Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Application of RBC Signals LLC for a 180-Day Extension of its Special Temporary Authorization To Provide TT&C to U.S.-Licensed Experimental Satellites	)	Call Sign:
	)	
	)	File No.: SES-STA-
	)	

REQUEST FOR SPECIAL TEMPORARY AUTHORIZATION EXTENSION

RBC Signals LLC ("RBC Signals"), pursuant to Section 25.120 of the Commission's rules, 47 C.F.R. § 25.120, respectfully seeks a 180-day extension of its existing special temporary authorization ("STA").[1] RBC Signals seeks to continue to operate the currently authorized Yagi antennas (the "400 MHz Yagis") at its existing earth station site in Fairbanks, Alaska, to provide telemetry, tracking, and command ("TT&C") support for two U.S.-licensed, non-geostationary satellite orbit ("NGSO") cubesats – the BRIO and THEA satellites – operated by SpaceQuest, Ltd. ("SpaceQuest").[2] RBC Signals will perform TT&C operations in the 400.50-400.65 MHz band (space-to-Earth) and 399.90-400.05 MHz (Earth-to-space), consistent with the SpaceQuest Licenses. RBC Signals seeks this 180-day STA extension to ensure continuing authority for critical TT&C functions during the life of the SpaceQuest mission.

I. DISCUSSION

RBC Signals seeks to support the SpaceQuest spacecraft using the 400 MHz Yagis (the M2 Antenna Systems Model 400CP30A) at its existing earth station facility in Fairbanks, Alaska.[3] RBC Signals currently operates in various segments of the 400 MHz band in Alaska with no reported cases

[1] *See* RBC Signals, File No. SES-STA-20181115-03264 (expired on January 26, 2019) ("*Fairbanks STA*"). RBC Signals understands that due to the government shutdown, any STAs that would have expired from January 3, 2019 through January 29, 2019 are extended until January 30, 2019 (*see* Public Notice, DA 19-20 (rel. Jan. 28, 2019)).

[2] *See* SpaceQuest, Ltd., File No. 0176-EX-CN-2018, Call Sign WJ2XNV; *see also* SpaceQuest, Ltd., File No. 0220-EX-CN-2018, Call Sign WJ2XPE (collectively, the "SpaceQuest Licenses").

[3] *See, e.g.,* RBC Signals, LLC, File No. SES-STA-20180719-01879 (180-day STA extension to provide TT&C support in the 401-402 MHz band at the Fairbanks site).

of interference, and this request will not increase the potential for interference because the limited operations are similar to those previously authorized by the Commission.[4]

RBC Signals incorporates by reference the draft FCC Form 312 Schedule B provided with the *Fairbanks STA* for information relating to the proposed earth station operations. In addition, RBC Signals incorporates by reference the technical information submitted by SpaceQuest in support of the experimental licenses granted by the Commission for the BRIO and THEA spacecraft.[5] RBC Signals has identified the Fairbanks site as a viable ground station location to support the SpaceQuest mission and plans to provide ongoing TT&C functions for the cubesats from the site. Accordingly, RBC Signals files this 180-day STA extension of the *Fairbanks STA* to ensure appropriate longer-term authority during the BRIO and THEA mission. As discussed below, grant of the requested STA will continue to serve the public interest, convenience, and necessity.

A. Satellites and TT&C Earth Stations

The BRIO and THEA satellites are 3U cubesats, each with a mass of approximately 5 kg. BRIO and THEA were launched on November 19, 2018, on the SSO-A mission from Vandenberg Air Force Base in California.[6] The satellites operate in a circular, sun-synchronous orbit at 575 km with an inclination from the equator of 97.52°. The expected mission lifetime of the satellites is five years.[7]

The BRIO and THEA satellites are operated by SpaceQuest, which recently received experimental licenses for their operation.[8] The primary mission of the BRIO satellite is to investigate,

---

[4] *See, e.g.,* RBC Signals, LLC, File No. SES-STA-20170731-00848 (authority to operate in the 399.926-399.950 MHz and 401.05-401.25 MHz bands); RBC Signals, LLC, File No. SES-STA-20171213-01333 (authority to operate in the 401.43-401.57 MHz, 449.93-450.07 MHz and 450.2-450.25 MHz bands); RBC Signals, LLC, File No. SES-STA-20180430-00416 (authority to operate in the 401.24-401.36 MHz band). This authority included NASA coordination conditions to avoid interference to ISS EVA operations.

[5] *See* SpaceQuest Licenses.

[6] *See* http://spaceflight.com/sso-a/.

[7] The expected mission lifetime of the SpaceQuest cubesats does not warrant regular commercial authority for the operations proposed herein (i.e., a 15-year license).

[8] *See* SpaceQuest Licenses.

identify and resolve potential technical and implementation issues with SpaceQuest's advanced software defined radio ("SDR") satellite design. The primary mission of the THEA satellite is to test experimental payloads from U.S.-based Aurora Insight to validate the ability of its flight computer firmware to monitor, process, and generate relevant measurements using a novel wideband antenna.

RBC Signals seeks to provide reliable TT&C support for BRIO and THEA, which is important to maintain effective communications with and control of the satellites during orbit. It is especially important to be able to provide initial TT&C for early mission communications, operation optimization and other program-related issues. To date, only one ground station in Fairfax, Virginia is able to support the SpaceQuest mission. Given their polar orbits, this single location cannot provide sufficient TT&C support for the SpaceQuest satellites. For this reason, SpaceQuest seeks TT&C support from RBC Signals established earth station facilities in Alaska, which maximize communications with its polar-orbiting satellites.

