

International Organization for Standardization (ISO) activities for Long-Term Sustainability (LTS) of space activities

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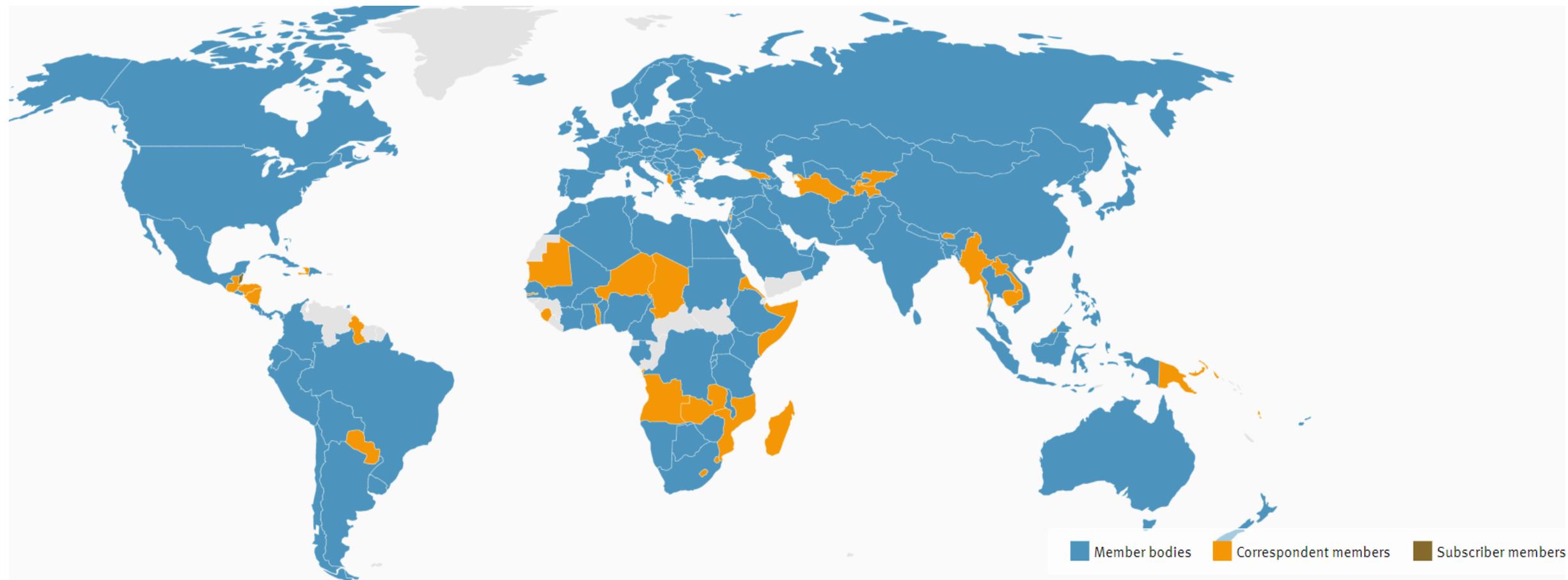
UN COPUOS STSC Meeting, 14 Feb 2022



About ISO

- ISO established in 1947 to promote standards in international trade, communications, and manufacturing
 - ISO general consultative status with UN ECOSOC since 1947
- ISO is an independent, non-governmental organization made up of members from national standards bodies of 167 countries
- “World's largest developer of international standards”
- “One country, one vote”

The ISO network



This map is designed to visually demonstrate the geographic distribution of our Members. The boundaries shown do not imply an official endorsement or acceptance by ISO.

