14 November 2019

Via IBFS

Marlene H. Dortch
Secretary, Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: IBFS File No. SES-STA-20191112-01480

Dear Ms. Dortch:

Swarm Technologies, Inc. ("Swarm") hereby attaches a Corrected Narrative and Corrected Form 312 in support of its request for special temporary authority ("STA") to operate a gateway earth station in Mountain View, California. The original Narrative inadvertently referenced a fifth antenna that Swarm seeks to operate at its other proposed gateway locations, but not in Mountain View at this time. That reference has been removed and reflects the only change made to the Corrected Narrative. The original Form 312 was a draft version of the final Form 312 filed as part of the underlying license application. The final Form 312, as filed, is enclosed herein.

The substance of Swarm's request—to operate the Mountain View gateway under an STA with the same technical characteristics set forth in the pending application (*see* SES-LIC-20190806-01029)—remains entirely unchanged.

Please contact me if you have any questions.

Respectfully submitted,

/s/
Kalpak Gude
General Counsel, Head of Regulatory, and Compliance Officer
Swarm Technologies, Inc.

+1-202-630-3848
kalpak@swarm.space

CORRECTED NARRATIVE

REQUEST FOR SPECIAL TEMPORARY AUTHORITY

Swarm Technologies, Inc. ("Swarm"), pursuant to Section 25.120 of the Commission's rules, hereby requests Special Temporary Authority ("STA") to operate its gateway earth station to communicate with the first satellites launched as part of its planned 150 satellite non-geostationary orbit ("NGSO") constellation.

Swarm currently has an application pending for a VHF gateway earth station located in Mountain View, CA (Public Notice released on October 15, 2019).[1] Swarm would operate the earth station under an STA with the technical characteristics set forth in the application. The gateway earth station will operate on frequencies in the 148-149.95 MHz (uplink) and 137- 138 MHz (downlink) bands, consistent with Swarm's space station authorization.

This request is supported by good cause. Swarm seeks authority to communicate with the Swarm NGSO satellites to conduct in-orbit testing after launch. This will allow Swarm to confirm the operational status of its satellites beginning immediately after orbital insertion. Accordingly, the STA will serve the public interest by promoting the health and safety of Swarm's NGSO constellation and thereby enhancing space safety.

Swarm will operate on a non-interference basis. As set forth in the underlying earth station application, the gateway will protect terrestrial and space systems in shared spectrum bands consistent with FCC rules.

The first set of Swarm satellites is scheduled to be launched in late December 2019. Accordingly, Swarm requests that the Commission issue an STA structured to begin on the launch date and remain in force for up to 60 days.

For convenience, below is supplemental information that was included in the narrative of the gateway license application.

Frequencies and Emissions

To supplement the information provided in the Form 312, Main Form and Schedule B, additional information regarding the operating frequencies and emission characteristics of Swarm's proposed earth station is provided below.

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[1] The IBFS file number for this earth station application is SES-LIC-20190806-01029. The application contains all relevant operational characteristics and is hereby incorporated herein to the extent necessary.

Frequencies

A complete listing of the requested frequencies on which Swarm's earth station will transmit and receive is provided in Table 1. These frequencies are identical to those requested in Swarm's Part 25 application for the corresponding 150-satellite system.[2]

Table 1. Frequencies on which Swarm's earth station will transmit and receive.

Lower Frequency (MHz)	Upper Frequency (MHz)	Transmit or Receive Mode	Nature of Service
137.0250	137.1750	Receive	NVNG MSS
137.3275	137.3750	Receive	NVNG MSS
137.4725	137.5350	Receive	NVNG MSS
137.5850	137.6500	Receive	NVNG MSS
137.8125	138.0000	Receive	NVNG MSS
148.2500	148.5850	Transmit	NVNG MSS
148.6350	148.7500	Transmit	NVNG MSS
149.9000	149.9500	Transmit	NVNG MSS

As described in Swarm's space station application, Swarm does not propose to designate exclusive feeder uplink and downlink channels within its requested frequency assignment.[3] Instead, customer data will be transferred between Swarm's earth station and satellites on the uplink and downlink frequencies shown in Table 1. Similarly, Swarm does not propose to designate channels exclusively for TT&C purposes.[4] TT&C operations will be conducted on channels within the uplink and downlink frequencies shown in Table 1.[5]

Emission Characteristics

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[2] *Id.*
[3] *Id. at 8.*
[4] *Id.*
[5] Pursuant to 47 C.F.R. §25.202(g)(1), Swarm's telemetry, tracking, and command signals cause no greater interference and require no greater protection from harmful interference than communications traffic on the Swarm network, and therefore may be transmitted in frequencies that are not at a band edge.

