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 at eight additional sites. These proposed sites are detailed in the attached Form 442. All sites involve petroleum or mining infrastructure and geography located in rural areas. 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 purpose of these experiments is providing analysis and information to further aerial surveillance in support of the operational aspects of petroleum and mining industry infrastructure and geography. The ability of real-time full motion video via small unmanned aircraft system (SUAS) technologies to assist in monitoring on a regular basis, particularly when equipment indicates a malfunction, contributes to better supervision, cost efficiencies and and improved maintenance. Real time information and imagery allows more informed assessments and faster corrective decisions. Data captured by cameras is typically far more accurate than the human eye and provides a longer opportunity to scrutinize the challenge. For nighttime operations, a SUAS can be fitted with an infrared (IR) camera to enhance visibility.

The aerial monitoring and inspections proposed address critical national infrastructure. The objective is demonstrating that the technology can make a meaningful contribution to the important purpose these facilities represent. The experimental authorization also seeks to show how that the technology can enhance emergency response responsibilities associated with the petroleum and mining industries.

3. **Technology Use**

The experiments embrace a model using a band segment aligning with technology and equipment currently available. AeroVironment renews 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 petroleum and mining sectors serve 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.

At each individual site, there will be only one SUAS airborne at any time. Operations will be limited to 400' (121.92 meters) and below. The SUAS will remain within the radius of the exercise center points, which range from 5 to 53 nautical miles.

The proposed location of operations are as follows:

- Coalinga, Fresno County, California, within 18.52 km of the center point
- San Ardo, Monterey County, California, within 18.52 km of the center point, excepting the area of the Camp Roberts Military Operations Area
- Lost Hills, Kern County, California, within 37.04 km of the center point, excepting the area of the Kern National Wildlife Refuge
- McKittrick, Kern County, California, within 18.52 km of the center point
- Kern River, Bakersfield, Kern County, California, within 9.26 km of the center point
- Chuck Rock, McKinley County, New Mexico, within 37.04 km of the center point
- Boquillas Ranch, Cochise County, Arizona, within 98.15 km of the center point, excepting that the radius of operation will be limited in an easterly and westerly direction to 75.9 km from the center point
- Kayenta, Navajo County, Arizona, within 46.3 km of the center point.

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Maps of each site and the parameters of operations are provided in the 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 Federal Aviation Administration 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.

11. **Diagram**

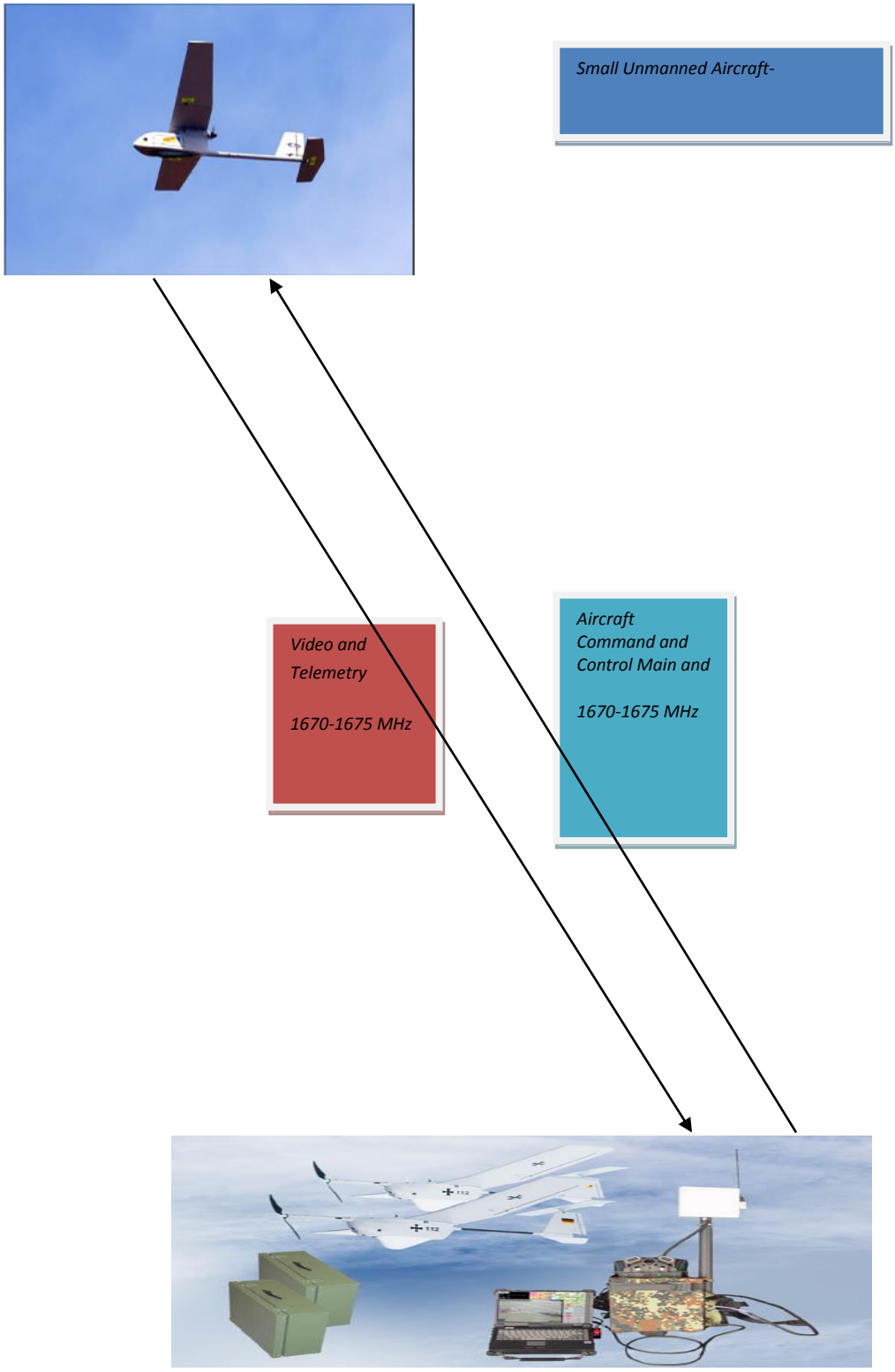
A diagram and maps of the proposed operations is provided in the Attachment.

