I C R M S 2 0 2 3

Technical Program

August 26-29, 2023 Urumqi, Xinjiang, China

The 14th International Conference on Reliability, Maintainability and Safety

Organized by

Chinese Society of Astronautics

Chinese Society of Aeronautics and Astronautics

China Institute of Field Statistics

China Electronics Society

China Society of Mechanical Engineering

China Instrument and Control Society

China Ordnance Society

ICRMS2023 Call for Papers

The 14th International Conference on Reliability, Maintainability and Safety (ICRMS2023) will be held from 26-29 Aug 2023 in Urumqi, Xinjiang, China, hosted by China Astronautics Standards Institute and Xinjiang University. ICRMS is an international conference on Reliability, Maintainability and Safety with a long history. It was initiated by several leading academic societies in China and has been sponsored by the IEEE Beijing Section and its Reliability Chapter. This year, the theme for the conference is Reliability，Maintainability and Safety for High -quality development. The conference covers all topics related to reliability, maintainability and safety with potential applications in the fields of industrial engineering, mechanical engineering, electrical and computer engineering, aerospace, transportation, petrochemical, civil engineering, and more. The ICRMS2023 serves a platform for discussion and shows case of the latest research achievements in reliability, maintainability and safety. In addition, internationally renowned experts will be invited to deliver keynote speeches, session.

TOPICS of Interest (but not limited)

I High-quality Development

1 Quality Management Technology
2 Quality Assurance Technology
3 Quality Improvement Technology
4 Quality Policy Research
5 Digital Quality Management System Construction
6 Digital Development and Production Process Quality Management

II Digital and Intelligent Systems Reliability, Maintainability and Safety Assurance

7 Intelligent and Reusable Systems Reliability and Safety
8 Man-machine Integration, Hardware and Software Mixed Systems Reliability and Safety
9 Cyber-Human-Physics Systems（CHPS）Reliability and Safety
10 Network and System of systems Reliability and Safety
11 Digital-Twin Systems Reliability and Safety

III Industry Product Reliability and Testability

12 Electrical, Electronic and Electromechanical（EEE）Unit Reliability and Testability
13 Material Reliability
14 Supply Chain Reliability and Safety
15 Software Reliability and Safety

IV Other Topics

16 Human Factor Reliability and Safety
17 Prognostics and Health Management
18 Life Assessment and Remaining Useful Life Prediction
19 Equipment Maintainability, Testability and Supportability
20 Failure Analysis and Physics of Failure
21 Multidisciplinary Design Optimization
22 HALT/HASS
23 Model-based Reliability and Safety Analysis; Model-based Fault Management
24 Environment Adaptability Design, Analysis and Assessment
25 Reliability, Maintainability and Safety Standards

ICRMS 2023

The 14th International Conference on

Reliability, Maintainability and Safety

August 26-29, 2023 Urumqi, Xinjiang, China

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- Chinese Society of Astronautics
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- China Instrument and Control Society
- China Ordnance Society

Technically Sponsored by

- IEEE Beijing Section
- IEEE Beijing Section Reliability Chapter

Co-Organized by

- IEEE Reliability Society
- Reliability Committee of Operation Research Society of China

Hosted by

- China Astronautics Standards Institute
- Xinjiang University

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- Beijing Hangbiao Times Testing and Certification Co., Ltd.
- Tsinghua University
- Beihang University
- Tongji University
- University of Electronic Science and Technology of China
- Northwestern Polytechnical University
- Beijing Institute of Technology
- Technical Institute of Physics and Chemistry CAS

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中国现场统计研究会
Chinese Association for Applied Statistics

中國電子學會
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中国机械工程学会
CHINESE MECHANICAL ENGINEERING SOCIETY

中国仪器仪表学会
China Instrument and Control Society

中国兵工学会
China Ordnance Society

中国运筹学会
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IEEE 中国联合会
IEEE 北京分会

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BEIJING INSTITUTE OF TECHNOLOGY

中国科学院新疆理化技术研究所
Xinjiang Technical Institute of Physics and Chemistry, Chinese Academy of Sciences

ICRMS Technical Program

Table of Contents

I、Welcome

Wu Yansheng

Conference Chairman

President of Chinese Society of Astronautics

On behalf of the co-organizers of the conference, I would like to extend a warm welcome to all guests to the 14th International Conference on Reliability, Maintainability and Safety held in Urumqi, Xinjiang Uygur Autonomous Region, from August 26 to 29, 2023.

The ICRMS aims to provide an opportunity and platform for researchers from different backgrounds around the world to share theoretical methods, standard specifications, software tools, and the latest developments in engineering applications. We appreciate the active support from all friends that has made this conference one of the prestigious academic events with a long history in the field of reliability. We are particularly delighted to see that the conference has facilitated talent development, promoted technological advancements, and contributed to the high-quality development of the society and economy.

This conference has invited 16 well-known experts both at home and abroad to deliver keynote speeches, sharing specialized topics on the latest academic and technical achievements and trends. The conference has also organized a section on high-quality development for enterprises in the Xinjiang Uygur Autonomous Region, inviting renowned enterprises from the region to exchange experiences in enterprise quality management. Additionally, the conference has set up 13 specialized sessions, including model-based systems engineering (MBSE), fault prediction, and health management, providing a technical platform for scholars, university professors and students. Furthermore, the conference offers hot-topic technology tutorial and visits to well-known enterprises for participants, aiming to present a high-level and content-rich academic feast.

The successful organization of the conference would not have been possible without the collaborative efforts and dedication of the steering committee, program committee, organizing committee, secretariat, as well as volunteers and other participants. I would like to thank the departments of the People's Government of Xinjiang Uygur Autonomous Region, the Institute of Electrical and Electronics Engineers Beijing Section and Reliability Chapter, the Reliability Committee of Operation Research Society of China, Tsinghua University, University of Electronic Science and Technology of China, Beihang University and other institutions. At the same time, I would like to express my gratitude to the China Astronautics Standards Institute and Xinjiang University for their efficient organizational work.

We believe that this conference is worth your anticipation. We hope you have a pleasant stay in Urumqi. Wish you good health. And we hope you will continue to follow the International Conference on Reliability, Maintainability and Safety.

II、Sponsors & Organizers

1.Organizers

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IV、ICRMS2023-CONFERENCE AGENDA

Saturday, August 26, 2023

周六，2023 年 8 月 26 日

TIME 时　间	ACTIVITY 活　动	LOCATION 地　点
10:00-24:00 全天	Registration & Check-in 签到	Universal Hotel Urumqi Main Building, 1st floor 乌鲁木齐环球国际大酒店主楼 1 楼 Academic Exchange Center of Xinjiang University (Honghu campus), 1st floor 新疆大学（红湖校区）学术交流中心 1 楼
17:00-19:00	Technical Tutorial 技术培训	Universal Hotel Urumqi Convention Centre, Ural Hall 乌鲁木齐环球国际大酒店会展中心乌拉尔厅
19:00-19:50	Preparatory Meeting 七大学会预备会议	Universal Hotel Urumqi, Kunlun Hall 乌鲁木齐环球国际大酒店昆仑厅 *NOTE: Representatives of the Seven Organizing Societies Only* *注释：七大学会代表参加*

Sunday, August 27, 2023

周日，2023 年 8 月 27 日

TIME 时 间	ACTIVITY 活 动	ROOM 会议室	SPEAKER 演讲人	HOST 主持人
10:30-10:40	Opening Ceremony 开幕式致辞	Grand Ballroom 天山厅	Wu Yansheng 吴燕生	Ren Liming 任立明
10:40-10:50			To be determined 待确定	
10:50-11:20	Keynote Speech 1 主题演讲 1	Grand Ballroom 天山厅	Long Lehao 龙乐豪	
11:20-11:50	Keynote Speech 2 主题演讲 2		Yang Changfeng 杨长风	
11:50-12:10	*Tea Break* *茶歇*		*Grand Ballroom* *天山厅*	
12:10-12:40	Keynote Speech 3 主题演讲 3	Grand Ballroom 天山厅	Yang Shuangjin 杨双进	Mingjian Zuo 左明健
12:40-13:10	Keynote Speech 4 主题演讲 4		Wang Zili 王自力	
13:10-13:40	Keynote Speech 5 主题演讲 5		Xie Liyang 谢里阳	
14:00-16:00	*Lunch&Break* *午餐&休息*	*Amulet Western Restaurant、Kunlun Hall、Hongshan Hall* *阿姆河西餐厅、昆仑厅、红山厅*		
16:00-16:30	Keynote Speech 6 主题演讲 6	Grand Ballroom 天山厅	Zhou Jianping 周建平	Xie Liyang 谢里阳
16:30-17:00	Keynote Speech 7 主题演讲 7		Tommaso Sgobba	
17:00-17:30	Keynote Speech 8 主题演讲 8		Yang Hong 杨宏	
17:30-18:00	Keynote Speech 9 主题演讲 9		Dong Yaohai 董瑶海	
18:15-19:55	Special Session 专题分会场	Kunlun Hall 昆仑厅	Representatives of 5 Local Enterprises 五家自治区企业代表	Chen Libo & Yuan Li 陈立波/袁丽
20:00-21:30	Welcome Dinner 欢迎晚餐	Grand Ballroom 天山厅	Jiang Jun, Zhou Jianping, Frank Sun, Zhaojun Steven Li, and Representatives of the Organizing Societies 姜军、周建平、孙凤斌、李钊军以及各主办学会代表	Ren Liming 任立明

Monday, August 28, 2023

周一，2023 年 8 月 28 日

TIME 时 间	ACTIVITY 活 动	ROOM 会议室	SPEAKER 演讲人	HOST 主持人
10:00-10:30	Keynote Speech 10 主题演讲 10	Grand Ballroom 天山厅	Michael Kezirian	Liu Yu 刘宇
10:30-11:00	Keynote Speech 11 主题演讲 11		Zhao Yuanfu 赵元富	
11:00-11:30	Keynote Speech 12 主题演讲 12		Wendai Wang	
11:30-12:00	Keynote Speech 13 主题演讲 13		Antoine Grall	
12:00-12:20	*Tea Break* *茶歇*	*Grand Ballroom* *天山厅*		
12:20-12:50	Keynote Speech 14 主题演讲 14	Grand Ballroom 天山厅	Martin Spel	Wengdai Wang
12:50-13:20	Keynote Speech 15 (Video) 主题演讲 15（录播）		Paolo Gardoni	
13:20-13:50	Keynote Speech 16 (Video) 主题演讲 16（录播）		Loon Ching Tang	
14:00-16:00	*Lunch&Break* *午餐&休息*	*Amulet Western Restaurant* *阿姆河西餐厅*		
TIME 时 间	**ACTIVITY 活 动**	**ROOM 会议室**	**HOSTS 主持人**	
16:00-18:50	Technical Session 1 技术分会场 1	Huashan Hall 华山厅	Zhang Wenfeng & Wang Guoxin 张文丰&王国新	
	Technical Session 2 技术分会场 2	Arshan Hall 阿尔山厅	Li He & Wang Weijun 李贺&王卫军	
	Technical Session 3 技术分会场 3	Swan Lake Hall 天鹅湖厅	Gu Lixiang & Cheng Hailong 谷立祥&程海龙	
	Technical Session 4 技术分会场 4	Hongshan Hall 红山厅	Yue Xiaowei & Duan Chunyan 岳小伟&段春艳	
	Technical Session 5 技术分会场 5	Kunlun Hall 昆仑厅	Li Yanfu & Liu Yu 李彦夫&刘宇	
	Technical Sessions 6 技术分会场 6	Huoyanshan 1st Hall 火焰山 1 厅	Cheng Sheng & Zheng Jiangbin 程胜&郑江滨	
	Technical Session 7 技术分会场 7	Huoyanshan 2nd Hall 火焰山 2 厅	Chen Yiqiang & Lu Guoguang 陈义强&路国光	

Tuesday, August 29, 2023

周二， 2023 年 8 月 29 日

TIME 时 间	ACTIVITY 活 动	ROOM 会议室	HOSTS 主持人
10:00-12:50	Technical Sessions 8 技术分会场 8	Huashan Hall 华山厅	Qiu Jing & Xiahou Tangfan 邱静&夏侯唐凡
	Technical Session 9 技术分会场 9	Arshan Hall 阿尔山厅	Tao Qing & Xie Jun 陶庆&谢俊
	Technical Session 10 技术分会场 10	Swan Lake Hall 天鹅湖厅	Qian Cheng & Wang Chengcheng 钱诚&王成城
	Technical Session 11 技术分会场 11	Hongshan Hall 红山厅	Guo Qi & Wang Jingyan 郭旗&王晶燕
	Technical Session 12 技术分会场 12	Kunlun Hall 昆仑山	Wendai Wang & Minxiang Hu & Jiliang Zhang
	Technical Session 13 技术分会场 13	Huoyanshan 1st Hall 火焰山 1 厅	Mingjian Zuo & Ren Yi 左明健&任弈
13:00-16:00	*Lunch&Break* *午餐&休息*	*Amulet Western Restaurant/Kunlun Hall* *阿姆河西餐厅/昆仑厅*	
16:00-19:00	Technical Visits Route 1/Route 2 (one route only) 技术参观 路线 1/路线 2 （二选一）	Route 1: Xinjiang Museum 新疆博物馆 Route 2: Goldwind Science&Technology Co., Ltd. 金风科技股份有限公司	
16:00-19:00	Check-out & Adjourn 代表撤离		

V、Technical Tutorial

Space System Safety Key Principles and Evolution

Time: August 26, 2023, 17:00-19:00

Location: Universal Hotel Urumqi Convention Centre, Ural Hall

Host: Wendai Wang

Speaker: Tommasso Sgobba

Mr. Sgobba is the Head of the Independent Flight Safety and Planetary Protection Office for the European Space Agency. In this role, he was responsible for flight safety of European Space Agency manned systems, spacecraft reentry safety, space debris, use of nuclear power sources, and planetary protection. Mr. Sgobba joined the European Space Agency in 1989, after 13 years in the aeronautical industry. He supported the development of the Ariane 5 launcher, Earth observation and meteorological satellites, and the early Hermes spaceplane phase. Later, he became product assurance and safety manager for all European manned missions on Shuttle, MIR station, and for the European research facilities for the International Space Station. Mr. Sgobba holds an M.S. in Aeronautical Engineering from the Polytechnic of Turin, where he has been also professor of space system safety (1999-2001). Mr. Sgobba is the co-editor of the first book on safety design of space systems, and Executive Director of the International Association for the Advancement of Space Safety (IAASS).

