



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Engine & Propeller Directorate  
Manufacturing Inspection District Office #44

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## EXPERIMENTAL OPERATING LIMITATIONS

### RESEARCH AND DEVELOPMENT, MARKET SURVEY & CREW TRAINING

**MAKE:** Aurora Flight Sciences, Inc.    **SERIAL NO:** 42.MN004

**MODEL:** Diamond DA42 M NG                      **REGISTRATION NO:** N51AU

These limitations are a part of an FAA Form 8130-7 dated October 29, 2015. This aircraft is governed by the operating rules contained in 14 Code of Federal Regulations (14 CFR) Part 91, and is subject to the operating limitations listed below:

1. No person may operate this aircraft unless FAA Form 8130-7 is displayed at the cabin or cockpit entrance and is visible to all flight crew members.
2. No person may operate this aircraft for other than the purpose of research and development, market survey, or crew training to accomplish the flight operations outlined in the Aurora Flight Sciences, Inc. program letter, Aurora Report No. AR15-273-, dated October 1, 2015, which describes compliance with 14 CFR 21.193(d), and has been made available to the pilot in command of the aircraft. In addition, this aircraft must be operated in accordance with applicable air traffic and general operating rules in 14 CFR part 91, and all additional limitations herein prescribed under the provisions of 14 CFR 91.319(i).
3. When changing between operating purposes for research & development, market survey, and crew training, the operator must determine that the aircraft is in a condition for safe operation and appropriate for the purpose intended. A record entry will be made by persons authorized in Limitation # 11 to document that finding in the aircraft logbook. Major modifications must be flight tested prior to conducting market survey or crew training flights. These flight tests require five takeoffs and landings over a period of ten flight hours. The successful completion of the flight tests must be recorded in the aircraft log.

4. No flight operations will be conducted without the Pilot-in-Command aboard and in control of the aircraft.

5. The primary (home) base of operation for this aircraft is to be the Manassas Regional Airport (KHEF), Manassas, VA. All flights must be conducted within the area depicted in the Aurora Flight Sciences, Inc. Program Letter, Aurora Report No. AR15-273- dated October 1, 2015 depicted and designated by:

The attached chart, Figure 1 and Figure 2 (detailed), Manassas (KHEF) Flight Test Operations Area for Centaur OPA Flight Test Operations, and as defined by the coordinates in Table 1, Manassas (KHEF) Flight Test Operations Boundary Coordinates, on Pages 10, 12, 13 of 14 of these Operating Limitations.

AND

The attached chart, Figure 3, Griffiss, (KRME) Flight Test Operations Area for Centaur OPA Flight Test Operations, and as defined by the coordinates in Table 2, Griffiss (KRME), Flight Test Operations Boundary Coordinates, both on Pages 10, 13 of 14 of these Operating Limitations.

AND

The attached chart, Figure 4, Spaceport America (9NM9) Flight Test Operations Area for Centaur OPA Flight Test Operations, and as defined by the coordinates in Table 3, Spaceport America (9NM9), Flight Test Operations Boundary Coordinates, both on Pages 11, 14 of 14 of these Operating Limitations.

6. All previously flight-proven systems may be installed or removed as required, and that activity recorded in the aircraft log by persons authorized in Limitation # 11. Any resultant weight and balance change must be computed and made a part of the aircraft record.

7. All flights must be conducted in accordance with the applicant's program letter dated October 1, 2015.

8. The aircraft, ground control station, and support equipment must not be operated unless it is inspected and maintained in accordance with the FAA accepted Aurora Centaur OPA maintenance and inspection program. The inspection program must meet at least the minimum requirements as set forth in 14 CFR Part 43, Appendix D.

9. No person may operate this aircraft unless within the preceding 12 calendar months it has had a condition inspection performed in accordance with, the FAA accepted Aurora Centaur OPA maintenance and inspection program and was found to be in a condition for safe operation. This inspection will be recorded in the aircraft maintenance records.

