

13th International Conference on Space Safety 2024

Building a Safe, Securing, and Sustainable
Space

Prague, Czech Republic
8-10 October 2024

ISBN: 979-8-3313-2543-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2024) by International Association for the Advancement of Space Safety (IAASS)
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact International Association for the Advancement of Space Safety (IAASS) at the address below.

International Association for the Advancement of Space Safety (IAASS)
Kapteynstraat 1
2201BB Noordwijk
The Netherlands

Phone: +31(0)712020023

spacesafety@iaass.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

2024 IAASS S01/1	1	2024 IAASS S03/4	87
Impacts of Spacecraft Reentry on the Stratosphere		A Contrast Between the Vintage and the Novel: A Comparison Study Between Two System Safety Methods	
2024 IAASS S01/2	2	2024 IAASS S05/1	93
Orbital Re-Entries of Human-Made Space Objects: Drawbacks for the Upper Atmosphere and the Safety of People		Realized Collision Risk	
2024 IAASS S01/3	12	2024 IAASS S05/2	103
Improvements of Embedded Operational Solutions for Studying Launch and Reentry Impacts on Air Traffic		Collision Avoidance Maneuvers Optimization Using Evolutionary Algorithms	
2024 IAASS S01/4	25	2024 IAASS S05/3	110
Launch and Reentry Vehicle Probability of Failure Analysis Methodology for Evaluation of Public Risk in Commercial Human Spaceflight		EUSPA Role in EU SST: Service Provision, User Uptake and Security	
2024 IAASS S02/1	37	2024 IAASS S06/1	116
The Human Research Program for Civilians in Spaceflight and Space Habitation: Implementing HRP-C		Risks to Aircraft from the Mishap During the Second Starship Integrated Flight Test (IFT-2)	
2024 IAASS S02/2	41	2024 IAASS S06/2	130
An Overview of Urolithiasis as a Potential Consequence of Prolonged Exposure to Microgravity and Other Factors of Long-Term Flights Beyond Low Earth Orbit		Recommendations for Flight Safety Systems Through STPA Application	
2024 IAASS S02/3	46	2024 IAASS S06/3	140
Transference of Emerging Aerospace Functional Assessments to Commercial Space Operations		Multifactor Experiments on the Relative Penetrability of Aircraft Aluminum and Composite Plates at Various Strain Rates	
2024 IAASS S03/1	57	2024 IAASS S06/4	153
Space Weather Monitoring and Radiation Characterization With Timepix-Family Detectors		Autonomous Flight Termination System: A Proposal for an International Regulatory Frame and Set of Requirements	
2024 IAASS S03/2	63	2024 IAASS S07/1	162
Continuous In-Situ and Remote Sun Observation for Space Weather Monitoring and Mitigation of Infrastructure Threats Through an Optimized Heliocentric Satellite Constellation		Research and Analysis on Safety Design of AI Technology Applied to Space System	
2024 IAASS S03/3	76	2024 IAASS S07/2	172
Application of Re-Entry Survivability Analysis Tool to Mars Planetary Protection		System Modelling and Analysis for the Realisation of a Private-Sector-Led Commercial Human Space Transportation System in Japan for Low Cost and High Reliability	

