SATCOM VSAT

Bridging In-Field Communications

During

Emergency Response

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By

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Impact of In-Field Communications – C3i

1. Communication
   i. Short range point-multipoint (“PMP”) comm with FM V/UHF radios
   ii. Long Range PMP with short wave HF
   iii. Long Range PMP with satellite comm
   iv. Data communication/Internet

2. Coordination
   i. Search & Rescue (“SAR”)
   ii. Disaster Relief
   iii. Field Care & Medivac

3. Command/Control
   i. Organization support
   ii. Logistics

4. Information Dissemination
   • Assessment updates
   • Progress updates
Salient Points of Short & Long Communications

1. **V/UHF Walkie-Talkie**
   - i. Point-To-Point ("PTP") & PMP localized unrepeated networked dispatch calls
   - ii. PTP & PMP Repeated localized networked dispatch calls
   - iii. Typically 3-5km coverage radius
   - iv. Low data, SMS & No Internet
   - v. No LIVE Video
   - vi. Data communication/Internet

2. **HF Radios**
   - i. PTP & PMP long range Networked Dispatch Calls
   - ii. Global coverage
   - iii. Low data, SMS & No Internet

3. **Satellite Comm - VSAT**
   - i. Fixed & Mobile Telephony with SMS, MMS and Internet
   - ii. Network of VSAT nodes with localized in-field services
   - iii. Broadband Internet/Data
   - iv. LIVE Videoconference/Video Broadcast
   - v. Global coverage for land and seas
Types of In-Field Services on VSAT

1. Dispatch Calls (V/U/HF)
   • Networked & Standalone

2. Fixed and Mobile Telephone & Fax Calls
   • Fixed PSTN Telephony
   • Fixed VoIP Telephony
   • Mobile Telephone – 2G & 3G

3. Wired and WirelessBroadband Internet/Data
   • Wired Data LAN
   • WiFi

4. Videoconference & Video Broadcast
   • Networked videoconference
   • Digital video broadcast
Typical Satellite VSAT Network in **STAR Configuration**

- **Downlink Channel (up to 66Mbps)**
- **Uplink Channel (up to 1.5Mbps)**

**Emergency Response HQ**

**Satellite Gateway**

**Internet**

**PSTN**

**Mobile**

**1.8m Ant.**

**Satellite Modem**

**Field Relief Center-1**

**Field Relief Center-n**

**In-Field Services**
In-Field Services via VSAT

MEASAT 3

Satellite Gateway

1.8m ant.

User Terminal on Site

LAN Switch

In-Field Services

- WiFi
- Wired Data
- CCTV
- Mobile
- Videoconference
- Payphone
- Voice-over-IP

Emergency Response HQ

Internet

Mobile

PSTN

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Topology of a Multi-Services VSAT Platform

- **GSM Network**
- **PSTN Network**
- **Internet Network**

**Satellite Gateway**

- **Satellite**
- **1.8m VSAT**
- **mSAT**
- **IPO**
  - Meshed WiFi
  - nanoBTS
  - 4 Mbps Downlink
  - 2Mbps Uplink

**GSM Subs**

**Public Phones**

**Private Phones/Fax**

**Wired Intranet/Internet**

**WiFi**

**GSM Mobile**

**Services:**
- Public payphones
- Private phones
- Wired Intranet/Internet
- WiFi
- GSM Mobile
- Community Access
- Individual Access
- Broadband Internet
- WiFi
- GSM Mobile

**Disaster Site**

- Outdoor WiFi AP + Omni Ant ~ 300m range
- Outdoor nanoBTS + Omni Ant ~ 3km range

