Satellite Constellation WG

National policy and regulation sub-group

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Overview

Objectives of the National Policy and Regulation group

Methodology

Review of national cases

Conceptual framework for recommendations

Objectives

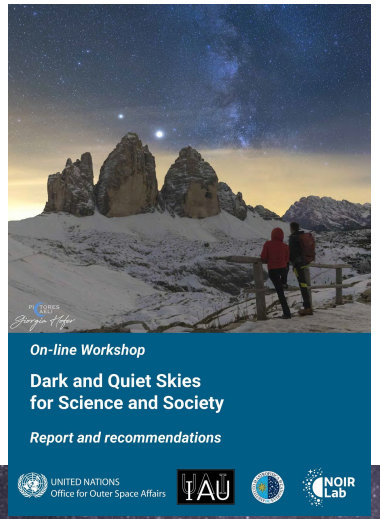
Increase number of States and industry companies that are taking account of astronomy and stewardship of the night sky in the design and operation of satellites and constellations

Understand how the recommendations developed in the 2020 Dark and Quiet Skies project can be implemented

Develop more detailed policy recommendations for relevant space and astronomy stakeholders

Support the production of a guide / template on astronomy and dark sky concerns for States developing or refreshing space policy and regulation

Recommendations Sat_Con12 - 17.



Study Overview

Review of national space policy and regulatory systems

- Conduct a descriptive review of current State practice in space policy and legislation
- Use this to examine how astronomy requirements could be included in existing practice

Development of a framework to explore further recommendations

- Expand on the details of the DQS1 Recommendations and organize and structure them
- Explore a range of possible policy instruments to achieve them, without being prescriptive