Swarm's proposed earth station will operate on channels within the uplink and downlink frequencies provided in Table 1. The earth station will only transmit on a single channel at any given time. Both the Swarm satellites and earth station are capable of operating with a variety of emissions designators, and Swarm may vary, within the range specified in this application, the bandwidth of channels on which the earth station transmits and receives to best serve customer and network needs and maximize spectral efficiency. Consistent with 47 C.F.R. § 25.275, Swarm specifies in Schedule B only those carriers with the highest Effective Isotropic Radiated Power ("EIRP") density, narrowest bandwidth, and largest bandwidth, and will transmit using emissions not specifically listed only if doing so would "not exceed the highest EIRP, EIRP density, and bandwidth prescribed for any listed emission."[6] For completeness, information regarding the characteristics of additional emissions designators and their corresponding power, EIRP, and EIRP density levels is provided in Table 2 below. In each case, the assigned bandwidth includes an appropriate frequency allowance to account for Doppler shift and frequency tolerance. Emissions specified in Schedule B are highlighted in blue and define the maximum bandwidth, EIRP, and EIRP density with which the earth station will transmit.

Table 2. Potential bandwidths, power levels, and EIRP levels for earth station transmissions.[7]

Emission Designator	Necessary Bandwidth (kHz)	Assigned Bandwidth (kHz)	Power Level (W)	Max EIRP (dBW)	Max EIRP Density (dBW/4kHz)
7K80F1D	7.8	16.0	10.0	21.0	18.1
10K4F1D	10.4	20.0	10.0	21.0	16.9
15K6F1D	15.6	24.0	10.0	21.0	15.1
20K8F1D	20.8	30.0	10.0	21.0	13.8

[6] 47 C.F.R. § 25.275(c).

[7] To provide an upper bound on the maximum EIRP and EIRP density levels, the values provided in Table 2 were calculated using the maximum antenna gain of 11.0 dBi. As described in the accompanying Form 312 Schedule B, the proposed earth station will be transmit using one of four antennas with gain values of 2.0 dBi, 5.5 dBi, 0.0 dBi, and 11.0 dBi. Only one antenna will transmit at any given time.

31K3F1D	31.3	40.0	10.0	21.0	12.1
41K7F1D	41.7	50.0	10.0	21.0	10.8
62K5F1D	62.5	72.0	10.0	21.0	9.1
125KF1D	125.0	134.0	10.0	21.0	6.1
250KF1D	250.0	259.0	10.0	21.0	3.0

Half-Power Beam Width (47 C.F.R. § 25.130(f))

Swarm's gateway earth station will transmit using one of the four antennas whose specifications are provided in the accompanying Form 312 Schedule B. The half-power beam widths for the antennas are as follows:

Antenna ID	**Model**	**Maximum Gain (dBi)**	**Half-Power Beam Width (°)**
W1/2	001	2.0	29.0
COLINEAR	002	5.5	32.0
QFH	003	0.0	104.0
YAGI	004	11.0	52.0

Out-of-Band Emissions (47 C.F.R. § 25.202(f))

Figures 1-3 below show the channels on which the proposed gateway earth station will transmit. As discussed previously, the earth station will only transmit on a single channel at any given time. As shown, the spectrum masks for Swarm earth station emissions comply with the limits set forth in Section 25.202(f) of the Commission's rules.[8]

[8] Figures 1-3 reflect Swarm's nominal initial plan for transmissions, which consists of channels with a necessary bandwidth of 20.8 kHz and an assigned bandwidth of 30.0 kHz to account for Doppler shift and frequency tolerance. Transmissions using alternative emissions designators (see Table 2) will also comply with the emissions mask requirements shown for each frequency band.

