SAT-MOD-20220906-00099

GRANTED IN PART/DEFERRED IN PART

Space Bureau

File # SAT-AMD-20221014-00136

Call Sign (or other identifier) S3042 Grant Date March 13, 2024

Term Dates

From: March 13, 2024 To: see conditions

Approved Merissa L. Velez

Merissa L. Velez

Chief, Satellite Programs and Policy Division

Approved by OMB 3060−0678

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FCC APPLICATION FOR SPACE AND EARTH STATION:MOD OR AMD − MAIN FORM FCC 312 MAIN FORM FOR OFFICIAL USE ONLY	FCC Use Only

APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:

Cluster 7+ Modification

1−8. Legal Name of Applicant

Name:	HawkEye 360, Inc.	**Phone Number:**	571−203−0360
DBA Name:		**Fax Number:**	
Street:	196 Van Buren Street Suite 450	**E−Mail:**	michael.mineiro@he360.com
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Country:	USA	**Zipcode:**	20170 −
Attention:	Mr Michael Mineiro		

ATTACHMENT TO GRANT
HawkEye 360, Inc.
ICFS File Nos. SAT-MOD-20220906-00099, SAT-AMD-20221014-00136

ICFS File No(s):	SAT-MOD-20220906-00099 SAT-AMD-20221014-00136[1]	**GRANTED IN PART/ DEFERRED IN PART** **With Conditions** **International Bureau Satellite Division**
Licensee/Grantee:	HawkEye 360, Inc. (HE360)	
Call Sign:	S3042	
Satellite Name:	HE360 constellation	
Orbital Location: (required station-keeping tolerance)	Non-geostationary satellite orbit (NGSO) constellation with operational apogee and perigee altitudes from 475 to 615 km (nominal 575 km) with near zero eccentricity. Includes 24 satellites with 97-98 degree inclination (near-polar); 30 satellites with 35-50 degree inclination (mid-inclination); and six satellites with 0-28.5 degrees inclination (near equatorial).	
Administration:	United States of America	
Nature of Service:	Earth Exploration Satellite Service (EESS)	
Scope of Grant:	Modification of license for six additional satellites, identified as Clusters 8 and 9, to include technical parameters and rule waivers previously granted for Cluster 7,[2] and expansion of the mid-inclination orbit range to 35-50 degrees. For Cluster 9, the license is also modified to specify: (1) additional antennas capable of receiving signals in the 30-88 MHz and 120-800 MHz band; (2) revised parameters for X-band (8025-8400 MHz) data downlink operations; (3) the addition of L-band inter-satellite links in the 1626.5-1645.5 MHz, 1646.5-1660.5 MHz, 1525-1544 MHz, and 1545-1559 MHz (space-to-space) frequency bands for relay communications with the Inmarsat Broadband Global Access Network (BGAN); and (4) starting with Cluster 9, removal of 2200-2290 MHz operations for emergency telemetry, tracking, and command.	
Previous Grant(s):	Authority to construct, deploy, and operate up to 80 HE360 satellites, limited to 15 operational at any one time, with apogee and perigee altitudes from 500 to 650 km (nominal 575 km) and with inclinations of 97-98 degrees.[3] Satellites will operate in clusters of 3 or 4 satellites. *See* ICFS File No. SAT-LOA-2019102-00001 (grant in part Dec. 10, 2019).	

[1] This application, as amended, was previously granted-in-part, and deferred-in-part. *See* ICFS File Nos. SAT-MOD-20220906-00099, SAT-AMD-20221014-00136, granted-in-part March 3, 2013, reissued March 13, 2023 (*March 2023 Grant Stamp*). In that prior grant, we deferred action on the portions of HE360's application for license modification for deployments beyond "Cluster 7". We defer action at this time regarding modification to the license for satellites deployed in Clusters 10 and after. This grant is also without prejudice to any action taken in connection with HE360's pending further modification request in ICFS File No. SAT-MOD-20230724-00181. On January 17, 2023, Space Exploration Technologies Corp. (SpaceX) filed an *ex parte* letter. Letter from David Goldman, Director of Satellite Policy, SpaceX, to Marlene H. Dortch, Secretary, FCC at 1 (dated Jan. 17, 2023). These issues are fully addressed in the accompanying Order.

[2] *See March 2023 Grant Stamp* (modification of license to specify, for three satellites identified as Cluster 7: (1) additional antennas capable of receiving signals in certain UHF frequencies (250-350 MHz); (2) a change in the authorized satellite operational altitude range from 500-615 km to 475-615 km; and (3) changes in operations due to modification of the satellite propulsion system).

[3] HE360's Constellation was preceded by an experimental earth exploration three-satellite cluster called Pathfinder, which was separately coordinated with federal operators. *See* ELS File No. 0024-EX-CN-2017, as modified 0055-EX-CM-2019. The Pathfinder satellites successfully launched on December 3, 2018 and operational in the 2240 MHz, 2246 MHz, 2256 MHz (space-to-Earth), 432-438 MHz (Earth-to-space), 2410 MHz (space-to-space), and 8050 MHz, 8175 MHz, and 8300 MHz (space-to-Earth) frequency bands. Authorization for continued operations of this first cluster of three Pathfinder satellites under Part 25 of the Commission's rules was included in the prior grant dated December 10, 2019. *See* ICFS File No. SAT-LOA-20190102-00001 (granted-in-part Dec. 10, 2019).

	Modification of license to specify: (1) an additional antenna, beginning with the second cluster, capable of receiving signals transmitted from terrestrial sources (Earth-to-space) in frequency bands used by the Global Positioning System (GPS),[4] for the purpose of detecting terrestrial transmitters that are interfering with GPS signals; and (2) an additional antenna, beginning with the fourth cluster, capable of receiving signals in the 600 MHz to 10 GHz (Earth-to-space) frequency range. *See* ICFS File No. SAT-LOA-20190102-00001 (grant in part Dec. 14, 2020). Modification of license to specify an additional antenna, capable of receiving signals in the 840-960 MHz and 1280-1410 MHz bands, and to reflect the applicant's specification of the "Enpulsion IFM06-02"; both changes beginning with the third cluster or later.[5] *See* ICFS File No. SAT-MOD-20210114-00010 (granted May 25, 2021). Authorization for up to 174 HE360 satellites total,[6] limited to 60 operational at any one time, with apogee and perigee altitudes from 500 to 615 km (nominal 575 km) and with inclinations of 0-28.5, 40-50 and 97-98 degrees. Satellites will operate in clusters of 3 satellites.[7] Modification of license to specify, for three satellites identified as Cluster 7: (1) additional antennas capable of receiving signals in certain UHF frequencies (250-350 MHz); (2) a change in the authorized satellite operational altitude range from 500-615 km to 475-615 km; and (3) use of a water-based propulsion system.
Service Area(s):	Global. *See* Schedule S Tech Report at Item S6.

[4] The antenna is capable of receiving signals in the frequency bands used by the GPS L1, L2, and L5 signals (space-to-Earth), with center frequencies of 1575.42 MHz, 1227.60 MHz, and 1176.45 MHz, but which are being transmitted by non-GPS sources in the Earth-to-space direction. *See* ICFS File No. SAT-AMD-20200728-00090, Letter from Tony Lin, Counsel for Hawkeye360, Inc. to Marlene H. Dortch, Secretary, FCC (Oct. 14, 2020).

[5] *See Policy Branch Information, Satellite Space Applications Actions Taken*, Public Notice, DA 21-630, Report No. SAT-01557 (ICFS File No. SAT−MOD−20210114−00010).

[6] *See* ICFS File No. SAT-LOA-20190102-00001, Letter from Dr. Michael Mineiro, V.P. Legal, Regulatory, and Government Affairs, HawkEye 360, to Samuel Karty, International Bureau, Satellite Policy Branch, FCC (dated Apr. 15, 2022) (requesting a total of 174, rather than 220 satellites, over the term of the license, with plans to operate up to 60 satellites simultaneously). HE360 submitted a letter stating that it has completed pre-coordination for its full constellation with relevant government agencies. *See* ICFS File Nos. SAT-LOA-20190102-00001; SAT-MOD-20210114-00010, Letter from Dr. Michael Mineiro, V.P. Legal, Regulatory, and Government Affairs, HawkEye 360, to Merissa Velez, Chief, Satellite Policy Branch, Satellite Division, FCC (dated Jan. 18, 2022). We had previously deferred action on its application, as requested by HE360, insofar as the application requested authorization of up to 220 satellites, i.e., in excess of 80 satellites. *See* ICFS File No. SAT-LOA-20190102-00001, Letter from Dr. Michael Mineiro, V.P. Legal, Regulatory, and Government Affairs, HawkEye 360, to Stephen Duall, Chief, Satellite Policy Branch, Satellite Division, FCC (dated Dec. 4, 2019).

[7] The application, as amended, was previously granted-in-part, and deferred-in-part. *See Policy Branch Information, Satellite Space Station Applications Actions Taken,* Public Notice, DA No. 19-1268, Report No. SAT-01432 (Dec. 13, 2019); *Policy Branch Information, Satellite Space Applications Actions Taken*, Public Notice, DA No. 20-1502, Report No. SAT-01518 (Dec. 18, 2020) (ICFS File Nos. SAT-LOA-20190102-00001; SAT-AMD-20200728-00090). The portion of HE360's request that had been granted was subsequently modified. *See* ICFS File No. SAT-MOD-20210114-00010 (granted May 25, 2021). The license for HE360's full constellation was granted on October 20, 2022. *See Policy Branch Information, Satellite Space Station Applications Actions Taken,* Public Notice, DA No. 22-1111, Report No. SAT-01676 (Oct. 21, 2022).

Frequencies:[8]

8025-8400 MHz (space-to-Earth) (data downlink):[9,12]

Downlink #1 for satellites 1-60 (20 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
8075.0 MHz	8.0 to 80.0 MHz	8	10	2
8165.0 MHz	8.0 to 80.0 MHz	8	10	2
8255.0 MHz	8.0 to 80.0 MHz	8	10	2

Downlink #2 for satellites 22-60, plus replenishment for satellites 1-21 (20 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
8090.0 MHz (LHCP only)	105.0 MHz	8	10	2
8210.0 MHz (LHCP)	105.0 MHz	8	10	2
8210.0 MHz (RHCP)	105.0 MHz	8	10	2

2025-2110 MHz (Earth-to-space) (data uplink):

Uplink for satellites 1-9 (3 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
2068.2 MHz	1.33 MHz and 2.66 MHz	3	0	0
2062.7 MHz	1.33 MHz and 2.66 MHz	3	0	0

[8] HE360 satellites have antennas capable of receiving in the following bands: 100-182 MHz (VHF Dipole): 382-422 MHz (UHF Dipole): 1090 MHz (ADS-B Patch): 1.6-1.7 GHz (L-band Patch); 2.9-3.1 GHz (S-band Patch): 1.4-7.0 GHz (Molded Button Antenna); 6.0-18.0 GHz (Horn Antenna). Starting with HE360 satellite cluster two, the satellites include antennas capable of receiving signals in the frequency bands used by the GPS L1 (center frequency 1575.42 MHz), L2 (center frequency 1227.60) and L5 (center frequency 1176.45 MHz) signals (GNSS Antenna). Starting with HE360 satellite cluster four, the Molded Button Antenna has been replaced by a Spiral-Backed Antenna capable of receiving in the 600 MHz-10 GHz frequency bands. Starting with HE360 satellites in Cluster 7, the satellites will include antennas capable of receiving signals in the 250-350 MHz frequency band, and the 1090 MHz (ADS-B Patch) antenna will be removed. Starting with HE360 satellites in Cluster 9, the satellites will include additional antennas capable of receiving signals in the 30-88 and 120-800 MHz frequency bands.

