grupo hispasat

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The Role of Satellite in Mobile Communications arena

Customer Engineering, Hispasat

INDEX

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1. ABOUT HISPASAT

About the Company

- HISPASAT is the world eight operator and third in Iberamerica by revenues. HISPASAT is the main communication link between Europe and America.

- HISPASAT is the leader operator in broadcast and distribution of spanish and portuguese contents.

- The company broadcasts and distributes more than 1.150 radio and TV channels, including contents of important Direct-To-Home (DTH) digital platforms, as well as their high definition offer.

1. About HISPASAT

Satellite Fleet

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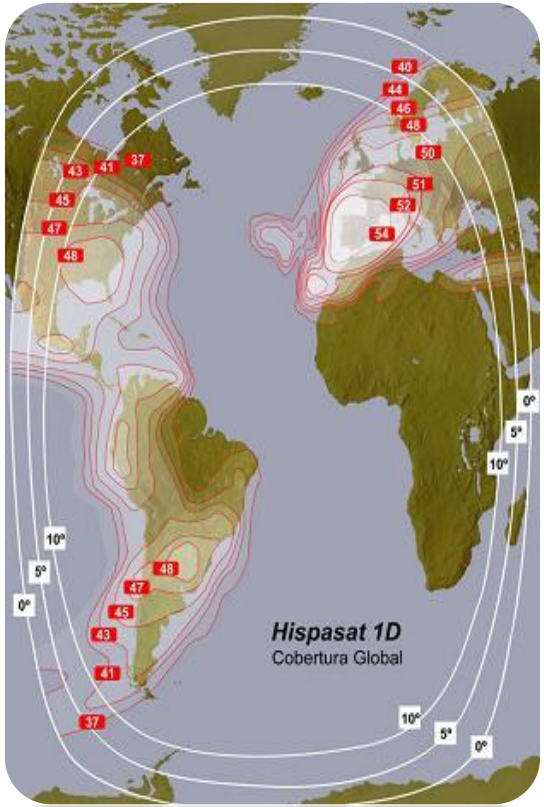
Orbital Position	Satellite	Capacity	Launch year
30 ° West	Hispasat 1C	24 Ku	2000
30 ° West	Hispasat 1D	28 Ku	2002
61 ° West	Amazonas	32 Ku, 19 C	2004
29 ° East	Xtar-Eur *	12 X	2005
30 ° West	Spainsat *	13 X, 1 Ka	2006
61 ° West	Amazonas 2	54 Ku, 10 C	2009
30 ° West	Hispasat 1E	57 Ku, 1 Ka	2010

