

GRANT
Pixxel Space Technologies, Inc.
ICFS File No. SAT-LOA-20250214-00046, SAT-AMD-20250408-00097

ICFS File No(s):	SAT-LOA-20250214-00046; SAT-AMD-20250408-00097 ¹	GRANTED – With Conditions  Space Bureau Satellite Programs and Policy Division
Licensee/Grantee:	Pixxel Space Technologies, Inc. (Pixxel)	
Call Sign:	S3222	
Satellite Name:	Honeybee-00	
Orbital Location: (required station-keeping tolerance)	Non-geostationary satellite orbit (NGSO), deployment and operations at an altitude of 500 km (+/- 20 km) at an inclination of 97.6 degrees (+/- 1.0 degree).	
Administration:	United States of America	
Nature of Service:	Earth Exploration Satellite Service (EESS) and Space Operation Service (SOS)	
Scope of Grant:	Authority to deploy and operate one NGSO satellite	
Service Area(s):	See conditions and Appendix	
Frequencies:	<u>EESS:</u> 8025-8400 MHz (space-to-Earth) (center frequency 8050.0 MHz with 13.5 MHz or 40.5 MHz bandwidth) 2025-2110 MHz (Earth-to-space) (center frequency 2100.0 MHz with 1.0 MHz bandwidth) 2200-2290 MHz (space-to-Earth) (center frequency 2240.0 MHz with 4.0 MHz bandwidth) (outside of U.S. only) 402.0-403.0 MHz (Earth-to-space) (center frequency 402.2 MHz with 6 kHz bandwidth, backup uplinks) (outside of U.S. only) <u>SOS:</u> 400.15-401.0 MHz (space-to-Earth) (center frequency 400.65 MHz with 20 kHz bandwidth) <u>Global Positioning System (GPS) Receive:</u> ² 1575.42 MHz (GPS L1) 1227.60 MHz (GPS L2) 1176.45 MHz (GPS L5)	
Unless otherwise specified herein, operations under this grant must comport with the legal and technical specifications and commitments set forth by the applicant or petitioner and with the Federal Communications Commission’s rules not waived herein. This grant is also subject to the following conditions:		
1. Pixxel’s space-to-Earth and Earth-to-space operations must be strictly limited to durations when the Honeybee-00 space station referenced within this license is visible to the corresponding earth station locations listed in the Appendix of this grant, noting the additional restrictions within this grant.		

¹ See *Pixxel Space Technologies, Inc.*, ICFS file nos. SAT-LOA-20250214-00046 (Feb. 14, 2025), SAT-AMD-20250408-00097 (filed April 8, 2025) (together, the Application). This Application, as amended, was accepted for filing and placed on public notice. See *Satellite Licensing Division and Satellite Programs and Policy Division Information, Space Station Applications Accepted for Filing*, Public Notice, Report No. SAT-01923 (May 30, 2025). Pixxel initially filed an application for the Honeybee-00 satellite under the Commission's section 25.122 streamlined processing rules. This application was subsequently refiled under the standard NGSO processing rules and withdrawn. See Application Narrative at n. 1.

² See Application, Exhibit C – Honeybee-00, Technical Annex at 1, n.1.

