STATEMENT ACCOMPANYING REQUEST TO MODIFY EXPERIMENTAL AUTHORIZATION WG2XVN OF AEROVIRONMENT, INC.

1. **Introduction**

By this application, AeroVironment, Inc. (AeroVironment), requests that the Commission grant a modification to call sign WG2XVN to operate facilities within the 1670-1675 MHz band one an additional site. The proposed site is detailed in the attached Form 442.

The experiments involve geographic studies of mountain, cliff and rock formations. There are no modifications to the technical elements of the technology. In this statement, we explain the purpose of the modification and why this application is within the Commission's experimental authorization rules.

2. **Purpose**

The experiments are proposed to take place within an area known as Book Cliffs, Utah, near the base of Mount Elliott. Book Cliffs is a series of Desert Mountains and cliffs commencing in eastern Utah and continuing to western Colorado. The cliffs' composition is drawn from Cretaceous sandstone. Because of the scale of Book Cliffs, it is a prominent geography study area for academic and industry geologist, particularly with regard to sequence stratigraphy. Sequence stratigraphy is the study of sediments and sedimentary rocks repetitively arranged. The work provides insight to factors addressing sediment transport and accumulation in a range of environments.[1]

The purpose of the experiments is to evaluate the small unmanned aircraft system (SUAS) technology's ability to discern varied geological composition and other elements. The work will be carried out by geological scientists who will analyze the information gathered for their professional objectives and to evaluate the technology's capability to provide more cost efficient and effective geological research. The SUAS technology's real time information and imagery will be reviewed in the context of whether it provides informed and accurate assessments and affords lengthier opportunity to scrutinize specimens.

The proposed site also presents a unique environment to test the radio transmissions directing the command and control and payload features of the SUAS and the quality and detail of the data transmissions from the aircraft. How the radio technology will perform in and around the long, precipitous cliffs in these desert mountains is one of the core objectives of the experiments.

As in previous experiments, the research and information resulting from this work is provided to the Federal Aviation Administration (FAA) and is critical to the FAA's congressionally mandated project to integrate SUAS into civilian airspace.

[1] For an informed discussion of Sequence Stratigraphy, *see* SEQUENCE STRATIGRAPHY, Nicholas Christie-Blick and Neal W. Driscoll, Department of Geological Sciences and Lamont-Doherty Earth Observatory of Columbia University, Palisades, New York 10964-8000.
http://www.ldeo.columbia.edu/~ncb/Selected_Articles_all_files/08_Ann.Rev.%20EPS%2023.451.pdf

The detailed results from AeroVironment's experiments are documented and submitted for FAA review on a monthly basis. The Commission's authorization is critical to developing a record demonstrating the safety and effectiveness of commercial small unmanned aircraft.

3. **Technology Use**

The experiments embrace a model using a band segment aligning with technology and equipment currently available. AeroVironment reiterates its commitment to operations respecting other users of the band and those in adjacent segments. The limited power levels proposed are part of this commitment. AeroVironment believes the compelling purpose of bringing these advanced services to the electric utility and railway sectors serves the public interest. The 1670-1675 MHz channels provide SUAS control and video and telemetry transmission from the SUAS to the ground. Slots are dedicated for uplink data and a downlink. There will be only one SUAS airborne at any time.

The proposed location of operations is:

- Near Mount Elliot, Emery County, Utah, within 14 km of the center point, 400' (121.92 m) AGL.

A maps of the site and the parameters of operations are provided in the Contour Attachment.

4. N**ature of Operations**

Surface Based and Airborne Transmission

As noted in our original application, AeroVironment's communications module, Digital Data Link (DDL), will use the 1670-1675 MHz band segment for purposes of sending ground based command and control data to and from the SUAS and to transmit video and telemetry to the ground control station. The technology, capable of operating within 1625-2390 MHz, requires 4 MHz for full motion video and a 1 MHz channel for video 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 or console. 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, will be available by telephone at 805.581.2198, extension 1892, Cell 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 unchanged. It is AeroVironment Transreceiver Model 50280, with 2 units at each location. It is not experimental.

7. **Antenna**

The Antenna details have not changed from the current authorization and are as follows:

Antenna	**Gain** (Nominal)	**Polarization**	Orientation in Vertical Plane	Oriental in Horizontal Plane
GCU Antenna ASY AeroVironment Stack Patch	9dbi*	Vertical	30	85
1670-1675 MHz Tailboom ASSY AeroVironment Dipole	2dbi	Vertical	78	360

*Major Side Lobe

- E-Plane
    - Gain: -2 dbi
    - 120 deg
- H- Plane
    - Gain: -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 requests a waiver of the station identification requirements stated in Section 5.115 of the Commission's rules.