Abstract: The development of new and technologically advanced systems requires an approach to safety different from the traditional one based on prescriptive rules. Such approach that goes under the name of “system safety” is based on the establishment by the safety authority of acceptable-level-of-safety requirements and criteria, on the execution of iterative design hazard analyses, and on independent design safety reviews. Although this approach has been used extensively in NASA and international cooperation programs like ISS (International Space Station), an adequate educational program is missing. This tutorial presents the key principles and their historical evolution in space programs, as an introduction to the new IAASS book “Safety Design for Space Systems” 2nd edition released by Elsevier In July 2023.

VI、Keynote Speeches

Keynote Speech 1

China's Launch Vehicle and Aerospace

Time: August 27, 2023, 10:50-11:20

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Long Lehao, Member of Chinese Academy of Engineering

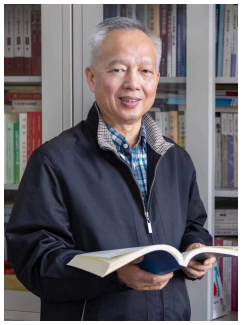
Host: Ren Liming

Abstract: This presentation introduces the development of the low-orbit, high-orbit, new-generation, and solid launch vehicles of China's Long March Series Launch Vehicles, explores the development trend of China's smart launch vehicle, introduces the development prospects of commercial satellite launch, space breeding, space station, Beidou Navigation System, lunar and deep space exploration, new-generation manned launch vehicles and heavy launch vehicle, and commercial aerospace exploration.

Bio of Speaker: Long Lehao, an expert in launch vehicles, served as Vice President of the China Academy of Launch Vehicle Technology and Chief Designer of the Long March Series of Launch Vehicles, and was elected academician of the Chinese Academy of Engineering in 2001. He has presided over and participated in the development of many types of launch vehicles and served as deputy chief designer of a major project in China. He was awarded the Grand Prize for National Scientific and Technological Progress, the National Medal for Outstanding Professional and Technical Talents, the Ho Leung Ho Lee Foundation Award for Scientific and Technological Progress, the National Outstanding Scientific and Technological Worker, the May Day Labor Medal, and also the International Astronautical Federation (IAF) Hall of Fame Award.

Keynote Speech 2

Quality and Risk Management of Beidou Navigation Satellite System



Time: August 27, 2023, 11:20-11:50

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Yang Changfeng, Member of Chinese Academy of Engineering

Host: Ren Liming

Abstract: The quality management of the Beidou Navigation Satellite System adheres to the concept of ‘comprehensive coverage, prevention first, source control, and unremitting efforts'. Based on the characteristics of the Beidou system, a quality management model of ‘reliability design system, testing and verification system, evaluation and supervision system, and quality management foundation system' is established. During the system networking construction and operation service stage, by conducting in-depth risk assessment and control & assurance chain, the Beidou system's risks can be identified through multi-source and multi-dimensional fusion perception, dynamic quantitative comprehensive evaluation, hierarchical classification and closed-loop control. By building a data fusion platform that covers the ‘three rings' data(i.e. inner, middle and outer rings) of the Beidou system, and breaking through a set of assessment, diagnosis, prediction, and optimization control methods based on big data, Mr. Yang aims to improve the quantitative, transparent, networked, and intelligent level of Beidou system operation and maintenance.

Bio of Speaker: Yang Changfeng, academician of the Chinese Academy of Engineering, is the Vice President of the Chinese Society of Astronautics (CSA). He led the creation of a new system of satellite navigation with Chinese characteristics, and helped contribute the ‘China Plan' to the world. He created a five-point linkage systematic engineering management model of ‘organizational collaboration, technological innovation, competition and cooperation coordination, quality control, and precise and stable operation'; made significant contributions to building the world-class Beidou system. He received the First Prize of the National Scientific and Technological Progress Award, two First Prizes in the Provincial and Ministerial Scientific Research Award, and the QianXuesen Outstanding Contribution Award.

Keynote Speech 3

Aerospace Reliability Engineering Innovation and Practice

Time: August 27, 2023, 12:10-12:40

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Yang, Shuangjin, Chief Engineer of CASC

Host: Mingjian Zuo

Abstract: This presentation systematically describes the concept and connotation of aerospace engineering reliability, and the establishment of working principles, criteria and system. From the reliability-centered universal quality characteristics technology, based on risk identification and control of reliability technology, and the aspect of engineering management, this presentation introduces the technical innovation and practice of aerospace engineering reliability, and explores the development trend of aerospace reliability technology from five aspects.

Bio of Speaker: Yang Shuangjin, Chief Engineer of China Aerospace Science and Technology Corporation (CASC), has served as the chief designer of manned space launch vehicle control system reliability, Director, President Assistant and Vice Director of the Quality Technology Department of China Academy of Launch Vehicle Technology (CALT), and Director of Quality Technology Department of CASC. He is currently a member of the China Association for Quality (CAQ). He has won more than 10 science and technology achievements above the ministerial level, and published more than 20 papers. He was awarded the National Advanced Pioneer of Quality Work and National May 1st Labor Medal, etc.

Keynote Speech 4

Model-Based Reliability System Engineering in the Digital Era

Time: August 27, 2023, 12:40-13:10

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Wang Zili, Member of Chinese Academy of Engineering

Host: Mingjian Zuo

Abstract: High-quality development has always attracted great attention by Chinese government. Under the national strategy “Make China Strong on Quality”, this report provides a systematic elucidation on the comprehensive quality view on three dimensions (CQVTD) and viewpoint of reforming by technology to strengthen quality management and design. First of all, the connotation and technical framework of Reliability System Engineering is systematically introduced. Then, this report emphatically introduces the latest development of theory and methods of Model-Based Reliability System Engineering (MBRSE), as well as the development and promotion status of the 4th generation Model-based reliability integration platform. At last, the prospective trends in the development of RSE are outlined from the aspects of technical characteristics, development strategies and work objects.

Bio of Speaker : Wang Zili, born in 1964, academician of Chinese Academy of Engineering, professor and doctoral advisor of Beijing University of Aeronautics and Astronautics (BUAA), is currently the director of Reliability Engineering Technology Center (RETC) and State Key Laboratory of Reliability and Environmental Engineering Technology (SKLRET). He has long been engaged in the theoretical research of reliability system engineering and the practice of major project management, formed a comprehensive integration theory of reliability, developed a comprehensive integration platform, and the results have been popularized to more than 100 units. He has published more than 140 papers and 7 monographs, authorized more than 40 invention patents, and trained more than 80 doctors and masters. He has won 2 Second Prizes of the National Scientific and Technological Progress Awards, and 4 First Prizes of Provincial and Ministerial Scientific and Technological Progress Awards, and 2 Grand Prizes of National Scientific and Technological Progress Awards as the team leader.

Keynote Speech 5

System Reliability Modeling-Mathematical Assumption and Physical Background

Time: August 27, 2023, 13:10-13:40

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Xie Liyang, Northeastern University, Professor

Host: Mingjian Zuo

Abstract: To develop system reliability models, assumptions are usually made, such as component failures are independent of each other, all components are subjected to the same or related load, etc. Based on a thorough analysis on the necessary condition for the assumptions to hold and their respective effects, both the compatible assumptions and contradictory assumption are discussed for system reliability modeling. As demonstrating examples, different series system and parallel system reliability models are developed by means of load-strength competition analysis. Besides, the errors in some traditional system reliability models resulted from contradictory assumptions are illustrated, the issue on the compatibility of assumptions is highlighted.

Bio of Speaker: Xie Liyang is a professor of Mechanical Engineering Department at Northeastern University, Shenyang, China. After received PhD degree in Northeastern University in 1988, he worked for one year (1996) in the Probabilistic Safety Analysis Institute in Hamburg, Germany, and two years in the Department of Equipment Safety of Otto-von-Guericke University Magdeburg, Germany during 1997-1998.

His research interests include structural integrity, reliability and system probabilistic risk analysis. He has published more than 100 research papers in peer reviewed journals and six books. He is the editorial board member of Int. J. of Reliability and Safety, and Int. J. of Advances in Reliability and Engineering Failure Analysis. He is the Executive Vice Chairman of the Reliability branch of Chinese Society of Mechanical Engineering and Vice Chairman of Fatigue Branch of Chinese Materials Research Society.

Keynote Speech 6

High Efficiency and High Quality Machining of Difficult Cutting Materials-introduction of Short Arc Machining Technology

Time: August 27, 2023, 16:00-16:30

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Zhou Jianping, Xinjiang University, Vice President, Professor

Host: Xie Liyang

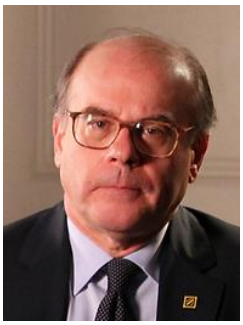
Abstract: Short arc machining is a high energy arc discharge machining method using gas-liquid mixture as working medium. It is an effective means to achieve efficient and low-cost removal of difficult-to-cut materials such as super alloy, titanium alloy and C/SiC composites. After more than 20 years of development, short arc machining technology has been widely used in Xinjiang characteristic industries, such as large mechanical and electrical equipment, petroleum machinery, mining machinery, metallurgical rollers, cement grinding rollers, aerospace and other fields. At present, short arc machining technology has realized the serialization and numerical control of processing equipment, and is developing in the direction of intelligence. This report mainly introduces the development history, application cases and future prospects of short arc machining technology.

Bio of Speaker: Zhou Jianping, Vice President, professor, doctoral advisor of Xinjiang University, and leader of the key disciplines of mechanical engineering in the autonomous region, the head of "Robotics and Intelligent Equipment Technology" science and technology innovation team in the autonomous region. He is now the director of Xinjiang Agricultural and Husbandry Robotics and Intelligent Equipment Engineering and Technology Research Center and Xinjiang Advanced Manufacturing Engineering and Technology Research Center, and the Vice President of Xinjiang Agricultural Machinery Society.

His main research directions are high-efficiency special processing technology, intelligent welding equipment and technology, high-end agricultural and animal husbandry equipment and special robots, focusing on the efficient processing of key parts in the field of aerospace science and industry, robot development and engineering applications in special industries.

Keynote Speech 7

Need for Cooperation and Collaboration for Safe and Sustainable Lunar Operations



Time: August 27, 2023, 16:30-17:00

Location: Universal Hotel Urumqi Convention Centre, Grand Ballroom 天山厅

Speaker: Tommasso Sgobba, IAASS Executive Director

Host: Xie Liyang

Abstract: While international cooperation and collaboration for emergencies on Earth is widely available with no restrictions, Lunar Search & Rescue is affirmed in principle by the Outer Space Treaty and but not (yet) pursued in practice because of some non-technical barriers. Removing those barriers is a matter of great urgency because multiple developments of lunar systems are already under way, and SAR (Search and Rescue) capabilities need to be embedded in the systems design since the beginning, otherwise it is almost impossible to introduce them retroactively. This keynote speech proposes a strategy to facilitate the removal, to some extent, of those barriers by expanding the scope of some existing international co-operations, and by embedding additional activities in existing international bodies.

