

**Proposed Modifications to Raytheon's
Experimental VSAT Network Authorization**

Raytheon Company—Imagery and Geospatial Systems Division (“Raytheon”) currently holds an experimental FCC license to test and demonstrate a conventional Ku-band very small aperture terminal (“VSAT”) network in the United States (Call Sign WC2XTV; File No. 0258-EX-PL-2001). This current authorization is for the operation of a single hub earth station located at a Raytheon facility in Bellevue, Nebraska (near Omaha), and up to twenty (20) transportable remote terminals that operate at various locations throughout the United States. The VSAT hub and transportable remote terminals currently communicate with the U.S.-licensed GE-4 satellite located in the 101° W.L. orbit location.

As explained in the initial application, Raytheon sought this experimental license to test and demonstrate the use of transportable Ku-band VSAT earth stations that could provide communications services primarily in the event of communications outages caused by disasters or other circumstances. For example, a commercial enterprise with multiple outlets could store one or more transportable VSAT terminals at a regional headquarters facility and deploy the terminals to individual outlets as needed to restore communications services. Alternatively, individual outlets could store such a VSAT terminal and deploy it quickly in the event of an outage of its primary communications network or service.

Raytheon’s testing of the VSAT network to date, and demonstrations to potential customers, have produced favorable results and been positively received by potential users. As a consequence, Raytheon now seeks authority from the Commission to expand its experimental program and to modify its FCC license in several respects.

First, Raytheon proposes to add a number of satellites as additional points of communication. Specifically, in addition to GE-4 at 101° W.L., Raytheon seeks authority for its VSAT network to communicate with the following Telstar satellites licensed to Loral and the SBS 6 satellite licensed to PanAmSat: Telstar 4 located at 89° W.L.; Telstar 5 located at 97° W.L.; Telstar 7 located at 129° W.L.; Telstar 8 to be located at 89° W.L.;¹ Telstar 11 located at 37.5° W.L.; and SBS 6 located at 74° W.L. The addition of these new points of communications will permit demonstrations and testing to reflect more realistically the nature of Raytheon’s mobile VSAT product line, *i.e.*, transportable terminals that can be readily deployed and easily operated to facilitate VSAT communications in emergency or other time-sensitive situations. Thus, for example, instead of communicating solely with the GE-4 satellite, the flexibility sought

¹ Loral currently operates Telstar 4 at the 89° W.L. orbit location. Later this year Loral will place its Telstar 8 satellite at 89° W.L. and will move Telstar 4 to another location. Raytheon requests permission to communicate with both Telstar 4 and Telstar 8 during the time each satellite is located and operating in the 89° W.L. location.

by this modification will permit demonstrations and testing using several satellites for the benefit of prospective purchasers that have their own satellite capacity on such satellites, or that intend to acquire such capacity.

Second, this application proposes to add new earth station antenna facilities to the experimental VSAT network in addition to the Prodelin, Comtech and Vertex antennas currently authorized under Raytheon's existing experimental license. A separate Equipment Exhibit lists the manufacturers and model numbers of the new antennas that will be used in this VSAT project, ranging in size from 1.2 meters to 3.8 meters, all of which are commercial, off-the-shelf items that have been approved for use by the FCC. The particulars of operation for each of these earth stations are set forth on separate engineering attachments. The reason for specifying additional new antennas is to afford added flexibility for Raytheon to demonstrate and test multiple product lines. For example, product demonstrations at given sites and related testing generally are dictated by the specific needs of prospective purchasers. For this reason, Raytheon seeks authority to demonstrate and test each of the listed antennas, including a range of models and sizes, to show that its new transportable VSAT concept can facilitate a variety of voice, data and video options as required by prospective users.

Raytheon is in the business of selling radio equipment and providing integration services for communications networks. As shown on the attached Equipment Exhibit, Raytheon seeks to test and demonstrate to prospective purchasers eighteen antenna models. Raytheon requests authority to operate two units for each listed antenna model under this experimental license for the purpose of demonstrating transportable VSAT networks to its prospective customers.² If a customer decides to purchase a VSAT network from Raytheon, then the specified antennas are acquired and tested by Raytheon as part of its VSAT network production and integration process before delivery to the customer. Thus, consistent with Section 5.3 of the rules, this experimental license encompasses the demonstration of equipment to prospective purchasers, as well as the testing of equipment in connection with the production and integration of the VSAT networks being delivered to customers. Raytheon's operations under this experimental authorization are limited to the demonstration and testing of equipment as described herein, and any permanent FCC authority to operate such VSAT networks are the responsibility of the customers.

Radiation hazard reports for each of the proposed new earth stations are being submitted with this application. Raytheon will take steps to ensure that the operation of the modified VSAT network will comply with applicable radiation requirements. To ensure that the public and operational personnel are not exposed to harmful levels of radiation from operation of the respective earth stations, Raytheon will set up a barrier around the earth station and post warning signs to alert persons in the vicinity of the potential hazard. Such barriers will restrict access within a distance that is at least three times the diameter of the respective earth station (*e.g.*, for

² Raytheon's existing experimental authorization permits it to operate up to ten units in the case of one antenna model and up to five units in the case of two other antenna models. As explained on the attached Equipment Exhibit, these quantities under the existing authorization are being reduced because Raytheon's requirements for demonstrating transportable VSAT networks are satisfied by operating two units of each antenna model.

the 2.4 meter earth stations, the barrier will be placed at least 7.2 meters from the antenna). Alternatively, where an earth station is placed on a rooftop, access to the facility could be restricted by a locked door or gate in lieu of a separate barrier, and warning signs will also be posted in this circumstance.

