IAASS Activities

20

YEARS

By
Paul WILDE
IAASS President

United Nations - Committee on the Peaceful Uses of Outer Space
61st Plenary Session of the Scientific and Technical Subcommittee
February 2024

Our Mission and Goals Aim High

Mission

Advancing space safety forms the foundation of our endeavour. Compared with the vastness political, financial and intellectual resources that space programs require our forces minute, truly a drop in the ocean. Nevertheless, we want to be that drop and indeed a catalyst drop. We are committed, through the knowledge and dedication of our members, to internationally advance space safety as parents are to their children, to help finally ensure that no accident shall ever happen because of:

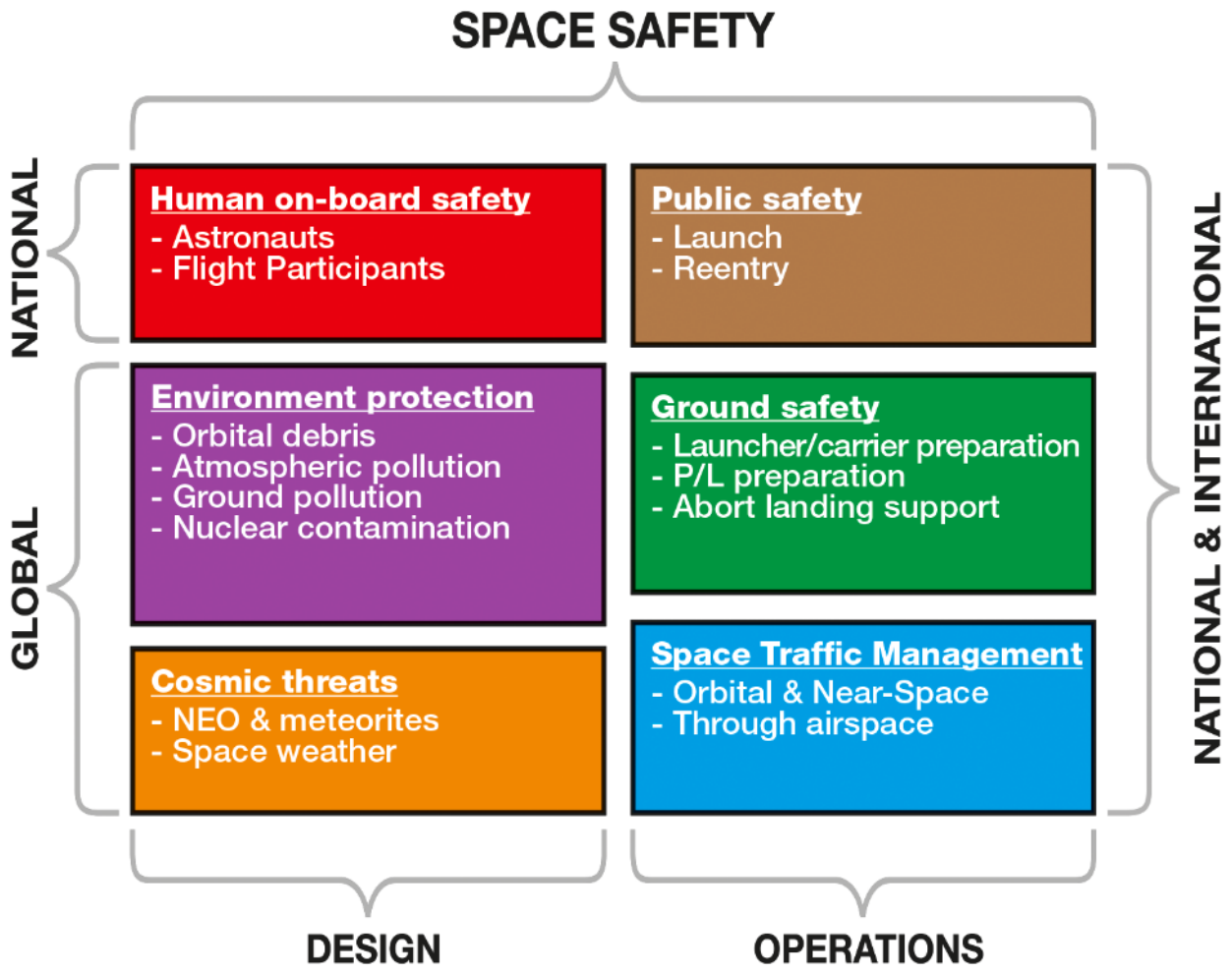
- Risk badly measured or willingly underestimated;
- Necessary knowledge not made available to others;
- Lack of management commitment and attention;
- Lack of personal accountability, which makes people negligent.