Bio of Speaker: Mr. Sgobba is the Head of the Independent Flight Safety and Planetary Protection Office for the European Space Agency. In this role, he was responsible for flight safety of European Space Agency manned systems, spacecraft reentry safety, space debris, use of nuclear power sources, and planetary protection. Mr. Sgobba joined the European Space Agency in 1989, after 13 years in the aeronautical industry. He supported the development of the Ariane 5 launcher, Earth observation and meteorological satellites, and the early Hermes space plane phase. Later, he became product assurance and safety manager for all European manned missions on Shuttle, MIR station, and for the European research facilities for the International Space Station. Mr. Sgobba holds an M.S. in Aeronautical Engineering from the Polytechnic of Turin, where he has been also professor of space system safety (1999-2001). Mr. Sgobba is the co-editor of the first book on safety design of space systems, and Executive Director of the International Association for the Advancement of Space Safety (IAASS).

Keynote Speech 8

Application and Development of Digitization Technology for China's Space Station

Time: August 27, 2023, 17:00-17:30

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Yang Hong, Member of Chinese Academy of Engineering

Host: Xie Liyang

Abstract: It briefly describes the development history of China's three-step manned spaceflight, elaborates on the path of all-digital advanced manufacturing and multidisciplinary simulation that China's space station has taken in its 11 years of research and development, and builds a digital space station based on the digitized model during the research and development period and adopts the digital twin technology as a means of digitally verifying the digital space station to support in-orbit missions, and to escort major missions, such as the assembly and construction of space stations and the launch of astronauts on board construction, astronauts out of the module and other major tasks. Finally, it will reflect on and look forward to the subsequent development of space station digitization technology.

Bio of Speaker: Yang Hong, born in 1963, is an expert in the design and engineering management of manned spacecraft systems, a researcher at the China Academy of Space Technology, an academician of the Chinese Academy of Engineering and an academician of the International Academy of Astronautics. He participated in China's manned spaceflight "three-step" mission and made breakthroughs in key technologies such as space rendezvous and docking and assembly control. He presided over the design and development of China's space station system, and completed the on-orbit verification, assembly and construction of key technologies. He has been awarded two Grand Prizes for National Scientific and Technological Progress, the Ho Leung Ho Lee Science and Technology Award, the Guanghua Engineering Science and Technology Award, the National Innovation Award, the Chinese Youth Science and Technology Innovation Excellence Prize, Aerospace Achievement Medals, etc. He has published more than 50 papers and 4 books.

Keynote Speech 9

Reliability Design and Practice of Fengyun Meteorological Satellites

Time: August 27, 2023, 17:30-18:00

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Dong, Yaohai, Chief Designer of FY meteorological satellites

Host: Xie Liyang

Abstract: The FY meteorological satellites have been introduced in this paper, including the requirements and the characteristic for full-time operation. This paper sorted out the design requirements for satellites, introduced corresponding reliability and safety design methods and measures, including satellite design, ground testing and experimentation, data detection and analysis, etc. The reliability requirements corresponding to higher quantitative remote sensing performance are put forward for the future development.

Bio of Speaker: Dong Yaohai, a member of the Standing Committee of Science and Technology Committee of Shanghai Academy of Aerospace Technology, researcher and chief designer of satellites, presided over the development of a number of overall satellite technologies and platform key technologies, and has won several technology awards including First Prizes and Second Prizes of National Science and Technology Progress Award.

VI、Special Session on Xinjiang Development

High Quality Development of Enterprises in Xinjiang

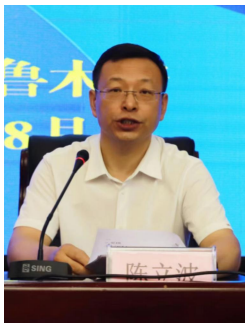
Time: Sunday, August 27, 2023, 18:15-19:45
Location: Kunlun Hall
Host: Chen Libo, Market Supervision Administration of Xinjiang, China
Yuan Li, China Astronautics Standards Institute, China

Introduction

With the theme of "vigorously promoting advanced quality management methods and leading the high-quality development of the eight industrial clusters", the sub-session is centered on the effective experience and practice of enterprise quality management, and invites representatives of China Aerospace and Xinjiang Quality Award-winning enterprises to exchange and share their experiences on quality management mode and the application of advanced quality management methods to promote the improvement of quality management capability and level of Xinjiang enterprises. The representatives of China Aerospace and Xinjiang Quality Award-winning enterprises are invited to exchange and share their experiences on topics such as quality management mode and application of advanced quality management methods, so as to promote the improvement of Xinjiang enterprises' quality management capability.

TIME	TOPIC	SPEAKER	AFFILIATION	Host
16:00-16:10	Check-in & Group Photos			
Invited Speech				
16:10-16:30	Quality Management Model for Electronic New Materials	Sun Yuanshou	Xinjiang Joinworld Co., Ltd.	Chen Libo
16:30-16:50	Result-Oriented Whole-Process Refined management model	Wang Yonggang	Xinjiang Blue Ridge Tunhe Sci. & Tech. Co., Ltd.	
16:50-17:10	The 'four forces and five All' quality management model based on the three major industries	Li Bingkun	Xinjiang Third Farm Harvest Cotton Industry Limited Liability Company	
17:10-17:40	Tea Break			
Invited Speech				
17:40-18:00	The experience of improving the stability of product quality in the whole process of wine making	Tan Mingdong	CITIC Guoan Wine Co., Ltd.	Yuan Li
18:00-18:20	Tourism service quality management model with "ecological priority, tourists first" as the core and "ecological, standardization and digitalization"	Wang Qi	Xinjiang Tianchi Management Committee	

Host Information



Chen Libo, male, Mongolian, born in January 1972. He graduated from the Law School of Wuhan University with a master's degree in Administrative Law and a Doctor's degree in law. He has worked for a long time in the State Administration for Industry and Commerce, the State Administration for Market Regulation and other national ministries and commissions, and is currently the deputy director of the Market Supervision Administration of Xinjiang Uygur Autonomous Region.

Yuan Li, female, born in December 1974, is now vice president of China Astronautics Standards Institute. She graduated from the University of Science and Technology of China in 2000 with a master's degree in management science and engineering. In the same year, she joined Beijing Institute of Microelectronics Technology. Ltd..

VII、Keynote Speeches

Keynote Speech 10

OceanGate Titan Submersible Implosion: Lessons Learned for Regulation and Consensus Standards

Time: August 28, 2023, 10:00-10:30

Location: Universal Hotel Urumqi Convention Centre, Grand Ballroom 天山厅

Speaker: Michael Tevriz Kezirian, Professor

Host: Liu Yu

Abstract: Adventure travel has grown exponentially: trekking, diving and spaceflight. The emergence of New Space has led to public discourse on the value of heritage safety, given the perceived astronomical costs. Government agencies have conflicting roles to both promote New Space activities and to protect participants. NASA's established process (classification for targeted applications coupled with industry consensus standards) is proven and will enable us to build on the success and painful lessons learned of the first half century of human spaceflight.

The OceanGate submersible's tragic voyage to the Titanic is a wakeup call. Composite carbon graphite fibers/epoxy resin structures are known to provide weight saving structural strength in a variety of applications: marine, automotive, aviation, and space. Industry standards exist to provide necessary and sufficient safety requirements for human-rated vehicles. The primary hazards attributed to fatigue and fracture, collateral damage, corrosive environments and temperature and pressure extremes have been historically managed.

Bio of Speaker: Dr. Kezirian is an Adjunct Professor of Astronautics Practice at the University of Southern California. As an Associate Technical Fellow for the Boeing Company, he led safety teams on Space Shuttle, International Space Station and the Boeing Starliner CST-100. He is an industry expert on Composite Overwrapped Pressure Vessels (COPVs) for storage of high-pressure gasses and liquids leading the AIAA standards committee on pressure vessels and teaching industry-focused courses. He is currently focused on mitigating hazards in the airspace from launch and re-entering space debris. He is also applying NASA concepts for sustainable natural gas production. He received his bachelor's degree from Brown University and master's and doctorate degree from the Massachusetts Institute of Technology, all in chemical engineering.

Keynote Speech 11

High-Reliability Technology and Application for Aerospace Integrated Circuits

Time: August 28, 2023, 10:30-11:00

Location: Universal Hotel Urumqi Convention Centre, Grand Ballroom 天山厅

Speaker: Zhao Yuanfu, Chief Technical Expert of CAAET

Host: Liu Yu

Abstract: Space radiation and strong mechanical impact environments pose unique reliability challenges to aerospace integrated circuits (ICs), significantly affecting their survivability, operational stability, and on-orbit lifetime. The report elucidates that aerospace ICs must overcome two key high-reliability technologies: radiation-hardening and impact-resistant packaging. It summarizes the proposed design hardening methods for single-event upset, single-event latchup, and total ionizing dose, as well as the proposed impact-resistant packaging method with thin film insulation process. Typical applications of these technological achievements are introduced. The new challenges faced by aerospace ICs' high-reliability technology are analyzed.

Bio of Speaker: Zhao Yuanfu is the Chief Technical Expert of China Academy of Aerospace Electronics Technology and has been long-term engaged in integrated circuit (IC) technology research. He has developed multiple aerospace core chips that have been widely applied in space projects such as Beidou navigation and manned spaceflight. He has also introduced China's aerospace IC product to the international stage for the first time. As the principal investigator, he has received the First Prize of State Technological Invention Award and China Patent Gold Award. He has been honored with the National Scientific Innovation and Advancement Badge and Ho-Leung-Ho-Lee Foundation Award.

Keynote Speech 12

Reliability is a Guarantee for the Growth and Prosperity of the Microelectronics Industry

Time: August 28, 2023, 11:00-11:30

Location: Universal Hotel Urumqi Convention Centre, Grand Ballroom 天山厅

Speaker: Wendai Wang, Professor

Host: Liu Yu

Abstract: Moore's Law has been the golden rule of the microelectronics industry since its release. Reliability is the key element that drives Moore's Law and is a foundational component of Moore's Law. This presentation will use Moore's Law as a thread to review, discuss and look ahead with attendees at the past, present and future of semiconductor reliability. The semiconductor industry has faced many reliability technology challenges along the path of integration, and has overcome many semiconductor reliability obstacles to ensure that the microelectronics industry continues to prosper and grow along the way.

Bio of Speaker: Dr. Wang received his B.S. and M.S. from Shanghai Jiaotong University and his Ph.D. from the University of Arizona. He has been a reliability technical leader at several Fortune 100 companies, where he has successfully initiated and deployed innovative design-for-reliability technique, reliability engineering practitioner program, reliability qualification methodologies, etc. He is the author of more than 50 publications, received prestige awards, and delivered keynotes and invited speeches at international conferences. He has been a Vice Chairman of the Reliability and Maintainability Symposium (RAMS) for 18 years, and is the Vice President of Silicon Valley chapter, Society of Reliability Engineers (SRE).

Keynote Speech 13

Predictive Maintenance for Deteriorating Systems and Small Data : Monitoring, Prognosis and Maintenance Decision-making

Time: August 28, 2023, 11:30-12:00

Location: Universal Hotel Urumqi Convention Centre, Grand Ballroom 天山厅

Speaker: Antoine Grall, Professor

Host: Liu Yu

Abstract: Condition-based and predictive maintenance policies aim to take advantage of monitoring information for maintenance decision-making improvement. They have become popular today, particularly in the context of the factory of the future vision. The explosion in the number of sensors and the ease with which monitoring techniques can be implemented means that in some cases approaches based on artificial intelligence techniques can be envisaged. However, this is not always the case, and some applications are based on a small amount of surveillance information. In this small data framework, model-based approaches remain of particular interest.However, their practical and effective implementation requires an advanced modeling framework that is not always available and represents a challenge for research.

In this talk, the modeling framework associated with gradually deteriorating systems is considered from the point of view of the information available for optimal maintenance decision-making.

The viewpoint of stochastic processes is privileged and described in the first place. The complete predictive maintenance processing chain is considered for different cases of information level, including deterioration prediction and remaining useful life (RUL) estimation. We share the conviction that the performance of a remaining life prediction and prognosis procedure can only be adequately assessed in light of the downstream maintenance decision procedure and overall maintenance performance.

Bio of Speaker: Antoine Grall is a Professor of Mathematics, Reliability and Maintenance Engineering, and the director of the doctoral school at Troyes University of Technology. His current research interests include stochastic degradation modeling, lifetime prognosis, reliability of deteriorating control systems, and mainly maintenance modeling and optimization. He is especially interested in condition-based and predictive dynamic maintenance policies with integration of online monitoring information.

Keynote Speech 14

Spacecraft Space Re-entry Risk Challenges and Response Methods

Time: August, 28, 2023, 12:20-12:50

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Martin Spel, Chief Technical Officer

Host: Wendai Wang

Abstract: The recent increase of the frequency of spacecraft launches for satellites in low earth orbit is resulting in more and more space debris entering the earth's atmosphere, both from upper stages or from the satellites themselves. Consequently, over the past few years, more space debris has been found on the ground. The keynote speech will address the challenges in modeling such spacecraft reentry events. For non-destructive reentry such as spaceplanes and capsules, the aerothermodynamics of the reentry phase is typically studied with Computational Fluid Dynamics methods, coupled loosely to other disciplines such as flight dynamics, structural analysis, thermal protection systems and thermal analysis. The challenge for a destructive reentry is to couple the disciplines together in a single tool and to address the issues of fragmentation and ablation which result in drastic shape changes and the generation of multiple fragments to track. Different methodologies to address those challenges will be presented.

