FUTURE PLANETARY DEFENSE FROM THE MOON, BOTH NEARSIDE AND FARSIDE

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The Moon Farside is the only place in space, and not too far from the Earth, where radio transmissions and noises produced by Humanity on Earth may not reach since the spherical body of the Moon blocks them, acting like a shield. Thus, protecting the Moon Farside from all kinds of non-scientific future exploitations (e.g. real estate, tourism and military) has long been a concern for many far-sighted space scientists as well as for several IAA Academicians. The IAA started facing this problem in the 1990s, when the French radio astronomer Jean Heidmann of the Paris Meudon Observatory first promoted an IAA Cosmic Study about which areas of the Moon Farside should be reserved for scientific uses only. Unfortunately, Heidmann passed away on July 3rd, 2000, and his work had to be continued by others. One of the authors, Claudio Maccone, took over his IAA Cosmic study and a paper describing both the scientific and legal aspects of the problem was published in 2008. Later, on June 10, 2010, he was the first scientist to present the case for the Moon Farside Protection at the United Nations Office of Outer Space Affairs in Vienna during a meeting of UN-COPUOS, the United Nations Committee on the Peaceful Uses of Outer Space. Unfortunately, the undeclared but quite real “current, new race to the Moon” complicates matters terribly. All the space–faring nations now keep their eyes on the Moon, and only the United Nations might have a sufficient authority to protect the Farside and keep safe its unique “radio-noise free” environment. However, time is money, and the “Moon Settlers” may well reach the Moon before the United Nations come to agree about any official decision concerning the Farside Protection. In past papers, the PAC (Protected Antipode Circle) was defined, i.e. a circular piece of land on the Farside having its center at the Antipode of the Earth and tangent to the +30 and -30 parallels.x

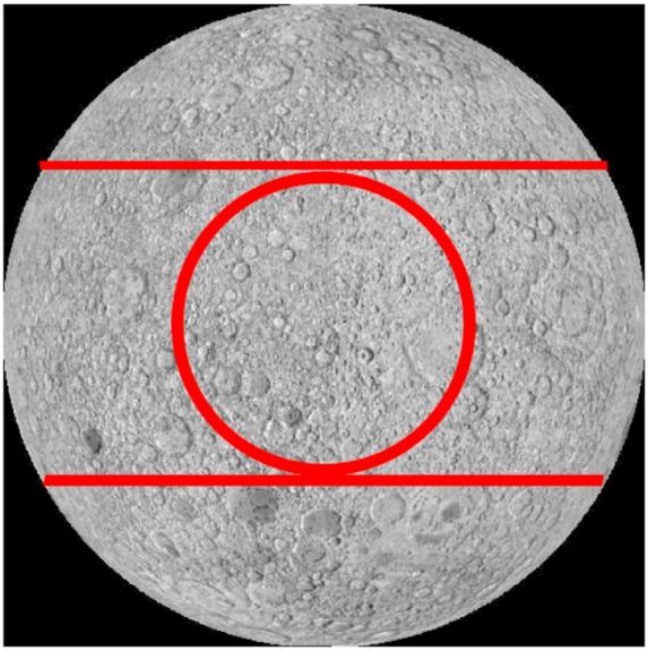

Figure 1 Location of the Protected Antipode Circle on the Lunar Farside

This turns out measuring about 1820 km in diameter on the surface of the Moon Farside. Then it was proposed that the new “Moon Village”, supported by the vision of the ESA, Jan Woerner, be located OUTSIDE the PAC (obviously not to interfere with the detection of radiation coming from space) and also SOUTH OF THE PAC, to be “close” to the South Pole as much as needed in order to benefit of

frozen water there. It thus appears that the best venue for the “Moon Village” would be on or around the 180 meridian and possibly quite close to the South Pole.

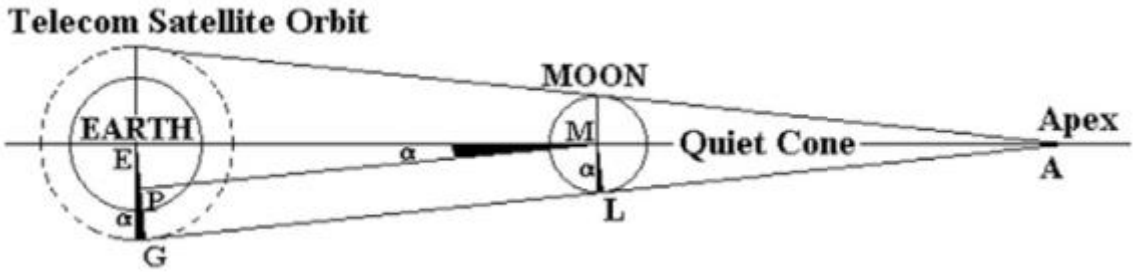

Figure 2 Geometry of the Quiet Cone on the Moon Farside

The goal of this presentation was to make the readers sensitive to the importance of protecting the Central Farside of the Moon from any future non-scientific exploitation.
In particular, we give sound scientific reasons why the PAC, Protected Antipode Circle, should be declared an internationally protected area under the Protection of the United Nations.
Existing Radio Regulations could guarantee the necessary communication frequencies for a future base on the lunar Farside, as well as the necessary radio silence for successful astronomic endeavors within the PAC.
In 1974, the International Telecommunication Union (ITU), member of the United Nations Organizations (UNO), first wrote the Recommendation ITU-R RA.479, on the protection of frequencies for radio astronomical measurements in the Shielded Zone of the Moon.
In 1967, the Outer Space Treaty was signed under the aegis of UNOOSA; according to the treaty, no Country can colonize the Moon, planets or asteroids for a country only.
However, not even the Quiet Cone can provide integration times longer than 40 minutes, even for satellites crossing the Cone at its largest geometrical extent. Therefore, only a Farside Lunar ground facility could yield large integration times of up to ten days.
More generally, the PAC must be preserved also by private investors and it is the goal of the newly created IAA Moon Farside Protection Permanent Committee to promote a new space treaty under the aegis of UNOOSA to protect the Moon Farside for scientific purposes also from private endeavors.
Thus, the whole science of radio astronomy would benefit:

1. SETI needs radio quietness to possibly detect Alien Civilizations “signatures” that reach us very feeble because of the huge distances among stars in the Milky Way, if not from other galaxies.
2. ASTROBIOLOGY studies pre-biological interstellar molecules by virtue of their roto-vibrational spectra: a delicate search for feeble spectral lines that only advanced radio telescopes and the Moon Farside radio silence may achieve.
3. COSMOLOGY needs the radio quietness on and above the Moon Farside to pick up the extremely feeble radiation of the hydrogen line at 1420 MHz as down-shifted to much smaller frequencies, MHz or kHz, by the 14 billion years of universe expansion
4. PLANETARY DEFENSE. The seeing from the Moon is wonderful (though the micro-meteorite risk is high). Thus, optical telescopes pointing at the (blocked) Sun would enable high-accuracy measurements of the orbital parameters of NEOs, greatly improving all data for Planetary Defense