The Boeing Company
Request for Experimental License Exhibit

Kratos Lancaster Trajectory Control Unit (TCU) and Projectile Control Unit (PCU) Systems
Independent Research and Development

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by

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Why an Experimental License is necessary

The Boeing Company requests an experimental license in order to locally test the Kratos Lancaster Trajectory Control Unit (TCU) and Projectile Control Unit (PCU) systems. This experimental license will allow testing to gauge the performance of the systems. The systems being tested will be potentially used to support government contractual work in the long-term future. Boeing will greatly appreciate a determination as quickly as possible to meet the directive schedule.

Purpose of Operation

The purpose of the TCU is to provide telecommand data that will be used to guide a projectile to its target. The TCU will be onboard an aircraft but will be tested on ground as well. Once the telecommand signal is received by the projectile, the projectile acknowledges the command via its onboard PCU, and executes the command. The carrier frequency used for both the TCU and PCU is 17500 MHz. Both systems, therefore, are half duplex.

Test Description

In a real-world scenario, the TCU would be mounted on the aircraft and the PCU would be integrated into the projectile. Targeting information from aircraft sensor systems will be communicated via aircraft data buses to the aircraft fire control system, which will then be passed to the Fire Control Processor (FCP). The FCP will translate the targeting information into a common coordinate axis system, and pass the information to the TCU. The TCU then will generate and transmit guidance commands to the PCU on the projectile, with the PCU transmitting back an acknowledgement that the command has been received, and the projectile responds accordingly.

For testing in the St Charles, Missouri area, Boeing will be performing two tests:

- A fixed ground test where both the PCU and TCU will be tested in a laboratory. This test will be conducted at Boeing facilities near Boeing building 73-598 in St Charles, Missouri.
- A ground mobile range test where the TCU will be mounted on a wheeled vehicle and the PCU will be mounted on a pedestal above the ground. This test will be conducted near St Charles County Smartt Airport in Portage Des Sioux, Missouri

Both tests will assess the TCU's ability to transmit commands to the PCU and the PCU's ability to acknowledge and respond to those commands. During both tests, no actual projectile will be used.

Locations

The Boeing Company
Bldg 73-598
2600 N Highway 94
St Charles (St Charles County), MO 63301-0060
38° 48' 46"N
90° 28' 18"W
WGS84/NAD83
3 kilometer radius

Figure 1 – Ground Testing Boeing, St Charles, MO (Building 73-598)

St Charles County Smartt Airport
6390 Grafton Ferry Rd
Portage Des Sioux, Missouri 63373
38° 56' 02"N
90° 25' 25"W
WGS84/NAD83
25 kilometers radius at 10,000 foot flight level for aircraft

