

# STATEMENT ACCOMPANYING REQUEST FOR EXPERIMENTAL AUTHORIZATION

## 1. Introduction

By this application, AeroVironment, Inc. (AeroVironment), requests that the Commission grant a 14 month experimental license to operate facilities within the 2085.5-2097.5 MHz and 2097.5-2109.5 MHz segments at a site, detailed in the attached application, located at:

- Near 162 Echo Hill Lane, Washington, Rappahannock County, Virginia, mobile and airborne, 3.3 km radius, 152 m AGL, centered on NL 38° 42' 35" WL 78° 07' 53"

The testing and experiments continue work for the US Department of Defense (DoD), Defense Advanced Research Projects Agency (DARPA). AeroVironment has contractual agreements with DoD. AeroVironment collaborates with the Mid-Atlantic Partnership of Virginia Tech University to perform the experiments.

The Commission previously granted AeroVironment an experimental license, WN9XHL, for the proposed site and at a site in Blacksburg, Virginia (WJ2XFX) for similar purposes. The grant of this application will reengage testing for the client agency to study and further evaluate the technology. As with the previous grant, the proposed site is based on agency requirement that tests be performed in a location permitting participation of agency personnel.

The following summarizes the testing proposed, the reasons underlying the effort and the technical parameters of the intended operations.

## 2. Purpose and Technology

AeroVironment designs and manufactures small unmanned aircraft systems (SUAS) in support of US and allied Armed Forces to help establish intelligence, surveillance and reconnaissance superiority.

AeroVironment's SUAS DDL™ is a lightweight, low power, bi-directional, digital wireless video link. Compliant with the Small Unmanned Airborne Systems Digital Data Link (SUAS DDL) waveform, it enables enhanced command and control of small UAS. DDL is IP-based to enable flexibility and interoperability between small airborne and ground systems with limited power availability and bandwidth to maximize the systems operating within an area. The primary frequency band supporting US DoD has been the 1780-1850 MHz segment.

The purpose of the experiments is to further examine interference between transmissions in the 2085.5-2097.5 MHz and 2097.5-2109.5 MHz band segments and an RF payload on the aircraft. Radio performance and functional flight tests will be pursued. The experiments will replicate scenario-based environments to discern operational effectiveness and the degree refinements are needed to transceivers, antenna, emission designators, power source and the

overall system. The testing will evaluate the technology's effectiveness in context of the RF payload. Tests will be on an intermittent basis.

### **3. *Deference to Licensed Users***

AeroVironment commits to operations respecting other users of the band and those in adjacent segments. The limited power levels are part of this commitment. The channels provide aircraft control and video and telemetry transmission from the aircraft to the ground. Time slots are dedicated for uplink data and a downlink.

AeroVironment will continue coordination with the Society of Broadcast Engineers' regional frequency advisor as to the 2025-2110 MHz band and to respect broadcast auxiliary operations.

### **4. *Nature of Operations***

#### *Surface Based and Airborne Transmission*

The DDL communications module will use band segments that are 4.68 MHz wide in the 2085.5-2097.5 and 2097.5 – 2109.5 MHz segments for purposes of sending ground based command and control (C2) data to and from the SUAS and to transmit video and telemetry to the ground control station. The technology requires 4.68 MHz for a control channel. The channel will be divided in time between uplink (ground to air) C2 and downlink (air to ground) full motion video and associated metadata at 15 frames per second. Emission Designators are 4M68G7W and 1M56G7W, respectively, with a transmit power at 10W. Transmission control will be from the surface control station to the SUAS via a laptop, console, or tablet. AeroVironment's DDL system is embraced by the US Army as a standard communications architecture for all small unmanned systems, including ground robots.

### **5. *Stop Buzzer***

Bart Decker, Flight Standards Director is available by telephone at (805) 391-1335 or electronic mail, [Decker@avinc.com](mailto:Decker@avinc.com), and will act as a "stop buzzer" if any matters involving interference arise during the testing.

## 6. Transmitting Equipment

The transmitting equipment is AeroVironment Transreceiver Models 75869 and 76778, with up to 5 units sharing the channel in a Time Division Multiple Access (TDMA) manner at the location proposed. It is not experimental.

## 7. Antenna

The Antenna details are as follows:

<b>Antenna</b>	<b>Gain (Nominal)</b>	<b>Polarization</b>	<b>Orientation in Vertical Plane</b>	<b>Oriental in Horizontal Plane</b>
GCU Antenna ASY AeroVironment Stack Patch	9dbi*	Vertical	30	85
Tailboom ASSY AeroVironment Dipole	2.9dbi	Vertical	78	360

\*Major Side Lobe

- E-Plane
  - Gain: +9 or +2 dbi
  - 120 deg
- H- Plane
  - Gain: +9 or +2 dbi
  - 179 deg

## 8. Restrictions on Operations and Interference Protection

AeroVironment understands that experimental operations must not cause harmful interference to authorized facilities. Should any interference occur, AeroVironment will take immediate steps to resolve the interference, including, if necessary, discontinuing operations.

