SATELLITE VALUE CHAIN: SNAPSHOT 2016

KEY TRENDS AND INDICATORS ON SUPPLY & DEMAND
OF THE WORLD COMMERCIAL SATELLITE INDUSTRY – **AN EXTRACT**

A Euroconsult **Executive Report**

WHO WE ARE / WHAT WE DO

We are trusted experts in the satellite industry, advising the world's leading businesses and governments

CONSULTING

RESEARCH

TRAINING

SUMMITS

AT A GLANCE

Over **30** years of experience in space markets

Multi-cultural team of over **30** full-time experts

600 clients in over **50** countries

Completed **500+** consulting missions in over **50** countries

Missions conducted in **all** world regions on a yearly basis

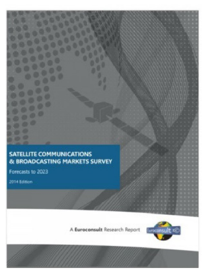
We participate in over **30** international events each year

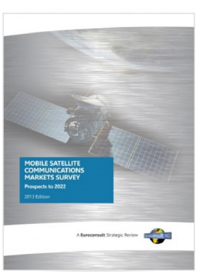
Following the acquisition of a majority stake, Southern Aerospace & Telecom Consulting (SATConsult) has joined the Euroconsult group. Euroconsult & SatConsult will continue to operate as separate companies and will work in concert on a project-by-project basis. Together the two companies boast an international roster of nearly 80 experts from a host of countries that can be called upon for projects across the entire spectrum of the satellite value chain and expertise domains.

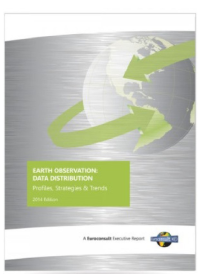
THE BEST OF EUROCONSULT'S 2016 RESEARCH

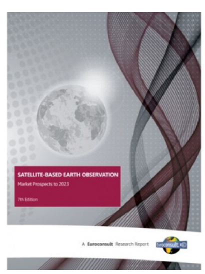
REPORT CONTENT COMES FROM:

- SATELLITES TO BE BUILT & LAUNCHED BY 2025
- SATELLITE COMMUNICATIONS & BROADCASTING MARKETS SURVEY
- SATELLITE-BASED EARTH OBSERVATION: MARKET PROSPECTS TO 2025
- TRENDS & PROSPECTS FOR EMERGING SPACE PROGRAMS
- HIGH THROUGHPUT SATELLITES: VERTICAL MARKET ANALYSIS & FORECASTS
- PROSPECTS FOR IN-FLIGHT ENTERTAINMENT & CONNECTIVITY
- PROSPECTS FOR MARITIME SATELLITE COMMUNICATIONS
- PROSPECTS FOR THE SMALL SATELLITE MARKET









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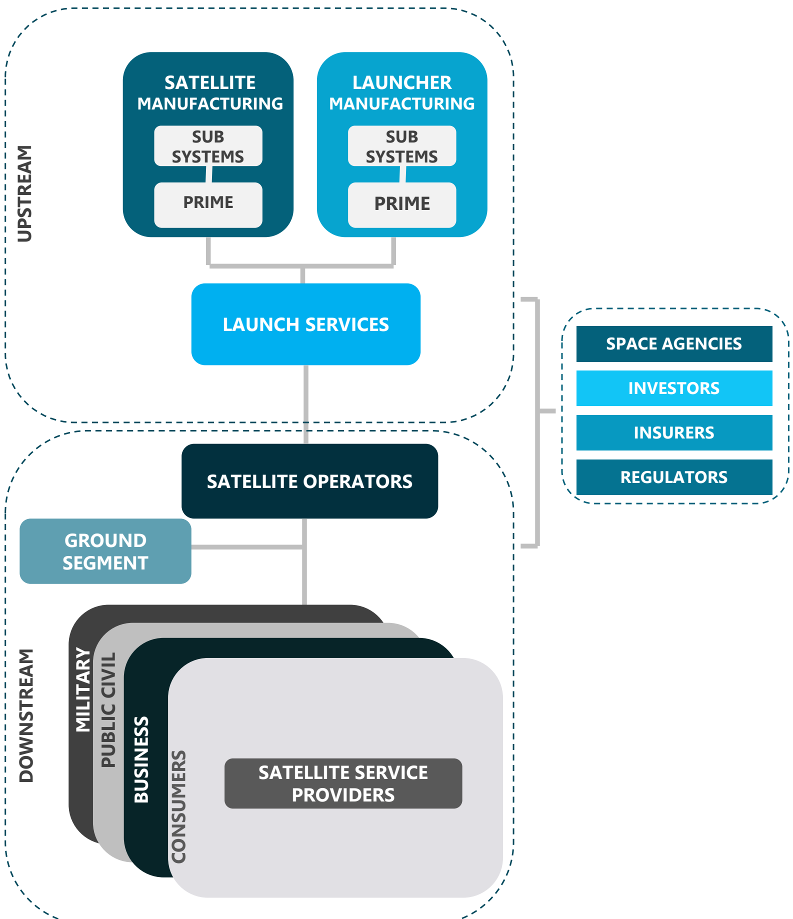


