Request for 60-Day Special Temporary Authority to Operate a
Backup Herndon, Virginia Ground Station
For HawkEye 360 "Cluster 2" Satellites During LEOP In the Event of an Emergency

Background:

HawkEye 360 (Hawkeye 360) requests Special Temporary Authority (STA) to operate a temporary ground station located at HawkEye 360's headquarters in Herndon, VA, USA. This ground station will serve as risk mitigation during the mission-critical launch and early orbit phase (LEOP) operations for the three Cluster 2 satellites (as defined below), currently scheduled for launch in October 2020. The backup ground station in Herndon will *only be used in the emergency case that the Svalbard, Norway ground station is not successfully communicating with the Cluster 2 satellites and only during the first 60 days following the Cluster 2 launch*.

HawkEye 360 currently has authority to construct, deploy, and operate up to 80 satellites, no more than 15 simultaneously operationally, with apogee and perigee altitudes from 500 to 650km (nominal 575km), with inclinations of 97-98 degrees and has pending a request to operate up to 220 satellites, no more than 80 simultaneously operationally. *See* Stamp Grant, File No. SAT-LOA-20190102-00001(granted in part Dec. 10, 2019). Pursuant to this authority, HawkEye 360 is scheduled to launch three (3) satellites in October 2020. These three (3) satellites will operate in a station-keeping formation and are referred to as "Cluster 2" of the HawkEye 360 constellation. All technical parameters of the satellites comply with Hawkeye 360's authorization.[1] The Hawkeye 360 satellites are authorized to communicate with the six ground stations specified in Appendix B of its license authorization. The Herndon, VA ground station is not identified in Appendix B.

Technical details:

If the Herndon, VA ground station is activated in an emergency scenario, HawkEye 360 would communicate with that ground station on the frequencies authorized under its satellite authorization.[2] Specifically, the Earth-to-Space communications would be 0.12 MHz in bandwidth and would be transmitted on the following three center frequencies: 2063.965 MHz, 2064.965 MHz, and 2065.965 MHz. The Space-to-Earth communications would be 4 MHz in bandwidth and would be transmitted on the following three center frequencies: 2236 MHz, 2242 MHz, and 2254 MHz.

Ground Station Information:

Site coordinates - 38° 57' 14.51" N 77° 23' 14.95" W (Herndon, VA, USA)
Make/Model/Diameter antenna – 2.4m from M2 Antenna Systems
Main beam gain at transmit – 31.7 dBi

[1] *See* below Exhibit, Table of Authorized Frequencies; *see also* Stamp Grant, Appendix A, File No. SAT-LOA-20190102-00001 (granted in part Dec. 10, 2019).
[2] *See* below Exhibit, Table of Authorized Frequencies.

Start/stop frequency range S-band – 2063.9-2066.1 MHz
Worst case antenna gain toward the horizon – 21.7 dB; Operate only >5 deg elevation
Uplink EIRP dBW – 53.46 dBW
Emission Designators or carrier bandwidths uplink ES– We have two available speeds with emission designators: 120KF1D and 180KF1D

Risk mitigation:

Cluster 2 will be the first satellites in the HawkEye 360 constellation to operate with the S-band uplink and downlink Telemetry, Tracking and Command (TT&C) communications and requires new system development to be installed at the KSAT location in Svalbard, from where HawkEye 360 intends to conduct both LEOP and full-time operations. However, given the new systems development, HawkEye 360 would like to have backup capability available in Herndon, using legacy ground capability in the unlikely (but potential) event that the new system in Svalbard does not function as intended. While HawkEye 360 is working hard with the satellite manufacturer and KSAT to address and eliminate risk to successful operation of the Svalbard system, it is not possible to test this system in an operational environment until launch of Cluster 2.

This temporary backup ground station mitigates risk to anomalous operations in the following ways:

1. Provides for emergency backup TT&C communication using a well-established system which was successfully operated for HawkEye 360's Pathfinder and adjusting to Cluster 2's S-band frequencies.
2. Having the system hardware geographically located with HawkEye 360's operators allows for faster correction cycles. Anomaly resolution speed during post-launch separation and early orbit activities is of the essence to ensuring successful satellite initialization.

Length of Requested STA:

The backup ground station in Herndon will only be used in the emergency case that the Svalbard station is not successfully communicating with the Cluster 2 satellites and only during the first 60 days following Cluster 2 launch.

COMSEARCH Study

HawkEye 360 has contracted with COMSEARCH to conduct an analysis and facilitate coordination with non-U.S. government users of the S-Band links in the Herndon, VA area. *See, e.g.*, 47 C.F.R. §§ 25.115(a)(6), 25.203. In the interest of time, HawkEye 360 is submitting its application first and will provide a copy of the COMSEARCH analysis and coordination report to the FCC once received from COMSEARCH.

HawkEye 360 requests temporary waiver of the FCC rules requiring submission of the coordination analysis with the application.[3] Good cause exists for the waiver of the requirement.[4] The launch is scheduled for October 2020 and waiting to file the application after COMSEARCH provides the relevant information could in theory leave insufficient time for processing and grant of the STA application, which would unnecessarily increase risk to the mission. Because Hawkeye 360 intends to complete the coordination, the purpose of the rule (to ensure proper coordination with terrestrial operators) would not be undermined by grant of the temporary waiver. Additionally, grant of the waiver request is consistent with FCC precedent.[5]

[3] *See* 47 C.F.R. §§ 25.115(a)(6), 25.203.

[4] *See* 47 C.F.R. § 1.3; *Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1164 (D.C. Cir. 1990); *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).

[5] *See, e.g.*, HNS License Sub, LLC, IBFS File No. SES-LIC-20170807-00892 (granted March 5, 2020)(granting application in which the coordination report was submitted more than four weeks after the filing); HNS License Sub, LLC, IBFS File No. SES-LIC-20170807-00886 (granted March 5, 2020)(same).

Exhibit – Table of Authorized Frequencies

Table of Frequency Bands
Authorized Pursuant to SATLOA2019010200001
Satellites 1-15 (Call Sign S3042)

Frequency Band (MHz)	Use	Transmit Center Frequency (MHz) per cluster[1]
X-band: 8025-8400	Primary payload downlink	Sat#1 - 8075 MHz Sat#2 - 8165 MHz Sat#3 - 8255 MHz Sat#4 - 8345 MHz
X-Band: 8025-8400	TT&C downlink	Sat#1 - 8291 MHz Sat#2 - 8297 MHz Sat#3 - 8303 MHz Sat#4 - 8309 MHz
S-Band: 2200-2290	Emergency Backup TT&C downlink	Sat#1 - 2236 MHz Sat#2 - 2242 MHz Sat#3 - 2254 MHz Sat#4 - 2260 MHz
S-Band: 2025-2110	Primary payload uplink	For satellites one (1) through nine (9): Sat#1 - 2068.2 MHz Sat#2 - 2062.7 MHz Sat#3 - 2077.4 MHz For satellites ten (10) through fifteen (15) (and any replacement satellites): Sat#1 - 2046.5 MHz Sat#2 - 2049.3 MHz Sat#3 - 2075.0 MHz Sat#4 - 2052.5 MHz
S-Band: 2025-2110	TT&C uplink	Sat#1 - 2063.965 MHz Sat#2 - 2064.965 MHz Sat#3 - 2065.965 MHz Sat#4 - 2065.465 MHz
S-Band: 2025-2110	High Speed TT&C uplink	Sat#1 - 2063.965 MHz Sat#2 - 2064.965 MHz Sat#3 - 2065.965 MHz Sat#4 - 2065.465 MHz