Goals

1. Advance the science and application of Space Safety
2. Improve the communication, dissemination of knowledge and cooperation between interested groups **and** individuals in this and related fields
3. Improve understanding and awareness of the Space Safety discipline
4. Promote and improve the development of Space Safety professionals and standards
5. Advocate the establishment of safety laws, rules, and regulatory bodies at national and international levels for the civil use of space

- ***20 years is time to assess the road covered…***

The Scope of IAASS Activities



1 - Advance the science and application of Space Safety

- "Round robin tests" of risk assessment tools for launch and reentry
- **Expert advice and tool development for Space debris mitigation for aviation (ADMIRE project)**
- **Promoting the Space Safety Institute (*now open at The Aerospace Corp.)***
- **Near-Space Region legal status definition (instead of Karman line delimitation)**
- **Publication of Manifesto**

MAX - min	SCARAB v3.0	SCARAB v. 3.1	DRAMA/ SESAM	ASTOS/ DARS	DEBRISK	ORSAT	CATNS
Fragmentation altitude	77.2	74.8	78	78	78	78	-74
Number of fragments	6	5	30	15	23	21	26
Surviving mass	41	124.5	71.4	73	58.7	47.2	159.7
Surviving mass (%)	10	30	18.2	18.7	14.5	12	37.7
Casualty area (m^2)	5.3	5.28	33.4	14.1	18.2	15.3	29.4
(min-heel) (km)	4368	4395	3777	3510	3955	4301	3985
(max-toe) (km)	4631	4597	4430	4411	4332	4509	4604
nt length (km)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	208	619

GENSAT re-entry cases study

MANIFESTO
FOR
A SAFE AND SUSTAINABLE SPACE

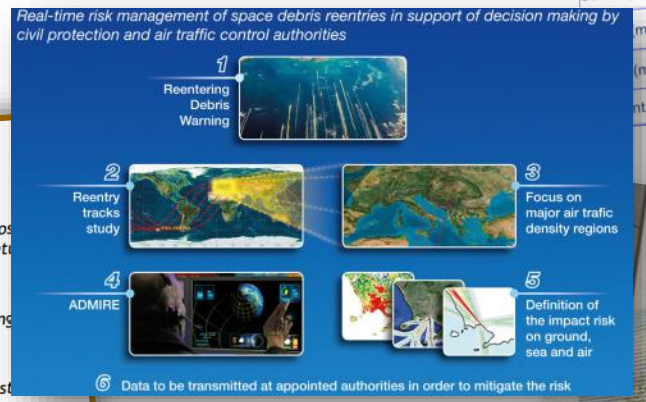
I. Ensure that citizens of all nations are equally protected from the risks pos
by over-flying space systems and objects during launch and re-entry/ret
operations

II. Ensure that space systems are developed, built and operated according
common minimum ground and flight safety rules

III. Seek to prevent collisions or interference with other aerospace syst
during launch, on-orbit operation, and re-entry

IV. Ensure the protection of the ground, air and on-orbit environments from
chemical, radioactive and debris contamination related to space operations

V. Ensure that mutual aid provisions for space mission safety emergencies are
progressively agreed, developed and made accessible without restriction
anywhere on the Earth and in Outer Space

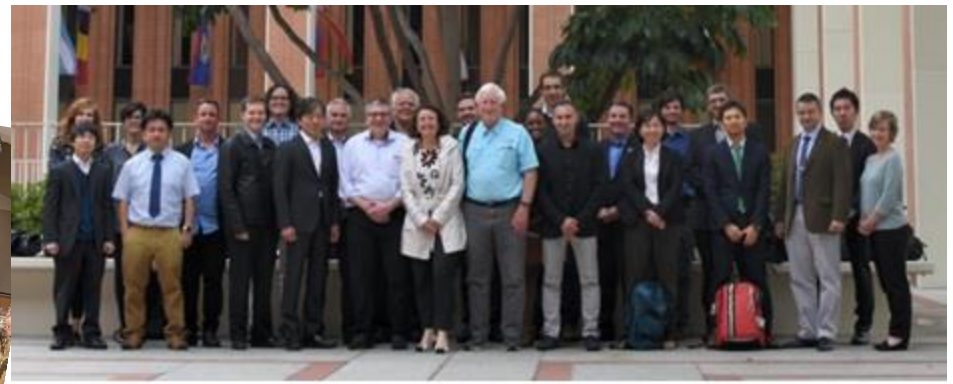


ADMIRE project

2 - Improve the communication, dissemination of knowledge and cooperation between interested groups and individuals in this and related fields

