FEMA TechNote

U.S. Department of Homeland Security

SAVER

System Assessment and Validation for Emergency Responders

The Federal Emergency Management Agency (FEMA) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions. The SAVER Program conducts unbiased operational tests on commercial equipment and systems and provides those results along with other relevant equipment information to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the U.S. Department of Homeland Security's Authorized Equipment List (AEL).

Information provided by the SAVER Program will be shared nationally with the responder community providing life- and cost-saving assets to FEMA, as well as to federal, state, and local responders.

The SAVER Program is supported by a network of technical agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?"

For more information on this and other technologies, please see the SAVER website or contact the SAVER Program Support Office.

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SPAWAR Systems Center ATLANTIC

Transportable Satellite Terminals for Broadband Services

The Federal Communications Commission (FCC) defines broadband service as high-speed Internet access with data transmission speeds exceeding 200 kilobits per second (kbps). Broadband service is typically provided via the ground based wired or fiber telecommunication network. The network, however, may not be available in all areas or may be overloaded or disabled during a disaster. In these instances, emergency responders who subscribe to a satellite broadband service can quickly establish broadband connectivity for their emergency operations. Once the satellite broadband connection is established, emergency responders can connect their personal computer to transfer files, upload and download video, access Web sites and intranet systems, and check e-mail just as they would over ground based services. Some services allow the transmission of streaming video and video-conferencing. A Voice over Internet Protocol (VoIP) phone system can also be configured with the satellite broadband service, enabling phone calls and faxes to be sent and received.

Technology Overview

Satellite broadband services require a ground earth station (often called a terminal) to transmit and receive radio signals to and from geostationary earth orbiting (GEO) satellites. These satellites orbit the earth directly above the equator and can handle hundreds of thousands of voice and data channels. A clear line of sight to the satellite from the terminal is needed for communication.

Two types of portable terminals are commonly used by satellite broadband service providers. They are Very Small Aperture Terminals (VSATs) and Broadband Global Area Network (BGAN) terminals. A VSAT consists of a small, outdoor satellite dish antenna (typically 3 to 4 feet in diameter) with an attached amplifier and transmitter/receiver, and a modem. VSATs accommodate multiple users and offer connection download speeds up to 4 megabytes per second (Mbps). As with the ground based network, upload speeds are typically lower.

VSAT

VSATs are typically mounted to and transported by pickup trucks or trailers and can be fully operational in less than 30 minutes. To set the system up, the VSAT dish is pointed to the south, and with the press of a button, the controller rotates and orients the dish, locking the system onto the satellite signal. Some service provider's offer prepackaged kits that contain a VSAT system, (i.e., the dish, controller, modem, and cables) in a hard-shell case. VSAT systems operate on standard AC power.

BGAN Terminal

BGAN terminals contain an antenna, amplifier, transmitter/receiver, tracking unit, and modem all in one unit. These terminals are available in various models that are about the size of a briefcase. The models range in functionality from single-user connections with data speeds up to 384 kilobytes per second (Kbps) to multiple-user connections with data speeds up to 492 Kbps.

BGAN terminals can be set up and operational in about 3 minutes and operate on standard AC power or internal batteries. The terminal must be pointed to the south. It will then lock on to the satellite signal.

Purchasing Equipment and Services

Subscribers of satellite broadband services purchase or rent a terminal from a service provider and pay a fee for the amount of data they transmit and/or receive. VSAT purchase prices can range from $3,000 to $30,000 and BGAN terminals can range from $1,300 to $17,000. The wide cost range reflects the wide variety of possible equipment configurations. Broadband service should be purchased as a package, much like cellular telephone service is purchased. This will allow the service provider to configure the terminal hardware to operate on their satellite network.

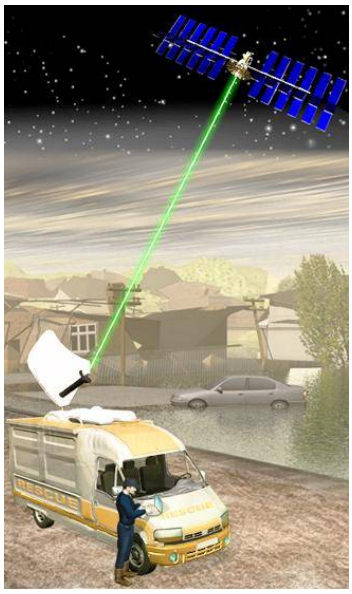
Service plans/contracts can be for up to 2 years and may include activation fees or fees for early termination of services. Some plans dictate a monthly or yearly data load allowance with fees for exceeding the limit. Most VSAT service providers quote data load allowances in gigabytes (GBs) and their monthly usage fees can range from $149 for 2 GB to $999 for 30 GB, with overage charges of nine cents per megabyte (MB). Most BGAN service providers quote data load allowances in MBs; their fees can range from $142 a month for 20 MB to $1,618 a year for 240 MB, with overage charges of $6.30 per MB.

Some providers offer plans/packages designed for emergency response applications that allow users to suspend service for periods of inactivity, charging only for the amount of data they transmitted and/or received. Prior to purchase, emergency responders should consult with the service provider concerning their data usage requirements and service plan options.

Performance Considerations

Emergency responders should be aware of the location of the service provider's satellites in relation to the terminal's location. Generally, satellite communications will be more stable when the satellite antenna can be aimed at a satellite that is more overhead rather than one that is on the horizon. All satellite broadband connections suffer a lag time in uploads and downloads due to the distance the data has to travel to and from the satellite. The satellite signal is susceptible to degradation, especially with smaller antennas, due to inclement weather—an issue commonly referred to as "rain fade." In addition, for communication with a satellite, the terminals require a clear view of the sky in the direction of the provider's satellite, which could prove difficult in cities crowded with large buildings or in heavily wooded environments.

Applications



Utilizing transportable satellite terminals for broadband service, emergency responders can coordinate rescue and recovery efforts, while maintaining contact with their home base of operations. Broadband services enable emergency responders to collect and disseminate information in real-time; mobilize recovery teams; organize medical supplies and basic necessities, such as food, water, shelter and clothing; and arrange evacuations.

Almost any mode of transportation can be utilized to transport VSAT and BGAN terminals to disaster areas. Once on site, they are easily set up and activated. The equipment can also be placed within a vehicle and a dome shaped tracking antenna mounted to the vehicle's roof, enabling satellite broadband to be accessed while a vehicle is moving up to 75 mph. Many of the Federal Emergency Management Agency (FEMA) Urban Search and Rescue teams that responded to New Orleans after Hurricane Katrina utilized VSAT systems while in route. Teams used their mobile systems to monitor the news and gather information on the affected areas via the Internet. Access to real-time information allowed the teams to plan their course of action prior to arrival. Once on site, the teams were able to collect and disseminate critical information to their home base.

Additional Information

The Federal Communications Commission
www.fcc.gov/cgb/broadband.html

The Responder Knowledge Base
www.rkb.us