

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of

Request of RBC Signals LLC for a 30-Day)
Special Temporary Authorization to) Call Sign:
Operate an Earth Station to Provide)
Tracking, Telemetry & Command for) File No.: SES-STA-_____
Foreign-Licensed Satellites)

REQUEST FOR SPECIAL TEMPORARY AUTHORITY

RBC Signals LLC (“RBC Signals”), pursuant to Section 25.120 of the Commission’s rules,¹ respectfully seeks a 30-day special temporary authorization (“STA”) to operate two (2) yagi antennas (the “400 MHz Yagi”) at an existing teleport facility in Deadhorse, Alaska² to perform tracking, telemetry and command (“TT&C”) in the 401-402 MHz band for two foreign-licensed, non-geostationary orbit (“NGSO”) cubesats operated by SatRevolution S.A. (“SatRevolution”): (i) the SW1FT cubesat and (ii) the SteamSat cubesat.³ RBC Signals also seeks to provide limited, receive-only downlink support for the SW1FT cubesat in the 2261.5-2269.5 MHz (space-to-Earth) band using a 2.4m Orbit Gaia-100 (“Orbit-100”) earth station. Grant of this STA will allow RBC Signals to provide near-term, critical launch support for the satellites’ during the Commission’s review of the *SatRevolution 180-Day STAs*.

Moreover, grant of this 30-day STA will serve the public interest by enabling RBC Signals

¹ 47 C.F.R. § 25.120.

² This 30-day STA request is identical to the operations proposed in File Nos. File No. SES-STA-20201105-01220 & SES-STA-20201105-01221 (together, the “*SatRevolution 180-Day STAs*”).

³ Specifically, RBC Signals seeks to perform TT&C for the SW1FT cubesat in 401.0375-401.0625 MHz (Earth-to-space) and 401.0125-401.0375 MHz (space-to-Earth) bands, and for the SteamSat cubesat in the 401.0-401.1 MHz (Earth-to-space) and 401.050-401.150 MHz (space-to-Earth) bands.

to help validate certain spacecraft technology and establish space heritage of these next-generation cubesat products and services to the benefit of government, non-profit, and commercial satellite operators. Specifically, this STA will allow RBC Signals to support the evaluation of a unique steam-based cubesat propellant module collocated on the SteamSat satellite, as well as the demonstration of high-resolution cameras and an Earth observation machine learning module on the SWIFT satellite.

The expected launch window for the SWIFT and SteamSat satellites is December 18, 2020 to December 31, 2020.⁴ Notably, these cubesats will be launched on the same vehicle as the AuroraSat satellite, which was recently authorized to communicate with RBC Signals' UHF ground station from Windham, New York for near-identical TT&C operations.⁵ Importantly, this STA will allow RBC Signals to provide mission support during the public notice period for the *SatRevolution 180-Day STAs*.

RBC Signals respectfully requests that the Commission consider and authorize the proposed TT&C and data downlink operations (as appropriately conditioned) as soon as practicable to allow for near-term mission support. RBC Signals will update the Commission with the final launch date once the launch schedule is finalized.

⁴ The mission life of the SWIFT and SteamSat spacecraft, approximately two years from launch including deorbiting, does not warrant long-term commercial earth station license authority for the proposed operations. Consistent with past practice regarding STA authority for time-limited earth station operations in the subject bands, RBC Signals intends to request renewal of the proposed 180-day STAs, as necessary, to ensure appropriate Commission authority for the life of the mission. RBC expressly acknowledges that grant of an initial STA or renewal will in no way affect the Commission's consideration of subsequent renewal requests.

⁵ See RBC Signals LLC, File No. SES-STA-20200724-00799 ("*Aurora STA*"). The STA period commences on December 1, 2020.

I. BACKGROUND

Consistent with its existing operations under the *Aurora STA*, RBC Signals seeks to provide TT&C support for the SW1FT and SteamSat satellites using a 400 MHz Yagi (the M2 Antenna Systems Model 400CP30A) located at its existing facility in Deadhorse, Alaska, where RBC Signals currently performs near-identical TT&C operations in the 401-402 MHz band.⁶ There have been no reported cases of interference in the 401-402 MHz band from the Deadhorse facility and this request will not create any the potential for interference given its temporary, intermittent use and low transmit power. In fact, the 400 MHz Yagi will transmit at significantly lower power levels than those presently authorized at the Deadhorse facility (*see* draft FCC Form 312 Schedule B).⁷

RBC Signals seeks to operate Orbit-100 to intermittently receive Earth observation data from the SW1FT cubesat in the 2261.5-2269.5 MHz band and RBC Signals receive-only earth station operations would not cause interference to other spectrum users. As discussed below, RBC Signals, together with SatRevolution, will coordinate with Federal users to ensure that the proposed receive-only (satellite space-to-Earth) operations will not cause harmful interference to Federal spectrum users or otherwise adversely affect U.S. government interests.

