

# The Space Safety Coalition in the context of international space cooperation

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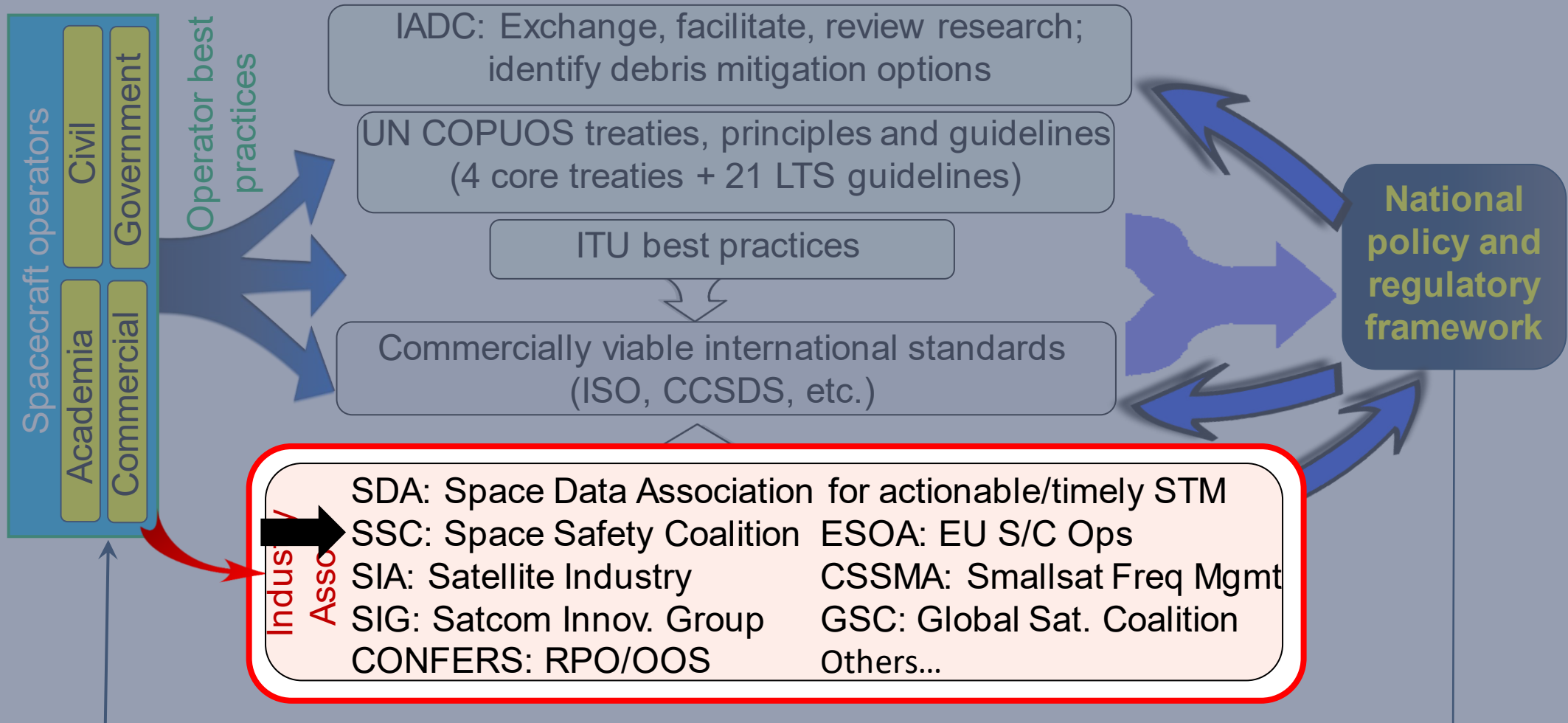
Space Safety Coalition Administrator