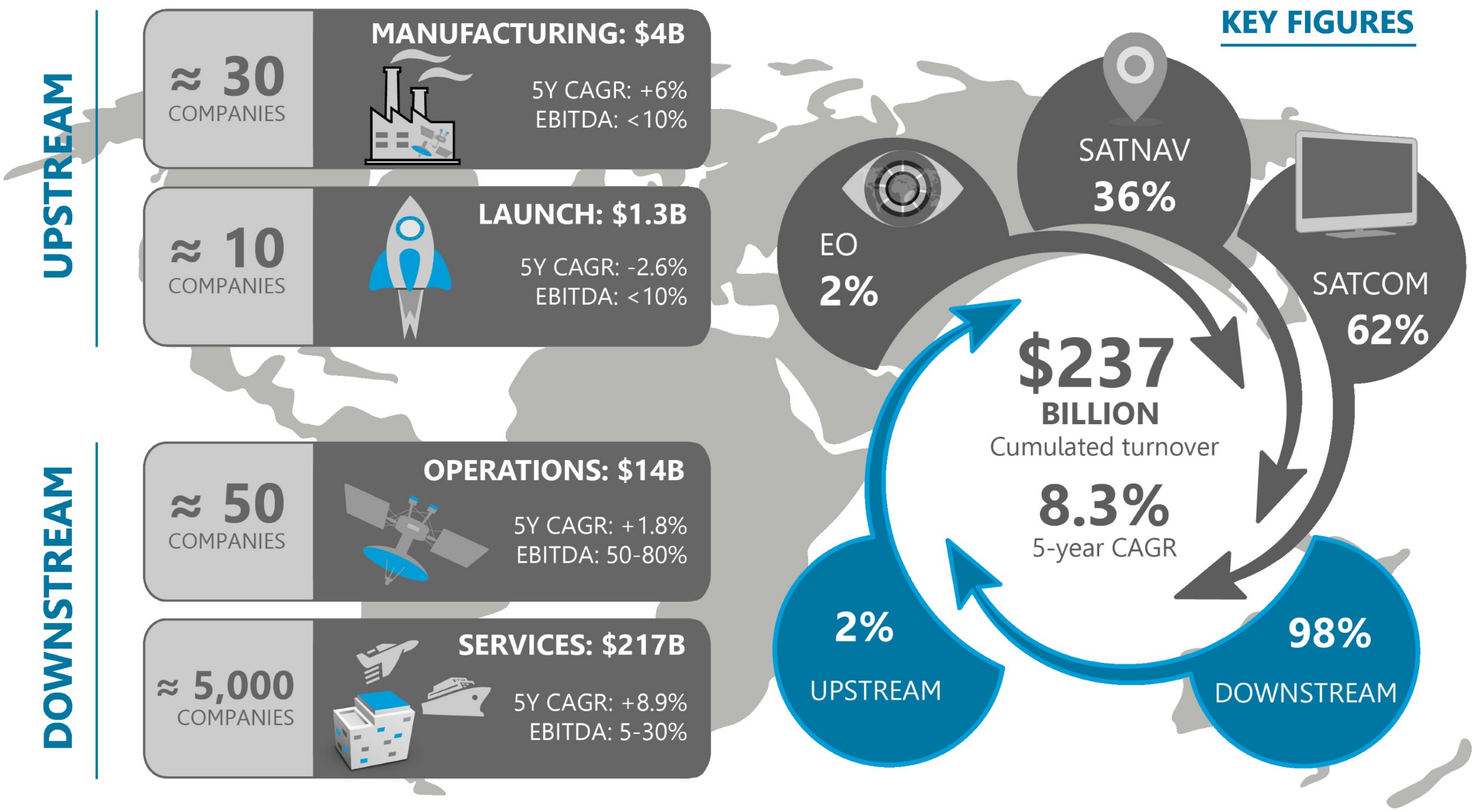
THE SATELLITE VALUE CHAIN

The satellite industry is an infrastructure supplier to government agencies and commercial companies. It operates upstream of a value chain that goes downstream to the ultimate users of satellite capabilities.

