

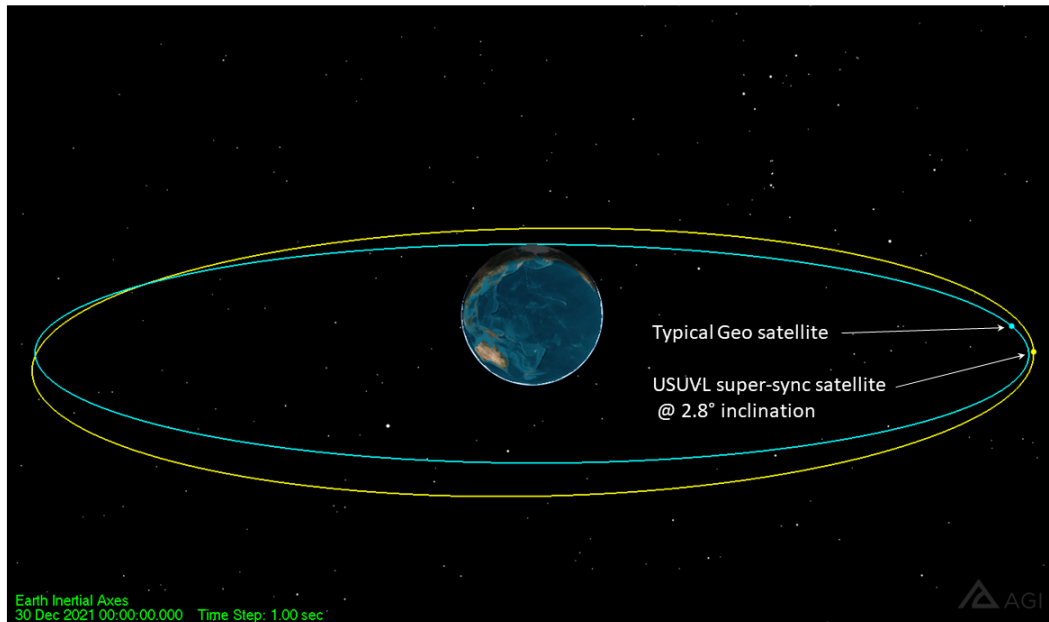
USN support of the geosynchronous test spacecraft USUVL from USN's Hawaiian earth station.

The spacecraft will be launched on or about October 9th, 2021 on a Falcon Heavy from the Kennedy Space Center. USUVL will rideshare on the vehicle with an unspecified US military spacecraft. USUVL will be injected into super-sync orbit on or about November 27th thru December 8th at which time USN will begin S-band support. The spacecraft is inclined at 2.8 degrees as to minimize potential interference with other geo spacecraft. The operators of USUVL have begun and will coordinate with other operators as to not cause interference as it moves around the geo-belt.

Nominal Injection TLE

USUVL

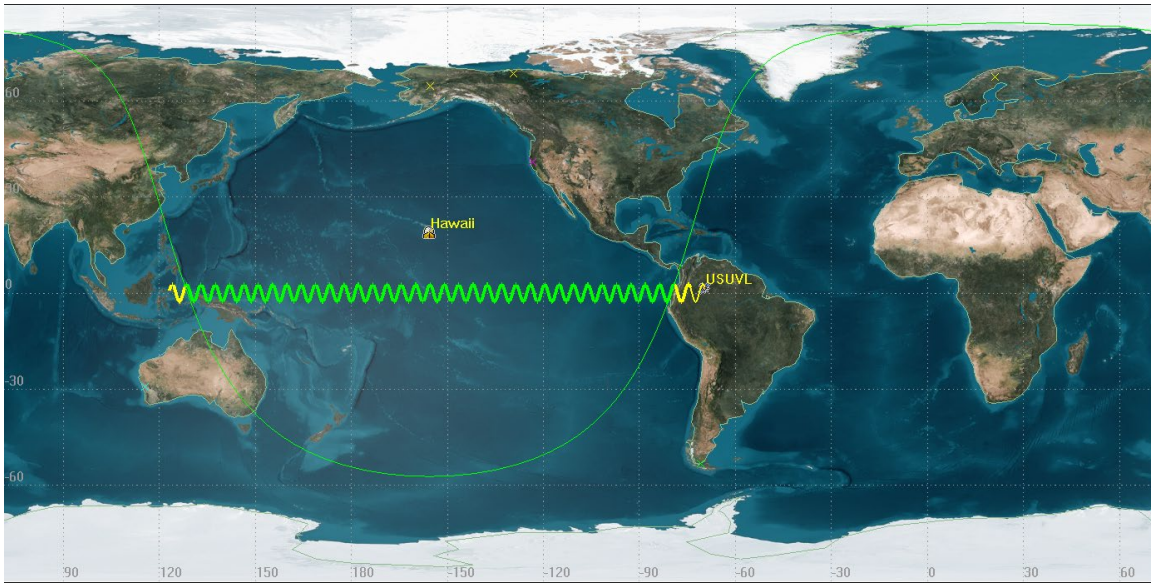
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2 00100 002.8169 340.9193 0000209 322.2077 038.0557 00.99036864 16
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Expected USUVL orbit after separation from vehicle Dec 2021