(*) Operated through Hisdesat

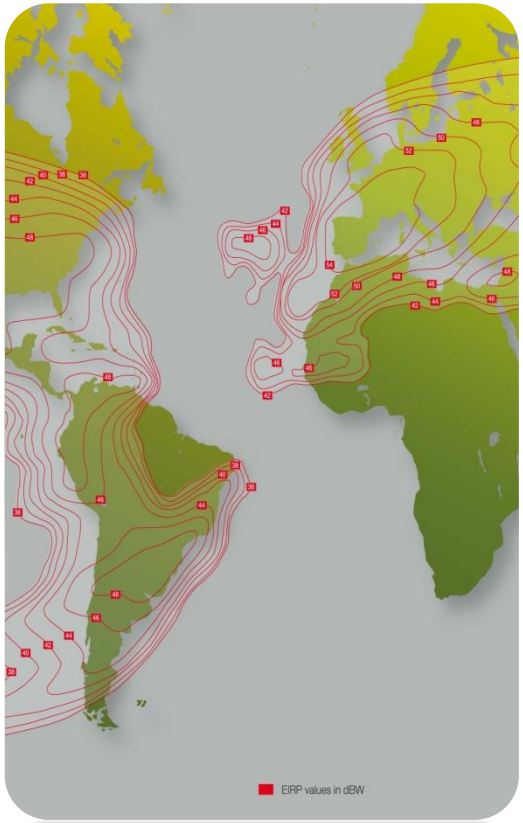
1. About HISPASAT

30ºW Coverage

Hispasat 1C



Hispasat 1D

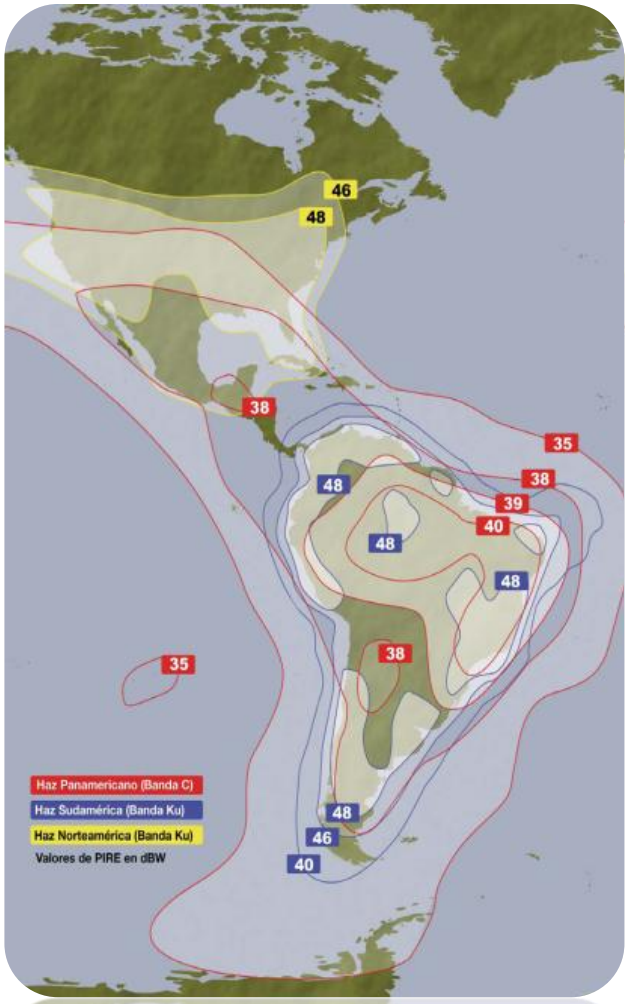


Hispasat 1E

1. About HISPASAT

61ºW Coverage

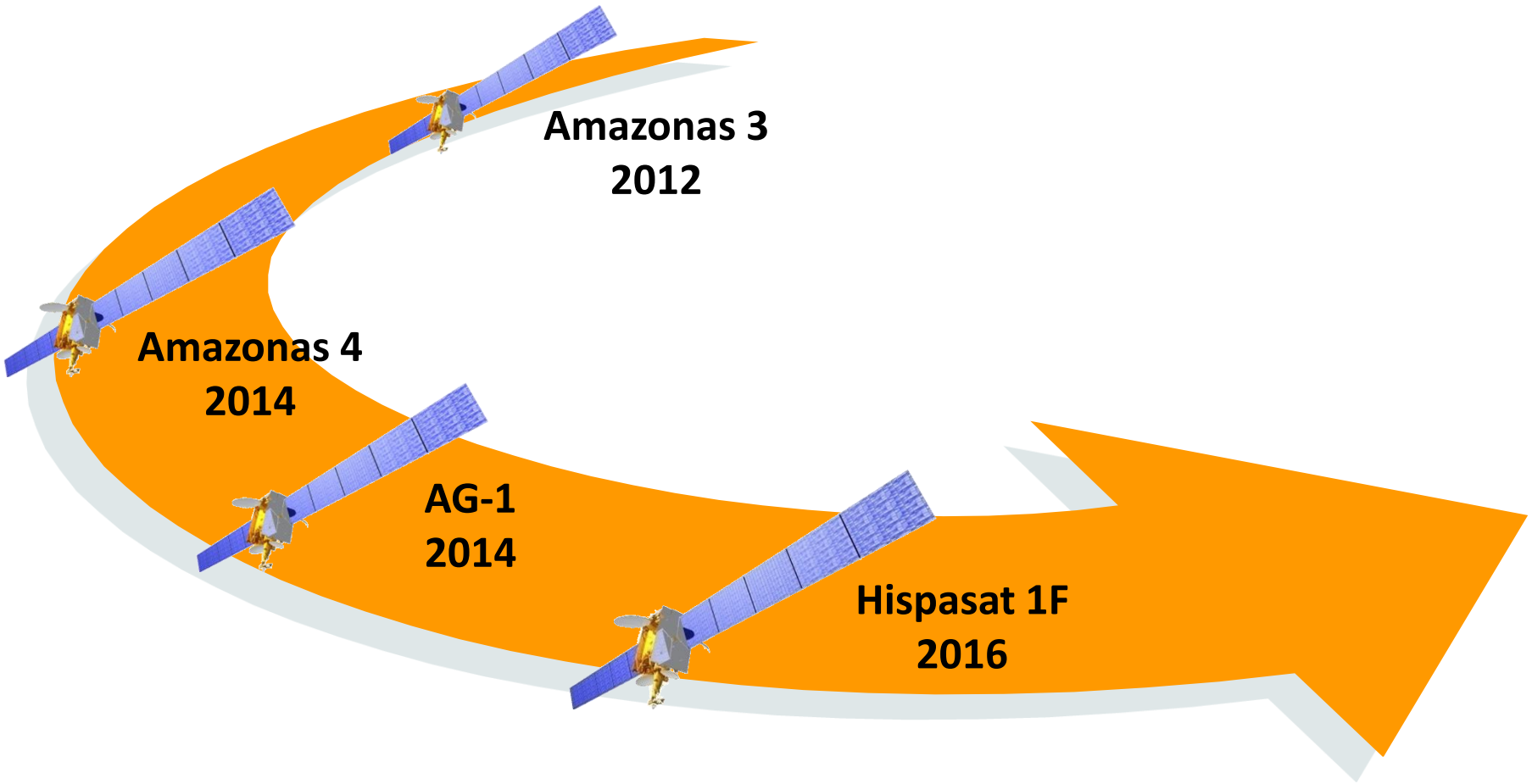
Amazonas 1



Amazonas 2

1. About Hispasat

Future launches



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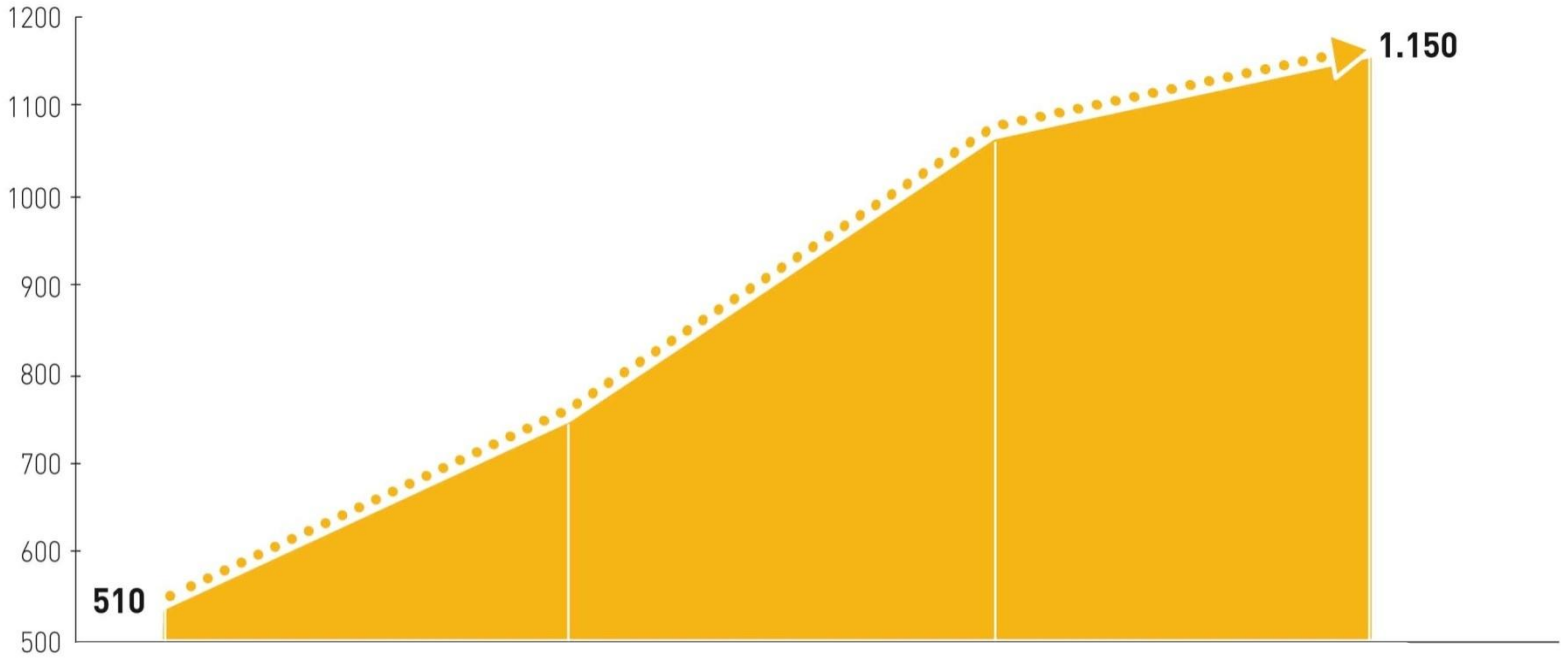
Contents through Hispasat



Evolution in the number of radio and TV channels (2006-2009)
Most relevant data 2011: 70 HD channels and 5 3DTV channels

2. INTRODUCTION TO SATCOM ON THE MOVE

A new paradigm

- During the last years, fixed satellite operators have begun to provide *Satcom on the move solutions* thanks to:
  - Better performances of geostationary satellites
  - More mature technology for ground segment equipment

FSS Operators
(Fixed Satellite services)

- Direct To Home TV
- TV Distribution and Constribution
- VSAT Networks
- Backhaul and IP-Trucking
- Broadband access
- …

$ 10,8bn revenues in 2010

MSS Operators
(Mobile Satellite Services)

- Mobile phone networks
- Narrow band access
- Aeronautical services
- Maritime services
- Broadband access
- …

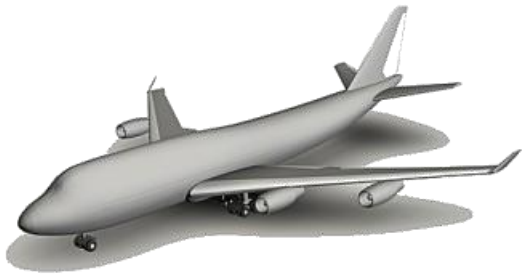
$ 1,38bn revenues 2010

1. Introduction to Satcom on the move

New markets for FSS Operators in the mobile arena

Maritime

-$ 1,4bn market
-315.000 terminals
-more mature market
-Aplications:
- -Safety and security
- -Professional: Ships operation,etc
- -*Crew entertaiment*



Aeronautical

-$ 1,3bn market
-247.000 satellite terminals
-Segments:
- -Commercial airlines
- -Government: UAVs,helicopters…

Mobile terrestrial

- Included trains, cars, buses and other terrestrial vehicles.

