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NASA'S INTEREST IN 3GPP MOBILE TELECOMMUNICATIONS PROTOCOLS FOR NEAR
EARTH SPACE AND THE LUNAR SURFACE

Abstract

NASA is planning to send astronauts back to the Moon in the next couple of years with its Artemis Program. Under Artemis, NASA plans to collaborate with commercial and international partners to establish a long-term presence on the Moon. Near term missions will be analogous but much more sophisticated versions of the last couple of Apollo missions. Lunar infrastructure will eventually be built over time by many organizations, public and private, to support sustained human exploration, science, and industrial activities on the Moon. A robust lunar communications and navigation infrastructure will be essential to realizing this long-term vision. Meanwhile, on Earth, major advances are being made with 5G mobile telecommunications rolling out across the globe. Furthermore, the 3rd Generation Partnership Project (3GPP) is beginning to define future 6G capabilities. NASA would like to see a lunar communications and navigation network with similar capabilities to communication networks we enjoy here on Earth. Building such a network will require participation by many organizations. NASA's Tipping Point program seeks industry-developed space technologies that can both foster commercial space capabilities and benefit future NASA missions. This paper will provide an overview of potential 3GPP NASA use cases as well as describe current work based on 3GPP standards within NASA or funded by NASA, such as Nokia's upcoming Tipping Point demonstration of 4G / LTE on the lunar surface in early 2023.