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2. Pixxel's transmissions in the 400.15-401.00 MHz and 402-403 MHz bands may be made only to/from earth stations coordinated with Federal agencies, including National Aeronautics and Space Administration (NASA), the Air Force Spectrum Management Office (AFSMO), and Department of Commerce/National Oceanic and Atmospheric Administration (DOC/NOAA). Transmissions in the 2025-2110 MHz, 2200-2290 MHz, and 8025-8400 MHz bands may only be made to/from Federal earth stations or earth stations coordinated with NASA, AFSMO, DOC/NOAA, and Department of the Navy (DON). Any use of Federal or government-sponsored ground stations must be coordinated by Pixxel's federal government customers with AFSMO (jimmy.nguyen@us.af.mil), NASA (HQ-SatCoord@mail.nasa.gov) and DOC/NOAA (spectrum.coordinator@noaa.gov). A list of coordinated non-Federal earth stations is attached in the Appendix. Pixxel must provide the FCC with an updated list of coordinated non-Federal earth stations within ten (10) business days following any changes to this list.
3. Transmissions in the 400.15 MHz, 402-403 MHz, 2025-2110 MHz, 2200-2290 MHz, and 8025-8400 MHz bands are limited to the center frequencies and emission bandwidths coordinated with Federal users set forth in the Frequencies section of this grant.
4. Pixxel's request for waiver of the U.S. Table of Frequency Allocations ("U.S. Table"), 47 CFR § 2.106(a), to conduct TT&C and EESS imaging control in the 2025-2110 MHz (Earth-to-space) band is DISMISSED as unnecessary.³ In the U.S. Table, the 2025-2110 MHz band is allocated, *inter alia*, to the Space Operations Service (SOS) (Earth-to-space and space-to-space) and to the Earth exploration satellite service (EESS) (Earth-to-space and space-to-space) on a primary basis for Federal use, and to the Fixed Service and Mobile Service on a primary basis for Federal and non-Federal use. In the U.S., space operations are limited to Federal operators,⁴ while non-Federal EESS use is permitted on a case-by-case basis, subject to the condition that it must not cause harmful interference to authorized operations.⁵ Pixxel seeks to use the 2025-2110 MHz (Earth-to-space) band for TT&C and EESS image tasking, and we find these operations are in accordance with the U.S. Table. In accordance with the U.S. Table, Pixxel's operations must not cause interference to authorized users of the 2025-2110 MHz band.
5. Earth station transmissions in the 2025-2110 MHz band must be coordinated with fixed and mobile stations in the 2025-2110 MHz band (e.g., via the Society of Broadcast Engineers (SBE)).
6. For uplinks centered at 2100 MHz (Earth-to-space), all supporting earth station transmissions must cease when any of the following spacecraft are within 5 degrees of the respective earth station antenna boresight:
 - a. Landsat-8 (NORAD ID: 39084),
 - b. Landsat-9 (NORAD ID: 49260),
 - c. MMS (NORAD IDs: 40482-40485).
7. Pixxel is authorized to operate in the 2200-2290 MHz (space-to-Earth) band to conduct TT&C and backup EESS downlinks outside the United States.⁶ The U.S. Table allocates the 2200-2290 MHz, *inter alia*, to space operation services (space-to-Earth) and EESS (space-to-Earth) in all International Telecommunications Union (ITU) regions, but the band is allocated solely for Federal use within the United States (except as provided for in 47 CFR § 2.106(c)(96), (303) (footnotes US96 and US303), which are not applicable here). We authorize Pixxel to operate in this band subject to the laws,

³ See Application, Narrative at 4, n.9.

⁴ The SOS (Earth-to-space) is also allocated on a secondary basis for non-Federal use, but under section 2.106(a), (c)(94)(i) of the Commission's rules, transmissions are restricted to telecommand use for pre-launch testing and space launch operations. 47 CFR § 2.106(a), (c)(94)(i).

⁵ 47 CFR § 2.106(a), (c)(347).

⁶ Pixxel's request for waiver to operate in this band, to the extent necessary, is dismissed as moot.

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regulations and requirements applicable to any such operations in foreign jurisdictions. Pixxel is only permitted to transmit to earth stations outside the United States in the 2200-2290 MHz band subject to any additional restrictions in this grant. Pixxel is required to successfully coordinate with the National Telecommunications and Information Administration (NTIA) prior to submitting any ITU filing involving any earth stations outside of the United States that operate in the 2200-2290 MHz band. NTIA will consider the request by Pixxel for access to the 2200-2290 MHz for ground stations located outside of the US&P on a case-by-case coordinated basis⁷ with electromagnetic compatibility (EMC) analysis to NTIA (ravery@ntia.gov), AFSMO (jimmy.nguyen@us.af.mil), NASA (HQ-SatCoord@mail.nasa.gov) and DOC/NOAA (spectrum.coordinator@noaa.gov) to ensure compatibility of operations with the Federal government.

