L3Harris
Special Temporary Authorization
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Application Background:

The purpose of this project is to ground and flight test with point-to-point data links for application to mobile communications for high-speed broadband data to aircraft. This is a preliminary step to unlocking the "Internet of the Sky" that will deliver substantial public interest benefits to consumers, airlines, aircraft crew, and public safety. This is related to the Aeronet Global Communications Inc.'s petition for rulemaking to amend the commission's allocation and service rules for the 71-76 GHz, 81-86 GHz, and 92-95 GHz bands to authorize aviation scheduled dynamic datalinks.

Concept of Operations:

There will be 3 test stations operating up to 2 different simultaneous data links. The test stations are both ground based and airborne based. Station#1 target aircraft will fly a racetrack pattern inside an 80 sm radius centered and furthest away from the ground station. Station#2 relay aircraft will fly in a racetrack pattern inside the 80 sm radius centered and over flying the ground station. The ground station will be sitting on the rooftop of building E located on the L3Harris campus in Salt Lake City, Utah.

Figure 1 illustrates the concept of operations for air-to-air-to-ground. Testing may include ground-to-ground tests, airborne-to-ground tests, or air-to-air-to-ground tests.

The 3 test stations and associated data links are defined below:

- Station #1 target will be a single terminal transmitting and receiving to/from the relay aircraft. It will have a 9.5" parabolic directional antenna with 26 dBi peak gain and 8 degree 3 dB beam width. It utilizes open loop pointing based on navigation data.

- Station #2 relay will have 2 identical terminals. One will be transmitting/receiving to/from the target aircraft. The second terminal will be transmitting/receiving to/from the ground entry point. It will use the same antenna type as Station #1 target.

- Station #3 ground entry point will transmit/receive to/from the relay aircraft. It will utilize a 4' parabolic reflector antenna with a peak gain of 41 dBi and has a 1.6 degree 3 dB beam width. Open loop pointing will be accomplished using navigation data.

Aircraft flight paths will be coordinated to minimize potential system interference from duplicated transmit frequencies.

