

**United States of America
FEDERAL COMMUNICATIONS COMMISSION
EXPERIMENTAL
RADIO STATION CONSTRUCTION PERMIT
AND LICENSE**

EXPERIMENTAL

(Nature of Service)

XT MO

(Class of Station)

WL9XZA

(Call Sign)

0049-EX-TC-2018

(File Number)

NAME Orbital Sciences Corporation

Subject to the provisions of the Communications Act of 1934, subsequent acts, and treaties, and all regulations heretofore or hereafter made by this Commission, and further subject to the conditions and requirements set forth in this license, the licensee hereof is hereby authorized to use and operate the radio transmitting facilities hereinafter described for radio communications in accordance with the program of experimentation described by the licensee in its application for license.

Station Locations

(1) MOBILE: Spacecraft-350km altitude-51.6 degrees inclination

Frequency Information

MOBILE: Spacecraft-350km altitude-51.6 degrees inclination

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
2205 MHz	MO	4M20G1D	1.08 W (ERP)	0.00045 %
2287.5 MHz	MO	6M16G1D	3.33 W (ERP)	0.00003 %
2287.5 MHz	MO	4M98G1D	3.33 W (ERP)	0.00003 %
2287.5 MHz	MO	3M00G1D	3.33 W (ERP)	0.00003 %

This authorization effective February 20, 2018 and
will expire 3:00 A.M. EST April 28, 2018

**FEDERAL
COMMUNICATIONS
COMMISSION**



Special Conditions:

- (1) This STA is limited to a single Cygnus capsule telemetry, tracking, and command operations for the upcoming Orbital ATK, Inc. 8 (OA-8) mission to the International Space Station (ISS). This STA covers the orbit raising maneuvers, approach and berthing with the International Space Station (ISS), unberthing and departure from the ISS, orbit maneuvering, and destructive re-entry into the Earth atmosphere. This STA will expire at Cygnus separation from the ISS + 14 days or 1 Mar 2018, whichever occurs first. Any future missions shall submit new applications to the FCC to be re-coordinated with the NTIA.
- (2) All transmissions in the band 2200-2290 MHz shall comply with national and international power flux density limits (PFD), except in cases where expected exceedance are pre-coordinated and agreed. PFD analysis and exceedances shall be included in the FCC STA application and provided in the request to the NTIA for US Government review and assessment.
- (3) Orbital ATK, Inc. shall be aware that future non-federal on-orbit operations will be considered on a case-by-case basis, especially for requests in the band 2200-2290 MHz, and Orbital ATK, Inc. shall have no expectations that future on-orbit operations will be approved
- (4) Due to potential harmful interference to naval activities, Orbital ATK, Inc. operations plan shall be submitted, at least 60 days prior to planned launch date, to the Naval Surface Warfare Center, Dahlgren Division (NSWCDD), Mr. James Moneyhon (540)653-3477, or james.moneyhon@navy.mil, for assessment. In order to mitigate the potential for interference with these naval activities, four blackout zones (BOZs) shall be assumed as follows: (1) 1500 nautical mile radius centered at 22N160W; (2) 1500 nautical mile radius centered at 33.25N119.57W; (3) 1500 nautical mile radius centered at 4.11N175.2W; and (4) 1500 nautical mile radius centered at 57.46N152.38W. These BOZs shall be implemented, unless otherwise coordinated and agreed to by the Naval Surface Warfare Center, Dahlgren Division (NSWCDD). In addition, Orbital ATK must also comply with any and all restrictions that may be levied by NSWCDD. Orbital ATK, Inc. must comply with any and all restrictions that may be levied by the NSWCDD. Coordination of the Orbital ATK, Inc. operations schedule and timeline, and any and all restrictions that may be levied by the NSWCDD, including imposition and implementation of a BOZ, shall be coordinated through Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO).
- (5) Cygnus 2287.5 MHz transmission (to relay or direct-to-ground) is not permitted when in view of the following deep space earth stations: Goldstone Deep Space Communications Complex (GDSCC), Madrid DSCC, Canberra DSCC and New Norcia Station, from horizon to horizon. Due to expected harmful interference on 2287.5 MHz downlink, downlink is prohibited to any western U.S. ground stations.
- (6) As soon as possible, but no later than 60 business days prior to the planned launch, Orbital ATK, Inc. is required to provide, at a minimum, launch date/time/window/duration and planned transmission frequencies to Jimmy Nguyen (jimmy.nguyen@us.af.mil, AFSMO), Felipe Arroyo (felipe.arroyo-1@nasa.gov, NASA/WFF), Scott Galbraith (vincent.s.galbraith@nasa.gov, NASA GSFC SMO), Vip Vipavetz (keven.g.vipavetz@nasa.gov, NASA/LaRC), Philip Whaley (philip.l.whaley@noaa.gov, NOAA Satellite Operations Control Center), Johnnie Best (johnnie.w.best1@navy.mil, NMSC) and Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO). In the event of last minute changes, 48-hour notice is required.

Special Conditions:

- (7) At least 7 business days prior to launch, and updated 2 hours after orbit insertion, a communications plan which precludes use of 2287.5 MHz transmission when in view of the deep space stations, as specified, shall be provided to Farzin Manshadi (Farzin.manshadi-1@nasa.gov, NASA JPL SMO), Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO), and Jimmy Nguyen (jimmy.nguyen@us.af.mil, AFSMO). Updates to this communications plan shall be provided at least 3 business days before a planned flight trajectory deviation from the post-orbit insertion plan.
- (8) During Cygnus on-orbit mission phase (after lift-off/ascent, free flight, or attached to the International Space Station), Orbital ATK, Inc. shall provide the radio frequency operation plan to Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO) for coordination with authorized users at least 7 business days prior to any planned transmission operation.
- (9) For Cygnus departure/re-entry operations, including pre-departure checkout, requests for coordination shall be provided to Cathy Sham (catherine.c.sham@nasa.gov, NASA JSC SMO) for coordination with authorized users at least 14 business days prior to communications activation related to pre-departure checkout, departure preparation, or departure operation. Requests for coordination shall include, at a minimum, planned communication timelines with start/end time, receiving station location, transmit/receive parameters/power/bandwidth, and spacecraft trajectory/orbital locations.
- (10) The STOP BUZZER POC information for all operations shall be provided to NTIA (bmitchell@ntia.doc.gov). This phone shall be manned 24/7.
- (11) Orbital ATK, Inc. shall keep a log of all transmissions in the band 2200-2290 MHz that shall be provided to the NTIA after the mission. This log shall include, at a minimum, the date, time, frequency, e.i.r.p density, pointing direction of the antennae. The log shall be provided to the following NTIA personnel no later than 3 weeks after completion of the mission: Brando Mitchell at bmitchell@ntia.doc.gov and Ed Drocella at edrocella@ntia.doc.gov
- (12) This license supersedes previous grant to revise condition #1 from +/- 8 days to +/- 14 days.