

Date & Time Filed: Apr 23 2018 4:58:07:650PM
File Number: SES-LIC-INTR2018-01030
Callsign/Satellite ID:

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| APPLICATION FOR EARTH STATION AUTHORIZATIONS | FCC Use Only |
| FCC 312 MAIN FORM FOR OFFICIAL USE ONLY | |

APPLICANT INFORMATION

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

MIT Lincoln MBTT System

| | | | |
|------------------------------|------------------------|----------------------|----------------------|
| 1-8. Legal Name of Applicant | | | |
| Name: | MIT Lincoln Laboratory | Phone Number: | 781-981-7689 |
| DBA Name: | | Fax Number: | 781-981-0189 |
| Street: | 244 Wood St. | E-Mail: | Fischetti@LL.MIT.EDU |
| City: | Lexington | State: | MA |
| Country: | USA | Zipcode: | 02420 - |
| Attention: | Mr Joseph Fischetti | | |

9-16. Name of Contact Representative

| | | | |
|-------------------|------------------------|----------------------|--------------------|
| Name: | John Pineau | Phone Number: | 781-981-2109 |
| Company: | MIT Lincoln Laboratory | Fax Number: | 781-981-0785 |
| Street: | 244 Wood St. | E-Mail: | jpineau@ll.mit.edu |
| City: | Lexington | State: | MA |
| Country: | USA | Zipcode: | 02420- |
| Attention: | John Pineau | Relationship: | Engineer |

CLASSIFICATION OF FILING

| | |
|--|---|
| <p>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.</p> <p>a.</p> <p><input checked="" type="radio"/> a1. Earth Station (N/A) a2. Space Station</p> | <p>b.</p> <p><input checked="" type="radio"/> b1. Application for License of New Station</p> <p><input type="radio"/> 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</p> <p><input type="radio"/> b10. Other (Please specify)</p> <p><input type="radio"/> 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.</p> <p><input type="radio"/> b12. Application for Database Entry (N/A) b13. Amendment to a Pending Database Entry Application (N/A) b14. Modifiction of Database Entry</p> |
| <p>17c. Is a fee submitted with this application?</p> <p><input checked="" type="radio"/> If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R.Section 1.1114).</p> <p><input type="radio"/> Governmental Entity <input type="radio"/> Noncommercial educational licensee</p> <p><input type="radio"/> Other(please explain):</p> | |
| <p>17d.</p> <p>Fee Classification BAX – Fixed Satellite Transmit/Receive Earth Station</p> | |

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

TYPE OF SERVICE

| | |
|---|---|
| <p>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:</p> | |
| <p><input checked="" type="checkbox"/> a. Fixed Satellite</p> <p><input type="checkbox"/> b. Mobile Satellite</p> <p><input type="checkbox"/> c. Radiodetermination Satellite</p> <p><input type="checkbox"/> d. Earth Exploration Satellite</p> <p><input type="checkbox"/> e. Direct to Home Fixed Satellite</p> <p><input type="checkbox"/> f. Digital Audio Radio Service</p> <p><input type="checkbox"/> g. Other (please specify)</p> | |
| <p>21. STATUS: Choose the button next to the applicable status. Choose only one.</p> <p><input type="radio"/> Common Carrier <input checked="" type="radio"/> Non-Common Carrier</p> | <p>22. If earth station applicant, check all that apply.</p> <p><input checked="" type="checkbox"/> Using U.S. licensed satellites</p> <p><input type="checkbox"/> Using Non-U.S. licensed satellites</p> |
| <p>23. If applicant is providing INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Choose one. Are these facilities:</p> <p><input type="radio"/> Connected to a Public Switched Network <input type="radio"/> Not connected to a Public Switched Network <input checked="" type="radio"/> N/A</p> | |

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: Frequency Upper:

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

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 explanation 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 explanation 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 attempting 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 exhibit, 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.)

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

This antenna system will be used to demonstrate technologies for use with the PTW (Protected Tactical Waveform. over commercial satellites. The Laboratory is prototyping a new network architecture for protected SATCOM featuring flexible interconnection with user networks over commercial satellites.

