REQUEST FOR EXPERIMENTAL LINUS-A PAYLOAD AUTHORIZATION

Lockheed Martin Corporation ("Lockheed Martin") hereby seeks authority under Part 5 of the Federal Communications Commission's rules to conduct secondary payload experimental satellite operations of two cubesats in conjunction with the United States Space Force Long Duration Propulsed ESPA (LDPE-2) Mission. The LDPE-2 mission is currently projected for a May 2020 launch from the Cape Canaveral Air Force Station (CCAFS) and will include multiple cubesat secondary payloads that will be deployed above Geostationary Orbit (GEO).

Specifically, Lockheed Martin herein seeks authority for the LINUS-A (Lockheed Martin IN-space Upgrade System) GEO servicing risk reduction experiment, which it will conduct in coordination with the Air Force Research Laboratory (AFRL) under the Cooperative Research and Development Agreement (CRADA) No. 20-354-SSDP-01. The LINUS-A mission will operate from near GEO for a period of up to one year, which is the expected system lifetime. Given the complexity of the LDPE-2 mission, Lockheed Martin is herein seeking full experimental authority, rather than Special Temporary Authority, to account for any potential shifts in the deployment schedule of the launch and orbit-raising activity.

Experimental mission overview.

The LINUS-A spacecraft duo have a mission to demonstrate essential capabilities for Lockheed Martin's space upgrade and servicing missions of the future, in addition to demonstrating miniaturized Space Domain Awareness (SDA) capabilities.

Lockheed Martin has separately secured authority from the National Oceanic and Atmospheric Administration ("NOAA") to conduct the remote sensing functions of this mission. NOAA issued that authority on December 28, 2020.

LINUS-A Segment.

LINUS-A will ride along on the upper stage of the SpaceX FalconHeavy launch vehicle as a secondary payload to the LDPE-2 mission. After the two vehicles are deployed, they will operate in the GEO disposal orbit (GEO +300km).

LINUS-A will demonstrate the basic Guidance, Navigation, and Control (GNC) elements of performing upgrades in space within 50 meters of each other; however, no actual docking operations will take place between the vehicles or with any other Resident Space Objects (RSOs).

LINUS-A will also mature new onboard high-performance processing by Innoflight, low-toxicity propulsion by Vacco, and four miniature visible spectrum cameras, inertial measurement units (IMU), machine vision, 3-D printed components and SmartSat™ technologies by Lockheed Martin.

At the end of the mission, the spacecraft will be disposed in place in the experimental orbit, but will attempt to raise the orbit higher if mission life permits. Lockheed Martin attaches

to the instant application a comprehensive Orbital Debris Assessment, based on NASA-STD-8719.14.

Ground station segment.

The Lockheed Martin spacecraft will be under the control of one operations center facility in Littleton, Colorado with data relays through four earth station facilities, leased through the Swedish Space Company. The operators of those facilities are obligated to have in place their own authority to participate in this mission. The location details of those receiver facilities follow:

Station	Location	Dish Size	LINUS-A Capabilities
SSC Space Chile Santiago Satellite Station Autopista Los Libertadores s/n Km 28 Peldehue, Colina PO Box 9340000 Chile	33º 09′ South 70º 39′ West	Two Options: 12.2m & 13m	S-band downlink S-band uplink
SSC Space US 1465 Bradway Road North Pole, Alaska 99705	64º 48′ North 147º 39′ West	13m	S-band downlink S-band uplink
SSC Space US Western Australia (the US manages this site) SSC Space US, Inc. Yatharagga Site North Depot Hill Road Mingenew, Western Australia AUSTRALIA, 6522	29º 03′ South 115º 21′ East	13m	S-band downlink S-band uplink
SSC Space Sweden Esrange Space Center P.O. Box 802 SE-981 28 Kiruna, Sweden	67º 52′ North 21º 2′ East	13m	S-band downlink S-band uplink

Additional technical details.

Lockheed Martin supplements the details on its Form 442 with these details related to the LINUS-A mission:

a) Orbital characteristics – LINUS-A is in a GEO +300km orbit with an inclination angle of 2.8° and an Eccentricity of 0.

b) Apogee – LINUS-A is in a circular orbit, so the apogee and perigee are both GEO +300km

c) Perigee – LINUS-A is in a circular orbit, so the apogee and perigee are both GEO +300km

d) Uplink tuning range – 2025–2085 MHz

e) Satellite receive antenna gain and receive system noise temperature - Antenna Gain: 7 dBi, SNT: 692.6 K

f) Earth station transmit antenna gain and sidelobe characteristics - various SSC antennas will be used during mission. Santiago – 70dBW EIRP, North Pole 68 dBW EIRP, Dongara 68 dBW EIRP, ESRANGE 69 dBW. Sidelobe characteristics see Figure 1 & Figure 2.

g) Uplink carrier bandwidth, power and power density delivered to the earth station antenna – 64kbps

h) Earth station receive antenna gain, sidelobe characteristics and receive system noise temperature – various SSC antennas will be used during mission. Santiago – 24 dB/K, North 23.5 dB/K, Dongara 23.5 dB/K, Dependent on antenna: ESRANGE 23.0 dB/K OR 22.5 dB/K. Sidelobe characteristics see Figure 1 & Figure 2.