10. Inspections must be recorded in the aircraft maintenance records showing the following, or similarly-worded statement: **“I certify that this aircraft has been inspected on (date) in accordance with the scope and detail of the FAA accepted Aurora Centaur OPA maintenance and inspection program, and was found to be in a condition for safe operation”**. The entry will include the inspection date, the aircraft’s total time-in-service, and the name, signature, certificate number, and type of certificate held by the person performing the inspection.

11. Only FAA-certificated mechanics with appropriate ratings as authorized by 14 CFR 43.3 may perform inspections required by these operating limitations.

12. Aircraft flights may be conducted during day or night, in visual meteorological conditions (VMC), in instrument meteorological conditions (IMC), under visual flight rules (VFR), and under instrument flight rules (IFR). The aircraft must be equipped per 14 CFR Part 91.205. For night operations, the means to disengage the OPA system must be illuminated.

13. The OPA system has completed the flight hour requirement for Phase 1 flight testing, which limited the OPA’s system operation at or above 1500 feet AGL. Aurora may proceed with testing designated in the Aurora Flight Sciences approved flight test plan. This testing includes Automated Takeoff and Landing (ATOL) ATOL testing will not be performed on any runway with less than 1.3 times the distance calculated for takeoff or landing.

14. Altitude is restricted to a maximum FL250, and speed is restricted to a maximum of 188 kts indicated airspeed.

15. Ground based uplinks and uploaded commands to the aircraft can only be initiated while the aircraft is in its defined flight test operations area.

16. Aircraft instruments and equipment installed and used under 14 CFR 91.205 must be inspected and maintained in accordance with the requirements of 14 CFR part 43 and 91. Any maintenance or inspection of this equipment must be recorded in the aircraft maintenance records.

**17.** No person may be carried in this aircraft unless that person is essential to the purpose of the flight. The pilot in command of this aircraft must advise each passenger of the experimental nature of this aircraft, and explain that it does not meet the certification requirements of a standard certificated aircraft. All such persons shall be fully instructed regarding the nature of the flights to be performed. Records are to be kept on these flights, including:

- a.** Name of occupants.
- b.** Duty of occupants.
- c.** Date of flight.

**18.** The OPA system shall not impede the pilot from overriding or otherwise controlling the aircraft using normal control input forces. The PIC shall have the ability to immediately override any installed system.

**19.** ANE-MIDO-44 must be notified, and its response received in writing, prior to flying this aircraft for crew training and market survey, after incorporation of a major change as defined by 14 CFR 21.93.

**20.** This aircraft must contain the placards, markings, etc., required by 14 CFR 91.9.

**21.** This aircraft must display the word "EXPERIMENTAL" in accordance with 14 CFR 45.23(b).

**22.** If aircraft, engine, or propeller operating limitations are exceeded, an appropriate entry will be made in the aircraft records.

**23.** This aircraft is prohibited from acrobatic flight, that is, an intentional maneuver involving an abrupt change in the aircraft's attitude, an abnormal attitude, or abnormal acceleration not necessary for normal flight.

**24.** This aircraft does not meet the requirements of the applicable, comprehensive, and detailed airworthiness code as provided by Annex 8 of the Convention on International Civil Aviation. The owner/operator of this aircraft must obtain written permission from another country's CAA prior to operating this aircraft in or over that country. That written permission must be carried aboard the aircraft, together with the U. S. airworthiness certificate and, upon request, be made available to an FAA inspector or the CAA in the country of operation.

