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**UNDERSTANDING THE ROLE OF
SATELLITE IN DELIVERING
INTERNATIONAL CONNECTIVITY**

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Trends Driving Demand for Telecom/ICT Infrastructure

- Globalization and emerging economies
- 3G/4G/LTE rollouts continue
- Increased bandwidth requirements per user
- Always connected broadband anywhere
- Broadband mobility (land, air and sea)
- Digital Television Switchover
- Growth in data/media-intensive applications
- IP across mobile devices –including internet, video users and the trend toward cloud computing
- High Capacity links required

Satellite Technology

- Satellite is part of the mix of technologies that enable economic growth
- Fixed Satellite Services for Broadband Access Networks
 - Provides last-mile connectivity to reach most remote locations
 - Allows for rapid deployment
 - Provides ubiquitous communications to multiple geographically disperse sites
 - Allows communications to remain secure and trusted
 - Allocates bandwidth on an as-needed basis to drive economics
 - Provides the best method for multicast overlay of media-rich content
- Satellite Internet access is provided through geostationary communications satellites that can offer high data speeds, with newer satellites achieving downstream data speeds up to 15 Mbps

Satellite Technology Rural Applications

- Satellites Play A Key Role In Wireless Extension Services To Rural Areas
- 45% of the world's population live in Rural regions with limited connectivity
- 30% of the world population consumes 60% of the traffic
- They occupy only 1% of the worlds land area
- There is still no service to a significant population living in rural areas
- Cost of extending networks to rural areas is high
- High cost and low ARPUs are primary reasons for low penetration

Satellite based solutions are a natural fit for fulfilling the promise of universal connectivity

Rural/Remote



Rural/Remote



Satellite Applications

- Utilities (smart grid), oil, gas, mining applications
- Mobile banking
- Public Safety and Disaster Response
- Emergency preparedness/disaster relief communications when terrestrial networks are unreliable or fail
- Restore and backhaul terrestrial communications (pico cell provides IP connectivity for LMR and mobile phones)
- Humanitarian relief (Floods, Forest fires, Mining disasters)
- Telemedicine
- Ambulances: perform lifesaving procedures and diagnostic tests in the field or 'on the move'
- Mobile clinics: deliver primary and specialty care in rural communities

Satellite Technology – spectrum usage and challenges (I)

- Spectrum allocated to the unplanned FSS for in the Earth-to-space and space-to-Earth directions in Ku band (10-14 GHz) is 750 MHz
- The existing unplanned bands for the FSS in the Ku band range are extensively used for a large variety of satellite applications in many Commonwealth countries
 - Distribution of TV programs
 - Direct To Home (DTH)
 - Contribution and Occasional Use
 - Telephony
 - Enterprise data (VSAT, backhaul)
 - Broadband access
 - Commercial mobility
 - Governmental use

Satellite Technology – spectrum usage and challenges (II)

- WRC 07 – demand for extra spectrum for IMT with several spectrum bands considered
- WRC -07 decided to protect 3.4-4.2GHz for C band
- WRC-07 made IMT and FSS co-primary in the 3400-3600 MHz band
- Allocation became effective from 17 November 2010 but...
- Stringent conditions placed on the Operation of IMT
 - Co-ordination required between IMT and any FSS earth stations within identified co-ordination zone
 - Without co-ordination, administrations must limit power levels (PFD) at borders
 - PFD must not exceed $-154.5 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz))}$ for >20% of the time, at 3m above ground
 - PFD limit can be exceeded by agreement with neighbouring administrations
- C band on agenda of WRC-15

