

White Paper

LONG RANGE LINE-OF-SITE COMMUNICATIONS LINK

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Prepared By:

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1 EXECUTIVE SUMMARY

General Atomics Aeronautical Systems Incorporate (GA-ASI) is the leading designer and manufacturer of proven, reliable Remotely Piloted Aircraft (RPA) systems, radars, electro-optic and related mission systems. GA-ASI provides long-endurance, mission-capable aircraft with integrated sensor and data link systems required to deliver persistent flight that enables situational awareness and rapid strike. GA-ASI also provides up-to-date situational awareness capabilities supporting disaster relief and intelligent, surveillance, and reconnaissance (ISR) missions. These capabilities do depend on a reliable long-range broadband direct LoS data link to carry the mission critical videos and data to the hands of the first responders and war-fighters.

GA-ASI requests radio frequency approval of any 20 MHz within 2.36-2.395 GHz to test the Silvus line-of-site (LoS) communications datalink using a manned air platform. The objective is to verify the datalink performance at the maximum range (~300 km) and the data throughput (10+ Mbps) supported at that range. Link budget analysis indicates transmit power of 80 W, which is the maximum transmit power of the Silvus system, is required to meet the stated objectives. A reduction in the desired link range or data rate or both will result if less transmit power is used.

2 TEST DESCRIPTION

To test the long-range LoS datalink, GA-ASI proposes to stream video and send data from a manned aircraft while tracking the transmitter with a ground terminal. The aircraft will carry a Silvus StreamCaster™ 4400 radio, an amplifier, and four 3dBi omni-directional blade antennas. The ground tracking station is consist of a Silvus StreamCaster™ 4400 radio, an amplifier, and

an Optimum Solutions OS-PT-100 24 dBi directional parabolic ground tracking station. GA-ASI requests to transmit minimum of 20 W and up to 80 W if possible in order to support the long-range link test. To reduce the RF footprint over land, the aircraft will fly away from San Diego towards the Pacific Ocean, while being tracked by the directional parabolic ground tracking station.

The flight test plan is as follows. On February 21st, 2019, an aircraft will take off from Montgomery-Gibbs Executive Airport (KMYF) and track by the ground tracking station on the rooftop of a GA-ASI building at 16868 Via Del Campo Court, San Diego, CA 92127, latitude 33° 1.200'N and longitude 117° 5.777'W. The aircraft will fly due west of the ground tracking station over the Pacific Ocean. Due to airspace considerations, the aircraft may first climb up to 17.5 kft MSL (per ATC coordination) towards KNUC. Once it exits over Warning Area W-291, it will climb to an altitude between 25-30 kft MSL (per ATC coordination). While the Silvus data link is alive, video and data will be streamed from the aircraft to the ground tracking station. Once the link range and data rate are verified at the maximum range, the aircraft will return to KMYF. See Figure 1 for the pictorial representation of the flight test.

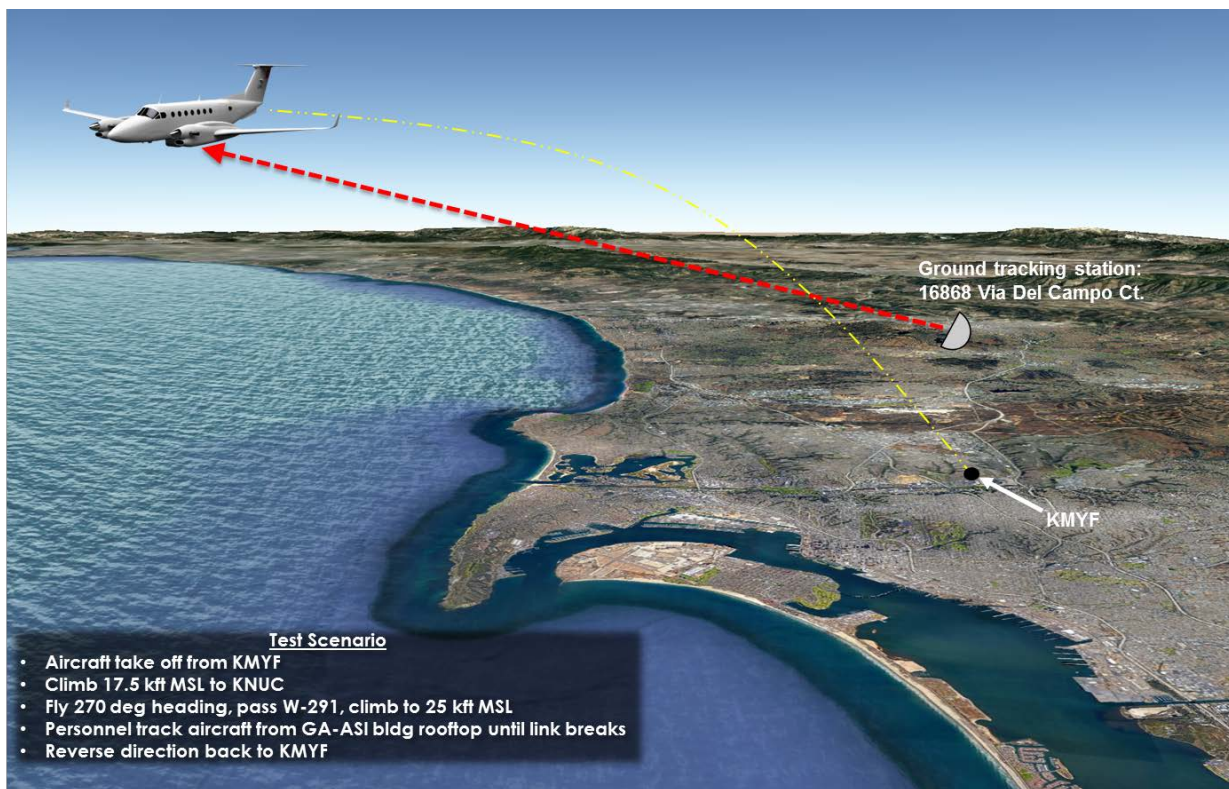


Figure 1. Long-Range Direct LoS Communications Datalink Test Scenario.

Prior to the flight test, on February 20th, 2019, GA-ASI requests for permission to transmit at the same frequency and power level over Borrego Springs at a target altitude of 15-18 kft MSL as

part of pre-flight test checkout. The radio will be off until the aircraft is at the target altitude and there will be no ground tracking station during this pre-flight checkout.

The durations of the preflight and flight test will be during daytime, 4-6 hr per day, with some flexibility in operation time.

3 SUMMARY

GA-ASI requests the use of any 20 MHz band within 2.36-2,395 GHz to test a long-range (+300 km) direct LoS communications link. A transmit power of minimum 20 W, up to 80 W desired, is needed to establish the long-range link with a data transmission rate of +10 Mbps. The range and data rate requirements are to support the dissemination of real-time situational video and mission critical data for humanitarian and ISR efforts.