- Railway as a new driver for this market: Hispasat provides broadband access to 50 high speed trains in Europe

3. Mobile Terrestrial

3. Mobile Terrestrial

Railway:our experience

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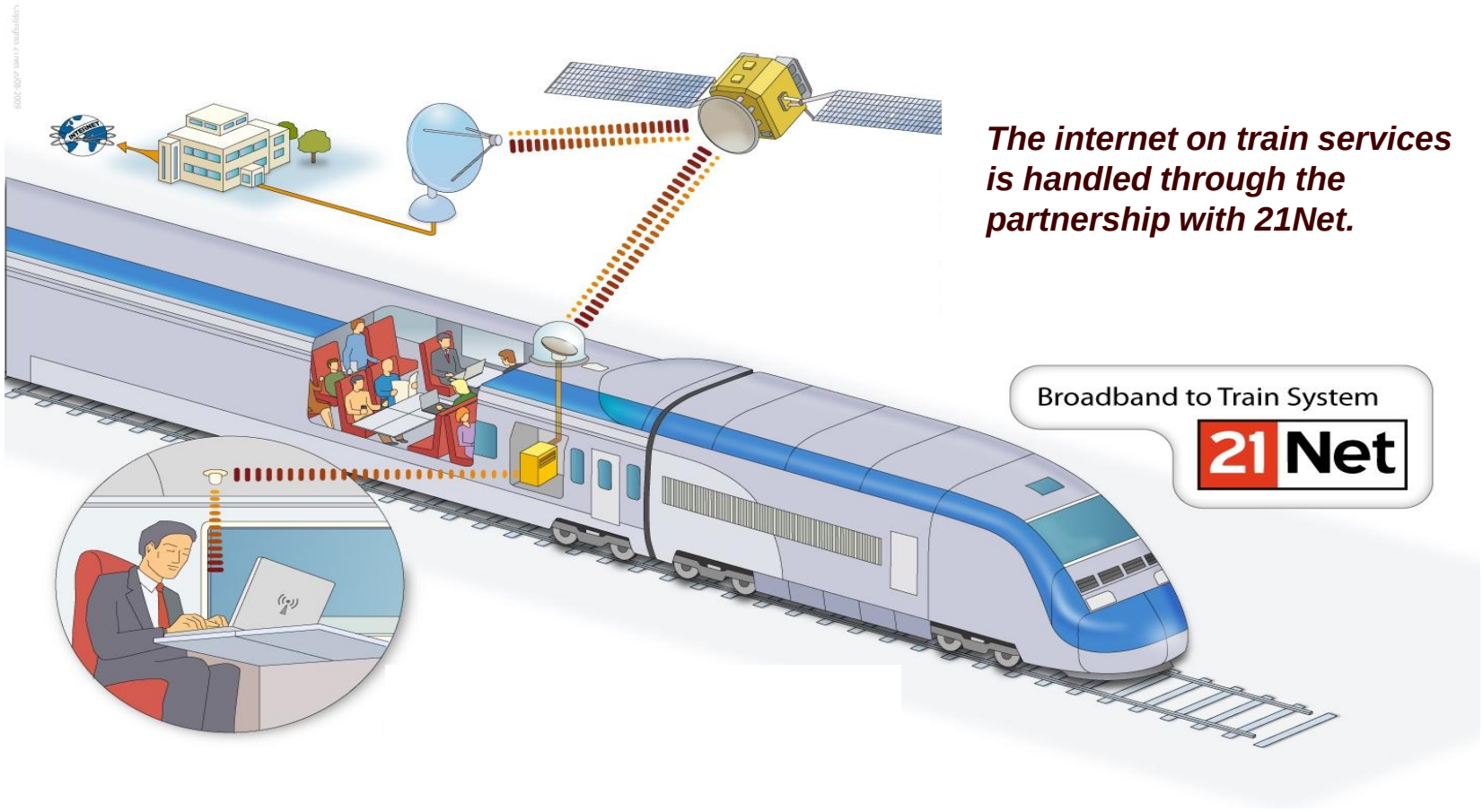
- HISPASAT is pioneer in offering Internet access to high speed trains on a deployed (and operational since 2008) network in rail operator Thalys (26 trains).
- Currently, NTV fleet of 25 trains (Italy) are under deployment; first trains are in commercial service since December 2011.



The internet on train services is handled through the partnership with 21Net.

3. Mobile terrestrial

Railway: Why Satellite?

- Forward and return by Satellite (European standard DVB-RCS) without terrestrial networks (satellite coverage typically covers 90 to 95%)
- Totally flexible slot configuration. Any available BW for the slot shared by all the terminals mobiles & fixed.
- Possibility of integration with terrestrial networks in the masking points (tunnels, stations, etc.) that are usually few -> minimum CAPEX.
- Solution tested and deployed in high-speed trains up to 330 km/h.
- Possibility of up to 16 Mbps by train with statistical mutliplexation between train fleet without fixed capacity reservation which minimizes the OPEX.

3. Mobile terrestrial

Railway: Technical challenges

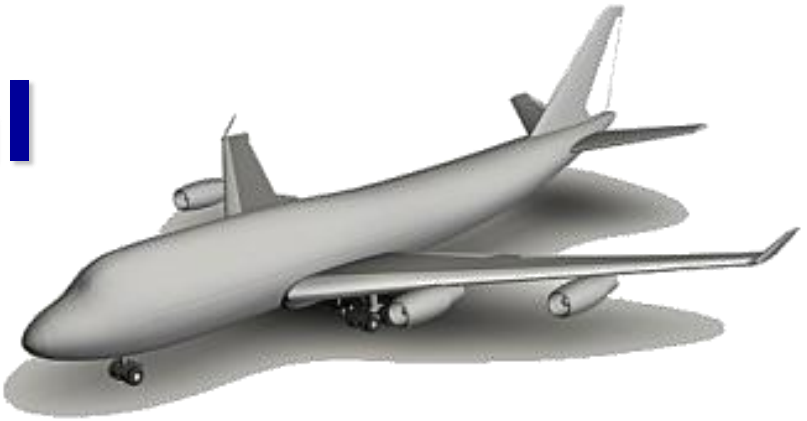
- **Signal interruptions:** due the lost of the line of sight because of the trackside posts and other railway infrastructure
- **Speed, vibration and acceleration conditions**: An important effort of network design must be carried out in order to adequate the satellite network to these extreme conditions. (e.g. Changes in the acquisition window of the sat terminals due to the Doppler effect).
- **Sparks and electrical** noise because of the High Tension Cables used in Railway infrastructures.
- **Ground segment integration**

3.Mobile terrestrial

Other applications

- The role of satellite networks in land mobile vehicles make have increased due to**:**
  - Improvements in the transmission standards: DVB-S2, Adapative Coding Modulation, Spread Spectrum,etc.
  - Improvements in the ground segment: Small terminals, antenna pointing,etc.
- Several innovatives initiatives has carried out in order to achieve these goals, such as **SIMBAD** Project, a Consortium led by Hispasat which develop new ground segment equipment for providing sat on the move solutions for land vehicles. Also, integration with other networks has been considered in order to provide global solutions for the emergencies arena.