i) Downlink carrier bandwidth and power density delivered to the satellite transmit antenna –256kbps & 1.5W

j) Downlink polarization used – RHCP

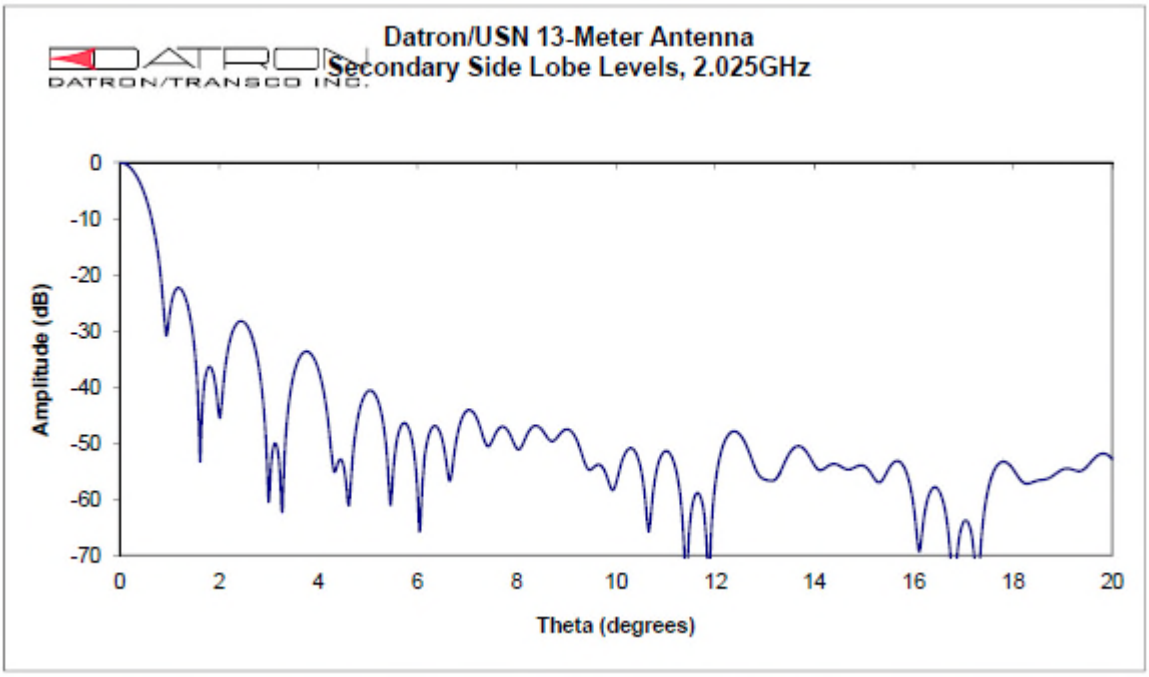

Figure 1: Sidelobe characteristics for the Earth Stations

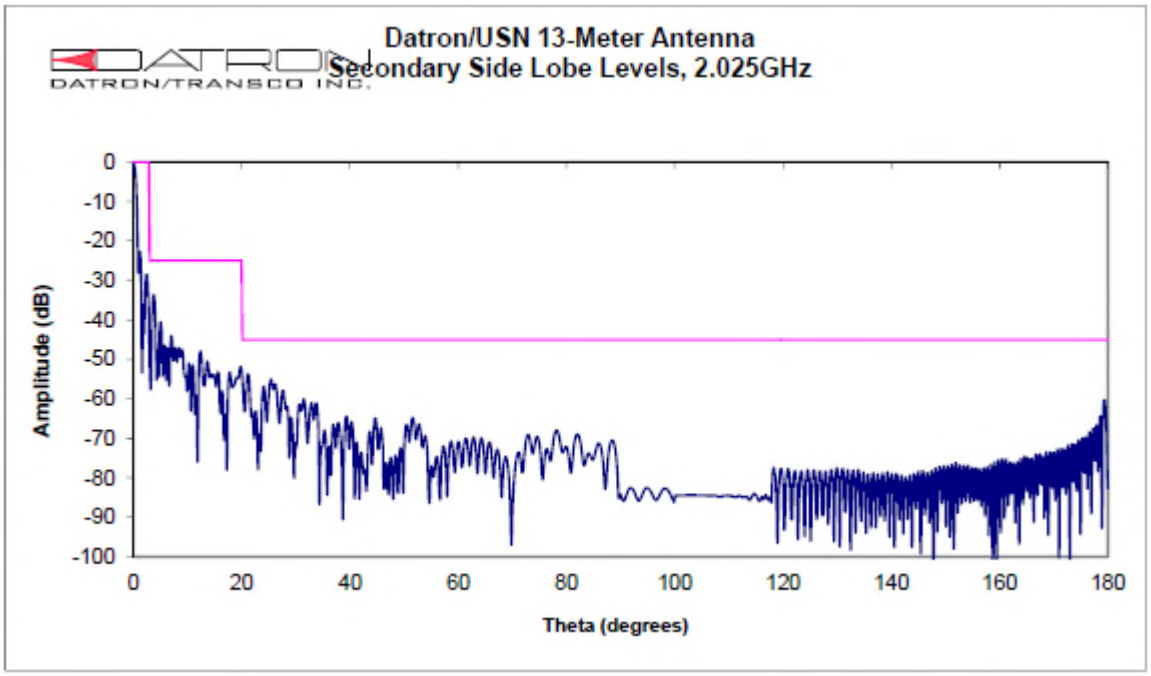

Figure 2: Sidelobe characteristics for the Earth Stations