[9] Starting with HE360 satellites deployed in Cluster 9, the specifications for this X-band downlink are modified as described in ICFS File Nos. SAT-MOD-20220906-00099 and SAT-AMD-20221014-00136. This includes modifications to the center frequencies. *See* ICFS File No. SAT-AMD-20221014-00136, Narrative at Attachment 2. Except as modified by this grant, the information in this section of the grant document reflects information previously included in what was formerly Appendix A. *See March 2023 Grant Stamp.*

2077.4 MHz	1.33 MHz and 2.66 MHz	3	0	0

Uplink for satellites 10-60, plus replenishments for satellites 1-9 (20 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
2046.5 MHz	1.33 MHz and 2.66 MHz	8	10	2
2049.3 MHz	1.33 MHz and 2.66 MHz	8	10	2
2075.0 MHz	1.33 MHz and 2.66 MHz	8	10	2

Telemetry, Tracking and Command:

8025-8400 MHz (space-to-Earth) (telemetry/tracking):

Downlink for satellites 1-60 (20 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
8291.0 MHz	128 kHz to 4.0 MHz	8	10	2
8297.0 MHz	128 kHz to 4.0 MHz	8	10	2
8303.0 MHz	128 kHz to 4.0 MHz	8	10	2

2200-2290 MHz (space-to-Earth) (emergency backup telemetry/tracking)[16]

Emergency Backup TT&C Downlink for satellites 1-21 (7 clusters of 3 satellites):

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
2242.0 MHz	256 kHz to 4.0 MHz	5	2	0
2254.0 MHz	256 kHz to 4.0 MHz	5	2	0
2260.0 MHz	256 kHz to 4.0 MHz	5	2	0

2025-2110 MHz (Earth-to-space) (command):

Command uplink for satellites 1-15 (5 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
2063.965 MHz	120 kHz and 180 kHz	4	1	0

2064.965 MHz	120 kHz and 180 kHz	4	1	0
2065.965 MHz	120 kHz and 180 kHz	4	1	0

Command uplink for satellites 16-60, plus replenishments for satellites 1-15 (20 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
2052.1 MHz	120 kHz and 180 kHz	8	10	2
2053.0 MHz	120 kHz and 180 kHz	8	10	2
2053.7 MHz	120 kHz and 180 kHz	8	10	2

432-438 MHz (Earth-to-space) (backup command; first cluster launched on December 3, 2018 only)

Inter-satellite links:[10]

First cluster launched on December 3, 2018 only:
2410 MHz (space-to-space)

Cluster 9 and satellites 22-60:
1626.5-1645.5 MHz (transmit) (space-to-space) (inter-satellite link), 200 kHz bandwidth
1646.5-1660.5 MHz (transmit) (space-to-space) (inter-satellite link), 200 kHz bandwidth
1525-1544 MHz (receive) (space-to-space) (inter-satellite link), 200 kHz bandwidth
1545-1559 MHz (receive) (space-to-space) (inter-satellite link), 200 kHz bandwidth

Receive only:

156.7625-156.7875 MHz Automatic Identification System (AIS 3)
156.8125-156.8375 MHz (AIS 4)
161.9625-161.9875 MHz (AIS 1)
162.0125-162.0375 MHz (AIS 2)
406.0-406.1 MHz Emergency Position-Indicating Radiobeacon (EPIRB)
156.5125-156.5375 MHz Digital Selective Calling (DSC)
1087.7-1092.3 MHz ((Earth-to-space) Automatic Dependent Surveillance-Broadcast (ADS-B))
Signals with center frequencies of 1575.42 MHz, 1227.60 MHz, and 1176.45 MHz (Earth-to-space)

[10] HE360 confirms that its terminals operating on the Inmarsat L-band frequencies have an out-of-band EIRP density that complies with the limits listed in Table 8 of ETSI EN 301 473 V2.1.2 and has the additional constraint that the EIRP density will not exceed -45 dBW/30 kHz in the frequency bands lower than 1626.5 MHz. Further, HE360 commits to operating those terminals subject to such limitations. *See* ICFS File Nos. SAT-MOD-20220906-00099 and SAT-AMD-20200728-00090, Letter from Tony Lin, Counsel for Hawkeye360, Inc. to Marlene H. Dortch, Secretary, FCC (Jan. 13, 2023).

Unless otherwise specified herein, operations under this grant must comport with the legal and technical specifications 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:[11]

1. HE360 must prepare the necessary information, as may be required, for submission to the International Telecommunication Union (ITU) to initiate and complete the advance publication, coordination, due diligence, and notification process for these space stations, in accordance with the ITU Radio Regulations. HE360 will be held responsible for all cost-recovery fees associated with ITU filings. No protection from interference caused by radio stations authorized by other administrations is guaranteed unless coordination and notification procedures are timely completed or, with respect to individual administrations, by successfully completing coordination agreements. Any radio station authorization for which coordination has not been completed may be subject to additional terms and conditions as required to effect coordination of the frequency assignments of other administrations. *See* 47 CFR § 25.111(b).

2. Upon receipt of a conjunction warning from the 18th Space Control Squadron or other source, HE360 must review and take all possible steps to assess the collision risk, and mitigate collision risk if necessary. As appropriate, steps to assess and mitigate should include, but are not limited to: contacting the operator of any active spacecraft involved in such warning; sharing ephemeris data and other appropriate operational information with any such operator; modifying spacecraft attitude and/or operations.

3. The number of simultaneously operational satellites must not exceed 60. This number does not include the three Pathfinder satellites launched on December 3, 2018, under grants of experimental authorizations pursuant to Part 5 of the Commission's rules.[12] These three Pathfinder satellites must operate under this Part 25 authorization pursuant to the terms and parameters, including earth station power level agreements and mitigation activities, coordinated with Federal users as part of those grants of experimental licenses.[13]

4. For S-band command uplink operations in the 2025-2110 MHz band, HE360 earth stations must operate a duty cycle of no more than 10% to ensure that the constellation complies with interference criteria contained in Recommendation ITU-R SA. 1155-2.[14]

5. This grant includes authority to deploy and operate technically identical replacement satellites during the term of the license, pursuant to 47 CFR § 25.113(i). Based on information provided by the applicant, the anticipated total number of satellites to be deployed during the license term would be 174. Deployment involving a different satellite bus will require the filing and approval of a license modification request in order to, inter alia, address any differences in debris risks due to changes in the physical characteristics of the spacecraft.[15]

6. HE360 must comply with any new rules adopted by the Commission as a result of the rulemaking in IB Docket No. 18-313.[16]

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[11] With respect to those frequency bands shared with Federal spectrum users, Federal operators have indicated that Federal missions brought into use after issuance of this grant may prevent future modification or renewal.

[12] *See supra* note 4. We note that the total number of simultaneously operational satellites refers specifically to those satellites operating in frequencies other than TT&C frequencies and does not include non-operational satellites that continue to operate in TT&C frequency bands as part of approved post-mission disposal plans.

[13] *See, e.g.,* ELS File No. 0024-EX-CN-2017, as modified 0055-EX-CM-2019.

[14] As noted *supra*, starting with HE360 satellites in Cluster 9, HE360 plans to remove the S-band transmitter used to provide emergency backup, telemetry (2200-2290 MHz).

[15] Deployment of satellites with different propulsion system characteristics, will require grant of a license modification.

[16] *See Mitigation of Orbital Debris in the New Space Age, Notice of Proposed Rulemaking,* FCC 18-159, 33 FCC Rcd 11352 (2018); *Mitigation of Orbital Debris in the New Space Age, Report and Order and Further Notice of Proposed Rulemaking,* FCC 20-54, 35 FCC Rcd 4156 (2020).

7. HE360's space-to-Earth and Earth-to-space operations shall be strictly limited to durations when the HE360 space stations referenced within this license request are visible to the corresponding earth station locations listed in Appendix A of the attachment to this grant, noting the additional restrictions within this grant.

8. We grant, on our own motion, a waiver of the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), to allow non-conforming use of the 2200-2290 MHz band for HE360 to conduct telemetry and tracking,, subject to the condition that HE360 operates on a non-interference basis, accepts any interference from authorized services in these bands, and complies with the other conditions below regarding operations in these bands. HE360 intends to operate TT&C in these frequencies but will not operate in the EESS using this frequency band. The 2200-2290 MHz band is allocated to the space operation (space-to-Earth) and space research (space-to-Earth) services in the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), for federal use only.[17] In this instance we find good cause to waive the Table of Allocations to allow HE360 to operate command links only with its satellites based on HE360's coordination with federal users in the frequency band. Additionally, HE360 shall be aware that non-Federal space-to-Earth transmissions in the 2200-2290 MHz are not permitted to earth stations within the US&P. Based on HE360's coordination with federal users in the frequency band, which should ensure that any authorized federal users are protected from harmful interference, we find good cause to waive the U.S. Table of Frequency Allocations to allow HE360 to operate telemetry and tracking with its satellites in the 2200-2290 MHz band.

9. On our own motion, we grant a waiver of the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), for HE360 to conduct non-Federal space-to-space EESS operations at 2410 MHz with the first HE360 satellite cluster launched on December 3, 2018 only, subject to the condition that operations in this band do not cause harmful interference and that HE360 may not claim protection from interference. The 2400-2417 MHz band, *inter alia*, is allocated to the amateur service on a primary basis in the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), for non-Federal use.

10. On our own motion, we grant a waiver of the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), for HE360 to conduct non-Federal Earth-to-space operations in the 432-438 MHz band, with the first HE360 satellite cluster launched on December 3, 2018 only, subject to the condition that operations in this band do not cause harmful interference and that HE360 may not claim protection from interference. The 432-438 MHz band is allocated to the Earth exploration-satellite service (active) on a secondary basis in the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), (c)(397), for Federal use only.

11. Power flux-density from HE360's operations in the 8025-8400 MHz band must not exceed the limits in No. 22.5 and Table 21-4 of the International Telecommunication Union's Radio Regulations. In addition, power spectral density levels at space research service earth stations from space-to-Earth operations in the 8025-8400 MHz band must not exceed the limits/protection criteria in Recommendation ITU-R SA.1157-1, and the guidelines for systems operating in the 8025-8400 MHz band in Recommendation ITU-R SA.1810 must be followed.

12. Operations pursuant to this license must not cause harmful interference to stations operating in the 2025-2110 MHz band in accordance with the United States Table of Frequency Allocations. *See* 47 CFR § 2.106(a), (c)(347).

13. Transmissions in the 2025-2110 MHz, 8025-8400 MHz, and 2200-2290 MHz bands[18] may only be made to/from earth stations coordinated with federal agencies, including National Aeronautics and Space Administration (NASA), Department of Commerce/National Oceanic and Atmospheric Administration (DOC/NOAA), and the United States Air Force Spectrum Management Office (AFSMO). Any use of Federal ground stations shall be coordinated by HE360's federal government customers with AFSMO (jimmy.nguyen@us.af.mil), NASA (HQ-SatCoord@mail.nasa.gov) and DOC/NOAA (edna.prado@noaa.gov). A list of coordinated non-Federal earth stations is attached as Appendix A. HE360 shall provide the FCC with an updated list of coordinated non-Federal earth stations within ten business days following any changes to that list.[19]

14. Earth-to-space transmissions in the 2025-2110 MHz band to HE360 satellites must be coordinated with the SBE (Society of Broadcast Engineers).

15. Transmissions in the 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.

16. In the 2025-2110 MHz band, HE360 shall comply with the following limitations:

a. The primary uplink (Earth-to-space) emission bandwidths shall be limited to 170 kHz, 1.33 MHz, and 2.66 MHz. All uplink (Earth-to-space) 2.66 MHz emission bandwidth transmissions shall be limited to a duty cycle of no more than 10% per earth station per satellite.

b. All uplink (Earth-to-space) transmissions to HE360 satellites using a center frequency of 2046.5 MHz and emission bandwidth of 1.33 MHz from any earth station located in the Northern hemisphere at latitudes greater than 60 degrees or in the Southern hemisphere at latitudes below 50 degrees (e.g. above 60N or below 50S) shall cease transmissions when the NASA PUNCH satellites (4 total) are within view of the respective earth station.

c. All uplink (Earth-to-space) transmissions using center frequencies of 2064.965 MHz and 2065.965 MHz shall be limited to a duty cycle of less than 4% per earth station per satellite.

d. All uplink (Earth-to-space) transmissions using center frequencies of 2053.0 MHz, 2053.7 MHz, 2077.4 MHz, and 2075.0 MHz shall cease transmissions during the Artemis-IV and later Artemis missions from launch to launch + 48 hours.

17. Power flux-density levels at the surface of the Earth resulting from space-to-Earth operation in the 2200-2290 MHz band must not exceed the limits in Table 21-4 of the ITU Radio Regulations, and the power spectral density levels at space research service earth stations resulting from space-to-Earth operations in the 2200-2290 MHz band must not exceed the protection criteria in Recommendation ITU-R SA.1157-1 and Recommendation ITU-R SA.609-2.