- 167 Member bodies
- 39 Correspondent members
- 4 Subscriber members

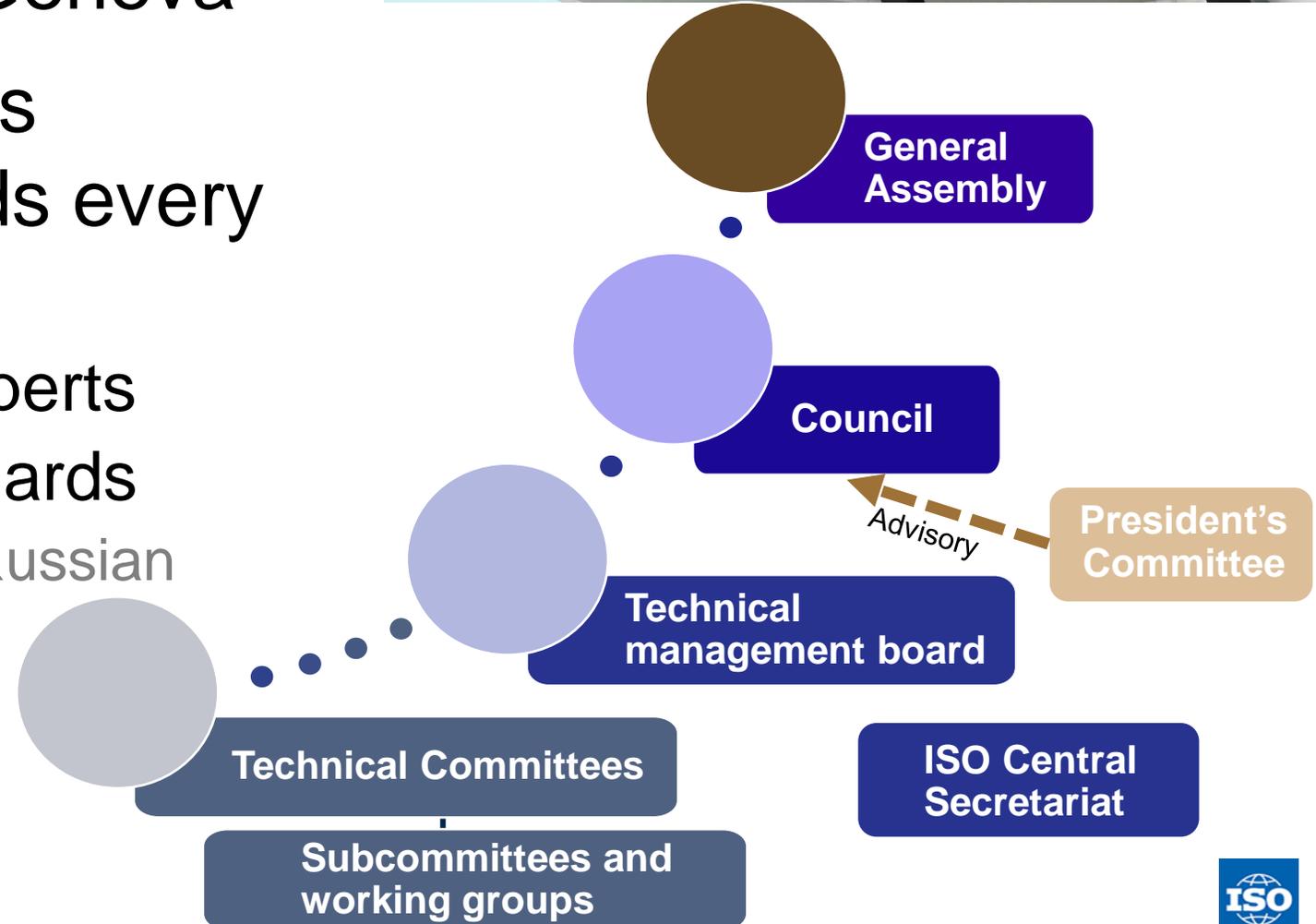
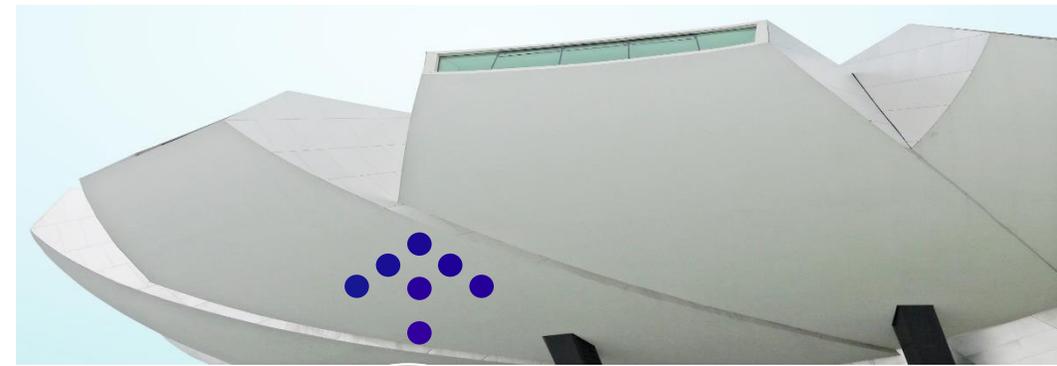
Globally, international standards ...

