

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

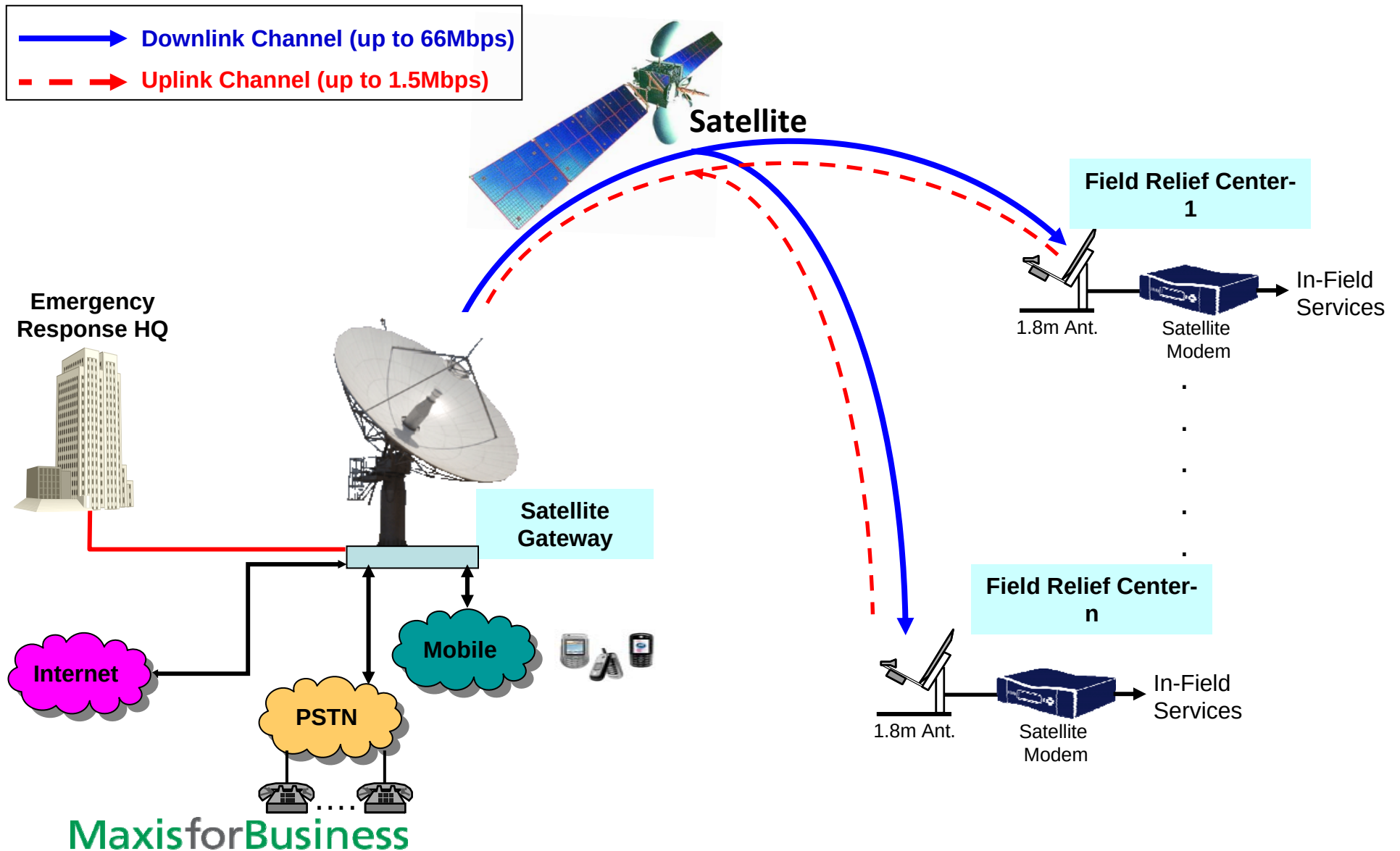
3. Satellite Comm - VSAT

- 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

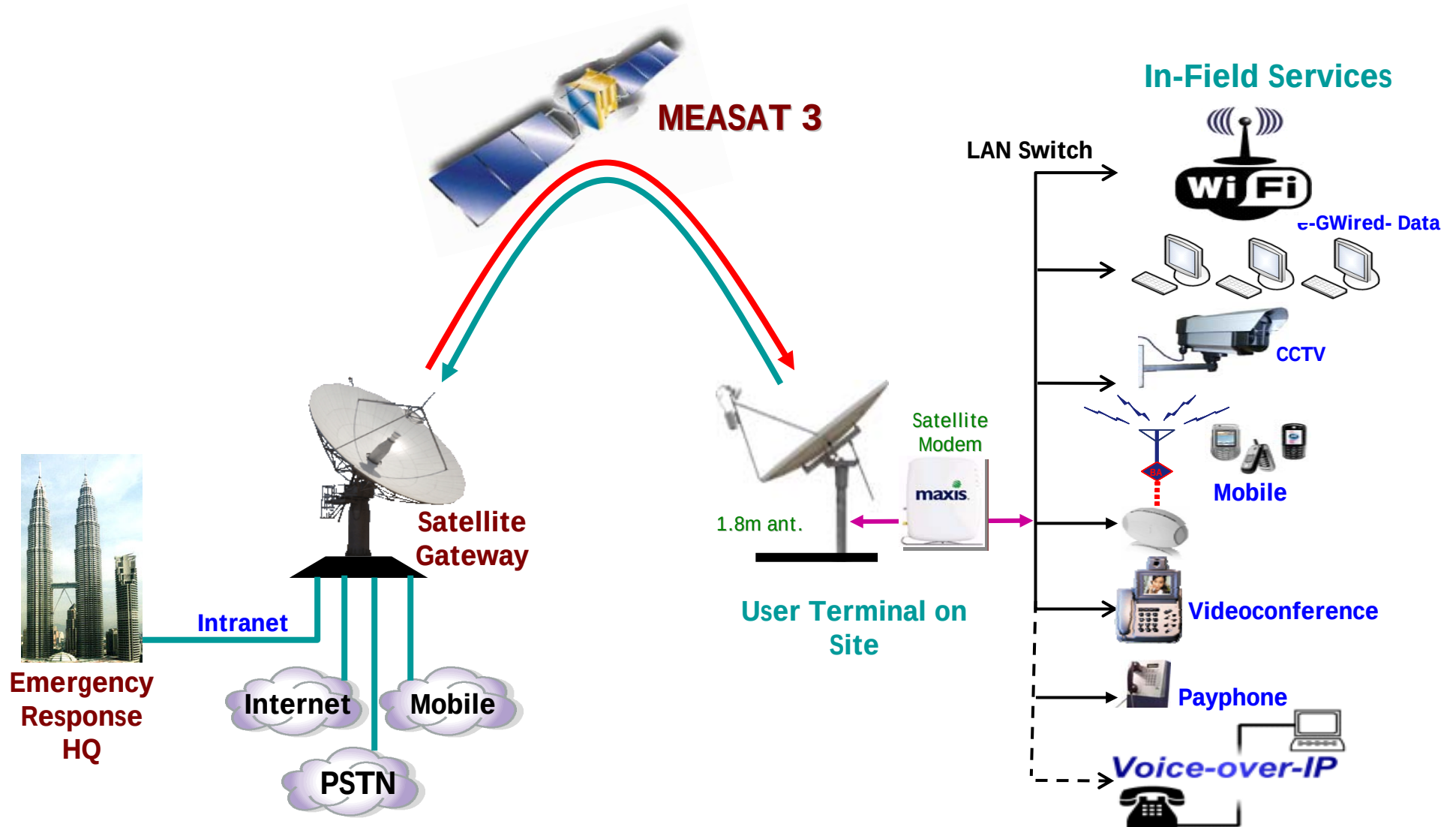
Types of In-Field Services on VSAT

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 Wireless Broadband Internet/Data**
 - Wired Data LAN
 - WiFi
4. **Videoconference & Video Broadcast**
 - Networked videoconference
 - Digital video broadcast