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UN COPUOS STSC

**SSC** SPACE  
SAFETY  
COALITION

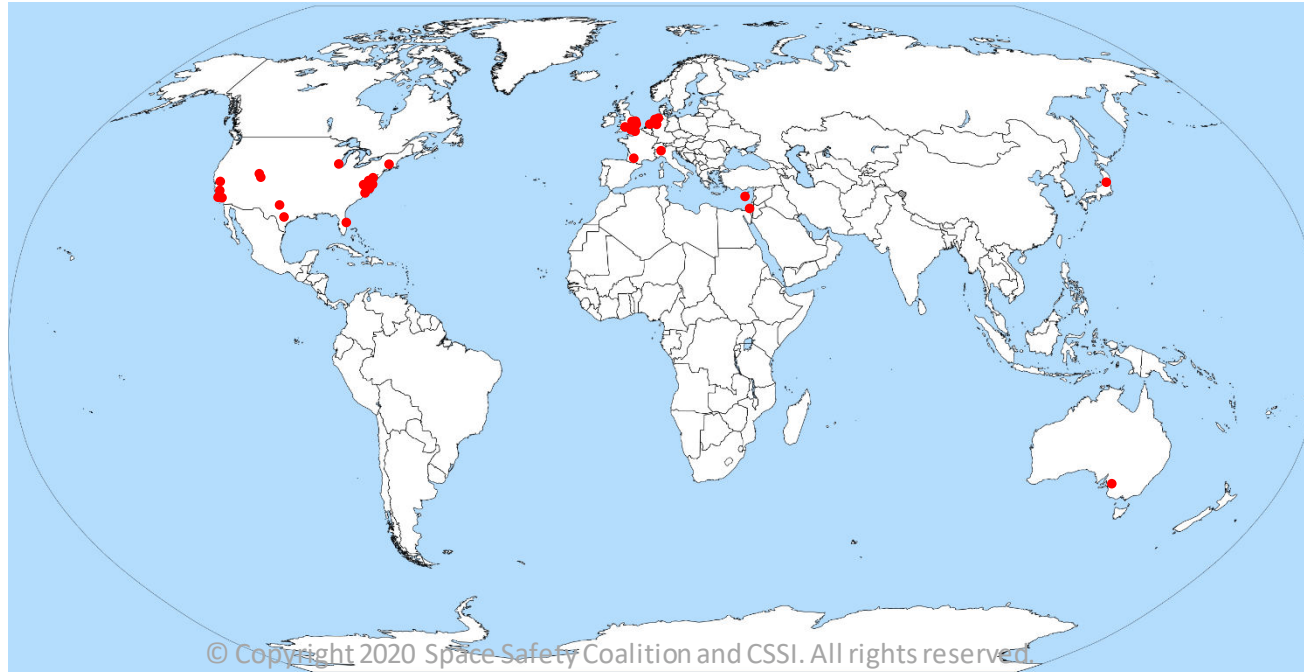
# Space policy framework *virtuous cycle*



# Space Safety Coalition (SSC)

- <https://spacesafety.org>
- Most operators support space sustainability
  - “It’s just good business sense”
  - Especially important for new large constellations
- SSC is a new ad hoc coalition of willing space operators and relevant industry stakeholders, formed to assemble a **living set of aspirational best space operations practices**
- Signatories endorse and agree to strive to implement best practices
  - To ensure safety and commercial viability of space activities
- SSC can make a difference, in *advance* of:
  - Space treaties and consensus guidelines
  - Standards
  - National regulations

# Diverse set of 37 global space organizations have endorsed so far



# SSC's "Best Practices for the Sustainability of Space Operations"

- **A ground-breaking "living" best practices document:**
  - **Part 1:** Endorses existing international guidelines and standards (**IADC, UN, ISO**)
  - **Part 2:** Contains **over forty additional specific best practices** to further enhance and secure the long-term sustainability of space operations
    - Spans all phases of design and spaceflight, orbit regimes, spacecraft form factors, life cycle phases, and mission types