4. Aeronautical market



4. Aeronautical market

Some figures

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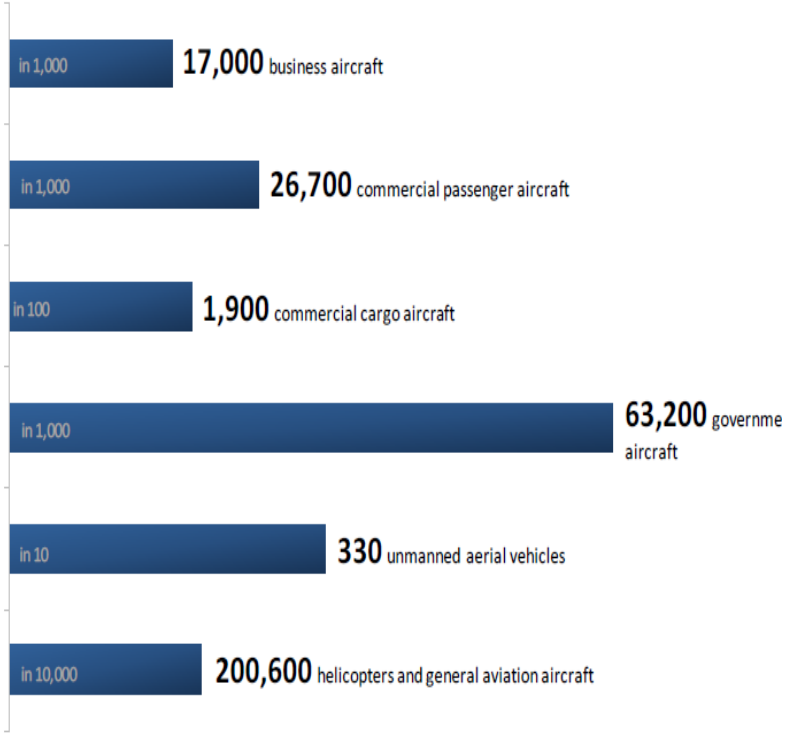
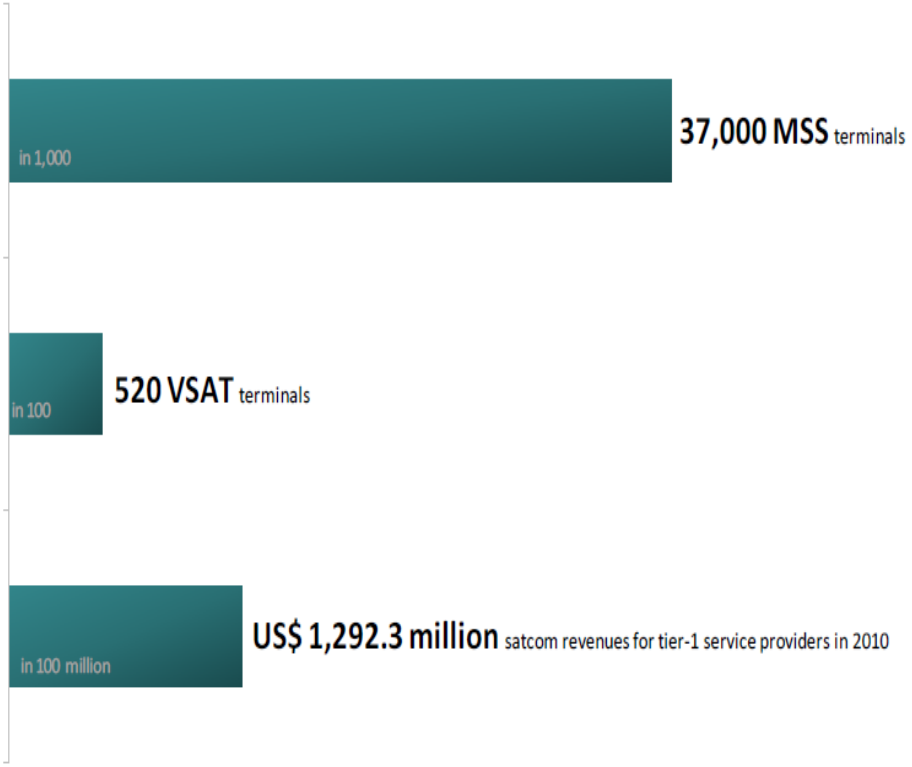
Addressable market (2010)



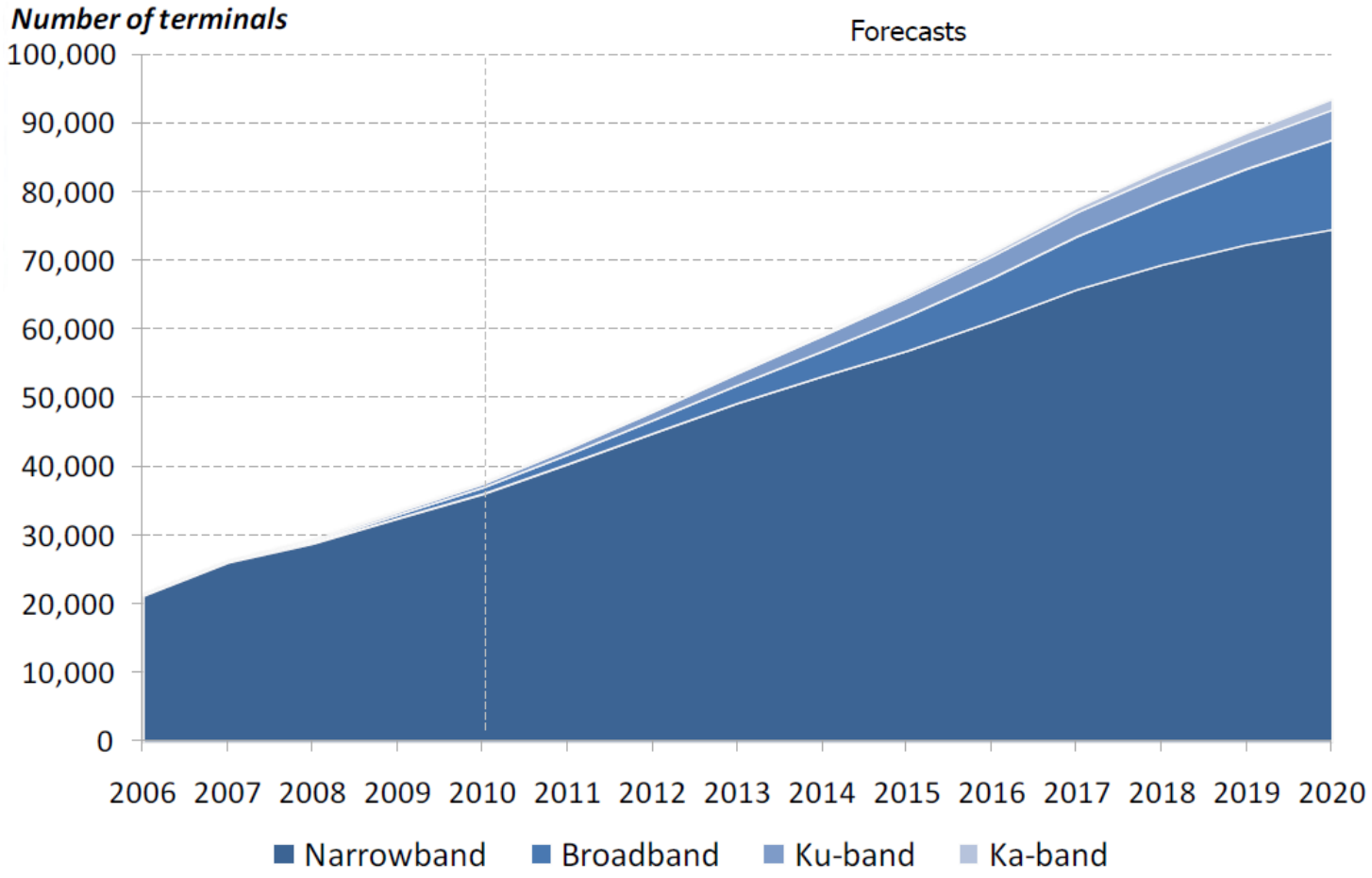
Terminals and revenues (2010)



Source: Euroconsult

4. Aeronautical market

Some Figures



Source: Euroconsult

4. Aeronautical market

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Key Drivers

Business Aviation

- Improved equipment with reduced size and weight
- Office in the sky notion through seamless satcom services
- Increase recongition of business travellers of satcom services
- New heavy users with emergin application such as video-conference

Commercial Airlines

- More than new 200 routes since 2008
- Reduced service pricing stimulates usage in such a cost-sensitive market.
- Airlines consider IFE (in flight entertainment) services can be a revenue source.
- Growing market including new services (e.g in-seat TV)

Government Aircraft

- Growing military demand outpaces the bandwidth available in the market
- Need for video during military missions
- Long endurance UAVs relies on satcom networks

Helicopter and general aviation

- Emergency and security networks
- Increasing concern for air traffic control and air safety communication in the general aviation segment stimulates satcom capacity demand

UAVs: a new opportunity

- Unmanned aerial vehicles (UAVs) are normally used for reconissation tasks in government and military operations.
- During the last years, there has been an extraordinary increase in the number of UAVs available which required an important amount of satellite network bandwidth, specially for medium and high-altitude long endurance vehicles. These figures are expected to grow significantly in the coming years.
- Hispasat, through Amazonas 2 satellite, has several customers operating UAVs such as U.S. Government and NASA.

