

# STATEMENT ACCOMPANYING REQUEST FOR EXPERIMENTAL AUTHORIZATION

## 1. Introduction

By this application, AeroVironment, Inc. (AeroVironment), requests that the Commission grant an experimental license to operate facilities in the 1670-1675 MHz band segment at sites detailed in the attached Form 442, located at:

- East Kern, Kern County, CA , North 35° 03' 20" West 118° 01' 46 " , Edwards Air Force Base, Hyundai
- East Kern, Kern County, CA, North 34° 50' 03 " West 114° 04' 19" , Edwards Air Force Base, Rosamond Lake Bed

AeroVironment's contractual agreements with the US Department of Defense (DoD) include supplying unmanned aircraft systems (UAS) and related services, particularly to the US Army, Marine Corps, Special Operations Command, Air Force and Navy. These systems help establish intelligence, surveillance and reconnaissance superiority.

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

## 2. Purpose and Technology

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 SUAS. DDL is IP-based to enable flexibility and interoperability between airborne and ground systems with limited power availability and bandwidth to maximize the systems operating within an area.

The purpose of the experiments is to examine and analyze integration of acoustic sensors using Passive Acoustic Non-Cooperative Collision-Alert System (PANCAS) technology into the SUAS. PANCAS consists of lightweight acoustic probes, a digital-signal processor, and proprietary windscreen technology and mounts removing the effects of wind noise and platform vibration. The digital signal processor performs acoustic filtering, detection, location and tracking. It interfaces with the SUAS flight control system using the 1670-1675 MHz segment to gather GPS location and aircraft attitude data. It is the coexistence of the PANCAS technology and ability to send data to ground station via the UAS downlink that will be tested and examined.

### 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 commits to coordinate with the licensed spectrum or lease holder and to respect its 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 1670-1675 MHz band 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 has been adopted by the US Army as the standard communications architecture for all small unmanned systems, including ground robots.

### 5. **Stop Buzzer**

Andy Thurling, Chief Test Pilot, Director, Product Safety and Mission Assurance, is available by telephone at 805.581.2198, extension 1892, Mobile Phone 805.368.6351 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 Model 50280. 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 ask that its waiver of the station identification requirements stated in Section 5.115 of the Commission's rules remain in place.

## **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, NTIA's, DoD and other agency consideration of this application.