# AIAA global space policy characterization

United Nations

International NGOs

National Regulatory

Industry Consortia

	UN COPUOS (Treaties)	UN COPUOS (Excl. Treaties, SDM & LTS Guidelines)	United Nations Space Debris Mitigation Guidelines	United Nations Long Term Sustainability Guidelines	Committee on Space Research (COSPAR)	Consultative Committee for Space Data Stds	Inter-Agency Debris Coordination Committee	Intl Assoc for Adv of Space Safety (IAASS)	Intl Organization for Standardization (TC20/SC14)	International Telecommunications Union (ITU)	Canada	EU	France	Japan	Space Explorers (ASE)	Space Data Association (SDA)	Space Safety Coalition (SSC)	World Economic Forum	Industry Consortium (SSC)	Industry Consortium (SSC)
Normative? (●=Y ○=N ●=Mix)	●	○	○	○	○	●	○	○	●	○	●	●	●	●						
Capacity building																				
Casualty risk																				
Contamination (physical)																				
Contamination (radiation)																				
Contamination (RFI)																				
Cooperation, inclusiveness																				
Exchange of space data																				
Health & status																				
Jurisdiction & ownership																				
Moon & celestial bodies																				
Registration																				
Responsibility/Liability																				
RPO/OOS																				
Safety																				
Security																				
Space law																				
Space weather effects																				
SSA																				
Standardization																				
TCBMs																				

# Why is “business as usual” not an option ?

## 1. Because today’s flight safety is not sufficient.

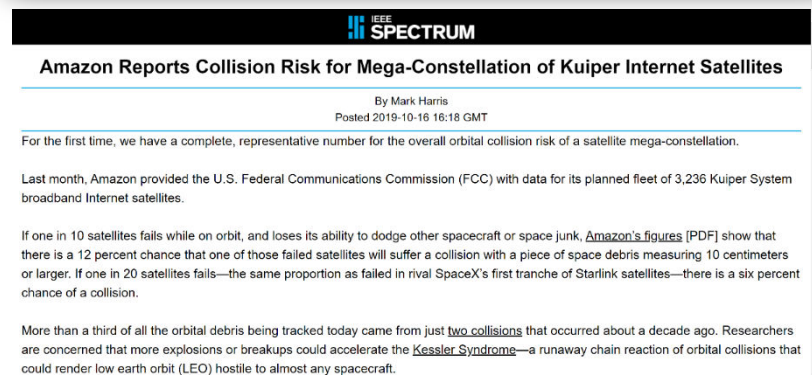
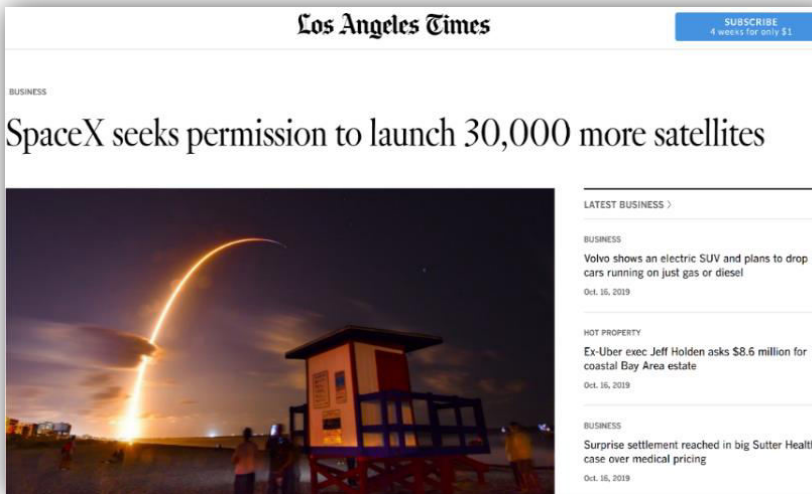
- Spacecraft operators **can’t tell which conjunctions are “too close”**
- Flight safety services missing serious collision risks and are not transparent and timely
- Spacecraft operators overwhelmed by **false alarms and inaccurate SSA\***
- **Only 60% of spacecraft and 65% upper stages in LEO are successfully disposed\*\***

## 2) Because New Space is a threshold of intense change:

- Operational **spacecraft may increase tenfold** by 2029.
- Quantity of **tracked debris may increase tenfold** within two years.
- **Low-thrust propulsion** will soon be the rule, rather than exception.
- High conjunction rates fuel desire for **automated collision avoidance decision making.**
- Step change increase in state and commercial actors in space.
  - Highest treaty ratification of 63% omits many countries out.
  - **Information pooling, exchange and standardization is critical.**

# Even if only half of New Space applicants actually come to fruition...

- That will be a space population like we've never seen before!
- **58,841** new spacecraft proposed globally in next ten years