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.

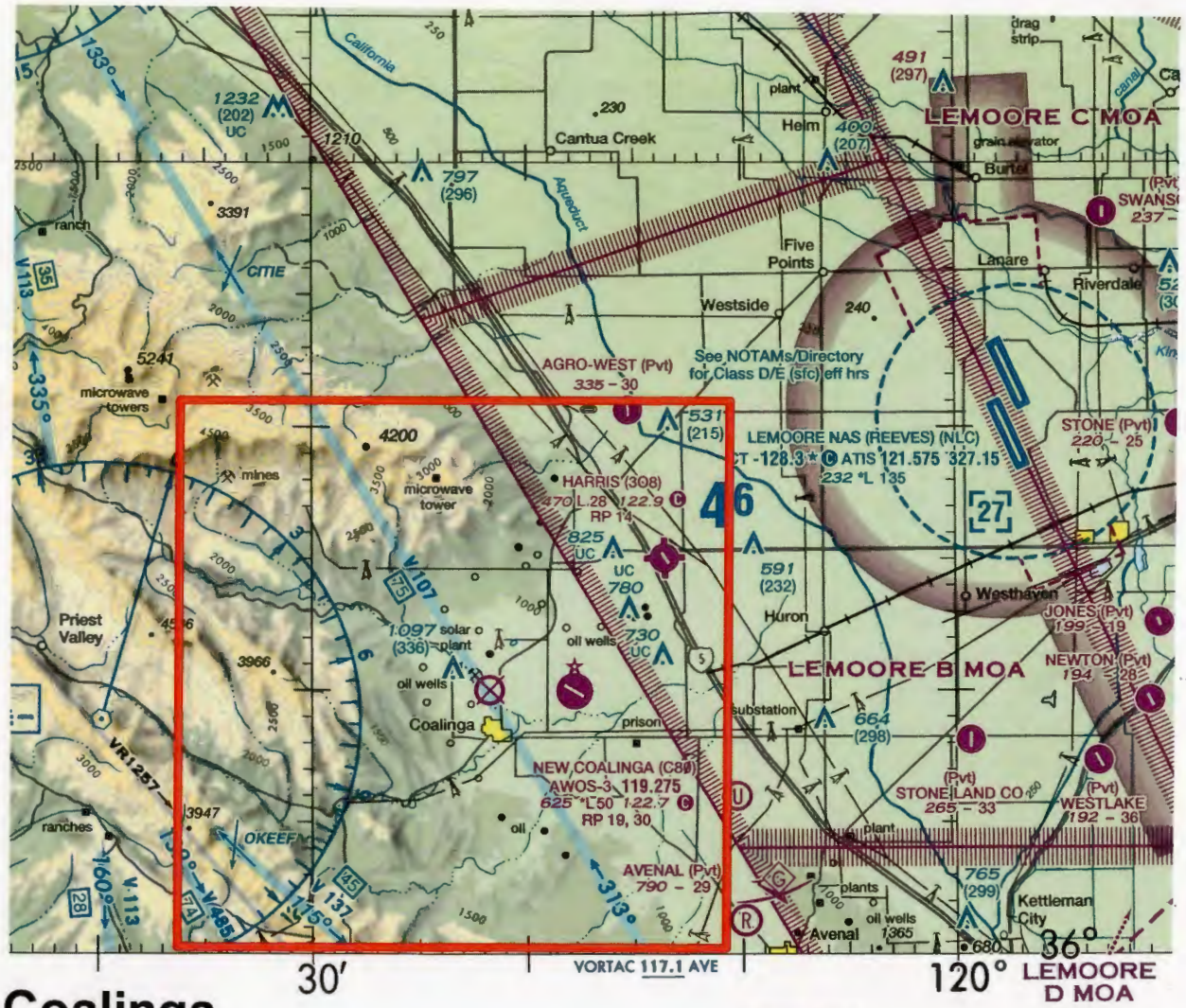
Attachment

Operations Diagram



Operations Contours

Operations Contours



Coalinga
10 NM
PROPOSED AREA OF OPERATION

Distance of Center point from Town - 2.54 NM
Distance of Center point from C80 - 4.49 NM
Distance of Center point from 3O8 - 8.37 NM

