Special Temporary Authorization
File No.: 0528-EX-ST-2011

Exhibit 1: Need for the STA, Explanation of Experimentation, and Antenna Information

L-3 Communications
Communications Systems – West
Salt Lake City, Utah
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Special Temporary Authorization
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Exhibit 1: Need for the STA, Confidentiality, Explanation of Experimentation, and Antenna Pointing Information

Applicant Background:

L-3 Communication Systems-West is a leader in developing communications systems for high-performance intelligence collection, imagery processing and satellite communications for Department of Defense (DoD) and other government agencies. The company provides high-data rate, wideband, secure, real-time communications systems for surveillance, reconnaissance and other airborne intelligence collection systems.

Need for STA:

STA is necessary to provide authority to operate high-capacity experimental aeronautical mobile communication links in government-exclusive frequency bands as part of the first phase of a test program. The operations will be carried out at a location that is not on a government test range, so typical experimental operation and authorization via other means (e.g., 7.11 authority) is not available.

Note that this application for STA is essentially unchanged from earlier application, file number 0137-EX-ST-2011, which was not utilized due to schedule slippage.

Description of the Experiment:

Overview

The experimental operation requested in the STA application is for the evaluation of a prototype airborne networking system. The experiment includes two basic test cases. The first case tests the system when communicating between an aircraft and a ground node. One communication terminal will be installed on an aircraft and another will be installed in a stationary ground shelter. The second case, which will be performed over two differing terrain types (ground and ocean) tests the system when communicating between two aircraft, with one terminal installed in each aircraft. The aircraft will fly above 10,000 ft MSL and below 25,000 ft MSL during the experiment. Operation of the RF equipment is

addressed in the STA application; other aspects of the tests requiring certification (e.g. flight safety) are being addressed through the appropriate authorities (FAA).

Test Schedule

The tests will begin no earlier than October 1, 2011, and will conclude no later than March 1, 2012. Detailed test plans and schedules will be available no later than September 15, 2011.

Spectral Usage

The RF links utilize frequency division duplex operation at Ku-band, with one of the terminals transmitting in the 15.150 -15.350 GHz frequency range, and the other transmitting in the 14.500 -14.830 GHz frequency range. Typically in the air-to-surface case, the surface terminal will transmit in the 15.150-15.350 GHz frequency range, although the equipment capabilities allow transmission in either band. A line diagram showing this typical spectrum usage is shown in Figure 1 below. Note that, in the air-to-air case, one of the airborne terminals must operate using the surface terminal frequency plan. This is made necessary by the frequency division duplex mode of operation.

The RF transmissions will utilize root raised-cosine (RRC) shaped offset QPSK modulation, at various symbol rates, with shaping factor (alpha) of 0.33. All transmitted data will be encoded with a rate-7/8 turbo product code prior to transmission.

The transceiver tunes the indicated frequency ranges in 5 MHz steps, although the allowable transmit center frequency is limited by the signal bandwidth and the proximity of the occupied bandwidth to the band edges. The center frequencies in the lower band that would be possible for assignment in the case of the lowest-bandwidth signal (46M8G1D) would begin at 14525 MHz, proceed in 5 MHz steps up to 14805 MHz, i.e., 281 possible center frequencies. Tuning range limitations for the wider bandwidth signals is calculated similarly and would result in fewer center frequency selections.

