1229-EX-CN-2023 27 Sept 2023

Aurora Flight Sciences

Submitted by:

Daniel McNeil

The Boeing Company

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714-642-7485

1) Submit a narrative that describes your experiment in great detail. Describe the exact purpose of this experiment and describe the application of this frequency request. The attached narrative is vague. You can refer to other application but since you filed for new application you need to provide a detailed narrative.

This frequency request supports testing of a radar sensor onboard a manned aircraft in the vicinity of the Potomac River in the area that is clear of the FAA published Restricted areas. This requested license area provides a variety of maritime items of interest for testing maritime radar sensor modes that cannot be adequately tested over land. Although the aircraft is manned, this radar and the aircraft's camera are remotely controlled via line-of-sight data link from a ground control station, but can be shut down at any time by the onboard pilot as required.

2) Verify the coordinates. The coordinates plot in Virginia and not in Maryland.

38-09-02N, 76-50-57W is correct. The State originally listed on the Form 442 was incorrect.

3) Enter the Name of the City/Town in the Form 442. That information is missing.

Stratford, VA

4) Are you providing commercial and/or operational service under this experimental license?

No

5) In addition to the previous email, please address the following: Provide a radiation hazard analysis for the transmitter to verify minimal safe operating distances to ensure public safety during demonstrations.

The manufacturer of the radar has performed analysis and testing including EIRP measurements from Near Field Range (NFR) testing and documented the following RF Safe Distances:

Exposure to General Public, 10W/m2: 25 m
Exposure, Occupational, 50W/m2: 11.2 m

Per FAA regulations except when necessary for takeoff and landing the minimum operating distance of an aircraft from any person, vessel, vehicle, or structure is at least 500 ft (152 m). The expected operating altitude of the aircraft is 6,000 ft to 10,000 ft (1829 m to 3048 m). This operating altitude significantly exceeds the radar's safe RF distance.

Aurora Flight Sciences has implemented both system and procedural mitigations to ensure safety while not flying. The Radar transmit circuit is interlocked with the aircraft's weight-on-wheels switch so that the radar cannot normally be operated while on the ground (except for specific maintenance activities enabled via key switch along with special procedures used to create an RF safety zone). Additionally, per operating checklist, the radar's transmit function is disabled during takeoff and landing.

As a check of the manufacturer's published safe distances, hand calculations were performed using a standard power density formula and the radar's Power and Antenna Gain:

$$Pd = PtGt / 4*pi*R^2$$

Setting Pd = 10 W / m^2 (Exposure limit for General Public for f= 1,500 – 100,000 MHz) results in the following:

R = 54.9 meters

This calculation is approximately twice the distance provided by the radar manufacturer, making it conservative, and is still satisfied by the FAA minimum operating distance of an aircraft from any person, vessel, vehicle, or structure which was noted above as a minimum of 152 meters.

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Description of Operation:

The objective of this request is to extend flight operations in conjunction with WK2XVR.

Area of Operation:

Location:

1) Mobile / Airborne Operations – ~~18,000 ft AGL~~ 10,000 ft MSL, 60km radius centered around 38-09-02N, 76-50-57W.

Frequencies and Emissions:

Location 1:

Frequencies:	9.5-10GHz
Station Class:	MO
Emission Designator:	1M30Q3N, 43M2Q3N
Power (ERP):	378442W

Frequencies:	9.6375-9.8625GHz
Station Class:	MO
Emission Designator:	225MQ3N
Power (ERP):	378442W

Frequencies:	9.75GHz
Station Class:	MO
Emission Designator:	1M30Q3N, 18M3Q3N
Power (ERP):	378442W

Stop Buzzer:

Jason Fine 571-364-4688

Auxiliary Information: