

**Contribution to seminar on
“The satellite role in the mobile
communications arena”**

15th June 2012

abertis and abertis telecom

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- 1. abertis and abertis telecom**
2. Markets and Services
3. Satellite Infrastructure
4. Services architectures
5. Final Remarks

abertis

Presence and leadership

Diversification and internationalization

A Global Group

Diversified



3 sectors

Global



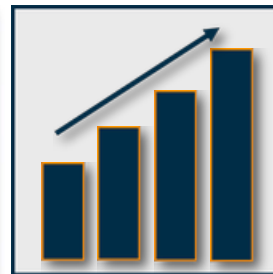
15 countries

High Quality



High quality
assets

Predictable



great
visibility

**Financial
Soundness**



1.533 Bn€ in
cash flow
2011

Consolidated figures, December 2011

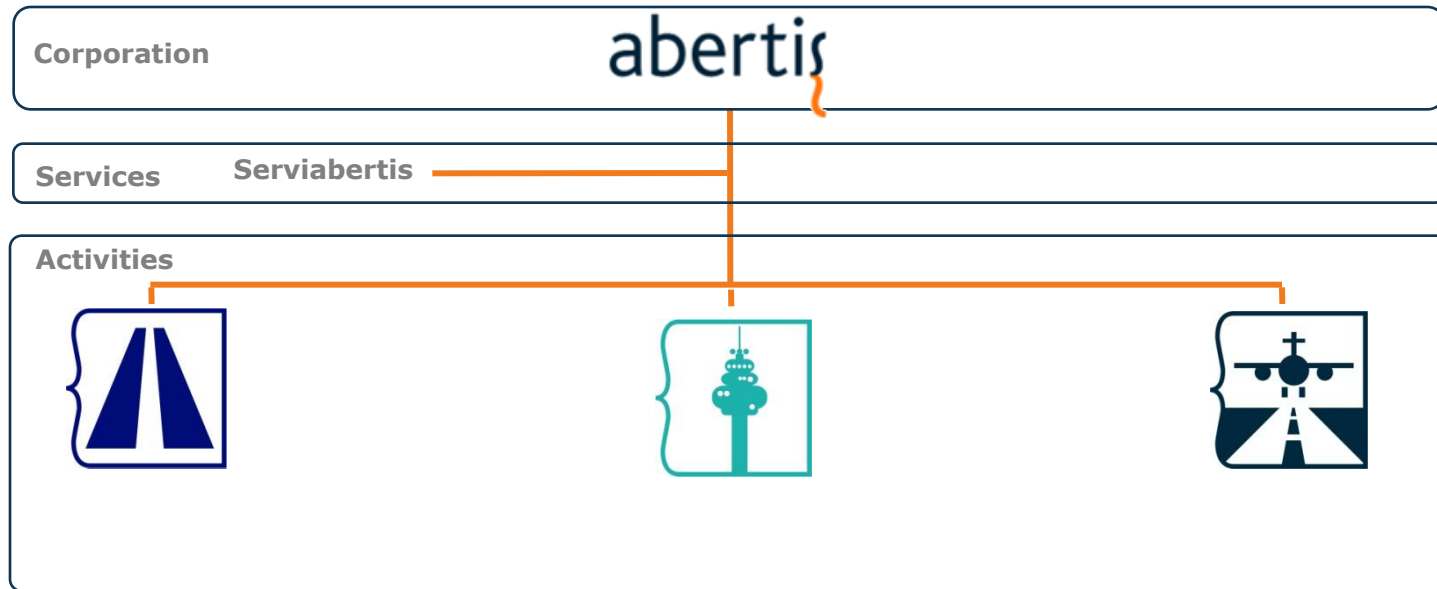
Ebitda: 2.454 millions of Euros (+1,9%).

Revenues : 3.915 millions of Euros (+5,2%)

Investment: 676 millions of Euros .

