Possible policy solutions for protecting Dark and Quiet Skies

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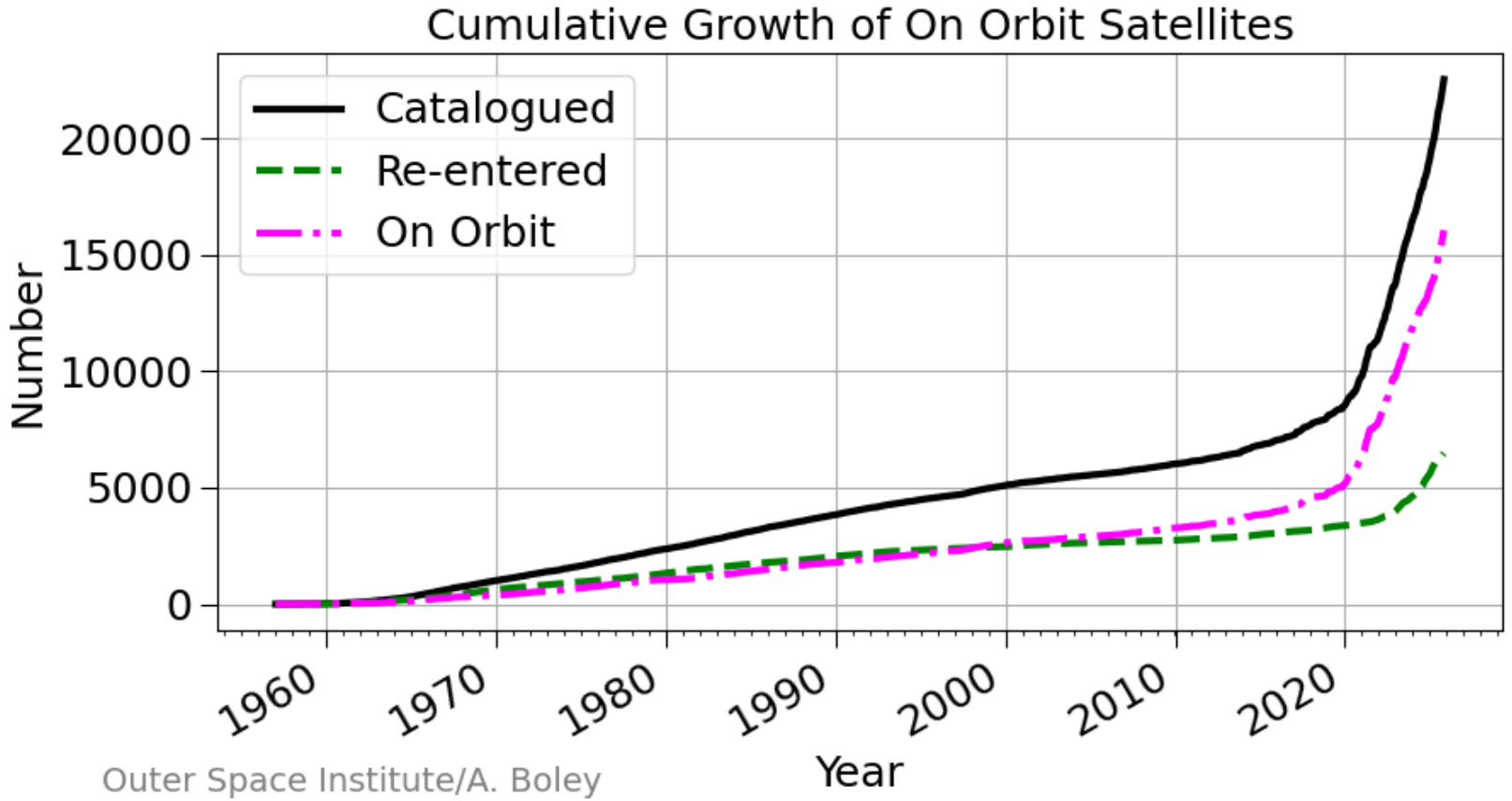
Quotas and
Cap-and-Trade

(Ongoing OSI work by
Byers and Boley)



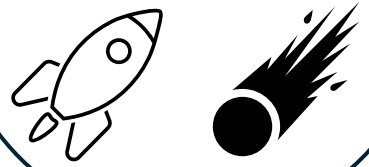
Policy challenge: Limits and sharing space

Issues

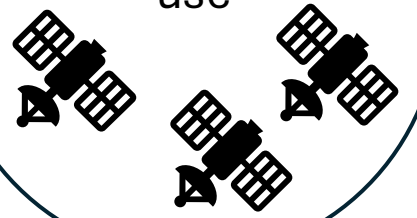
- Space use and exploration have a range of impacts on the Earth-Space system

Dark and Quiet Skies

Emissions (Launch and Reentry)