- ... provide a reference framework and a common language to facilitate trade and technology transfer
- ... prioritize describing performance requirements and interfaces
- ... are verifiable and well-suited for contractual mechanisms
- ... ensure shared technical knowledge and compatibility
- ... provide scientific basis for health, safety and environmental legislation

Voluntary, consensus international standards can overcome political barriers, diplomatic objectives, and competitive rivalries.

ISO Governance Structure

- ISO General assembly and Central Secretariat are based in Geneva
- 300+ technical committees developing 100+ standards every month
 - 100 000+ subject matter experts
 - 23 000+ international standards
 - Languages: English, French, Russian



ISO air and space standards developed in TC20

- ISO/TC 20 develops and maintains standards for aircraft and space vehicles, including:
 - materials, components and equipment for construction and operation of aircraft and space vehicles
 - equipment used in the servicing and maintenance of these vehicles
- Over 700 published standards
- Over 94 in development



ISO TC 20/SC 1 Aerospace electrical requirements
ISO TC 20/SC 4 Aerospace fastener systems
ISO TC 20/SC 6 Standard atmosphere
ISO TC 20/SC 8 Aerospace terminology
ISO TC 20/SC 9 Air cargo and ground equipment
ISO TC 20/SC 10 Aerospace fluid systems and components
ISO TC 20/SC 13 Space data and information transfer systems
ISO TC 20/SC 14 Space systems and operations
ISO TC 20/SC 15 Airframe bearings
ISO TC 20/SC 16 Unmanned Aircraft Systems
ISO TC 20/SC 17 Airport Infrastructure
ISO/TC 20/SC 18 Materials

SC13 develops international space data standards

- SC13 is operated by the Consultative Committee for Space Data Systems (CCSDS)

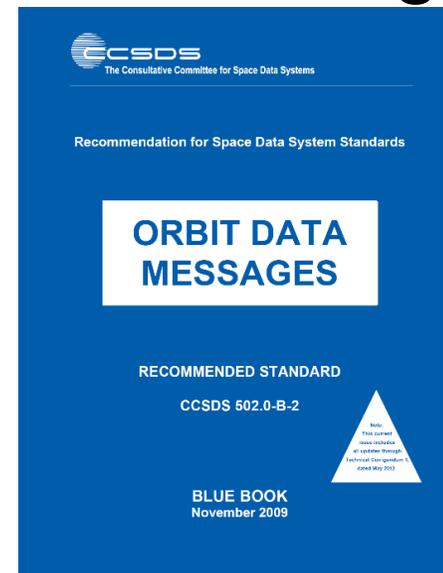


- Comprised of 11 space agencies
- Standards available through ISO and also at:
<https://public.ccsds.org/default.aspx>



- LTS-relevant CCSDS navigation data exchange messages:

- Orbit Data Message (ODM)
- Conjunction Data Message (CDM)
- Tracking Data Message (TDM)
- Attitude Data Message (ADM)
- Events Data Message (EDM)
- Reentry Data Message (RDM)



