

GetSAT – NTS

TE 16-4 COTM Capability CONOPS

19-23 September 2016

Location: Little Creek, VA, coastal waters nearby

Objective: To test operations of the GetSAT Micro terminal on the Inmarsat/Boeing I5 Mil Ka and GSB constellations while demonstrating Comms on The Move (COTM) and Roll-on, Roll-off capabilities.

Description: This demonstration is in support of the US SF community. The GetSAT MicroSAT terminals are being tested for their functionality with Inmarsat commercial and Mil KA. This time is also being used to demonstrate the capability GetSAT provides in support of COTM operations. On customer site at Little Creek we will temporarily mount a MicroSAT terminal, 20W BUC, modem, baseband and power to a USSOCOM designated boat. This boat will be used to demonstrate COTM capabilities by holding constant comms on the satellite both while the boat is at standstill, on the move and maneuvering. The applications being tested will include voice, UC/Collaboration, FMV, H.265 encoding, WAN Optimization and Voice Optimization. We will also validate performance using testing software, such as iperf. Success will depend on amount of throughput achieved, sustained connection to the Inmarsat constellation, and how the MicroSAT performs during COTM testing. Additional, cooperative testing with Mobile Ad hoc radio Network (MANET) and ICS providers to extend SATCOM services provided by the GetSAT Micro to other boats, as the customer requests. The majority of our baseband services will be run off of the Klas Voyager 8 kit. Exact configuration still to be determined.

Proposed Capabilities:

- COTM over Inmarsat KA Band – Mil and Commercial
- Network Optimization – WAN and Voice
- UC services – Voice, Video, Chat, Collaboration
- Mobile Comms – MANET, ICS, possibly Android

Limitations:

- Modem/hub set up, coordination.
- MANET Set-up
- Unknown space on Boat for equipment to operate with adequate anchor points- must be free and clear of major obstructions, obstacles blocking line-of-site to the I5 Satellite in 360 degrees

Success Criteria:

- Desired throughput to be determined following link budget analysis.
- Holding voice/data/FMV comms during the on-the-move testing w/ minimal loss.
- Keeping lock on constellation with no operator assistance required. 90% uptime.
- Successful connection, close loop with Inmarsat/Boeing I5 Satellite
- % Reduction in data over the WAN/SAT shot
- # of voice/video calls sustained with static and on the move

