

Future Satellite Applications

World Space Risk Forum 2010 – Day 3
Dubai, 3 March 2010

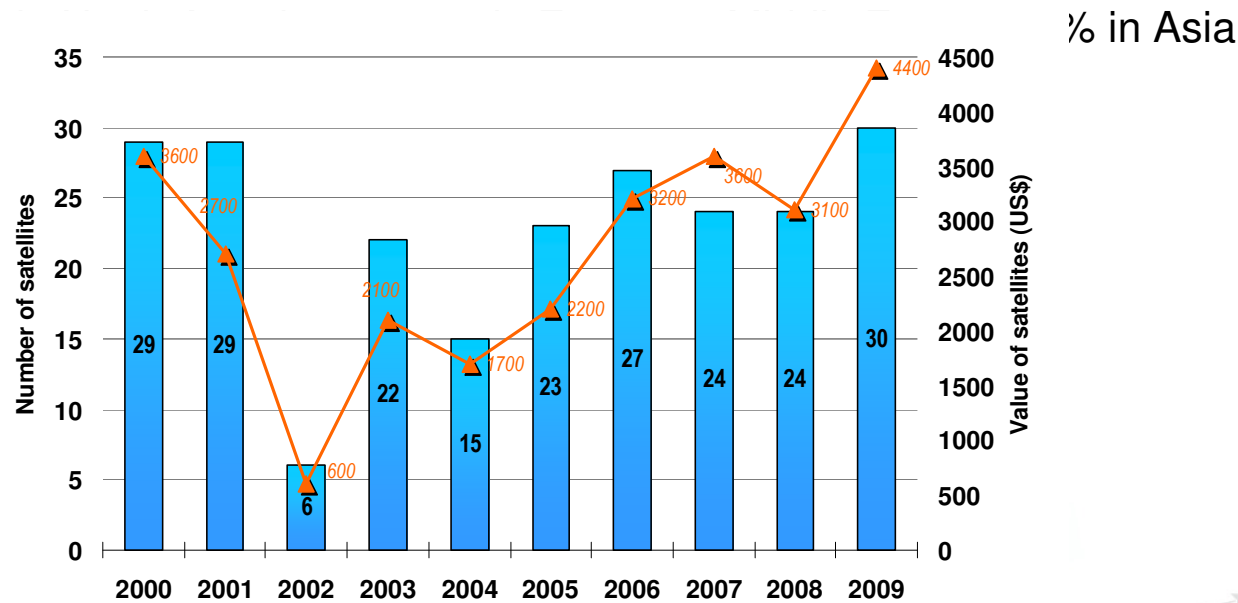
Philippe Pham, Astrium Satellites

All the space you need



GEO Telecom Market Perspective

- Expected solid and stable GEO commercial market
 - An average annual level of 18-22 satellites orders over 5 coming years
 - Replacement market driving some 65% of orders
 - Impact of the economic crisis still uncertain
- Leading operators to concentrate most of the future needs
 - More than 50% of spacecraft orders from top 10 operators
- Demand spread over the 3 main Regions
 - >35%