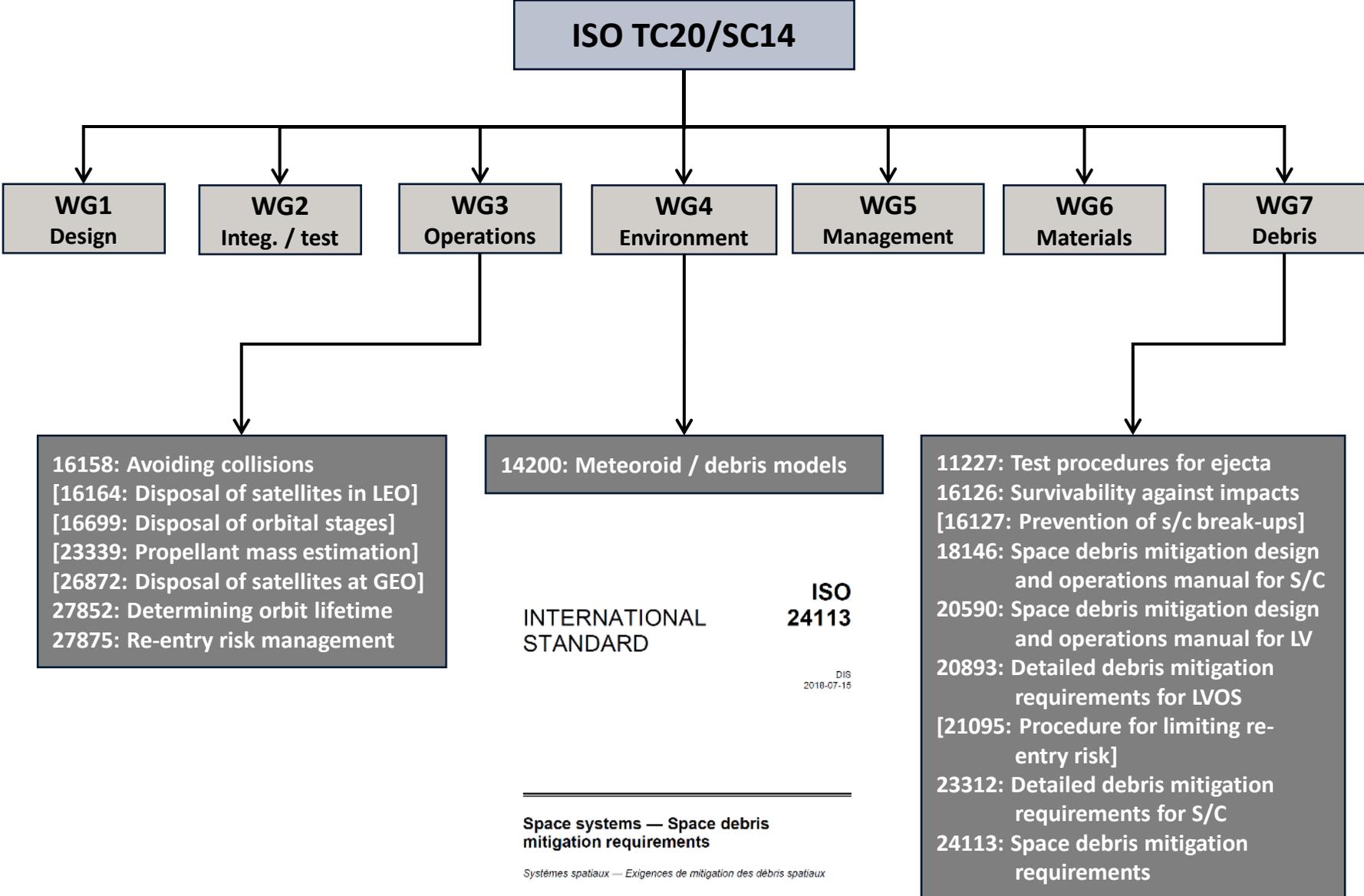
The ODM is the most popular SC13 NAV WG standard today

SC14 develops best practices for space

- Space Systems & Operations
 - SC14/WG3: Space operations international standards.
 - SC14/WG7: Orbital debris mitigation international standards.

