys, Senior Project Leader, Materialise</i> <i>Bo ZOU, Chairman of Shanghai Union Technology Co., Ltd.</i> <i>Rodolphe Bardou, Director of Production Support Engineering, Aerospace, Honeywell Integrated Technology China Co, Ltd.</i> <i>James YAO, Aerospace & Automotive Vertical Sales Manager, Stratasys</i></p>
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Guanghai WU

Vice President
COMAC

Mr. Wu Guanghai, born in February 1960 in Wuhan of Hubei Province, holds a Doctorate Degree and a technical title of Researcher. He started working in September 1977, and joined the Communist Party of

China (CPC) in September 1985. 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 No. 603 Research Institute in 1982, serving successively as Designer, Deputy Director and Director of General Design Research Lab, Director of Civil Aircraft General Design Research Lab, Director, Deputy Chief Designer, Superintendent Assistant and Deputy Superintendent of Civil Aircraft General Subsection, and 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, Deputy Secretary of the Party Committee, Chief Designer of 998 Project, Chief Designer of ARJ21, General Director of On-site Command Department of 998 Project and General Director of Research Site of Large Transport Aircraft. He was appointed as Vice President of COMAC, Member of the Party Committee of COMAC and Chief Designer of C919 program in March 2008.

He won the First Prize of Science and Technology for National Defense in an aircraft project, First-class Merit of AVIC I in the first flight of a key aircraft model, Individual First-class Merit of Commission of Science, Technology and Industry for National Defense (COSTIND), the First Prize of Science and Technology by AVIC I for Aircraft-carried Conversion in one key project, the First Prize of Science and Technology in PLA Army, and the Prize for Outstanding Achievement of Dedication in Aviation to Serve the Motherland given by AVIC I. He also received the titles of Model Worker of AVIC I and National Committee of Chinese Defense Posts and Telecommunications Labor Union, Model Worker of Science, Technology and Industry System for National Defense by National Ministry of Personnel and Commission of Science, Technology and Industry for National Defense, Young and Middle-aged Specialist with Outstanding Contributions for Science, Technology and Industry of National Defense, and Young and Middle-aged Specialist with Outstanding Contributions in Shaanxi Province. 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.

Delegate of the 17th National Congress of the CPC, and Member of the 11th and 12th National Committee of the Chinese People's Political Consultative Conference (CPPCC).



Kecen HAN

Vice President
COMAC Shanghai Aircraft Design and Research Institute

Han Kecen, Vice President of COMAC Shanghai Aircraft Design and Research Institute, Engineering Vice President of C919 Program, Vice President of Chinese Society for Composite Materials, and

Council Member of Chinese Society of Aeronautics and Astronautics.

After graduation from Northwestern Polytechnical University in 1982, he worked in the First Aircraft Institute of AVIC and was engaged in the development of multiple aircraft programs, including Y7, JH-7, KJ, and ARJ21. He has been devoted to the development of C919 Program since 2009 and has been rewarded national and ministerial awards for scientific and technological progress due to achievements in program development and advanced study projects.



John Goglia
Former Director
US National Transportation Safety Board

With more than 40 years experience in the aviation industry, The Honorable John Goglia, was the first and only Airframe and Powerplant mechanic to receive a presidential appointment to the National

Transportation Safety Board (NTSB). He served from August 1995 to June 2004.

As a Board Member, Mr. Goglia distinguished himself in numerous areas of transportation safety. In particular, he was instrumental in raising awareness of airport safety issues, including the importance of airport crash fire and rescue operations and the dangers of wildlife at airports. He played a key role in focusing international attention on the increasing significance of aircraft maintenance in aviation accidents. He pressed, successfully, for greater integration of civilian and military safety information, becoming a featured speaker at national aviation symposiums attended by military leaders and major defense contractors. He is a

leading proponent of airplane child safety seats.

Prior to becoming a Board Member, Mr. Goglia held numerous positions in the airline industry. He started as a mechanic for United Airlines and eventually joined Allegheny, which became USAir. Additionally, he was involved for more than 20 years as a union flight safety representative on accident investigation teams. There, he developed a safety program for his union, the International Association of Machinists, and was its representative for NTSB investigations. For twelve years, he operated his own aircraft service company.

Numerous prestigious groups have recognized Mr. Goglia's contributions to aviation safety. Aviation Week & Space Technology awarded him a coveted 2004 Laurel for his outstanding service as an NTSB Board member. The Society of Automotive Engineers presented him with the Aerospace Chair Award for outstanding leadership in 2003 and the Marvin Whitlock Award for outstanding management accomplishment in 2002.