MBTT System

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 Joseph Fischetti | 46. Title of Person Signing Radio Frequency Coordinator |
|--|--|

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: | MIT Lincoln Lab MBTT | E5: Call Sign: | |
| E2: Contact Name | John Pineau | E6: Phone Number: | 781-981-2109 |
| E3: Street: | 244 Wood St. | E7: City: | Lexington |
| | | E8: County: | Middlesex |
| E4: State | MA | E9: Zip Code | 02420 |
| E10: Area of Operation: | Lexington, MA | | |
| E11: Latitude: | 42 °27 '29.0 "N | | |
| E12: Longitude: | 71 °15 '58.0 "W | | |
| E13: Lat/Lon Coordinates are: | <input type="radio"/> NAD-27 | <input checked="" type="radio"/> NAD-83 | <input type="radio"/> N/A |
| E14: Site Elevation (AMSL): | 80.0 meters | | |

| | |
|---|--|
| <p>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.</p> | <p><input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A</p> |
| <p>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?</p> | <p><input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> N/A</p> |
| <p>E17. Is the facility operated by remote control? If YES, provide the location and telephone number of the control point.</p> | <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p> |

| | |
|---|--|
| <p>E18. Is frequency coordination required? If YES, attach a frequency coordination report as</p> | <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p> |
| <p>E19. Is coordination with another country required? If YES, attach the name of the country(ies) and plot of coordination contours as</p> | <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p> |
| <p>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.</p> | <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p> |

POINTS OF COMMUNICATION

| |
|--|
| <p>Satellite Name: PERMITTED LIST If you selected OTHER, please enter the following:</p> |
|--|

| | |
|----------------------|----------------|
| E21. Common Name: | E22. ITU Name: |
| E23. Orbit Location: | E24. Country: |

POINTS OF COMMUNICATION (Destination Points)

| | |
|--|-------------------|
| E25. Site Identifier: MIT Lincoln Lab MBTT | |
| 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) |
|----------------------|-----------------|---------------|-------------------|------------|---------------------------|---|
| MIT Lincoln Lab MBTT | MBTT-Ku | 1 | General Dynamics | Ku Feed | 6.3 | 55.0 dBi at 12 |
| | | | | | | 56.5 dBi at 14.25 |
| | | | | | | 56.5 dBi at 14.25 |
| | MBTT-Ka | | | Ka Feed | | 59.3 dBi at 19.7 |
| | | | | | | 62.9 dBi at 29.5 |

| 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) |
|-----------------|---------------------------------------|--------------------------------------|-----------------------------------|--|--|--|---|
| | | | | | | | |

| | | | | | | | |
|---------|---------|------|------|------|-------|------|------|
| MBTT-Ku | 6.3/6.3 | 14.0 | 80.0 | 16.0 | 100.0 | 20.0 | 76.5 |
| MBTT-Ka | 6.3/6.3 | 14.0 | 80.0 | 16.0 | 100.0 | 20.0 | 82.9 |

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) |
|------------------------|--------------------------------------|----------------------|--|---------------------------------|--|---|
| MBTT-Ku | 11700 12200 | R | Horizontal and Vertical | 500MF1D | 76.5 | 58.5 |

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.)

QPSK, 8PSK, FEC Rates 8/9 to 1/12, various rates 312 Kbps to 135Mbps

| | | | | | | |
|---------|----------------|---|-------------------------|---------|------|------|
| MBTT-Ku | 14000 14500 | T | Horizontal and Vertical | 500MF1D | 76.5 | 58.5 |
|---------|----------------|---|-------------------------|---------|------|------|

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.)

QPSK, 8PSK, FEC Rates 8/9 to 1/12, various rates 312 Kbps to 135Mbps

| | | | | | | |
|---------|----------------|---|-------------------------|---------|------|------|
| MBTT-Ka | 19200 20200 | R | Left and Right Circular | 1G00F1D | 82.9 | 64.9 |
|---------|----------------|---|-------------------------|---------|------|------|

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.)

QPSK, 8PSK, FEC Rates 8/9 to 1/12, various rates 312 Kbps to 135Mbps

| | | | | | | |
|---------|----------------|---|----------------------------|---------|------|------|
| MBTT-Ka | 29000 30000 | T | Left and Right Circular | 1G00F1D | 82.9 | 64.9 |
|---------|----------------|---|----------------------------|---------|------|------|

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.)

QPSK, 8PSK, FEC Rates 8/9 to 1/12, various rates 312 Kbps to 135Mbps

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) |
|----------------------------|--------------------------------------|--|---|---|---|---|---|--|
| MBTT-Ku | Geostationary | 11700 12200 | 8.0/ 138.0 | 105.0 | 5.0 | 255.0 | 5.0 | -6.0 |
| MBTT-Ka | Geostationary | 19200 30000 | 8.0/ 138.0 | 105.0 | 5.0 | 255.0 | 5.0 | -0.9 |

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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