

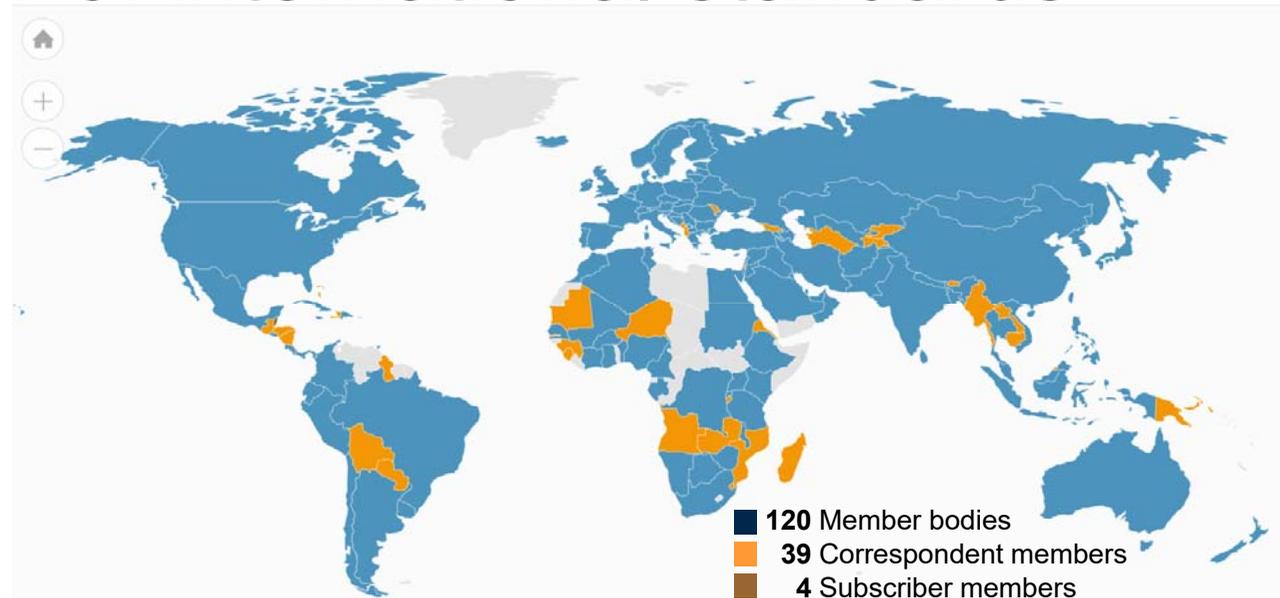
# **International Organization for Standardization (ISO) activities for Long-Term Sustainability (LTS) of space activities**

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# 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 163 countries
- “World's largest developer of international standards”
- “One country, one vote”