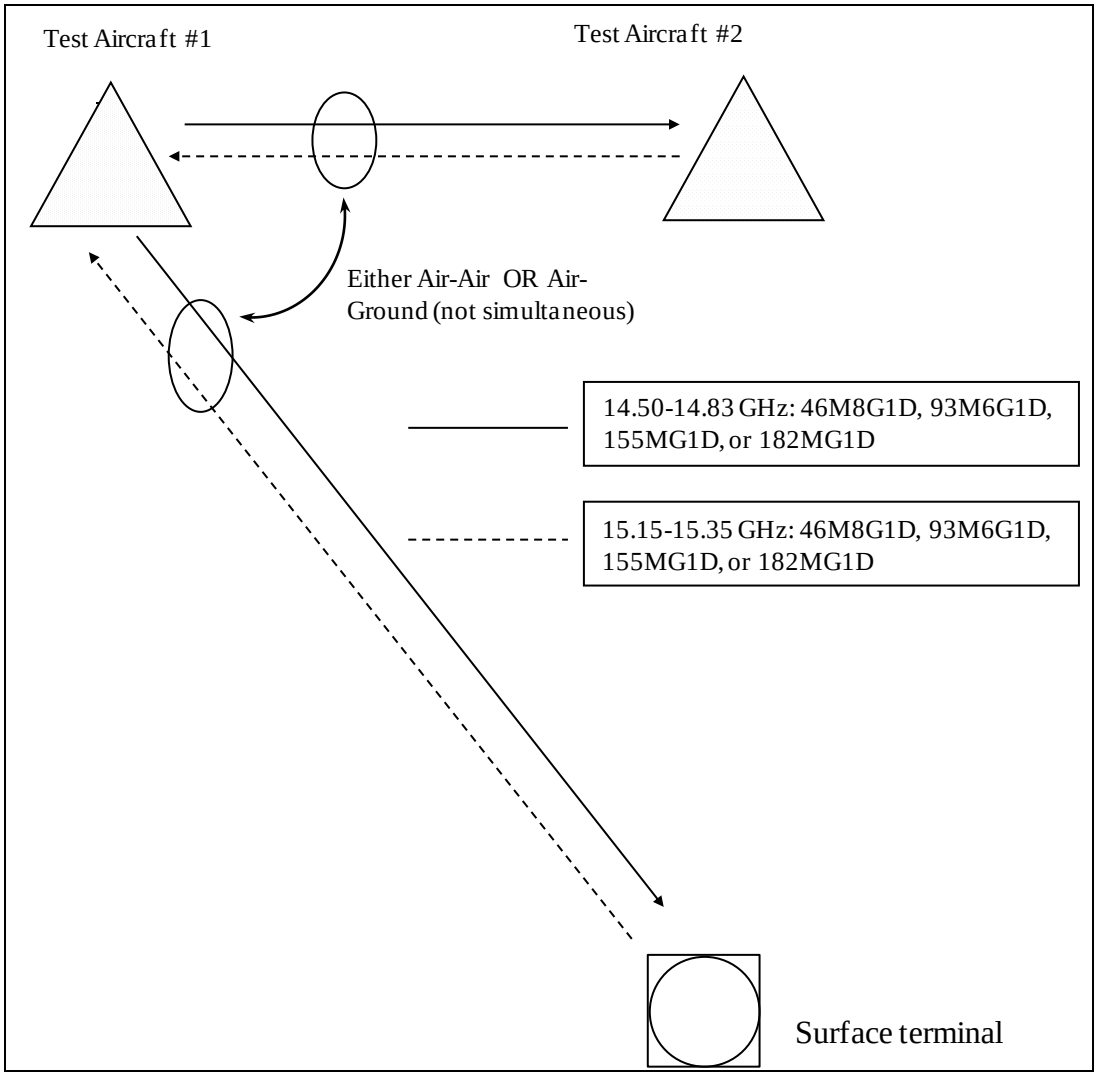

Figure 1. Phase 1 Test Line Diagram, Typical Frequency Plan.

Location of Testing

All testing covered by this STA will be performed in the vicinity of Hollister, California and above the Pacific Ocean, to the west. The surface terminal will be located on the ground, at the Hollister Municipal Airport. There will also be two identically-equipped test aircraft, based at the Hollister airport.

In the case of the air/surface tests, one of the test aircraft will fly within the general area indicated on Figure 2, at an altitude not to exceed 25,000 ft MSL. Detailed flight profile definition will be available prior to any test flights. All flight patterns are being coordinated with the Hollister airfield. The maximum range from the aircraft to the surface terminal is approximately 60 km. At the minimum altitude of 10,000 ft MSL and at this maximum range, the elevation angle measured from the surface terminal to the aircraft is approximately 2.6°, assuming a 4/3-earth radius geometry and surface terminal elevation 233 ft MSL.