8. Pixxel's operations in the 2200-2290 MHz band must not exceed the interference protection criteria specified in ITU-R SA.609 and the resulting power flux density levels at the surface of the earth must not exceed the limits in Table 21-4 of the ITU Radio Regulations. Additionally, the resulting unwanted power flux-density levels at the surface of the earth from Pixxel's operations in the 2200-2290 MHz band must not exceed the interference protection criteria for deep-space earth stations in the 2290-2300 MHz as specified in Table 5 of Recommendation ITU-R.1157.
9. Pixxel's request for a waiver of the U.S. Table, 47 CFR § 2.106(a), for space-to-Earth operations in the 8025-8400 MHz band is GRANTED. The 8025-8400 MHz band is allocated to the Earth-exploration satellite service (EESS) (space-to-Earth) on a primary basis, including for non-Federal operations, subject to a case-by-case EMC analysis.⁸ The 8025-8400 MHz band is not allocated for space operations in either the U.S. Table or internationally. We conclude that grant of waiver to permit these operations is in the public interest. Pixxel intends to use this band for image tasking, TT&C, and EESS data downlinks for limited durations while Honeybee-00 is visible to receiving/transmitting earth stations, with one satellite, which is similar to how operations occur in the EESS.⁹ Pixxel states it will not cause harmful interference to other operators and commits to coordinating with other users in the band.¹⁰ Pixxel is authorized for these operations on an unprotected and non-interference basis, and operations pursuant to this authorization must accept interference from and not cause harmful interference to other stations that are operating in the 8025-8400 MHz and adjacent bands in accordance with the U.S. Table.¹¹ Upon receiving a documented report of harmful interference, Pixxel must immediately cease the operation causing the harmful interference until the issue is resolved.
10. Power flux-density limits from operations in the 8025-8400 MHz band must not exceed the limits in No. 22.5 and Table 21-4 of the ITU Radio Regulations. Pixxel must satisfy the protection criteria in Recommendation ITU-R SA.1157 and must follow the guidelines in Recommendation ITU-R SA.1810.¹²
11. In the 8025-8400 MHz band (space-to-Earth), Pixxel must ensure that Honeybee-00 transmissions centered at 8050 MHz are ceased, and no earth station receive operations are permitted, when any of the following occur:

⁷ See Appendix for a list of coordinated earth stations.

⁸ 47 CFR § 2.106(a), (c)(258).

⁹ See Application, Narrative at 4-5.

¹⁰ *Id.*

¹¹ 47 CFR § 2.106(a).

¹² See Application, Technical Annex at 7-8. Pixxel commits to compliance with the interference criteria in ITU-R SA.1157 and ITU-R. SA. 1810 for its X-band operations and intends to use a channel frequency at the lower end of the 8025-8400 MHz band to maximize frequency separation from the protected deep space network (DSN) band.