Typical Satellite VSAT Network in **STAR** Configuration **maxis**

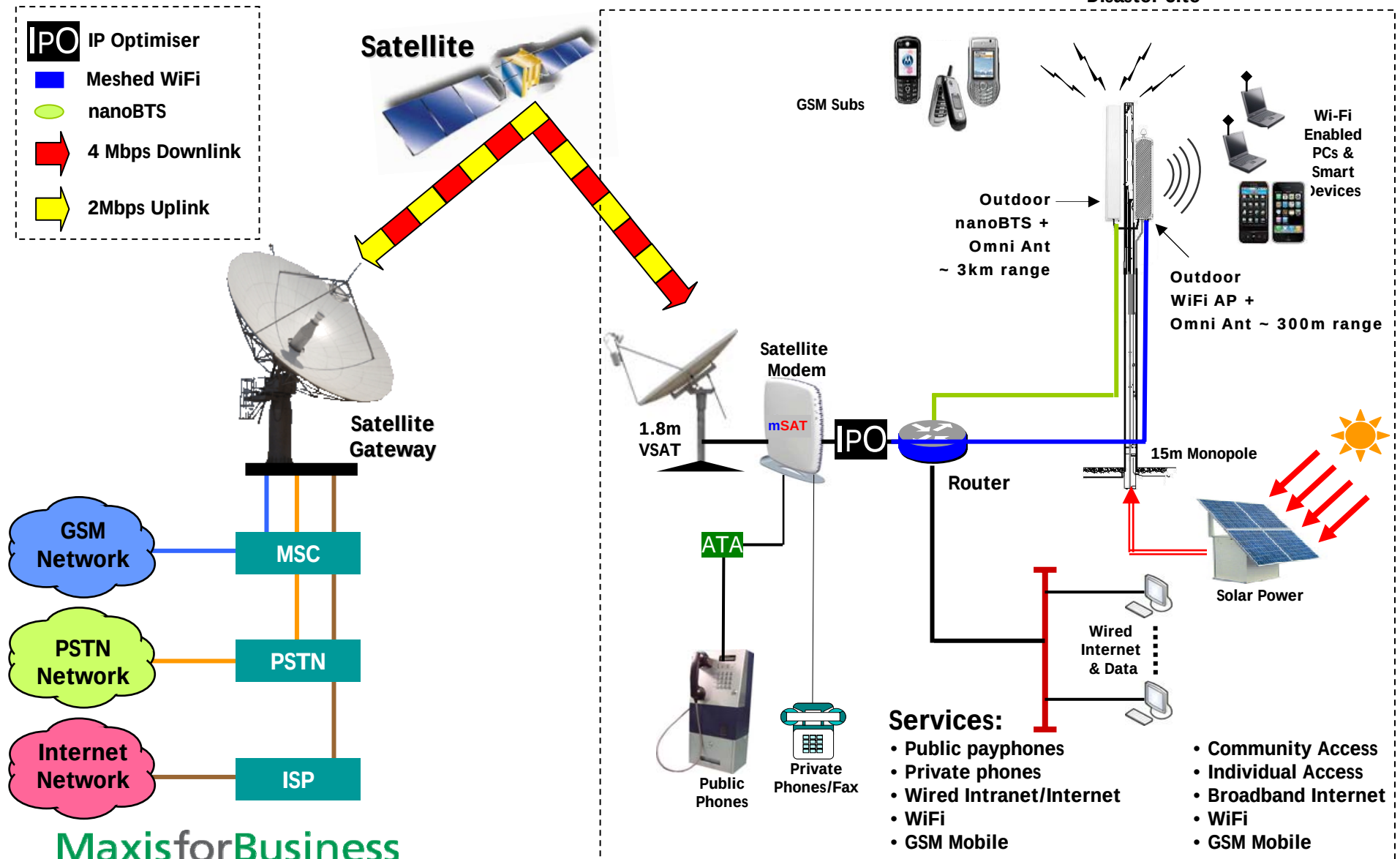


In-Field Services via VSAT



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Topology of a Multi-Services VSAT Platform