Yinming SHI
Technical Supervisor for Simulation and Testing Solutions
Siemens PLM Software

Dr. Shi was a doctor fellow at National Key Laboratory of Vibration Shock & Noise of Shanghai Jiaotong University in 2001.

From 2001 to 2004, he

contributed efforts to Composite Feature Identification Project at KUL, Belgium, specializing in structural vibration. With extensive engineering experiences, he is now China Technical Supervisor for Simulation and Testing Solutions at Siemens PLM Software.



Linghui ZHANG
Asia-Pacific Technical Manager
The MathWorks, Inc.

Linghui Zhang is Asia-Pacific Technical Manager at MathWorks. She is responsible for leading the project teams to assist companies across industries to adopt and implement Model-Based

Design, Production Code Generation and Verification & Validation. Ms. Zhang has been with MathWorks for

15 years. Before MathWorks, she spent more than 10 years working in China Academy of Space Technology, as technical project manager and professor, in charge of the development of control systems for satellites and spacecraft. She received her master's degree in Mechanical Engineering from the University of Akron in the US and Master's degree in Automatic Control from China Academy of Space Technology.



Ivan BURDUN

President & Directeur Scientifique
AIXTREE S.A.S

Ivan BURDUN has 37 years' research and academic experience in ex-USSR, UK, USA, Russia, France. His competences include high-fidelity mathematical modeling, artificial intelligence and fast-

time simulation of flight for predicting the 'aircraft - pilot/automaton - vehicle - operating environment' system safety performance in multifactor (off-normal/

unknown) situations. These techniques have been applied to 30 aircraft types and projects: fixed-/rotary-wing, tilt-rotor; sub-/super-/hypersonic - during design, flight test, certification, operations, accident analysis and safety management.

Ivan's current research is focused on virtual test, identification and prevention of irreversible anomalies in the system dynamics, and prototyping of AI safety protection systems for manned/unmanned vehicles and robotic swarms.



Alexander GREBENKIN

Head of Department
MIEA JSC

Alexander GREBENKIN has 30 years' experience in unsteady aerodynamics, automated flight control, flight dynamics modeling and simulation (M&S). In 1987 Alexander received his PhD degree in

Aerodynamics and Flight Operations. In 1993-2011 he worked at Egoryevsk Aviation Technology College. In 2000 Alexander defended his D.Sc. thesis in Automated Flight Control and Flight Operations. In 2001-2011 he

worked as Lead Design Engineer (part-time) at Tupolev Aircraft Design Bureau, Stability and Controllability Division. He was in charge for flight M&S to support aircraft certification programs. Since 2011 Alexander works at Moscow Institute of Electromechanics and Automatics as a Head of Department. His research interests include aerodynamics, flight M&S, fly-by-wire systems, synthesis of automatic control algorithms.



Deryl Snyder

Vice President of Global Business Development
CD-adapco

Deryl Snyder is Vice President of Global Business Development at CD-adapco. Deryl received his Ph.D. in Mechanical Engineering jointly from Utah State University and the von Karman Institute for Fluid

Dynamics, specializing in numerical algorithms for CFD. He has worked as an engineering support contractor for the U.S. Air Force at Eglin Air Force Base where he solved aerodynamic technical issues for various

missile systems and tactical UAVs. He also led the CFD efforts in the Aerodynamics Center of Excellence at Lockheed Martin Missiles and Fire control, where he was responsible for overseeing numerical analysis methods, procedures, practices, and tools. Deryl also spent time as a tenure-track faculty member in the Mechanical Engineering Department at Brigham Young University, specializing in computational methods in the thermal/fluid sciences as well as small- and micro-UAV development.



Zhongmin HU

Director of Advanced Structure & Process Laboratory for Commercial Airplanes
COMAC

Dr. Zhongmin Hu got his Bachelor degree (1982) & Master degree (1985) from Chongqing University, PhD from Birmingham University (1995). He worked at Chongqing University, Birmingham University

and QinetiQ with over 30 year experience in materials,

processes and structures. He is currently the Director of Advanced Structure & Process Laboratory for Commercial Airplanes of BASTRI, COMAC.

While active in R&D of aerospace material, process & structure, he is also heavily engaged in energy conservation & emission reduction activities, especially in aviation biofuel through the joint work with Boeing.