Third, the current authorization permits communications only between Raytheon's hub in Bellevue, Nebraska, and its authorized remote terminals. By this modification application, Raytheon seeks authority for communications not only between the hub and remotes, but also for communications directly between remote stations without passing through the hub. A grant of this request will enable Raytheon to better demonstrate its experimental VSAT network under "real world" conditions to prospective customers. For example, rather than limiting demonstrations to communications between a single customer facility and Raytheon's current hub in Bellevue, Nebraska, this modification will permit Raytheon to demonstrate VSAT network operations between or among two or more independent locations, *e.g.*, a company's headquarters and branch office or multiple company outlets, as designated by the prospective customer. This new configuration also contemplates that any of the authorized antennas could be installed for use at any remote location as well as at the currently authorized hub facility in Bellevue, Nebraska. This modified VSAT network configuration will afford greater flexibility and will permit Raytheon to test and demonstrate a communications system that more closely replicates a prospective customers' actual needs.

Fourth, as specified in the engineering attachment, Raytheon proposes to operate its experimental VSAT network using increased bandwidths and data rates to facilitate the transmission and reception of a range of communications services, including quality video signals.

Fifth, to the extent required, Raytheon seeks authority to use a satellite simulator manufactured by Tampa Microwave Labs, Inc. (Model # LT-03-W-197) to assist in testing equipment suites for functionality and compatibility. The simulator will operate using the same conventional Ku-band frequencies as specified in this application. A specification sheet provided by the manufacturer of the simulator is attached to this application. The simulator will be located on the roof of Raytheon's Bellevue, Nebraska hub facility and will be operated in a manner that precludes any interference to other communications equipment in the area. Furthermore, access to the simulator will be restricted by a locked door or gate to ensure that only authorized personnel may have access to this equipment.

Permitting these changes to Raytheon's experimental VSAT network will serve the public interest for the same reasons that grant of the original authorization was in the public interest. The use of transportable Ku-band earth stations in VSAT configuration for service restoration purposes reflects an important new development that can afford substantial public interest benefit. As the Commission is well aware in today's environment, terrestrial communications networks are vulnerable to disasters and other unexpected occurrences. The deployment of transportable Ku-band VSAT terminals on an as-needed basis would permit the rapid restoration of communications services in the event of an unforeseen communications outage. Indeed, restoring service under such circumstances would enable the continued flow of communications traffic and facilitate the continuing conduct of commercial and governmental

business, and could even enhance the capability of governmental authorities to address the situation at hand. For reasons set out above, granting the modifications requested herein will afford greater flexibility for Raytheon to demonstrate and test its transportable VSAT network products, and will permit Raytheon to demonstrate and test the viability of such networks in a variety of technical and operational contexts.

Finally, the current experimental authorization granted Raytheon an exemption or waiver of the station identification requirements of Section 5.115 of the Commission's rules. Raytheon requests that this current exemption or waiver be extended to cover the new facilities authorized in accordance with this modification application. As noted above, Raytheon will operate its expanded experimental VSAT network in primary FSS spectrum using conventional Ku-band frequencies, and all of its new earth stations comply with the FCC's antenna performance specifications and other earth station rules. Thus, there is no possibility of interference to other services or to other FSS operations in the bands. In addition, except for satellite uplinks carrying broadband video information, earth stations operating under Part 25 of the FCC's rules are not subject to such station identification requirements. *See* 47 C.F.R. § 25.206. With respect to broadband video information, the added antennas may be used by Raytheon to uplink broadband video communications, but all video transmissions will be digital communications. The station identification requirements of Section 25.206, by their terms, relate solely to *analogue* transmissions and therefore do not apply to the digital communications that will be uplinked by Raytheon. For this reason, there is no need to require Raytheon to transmit station identification information from each of its proposed earth stations after every transmission, nor would any public benefit result from such a requirement.

Moreover, complying with such a requirement would be unduly burdensome in the context of the proposed experimental operations. Each of the new antennas to be used by Raytheon is a commercial, off-the-shelf item that is not capable of transmitting station identification information after each transmission. Moreover, the transportable VSAT remote terminals will transmit intermittently depending on the communications being carried during a demonstration or test, making it impossible to transmit station identification information at the end of each transmission. Finally, Raytheon seeks to demonstrate its experimental VSAT network under "real world" conditions to prospective purchasers in order to validate this new communications concept. Significantly modifying standard earth station equipment (if it is even possible) or operational procedures would substantially undermine Raytheon's "proof of concept" testing and customer demonstrations, which would be contrary to the public interest given the potential benefits of Raytheon's transportable VSAT network. For these reasons, Raytheon respectfully requests that the Commission grant an exemption or waiver of the station identification requirement of Section 5.115 of the rules.