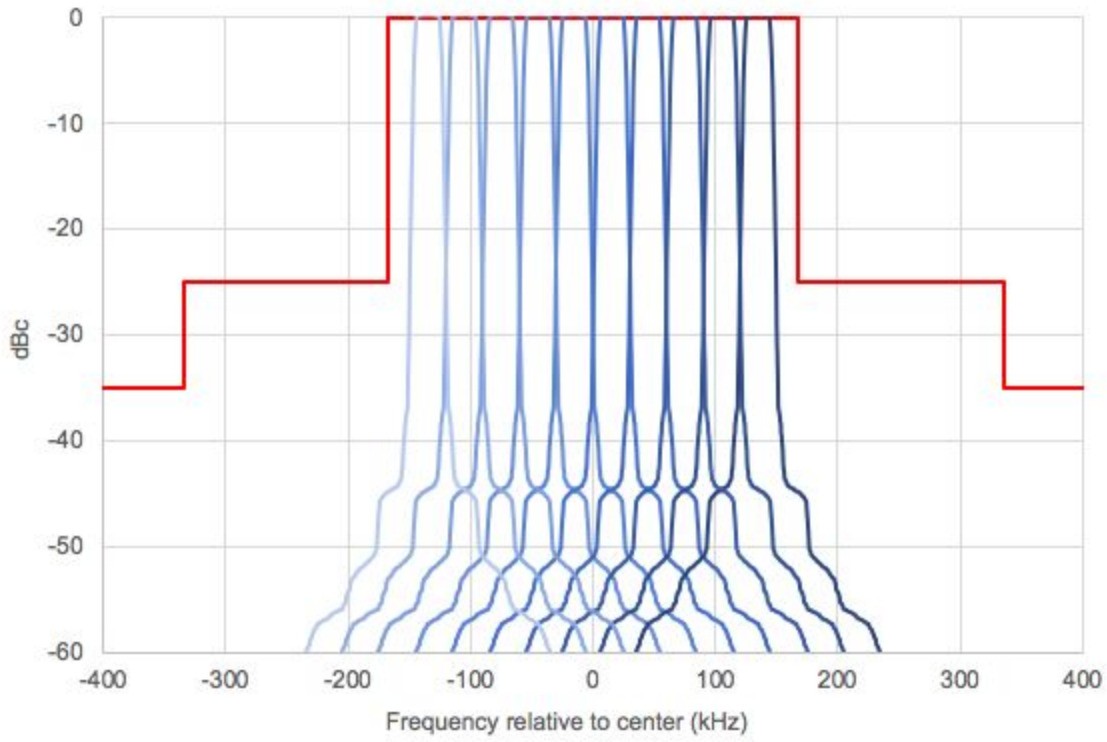

Figure 1. Emission mask for the 148.250-148.585 MHz band.

