L-3 Communications, CS-W
Special Temporary Authorization
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Application Background:

The purpose of this project is to ground test and flight test with point-to-point data links for application to mobile communications with hotspots for military applications. This application is very similar to File No. EL565737; STA File No.: 0990-EX-ST-2016; Call Sign WJ9XBZ. This license request moves the test area to Yuma, Arizona and adds additional applications to the test scenario.

Concept of Operations:

There will be up to 6 test stations operating up to 4 different simultaneous data links. The test stations are both ground based and airborne based. The aircraft is a PA-31-350 Piper Navajo Super Chieftain. Maximum altitude is 12.5kft or 3810m MSL with typical altitude being 10kft or 3048m MSL. The five links are referred to as the Discovery Link, the E-band link, the Rover link, and the MNR10 link.

Figure 1 illustrates the concept of operations for ground-to-airborne-to-ground testing where the green arrow is the Discovery Link, the red arrow is the E-band link, and the black arrow is the Rover link and MNR10 link.

The 6 test stations and associated data links are defined below:

- Station #1 will operate a Discovery link and E-band link simultaneously and is ground based.

- Station #2 will operate a Discovery link and E-band link simultaneously and is ground based.

- Station #3 will operate a Discovery link, an E-band link, and a Rover-Vortex link simultaneously and is airborne based.

- Station #4 will operate a Discovery link, an E-band link, and a Rover-Vortex link simultaneously and is ground based.

- Stations #5 and #6 will operate the MNR10 link and will be co-located with Station #2.

Spectrum Requirements:

Discovery Link:
The discovery link will operate in the unlicensed 900 MHz ISM band (902.2464-927.8208 MHz). The radio is a commercial off the shelf product (MM2-EX family) made by Freewave Inc. The radio uses a spread spectrum frequency hopping waveform. The radio is connected to an omni antenna.

E-band Link:
The E-band link will operate in either the 71-76 GHz or 81-86 GHz frequency bands. The radio is an L-3 custom product designed for these bands. Four data rates are included in the E-band radio which uses S-OQPSK for the 2 higher data rates and DPSK for the 2 lower data rates. All waveforms use 7/8 LDPC FEC with root raised cosine filtering α=0.33. The radio is connected to an axially displaced ellipse directional tracking antenna with 39 dBi gain, RHCP polarization, and 1.6° 3 dB beamwidth.

Rover Link:
The Rover link is comprised of two radios; an airborne L-3 Vortex transceiver (DD1494 J/F 12/09626) and a ground based L-3 Vortex transceiver. The Rover-Vortex link will operate in C-band (4.4-4.94 GHz) for the down link and will operate in S-band (2.2-2.29 GHz) for the uplink. The radios are both connected to omni antennas. A DD1494 is available for the Vortex radio.

Mesh Network Radio 10 (MNR10) Link:
The MNR10 link is comprised of three common radios that interact to create a small ground based network. The radio is a commercial off the shelf product (Streamcaster 3822 family) manufactured by Silvus Technologies and operates in S-band or C-band. The radios are connected to omni antennas. (DD1494 J/F12/10447)