18. All downlink (space-to-Earth) operations in the 2200-2290 MHz band shall be restricted to communication with earth stations identified in Appendix A that are located outside the US&P.[20]

19. In the event a spacecraft emergency requires activation of the emergency backup downlink (space-to-Earth) capability using center frequencies of 2242.0 MHz, 2254.0 MHz, or 2260.0 MHz, HE360 shall immediately notify the NASA JSC Spectrum Management (jsc-dl-spectrum-management@mail.nasa.gov) and Travis Inghram (HQ-SatCoord@mail.nasa.gov). Emergency backup downlink operations in the 2200-2290 MHz band shall be limited to spacecraft emergency situations only, and all other usage is not authorized.

20. All reception must comport with the requirements on unauthorized publication or use of communications in section 705 of the Communications Act of 1934, as amended (47 U.S.C. § 605). This license grant does not constitute an "authorization" with respect to the activities specified in section 705 of the Communications Act or in related provisions of chapter 119, Title 18, United States Code.

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[17] Although there are additional footnote allocations for non-Federal space research, space operations, and EESS, these non-federal allocations are limited to circumstances not relevant to HE360's operations. *See* 47 CFR § 2.106(a)(c)(96) and (c)(303).

[18] As noted *supra*, starting with HE360 satellites in Cluster 9, HE360 plans to remove the S-band transmitter used to provide emergency backup, telemetry downlinks (2200-2290 MHz).

[19] A list of earth stations already coordinated with federal agencies is attached as Appendix A to this grant.

[20] *See also* condition 8.

21. The U.S. Table of Frequency Allocations, Section 2.106(a), is waived with respect to reception of ADS-B signals in the 1087.7-1092.3 MHz frequency band, for satellites through Cluster 8. This band was allocated internationally for the aeronautical mobile-satellite (R) service (AMS(R)S) (Earth-to-space) on a primary basis, at WRC-15, and is limited to the space station reception of ADS-B emissions from aircraft transmitters that operate in accordance with recognized international aeronautical standards. Stations operating in the AMS(R)S shall not claim protection from stations operating in the aeronautical radionavigation service. Resolution 425 (WRC-15) shall apply.[21] Any future protection of ADS-B reception will be governed by the relevant status in the Table of Frequency Allocations and must be in accordance with any subsequent rulemaking proceedings to implement any new domestic allocations or service rules.

22. The U.S. Table of Frequency Allocations, Section 2.106(a), is waived with respect to reception of AIS signals in the 156.7625-156.7875 MHz (AIS 3), 156.8125-156.8375 MHz (AIS 4), 161.9625-161.9875 MHz (AIS 1) and 162.0125-162.0375 MHz (AIS 2).[22] As a condition of this waiver, HE360 must not claim protection for reception of messages in the 156.0125-162.0375 MHz frequency band that is not in accordance with the Table of Frequency Allocations for the pertinent area and may only claim protection to the extent provided by the status of the reception under the Table of Frequency Allocations.

23. HE360 may claim protection for reception in the 156.7625-162.0375 MHz band only to the extent permitted under the U.S. Table of Frequency Allocations for domestic operations or the ITU Radio Regulations for international operations, as of the time of operation. Operations in the 156.7625-162.0375 MHz band must be in accordance with any Commission rulemakings subsequent to the release of this license that implement any new domestic allocations or service rules for these bands.[23]

24. The U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), is waived with respect to reception of the DSC signal in the 156.5125-156.5375 MHz frequency band on a non-conforming, non-harmful interference basis. The 156.5125-156.5375 MHz frequency band is allocated to Maritime Mobile on a primary basis for non-Federal operations and in all ITU Regions.[24] In the United States, there is also limited use of this band by certain grandfathered public safety radio pool licensees.[25] As a condition of this waiver, HE360 must not claim protection for reception of messages in the 156.5125-156.5375 MHz frequency band that is not in accordance with the Table of Frequency Allocations for the pertinent area and may only claim protection to the extent provided by the status of the reception under the Table of Frequency Allocations.

25. The U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), is waived with respect to reception of EPIRB signals in the 406-406.1 MHz frequency band. The 406-406.1 MHz frequency band is allocated for Mobile-Satellite Service (MSS) and is limited to low-power satellite emergency position-indicating radio beacons

[21] We previously found good cause to waive sections 2.102(a) and 2.106 to permit reception of ADS-B messages on an unprotected basis in the United States because doing so will not cause any interference or unreasonably preclude other services, and make the same finding with respect to Cluster 8.

[22] We previously found that the reception of AIS transmissions cannot cause harmful interference, and these transmissions will be present pursuant to existing authorizations using frequencies allocated to other services regardless of whether they are received by a HE360 satellite. We also concluded that the service HE360 proposes will serve the public interest by providing critical near real-time maritime data of interest for both government and commercial users. We make the same findings with respect to Clusters 8 and 9.

[23] *Iridium Order and Authorization*, 31 FCC Rcd at 8689, para. 50.

[24] 47 CFR § 2.106(a), (b)(111), (266), and (c)(52).

[25] 47 CFR § 2.106(a), (c)(266). We found that the reception of DSC transmissions cannot cause harmful interference, and these transmissions will be present pursuant to existing authorizations using frequencies allocated to other services regardless of whether they are received by a HE360 satellite. We also concluded that the service HE360 proposes will serve the public interest by providing near real-time maritime safety data. Exhibit A: Narrative at 44. We make the same findings with respect to Clusters 8 and 9.

(EPIRB).[26] As a condition of this waiver, HE360 must not claim protection for reception of messages in the 406-406.1 MHz frequency band that is not in accordance with the Table of Frequency Allocations for the pertinent area and may only claim protection to the extent provided by the status of the reception under the Table of Frequency Allocations.

26. The U.S. Table of Frequency Allocations, § 2.106(a), is waived, to the extent necessary, with respect to reception of signals transmitted from terrestrial sources (Earth-to-space) in frequency bands used by the Global Positioning System (GPS). The frequency bands used by the GPS are allocated for Space-to-earth transmissions.[27]

27. HE360's request for a waiver of the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a),[28] with respect to reception of inter-satellite signals from the Inmarsat satellite system in the 1525-1544 MHz and 1545-1559 MHz frequency bands is GRANTED, on an unprotected, non-interference basis.[29] Although the allocations in this frequency band do not include a directional indicator for space-to-space communications, reception by the HawkEye satellites of these frequencies will not in any way alter the interference environment, as the received signal will be indistinguishable in its technical characteristics from signals transmitted in the allocated space-to-Earth direction.

28. HE360's request for a waiver of the Table of Frequency Allocations, 47 CFR § 2.106(a), to receive inter-satellite signals from the Inmarsat satellite system in the 1626.5-1645.5 and 1646.5-1660.5 MHz frequency bands on an unprotected, non-interference basis, is GRANTED.[30] Additionally, we grant on our own motion waiver to of the Table of Frequency Allocations, 47 CFR § 2.106(a), to transmit inter-satellite signals to the Inmarsat satellite system in the 1626.5-1645.5 MHz and 1646.5-1660.5 MHz frequency bands on an unprotected, non-interference basis. The allocation for the Mobile-Satellite Service in which the Inmarsat system operates and that encompasses these bands does not include a space-to-space directional indicator. HE360 states that transmission on a non-conforming basis in the L-band frequencies will occur only on frequencies that Inmarsat assigns to the spaceborne Inmarsat BGAN terminals onboard the HE360 spacecraft. HE360 states that transmission on a non-conforming basis in the L-band frequencies will occur only on frequencies that Inmarsat assigns to the spaceborne Inmarsat BGAN terminals onboard the HE360 spacecraft. HE360 notes that these transmissions are approved and supported by Inmarsat and fall within its licensed spectrum.[31] As with its other operations, Inmarsat will assign channels to the spacecraft consistent with its coordination agreements with other operators in the band,

[26] 47 CFR § 2.106(a), (b)(266). We found that the reception of EPIRB transmissions cannot cause harmful interference, and these transmissions will be present pursuant to existing authorizations using frequencies allocated to other services regardless of whether they are received by a HE360 satellite. We also concluded that the service HE360 proposes will serve the public interest by augmenting existing COSPAS-SARSAT architecture used to monitor and geolocate EPIRB distress signals. We make the same findings with respect to Clusters 8 and 9. The SARSAT (Search and Rescue Satellite Aided Tracking) system is operated by NOAA to detect and locate mariners, aviators, and recreational enthusiasts in distress. It uses NOAA satellites in low-earth and geostationary orbit to detect and locate distress signals and relay them from emergency beacons to a network of ground stations and the U.S. Mission Control Center, which processes the signals and alerts appropriate search and rescue authorities. SARSAT is part of the international COSPAS-SARSAT program. *See* http://www.sarsat.noaa.gov.

[27] We found that the reception of transmitted signals from terrestrial sources (Earth-to-space) in frequency bands used by the Global Positioning System (GPS) cannot cause harmful interference to actual GPS (Space-to earth) operations. We make the same findings with respect to Clusters 8 and 9.

[28] We note that waiver of 47 CFR § 25.112(a)(3) is unnecessary as this provision was removed from the Commission's rules effective Jan. 5, 2024. *See Space Innovation; Expediting Initial Processing of Satellite and Earth Station Applications, Report and Order and Further Notice of Proposed Rulemaking*, FCC 23-73 (Sept. 22, 2023) at para. 27; 88 Federal Register 84737 (Dec. 6, 2023).

[29] *See* Legal Narrative at 8-9.

[30] Legal Narrative at 8.

[31] *Id*. at 9.

ensuring that there is no harmful interference between these systems.[32] Inmarsat will maintain the same extent of positive control of HE360's operations as it does for its other L-band users and will thereby be able to address any unlikely interference issues as required by Section 25.287 of the Commission's Rules.

29. HE360 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 also be provided to NTIA (ravery@ntia.doc.gov), DOC/NOAA (edna.prado@noaa.gov), and NASA (HQ-SatCoord@mail.nasa.gov).

30. HE360 shall provide the FCC and other federal agencies the initial orbital parameters (e.g. operating altitudes, inclination angle) for each cluster within 30 days following launch. Notification shall be provided to AFSMO (jimmy.nguyen@us.af.mil), NASA (HQ-SatCoord@mail.nasa.gov) and DOC/NOAA (edna.prado@noaa.gov).

31. Given the opportunity for additional entrants to operate in HE360's requested frequency bands, this grant includes the previously-granted waiver to HE360 of the modified processing round requirements of 47 CFR §§ 25.156 and 25.175.[33]

32. Because HE360 must comply with the technical requirements in Part 2 of the Commission's rules and the above-referenced power flux-density limits, which should prevent harmful interference to other operators in the band, this grant includes the previously-granted waiver of the default service rules in 47 CFR § 25.217(b).[34]

33. This license will become null and void if, at any time during the license term, there are no HE360 satellites operating.

34. In connection with the provision of service in any particular country, HE360 is obliged to comply with the applicable laws, regulations, rules, and licensing procedures of that country

35. HE360's three Pathfinder satellites were successfully launched on December 3, 2018 and are operational. *See* ELS File No. 0024-EX-CN-2017. Authorization for continued operations of the three Pathfinder satellites under Part 25 of the Commission's rules is included in this grant. We find that warehousing concerns are addressed in this situation through the imposition of condition 25 above. Thus, we decline to impose milestone and bond obligations on HE360.

36. HE360 must coordinate physical operations of spacecraft with any operator using similar orbits, for the purposes of eliminating collision risk and minimizing operational impacts. The orbital parameters specified in this grant are subject to change based on such coordination.

37. HE360 must provide a semi-annual report, by January 1 and July 1 each year, covering the preceding six month period, respectively, from June 1 to November 30 and December 1 to May 31. The report should include the following: Number of conjunction events identified for any HE360 system satellites during the reporting period, and the number of events that resulted in an action (maneuver or coordination with another operator), as well as any difficulties encountered in connection with the collision avoidance process and any measures taken to address those difficulties.

HE360 must report any loss of control of HE360 satellites at altitudes above 350 km not less than 10 days following the loss of control.

Based on the information reported, the license may be subject to additional terms and conditions, including additional reporting obligations, limitations on additional deployments, requirements for early removal of satellites from orbit, or any other appropriate conditions to limit collision risk. In the event of HE360 satellite

[32] *Id*.

[33] *See DigitalGlobe, Inc.*, Order and Authorization, 20 FCC Rcd 15696 (Sat. Div., Int'l Bur. 2005) at para. 8.

[34] *Id.*, 20 FCC Rcd at 15702-03, para. 19.

failures resulting in more than 100 post-failure object years, HE360 may not deploy any additional HE360 satellites until the Commission has approved a license modification that includes an updated orbital debris mitigation plan addressing reduction in the failure rate or mitigation of the risk of satellite failures.

