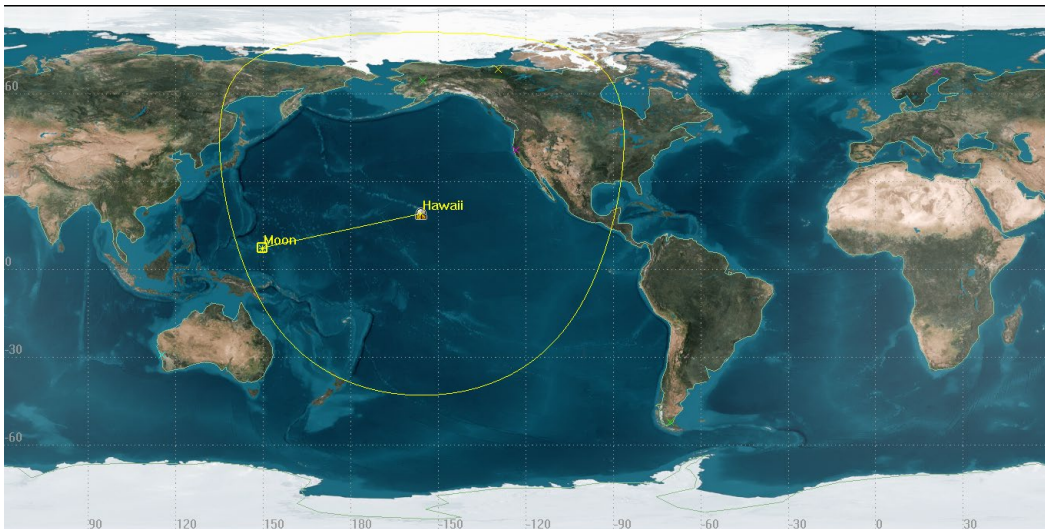


## USN support for Chandrayaan-2 Lunar orbiter from Hawaii

By this application, SSC Space US, Inc. dba Universal Space Network (collectively, "USN"),<sup>1</sup> a Delaware corporation, seeks further ongoing FCC approval to support Chandrayaan-2, 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. This additional science data collection from Hawaii will benefit the near future missions to the moon.

The Commission has granted a number of authorizations for USN to support this publicly beneficial mission, including FCC File Nos. SES-STA-20201125-01271, and SES-STA-20210309-00457 for authorization to conduct receive-only operations (as well as SES-STA-20210505-00771 authorized telecommand for a lunar eclipse event). In addition, a request to extend its prior receive-only authorization for 180 days, see FCC File No. SES-STA-20210223-00379, has remained pending for nearly 180 days. (This extension request appeared as accepted for filing on public notice in late April, but has not yet been granted.) Accordingly, in an abundance of caution, and consistent with its understanding of prior FCC guidance, USN is hereby submitting this request to further extend its existing authorization for an additional 180 days to operate as a receive-only facility for this mission, as set forth on the attached form.

The support requested by this application is for 180 days for 2 hours each day of receive-only reception of science data when the moon is in view of the earth station.



**Chandrayaan-2 typical coverage from Hawaii**

---

<sup>1</sup> USN also is engaging counsel to update the entity's FRN information to reflect its corporate name, SSC Space US, Inc., rather than its former and d/b/a name. However, given the pressing nature of this request, this request is being submitted under the entity's current registration.

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

The Flux density is calculated as:

$$\text{Flux density} = \text{EIRP} \div (4 \pi R_{se}^2)$$

Where  $R_{se}$  is the distance from spacecraft to the ground.

Where  $\text{EIRP}$  is the Effective Isotropic Radiated Power of the Spacecraft.

Data from the spacecraft vendor indicates that the maximum EIRP of Chandrayaan-2 is 35.0 dBW. The altitude (and thus the closest distance to earth during an overhead pass) is = 400,000 Km. Converting 35.0 dBW to scalar watts = 3162.3 watts transmitted at 8484.000 MHz

Therefore:

$$\text{Flux density} = 3162.3 \div (4 \pi * 400,000,000 \text{ meters}^2)$$

**Flux density =  $1.572 \times 10^{-15}$  Watts/meter<sup>2</sup>**

Or

**Flux density =  $1.572 \times 10^{-16}$  mW/cm<sup>2</sup>**