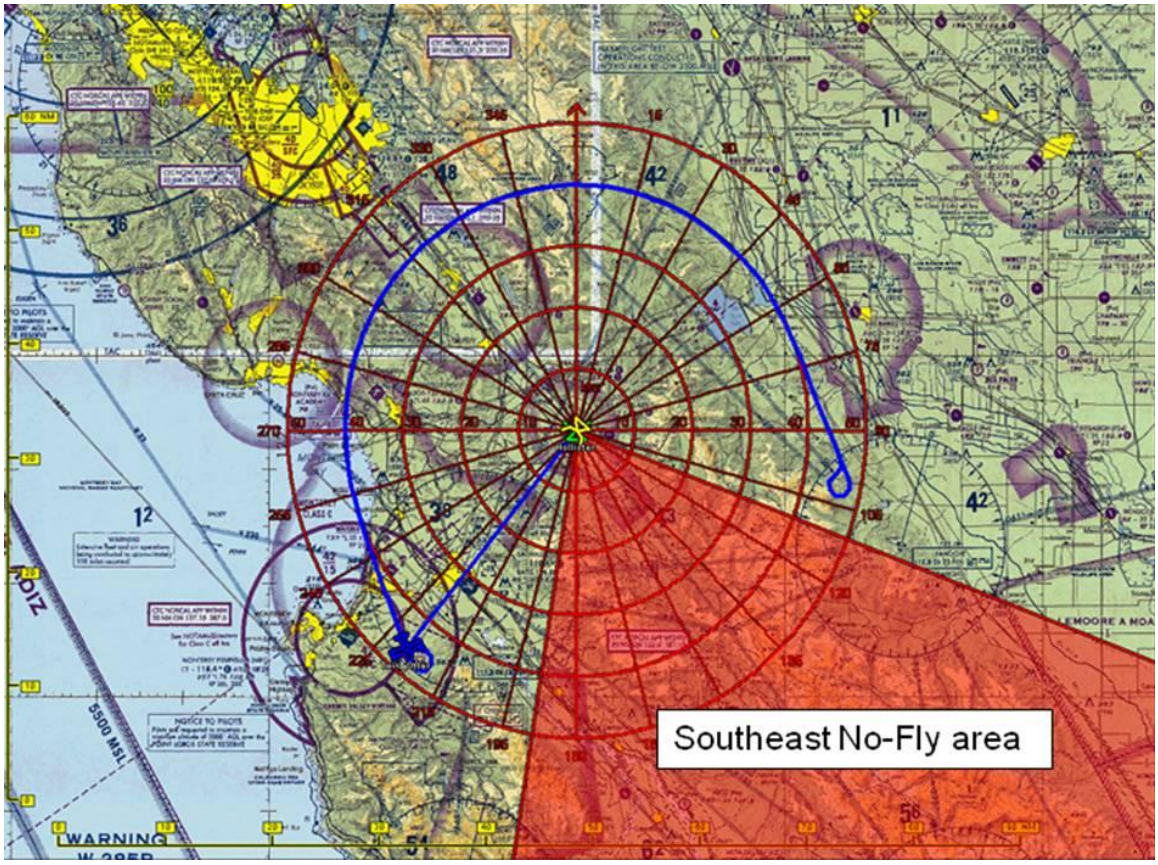

Figure 2. Location of air-to-surface testing. Surface terminal at Hollister, California.

For the air-to-air testing in the vicinity of Hollister (scenario 1, over land), the two test aircraft will fly prescribed routes as shown in Figure 3. The aircraft will each operate at 10,000 – 25,000 ft MSL. Detailed flight profile definition will be available prior to any test flights. The maximum range between the aircraft will be approximately 125 km.