**25.** No person may operate this aircraft for carrying persons or property for compensation or hire.

26. This aircraft must be flown in such a manner that it will not constitute a hazard to persons or property on the ground.
27. The pilot in command of this aircraft must notify air traffic control of the experimental nature of this aircraft when operating into or out of airports with operating control towers.
28. This aircraft must not be used for glider towing, banner towing, or intentional parachute jumping.
29. Any external stores carried must be attached in a manner such that they cannot be jettisoned in flight.
30. Any flights that occur in military operating areas (MOA) or restricted areas must be approved prior to such operations. Written authorization for such flights must be carried aboard the aircraft during all such operations.
31. 14 CFR 47.45 requires that the FAA Aircraft Registry must be notified within 30 days of any change in the aircraft registrant's address. Such notification is to be made by submitting AC Form 8050-1 to AFS-750 in Oklahoma City, OK.
- 32. Supplemental Pilot.** For the purposes of the flight operations the Supplemental Pilot (SP) is acting as the control station pilot, therefore the terms Supplemental Pilot and Control Station Pilot may be used interchangeably.
33. Prior to all flight operations, the PIC and SP shall conduct a thorough pre-flight briefing to discuss operational aspects of the flight to be conducted including crew coordination and normal/emergency procedures.
34. The PIC must be aboard the aircraft for all flight operations. The PIC has responsibility and is accountable for each flight. The PIC is responsible for the safety of the aircraft, as well as for persons or property along the flight path. This includes, but is not limited to, collision avoidance, and safety of persons and property in the air and on the ground. The PIC shall have the ability to immediately override any installed system that can be operated remotely or by automation.
- 35. Aircraft PIC currency, flight review and training.**
- a. The Pilot-In-Command of this aircraft shall hold, as a minimum, an FAA private pilot certificate, airplane category, with multi-engine class and instrument rating. In accordance with 14 CFR 61.113, no person who holds

a private pilot certificate may act as pilot in command for compensation or hire unless the flight is incidental to that business or employment. In all other cases, the pilot in command must be in possession of a valid commercial pilot certificate per 14 CFR 61.113.

b. The PIC must have a flight review in manned aircraft every 24 calendar months in accordance with 14 CFR 61.56, Flight review.

c. The PIC must maintain currency in the aircraft in accordance with documented Aurora Flight Sciences company procedures.

d. The PIC must have completed applicable Aurora Flight Sciences training for the aircraft.

e. The PIC must have, and be in possession of, a valid second-class (or higher) airman medical certificate issued under 14 CFR part 67, Medical Standards and Certification.

**36. Control Station/Supplemental Pilot (SP) currency, flight review and training.**

a. The SP must hold, and be in possession of, as a minimum, an FAA private pilot certificate, airplane category, with a multi-engine class rating. Alternatively, supplemental pilots that do not hold an FAA private pilot certificate must have successfully completed private pilot ground school or an FAA recognized equivalent, and must have successfully passed the private pilot, commercial pilot, or airline transport pilot knowledge test within the past 24 calendar months. The Centaur OPA SP cannot assume the role of PIC.

b. The SP must have a flight review in manned aircraft every 24 calendar months in accordance with 14 CFR 61.56, Flight Review.

c. The SP must maintain currency in the aircraft in accordance with documented Aurora Flight Sciences company procedures.

d. The SP must have completed applicable Aurora Flight Sciences training for the aircraft.

e. The SP must have, and be in possession of, a valid second-class (or higher) airman medical certificate issued under 14 CFR part 67, Medical Standards and Certification.

f. The SP must perform crew duties for only one aircraft at a time.

### **37. Equipage.**

a. The aircraft must be equipped with an operable transponder with Mode C or Mode S, and 2-way communications equipment allowing communication between the PIC, SP and ATC.

b. The aircraft must be equipped with operable navigation, position and/or strobe/anti-collision lights. Strobe/anti-collision lights must be illuminated during all flight operations.

c. Aurora Flight Sciences shall operate the aircraft's transponder in accordance with 14 CFR part 91, or as instructed by ATC.

### **38. Frequency Approval.**

a. Before any flight operations, the frequency spectrum used for operation and control of the aircraft must be approved by the Federal Communications Commission (FCC) or other appropriate government oversight agency, as required.

### **39. Communications.**

a. Appropriate air traffic frequencies must be monitored during all flight operations.

b. All crew positions must maintain 2-way communications with each other during all operations. If unable to maintain such 2-way communication, the aircraft PIC will expeditiously return the aircraft to its base of operations while remaining within the flight test area, and conclude the flight operation.