Working Group		Convener
WG 1	Design, engineering and production	Japan
WG 2	Interfaces, integration and test	United States
WG 3	Operations and ground support	Germany
WG 4	Space environment (natural and artificial)	Russia
WG 5	Space system programme management and quality	France
WG 6	Materials and processes	Japan
WG 7	Orbital debris	United Kingdom

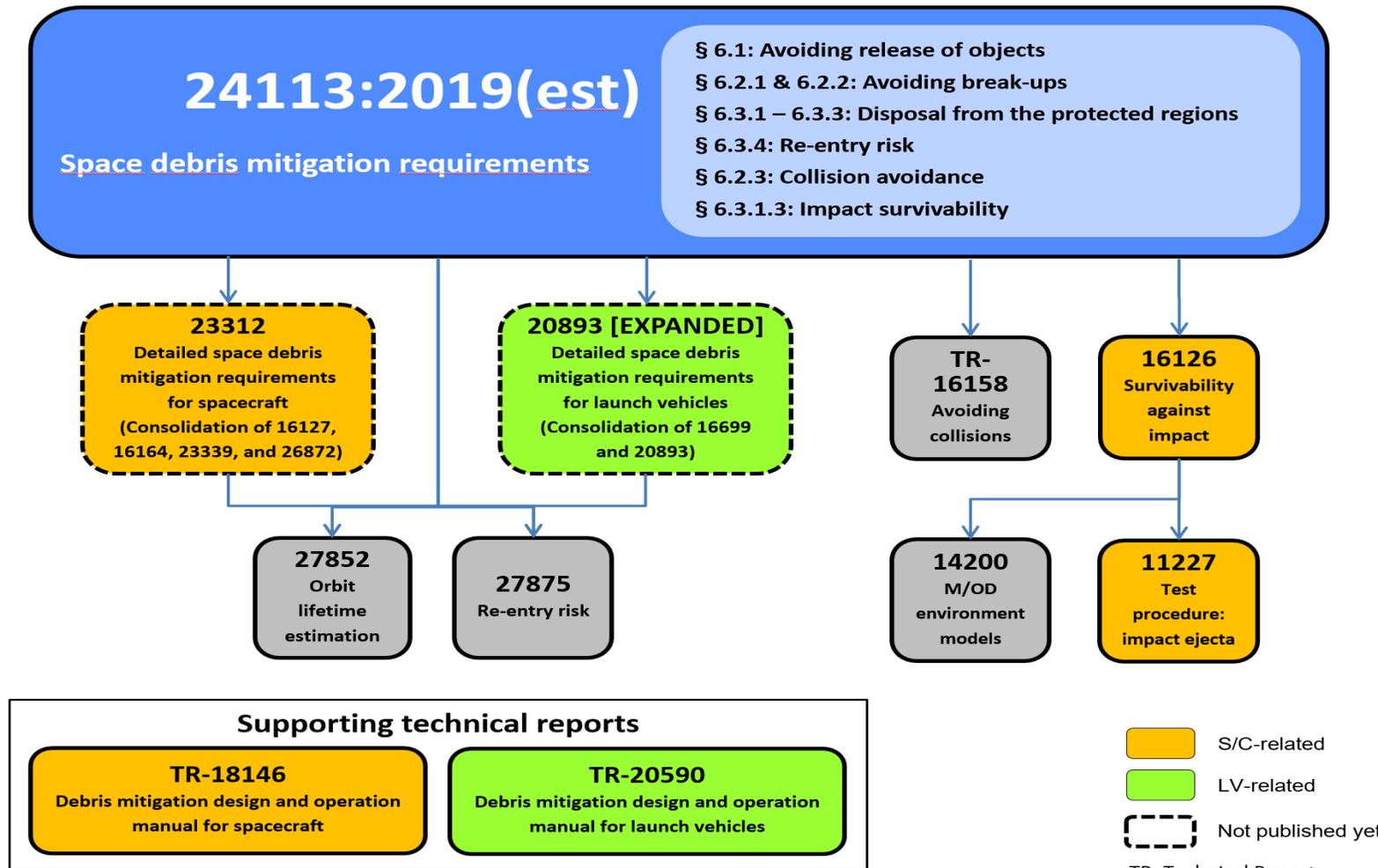
SC14 core space debris mitigation standards



