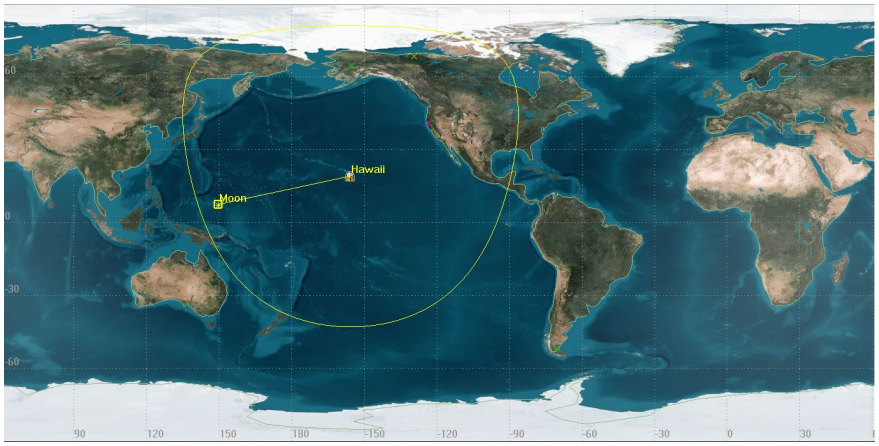
USN Critical Eclipse support for Chandrayaan-2 from Hawaii

Chandrayaan-2 is the second lunar mission of the Indian Space Research Organization (ISRO). Chandrayaan-2 is currently orbiting the moon and will explore the polar regions of which this data is essential for the NASA Artemis program and future US/Japanese lunar base. The spacecraft will experience a lunar eclipse on May 26th from 08:47 to 13:49 UTC. During this time the spacecraft will have very limited power available for critical TT&C. ISRO will have very limited visibility during this event and critically needs the Hawaiian earth station for this support to avoid risk to the spacecraft. ISRO is also low on personnel due to the expanding Covid-19 pandemic. It is requested that this authorization to take effect on May 20th for testing and validation prior to the event.

The critical support is requested for 8 days, during which testing and validation will be conducted before the actual eclipse event and full time support for the 5 hour eclipse.

A Comsearch coordination has been ordered but may not be delivered before the needed support, therefore a waiver will be requested. The report will be provided as soon as possible. USN has already directly coordinated with the SBE and has a non-inference approval.



Chandrayaan-2 typical coverage from Hawaii

Flux Density impinging on the ground in Hawaii from Chandrayaan-2

The Flux density is calculated as:

$$\boldsymbol{Flux\ density = EIRP \div (4\,\pi\, Rse^2)}$$

Where $\boldsymbol{Rse}$ is the distance from spacecraft to the ground.
Where $\boldsymbol{EIRP}$ is the Effective Isotropic Radiated Power of the Spacecraft.

Data from the spacecraft vendor indicates that the maximum EIRP of Chandrayaan-2 is -1.0 dBW. The altitude (and thus the closest distance to earth during an overhead pass) is = 400,000 Km. Converting -1.0 dBW to scalar watts = 0.794 watts transmitted at 2217.120 MHz

Therefor:

$$\boldsymbol{Flux\ density = 0.794 \div (4\,\pi * 400{,}000{,}000\ meters^2)}$$

Flux density = 3.950 x 10^{-19} Watts/meter^2
Or
Flux density = 3.950 x 10^{-20} mW/cm^2