

A proposed space mission around the Moon to measure the Moon Radio-Quiet Zone

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In a series of papers published since 2000 mainly in *Acta Astronautica*, the senior author (Maccone) dealt with the advantages of the Farside of the Moon for future utilization. Clearly, the Moon Farside is free from RFI (Radio Frequency Interference) produced in larger and larger amounts by the increasing human exploitation of radio technologies. That author suggested that crater Daedalus, located at the center of the Farside, was the best possible location to build up, in the future, one or more radiotelescopes (or phased arrays) to achieve the maximum sensitivity in radioastronomical and SETI searches. Also, a radio-quiet region of space above the Farside of the Moon exists and is called the Quiet Cone. The Quiet Cone actual size, however, is largely unknown since it depends on the orbits of radio-emitting satellites around the Earth, that are themselves largely unknown (due to the military involvements). In addition, diffraction of electromagnetic waves grazing the surface of the Moon causes further changes in the geometrical shape of the Quiet Cone. This riddle can be solved only by direct measurements of the radio attenuation above the Farside of the Moon performed by satellites orbiting the Moon itself. In this paper we propose to let one or more (low cost) radiometers be put into orbit around the Moon to measure the RFI attenuation at different frequencies and altitudes above the Moon. The opportunity of adding more payload(s), such as an ion detector and/or a temperature sensor, is evaluated also. In this regard, we present in this paper the experience gained by working at Project PICPOT 2, a very small satellite currently under development at the engineering school (Politecnico) of Turin. And PICPOT 2, is, in turn, the follow-on of PICPOT, a small microsatellite (mass < 50 kg, power < 10 watts) designed under a modular scheme to enhance its future enlargements, that is to be launched into LEO in the spring of 2006. In conclusion, we claim that humanity would greatly benefit from preserving the RFI-free Farside of the Moon and the Quiet Cone above it. To achieve this goal, a few low-cost radiometers in orbit around the Moon would be ideal.