

Open Lunar Foundation, Agenda Item 13 Long Term Sustainability

Madam Secretary, distinguished delegates, in an effort to aid deliberations, Open Lunar Foundation wishes to offer comments today on lunar technology, standards development, and in particular emerging plans for lunar communications capabilities and architectures. We believe there are significant opportunities for planned interoperability between lunar missions, as well as opportunities to enable a wider variety of missions through cost reduction and shared services, that will enable the long term sustainability of lunar activities.

The Open Lunar Foundation works across technology and policy to ensure we all set positive precedents for our shared future on the Moon. As part of this work we monitor upcoming lunar missions, architectures, and activities, and seek to advance collaboration across the community where possible. We consider standardization and interoperability to be paramount for the design of sustainable space infrastructure, open access, and international cooperation.

More missions are going to the Moon now than ever before, and those numbers are continuing to increase. Many missions develop their own approaches, sometimes their own purpose built components, which adds additional costs and time to every pursuit. There are partnerships between nation states forming to establish lunar infrastructure, such as the International Lunar Research Station, and the Artemis program, now with sixteen signatories. There is a rising interest and investment in communications systems, a key component of sustained lunar presence. There is growing interest in the engineering community to learn together about what is working across different missions, and what could enable an ecosystem to be fostered. This we see within working groups such as those convened by the Lunar Surface Innovation Consortium, based in the United States but open to international participation.

These circumstances could be leveraged to maximise cooperation. There are opportunities to convene groups of space agencies and companies alike to discuss interoperable lunar architectures. With so much planned investment, the time is ripe to facilitate interoperability not only for technical benefit but also for security benefits. Cooperating around space infrastructure can promote

transparency and confidence building overall. In particular, we recognise that planned communication systems offer a near-term utility which all actors in cislunar space can benefit from. Open standards, inter-networking, and reliable communications, both technical and norms of shared use, can lay a foundation for stronger lunar infrastructure, including cooperation and stability, over time.

There are always complexities regarding standards development. For example, there is a risk of standardising too soon and stifling innovation. There is also a challenge of defining which parties are involved in standards setting.

Furthermore, some standards arise as a derivative of other decisions, such as the form factor of another aspect of mission architecture. What is clear however, is that standards in other industries such as WiFi, were not simply emergent over time - the development of standards was actively cultivated. In the case of infrastructure which will underpin our shared lunar future, there is a need to collectively recognise the work we can do today to enhance systems for decades to come.

Given this landscape, we believe member states should consider advocating for and investing in standards development. Standards discussions are occurring between major players as we speak, yet there is no unifying platform or open opportunity for wider participation. This could be as simple as existing meetings being broadcasted more widely and advocating the value of investing time in this area, or as sophisticated as the endorsement of and investment in centralised coordination efforts. Major space agencies will continue to coordinate at some level, however a much greater value could be generated, and a much wider variety of lunar missions could be enabled, by investing in standards that in turn lower the cost of missions into the future.

A well known contemporary issue for all of us is the management of mega-constellations and their impacts. Consider for a moment some equivalent challenges in lunar space. On the far side of the Moon, there is a radio-quiet zone protected from the noise of Earth by the mass of the Moon. This unique area is well suited to deep space observation, yet could be polluted with radio activity on many frequencies. If we agree on types of communications protocols, and a radio frequency management system sooner rather than later, we will all stand to

benefit more sustainably from the scientific value of the radio quiet zone. If we have multiple communications networks around the Moon which are not interoperable, each network's coverage will be smaller as a result. Both of these examples reinforce the importance of lunar communications architecture coordination, and would benefit from near term lunar frequency and networking standards. We wish to encourage the practical adoption of technical standards to assist cost reduction, increased participation, and scarce resource management alike.

Madam Secretary, distinguished delegates, thank you for listening, we hope our comments on standards aid the STSC in matters of long term sustainability for our shared future on the Moon.