With the support of RBC Signals, SatRevolution seeks to demonstrate: (i) the SteamSat's low power, steam-based propulsion module (the "TunaCan") to help improve constellation management, satellite maneuvering and collision avoidance; and (ii) the SW1FT's high-resolution Earth observation cameras (the "Vision300") and optical machine learning module (the

⁶ *See, e.g.*, RBC Signals LLC, File No. SES-STA-20200107-00013.

⁷ *Id.*

“SpaceEdgeZero”).⁸ Towards this end, with RBC Signals’ backing, SatRevolution can effectively test components, software design, and operational concepts of these novel cubesat technologies.⁹

The SWIFT satellite has been authorized and registered by Poland, a WTO-member country. UKE – the Polish Office of Electronic Communications – has submitted ITU filing for the SWIFT satellite on behalf of SatRevolution. RBC Signals understands that UKE will file a modification to the SWIATOWID_2 (SWIFT) satellite filing to reflect updates to certain operational parameters. In the interest of providing the most accurate information possible, RBC Signals submits herewith a SPACEPUB file that reflects the updated operational parameters. RBC Signals also includes a brief overview of the differences between the current SWIATOWID_2 filing and the SWIFT satellite’s updated operational parameters for the Commission’s reference.¹⁰

During the missions, RBC Signals’ operations will be conducted on an unprotected and non-interference basis intermittently when the satellites pass over the earth station. In addition, RBC Signals will conduct these operations in accordance with the Commission’s rules and interagency requirements governing fixed earth station operations in the subject bands. RBC Signals provides the attached Technical Appendix for detailed information on the satellite and earth station operations, including an orbital debris assessment report, antenna patterns and a draft FCC Form 312 Schedule B.¹¹ As discussed below, grant of the requested STA will serve the public interest, convenience, and necessity.

⁸ SatRevolution is a 100% Polish-owned entity and does not intend to conduct remote sensing operations over U.S. territory. As a result, a remote sensing authorization from the National Oceanic and Atmospheric Administration (“NOAA”) is not necessary to support these test and demonstration operations.

⁹ SatRevolution has prepared the necessary ITU-related information (satellite system filings and cost-recovery documentation) in connection with this application. Moreover, the SteamSat and SWIFT spacecraft have been registered with Poland, a WTO-member country (UKE – the Polish Office of Electronic Communications – has submitted ITU filings on behalf of SatRevolution).

¹⁰ RBC Signals has also provided a draft Schedule S for the SWIFT satellite in the Technical Appendix.

¹¹ RBC respectfully requests leave to update the technical or operational data associated with this STA request should the Commission seek any clarifying or supplemental information in considering this request.

II. DISCUSSION

RBC Signals seeks to operate the 400 MHz Yagi with the SteamSat and SW1FT cubesats in the 401-402 MHz band. Specifically, RBC Signals will operate with the SW1FT cubesat in the 401.0375-401.0625 MHz (Earth-to-space) and 401.0125-401.0375 MHz (space-to-Earth) bands. RBC Signals will operate with the SteamSat cubesat in the 401.0-401.1 MHz (Earth-to-space) and 401.050-401.150 MHz (space-to-Earth) bands. RBC Signals also seeks to provide limited, receive-only support for the SW1FT cubesat in the 2261.5-2269.5 MHz (space-to-Earth) band.

Grant of this STA request is critical for the reliability SW1FT mission and will not increase the potential for interference since RBC Signals' receive-only operations are unlikely to result in interference to other spectrum users given the remote location of the earth station facility (i.e., the North Slope of Alaska) and limited, intermittent use. RBC Signals provides detailed satellite information in the attached Technical Appendix and Technical Description. RBC Signals provides detailed satellite information in the attached Technical Appendix and Technical Description.