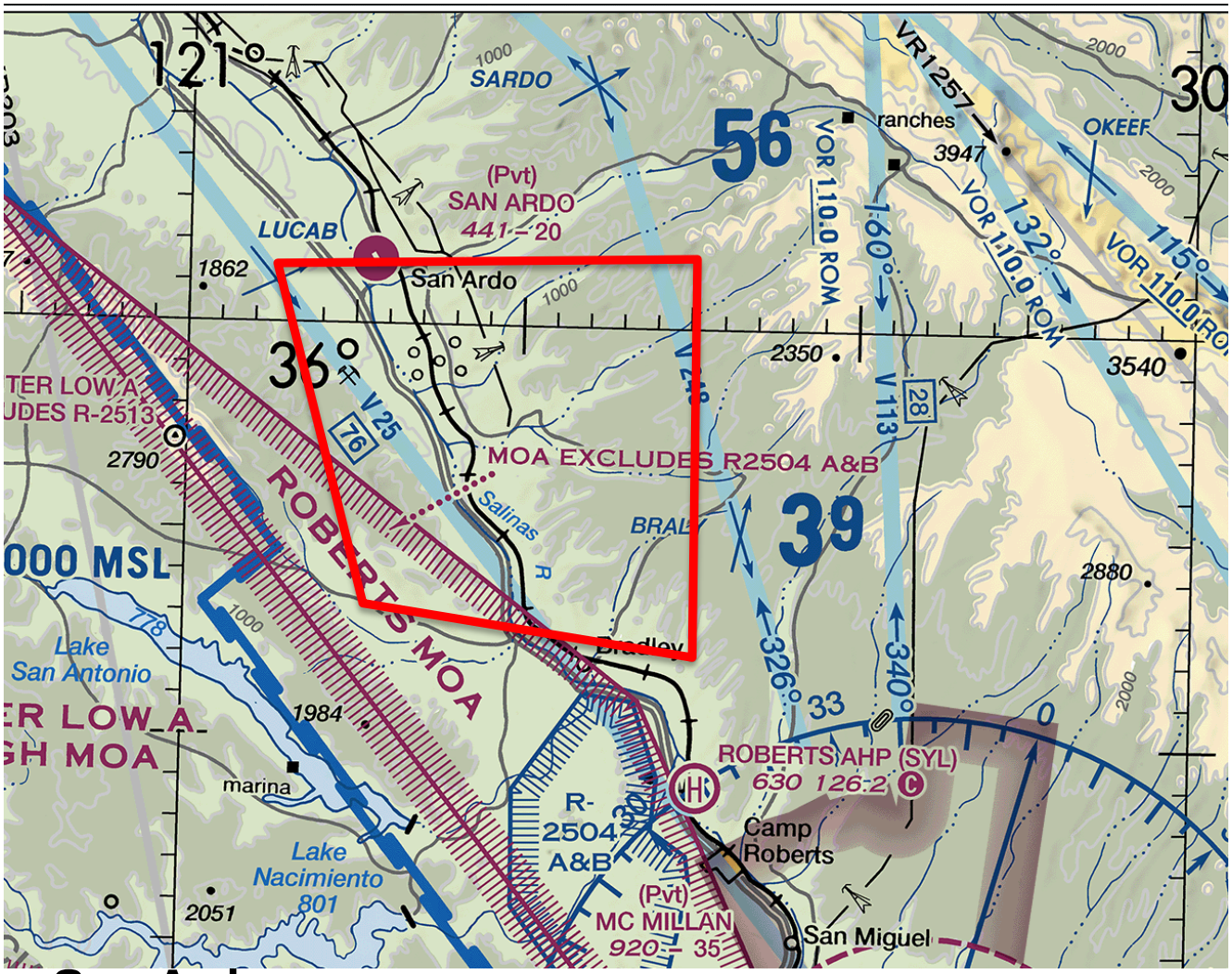
Center Point
N 36°10.23
W 120°23.08

Top Right
N 36°20.14
W 120°11.20

Top Left
N 36°20.17
W 120°35.53

Bottom Right
N 36°00.24
W 120°11.08

Bottom Left
N 36°00.42
W 120°35.46



San Ardo

10 NM except bottom left corner to keep clear of HUNTER LOW A MOA

PROPOSED AREA OF OPERATION

Distance of Center point to Bradley - 6.31 NM
Distance of Center point to San Ardo Field (PVT) - 5.45 NM
Roberts MOA 500agl to 14,999