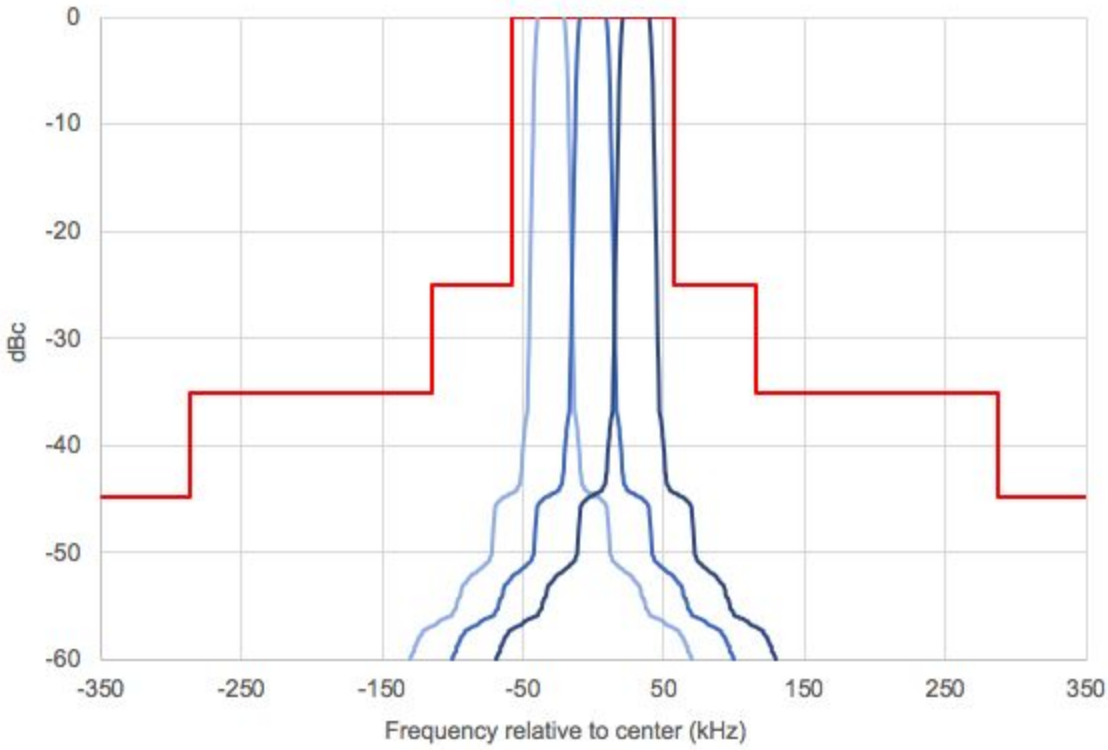

Figure 2. Emission mask for the 148.635-148.750 MHz band.

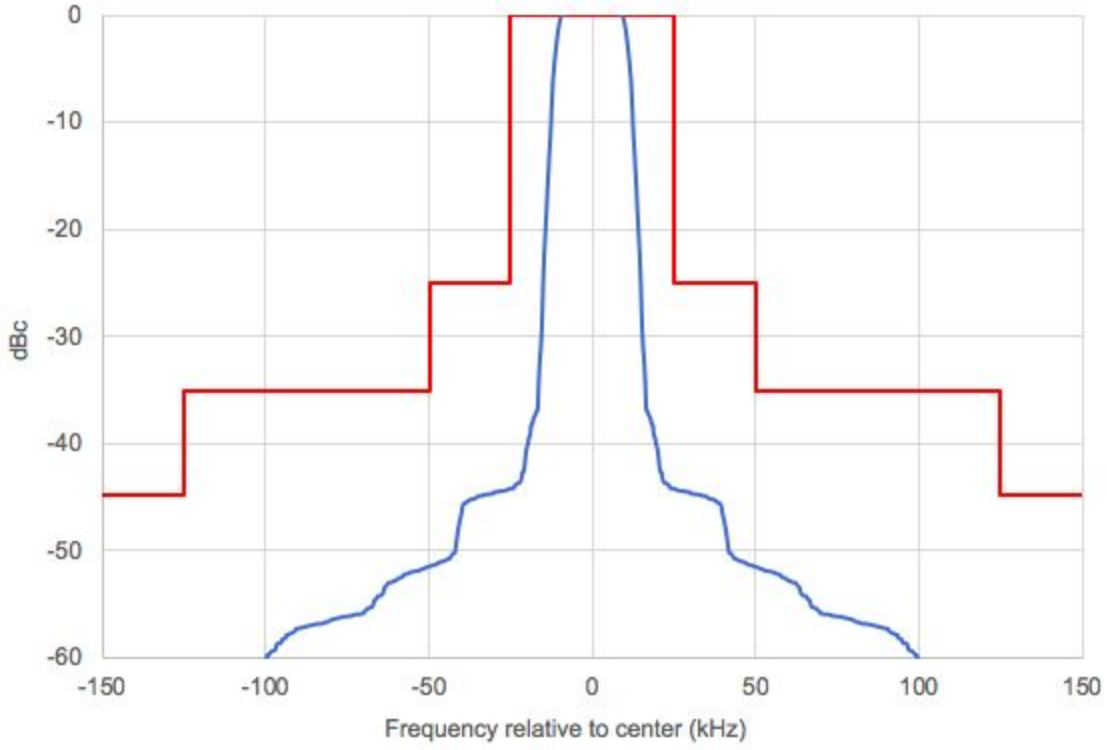

Figure 3. Emission mask for the 149.000-149.950 MHz band.