Global Hawk UAV

Predator UAV

Commercial airlines: our experience

- Hispasat have participated in several initiatives aiming to provide advanced broadband communications services for commercial aircrafts, such as Internet access, mobile telephony (GSM, GPRS and UMTS) and live TV.

- Currently, some commercial projects in Europe are under development which confirm the opportunities that this market is generating recently.

Antenna with electromechanical pointing used in commercial airlines

5. Maritime market

3. Maritime market

Some Figures

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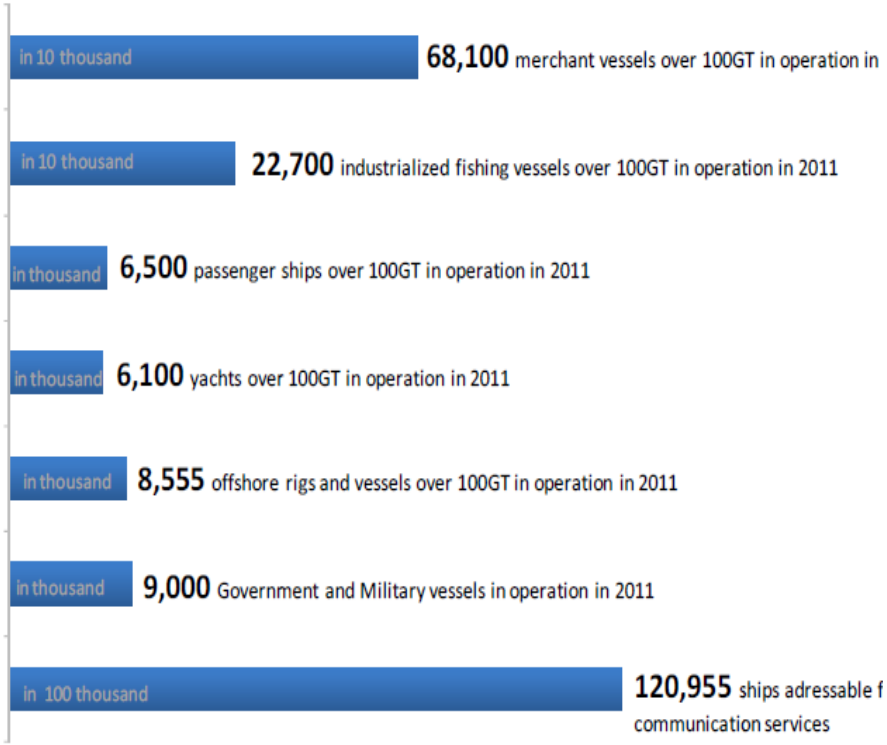
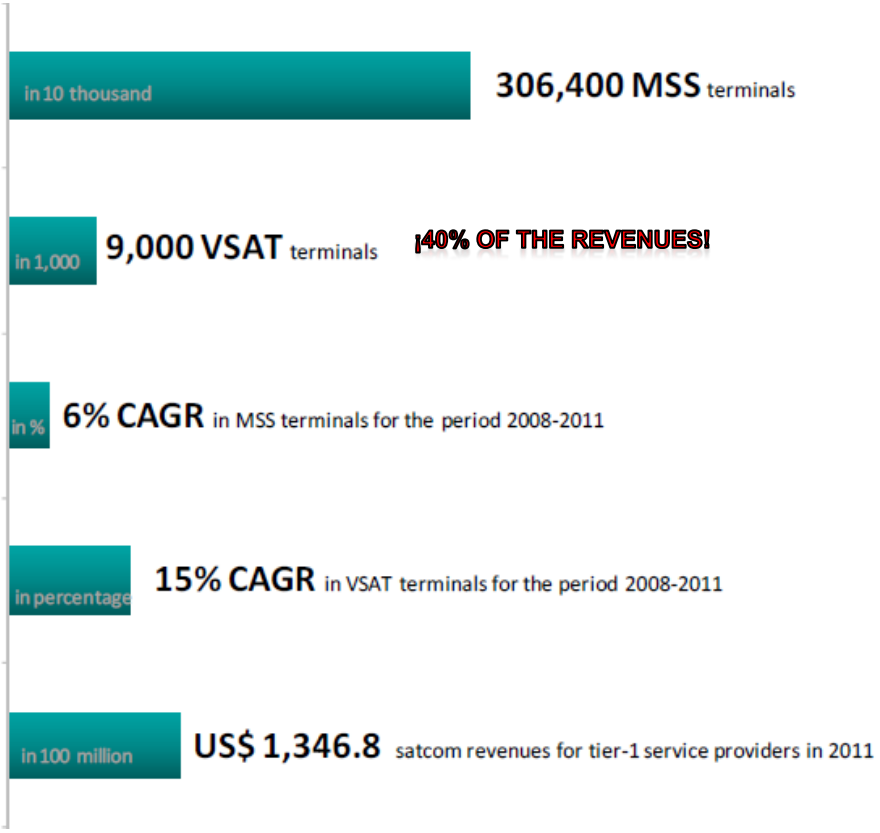
Addressable market (2011)



Terminals and revenues (2011)