Personnel: more than 11.000 employees

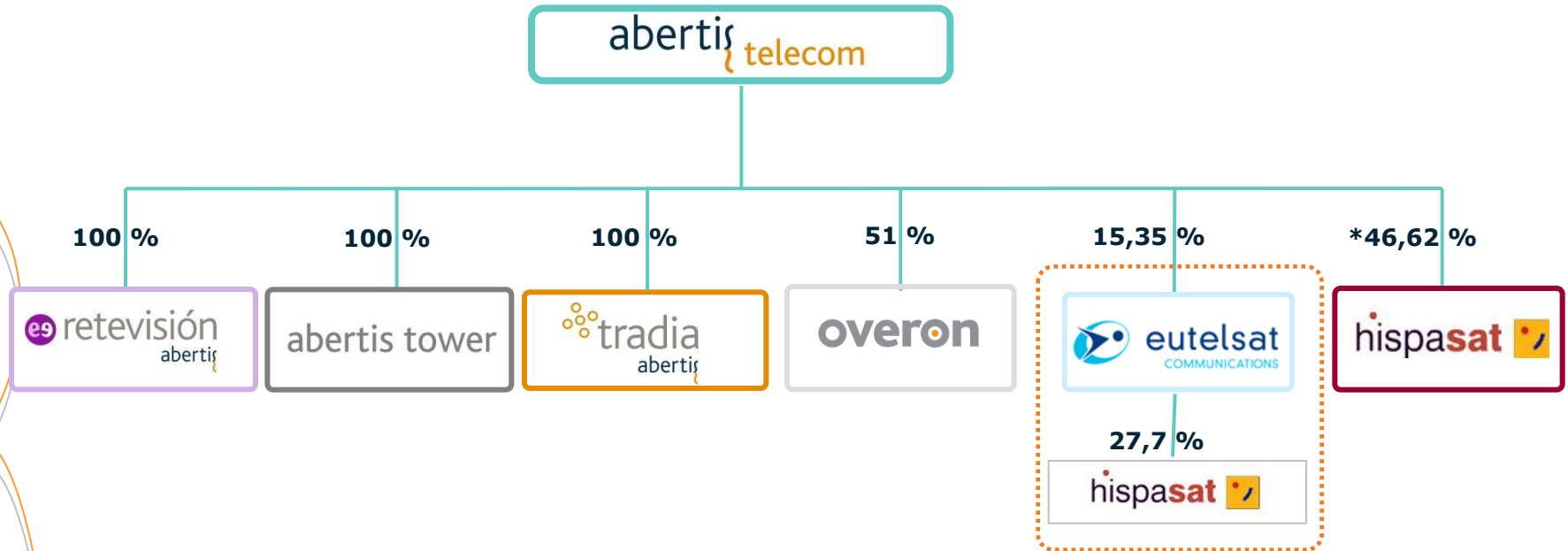
abertis telecom within abertis group



abertis telecom company responsible for telecommunications infrastructures

abertis telecom

Structure



Key figures, December 2011

- Revenues : 512,705 m€
- Investment: 101,752 m€
- Personnel: 1,343 people (RTV+TRD)

abertis telecom

Key figures

Business Units

Media - Public Safety - Wholesale

Main activities

- Digital TV broadcasting
- Digital and analogue radio broadcasting
- Mobile Radio-communications
- Public Wi-Fi
- Transport (satellite, radio, fiber)
- Co-location
- Other (O&M, engineering, etc)

Human Resources

- 1,300 specialized professionals distributed throughout the country.
- Teamwork, **customer orientation** and communication between different professionals.



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Key figures

Leader in the Spanish Broadcasting Market

- More than **98%** Digital Terrestrial TV (**DTT**) coverage
- Analogue radio coverage for over **99%**
- **Leader** in emergency radio communication networks
- Deployment of the **first Smart Zone** in Spain.

Certifications

- UNE-EN ISO 9001: 2008 **quality** management.
- UNE-EN ISO 14001: 2004 **environmental** management.
- BSI-OHSAS 18001: 2007 **security & occupational health** management.
- UNE-EN 166002: 2006 **I+D+I** management.
- European Excellence 500+, **EFQM** model.
- Law 31/1995 & 54/2003 on **Workplace Security**.
- Fundamental Law 15/1999 on **protection of personal data**.



abertis telecom, Company Overview

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Markets

Media

- National, regional and local broadcasters.
- Companies of Audiovisual services.

Public Safety

- Administrations and/or public agencies (National, Regional &/or Local).
- Security and emergencies (Firefighters, Ambulances, ...)
- Environment and Integrated Water Cycle.
- Utilities sector, companies providing public services (electric, gas, transport).

Wholesale

- Suppliers of Mobile and fixed telephony.
- Suppliers of f.o. and wireless (wifi/wimax) networks.
- Other telecom suppliers.



Services

Radio and Televisión broadcasting

- Transport and broadcasting for DTT, FM and DB
- Codification in SD, HD and 3D-HD
- Multiplexing of contents with and without disconnections.
- Fiber, satellite and terrestrial transport.
- Network planning and design.

Radio-communications services

- Supply and installation of equipment
- Interconnection of mobile communication networks with external networks.
- Fleet Management.
- Network planning and design



Services

Municipal Wireless networks

Infrastructure for Public Administrations in their service management in public places:

- **Mobility, Resource Optimization, Sustainable Economy.**



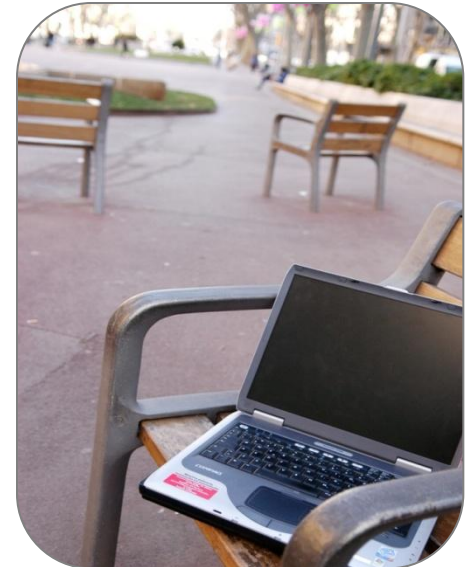
This infrastructure is the perfect complement for safety and emergency networks.

Co-location and transport

More than 4.000 sites in Spain.

- Uninterrupted power supply system
- Automatic alarm detection system.
- Broadcast control.

Transport services rental.



Services

Supervision and control

- Services supervision by:
Telecontrol and **Monitoring**.