RBC Signals' TT&C operations will be conducted on an unprotected and non-interference basis intermittently and as-needed approximately two or three times per day when the satellites pass over the earth station. RBC Signals will continue to conduct these operations in accordance with the Commission's rules and interagency requirements governing fixed earth station operations in the subject bands. In addition, RBC Signals expressly acknowledges that any grant of this STA request is without prejudice to Commission action on other requests for authority to provide TT&C support for the SpaceQuest satellites.

B. TT&C Spectrum Use

RBC Signals seeks to operate the 400 MHz Yagis with the SpaceQuest satellites in the 399.90-400.05 MHz (Earth-to-space) and 400.50-400.65 MHz (space-to-Earth) bands to communicate with the BRIO and THEA satellites to provide TT&C support. RBC Signals understands that there is limited U.S. government use of the 399.90-400.05 MHz band,[9] but

[9] *See* Federal Government Spectrum Use Report, 225 MHz – 7.125 GHz at https://www.ntia.doc.gov/files/ntia/publications/compendium/0399.90-0400.05_01DEC15.pdf.

acknowledges that there is a pending FCC rulemaking addressing further use of this band.[10] 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 399.90-400.05 MHz band is used on a primary basis by the federal and non-federal mobile-satellite service (MSS) and radionavigation-satellite service ("RNSS"). Thus, RBC Signals will continue to conduct its limited TT&C uplink operations in the band on an unprotected, non-harmful-interference basis as a non-conforming use. RBC Signals' prior operations in the band[11] without interference incident confirm near-term authority for the similar operations proposed herein can be granted.

The 400.50-400.65 MHz band is used, among other things, for federal and non-federal space operations.[12] RBC Signals will continue to work with NASA to ensure compatibility of the proposed downlink transmissions, in particular, with the International Space Station operations. RBC Signals is unaware of any additional, near-term interference concerns with the proposed TT&C downlink operations. RBC Signals will also work with Commission staff to ensure that these temporary operations will not increase the potential interference to current or future government users; and will coordinate with NASA and other U.S. government agencies to ensure that the limited TT&C operations proposed herein are compatible with government operations, and that the interests of the United States are fully accommodated.

B. STA Request & Public Interest Considerations

RBC Signals respectfully requests this 180-day STA pursuant to Section 25.120 of the Commission's rules, 47 C.F.R. § 25.120. Section 25.120(a) provides that STA requests should be

[10] Use of the 399.9-400.05 MHz Band; and Allocation of Spectrum for Non-Federal Space Launch Operations, ET Docket No. 13-115, RM-11341; *see also* https://www.fcc.gov/items-on-circulation.

[11] *See* RBC Signals, LLC, File No. SES-STA-20170731-00848.

[12] *See* 47 C.F.R. § 2.1 ("space operations" are defined as "a radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry, and space telecommand"); *See also* Federal Government Spectrum Use Report, 225 MHz – 7.125 GHz at https://www.ntia.doc.gov/files/ntia/publications/compendium/0400.15-0401.00_01DEC15.pdf.

filed at least three working days prior to the date of commencement of the proposed operations.[13] Here, RBC Signals seeks grant and operation under the 180-day STA consistent with the Commission's processing rules, which includes a 30-day public notice period for this STA request. Pursuant to Commission rules and precedent, RBC Signals understands that this timely filed extension request will effectively extend its current temporary authority until the Commission acts on the instant request, affording sufficient time for it to be placed on public notice and enabling RBC Signals to continue to support the THEA and BRIO mission in the interim.[14]

Grant of this STA request is in the public interest because (i) SpaceQuest has limited earth station facilities that can provide essential TT&C support for their polar-orbit satellites; (ii) grant will facilitate the safe operation of the SpaceQuest satellites by ensuring reliable TT&C functions for the launch and operation of the satellites; (ii) it will promote U.S. leadership in the development of next-generation satellite technologies being tested by the SpaceQuest satellites; and (iv) grant will also facilitate U.S. leadership in earth station services by enabling RBC Signals to provide critical NSGO TT&C support.

III. CONCLUSION

In view of the foregoing, the public interest would be served by a grant of a 180-day STA extension to allow RBC Signals to perform ongoing TT&C support for the SpaceQuest mission using the 400 MHz Yagis from its existing facility in Fairbanks, Alaska.

---

[13] Due to the government shutdown, it was not possible for RBC Signals to file the instant request three business days prior to the expiration of the *Fairbanks STA*. As noted, for all filings that were due between January 3, 2019 and January 29, 2019, the Commission has extended the filing deadlines to January 30, 2019.

[14] *See* 47 C.F.R. §§ 25.120 & 25.163(b); Administrative Procedure Act § 9(b). *See also* 47 C.F.R. §1.955(b); *In the Matter of Marc D. Sobel Application for Consent to Assign the License for Conventional 800 MHz SMR Station KKT934, Montrose, California,* Memorandum Opinion & Order, FCC 05-90, ¶¶ 2 & 6; Intelsat License LLC, File Nos. SAT-STA-20171016-00139 (30-day STA to drift and operate Intelsat 16 in TT&C frequencies) and SAT-STA-20171016-00140 (180-day extension of 30-day STA operations).