A. SteamSat Satellite Overview

The SteamSat mission will consist of a single satellite launched into sub-synchronous circular orbit with nominal orbit altitude of 525 km (based upon a range of SSO orbit altitudes from 500km to 550km) with an inclination from the equator of 97.6°. The SteamSat satellite is based on the SatRevolution NanoBus and conforms to the form factor of a 1.5U cubesat (190.5 mm x 111 mm x 100 mm) with a total mass of approximately 1.37 kg. The satellite is composed of the 1.5U bus, deployable solar panels, deployable UHF antenna, and the TunaCan propulsion module. The SteamSat cubesat will be launched as a secondary payload aboard a SpaceX Falcon 9 launch vehicle from the Cape Canaveral Air Force Station in December 2020. An orbital lifetime calculation for

this orbit estimates that the satellite will remain in orbit for approximately 2.97 years (under worst-case conditions), well within the limits set by internationally accepted guidelines.¹²

B. SWIFT Satellite Overview

The SWIFT mission will consist of a single satellite launched into sub-synchronous circular orbit with nominal orbit altitude of 525 km (based upon a range of SSO orbit altitudes from 500km to 550km) with an inclination from the equator of 97.6°. The SteamSat satellite is based on the SatRevolution NanoBus and conforms to the form factor of a 3U cubesat (340.5 mm x 116 mm x 109 mm) with a total mass of approximately 3.0 kg. The satellite is composed of the 3U bus, deployable solar panels, deployable UHF and S-band antennas, camera system, and the SpaceEdgeZero machine learning module. The SWIFT cubesat will be launched as a secondary payload aboard a SpaceX Falcon 9 launch vehicle from the Cape Canaveral Air Force Station in December 2020. An orbital lifetime calculation for this orbit estimates that the satellite will remain in orbit for approximately 2.513 years (under worst-case conditions), well within the limits set by internationally accepted guidelines.¹³

C. TT&C Spectrum Use

The United States Table of Frequency Allocations (“Table of Allocations”), Section 2.106 of the Commission’s rules, 47 C.F.R. § 2.106, provides that the 401-402 MHz band is shared on a co-primary basis between meteorological aids (Earth-to-space) and space operations services (space-to-Earth). RBC Signals seeks to perform TT&C operations in the 401-402 MHz band, as specified above, consistent with the co-primary space operations allocation in this band.¹⁴

¹² See SteamSat Orbital Debris Assessment Report (attached).

¹³ See SWIFT Orbital Debris Assessment Report (attached).

¹⁴ See 47 C.F.R. § 2.1 (defining “space operations” as “a radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry, and space telecommand.”).

RBC Signals acknowledges that there are certain U.S. government meteorological aids and Earth exploration operations conducted in the 401-402 MHz band.¹⁵ Moreover, RBC Signals understands that although expanded Federal use of the 401-402 MHz band is anticipated, such plans do not commence until well after the end of the SWIFT and SteamSat mission. RBC Signals will continue to work with Commission staff to ensure that these temporary TT&C operations will not increase the potential interference to current or future government users, and will coordinate with NASA, GOES NOAA, and other U.S. government agencies to ensure that the TT&C operations proposed herein are compatible with government operations and that the interests of the United States are fully accommodated.

The facility in Deadhorse, Alaska currently supports TT&C operations (transmit and receive) in the 401-402 MHz band with no reported cases of interference, and RBC Signals' proposed TT&C operations under this STA will be conducted at considerably lower power levels than those currently authorized at the site. Thus, the proposed TT&C operations in this band will not present an increased interference risk to other authorized users.

D. Downlink Spectrum Use

RBC Signals seeks to provide limited, downlink support for the SWIFT spacecraft in the 2261.5-2269.5 MHz band. The Table of Allocations provides that the 2200-2290 MHz band may be used for Federal EESS, space operations, and space research with no allocation for non-Federal uses.¹⁶ RBC, together with SatRevolution, will coordinate with Federal users to ensure that the proposed receive-only (satellite space-to-Earth) operations will not cause harmful interference to Federal spectrum users or otherwise adversely affect U.S. government interests.

¹⁵ See https://www.ntia.doc.gov/files/ntia/publications/compendium/0401.00-0402.00_01MAR14.pdf.

¹⁶ Non-federal operations in this band are limited to transmissions to the Tracking and Data Relay Satellite System ("TRDSS"). See 47 C.F.R. §2.106, fn. US303.