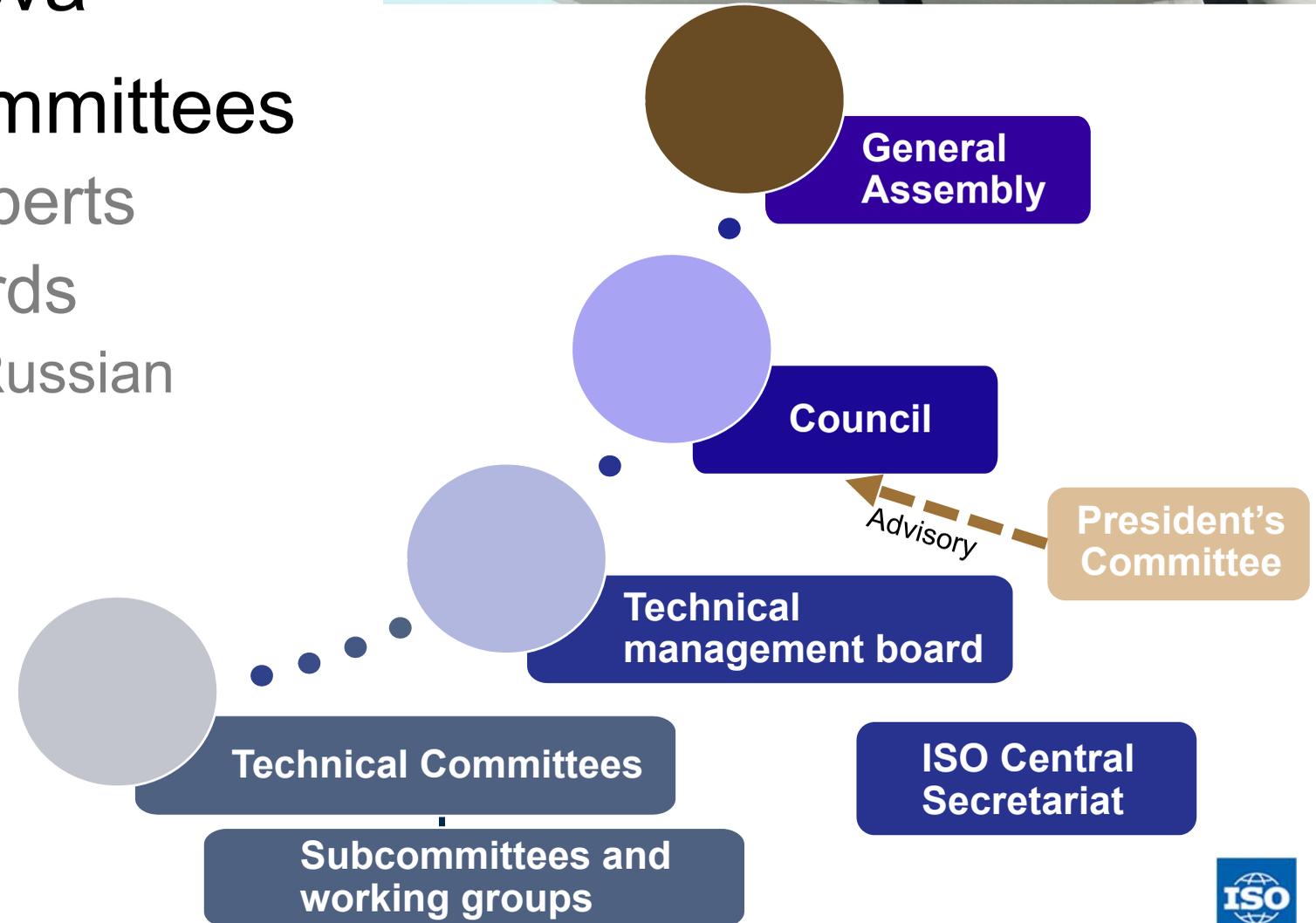
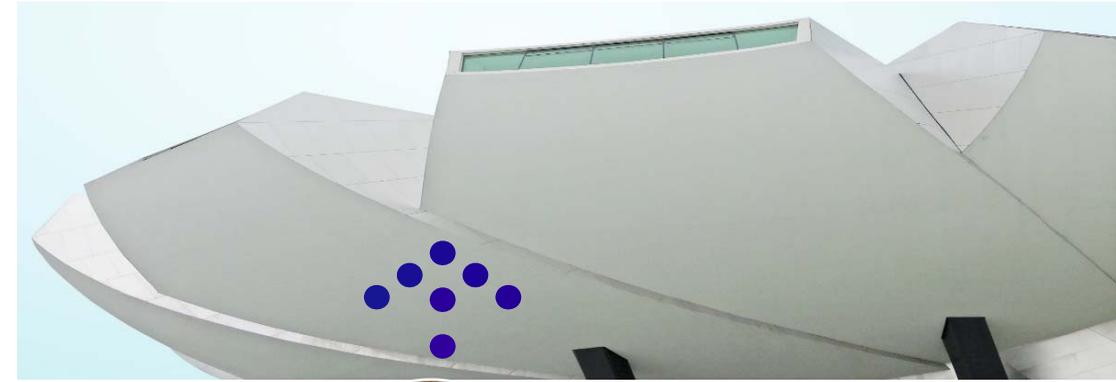
# Globally, international standards ...