### **40. Revisions and Other Provisions.**

a. The experimental airworthiness certificate, the Aurora Flight Sciences Centaur OPA program letter and operating limitations cannot be reissued, renewed or revised without application being made to ANE-MIDO-44, in coordination with AIR-100. AIR-100 will be responsible for FAA Headquarters internal coordination with the Aircraft Certification Service, Flight Standards Service, Air Traffic Organization, Office of the Chief Council, and Office of Rulemaking.

b. Aurora Flight Sciences shall notify ANE-MIDO-44 and AIR-100 if the aircraft listed in these operating limitations is intended to be flown under a Certificate of Waiver or Authorization (COA) during the effective period of the experimental certificate.

c. The provisions and limitations annotated in this operational approval may be amended or cancelled at any time as deemed necessary by FAA.

d. All revisions to the Aurora Flight Sciences Centaur OPA FAA-accepted maintenance and inspection program (MX Program) must be reviewed and accepted by the Washington-Dulles Flight Standards District Office, AEA-FSDO-27.

#### **41. Aircraft Modifications.**

a. All software changes will be documented as part of the normal maintenance procedures and will be available for inspection. All software changes to the aircraft and control station are classified as major changes and must be provided in summary form to ANE-MIDO-44 prior to installation.

b. All major modifications, performed under the experimental certificate, COA, or other authorizations that could potentially affect the safe operation of the system must be documented and provided to ANE-MIDO-44 before operating under this certificate. Additional flight testing may be required.

c. All requested information is to be coordinated with ANE-MIDO-44 prior to any flights with major changes or software changes.

**42.** This certificate will expire on October 28, 2016.

Issue Date: October 29, 2015



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Stacy L. Ratliff  
Supervisory Aviation Safety Inspector (Mfg.)  
FAA ANE-MIDO-44  
400 Airport Road - Room 102  
New Cumberland, PA 17070-3419 (Tel. 717-782-4425, Fax 717-782-2231)



I certify that I have read and understand the operating limitations and conditions that are a part of the special airworthiness certificate, FAA Form 8130-7, issued 10/29/15, for the purposes of research and development, market survey and crew training.

This special airworthiness certificate is issued for Aurora Diamond DA42 M-NG, serial number 42.MN004, registration number N51AU.

Applicant (signature) Thomas Washington Date: 29/08/15  
Name (Printed): THOMAS WASHINGTON  
Title: MANAGER FLIGHT TEST OPERATIONS  
Company: AURORA FLIGHT SCIENCES

Waypoint	Latitude (deg)	Longitude (deg)	Distance to next point (nm)
A	N 38 47.10	W 77 38.40	2
B	N 38 47.58	W 77 36.24	3
C	N 38 47.70	W 77 32.22	14
D	N 38 35.51	W 77 24.21	64
KESN	N 38 48.25	W 76 04.14	40
ATR	N 38 48.60	W 75 12.70	30
KOXB	N 38 18.63	W 75 07.44	99
ORF	N 36 53.50	W 76 12.02	40
FKN	N 36 42.80	W 77 00.80	112
DAN	N 36 34.10	W 79 20.20	81
MOL	N 37 54.02	W 79 06.41	73
CSN	N 38 38.45	W 77 51.92	14

**Table 1: Manassas (KHEF) Flight Test Operations Boundary Coordinates**

Waypoint	Latitude (deg min sec)	Longitude (deg min sec)	Leg Length (nm)
KRME Class D Boundary	-	-	5 (radius)
1	N 43 15 44	W 75 18 00	6.3
2	N 43 19 00	W 75 08 00	8
3	N 43 30 00	W 75 08 00	11
4	N 43 30 00	W 75 20 00	9
5	N 43 53 00	W 75 20 00	23
6	N 43 53 00	W 75 35 00	10.8
7	N 43 44 00	W 75 52 00	15.2
8	N 43 30 00	W 75 52 00	14
9	N 43 30 00	W 75 38 00	10
10	N 43 19 00	W 75 25 00	14.5