RBC Signals acknowledges that this band is used by Federal agencies for diverse satellite and terrestrial applications, including the Tracking and Data Relay Satellite System (“TRDSS”),¹⁷ but there does not appear to be any incompatibility issues. Accordingly, when operating the Orbit-100 earth station in the 2261.5-2269.5 MHz band for data downlink operations, RBC Signals will operate the earth station on a non-conforming (unprotected and non-interference) basis. RBC Signals respectfully requests a waiver of the Table of Allocations, 47 C.F.R. §2.106, to the extent necessary to permit its non-conforming use of the 2261.5-2269.5 MHz band.

Given the remote geographical location of the earth station, RBC Signals is confident it can operate the Gaia-100 earth station without causing harmful interference to authorized spectrum users and agrees to accept any harmful interference from Federal stations while operating on a non-conforming, unprotected basis. In addition, RBC Signals’ use of this band will be limited to intermittent receive operations in eight megahertz of spectrum, and the earth station will be located in a controlled facility that is managed on a 24/7 basis to immediately respond to any reports of harmful interference. RBC Signals will neither ensure that these operations do not cause harmful interference to, and RBC Signals will not claim protection from, Federal operations in the band.

RBC Signals respectfully seeks a waiver of Section 2.106 of the Commission’s rules, 47 C.F.R. § 2.106, to permit operation of Orbit-100 earth station in the 2261.5-2269.5 MHz band to provide limited, downlink support for the SWIFT spacecraft. As noted, the Table of Allocations provides that the 2200-2290 MHz band may be used for Federal EESS, space operations, and space research with no allocation for non-Federal uses (non-federal operations are limited to TRDSS transmissions).¹⁸ The Commission may waive its rules for “good cause shown.”¹⁹ In general, good

¹⁷ See <https://www.ntia.doc.gov/files/ntia/publications/compendium/2200.00-2290.00-01MAR14.pdf>.

¹⁸ See 47 C.F.R. §2.106, fn. US303.

¹⁹ See 47 C.F.R. § 1.3. *WAIT Radio v. FCC*, 418 F.2d 1153, 1157 (D.C. Cir. 1969).

cause exists if grant of a waiver would not undermine the purposes of the rule and would otherwise serve the public interest.²⁰

A waiver is warranted in this case because there is limited potential for interference from the proposed receive-only operations and RBC Signals will ensure that the operations do not adversely impact U.S. government operations. Specifically, RBC Signals limited operations will occur only when the satellite is within view of the relevant earth station for brief periods of time and will only utilize proposed 8 MHz of spectrum to communicate with the satellite. In addition, RBC Signals will avoid harmful interference to other authorized spectrum users, will immediately cease operations if it learns they are causing harmful interference, and agrees to accept any harmful interference from Federal stations while operating on a non-conforming, unprotected basis. Finally, RBC Signals and its customer SatRevolution will comply with any limitations or restrictions on satellite downlink (space-to-Earth) operations necessary to protect Federal uses from harmful interference. Thus, grant of the requested waiver is appropriate and RBC Signals commits to working with Federal agencies to coordinate use of the band as necessary.

E. STA Request & Public Interest Considerations

RBC Signals respectfully seeks this 30-day STA pursuant to Section 25.120 of the Commission's rules, 47 C.F.R. § 25.120. A 30-day STA is appropriate because RBC Signals does not plan to file an application for regular authority for the subject operations because the length of the mission (approximately two years) does not warrant a long-term commercial earth station license (*i.e.*, a 15-year term). Additionally, this STA will allow for near-term operations while also affording sufficient time to place the *SatRevolution 180-day STAs* on public notice and make a determination on longer term authority.

²⁰ *See id.*

SatRevolution realizes the crucial importance of reliable TT&C support to ensure successful mission launch and of reliable mission-data downlink support to ensure a successful mission given the SW1FT's Earth observation modules. RBC Signals can provide tested and proved ground station support from an existing teleport facility without increasing the potential for interference into other commercial or Federal users, and help SatRevolution gather critical mission data to validate the commercial viability of its earth observation technology to the benefit of all NGSO satellite operators. Moreover, grant of this STA request is in the public interest because it will facilitate the safe operation of the SW1FT and SteamSat spacecraft by ensuring reliable TT&C functions in time for the launch of the satellites.

III. CONCLUSION

Based on the foregoing, the public interest would be served by a grant of this 30-day STA request to allow RBC Signals to provide TT&C in the 401-402 MHz band to support the SW1FT and SteamSat cubesats, as well as limited, receive-only support for the SW1FT cubesat in the 2261.5-2269.5 MHz band, from an existing earth station facility in Deadhorse, Alaska.