* [bracketed standards] will be merged/replaced

WG7 Orbital Debris Working Group

- IADC guidelines have been codified as ISO standards through WG7's Orbital Debris Mitigation Work Program since 2009



Newest ISO/CCSDS space safety initiatives


 The Consultative Committee for Space Data Systems

Draft Recommendation for Space Data System Standards

ORBIT DATA MESSAGES

DRAFT RECOMMENDED STANDARD
CCSDS 502.0-P-YYY

PINK BOOK
January 2022


 The Consultative Committee for Space Data Systems

Recommendation for Space Data System Standards

CONJUNCTION DATA MESSAGE

RECOMMENDED STANDARD
CCSDS 508.0-P-YYY

PINK BOOK
January 2022

WD TS 6434

2021-11-09

Space systems — Design, Testing and Operation of a Spacecraft Large Constellation

9 November 2021
ISO\TC20\SC14\WG3
PoCs
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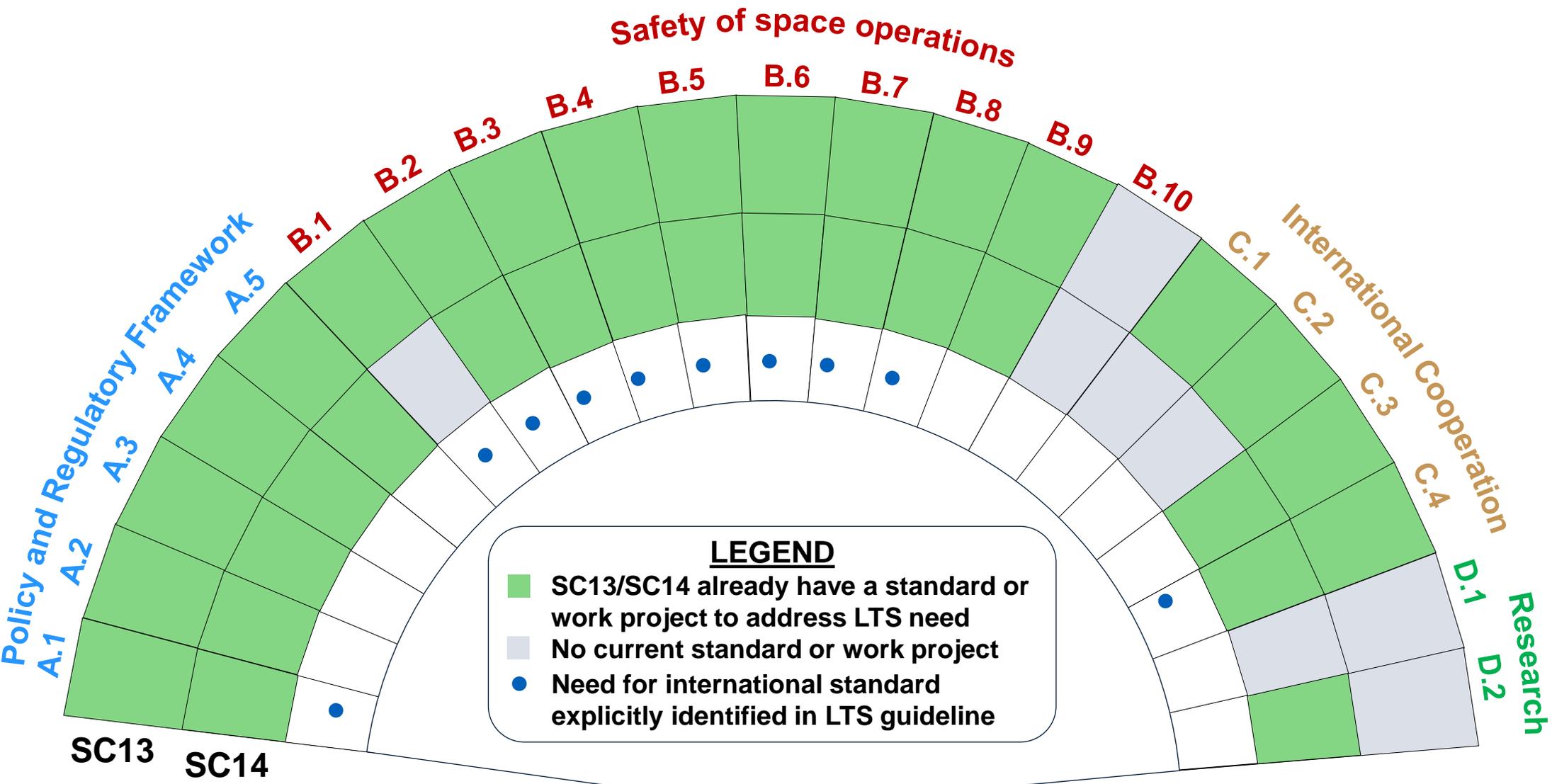
WD 9490