	Downlink	Uplink
USUVL	2235.000 MHz	2037.500 MHz

The spacecraft may be supported when in view of USN's Hawaiian earth station up to 24/7 (with mute transmissions as coordinated to mitigate interference) between longitudes 80° west to 128° east as the spacecraft drifts west as shown below. As the spacecraft goes out of view of Hawaii the sequence will repeat after the spacecraft moves around the earth back to 80° west in approximately 43 days. This sequence may repeat a third time 90 days later if the spacecraft is in good health.



Flux Density impinging on the ground in Hawaii from USUVL

The Flux density is calculated as:

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

Where **Rse** is the distance from spacecraft to the ground?

Where **EIRP** is the Effective Isotropic Radiated Power of the spacecraft?

Data from the ITU filing indicates that the nominal EIRP of the USUVL spacecraft is 2.0 dBW. Being in a super-sync orbit, the altitude (and thus the closest distance to earth during an overhead pass) is = 35,786 km.

Converting 2.0 dBW to scalar Watts = 2.58 Watts transmitted at 2235.0 MHz

Therefore:

$$\text{Flux density} = 2.0 \div (4 \pi * 35,786,000 \text{ meters}^2)$$

Flux density = 4.447 x 10⁻⁹ Watts/meter²

Or

Flux density = 1.127 x 10⁻¹⁰ mW/cm²

I. GOOD CAUSE EXISTS FOR A WAIVER OF THE UNITED STATES TABLE OF FREQUENCY ALLOCATIONS

USN requests a waiver of the United States Table of Frequency Allocations ("U.S. Table") as described in section 2.106 of the rules for the frequency bands 2025 – 2110 MHz (Earth-to-Space) and 2200 – 2290 MHz (Space-to-Earth).⁶ Section footnotes allow for non-federal Government use of these bands in the United States on a case-by-case non-interference basis. Such use by USN necessitates a waiver of the U.S. Table.

Good cause exists to grant USN a limited waiver of the U.S. Table to allow support of the USUVL satellite. In considering request for case-by-case spectrum uses, the Commission has indicated that it would generally grant such waivers "where there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the case-by-case operator accepts any interference from authorized services."⁷ USN will contact the satellite as requested and will coordinate with other parties operating communication systems in compliance with the Table of Frequency Allocations to ensure that no harmful interference is caused. USN seeks to operate only pursuant to special temporary authorization and thus agrees to accept any interference from authorized services. In summary, USN's operation on a non-interference, non-protected basis support waiver of the U.S. Table.

⁶ 47 C.F.R. §2.106

⁷ Previously approved STA's for Universal Space Network SES-STA-20020725-01174; SES-STA-20021112-02008; SES-STA-20040315-00475; SES-STA-20210512-00792

Summary of Technical Information
For Coordination with NTIA/FAS/IRAC

Applicant: Universal Space Network, Inc.

File No.: _____

Call Sign: No Call Sign

Special Temporary Authority ("STA")

Purpose of operation: TT&C Support in super-synchronous orbit

Start Date: 16 July, 2022

End Date: 12 January, 2023

Site Location: Naalehu, HI

Latitude: 19 deg 00' 50.3" N (NAD-83)

Longitude: 155 deg 39' 46.6" W (NAD-83)

Transmit frequency: 2037.500MHz

Polarization: R

Antenna manufacturer: Datron

Antenna Size in meter: 13m

Antenna model: 1453

Antenna Gain Transmit: 46.3dBi @ 2072 MHz

<u>Frequency Band</u> (MHz)	<u>Emissions</u>	<u>Max.eirp</u> (dBW)	<u>Max.eirp density</u> (dBW/4KHz)
2037.500MHz	256K0G1D	68	51

Satellite: USUVL