Capacity Building Workshop on Satellite Communications: “Latest Developments in Satellite Communication Technologies and ITU Satellite Regulations Governing Orbital Resources”.

Nairobi Safari Club, Nairobi - KENYA, 8 – 10 February, 2016

The Role of Satellite Communications (Satcom)

Introduction and Presentation Outline

The purpose of this presentation is to discuss the changing role of satellite communications (Satcom).

The presentation starts with a brief overview of the evolution of the role of Satcom since its “birth”

It then follows with a look at the present day role of Satcom

And concludes with a look at the future role of Satcom in the global Broadband agenda

Satcom's role is evolving with ……

- Advances in Technology
- Access to new spectrum especially at higher frequencies e.g C, Ku, Ka
- Changing Economics of Telecom Network Deployments
- Economics of satellites

Back then……

Satcom provided:

- “Backhaul” transmission of Public Switched Telephone Networks (PSTN) traffic and Broadcasting
- International PSTN connectivity between countries
- Private networks of large Corporations, Banks and Embassies
- Domestic Satcom networks “DOMSAT”
- Regional Satcom Networks
- Maritime Mobile Communications

As a result of major technological breakthroughs (1990s , early 2000s) satcom “burst” on to the “end user” and “consumer market”

- With miniaturization of the Satellite Earth Stations (SES) it became possible to place GES at the end-user’s premises. With this, applications such as Direct to Home (DTH) satellite television (or DSTV) were born and have grown in leaps and bounds
- **ISPs** could then afford to land large Internet Protocol (IP) bandwidths using VSATs and distribute it on **WiMax** and other terrestrial wireless technologies
- **Teleport** “sitting” on the fibre backbone in Europe began distributing IP to “remote” places
- Cellular backhauls via satellite became feasible

With Digital Convergence and advances in the technology……

- The VSAT as a user terminal or device was able to deliver “triple play” services even to the remotes of villages.

Currently….

Satcom has been largely “commoditized” and “demystified”

Satcom continues to play its original role of core network backhaul transmission in geographies where fibre and microwave are not feasible

Satcom plays a crucial role as a restoration and backup to other backhaul transmission technologies and as a technology of first recourse when natural disasters such ad typhoons strike

Satcom remains one of the very few viable options for internet distribution and “last mile” connectivity for a large number of countries on our continent

Increasingly being used as a “middle-mile” solution in Broadband networks

Unique Features of Satcom

- Adaptable to customer requirements
- Mobility
- Cost advantage
- Not affected by geographical obstructions
- Quick implementation
- Alternate routing or redundancy
- Cost is independent of distance
- Cost effective for short term requirements

Satellite Communication Services at a Glance 1/2

Network Services


Cell Backhaul


Maritime Communications


Oil & Gas


Aeronautical


Disaster Recovery


Enterprise

Media Services


DTH


Cable Distribution


MCPC Platforms


Special Events


Satellite News Gathering


Mobile Video

Government Services


ISR


Military Mobility


Hosted Payloads


End-to-End Communications


Embassy Networks


Space Situational Awareness

Satcom and Universal Access (telephony)

In the 2000s, the use of Satcom in the “last mile” made possible achievement of universal access targets for public telephone (voice) services in sparsely populated countries.

Satellite Communication Services at a Glance

The Commercial Satellite Industry

Voice/Video/Data Communications

- Rural Telephony
- News Gathering/Distribution
- Internet Trunking
- Corporate VSAT Networks
- Tele-Medicine
- Distance-Learning
- Mobile Telephony
- Videoconferencing
- Business Television
- Broadcast and Cable Relay
- VOIP & Multi-media over IP

Direct-To-Consumer

- Broadband IP
- DTH/DBS Television
- Digital Audio Radio
- Interactive Entertainment & Games
- Video & Data to handhelds

GPS/Navigation

- Position Location
- Timing
- Search and Rescue
- Mapping
- Fleet Management
- Security & Database Access
- Emergency Services

Remote Sensing

- Pipeline Monitoring
- Infrastructure Planning
- Forest Fire Prevention
- Urban Planning
- Flood and Storm watches
- Air Pollution Management
- Geo-spatial Services

Global Satellite Communications Systems for Safety of Life, Search and Rescue, Disaster Response

- Maritime : Global Maritime Distress and Safety System (GMDSS), e-navigation
- Aeronautical: Global Aeronautical Distress and Safety System (GADSS)
- Search and Rescue: SARSAT-COSPAS (Search and Rescue Satellite-Aided Tracking-Cosmicheskaya Sistyema Poiska Avariynich Sudov)

Satellite Communications in Natural Disaster Response – Example of Typhoon Haiyan in the Philippines

- On November 2013, Typhoon Haiyan struck as the deadliest typhoon on record in the Philippines. Relief efforts were hampered by the loss of communications infrastructure. The day after the typhoon, the ICT Office assembled a 'package' consisting of one VSAT, three TVWS radios, and two WiFi routers to be dispatched to Tacloban. Once the equipment was in and the locations for network nodes established, the network was set up and switched on in hours.

