

SUBJ: Proposed Approval for Testing Persistent Systems WR5100 Data Downlink System during TSOA-17-1

Description:

Persistent Systems, LLC has developed a data downlink system for use with airborne and ground terminal users. The US Special Operations Command (USSOCOM) has requested testing of the Persistent Systems Data Downlink for limited evaluation of this technology for its use to better enable its users in the future. The TSOA17-1 event is scheduled for 01-10 DEC 2016. To facilitate testing and evaluation, Persistent Systems is requesting that AFTRCC approve the following test and evaluation plan. Persistent Systems personnel will conduct all testing and use of RF equipment.

Frequency Requested: 2277.00 MHz – 5,10,20 MHz Bandwidth

Duration of Program: 10 days (01-10 DEC 2016))

Program Notes: 2277.00 MHz is the preferred frequency to provide a consistent benchmark for testing and evaluation, however any frequency from 2212.00 to 2407.00 MHz using 5MHz steps can be utilized with minimal impact to testing and demonstration. Frequency change can be facilitated from the ground should the need to do so arise. All testing will be conducted during daylight hours. Only a request from USSOCOM would alter the planned testing and demonstration testing hours. A five (7) day week (M-S) is planned for testing and evaluation.

Note: Map & Radio Specifications on following page for following program plans.

The system will operate inside of the red circle shown in the map below on a daily as needed for testing. A ground station will be located at Camp Dawson, WV $-39^{\circ}26'43"N$ $79^{\circ}40'12"W$). The ground station antenna is omni directional and is intended to maintain a link to the aircraft. The MIRAD for this request is 4.31 Nautical Miles (8km) to ensure coverage of the aircraft operations area.

Testing will cover systems operation, real-time telemetry data, Radio over IP (RoIP) and high definition full motion video. Throughout the test period, frequency changes and/ or complete shutdown of all radiating sources from the WR5100 unit can be accomplished from the ground within 30 minutes of notification.

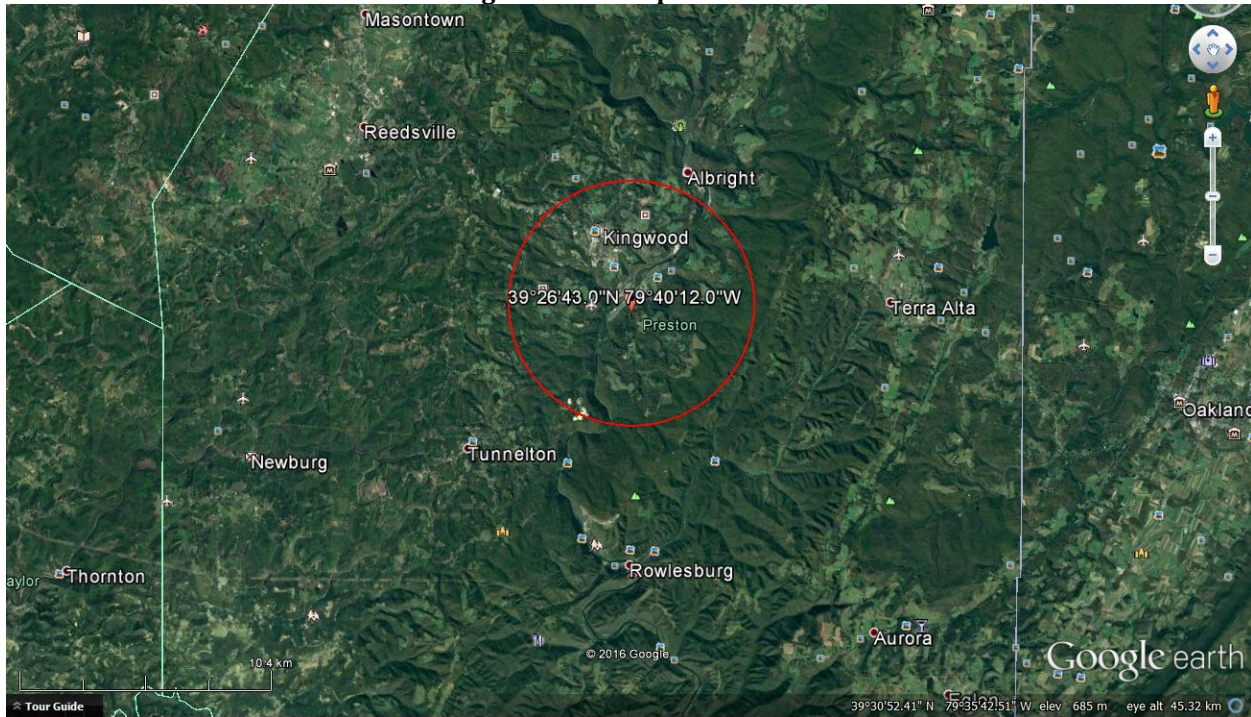
Stop buzzer POC: Phil Hoster (281) 814 3574