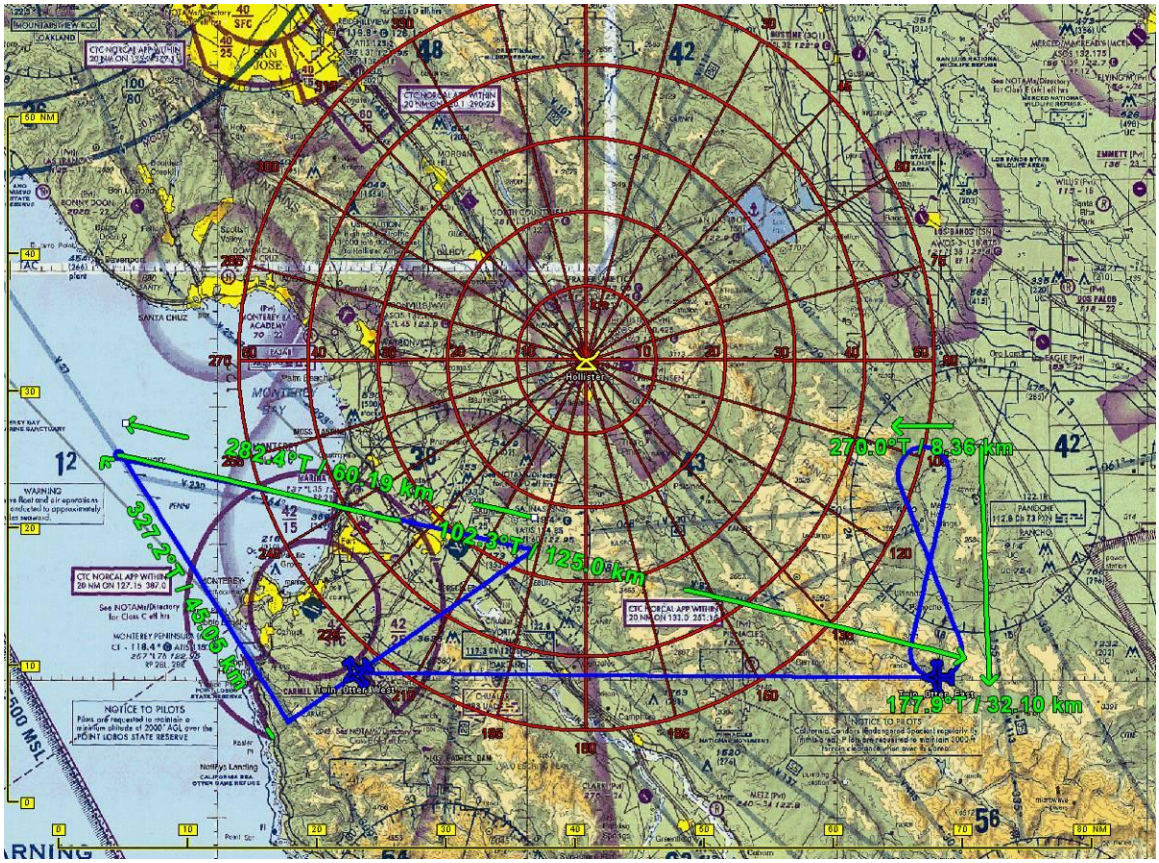

Figure 3. Location of over-land air-to-air testing (scenario 1), south of Hollister, California.

For the over-water (scenario 2) air-to-air testing, the two test aircraft will fly prescribed routes as shown in Figure 4. As in the over-land testing, the aircraft will operate at 10,000 – 25,000 ft MSL. Detailed flight profile definition will be available prior to any test flights. The maximum range between the aircraft will be approximately 150 km.