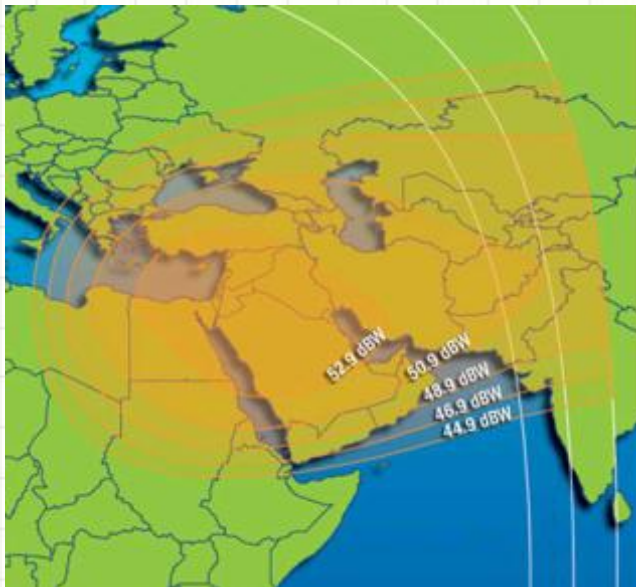
Satellite industry

- key factors for the future

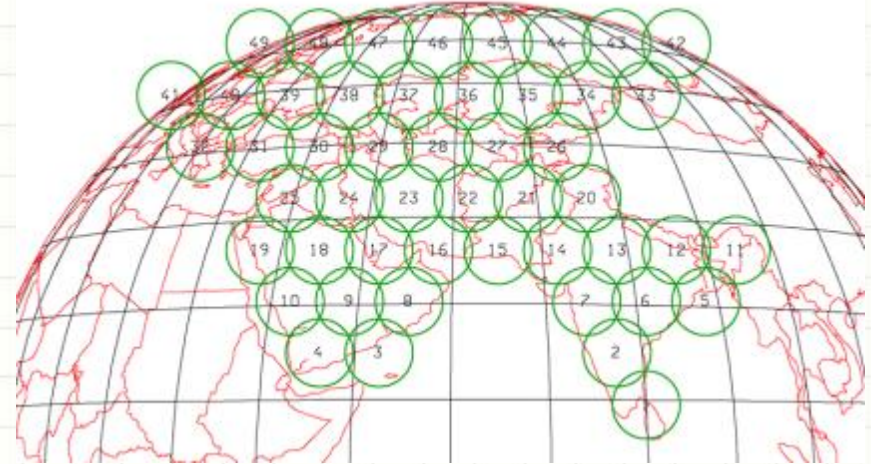
- Multispot beams
- For example: A 24 transponder Ku band typically provide about 1 or 2 Gbps of throughput on conventional satellites
- Multi-spot architecture will enable throughputs that are 10- 30 times more
- Needs higher thruput – better economics
- Flexibility – contract term, price, portability, fixed/variable portion, creative bundling of equipment and B/w
- Next Generation Satellites currently being built give factor of 10 increase in thruput
- This means the price per Mbit could rival the price of fibre
- New Generation satellites will make a significant contribution to lowering the total cost of ownership of mobile and fixed networks

From legacy broad beams to multispot beams

Legacy Broad beams



Future multispot beamns



Satellite providing the missing links in Africa

- Satellite has been used in Africa over more than 40 years, providing international voice trunks, broadcasting services, private data networks and internet access
- More than 68 operational commercial satellites providing coverage of Africa and more than 20 satellites are expected to be launched over Africa within the next 5 years
- Satellite is being utilized to broadcast more than 300 public and private African television channels to rebroadcasting stations or to subscribers.
- Satellite was the only backbone to the internet until the fibre hit the shores of Africa, but remains the only access point to the internet backbone for countries such as South Sudan, Central African Republic and DR Congo who don't yet have access to international fibre.

Conclusions

- Satellite services efficiently serve all types of communication needs across the world, and are increasingly important as new technologies and communications needs emerge
- Demand for these services is very strong, and will continue to grow in the foreseeable future
- C-band, Ku-band and Ka-band spectrum is the foundation of fixed-satellite service (“FSS”) industry, and the communications needs it serves can not be met if the spectrum it relies on is not protected – need to protect C band at WRC-15
- Satellite will continue to complement other terrestrial technologies in delivering services to rural communities and in reducing the cost of access.



THANK YOU

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