**Table 2: Griffiss (KRME) Flight Test Operations Boundary Coordinates**

Waypoint	Longitude (deg min sec)	Latitude (deg min sec)	Leg Length (nm)
1	W 106° 48' 39"	N 33° 34' 9"	--
2	W 107° 7' 33"	N 33° 20' 42"	21
3	W 107° 12' 31"	N 32° 59' 60"	21
4	W 107° 5' 35"	N 32° 47' 18"	14
5	W 106° 56' 59"	N 32° 46' 3"	7
6	W 106° 45' 45"	N 32° 43' 40"	10
7	W 106° 52' 19"	N 33° 12' 59"	30
1	W 106° 48' 39"	N 33° 34' 9"	21

**Table 3: SpacePort America (9NM9) Flight Test Operations Boundary Coordinates**



Figure 1: Manassas (KHEF) Flight Test Operations Area



Figure 2: Detailed view of test areas near KHEF

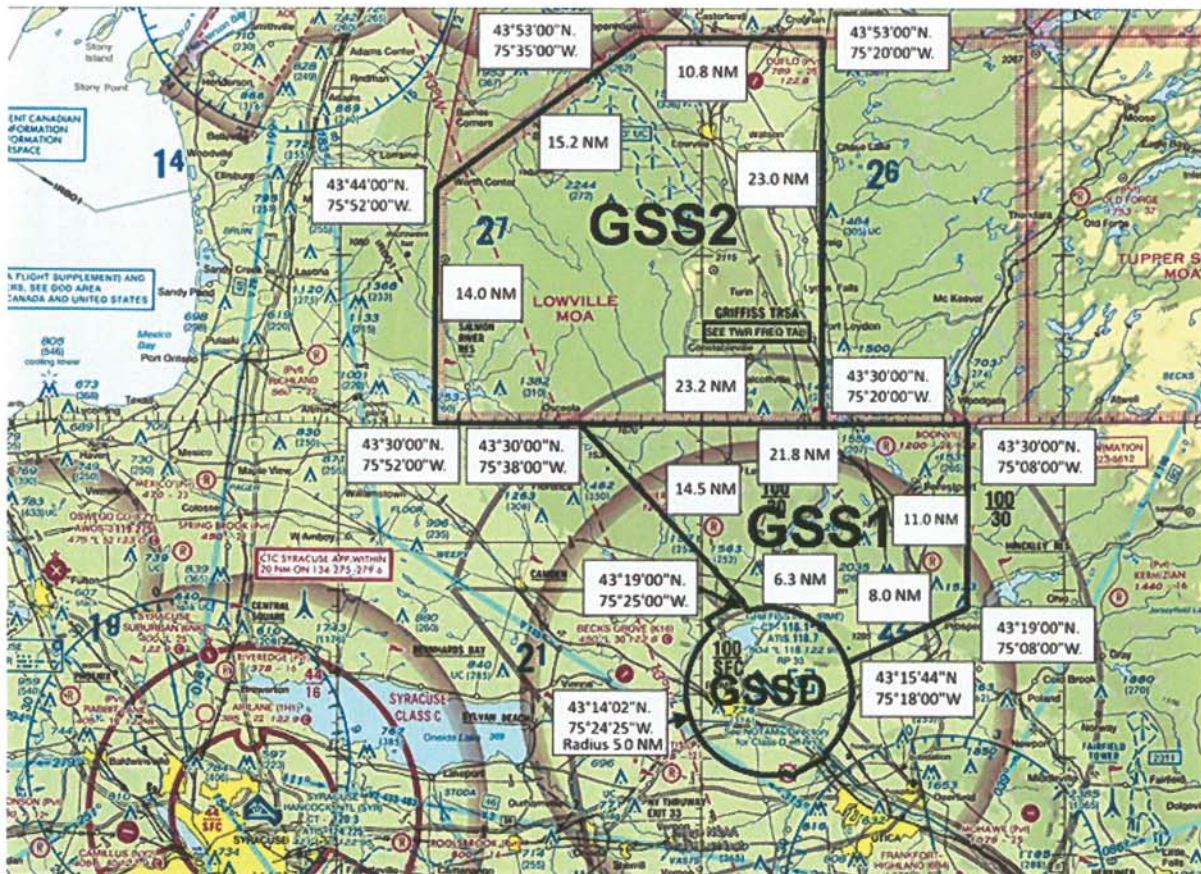


Figure 3: Griffiss (KRME) Flight Test Operations Area

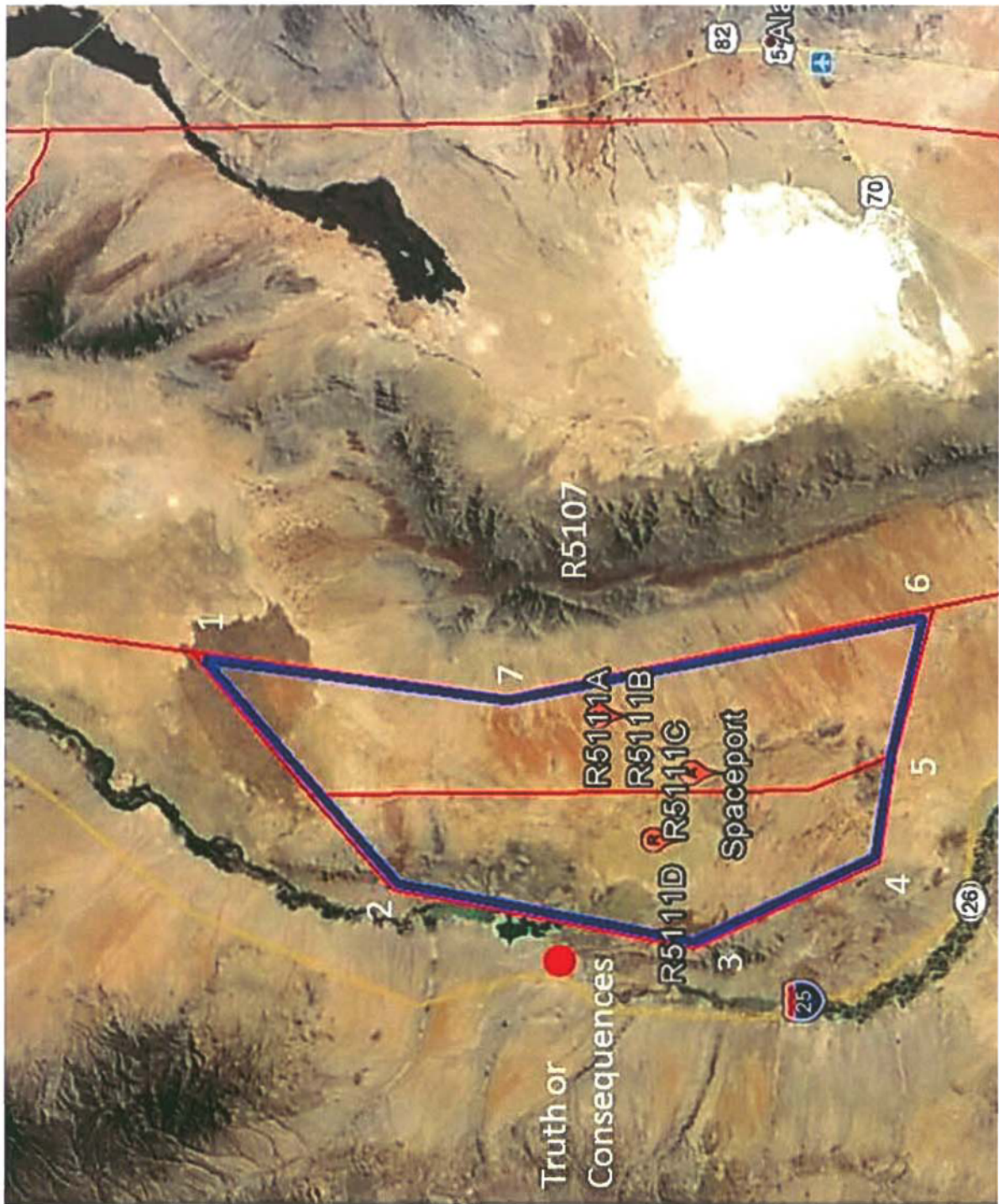


Figure 4: SpacePort America (9NM9) Flight Test Operations Area

End of Operating Limitations