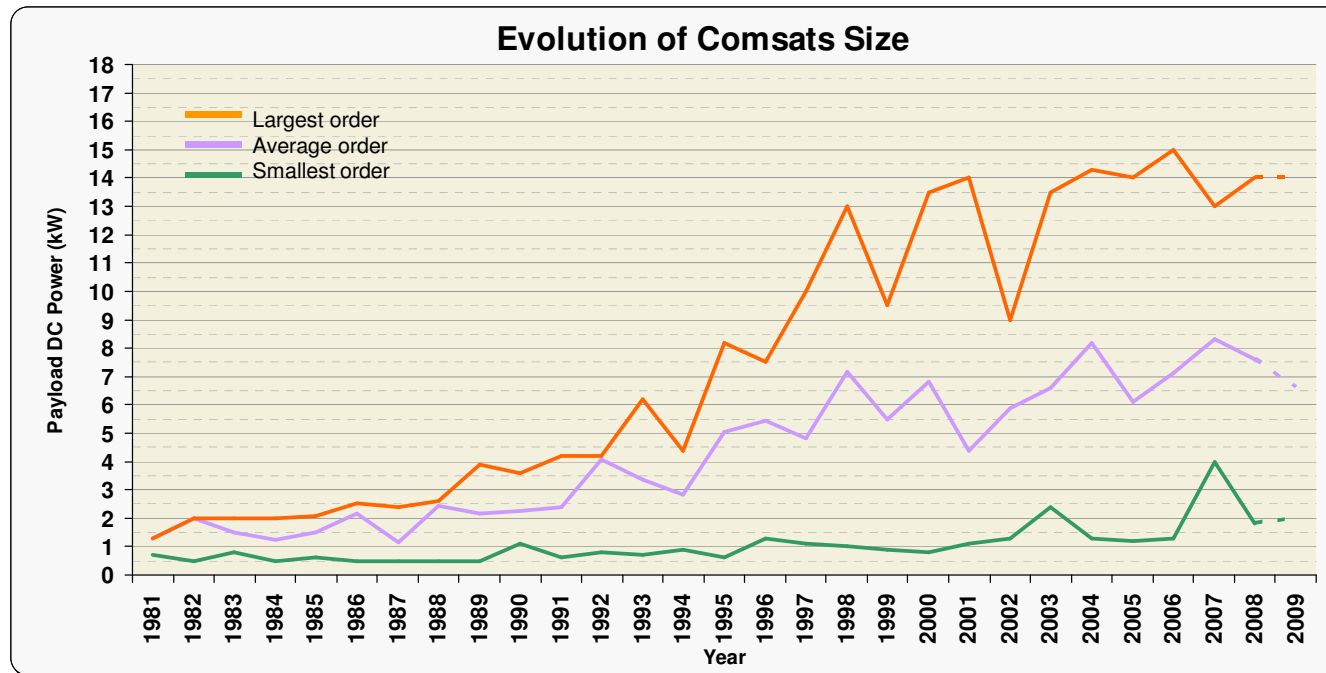
Market demand for satcom capacity

- Dominance and continuous growth of broadcast TV channels and video services
 - Replacement driving more than half of orders
 - Strong expansion perspectives: HDTV, 3DTV, richer content
 - Some uncertainties: IPTV on ADSL, fibre, compression, etc.
 - Increasing demand for broadband access services
 - Broadband market developing rapidly, unmet demand in many regions
 - Satellite part of all broadband plans initiated worldwide
- Dynamic mobile market (bi-way services, radio, TV)
- Continuous need for satellite backhauling / data collection
 - Video contribution, TV & Internet trunking, corporate networks
- Increasing communications needs for institutional users, and new services
 - Capacity for Government / MoD
 - Air Traffic Management, aeronautical in-flight services, public safety, data relay



Demand forecast per size of satellite - 5 coming years

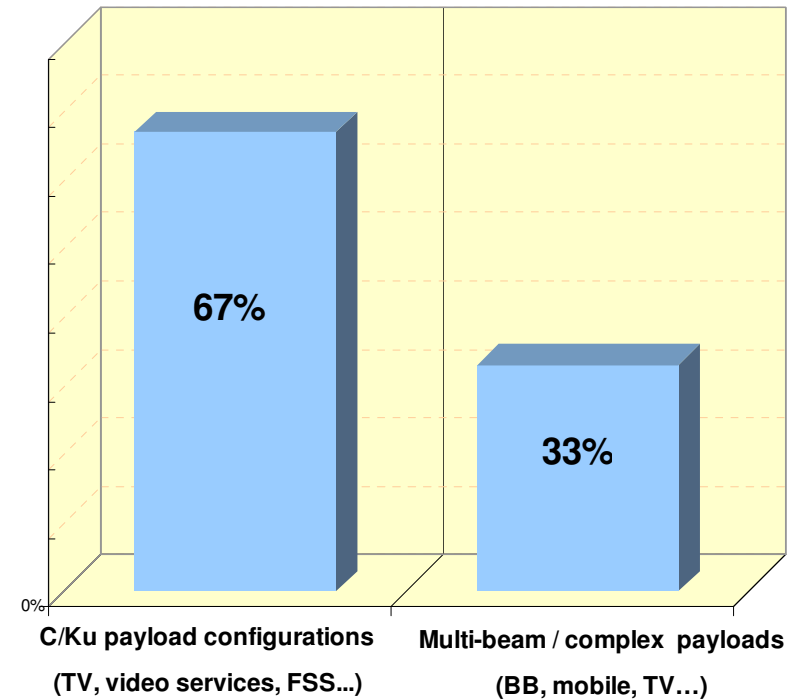
- Commercial demand spread over full S/C range (1 to 20+kW PL range)
- Increasing demand for higher power satellites
 - >55% of accessible market for large S/C > 8 kW DC payload (9 to 12 S/C p.a.)
- Market for medium-size satellites keeping momentum
 - 25-30% of accessible market for S/C in [4-7+ kW] (8 to 10 S/C p.a.)
- Existing demand for small satellites
 - An accessible market of 2 to 4 S/C p.a. below 4kW



