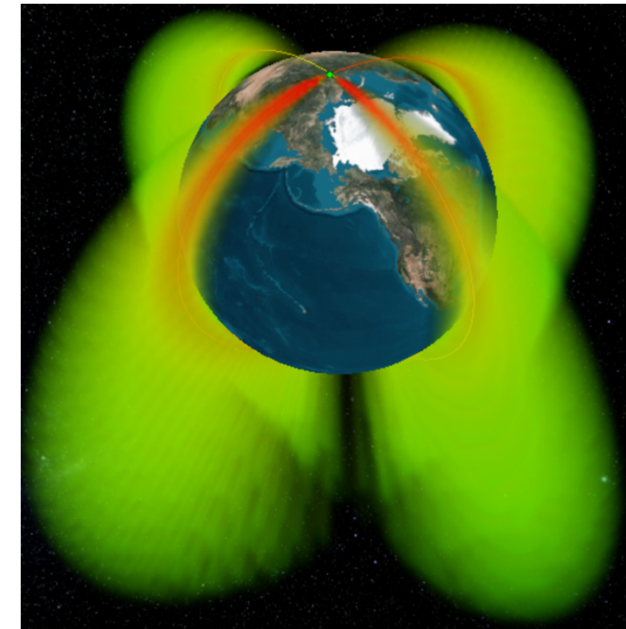


# The GVF Best Practices for Space Sustainability Document

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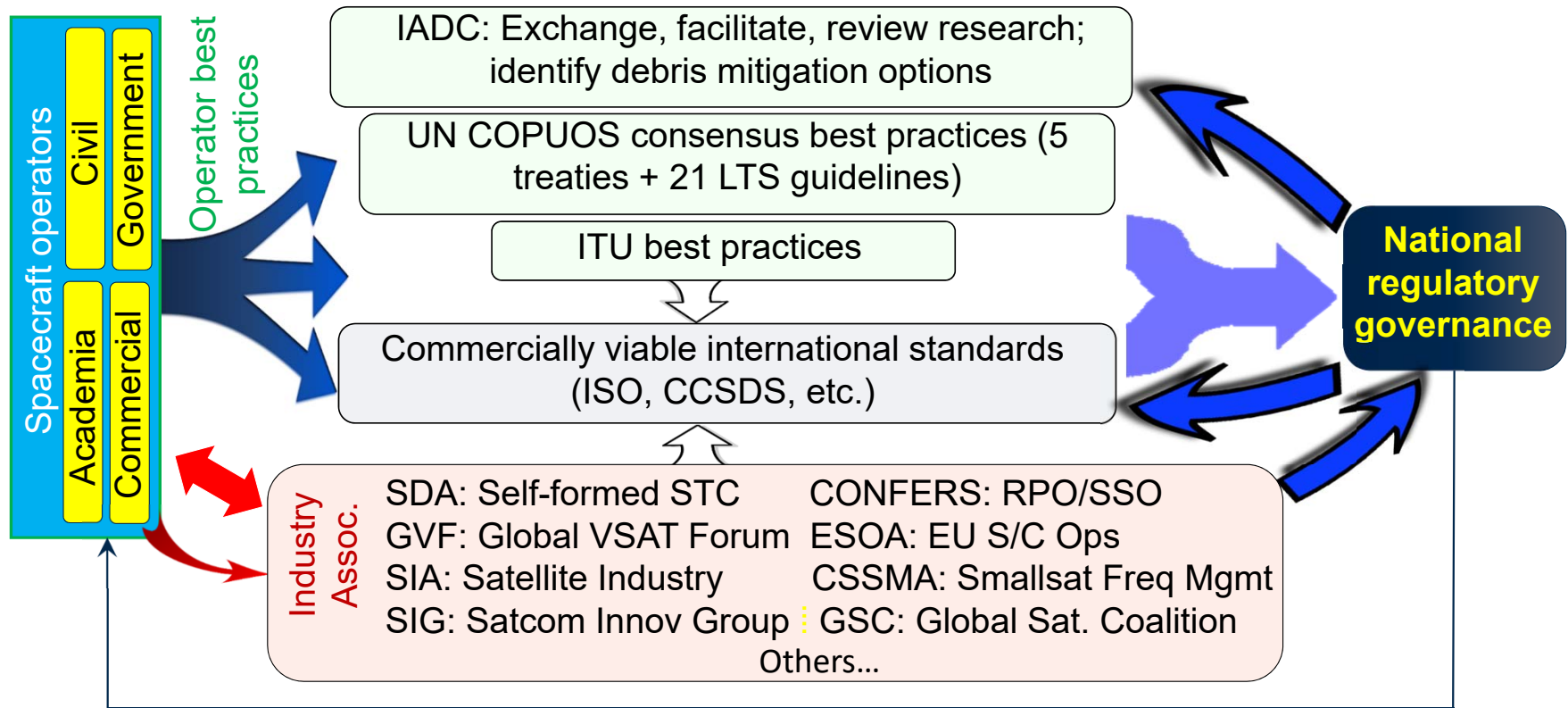
ESA-ECSL Space Debris Workshop: Regulation, Standards and Tools



Iridium/Cosmos 2009



# Today's complex space governance framework



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## What can satellite operators and industry associations accomplish?