Frequency Tolerance (47 C.F.R. § 25.202(d))

The carrier frequency of the earth station will be maintained within 0.001% of the reference frequency as required by Section 25.202(d) of the Commission's rules.

Minimum Antenna Elevation Angle. (47 C.F.R. § 25.205(a))

The Swarm earth station antennas will not transmit at elevation angles less than five degrees, measured from the horizontal plane to the direction of maximum radiation.

Respectfully submitted,

Swarm Technologies, Inc.

By: _*/s/ Kalpak Gude*_____
Kalpak Gude
General Counsel

Dr. Sara Spangelo
Chief Executive Officer

Swarm Technologies Inc.
845 Madonna Way
Los Altos, CA 94024

CORRECTED FORM 312

Approved by OMB
3060−0678

Date & Time Filed: Aug 6 2019 9:37:46:503AM
File Number: SES−LIC−INTR2019−02901
Callsign/Satellite ID:

APPLICATION FOR EARTH STATION AUTHORIZATIONS 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:
Swarm Mountain View Gateway Earth Station Application

1−8. Legal Name of Applicant

Name:	Swarm Technologies, Inc.	**Phone Number:**	425−753−3349
DBA Name:		**Fax Number:**	
Street:	845 Madonna Way	**E−Mail:**	sophie@swarm.space
City:	Los Altos	**State:**	CA
Country:	USA	**Zipcode:**	94024 −
Attention:	Dr. Sophie Arlow		

9−16. Name of Contact Representative

Name:	Kalpak Gude	**Phone Number:**	202−437−4484
Company:	Swarm Technologies, Inc.	**Fax Number:**	
Street:	845 Madonna Way	**E−Mail:**	kalpak@swarm.space
City:	Los Altos	**State:**	CA
Country:	USA	**Zipcode:**	94024−
Attention:	Kalpak Gude	**Relationship:**	Same

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.	b.
a. ◉ a1. Earth Station (N/A) a2. Space Station	◉ b1. Application for License of New Station ○ b2. Application for Registration of New Domestic Receive−Only Station (N/A) b3. Amendment to a Pending Application (N/A) b4. Modification of License or Registration (N/A) b5. Assignment of License or Registration (N/A) b6. Transfer of Control of License or Registration (N/A) 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 ○ b10. Other (Please specify) ○ 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. ○ b12. Application for Database Entry (N/A) b13. Amendment to a Pending Database Entry Application (N/A) b14. Modifiction 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 BAX − Fixed Satellite Transmit/Receive Earth Station

18. If this filing is in reference to an existing station, enter: (a) Call sign of station: Not Applicable	19. If this filing is an amendment to a pending application enter: (a) Date pending application was filed: Not Applicable (b) File number of pending application: Not Applicable

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
- ☐ d. Earth Exploration Satellite
- ☐ e. Direct to Home Fixed Satellite
- ☐ f. Digital Audio Radio Service
- ☐ g. Other (please specify)

21. STATUS: Choose the button next to the applicable status. Choose only one.	22. If earth station applicant, check all that apply.
○ Common Carrier ◉ Non−Common Carrier	☒ 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)

☒ c.Other (Please specify upper and lower frequencies in MHz.)

Frequency Lower: 137.00 Frequency Upper: 149.95

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

(N/A) e. Geostationary Space Station

(N/A) f. Non−Geostationary Space Station

○ g. Other (please specify)

26. TYPE OF EARTH STATION FACILITY: Choose only one.

◉ Transmit/Receive ○ Transmit−Only ○ Receive−Only ○ 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.)

Not Applicable

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 RadHaz Report

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 Question 36

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?

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.)

