P A C

PROTECTED ANTIPODE CIRCLE

AT THE MOON FARSIDE CENTER

FOR THE BENEFIT OF HUMAN KIND

ICEUM9, Sorrento, Italy, October 22\textsuperscript{nd}-26\textsuperscript{th}, 2007
by

Claudio Maccone

Member of the International Academy of Astronautics (IAA), Co-Chair, IAA SETI Permanent Study Group

E-mail: clmaccon@libero.it
Home page: www.maccone.com
PAC, the Protected Antipode Circle.

It is a circular piece of land, 1820 km = 1131 miles across in diameter along the Moon surface on the Farside of the Moon. We propose it to be reserved for scientific purposes only.

PAC is tangent to two Parallels: ±30° in latitude, North and South.

At the center of PAC is the Antipode of the Earth (on the equator and at 180 deg in longitude). Near to the Antipode is crater Daedalus, an 80 km crater proposed by the author in 2005 as the best location for the future Lunar Farside Radio Lab.

Inside Daedalus, the expected attenuation of the man-made RFI (Radio Frequency Interference) coming from the Earth is of the order of 100 dB or higher.
PAC is a consequence of the Lunar Farside Radio Lab

“Cosmic Study” of the International Academy of Astronautics (IAA)
That IAA “Cosmic Study” was started by the late French radioastronomer Jean Heidmann (1920-2000)
Timeline For That “Cosmic Study”

- 1994 – Jean Heidmann proposes SETI observatory in farside Saha Crater with link to nearside Mare Smythii plain and then to Earth
- 1994 Lunar Farside Study Sub-committee established within IAA SETI Committee
- 1996 – IAA approves Cosmic Study concept
- 1998 – COSPAR meeting to solicit ideas
- 2000 – Heidmann dies, Maccone takes over
- 2001 – Meeting at JPL
- 2003 – Cosmic Study presented to IAA
Earth-Moon Lagrangian Points

L3

1.007114 R

EARTH

L1

0.1596003 R

L4

R

R

MOON L2

0.1595926 R

L5

R

R

Copyright © 1994 by Addams
Shielded Zone of the Moon

ITU Radio Regulations Article S22

If this is 100,000 Km orbit

Then this is the ITU Shielded Zone of the Moon
Section V. Radio Astronomy in the Shielded Zone of the Moon

S22.22
§8. (1) In the shielded zone of the Moon (g) emissions causing harmful interference to radio astronomy observations (h) and to other users of passive services shall be prohibited in the entire frequency spectrum except in the following bands:

S22.23
a) the frequency bands allocated to the space research service using active sensors;

S22.24
b) the frequency bands allocated to the space operation service, the earth exploration-satellite service using active sensors, and the radiolocation service using stations on spaceborne platforms, which are required for the support of space research, as well as for radiocommunications and space research transmissions within the lunar shielded zone.

S22.25
(2) In frequency bands in which emissions are not prohibited by Nos. S22.22 to S22.24, radio astronomy observations and passive space research in the shielded zone of the Moon may be protected from harmful interference by agreement between administrations concerned.

S22.22.1
9 - The shielded zone of the Moon comprises the area of the Moon's surface and an adjacent volume of space which are shielded from emissions originating within a distance of 100,000 km from the centre of the Earth.

S22.22.2
10 - The level of harmful interference is determined by agreement between the administrations concerned, with the guidance of the relevant ITU-R Recommendations.
Satellites In Orbit Around Moon

Depends on height of communication satellites around Earth
Orbits Higher Than Geostationary
Move Shielded Zone Back

Terminal longitude on Moon in degrees

Telecom sat orbital radius in GEO units
Daedulus Crater Is Proposed

- Formerly I.A.U. Crater No. 308
- 179 degrees east longitude
- 5.5 degrees south latitude
- 80 km diameter
Three Zones On Farside
“Sharing The Moon By Thirds”

- Western Sector: ITU
- Central Sector: PRISTINE
- Eastern Sector: ITU

90° W
150° W
150° E
90° E

To L4
To L2
To L5
To Earth

Daedalus Crater
RFI-free Base
How Quiet Is The Farside?

• L5 Society wants to have space colony in orbit at L5
  – Western third would be shielded from this by the body of the moon
• Symmetric situation for L4
• Leave L2 alone!
• There is another L2 that matters…
How Quiet Is The Farside?

- L5 Society wants to have space colony in orbit at L5
  - Western third would be shielded from this by the body of the moon
- Symmetric situation for L4
- Leave L2 alone!
- There is another L2 that matters…
Earth-Sun Lagrangian Points
Earth-Sun Lagrangian Points

- L1
- L2
- L3
- L4
- L5

Soho
Herschel-Planck
‘Dueling’ Cosmic Studies

- A new ‘moon rush’
- Lunar Prospector and Clementine find water
‘Dueling’ Cosmic Studies

- A new ‘moon rush’
- Lunar Prospector and Clementine find water

South Pole Aitken Basin
‘Dueling’ Cosmic Studies

- A new ‘moon rush’
- Lunar Prospector and Clementine find water
- IAA Cosmic Study S 1.1 “The Next Steps in Exploring Deep Space”
  - Use Earth-Moon L2 for servicing station for satellites
  - Low-gravity launching platform for large spacecraft to the Asteroids, Mars and the outer solar system bodies
Peaceful Co-existence At A Price

A permanent shield between L2 and the moon
PAC, the Protected Antipode Circle.

It is a circular piece of land, 1820 km = 1131 miles across in diameter along the Moon surface on the Farside of the Moon. We propose it to be reserved for scientific purposes only.

PAC is tangent to two Parallels: ±30° in latitude, North and South.

At the center of PAC is the Antipode of the Earth (on the equator and at 180 deg in longitude). Near to the Antipode is crater Daedalus, an 80 km crater proposed by the author in 2005 as the best location for the future Lunar Farside Radio Lab.

Inside Daedalus, the expected attenuation of the man-made RFI (Radio Frequency Interference) coming from the Earth is of the order of 100 dB or higher.
Thank you !