38. HE360 must communicate and collaborate with NASA to support safety of both HE360 and NASA assets and to preserve long-term sustainable space-based communications services. HE360 must report on the progress of its communications and collaboration efforts to the Commission in its regular reports specified in condition 27, above. HE360 must coordinate and collaborate with NASA to promote a mutually beneficial space environment that would minimize impacts to NASA's science missions involving astronomy.

39. HE360 must coordinate with NSF to achieve a mutually acceptable agreement to mitigate the impact of its satellites (call sign S3165) on optical ground-based astronomy. HE360 must submit an annual report to the Commission, by January 1st each year covering the preceding year (1) describing whether it has reached a coordination agreement with NSF addressing optical astronomy; and (2) any steps HE360 has taken to reduce the impact of its satellites on optical astronomy. If HE360 provides a statement in the record that NSF has no concerns within 45 days following deployment of the HE360 satellites to approximately 590 km, no further reporting will be required.

40. The license term is 15 years, calculated from the deployment of the three Pathfinder satellites on December 3, 2018 (that is December 3, 2033).

41. Within 30 days after deployment of each satellite pursuant to this license, HE360 must file a notification with the Commission specifying its apogee and perigee altitudes and orbital inclination.

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.

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:	March 13, 2024	
Term Dates	**From:** March 13, 2024	**To:** see conditions

Approved:

Merissa L. Velez

Merissa L. Velez
Chief, Satellite Programs and Policy Division

Appendix A[35]:
HawkEye 360 Earth Stations
Coordinated With Federal Agencies

HawkEye Earth Stations*		
Earth stations	Latitude (N)	Longitude (E)
Svalbard, Norway	78.231	15.390
Tromso, Norway	69.663	18.940
Troll, Antarctica	-72.001	2.526
Punta Arenas, Chile	-52.936	-70.870
Awarua, New Zealand	-46.529	168.381
Hartbeesthoek, South Africa	-25.884	27.884
Long Beach, CA (USA)[36]	34.0	-118.3
Maui, HI (USA) [37]	20.8	-156.5
Athens, Greece	37.845	22.623
Fairbanks, AK (USA)[38]	64.890	-147.529
Inuvik, Canada	68.325	-133.613
Jeju, South Korea	33.541	126.816
Mauritius	-20.501	57.450
Mingenew, Australia	-29.010	115.342
Puertollano, Spain	38.672	-4.162
Peterborough, Australia	-32.962	138.850
Absheron, Azerbaijan	40.466	49.486
Plana, Bulgaria	42.483	23.445
Blonduos, Iceland	65.647	-20.246
Kandy, Sri Lanka	7.274	80.725
Azores, Portugal	36.998	-25.137
Shetland, United Kingdom	60.748	-0.858

* Earth stations are owned and operated by Kongsberg Satellite Services. *See also* ICFS File Nos. SAT-LOA-20190102-00001, Letter from Dr. Michael Mineiro, V.P. Legal, Regulatory, and Government Affairs, HawkEye 360, to Stephen Duall, Chief, Satellite Policy Branch, Satellite Division, FCC (dated Dec. 4, 2019); ICFS File Nos. SAT-LOA-20190102-00001; SAT-MOD-20210114-00010, Letter from Dr. Michael Mineiro, V.P. Legal, Regulatory, and Government Affairs, HawkEye 360, to Merissa Velez, Chief, Satellite Policy Branch, Satellite Division, FCC (dated Jan. 18, 2022); and ICFS File Nos. SAT-LOA-20190102-00001 and SAT-AMD-20200728-00090, Letter from Tony Lin, Counsel for Hawkeye360, Inc. to Marlene H. Dortch, Secretary, FCC (Nov. 15, 2022).

[35] In the prior grant document, this appendix was designated as "Appendix B." *See March 2023 Grant Stamp.*

[36] The Long Beach, CA, USA earth station will not operate in any S-band frequencies.

[37] The HI, USA earth station will only operate S-band frequencies for uplinks only.

[38] The Fairbanks, AK, USA earth station will not operate with S-band downlinks.

9−16. Name of Contact Representative

Name:	Tony Lin	**Phone Number:**	202−799−4450
Company:	DLA Piper LLP US	**Fax Number:**	
Street:	500 8th St., NW	**E−Mail:**	tony.lin@us.dlapiper.com
City:	Washington	**State:**	DC
Country:	USA	**Zipcode:**	20004−
Attention:		**Relationship:**	Legal Counsel

CLASSIFICATION OF FILING

17. Choose the button next to the classification that applies to this filing for both questions a. and b. Choose only one for 17a and only one for 17b. ○ a1. Earth Station ◉ a2. Space Station	(N/A) b1. Application for License of New Station (N/A) b2. Application for Registration of New Domestic Receive−Only Station ○ b3. Amendment to a Pending Application ◉ b4. Modification of License or Registration b5. Assignment of License or Registration b6. Transfer of Control of License or Registration ○ b7. Notification of Minor Modification (N/A) b8. Application for License of New Receive−Only Station Using Non−U.S. Licensed Satellite (N/A) b9. Letter of Intent to Use Non−U.S. Licensed Satellite to Provide Service in the United States (N/A) b10. Other (Please specify) (N/A) b11. Application for Earth Station to Access a Non−U.S.satellite Not Currently Authorized to Provide the Proposed Service in the Proposed Frequencies in the United States (N/A) b12. Application for Database Entry ○ b13. Amendment to a Pending Database Entry Application ○ b14. Modification of Database Entry

17c. Is a fee submitted with this application?

◉ If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R.Section 1.1114).

○ Governmental Entity ○ Noncommercial educational licensee

○ Other(please explain):

17d.

Fee Classification

18. If this filing is in reference to an existing station, enter:	19. If this filing is an amendment to a pending application enter both fields, if this filing is a modification please enter only the file number:	
(a) Call sign of station: S3042	(a) Date pending application was filed:	(b) File number: SATMOD2021011400010

TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Select all that apply:

- [ ] a. Fixed Satellite
- [ ] b. Mobile Satellite
- [ ] c. Radiodetermination Satellite
- [x] d. Earth Exploration Satellite
- [ ] e. Direct to Home Fixed Satellite
- [ ] f. Digital Audio Radio Service
- [x] g. Other (please specify) Radiofrequency Sensing

21. STATUS: Choose the button next to the applicable status. Choose only one.

( ) Common Carrier (•) Non−Common Carrier

22. If earth station applicant, check all that apply.

- [ ] Using U.S. licensed satellites
- [ ] Using Non−U.S. licensed satellites

23. If applicant is providng INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Choose one. Are these facilities:

( ) Connected to a Public Switched Network ( ) Not connected to a Public Switched Network (•) N/A

24. FREQUENCY BAND(S): Place an 'X' in the box(es) next to all applicable frequency band(s).

- [ ] a. C−Band (4/6 GHz)
- [ ] b. Ku−Band (12/14 GHz)
- [x] c.Other (Please specify upper and lower frequencies in MHz.)

Frequency Lower: 2025 Frequency Upper: 8400 (Please specify additional frequencies in an attachment)

TYPE OF STATION

25. CLASS OF STATION: Choose the button next to the class of station that applies. Choose only one.

- ○ a. Fixed Earth Station
- ○ b. Temporary−Fixed Earth Station
- ○ c. 12/14 GHz VSAT Network
- ○ d. Mobile Earth Station
- ○ e. Geostationary Space Station
- ◉ f. Non−Geostationary Space Station
- ○ g. Other (please specify)

26. TYPE OF EARTH STATION FACILITY:

○ Transmit/Receive ○ Transmit−Only ○ Receive−Only ◉ N/A

"For Space Station applications, select N/A."

PURPOSE OF MODIFICATION

27. The purpose of this proposed modification is to: (Place an 'X' in the box(es) next to all that apply.)

- [x] a −− authorization to add new emission designator and related service
- [ ] b −− authorization to change emission designator and related service
- [ ] c −− authorization to increase EIRP and EIRP density
- [x] d −− authorization to replace antenna
- [x] e −− authorization to add antenna
- [ ] f −− authorization to relocate fixed station
- [ ] g −− authorization to change frequency(ies)
- [x] h −− authorization to add frequency
- [ ] i −− authorization to add Points of Communication (satellites & countries)
- [ ] j −− authorization to change Points of Communication (satellites & countries)
- [ ] k −− authorization for facilities for which environmental assessment and radiation hazard reporting is required
- [x] l −− authorization to change orbit location
- [ ] m −− authorization to perform fleet management
- [ ] n −− authorization to extend milestones
- [ ] o −− Other (Please specify)

ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307? If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the Commission's rules, 47 C.F.R. 1.1308 and 1.1311, as an exhibit to this application.A Radiation Hazard Study must accompany all applications for new transmitting facilities, major modifications, or major amendments.	○ Yes ◉ No

ALIEN OWNERSHIP Earth station applicants not proposing to provide broadcast, common carrier, aeronautical en route or aeronautical fixed radio station services are not required to respond to Items 30−34.

29. Is the applicant a foreign government or the representative of any foreign government?	○ Yes ◉ No
30. Is the applicant an alien or the representative of an alien?	○ Yes ◉ No ○ N/A
31. Is the applicant a corporation organized under the laws of any foreign government?	○ Yes ◉ No ○ N/A
32. Is the applicant a corporation of which more than one−fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	○ Yes ◉ No ○ N/A

33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one−fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	○ Yes ◉ No ○ N/A
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as an exhibit an identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.	

BASIC QUALIFICATIONS

35. Does the Applicant request any waivers or exemptions from any of the Commission's Rules? If Yes, attach as an exhibit, copies of the requests for waivers or exceptions with supporting documents.	◉ Yes ○ No
36. Has the applicant or any party to this application or amendment had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as an exhibit, an explination of circumstances.	○ Yes ◉ No

37. Has the applicant, or any party to this application or amendment, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court? If Yes, attach as an exhibit, an explination of circumstances.	○ Yes ◉ No
38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attemptiing unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition?If Yes, attach as an exhibit, an explanation of circumstances	○ Yes ◉ No
39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceding two items? If yes, attach as an exhinit, an explanation of the circumstances.	○ Yes ◉ No
40. If the applicant is a corporation and is applying for a space station license, attach as an exhibit the names, address, and citizenship of those stockholders owning a record and/or voting 10 percent or more of the Filer's voting stock and the percentages so held. In the case of fiduciary control, indicate the beneficiary(ies) or class of beneficiaries. Also list the names and addresses of the officers and directors of the Filer.	

41. By checking Yes, the undersigned certifies, that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti−Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.	◉ Yes ○ No
42a. Does the applicant intend to use a non−U.S. licensed satellite to provide service in the United States? If Yes, answer 42b and attach an exhibit providing the information specified in 47 C.F.R. 25.137, as appropriate. If No, proceed to question 43.	○ Yes ◉ No
42b. What administration has licensed or is in the process of licensing the space station? If no license will be issued, what administration has coordinated or is in the process of coordinating the space station?United States	

43. Description. (Summarize the nature of the application and the services to be provided). (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

```
Applicant seeks authority to modify license to reflect proposed constellation changes
pertaining to Clusters 7 and later.
```

Narrative

43a. Geographic Service Rule Certification

By selecting A, the undersigned certifies that the applicant is not subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25.

◉ A

By selecting B, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will comply with such requirements.

○ B

By selecting C, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will not comply with such requirements because it is not feasible as a technical matter to do so, or that, while technically feasible, such services would require so many compromises in satellite design and operation as to make it economically unreasonable. A narrative description and technical analysis demonstrating this claim are attached.

○ C

CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

44. Applicant is a (an): (Choose the button next to applicable response.)

- ○ Individual
- ○ Unincorporated Association
- ○ Partnership
- ◉ Corporation
- ○ Governmental Entity
- ○ Other (please specify)

45. Name of Person Signing	46. Title of Person Signing
Michael Mineiro	VP Legal, Regulatory, & Government Affairs

-->

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT

The public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. If you have any comments on this burden estimate, or how we can improve the collection and reduce the burden it causes you, please write to the Federal Communications Commission, AMD−PERM, Paperwork Reduction Project (3060−0678), Washington, DC 20554. We will also accept your comments regarding the Paperwork Reduction Act aspects of this collection via the Internet if you send them to PRA@fcc.gov. PLEASE DO NOT SEND COMPLETED FORMS TO THIS ADDRESS.

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THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104−13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.

