

EXHIBIT 1 — APPLICATION NARRATIVE

August 21, 2026

Federal Communications Commission
Office of Engineering and Technology
Experimental Licensing Branch
1270 Fairfield Road
Gettysburg, PA 17325-7245

Re: Application Narrative — Request for Conventional Experimental Authorization, GNSS Re-Radiation System, North Kingstown, Rhode Island

1. Applicant and purpose

HavocAI, Inc. (“the Applicant”) designs, manufactures, and operates autonomous unmanned surface vessels. Every vessel produced integrates one or more Global Navigation Satellite System receivers, which supply the position, velocity, and timing references on which the vessel's navigation, autonomy, and vehicle-to-vehicle coordination functions depend.

The Applicant requests a two-year conventional experimental authorization to operate a fixed GNSS re-radiation system indoors at Unit B, 100 Commerce Park Road, North Kingstown, Rhode Island, for the purpose of testing GNSS receivers and receiver-dependent subsystems.

2. Objectives

- a. Illuminate a designated interior area of the leased premises with re-radiated GNSS signals, so that receivers installed in vessels and subsystems under assembly, integration, and test can acquire and track live constellation signals without removing the vessel from the building.
- b. Verify GNSS receiver performance, antenna installation integrity, and time-to-first-fix behavior as an integrated element of production acceptance testing, at the point of assembly rather than after launch.
- c. Support continued development of navigation and timing subsystems dependent on GNSS-derived position, velocity, and time.

3. Why indoor re-radiation is necessary

Vessel assembly and integration occur inside a metal-clad industrial building — corrugated steel cladding over a structural frame — which presents on the order of 20 to 40 dB of attenuation at L-band and effectively excludes signals in the 1559–1610 MHz band from the interior. Absent re-radiation, receivers installed in vessels under construction cannot acquire, and no GNSS-dependent function can be exercised until the vessel is moved outdoors: a slow, costly evolution repeated for every defect found and corrected.

The Applicant has considered and rejected GNSS signal simulation for this application. Simulated signals do not exercise the receiver's live-sky acquisition path, do not reproduce actual constellation geometry or signal dynamics, and do not validate the installed antenna and cabling. Re-radiation of live signals is necessary to test what the vessel will experience in service.

The Applicant notes that the same structural property has a second consequence: the building that excludes signals from the interior equally contains re-radiated emissions within it. **This attenuation is not credited anywhere in the Applicant's calculations**, consistent with § 8.3.28(6), which requires free-space assumptions with no allowance for building attenuation. It is identified because it is the reason the system is necessary, and because actual emissions outside the structure will be materially below the calculated values in Exhibit 3.

4. Technical description

The system comprises a Roger-GPS Ltd. model GNSS-L1G1GA re-radiator, a roof-mounted Calian/Tallysman TW3742 active GNSS antenna, and 66 ft (20 m) of RF240 coaxial cable. The outdoor antenna receives live GNSS signals; the re-radiator amplifies them and re-transmits them through an integral low-gain antenna into the interior work area.

Figure 1 — Signal chain

The device performs no frequency translation, demodulation, correlation, or signal generation.

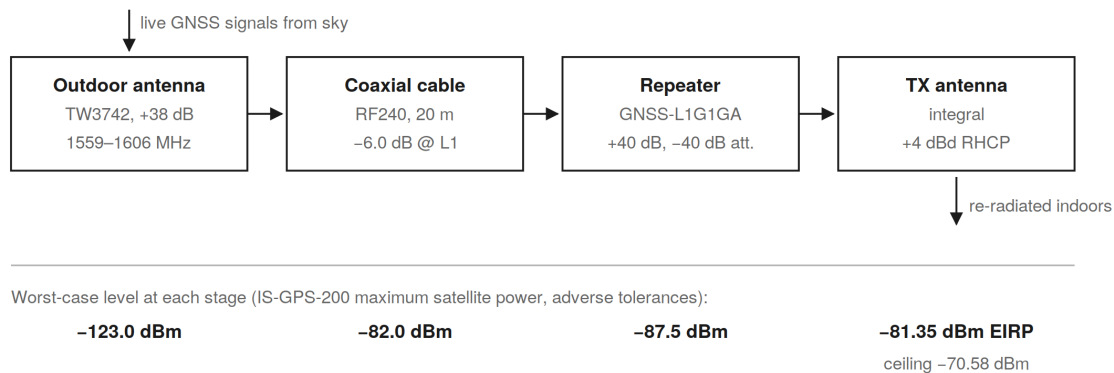


Exhibit 1 §4 / Exhibit 3 §3 — bent-pipe signal chain, worst-case levels

The device performs no frequency translation, demodulation, correlation, or signal generation of any kind. It is a bent-pipe amplifier and cannot originate a signal in the absence of live satellite reception. It incorporates automatic gain limitation, feedback-oscillation suppression, and a manually adjustable 0–40 dB attenuator, which will be set to its mechanical maximum as described in Exhibit 3.

Because the device performs no constellation discrimination, it re-radiates the entire span of its analogue passband. The Applicant therefore requests authorization across **1559.0–1610.0 MHz** rather than for individual constellation frequencies, that range being the accurate description of the station's emissions.

All re-radiation occurs indoors. The equipment is not capable of station identification under 47 CFR § 5.115, and the Applicant requests waiver of that requirement on the grounds that a bent-pipe re-radiator cannot originate an identification signal without corrupting the signals it exists to convey.

5. Emission limit and compliance

The Applicant requests a maximum EIRP of **–70.58 dBm (87.5 pW)**, derived from the criterion in Section 8.3.28(6) of the NTIA *Manual of Regulations and Procedures for Federal*

Radio Frequency Management — calculated emissions no greater than -140 dBm/24 MHz as received by an isotropic antenna at 100 feet from the building, free space, no allowance for building attenuation — with a claimed transmit-antenna-to-exterior-wall standoff of 50 ft.

Exhibit 3 demonstrates that in the licensed configuration the station's worst-case emission is **-81.35 dBm, 10.77 dB below the requested ceiling**, under assumptions chosen throughout to overstate rather than understate emissions.

6. Proximity to Quonset State Airport

The Applicant notes affirmatively, and without request, that Quonset State Airport (KOQU) lies approximately 1.45 statute miles (7,640 ft) east, and that the airfield supports instrument operations, Air National Guard C-130J airlift, and Army National Guard rotary-wing activity. A full aeronautical compatibility analysis is submitted as **Exhibit 4**.

That analysis evaluates two mechanisms. Receiver desensitization is assessed against the ICAO Annex 10 / RTCA DO-229 threshold of -150.5 dBW for C/A-code tracking; at the requested ceiling the level at the airport reference point is 53.8 dB below it. False acquisition of the re-radiated signal — the mechanism producing hazardously misleading position rather than loss of function, and the one responsible for documented incidents involving re-radiators near airfields — is bounded by the range at which re-radiated and direct signals are equal. At the requested ceiling that range is **39 ft**, contained within the building envelope.

The Applicant will notify the airport operator in writing before commencing operation per § 8.3.28(7), and will maintain a stop-buzzer contact reachable at all times during operation.

7. Non-interference status

The Applicant acknowledges that operation under this authorization is on a non-interference, unprotected basis, and that operation must cease immediately upon notification of harmful interference to any authorized service.

Respectfully submitted,



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