- 5 technical committees conducting professional workshops
- Dozens of IAASS position papers and editorials

Tulsa, 2024



Los Angeles, 2019

Kourou, 2010

IAASS POSITION PAPERS:

- A Grand Challenge for Active Removal of Space Debris (7-5-2017)
- Applicability of Pressure Suits for Suborbital Flights (7-5-2017)

IAASS REPORTS TO UN COPUOS:

- Suborbital Flights and the Delimitation of Air Space Vis-à-vis Outer

International Association for the Advancement of Space Sa

IAASS Position on OST Obligations
Lunar SAR
IAASS' topics of interest and messages

Preamble

Space Safety is the common denominator of Space activities, irrespective of participant's nationa affiliation and type of international cooperation. On such grounds, Search and Rescue (SAR) activi in Space, and more specifically on Lunar Soil, can be tackled with the aim of building a sincere cooperation among different key-players at operational level and bridging possible political gaps.

Astronauts' SAR is mentioned in several diplomatic documents governing space activities, such as the Outer Space Treaty (OST), the Astronauts' Agreement, and the Moon Agreement. Astronauts' SAR activities that may be encountered in space, whether in Earth orbit, in Outer Space or on the Moon, will also face challenging new technical and operational aspects in addition to the already

- **Human Factors & Performance for Safety**
  Dr. Bettina Beard, NASA-AMES, USA
- **Launch Safety**
  Dr. Ronen Ingbir, Israel
- **Re-entry Safety**
  Dr. Cristina De Persis, NL
- **Space Safety Laws & Regulations**
  Prof. LIU Hao, China;
  Prof. Andrea Harrington, Canada
- **Space Hazards**
  Dr. Bill Ailor, USA
- **Technical Director**
  Maite Trujillo, Spain

- >12 Conferences (IAASS, Manfred Lachs…)
- **Journal of Space Safety Engineering**
- **Space Safety Magazine online**

Osaka, 2023

IAASS Conference 2011 – Versailles, France

IAASS Conference 2010 – Huntsville, USA

IAASS Conference 2008 – Rome, Italy

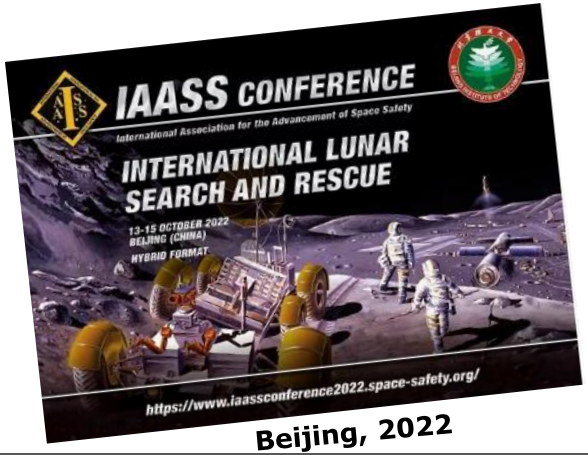
IAASS Conference 2013 – Montreal, Canada

IAASS Conference 2017 – Toulouse, France

Space Safety Magazine

Nice, 2005

Florida, 2016



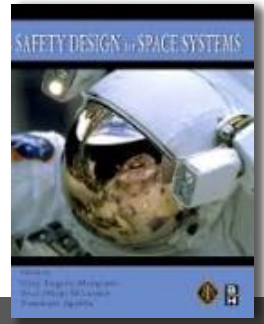
Beijing, 2022

3- Improve understanding and awareness of the Space Safety discipline

- Support to educational programmes (universities…)
- **Jeffersonian diners**
- Books

USC Viterbi
School of Engineering
Department of Aerospace and Mechanical Engineering

