

Working Group on Astronomy on the Moon

Responding to a compelling white paper produced by Lorena Nicotera as part of her Master's degree program at the University of Groningen, the IAU Executive authorized the formation of a Working Group on September 15, 2023. The WG is under the auspices of Commission C.B7, Protection of Existing and Potential Observatory Sites. The group membership consists of astronomy mission PIs and advocates, spectrum managers, and experts in policy and space law.

Scientific

Richard Green, UArizona – Chair
Martin Elvis, CfA – Co-Chair
Jack Burns, U Colorado – radio
Xuelei Chen, NAOC - radio
Jan Harms, Gran Sasso, Grav.Wave
Karan Jani, Vanderbilt – Grav.Wave
Claudio Maccone, Turin - radio
Jean-Pierre Maillard, IAP – UV/Opt
Joe Silk, IAP – CMB

Spectrum

Federico Di Vruno, SKAO/IAU
Balt Indermuehle, CSIRO
Gyula Józsa, MPIfR

Advisors

Veronique Glaude, ITU
Steve Mirmina, NASA OGC

Policy & Law

Chris Johnson, SWF – Co-Chair
Aaron Boley, OSI – Policy
Jessica Heim - Student (IAU)
Alanna Krolkowski, MO State – Policy/Law
Rafael Moro, IISL – Space Law
Lorena Nicotera – Student
Giuliana Rotola – Space Law
Antonino Salmeri – Space Law
Les Tennen – Space Law
Connie Walker, NOIRLab/IAU - Policy
Andrew Williams, ESO – Policy

The group established its initial terms of reference:

- Develop scientific information and policy recommendations to support those working, in particular at ITU-R, to protect the ability to make radio astronomical observations unique to the Shielded Zone of the Moon (SZM)
- Lead and collaborate on identifying, prioritizing and developing policy to protect sites of extreme scientific value for other astronomy-related observational facilities (e.g., IR interferometry, gravitational wave interferometry)
- Inform policy makers and agencies about astronomy needs and immediate threats
- Support the IAU in their efforts at the United Nations COPUOS and other bodies to promote an international policy that includes lunar astronomical site protection

It received the endorsement of the following organizations with complementary interests in lunar policy to present a Conference Room Paper (CRP) at the 2024 meeting of the UN Commission on the Peaceful Uses of Outer Space (COPUOS) Science and Technical Subcommittee:

Square Kilometer Array Observatory, European Organisation for Astronomical Research in the Southern Hemisphere, European Astronomical Society, Open Lunar Foundation, For All Moonkind, Secure World Foundation and the International Institute for Space Law.

The major points of the CRP were these:

1. The ability to utilize the unique advantages of science on the Moon, including astronomy, will depend on the development of internationally accepted methods to communicate, signal intentions between actors, foster coordination and due regard between relevant users and stakeholders, avoid harmful interference, and in allocating and protecting specific sites from interfering activities.
2. In short, some of the most important and pioneering scientific missions on the Moon can only take place in specific locations and under specific conditions, and can only take place if they are protected from interference—even from other peaceful uses.
3. Such a process of transparent and internationally-accepted coordination and protection for science is needed by the time the current phase of governmental and non-governmental demonstrations and prototyping of launch, delivery, and deployment is complete.
4. The IAU will work with other organizations with complementary interests to encourage COPUOS's thinking and planning on this complex issue.

The Working Group plans to present an updated CRP to the full COPUOS meeting in June.

The immediate goals of the Working Group are as follows:

Engage the astronomy community to

Identify and prioritize sites of extreme scientific interest on the basis of scientific requirements.

Initiate sensitivity studies to define the distances between sensitive facilities and activities that create disturbances, such as mining

Support spectrum managers in prioritizing protected frequencies

Define the frequency ranges most necessary for scientific investigations

Provide observational data on power levels of equipment currently in service in space

Provide limits on aggregate noise as a function of frequency tolerable for successful observations

Engage with and support other NGOs with complementary interests in a common approach to COPUOS

IAU represented on GEGSLA Working Group 1, and interacts with COSPAR scientific efforts through that activity

IAU supports the policy approach of the Lunar Policy Platform
IAU engages directly with IAA, IAF, Open Lunar Foundation, For All Moonkind,
Secure World Foundation and the International Institute for Space Law.

Develop model policy for astronomical site protection, based on legal instruments such as the Artemis Accords and the Moon Treaty.

The longer terms goals of the Working Group are to

Engage national space agencies to be mindful of astronomy constraints

Assure that astronomy site choices are informed by the best lunar survey data

Engage the astronomical community in a definition of ethical conduct of research on the Moon

Practical realization of the principle of non-appropriation in developing astronomical sites, with options such as

- Fair process for competing for exclusive access
- Broad opportunity for international participation in project development
- Open access data
- Finite period of use

Community support of long-term sustainability

Strategic approach to waste management, biological contamination, indigenous cultural concerns, impact of lunar transport on Earth's atmosphere

The demand is urgent for some “rules of the road” on the Moon in order to protect key astronomical sites from other sources of interference. The Working Group is committed to a very active approach to achieving international consensus on such protection.