GSM Backhauling and Optimization – A BCom-Comtech Case Study

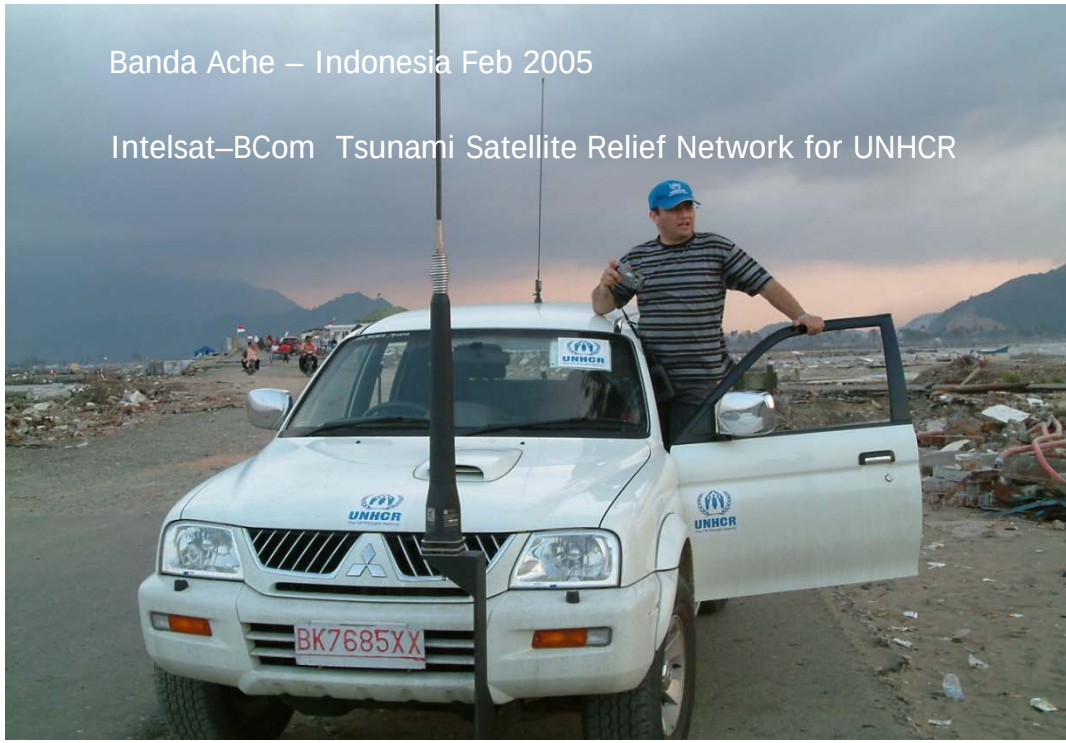
Comtech Technology Seminar - Amsterdam

Presentation Outline

- BCom Company Overview and Past Experience
- GSM Backhauling Optimization and Compression projects
- Central African GSM Network Case Study

BCom Quick Overview

- BCom Offshore SAL in Beirut, Lebanon (1999):
  - Focus on Installation, support & maintenance field services, solution design, and project management
- BCom SA in Geneva, Switzerland (2006):
  - Focus on satcom equipment integration, testing, packing/logistics, & Tactical satellite gateway services



Our Portfolio of Services

- Conducting detailed site surveys (including RF surveys & existing site audits) & site preparation follow-up of VSAT & satellite earth stations (ES)
- Installation, support & maintenance of satellite networks (antenna sizes up to 7.3mtr) including deployment project management and network migrations
- ES equipment integration, testing & supply services including packing and logistics.
- Design & installation of bandwidth optimization and compression solutions for GSM DCME and Abis links
- Provisioning of Tactical Satellite Gateway services out of BCom SA Geneva, Intelsat and Eutelsat teleports

Global Coverage & Customer Base

- BCom's on-site interventions have spanned the globe in 4 continents
- BCom's teams have installed satellite earth stations in more than 70 countries
- End-Customers included: ISPs, diplomatic missions, mining, oil & gas, disaster recovery, remote office, telemedicine, tele-education, TV uplink, & GSM satellite backhauling customers.