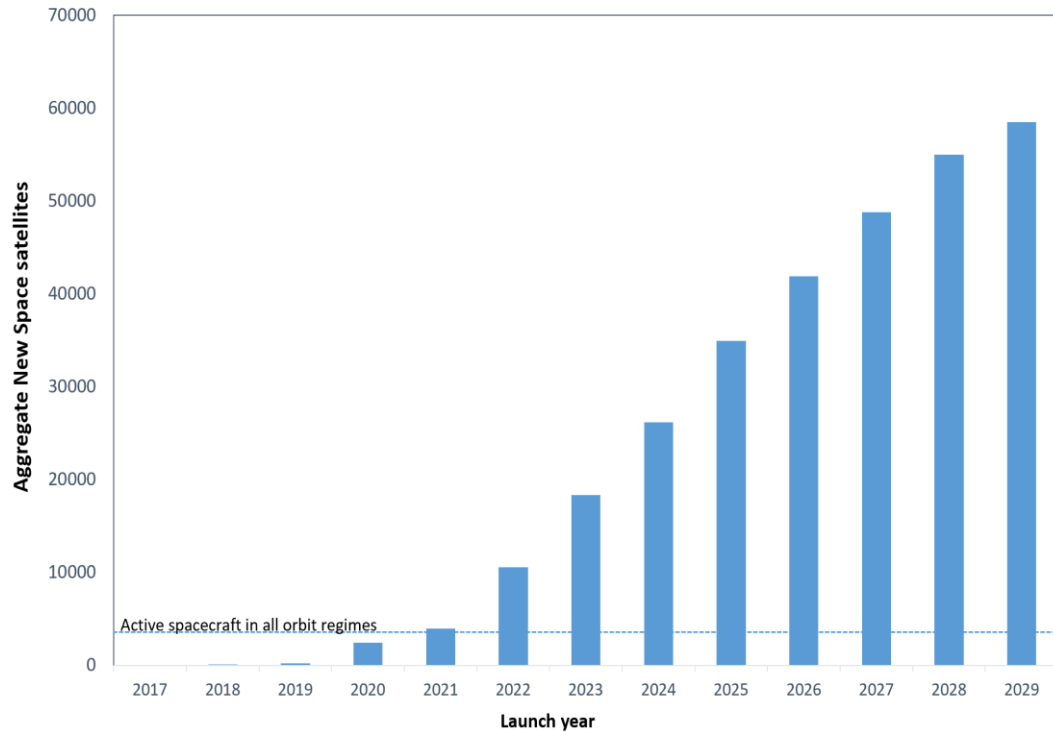




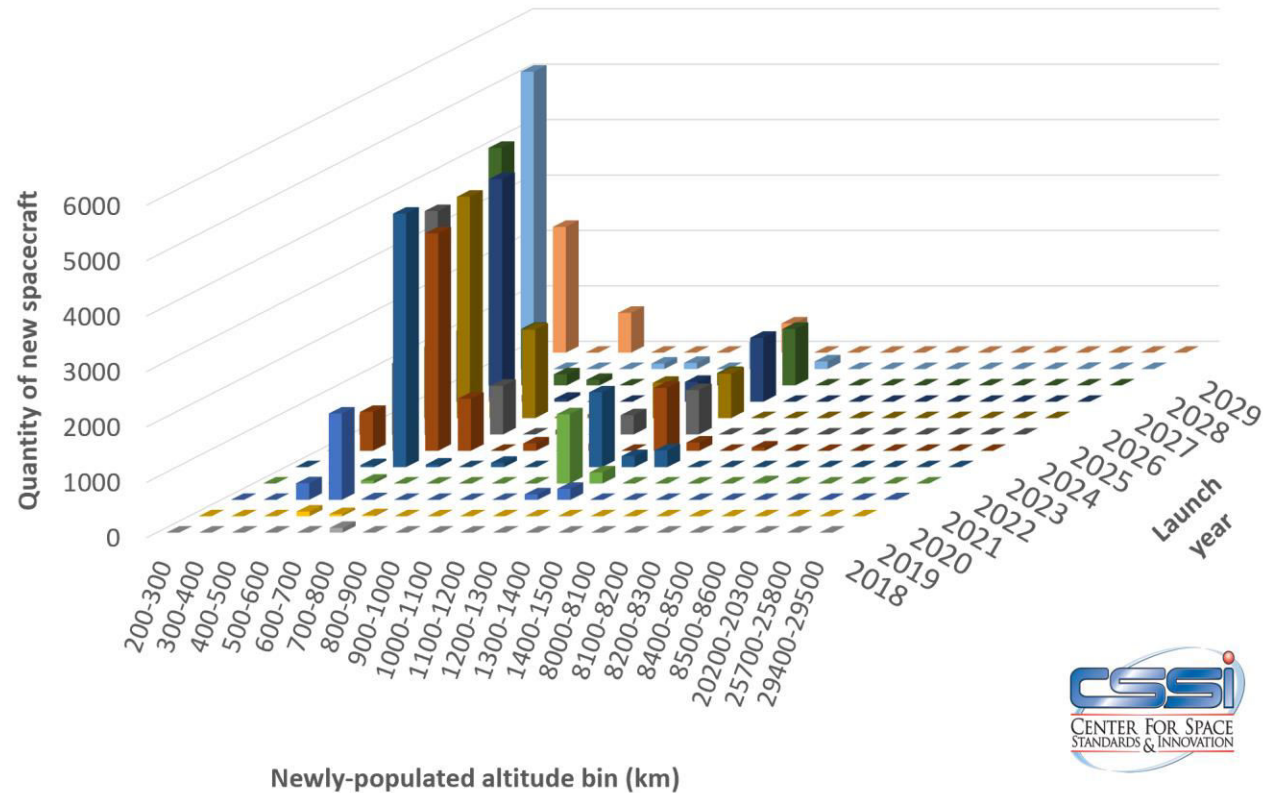
# Still have time to prepare for potential large constellations!