Operation and maintenance

- Control and Operation Sites (24x7): Tres Cantos, Collserola, Torrespaña and Arganda del Rey.
- Optimization in handling incidents
- Preventive and corrective maintenance.

Engineering and consultancy

- Data applications and added value in radio-communication and transmission networks.
- Network and project management.
- Master Plan and Strategic Consultancy.
- Projects Direction and Technical Assistance
- Network and service Audits
- Contingency plans for networks of infrastructures.



Infrastructures

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Terrestrial Infrastructure

abertis telecom has national coverage with an extensive sites network and a transmission network (satellite, radiolinks and fiber).

- **More than 4.000** sites -> more than 80% multiservice and multioperator
- Placed in **urban** and **rural** areas.
- Operation and maintenance **Integral Service**



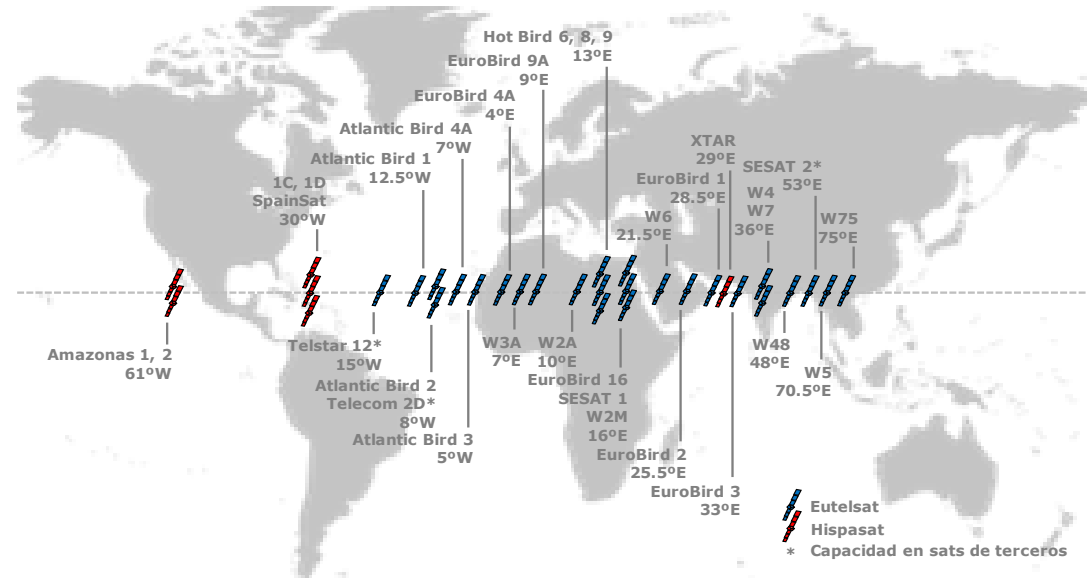
- Control Center **24x7**
- Equipped with advanced supervision systems



Satellite Infrastructure

Eutelsat

- 26 satellites at 20 orbital positions
- Market presence in Europe, Africa, Asia and America



Hispasat

- Fleet of 7 satellites at 3 orbital positions:
 - 30° W: satellites 1C, 1D and 1E providing commercial services to Europe and the Spainsat satellite dedicated to government services
 - 61° W: Amazonas satellites 1 and 2, providing services to the American continent
 - 29° E: X-TAR satellite dedicated to government services (Spanish Ministry of Defence and US government)
 - 5 new satellites scheduled for 2011-2013

Satellite Infrastructure

- **2 Teleports in Madrid (Arganda and Tres Cantos) and 1 in Canary Islands (Isleta)** connected to the main PoPs of terrestrial network operators.
- **Satellite capacity** in Hispasat.
- **Fixed TX/RX earth stations:**
 - C, Ku, DBS and Ka band
 - For permanent or occasional services.
- **HUB and VSAT stations** for VSAT network.
- **RX only stations** for TV and radio services broadcast.
- **Transportable stations:** mobile satellite unit, fly-away, mobile microwave links