Bio of Speaker: Martin Spel graduated in the field of electrical engineering from Hogeschool Utrecht (the Netherlands) in 1989. He worked for a decade for the aerothermodynamics section at the European Space Agency (ESTEC). During this period, he worked on scientific visualisation, numerical methods for structured multi-block grid generation, parallel computing and CFD code development. He introduced the first cluster of standard PCs at ESTEC in the '90s. He provided technical support to several projects such as the Hermes Crew Escape Vehicle, X38, Huygens and the FLTP program. In 2001 he founded the company R.Tech an SME specialised in atmospheric re-entry. Martin is involved in several software developments such as the MISTRAL-CFD code, and the spacecraft re-entry codes Debrisk and Pampero and is providing technical support in the field of destructive and non-destructive re-entry.

Keynote Speech 15

An Overview of Regional Risk and Resilience Analysis

Time: August 28, 2023, 12:50-13:20

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Paolo Gardoni, Professor

Host: Wendai Wang

Abstract: Civil structures and infrastructure provide vital services that support and enable societal functions. Therefore, ensuring their reliability and prompt recovery is critical for the public's well-being and economic prosperity. The consequences of past disasters around the world have raised concerns about the vulnerability of civil structures and infrastructure and have highlighted the significance of risk mitigation and management. The maintenance, repair, or replacement of existing vulnerable, deficient, and deteriorating structures and infrastructure represents a significant investment. To wisely invest the limited funding, it is crucial to use advanced risk analysis tools in the decision-making process. This presentation discusses a general formulation for regional risk and resilience analysis. The presentation explains how to conduct a regional risk and resilience analysis considering multiple hazards and different infrastructure, as well as the effects of deterioration and interdependencies among infrastructure. Finally, the presentation concludes with the modeling of business interruption due to a hypothetical earthquake in the New Madrid seismic zone.

Bio of Speaker: Paolo Gardoni is the Alfredo H. Ang Family Professor and an Excellence Faculty Scholar in the Department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign. He is also a Professor in the Department of Biomedical and Translational Sciences in the Carle Illinois College of Medicine, and a Fellow of the Office of Risk Management &Insurance Research in the Gies College of Business. He is the Director of the Multi-hazard Approach to Engineering (MAE) Center, the Editor-in-Chief of the journal Reliability Engineering and System Safety, and the founder and former Editor-in-Chief of the journal Sustainable and Resilient Infrastructure. His research interests include probabilistic mechanics; reliability, risk and life cycle analysis; decision-making under uncertainty; performance assessment of deteriorating systems; modeling of natural hazards and societal impact; ethical, social and legal dimensions of risk; optimal strategies for natural hazard mitigation and disaster recovery; and engineering ethics.

Keynote Speech 16

Reliability Engineering: From Practice to Theory

Time: August 28, 2023, 13:20-13:50

Location: Universal Hotel Urumqi Convention Centre,
Grand Ballroom 天山厅

Speaker: Loon Ching Tang, Professor

Host: Wendai Wang

Abstract: In this presentation, I shall present some of the actual industrial projects related to reliability that I have been involved with over the past 30 years to highlight the gaps between practice and theory in reliability engineering. This is followed by elucidating the development of various approaches in bridging these gaps. In particular, we discuss the gaps between research and applications in testing for high reliability parts, reliability centred maintenance, and degradation modeling, and listed some of the associated results over the years. We also point out some of the directions for future research in response to some of the problems faced by in repairable systems.

Bio of Speaker: Dr Loon Ching Tang is currently professor of Department of Industrial Systems Engineering & Management at the National University of Singapore and Fellow of Academy of Engineering, Singapore. He obtained his Ph.D. degree from Cornell University in the field of Operations Research in 1992 and has published extensively in areas related to industrial engineering and operations research. He has been presented with a number of best paper awards including the IIE Transactions 2010 Best Application Paper Award and 2012 R.A. Evans/P.K. McElroy Award for the best paper at Annual RAMS. Prof Tang is the main author of the award-winning book: *Six Sigma: Advanced Tools for Black Belts and Master Black Belts*. Besides being active in the forefront of academic research, in the last 30 years, Prof Tang has served as a consultant for many organizations, such as the Ministry of Home Affair, Singapore Power Grid, Republic of Singapore Air Force, Seagate, HP, Phillips, etc, on a wide range of projects aiming at improving organizational and operations efficiency; especially through better management of engineering assets. He is currently the Co-Editor-in-Chief of *Quality & Reliability Engineering International*, editorial review board member of *Journal of Quality Technology* and a fellow of ISEAM.

VIII、Technical Sessions

Technical Session 1: Model-Based Systems Engineering (MBSE)

Time: Monday, August 28, 16:00-19:00
Location: Huashan Hall
Hosts: Zhang Wenfeng, Shanghai Aerospace System Engineering Institute, China
Wang Guoxin, Beijing Institute of Technology, China

Introduction

Model-based Systems Engineering (MBSE) is an important Systems Engineering to promote the development of advanced technology and enhance the core design capability of products. System model architecture design, model-based reliability systems engineering, data fusion technology, MBSE-based fault diagnosis are all new areas to be explored. We invite senior experts from academia and industry to share the latest progress of MBSE research and promote the development of MBSE technology.

TIME	TITLE	SPEAKER	AFFILIATION
16:00-16:10	Check-in & Group Photos		
Invited Speech			
16:10-16:30	Product reliability model system	Kang Rui	Beihang University
16:30-16:50	Integrated Modeling Theory for Complex Product Design and Manufacturing Services	Zhang Wenfeng	Shanghai Aerospace System Engineering Institute
16:50-17:10	Model Integration and Data Management Technology for MBSE	Wang Guoxin	Beijing Institute of Technology
17:10-17:30	Development and Prospects of Intelligent Manufacturing and Digital Technology	Lan Xiaoping	China North Industries Group Corpoation Iimited
17:30-17:50	Multi architecture modeling technology for intelligent design of aircraft	Tang Jian Lu Jinzhi	COMAC/Beihang University
18:10-18:30	Practice and Reflection on Digital Construction of Ships	Jiang Xuan	China Shipbuilding Industry Group Co., Ltd.
18:30-18:50	Tea Break		
Paper Presentation			
18:50-19:05	A Method for Comprehensive Resilience Measuring of Air	Wang Kaixun	Beihang University
19:05-19:20	Reliability Analysis of the Phased-Mission System Based on Bayesian Network	Ding Yu	Beihang University
19:20-19:35	System Design and Characteristic Analysis of Manned Lunar Landing Spacecraft Based on SysML	Peng Kun	Beijing Institute of Spacecraft System Engineering

Host Information

Zhang Wenfeng, Chief scientist of National key research and development program; Chairman of MBSE Committee at MBSE Laboratory of Aerospace System Engineering institute; Assistant of chief designer of New generation of launch vehicle; Now her major responsibility is leading MBSE digital transformation for the new generation launch vehicle etc. For over 20 years, Prof. Zhang Wenfeng has devoted herself to the research of MBSE (Model-Based Systems Engineering), virtual real system and digital Twin. She is in charge of over 10 national projects and won a lots of honors such as “Chinese National Expert”, “the first prize of State science and technology awards “, “Contribution Awards”, “Best partner”, “Professional prize” , and “Pride prize” of “The most (Professional/Pride/Partner)” (Japan).

Wang Guoxin, Doctor of Engineering, professor, professor. Head of Department of Beijing Institute of Technology Manufacturing Engineering, Deputy Director of Key Laboratory of Ministry of Industry and Information Technology for industrial knowledge and data fusion application, research direction MBSE, knowledge engineering, intelligent design. He served as webmaster of the systems engineering systems engineering promotion workstation, member of the digital design and Manufacturing Committee of the Chinese Society of graphics, and member of the IEEE SMC MBSE committee. In recent years, he has presided over and participated in more than 30 projects including the National Natural Science Foundation of China, the National Key Research and development program. Published more than 150 academic papers, published 4 monographs, authorized more than 20 national invention patents.

Technical Session 2: Intelligent Unmanned Systems Reliability Security

Time: Monday, August 28, 16:00-19:00
Location: Arshan Hall
Hosts: Li He, University of Lisbon, The Portuguese Republic
Wang Weijun, Shanghai Aerospace System Engineering Institute, China

Introduction

Intelligent Unmanned Systems encompass a novel interdisciplinary framework that integrates mechanical, electronic, communication, and control components, such as robots, drones, and unmanned vessels. Ensuring and enhancing the reliability and safety of intelligent unmanned systems are crucial for optimizing their design efficiency and enabling successful execution of various tasks. This symposium aims to facilitate discussions on the design and applications of intelligent unmanned systems, as well as present the latest research findings and promising future directions in the field of reliability and safety studies associated with these systems.

TIME	TITLE	SPEAKER	AFFILIATION
16:00-16:10	Check-in & Group Photos		
Invited Speech			
16:10-16:30	Research on Multidisciplinary High Dimensional Global Optimization and Robust Design Methods for Aircraft Aerodynamics/Stealth	Zhao Huan	Shanghai University
16:30-16:50	Research on High Reliability Soft-hard Decoupling Control Technology of Universal Humanoid Robot	Jiang Lei	China Northern Vehicle Research Institute
16:50-17:10	Reliability analysis of industrial robots based on the unified multi-domain model and multi-fidelity integration method	Wu Jinhui	Hebei University
17:10-17:30	Reliability and safety design of lunar activity	Xu Weiyang	Shanghai Aerospace System Engineering Institute
17:30-17:50	Tea Break		
Paper Presentation			
17:50-18:05	Fault Diagnosis of Unmanned Aerial Vehicle Based on the Slime Mold Algorithm under Imbalanced Data Conditions	Wu Xinman	Beihang University
18:05-18:20	Research on dynamic prediction method of temperature environment for unmanned aerial	Li He	China Aero-Polytechnology

	vehicle platform based on Kalman filter method		Establishment
18:20-18:35	Design and Validation of Maintenance System for Space Manipulator Grapple Fixture	Zeng Lei	Beijing Institute of Spacecraft System Engineering
18:35-18:50	Study on failure mechanism and Reliability Evaluation of the space capture device	Wang Yingying	Northwestern Polytechnical University
18:50-19:05	Research on Mission Chain Scheduling Method for UAV Swarm Based on Intelligent Algorithms	Xu Minze	Beihang University

Host Information

Li He works at the University of Lisbon, Portugal. His research mainly focuses on the failure, risk, reliability, and maintainability of ocean-based equipment such as floating offshore wind turbines. Dr. He Li has published two books (with Springer) and more than 30 peer-reviewed papers, including 4 highly cited papers and 1 hot paper. He is the winner of the world's prominent design award A'Design (Product Engineering and technical Design-Gold Award). Dr. He Li is the associate editor, guest editor, and member of the editorial board of 8 Journals and has been organization committee co-chair, section chair, special session chair, and program committee member of more than 20 international conferences.

Wang Weijun, male and researcher, is mainly engaged in the overall design of space docking mechanism system, mobile system and spacecraft. He served as deputy director of Chang'e-5 spacecraft docking and sample transfer subsystem, director of one space mechanism system, and director of department. Currently, he is the director of the general research office of the lunar activity system in Shanghai Aerospace System Engineering Institute, and is responsible for the design of the lunar activity support system for manned lunar exploration.

Technical Session 3: Intelligent Integrated Logistic Support (ILS) Technology of Production

Time: Monday, August 28, 16:00-19:05
Location: Swan Hall
Hosts: Gu Lixiang, China Academy of Launch Vehicle Technology, China
Cheng Hailong, China Astronautics Standards Institute, China

Introduction

Integrated logistic support (ILS) of products is an important link throughout the entire life cycle. With the improvement of product intelligence level, ILS technology has also rapidly developed, and many emerging technologies and cross domain integration intelligent technologies have emerged. The purpose of this meeting is to build a platform for sharing and exchanging intelligent ILS technology in new domain products, the solution of ILS problems in complex systems and the developments of ILS, and to strengthen the exchange and cooperation of experts and scholars in this field. This meeting covers the development and application of intelligent ILS technology in mechanical, aerospace, transportation, computer and other fields.