SAT-MOD-20220906-00099

GRANTED IN PART/DEFERRED IN PART

Space Bureau

File # SAT-AMD-20221014-00136

Call Sign (or other identifier) S3042 Grant Date March 13, 2024

Term Dates

From: March 13, 2024 To: see conditions

Approved Merissa L. Velez

Merissa L. Velez

Chief, Satellite Programs and Policy Division

Approved by OMB 3060−0678

Date & Time Filed: Oct 14 2022 12:28:41:056PM
File Number: SAT−AMD−20221014−00136

FCC APPLICATION FOR SPACE AND EARTH STATION:MOD OR AMD − MAIN FORM FCC 312 MAIN FORM FOR OFFICIAL USE ONLY	FCC Use Only

APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:

X−Band 2 TX and Ground Station Amendment

1−8. Legal Name of Applicant

Name:	HawkEye 360, Inc.	**Phone Number:**	571−203−0360
DBA Name:		**Fax Number:**	
Street:	196 Van Buren Street Suite 450	**E−Mail:**	michael.mineiro@he360.com
City:	Herndon	**State:**	VA
Country:	USA	**Zipcode:**	20170 −
Attention:	Mr Michael Mineiro		

ATTACHMENT TO GRANT
HawkEye 360, Inc.
ICFS File Nos. SAT-MOD-20220906-00099, SAT-AMD-20221014-00136

ICFS File No(s):	SAT-MOD-20220906-00099 SAT-AMD-20221014-00136[1]	**GRANTED IN PART/ DEFERRED IN PART** **With Conditions** **International Bureau Satellite Division**
Licensee/Grantee:	HawkEye 360, Inc. (HE360)	
Call Sign:	S3042	
Satellite Name:	HE360 constellation	
Orbital Location: (required station-keeping tolerance)	Non-geostationary satellite orbit (NGSO) constellation with operational apogee and perigee altitudes from 475 to 615 km (nominal 575 km) with near zero eccentricity. Includes 24 satellites with 97-98 degree inclination (near-polar); 30 satellites with 35-50 degree inclination (mid-inclination); and six satellites with 0-28.5 degrees inclination (near equatorial).	
Administration:	United States of America	
Nature of Service:	Earth Exploration Satellite Service (EESS)	
Scope of Grant:	Modification of license for six additional satellites, identified as Clusters 8 and 9, to include technical parameters and rule waivers previously granted for Cluster 7,[2] and expansion of the mid-inclination orbit range to 35-50 degrees. For Cluster 9, the license is also modified to specify: (1) additional antennas capable of receiving signals in the 30-88 MHz and 120-800 MHz band; (2) revised parameters for X-band (8025-8400 MHz) data downlink operations; (3) the addition of L-band inter-satellite links in the 1626.5-1645.5 MHz, 1646.5-1660.5 MHz, 1525-1544 MHz, and 1545-1559 MHz (space-to-space) frequency bands for relay communications with the Inmarsat Broadband Global Access Network (BGAN); and (4) starting with Cluster 9, removal of 2200-2290 MHz operations for emergency telemetry, tracking, and command.	
Previous Grant(s):	Authority to construct, deploy, and operate up to 80 HE360 satellites, limited to 15 operational at any one time, with apogee and perigee altitudes from 500 to 650 km (nominal 575 km) and with inclinations of 97-98 degrees.[3] Satellites will operate in clusters of 3 or 4 satellites. *See* ICFS File No. SAT-LOA-2019102-00001 (grant in part Dec. 10, 2019).	

[1] This application, as amended, was previously granted-in-part, and deferred-in-part. *See* ICFS File Nos. SAT-MOD-20220906-00099, SAT-AMD-20221014-00136, granted-in-part March 3, 2013, reissued March 13, 2023 (*March 2023 Grant Stamp*). In that prior grant, we deferred action on the portions of HE360's application for license modification for deployments beyond "Cluster 7". We defer action at this time regarding modification to the license for satellites deployed in Clusters 10 and after. This grant is also without prejudice to any action taken in connection with HE360's pending further modification request in ICFS File No. SAT-MOD-20230724-00181. On January 17, 2023, Space Exploration Technologies Corp. (SpaceX) filed an *ex parte* letter. Letter from David Goldman, Director of Satellite Policy, SpaceX, to Marlene H. Dortch, Secretary, FCC at 1 (dated Jan. 17, 2023). These issues are fully addressed in the accompanying Order.

[2] *See March 2023 Grant Stamp* (modification of license to specify, for three satellites identified as Cluster 7: (1) additional antennas capable of receiving signals in certain UHF frequencies (250-350 MHz); (2) a change in the authorized satellite operational altitude range from 500-615 km to 475-615 km; and (3) changes in operations due to modification of the satellite propulsion system).

[3] HE360's Constellation was preceded by an experimental earth exploration three-satellite cluster called Pathfinder, which was separately coordinated with federal operators. *See* ELS File No. 0024-EX-CN-2017, as modified 0055-EX-CM-2019. The Pathfinder satellites successfully launched on December 3, 2018 and operational in the 2240 MHz, 2246 MHz, 2256 MHz (space-to-Earth), 432-438 MHz (Earth-to-space), 2410 MHz (space-to-space), and 8050 MHz, 8175 MHz, and 8300 MHz (space-to-Earth) frequency bands. Authorization for continued operations of this first cluster of three Pathfinder satellites under Part 25 of the Commission's rules was included in the prior grant dated December 10, 2019. *See* ICFS File No. SAT-LOA-20190102-00001 (granted-in-part Dec. 10, 2019).

	Modification of license to specify: (1) an additional antenna, beginning with the second cluster, capable of receiving signals transmitted from terrestrial sources (Earth-to-space) in frequency bands used by the Global Positioning System (GPS),[4] for the purpose of detecting terrestrial transmitters that are interfering with GPS signals; and (2) an additional antenna, beginning with the fourth cluster, capable of receiving signals in the 600 MHz to 10 GHz (Earth-to-space) frequency range. *See* ICFS File No. SAT-LOA-20190102-00001 (grant in part Dec. 14, 2020). Modification of license to specify an additional antenna, capable of receiving signals in the 840-960 MHz and 1280-1410 MHz bands, and to reflect the applicant's specification of the "Enpulsion IFM06-02"; both changes beginning with the third cluster or later.[5] *See* ICFS File No. SAT-MOD-20210114-00010 (granted May 25, 2021). Authorization for up to 174 HE360 satellites total,[6] limited to 60 operational at any one time, with apogee and perigee altitudes from 500 to 615 km (nominal 575 km) and with inclinations of 0-28.5, 40-50 and 97-98 degrees. Satellites will operate in clusters of 3 satellites.[7] Modification of license to specify, for three satellites identified as Cluster 7: (1) additional antennas capable of receiving signals in certain UHF frequencies (250-350 MHz); (2) a change in the authorized satellite operational altitude range from 500-615 km to 475-615 km; and (3) use of a water-based propulsion system.
Service Area(s):	Global. *See* Schedule S Tech Report at Item S6.

[4] The antenna is capable of receiving signals in the frequency bands used by the GPS L1, L2, and L5 signals (space-to-Earth), with center frequencies of 1575.42 MHz, 1227.60 MHz, and 1176.45 MHz, but which are being transmitted by non-GPS sources in the Earth-to-space direction. *See* ICFS File No. SAT-AMD-20200728-00090, Letter from Tony Lin, Counsel for Hawkeye360, Inc. to Marlene H. Dortch, Secretary, FCC (Oct. 14, 2020).

[5] *See Policy Branch Information, Satellite Space Applications Actions Taken*, Public Notice, DA 21-630, Report No. SAT-01557 (ICFS File No. SAT−MOD−20210114−00010).

[6] *See* ICFS File No. SAT-LOA-20190102-00001, Letter from Dr. Michael Mineiro, V.P. Legal, Regulatory, and Government Affairs, HawkEye 360, to Samuel Karty, International Bureau, Satellite Policy Branch, FCC (dated Apr. 15, 2022) (requesting a total of 174, rather than 220 satellites, over the term of the license, with plans to operate up to 60 satellites simultaneously). HE360 submitted a letter stating that it has completed pre-coordination for its full constellation with relevant government agencies. *See* ICFS File Nos. SAT-LOA-20190102-00001; SAT-MOD-20210114-00010, Letter from Dr. Michael Mineiro, V.P. Legal, Regulatory, and Government Affairs, HawkEye 360, to Merissa Velez, Chief, Satellite Policy Branch, Satellite Division, FCC (dated Jan. 18, 2022). We had previously deferred action on its application, as requested by HE360, insofar as the application requested authorization of up to 220 satellites, i.e., in excess of 80 satellites. *See* ICFS File No. SAT-LOA-20190102-00001, Letter from Dr. Michael Mineiro, V.P. Legal, Regulatory, and Government Affairs, HawkEye 360, to Stephen Duall, Chief, Satellite Policy Branch, Satellite Division, FCC (dated Dec. 4, 2019).

[7] The application, as amended, was previously granted-in-part, and deferred-in-part. *See Policy Branch Information, Satellite Space Station Applications Actions Taken,* Public Notice, DA No. 19-1268, Report No. SAT-01432 (Dec. 13, 2019); *Policy Branch Information, Satellite Space Applications Actions Taken*, Public Notice, DA No. 20-1502, Report No. SAT-01518 (Dec. 18, 2020) (ICFS File Nos. SAT-LOA-20190102-00001; SAT-AMD-20200728-00090). The portion of HE360's request that had been granted was subsequently modified. *See* ICFS File No. SAT-MOD-20210114-00010 (granted May 25, 2021). The license for HE360's full constellation was granted on October 20, 2022. *See Policy Branch Information, Satellite Space Station Applications Actions Taken,* Public Notice, DA No. 22-1111, Report No. SAT-01676 (Oct. 21, 2022).

Frequencies:[8]

8025-8400 MHz (space-to-Earth) (data downlink):[9,12]

Downlink #1 for satellites 1-60 (20 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
8075.0 MHz	8.0 to 80.0 MHz	8	10	2
8165.0 MHz	8.0 to 80.0 MHz	8	10	2
8255.0 MHz	8.0 to 80.0 MHz	8	10	2

Downlink #2 for satellites 22-60, plus replenishment for satellites 1-21 (20 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
8090.0 MHz (LHCP only)	105.0 MHz	8	10	2
8210.0 MHz (LHCP)	105.0 MHz	8	10	2
8210.0 MHz (RHCP)	105.0 MHz	8	10	2

2025-2110 MHz (Earth-to-space) (data uplink):

Uplink for satellites 1-9 (3 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
2068.2 MHz	1.33 MHz and 2.66 MHz	3	0	0
2062.7 MHz	1.33 MHz and 2.66 MHz	3	0	0

[8] HE360 satellites have antennas capable of receiving in the following bands: 100-182 MHz (VHF Dipole): 382-422 MHz (UHF Dipole): 1090 MHz (ADS-B Patch): 1.6-1.7 GHz (L-band Patch); 2.9-3.1 GHz (S-band Patch): 1.4-7.0 GHz (Molded Button Antenna); 6.0-18.0 GHz (Horn Antenna). Starting with HE360 satellite cluster two, the satellites include antennas capable of receiving signals in the frequency bands used by the GPS L1 (center frequency 1575.42 MHz), L2 (center frequency 1227.60) and L5 (center frequency 1176.45 MHz) signals (GNSS Antenna). Starting with HE360 satellite cluster four, the Molded Button Antenna has been replaced by a Spiral-Backed Antenna capable of receiving in the 600 MHz-10 GHz frequency bands. Starting with HE360 satellites in Cluster 7, the satellites will include antennas capable of receiving signals in the 250-350 MHz frequency band, and the 1090 MHz (ADS-B Patch) antenna will be removed. Starting with HE360 satellites in Cluster 9, the satellites will include additional antennas capable of receiving signals in the 30-88 and 120-800 MHz frequency bands.