Services architectures

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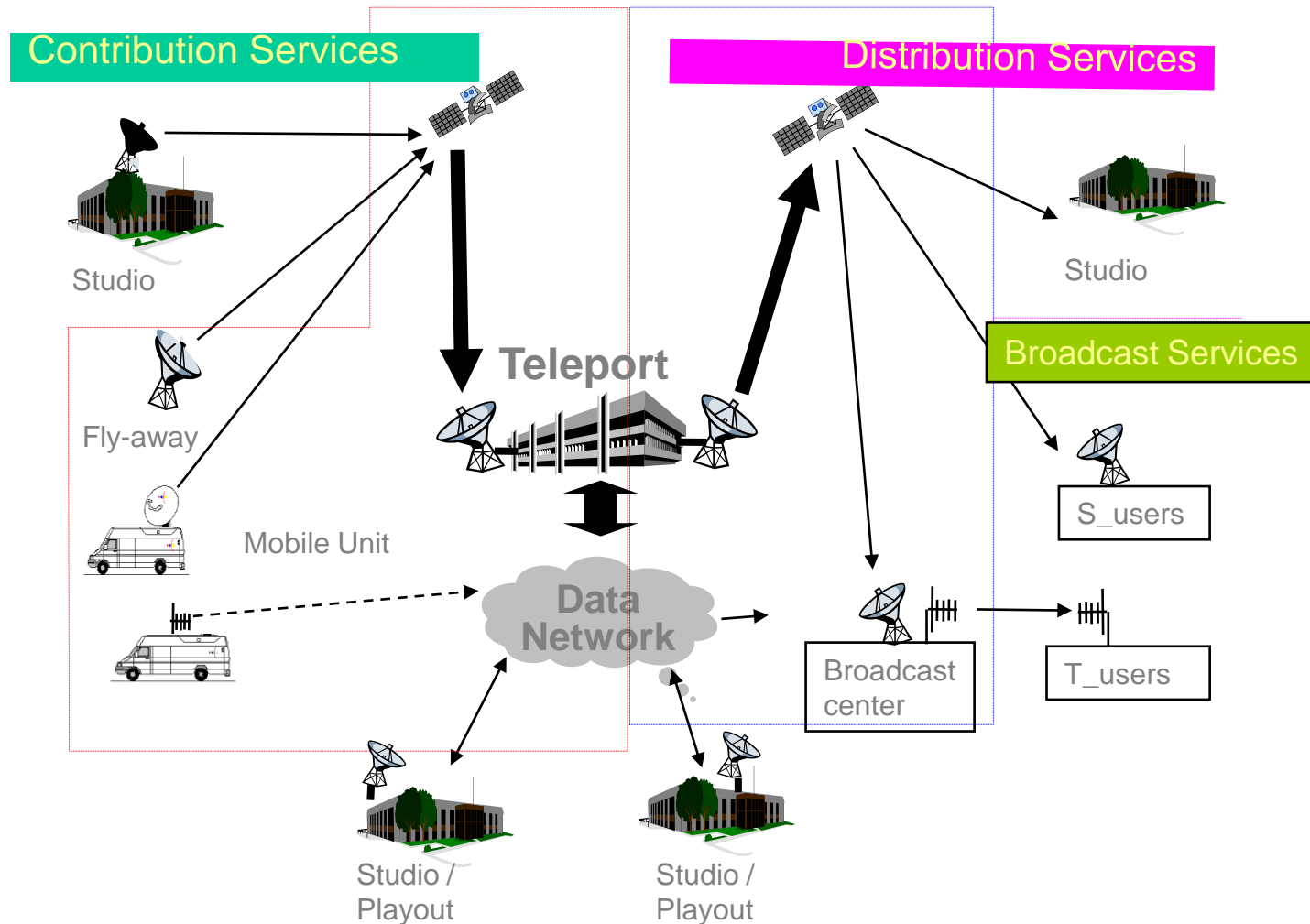


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Services architectures. Satellite main aspects

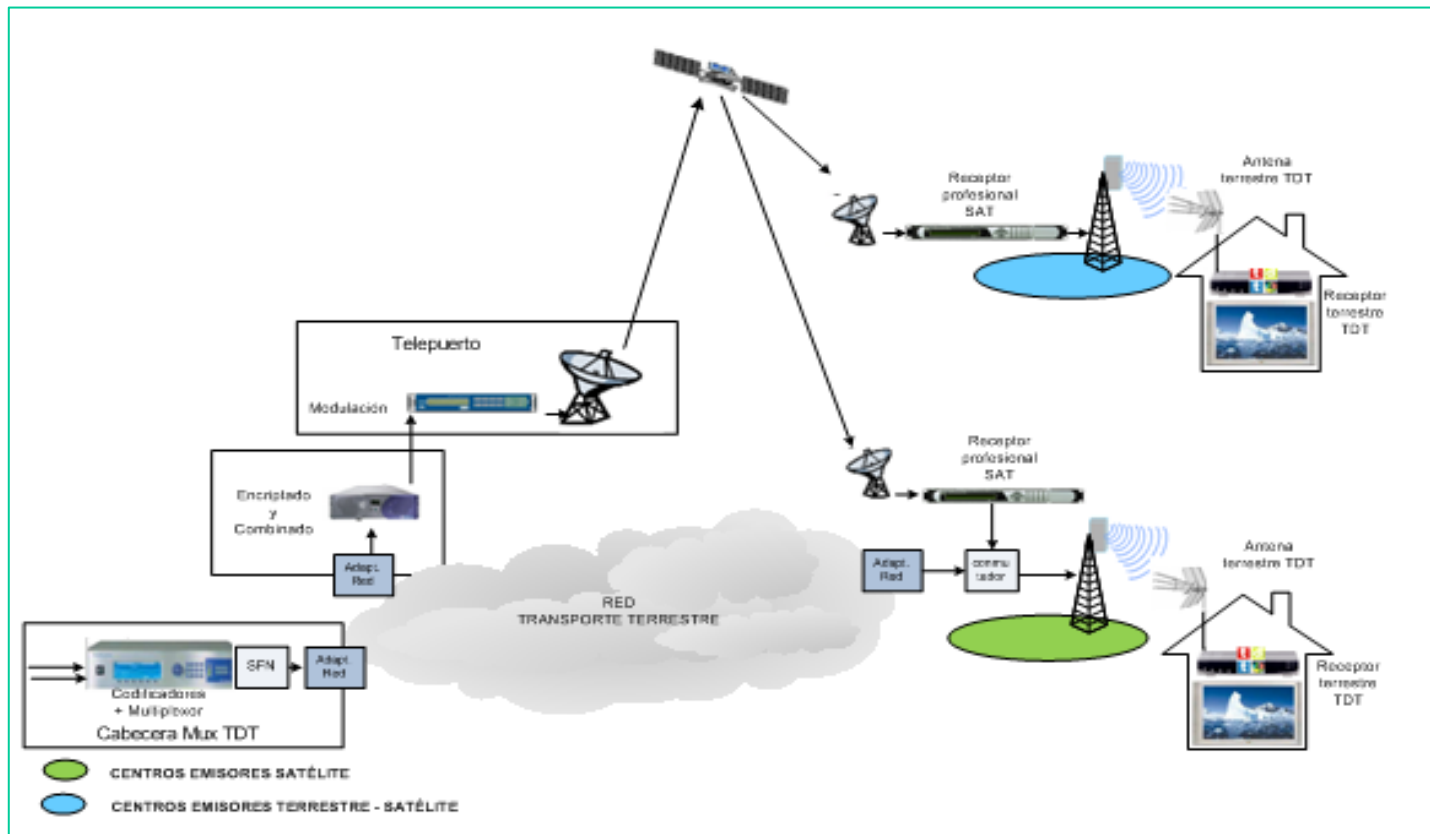
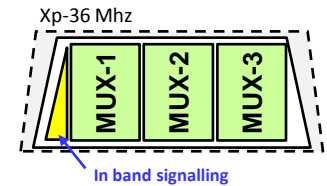
- **Advantages:**
 - Quick deployment.
 - Wide coverage in the geographical area.
 - Cost does not depend on the distance.
 - Suitable for point to multipoint connections.
- **Drawbacks:**
 - Expensive for point to point links.
 - Fiber bandwidth is much greater than satellite bandwidth.
 - Transmission delay shall be considered in the protocols design. (approx. 250 msec per hop). Higher than radionlinks and fiber.

