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CHALLENGES OF SCHEDULING GROUND INFRASTRUCTURE FOR LUNAR COMMUNICATION

Abstract

It is more than 50 years ago that humans visited the Moon. Accordingly, the infrastructure left from that time are mostly museum pieces. Since then few antennas have been built that are suitable for lunar communications and it is unclear how the more than 140 lunar missions scheduled are supposed to communicate with Earth. Therefore, KSAT has taken the decision to invest into three Lunar antennas to allow constant visibility of the Moon, located in New Mexico (USA), Cebreros (Spain) and Mullawa (Western Australia). This 50 Million USD investment, fully funded by KSAT is unique so far. It consists of three 20.2 m antennas that communicate in X- and Ka-band with both up- and downlink. The antennas comply to the NASA LEGS (Lunar Exploration Ground Sites) assuring interoperability with most lunar missions. While the antennas enable permanent visibility, a single mission with a requirement of continuous contact would block the entire antenna network. So special consideration is given to the scheduling model where certain rules are used to allow the antennas to be used in a multi-mission environment. The challenges of this trade offs are discussed in this paper.