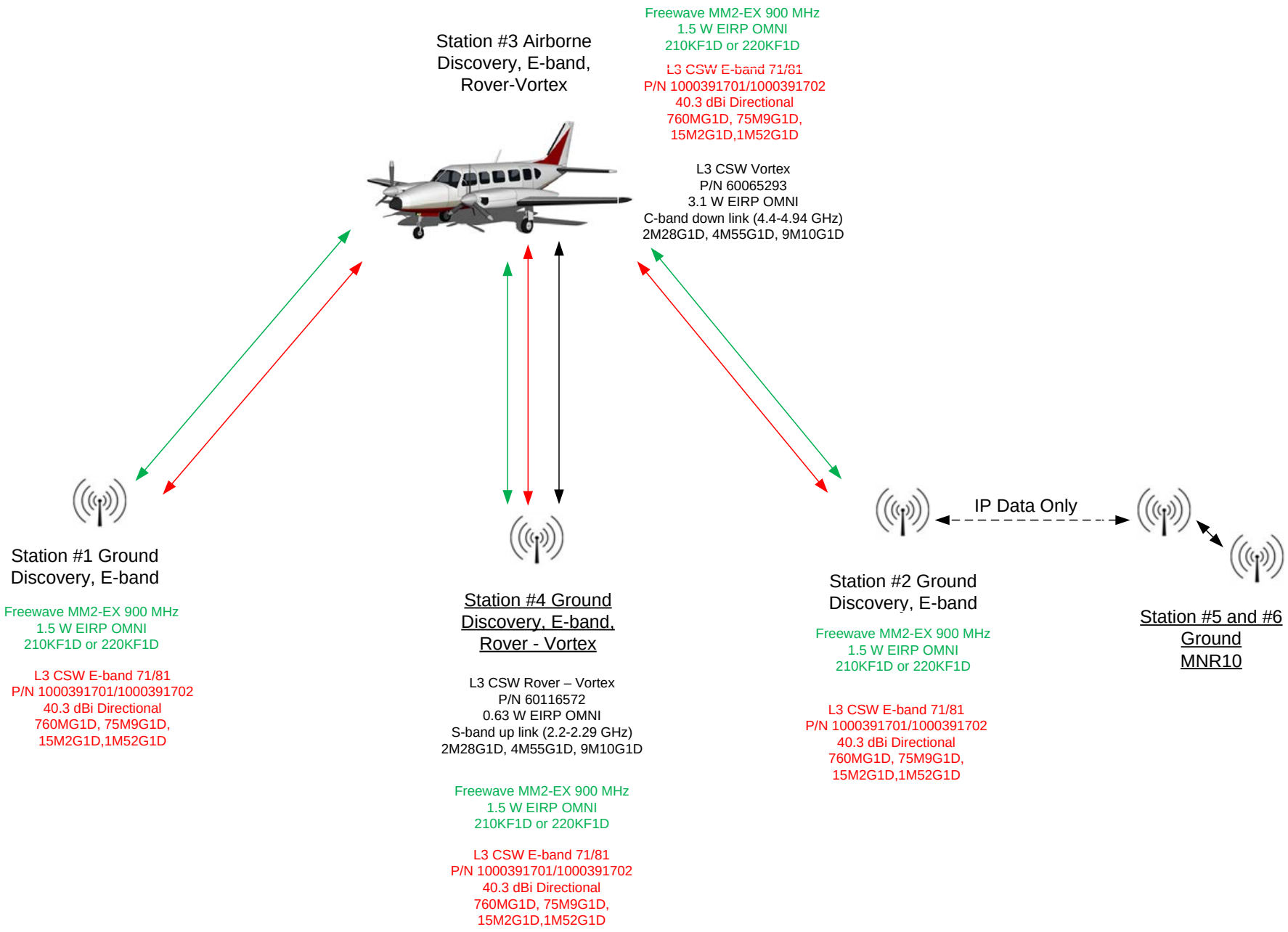

Figure 1 Concept of Operations – Ground & Flight Test

Ground & Flight Testing Summary

Location of Ground Equipment:

The approximate locations of the ground stations are shown in Figure 2.

- Ground station #1, Discovery and E-band, approximate location:
  Lat: N 32^0 39’ 15.60”, Long: W 114^0 35’ 15.80”, Alt 230 feet MSL
- Ground station #2, #5 and #6, Discovery, E-band, and MNR10 approximate location:
  Lat: N 32^0 37’ 10.10”, Long: W 114^0 12’ 40.30”, Alt 410 feet MSL
- *Ground station #2 alternate location, #5 and #6, Discovery, E-band, and MNR10 approximate location:*
  Lat: N 32^0 30’ 08.80”, Long: W 114^0 09’ 29.80”, Alt 800 feet MSL
- Ground Station #4, Discovery, E-band and Rover-Vortex, approximate location:
  Lat: N 32^0 42’ 17.70”, Long: W 114^0 26’ 05.35”, Alt 235 feet MSL

Location of Airborne Equipment:

The approximate location of the station #3 aircraft flight profile is shown in Figure 3. Typical altitude is 10 kft MSL. Approximate waypoints are listed below:

WP1: (Lat: N 32^0 40’ 43”, Long: W 114^0 30’ 00”)
WP2: (Lat: N 32^0 40’ 16”, Long: W 114^0 18’ 35”)
WP3: (Lat: N 32^0 44’ 12”, Long: W 114^0 18’ 35”)
WP4: (Lat: N 32^0 44’ 43”, Long: W 114^0 30’ 00”)

Figure 2 Locations of Airborne and Ground Test Equipment