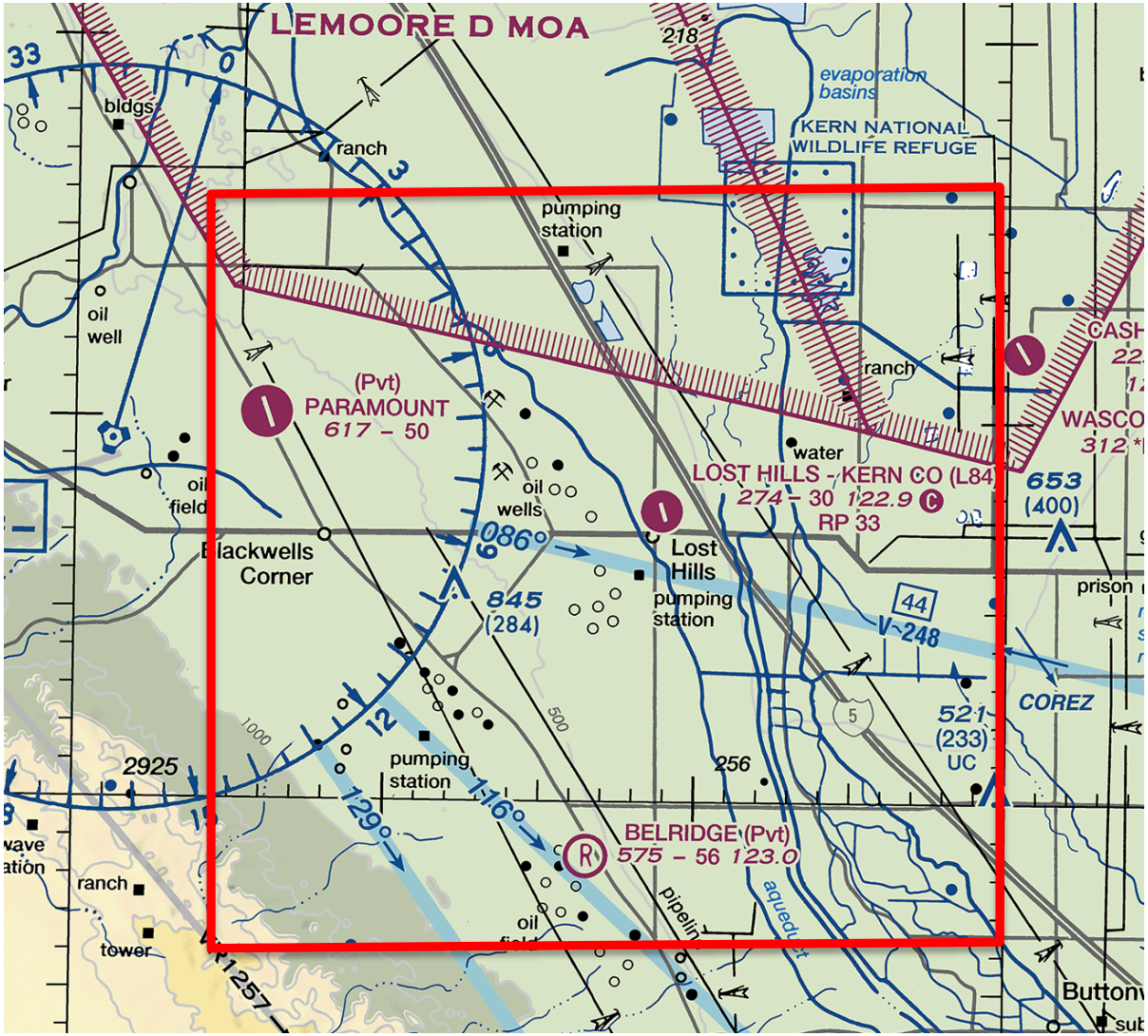
Center Point
N 35 57.19'
W 120 51 51'

Top Right
N 36 02.22'
W 120 45.38'

Top Left
N 36° 02.18'
W 120° 57.66'

Bottom Right
N 35 52.19'
W 120° 45.38'

Bottom Left
N 35°53.75'
W 120° 56.18'



Lost Hills

20 NM (will exclude the Kern National Wildlife Refuge)

PROPOSED AREA OF OPERATION

Distance of Center point from Lost Hills Township - .70nm
Distance of Center point from L84 - .64 NM
Distance of Center point from Paramount (PVT) - 9.11nm
LEMORRE D,E MOA - 5000

