Lockheed Martin Integrated Systems & Solutions
700 N. Frederick Avenue   Gaithersburg, MD 20879
Telephone 301·240·7500

To: Federal Communications Commission
Experimental Radio Service
P.O. Box 358320
Pittsburgh, PA 15251-5320

Date: June 10, 2005

Subject: FRN0013623376   STA File Number 0383-EX-ST-2005

To Whom It May Concern:

The purpose of this letter is to obtain a Special Temporary Authorization for experimental stations, located in Taunton MA and Ft. Huachuca AZ, as stated in FCC documents.

Lockheed Martin Integrated Systems and Solutions, in partnership with General Dynamics C4 Systems, is requesting that the FCC grant a Special Temporary Authorization (STA) to operate an experimental station for the period from June 30th to December 30th 2005. This STA will be used to demonstrate satellite communications on the move technology using a mobile terminal with a small aperture Ku-Band antenna to the United States Government per Government Contract DAAB07-02-C-F403.

Lockheed Martin is filing FCC Form 442 and this letter to request an STA in order to begin transmission earlier than the 10 week time period required to approve the FCC Form 442 data. Hence, a request is made to approve this STA to allow transmission beginning on June 30th 2005.

Included with this letter is FCC Form 159-Remittance Advice and a check for the $50 processing fee.

The following information and attached Narrative provides the details required for this STA:

1. **Name and Address:** Lockheed Martin Integrated Systems and Solutions, 700 N. Frederick Road, Gaithersburg, MD 20879. Attention: John Mitchell Phone: 301-240-7282 e-mail: john.e1.mitchell@lmco.com

2. **Need for Special Action:** Lockheed Martin Integrated Systems and Solutions is requesting that the FCC grant a Special Temporary Authorization (STA) for the operation of experimental stations for the period from June 30th to December 30th 2005. This request is for the demonstration of a small aperture Ku-Band satellite communications terminal mounted on a mobile platform.

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In conjunction with the FCC Form 442, this letter is also filed to request an STA for the purpose of beginning transmission earlier than the 10 weeks time period required to approve the FCC Form 442.

3. **Type of Operation to be Conducted:** Demonstration of an 11.5" antenna and associated communication equipment to access and track a commercial Ku-Band satellite while on a mobile platform driving within a 10 mile radius of Taunton, Massachusetts in the first half of the test period and similarly at Ft. Huachuca, Arizona for the second half of the period. A duplex communications link will be established with a either a 3.7 meter or an 8.1 meter Ku-Band antenna located in Ft. Monmouth, New Jersey. Also, a duplex link will be established with satellite emulator placed on a 90 ft. tower at the Taunton MA location. Later, at Ft. Huachuca, the emulator will be mounted on a 60 ft tower on TV Hill (elevation 6943 ft asl). These links will be used to demonstrate the ability of the proposed system to accessing commercial Ku-Band geostationary satellites.

4. **Purpose of Operation:** To demonstrate communications on the move technology as outlined in United States Government Contract DAAB07-02-C-F403.

5. **Time and Date of Proposed Operation:** A 6-month time period will be needed to conduct numerous tests between 8:00 AM to 5:00 PM EST. The first portion of the tests (June 30 – Sept 15, 2005) will be conducted in Taunton, Massachusetts, and the second portion (Sept 16 – Dec 30, 2005) will be conducted in Ft. Huachuca, Arizona.

6. **Class of Station, Call Sign of Station:** Station would be classified a satellite communications terminal for use on the commercial Ku-Band frequencies.

7. **Nature of Service:** Communications service that would be demonstrated would be a duplex 128 kbps and 256 kbps digital data link over a commercial Ku-Band satellite. The modulation will be BPSK spread spectrum with selectable spreading from 0 to 12 dB (7.170 MHz maximum occupied bandwidth) to allow low radiated EIRP Density to accommodate the antenna's sidelobe characteristics.

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8. **Location of Proposed Operation:** Taunton, Massachusetts (41° 57′ 03″ N, 71° 07′ 43″ W)
   Ft. Huachuca, Arizona (31° 32′ 31.6″ N, 110° 24′ 16.7″ W)

9. **Equipment to be used, including name of manufacturer, model and number of units:** One unit will be used for demonstration purposes, A Rantec 11.5″ Ku-Band MSAS Antenna and a Titan Model Number AN/USC66-V2 modem for the link with Ft. Monmouth, NJ. The link using the emulator will be communicating with a separate mobile terminal using a 24″ Vertex RSI antenna (the configuration of this second mobile terminal already has an FCC License to transmit). Both links will not be activated at the same time. The satellite emulator is the Dual-Band Satellite Emulator manufactured by Tampa Microwave Labs, Inc.

10. **Frequencies to be used:** 14.0 to 14.5 GHz Transmit and 10.95 to 12.75 GHz Receive for the Terminal. The satellite emulator frequencies are the complement of the Terminal frequencies.

11. **Effective Radiated Power:** Terminal EIRP is 35.3dBW (peak) Maximum RF Output at transmitter is 4.5 Watts.
    The satellite emulator EIRP is 14 dBm, with a maximum transmitter power of 5 dBm into the antenna.