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

Operations Diagram Attachment

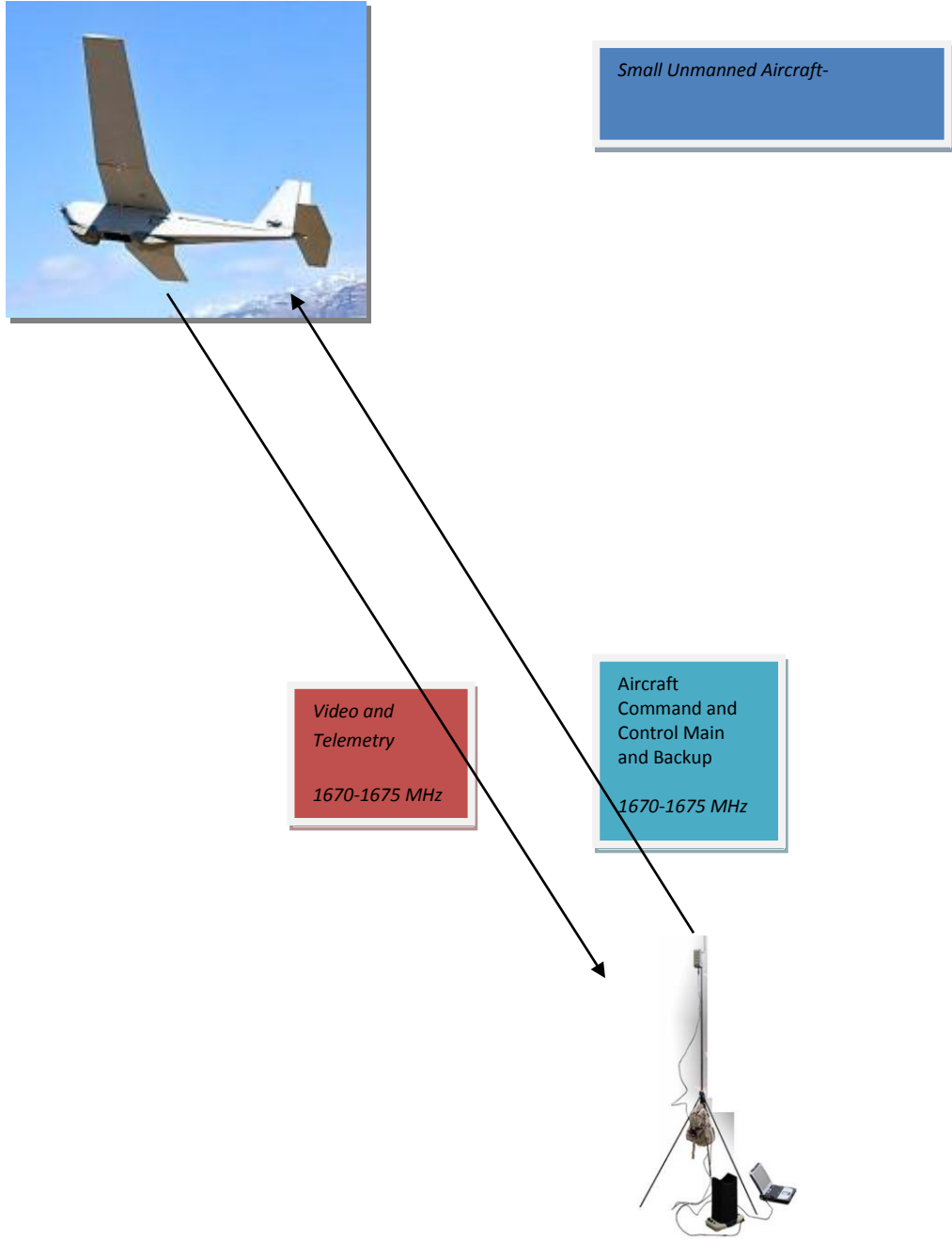
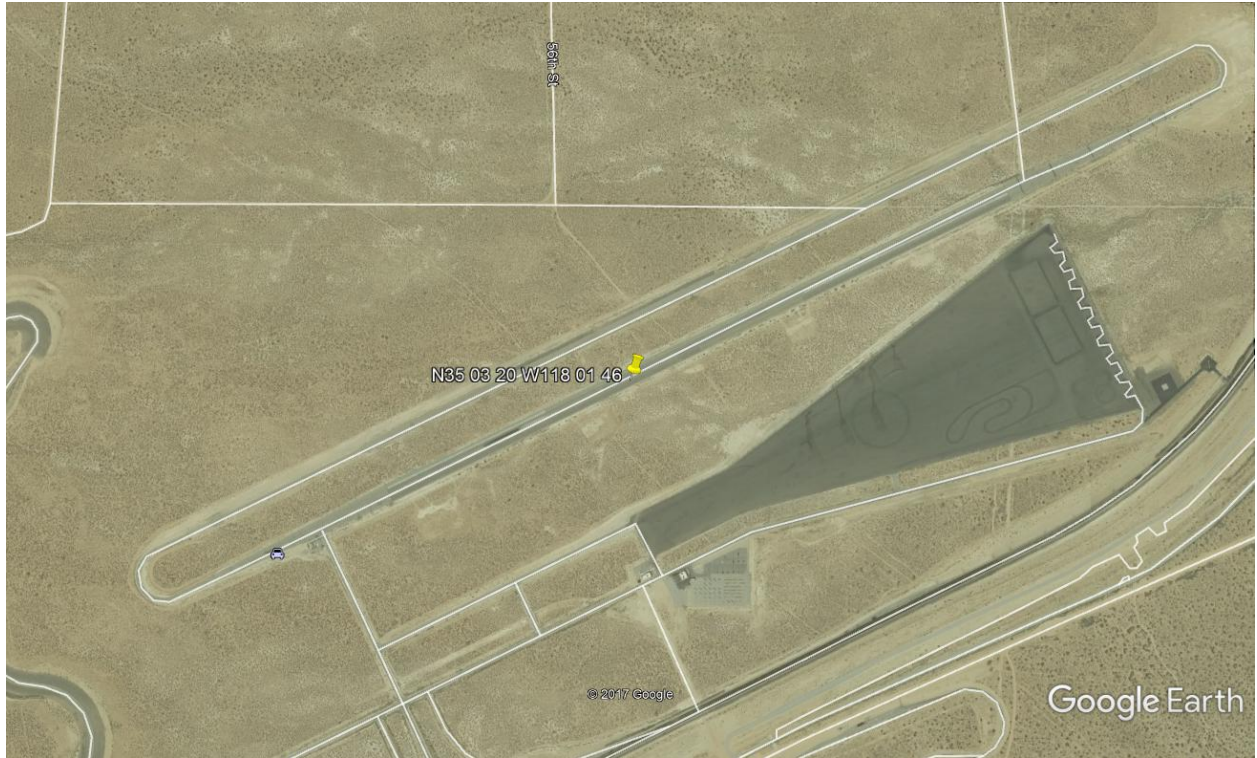