Swarm seeks authority for a new gateway earth station located in Mountain View, CA to communicate with its non−geostationary, non−voice mobile−satellite service system.

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
Dr. Sara Spangelo	CEO

47. Please supply any need attachments.

Attachment 1:	Attachment 2:	Attachment 3:

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).

SATELLITE EARTH STATION AUTHORIZATIONS
FCC Form 312 − Schedule B:(Technical and Operational Description)
FOR OFFICIAL USE ONLY

Location of Earth Station Site

E1: Site Identifier:	Mtn View Gateway	E5. Call Sign:		
E2: Contact Name	Benjamin Longmier	E6. Phone Number:	608−225−3173	
E3. Street:	435 N Whisman Rd Ste 100	E7. City:	Mountain View	
		E8. County:	Santa Clara	
E4. State	CA	E9. Zip Code	94043	
E10. Area of Operation:		Mountain View, CA		
E11. Latitude:	37 °24 ’3.6 "N			
E12. Longitude:	122 °3 ’26.0 "W			
E13. Lat/Lon Coordinates are:		○ NAD−27	◉ NAD−83	○ N/A
E14. Site Elevation (AMSL):		16.0 meters		

E15. If the proposed antenna(s) operate in the Fixed Satellite Service (FSS) with geostationary satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a) and (b) as demonstrated by the manufacturer's qualification measurement? If NO, provide as a technical analysis showing compliance with two−degree spacing policy.	○ Yes ○ No ◉ N/A
E16. If the proposed antenna(s) do not operate in the Fixed Satellite Service (FSS), or if they operate in the Fixed Satellite Service (FSS) with non−geostationary satellites, do(es) the proposed antenna(s) comply with the antenna gain patterns specified in Section 25.209(a2) and (b) as demonstrated by the manufacturer's qualification measurements?	○ Yes ○ No ◉ N/A
E17. Is the facility operated by remote control? If YES, provide the location and telephone number of the control point.	○ Yes ◉ No

E18. Is frequency coordination required? If YES, attach a frequency coordination report as	○ Yes ◉ No
E19. Is coordination with another country required? If YES, attach the name of the country(ies) and plot of coordination contours as	○ Yes ◉ No
E20. FAA Notification − (See 47 CFR Part 17 and 47 CFR part 25.113(c)) Where FAA notification is required, have you attached a copy of a completed FCC Form 854 and or the FAA's study regarding the potential hazard of the structure to aviation? FAILURE TO COMPLY WITH 47 CFR PARTS 17 AND 25 WILL RESULT IN THE RETURN OF THIS APPLICATION.	○ Yes ◉ No

POINTS OF COMMUNICATION

Satellite Name:OTHER | OTHER |	If you selected OTHER, please enter the following:

E21. Common Name: Swarm 1	E22. ITU Name: USASAT−NGSO−7
E23. Orbit Location: NGSO	E24. Country: USA

POINTS OF COMMUNICATION (Destination Points)

E25. Site Identifier: Mtn View Gateway	
E26. Common Name:	E27. Country:USA

ANTENNA

Site ID	**E28. Antenna Id**	**E29. Quantity**	**E30. Manufacturer**	**E31. Model**	**E32. Antenna Size<meters>**	**E41/42. Antenna GainTransmint and/or Recieve (____dBi at _____GHz)**
Mtn View Gateway	W1/2	1	Swarm	001	1.1	2.0 dBi at 0.138
						2.0 dBi at 0.148
	COLINEAR			002	3.0	5.5 dBi at 0.138
						5.5 dBi at 0.148
	QFH			003	1.6	0.0 dBi at 0.138
						0.0 dBi at 0.148
	YAGI			004	1.7	11.0 dBi at 0.138
						11.0 dBi at 0.148

E28. Antenna Id	E33/34. Diameter Minor/Major (meters)	E35. Above Ground Level (meters)	E36. Above Sea Level (meters)	E37. Building Height Above Ground Level (meters)	E38. Total Input Power at antenna flange (Watts)	E39. Maximum Antenna Height Above Rooftop (meters)	E40. Total EIRP for al carriers (dBW)
W1/2	0.0/0.0	7.1	23.1	6.0	10.0	1.1	12.0
COLINEAR	0.0/0.0	9.0	25.0	6.0	10.0	3.0	15.5
QFH	0.0/0.0	7.6	23.6	6.0	10.0	1.6	10.0
YAGI	0.0/0.0	7.7	23.7	6.0	10.0	1.7	21.0