- ... 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 secretariat based in Geneva
- ISO has 245 technical committees
  - 100 000+ subject matter experts
  - 22 000 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 600 published standards
- Over 200 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

# SC13 develops international space data standards

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

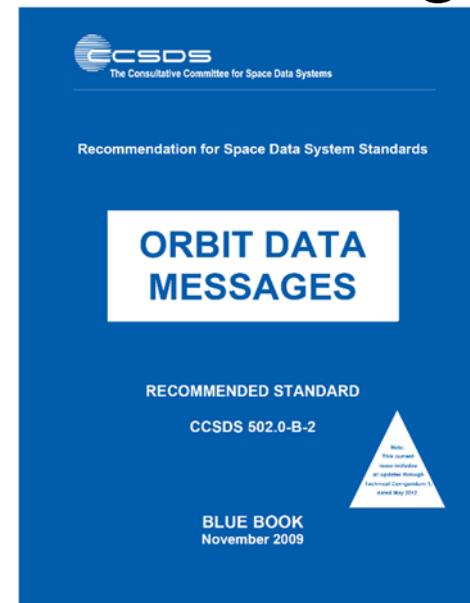


- Comprised of 11 space agencies
- Standards available through ISO and also at:  
<https://public.ccsds.org/default.aspx>



- 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 standard today

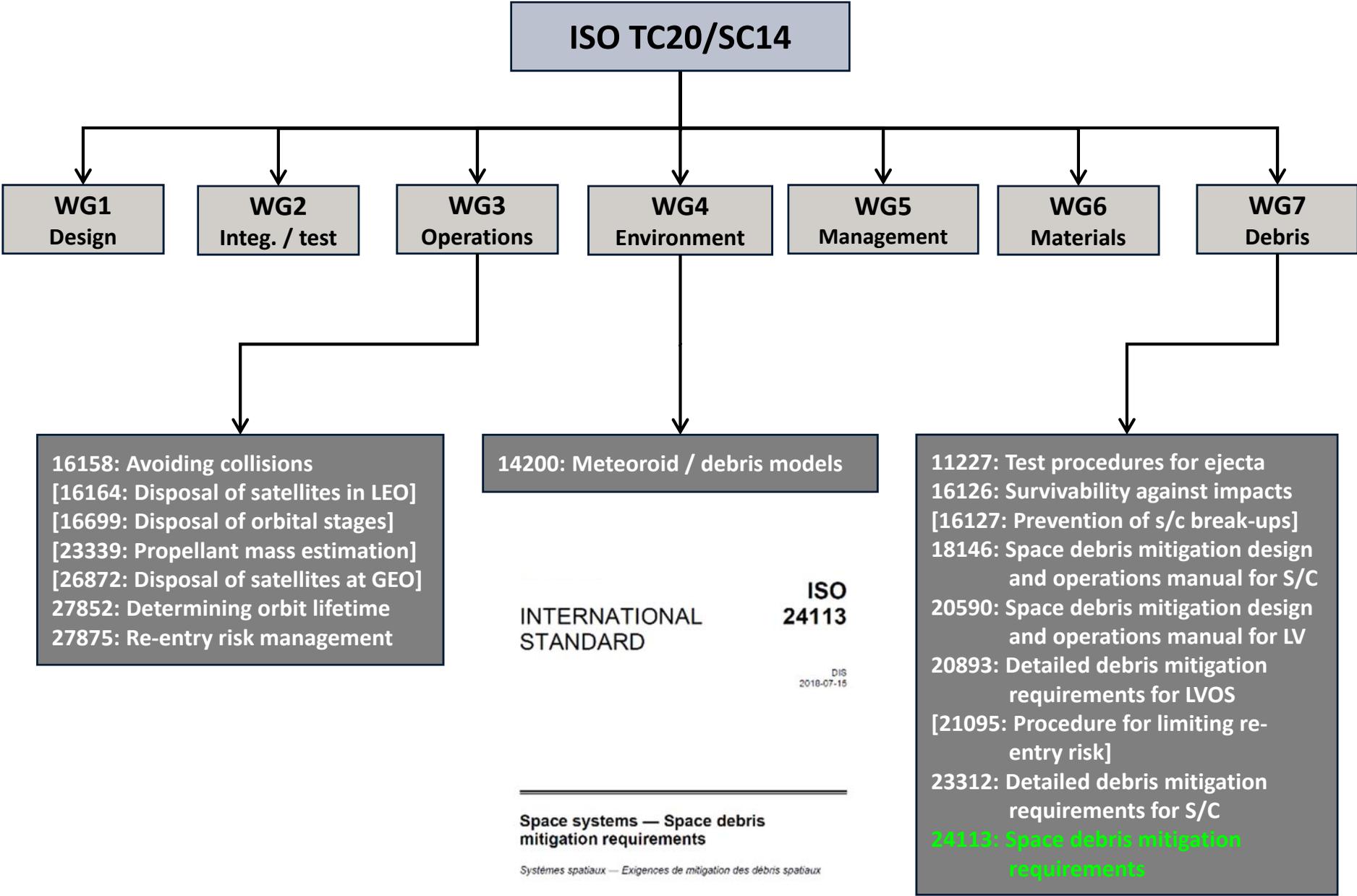


# SC14 develops best practices for space

- 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

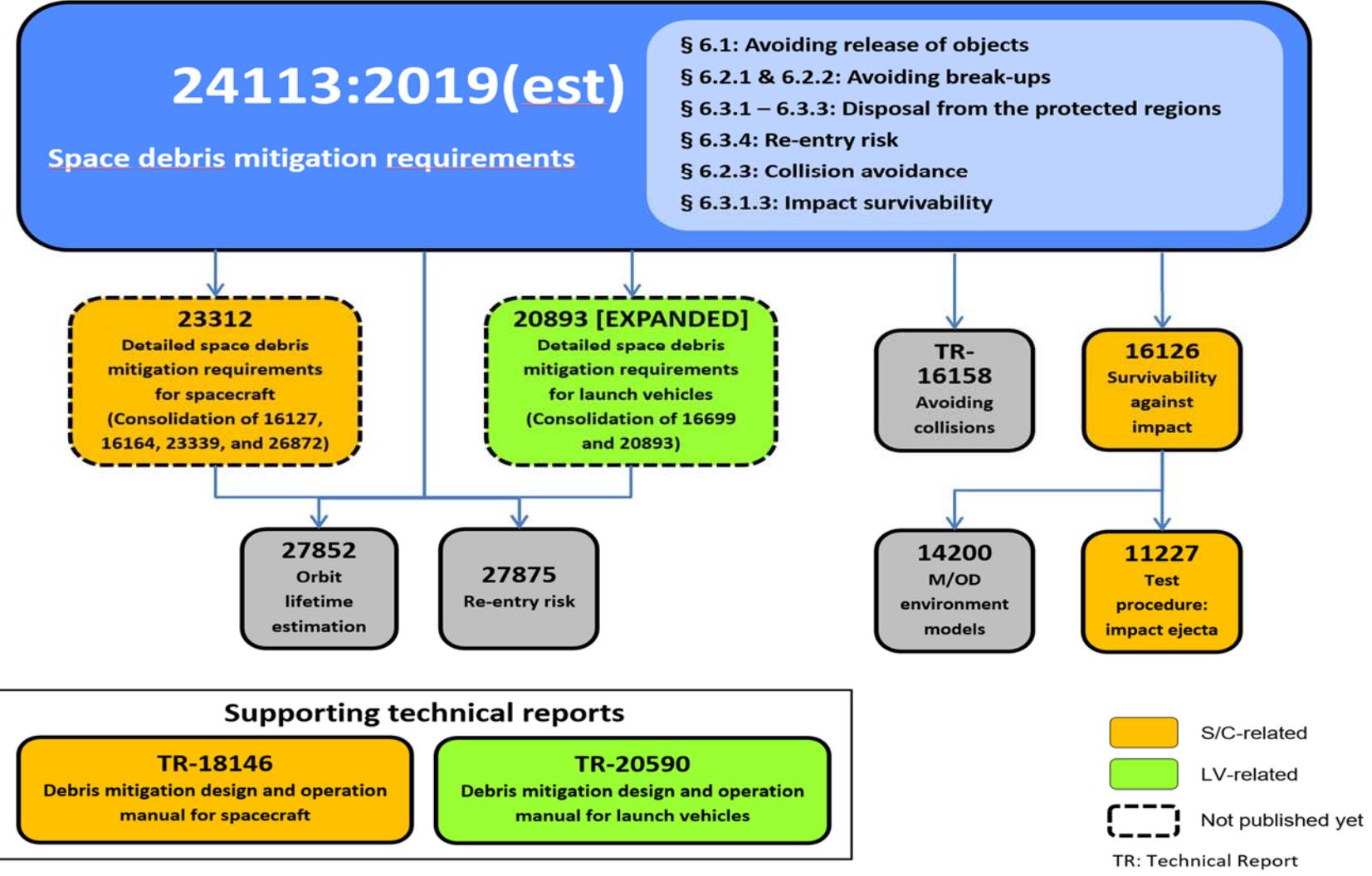
# SC14 core space debris mitigation standards