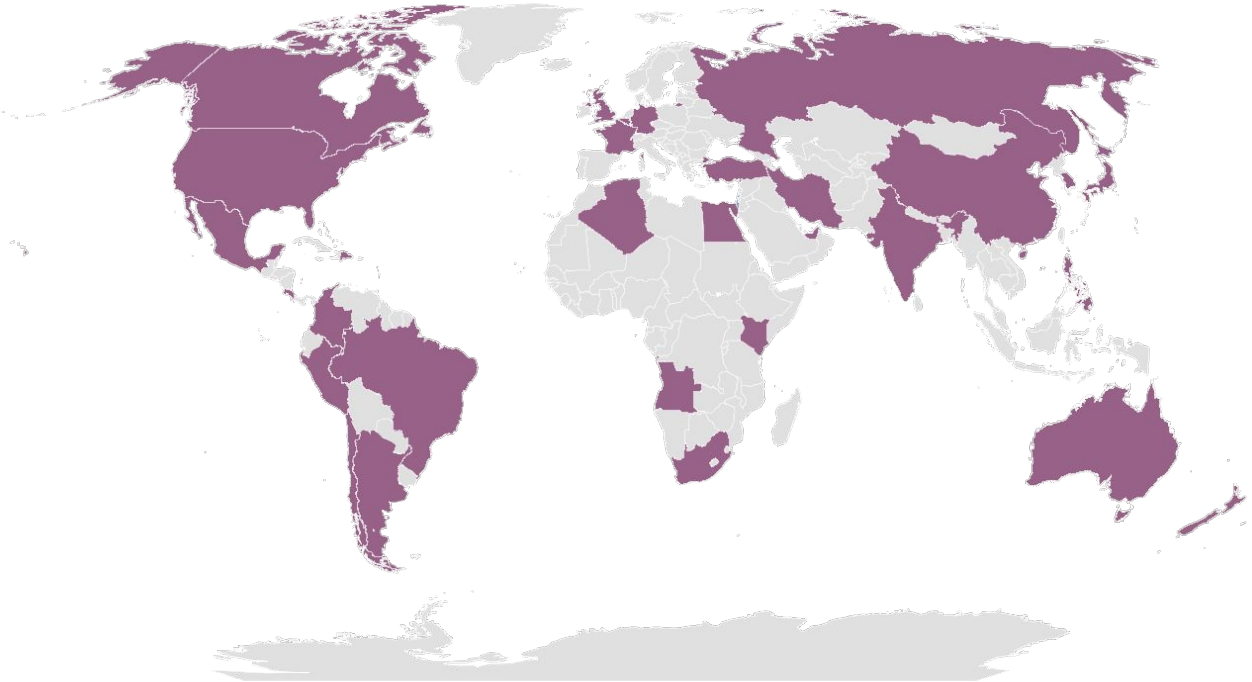
Case study methodology

1 **Select** a number of countries

2 **Establish** a research framework

3 **Highlight** key takeaways for each country

Country Selection



Research Framework

1 Authorization
Who grants licenses and under which conditions?

2 Law & Policy
Do they mention astronomy, the protection of the outer space environment, or environmental sustainability?

3 Special boards
Is there a space board with a scientific representant to cater to the interests of science, and astronomy in particular?

4 Astronomy
Is astronomy a core national space activity?

5 International
Do national instruments show a commitment to follow international standards and norms?

6 Cooperation
Do national instruments support cooperation between industry and astronomy?

7 Technical standards
Is the industry given the tools to upgrade manufacturing and operation according to recommended standards?

8 Constellations
Are there any registered or planned constellations?

Preliminary Takeaways

National Laws and **Policies** showed

- Strong push to support growth of space economy, industry, and commercial activities. But, rarely paired with safeguards to ensure the developments are environmentally sustainable. Practicle environmental protection mechanisms are lacking.
- Direct interest in the preservation of dark and quiet skies, since they invest considerable human and financial resources to astronomical activities within the country and in collaboration with others.
- An appropriate forum at national level is needed to balance national interests in astronomy and commercial space activities.

Dark and Quiet Skies 1 Recommendations

Dark and Quiet Skies I (2020) made a number of recommendations grouped by stakeholder:

- Observatories
- Industry

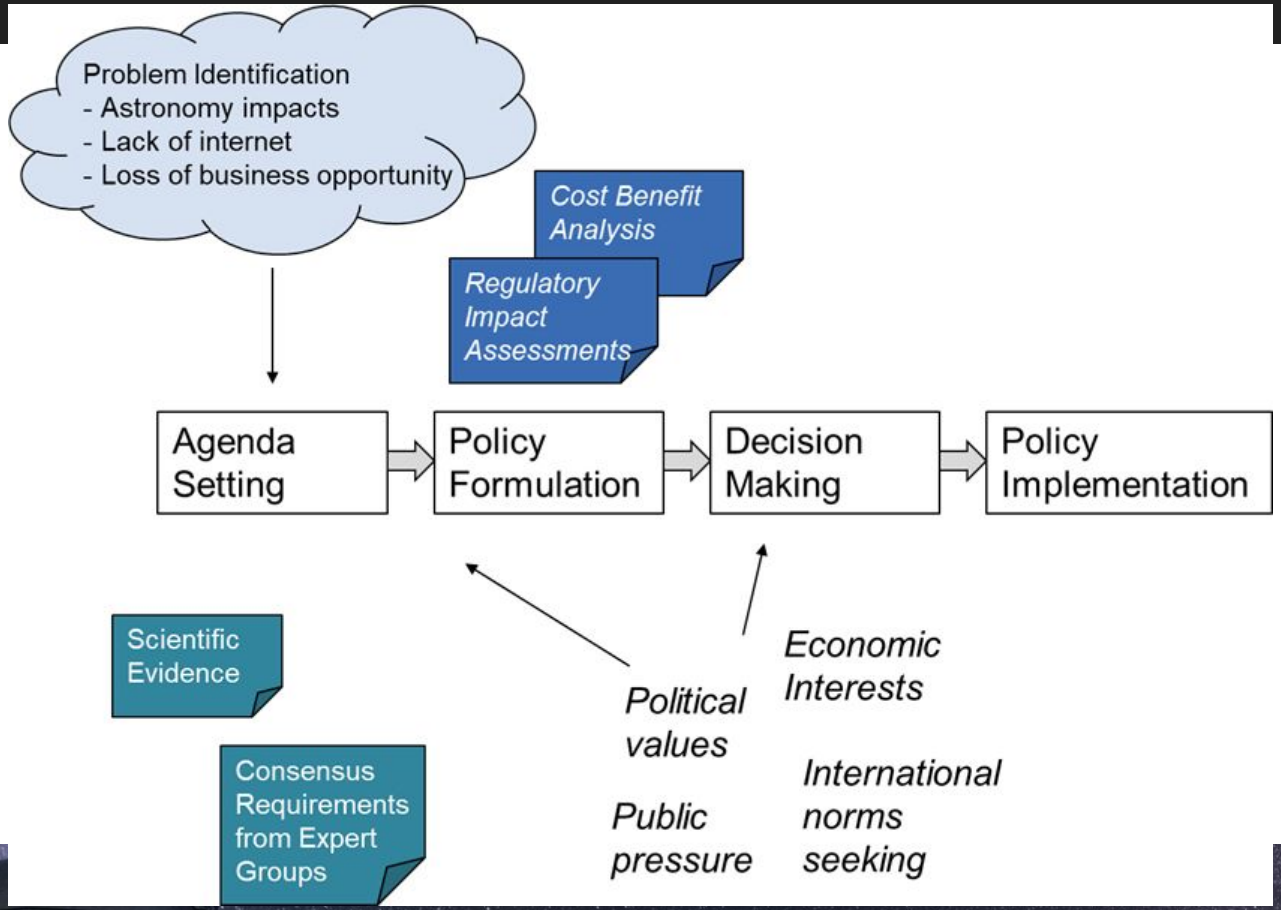
→ Very specific technical recommendations

