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NASA GATEWAYS AT L1 AND L2 AND THE RADIO-QUIET MOON FAR SIDE IMPERATIVE

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NASA is currently studying the possibility of establishing future space bases at either of the libration points (also called Lagrangian points) L1 and L2 of the Earth-Moon system. Two more similar points L1 and L2 of the Sun-Earth system are under consideration also. Such possible future space bases are called "Gateways" in the NASA jargon. Each Gateway has its own pros and cons in terms of gravitational pull, distance from the Earth, and targets attainable by future spacecraft departing from the Gateway. A preliminary, concise review of these alternative possibilities is presented in this paper.

We claim, however, that an extra factor has to be included in the NASA scenario also. This is the "Radio-Quiet Moon Farside Imperative", called simply the "Farside Imperative" hereafter. This imperative is the need to keep at least the central part of the Farside of the Moon free from Radio Frequency Interference (RFI) coming from the Earth and shielded by the Moon's spherical body. In fact, the Farside of the Moon, and the Quiet Cone that extends into space above it for a few thousands of kilometers, represent a unique outpost for humankind: they are the only place close to the Earth where all radio-garbage produced by modern human civilization cannot reach. Thus, an array of radio antennas located there would sense the rest of the universe to an unprecedented degree of radio cleanliness, and, hence, of radio details. Not only would astrophysics and radio astronomy in general greatly benefit from this radio-quiet environment, but we would possibly achieve there for the first time a neat radio contact with an extraterrestrial civilization harboring somewhere else in the Galaxy (SETI) that could be too noisy to be detected on Earth.

It is thus felt that a fair balance has to be reached between the astronomical drive to enlarge the exploration of the solar system and the imperative to keep the Farside of the Moon radio-clean. This paper puts forward a set of constructing proposals in this direction.