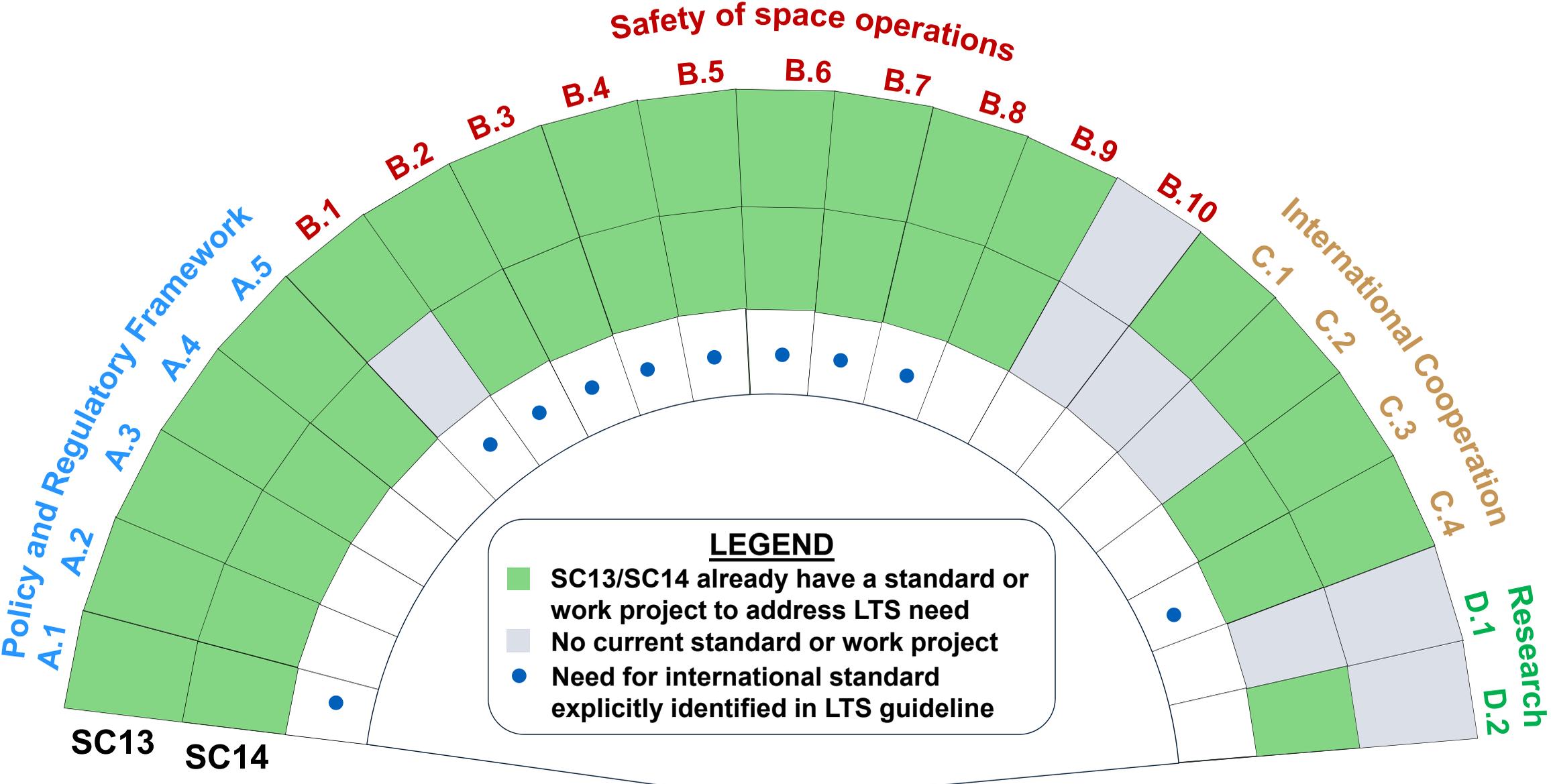
\* [bracketed standards] will be merged/replaced