Demand forecast per type of mission - 5 coming years

- Most of the demand for C/Ku payload
 - More than 75% of accessible satellites including Ku
- Increasing demand for multi-beam Ka payloads
 - Dedicated and hybrid configurations
- GEO mobile opportunities in L and S-band
 - Large missions and smaller-size payload opportunities
- Governmental, institutional opportunities
 - 1-2 opportunities p.a.
- Growing operator interest for improved fleet management, in-orbit back-up, adaptation to market changes over time
 - Multi-mission satellites, more sophisticated payloads, more complex antenna farms

Payload market split (in value)
[2009-2013] - Accessible market

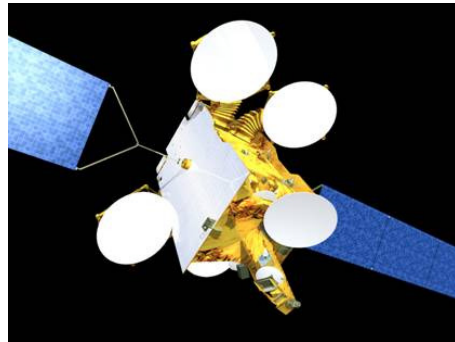


Innovative technologies/products to meet market evolution

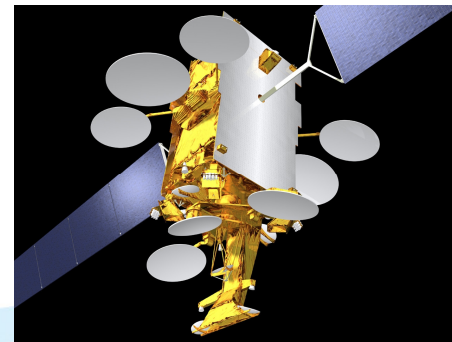
- Platforms -

- Need for platforms capable to
 - Accommodate more and more demanding missions
 - Further improve in-orbit cost per capacity
- Development of Alphas platform for very large satellites
 - Current version up to 18 kW, extended version up to some 25 kW payload power
- Eurostar E3000 innovation and improvement for medium and large spacecraft (up to 14+kW)
 - Astrium was first to successfully introduce Li-Ion batteries, Plasma Propulsion, GaAs Solar Arrays
- Next generation of very innovative platforms
 - Breakthrough in technologies, products, new architecture concepts and industrial approach