12. **Emission Type:** The modulation would be BPSK spread spectrum with selectable spreading from 0 to 12 dB (7.170 MHz maximum occupied bandwidth) for a 256 kbps data rate.

13. **Overall Height Above Ground of Antenna Structure:** The height would be less than 6 meters as the antenna would be mounted on the roof of a HUMVEE or similar type military transport vehicle. The satellite emulator will be on a 90 ft tower in Taunton, MA and on a 60 ft tower in Ft. Huachuca, AZ.

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Exhibit 1

Narrative Statement

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Exhibit 1

PROGRAM DESCRIPTION: The WIN-T mobile terminal is a Ku-Band satellite communications terminal designed for communications-on-the move for U.S Government Departments. The concept uses a very small aperture antenna, 11.5" in diameter, which mounts on a mobile platform. To accommodate for sidelobe characteristics of small aperture antennas, the spread spectrum modulation method chosen spreads a 128kbps or 256kbps BPSK signal to large variable bandwidths (up to 7.170 MHz) to allow for a low radiated on-axis and off-axis EIRP Density spectrum. This low EIRP Density Signal will minimize adjacent satellite interference in the direction of the satellite arc and toward other terrestrial receiving antennas in the Ku Satellite Band (14.0 to 14.5 GHz).

The WIN-T Program will demonstrate this transmission method during the period late June through September 2005 in Taunton, Massachusetts. The demonstration is part of Government Contract DAAB07-02-C-F403. The demonstration will access a commercial Ku-Band satellite on the domestic arc and lease sufficient transponder capacity to allow for a demonstration of a 128kbps or 256 kbps through-put. The receive antenna will be a 6m or 8m Ku-Band antenna located in Ft. Monmouth, New Jersey.

The modulated signal uses a unique Network Centric Waveform that is spread across a large amount of bandwidth to maintain low EIRP Density in the direction of the satellite.

This Network Centric Waveform (NCW) is an IP-based, bandwidth-on-demand (BoD) system developed specifically to provide deployed forces with efficient SATCOM capability. It supports transmission of block file data, VoIP, VTC, and other IP based services. Quality of service is provided using differentiated services (DiffServ) and IP precedence levels.

The NCW waveform utilizes Multi-Frequency Time Division Multiple Access (MF-TDMA) for two major reasons. First, the ability to rapidly allocate TDMA time slots to users supports DAMA operation with networks of terminals having varying traffic loads. Secondly the use of multiple, low-burst-rate carriers is advantageous in supporting network access from small disadvantaged terminals with antenna sizes as small as 16" or less while still maintaining a large total network throughput capability

The NCW waveform has a number of additional features that address the needs of small, OTM terminals whose links are disadvantaged. Not all of these features will be demonstrated at this time. The features include:

- Mesh, hub-spoke, or hybrid networks of up to 255 members
- Unicast and multicast (group) operations
- Central automatic resource allocation (time slot assignment) based strictly on QoS using DiffServ Code Points, vs. standard commercial, best-effort systems
- Multiple burst rates from 32 kbps to 8.192 mbps to allow each link within hybrid large/small terminal networks to be optimized for the specific source-destination

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terminal pairing; entire burst rate can be allocated to a given terminal, or shared among many terminals, based on priority

- Special sub-frame assignments to guarantee QoS for VoIP traffic
- SOTM transmit capability at up to 256 kbps rate (higher at beam center and clear sky conditions)
- Terminal aggregate receive capability of up to 7 carriers, each with variable burst rates up to 8.192 mbps
- Link data rates that are adaptable as a function of location within a WGS beam, link weather conditions and blockage, to maximize throughput during clear link conditions but maintain connectivity during adverse conditions
- Use of spread spectrum to allow small SOTM antenna operations at Ku band
- Incorporation of a hub-assist mode for operations with small Ku terminals which must typically use a hub due to link budget constraints
- Outside-the-network, secure voice orderwire (SVOW) provided for terminal operator to operator communications.

Centralized control of the network is provided by a primary network control terminal, which would be backed up by one or more secondary terminals to which control can devolve if the primary controller is no longer able to provide control.
The control terminal provides the time slot scheduling function for network-centric operations. The time slot scheduler process, which is repeated for every TDMA frame, operates as follows: During every TDMA frame, each terminal in the network reports to the control terminal over a Return Orderwire (ROW) the status of up to 16 local priority buffers, including destinations for each packet, as well as the terminal's current link performance information. The scheduler in the control terminal then takes this composite information from all registered terminals and proceeds through a resource allocation process of selecting the burst rates for each of the MF-TDMA carriers employed in the network, as well as time slot assignments on each carrier for each source-destination terminal pairs. These assignments are then broadcast out over a Forward Orderwire (FOW) to all network terminals. Each terminal then follows its assignments and sends the packet traffic to the appropriate destination terminal or terminals. The packet traffic can be expected to be transmitted to the satellite approximately 3 frame times after entering the terminal buffer.
The control terminal operator can interface to the WSOC (WGS) or commercial satellite controller authority via an outside means, such as Integrated Monitoring and Power Control Subsystem (IMPCS) in the case of WGS. This feature will not be demonstrated at this time.