## 9. Waiver of Station Identification Requirements

AeroVironment asks that a waiver of the station identification requirements stated in Section 5.115 of the Commission's rules be afforded.

## **10. Diagram**

A diagram of the operations is provided in the Attachment as is the location of the proposed experiments.

## **Conclusion**

AeroVironment appreciates very much the Commission's and NTIA' and other agency consideration of this application.

Please call upon us if we can respond to any questions.

Attachment

Operations Diagram

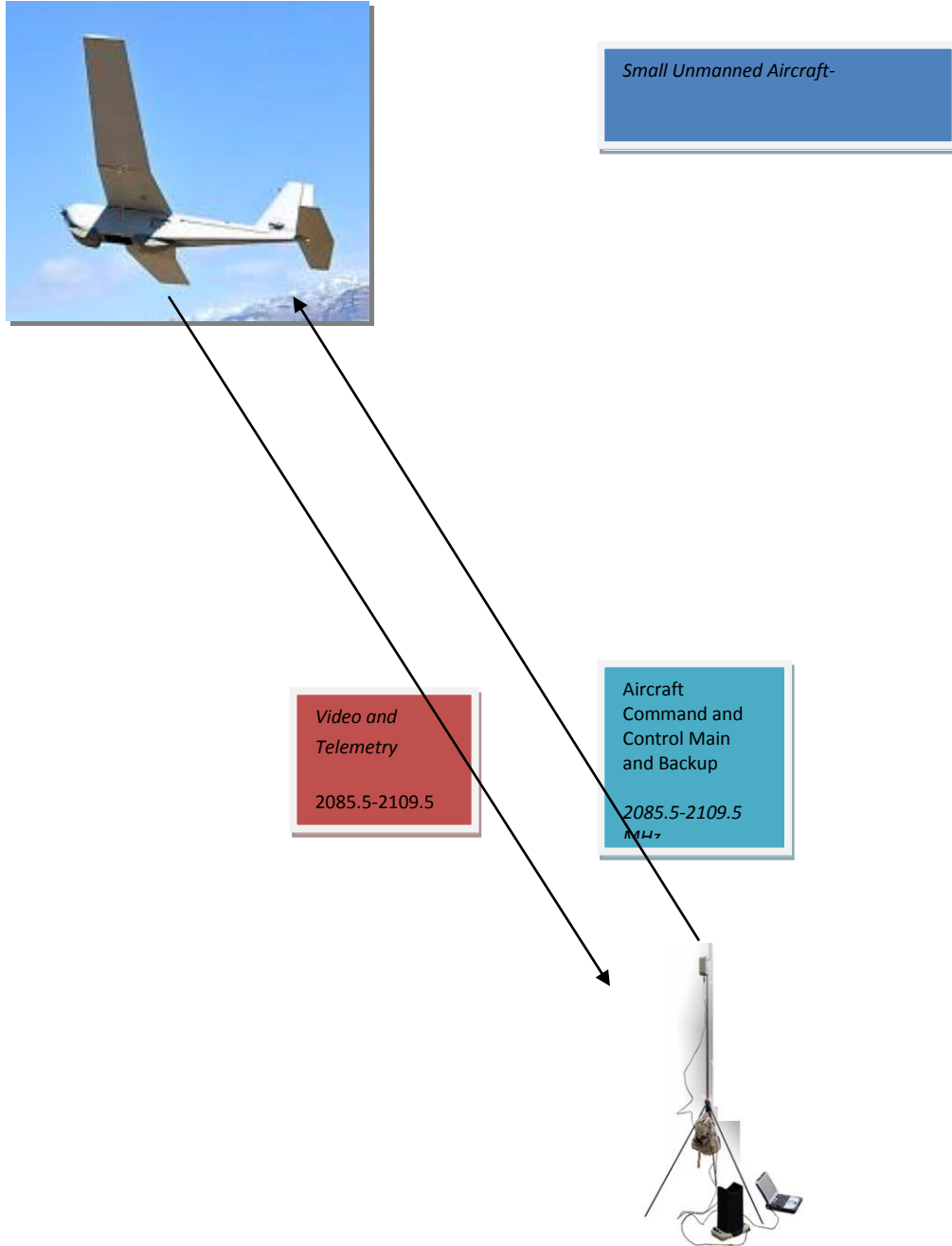


Figure 1 Simplified view of planned operations

### **Location**

Near 162 Echo Hill Lane, Washington, Rappahannock County, Virginia, mobile and airborne, 3.3 km radius, 152 m AGL, centered on NL 38° 42' 35" WL 78° 07' 53"

# Near 162 Echo Hill Lane Washington, Rappahannock County, VA

Write a description for your map.

**Legend**

- CA-
- CA-
- N38 42 35 W78 07 53

N38 42 35 W78 07 53

1000 ft