Past Global Interventions (1)

Europe

Balkans: *Kosovo, Albania & Macedonia.*
Switzerland – *Geneva.*
Norway – *Nittedal.*
Cyprus – *Nicosia.*
Turkey – *Istanbul, Izmir , Ankara.*
Germany – *Berlin.*
Italy – *Catania, Rome, Milano, Genoa.*
Greece – *Athens, Iraklion, Mytilen.*
Bulgaria – *Sofia*
UK – *London, Aberdeen.*
France – *Sete.*
Luxembourg – *Luxembourg.*
Denmark– Hjorring.

Latin America

Nicaragua – *Managua.*
Cuba - *Havana.*

Middle East

Saudi Arabia- *Riyadh.*
United Arab Emirates – *Dubai, Abu Dhabi.*
Kuwait - *Kuwait City.*
Jordan – *Amman, Dead Sea, Irbid.*
Syria – *Damascus.*
Lebanon
Iraq – *Baghdad, Mosul and Irbil.*
Iran – *Tehran.*
Afghanistan – *Kabul.*
Yemen – *Sanaa, Balhaf.*

70+ countries!

Asia

Bangladesh – *Dhaka.*
Nepal – *Katmandu.*
Vietnam – *Hanoi.*
Indonesia – *Tsunami areas (Medan, Banda Ache, Meulaboh, Lamno).*
Pakistan - *Islamabad, Lahore.*
Sri Lanka *- Colombo*

Past Global Interventions (2)

Africa

Morocco – *Rabat & Several Areas*
Tunisia – *Tunis.*
Algeria - *Algiers, Oran.*
Egypt – *Cairo, Alexandria.*
Tanzania – *Dar Es Salam.*
Kenya – *Nairobi.*
Mozambique – *Maputo.*
Mauritius – *Port Louise.*
Madagascar – *Antananarivo.*
Burundi – *Bujumbura & Several areas*
Rwanda- *Kigali.*
Zambia – *Lusaka.*
Ethiopia – *Addis Abeba.*
Nigeria – *Lagos and Abuja.*
Gabon –*Libreville.*
Uganda- *Kampala*
Central African Republic – *Bangui*
Togo– *Lome*

Angola – *Luanda.*
Namibia – *Windhoek.*
Congo– *Pointe Noire, Brazzaville.*
Congo DRC - Mongbwalu, Kinshasa, Matadi.
Burkina Fasso – *Ouagadougou & Several Areas.*
Guinea – *Conakry, Siguiri,Mamou,N'Zerekore.*
Ghana – Accra,Tema,Takoradi.
Niger – *Niameh.*
Chad- *Ndjamena.*
Sudan- *Juba, Khartoum*
Guinea Bissau- *Bissau.*
Liberia- *Monrovia.*
Mauritania – *Nouakchott*, *Nouadhibou.*
Cameroun- *Douala.*
Seychelles- *Victoria*

70+ countries!

Our Success Factors

- Quick response & competitiveness, due to a small & efficient structure
- Ability to intervene globally especially in hardship environments
- Transparency and Quality with comprehensive project documentation
- Solid experience & technical competence of its engineers in both RF & IP
- Trilingual field and project management teams enabling efficient interfacing with end-customers.

Embassy Network Projects …(1)

- Provided for various European companies VSAT installation services for embassy networks worldwide
- Performed installations in more than 100 European embassy sites worldwide
- Obtained ‘technical’ and ‘security’ clearance to access sensitive diplomatic missions locations

United Nations Projects

- Provided for the United Nations Refugee Agency VSAT services in:
  - Jan 2005 for the equipment supply and installation of a 10site 2.4 mtr, iDirect C-Band network for its fixed and mobile offices in the Tsunami-stricken areas of Indonesia and Sri Lanka.
  - 1999 for the installation and operation of 15 Ku-Band VSATs in Kosovo, Macedonia and Albania just after the end of military operations for the provision of telephony services having sometimes boarded security-cleared military helicopters
- Provided for the United Nations Interim Force in Lebanon UNIFIL satellite services in Lebanon (2009-2010)