2024 IAASS S07/3	180	2024 IAASS S13/1	282
Space Rider's Maiden Flight Payloads/ Experiments Safety Acceptance Process		Human Factors Analysis Using NASAHFACS Red- Light / Green-Light to Build a Safe, Secure, and Sustainable Space Operations	
2024 IAASS S09/1	184	2024 IAASS S13/2	287
Exhaustive Probabilistic Risk Assessment for Space Applications Including Common Causes		NASA's Agency-Level Space Flight Human System Standards	
2024 IAASS S09/2	194	2024 IAASS S13/3	294
Development of Quantitative Crew Safety Assessment Method Based on Multi-Physics Simulation Code LS-LUCA		Finite Element Modeling of Extravehicular Mobility Units for Use with Human Body Models – Motivation, Major Challenges, Use Cases and Preliminary Work	
2024 IAASS S09/3	203	2024 IAASS S13/4	303
Analysis and Risk Assessment, Systems Design and Systems Architecture for the Mexican Moon Base Habitat		Crisman Modified Hierarchy of Needs Methodology for Space Systems Architecture Within Human-Centered Design	
2024 IAASS S09/4	213	2024 IAASS S13/5	311
Evaluation of System Safety Based on ISS Experiences		Humans to Mars, But How Many? Using Training Qualification Modeling to Inform Number of Crew	
2024 IAASS S10/1	218	2024 IAASS S14/1	321
Y-Fuselage Configuration to Enhance Suborbital Payload Capacity, Seaworthiness Safety and Aerodynamics		NASA's Space Sustainability Strategy: An Overview and a Conceptual Framework for Implementation	
2024 IAASS S10/2	227	2024 IAASS S15/1	325
Risk Assessment for a Suborbital Flight Operation		Development of Probabilistic Risk Analysis Model for Launch and Flight Abort Dynamic Events Toward Human Space Flight – 1st Report	
2024 IAASS S10/3	235	2024 IAASS S15/2	332
The Concept of Antipodal Equatorial Spaceport and Antipodal Equatorial Spaceplane		Trends in Human Spaceflight: Analysis of Observed Propulsion Failure Modes Following NASA's Artemis I Mission	
2024 IAASS S11/1	244	2024 IAASS S15/3	341
Ensuring Safe Decision-Making on the Moon and Mars: Cognitive Performance Assessment for Exploration Class Mission EVA		Safety Design and Operational Control of KIBO Experiment Facility (ELF: Electro-Static Levitation Furnace) on ISS	
2024 IAASS S11/2	253	2024 IAASS S15/4	349
Designing Safety Into Extra-Terrestrial Habitats: Lessons from Space Mission Anomalies and Accident Mitigation		Benefits of Using Functional Safety in Commercial Space Applications	
2024 IAASS S11/3	269	2024 IAASS S17/1	357
Automation Creativity and Resilience: Leveraging Human Expertise		The Australian Space Activities Regulatory Framework: Ensuring Risk-Based Safety Assessments, Adaptable for a Growing Space Ecosystem	
2024 IAASS S11/4	274		
Organizing the Investigation of Human Cardiorespiratory System During Yearlong Wintering at Vostok Station as an Analogue for a Lunar Base			

2024 IAASS S17/2 365	2024 IAASS S21/2 468
WRC-23 Outcomes: ITU Role and Latest Activities on Space Innovation and Sustainability	Influence of Air and Sea Launch Characteristics on the Risk to Third Parties for North Sea Launches "Building a Safe and Secure Sustainable Space"
2024 IAASS S17/3 374	2024 IAASS S21/3 476
Navigating the Complexities of Safety and Mission Assurance Across NASA's Partnership Landscape	Integrity of INS-GNSS Localization Systems for Micro-Launchers
2024 IAASS S17/4 383	2024 IAASS S21/4 483
Why Safety Is Instrumental to Operating a Test Site Within the Paradigm of New Space Era?	TRSAT - Analytic Risk Assessment Module
2024 IAASS S18/1 390	2024 IAASS S23/1 491
Simplified Far-Field Overpressure Blast Effects Risk Analysis	Accounting for Point Estimate Uncertainty in Space Systems Reliability & Risk Analysis
2024 IAASS S18/2 401	2024 IAASS S23/2 495
Tailored Flight Safety Systems	A Reliability-Driven Design and Test (ReDDT) Methodology for Space Nuclear Power and Propulsion Systems
2024 IAASS S18/3 406	2024 IAASS S23/3 509
Predictive Intervention Strategies for Reducing Casualty Risk in Launch Vehicle Operations	Getting the Preliminary Hazard Analysis Right
2024 IAASS S18/4 412	2024 IAASS S24/1 515
Simulating Scaled Launch Vehicle Accident Scenarios for Explosive Yields	Environmental Estimation Method to Follow Sudden Changes Due to Satellite Fragmentation
2024 IAASS S19/1 419	2024 IAASS S24/2 523
Debris Shield Designs for Mass-Efficient Orbital Debris Protection, Breakdown and Collection: Analysis and Simulation	Space Debris Optical Perception in Near-Earth Orbits
2024 IAASS S19/2 429	2024 IAASS S25/1 529
Orbital Capacity and the Effects of Catastrophic Collisions in Medium Earth Orbit	Universal Safety Technical Standards as a Foundation of National and European Space Laws. Space Law Building Blocks Revisited
2024 IAASS S19/3 439	2024 IAASS S25/2 542
Environmental Impact of Large LEO Constellations	Independent Safety Investigation for Commercial Space Accidents? A Research on Relevant International Laws and Their Implications
2024 IAASS S19/4 449	2024 IAASS S25/3 551
Space Safety and Sustainability Best Practices, Standards and Guidelines: Where the Gaps, Consistencies and Inconsistencies Exist Across Six Key Publications	International Cooperation on Space Safety Standards (ICSSS)
2024 IAASS S21/1 455	2024 IAASS S26/1 558
Probability of Failure Analysis for New Launch Vehicles	Development of a Lox/Methane Intact Impact Yield Curve for a New Launch Vehicle