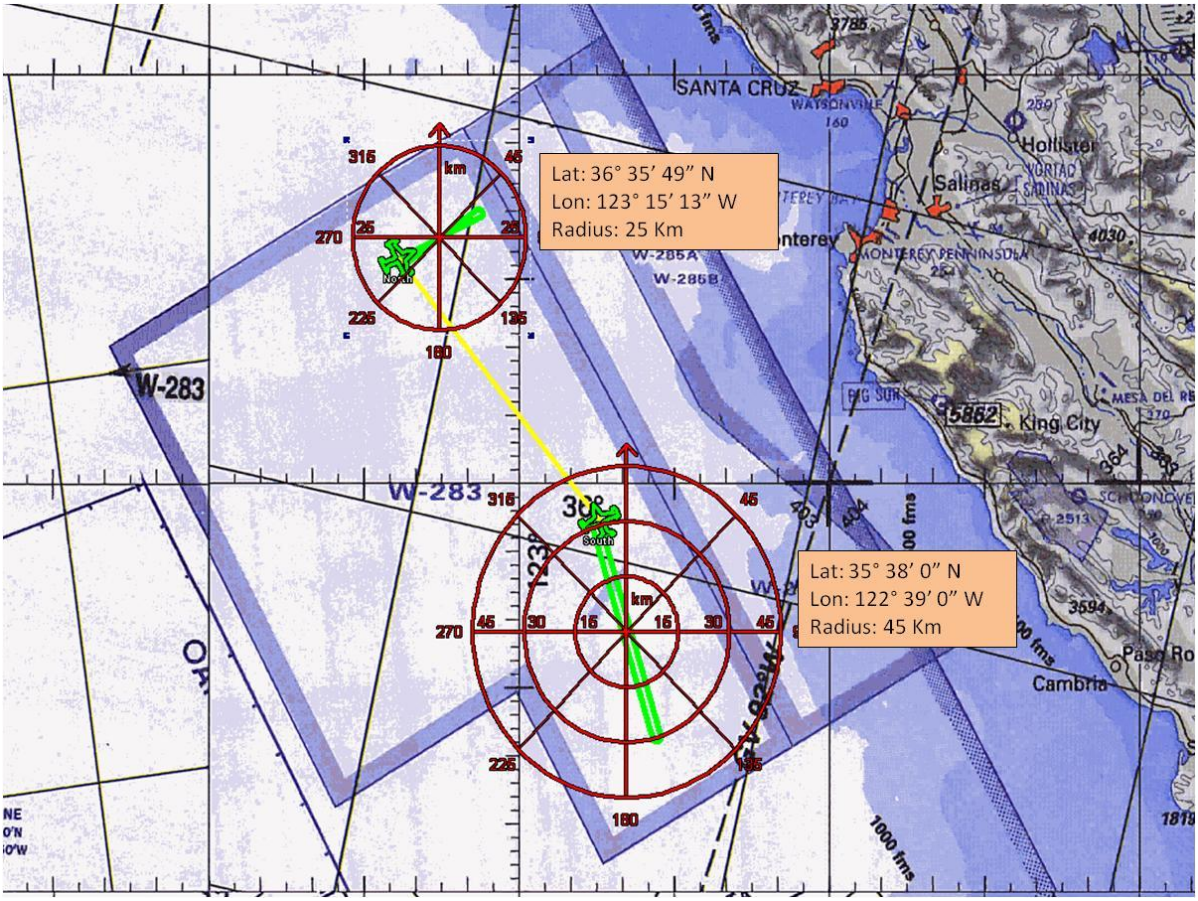

Figure 4. Location of over-water air-to-air testing (scenario 2), west of Big Sur, California.

Surface Terminal Antenna Pointing

The surface terminal directional antenna (a 9.5 inch parabolic dish) automatically points toward the aircraft, in elevation and azimuth, as it flies within line-of-sight of the surface terminal.

Azimuth angle: The surface terminal azimuth pointing angle depends on the aircraft's location, and can theoretically vary to any point on the compass. However, test flight plans will be developed such that the azimuth pointing angles toward the aircraft will be restricted to: a) avoid azimuth angles at which obstructions will prevent successful link closure; b) avoid azimuth angles at which transmissions would present a potential hazard to test personnel or to other uninvolved persons or structures.

The surface terminal will be located in a restricted access area to account for public safety concerns. Only knowledgeable test personnel will be allowed access to the shelter terminal location.

Elevation angle: Elevation angle will typically vary from near-horizon (long range) to +45° or higher (short range). The pointing angle is determined

automatically by the surface terminal based on its location and the location of the aircraft.