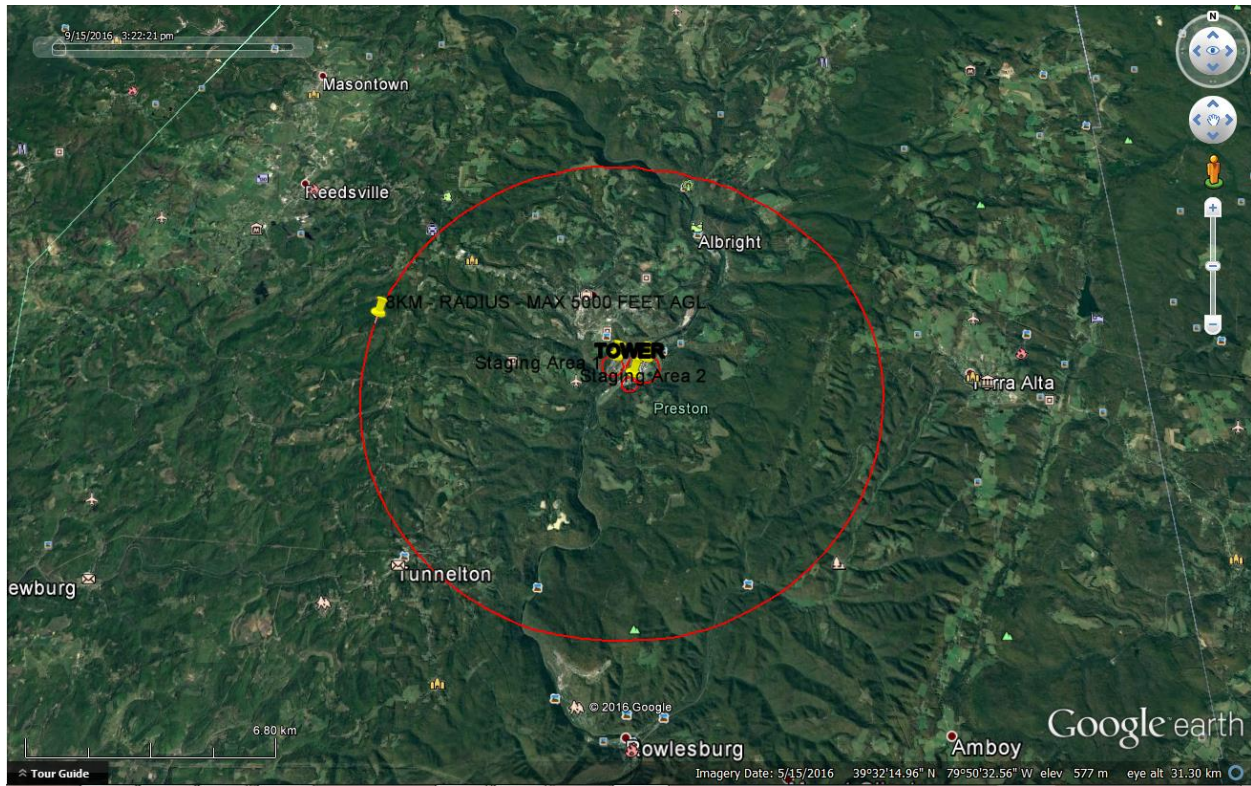
Alternate Stop Buzzer: Paul Greaves (813) 618 6883

