

S2912 SAT-AMD-20171025-00144 IB2017003055
Planet Labs Inc.
Flock



File # SAT-AMD-20171025-00144

Call Sign S2912 Grant Date 12/08/17

(or other identifier)

From 12/08/17 Term Dates see conditions To: conditions

Approved: *Stephen J. Duall*

Stephen J. Duall
Chief, Satellite Policy Branch

Approved by OMB
3060-0678

Date & Time Filed: Oct 25 2017 6:49:46:463PM
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FCC APPLICATION FOR SPACE AND EARTH STATION:MOD OR AMD – MAIN FORM	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:
Amendment to Flock Mod 4

1-8. Legal Name of Applicant

Name:	Planet Labs Inc.	Phone Number:	202-827-5152
DBA Name:		Fax Number:	
Street:	346 9th St.	E-Mail:	craig@planet.com
City:	San Francisco	State:	CA
Country:	USA	Zipcode:	94103 -
Attention:	Mr Rich Leshner		

ATTACHMENT TO GRANT

Planet Labs Inc.

IBFS File No. SAT-MOD-20170713-00103; SAT-AMD-20171025-00144; SAT-AMD-20171106-00151

IBFS File No(s):	SAT-MOD-20170713-00103; SAT-AMD-20171025-00144; SAT-AMD-20171106-00151	GRANTED IN PART – With Conditions DEFERRED IN PART  International Bureau Satellite Division
Licensee/Grantee:	Planet Labs Inc.	
Call Sign:	S2912	
Satellite Name:	Flock	
Orbital Location: (required station-keeping tolerance)	NGSO at altitudes between 350 km and 720 km (see scope of grant below)	
Administration:	United States of America	
Nature of Service:	Earth Exploration Satellite Service; Space Operations	
Scope of Grant:	Authority to construct, deploy, and operate a constellation of up to 544 technically identical non-geostationary satellites as follows:¹ • 12 Flock 2p satellites deployed at 505 km with an inclination of 97.51° by the PSLV launch vehicle; • 529 satellites initially deployed to orbital apogee altitudes of no greater than 660 kilometers; • 3 satellites for purposes of a propulsion demonstration, deployed to orbital apogee altitudes of approximately 550 kilometers. Action is deferred on Planet Lab's other requests in IBFS File No. SAT-MOD-20170713-00103. No action is taken on Planet Lab's requests in IBFS File No. SAT-AMD-20171106-00151.²	
Previous Grant(s):	SAT-MOD-20150802-00053 (granted in part, deferred in part Sept. 15, 2016); SAT-MOD-20140912-00100 (granted Oct. 23, 2014) SAT-MOD-20140321-00032 (granted June 18, 2014) SAT-LOA-20130626-00087 (granted Dec. 3, 2013)	
Service Area(s):	Global. See Schedule S Tech Report at Item S6 (SAT-MOD-20150802-00053)	
Frequencies:	8025-8400 (space-to-Earth) (remote sensing data) Telemetry, Tracking, and Command frequencies: 2025-2110 MHz (Earth-to-space) (command) 8025-8400 (space-to-Earth) (telemetry) 401-402 MHz (space-to-Earth) and 449.75-450.25 MHz (Earth-to-space) (early-phase and emergency-backup, as well as ranging and orbit determination on a non-emergency basis)	

¹ This grant is separate from grants for 55 satellites launched prior to June 15, 2016. See IBFS File Nos. SAT-LOA-20130626-00087 (granted December 3, 2013), SAT-MOD-20140321-00032 (granted June 18, 2014), and SAT-MOD-20140912-00100 (granted October 23, 2014).

² IBFS File No. SAT-AMD-20171106-00151 was accepted for filing on December 1, 2017, and the 30-day comment period expires on December 31, 2017.

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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 Federal Communication Commission's rules not waived herein. This grant is also subject to the following conditions:

1. Planet Labs 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. Planet Labs shall 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 with the frequency assignments of other administrations. *See* 47 CFR § 25.111(b).
2. Upon receipt of a conjunction warning from the JSpOC or other source, Planet Labs must review the warning and take all possible steps to assess and, if necessary, to mitigate collision risk, including, but 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 200.
4. No more than 120 satellites may be deployed to orbits that exceed an apogee altitude of 500 kilometers.
5. Deployment into an orbit with an inclination of 51.6 degrees, plus or minus 0.1 degree, at an altitude above the ISS, is not authorized by this grant.
6. Planet Labs shall tune TT&C UHF links to an agreed frequency range with NOAA as soon as possible to minimize interference to NOAA GOES Data Collection System (DCS), and radiosonde operations and continue to work closely with NOAA to identify and implement any further measures needed to avoid RFI to the systems mentioned earlier. This initial tuning would be an interim frequency range for Planet Labs to use for upcoming launches. For future mission planning, transition out of 401-406 MHz to avoid interference to DCS and radiosondes is recommended. Planet Labs and NOAA shall work jointly to explore future mitigation strategies to avoid interference to NOAA missions.
7. Transmissions of remote-sensing and telemetry data in the 8025-8400 MHz frequency band may only be made to and when within line of sight of the following earth stations:

Location
Maddock, ND (see condition 7 of this grant)
Brewster, WA
Goonhilly, United Kingdom
Chilbolton, United Kingdom
Awarua, New Zealand
Usingen, Germany
Ningi, Australia

ATTACHMENT TO GRANT

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Keflavik, Iceland (see condition 7 of this grant)

Transmissions to other earth station locations in the 8025-8400 MHz frequency band requires supplementing this modification application to include such additional earth station prior to action on the deferred portion of this application, or modification of this license condition after action is taken on the deferred portion.

