

November 12, 2004

James R. Burtle
Experimental Licensing Branch Chief
Office of Engineering and Technology
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

**Re: Request for Special Temporary Authority to Operate a VSAT
Network to Test, Demonstrate and Conduct Training of a Tactical
Military Communications Network**

Dear Mr. Burtle:

Pursuant to Section 5.61 of the Commission's rules (47 C.F.R. §5.61), General Dynamics SATCOM Technologies, Inc. (General Dynamics), hereby requests special temporary authority (STA) to operate a network using sub-meter antennas to provide a mobile satellite communications (satcom) infrastructure for predominately military applications.¹ General Dynamics requests this STA to allow for domestic testing, demonstration and training operations of this new system for a period of 6 months while it prepares, files and awaits grant of an experimental authorization to operate the satcom network.

General Dynamics has developed a communications system which will provide the U.S. military with tactical satellite connectivity. This system, called Satcom-on-the-Move™, uses a network consisting of a VSAT hub and sub-meter terminal antennas. The system mounts small (0.6 meter) earth station antennas on combat vehicles (Humvees, tanks, etc.) to support reliable tactical military communications despite the intense gyrations that occur as the vehicles move over rough terrain. The system's unique design ensures that the satellite dish is stabilized at all times so that there is no need to stop the vehicles to lock onto a satellite. This is an important development in tactical military communications.

¹ The information required by Section 5.61 of the rules is provided in the electronic STA form to which this letter is attached.

To support U.S. forces in the Middle East as well as other potential theaters of operation, the U.S. military needs reliable communications systems. The Satcom-on-the-Move™ system is a critical leap forward in meeting this goal. Satcom-on-the-Move™ uses TDMA technology and commercial Ku-band transponders to provide very high potential data rates (312 KB/s or greater) to coverage areas that are large and very well defined.

General Dynamics must now engage in a series of demonstrations to the U.S. Government that its new system can obtain the high data speeds that U.S. ground forces need immediately. The U.S. Marine Corps has deployed two Satcom-on-the-Move™ prototype units in Iraq, and General Dynamics has received orders from the U.S. Army and Marine Corps for additional units. General Dynamics has units at its Richardson, Texas, facility ready to be shipped to the U.S. Army Signal Corps at Fort Gordon, Georgia, to be used for demonstration purposes.² General Dynamics is preparing an application for an experimental authorization for this system. In the interim, General Dynamics asks the Commission to grant this STA request to allow for immediate domestic testing, demonstration and training operations for this new system. General Dynamics will use this STA until the experimental authorization is granted, but in any event no longer than six months.

The new developments in satellite technology involved in the Satcom-on-the-Move™ system make it difficult to identify the proper rules under which the system should operate. Part 25 of the Commission's rules contains various sections aimed at satellite systems with certain defined characteristics—for example, general FSS rules, Ku-band FSS VSAT systems, or L-band MSS systems. By contrast, this system is a mobile VSAT system operating in the international Ku-band.³ The Commission's rules do not provide for this

² In addition to the Richardson, TX, facility listed in the STA application, General Dynamics requests authority to operate the Satcom-on-the-Move™ system for testing, demonstration and training purposes at other General Dynamics locations and at locations where it will be demonstrated to the military. The full list of locations, coordinates and radii is as follows:

- VertexRSI, Richardson, TX facility: N 32° 58' 27", W 96° 42' 15", 5 km radius.
- General Dynamics, Taunton, MA facility: N 41° 57' 5", W 71° 7' 48", 5 km radius.
- Fort Gordon, GA: N 33° 24' 36", W 82° 8' 24", 5 km radius.
- VertexRSI Duluth, GA facility: N 33° 55' 10", W 84° 16' 12", 5 km radius.
- Coherent Systems Fredericksburg, VA, facility: N 38° 19' 49.9", W 77° , 28' 56.1", 5 km radius.

³ Particularly, this system will operate via transponders with the international Ku-band frequency ranges of 14.0–14.5 GHz uplink and 11.45–11.7 downlink.

particular combination of technical characteristics, but the Commission has in the past considered and granted a significant number of licenses for similar uses of the Ku-band spectrum.⁴ The Commission has found that such uses present “little potential for interference into any service authorized under the Table of Frequency Allocations” because they will use “licensed geostationary satellites operating within applicable coordination agreements with adjacent satellites.”⁵

The Satcom-on-the-Move™ system uses a directional antenna. The width of the beam at the half-power point is 2.3° for the 0.6 m antenna and 0.49° for the 2.4 m hub. The orientation on both the horizontal and the vertical plane is adjustable.