The satellite value chain that allows the delivery of space-based services from satellite technology includes a wide diversity of stakeholders acting at five levels of the chain:

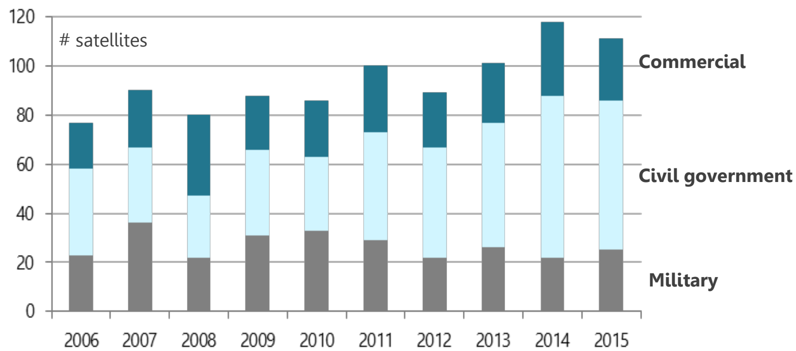
- **Government agencies** who fund space technology R&D for their own uses and for dual-uses: public R&D efforts remain highly concentrated in a limited number of countries
- **The space industry** (upstream) that includes a limited number of players who design and manufacture space systems and their launch vehicles
- **The satellite operators** who own the satellite systems and market their capacities to the service providers (downstream) who deliver communications, navigation and geographic information services to the final users by integrating the satellite signal into packaged solutions
- **Ground segment and terminal suppliers**, who design and deliver a large variety of software and equipment for both the management of satellite infrastructure, and for the access to services by the users. Customers stand along the value chain.
- **The final users**, whether governmental (civil/military) or commercial (business or customer), do not ask for the satellite technology per se but for solutions tailored to their needs, whether for better communications, navigation or geographic information services

INTRODUCTION // OVERVIEW OF THE SATELLITE VALUE CHAIN

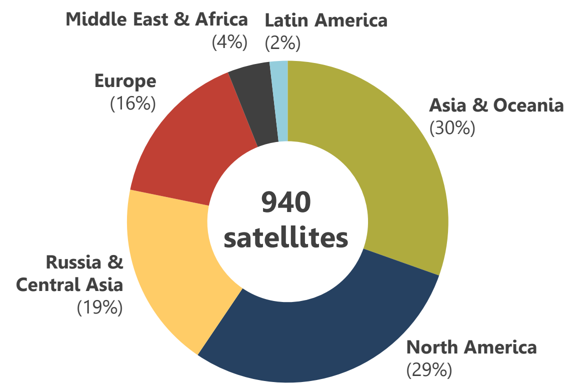


SATELLITE MANUFACTURING & LAUNCH SERVICES // SATELLITES LAUNCHED OVER THE DECADE

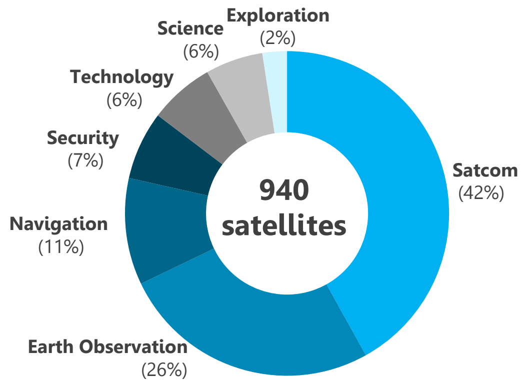
SATELLITES LAUNCHED BY CLIENT (2006-2015)



SATELLITES LAUNCHED BY REGION OF OPERATORS (2006-2015)



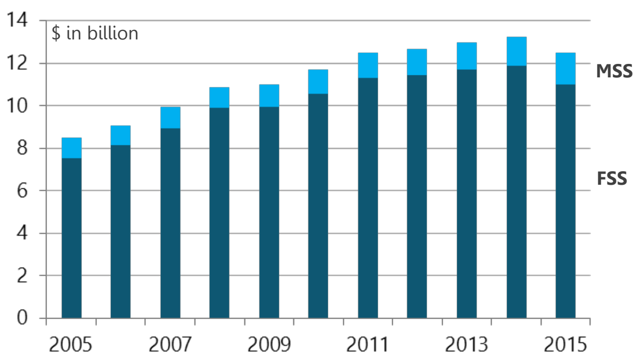
SATELLITES LAUNCHED BY APPLICATION (2006-2015)