FREQUENCY

E28. Antenna Id	E43/44. Frequency Bands (MHz)	E45. T/R Mode	E46. Antenna Polarization(H,V, L,R)	E47. Emission Designator	E48. Maximum EIRP per Carrier (dBW)	E49. Maximum ERIP Density per Carrier (dBW/4kHz)
W1/2	137 138	R	Vertical	125KF1D	0.0	0.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

```
FSK / data (non-voice)
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W1/2	137 138	R	Vertical	7K80F1D	0.0	0.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non-voice)

W1/2	148	149.95	T	Vertical	250KF1D	12.0	−6.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non-voice)

W1/2	148	149.95	T	Vertical	7K80F1D	12.0	9.1

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non-voice)

COLINEAR	137	138	R	Vertical	125KF1D	0.0	0.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non−voice)

COLINEAR	137	138	R	Vertical	7K80F1D	0.0	0.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non−voice)

COLINEAR	148	149.95	T	Vertical	250KF1D	15.5	−2.5

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non−voice)

COLINEAR	148	149.95	T	Vertical	7K80F1D	15.5	12.6

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non−voice)

QFH	137	138	R	Left Hand Circular	125KF1D	0.0	0.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non−voice)

QFH	137	138	R	Left Hand Circular	7K80F1D	0.0	0.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non−voice)

QFH	148	149.95	T	Left Hand Circular	250KF1D	10.0	−8.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non-voice)

QFH	148	149.95	T	Left Hand Circular	7K80F1D	10.0	7.1

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non-voice)

YAGI	137	138	R	Vertical	125KF1D	0.0	0.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non-voice)

YAGI	137	138	R	Vertical	7K80F1D	0.0	0.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non-voice)

YAGI	148	149.95	T	Vertical	250KF1D	21.0	3.0

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non-voice)

YAGI	148	149.95	T	Vertical	7K80F1D	21.0	18.1

E50. Modulation and Services (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

FSK / data (non-voice)

FREQUENCY COORDINATION

E28. Antenna Id	**E51. Satellite Orbit Type**	**E52/53. Frequency Limits(MHz)**	**E54/55. Range of Satellite Arc E/W Limit**	**E56. Earth Station Azimuth Angle Eastern Limit**	**E57. Antenna Elevation Angle Eastern Limit**	**E58. Earth Station Azimuth Angle Western Limit**	**E59. Antenna Elevation Angle Western Limit**	**E60. Maximum EIRP Density toward the Horizon (dBW/4kHz)**
W1/2	Non−Geostationary	137 138	0.0/ 0.0	0.0	5.0	0.0	5.0	0.0
	Non−Geostationary	148 149.95	0.0/ 0.0	0.0	5.0	0.0	5.0	−39.9
COLINEAR	Non−Geostationary	137 138	0.0/ 0.0	0.0	5.0	0.0	5.0	0.0
	Non−Geostationary	148 149.95	0.0/ 0.0	0.0	5.0	0.0	5.0	−44.9
QFH	Non−Geostationary	137 138	0.0/ 0.0	0.0	5.0	0.0	5.0	0.0
	Non−Geostationary	148 149.95	0.0/ 0.0	0.0	5.0	0.0	5.0	−35.9
YAGI	Non−Geostationary	137 138	0.0/ 0.0	0.0	5.0	0.0	5.0	0.0

	Non−Geostationary	148 149.95	0.0/ 0.0	0.0	5.0	0.0	5.0	−47.9

REMOTE CONTROL POINT LOCATION

E61. Call Sign NOTE: Please enter the callsign of the controlling station, not the callsign for which this application is being filed.		E65. Phone Number	
E62. Street Address			
E63. City	E67. County	E64/68. State/Country /	E66. Zip Code

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