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- a. The conjunction angle formed by the location 78° 13' 54" N 015° 24' 40" E (angle vertex), the Honeybee-00 spacecraft, and any of the following spacecraft is less than or equal to 5 degrees:
 - ICESat-2 (NORAD ID: 43613),
 - SMAP (NORAD ID: 40376),
 - Landsat-8 (NORAD ID: 39084),
 - Landsat-9 (NORAD ID: 49260),
 - OCO-2 (NORAD ID: 40059),
 - Terra (NORAD ID: 25994).
 - b. The conjunction angle formed by the location 67° 53' 24" N 021° 04' 12" E (angle vertex), the Honeybee-00 spacecraft, and the SWOT (NORAD ID: 54754) spacecraft is less than or equal to 5 degrees; or
 - c. The conjunction angle formed by the location 25° 53' 16" S 027° 41' 10" E (angle vertex), the Honeybee-00 spacecraft, and the SWOT (NORAD ID: 54754) spacecraft is less than or equal to 5 degrees.
12. Pixxel is authorized to use the 400.15-401.00 MHz band for backup TT&C downlinks and for beacon purposes, consistent with the secondary SOS (space-to-Earth) allocation in this band.¹³ Pixxel states that it will only use this band for backup TT&C in the event of off-nominal situations and during initial commissioning, and commits to coordination with other operators in the band, including Federal operators.¹⁴ Due to the secondary status of the non-Federal SOS allocation in the 400.15-401.00 MHz band, Pixxel's operations are authorized on an unprotected, non-interference basis, and Pixxel must accept interference from and not cause harmful interference to other authorized users in the 400.15-401.00 MHz band and adjacent bands that are operating in accordance with the U.S. Table.¹⁵ Upon receiving a documented report of harmful interference, Pixxel must immediately cease the operation causing the harmful interference until the issue is resolved.
13. Pixxel is authorized to use the 402-403 MHz band for backup EESS image tasking and TT&C uplink operations in the event of off-nominal situations.¹⁶ Pixxel's proposed use of the band will be used in limited time and duration, with a duty cycle of less than 0.1 percent.¹⁷ Pixxel states that its operations in the 402-403 MHz band will not exclude other operators from use of the band and will be limited to use

¹³ Application, Narrative at 5-6. The 400.15-401.00 MHz band is allocated internationally and in the United States on a primary basis for the Mobile Satellite Service (MSS) (space-to-Earth) and on a secondary basis for SOS (space-to-Earth) for Federal and non-Federal use. 47 CFR § 2.106(a).

¹⁴ See Application, Narrative at 5. Pixxel states that Honeybee-00 will "use a beacon for a brief period after deployment" to maintain tracking. See Application, Orbital Debris Assessment Report at 9.

¹⁵ 47 CFR § 2.106(a).

¹⁶ Pixxel states that the off-nominal use of the 402.0-403.0 MHz band will primarily be to issue firecodes. Firecodes enable the spacecraft to be rebooted manually from the ground in the event of an anomaly, such as failure of one or more subsystems that leads to non-nominal operations, and any such use of the band would cease once the issue is resolved and the spacecraft returns to nominal operations. See Application, Narrative at 3, n.5. The 402-403 MHz band is allocated, inter alia, to the EESS (Earth-to-space) and meteorological-satellite service (METSAT Service) (Earth-to-space) on a primary basis internationally, but in the U.S. Table, the 402-403 MHz band is allocated, inter alia, to the EESS (Earth-to-space) and METSAT Service (Earth-to-space) on a secondary basis for non-Federal use, with these two non-Federal services limited to earth stations transmitting to Federal satellites. 47 CFR § 2.106(a), (c)(384). Pixxel's request for waiver of the U.S. Table, to the extent necessary, to operate in this band outside of the U.S. is dismissed as moot.

¹⁷ See Application, Technical Annex at 1.

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only at the Lomazzo, Italy earth station.¹⁸ We authorize Pixxel to operate in this band subject to the laws, regulations and requirements applicable to any such operations in foreign jurisdictions. Pixxel is only permitted to transmit from earth stations outside the US&P in the 402-403 MHz band subject to any additional restrictions in this authorization.