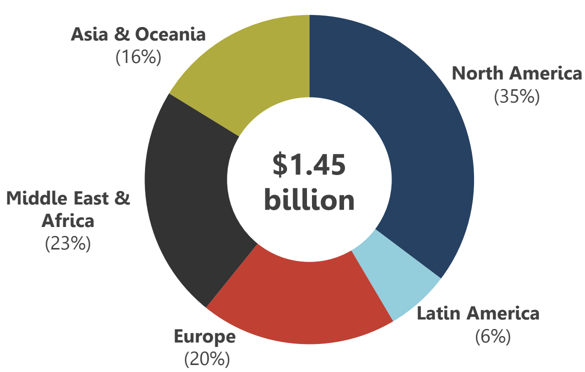
- A total of 940 satellites have been launched worldwide over the decade by government agencies and commercial clients, i.e. an average of 94 units/year.
- Governments remains the first client of the space industry, with three-quarters of all satellites launched during the decade (i.e., 692 units). The dominance of government satellites achieved a record in 2015: 692 civil and military satellites launched versus 248 for commercial operators).
- Telecommunication is by far the largest application with 394 satellites while EO comes second with 244 satellites. Together these two applications account for 68% of the total. The remaining five applications gather 302 satellites.
- North America and Asia launched together nearly 560 satellites. This dominance reflects the large government and commercial demand in these two regions.

SATELLITE COMMUNICATIONS // SATELLITE OPERATORS

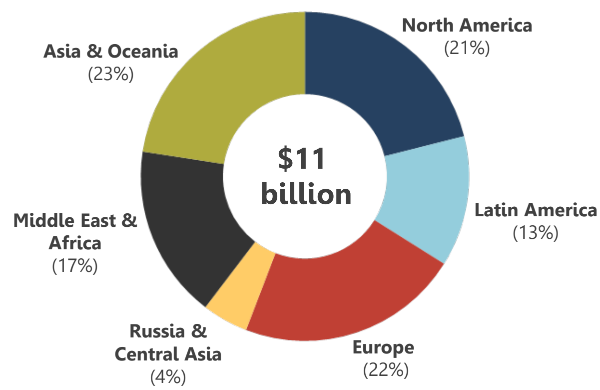
SATELLITE OPERATORS WHOLESALE REVENUE (2005-2015)



MSS WHOLESALE REVENUE BY REGION (2015)



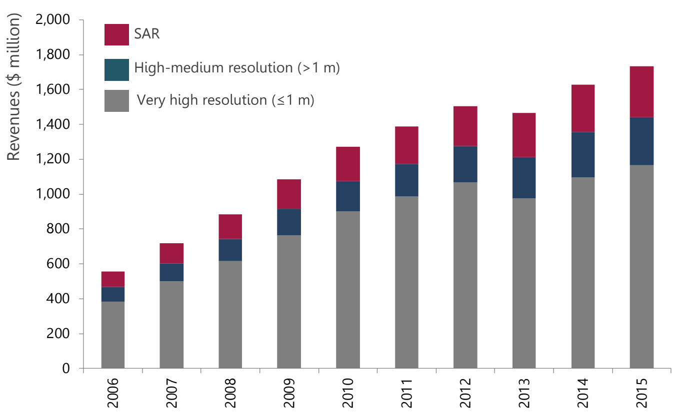
FSS WHOLESALE REVENUE BY REGION (2015)