Aircraft Terminal Antenna Pointing

The aircraft terminal directional antenna (also a 9 inch parabolic dish, on each test aircraft), points toward the surface terminal in azimuth and elevation, based on open-loop calculations, given the known fixed location of the ground terminal and the position and orientation of the aircraft as determined on a time-varying basis by the onboard navigation data. In air-to-air operations, once the link has been established between the two aircraft, the antennas are pointed in azimuth and elevation based on the host aircraft's position and orientation, and on the position of the destination aircraft as determined by the navigation data passed by the RF link.

Antenna Pattern

All transmissions will use identical 9.5" parabolic dish antennas. The measured azimuth relative gain pattern for this antenna is shown below for frequencies spaced through the range of interest.

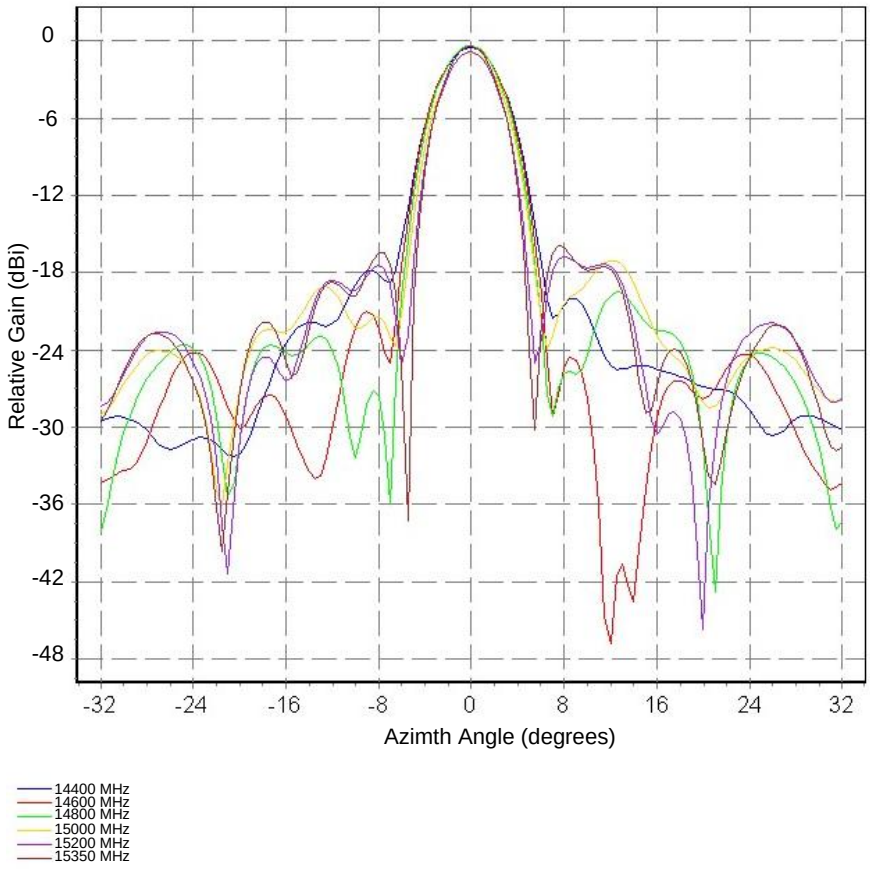

Figure 5. Antenna Pattern

Summary

STA is necessary to provide authority to operate high-capacity experimental aeronautical mobile communication links in government-exclusive frequency bands as part of the first phase of a test program. Questions regarding this STA application should be referred to Robert A. Wright (Bob.Wright@L-3com.com) , (801)594-2149.

Stop Buzzer Contacts:

In the even of interference caused by the experiment, the following individuals will be responsible for ensuring that transmissions cease as soon as possible after notification:

Primary: Roger Baker (801) 671-5162 (cell)
Backup: Dave Young (410) 585-5654 (cell)
Backup: Jeff Douglass (408) 438-8041 (cell)