Coordination and Equitable use



Casualty Risks

Space Debris

Policy challenge: Limits and sharing space

Issues

- Space use and exploration have a range of impacts on the Earth-Space system
- Some impacts are addressed with existing regulation, while others are not
- Those that are addressed typically do not account for cumulative impacts or systemic effects
- A wide range of missions create serious challenges for all actors to meet proposed limits all (or even most) of the time
- There are many national approaches to authorizing and supervising, yet all uses of outer space have international consequences
- Challenges include coordination, resource sharing, pollution, and risk exportation

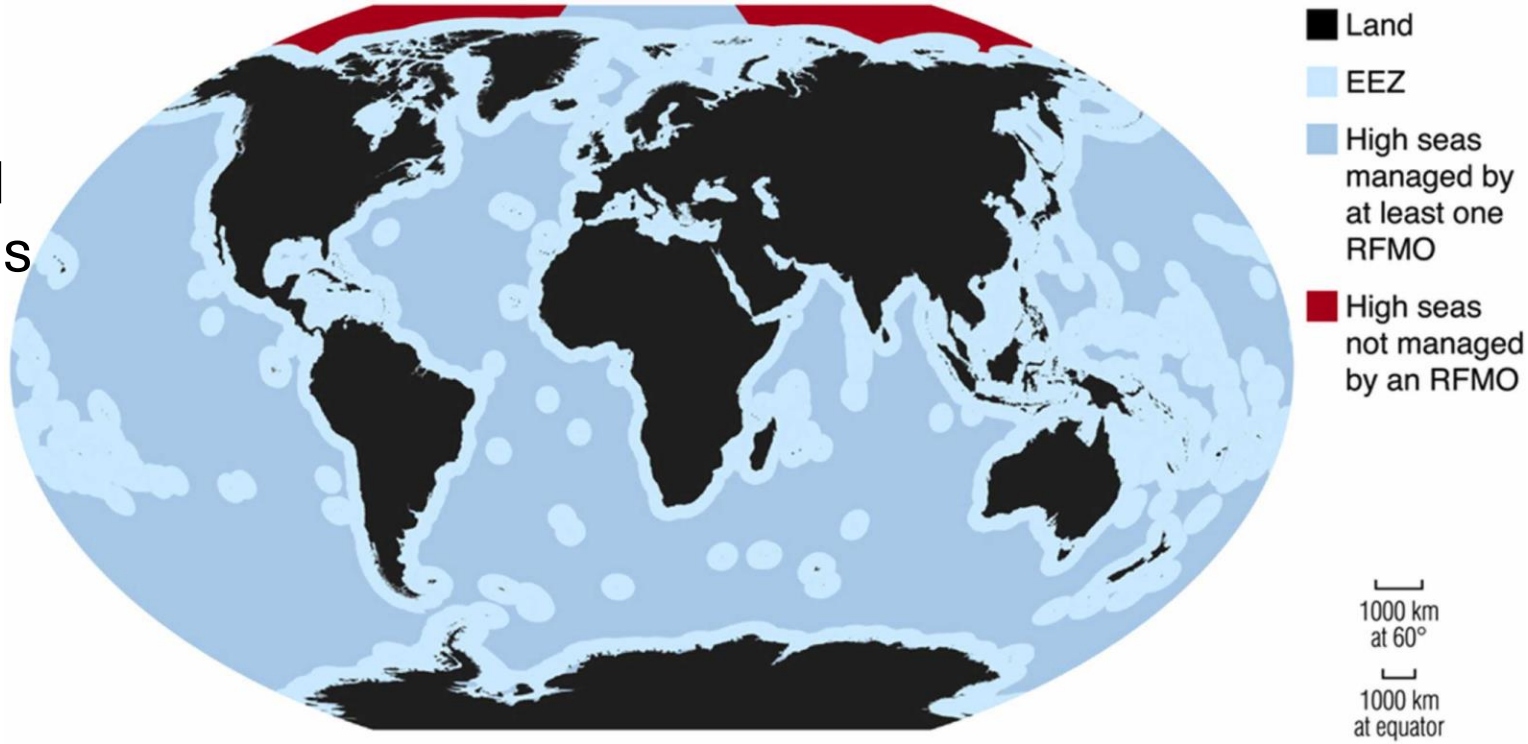
Possible Solution: Quotas

- Fisheries are a potential analogue
  - Managed by contracting states in each RFMO
  - Binding measures for maintaining fish stocks
  - Member states share data and support scientific assessments
  - Use those assessments to reevaluate measures

- GEO “slots” also provide insight
  - Coordination and rulemaking through the ITU
  - *But* GEO solution cannot be simply exported to LEO