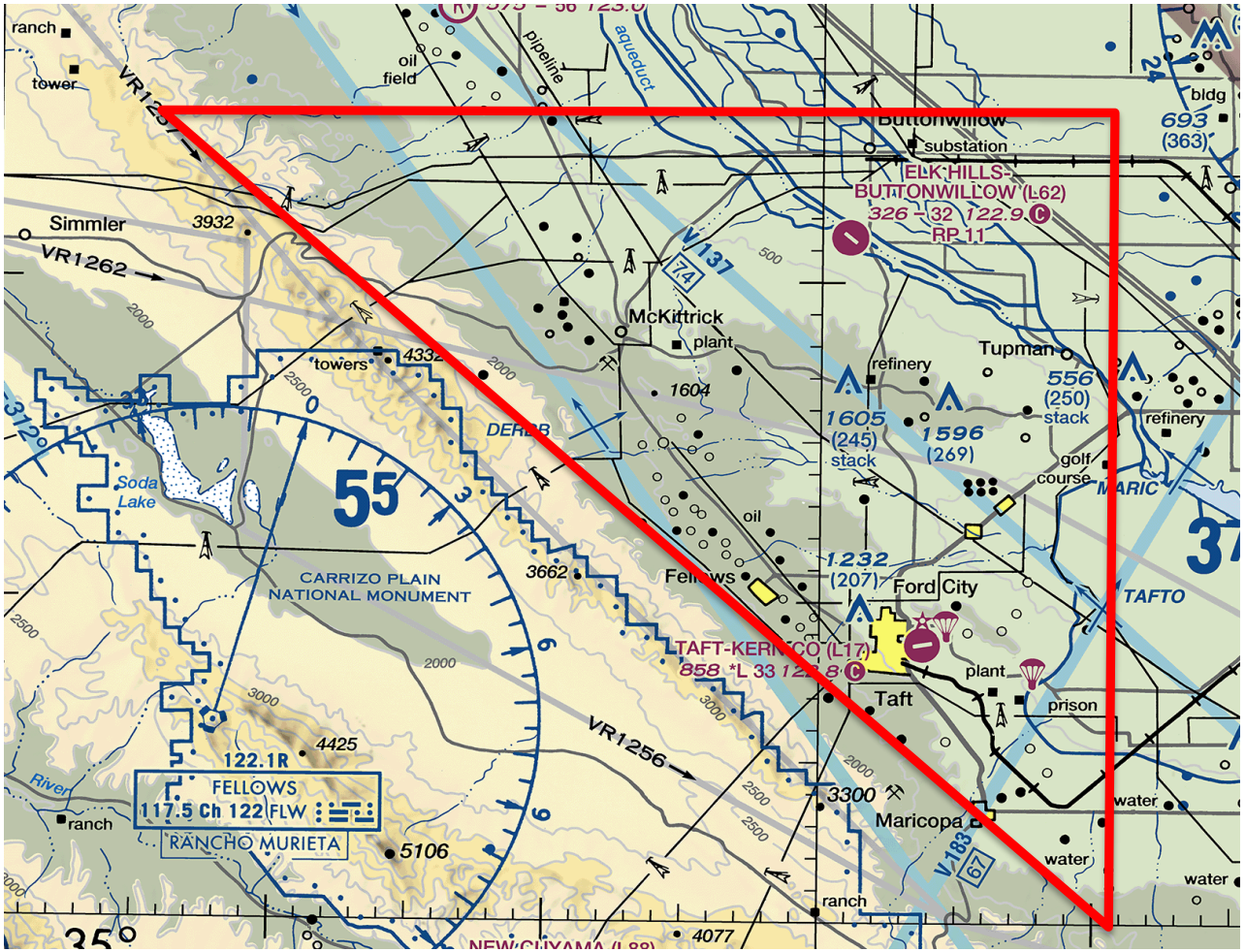
Center **Point**
N 35° 36.20'
W 119° 42.20'

Top Right
N 35° 46.17'
W 119° 30.95'

Top Left
N 35° 46.23'
W 119° 55.54'

Bottom Right
N 35° 26.29'
W 119° 31.00'

Bottom Left
N 35° 26.26'
W 119° 55.59'