Telemedicine & Education Projects

- Provided equipment, logistics, installation, support and space segment services for a 10site telemedicine and tele-education project in Africa (Digital Solidarity Fund, Geneva based NGO)
- Deployed a 7-site telemedicine satellite terminals for oil & gas customers in Europe (OPTESS)
- Deployed a 9-site university network for tele-education around the Mediterranean (EMIPSHER EU-sponsored with Eutelsat)

GSM Satellite Backhaul Projects(1)

- Installed satellite-backhaul solutions for several GSM operators in Algeria, Afghanistan, Sudan, Guinea Conakry, Guinea Bissau, Central African Rep, Congo, Somaliland, Gabon and Togo
- Typical sites included :
  - C-band 4.5 and 7.3mtr antennas.
  - Redundant 1:1 100w-800w RF equipment
  - Redundant *Comtech* G.703 SCPC modems
  - Redundant *Memotec* DCME, GSM A-ter, and GSM A-bis optimization and compression equipment

GSM Satellite Backhaul Projects (2)

- Designed and installed bandwidth optimization and compression solutions for GSM DCME (international) and GSM Abis (national) links
- Strategic Partnership with Comtech and Memotec
- Satellite OPEX Savings are very strategic for GSM operators (national and international backhauling) as Satellite bandwidth nowadays is both a scarce and a costly commodity!

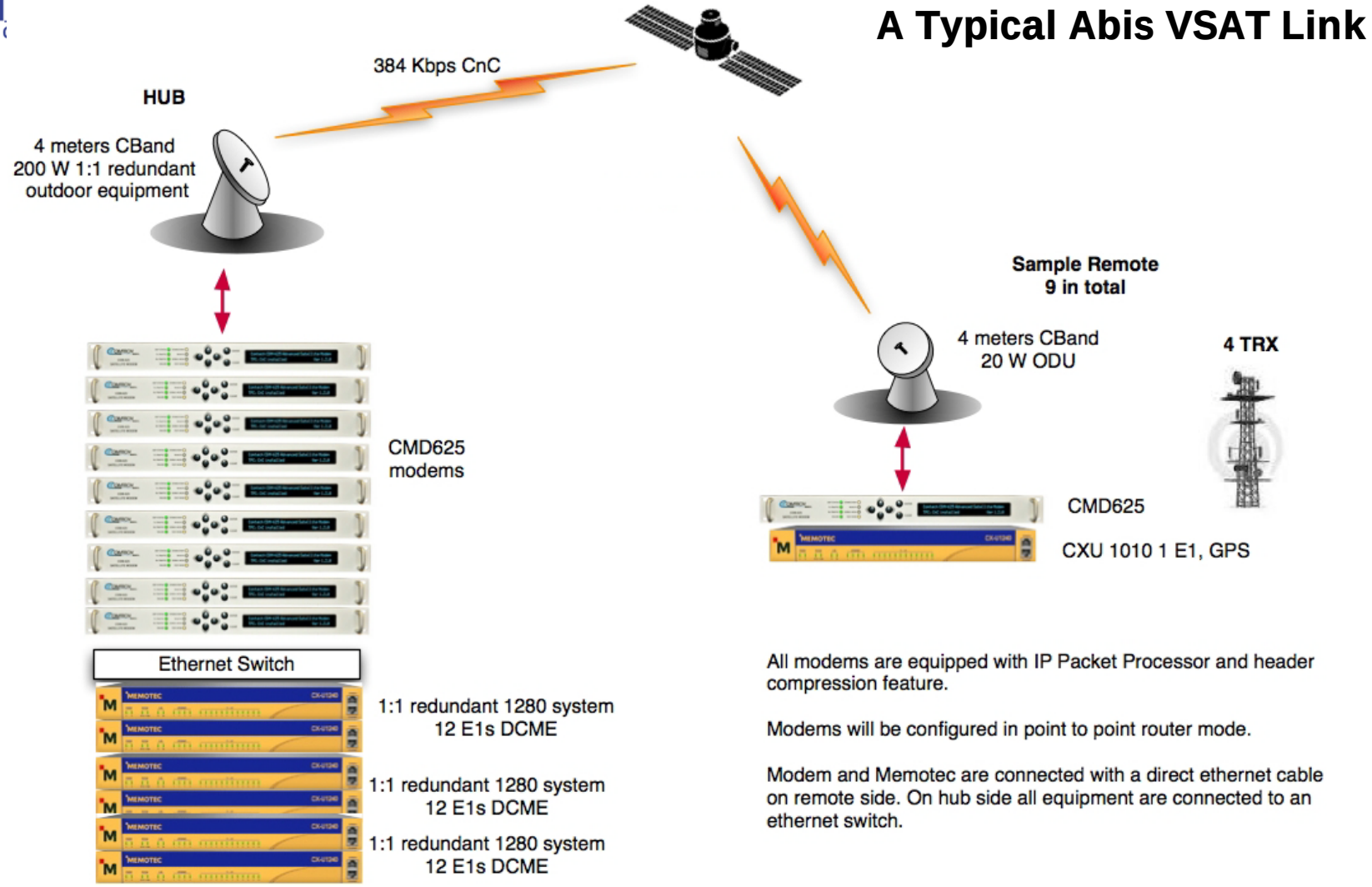
BCom Case Study: Central African GSM Network

