

**Exhibit 1.**

**Narrative Statement Describing The Government Contract**

MITRE Corporation is developing a prototype Satellite Communications (SATCOM) On The Move (SOTM) terminal designed to operate at Ku-band. The MITRE effort is being sponsored by the US Army Program Executive Office for Command, Communications, and Control Systems (PEOC3S), Fort Monmouth, NJ. This program is intended to develop a prototype terminal mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV) that will be subjected to various unimproved road conditions to characterize the terminal's ability to faithfully track the satellite under extreme conditions. The prototype terminal employs commercial off-the-self (COTS) equipment designed for Ku-band SATCOM operation. To mitigate the risk of interference, the terminal makes use of a direct sequence spread spectrum modem.

Project Number: 0701M570

Agency Sponsor: Program Executive Office for Command, Control, and Communications Systems (PEO C3S), Fort Monmouth, NJ.

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Contract No.: DAABO7-01-CC201

## **Exhibit 2.**

### **Narrative Statement Describing The Research Project**

**Medium Data Rate Satellite Communications (SATCOM) On The Move (SOTM) for the Battalion-Level Warfighter**

This Army-sponsored Mission Oriented Investigation and Experimentation (MOIE) calls for the design and prototyping of an affordable satellite communications (SATCOM) terminal that can support SATCOM OTM (SOTM) and Medium Data Rate (MDR) SATCOM On-The-Pause (SOTP) communications. The anticipated data rate required for SOTM operation is 128 kbps. This program is intended to develop a prototype terminal mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV) that will be subjected to various unimproved road conditions to characterize the terminal's ability to faithfully track the satellite under extreme conditions.

Under the MOIE program, research is underway in four key challenge areas; development of a low-cost platform stabilization and antenna tracking system; development of a link layer protocol to support shared channel access; conduct waveform performance analysis using RF channel simulator to tune modem hardware; and develop a small aperture antenna with excellent gain and low sidelobes. The prototype terminal will represent the successful integration of our research with low cost COTS products to support SOTM. The HMMWV-mounted prototype terminal will undergo test and characterization that will lead to FCC certification. The resulting prototype terminal will serve as a mobile lab to enable MITRE to refine the performance (e.g., data rate, road challenges, communications reliability) of the terminal. We plan to conduct a series of demonstrations that confirm the prototype terminal's ability to exchange SA and some C2 messages OTM. In addition, a requirements specification will be developed to assist the Army program office in defining a program for the procurement of SOTM terminals.

Low-cost platform stabilization will be achieved by leveraging the use of Fiber Optic Gyros (FOGs) as a key part of the tracking system. The tracking system will be a hybrid design, which includes open loop tracking with periodic closed loop updates to correct for drifting of the inertial system.

The link layer protocol will support reliable, shared and efficient satellite transponder channel access. The link layer protocol will be designed to service both multicast and unicast routed messages. Furthermore, the protocol will support peer-to-peer and hub-spoke connectivity and minimize the mobile SATCOM terminal's modem count.

**Exhibit 3: Transmitting Equipment To Be Installed**

Item	Description and Model No.	Function	Experimental	Company
1	Rack Mountable Computer, 10" Monitor , 233 MMX , 2MB, PCI 14 slot backplane (2 PCI, 2-SBC,8-ISA)	Host for Sigtek Modulator/Demodulator Cards	No	Broadax Systems, Inc.
2	Sigtek QPSK Direct Sequence Spread Spectrum Signal modulator w/Higher chip rate and FEC option, model ST-112	Modulator	No	Sigtek
3	EF Data Ku-band Transceiver model KST-2000a with 40 watt RF and 85 degree K LNA, LNA with 60 dB gain and 70 MHz IF	Transceiver	No	EF Data/Adaptive Broadband Corp
4	KVH pedestal/tracking unit with full stabilization(GyroTrac included), KVH model TracVision TVG6 with North American LNB, Part Number: 01-0238-01	Terminal, Antenna Reflector and Radome	No	KVH Inc.
5	Transmit/Receive Feed Assembly with Tx Reject Filter	Antenna Feed	No	Seavey Engineering
6	Novella SatComs Ltd. L-band Tracking Receiver model B355	Tracking Receiver	No	Novella SatComs Ltd
7	Wind River Tomado II Dev. Tools and VxWorks RTOS /Tornado Standard/processor, Patriot 1000/Host	Platform Stabilization	No	Wind River
8	KVH: Fiber Optic Gyros 4100 HP Dual Axis	Platform Stabilization	No	KVH Inc.
9	EVAL-AD1555/1556 Sigma Delta evaluation board w/software and following Analog Devices chipsets; AD2S83AP, AD2S90, AD2S99AP, EVAL-AD-1555/56EB Sigma Delta Module, and AD-7714-5EB	Platform Stabilization	No	Analog Devices
10	Miscellaneous, RF Rotary Joint, WR-75 Transitions, Flex Waveguide, Cable	Integration	No	Kevlin and others