Eurostar E3000



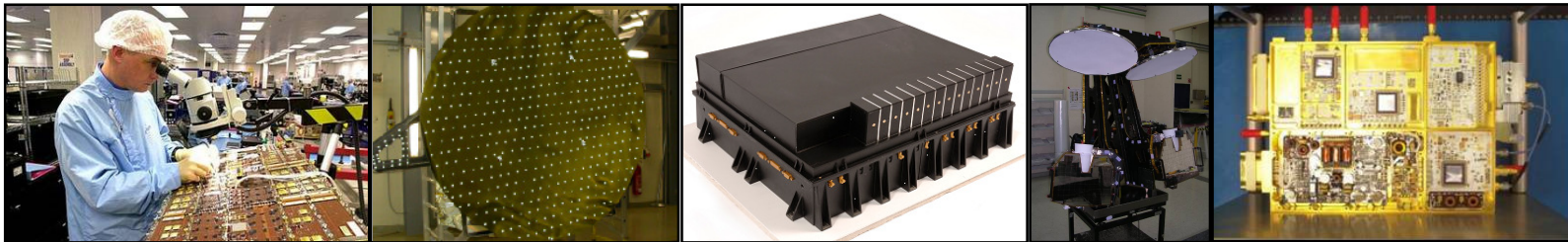
Alphas



Innovative technologies/products to meet market evolution

- Payload and antennas -

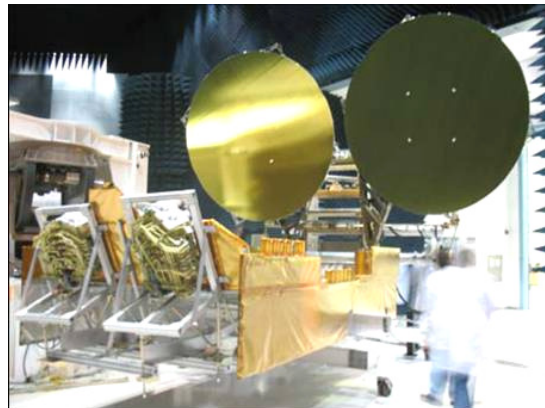
- Need for payloads capable to
 - Adapt to market and service changes, maximize capacity, provide new services...
- Antennas
 - Reconfigurable antennas (active & passive)
 - Single Feed per Beam and Array Fed Reflector solutions for very large number of beams
 - Larger reflectors, very high power feeds
 - Complex top floor antenna farms incl. steerable antennas...
- Repeater
 - On board processing
 - Flexible input and output technologies (INET & ONETs, MPAs...)
 - Laser communication technologies...
- Improved cost, mass and performance of conventional payload solutions



Astrium active to implement these innovations



Service module with Li-ion batteries and plasma propulsion



Multi-beam antennas



3-deck communications module

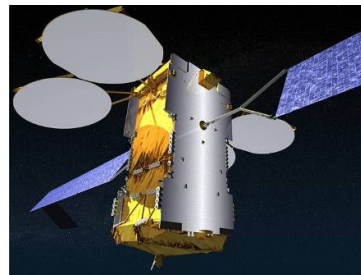
Astrium active to implement these innovations

- And serve customers over the full range of solutions (from 1 to 20+ kW, in all bands)
 - Building on Astrium leading position
 - In high power spacecraft, multiple spot beams, GEO mobile solutions, most advanced technologies, etc.



Astra 3B

Ku/Ka configuration with complex antenna farm



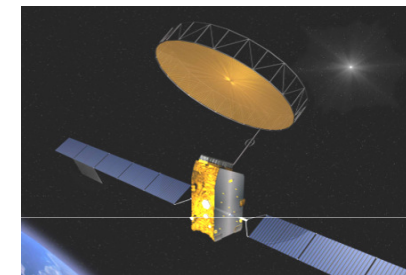
Eutelsat Ka-Sat

First European all-Ka multi-beam satellite



Alphasat I-XL

Most advanced mobile mission, fully processed & flexible



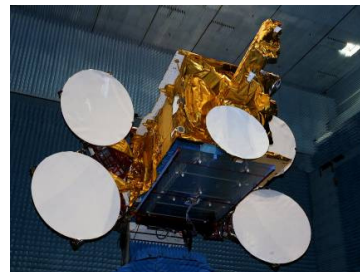
Inmarsat-4

Three satellites in orbit
Global broadband access



Express AM4

Four-band, 14 kW payload



Amazonas 2

High power C/Ku mission



Hylas

Advanced payload technologies

Conclusions – the Astrium way

- Safe approach to introduce new key technologies and products
- Extensive development, qualification and validation of products
- Early involvement and continuous closed loop with our Customers to prepare, accompany and validate step by step product evolutions
- Continuous efforts
 - to implement lessons learnt from development, production and operations back into the products design, qualification and system validation,
 - to improve design and operations robustness and reliability/ availability
- Yearly Eurostar Conference with all our Customers & Operators,
- Yearly Insurers & Brokers Conference
- In-orbit support and services from cradle to graveyard orbit