Services architectures. Broadcast services

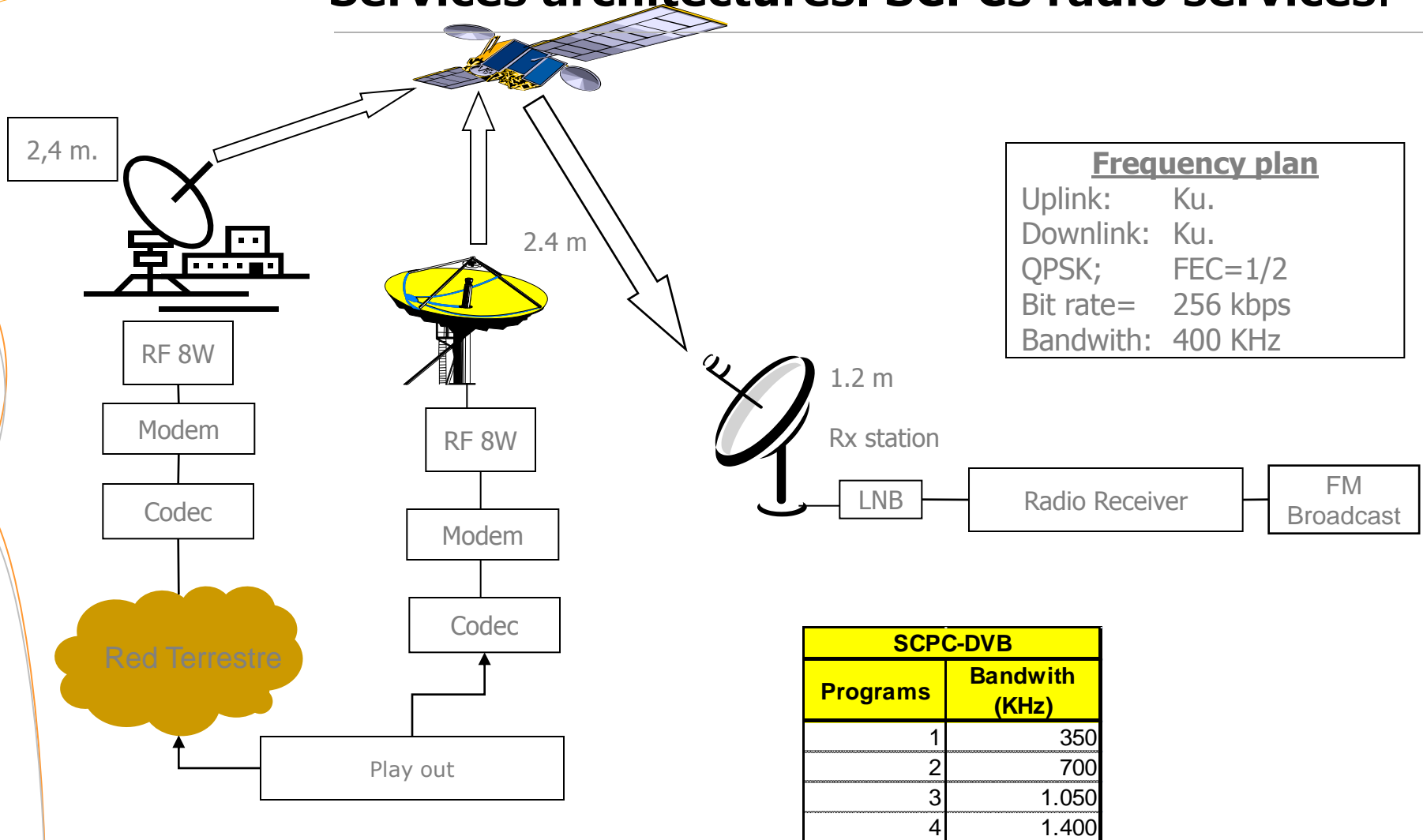


Services architectures. DTT distribution.