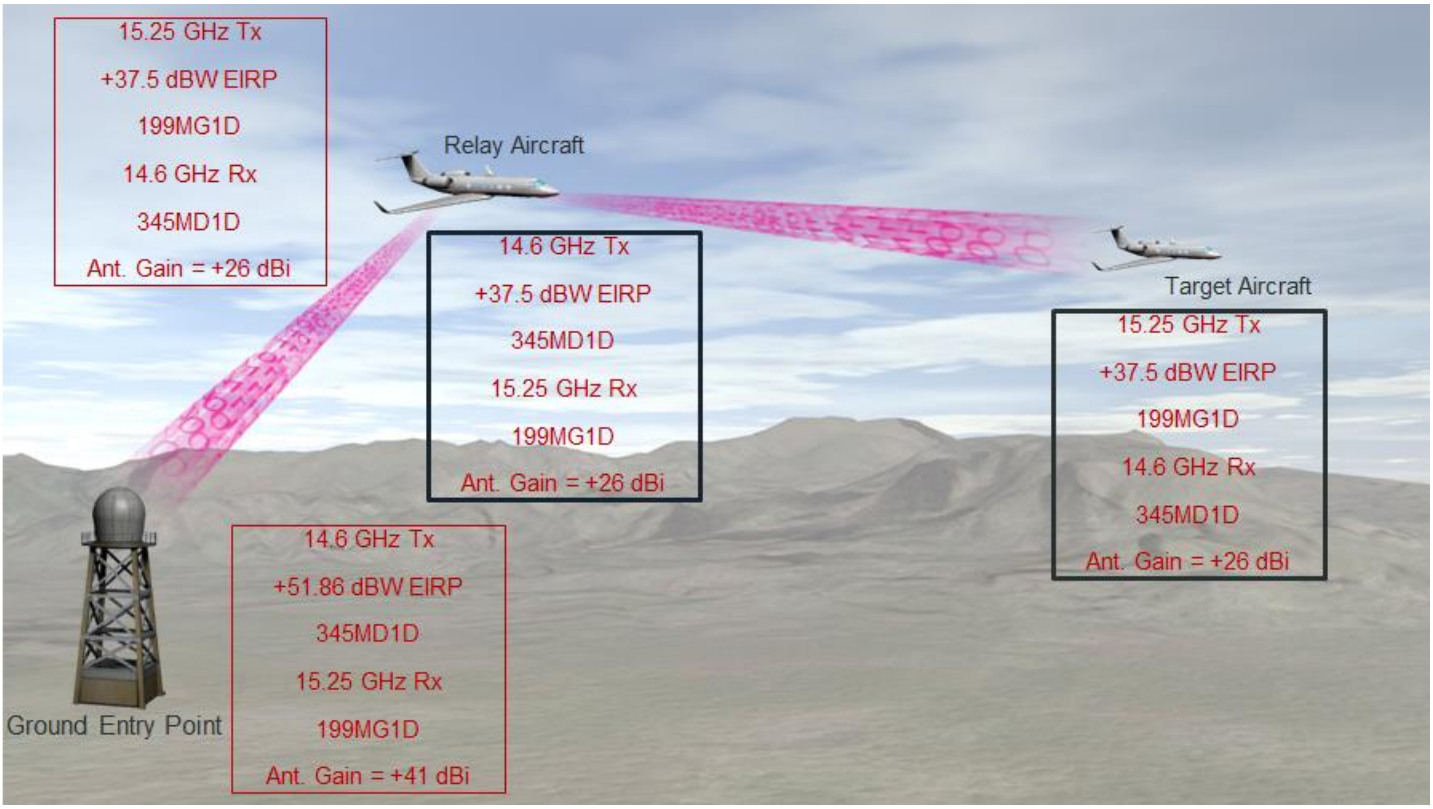

Figure 1 Concept of Operations

Spectrum Requirements:

The data links between the ground entry point, the relay aircraft, and the target aircraft will operate in the federal Ku-band 14.4-14.83 and 15.15-15.35 GHz frequency bands. The upper Ku-band frequency will act as the uplink or forward link from the ground station to the target aircraft. It will utilize a 900 Mbps 16APSK modulated low density parity check forward error correction coded waveform with emission designator 345MD1D. The downlink or return link will operate in lower Ku-band for the link from the target aircraft to the ground station. It will employ a 274 Mbps 8PSK modulated Trellis and Reed-Solomon forward error correction coded waveform with emission designator 199MG1D. Both of these waveforms take advantage of root raised cosine filtering alpha=0.33 to constrain the necessary bandwidth.

Ground & Flight Test

The locations of the airborne and ground test stations are shown in Figure 2.

- Station #1 Target Aircraft will follow a north/south narrow racetrack pattern offset approximately 30 sm to the west of the ground entry point and station#2 target aircraft. Station #1 will stay within an 80 sm radius of the ground entry point located at Lat: N 40°47'1.4" and Long: W 111°57'7.74". Station #1 will fly at an altitude between 20 and 30 kft MSL or as local air traffic will allow.
- Station #2 Relay Aircraft, will also follow a north/south narrow racetrack pattern centered over the ground entry point. Station #2 will also stay within an 80 sm radius of the ground entry point located at Lat: N 40°47'1.4" and Long: W 111°57'7.74". Station #2 will fly at an altitude between 20 and 30 kft MSL or as local air traffic will allow.
- Station #3 Ground Entry Point will be located on the roof of building E on the L3Harris Salt Lake City, Utah campus. The exact location is Lat: N 40°47'1.4" and Long: W 111°57'7.74". This is approximately 700 N 2200 W in Salt Lake City.

