

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of	)	
	)	Call Sign(s):
AstroForge Inc.	)	
	)	
Application for License	)	File No. 0693-EX-CN-2026
of AstroForge Inc. and	)	
DEEPSPACE-2S Spacecraft	)	

**APPLICATION FOR LICENSE OF ASTROFORGE INC AND DEEPSPACE-2S
SPACECRAFT**

AstroForge Inc. (“AstroForge”), in accordance with Part 5 of the Federal Communications Commission’s (“Commission”) rules, hereby files this application requesting experimental authorization for AstroForge Inc.’s DEEPSPACE-2S deep space satellite for its mission to perform reconnaissance of a target near-Earth asteroid, scheduled to launch no earlier than December 2026.

Consistent with the information required by the Commission’s Rules, AstroForge Inc. has also provided a completed Form 442, Technical Narrative, Orbital Debris Assessment Report (ODAR) and ITU supporting documents. AstroForge Inc. specifically seeks authorization for use of the Space Research Service’s 2110 MHz to 2120 MHz Earth-to-space (deep space) and 2290 MHz to 2300 MHz space-to-Earth (deep space) frequency allocations on an experimental basis, which has been pre-coordinated with NASA’s Jet Propulsion Laboratory (JPL), the agency in charge of frequency coordination for deep space bands.

I. INTRODUCTION

A. ASTROFORGE INC BACKGROUND

Aiming to extract platinum group metals from near-Earth asteroids, AstroForge was founded in January 2022 by Matthew Gialich with a mission to provide off-planet resources for the benefit of humanity. The company aims to build small spacecraft to go to near-Earth asteroids, extract platinum group metals with their refinery technology, and deliver the refined materials back to Earth. AstroForge is headquartered in Seal Beach, CA with over 50 full-time employees. The company has raised multiple series of private venture funding to fund this spacecraft through completion of the mission.

B. DEEPSPACE-2S DESCRIPTION

1. DEEPSPACE-2S SPACECRAFT OVERVIEW

As part of the overall goal of extracting platinum group metals from near-Earth asteroids, the mission of the DEEPSPACE-2S spacecraft is to do initial imaging and reconnaissance of one of AstroForge's target asteroids. This mission aims to do a rendezvous with the target asteroids and take high-resolution, monochromatic images to analyze the surface for docking sites in future missions. Further this mission will help determine whether the asteroid is of a specific type based on the crater impacts and cracking on the surface. The mission also aims to demonstrate AstroForge's spacecraft in deep space and the ability to operate for a mission duration of 2 years. For clarity, this application is not to be confused with AstroForge's previously authorized spacecraft named DEEPSPACE-2¹. This application is requesting authorization of a new spacecraft named DEEPSPACE-2S that is technically identical to

¹ See FCC ELS File Number 0229-EX-CN-2026 (Callsign WQ2XIU)

DEEPSPACE-2, performing a similar mission profile but to different target asteroid than DEEPSPACE-2.

2. FREQUENCY PLAN

i. S Band Uplink

The DEEPSPACE-2S spacecraft requests use the 2110-2120 MHz Space Research Services deep space allocations for Earth-to-space uplink telecommanding. The Deep Space Network has developed channel plans to provide for orderly selection and assignment of frequencies for deep-space missions within NASA Category B type missions, which include spacecraft operating greater than 2 million km from Earth, for the S- and X-bands. NASA's Jet Propulsion Laboratory (JPL), the agency in charge of frequency coordination for deep space bands has performed frequency analysis, and recommend the use of Deep Space S-band Channel 13.325, corresponding to 2113.082292 MHz as the uplink center frequency. The DEEPSPACE-2S spacecraft is operating at a maximum distance of 20 million km from Earth, meeting the criteria for Category B missions, and thus primary access to deep space allocations.

ii. S Band Downlink

The DEEPSPACE-2S spacecraft requests use the 2290-2300 MHz Space Research Services deep space allocations for space-to-Earth downlink telemetry. NASA's Jet Propulsion Laboratory (JPL), the agency in charge of frequency coordination for deep space bands, has performed frequency analysis and recommend the use of Deep Space S-band Channel 13.325, corresponding to 2294.75 MHz as the downlink center frequency. As with the S Band uplink, primary access to deep space allocations is requested as the DEEPSPACE-2S spacecraft operates at distances greater than 2 million km.