VSAT Specifications

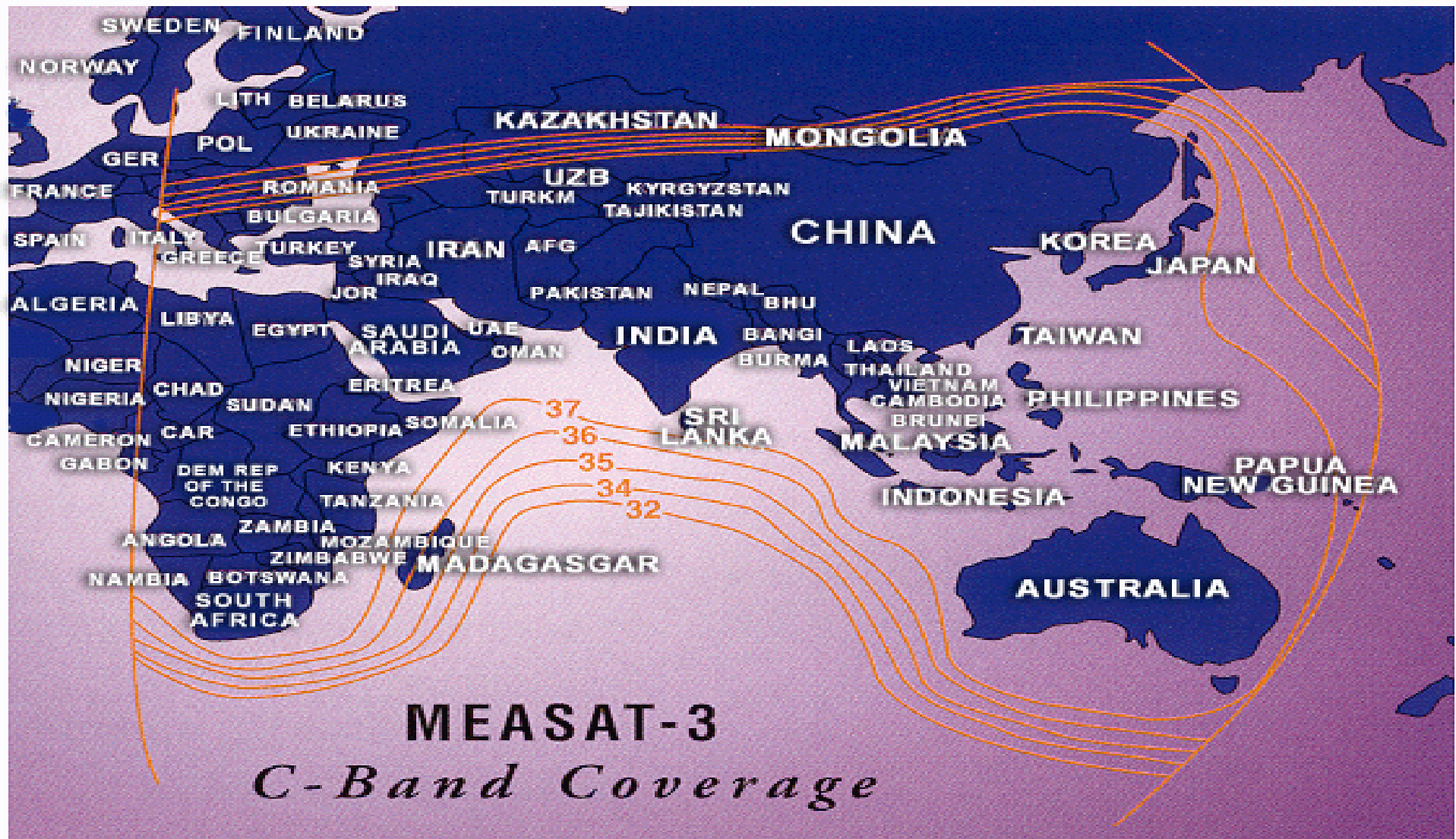
C-Band VSAT

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

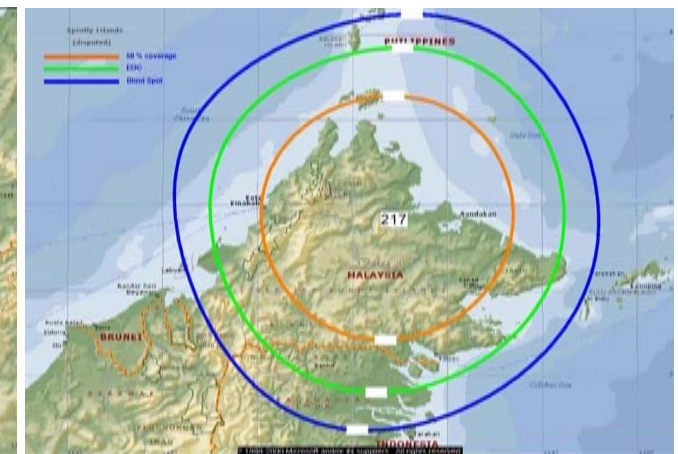