- While SpaceX and OneWeb launching now, onslaught isn't for several years.
- Imperative to get our space safety guidelines and processes in order now.

Potential New Space satellites aggregated 2019-2029 as function of year



Quantity of spacecraft introduced by altitude and year (new constellations, 2017 - 2029)



# Space safety policy landscape continuum

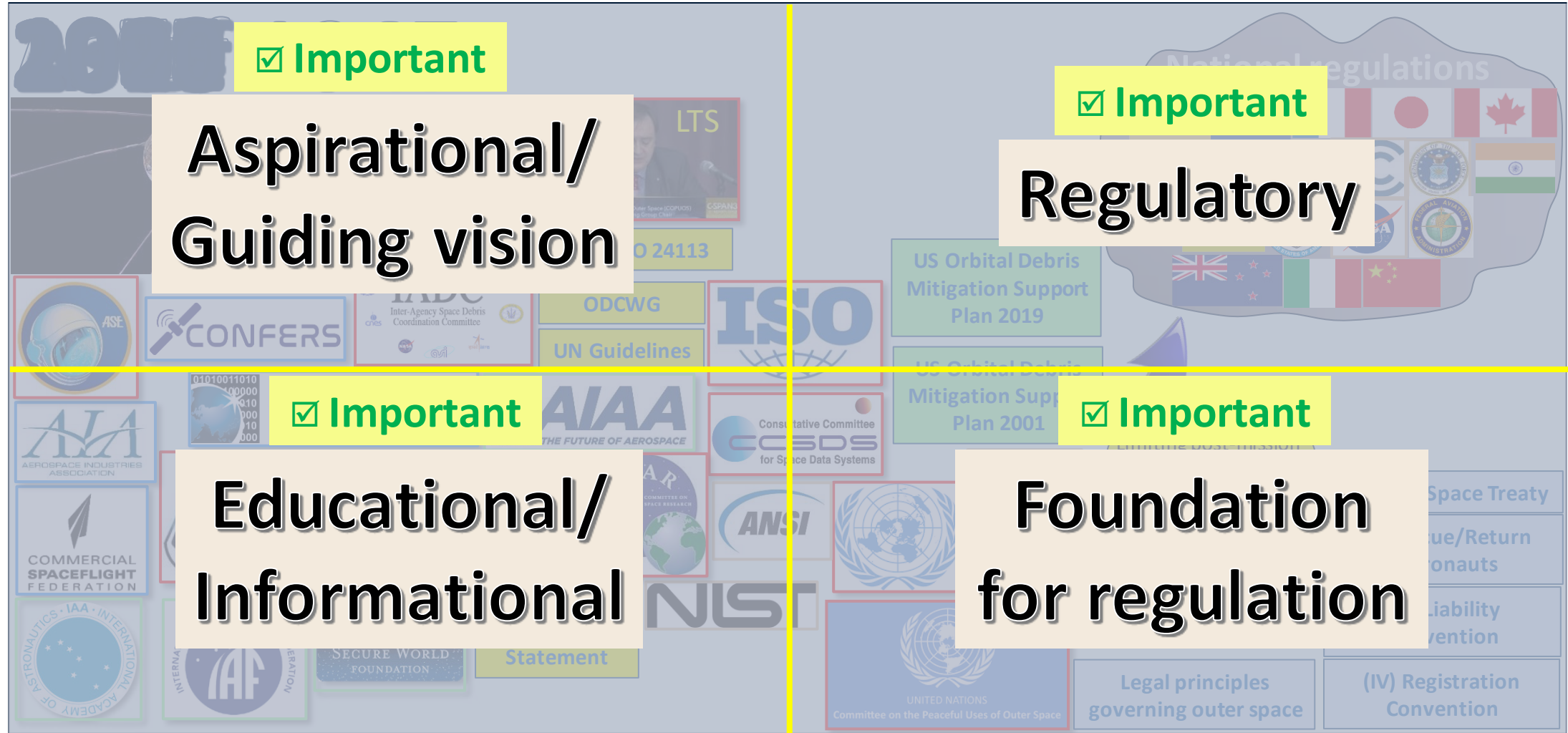
Color scheme:

- Non-Gov't Organizations
- National regulations
- Industry Associations
- International bodies

Demanding

Degree of stringency ↑

Lenient  
Minimum allowed  
Lowest common denominator

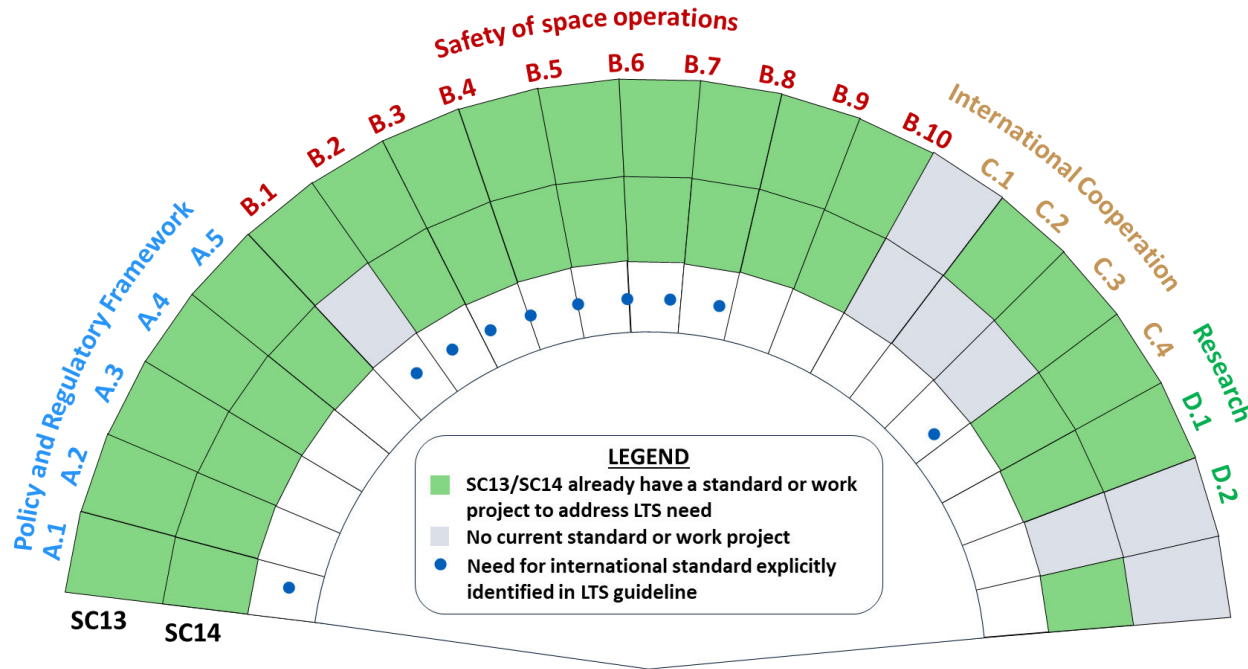


Degree of mandatory compliance (incorporates ratification rate)