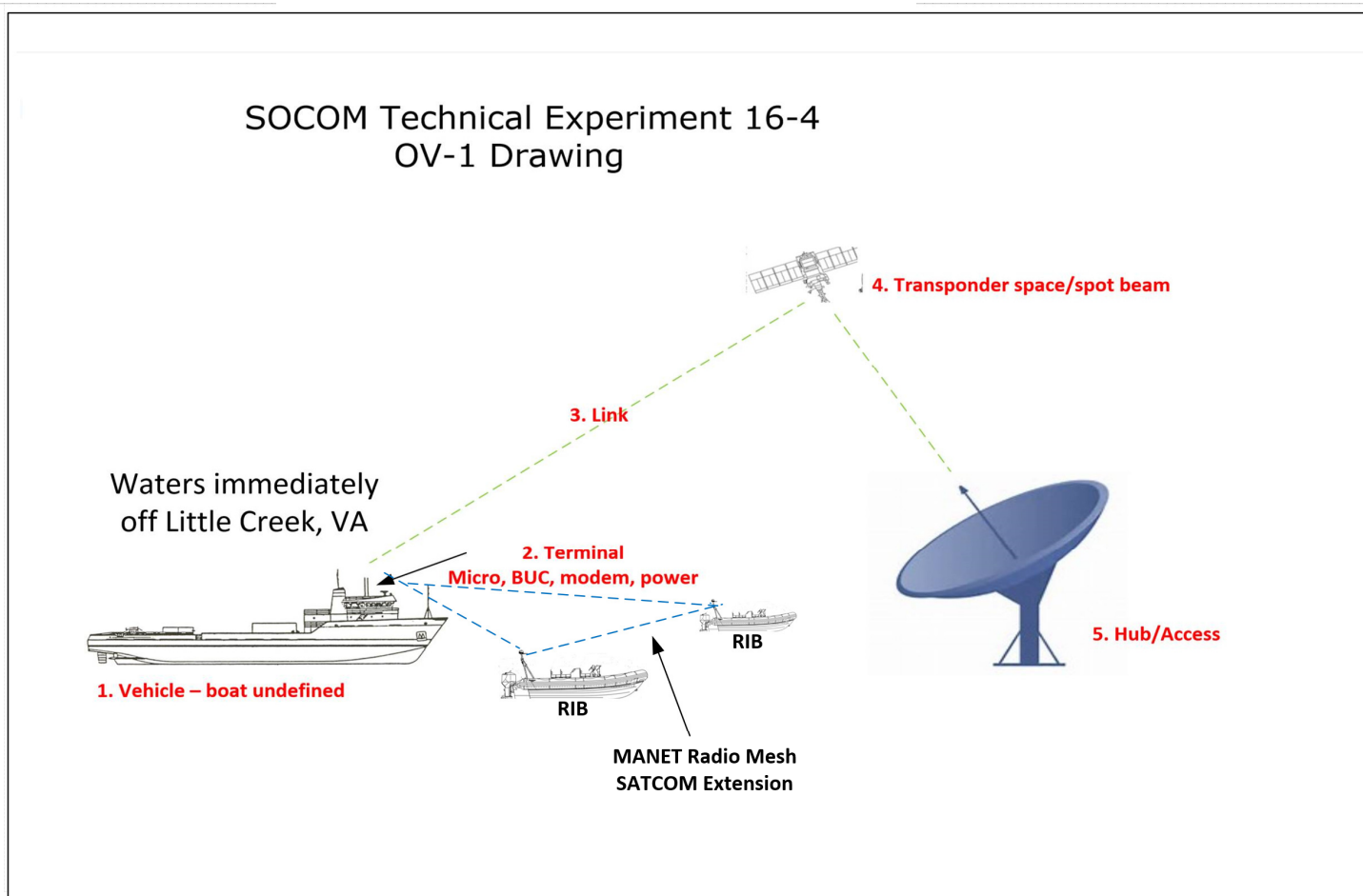
Assumptions:

- Vehicle will be a boat with anchor points for tie straps
- Authority to operate from Inmarsat/Boeing at Mil Ka
- Approval by the FCC- Special Temporary Authority
- Vessel will be on-the-move determined by customer
- I5 Satellite Transponder Availability
- High speeds and/or rough seas
- Modem, matching that at the Hub Site in Lino Lakes, MN
- Available power on the boat

Risks:

- Unanticipated failure at hub site
- Equipment is not properly secured, falls into water or is broken by dropping
- Failure to secure authority to operate from FCC in time for the TE
- Modem- configuration must match hub modem configuration
- I5 Satellite Mil-Ka spectral bandwidth availability
- Power – Virideon Battery availability
- Sat service (Inmarsat/Boeing I5, Mil Ka)
- Vessel mount -GetSat vehicle mount- equipment secure
- Package (how will all of these things be packaged in the vehicle)
- Test plan, CONOPS, Success Criteria (not yet documented)

Figure 1: Diagram



1. Boat
2. MicroSAT, Hughes modem, 20 W BUC, laptop with GETSAT app loaded, pigtail cable, to access Internet for FMV, data, audio (content tbd), Klas Voyager 8 (x2ESR, VM, SW24, LMR)
3. Link- 10x10 Mb/s would be ideal. Waiting on link budget for details
4. Transponder Boeing/Inmarsat I5
5. HUB provided by Inmarsat– Located in Lino Lakes, MN. 2.4m antenna, 50 W BUC

The diagram illustrates the GetSat Microsat Ka Band Antenna system and its connection to a BOAT (Boat Antenna and Antenna Test) system. The antenna assembly, housed in a Radome, consists of the GetSat Microsat Ka Band Antenna, Ka band RF, Mounting Plate, SMA, and Wave Guide. The BOAT system includes a BUC (Boat Unit Controller), Wave Guide, N (Noise), F (Feed), and 10 MHz Reference. The BOAT is connected to a Satellite Communications Modem (HM200) via SMA connectors. The modem is also connected to a DC Ethernet Switch, which is connected to a Laptop and a MANET RADIO. The system is powered by a VIREDEON POWER BATTERY (120 VAC) and a 24 VDC source.