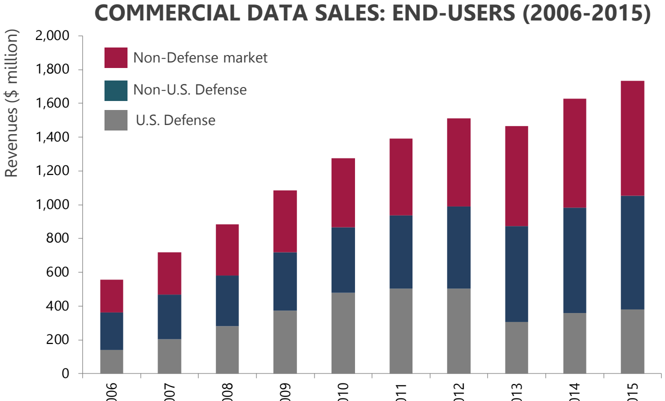
- The wholesale of satellite capacity is the primary revenue source for both FSS and MSS operators. Total wholesale revenues from satellite operators in 2015 decreased by 5.8% compared to last year, and reached $12.4 billion. This was entirely due to a decline in FSS operators revenue, which nevertheless accounted for ~88% of total wholesale revenues.
- Following a period of limited growth for the FSS industry in recent years, revenues declined by 7% in 2015 to $11 billion. Part of the decrease was explained by the strengthening of the U.S. dollar against local currencies (e.g. Russia, Brazil). However, other challenges such as adverse macroeconomic conditions, increasing competition from new entrants (national systems and HTS players), and more price competition contributed to that downward trend.
- Total MSS wholesale revenue reached $1.45 billion in 2015, with a 7.9% growth y-o-y. In the MSS market, both mature and emerging regions equally contribute about 50% to total MSS wholesale revenues, growing at similar rate.

EARTH OBSERVATION // COMMERCIAL DATA MARKET

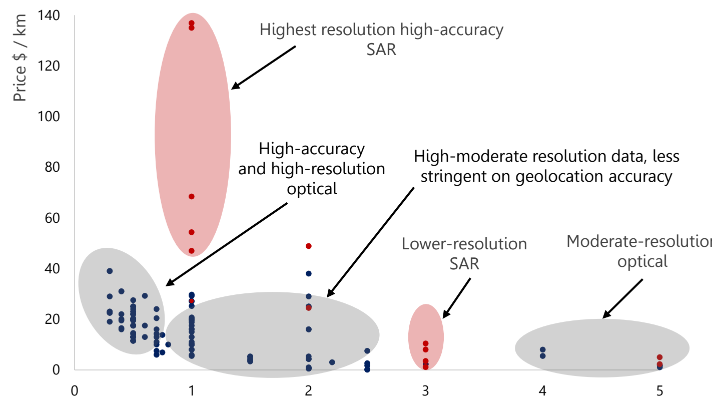
COMMERCIAL DATA SALES: OPTICAL & RADAR (2006-2015)



COMMERCIAL DATA SALES: END-USERS (2006-2015)



COMMERCIAL DATA PRICES*

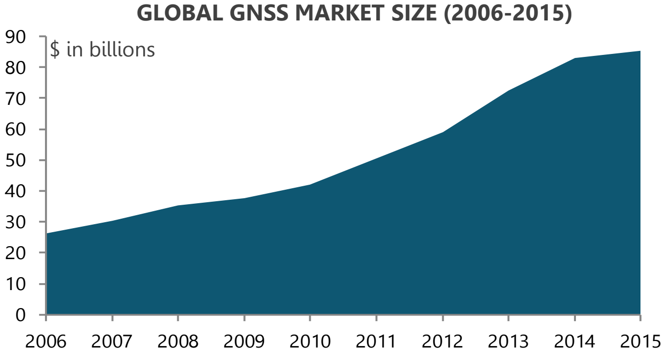


**Newly acquired Level 1 data, data prices from the last 12 months*

- Commercial data market totaled $1.7 billion in 2015; this represents a 5% growth over 2014 and a five-year CAGR of 8%.
- Defense markets dominate, topping $1 billion in 2015. Non-U.S. defense spending continues to grow strongly reaching $651 million in 2015 for a five-year CAGR of 11%.
- VHR optical data market is valued at $1.1 billion, primarily defense driven. The optical data of both very high-resolution and high to moderate resolution represented 83%.
- The remaining 17% corresponded to SAR data. SAR has not experienced the same ramp-up in sales as optical data, however, in specific applications areas, such as maritime domain awareness, it is gaining more traction. Higher SAR data costs also remain an issue.
- Data pricing is driven by ground resolution and geolocation accuracy: higher resolution and accuracy = more complex and costly systems.