- A national satellite network of 15 BTS Remote VSAT sites
- An international VSAT-based backbone for voice and IP Data
- Symmetrical 4.0-4.5mtr C-band national SCPC links
- High OPEX with low ARPU (revenue per user)
- Perfect Candidate for Reduction of Satellite BW OPEX using the “Comtech Recipe”
- BCom wins the Network Optimization project after a successful ‘proof of concept’ link optimization

The Comtech Platform– National Abis and DCME Links

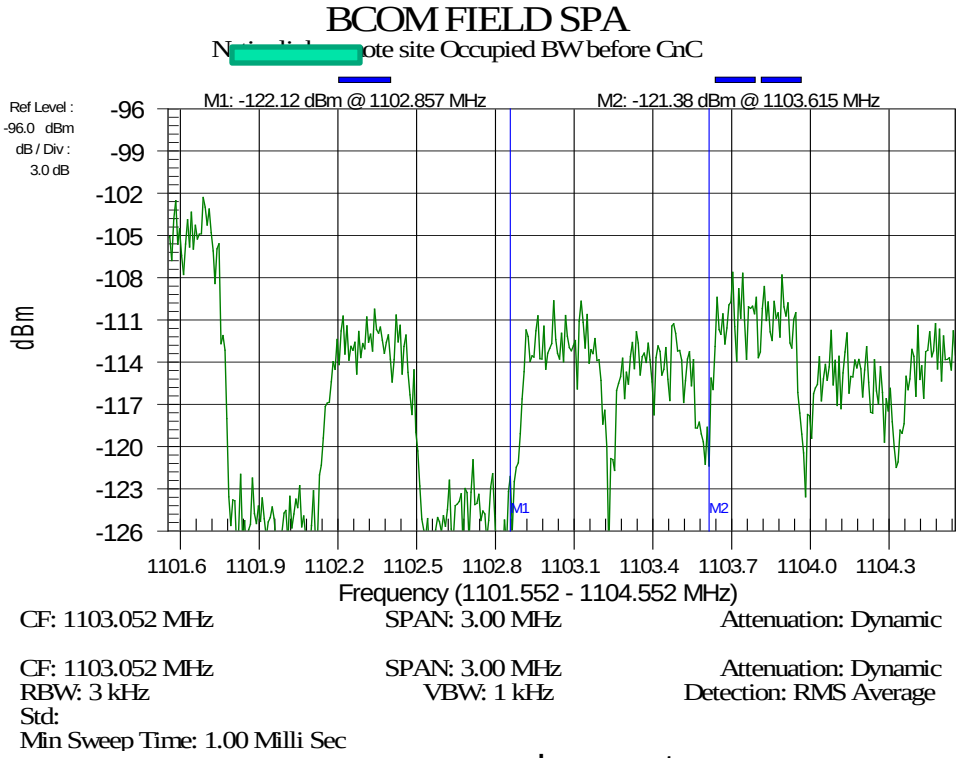
- National Network Savings Started with changing modulation/FEC:
  - Ran link budgets to determine the most optimal modulation and FEC which the existing Paradise modems did not support
- ….and ended with the Comtech/Memotec overhaul:
  - Utilized IP enabled modems with Carrier in Carrier technology which led to a 40% bandwidth savings
  - Added Memotec bandwidth optimization and compression technology which led to:
    - 33% (half rate) bandwidth savings on in-country Abis links
    - 12:1 compression on international DCME links with voice carrier providers
- Result: 60% savings on national links inlcuding 20% more BTS traffic capacity!! + Great Savings on international links!