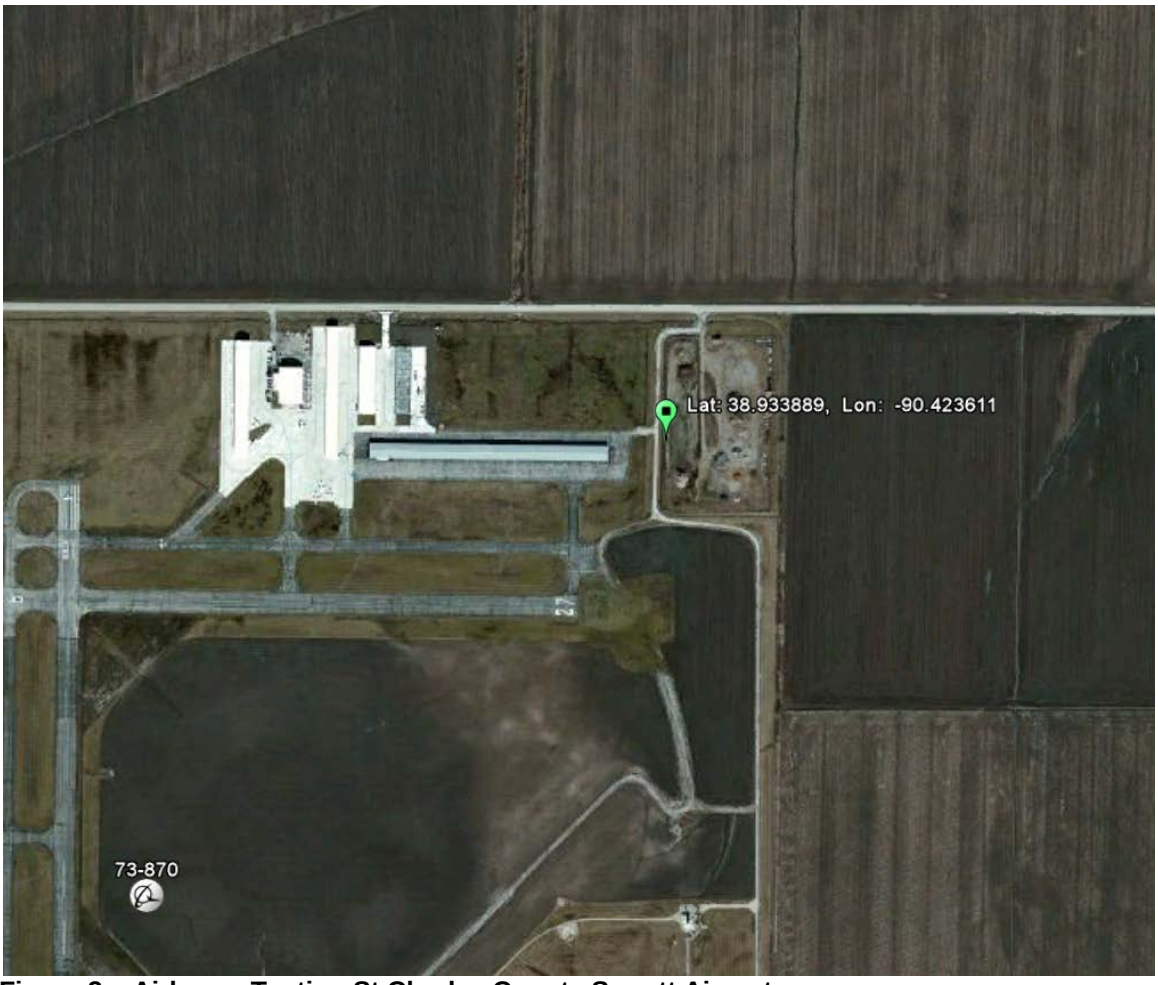

Figure 2 – Airborne Testing St Charles County Smartt Airport

Schedule

The requested experimental license is to be effective for 2 years upon a grant from the FCC/OET. This experimental license is requested to become effective when FCC OET License WI9XLU expires on November 16, 2015. This 2 year OET experimental license will permit intermittent testing that is currently being fulfilled under FCC Special Temporary Authorization WI9XLU. Ground Fixed Test Operations (laboratory) will be anytime, 24 hours a day, 7 days a week, within a 5 kilometer radius of the given location. Ground Mobile Test Operations (range) will be during airport hours, within a 25 kilometer radius and 10,000 foot flight level of the given location.

Stop Buzzer Contact Information

The equipment will be operated by Boeing employees.

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Test and Evaluation
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Frequencies, Power and Emission

Transmitter	Frequency (MHz)	Power	Emission
Tactical Control Unit (TCU)	17500	2 watts (peak envelope power)	118M0G1D
Projectile Control Unit (PCU)	17500	0.5 watts (peak envelope power)	118M0G1D

Equipment and Antenna Parameters

Transmitter Manufacturer	Kratos Lancaster
Transmitter Part Number	Trajectory Control Unit (TCU)
Emission	118M0G1D
Antenna Type	Horn
Antenna Gain	13 dBi Main Beam; -5 dBi 1st Major Sidelobe
Antenna Beamwidth	40 degrees horizontal; 40 degrees vertical
Antenna Polarization	Left Hand Circular

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Transmitter Manufacturer	Kratos Lancaster
Transmitter Part Number	Projectile Control Unit (PCU)
Emission	118M0G1D
Antenna Type	Microstrip Patch Array
Antenna Gain	11 dBi Main Beam; -7 dBi 1st Major Sidelobe
Antenna Beamwidth	40 degrees horizontal; 40 degrees vertical
Antenna Polarization	Right Hand Circular