**15m Monopole**

**Solar Power**

**Router**

**ATA**

**Public Phones**

**Private Phones/Fax**

**Wired Internet & Data**

**Wi-Fi Enabled PCs & Smart Devices**

**Community Access**

**Individual Access**

**Broadband Internet**

**WiFi**

**GSM Mobile**
## VSAT Specifications

### C-Band VSAT
- **Antenna Diameter**: 1.8m (typical)
- **Traffic Capacity**: 9.6kbps to 2Mbps
- **Frequency Bands**: C-band (4 - 6 GHz)
- **Use of Satellite**: Geo-stationary MEASAT-3 Satellite
- **Network Configurations**: i. P-2-P, P-M-P (STAR network)
- **Equipment List**: ii. Antenna (1.8m / 2.4m / 3.8m) iii. Outdoor Unit (Feedhorn, LNB, BUC) iv. Indoor Unit (Satellite Modem)
- **Applications**: PSTN Voice & Fax, VoIP, Data, Internet/Intranet, Videoconference
- **Operating Environment**: All weather

### KU-Band VSAT
- **Antenna Diameter**: 1.2m (typical), 84cm
- **Traffic Capacity**: 64kbps to 4Mbps
- **Frequency Bands**: Ku-band (11 - 13 GHz)
- **Use of Satellite**: Geo-stationary MEASAT-5 (IPStar) Satellite
- **Network Configurations**: i. P-2-P, P-M-P (STAR network) ii. Antenna (84cm / 1.2m)
- **Equipment List**: iii. Outdoor Unit (Feedhorn, LNB, BUC) iv. Indoor Unit (Satellite Modem)
- **Applications**: VoIP Voice, Data, Internet/Intranet, Videoconference
- **Operating Environment**: Rains induced interruptions
Global C-Band Network Coverage on MEASAT-3
MEASAT5 Ku Spot Beams Over Malaysia

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A Typical C-Band VSAT Service Features

- Hub-based broadband IP VSAT service operating on GEO Satellite
- Provides broadband data & PSTN telephony in one VSAT
- Uses a 1.8m antenna & 2W BUC (amplifier)
- Total system downlink up to 66Mbps, uplink up to 1.5Mbps per VSAT
- Supports native PSTN voice – up to 10 lines per VSAT
  - Data & voice bandwidth on separate channels
    - Voice calls are carried on separate bandwidth
    - data b/w will not be compromised when voice calls are made
- Optimized for TCP/IP implementation – TCP acceleration
- Quality of Service (QoS) – guaranteed bandwidth (CIR &MIR)
  - Bandwidth on the i/b & o/b channels can be dedicated to customers
  - Customers get a guaranteed QoS for their links – CIR & MIR can be set for each link
A Typical Ku-Band VSAT Service Features

- Hub-based broadband IP VSAT service operating on GEO Ku Satellite
- Provides broadband Internet & Business Voice (VoIP) telephony in one VSAT
- Uses a 1.2m antenna & 1W BUC (amplifier)
- Maximum downlink up to 4Mbps & Uplink up to 2Mbps per mSAT
- Supports VoIP Telephony – number of lines is dependent on bandwidth & concurrent bandwidth applications per VSAT
  - Internet & VoIP bandwidth share the same channels
  - Data or Internet slow down when voice calls are in progress
- Optimized for TCP/IP implementation – TCP acceleration
- Quality of Service (QoS) – guaranteed bandwidth (CIR & MIR)
  - Bandwidth on the i/b & o/b channels can be dedicated to customers
  - Customers get a guaranteed QoS for their links – CIR & MIR can be set for each link
- Service is temporary interrupted during heavy rains.

Maxis for Business
A Solar-Powered VSAT Backhauled nanoGSM Node @ Rural Sarawak

 Omni Antenna
 Solar Panel
 SkyWay VSAT
 Long Jeketan

nanoGSM Indoor Enclosure
Indoor Installation - VSAT + nanoGSM + AVR/UPS

nanoBTS + Enclosure

VSAT Modem

nanoBTS + Enclosure

nanoGSM + AVR/UPS
Live Deployment - VSAT + Solar Power + nanoGSM + AVR/UPS

Bakelalan STOL Airstrip, Sarawak

Bario STOL Airstrip, Sarawak

Belaga POM

Bakelalan STOL Airstrip, Sarawak

Kretam Plantation, Sabah

Larissa Camp, Sarawak
Q & A

Thank you