McKittrick
10 NM
PROPOSED AREA OF OPERATION

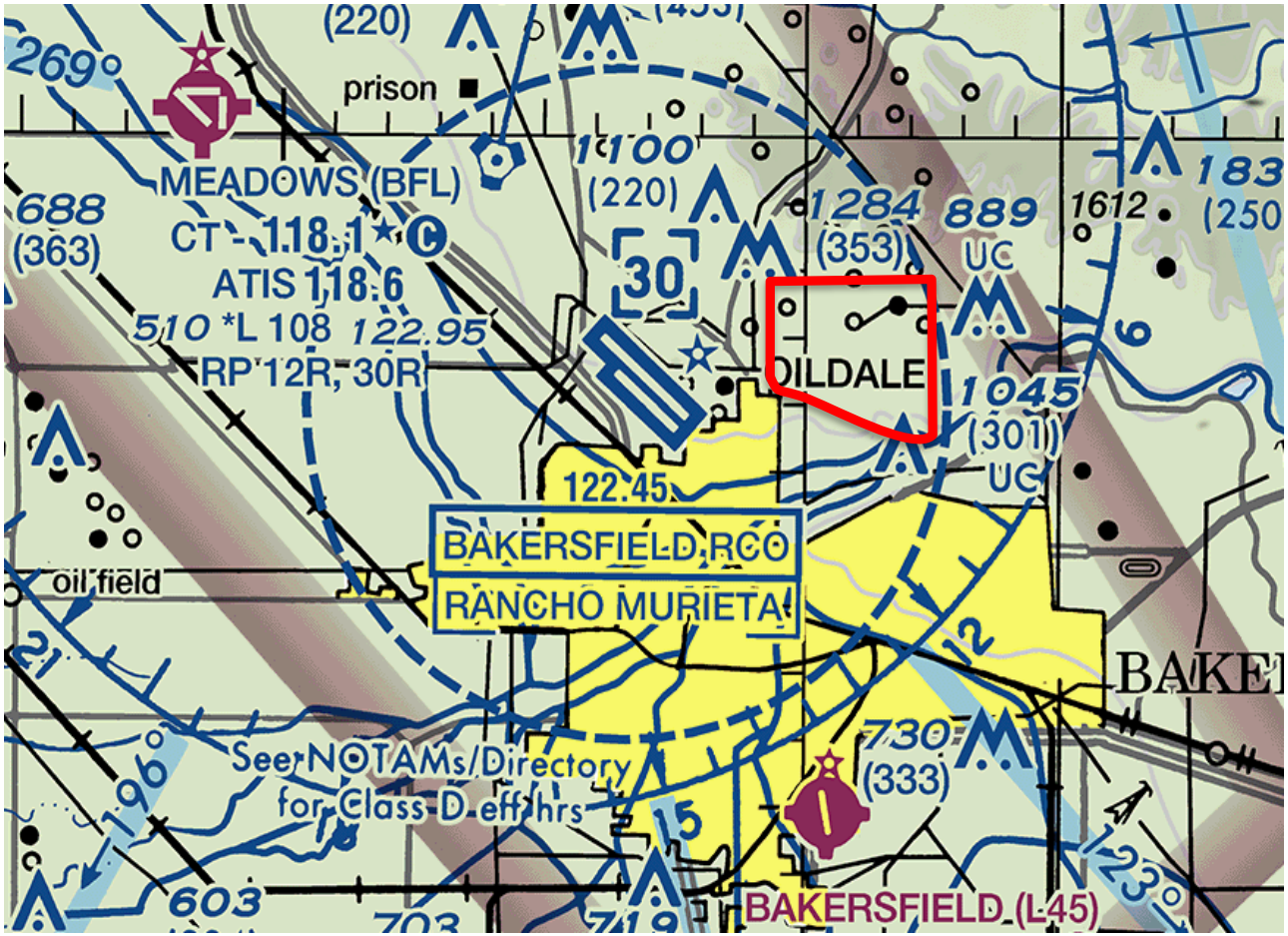
Distance of Center point from Ford City – 11nm
Distance of Center point from L17 – 12nm
Distance of Center point from L62 – 9nm

Center Point
N 35°16.35'
W 119°36.08'

Top Right
N 35°25.65'
W 119°19.57'

Top Left
N 35°25.81'
W 119°54.26

Bottom Right
N 35°03.04'
W 119°19.47'



KERN RIVER
5 NM
PROPOSED AREA OF OPERATION

Distance of Center point from city center – 5.4 NM
Distance of Center point from BFL - 3.29 NM

