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Author: Ms. Rebecca Palmer
Georgia Institute of Technology, United States

Prof. Mariel Borowitz
Center for Space Technology and Research (CSTAR), United States

CISLUNAR COMMUNICATIONS INFRASTRUCTURE – POLICY AND INTERNATIONAL RELATIONS CHALLENGES

Abstract

As the number of planned missions into cislunar space increases, so does the need for improved communications infrastructure in the cislunar service volume (CSV). National strategies and financial investment decisions across the globe indicate a coming abundance of new users in the CSV. Small-sat science missions, lunar surface explorations, orbital gateway stations, and eventual permanent human habitations will require the use of cislunar communications orbiters working in conjunction with permanent communication ground stations on the lunar surface to safely meet their objectives. This paper examines ongoing efforts to develop cislunar communication infrastructure and identifies challenges and opportunities for international cooperation and policy development.

International collaboration is required to successfully build this infrastructure, not only to timely surmount technical challenges, but also to properly consider legal obligations in step with progress. Policy and regulation discussions are ongoing within international standards organizations and relevant committees at the United Nations, but nationally sponsored projects are leading development well ahead of policy guidance. The current state of such national projects is further presented in this paper. LunaNet may be the most technically detailed communications framework currently under development; though it is a collaboration led by NASA with ESA, it intends to set interoperability guidelines for anyone who wants to participate as a provider or user in the CSV.

Established spacefaring nations are not the only countries concerned with this issue. This paper also explores equitable access to the economic prosperity, scientific discovery, and cultural advancement opportunities provided by lunar exploration, which is a notable policy driver behind CSV communications infrastructure development concerns.