Figure 1 Area of Operations

| | | | |
|------------------------------|---|---------------------------------|---|
| RF Modulation | OFDM (64QAM, 16QAM, QPSK, BPSK) | TX Power Control | From 33dBm to 8dBm, 1 dB per step |
| Number of Antenna Chains | 3 Independent RF Chains | Power Control Accuracy | +/- 2dB maximum at all power levels |
| TX/RX Operating Modes | All MIMO modes from SISO to 3X3 | Spurious Output, Harmonic | -53dBm, max. |
| Channel Bandwidth | Software configurable: 2.5 MHz, 5 MHz, 10 MHz, 20 MHz, and 40 MHz | Spurious Output, Non-Harmonic | -30dBm, max. (within any 30 KHz bandwidth) |
| Aggregate Transmit Power | 37.8dBm (6W) - (2W) per RF Chain | Max Peak Power Consumption, TX | 32W (All three chains with 33dBm RF out individually) |
| Minimum Receiver Sensitivity | -101 dBm | Power Consumption, RX | 1.9W, all three chains ON |
| Data Rate | 216.7 Mbps at 20MHz Channel 450 Mbps at 40MHz Channel | Power Consumption, standby mode | 0.15W |
| ESD Protection | +/- 8KV contact discharge, per IEC 6100-4-2 | MIMO Techniques | FIR Equalizer, Maximal Ratio Combining, TX Beamforming, Space-Time Block Coding, Spatial Multiplexing |
| Frequency Accuracy | +/- 4 ppm, max. | Antenna Ports | (3) SMP (50 Ohms) |
| Adjacent Channel Rejection | 7 dB for 64QAM, 29dB for BPSK | Temperature Range | -40° to 85° C |
| Spurious Response Rejection | 67.7dB at 40MHz offset | Dimensions | 2.25 in x 3.45 in x 0.55 in |
| Max. RF input without damage | +10dBm, min. | Weight | 3.7 oz |
| Max. RF input | -20dBm, min. | | |