Source: Euroconsult

5. Maritime market

Some Figures

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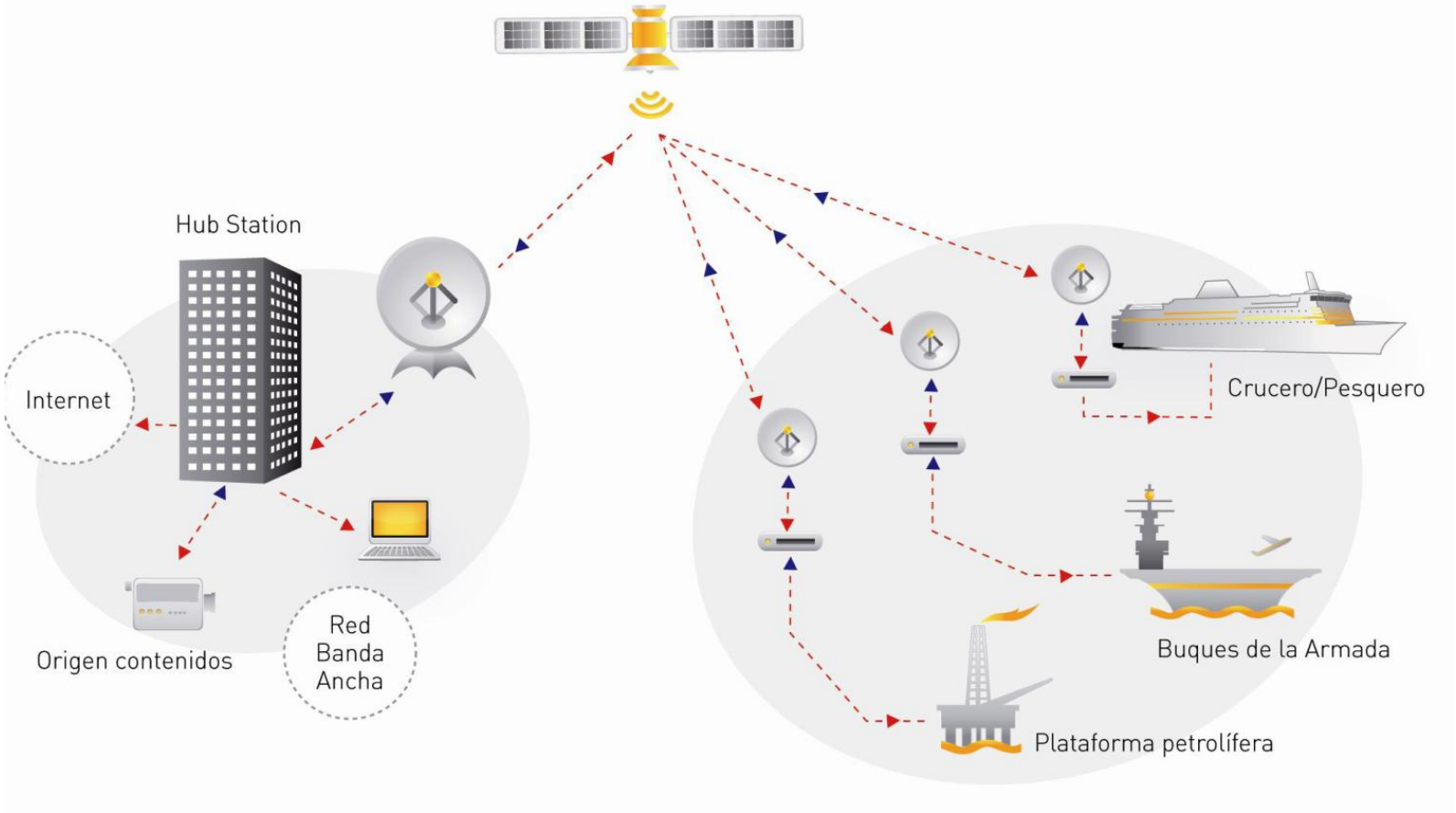
Maritime VSAT Terminals (forecast)

Source: Euroconsult

Hispasat products

- Hispasat, through its Broadband Platform, provides several products for the the Maritime market
- Up to 1Mbps/512Kbps of internet access could be provided as well as other ad-hoc solutions using a DVB-S2/DVB-RCS platform.



6. Mobile TV

Standardization

- Broadcast community has worked during the last years to provide Mobile Tv services via broadcasting networks via satellite for handheld terminals. However, good market response has still not been found.

DVB SH

DVB Satellite Handheld, includes both satellite and terrestrial networks for providing hybrid and cost-effective mobileTV broadcast services

DVB-NGH

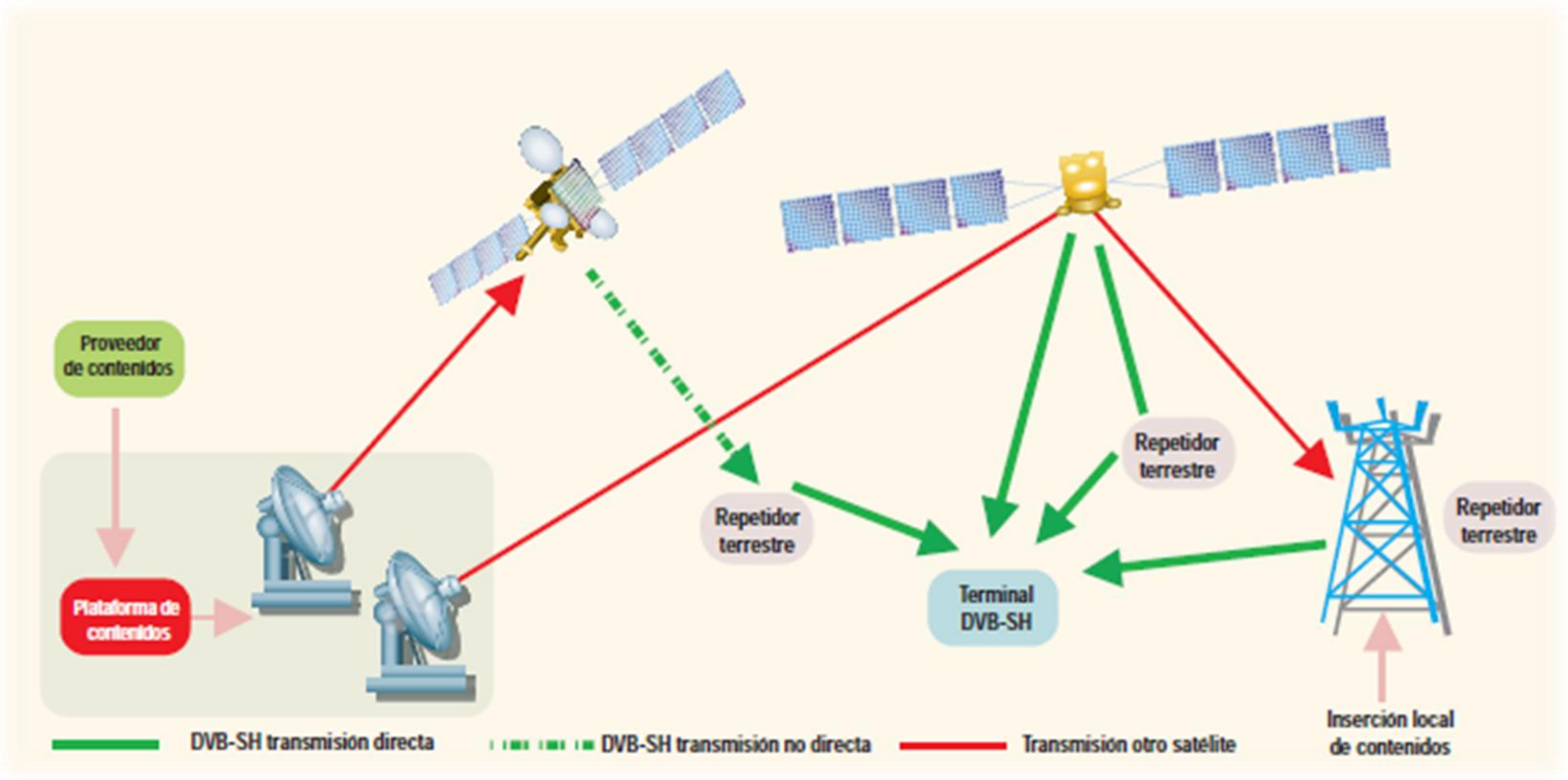
(under development)

To be launched 2012, incorporates cutting edges technologies for improving the spectral efficiency of previous DVB systems. Hybrid networks.

DVB S2

Although it is not a standard for handheld terminals, DVB-S2 is highly used in sat on the move scenarios for TV services: Maritime,trains,ect.

- Hispasat, as a funding member, has participated in the DVB standardization process for Mobile TV. Moreover, different R+D+i projects (Celitic Engines, Celtic B21C, Avanza Furia) have been carried out in order to contribute to the technology and market development.