General Dynamics will use Ku-band capacity on the Intelsat 707 satellite at 53° W.L. Because of the use of sub-meter antennas that serve as the essential component of the system, the power levels that result from operation of the system may be higher than those that result from the use of larger, more traditional-sized antennas.⁶ Although the power levels comply with the ITU levels that will govern when the system is used in the field around the world, they may exceed those currently imposed by the Commission for operations in the United States. Accordingly, were General Dynamics to apply to the International Bureau for permanent authority for this system, it would require a waiver the Commission’s rules to operate at these higher power levels. Although—as described above—this system does not fit within any particular set of rules setting forth applicable satellite power level limits, to the extent necessary we request a waiver of the Commission’s rules to operate the system with the technical characteristics set forth in this application.

General Dynamics has obtained confirmation from Intelsat that the higher power levels will not cause unacceptable interference to its operations. Indeed, Intelsat is the only affected operator; the Intelsat 707 satellite at 53° W.L. is bracketed in the Ku-band by Intelsat

⁴ See, e.g., *In re The Boeing Co.*; Application for Blanket Authority to Operate up to Eight Hundred Technically Identical Receive-Only Mobile Earth Stations Aboard Aircraft in the 11.7–12.2 GHz Frequency Band, *Order and Authorization*, 16 FCC Rcd. 5864 (Int’l Bur. & OET 2001) (“*Boeing Order*”); USA Today Sky Radio, Application for Blanket License for 2000 Receive-Only Mobile Earth Stations to be Mounted on Aircraft, *Order and Authorization*, 7 FCC Rcd. 7943 (Domestic Facilities Div. 1992); Qualcomm, Inc., Application for Blanket Authority to Construct and Operate a Network of 12/14 GHz Transmit/Receive Mobile and Transportable Earth Stations and a Hub Earth Station, *Memorandum Opinion and Order*, *Order and Authorization*, 4 FCC Rcd. 1543 (1989).

⁵ *Boeing Order*, 16 FCC Rcd. at 5866–67.

⁶ Link budget analyses attached at Exhibit A provide more information regarding the power levels with which the system will operate. The attached analyses provide information for the Richardson, TX, and Fort Gordon, GA, facilities. Power levels for the remaining facilities will be much lower than those demonstrated for these facilities.

805 at 55.5° W.L. and Intelsat 705 at 50° W.L.⁷ Commission precedent has established that such confirmation from affected operators is sufficient to mitigate concerns about interference with respect to nonconforming earth station applications.⁸ The antennas used by General Dynamics can provide suitable link performance while restricting interference to other operators. However, in the event that harmful interference to any lawfully operating communications station should occur, General Dynamics will take all necessary measures to immediately eliminate the interference.

Preliminary radiation hazard analyses indicate that, although the VSAT hub antenna is compliant with the FCC's RF exposure standards, the terminal antennas may exceed those standards.⁹ However, the terminal antennas have a very small signal beam area and are, of course, planned for use on military vehicles with trained operators. The antennas will be mounted on the roof of the vehicles and pointed at geostationary satellites, not at the horizon where personnel could enter the beam. Additionally, the transmitters will be equipped with transmit cut-out protection such that the systems will only transmit when an appropriate satellite receive signal is present. In other words, the transmitters will be disabled at all times other than when the antennas are accurately pointed at the target satellite. Finally, General Dynamics is willing to undertake any other mitigation efforts the Commission deems necessary to safely operate this equipment during the testing, demonstration and training phase of the system.

For the reasons discussed above, the Commission should expeditiously grant this request. Grant of this STA is necessary and will serve the public interest by contributing to the achievement of essential tactical communications that are critical to successful military engagements worldwide.

Sincerely,

Philip L. Verveer
Jennifer D. McCarthy
Kasey A. Chappelle

⁷ Other, more distant satellites in the area are TDRS 6 at 47° W.L. and PAS-9 at 58° W.L.

⁸ See, e.g., *In re SWE-DISH Satellite Communications, Inc.*, Application for Authority to Operate a Single Temporary-Fixed Earth Station in the Ku-Band Fixed-Satellite Service, *Order and Authorization*, DA 04-2607 at ¶ 3 (Int'l Bur. 2004) (recognizing that interference concerns can be addressed by providing evidence that potentially affected satellite operators have agreed to the proposed operations).

⁹ A radiation hazard analysis for each antenna is attached at Exhibit B.