TIME	TITLE	SPEAKER	AFFILIATION
16:00-16:10	Check-in & Group Photos		
Invited Speech			
16:10-16:30	Research on Fault Knowledge Graph of Large Language Modelfor Maintenance Personnel	Xie Wenshu	China Academy of Launch Vehicle Technology
16:30-16:50	Uncertainty and Reliability Analysis of Composite Material Structures for Aerospace Applications	Zhang Shufeng	National University of Defense Technology
16:50-17:10	An optimal order-replacement policy for a repairable system with imperfect maintenance	Dong Wenjie	Nanjing University Of Aeronautics And Astronautics
17:10-17:30	Research and Application Prospects of Fault Diagnosis and Prediction Technology for Space Station Products	Haung Shouqing	China Acadamy of Space Technology
17:30-17:50	Tea Break		
Paper Presentation			
17:50-18:05	Research on the Construction of Digital Twin for Frontline Maintenance Support of Aviation Equipment	Cui Lijie	Air Force Engineering University

18:05-18:20	Research on Integrated Support Data Model Standards	Zhou Yan	Avic China Aero-polytechnology Establishment
18:20-18:35	Research on the Definition and Connotation of Equipment Support Effectiveness	Wang Yun	China Academy of Civil Aviation Science and Technology
18:35-18:50	Research on Small Sample Quality Analysis Method for Aerospace Products	Du Beina	China Aerospace Science and Industry Corporation Limited
18:50-19:05	The Research on Equipment Support Process Modeling Based on S-C Time Petri Nets	Cui Bowen	Beijing Institute of Electronic Engineering and Electronics

Host Information

Gu Lixiang, Doctor of Engineering, researcher, doctoral supervisor, part-time professor of Dalian University of Technology and Central South University, part-time professor and doctoral supervisor of Harbin Engineering University. He has been engaged in the research of general quality characteristics for a long time. He has presided over several major national projects as a subject leader and project manager, and has published more than 70 papers.

Cheng Hailong, Ph.D., researcher, member of Reliability Technical Committee of China Aerospace Industry Quality Association, Professor of China Asronautics Standards Institute. He has been engaged in aerospace reliability and maintainability related research, and engineering application work.

Technical Session 4: Postdoctoral Session

Time: Monday, August 28, 16:00-18:30
Location: Hongshan Hall
Hosts: Yue Xiaowei , Tsinghua University, China
Duan Chunyan, Tongji University, China

Introduction

The post-doctoral symposium aims to establish an academic exchange platform for postdoctoral and young researchers to share new research accomplishments and discuss the latest science and technology. Its topics cover a wide range of quality, reliability, maintainability and safety disciplines, involving cutting-edge scientific research, innovative technology application, academic methodology, academic development trends, and more. The post-doctoral symposium is a platform for encouraging research cooperation, promoting collaborations between academia, industry and research institutions, thereby synergistically boosting the development of the fields.

TIME	TITLE	SPEAKER	AFFILIATION
16:00-16:10	Check-in & Group Photos		
16:10-16:30	Network reliability from a random graph theory perspective	Sun Muxia	Tsinghua University
16:30-16:50	Cross modal fault diagnosis technology for small samples	Liu Xin	Beijing Institute Of Technology
16:50-17:10	Prediction and Estimation of Multivariate Time Series Data Based on Cluster Analysis	Zhang bo	Tsinghua University
17:10-17:30	Tea Break		
17:30-17:50	Collaborative maintenance and component service strategy utilizing used items for service-oriented OEMs involved in differentiated coopetition patterns	Zhu Ying	Shanghai Jiao Tong University
17:50-18:10	Process Modeling and Monitoring Method Based on Functional State Space Model and Its Application in Advanced Manufacturing Industry	Zhou Peng	Guizhou University
18:10-18:30	A Risk Assessment Method for Digital Twin System based on Improved TODIM and FMEA	Duan Chunyan	Tongji University

Host Information

Yue Xiaowei is an associate professor in the Department of Industrial Engineering at Tsinghua University. Prior to that, he was an assistant professor and Grado Faculty Fellow at Virginia Tech. Dr. Yue's research interests focus on data analytics for quality control of intelligent manufacturing. His research has obtained more than 15 best paper awards and two best dissertation awards. Dr. Yue is a recipient of multiple awards, such as IISE Hamed K. Eldin Outstanding Early Career IE in Academia Award, SME Outstanding Young Manufacturing Engineer award, IISE Manufacturing & Design Outstanding Young Investigator Award, and Grainger Frontiers of Engineering Grant Award from the U.S. National Academy of Engineering, etc. He serves as an associate editor for IISE Transactions, Journal of Intelligent Manufacturing, and IEEE Transactions on Neural Networks and Learning Systems. He is also selected to be an editorial board member for PNAS Nexus, an open-access journal of the U.S. National Academy of Sciences (NAS).

Duan Chunyan currently serves as an associate professor and doctoral supervisor at the School of Mechanical Engineering, Tongji University. She has previously conducted postdoctoral research at the University of Washington (Seattle, USA), the University of Arkansas (Fayetteville, USA) and Tongji University (China). She has been engaged in research in the fields of intelligent manufacturing and risk management, artificial intelligence and decision optimization for a long time. She was selected for the Shanghai Pujiang (Class A) Talent Program in 2020. She also serves as a member of the First Youth Working Committee of the Shanghai Operations Research Society, vice chairman and deputy secretary-general of the Postdoctoral International Exchange Program Association, etc. She has hosted 10 national, provincial and ministerial-level, and institutional-level projects, including general projects based on the National Natural Science Foundation of China.

Technical Session 5: Youth Session

Time: Monday, August 28, 16:00-18:50
Location: Kunlun Hall
Hosts: Li Yanfu, Tsinghua University, China
Liu Yu, University of Electronic Science and Technology of China

Introduction

The youth session aims to set up a platform for academic exchange and scientific research achievements through special reports, academic seminars, etc., and to discuss the cutting-edge hotspots in a wide range of quality, reliability, maintenance and safety disciplines, including exploring the uncertainty in the optimization process of system reliability and structural reliability assessment, etc., and to promote academic exchanges among young scholars in the field of reliability and other related fields and stimulate the innovative vitality of the young scholars through this session.

TIME	TITLE	SPEAKER	AFFILIATION
16:00-16:10	Check-in & Group Photos		
16:10-16:30	Reinforcement Learning in Online Maintenance for Large-Scaled Systems: Dimensional Challenges and Feasible Solutions.	Xu Jianyu	Xi'an Jiaotong-liverpool University
16:30-16:50	Data-Driven Ultra-High Precision Quality Control for Aircraft Assembly	Yue XIaowei	Tsinghua University
16:50-17:10	Reliability analysis of k-out-of-n phased-mission systems	Zhang Chaonan	Jinan University
17:10-17:30	State perception and fault rotation of massive power IoT devices	Yang Zhou	Guangxi Power Grid Co., Ltd.
17:30-17:50	Tea Break		
17:50-18:10	Inspection policy optimization for a k-out-of-n:G system considering failure dependence	Yang Fei	Northeastern University at Qinhuangdao
18:10-18:30	Calibration of Expert Opinions for Reliability Assessment of Multi-State Systems: A Consensus Reaching Model	Xiahou Tangfan	University of Electronic Science and Technology of China
18:30-18:50	Reliability analysis and optimization of phased mission systems with mission backups	Li Xiangyu	Tai Yuan University of technology

Host Information

Li Yanfu is currently the Director of the Institute for Quality & Reliability and a full professor at the Department of Industrial Engineering in Tsinghua University, China. From 2011 to 2016, he was a faculty member at CentraleSupélec in Université Paris-Saclay, France. His research areas mainly include system reliability and PHM with the applications onto telecom systems, transportation systems, etc. He is the Principal Investigator (PI) of several government projects including the key project funded by National Natural Science Foundation of China, the project in National Key R&D Program of China. He is elected as the Elsevier Highly Cited Chinese Researcher 2019-2022. He has won multiple national society and international society search awards. He is currently an Associate Editor of IEEE Transactions on Reliability, a senior member of IEEE and IISE. He is a vice president of the System Reliability Chapter of System Engineering Society of China.

Liu Yu is the Dean and Full Professor of the School of Mechanical and Electrical Engineering at the University of Electronic Science and Technology of China. He has been recognized as one of the Most Cited Chinese Researchers by Elsevier since 2016 and the World's Top 2% Scientists since 2020. He was a recipient of the National Science Fund for Excellent Young Scholars, IISE QCRE Teaching Award, the Youth Science and Technology Award of Operations Research Society of China, the Youth Science and Technology Award of Sichuan Province, and the HIWIN Doctoral Dissertation Award sponsored by Chinese Society of Mechanical Engineers and HIWIN Technologies Corporation. He serves as an Associate Editor of IISE Transactions and IEEE Transactions on Reliability and one of the editorial board members of Quality and Reliability Engineering International, International Journal of Reliability, Quality and Safety Engineering, and Chinese Journal of Aeronautics. He also serves as the Vice President of the Reliability Committee of Operations Research Society of China. He is an ISEAM Fellow and a senior member of IEEE Reliability Society.

Technical Session 6: Software Reliability and Safety

Time: Monday, August 28, 16:00-18:20
Location: Huoyanshan 1st Hall
Hosts: Cheng Sheng, China Manned Space Engineering Software Engineering and Digital Technology Development and Management Center, China
Zheng Jiangbin, Northwestern Polytechnical University, China

Introduction

With the rapid development of modern equipment intelligence and networking, software has become the key component of equipment and has even decisive influence on the safety and reliability of equipment itself. How to effectively guarantee the reliability and safety of complex software has become the focus of industry and academia. This section invites senior experts from academia and industry to share the latest progress and practice of software reliability and safety, to jointly promote their research and industry application.

TIME	TITLE	SPEAKER	AFFILIATION
16:00-16:10	Check-in & Group Photos		
Invited Speech			
16:10-16:30	Safety Based Civil Aircraft Flight Control System Software Design Consideration	Wu Fangfang	AVIC Xi'an Flight Automatic Control Research Institute
16:30-16:50	Formal Verification of Spacecraft Operating System	Qiao Lei	Beijing Institute of Control Engineering
16:50-17:10	Model-Based Human-Cyber-Physical System Engineering --- Concepts, Theoretical Foundation and Challenges	Liu Zhiming	Southwest University
17:10-17:30	A Re-configurable Software System Architecture for Improving The Intrinsic Safety	Han Xiangyu	China Academy of Launch Vehicle Technology
17:30-17:50	Tea Break		
Paper Presentation			
17:50-18:05	Automated analysis method for software failure modes based on models and data	Feng Erqiang	AVIC China Aero-Polytechnology Establishment
18:05-18:20	Reliability analysis of industrial robots based on the unified multi-domain model and multi-fidelity integration method	Wu Jinhui	Hebei University of Technology

18:20-18:35	Research on Quality Control Method for Spacecraft Digital System Design Process Based on MBSE	Han Dong	China Academy of Space Technology
18:35-18:50	Selective Condition-Based Maintenance Decision of Wind Turbines under Stochastic Weak Wind Periods Constraints	Sun Chaoli	Taiyuan University of Science and Technology

Host Information

Cheng Sheng is the head of the China Manned Space Engineering(CMSE) Software Engineering and Digital Technology Development and Management Center， the State Council Special allowances expert，academic leader of CASC，the deputy head of CMSE Software Expert Group and Digital Expert Group. He has engaged in the research of space common software and software engineering technology for over 20 yearsPublished more than 30 papers and 3 books. He has been awarded many provincial and ministerial-level science and technology prizes, honored "CMSE Outstanding Contribution Collective","China Aerospace Top Ten Outstanding Youth", "China Aerospace Innovation Award", etc.

Zheng Jiangbin is a professor in the School of Software, Northwestern Polytechnic University, China, with a Ph.D. degree in engineering, and a visiting scholar at the University of Sydney, Australia from 2004 to 2005. He conducted collaborative research at the Hong Kong Polytechnic University twice between 2000 and 2002. His research interests include computer vision, pattern recognition, image processing, and multimedia embedded processing systems. He has published more than 50 papers in conferences and journals. He is a CCF senior member, and a CCF TCFT member now.

Technical Session 7: Reliability and Safety of Electronic Components

Time: Monday, August 28, 16:00-18:50
Location: Huoyanshan 2nd Hall
Hosts: Chen Yiqiang, the No.5 Electronics Research Institute of the Ministry of Industry and Information Technology, China
Lu Guoguang, the No.5 Electronics Research Institute of the Ministry of Industry and Information Technology, China

Introduction

Electronic components are the basic unit of equipment, and their reliability determines the safety and reliability level of equipment. Electronic components are developing in the direction of miniaturization, high density, high performance and low power consumption, and their reliability problems are becoming more and more prominent, which has become an important factor affecting the quality and reliability of equipment. This session invites senior experts in the academic community to share the latest progress in the reliability research of electronic components, and jointly promote the development of safety and reliability technology of electronic components and equipment.