- Astronomy Community
- Science funders
- National policy makers
- International policy makers

→ Very broad recommendations, e.g.

> **Sat_Con 13.** Formulate satellite licensing requirements and guidelines that take into account the impact on stakeholders, including astronomical activities, and that coordinate with existing efforts in relation to radio astronomy and space debris mitigation.

How is policy made? Public policy 101*...



*In reality, usually much more complicated

Provision of industry data during design process and after deployment	Operational data (location, timings, maneuvers, rotations)
	Spacecraft data (dimensions, profile, albedo, reflectance)
	Radio emission data (antenna specifications, EPFD, thermal noise in system)
Required engineering and operational constraints on individual satellite units and overall mission design, which should ideally be regulated by a licensing process	Minimisation and control of satellite reflectance
	Minimisation of illumination of radio quiet zones
	Limits on mean absolute magnitude in optical wavelengths
	Minimisation and control of intentional optical transmissions
	Minimisation of satellite unit numbers at any stage of operations
	Minimisation of satellite operational altitudes
	Orbital control of space objects
Broader cross-cutting policy measures	Development of industry standards
	Development and implementation of coordination mechanisms to avoid harmful interference
	Support for mitigation measures in national science policies and funding instruments
	Incentives for corporate social responsibility
	Assessments of Cumulative effects
	Coordination with other space policy issues (E.g. space traffic management, space debris, spectrum management)

ARC Framework

	Avoid: Policies and instruments to avoid effects on astronomy either before launch or once satellite systems are launched and operational	Reduce: Policies and instruments to reduce the impacts of effects that occur	Cooperate: Policies and instruments to prevent the occurrence of astronomy impacts before they can happen, establish the conditions for dialogue and exchange of information; achieve government policy coherence
Provision of industry data during design process and after deployment	X	X	X
Required engineering and operational constraints on individual satellite units and overall mission design, which should ideally be regulated by a licensing process	X	X	X
Broader cross-cutting policy measures	X	X	X