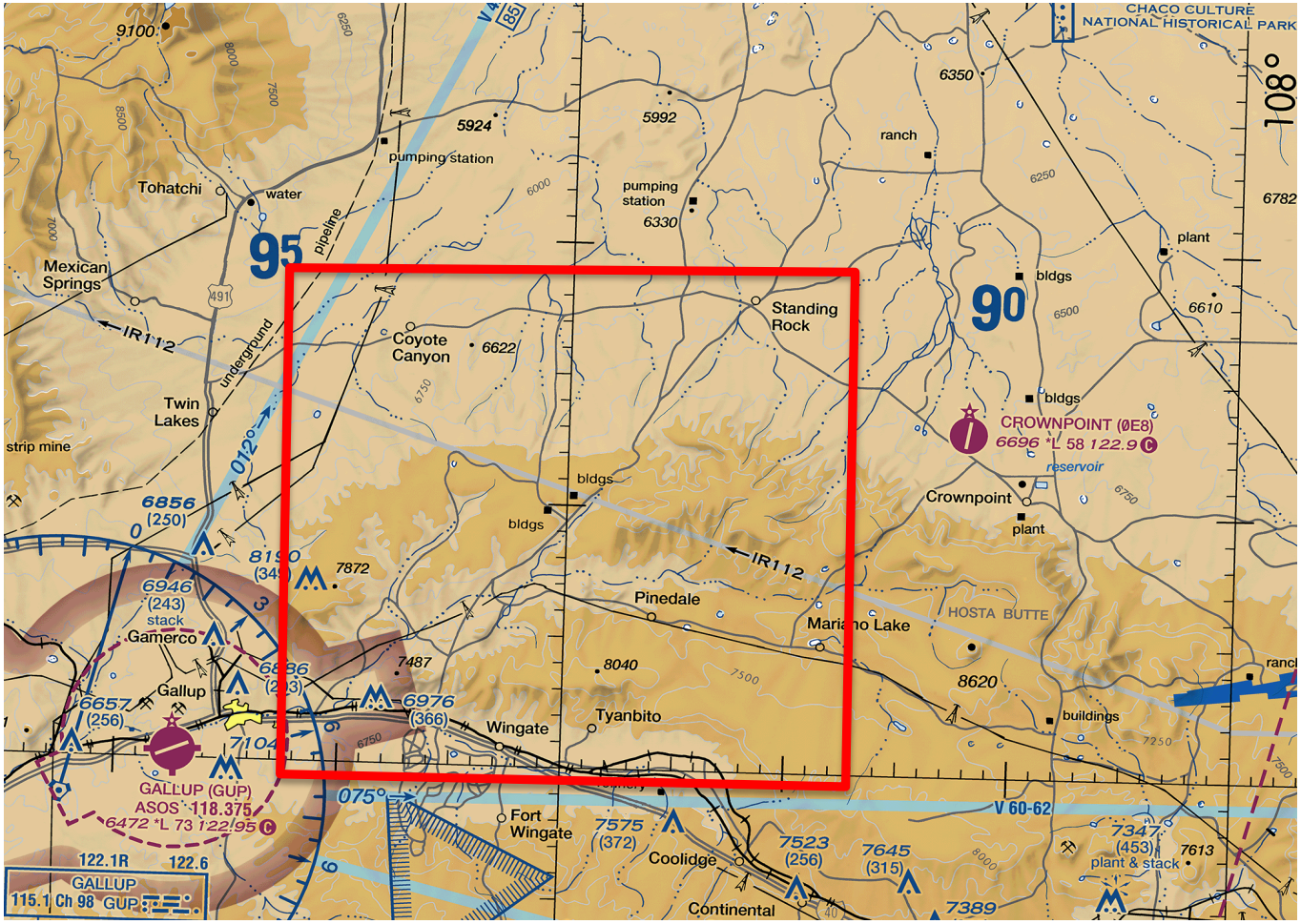
Center Point
N 35°26.56
W 118°59.21

Top Right
N 35°29.43
W 118°56.12

Top Left
N 35°29.39
W 119°02.44

Bottom Right
N 35°24.22
W 118°56.05

Bottom Left
N 35°24.18
W 119°02.36



Chuck Rock

20 NM

PROPOSED AREA OF OPERATION

Distance to City of Gallup from Center point - 15nm
Distance to (GUP) from Center point - 16nm
Distance to (0E8) from Center point from - 15nm