- **Concept is one of self-regulation**
- **While bad actors will likely always be present, we observe that many operators want to support space sustainability**
  - It's good business sense
  - Especially important for new large constellations
- **In advance of treaties, consensus guidelines, standards and national regulations, satellite operators can make a difference!**

## “Best Practices for the Sustainability of Space Operations”

- Who is the Global VSAT Forum (GVF) ?
- GVF and space organizations assembled best practices for space sustainability.
- Initiative spurred by concerns of large constellations.
- Resulting set of best practices span:
  - All phases of spaceflight life cycle
  - All orbit regimes
  - All mission types
  - All spacecraft form factors
- While non-normative, signatories *endorse and agree to strive to implement* these best practices to ensure safety and commercial viability of space activities.



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## GVF document: Part I

- **Adherence to current international best practices and standards:**
  - IADC space debris mitigation guidelines
  - UN COPUOS space debris mitigation guidelines
  - ISO family of space debris mitigation standards
  - CCSDS space data standards

## GVF document: Part II

- **Endorsement of additional best practices not captured in current IADC, UN or ISO documents that are seen as critical to maintaining safe space operations in all orbital regimes (both NGSO and GSO), including:**
  - Operator exchange of information relevant to safety-of-flight and collision avoidance with other space operators and stakeholders in accordance with each operator's country export regulations;
  - Satellite operator selection of launch vehicles with due consideration of sustainability of the space operating environment;
  - Responsible mission and constellation design to make space safety for spacecraft and constellations a priority;
  - Commitment to spacecraft designs that facilitate successful disposal (striving for a probability of successful disposal of 95%), actively avoid collisions, minimize casualty risk, mitigate risk of post-mission fragmentation, ensure sensor trackability and facilitate spacecraft servicing and removal;
  - Commitment to space operations that actively avoid collisions, properly passivate satellites either upon end-of-mission or after a suitable active collision avoidance phase has been completed, dispose the satellites within 5 years of end-of-mission for manoeuvring spacecraft and maintain accurate spacecraft positional knowledge.

# Alignment with Long-Term Sustainability (LTS) guidelines

Guideline	Guideline Title	LTS Year	GVF Endorsement Doc
<b>Policy and regulatory framework for space activities</b>			
1	Adopt, revise and amend, as necessary, national regulatory frameworks for outer space activities	2016	
2	Consider a number of elements when developing, revising or amending, as necessary, national regulatory frameworks for outer space activities	2016	
3	Supervise national space activities	2016	
4	Ensure the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites	2016	
6	Enhance the practice of registering space objects	2018	Endorses spacecraft owner, operator and stakeholder exchange of information relevant to safety-of-flight and collision avoidance with other space operators and stakeholders

## Alignment with Long-Term Sustainability (LTS) guidelines (cont.)

International cooperation, capacity-building and awareness			
23	Promote and facilitate international cooperation in support of the long-term sustainability of outer space activities	2018	Promotes industry awareness
24	Share experience related to the long-term sustainability of outer space activities and develop new procedures, as appropriate, for information exchange	2018	Promotes industry awareness
25	Promote and support capacity-building	2016	Promotes industry awareness
26	Raise awareness of space activities	2016	Promotes industry awareness
Scientific and technical research and development			
27	Promote and support research into and the development of ways to support sustainable exploration and use of outer space	2016	
28	Investigate and consider new measures to manage the space debris population in the long term	2016	



## Alignment with Long-Term Sustainability (LTS) guidelines (cont.)

Safety of space operations			
11	Provide updated contact information and share information on space objects and orbital events	2018	Endorses data sharing relevant to orbital debris mitigation and collision avoidance
12	Improve accuracy of orbital data on space objects and enhance the practice and utility of sharing orbital information on space objects	2016	Endorses accurate orbit solutions and data sharing
13	Promote the collection, sharing and dissemination of space debris monitoring information	2016	
14	Perform conjunction assessment during all orbital phases of controlled flight	2018	Endorses performing Active Collision Avoidance so long as it remains possible for the spacecraft to do so
15	Develop practical approaches for pre-launch conjunction assessment	2018	
16	Share operational space weather data and forecasts	2106	
17	Develop space weather models and tools and collect established practices on the mitigation of space weather effects	2016	
30	Design and operation of space objects regardless of their physical and operational characteristics	2018	Endorsed practices are generally independent of size/form factor/function.
31	Take measures to address risks associated with the uncontrolled re-entry of space objects	2018	Advocates for design for demise and 1.e-4 casualty risk per spacecraft
32	Observe measures of precaution when using sources of laser beams passing through outer space	2018	

## Status and progress to date

- **Began in September 2017**
- **Participating operators reached broad technical consensus in mid-September 2018**
- **Space organizations still completing internal review**
  - Over 80% of participating current operators endorsed
  - Several current and future operators still reviewing
- **What's the hold-up?**
  - Continuing negotiations with several large constellation operators, hoping to complete in next several weeks
- **This is a living document: we will continually seek to:**
  - Evolve it to reflect current best practices
  - Promote it
  - Inform space operators and relevant industry stakeholders about it
  - Seek their participation and commitment

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## SUMMARY

- In one year, the space industry has assembled a set of best practices for the sustainment of space operations and activities
- Please contact GVF (David Meltzer, Secretary General of GVF, at [david.meltzer@gvf.org](mailto:david.meltzer@gvf.org)) or myself ([oltrogge@agi.com](mailto:oltrogge@agi.com)) if you want to learn more (and join!)

Thank you !

Dan Oltrogge ([oltrogge@agi.com](mailto:oltrogge@agi.com))