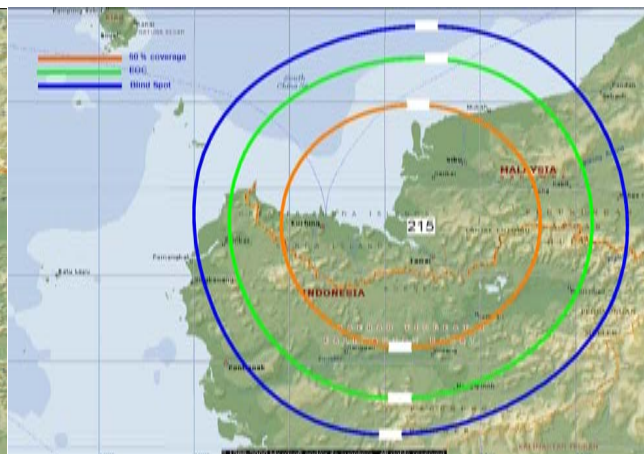
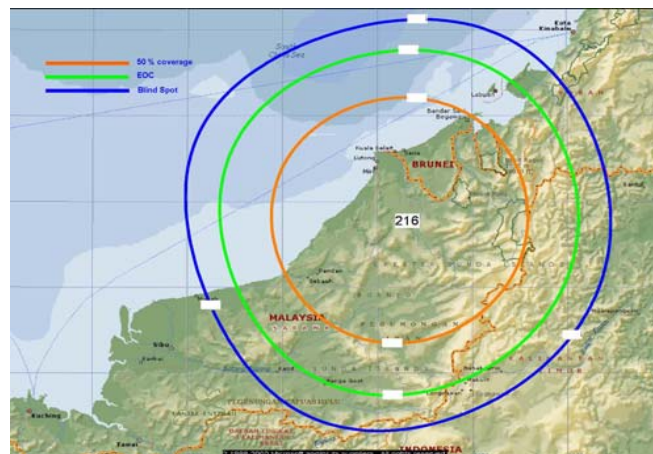
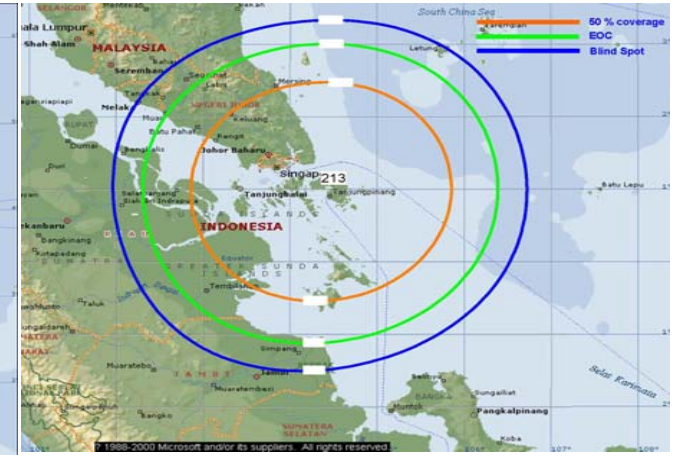
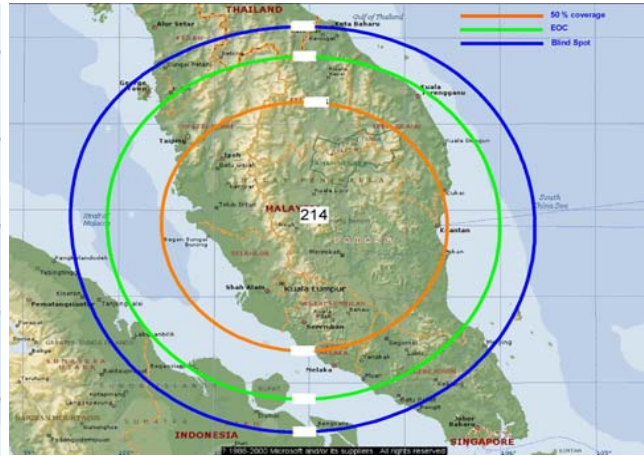
KU-Band VSAT