The Comtech Platform– National Abis Links



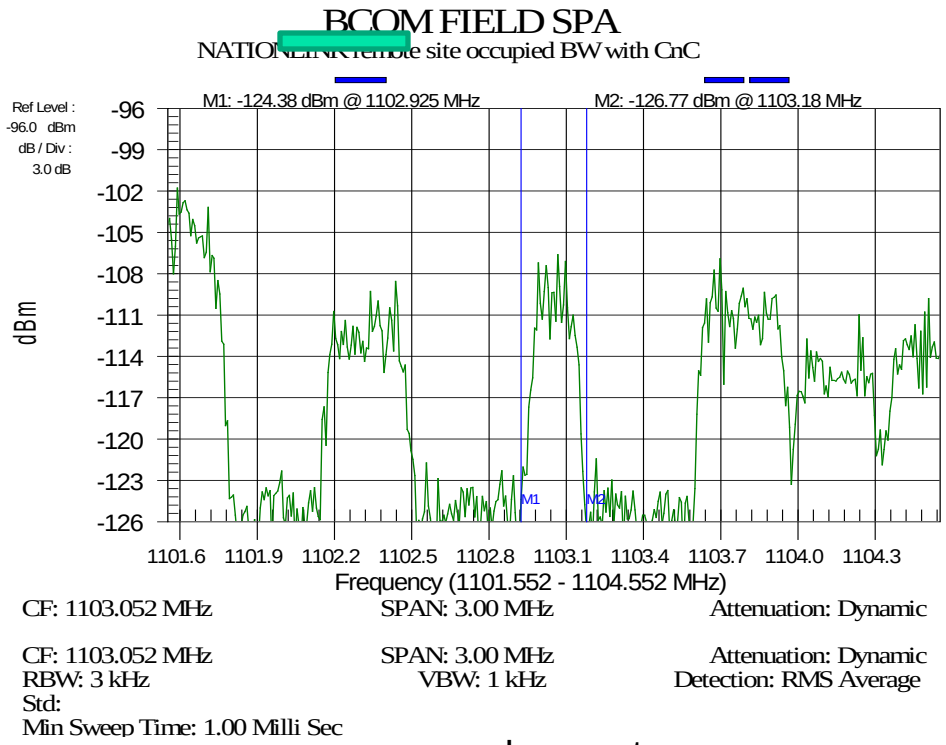
The Comtech Platform– National Abis Links (cont'd)

- 640kHz Occupied Satellite Bandwidth Per Site before modulation/FEC change, CnC and Memotec utilization



The Comtech Platform– National Abis Links (cont'd)

- 250kHz Occupied Satellite Bandwidth Per Site after modulation/FEC change, CnC and Memotec utilization