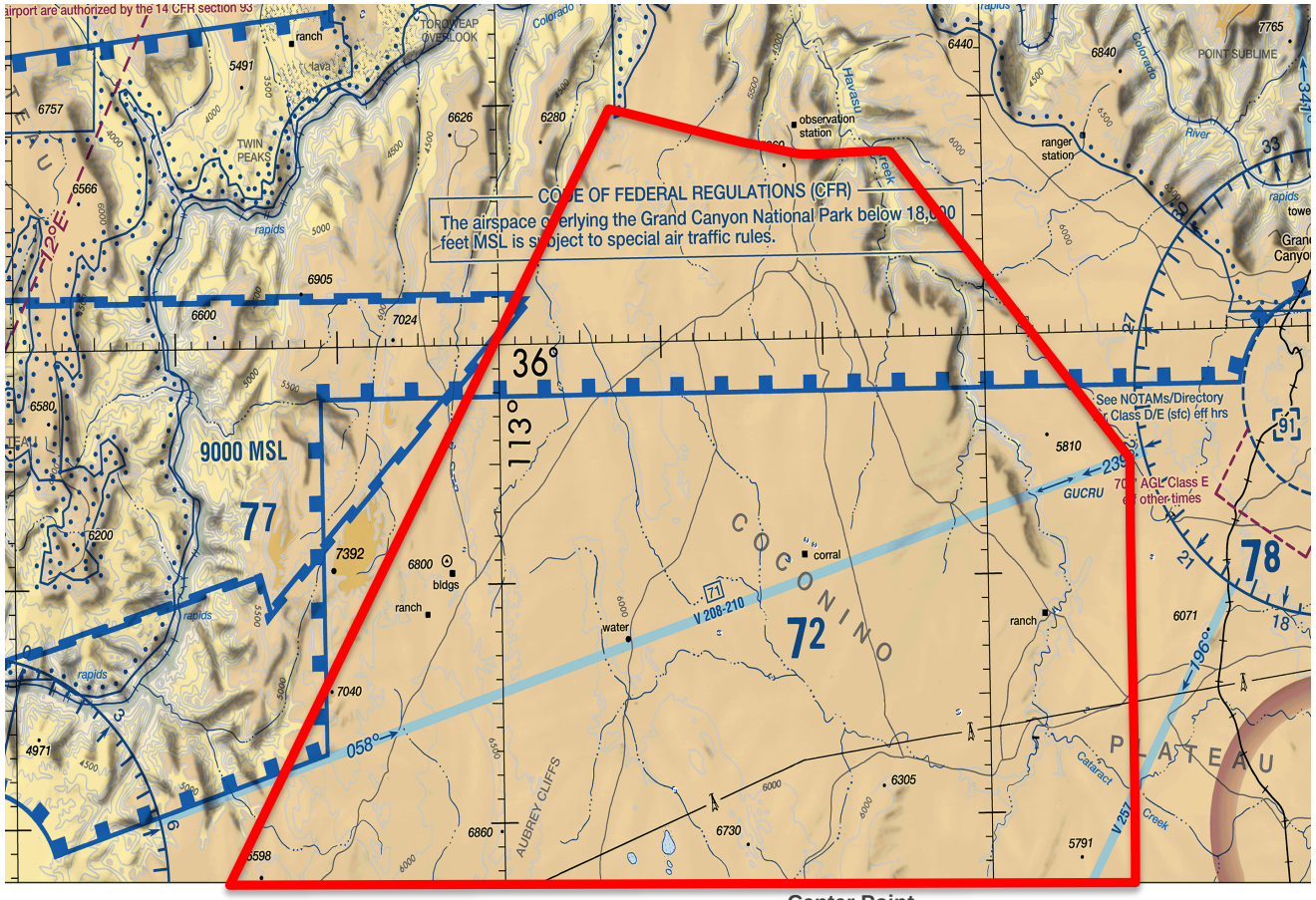
Center Point
N 35°39.38
W 108°30.17

Top Right
N 35°49.38
W 108°17.42

Top Left
N 35°49.46
W 108°42.22

Bottom Right
N 35°29.51
W 108°17.44

Bottom Left
N 35°29.53
W108°42.18



Boquillas Ranch

53NM (South to North) 41NM (West to East)

PROPOSED AREA OF OPERATION

Distance of Center point to GCN - 33nm
Distance of Center point to P23 - 22nm
Distance of Center point Seligman - 22nm

Center Point
N 35°40.57
W 112°44.21

Top Right
N 35°54.46
W 112°22.10

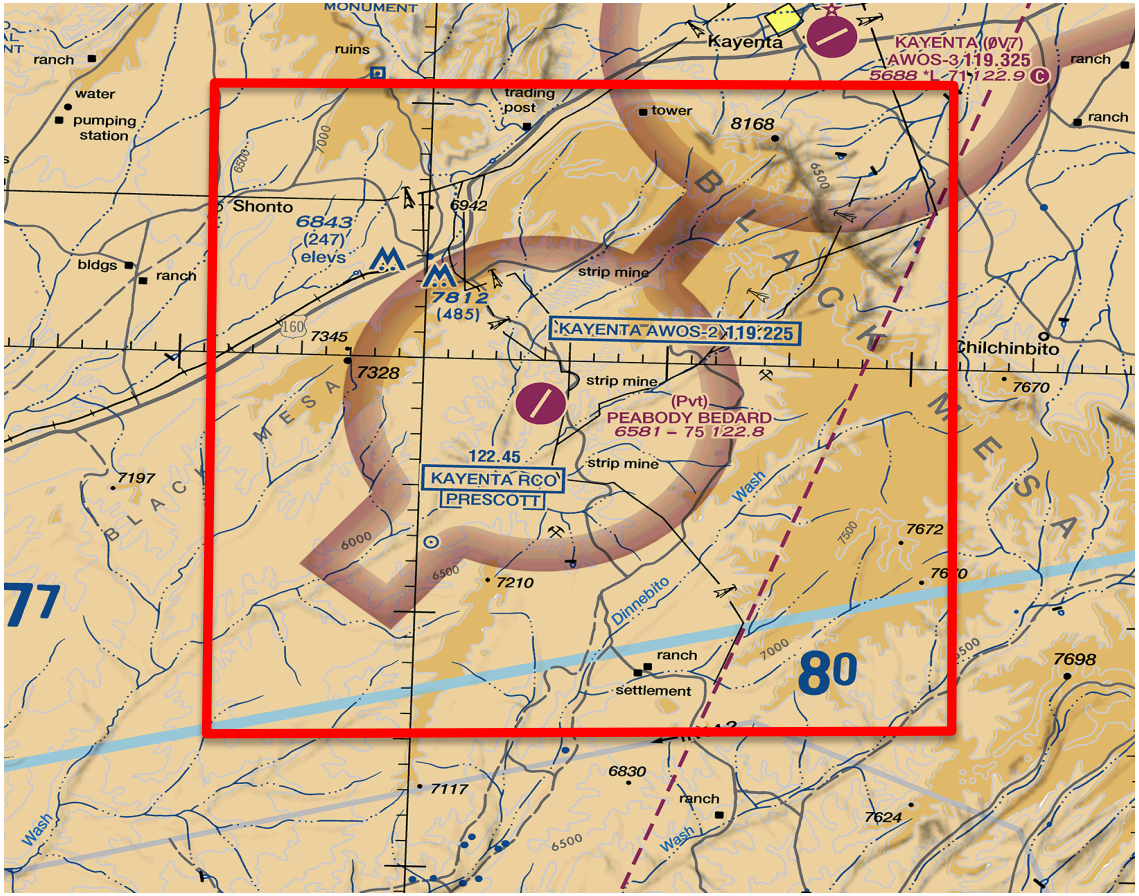
Top Left
N 36°09.48
W 112°53.16

Bottom Right
N 35°07.34
W 112°16.40

Bottom Left
N 35°22.55
W113°27.48

Center Top Left Right
N36°09.59
W112°44.33

Center Top
N36°07.47
W112°36.01



Kayenta
25 NM
PROPOSED AREA OF OPERATION

Distance of Center point from Town of Kayenta – 16.5nm
Distance of Center point from Peabody (38AZ) – 1.13nm

Center Point
N 36°28.14
W 110°23.38

Top Right
N 36°40.55
W 110°08.06

Top Left
N 36°40.39
W 110°39.17

Bottom Right
N 36°15.32
W 110°07.50

Bottom Left
N 36°15.08
W110°38.49