14. In the 402-403 MHz band, Pixxel's uplink (Earth-to-space) transmissions from the Lomazzo, Italy and Boden, Sweden earth stations must not exceed a maximum EIRP of 7 dBW (footnote 5.264A).¹⁹
15. To protect NOAA radiosondes operations in the United States, operations in the 400.15-400.00 MHz and 402-403 MHz bands must not exceed the long-term interference criteria limit of -162.4 dBW, as specified in Table 2 (Type C) of Recommendation ITU-R RS.1263-3.
16. Pixxel must provide the FCC and other Federal agencies with the initial orbital parameters of its satellite (e.g., operating altitudes, inclination angle), within 30 days following launch. Notification must be provided to AFSMO (jimmy.nguyen@us.af.mil), NASA (HQ-SatCoord@mail.nasa.gov) and DOC/NOAA (spectrum.coordinator@noaa.gov).
17. Pixxel must maintain a U.S. point of contact available by telephone 24 hours per day, seven days per week, with the authority and ability to terminate operations authorized herein. The telephone number for this U.S. point of contact must be provided to NTIA (ravery@ntia.gov), NASA (HQ-SatCoord@mail.nasa.gov), AFSMO (jimmy.nguyen@us.af.mil), and DOC/NOAA (spectrum.coordinator@noaa.gov).
18. Pixxel's request for waiver of sections 25.156 and 25.157, 47 CFR §§ 25.156, 25.157, which provide for the processing of "NGSO-like satellite systems" under a processing round framework is GRANTED with respect to the 400.15-401.00 MHz band²⁰ and the 2025-2110 MHz, 2200-2990 MHz, and 8025-8400 MHz bands.²¹ Pixxel's spectrum use will be limited in time and location, transmitting while visible to a dedicated earth station in periods less than ten minutes in duration.²² Pixxel is capable of sharing the spectrum on which it proposes to operate and affirms that its operations will not materially constrain future space entrants from using the authorized bands. With respect to the 400.15-401.00 MHz band, Pixxel states that its intended use of the band for space operations on a secondary basis is limited and not mutually exclusive with Mobile Satellite Service (MSS) operations in the band on a long-term basis. Given the opportunity for additional entrants to operate in these bands, as well as the limits on mission duration and frequency use contained in this grant, we find that granting waiver in this instance does not undermine the purpose of the processing round rules.²³
19. Pixxel's request for waiver of the Commission's default service rules under section 47 CFR § 25.217(b) is GRANTED. Pixxel must comply with the technical requirements in Part 25 of the Commission's rules

¹⁸ See Application, Narrative at 7.

¹⁹ 47 CFR § 2.106(b)(264)(i); see Appendix for a coordinated list of earth stations.

²⁰ Application, Narrative at 6. See *Cut-Off Established for Additional NVNG MSS Applications or Petitions for Operations in the 399.9-400.05 MHz and 400.15-401 MHz Bands*, Public Notice, DA 19-779 (rel. Aug. 15, 2019). The Commission established an October 15, 2019 cut-off deadline for requests to operate in the 400.15-401.0 MHz band for MSS.

²¹ Application, Narrative at 6. Pixxel requests processing under section 25.158 of the Commission's rules, 47 CFR § 25.158, which provides for processing of GSO-like satellites under a first-come, first-served framework. We decline to process this application under the first-come, first-served procedures. Since Pixxel is not a GSO satellite and it has indicated it can share spectrum with other operators, it is analogous to other applications for spacecraft communications for which we have granted waiver of the processing round rules without processing under the first-come, first-served procedures. See Pixxel Space Technologies, ICFS File Nos. SAT-LOA-20240523-00110, SAT-AMD-20240808-00175 (granted March 6, 2025).

²² Application, Narrative at 4, Technical Annex at 4.

²³ See DigitalGlobe, Inc., Order and Authorization, 20 FCC Rcd 15696, 15699 (Sat. Div., Int'l Bur. 2005).

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and the power flux-density limits referenced in this grant, which should prevent harmful interference to other operators in the requested bands.