DVB-SH Network

7. Other applications for mobile scenarios

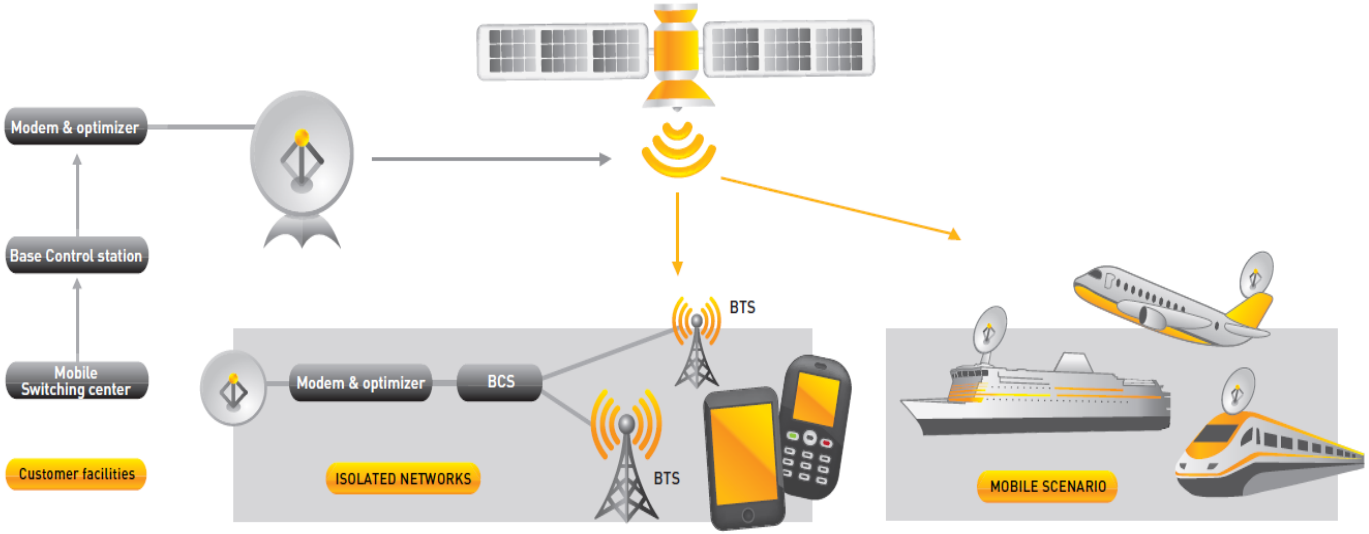
7. Other aplications

Cellular Backhaul

- In areas where terrestrial communications are unavailable and too costly to deploy, satellite communications are an ideal complement to mobile network operators to roll out cellular networks**.**

- Satellite-based cellular networks are easy to deploy, secure resilient and reliable communications and are cost and time effective solution for operators, specially when they have to offer communications to low population density areas or when the landscape characteristics present barriers to deploy terrestrial infrastructure.

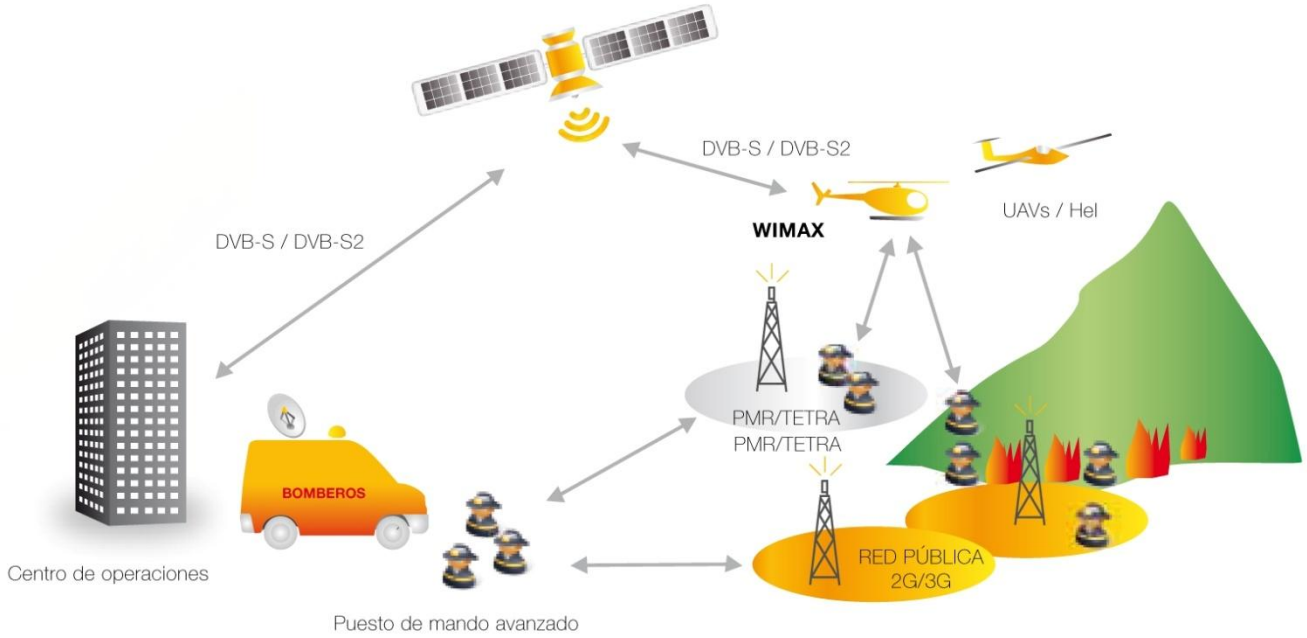
- As an example of this applications, HISPASAT is providing satellite capacity on its AMAZONAS-1 satellite to Telefónica in Ecuador, allowing the deployment of a national mobile phone network, both in the Continent as well as in Galapagos islands. The network comprises a hub located in Quito and more than 60 small remote VSAT , 1,8 m diameter, offering a high quality service to Movistar clients.



7. Other aplications

Emergencies and security

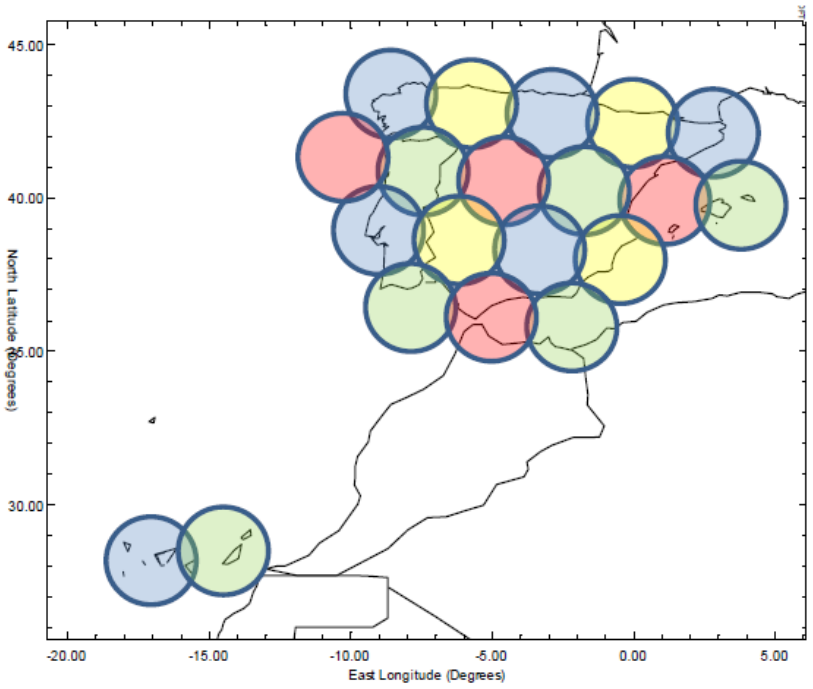
- Satellite also plays an important role in the emergencies and security scenarios thanks to its high capacity, easy deploy and global coverage.
- In most of the cases, Satellite is used as a “hub” for other technologies but also as a unique network when terrestrial infrastructure is not available.
- Hispasat participates in some R+D+I initiatives aiming to improve current solutions for emergencies scenarios wheen terrestial networks are not avaiable. An example of this are SIMBAD, IGNIS and PROMETEO projects focused on the wildfire scenario. In this case, satcom the move networks are also very importa