DRAFT for NWIP
XXXX
2021-11-06

Space systems —
Space Traffic Coordination

Section	
1, 2, 3	Scope, terms and definitions, abbrev.
4	Operator obligations, including Annex B: State Actor and spacecraft operator STC responsibilities
5	Expectations for “Giving Way”
6	Transparency
7	Interoperability
8	STC system requirements
Annex A	Relevant ISO standards
Annex B	Methods for assessing STC parameters
Annex C	Example of STC system

Published ISO documents addressing LTS guidelines*



Compendium of space debris mitigation standards

- Appreciate UNOOSA assistance adding international standards to “Compendium document (5 Sep 18)”



Our Work > Capacity Building Activities > Space Debris > Space Debris Compendium

Compendium of space debris mitigation standards adopted by States and international organizations

The compendium of space debris mitigation standards adopted by States and international organizations has been developed as a contribution of Canada, the Czech Republic and Germany to the Committee on the Peaceful Uses of Outer Space, and in reference to the agenda item of its Legal Subcommittee on “General exchange of information and views on legal mechanisms relating to space debris mitigation measures, taking into account the work of the Scientific and Technical Subcommittee”. The aim of the compendium is to inform States of the current instruments and measures that have been implemented by States and international organizations.

The initial version of the Compendium has been made available to the Legal Subcommittee at its fifty-third session held in Vienna from 24 March to 4 April 2014 under agenda item 11 of the provisional agenda of the session (A/AC.105/C.2/L.292) as a conference room paper A/AC.105/C.2/2014/CRP.15, supplemented by a contribution to the Compendium, contained in A/AC.105/C.2/2014/CRP.15/Add.1.

At that session, the Legal Subcommittee noted with appreciation the development of the Compendium by Canada, the Czech Republic and Germany, and requested those delegations to continue their work on the compendium with a view to increasing the number of States and international organizations included therein. The Subcommittee further requested that the compendium be provided to the Secretariat prior to the fifty-seventh session of the Committee, in June 2014 (A/AC.105/1067, para 154).

Our Work

- Secretariat of COPUOS
- Programme on Space Applications
- UN-SPIDER
- International Committee on GNSS
- UN-Space
- UNISPACE+50
- Space Law
- High Level Forum
- Worldwide Space Agencies
- Capacity Building Activities
 - Capacity Building Projects
 - Long-term Sustainability of Outer Space Activities
 - Disaster Management
 - Near Earth Objects
 - Space and Climate Change
 - Nuclear Power Sources
 - Space for Water
 - GNSS
 - Remote Sensing
 - Space Treaty Implementation
 - Space Debris
 - Space Debris Compendium
 - Space Weather
 - Space for Women
 - Space for Youth

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO): STANDARDS AND TECHNICAL REPORTS

International mechanisms:

The following is a list of the standards and technical reports of the International Organization for Standardization (ISO) for mitigating space debris.