[9] Starting with HE360 satellites deployed in Cluster 9, the specifications for this X-band downlink are modified as described in ICFS File Nos. SAT-MOD-20220906-00099 and SAT-AMD-20221014-00136. This includes modifications to the center frequencies. *See* ICFS File No. SAT-AMD-20221014-00136, Narrative at Attachment 2. Except as modified by this grant, the information in this section of the grant document reflects information previously included in what was formerly Appendix A. *See March 2023 Grant Stamp.*

2077.4 MHz	1.33 MHz and 2.66 MHz	3	0	0

Uplink for satellites 10-60, plus replenishments for satellites 1-9 (20 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
2046.5 MHz	1.33 MHz and 2.66 MHz	8	10	2
2049.3 MHz	1.33 MHz and 2.66 MHz	8	10	2
2075.0 MHz	1.33 MHz and 2.66 MHz	8	10	2

Telemetry, Tracking and Command:

8025-8400 MHz (space-to-Earth) (telemetry/tracking):

Downlink for satellites 1-60 (20 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
8291.0 MHz	128 kHz to 4.0 MHz	8	10	2
8297.0 MHz	128 kHz to 4.0 MHz	8	10	2
8303.0 MHz	128 kHz to 4.0 MHz	8	10	2

2200-2290 MHz (space-to-Earth) (emergency backup telemetry/tracking)[16]

Emergency Backup TT&C Downlink for satellites 1-21 (7 clusters of 3 satellites):

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
2242.0 MHz	256 kHz to 4.0 MHz	5	2	0
2254.0 MHz	256 kHz to 4.0 MHz	5	2	0
2260.0 MHz	256 kHz to 4.0 MHz	5	2	0

2025-2110 MHz (Earth-to-space) (command):

Command uplink for satellites 1-15 (5 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
2063.965 MHz	120 kHz and 180 kHz	4	1	0

2064.965 MHz	120 kHz and 180 kHz	4	1	0
2065.965 MHz	120 kHz and 180 kHz	4	1	0

Command uplink for satellites 16-60, plus replenishments for satellites 1-15 (20 clusters of 3 satellites)

Center Frequencies	Emission Bandwidths	# near-polar Satellites	# mid-inclination Satellites	# near-equatorial Satellites
2052.1 MHz	120 kHz and 180 kHz	8	10	2
2053.0 MHz	120 kHz and 180 kHz	8	10	2
2053.7 MHz	120 kHz and 180 kHz	8	10	2

432-438 MHz (Earth-to-space) (backup command; first cluster launched on December 3, 2018 only)

Inter-satellite links:[10]

First cluster launched on December 3, 2018 only:
2410 MHz (space-to-space)

Cluster 9 and satellites 22-60:
1626.5-1645.5 MHz (transmit) (space-to-space) (inter-satellite link), 200 kHz bandwidth
1646.5-1660.5 MHz (transmit) (space-to-space) (inter-satellite link), 200 kHz bandwidth
1525-1544 MHz (receive) (space-to-space) (inter-satellite link), 200 kHz bandwidth
1545-1559 MHz (receive) (space-to-space) (inter-satellite link), 200 kHz bandwidth

Receive only:

156.7625-156.7875 MHz Automatic Identification System (AIS 3)
156.8125-156.8375 MHz (AIS 4)
161.9625-161.9875 MHz (AIS 1)
162.0125-162.0375 MHz (AIS 2)
406.0-406.1 MHz Emergency Position-Indicating Radiobeacon (EPIRB)
156.5125-156.5375 MHz Digital Selective Calling (DSC)
1087.7-1092.3 MHz ((Earth-to-space) Automatic Dependent Surveillance-Broadcast (ADS-B))
Signals with center frequencies of 1575.42 MHz, 1227.60 MHz, and 1176.45 MHz (Earth-to-space)

[10] HE360 confirms that its terminals operating on the Inmarsat L-band frequencies have an out-of-band EIRP density that complies with the limits listed in Table 8 of ETSI EN 301 473 V2.1.2 and has the additional constraint that the EIRP density will not exceed -45 dBW/30 kHz in the frequency bands lower than 1626.5 MHz. Further, HE360 commits to operating those terminals subject to such limitations. *See* ICFS File Nos. SAT-MOD-20220906-00099 and SAT-AMD-20200728-00090, Letter from Tony Lin, Counsel for Hawkeye360, Inc. to Marlene H. Dortch, Secretary, FCC (Jan. 13, 2023).

Unless otherwise specified herein, operations under this grant must comport with the legal and technical specifications 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:[11]

1. HE360 must prepare the necessary information, as may be required, for submission to the International Telecommunication Union (ITU) to initiate and complete the advance publication, coordination, due diligence, and notification process for these space stations, in accordance with the ITU Radio Regulations. HE360 will be held responsible for all cost-recovery fees associated with ITU filings. No protection from interference caused by radio stations authorized by other administrations is guaranteed unless coordination and notification procedures are timely completed or, with respect to individual administrations, by successfully completing coordination agreements. Any radio station authorization for which coordination has not been completed may be subject to additional terms and conditions as required to effect coordination of the frequency assignments of other administrations. *See* 47 CFR § 25.111(b).

2. Upon receipt of a conjunction warning from the 18th Space Control Squadron or other source, HE360 must review and take all possible steps to assess the collision risk, and mitigate collision risk if necessary. As appropriate, steps to assess and mitigate should include, but are not limited to: contacting the operator of any active spacecraft involved in such warning; sharing ephemeris data and other appropriate operational information with any such operator; modifying spacecraft attitude and/or operations.

3. The number of simultaneously operational satellites must not exceed 60. This number does not include the three Pathfinder satellites launched on December 3, 2018, under grants of experimental authorizations pursuant to Part 5 of the Commission's rules.[12] These three Pathfinder satellites must operate under this Part 25 authorization pursuant to the terms and parameters, including earth station power level agreements and mitigation activities, coordinated with Federal users as part of those grants of experimental licenses.[13]

4. For S-band command uplink operations in the 2025-2110 MHz band, HE360 earth stations must operate a duty cycle of no more than 10% to ensure that the constellation complies with interference criteria contained in Recommendation ITU-R SA. 1155-2.[14]

5. This grant includes authority to deploy and operate technically identical replacement satellites during the term of the license, pursuant to 47 CFR § 25.113(i). Based on information provided by the applicant, the anticipated total number of satellites to be deployed during the license term would be 174. Deployment involving a different satellite bus will require the filing and approval of a license modification request in order to, inter alia, address any differences in debris risks due to changes in the physical characteristics of the spacecraft.[15]

6. HE360 must comply with any new rules adopted by the Commission as a result of the rulemaking in IB Docket No. 18-313.[16]

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[11] With respect to those frequency bands shared with Federal spectrum users, Federal operators have indicated that Federal missions brought into use after issuance of this grant may prevent future modification or renewal.

[12] *See supra* note 4. We note that the total number of simultaneously operational satellites refers specifically to those satellites operating in frequencies other than TT&C frequencies and does not include non-operational satellites that continue to operate in TT&C frequency bands as part of approved post-mission disposal plans.

[13] *See, e.g.,* ELS File No. 0024-EX-CN-2017, as modified 0055-EX-CM-2019.

[14] As noted *supra*, starting with HE360 satellites in Cluster 9, HE360 plans to remove the S-band transmitter used to provide emergency backup, telemetry (2200-2290 MHz).

[15] Deployment of satellites with different propulsion system characteristics, will require grant of a license modification.

[16] *See Mitigation of Orbital Debris in the New Space Age, Notice of Proposed Rulemaking,* FCC 18-159, 33 FCC Rcd 11352 (2018); *Mitigation of Orbital Debris in the New Space Age, Report and Order and Further Notice of Proposed Rulemaking,* FCC 20-54, 35 FCC Rcd 4156 (2020).

7. HE360's space-to-Earth and Earth-to-space operations shall be strictly limited to durations when the HE360 space stations referenced within this license request are visible to the corresponding earth station locations listed in Appendix A of the attachment to this grant, noting the additional restrictions within this grant.

8. We grant, on our own motion, a waiver of the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), to allow non-conforming use of the 2200-2290 MHz band for HE360 to conduct telemetry and tracking,, subject to the condition that HE360 operates on a non-interference basis, accepts any interference from authorized services in these bands, and complies with the other conditions below regarding operations in these bands. HE360 intends to operate TT&C in these frequencies but will not operate in the EESS using this frequency band. The 2200-2290 MHz band is allocated to the space operation (space-to-Earth) and space research (space-to-Earth) services in the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), for federal use only.[17] In this instance we find good cause to waive the Table of Allocations to allow HE360 to operate command links only with its satellites based on HE360's coordination with federal users in the frequency band. Additionally, HE360 shall be aware that non-Federal space-to-Earth transmissions in the 2200-2290 MHz are not permitted to earth stations within the US&P. Based on HE360's coordination with federal users in the frequency band, which should ensure that any authorized federal users are protected from harmful interference, we find good cause to waive the U.S. Table of Frequency Allocations to allow HE360 to operate telemetry and tracking with its satellites in the 2200-2290 MHz band.

9. On our own motion, we grant a waiver of the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), for HE360 to conduct non-Federal space-to-space EESS operations at 2410 MHz with the first HE360 satellite cluster launched on December 3, 2018 only, subject to the condition that operations in this band do not cause harmful interference and that HE360 may not claim protection from interference. The 2400-2417 MHz band, *inter alia*, is allocated to the amateur service on a primary basis in the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), for non-Federal use.

10. On our own motion, we grant a waiver of the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), for HE360 to conduct non-Federal Earth-to-space operations in the 432-438 MHz band, with the first HE360 satellite cluster launched on December 3, 2018 only, subject to the condition that operations in this band do not cause harmful interference and that HE360 may not claim protection from interference. The 432-438 MHz band is allocated to the Earth exploration-satellite service (active) on a secondary basis in the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), (c)(397), for Federal use only.

11. Power flux-density from HE360's operations in the 8025-8400 MHz band must not exceed the limits in No. 22.5 and Table 21-4 of the International Telecommunication Union's Radio Regulations. In addition, power spectral density levels at space research service earth stations from space-to-Earth operations in the 8025-8400 MHz band must not exceed the limits/protection criteria in Recommendation ITU-R SA.1157-1, and the guidelines for systems operating in the 8025-8400 MHz band in Recommendation ITU-R SA.1810 must be followed.

12. Operations pursuant to this license must not cause harmful interference to stations operating in the 2025-2110 MHz band in accordance with the United States Table of Frequency Allocations. *See* 47 CFR § 2.106(a), (c)(347).

13. Transmissions in the 2025-2110 MHz, 8025-8400 MHz, and 2200-2290 MHz bands[18] may only be made to/from earth stations coordinated with federal agencies, including National Aeronautics and Space Administration (NASA), Department of Commerce/National Oceanic and Atmospheric Administration (DOC/NOAA), and the United States Air Force Spectrum Management Office (AFSMO). Any use of Federal ground stations shall be coordinated by HE360's federal government customers with AFSMO (jimmy.nguyen@us.af.mil), NASA (HQ-SatCoord@mail.nasa.gov) and DOC/NOAA (edna.prado@noaa.gov). A list of coordinated non-Federal earth stations is attached as Appendix A. HE360 shall provide the FCC with an updated list of coordinated non-Federal earth stations within ten business days following any changes to that list.[19]

14. Earth-to-space transmissions in the 2025-2110 MHz band to HE360 satellites must be coordinated with the SBE (Society of Broadcast Engineers).

15. Transmissions in the 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.

16. In the 2025-2110 MHz band, HE360 shall comply with the following limitations:

a. The primary uplink (Earth-to-space) emission bandwidths shall be limited to 170 kHz, 1.33 MHz, and 2.66 MHz. All uplink (Earth-to-space) 2.66 MHz emission bandwidth transmissions shall be limited to a duty cycle of no more than 10% per earth station per satellite.

b. All uplink (Earth-to-space) transmissions to HE360 satellites using a center frequency of 2046.5 MHz and emission bandwidth of 1.33 MHz from any earth station located in the Northern hemisphere at latitudes greater than 60 degrees or in the Southern hemisphere at latitudes below 50 degrees (e.g. above 60N or below 50S) shall cease transmissions when the NASA PUNCH satellites (4 total) are within view of the respective earth station.

c. All uplink (Earth-to-space) transmissions using center frequencies of 2064.965 MHz and 2065.965 MHz shall be limited to a duty cycle of less than 4% per earth station per satellite.

d. All uplink (Earth-to-space) transmissions using center frequencies of 2053.0 MHz, 2053.7 MHz, 2077.4 MHz, and 2075.0 MHz shall cease transmissions during the Artemis-IV and later Artemis missions from launch to launch + 48 hours.

17. Power flux-density levels at the surface of the Earth resulting from space-to-Earth operation in the 2200-2290 MHz band must not exceed the limits in Table 21-4 of the ITU Radio Regulations, and the power spectral density levels at space research service earth stations resulting from space-to-Earth operations in the 2200-2290 MHz band must not exceed the protection criteria in Recommendation ITU-R SA.1157-1 and Recommendation ITU-R SA.609-2.