Source: Report of the Broadband Commission 2014

Satellite Communications in Education- Example of Malaysia

Malaysia is currently implementing its **Frog Virtual Learning Environment (VLE)** as a platform for teaching and learning in all primary and secondary schools. VLE is a part of the broader Malaysia Education Blueprint, 2013-2025, which aims to ensure that Malaysian students learn how to use ICTs, and can leverage them to enhance learning. Under the 1BestariNet initiative, all 10,013 schools in Malaysia must be provided with broadband access via either a 2-4 Mbps or 4-10 Mbps connectivity. The 2-4 Mbps bandwidth is for rural and remote schools via VSAT, while the 4-10 Mbps bandwidth uses wireless 4G technology.

Source: Report of the Broadband Commission 2014

Satcom and Universal Access to Broadband……

Addressing the challenges of Broadband deficit 1/2

- Wireless solutions often are the most effective option to address Internet access infrastructure needs quickly.
- The explosion in mobile broadband networks and subscribers is helping bring the experience of higher speed, broadband Internet to remote and rural areas.
- Satellites have the potential to enable the delivery of equitable, affordable broadband access to the Internet for all people, regardless of where they live.
- Satellite broadband radio communication systems are especially important for landlocked countries

Addressing the challenges of Broadband deficit 2/2

The role of satellite systems was recognized by ITU Member States at WTDC-2014 in three Resolutions acknowledging the benefits that satellites provide to remote areas, and in helping bridge the digital divide between urban, remote and rural regions with inadequate coverage via conventional fixed-line services.

Specifications and Standards for Satellite Broadband

- ITU-R Study Groups unite leading experts from network operators, ISPs, broadcasters, regulators and R&D organizations to develop technical standards for interoperability and performance of terrestrial and satellite broadband systems.

- An enabling environment for ubiquitous broadband is being forged with the putting in place detailed specifications for the satellite radio interfaces of IMT-Advanced (in December 2013) and new and revised standards on fixed-satellite service (FSS) broadband systems in the near future.

Role of Satellite Communications in Achieving "Broadband for All"

- Many modern broadband applications (such as multimedia videoconferencing and software distribution) are now based on distributing information to numerous widely dispersed sites..

- Satellite costs are constantly decreasing and satellites are a tested and reliable means for broadband communication.

- Broadband satellite systems have developed enormously to meet fast-growing demand, and now play an important role in air-space-ground integrated communications networks

Advances in Satellite Broadband Technologies

Timeline	2005	2010	2015	2020
Generation	Ku-band satellites	First generation multi beam Ka-band satellites	Second generation multi beam Ka-band satellites	Third generation multi beam Ka-band satellites
Service capability	Internet broadband	High speed Internet broadband	Superfast Internet broadband	Very high speed Internet broadband
Maximum service rate	2-3 Mbps	10-2 Mbps	30-50 Mbps	100 Mbps
Capacity per satellite	5	50-100	150-200	>500
Users per satellite	100	Several 100.000s	Up to 1 million	>1 million

Satellite Broadband Initiatives Around the World 1/3

- Large areas across Africa, the Middle East, and Latin America are characterized by low population densities, poor infrastructure and high connectivity costs.
- In Asia, satellite connectivity offers significant benefits across the region, especially in countries such as Indonesia that span thousands of Islands

Satellite Broadband Initiatives Around the World 2/3

The use of hybrid satellite and terrestrial systems is also being considered for broadband, where satellites are used to feed terminals at local centres and terrestrial retransmission via wireless is used for last-mile connectivity.

Satellite Broadband Initiatives Around the World 3/3

With the latest KA-SAT high throughput communications and spot-beam technology, end-users can benefit from 20 Mbps links downstream and 6 Mbps upstream, regardless of their location.

The Changing Economics of Telecom Network Deployments 1/3

However, as telecom markets move from an era of high growth into an era of intensifying competition, market consolidation and maturity, governments face challenges in convincing market players to invest at a time of changing business models or less favourable economic conditions.

Investing in Different Network Layers

	% of network costs	Payback period	Examples
Passive infrastructure layer	70-80%	15 years	Trenches, ducts, dark fibre, etc
Active infrastructure layer	20-30%	5-7 years	Electronic equipment, OSS, BSS
Service layer	N/A	Few month –3 years	Content, services and applications

The Changing Economics of Telecom Network Deployments 2/3

The costs associated with network deployments vary significantly, according to such variables as:

- Age/structure of existing infrastructure;
- Industry structure
- Population density (for common classifications such as urban, peri-urban and rural areas);
- Levels of ARPU;
- Service take-up;
- User demand requirements.
- Availability of civil engineering infrastructure; and
- Speed targets.

The major factor resulting in the attractiveness of any particular area is average deployment cost, which can vary significantly.

The Changing Economics of Telecom Network Deployments

3/3

Some of these challenges can be overcome by taking advantage of the unique features of Satcom

Thank You!

Any Questions?