1. ISO 24113, Space systems — Space debris mitigation measures — Part 1: General requirements. 1st edition - 2010; 2nd edition - 2011; 3rd edition - in preparation.
2. ISO 23312, Space systems — Detailed space debris mitigation measures for spacecraft. Publication date: 1st edition - in preparation.
3. ISO 20893, Space systems — Detailed space debris mitigation measures for launch vehicle orbital stages. Publication date: 1st edition - in preparation.
4. ISO 11227, Space systems — Test procedures upon hypervelocity impact. Publication date preparation.
5. ISO 14200, Space environment (natural and artificial) — Assessment of meteoroid and debris environment for spacecraft (LEO+2000km). Publication date: 1st edition - in preparation.
6. ISO 16126, Space systems — Assessment of space debris and meteoroid impacts to spacecraft. Publication date: 1st edition - 2014.
7. ISO 27852, Space systems — Estimation of orbital debris population. 1st edition - 2011; 2nd edition - 2016.
8. ISO 27875, Space systems — Re-entry risk management for launch vehicle orbital stages. Publication date: 1st edition - in preparation.
9. ISO/TR 16158, Space systems — Avoiding collisions in space: Guidelines for spacecraft. Publication date: 1st edition - 2013; 2nd edition - in preparation.
10. ISO/TR 18146, Space systems — Space debris mitigation measures for spacecraft. Publication date: 1st edition - in preparation.
11. ISO/TR 20590, Space systems — Space debris mitigation measures for launch vehicle orbital stages. Publication date: 1st edition - in preparation.

	Measures	ISO Standards (or Technical Reports)	UN Guidelines	IADC Guidelines
Disposal at end-of-operations	GEO	Re-orbit at end of operation ISO 24113, 6.3.2 (Detailed in ISO 20893, 23312) 6.3.2.1: General Requirement	Recommendation 7 (No quantitative requirements)	5.3.1 235 km+ (1 000•Cr•A/m),
	LEO	Reduction of orbital lifetime ISO 24113, 6.3.2.2		
Limiting debris generation	Released objects	General measures for avoiding the release of objects	ISO 24113, 6.1.1	Recommendation 1
		Slag from solid motors	ISO 24113, 6.1.2.2, 6.1.2.3	--
	On-orbital break-ups	Combustion products from pyrotechnics	ISO 24113, 6.1.2.1 (Combustion Products < 1 mm)	--
On-orbital break-ups	Collision avoidance for large debris	Avoidance of ground casualties	ISO 24113, 6.2.1	Recommendation 4
		Intentional destruction	ISO 24113, 6.2.1	Recommendation 4
		Accidental break-ups during operation	ISO 24113, 6.2.2 (Probability < 10⁻³)	Recommendation 2
On-orbital break-ups	Protection from the impact of micro-debris	Post-mission break-up (Passivation, etc.)	ISO 24113, 6.2.2.3 (Detailed in ISO 20893, 23312)	Recommendation 5
				5.2.2 (Monitoring)
				5.2.1

the Peaceful Uses of Outer Space at its fifty-seventh session held in Vienna on 10-14 June 2014 (A/AC.105/C.2/2014/CRP.13. Editorial support in compiling and finalizing the Compendium was provided by the Legal Services Department of the European Space Agency (ESA).

Czech Republic and Germany for the development of the compendium and dedicated page of the website of the Office for Outer Space Affairs (A/69/20, para 154).

States and international intergovernmental organizations with permanent observer status to the Committee on the Peaceful Uses of Outer Space to update the information on any legislation or standards adopted with regard to space debris mitigation. The Committee also agreed that all other States Members of the Committee should be encouraged to update the information on any legislation or standards adopted with regard to space debris mitigation. The Committee also agreed that all other States Members of the Committee should be encouraged to update the information on any legislation or standards adopted with regard to space debris mitigation.

Compendium papers:

- Compendium of space debris mitigation standards adopted by States and Technical Subcommittee;
- Compendium of space debris mitigation standards adopted by States and Technical Subcommittee;
- Compendium of space debris mitigation standards adopted by States and Technical Subcommittee



Space governance framework



ISO Strategy 2030: Goals



<https://www.iso.org/publication/PUB100364.html>