

## 1.6-Meter Quick Response Vehicle





This document describes the Quick response Vehicles that *Satcom Scientific, Inc. (SSI)* has developed and can provide as a cost effective solution for a flexible and highly mobile transportable earth station. These systems are designed to provide transmission and reception of compressed digital video, Voice-over-IP, or high-speed Internet using a compact vehicle capable of quick response to any emergency situation.

The system pictured is hosted on a stock GMC Yukon XL, 2-wheel drive gasoline powered SUV as the platform of choice. This vehicle has proven to be a very reliable, rugged, and stable choice for other transportable earth stations built and delivered by *SSI*. The unit is usually equipped with 4-speed automatic transmission, transmission cooler, heavy-duty towing package, and numerous amenities such as leather driver and passenger bucket seats, electric windows and door locks, AM/FM/CD Stereo, power rear lift gate, steering wheel controls for cruise control and audio, and automotive air conditioning. This configuration employs the long wheelbase,  $\frac{3}{4}$ -ton chassis.

The rear seats are removed and a walled partition installed to separate the on-board gasoline generator, AC-driven air conditioner, and storage area from the personnel compartment. A single EIA-19 equipment rack is installed in the rear portion of the truck to house the rack-mounted electronics. This equipment rack also serves as an integral part of the antenna load frame that assures the rigidity of the roof-mounted, motorized 1.6-meter Ku-Band antenna. A third seat for the engineer is installed forward of the equipment rack.

Although the vehicle is equipped with GMC automotive air conditioning for environmental control while moving, it is also be equipped with a 16,000 BTU air conditioner for extra cooling capacity in desert environments. The air conditioner features a specialized sand filter that can be easily cleared of sand and other foreign objects. This air conditioner will provide cooling for the personnel area and rack mounted electronics when the engine of the vehicle is not running.

The truck features a 6kW on-board generator that provides electrical power to the unit while in remote locations. The electrical system also allows operation from an external utility power source when being used in a fixed location where utility power is available. A transfer switch allows the operator to select power from either the vehicle's on-board generator or from the local utility grid. An electrical distribution panel includes all main and subsystem circuit breakers, and contains digital metering to monitor electrical system parameters. A 2.1kW UPS system is also installed to provide continuous fail-safe power to all the rack mounted equipment. The vehicle is designed for 220 VAC, 50 Hz operation, but can, of course, be equipped for other power grids.

Storage is available in the rear of the unit above the insulated, sound-attenuated generator compartment and air conditioner unit. Storage space is also allocated for an extensive first aid kit, emergency rations, water, and CBR (Chemical, Biological, and Radiological) protective clothing as necessary.



An AVL 1.6-meter antenna system with 2-port Global (wideband) feed system is mounted on the vehicle's roof and features an auto locating "one-button" antenna controller. The antenna system includes a flux gate compass and GPS system that feeds location data to the peaking algorithm as well as a DVB receiver. This receiver enables the controller to automatically confirm satellite identity of either the target satellite or a designated "signpost" satellite by matching a pre-programmed DVB signal on the satellite, and then peaking by maximizing this signal's strength. Once the satellite has been verified and the system is "peaked", then the antenna is operational; if this is a "signpost" satellite, then the controller moves the antenna directly to the target satellite. At this point the transmit electronics are in standby until the engineer selects transmit. As an option, a 70 MHz RF enable switch can be added that is triggered by the modem once a "handshake" has been established with the satellite. At this point the network operations center can control the vehicle's transmit carrier.

The 48-inch equipment rack allows for the installation of up to 27 RU of electronic equipment.

The design team at **SSI** has also integrated many convenient optional features suitable for desert operations which can be delivered in this vehicle. Optional run-flat tires and wheels may be mounted on the delivered vehicle to ensure mobility despite losing tire pressure. A 150 psi air compressor with air hose, adaptors, and an air impact wrench can also be added as optional features to allow tires to be quickly removed and/or repaired in the field if any damage occurs to them.

This short summary is merely a listing of the major features of this mobile earth station. A detailed list of features and capabilities are available upon request. **SSI** was originally organized in 1983 as **RF Scientific, Inc.**, and mobile satellite communications has been our focus throughout the years. This vehicle has been designed to offer the maximum flexibility and dependability for this type of application, and we are confident it will perform well and provide many years of reliable and economic service to the end-user.