8. Planet Labs is not authorized to use the Maddock, ND, and Keflavik, Iceland, earth stations with Planet Labs satellites launched after June 15, 2016, due to interference with operations of the LandSat satellites in the 8025-8400 MHz band until such time as a final agreement is reached on the necessary Memorandum of Agreement (MoA). Transmission to those earth stations will subsequently be subject to the terms and agreements of the MoA. The details (technical and otherwise) of such an arrangement need to be worked out between Planet Labs and three interested agencies (NASA, USGS, NOAA).

9. Power flux-density from operation in the 8025-8400 MHz band must not exceed the limits in No. 22.5 or Table 21-4 of the International Telecommunication Union's Radio Regulations or the limits in ITU-R Recommendation SA-1157.3.

10. Operations pursuant to this authorization must not cause harmful interference to stations operating in the 2025-2110 MHz band in accordance with the U.S. Table of Frequency Allocations. *See* 47 CFR § 2.106, Footnote US347.

11. Given that there is little potential for interference into any authorized service, we grant, on our own motion, a waiver of the U.S. Table of Frequency Allocations, 47 CFR § 2.106, to allow non-conforming use of the 2025-2110 MHz band and the 8025-8400 MHz band in support of Planet Lab's limited demonstration of propulsion technology, subject to the condition that Planet Labs accepts any interference from authorized services in these bands in connection with its limited propulsion demonstration and that transmissions in the 8025-8400 MHz band are subject to any agreement reached between Planet Labs and NASA in this band.³

12. Given the opportunity for additional entrants to operate in the 8025-8400 MHz band, we grant Planet Lab's request for waiver of the modified processing round requirements of 47 CFR §§ 25.156 and 25.157. *See DigitalGlobe, Inc.*, Order and Authorization, 20 FCC Red 15696 (Sat. Div., Int'l Bur. 2005), at paragraph 8.

13. Because Planet Labs must comply with 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 operations in the band, we grant its request for a waiver of the default service rules in 47 CFR § 25.217(b). *See DigitalGlobe, Inc.*, *supra*, at paragraph 15.

14. This authorization will become null and void if, at any time during the license term, none of the 600 satellites hereby authorized is operating. This authorization may be subject to additional conditions, or a reduction in the number of authorized satellites, in the event future deployment rates do not justify an authorization for 200 operational satellites.

15. Planet Labs has fulfilled milestone and bond obligations imposed as conditions to a previous grant of authority to operate up to 28 NGSO satellites in the 8025-8400 MHz band. *See* IBFS File No. SAT-MOD-20140321-00032 (grant stamp dated June 18, 2014). Because of the need for Planet Labs to continuously replenish its satellite constellation within the duration of its license term, we will not impose additional milestones or bond conditions in connection with this license modification. We find that warehousing concerns are addressed in this situation through the imposition of condition 13 above.

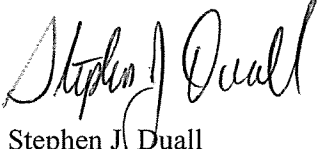
16. Within 30 days after deployment of each satellite pursuant to this authorization, Planet Labs must file a notification with the Commission specifying its apogee and perigee altitudes and orbital inclination.

³ Planet Labs states that it has executed a written coordination agreement with NASA identifying the earth stations with which Planet Labs may communicate and specifying a process by which to remove and add earth stations. IBFS File No. SAT-MOD-20170713-00103, Narrative Exhibit 43 at 1.

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17. The authority granted herein is subject to the existing license term for operation under S2912, which ends February 28, 2029.		
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 C.F.R. § 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:	December 8, 2017	
Term Dates	From: December 8, 2017	To: see conditions
Approved:  Stephen J. Duall Chief, Satellite Policy Branch		

9-16. Name of Contact Representative

Name:	Planet Labs Inc.	Phone Number:	720-238-5634
Company:		Fax Number:	
Street:	346 9th St.	E-Mail:	craig@planet.com
City:	San Francisco	State:	CA
Country:	USA	Zipcode:	94103-
Attention:	Mr Craig Scheffler	Relationship:	Engineer

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

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. ☒ 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 providing 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: 401 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

ODAR Dove with Prop

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.)

Planet requests to amend its modification application to include a request to authorize a propulsion system technology demonstration on up to three of the satellites.

Amendment Technical

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
Craig Scheffler

—>

46. Title of Person Signing
Spectrum Manager

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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