# Space Safety Coalition aids implementation of LTS guidelines

SSC incorporates ISO standards that address LTS guidelines



## SSC best practices that address LTS guidelines

Guideline	Guideline Title	SSC Endorsement Doc
<b>Safety of space operations</b>		
B.1	Provide updated contact information and share information on space objects and orbital events	Endorses data sharing relevant to orbital debris mitigation and collision avoidance
B.2	Improve accuracy of orbital data on space objects and enhance the practice and utility of sharing orbital information on space objects	Endorses accurate orbit solutions and data sharing
B.3	Promote the collection, sharing and dissemination of space debris monitoring information	Encourages use of SSA and STM entities to share safety of flight data
B.4	Perform conjunction assessment during all orbital phases of controlled flight	Endorses Active Collision Avoidance when feasible
B.5	Develop practical approaches for pre-launch conjunction assessment	Endorses use of launch providers who take steps to preclude collisions between spacecraft, stages of the launch vehicle, active space and debris throughout deployment phase
B.6	Share operational space weather data and forecasts	
B.7	Develop space weather models and tools and collect established practices on the mitigation of space weather effects	
B.8	Design and operation of space objects regardless of their physical and operational characteristics	Endorsed practices are agnostic of size/form factor/function.
B.9	Take measures to address risks associated with the uncontrolled re-entry of space objects	Advocates for design for demise and 1.e-4 casualty risk per spacecraft
B.10	Observe measures of precaution when using sources of laser beams passing through outer space	

Guideline	Guideline Title	SSC Endorsement Doc
<b>Scientific and technical research and development</b>		
D.1	Promote and support research into and the development of ways to support sustainable exploration and use of outer space	Incorporates by reference and promotes IADC guidelines which are based upon such research
D.2	Investigate and consider new measures to manage the space debris population in the long term	Incorporates by reference and promotes IADC guidelines which are based upon such investigations

Guideline	Guideline Title	SSC Endorsement Doc
<b>Policy and regulatory framework for space activities</b>		
A.1	Adopt, revise and amend, as necessary, national regulatory frameworks for outer space activities	
A.2	Consider a number of elements when developing, revising or amending, as necessary, national regulatory frameworks for outer space activities	
A.3	Supervise national space activities	
A.4	Ensure the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites	
A.5	Enhance the practice of registering space objects	Endorses spacecraft owner, operator and stakeholder exchange of information relevant to safety-of-flight and collision avoidance with other space operators and stakeholders

Guideline	Guideline Title	SSC Endorsement Doc
<b>International cooperation, capacity-building and awareness</b>		
C.1	Promote and facilitate international cooperation in support of the long-term sustainability of outer space activities	Incorporates by reference IADC, UN COPUOS and ISO/CCSDS guidelines and standards which promote international cooperation
C.2	Share experience related to the long-term sustainability of outer space activities and develop new procedures, as appropriate, for information exchange	Spacecraft owners, operators and stakeholders should exchange information relevant to safety-of-flight and collision avoidance via intra-operator coordination and SSA and STM service entities
C.3	Promote and support capacity-building	Incorporates by reference IADC, UN COPUOS and ISO/CCSDS guidelines and standards which promote capacity building
C.4	Raise awareness of space activities	Incorporates by reference IADC, UN COPUOS and ISO/CCSDS guidelines and standards which promote space activities

# Summary

- **The global space policy framework unites the existing legal regime with complementary non-legally binding best practices and confidence-building measures to form in aggregate a comprehensive virtuous cycle.**
- **As a key part of that virtuous cycle, the space industry can embrace existing international space policies while aspiring to achieve an even higher standard, in advance of international consensus.**
- **In so doing, like-minded space industry members can lead the initiative to implement the 21 LTS guidelines in a practical and expeditious manner.**

Legal entities that have a direct and material interest in space safety and sustainability can learn more about the space safety coalition at: <https://spacesafety.org> or email us at [info@spacesafety.org](mailto:info@spacesafety.org)

## Best Practices for the Sustainability of Space Operations