March 2009



August 2010

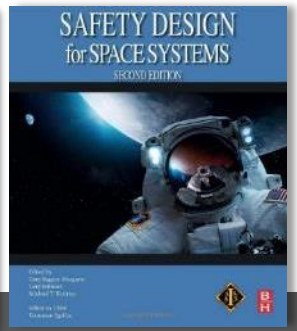
Safety Design in Chinese, 2011

September 2011

May 2013

November 2017

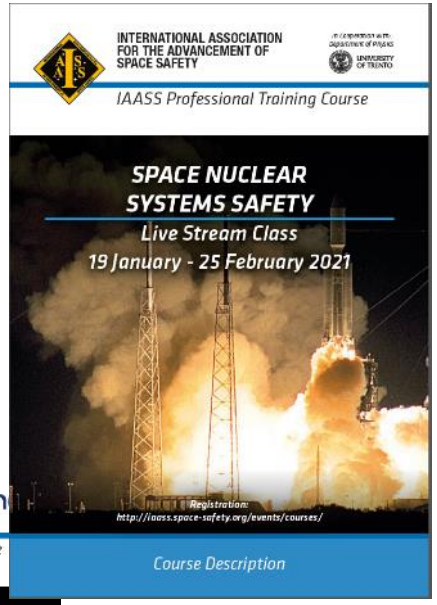
2nd Edition 2023

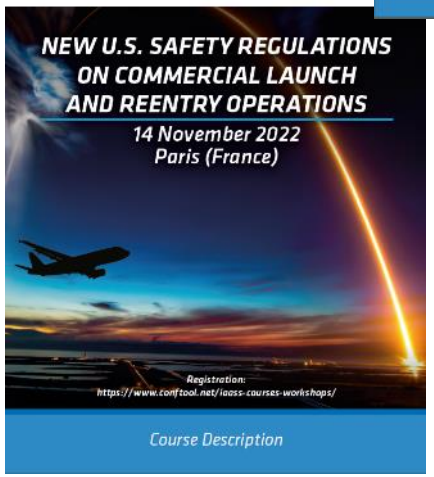


4. Promote and improve the development of Space Safety professionals and standards

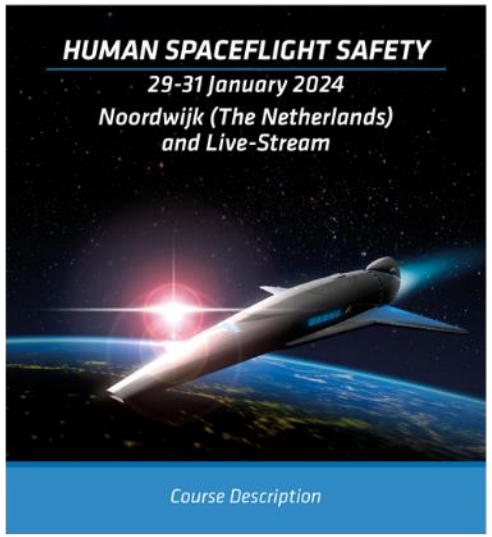
   - Professional Training Courses
   - Standard for commercial human spaceflights

Example of Professional Courses



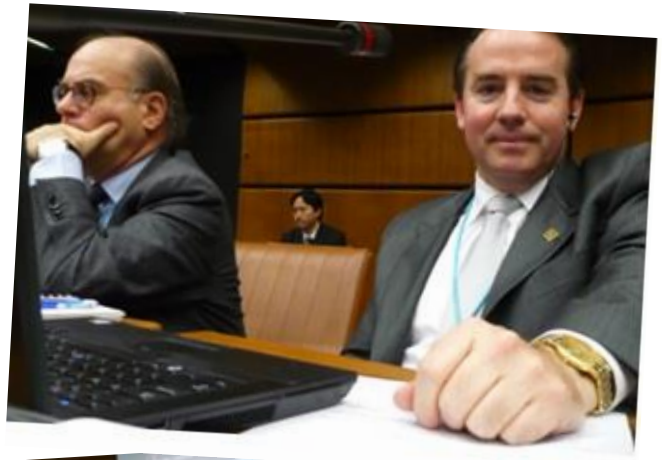


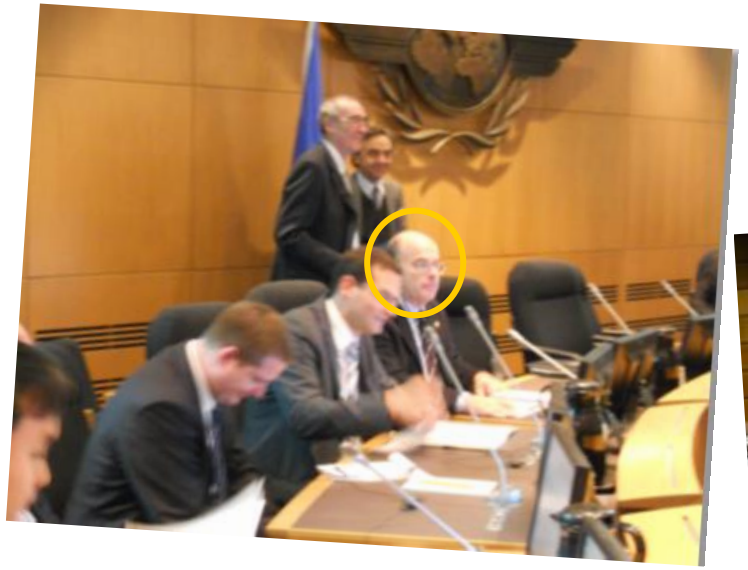
Next courses in 2024



5 - Advocate the establishment of safety laws, rules, and regulatory bodies at national and international levels for the civil use of space