Mike Boost

Vice President of Technology and Research
Meggitt

Mike Boost is the VP of technology and research for Securaplane Technologies and holds a Ph.D. in Electrical Engineering. Mike has over 25 years of experience in the area of power conversion and

energy storage, 15 years within aviation. Through his

career, Mike has researched technologies and developed products focusing on Multi-chemistry battery chargers, engine start inverters, and energy storage systems including lithium batteries.

Mike's rechargeable lithium experience began in 2006 with chemistry evaluation for a rechargeable lithium system. Currently, Mike is overseeing numerous Applied Research and Technology programs within Meggitt Securaplane's portfolio.



John LIU

LEAP-1C Program Director
GE Aviation

John Liu holds the profit and loss (P&L) commercial leadership responsibility for LEAP-1C engine product line for GE Aviation/CFM International. He leads teams of commercial, engineering, quality,

supplier chain, and, airworthiness for integrating LEAP-1C integrated propulsion system with COMAC's C919 airplane. John serves as the focal contact between CFMI and COMAC.

John began GE career 15 years ago at GE Global Research Center, New York. He held leadership positions in several GE businesses with extensive experience in research and development, advanced engineering design, service engineering, and project management.

John held Ph.D. degree in mechanical engineering from Rensselaer Polytechnic Institute, Troy, New York, M.S. degree from 3rd Research Academy of Chinese Aerospace Ministry, and B.S degree from Beijing Institute of Aero. and Astro.

SPEAKER BIOGRAPHIES



Frank XIAO

Certification Engineer
Aviage Systems

Frank Xiao is a Certification Engineer with AVIAGE SYSTEMS. In this role, Frank is responsible for driving and conducting CTSO/TSO certification activities for company avionics products, he is the CTSO

specialist and coordinator working closely with CAAC to introduce the C153 to China and drive AVIAGE CTSOA projects towards successful authorization. He is also responsible for assurance of electronic hardware (DO-254) compliance for AVIAGE Integrated Modular Avionics (IMA) products while providing guidance

for corresponding certification regulations with internal/external customers and suppliers including Commercial Aircraft Corporation of China (COMAC) for the C919 program.

Frank began his aviation career at COMAC in 2008 he has over seven years of experience in flight training & operations, aircraft performance, airworthiness certification and project management. Frank holds a Master's Degree in Aircraft Design and Engineering from Beijing University of Aeronautics and Astronautics (BUAA), and he is a certified Project Management Professional (PMP) by Project Management Institute (PMI).



Eric Peterson

Vice President
Electron International, Inc.
Vice Chairman
SAE S-18 Aircraft & Systems Development
and Safety Assessment Committee

Mr. Peterson is Vice-President of Systems and Safety for Electron International, Inc. He holds a B.S. in Electrical

Engineering from Montana State University.

Mr. Peterson has over 38 years' experience in management, system design and analysis, development of hardware & software and safety assessments for commercial and military flight critical avionics, engine control, ground based navigation augmentation and fly-by-wire system applications.

Mr. Peterson is an active member of Society of Automotive Engineers (SAE) and presently serves as the SAE S-18 Aircraft & Systems Development and

Safety Assessment Committee Vice-Chairman. He provided key contributions to the industry documents, "Guidelines for Development of Civil Aircraft and Systems", ARP4754A, "Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment", ARP 4761 and ARP 5150, "Safety Assessment Methods and Tools to Support Safety Management of Transport Airplanes in Commercial Service." He provides industry instruction on these industry standards; presenting the ARP4754A training seminar over 35 times on four continents.

Mr. Peterson is a licensed private pilot and an FAA Systems and Equipment Safety DER with Level A software endorsement.



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 charts 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.

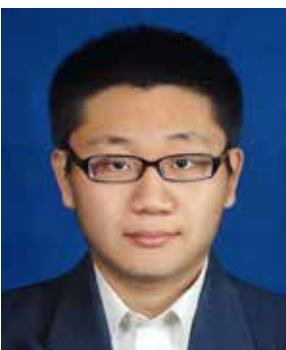


Lin ZHANG

Nanjing University of Aeronautics and Astronautics

Dr Lin Zhang, Male, PHD, Graduate Tutor of Nanjing University of Aeronautics and Astronautics (NUAA), has been working for seven years in College of Mechanical and Electrical Engineering at NUAA. His

research interests are CNC machine tool system design and optimization, micro machining technology, aircraft flexible assembly technology and industry robots. Recently, he is undertaking some research projects on the automatic drilling and riveting technology and has established a solid relationship with AVIC and COMAC. To date he has published twenty papers and three patents of invention.