# WG7 Orbital Debris Working Group

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



# Published ISO documents addressing LTS guidelines\*



# Compendium of space debris mitigation standards

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



## 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 ).

the Peaceful Uses of Outer Space at its fifty-seventh session held in Vienna 05/2014/CRP.13. Editorial support in compiling and finalizing the Compendium 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,

and international intergovernmental organizations with permanent observer update the information on any legislation or standards adopted with regard to purpose. The Committee also agreed that all other States Members of the compendium, encouraging States with such regulations or standards to provide

born papers:

ic and Technical Subcommittee; Subcommittee; ic and Technical Subcommittee Subcommittee.

- 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		Measures	ISO Standards (or Technical Reports)	UN Guidelines	IADC Guidelines	
<b>International mechanisms:</b> 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 for launch vehicle orbital stages. Publication date: 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 procedure upon hypervelocity impact. Publication date: in preparation. 5. ISO 14200, Space environment (natural and artificial) — Implementation of meteoroid and debris environment protection for GEO+2000km. Publication date: 1st edition - in preparation. 6. ISO 16126, Space systems — Assessment of risk against space debris and meteoroid impacts to launch vehicle orbital stages. Publication date: 1st edition - 2014. 7. ISO 27852, Space systems — Estimation of orbital debris environment. Publication date: 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: practices, data requirements, and operational procedures. Publication date: 1st edition - 2013; 2nd edition - in preparation. 10. ISO/TR 18146, Space systems — Space debris mitigation guidelines for spacecraft. Publication date: 1st edition - in preparation. 11. ISO/TR 20590, Space systems — Space debris mitigation guidelines for launch vehicle orbital stages. Publication date: 1st edition - in preparation.	Disposal at end-of-operations LEO Re-entry Collision avoidance for large debris Protection from the impact of micro-debris	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),	
		Released objects	General measures for avoiding the release of objects	ISO 24113, 6.1.1	Recommendation 1	5.1
			Slag from solid motors	ISO 24113, 6.1.2.2, 6.1.2.3	--	--
			Combustion products from pyrotechnics	ISO 24113, 6.1.2.1 (Combustion Products < 1 mm)	--	--
		On-orbital break-ups	Intentional destruction	ISO 24113, 6.2.1	Recommendation 4	5.2.3
			Accidental break-ups during operation	ISO 24113, 6.2.2 (Probability < 10 <sup>-3</sup> )	Recommendation 2	5.2.2 (Monitoring)
			Post-mission break-up (Passivation, etc.)	ISO 24113, 6.2.2.3 (Detailed in ISO 20893, 23312)	Recommendation 5	5.2.1

<http://www.unoosa.org/oosa/en/ourwork/topics/space-debris/compendium.html>



# Space governance framework