iii. Spectrum Sharing Capabilities

The DEEPSPACE-2S spacecraft is designed to be capable of sharing the Space Research Service band with current and future users. The DEEPSPACE-2S spacecraft shall utilize current Space Research Service S-Band (deep space) frequencies, that are coordinated with the Jet Propulsion Laboratory, who work with other deep space partners to ensure the DEEPSPACE-2S spacecraft will not cause interference to other users in the band, and that future user are compatible with the DEEPSPACE-2S spacecraft. This centralized frequency coordination contact ensures that all current and future users in this spectrum are protected from each other at all times. If interference does occur, AstroForge Inc.'s contact information is shared within this centralized system and will have operators on call 24 hours a day to respond to any issues that arise. Operations will not materially constrain future space station entrants from using the authorized frequency band(s).

3. LAUNCH SCHEDULE

The DEEPSPACE-2S spacecraft is scheduled to launch no earlier than December 1st, 2026. As launches to Trans-lunar injection are relatively infrequent, this date may move further to the future, and AstroForge shall keep the Commission apprised of any delays that do occur with this mission.

II. GRANT OF THIS APPLICATION WILL SERVE THE PUBLIC INTEREST

The grant of this application will serve the public interest in two different ways. Firstly, this application serves the public interest by providing a small scale spacecraft that is capable to performing rendezvous and docking to the surface of an asteroid that is approximately 20 million km away from Earth. The technology and techniques developed by the DEEPSPACE-2S mission will help not just AstroForge Inc, but others looking to do rendezvous of distant space objects,

valuable data and experience to refine and hone the ability to accurately land on distant objects and eventually return back to Earth.

Secondly, this application serves the public interest as asteroid mining shows promise as a method for obtaining critical elements that are classified as rare on Earth. The asteroid belt in our solar system contains ~8% metal-rich (M type) asteroids, ~17% spectral (S type) asteroids and 75% volatile-rich carbonaceous (C type) asteroids. The denser metals in asteroids, including platinum group minerals and REE's, are distributed relatively evenly throughout the asteroid body, simplifying the mining process as drilling can be relatively shallow (i.e. not into the core) for high grades of ore. As these elements are already scarce on Earth, and rapidly dwindling, looking to new sources for these elements will help to advance new technologies that are dependent on these elements.

III. ADDITIONAL LEGAL MATTERS

A. Eligibility and Operational Requirements

1. System Eligibility (47 CFR § 5.3)

The DEEPSPACE-2S spacecraft is eligible for a Part 5 experimental license under subset (e) of Section 5.3 (“Technical demonstrations of equipment or techniques”). As the DEEPSPACE-2S spacecraft is the first of its kind system with the aim of imaging and determining composition of a deep space asteroid, all systems on the DEEPSPACE-2S spacecraft are to be tested and demonstrated on-orbit for the first time by a commercial company (instead of governmental agencies), with the goal of a successful demonstration leading to follow-on operational missions that will fall under Part 25 licensing once proven.

2. Special provisions for satellite systems (47 CFR § 5.64)

Pursuant to 47 CFR §5.64, the DEEPSPACE-2S spacecraft conforms to all provisions set forth for satellite systems certification:

(a) AstroForge certifies that construction is entirely at the applicant's risk and does not entitle the applicant to any assurances that its proposed experiment will be subsequently approved or regular services subsequently authorized. AstroForge requests to use this notice, along with all further documentation submitted with this application as formal notice of its plans to construct at its own risk.

(b) AstroForge submits the following information as requested by Section 5.64 (and found in other documents or attachments as referenced):

(1) AstroForge has assessed and eliminated any amount of debris released in a planned manner during normal operations. By design, the DEEPSPACE-2S spacecraft will release no operational debris. More detail can be found in Section 3 of the attached Orbital Debris Assessment Report.