- Presentations to COPUOS Technical Sub-committee
- Reports for COPUOS Legal Sub-Committee
- Participation to ICAO Space Learning Group





> 2 Dozen presentations to COPUOS

Presentations at COPUOS

1. **« IAASS General presentation »** by **Tommaso Sgobba** COPUOS 2010
2. **« Towards Long-term Sustainability of Space Activities: Overcoming the Challenges of Space Debris »** by Prof. Dr. **Ram Jakhu** COPUOS LRC 2011
3. **« Two Space Debris Issues: Long-Term Cost of Satellite Operations Refining Reentry Disposal Hazards »** by **William Ailor** Ph.D COPUOS STSC 2011
4. **« Active Debris Removal - An Essential Mechanism for Ensuring the Safety and Sustainability of Outer Space »** by Prof. Dr. **Ram Jakhu** COPUOS STSC 2012
5. **« IAASS Goals and initiatives »** by **Carmen Victoria Felix** COPUOS STSC 2013
6. **« The Definition and Delimitation of Outer Space: The Present Need to Determine Where "Space Activities »** By **Yaw Otu Mankata Nyampong** COPUOS LRC 2014
7. **« Commercial Human Spaceflight Safety »** By **Tommaso Sgobba** COPUOS 2014 STSC
8. « **Public Risk Criteria and Rationale for Commercial Launch and Reentry »** by **P. Wilde**, Ph.D. COPUOS 2014 STSC
9. **« Space Safety and Space Traffic Management »** By **Isabelle Rongier and Tommaso Sgobba** IISL-ECSL Space Law Symposium 2015
10. **« The need for International approach and framework for operations in near-space »** by **Taro Kuusiholma & Ram Jakhu** » COPUOS LRC 2015
11. ***« Risk to Aircraft From Space Vehicles Debris »*** *by* **Matteo Emanuelli, Tobias Lips** COPUOS STSC 2015
12. ***« Lessons Learned from Space Failures »*** *By* **Isabelle Rongier** COPUOS STSC 2015
13. « **The Definition and Delimitation of Outer Space and the Safety of Aerospace Operations »** by **R. S. Jakhu and A. Harrington** COPUOS LRC 2016
14. ***« International Space Governance »*** by **Tommaso Sgobba** COPUOS STSC 2016
15. **"The definition and delimitation of outer space and the safety of aerospace operations"** *by* **Paul Dempsey** COPUOS LRC 2017
16. **"Impact of newcomers on space debris risks"** *by* **Fernand Alby and Bruno Lazare** *COPUOS STSC 2017*
17. "**Massive Collision Monitoring Activity (MCMA) Examining Urgency and Options for Debris Remediation"** by Dr. **Darren McKnight** COPUOS 2017
18. ***« Progress with Commercial Space Safety Institute »*** by **Tommaso Sgobba** ICAO/UNOOSA Aerospace Symposium (SPACE 2017)
19. "**An Institute for Space Debris Prevention and Control"** by **Tommaso Sgobba and Dr. Mark A. Skinner** COPUOS 2018

…Etc.

Good news is we've already come a long way… but there are new challenges to face!

- **Reentry casualty requirement no longer to be based on (rare) events (10^{-4}), but to be computed and allocated on annual basis**
- **New fields to be studied:**
  - **effects of vapors linked to space objects demise, during reentry (pollution of high layers of atmosphere),**
  - **risk created by small (> 300g) remaining fragments for aviation**
- **Governance of Space Traffic Management to be agreed at international level, including specific case of air-launches from international airspace**
- **Promoting Lunar Search & Rescue Cooperation & Collaboration**
- **International Cooperation for Space Safety Standards (ICSSS), initiative**

OUR STRATEGIC DRIVERS

- Advancing safety is a key element to expand space programs and make them economically viable
- Space commercialization and international cooperation in civil space programs is the way ahead. It requires an international safety culture!
- Need for an integrated (airspace/outer space) international regulations system to cover traffic and safety of aero-space operations (emerging suborbital spaceplanes, space-based safety critical services, etc.)
- Need for uniform international space safety standards to ensure fair competition in the global (space) market.

CALL FOR PAPERS!