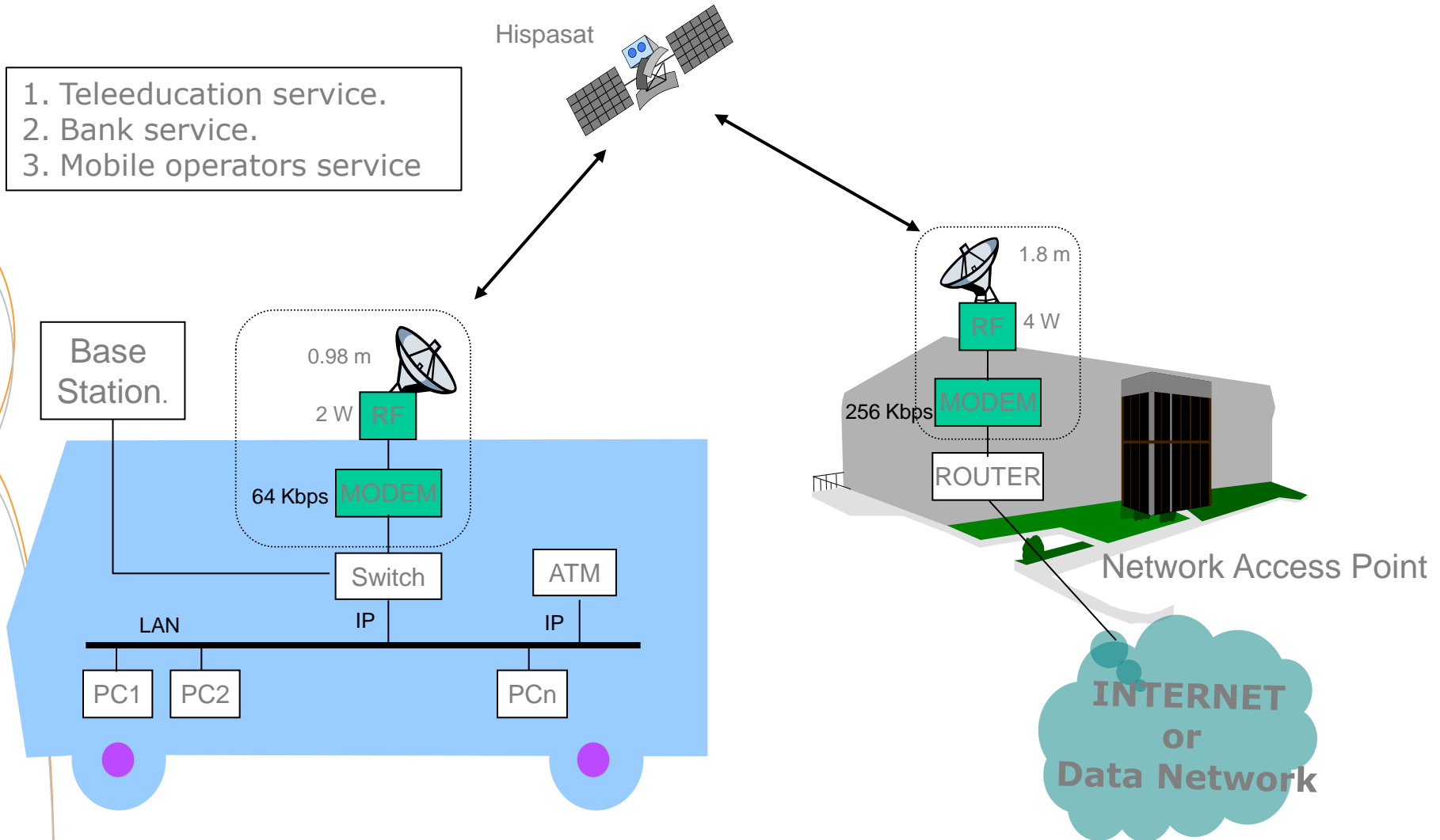
- Satellite capacity: 3*DTT multiplex in one 36 MHz transponder.
- Standards (TS, DVB-S2, DVB-T, ...)
- Encryption.
- Terminals management.