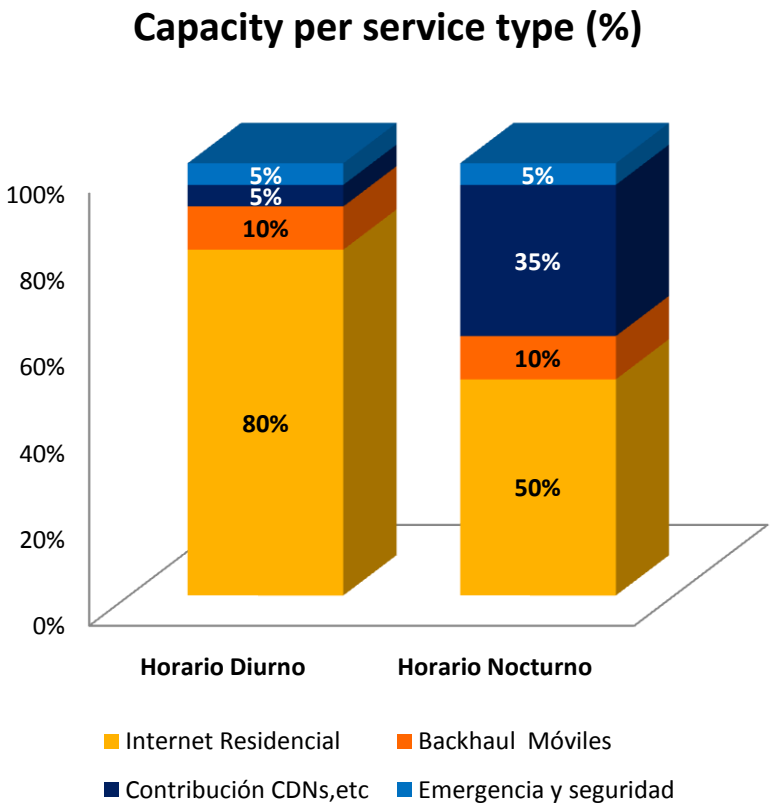
8. Future satellite networks

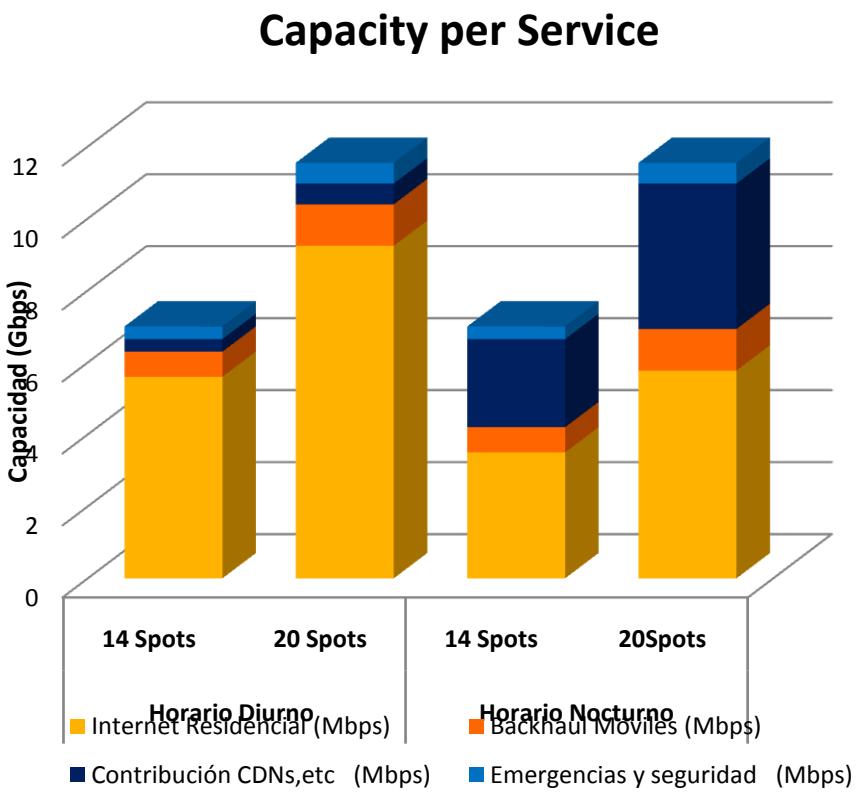
- Ka band represent a good opportunity for satellite operators for increasing the capacity available.
- Taking into account the target market and the technological issues multispot payload are selected in most cases.

Example of ka multispot design with 20 spots over Spain. Capacity of 12 Gps. Reception with antennas of 60cm.



- A multiservice approach could be carrier out for future ka multispots platforms.



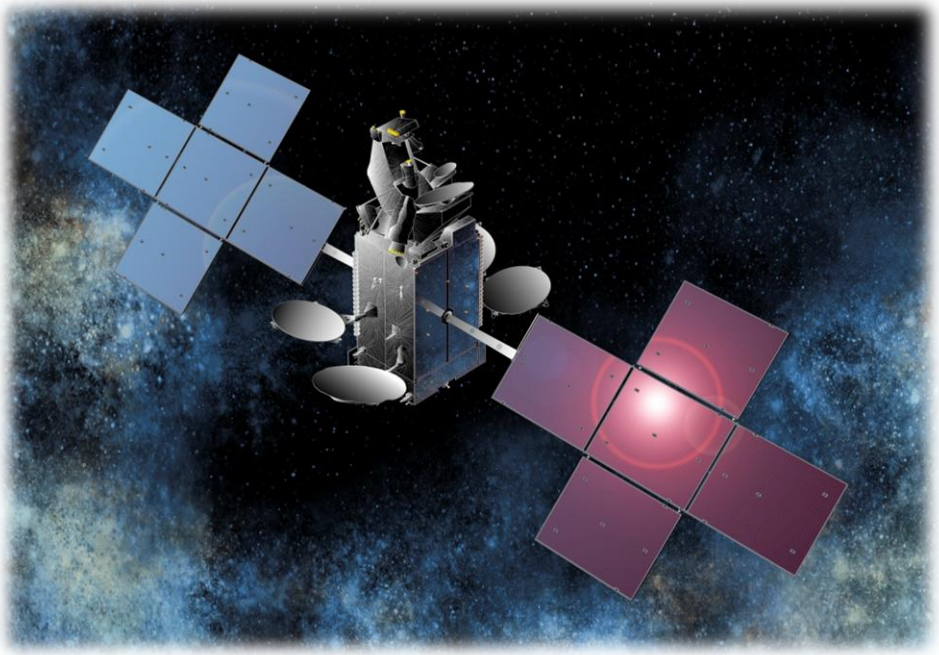


9. CONCLUSIONS

9. Conclusions

- Satcom on the move services has seen an significant growth during the last years.
- New markets arise for FSS operators in the mobile arena: Maritime, railway and aeronautical.
- Aeronautical market is growing quickly and new markets niches also provides new opportunities (e.g. UAVs)
- In the Railway scenario, new services have been deployed recently. Hispasat is pioneer in this market with more than 50 high-speed trains in service.
- Other more traditional applications as emergencies and celluar backhaul are also very profitable.
- Hispasat is involved in different R+D+I initiatives which develop innovative solutions in order to offer the best products and services for its customers in the sat on the move arena.

THANKS!



Our next bird Amazonas 3
(To be launched 2013 Q1)

www.hispasat.com