

JHU/APL STA Application

WB-57 HF Antenna



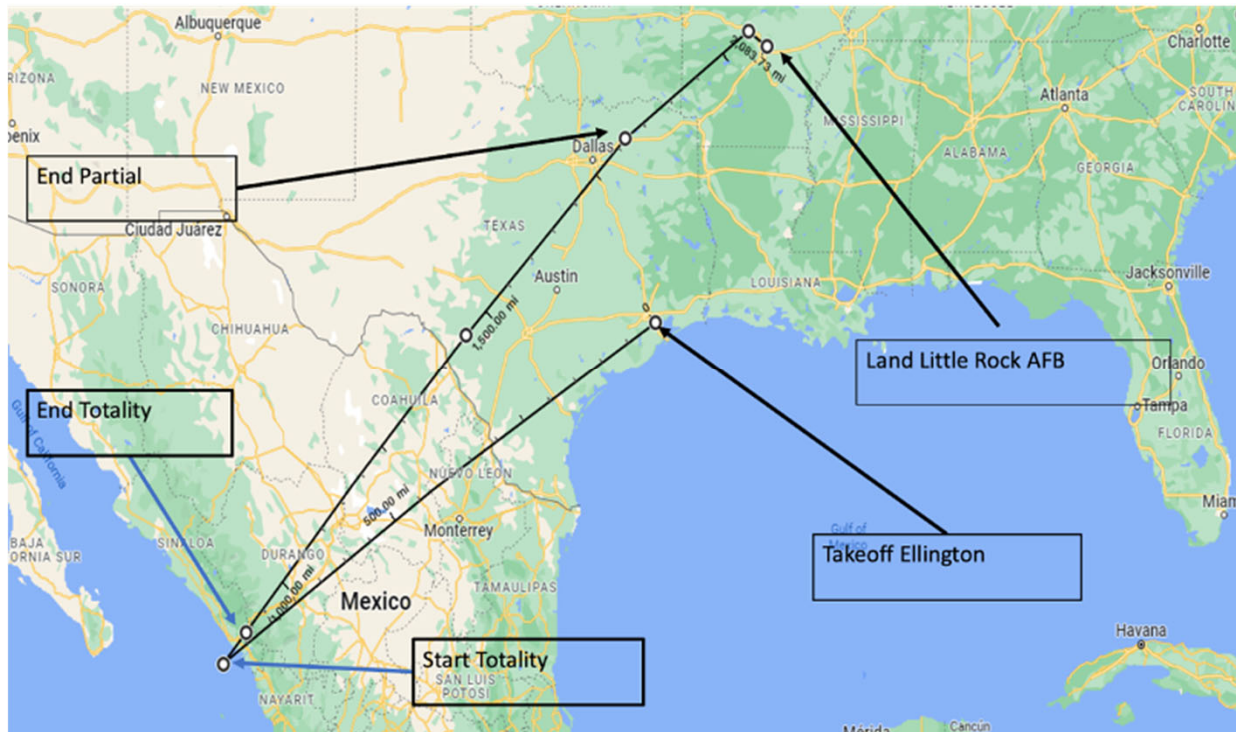
- Experiment Point of Contact:
 - Contact 1: Alex Chartier, alex.chartier@jhuapl.edu, 240-592-5861
 - Contact 2: Evan Shi, evan.shi@jhuapl.edu, 551-655-1573
- Background: This Special Temporary Authority (STA) License Application covers research initiated under the contract Contract #: N00024-22-D-6404
- Objective:
 - To investigate the effect of the April 8th total solar eclipse on the thermosphere-ionosphere system.
- Experiment Description: The Johns Hopkins Applied Physics Laboratory (JHUAPL) is a University Associated Research Center (UARC) that conducts basic research for the United States Government (USG)
 - What transmitters and receivers are involved? How many?
 - One transmitter and one receiver, co-located on the same WB-57 aircraft.
 - Long-wire, 42-ft antenna is used for both TX and RX
 - Are the nodes on the ground/airborne, are they fixed or mobile?
 - Fixed antenna on the airborne plane.
 - Where will the experiment take places?
 - Flight path is shown on following slide (subject to change)
 - How long will the experiment last?
 - Two separate days – Date of eclipse (04/08/2024) plus a Dry Run event within 2 wks prior to the eclipse
 - What will be the duty cycle of transmission?
 - 13% (Pulse repetition frequency 250 Hz with a 520 microsecond pulse length)

Proposed Flight Plan – Test Flight

- Location Details:
 - Takeoff: Ellington Field in Houston, Texas
 - Landing: Ellington Field in Houston, Texas
 - Street address of test site: 1221 Brantly Ave, Houston, TX 77034

Proposed Flight Plan – Experiment Flight

- Location Details:
 - Takeoff: Ellington Field in Houston, Texas
 - Landing: Little Rock Air Force Base in Little Rock, Arkansas
 - Street address of test site: 1221 Brantly Ave, Houston, TX 77034



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- Emission Details (include for each signal if multiple)
 - 46 dBm peak output power
 - 51 dBm ERP
 - Frequencies: 4.75 MHz, 6.75 MHz, 11.75 MHz
 - Frequency Tolerance: +/- 0.01 Hz
 - Signal Bandwidth: 50 kHz
 - Signal Type/description: BPSK, Barker-13 pulse compression with 40 microsecond chip length.
- FCC License Request Dates:
 - 03/27/2024 to 04/08/2024
 - Test will encompass 2 days; one test flight *tentatively* 03/27/2024 (no sooner) and the experiment flight 04/08/2024
 - Schedules for both days are in work; maximum of 12 hours transmission per day

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- Antenna Description:
- Antenna >6m above ground? Yes
- Directional? No
- Manufacturer: NASA Airborne Operations Division
- Model #: 540E570
- Polarization: Linear
- 3-dB Beamwidth: No gain pattern information available; 42 ft. wire from cockpit to tail
- Orientation in horizontal plane: See above
- Orientation in vertical plane: See above