Dawei LI

Nanjing University of Aeronautics and Astronautics

Dawei Li obtained a B.S. in Aircraft Manufacturing from Nanjing University of Aeronautics and Astronautics (NUAA), and pursuing M.S. in Aerospace Manufacturing and Engineering from NUAA.

He currently major in the areas of aircraft digital design and manufacturing, robotics.

SPEAKER BIOGRAPHIES



Dongsheng LI

President
Beijing Aeronautical Science and Technology Center
COMAC

Dr. LI Dongsheng, Acting President of Beijing Aeronautical Science and Technology Centre of COMAC, Fellow of Royal Aeronautical Society of the United Kingdom.

Ph.D. supervisor for Imperial College, Bristol University and Bath University in the UK. He also worked as Vice President of Shanghai Aircraft Design and Research Institute of COMAC. Dr. Li has has many years of experiences in the industry and academia in China and in Europe. He is widely known as an expert in composite aircraft structures with more than 70 publications.

He has worked as Transnational Team Leader and Head of Department in Airbus. He has been Industrial



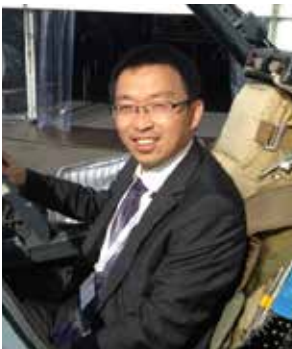
Jixiong LIU

Project Director
Research Institute
BaoTi Group Co.,Ltd.

Mr. Liu graduated from University of Science and Technology Beijing with doctor degree in 2012, and now is Project director of Research Institute in BaoTi Group CO., Ltd. He

responded and participated in the work of a number of program confirmations, research schemes drawing up and working out in respectively national, provincial and ministerial level. He was awarded many honorary titles such as the Shaanxi Provincial Youth Science and Technology New Star, etc. with over 40 papers published.

is mainly engaged in material process researching and developing of titanium and titanium alloy. Mr. Liu



Aiguo XU

Senior Manager
Technical Sales and Business Consulting Director
Dassault Systemes

Aiguo XU (1975-), D. E. of BUAA. Successively served as Senior manager technical Sales and Business consulting director and of global A&D industry team in Dassault

Systemes. Responsible for A&D industry solution, value selling strategy and solution architecture. Involving in most of China Aerospace OEM PLM consulting, planning and implement projects.

Prior to joining Dassault Systemes, Take the engineer and consult role in Industry Sector and Global Business Service Sector of IBM.

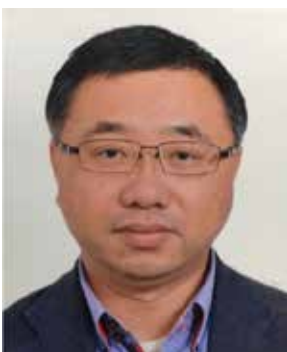


Dries Vandecruy
Senior Project Leader
Materialise

Mr Vandecruys, a master in industrial design, has been working more than 5 years for Materialise. As senior project leader, he has been working with companies like Toyota, Kipling, Jaguar, Fokker, Adidas, to

introduce 3D printing to them. One of the key roles that Mr Vandecruys has been playing is to make people

understand the importance of designing for AM. He lead several so called 'co-creation' workshops where his extensive knowledge of the technology, combined with his design skills, were able to make the power of Additive Manufacturing crystal clear for everyone involved. In displaying his knowledge and skills, he was also involved in setting up new business lines inside Materialise, RS Print for example, or in projects where Materialise cooperated with other companies on dedicated series: the Hoet – series for example.



Bo ZOU
Chairman
Shanghai Union Technology Co., Ltd.

Mr. ZOU graduated with Bachelor degree in marine engineering in 1990 and since then was engaged in the design and development activities in ship and automotive industries. He

also practiced advanced manufacturing technologies including 3D printing, and was also engaged in management and operation activities. In 2000, he fully invested himself in 3D printing by establishing Shanghai Union Technology Co., Ltd., an SLA 3D printing company. With over 10 years' experience in 3D

printing design, R&D, production and sales, UnionTech has taken the biggest share of industrial customers of SLA printing in China. As one of the founders of UnionTech, Mr. ZOU was a witness of the growth of additive manufacturing industry in China, gaining unique opinions on the development, application and market demands of this technology. His personal experiences in manufacturing of over 20 years and multiple studies in foreign countries every year give him a profound perspective about manufacturing in China and in the world. Mr. ZOU wishes to achieve more innovations and breakthroughs in additive manufacturing, with his company UnionTech.