(2) AstroForge has assessed and limited the probability that the space station(s) will become a source of debris by collision with small debris or meteoroids that would cause loss of control and prevent disposal. AstroForge has been advised that this requirement is Not Applicable to the DEEPSPACE-2S mission. Following launch, the DEEPSPACE-2S spacecraft will only be in Earth orbit for less than 12 hours before either performing the first burn to head towards the target asteroid, or making the decision that a detected failure that would prevent safe completion of the burn occurred. In the worst-case scenario, failures during launch would prevent either a post Trans Lunar Injection burn or Post Mission Disposal burn. In this case, orbital disposal by atmospheric entry would occur within 0.036 years (~ 14 days) and does not require a specific spacecraft orientation and drag state to meet the disposal requirements as shown in the Orbital Debris Assessment Report. Therefore, no element or component of the spacecraft system is required to complete post-mission operations.

Further, per the DAS User Guide provided by NASA, this requirement is not applicable for short durations: “Due to the very short mission duration of launch vehicle orbital stages (normally less than 24 hours), the probability of a disabling small debris impact on orbital stages is not significant.” As the DEEPSPACE-2S spacecraft’s propulsion system only needs to operate within the first 12 hours of the mission to be able to burn away from the Earth’s orbit, “the probability of a disabling small debris impact on orbital stages is not significant” before or during this burn, thus making this requirement Not Applicable. More detail can be found in Section 5 of the attached Orbital Debris Assessment Report.

(3) AstroForge has assessed and limited the probability during and after completion of mission operations, of accidental explosions or of release of liquids that will persist in droplet form. No debris will be generated in an accidental explosion resulting from the conversion of energy sources on board the DEEPSPACE-2S spacecraft into energy that fragments the spacecraft. More detail can be found in Section 4 of the attached Orbital Debris Assessment Report.

(4A) AstroForge has assessed and limited the probability of the space station(s) becoming a source of debris by collisions with large debris or other operational space stations. The probability of a collision between the DEEPSPACE-2S spacecraft and any other large object (10 centimeters or larger) during the lifetime of the spacecraft is $4.6889\text{E-}08$, which is less than the required 0.001 as calculated using current NASA Debris Assessment Software (DAS) version 3.2.6. More detail can be found in Section 5 of the attached Orbital Debris Assessment Report.

(4B) AstroForge has assessed and limited the probability of the space station(s) becoming a collision risk by being launched into a trans-lunar orbit that is not used by other spacecraft other than the ones on the launch itself. AstroForge will coordinate with NASA Trajectory

Operations and Planning Office (“TOPO”) if needed to avoid any objects in Trans-lunar Orbit trajectories from this launch.

(4C) The DEEPSPACE-2S spacecraft is not designed to operate or transit through any orbits that are used by inhabitable spacecraft.

(4D) The DEEPSPACE-2S spacecraft will use radio frequency PN ranging sequences to determine orbital parameters once the spacecraft has left the initial Trans-Lunar Injection orbit. The spacecraft’s propulsion system will be used to keep the spacecraft on the planned trajectory.

(4E) AstroForge certifies that upon receipt of a space situational awareness conjunction warning, the operator will review and take all possible steps to assess the collision risk, and will mitigate the collision risk if necessary.

(5) The DEEPSPACE-2S spacecraft is trackable due to the fact that the spacecraft is much greater than 10 cm in its smallest dimension. The DEEPSPACE-2S spacecraft will also be identifiable by a unique signal-based telemetry marker distinguishing it from other space stations or space objects based on frequency, ranging PN and packet formats. AstroForge plans to share information regarding initial deployment, ephemeris, and/or planned maneuvers with the 18th Space Control Squadron or successor entity, other entities that engage in space situational awareness or space traffic management functions, and/or other operators.

(6) The DEEPSPACE-2S spacecraft will not perform any proximity operations in Earth’s orbit, thus no debris generation in Earth orbit will result from proximity operations. For completeness, DEEPSPACE-2S will do proximity operations with the target asteroid at a distance of greater than 2 million kilometers from Earth.