Geostationary belt

Image from Roberts & Bullock (2023), MIT Science Policy Review

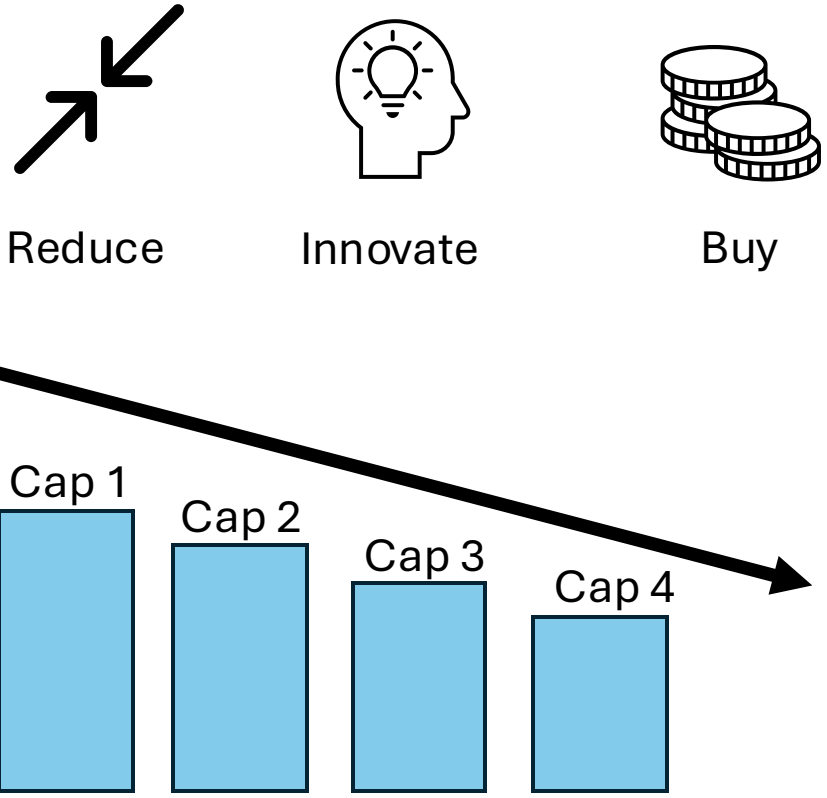


Regional Fisheries Management Organizations

Image from Alger et al. (2023), Marine Policy

Possible Solution: Cap-and-Trade

- Set amount of credits
- Credits give pollution or risk “rights”
- Credits can be bought and sold on an open market
  - Fixed number of credits make the pollution/risk right a scarce resource
  - Other than total credits, does not specify how an actor uses the credits
  - Flexibility in how an actor can pollute, but keeps everyone within an overall envelope
- Worked very well for acid rain reduction
- Has worked for regional climate action (but not globally)



Considerations for quotas/cap-and-trade

- Overall, there would need to be an international coordination mechanism that is facilitated by national approaches
- There would need to be a means for establishing obligations within the system, including international limits or allotments
- National jurisdictions would decide how to meet obligations through quotas or credits
- International limits would be reassessed regularly and based on scientific study, with such discussions involving all actors
  - We suggest that this process involve all COPUOS member States
  - Maintain scarcity to drive innovation and meet sustainability demands, although it is possible that some limits become relaxed with time
  - Verification where feasible and an effective mechanism for dealing with excess

Considerations for a Quota/Credit System

1. Satellite numbers
2. Satellite distributions
3. Debris distributions
4. Satellite surface area
5. Satellite system mass
6. Rates
7. Composition
8. Brightness impacts
9. Radio impacts

- Some credit requirements could scale with numbers, while others could be in excess of certain thresholds
- Some operators may easily be within some limits, but not others
- Can reduce, innovate, or buy credits to maintain operations
- States with no satellites can still participate and sell credits on a global market
  - This can provide greater legitimacy to the system without hindering the operation of market forces

OSI

Considerations for COPUOS

- Quotas/Cap-and-Trade could help to meet LTS Guidelines, especially A, C, and D
- Possibility of involving all State Parties in benefits (e.g., a State with no satellites can derive benefits by selling credits, as well as take part in regular quota assessments)
- An Action Team could explore initial development, with potential connections to LTS Guidelines and Dark and Quiet Skies
  - Would work toward identifying long-term implementation and management plan
  - Ideally, a quota or credit system would apply to multiple areas of space sustainability
  - However, light and spectrum pollution could be a good place to start (i.e., Dark and Quiet Skies)

STSC possible actions developed in collaboration with Giuliana Rotola

Considerations for COPUOS

- In the near-term, the potential Action Team could focus on development of quotas/credits, initial criteria, distributions, and reassessment periods, etc.
- National jurisdictions could then develop their own approaches to managing, allocating, using, and buying and selling credits
- Quotas and credits could further help to account for projects that have outsized impacts (and certain activities could have quotas of 0)
- Could we have a nascent system in place by 2029?

STSC possible actions developed in collaboration with Giuliana Rotola