FCC PART 5 · EXPERIMENTAL RADIO SERVICE

Exhibit A — Narrative Statement of Research and Experimentation

Submitted in support of Items 4, 5, and 6 answered "No." · Project: **HamVoice** — Voice-Controlled Multi-Vendor CAT Interface for Amateur-Radio Transceivers.

APPLICANT & MOTIVATION

The applicant is **Robert Ayers** (individual applicant), a **service-disabled U.S. military veteran** (U.S. Air Force) and an existing FCC licensee holding **GMRS license WRFL312** (FRN 0029351426). The applicant is **not an amateur licensee**; the Experimental Radio Service (Part 5) is the appropriate authorization for the research described, which involves automated / voice-initiated transmit control and multi-band, multi-mode operation that are not authorized under the applicant's GMRS license and are not accommodated by any radio service the applicant otherwise holds. This experiment is motivated in significant part by **accessibility**: conventional transceiver operation depends on dense manual controls, multi-layer menus, and fine motor manipulation that present a real barrier to operators with mobility, dexterity, or vision limitations — a population that includes many disabled veterans. A reliable, safe, hands-free voice-control layer would materially widen participation in the radio service. The applicant's lived experience as a disabled veteran directly informs the human-factors and interlock design goals below.

a. Program of research and experimentation, including equipment and theory of operation

The applicant proposes to research and develop a **vendor-agnostic, voice-controlled Computer-Aided Transceiver (CAT) control system** ("HamVoice") enabling an operator to command amateur transceivers and software-defined radios through natural spoken language rather than manual controls or vendor-specific software.

Theory of operation. Spoken operator commands are captured locally and converted to intent by an on-device speech-recognition and natural-language layer. Recognized intents are mapped to standardized rig-control instructions and issued to the connected transceiver over its CAT protocol (Icom CI-V; Yaesu / Kenwood / Elecraft CAT; FlexRadio; and SDR back-ends via the Hamlib / `rigctl` abstraction). Commands under test include frequency and band selection, mode selection, memory recall, antenna tuning, and **transmit (PTT) initiation**. A software-defined receiver [Uniden SDS-series / RTL-SDR / other — specify] provides a closed receive-monitoring loop, feeding spectrum and signal telemetry back into

the voice system. Transmit is gated by explicit safety interlocks — positive confirmation of transmit intent, transmit time-out, and automatic station identification — so that voice-mediated operation remains consistent with control-operator responsibility.

Equipment. Icom IC-705 (HF/VHF/UHF QRP SDR transceiver) and **Icom IC-7300 MkII** (HF/6 m SDR transceiver), both controlled via Icom CI-V CAT, with the control abstraction designed to extend to additional vendors (Yaesu / Kenwood / Elecraft / FlexRadio); software-defined receivers including **Uniden SDS-series scanners** and **multiple SDRplay RSP devices**; a control host — a general-purpose computer, an embedded single-board computer (e.g., Raspberry Pi), or a **smartphone / tablet application** (the smartphone mode is central to the hands-free, portable accessibility objective) — running the experimental HamVoice software; a selection of antennas including **end-fed / long-wire HF antennas** at the fixed station, VHF/UHF vertical antennas, and portable field-deployable wire and whip antennas for mobile and POTA use. The experiment is conducted from a **fixed base station at 1000 Lantern Hill Road, Shavertown, PA 18708** (Luzerne County), and also **mobile and portable — including Parks On The Air (POTA) activations** from public lands using the battery-portable IC-705. All portable and mobile operation is temporary and low-power, with no permanent antenna structure or facility construction.

FREQUENCIES, EMISSIONS, AND POWER PROPOSED

The experiment will be conducted across representative HF and VHF/UHF ranges under the requested experimental authorization, so that the voice-control layer is validated across both VHF/UHF and **HF**, where the human-factors and propagation-dependent operating workload are greatest. All operation will conform to the specific frequencies, power, and conditions the Commission specifies in the grant:

Segment	Range	Purpose in experiment
HF — 80 m	3.500–4.000 MHz	Voice-control latency under HF SSB operating workload
HF — 40 m	7.000–7.300 MHz	Band-change + tuning command validation
HF — 20 m	14.000–14.350 MHz	Primary HF SSB / digital-voice test band
HF — 15 m	21.000–21.450 MHz	Cross-band command consistency
HF — 10 m	28.000–29.700 MHz	SSB + digital-voice mode-switch tests
VHF — 6 m	50–54 MHz	VHF PTT / mode interlock validation
VHF — 2 m	144–148 MHz	NBFM transmit-control + auto-ID tests
UHF — 1.25 m / 70 cm	222–225 / 420–450 MHz	UHF command reliability

Emissions: analog voice — SSB (`2K80J3E`) and NBFM (`16K0F3E`); digital voice — FreeDV / Codec2 over SSB (`2K80J2E`). **Maximum power:** ≤100 W on HF and 6 m (Icom IC-7300 MkII); ≤10 W on VHF/UHF (Icom IC-705, QRP). **Estimated program duration and requested license term:** 24 months, allowing for iteration across seasonal HF-propagation conditions and progressive multi-vendor equipment integration.

> Part 5 authority is sought because the experimentation involves **automated / voice-initiated transmit control** and multi-band, multi-mode operation that are not authorized under the applicant's GMRS license and are not accommodated by any radio service the applicant holds — the applicant is not an amateur licensee — precisely the novel, controlled testing the Experimental Radio Service exists to authorize.

b. Specific objectives

1. Determine whether a single natural-language voice abstraction can **reliably and safely** operate transceivers across multiple, incompatible vendor CAT protocols.
2. Characterize **latency, recognition-error rates, and failure modes** of voice-initiated control, and validate transmit safety interlocks (confirmation, time-out, auto-ID) under real over-the-air conditions.
3. Develop and prove a **control-operator-compliant framework for voice/AI-mediated transmit control** — establishing where human confirmation is required and how automated control can be conducted responsibly.
4. **Advance accessible, hands-free station operation for disabled operators, including disabled veterans**, for whom conventional multi-knob, multi-menu rig operation is a barrier — quantifying the accessibility gain and publishing the interlock and interaction patterns that make it safe.
5. Evaluate integration of software-defined **receive monitoring** into the voice-control loop for closed-loop, situationally-aware operation.

c. Reasonable promise of contribution to the radio art / lines not already investigated

No existing amateur or commercial product provides a **unified, vendor-independent natural-language voice-control layer** over the fragmented CAT landscape, integrated with software-defined receive and with **validated safety interlocks for voice/AI-initiated transmit**. This program advances the radio art along several lines not previously investigated:

- **Human-factors and safety of voice-mediated RF control** — a rigorous characterization of how spoken / AI control interacts with control-operator requirements, yielding a reusable interlock framework other experimenters and manufacturers can adopt.

- **Cross-vendor interoperability** — a standardized control abstraction spanning incompatible manufacturer protocols, reducing the vendor fragmentation that constrains the art today.
- **Accessibility for disabled operators and veterans** — hands-free operation materially expands who can participate in the radio service. This is a genuine, under-served public-interest contribution, informed by the applicant's own experience as a service-disabled veteran.
- **Closed-loop SDR-plus-voice operation** — coupling real-time software-defined receive telemetry to voice-driven transmit decisions.

The results — interlock designs, latency and error characterizations, the accessibility findings, and the control-operator framework — are intended to be documented and shared with the amateur and experimental community, contributing to the development, extension, expansion, and utilization of the radio art.