20. We waive, on our own motion and to the extent necessary, the U.S. Table, 47 CFR § 2.106(a), with respect to reception of signals in frequencies used by the Global Positioning System (GPS).²⁴ Pixxel will use passive reception of GPS signals, specifically, GPS L1 (1575.42 MHz), L2 (1227.60 MHz), and L5 (1575.42 MHz), for on-orbit determination and satellite tracking.²⁵ Pixxel's reception in this band is authorized on an unprotected, non-interference basis, and Pixxel must not claim protection from any authorized users of the band operating consistent with the allocation, and must immediately terminate non-conforming operations upon notification of harmful interference.
21. Pixxel's request for waiver of the milestone and bond requirement under 47 CFR §§ 25.164, 25.165 is **GRANTED IN PART**.²⁶ The requirement for Pixxel to post a surety bond in accordance with 47 CFR 25.165(a)(2) is deferred by 150 days, making the bond due a total of 180 days from the date of this authorization.²⁷ Section 25.165 requires that space station licensees post a bond within 30 days of grant of license. A waiver is appropriate only if (1) both special circumstances warrant a deviation from the general rule, and (2) such deviation better serves the public interest. Pixxel states that a waiver is warranted because Pixxel does not seek "exclusive" use of the spectrum and because grant of Pixxel's requested authorization would not preclude other operators from seeking authorization to use the bands proposed by Pixxel. Pixxel is expected to launch within several months of this grant. These factors are sufficient to provide safeguards against warehousing and spectrum resources until the date the bond becomes due, and this partial grant does not undermine the purpose of the rule.
- a. In the event that Honeybee-00 has not been launched, placed into the assigned orbit, and begun operations in accordance with this grant by January 11, 2027, Pixxel must post a surety bond in satisfaction of 47 CFR 25.165(a)(1) and (b) no later than February 8, 2027, and thereafter maintain on file a surety bond requiring payment in the event of a default in an amount, at minimum, determined according to the formula set forth in 47 CFR § 25.165(a)(1).
 - b. Pixxel must launch the Honeybee-00 space station, place it into the assigned orbit, and operate the space station in accordance with this grant no later than August 12, 2032. 47 CFR § 25.164(b).
22. Upon commencement of operations, Pixxel must file a notification within one (1) day certifying to the Commission that the space station has been placed in orbit and indicating whether the operations fully conform to the terms and conditions of this grant. The term of this authorization is six (6) years, commencing at 3 a.m. Eastern Time on the date when Pixxel notifies the Commission that the space station has been placed in its authorized orbit and has begun operating and that operation of the Honeybee-00 spacecraft is compliant with the license terms and conditions.

Licensee/grantee is afforded thirty (30) days from the date of release of this action to decline the grant as conditioned. Failure to respond within this period will constitute formal acceptance of the grant as conditioned.

²⁴ See Application, Technical Annex at 1, N.1.

²⁵ *Id.* at 1, N.1, 18.

²⁶ Application, Narrative at 11.

²⁷ 47 CFR §§ 25.165(a), (b). We note that the Division has typically granted only 60-day extensions (for a total of 90 days) of the Commission's surety bond deadline. However, because licenses are often issued further in advance of launches, primarily due to the increased speed of processing satellite license applications, the Division is granting an extension of 150 days (for a total of 180 days) to post the required bond.

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This action is taken pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 CFR § 0.261, and is effective upon release.

Station licenses are subject to the conditions specified in Section 309(h) of the Communications Act of 1934, as amended, 47 U.S.C. § 309(h).

Action Date:	August 12, 2026
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Term Dates	From: See conditions	To: See conditions
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Approved:

Carolyn A. Mahoney
Acting Chief, Satellite Programs and Policy Division

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Appendix:
Earth Station Locations Coordinated with Federal Agencies²⁸

1. Svalbard, Norway (S, and X)
2. Punta Arenas, Chile (UHF receive, S, and X)
3. Mauritius (UHF receive, S, and X)
4. Kandy, Sri Lanka (UHF receive and S)
5. Santa Maria, Portugal (UHF receive and S)
6. Unst, Scotland (UHF receive and S)
7. Azerbaijan (UHF receive and S)
8. Awarua, New Zealand (UHF receive, S, and X)
9. Inuvik, Canada (UHF receive and S)
10. Jeju, South Korea (UHF receive and S)
11. Hartebeesthoek, South Africa (UHF receive, S, and X)
12. Bulgaria (UHF receive and S)
13. La Paz, Mexico (UHF receive and S)
14. Lomazzo, Italy (UHF only)
15. Boden, Sweden (UHF, S, and X)

²⁸ Application, Exhibit D.