Figure 1 Simplified view of planned operations

## Locations

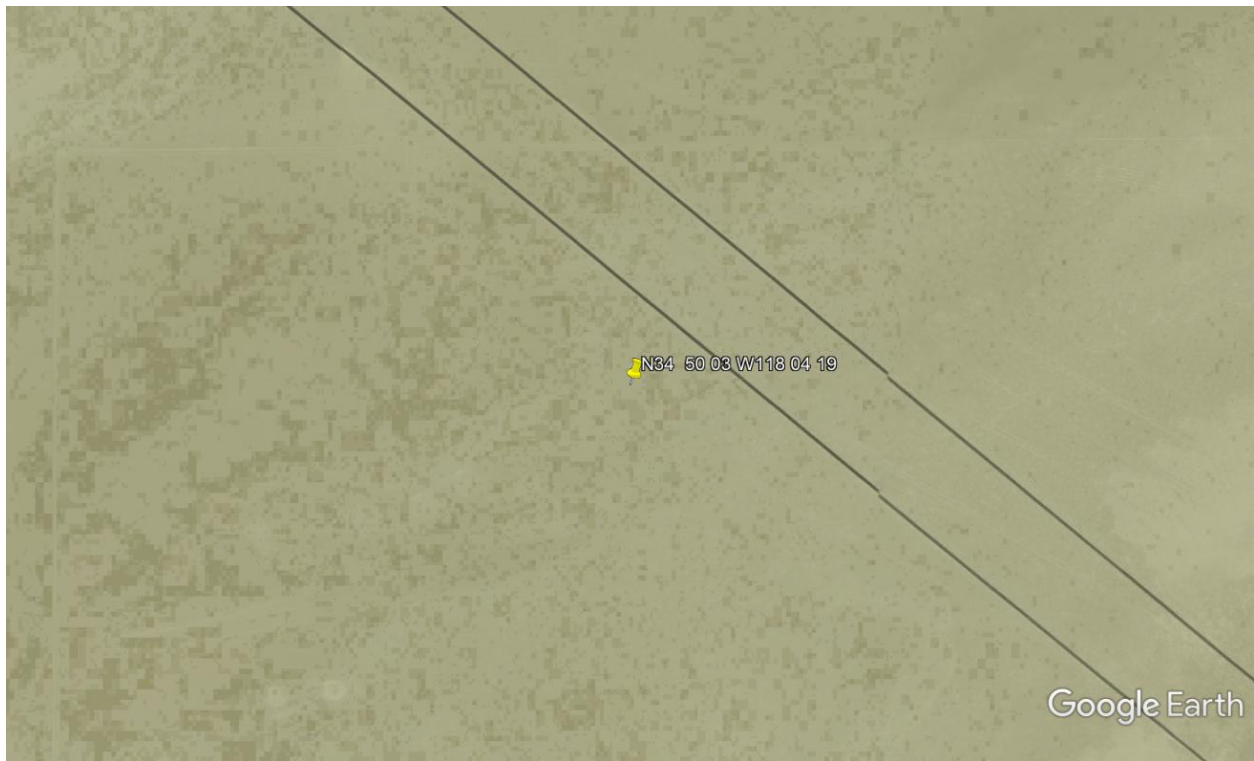


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