

**United States of America
FEDERAL COMMUNICATIONS COMMISSION
EXPERIMENTAL
SPECIAL TEMPORARY AUTHORIZATION**

EXPERIMENTAL

(Nature of Service)

WO9XDR

(Call Sign)

XT MO

(Class of Station)

0307-EX-ST-2019

(File Number)

NAME Orbital Sciences Corporation

This Special Temporary Authorization is granted upon the express condition that it may be terminated by the Commission at any time without advance notice or hearing if in its discretion the need for such action arises. Nothing contained herein shall be construed as a finding by the Commission that the authority herein granted is or will be in the public interest beyond the express terms hereof.

This Special Temporary Authorization shall not vest in the grantee any right to operate the station nor any right in the use of the frequencies designated in the authorization beyond the term hereof, nor in any other manner than authorized herein. Neither the authorization nor the right granted hereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934. This authorization is subject to the right of use of control the Government of the United States conferred by Section 706 of the Communications Act of 1934.

Special Temporary Authority is hereby granted to operate the apparatus described below:

Purpose Of Operation:

Spacecraft telemetry links for monitoring of Cygnus spacecraft state of health.

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 (+/-)
2203.2 MHz	MO	5M93G1D	7.16 W (ERP)	0.00008 %
2287.5 MHz	MO	6M16G1D	6.04 W (ERP)	0.00018 %
2287.5 MHz	MO	4M98G1D 6M16G1D	4 W (ERP)	0.00018 %

This authorization effective April 10, 2019 and
will expire 3:00 A.M. EST October 10, 2019

**FEDERAL
COMMUNICATIONS
COMMISSION**



Frequency Information

MOBILE: Spacecraft-350km altitude-51.6 degrees inclination

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
2287.5 MHz	MO	3M00G1D	4 W (ERP)	0.00018 %

Special Conditions:

- (1) All Orbital Sciences Corporation operations granted on an experimental basis shall be on an unprotected, non-interference basis to authorized AF stations. This STA is limited to a single NG-11 Cygnus spacecraft capsule telemetry, tracking, command operations, orbit raising maneuvers, approach and berthing with the International Space Station (ISS), unberthing and departure from the ISS, followed by orbit maneuvering, and finally controlled destructive re-entry into the earth's atmosphere.
- (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 Sciences Corporation shall be aware that future non-federal on-orbit operations in the band 2200-2290 MHz will be considered on a case-by-case basis and Orbital Sciences Corporation shall have no expectations that future on-orbit operations will be approved.
- (4) Cygnus direct-to-ground transmission using a frequency of 2287.5 MHz and emission designators of 3M00G1D or 4M98G1D is not permitted when in view of the following deep space earth stations: Goldstone Deep Space Communications Complex (GDSCC), Madrid Deep Space Communications Complex (MDSCC), Canberra Deep Space Communications Complex (CDSCC), and New Norcia Station, from horizon to horizon.
- (5) Cygnus to TDRS return link transmission using frequency of 2287.5 MHz with an emission designator of 6M16G1D, and an ERP of 6.04 watts is not permitted when in view of the following deep space earth stations: Goldstone Deep Space Communications Complex (GDSCC), Madrid Deep Space Communications Complex (MDSCC), Canberra Deep Space Communications Complex (CDSCC), and New Norcia Station, from horizon to horizon.

Special Conditions:

- (6) As soon as possible, but no later than 60 business days prior to the planned launch, Orbital Sciences Corporation is required to provide, as a minimum, launch date/time/window and planned Cygnus trajectory from launch to capture by the International Space Station (ISS), and transmission frequencies with associated duration/cut-off time 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), Stephen Horan (stephen.j.horan@nasa.gov, NASA/LaRC), Kevin Vipavetz (kevin.g.vipavetz@nasa.gov, NASA/LaRC), NOAA Satellite Operations Control Center (philip.l.whaley@noaa.gov), and Cathy Sham (catherine.c.sham@nasa.gov). In the event of last-minute changes, 48-hour notice is required.
- (7) Due to potential harmful interference to naval activities, Orbital Sciences Corporation 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. 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., shall be assumed, unless otherwise coordinated with, and agreed to, by the NSWCDD. Northrop Grumman must comply with any and all restrictions that may be levied by the NSWCDD. Coordination of the Northrop Grumman 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).
- (8) At least 7 business days prior to launch, and updated 2 hours after orbit insertion, Orbital Sciences Corporation shall provide a communications plan which precludes use of the Cygnus direct-to-ground transmission using a frequency of 2287.5 MHz and emission designators of 3M00G1D or 4M98G1D when in view of the deep space stations, as specified, 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 every 5 days for the duration of this grant, in order to support radio frequency interference mitigation.
- (9) During Cygnus on-orbit mission phase (after lift-off/ascent, free flight, or attached to the International Space Station), Northrop Grumman 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.
- (10) 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.

Special Conditions:

- (11) The STOP BUZZER POC information for all operations shall be provided to NTIA (bmitchell@ntia.doc.gov). This phone shall be manned 24/7.