TIME	TITLE	SPEAKER	AFFILIATION
16:00-16:10	Check-in & Group Photos		
Invited Speech			
16:10-16:30	Reliability of p-GaN gate HEMTs	Li Xiangdong	Xidian University
16:30-16:50	Avalanche Robustness of (ultra) Wide Bandgap Materials and Power Devices	Zhou Feng	Nanjing University
16:50-17:10	p-GaN Power HEMTs with Enhanced Vth Stability	Liu Siyang	Southeast University
17:10-17:30	From Aviation to Deep Underground: Research of Atmospheric Neutron Induced Single Event Effect and Its Application	Zhang Zhangang	The Fifth Institute of Electronics, Ministry of Industry and Information Technology
17:30-17:50	Tea Break		
Paper Presentation			
17:50-18:05	Reliability Prediction of COTS Electronic Components: An Enhanced FIDES Approach	Niu Hao	No.5 Electronics Research Institute of Ministry of Industry and Information Technology
18:05-18:20	The optimized method of thermal test based on the sensitivity analysis	Fang Man	Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences

18:20-18:35	Health assessment method for core components of switching quantity interface circuit based on active excitation test	Xu Peiyang	Science & Technology on Reliability & Environmental Engineering Laboratory

Host Information

Chen Yiqiang is Full Research Fellow of the Science and Technology on Reliability Physics and Application of Electronic Component Laboratory, The No.5 Electronics Research Institute of the Ministry of Industry and Information Technology, China. His research interests include the failure mechanism and model of key devices, such as microwave devices, power devices and so on, prognostics and health management (PHM) of power conversion system (PCS), PHM of system on chip (SoC). He has successfully developed and verified six kinds of chips for the failure monitoring and warning of SoC, and a series of instruments such as the semiconductor device quantitative evaluation system and power cycle test system, which provides a technical support for the reliability and security of electronic products.

Lu Guoguang, Professor of Engineering, Deputy Director of the National Key Laboratory of the No.5 Electronics Research Institute of the Ministry of Industry and Information Technology, and academic leader in the field of optoelectronic device reliability research. He finally developed 30 sets of high-power semiconductor laser comprehensive test series instruments and obtained a series of reliability engineering solutions. He has won 1 first prize of Guangdong Province Science and Technology Progress, 1 Excellent Patent Award of Guangdong Province, 2 innovation team awards, 6 granted invention patents, and published more than 30 SCI/EI papers.

Technical Session 8: Human Factors Reliability Safety

Time: Tuesday, August 29, 10:00-12:50
Location: Huashan Hall
Hosts: Qiu Jing, University of Electronic Science and Technology of China
Xiahou Tangfan, University of Electronic Science and Technology of China

Introduction

Human factors have become important factors affecting the reliability and safety of systems, especially in some safety critical systems where human factors greatly constrain the improvement of system reliability and safety. This session focuses on the identification, modeling, and analysis of human factors in complex systems or scenarios, exploring the impact of key factors such as human-machine interaction and human-machine-environment coupling on system reliability and safety, and exploring the development trend of human factors engineering from the perspective of complex system reliability and safety.

TIME	TITLE	SPEAKER	AFFILIATION
10:00-10:10	Check-in & Group Photos		
Invited Speech			
10:10-10:30	Space human-machine interaction safety model and simulation	Li Xiaopeng	China Asronautics Standards Institute
10:30-10:50	Dynamic Risk Evaluation of Complex Equipment Systems Based on Neural Differential Equations and Dynamic Event Trees	Deng Yingjun	Beihang University
10:50-11:10	Human Factors and Ergonomic Intervention with Exoskeletons	Qiu Jing	University of Electronic Science and Technology of China
11:10-11:30	Tea Break		
Paper Presentation			
11:30-11:45	Trust State Monitoring of Human-machine Co-driving Based on EEG Signals in intelligent Driving Scenarios	Cao Wenyan	Beihang University
11:45-12:00	Calculation of Radiation Dose to Chinese Female Astronauts	Zhou Hongtao	Aerospace System Engineering Shanghai
12:00-12:15	Risk assessment of human-machine systems based on Hybrid Causal Logic model and CREAM	Zhao Yingzhi	Beihang University

Host Information

Qiu Jing, Researcher at the University of Electronic Science and Technology of China, director of the Exoskeleton Research Institute of the Engineering Research Center of the Ministry of Education for Machine Intelligence Technology and Systems, and the vice chairman of the Intelligent Rehabilitation Committee of the Jiangxi Rehabilitation Medicine Association.She received her PhD in 2010 from the Institute of Ergonomics, TU Darmstadt, Germany. Her main focus is ergonomic design and evaluation, and her current research focuses on human-machine, human-system interaction mechanisms, evaluation, and safety design. She has published more than 45 papers in foreign journals and conferences, and published 1 monograph. More than 80 national invention patents have been applied for, and 33 national invention patents have been authorized, 7 of which have been industrialized. In recent years, she has presided over (mainly researched) more than 13 scientific research projects, including 1 national key research and development project and 5 National Natural Science Foundation of China. In 2017, she won the first prize of the Wu Wenjun Artificial Intelligence Technology Progress Award.

Xiahou Tangfan, He is currently a Lecturer with the School of Mechanical and Electrical Engineering, University of Electronic Science and Technology of China. He received his Ph.D. degrees in mechanical engineering from UESTC in 2022. He has published more than 20 peer-reviewed papers in international journal. His research interests include reliability modeling under uncertainty, Dempster-Shafer evidence theory, and prognostics and health management (PHM). He has received several awards, including IEEE reliability society Student Achievement Award, IISE annual conference 2022 QCRE Best Track Paper Award Finalist, Best Paper Award in APARM2018&QR2MSE2018. He is also a member of IISE and IEEE.

Technical Session 9: Life Assessment and Remaining Useful Life Prediction

Time: Tuesday, August 29, 10:00-13:05
Location: Ershan Hall
Hosts: Tao Qing, Xinjiang University, China
Xie Jun, Xinjiang University, China

Introduction

The service environment for critical components such as aerospace, power generation, and heavy chemical equipment is becoming increasingly harsh, posing higher requirements for material and structural strength. The purpose of this meeting is to address issues related to the safety life assessment and remaining life prediction of materials and structures, and to strengthen exchanges, discussions, and cooperation between experts and researcher in this field. The conference covered key topics related to life assessment and remaining life prediction, as well as potential applications in mechanical engineering, aerospace, transportation, computer engineering and other fields.

TIME	TITLE	SPEAKER	AFFILIATION
10:00-10:10	Check-in & Group Photos		
Invited Speech			
10:10-10:30	Research and industrial application of data-model linkage methods for reaming useful life prediction of mechanical systems	Li Naipeng	Xi'an Jiaotong University
10:30-10:50	Digital Twin Based Residual Life Calculation Method for Wind Turbines	Zhou Jianxing	Xinjiang University
10:50-11:10	Research on Fault Diagnosis and Remaining Useful Life of Rolling Bearing with Deep Learning	Tu Songjiang	Xinjiang University
11:10-11:30	Research on Fatigue Life Prediction Method of Metal Materials Based on Neural Network Model	Gao Jianxiong	Xinjiang University
11:30-11:50	Tea Break		
Paper Presentation			
11:50-12:05	Numerical Simulation on Key Parameters of an Accelerated Degradation Test Scheme for Rubber Sealing Rings	Huang Beibei	Beihang University
12:05-12:20	Equivalent Design of Multi-profile Lab Accelerated Life Test Considering Profile Sequence Effect	Huang Pu	Beihang University
12:20-12:35	Bivariate Reliability and Remaining Useful Life Prediction Model Based on Inverse Gaussian Processes and Frank Copula	Chen Tongren	Beihang University

Host Information

Tao Qing, professor, doctoral supervisor, is a visiting scholar at Brunel University in the United Kingdom. He is one of the academic leaders of Xinjiang Special Robot and Intelligent Control Engineering Technology Research Center, the standing Committee Member of Group and Intelligent Integration Technology Branch of China Mechanical Engineering Society. He is also the member of Medical and Worker Integration Branch of the China Medical and Health Culture Association. Currently, he holds the position of Dean at the School of Mechanical Engineering at Xinjiang University.

Xie Jun, associate professor and doctoral supervisor, School of Mechanical Engineering, Xi 'an Jiaotong University. He is mainly engaged in the research of multi-mode human-computer interaction and brain-computer interface. He has presided over a number of national provincial and ministerial projects such as the National Natural Science Youth Science Fund. He has published more than 40 papers in well-known academic journals and conferences at home and abroad.

Technical Session 10: Smart Maintenance and Performance Testing of Industrial Instruments

Time: Tuesday, August 29, 10:00-13:15
Location: Swan Lake Hall
Hosts: Qian Cheng, Beihang University, China
Wang Chengcheng, Instrumentation Technology and Economy Institute

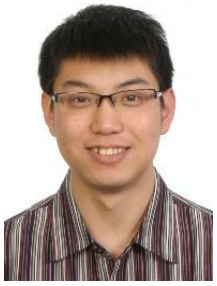
Introduction

Regarded as the "peripheral nerves" in sensing and controlling manufacturing processes, intelligent instruments play an invaluable role in the domestic economic development of China. The rapid development of science and technology has spurred continuous improvements in these products, leading to increased demands on their reliability and performance. In recent years, new theories, models, methods, and technologies related to intelligent instruments have emerged, with a particular focus on the reliability, smart maintenance, and performance testing. They have consistently evolved towards multidisciplinary collaboration and integration. In this forum, with the support from the national key research and development project "Smart Maintenance and Performance Testing Platform for Industrial Instruments", we cordially invite experts, scholars and industrial engineers to join us in exploring and sharing the latest achievements and innovations on advanced theories and technologies in the current research areas of smart maintenance and performance testing. This collaborative forum is also expected to lay a solid foundation for promoting R&D and innovation in China's intelligent instrument industry, while facilitating an integrated ecosystem of research, development, manufacturing and operation.

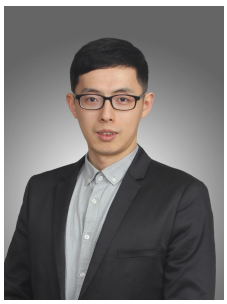
TIME	TITLE	SPEAKER	AFFILIATION
10:00-10:10	Check-in & Group Photos		
Invited Speech			
10:10-10:30	Development and Standardization on Reliability Technology of Intelligent Instruments	Wang Chengcheng	Instrumentation Technology and Economy Institute
10:30-10:50	High Speed Fault Prognosis Approach and System of Industrial Intelligent Instruments	Zhang Ke	Chong Qing University
10:50-11:10	Research on optimization method of elevator system maintenance strategy based on semi-Markov process	Wang Qiang	China Jiliang University
11:10-11:30	Tea Break		
Paper Presentation			
11:30-11:45	Research on fault diagnosis and propagation path identification method of intelligent instrument system	Wang Kai	InstrumentationTechnology and Economy

	based on Deep learning and Granger causality analysis		Institute
11:45-12:00	Contact fatigue strength reliability assessment of transmission gears considering assembly uncertainty	Li Wenjuan	Beihang University
12:00-12:15	Reliability Analysis of the Phased-Mission Safety Instrumented System Considering Common Cause Failures and Cascading Failures	Wei Shengxing	Beihang University
12:15-12:30	Fault Diagnostic Opportunities for robot servo motor using Physics-of-Failure Analysis	Zhang Bo	Shenyang Institute of Automation, Chinese Academy of Sciences
12:30-12:45	Reliability evaluation of capacitive pressure transmitters considering natural degradation and random shocks	Li Fuqiang	Hebei University of Technology
12:45-13:00	Sensor Fault Diagnosis of PMSM Drive System Based on Improved LDBO-BP	Li Longfei	Chongqing Jiaotong University
13:00-13:15	RUL Prediction Based on Multi-phase Wiener Process with Measurement Errors	Lin Wenyi	Chongqing University

Host Information



Qian Cheng is currently working as an Associate Professor in the School of Reliability and Systems Engineering, Beihang University. He considers himself as an experienced research scientist in reliability simulation, design and optimization of complicated products and systems. He has held more than 20 national funded and industrial projects, published over 80 research papers and 5 book chapters.



Wang Chengcheng, Director of Standardization Department of Instrument Technology and Economic Institute , Doctor/Senior Engineer, leading talent of machinery industry innovation, convenor of IEC SC65E/WG12 Predictive Maintenance Working Group, Leader of GB/T 37393-2019 "Digital Workshop - General Technical Requirements" and GB/T 40571-2021 "Intelligent Services - Predictive Maintenance - General Requirements". At present, he is a Chinese expert in IEC/TC65 WG22 reliability, IEC SC65E/WG10 intelligent device management, WG11 condition monitoring, WG19 full life cycle management and other working groups, and the Chinese leader of the Sino-German Intelligent Manufacturing Predictive Maintenance Working Group.

Technical Session 11: Electronic Devices and System Reliability in Harsh Environments

Time: Tuesday, August 29, 10:00-13:15
Location: Hongshan Hall
Hosts: Guo Qi, Xinjiang Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, China
Wang Jingyan, China Academy of Space Technology, China

Introduction

Electronic devices and systems in aerospace, nuclear industry, energy and other fields face harsh environments, including radiation, extreme temperature, high pressure and other harsh environments that will lead to degradation of electronic device performance, which will affect the reliability of systems and equipment. In recent years, with the advancement of device technology, the application of new devices such as nano devices and high-voltage high-power devices in harsh environments has become possible. However, they also face reliability issues brought by the device itself and external environment, and new characteristics different from previous devices have emerged. The research on the reliability mechanism and key technologies of new electronic devices and systems is of great significance.