18. All downlink (space-to-Earth) operations in the 2200-2290 MHz band shall be restricted to communication with earth stations identified in Appendix A that are located outside the US&P.[20]

19. In the event a spacecraft emergency requires activation of the emergency backup downlink (space-to-Earth) capability using center frequencies of 2242.0 MHz, 2254.0 MHz, or 2260.0 MHz, HE360 shall immediately notify the NASA JSC Spectrum Management (jsc-dl-spectrum-management@mail.nasa.gov) and Travis Inghram (HQ-SatCoord@mail.nasa.gov). Emergency backup downlink operations in the 2200-2290 MHz band shall be limited to spacecraft emergency situations only, and all other usage is not authorized.

20. All reception must comport with the requirements on unauthorized publication or use of communications in section 705 of the Communications Act of 1934, as amended (47 U.S.C. § 605). This license grant does not constitute an "authorization" with respect to the activities specified in section 705 of the Communications Act or in related provisions of chapter 119, Title 18, United States Code.

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[17] Although there are additional footnote allocations for non-Federal space research, space operations, and EESS, these non-federal allocations are limited to circumstances not relevant to HE360's operations. *See* 47 CFR § 2.106(a)(c)(96) and (c)(303).

[18] As noted *supra*, starting with HE360 satellites in Cluster 9, HE360 plans to remove the S-band transmitter used to provide emergency backup, telemetry downlinks (2200-2290 MHz).

[19] A list of earth stations already coordinated with federal agencies is attached as Appendix A to this grant.

[20] *See also* condition 8.

21. The U.S. Table of Frequency Allocations, Section 2.106(a), is waived with respect to reception of ADS-B signals in the 1087.7-1092.3 MHz frequency band, for satellites through Cluster 8. This band was allocated internationally for the aeronautical mobile-satellite (R) service (AMS(R)S) (Earth-to-space) on a primary basis, at WRC-15, and is limited to the space station reception of ADS-B emissions from aircraft transmitters that operate in accordance with recognized international aeronautical standards. Stations operating in the AMS(R)S shall not claim protection from stations operating in the aeronautical radionavigation service. Resolution 425 (WRC-15) shall apply.[21] Any future protection of ADS-B reception will be governed by the relevant status in the Table of Frequency Allocations and must be in accordance with any subsequent rulemaking proceedings to implement any new domestic allocations or service rules.

22. The U.S. Table of Frequency Allocations, Section 2.106(a), is waived with respect to reception of AIS signals in the 156.7625-156.7875 MHz (AIS 3), 156.8125-156.8375 MHz (AIS 4), 161.9625-161.9875 MHz (AIS 1) and 162.0125-162.0375 MHz (AIS 2).[22] As a condition of this waiver, HE360 must not claim protection for reception of messages in the 156.0125-162.0375 MHz frequency band that is not in accordance with the Table of Frequency Allocations for the pertinent area and may only claim protection to the extent provided by the status of the reception under the Table of Frequency Allocations.

23. HE360 may claim protection for reception in the 156.7625-162.0375 MHz band only to the extent permitted under the U.S. Table of Frequency Allocations for domestic operations or the ITU Radio Regulations for international operations, as of the time of operation. Operations in the 156.7625-162.0375 MHz band must be in accordance with any Commission rulemakings subsequent to the release of this license that implement any new domestic allocations or service rules for these bands.[23]

24. The U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), is waived with respect to reception of the DSC signal in the 156.5125-156.5375 MHz frequency band on a non-conforming, non-harmful interference basis. The 156.5125-156.5375 MHz frequency band is allocated to Maritime Mobile on a primary basis for non-Federal operations and in all ITU Regions.[24] In the United States, there is also limited use of this band by certain grandfathered public safety radio pool licensees.[25] As a condition of this waiver, HE360 must not claim protection for reception of messages in the 156.5125-156.5375 MHz frequency band that is not in accordance with the Table of Frequency Allocations for the pertinent area and may only claim protection to the extent provided by the status of the reception under the Table of Frequency Allocations.

25. The U.S. Table of Frequency Allocations, 47 CFR § 2.106(a), is waived with respect to reception of EPIRB signals in the 406-406.1 MHz frequency band. The 406-406.1 MHz frequency band is allocated for Mobile-Satellite Service (MSS) and is limited to low-power satellite emergency position-indicating radio beacons

[21] We previously found good cause to waive sections 2.102(a) and 2.106 to permit reception of ADS-B messages on an unprotected basis in the United States because doing so will not cause any interference or unreasonably preclude other services, and make the same finding with respect to Cluster 8.

[22] We previously found that the reception of AIS transmissions cannot cause harmful interference, and these transmissions will be present pursuant to existing authorizations using frequencies allocated to other services regardless of whether they are received by a HE360 satellite. We also concluded that the service HE360 proposes will serve the public interest by providing critical near real-time maritime data of interest for both government and commercial users. We make the same findings with respect to Clusters 8 and 9.

[23] *Iridium Order and Authorization*, 31 FCC Rcd at 8689, para. 50.

[24] 47 CFR § 2.106(a), (b)(111), (266), and (c)(52).

[25] 47 CFR § 2.106(a), (c)(266). We found that the reception of DSC transmissions cannot cause harmful interference, and these transmissions will be present pursuant to existing authorizations using frequencies allocated to other services regardless of whether they are received by a HE360 satellite. We also concluded that the service HE360 proposes will serve the public interest by providing near real-time maritime safety data. Exhibit A: Narrative at 44. We make the same findings with respect to Clusters 8 and 9.

(EPIRB).[26] As a condition of this waiver, HE360 must not claim protection for reception of messages in the 406-406.1 MHz frequency band that is not in accordance with the Table of Frequency Allocations for the pertinent area and may only claim protection to the extent provided by the status of the reception under the Table of Frequency Allocations.

26. The U.S. Table of Frequency Allocations, § 2.106(a), is waived, to the extent necessary, with respect to reception of signals transmitted from terrestrial sources (Earth-to-space) in frequency bands used by the Global Positioning System (GPS). The frequency bands used by the GPS are allocated for Space-to-earth transmissions.[27]

27. HE360's request for a waiver of the U.S. Table of Frequency Allocations, 47 CFR § 2.106(a),[28] with respect to reception of inter-satellite signals from the Inmarsat satellite system in the 1525-1544 MHz and 1545-1559 MHz frequency bands is GRANTED, on an unprotected, non-interference basis.[29] Although the allocations in this frequency band do not include a directional indicator for space-to-space communications, reception by the HawkEye satellites of these frequencies will not in any way alter the interference environment, as the received signal will be indistinguishable in its technical characteristics from signals transmitted in the allocated space-to-Earth direction.

28. HE360's request for a waiver of the Table of Frequency Allocations, 47 CFR § 2.106(a), to receive inter-satellite signals from the Inmarsat satellite system in the 1626.5-1645.5 and 1646.5-1660.5 MHz frequency bands on an unprotected, non-interference basis, is GRANTED.[30] Additionally, we grant on our own motion waiver to of the Table of Frequency Allocations, 47 CFR § 2.106(a), to transmit inter-satellite signals to the Inmarsat satellite system in the 1626.5-1645.5 MHz and 1646.5-1660.5 MHz frequency bands on an unprotected, non-interference basis. The allocation for the Mobile-Satellite Service in which the Inmarsat system operates and that encompasses these bands does not include a space-to-space directional indicator. HE360 states that transmission on a non-conforming basis in the L-band frequencies will occur only on frequencies that Inmarsat assigns to the spaceborne Inmarsat BGAN terminals onboard the HE360 spacecraft. HE360 states that transmission on a non-conforming basis in the L-band frequencies will occur only on frequencies that Inmarsat assigns to the spaceborne Inmarsat BGAN terminals onboard the HE360 spacecraft. HE360 notes that these transmissions are approved and supported by Inmarsat and fall within its licensed spectrum.[31] As with its other operations, Inmarsat will assign channels to the spacecraft consistent with its coordination agreements with other operators in the band,

[26] 47 CFR § 2.106(a), (b)(266). We found that the reception of EPIRB transmissions cannot cause harmful interference, and these transmissions will be present pursuant to existing authorizations using frequencies allocated to other services regardless of whether they are received by a HE360 satellite. We also concluded that the service HE360 proposes will serve the public interest by augmenting existing COSPAS-SARSAT architecture used to monitor and geolocate EPIRB distress signals. We make the same findings with respect to Clusters 8 and 9. The SARSAT (Search and Rescue Satellite Aided Tracking) system is operated by NOAA to detect and locate mariners, aviators, and recreational enthusiasts in distress. It uses NOAA satellites in low-earth and geostationary orbit to detect and locate distress signals and relay them from emergency beacons to a network of ground stations and the U.S. Mission Control Center, which processes the signals and alerts appropriate search and rescue authorities. SARSAT is part of the international COSPAS-SARSAT program. *See* http://www.sarsat.noaa.gov.

[27] We found that the reception of transmitted signals from terrestrial sources (Earth-to-space) in frequency bands used by the Global Positioning System (GPS) cannot cause harmful interference to actual GPS (Space-to earth) operations. We make the same findings with respect to Clusters 8 and 9.

[28] We note that waiver of 47 CFR § 25.112(a)(3) is unnecessary as this provision was removed from the Commission's rules effective Jan. 5, 2024. *See Space Innovation; Expediting Initial Processing of Satellite and Earth Station Applications, Report and Order and Further Notice of Proposed Rulemaking*, FCC 23-73 (Sept. 22, 2023) at para. 27; 88 Federal Register 84737 (Dec. 6, 2023).

[29] *See* Legal Narrative at 8-9.

[30] Legal Narrative at 8.

[31] *Id*. at 9.

ensuring that there is no harmful interference between these systems.[32] Inmarsat will maintain the same extent of positive control of HE360's operations as it does for its other L-band users and will thereby be able to address any unlikely interference issues as required by Section 25.287 of the Commission's Rules.

29. HE360 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 also be provided to NTIA (ravery@ntia.doc.gov), DOC/NOAA (edna.prado@noaa.gov), and NASA (HQ-SatCoord@mail.nasa.gov).

30. HE360 shall provide the FCC and other federal agencies the initial orbital parameters (e.g. operating altitudes, inclination angle) for each cluster within 30 days following launch. Notification shall be provided to AFSMO (jimmy.nguyen@us.af.mil), NASA (HQ-SatCoord@mail.nasa.gov) and DOC/NOAA (edna.prado@noaa.gov).

31. Given the opportunity for additional entrants to operate in HE360's requested frequency bands, this grant includes the previously-granted waiver to HE360 of the modified processing round requirements of 47 CFR §§ 25.156 and 25.175.[33]

32. Because HE360 must comply with the technical requirements in Part 2 of the Commission's rules and the above-referenced power flux-density limits, which should prevent harmful interference to other operators in the band, this grant includes the previously-granted waiver of the default service rules in 47 CFR § 25.217(b).[34]

33. This license will become null and void if, at any time during the license term, there are no HE360 satellites operating.

34. In connection with the provision of service in any particular country, HE360 is obliged to comply with the applicable laws, regulations, rules, and licensing procedures of that country

35. HE360's three Pathfinder satellites were successfully launched on December 3, 2018 and are operational. *See* ELS File No. 0024-EX-CN-2017. Authorization for continued operations of the three Pathfinder satellites under Part 25 of the Commission's rules is included in this grant. We find that warehousing concerns are addressed in this situation through the imposition of condition 25 above. Thus, we decline to impose milestone and bond obligations on HE360.

36. HE360 must coordinate physical operations of spacecraft with any operator using similar orbits, for the purposes of eliminating collision risk and minimizing operational impacts. The orbital parameters specified in this grant are subject to change based on such coordination.

37. HE360 must provide a semi-annual report, by January 1 and July 1 each year, covering the preceding six month period, respectively, from June 1 to November 30 and December 1 to May 31. The report should include the following: Number of conjunction events identified for any HE360 system satellites during the reporting period, and the number of events that resulted in an action (maneuver or coordination with another operator), as well as any difficulties encountered in connection with the collision avoidance process and any measures taken to address those difficulties.

HE360 must report any loss of control of HE360 satellites at altitudes above 350 km not less than 10 days following the loss of control.

Based on the information reported, the license may be subject to additional terms and conditions, including additional reporting obligations, limitations on additional deployments, requirements for early removal of satellites from orbit, or any other appropriate conditions to limit collision risk. In the event of HE360 satellite

[32] *Id*.