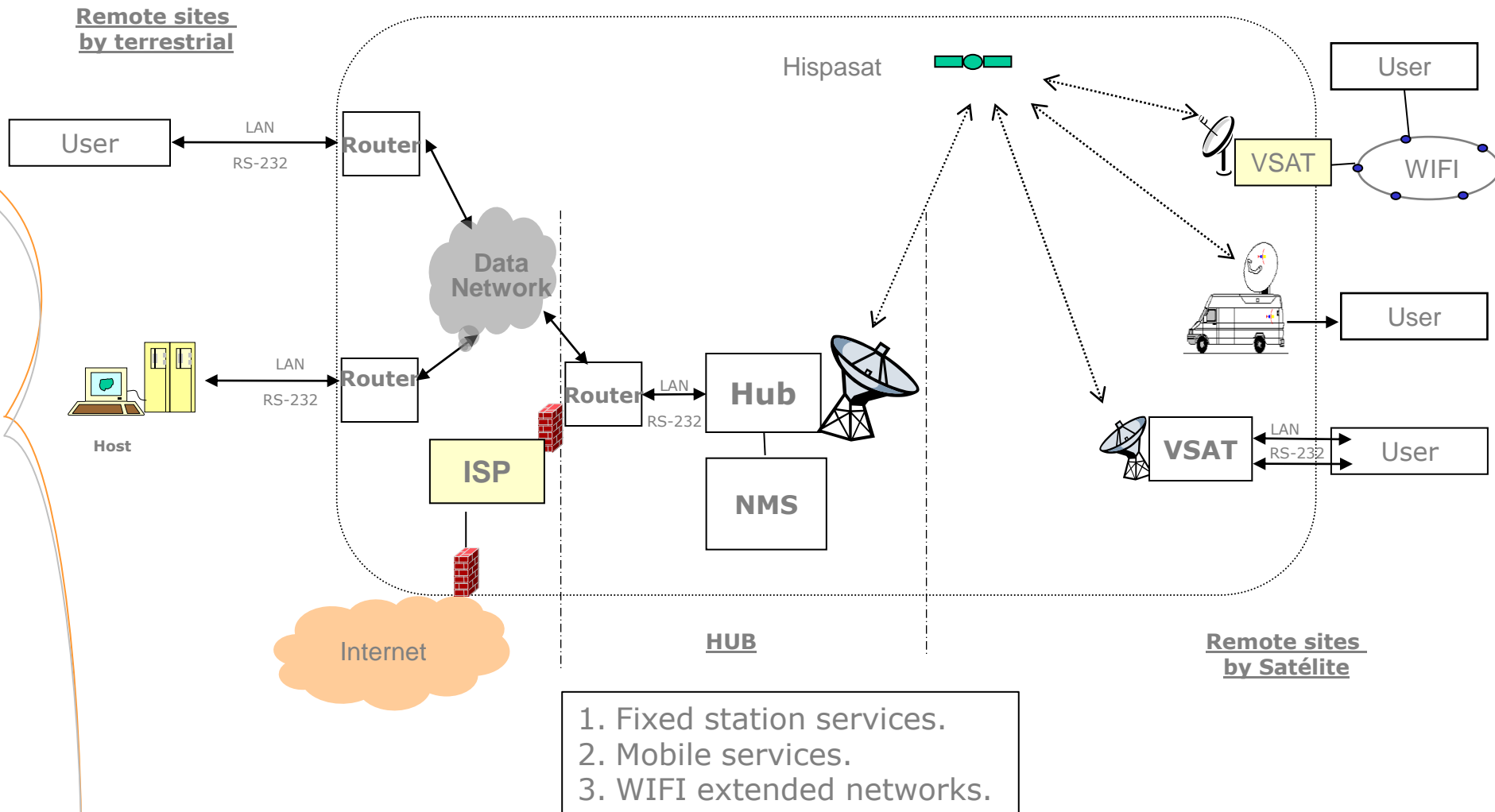
Services architectures. SCPCs radio services.