TIME	TITLE	SPEAKER	AFFILIATION
10:00-10:10	Check-in & Group Photos		
Invited Speech			
10:10-10:30	Research on radiation failure mechanism and radiation hardening technology of SiC MOSFET devices	Sheng Kuang	Zhejiang University
10:30-10:50	Research on the reliability of wide band gap semiconductor devices	Ma Xiaohua	Xidian University
10:50-11:10	Design of Underwater Camera Pan-Tilt for Operation and Maintenance of Nuclear Power Plant	Li Yiquan	China Nuclear Power Operation Technology Corporation，LTD.
11:10-11:30	Research on Electronic Systems and Intelligent Equipment in High-Radiation Environments in the Nuclear Industry	Li Yudong	Xinjiang Technical Institute of Physics and Chemistry, CAS
11:30-11:50	Tea Break		
Paper Presentation			
11:50-12:05	Electromagnetic Simulation of the Influence on Electric Field of Electrode R-Angle Design of Multilayer Ceramic High-Voltage Capacitor	Chen Longbo	Fujian Torch Electron Tech.Co.,LTD
12:05-12:20	Early recognition of abnormal capacity degradation of lithium-ion battery based on interpretable deep machine learning	Zhou Ziyi	Beihang University

Host Information

Guo Qi, professor of the University of the Chinese Academy of Sciences, doctoral supervisor, fellow of the Chinese Society of Electronics, is currently the director of the Laboratory of Solid State Radiation Physics of the Xinjiang Technical Institute of Physics and Chemistry, Chinese Academy of Sciences. Mainly engaged in research on the radiation effect mechanism and experimental evaluation methods of electronic devices. Led over 30 projects such as the National Natural Science Foundation of China, published over 200 papers, and authorized over 20 national invention patents. He won four first prizes for scientific and technological progress and one outstanding contribution award in Xinjiang.

Wang Jingyan is the porfessor and research director in Beijing institute of Spacecwt Systems Engineering. She is the member of the Quality & Reliability Professional Group, Committee on Science and Technology, CASC and a member of the Reliability Expert Group, CASC. She has been engaged in the research and application of spacecraft reliability and safety (R&S). She is responsible for the R&S assurance from Chang'e-1 Lunar Probe to Chang'e-5 Lunar Probe, as well as TianWen 1 Mars Probe. She received several awards for her contributions, including the Advanced Individual in Chang'e-5 Mission, Outstanding individual of Technical Breakthrough and Preliminary Design in Lunar Exploration Phase III, Individual Award of Quality Technology Award of China Quality Association (2022), First Prize of Quality Technology Project of China Quality Association (2022), Second Prize of National Science and Technology Progress Award, and Third Prize of CASC Scientific and Technological Progress.

Technical Session 12: Reliability and Safety of Autonomous Vehicles

Time: Tuesday, August 29, 10:00-12:50
Location: Arshan Hall
Hosts: Wendai Wang
Minxiang Hu, HAYLION Technologies, USA
Jiliang Zhang

Introduction

In order to promote the research on reliability and safety technology methods and standards for self-driving cars, build a platform for in-depth communication and interaction between industry and academia, and promote the breakthroughs in key technology research on high-speed and reliable interaction of software and hardware, integrated reliability and safety design of sensing, positioning, controlling and executing, and reliable identification of typical scenarios and high-efficiency driving, the reliability engineers/Chief Quality Officers of domestic and foreign well-known automobile enterprises and famous experts and scholars from universities are invited to jointly organize the Reliability and Safety Session on Autonomous Vehicle Reliability and Safety.

TIME	TITLE	SPEAKER	AFFILIATION
10:00-10:10	Check-in & Group Photos		
Invited Speech			
10:10-10:30	Challenges and Methods in Autonomous Vehicle Reliability Study	Zhang Jiliang	
10:30-10:50	Performance Reliability for Autonomous Vehicle Systems	Li Yanfu	Institute for Quality and Reliability, Tsinghua University
10:50-11:10	Robustness Thinking in Autonomous Driving Reliability Improvement	Matthew Hu	Senior Vice President and Chief Quality Officer, HAYLION Technologies
11:10-11:30	Tea Break		
Paper Presentation			
11:30-11:50	Optimization of "one-station" aircraft carrier ground crew allocation	Liu Guang	Harbin Engineering University
11:50-12:05	Patio-Temporal fluctuation of blood pressure in the patients with carotid endarterectomy complications	Li Boyuan	Beihang University
12:05-12:20	Reliability Assessment of Unmanned Ground Vehicle Based on Multi-State Bayesian Network	Zhang Zirui	Beihang University

Host Information

Wendai Wang received his B.S. and M.S. from Shanghai Jiaotong University and his Ph.D. from the University of Arizona. He has been a reliability technical leader at several Fortune 100 companies, where he has successfully initiated and deployed innovative design-for-reliability technique, reliability engineering practitioner program, reliability qualification methodologies, etc. He is the author of more than 50 publications, received prestige awards, and delivered keynotes and invited speeches at international conferences. He has been a Vvice Cchairman of the Reliability and Maintainability Symposium (RAMS) for 18 years, and is the Vvice Ppresident of Silicon Valley chapter, Society of Reliability Engineers (SRE).

Jiliang Zhang has 25 years working experience in international companies like Apple, Tesla, Amazon, and Hewlett-Packard in reliability, quality, and testing functions. He received his B.S. and M.S. in Heat Energy Engineering, both from Hauzhong University of Science and Technology, China. He then attended the Ph.D. program in Reliability Engineering in The University of Arizona. His interest includes reliability test design, test and field data analysis, system reliability, Design-for-Reliability, manufacturing reliability, autonomous vehicle reliability, charging station reliability, company reliability programs, etc.

Minxiang Hu, a Senior Vice President Engineering and Chief Quality Officer at HAYLION Technologies, has been a recognized exceptional industrial expert and leader in robust engineering, quality, reliability, Design for Six Sigma (DFSS) and Robust Design for Reliability. Dr. Hu has made significant contributions as an engineer, specialist, six sigma master black belt, program manager, and executive during a long career in technology and product development, manufacturing, supply chain, commercialization, and operation. He held numerous leadership positions in automotive, aerospace, oil & gas, technology, medical device and consulting. He helped and saved companies over $19 million cost savings, including over $5.5 million cost savings for Ford Motor Company. He received numerous awards, including Ford Motor Company Global Customer Satisfaction Gold Winner Award.

Technical Session 13: Prognostics and Health Management (PHM)

Time: Tuesday, August 29, 10:00-12:50
Location: Huoyanshan 1st Hall
Hosts: Zuo Minjian, University of Alberta, Canada
Ren Yi, Beihang, University, China

Introduction

Prognostics and Health Management (PHM) is an advanced technology aimed at addressing the reliability assurance of complex equipment and systems throughout their entire lifecycle, encompassing design, manufacturing, and maintenance. As a result, PHM has been recognized as a crucial factor and effective approach to enhancing the reliability and safety of equipment and systems in various engineering applications. It has yielded a series of theoretical research achievements and technical solutions. Moreover, PHM is an interdisciplinary field that requires close collaboration among researchers from engineering, information technology, management, and other relevant disciplines. This special session aims to discuss the latest research findings and future developments related to PHM.

TIME	TITLE	SPEAKER	AFFILIATION
10:00-10:10	Check-in & Group Photos		
Invited Speech			
10:10-10:30	Anomaly Detection of Multi-dimensional Flight Parameters Using Highly Redundant Cross-linking Features	Miao Qiang	Sichuan University
10:30-10:50	Smart electricity meter reliability estimate, prediction and application	Sun Yongquan	Harbin University of Science and Technology, Harbin
10:50-11:10	Complex Nonstationary Signal Analysis for Rotating Machinery Fault Diagnosis	Feng Zhipeng	University of Science and Technology Beijing
11:10-11:30	Application of Information Theory in The Prognostic and Health Management of Machines	Li Yongbo	Northwestern Polytechnic University
11:30-11:50	Tea Break		
Paper Presentation			
11:50-12:05	A stator-current-signal-driven method for diagnosing induction motor bearing faults	Liu Zhiliang	University of Electronic Science and Technology of China
12:05-12:20	Research on Fault Analysis Technology for Aircraft Equipment	Qian Changlin	China Academy of Launch Vehicle Technology
12:20-12:35	A Novel Conditon-aware Mixture of	Jia	Zhejiang Lab

	Convolutional Experts Model-based Method for Fault Diagnosis under Variable Working Conditions	Weiqiang	
12:35-12:50	Bearing Fault Diagnosis Based on Parameter-Optimized Deep Belief Network Using Dung Beetle Optimizer	Gai Jingbo	Harbin Engineering University
12:50-13:05	Research on Risk-informed Performance and Safety Significance Analysis of Mitigating Systems of Nuclear Power Plants	Zhang Guoxu	Shanghai Nuclear Engineering Research and Design Institute Ltd., co.
13:05-13:20	Optimal condition-based maintenance of cold standby system with multiple operating units and multiple standby units	Li Yuxin	Taiyuan University of Science and Technology

Host Information

Mingjian Zuo is Guest Professor at the University of Electronic Science and Technology of China and Professor at the University of Alberta Canada. His research interests include system reliability analysis, maintenance modeling and optimization, signal processing, fault diagnosis, and health management of engineering systems. He is Fellow of the Canadian Academy of Engineering, Fellow of the Institute of Industrial and Systems Engineers (IISE), Fellow of the Engineering Institute of Canada (EIC), and Founding Fellow of the International Society of Engineering Asset Management (ISEAM).

Ren Yi received the Ph.D. degree in reliability engineering and systems engineering from Beihang University. he holds the position of Professor and serves as the Deputy Director at the Institute of Reliability Engineering, Beihang University. He has over 20 years of research and teaching experience in reliability engineering and system engineering. He is the Team Leader of the KW-GARMS© reliability engineering software platform, one Chinese nation-level professional award. His recent research interests include reliability of complex systems, physics of failure， model based reliability system engineering (MBRSE), computer aided reliability engineering , and product life-cycle reliability engineering management. He has led over 20 projects supported by government, industries and companies, and has published over 100 papers, 3 books and 3 book chapters.

IX、Technical Visits

Route1: Xinjiang Museum 新疆博物馆

Route1 leader contact: Mr.Lai Rui, +86 188 1300 7669
Mrs.Hu Siming, +86 135 2159 1275

Route2: Goldwind Science&Technology Co., Ltd.金风科技股份有限公司

Route2 leader contact: Mrs.You Jiaqi, +86 187 0134 2732
Mrs.Liu Yu, +86 198 0036 6715

Time: Tuesday, August 29, 2023, 16:00-19:00

NOTE: All buses departs on 16:00 at the Parking lot of the Universal Hotel Urumqi Convention Centre and return to the hotel around 19:00.

Introduction of the Technical Visit Routes

Route 1:Xinjiang Museum 新疆博物馆

The Museum of Xinjiang Uygur Autonomous region, located at 581 Northwest Road, Urumqi, was established and opened to the public in 1959. The construction of the second phase of the museum began in August 2018 and was completed in 2022. As a cutting-edge window to display the Silk Road culture in Xinjiang, China, there are 64952 cultural relics in the collection. The characteristic collections are mainly textiles, paper documents, painted clay sculptures and ancient mummified specimens, of which national first-class cultural relics account for about 60% of the total collection. Over the years, the museum has played a positive role in patriotic education, strengthening national unity, inheriting Chinese culture, and serving the masses of all ethnic groups, and achieved remarkable social benefits. Since the free-entry opening in 2008, the number of visitors has climbed from 281000/year to 1.23 million/year, an increase of nearly 3.4 times.

Route 2: Goldwind Science&Technology Co., Ltd. 金风科技股份有限公司

Goldwind is committed to building an energy foundation to drive a renewable future centered on the EOD (Ecology-Oriented Development) + ENERGY clean energy industry model. With reliable products and solutions in energy development, devices, service, and utilization, the company helps cities and enterprises with comprehensive and sustainable economic, ecological and social development.