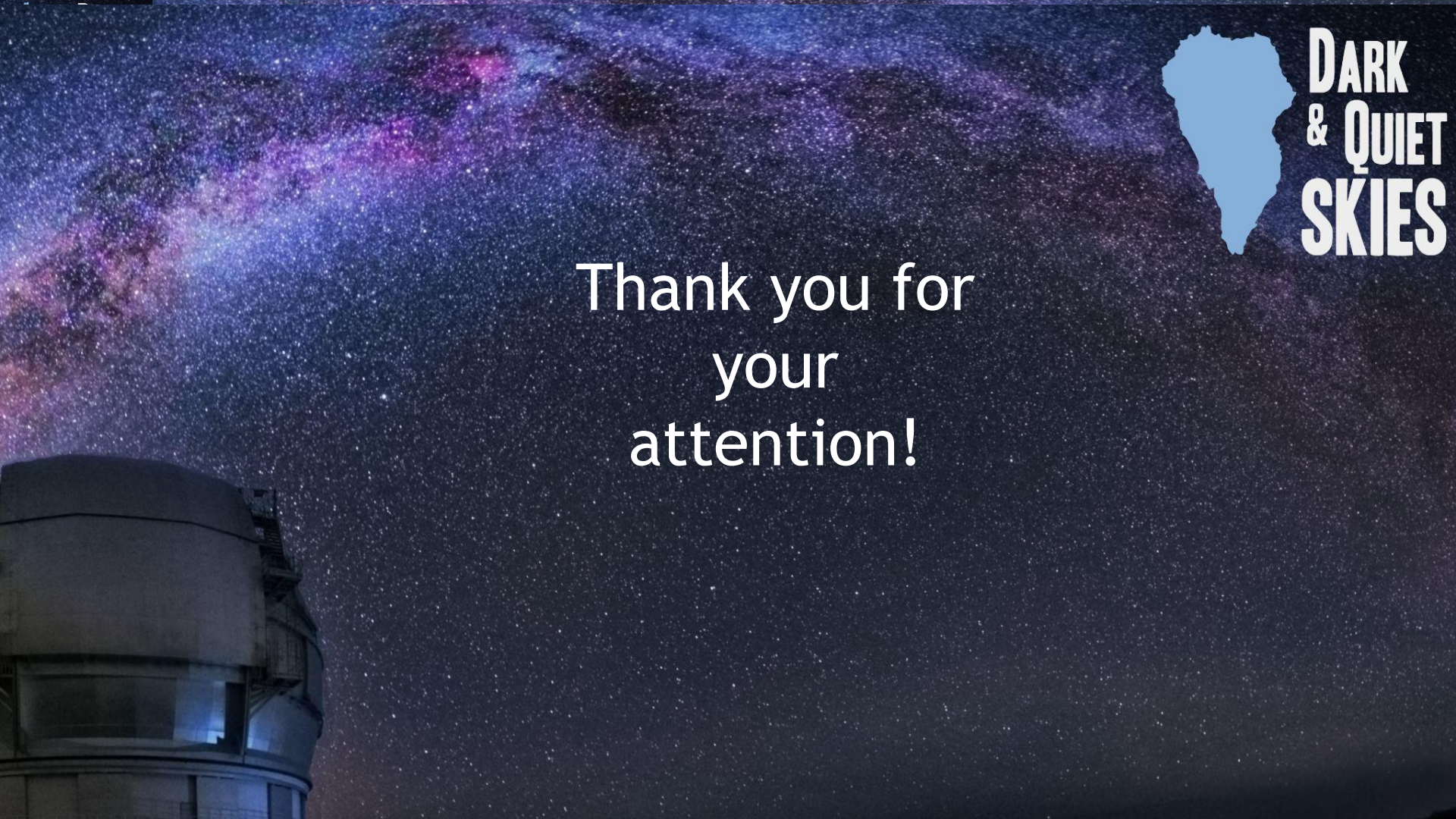
Next Steps

Finalise review of national space policies and legislations

Continue to explore potential policy instruments, informed by the review

Seek feedback from national experts

Organise and structure recommendations to support analysis and adoption by regulatory bodies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SKIES
Thank you for
your
attention!