Services architectures. Point to point links



Services architectures. VSAT networks

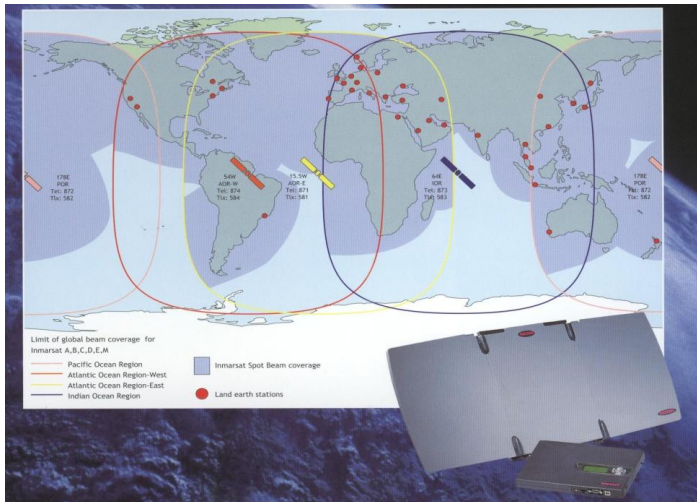


Services architectures. Multisatellite service

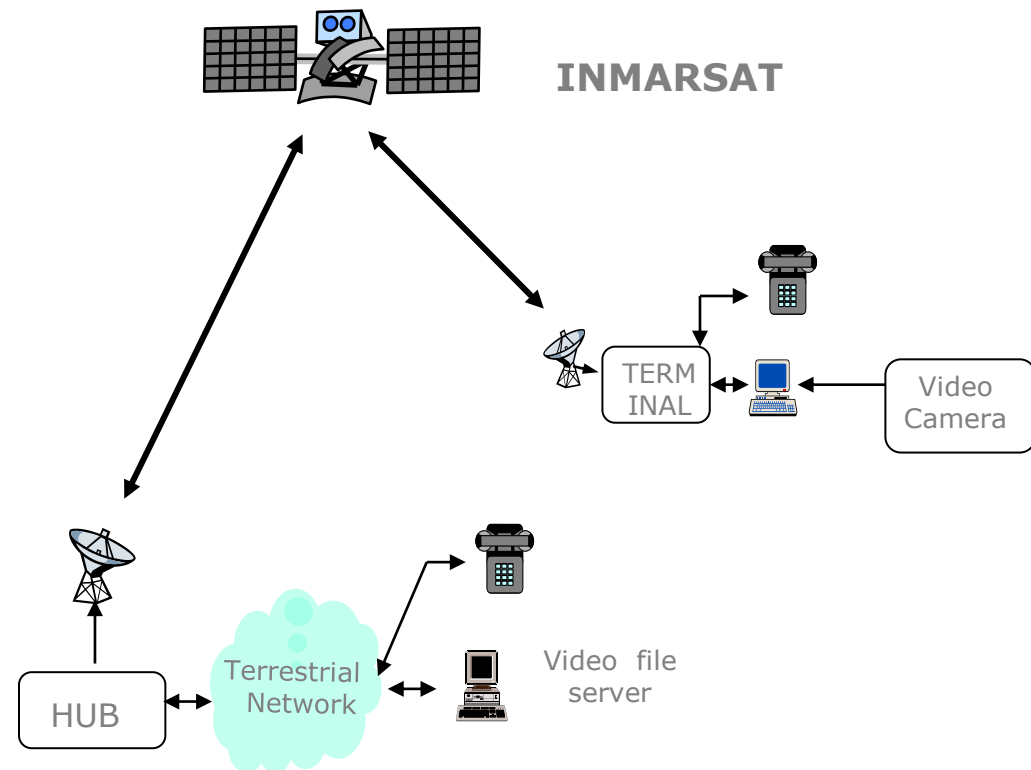
1. Professional data services (IP).
2. Global coverage needs several satellites to provide the service.
3. Typical application for a company having offices in 40 countries of 4 continents.
4. Network solution is shared with fiber circuits where available.



Services architectures. Portable terminal

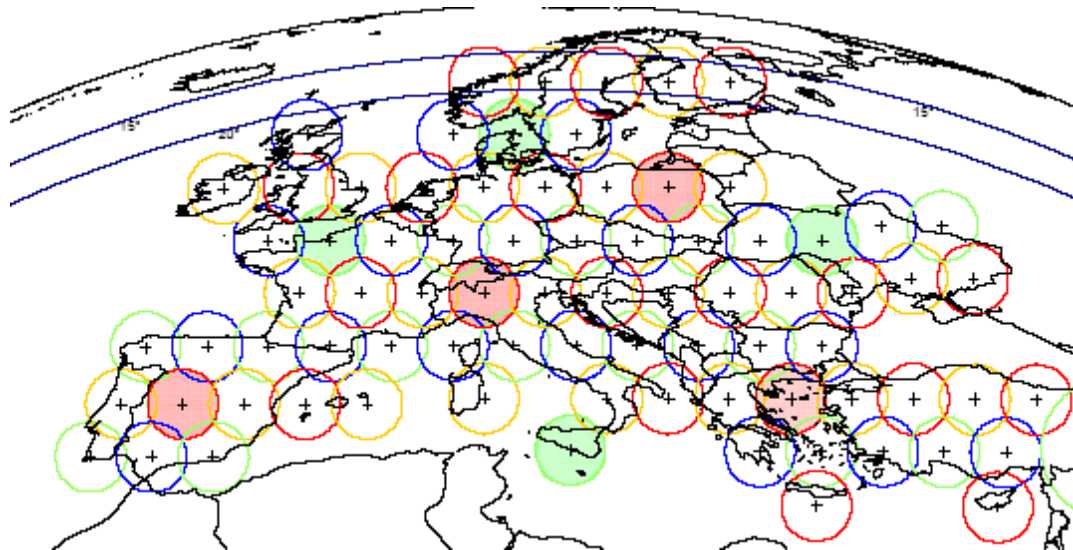


1. Service is built as global with repeater Hub earth stations
2. Low speed voice and data applications.
3. Portable terminal.
4. Building applications over the transmission layer.



Satellite Services. Other infrastructures.

- Other type of satellite infrastructures are consolidating in the satellite market:
 - Satellite constellations.
 - Satellites multispot:
 - Coverage concentrated in small spots in Ka band.
 - Big increase in capacity due to the number of spots and frequency reuse in the Ka-band spectrum allocated.
 - Big potential for deployment of for broadband services (specially internet access).



Final Remarks

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Final Remarks

- ❑ To provide a service to a customer a combination of satellite with fiber and radiolinks is needed.
- ❑ Satellite provides quick deployment in all coverage area. This may be a key aspect for mobile operators where terrestrial network is not deployed.
- ❑ Ka-band technology will allow start big deployment of broadband services with higher capacity services.

Thank you very much