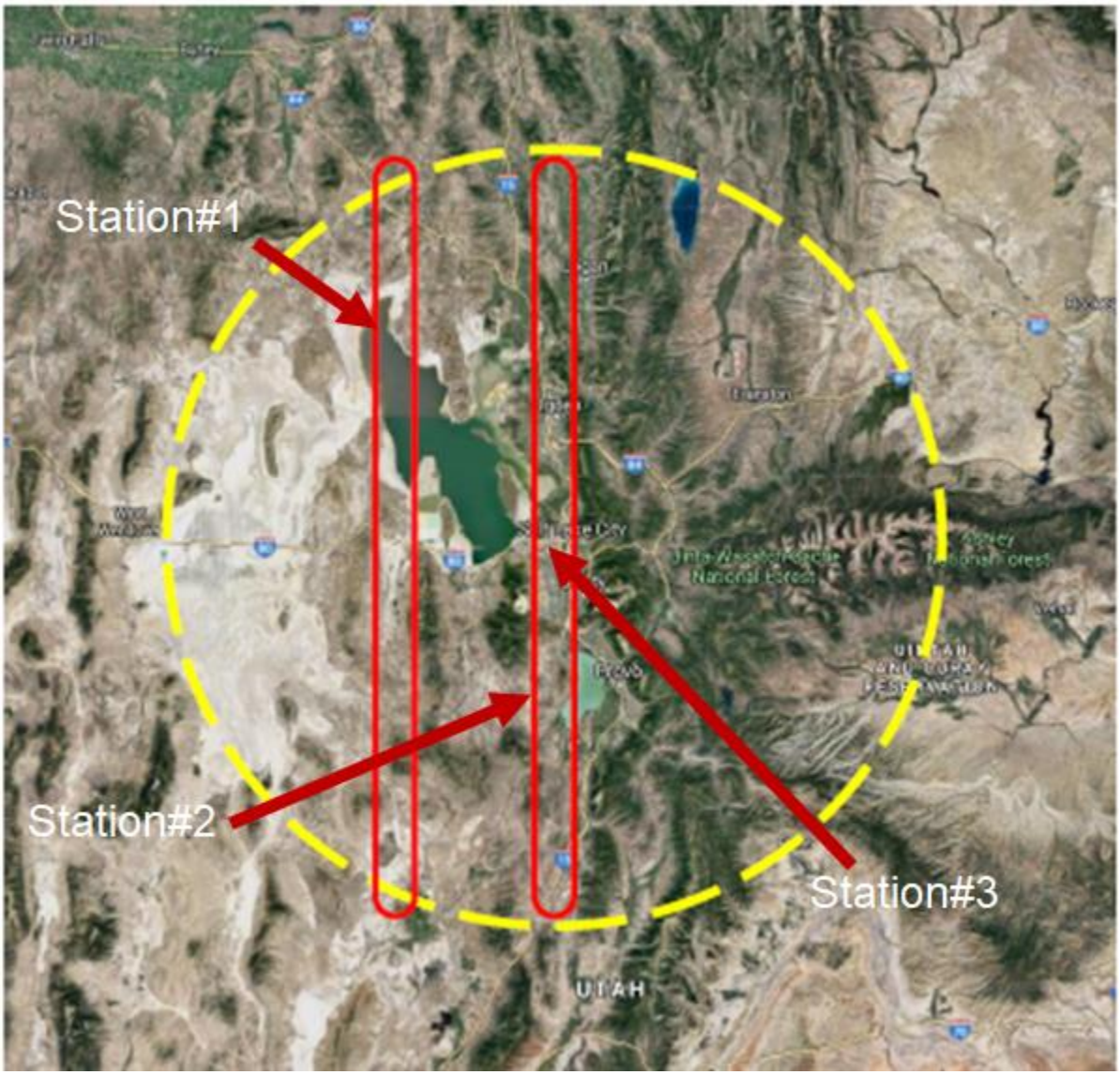

Figure 2 Test Station Locations