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, Videocon
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



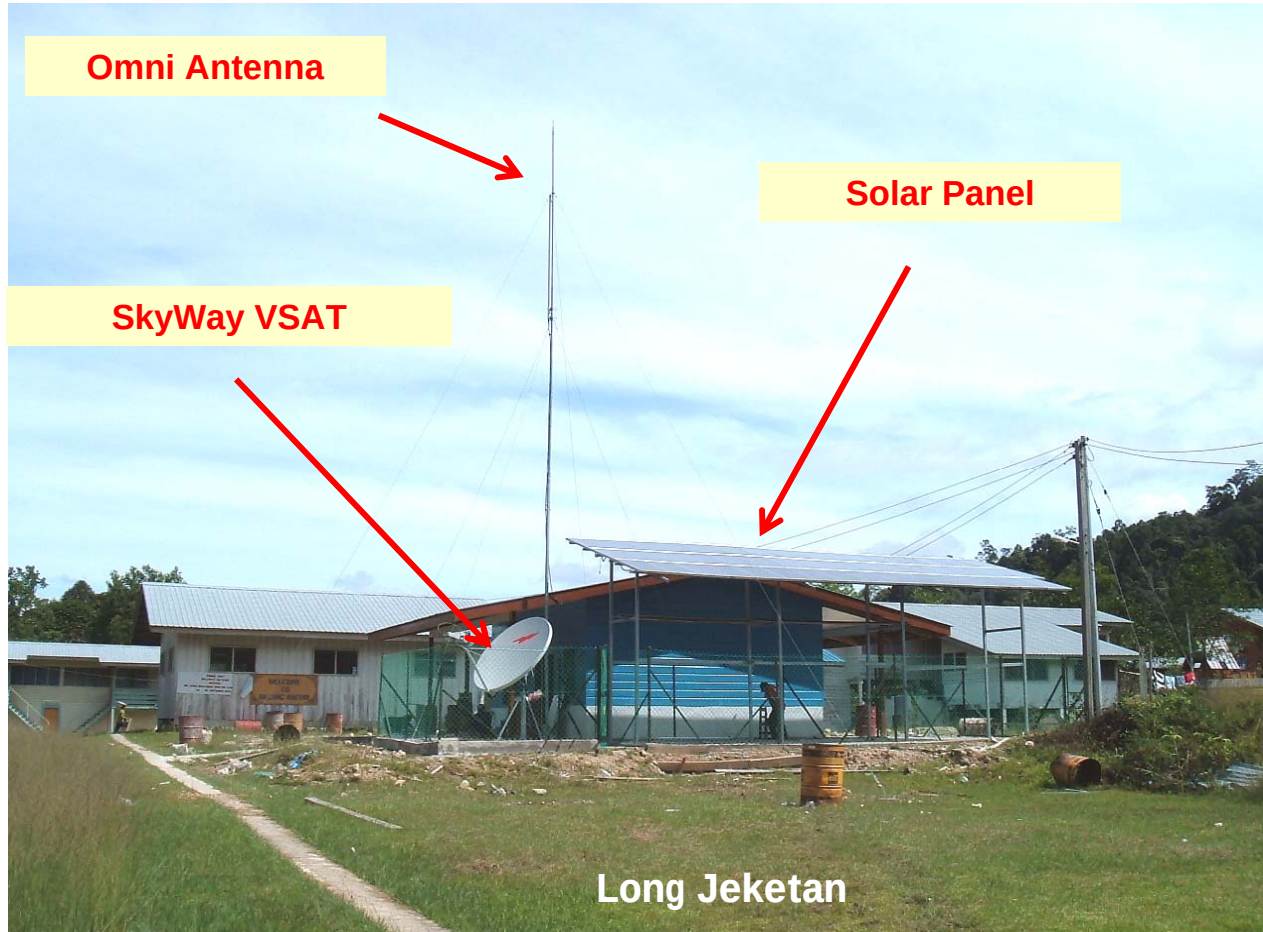
A Typical Ku-Band VSAT Service Features



- 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.



A Solar-Powered VSAT Backhauled nanoGSM Node @ Rural Sarawak



nanoGSM Indoor Enclosure



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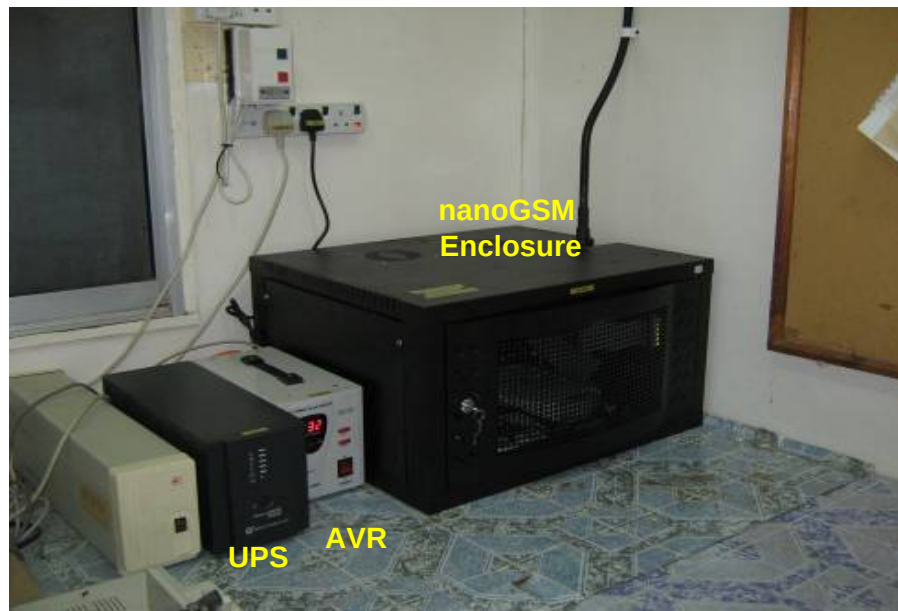
Indoor Installation - VSAT + nanoGSM + AVR/UPS



nanoBTS + Enclosure



VSAT Modem



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nanoGSM Equipment, VSAT Modem with AVR & UPS

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



Bakelalan STOL Airstrip, Sarawak



Bario STOL Airstrip, Sarawak



Belaga POM



Kretam Plantation, Sabah



Larissa Camp, Sarawak

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Q & A

Thank you