10. **Federal Aviation Administration (FAA) Certificate of Waiver Authorization (COA)**

AeroVironment has or will file applications for a Certificate of Waiver or Authorization with the FAA detailing the areas where the SUAS will be flying during the proposed operations. AeroVironment understands that no operations will be pursued until FAA approval of the COA and that any operations will be within the COA parameters.

11. **Diagram**

A diagram and referenced maps of the proposed operations are provided in the Attachment.

Conclusion

AeroVironment appreciates very much the Commission's consideration of this modification application for an Experimental Authorization. Please call upon us if we can respond to any questions.

Attachment

Operations Diagram

Small Unmanned Aircraft-

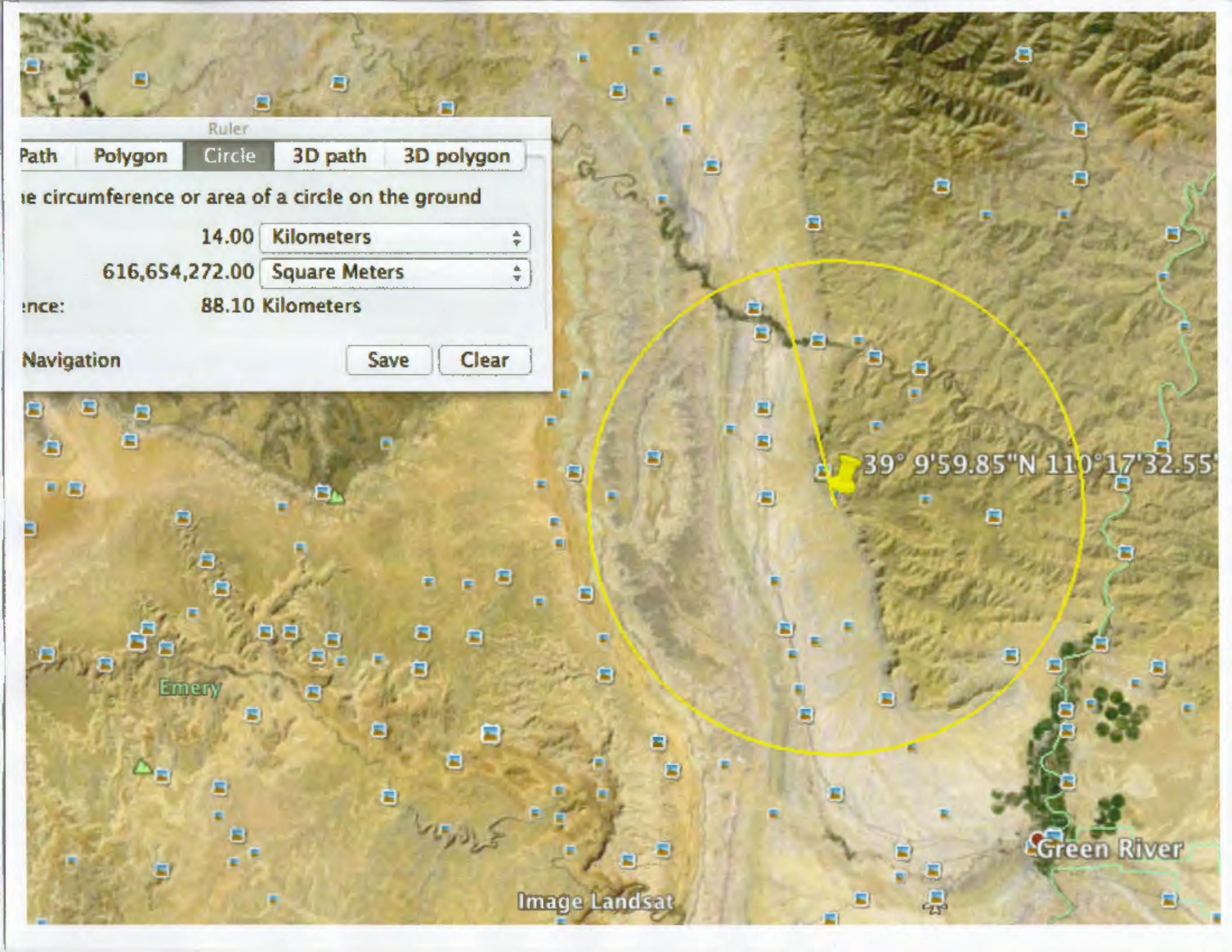
Video and Telemetry

1670-1675 MHz

Aircraft Command and Control Main and

1670-1675 MHz

Contour of Operations


Ruler
Path
Polygon
Circle
3D path
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ıe circumference or area of a circle on the ground
14.00
Kilometers
616,654,272.00
Square Meters
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88.10 Kilometers
Navigation
Save
Clear
39° 9'59.85"N 110°17'32.55"
Emery
Green River
Image Landsat