Rodolphe Bardou
Director of Production Support Engineering, Aerospace
Honeywell Integrated

Rodolphe Bardou is the Engineering Director for Honeywell Aerospace's Production Support Engineering team in China. His team lead 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 including the Joint Ventures. 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.

SPEAKER BIOGRAPHIES



James YAO

Aerospace & Automotive Vertical Sales Manager
Stratasys

Shanghai Jiaotong University, Information and control system

16 years of manufacture solution experience, now responsible of Stratasy

China direct digital manufacture business



Sarah FANG (Moderator)

Senior Engineer
COMAC

Fang Yuan, work in avionic systems department of COMAC Shanghai Aircraft Design and Research Institute(SADRI), senior engineer, CAAC designated engineering representative(DER), system engineer.

Fang Yuan holds a M.S in Electrical Engineering from Northwestern

Polytechnical University , she worked in SADRI and was engaged in the development of ARJ21 and C919. She has many years' experience in airborne software development and system engineering research. She has been rewarded some Software copyrights and company awards for scientific and technological progress.



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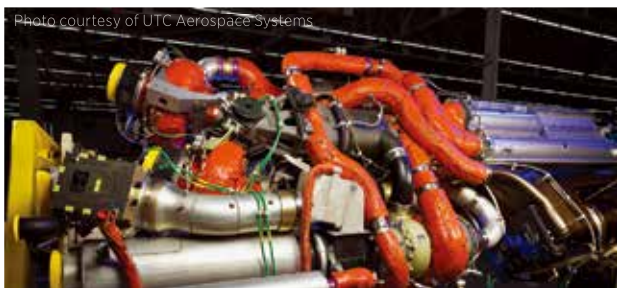


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Exhibitor Directory text is published as submitted by exhibiting companies.

A

Alliance 3D

Address: Room 102, 40 Songjiang Hi-tech Zone, CaoHeJing, 518 Xingzhuan Road, Songjiang, Shanghai. PRC.



http://www.alliance-3d.com

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3

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3DPRO(Shanghai)Technology Co. Ltd. is a professional supplier founded in Dec.2006 to offer 3D solution. We are specializing in digital medical, cultural innovation, innovative education and advanced manufacture. 3DPRO is the first domestic listed enterprise in 3D field and was awarded of "Specification & Latest" Enterprise of Shanghai, Shanghai New-high technology corporation. Meanwhile, 3DPRO became the Vice chairman of china's 3D print technologic Industrial Union. In the 3D technological industry, based on the technical strength of Jiao Tong University, 3DPRO invented world-wide advanced 3DPRO scan independently with the advanced 3D application technology.

C

CD- Adapco

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CD-adapco is a global engineering simulation company with a unique vision for Multidisciplinary Design eXploration (MDX). Engineering simulation provides the most reliable flow of information into the design process, which drives innovation and lowers product development costs.

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Address: 4F, Bldg.6 No.2388, Xiupu Road, Pudong, Shanghai. PRC.

http://www.3dsystems.com

3D Systems provides comprehensive 3D products and services, including 3D printers, print materials, on-demand parts services and digital design tools. Its ecosystem supports advanced applications from the product design shop to the factory floor to the operating room. 3D Systems' precision healthcare capabilities include simulation, Virtual Surgical Planning, and printing of medical and dental devices as well as patient-specific surgical instruments. As the originator of 3D printing and a shaper of future 3D solutions, 3D Systems has spent its 30 year history enabling professionals and companies to optimize their designs, transform their workflows, bring innovative products to market and drive new business models.

S

SIEMENS PLM Software



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http://www.plm.automation.siemens.com

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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 life time of learning, solutions to improved vehicle technology, and the advancement of the mobility industry.

SAE International's core competencies are life-long learning and voluntary consensus standards development. SAE International's charitable arm is the SAE Foundation, which supports many programs, including A World In Motion® and the Collegiate Design Series.

SAE provides Technical Forum, Professional Development Seminar, Technical Consulting in China, and organizes Chinese delegation to attend SAE global events and exhibitions.

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