2024 IAASS S26/2	573	2024 IAASS S30/1	670
Upper Stage Deorbit Operations, Their Development, and Considerations for Orbital Debris Mitigation Safety Frameworks		A Framework for Compatible-By-Design Orbit Coordination in LEO	
2024 IAASS S26/3	583	2024 IAASS S30/2	682
Fallacy of Critical Mass Limit in Liquid Propellant Rocket Explosions		Brazil's Strategy in Space Situational Awareness: Analysis of a Space Debris Monitoring Center	
2024 IAASS S27/1	593	2024 IAASS S30/3	686
The Use of Software Level Allocation (as Per ED- 12C) in EGNOS		Orbital Tolerances of an Existing Large Low Earth Orbit Constellation	
2024 IAASS S27/2	597	2024 IAASS S31/1	693
Early Validation of Safety Critical Software in Automated Docking Technology Demonstration on HTV-X Through Model-Based Independent Verification and Validation Activity		Real-Time Air-Traffic Warning During Satellite Re- Entries: Challenges and Developments	
2024 IAASS S27/3	606	2024 IAASS S31/2	702
Guarding the Galactic Gateway: Building a Secure Defensible Architecture to Safeguard the Vast Frontiers of Space		Comparison of Re-Entry Safety Analysis Tool LS- DARC and ORSAT-J for Model Update	
2024 IAASS S27/4	614	2024 IAASS S32/1	710
Limitations of Satellite Propellant Gas Dispersion Prediction Model and Efforts to Improve Them		Full Lunar Surface Visualization and Simulation Platform	
2024 IAASS S28/1	620	2024 IAASS S32/2	719
Multi-Objective Sensor Tasking of Optical Telescopes Using Monte Carlo Tree Search		Study on Requirements for International Lunar Search and Rescue Interoperability Standards	
2024 IAASS S28/2	630	2024 IAASS S32/3	726
Orbital Debris Collisions and Satellite Trajectories: Analysis of Delta-V and Altitude Deviations		Research on Safety Assurance and Related Standards for Manned Space Exploration Mission	
2024 IAASS S28/3	636	2024 IAASS E-posters/1	733
Japan's Ssa Policy: Objectives and Challenges for the Public SSA System		Design Consideration and Evaluation of a Human-Machine Interface for Real-Time Mission Monitoring of a Launch and Re-Entry Coordination Systems "Building a Safe and Secure Sustainable Space"	
2024 IAASS S29/1	647	2024 IAASS E-posters/2	743
The Need for a Strict Interpretation of Legal Instruments to Ensure Effective International Cooperation		Crew Safety for Space Nuclear Power Systems	
2024 IAASS S29/2	655	2024 IAASS E-posters/3	753
International Cooperation for Space Domain Security International Space Governance and Solutions for Galloping Commercial Space Traffic Management Including Issues of Re-Entry, Space Debris and Other Aspects of Safety		Space Traffic Management	