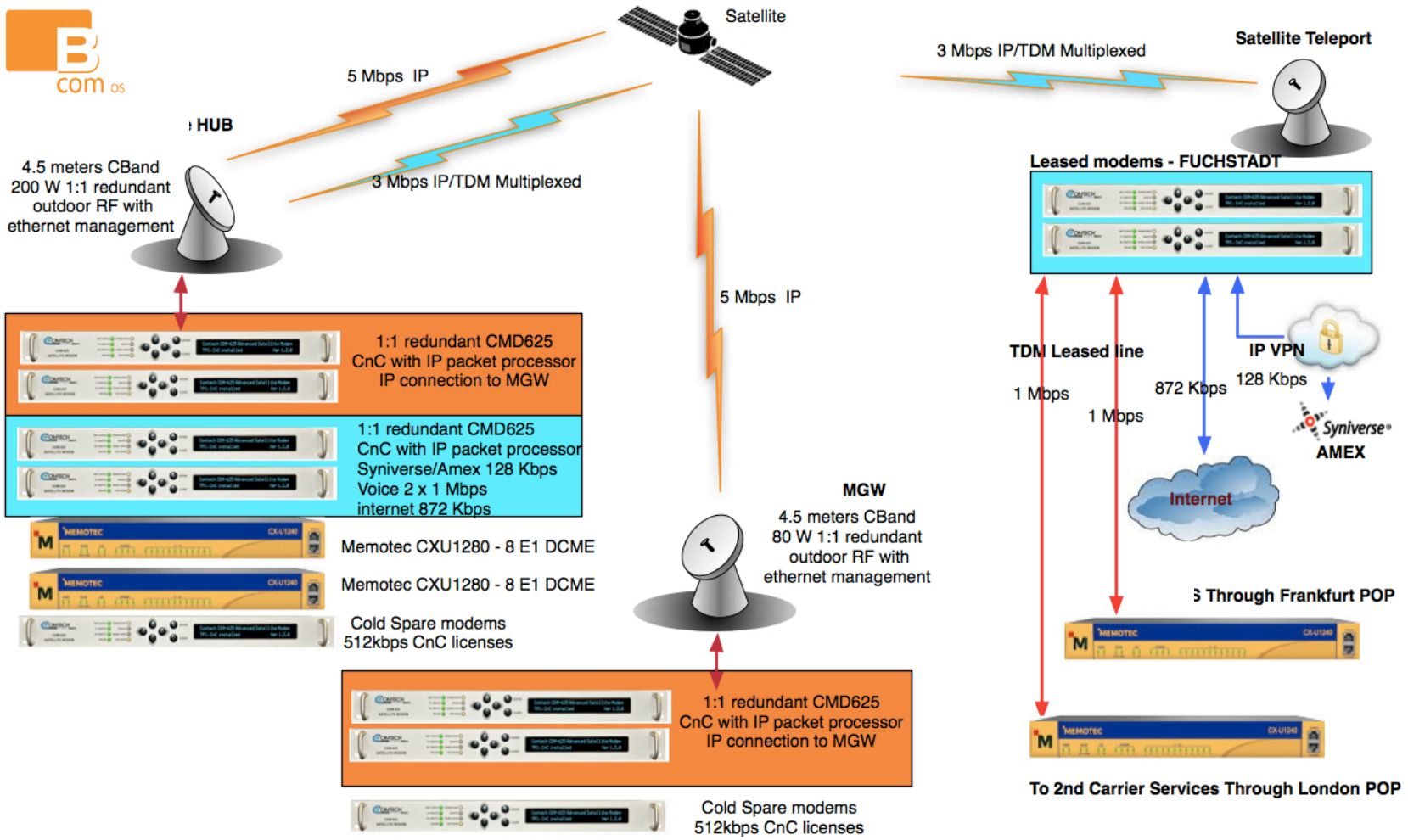
Typical BTS Site

www.bcomsat.com

The Comtech Platform– International Voice/Data Links

- A 3Mbps SCPC CnC link with IP Data and G.703 Memotec Optimized Voice multiplexed
- 1:1 Redundant CDM625 with CnC, Quad E1 and IP Packet Processor Card and IP Connected Memotec CXU1280 DCME unit with 12:1 compression

The Comtech Platform– International Voice/Data Links



Wild Africa –
A BCom Photo Experience