(7) The DEEPSPACE-2S spacecraft is designed to be disposed of at the deep space asteroid of the mission, and not in any Earth orbit. If the DEEPSPACE-2S spacecraft can perform the mission's initial burn from Trans-Lunar Injection, the spacecraft will be at a minimum of 1,000,000 km from the Earth. In the worst case, as discussed in Requirement 4.6-1 of the Orbital Debris Assessment Report, if the DEEPSPACE-2S spacecraft does not operate or function immediately after deployment from the booster due to a catastrophic malfunction, a Post Mission Disposal Maneuver will not be able to be performed but DAS simulations predict an orbital lifetime of 0.036 years before DEEPSPACE-2S atmospherically reenters. The DAS software gives the risk of human casualty from uncontrolled reentry of the DEEPSPACE-2S spacecraft as zero (0), which is less than the required 1:10000 probability. More detail can be found in Section 6 of the attached Orbital Debris Assessment Report.

3. License Period (47 CFR § 5.71)

AstroForge requests a license period of three (3) years, or 36 months. While the nominal mission duration is two (2) years from launch, three years is requested in order to cover unforeseen launch delays in order to not have to burden the Commission every time the launch is delayed, if this does occur. If requested, AstroForge will be glad to inform the Commission at the end of the mission as required, in order to ensure the license period is only two years of operational time per 47 CFR § 5.81.

4. Non-interference criterion (47 CFR § 5.84)

The DEEPSPACE-2S spacecraft can be commanded by command originating from the ground to immediately cease transmissions and AstroForge Inc. will have the capability to eliminate harmful interference when required under the terms of this license or other applicable regulations.

B. ITU Cost Recovery

AstroForge Inc is aware that, per actions taken at the 1998 Plenipotentiary Conference and as modified by the ITU Council in 2005, the ITU charges processing fees for satellite network filings to prevent “warehousing” of spectrum. Therefore, all applicants are responsible for all fees charged by the ITU regarding their application. AstroForge is aware of this requirement and accepts responsibility to pay all ITU cost recovery fees associated with this application. Such fees and invoices may be sent to the contact representative listed in this application.

IV. REQUEST FOR EXPEDITED PROCESSING OF ITU DOCUMENTS

AstroForge Inc. requests that the DEEPSAPCE-2S ITU Advanced Publication Information (API) and Graphical Interface Management System (GIMS) databases be forwarded to the ITU upon initial processing and check of completeness of this application. As this mission is pre-coordinated with the Deep Space Network for frequency allocations, submission of the API and GIMS database pose no risk to revisions due to updates from Federal equities, and further allows AstroForge and its partners operating Earth stations to process Earth-to-space licenses within their respective jurisdictions in an adequate time for a mission in the Deep Space portions of the Space Research Band.

V. OTHER MATTERS

A. Previous AstroForge Licenses

Previously, Orbital Astronautics Ltd submitted licensing for AstroForge Inc’s Brokkr-1 mission that was launched on April 15, 2023 aboard the SpaceX Falcon 9’s Transporter-7 mission. This spacecraft was licensed by German authorities under the application submitted by

the spacecraft's contractor, Orbital Astronautics Ltd based out of the United Kingdom. The ITU designation for Brokkr-1 was D2022-57244.

AstroForge was previously granted an Experimental license under Part 5 of the Commission's rules on October 18th, 2024, for the Odin mission (File Number 0593-EX-CN-2024, Callsign WO2XZY). This mission was launched February 27th, 2025, as a rideshare of the IM-2 lunar mission.

AstroForge was granted an Experimental license under Part 5 of the Commission's rules on May 13th, 2026, for the DEEPSPACE-2 mission (File Number 0229-EX-CN-2026, Callsign WQ2XIU). This mission is scheduled to be launched no earlier than October 1st, 2026.

VI. CONCLUSION

This Application, along with all attached documentation and databases containing appropriate diagrams and details, outlines AstroForge Inc's DEEPSPACE-2S spacecraft Radio Frequency system and provides the necessary information to review compatibility of the system with other current (and future) users. AstroForge Inc. specifically seeks authorization for use of the Space Research Service's S Band Uplink and Downlink deep space frequency allocations, which has already been pre-coordinated with NASA's Jet Propulsion Laboratory (JPL), the agency in charge of frequency coordination for deep space bands.

Attachments:

Technical Narrative

Orbital Debris Assessment Report

ITU SpaceCap

ITU GIMS

ITU Cost Recovery Letter

Respectfully submitted,

Robyn Ringuette

/s/

AstroForge Inc.