Figure 2 Radio Specification

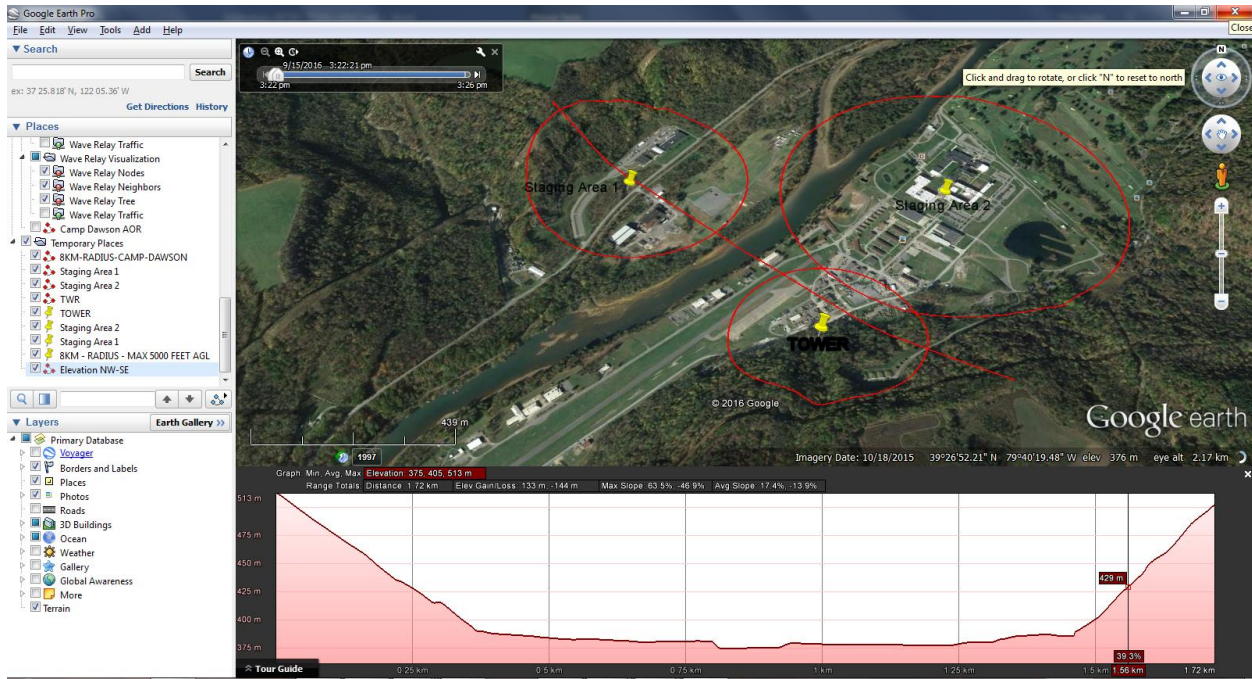




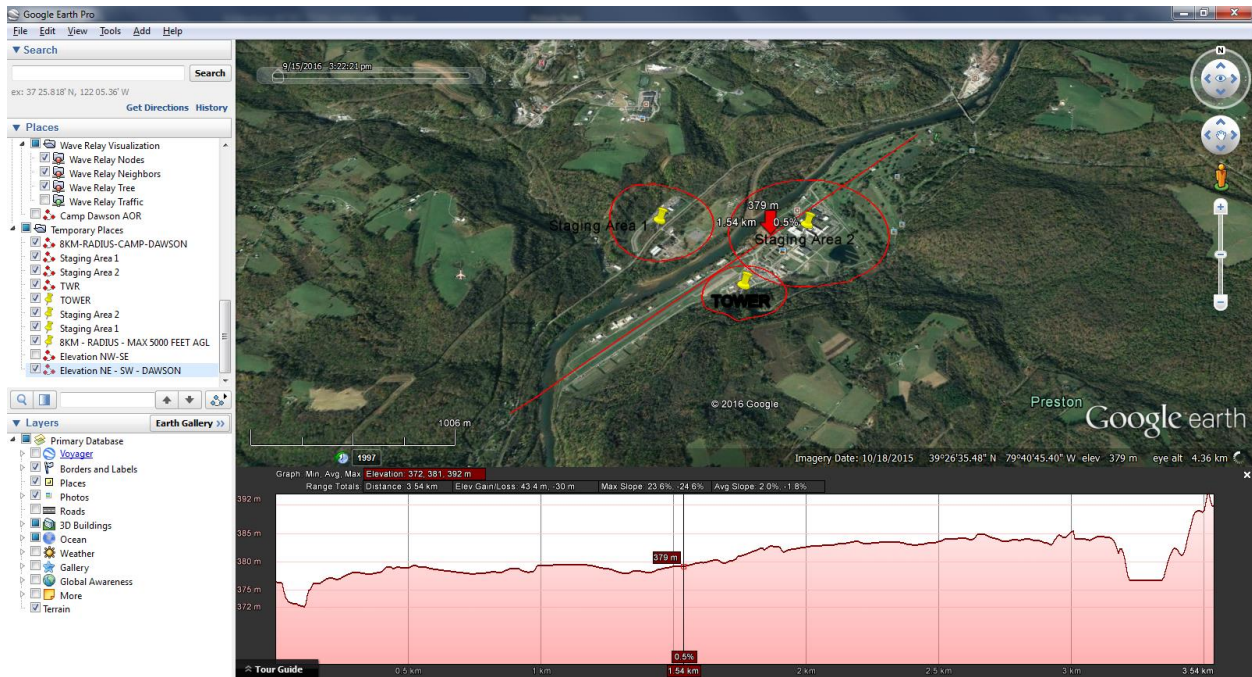
5KM Radius – Camp Dawson



Camp Dawson – TSOA 17-1 Staging and Operations Areas



Elevation NW – SE Camp Dawson



Elevation NE – SW Camp Dawson



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