[33] *See DigitalGlobe, Inc.*, Order and Authorization, 20 FCC Rcd 15696 (Sat. Div., Int'l Bur. 2005) at para. 8.

[34] *Id.*, 20 FCC Rcd at 15702-03, para. 19.

failures resulting in more than 100 post-failure object years, HE360 may not deploy any additional HE360 satellites until the Commission has approved a license modification that includes an updated orbital debris mitigation plan addressing reduction in the failure rate or mitigation of the risk of satellite failures.

38. HE360 must communicate and collaborate with NASA to support safety of both HE360 and NASA assets and to preserve long-term sustainable space-based communications services. HE360 must report on the progress of its communications and collaboration efforts to the Commission in its regular reports specified in condition 27, above. HE360 must coordinate and collaborate with NASA to promote a mutually beneficial space environment that would minimize impacts to NASA's science missions involving astronomy.

39. HE360 must coordinate with NSF to achieve a mutually acceptable agreement to mitigate the impact of its satellites (call sign S3165) on optical ground-based astronomy. HE360 must submit an annual report to the Commission, by January 1st each year covering the preceding year (1) describing whether it has reached a coordination agreement with NSF addressing optical astronomy; and (2) any steps HE360 has taken to reduce the impact of its satellites on optical astronomy. If HE360 provides a statement in the record that NSF has no concerns within 45 days following deployment of the HE360 satellites to approximately 590 km, no further reporting will be required.

40. The license term is 15 years, calculated from the deployment of the three Pathfinder satellites on December 3, 2018 (that is December 3, 2033).

41. Within 30 days after deployment of each satellite pursuant to this license, HE360 must file a notification with the Commission specifying its apogee and perigee altitudes and orbital inclination.

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.

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:	March 13, 2024	
Term Dates	**From:** March 13, 2024	**To:** see conditions

Approved:

Merissa L. Velez

Merissa L. Velez
Chief, Satellite Programs and Policy Division

Appendix A[35]:
HawkEye 360 Earth Stations
Coordinated With Federal Agencies

HawkEye Earth Stations*		
Earth stations	Latitude (N)	Longitude (E)
Svalbard, Norway	78.231	15.390
Tromso, Norway	69.663	18.940
Troll, Antarctica	-72.001	2.526
Punta Arenas, Chile	-52.936	-70.870
Awarua, New Zealand	-46.529	168.381
Hartbeesthoek, South Africa	-25.884	27.884
Long Beach, CA (USA)[36]	34.0	-118.3
Maui, HI (USA) [37]	20.8	-156.5
Athens, Greece	37.845	22.623
Fairbanks, AK (USA)[38]	64.890	-147.529
Inuvik, Canada	68.325	-133.613
Jeju, South Korea	33.541	126.816
Mauritius	-20.501	57.450
Mingenew, Australia	-29.010	115.342
Puertollano, Spain	38.672	-4.162
Peterborough, Australia	-32.962	138.850
Absheron, Azerbaijan	40.466	49.486
Plana, Bulgaria	42.483	23.445
Blonduos, Iceland	65.647	-20.246
Kandy, Sri Lanka	7.274	80.725
Azores, Portugal	36.998	-25.137
Shetland, United Kingdom	60.748	-0.858

* Earth stations are owned and operated by Kongsberg Satellite Services. *See also* ICFS File Nos. SAT-LOA-20190102-00001, Letter from Dr. Michael Mineiro, V.P. Legal, Regulatory, and Government Affairs, HawkEye 360, to Stephen Duall, Chief, Satellite Policy Branch, Satellite Division, FCC (dated Dec. 4, 2019); ICFS File Nos. SAT-LOA-20190102-00001; SAT-MOD-20210114-00010, Letter from Dr. Michael Mineiro, V.P. Legal, Regulatory, and Government Affairs, HawkEye 360, to Merissa Velez, Chief, Satellite Policy Branch, Satellite Division, FCC (dated Jan. 18, 2022); and ICFS File Nos. SAT-LOA-20190102-00001 and SAT-AMD-20200728-00090, Letter from Tony Lin, Counsel for Hawkeye360, Inc. to Marlene H. Dortch, Secretary, FCC (Nov. 15, 2022).

[35] In the prior grant document, this appendix was designated as "Appendix B." *See March 2023 Grant Stamp.*

[36] The Long Beach, CA, USA earth station will not operate in any S-band frequencies.

[37] The HI, USA earth station will only operate S-band frequencies for uplinks only.

[38] The Fairbanks, AK, USA earth station will not operate with S-band downlinks.

9−16. Name of Contact Representative

Name:	Tony Lin	**Phone Number:**	202−799−4450
Company:	DLA Piper	**Fax Number:**	
Street:	500 8th St NW	**E−Mail:**	tony.lin@us.dlapiper.com
City:	Washington	**State:**	DC
Country:	USA	**Zipcode:**	20004−
Attention:		**Relationship:**	Legal Counsel

CLASSIFICATION OF FILING

17. Choose the button next to the classification that applies to this filing for both questions a. and b. Choose only one for 17a and only one for 17b.

- ○ a1. Earth Station
- ◉ a2. Space Station

(N/A) b1. Application for License of New Station
(N/A) b2. Application for Registration of New Domestic Receive−Only Station
◉ b3. Amendment to a Pending Application
○ b4. Modification of License or Registration
b5. Assignment of License or Registration
b6. Transfer of Control of License or Registration
○ b7. Notification of Minor Modification
(N/A) b8. Application for License of New Receive−Only Station Using Non−U.S. Licensed Satellite
(N/A) b9. Letter of Intent to Use Non−U.S. Licensed Satellite to Provide Service in the United States
(N/A) b10. Other (Please specify)
(N/A) b11. Application for Earth Station to Access a Non−U.S.satellite Not Currently Authorized to Provide the Proposed Service in the Proposed Frequencies in the United States
(N/A) b12. Application for Database Entry
○ b13. Amendment to a Pending Database Entry Application
○ b14. Modification of Database Entry

17c. Is a fee submitted with this application?

◉ If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R.Section 1.1114).

○ Governmental Entity ○ Noncommercial educational licensee

○ Other(please explain):

17d.

Fee Classification

18. If this filing is in reference to an existing station, enter:	19. If this filing is an amendment to a pending application enter both fields, if this filing is a modification please enter only the file number:	
(a) Call sign of station: S3042	(a) Date pending application was filed:	(b) File number:
	09/06/2022	SATMOD2022090600099

TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Select all that apply:

- [ ] a. Fixed Satellite
- [ ] b. Mobile Satellite
- [ ] c. Radiodetermination Satellite
- [x] d. Earth Exploration Satellite
- [ ] e. Direct to Home Fixed Satellite
- [ ] f. Digital Audio Radio Service
- [x] g. Other (please specify) Radiofrequency Sensing

21. STATUS: Choose the button next to the applicable status. Choose only one.

( ) Common Carrier (•) Non−Common Carrier

22. If earth station applicant, check all that apply.

- [ ] Using U.S. licensed satellites
- [ ] Using Non−U.S. licensed satellites

23. If applicant is providng INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Choose one. Are these facilities:

( ) Connected to a Public Switched Network ( ) Not connected to a Public Switched Network (•) N/A

24. FREQUENCY BAND(S): Place an 'X' in the box(es) next to all applicable frequency band(s).

- [ ] a. C−Band (4/6 GHz)
- [ ] b. Ku−Band (12/14 GHz)
- [x] c.Other (Please specify upper and lower frequencies in MHz.)

Frequency Lower: 2025 Frequency Upper: 8400 (Please specify additional frequencies in an attachment)

TYPE OF STATION

25. CLASS OF STATION: Choose the button next to the class of station that applies. Choose only one.

- ○ a. Fixed Earth Station
- ○ b. Temporary−Fixed Earth Station
- ○ c. 12/14 GHz VSAT Network
- ○ d. Mobile Earth Station
- ○ e. Geostationary Space Station
- ◉ f. Non−Geostationary Space Station
- ○ g. Other (please specify)

26. TYPE OF EARTH STATION FACILITY:

○ Transmit/Receive ○ Transmit−Only ○ Receive−Only ◉ N/A

"For Space Station applications, select N/A."

PURPOSE OF MODIFICATION

27. The purpose of this proposed modification is to: (Place an 'X' in the box(es) next to all that apply.)

- ☐ a −− authorization to add new emission designator and related service
- ☐ b −− authorization to change emission designator and related service
- ☐ c −− authorization to increase EIRP and EIRP density
- ☐ d −− authorization to replace antenna
- ☐ e −− authorization to add antenna
- ☐ f −− authorization to relocate fixed station
- ☐ g −− authorization to change frequency(ies)
- ☐ h −− authorization to add frequency
- ☐ i −− authorization to add Points of Communication (satellites & countries)
- ☐ j −− authorization to change Points of Communication (satellites & countries)
- ☐ k −− authorization for facilities for which environmental assessment and radiation hazard reporting is required
- ☐ l −− authorization to change orbit location
- ☐ m −− authorization to perform fleet management
- ☐ n −− authorization to extend milestones
- ☐ o −− Other (Please specify)

ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307? If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the Commission's rules, 47 C.F.R. 1.1308 and 1.1311, as an exhibit to this application.A Radiation Hazard Study must accompany all applications for new transmitting facilities, major modifications, or major amendments.	○ Yes ◉ No

ALIEN OWNERSHIP Earth station applicants not proposing to provide broadcast, common carrier, aeronautical en route or aeronautical fixed radio station services are not required to respond to Items 30−34.

29. Is the applicant a foreign government or the representative of any foreign government?	○ Yes ◉ No
30. Is the applicant an alien or the representative of an alien?	○ Yes ◉ No ○ N/A
31. Is the applicant a corporation organized under the laws of any foreign government?	○ Yes ◉ No ○ N/A
32. Is the applicant a corporation of which more than one−fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	○ Yes ◉ No ○ N/A

33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one−fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	○ Yes ◉ No ○ N/A
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as an exhibit an identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.	

BASIC QUALIFICATIONS

35. Does the Applicant request any waivers or exemptions from any of the Commission's Rules? If Yes, attach as an exhibit, copies of the requests for waivers or exceptions with supporting documents.	○ Yes ◉ No
36. Has the applicant or any party to this application or amendment had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as an exhibit, an explination of circumstances.	○ Yes ◉ No

37. Has the applicant, or any party to this application or amendment, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court? If Yes, attach as an exhibit, an explination of circumstances.	○ Yes ◉ No
38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attemptiing unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition?If Yes, attach as an exhibit, an explanation of circumstances	○ Yes ◉ No
39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceding two items? If yes, attach as an exhinit, an explanation of the circumstances.	○ Yes ◉ No
40. If the applicant is a corporation and is applying for a space station license, attach as an exhibit the names, address, and citizenship of those stockholders owning a record and/or voting 10 percent or more of the Filer's voting stock and the percentages so held. In the case of fiduciary control, indicate the beneficiary(ies) or class of beneficiaries. Also list the names and addresses of the officers and directors of the Filer.	

41. By checking Yes, the undersigned certifies, that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti−Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.	◉ Yes ○ No
42a. Does the applicant intend to use a non−U.S. licensed satellite to provide service in the United States? If Yes, answer 42b and attach an exhibit providing the information specified in 47 C.F.R. 25.137, as appropriate. If No, proceed to question 43.	○ Yes ◉ No
42b. What administration has licensed or is in the process of licensing the space station? If no license will be issued, what administration has coordinated or is in the process of coordinating the space station?United States	

43. Description. (Summarize the nature of the application and the services to be provided). (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

```
Applicant amends the modification application SAT−MOD−20220906−00099 to update
communications links and update earth stations.
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Amendment Narrative

43a. Geographic Service Rule Certification

By selecting A, the undersigned certifies that the applicant is not subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25.

◉ A

By selecting B, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will comply with such requirements.

○ B

By selecting C, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will not comply with such requirements because it is not feasible as a technical matter to do so, or that, while technically feasible, such services would require so many compromises in satellite design and operation as to make it economically unreasonable. A narrative description and technical analysis demonstrating this claim are attached.

○ C

CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

44. Applicant is a (an): (Choose the button next to applicable response.)

- ○ Individual
- ○ Unincorporated Association
- ○ Partnership
- ◉ Corporation
- ○ Governmental Entity
- ○ Other (please specify)

45. Name of Person Signing	46. Title of Person Signing
Michael Mineiro	VP Legal, Regulatory, & Government Affairs

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WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

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