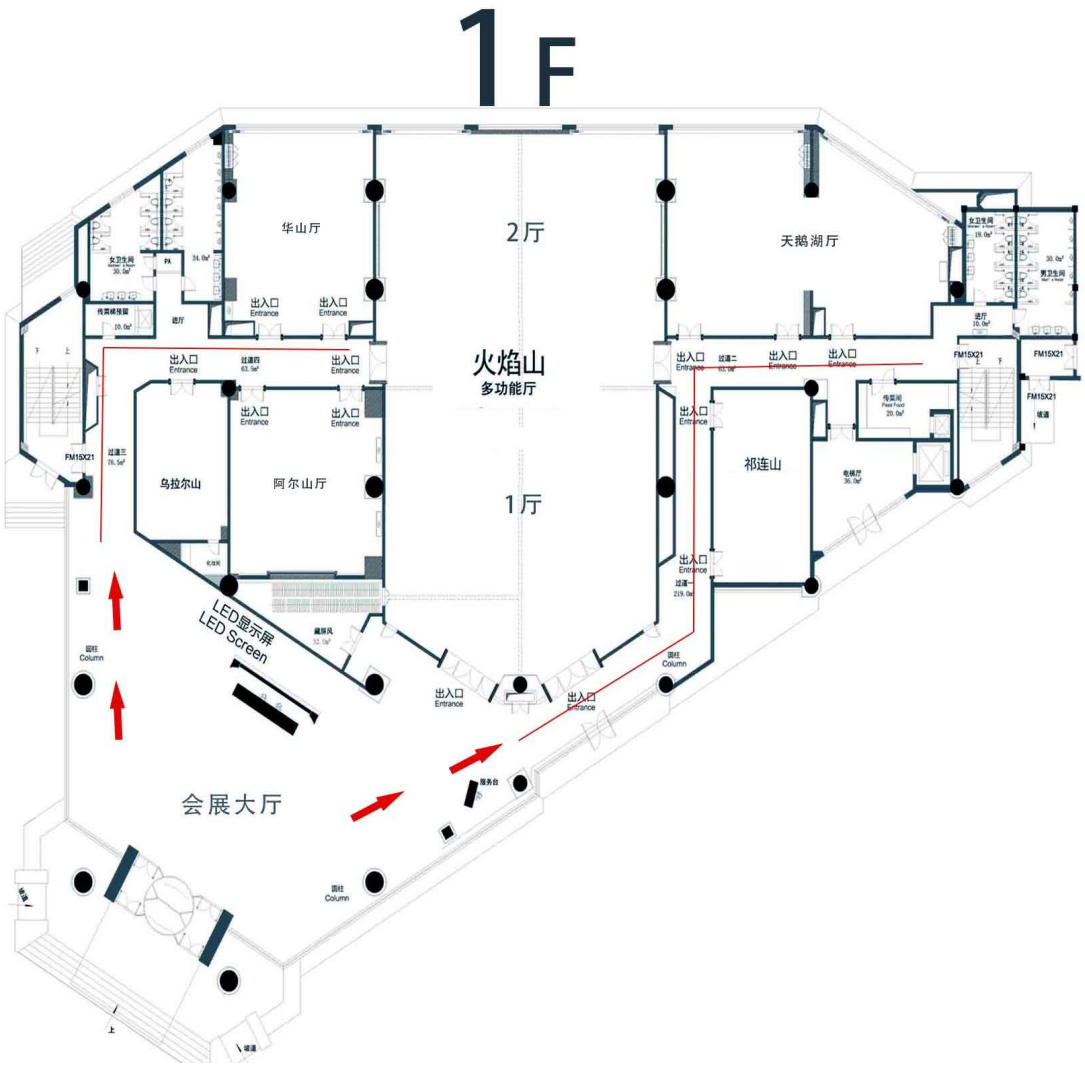
X、General Information

1. Conference Rooms

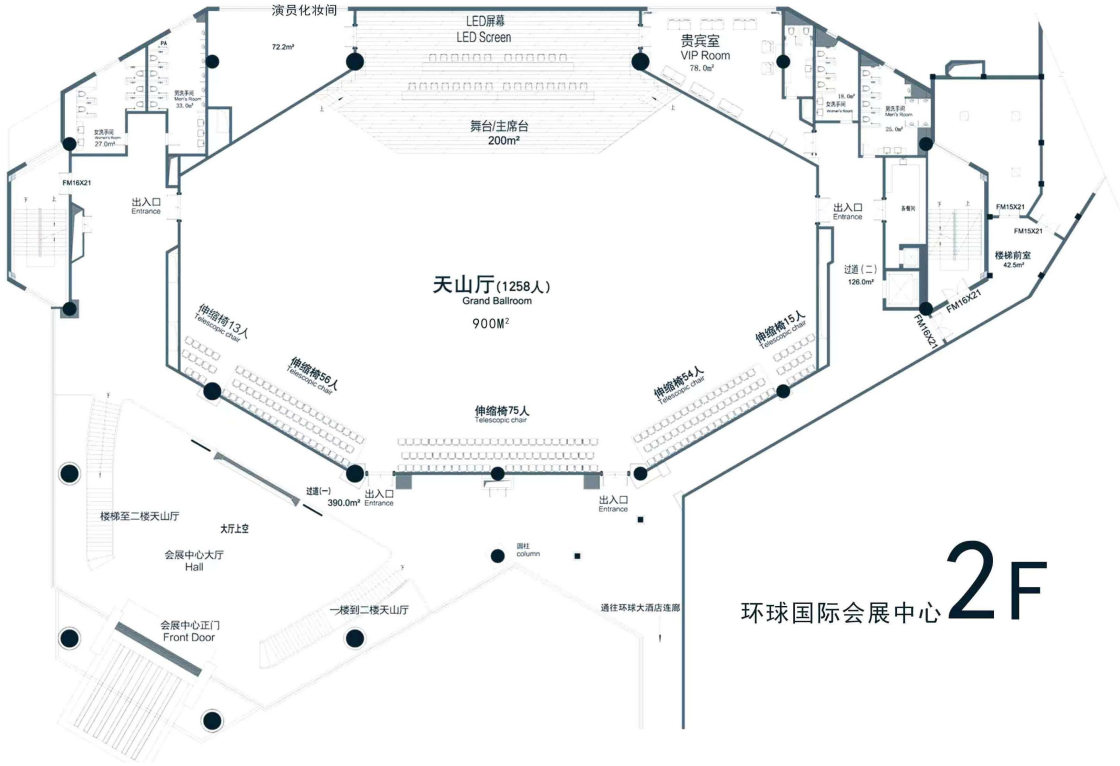
Address: No.76 South Beijing Road, Xinshi District, Urumqi, Xinjiang, China

Contact: Ms. Nicole Yan, +86 181 6797 2619

(1) 1st floor of Universal Hotel Urumqi Convention Centre



(2) 2nd floor of Universal Hotel Urumqi Convention Centre



宴会及会议设施								
多功能会议室	楼层	尺寸 (长 x 宽,米)	面积 (平方米)	高度 (米)	课桌式	剧院式	宴会式	U-型
天山宴会厅	2 楼	45 x 20	900	10m	430	1000（加排椅）	520	

(3) Kunlun Hall is in the 1st floor of Universal Hotel Urumqi Main Building , and there will be signs on site to guide you

2. Secretariat Contacts

Check-in & Registration	Mrs. Jin Chunyan	+86 159 9030 0859	Mr. Liu Kanglun	+86 155 3189 7250
Tutorial	Mr. Cui Jia	+86 188 1081 5689	Mrs. Yue Panxiang	+86 135 2222 4551
Preparatory Meeting	Mrs. Wang Shu	+86 178 8884 0056	Mr. Zhang Rui	+86 186 1213 0421
Keynote Speeches	Mr. Liu Kanglun	+86 155 3189 7250	Mrs. Li Jinzhu	+86 185 2532 9381
Special Session on Xinjiang	Mr. Li Ruifeng	+86 153 1397 5981	Mr. Cui Jia	+86 188 1081 5689
Technical Sessions	Mr. Li Ruifeng	+86 153 1397 5981	Mr. Cui Jia	+86 188 1081 5689
Technical Visits	Route 1: Mr.Lai Rui, +86 188 1300 7669 Mrs.Hu Siming, +86 135 2159 1275			
	Route 2: Mrs.You Jiaqi, +86 187 0134 2732 Mrs.Liu Yu, +86 198 0036 6715			
Hotel Reservation & Traffic	Mr. Meng Xiangwei	+86 183 1110 6135	Mr. Sun Wendong	+86 158 0163 3244
Exhibition	Mr. Wang Yalong	+86 188 1300 6430	Mrs. Liu Yanrong	+86 153 1385 3142

3. Transportation Information 交通信息

(1) Academic Exchange Center of Xinjiang University (Honghu campus)

新疆大学（红湖校区）学术交流中心

Bus Schedules:

Sunday, August 27:

Buses to the Universal Hotel depart on 9:20 at the parking lot of the Academic Exchange Center.

Buses returning to the Academic Exchange Center depart on 22:00 at the parking lot of the Universal Hotel.

Monday, August 28:

Buses to the Universal Hotel depart on 8:50 at the parking lot of the Academic Exchange Center.

Buses returning to the Academic Exchange Center depart on 19:20 at the parking lot of the Universal Hotel.

(2) Yema International Hotel

野马国际酒店

Bus Schedules:

Sunday, August 27:

Buses to the Universal Hotel depart on 9:50 at the parking lot of the Yema International Hotel.

Buses returning to the Yema International Hotel depart on 22:00 at the parking lot of the Universal Hotel.

Monday, August 28:

Buses to the Universal Hotel depart on 9:20 at the parking lot of the Yema International Hotel.

Buses returning to the Yema International Hotel depart on 19:20 at the parking lot of the Universal Hotel.

4. Working Language 会议工作语言

(1) The Conference working language is English and Chinese, multi-language supported.

会议工作语言为英文和中文，支持多语言。

(2) The Technical Tutorial will be given in English. The real-time Chinese subtitles translation is provided by IFLY TEK.

技术培训发言人使用英文，会场由科大讯飞提供实时中文字幕翻译。

(3) For Keynote Speeches in Grand Ballroom 天山厅, English and Chinese two-way instant subtitle translation is provided by IFLY TEK.

天山厅会议报告，由科大讯飞提供中英文双向实时字幕翻译

(4) Special Session on Xinjiang and other Technical Sessions, real-time two-way subtitle translation in English and Chinese is provided by IFLY TEK, according to specific needs.

新疆专题分会场和其他技术分会场，根据情况由科大讯飞提供中英文实时字幕翻译。

5. Conference Dress Code 会议着装要求

Business casual. Formal suits are not required.

正式着装（商务休闲）。

6. Meal Arrangement 餐饮安排

The conference will provide working lunch on August 27-29 and conference welcome dinner on August 27. Attendees are responsible for their own meals at other times.

会议将提供 8 月 27-29 日工作午餐和 8 月 27 日会议欢迎晚餐，除此之外参会者餐饮自理。

7. Technical Exhibition 技术展览

The conference organizes technical exhibitions by relevant organizations, universities and research institutes, which will be displayed inside and outside the conference rooms during the conference, providing free access to all participants.

会议组织了相关机构、高校、研究单位举办技术展览，会议期间将在会场内外展出，免费提供参会者参观咨询。

XI、Introduction of Xinjiang University

In 2000, Xinjiang University merged with the former Xinjiang Institute of Technology to form Xinjiang University. The school now has nine disciplines: philosophy, economics, law, literature, history, science, engineering, management and art, covering the main areas of advance professional training and scientific research. At present, there are 3 national “double-first-class” construction disciplines (Marxist Theory, Chemistry, Computer Science and Technology), 3 autonomous regional "14th Five-Year Plan" advantage disciplines to revitalize engineering construction disciplines (Mathematics, Chinese Language and Literature and Mechanical Engineering), 6 regional "14th Five-Year Plan" characteristic disciplines innovation engineering construction disciplines (Law, Geography, Biology, Ecology, Electrical Engineering and Chemical Engineering and Technology). Four disciplines (Chemistry, Engineering, Materials Science, Environment and Ecology) are in the top 1% of the ESI.

Over the past five years, Xinjiang University has undertaken 40 major national key scientific research projects, and the annual funding for scientific research has increased from 114 million yuan to 510 million yuan. It won second prize of the National Science and Technology Progress Award, Science and Technology Innovation Award of Ho Leung Ho Lee Foundation, the second National Innovation Award, and 134 provincial and ministerial scientific research awards. The university is the accepting unit of the government-sponsored study abroad program of the China Scholarship Council, it is a member of the Shanghai Cooperation Organization University, and has independent enrollment program of Chinese Government Scholarship, Confucius Institute scholarship and Xinjiang government scholarship program. The school has successively signed on Educational Exchanges and Scientific Research Cooperation Agreement (memorandums) with more than 80 universities and educational research institutions in 27 countries and regions. Three Confucius Institutes have been established in Kyrgyzstan and Russia. It has set up the Russian language Center of Xinjiang University and the examination center of Russian Foreign language examination, and has internship bases in many universities in Russia, Kazakhstan, Kyrgyzstan, Tajikistan and other countries.

XII、Introduction of China Astronautics Standards Institute (CASI)

CASI was established in1965. It is a research center for standardization and product assurance of China space, and is responsible for organizing and drafting space standards, technical support, international cooperation, product assurance and evaluation.

CASI also serves as the standard center for China National Space Administration and the Secretariat for National Technical Committee on Space Technology and Operation of Standardization Administration of China. CASI is responsible for China space standard system, and the planning, drafting, training and implementing of space standards.

CASI provides technical support and service of product assurance for space projects and products, and possess laboratories of life and reliability analysis and validation, standard parts and mechanical and electronic components, and software safety validation. There are several professional platforms at CASI under supervision of government authorities, space project authorities and CASC.