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Author: Mrs. Maria Drouet
Ecuadorian Civilian Space Agency (EXA), Ecuador, mdrouet@exa.ec

Prof. Ronnie Nader
Ecuadorian Civilian Space Agency (EXA), Ecuador, rnader@exa.ec
Mr. Jules Nader
Ecuadorian Civilian Space Agency (EXA), Ecuador, jnader@exa.ec

INTERNET FOR THE MOON: POSSIBLE COMMUNICATION ARCHITECTURES FOR CONNECTING THE MOON VILLAGE TO THE INTERNET

Abstract

At this point in time there is a growing global tendency from many nations to join efforts to develop an interdisciplinary space development program regarding the establishment of a lunar settlement in the near future. The European Space Agency has been proposing this concept under the name of "Moon Village" and among one of the most important interdisciplinary aspects are communications, specifically how to bring internet connectivity to such a lunar settlement and connecting it to Earth's internet as well as other spacecrafts in Earth orbit and/or cislunar space.

In this paper we propose and analyze possible communication architectures based on the existing TCP/IP protocol; from satellites-only networks to mixed or hybrid architectures based on lunar and/or terrestrial ground segment networks. We will also analyze protocol issues and physical transport medium, key technologies such as communications, thermal, power, shielding and space technologies; minimal requirements needed and the lunar ground last-mile implementation. The analysis of the proposed architectures is done in terms of technology availability and maturity, approximate financial and maintenance costs and estimated target performance.

As a result, we demonstrate that there are efficient and viable ways to communicate a Moon settlement with the Earth using the current technologies.