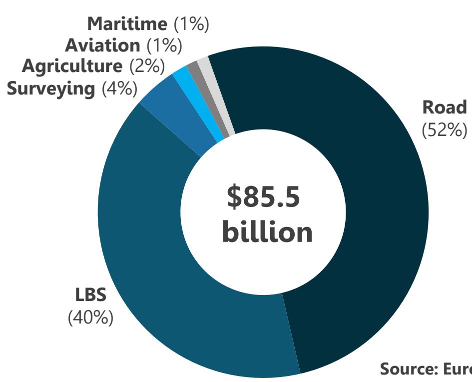
SATELLITE NAVIGATION // GNSS SERVICE MARKET

GLOBAL GNSS MARKET SIZE (2006-2015)



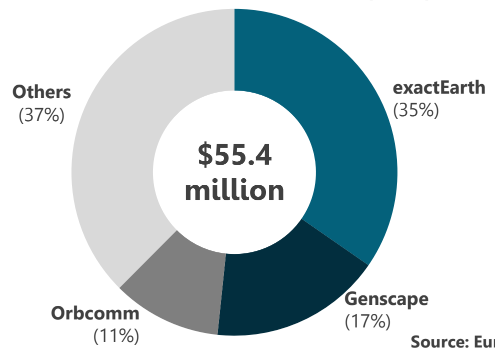
Source: Euroconsult & GSA

GNSS REVENUE BY APPLICATION (2015)



Source: Euroconsult & GSA

AIS PROVIDER MARKET SHARE (2015)



Source: Euroconsult

- The GNSS market includes sales of GNSS terminals (receivers and devices) and revenues generated by GNSS services.
- The GNSS market has been multiplied by four over the past ten years, driven by the LBS and road segments.
- Though LBS account for 96% of the GNSS shipments in 2015, road is the largest segment in revenues (52 % of GNSS market), mainly driven by in-vehicle systems (IVS), accounting for 40% of the total road revenues. IVS represent strong commercial opportunities especially for navigation and connected cars, meaning that automotive manufacturers such as Toyota, Volkswagen, General Motors, Ford and Nissan are becoming the largest integrators of GNSS solutions.
- The AIS service relies on the positioning information provided by GNSS systems. Satellite AIS service is mainly used by government authorities for maritime traffic monitoring and security.
- Satellite AIS has big potential for business applications: Commodity price speculation, insurance, and logistics, etc.
- In 2015, the AIS provider market is estimated at $55.4 million. ExactEarth is the leading AIS provider with market share of 35%.

ABOUT EUROCONSULT // CONSULTING & RESEARCH REPORTS

CONSULTING

BUSINESS STRATEGY

Market analysis & forecasts • Competitive analysis & benchmarking • Customer surveys • SWOT assessment

DUE DILIGENCE

Independent business case assessments • Pricing valuations • Revenue forecasts & DCF modeling • Feasibility study

GOVERNMENT POLICY

Policy & program evaluation • Impact assessments • Socio-economic & cost benefit analysis • International benchmarking and best practices

PROGRAM MANAGEMENT

Program specifications & procurement • Management and process optimization • Marketing and sales strategy

2016 RESEARCH REPORTS

- ✓ Prospects for In-Flight Entertainment & Connectivity
- ✓ High Throughput Satellites: Vertical Market Analysis & Forecasts
- ✓ Earth Observation: Defense & Security
- ✓ Prospects for Remotely Piloted Aircraft Systems
- ✓ Prospects for the Small Satellite Market
- ✓ Top NewSpace Startups to Watch
- ✓ Trends & Prospects for Emerging Space Programs
- ✓ Satellite Communications & Broadcasting Markets Survey
- ✓ Satellites to be Built & Launched by 2025
- ✓ Satellite-Based Earth Observation
- ✓ FSS Operators: Benchmarks & Performance Review
- ✓ Prospects for Maritime Satellite Communications
- ✓ Satellite Value Chain: Snapshot 2016

ABOUT EUROCONSULT // EXECUTIVE SUMMITS & EVENTS

Summit for Satellite Financing

SEPTEMBER, PARIS, FRANCE

The must-attend senior executive event for the satellite communication industry

> 550+ executive participants
> 80+ senior executive speakers
> 45+ countries

SmartPlane

SEPTEMBER, PARIS, FRANCE

The premier annual executive meeting place for the IFEC community

> 100+ executive participants
> 20 senior executive speakers

Summit on Earth Observation Business

SEPTEMBER , PARIS, FRANCE

The unique international event dedicated to commercial satellite imagery

> 250+ executives and senior government officials
> 40+ senior executive speakers
> 45+ countries

LATSAT

MAY, MEXICO CITY, MEXICO

The unique executive meeting place for the Latin American telecommunications sector

> 250+ executive participants
> 40+ senior executive speakers
> 25 countries

Perspectives Spatiales

JANUARY, PARIS, FRANCE

The unrivaled annual event for the French and European space sectors

> 200+ executives and senior government officials
> 40+ executive speakers

BRINGING TOGETHER EXECUTIVES OF THE GLOBAL SATELLITE COMMUNICATIONS AND INFORMATION BUSINESS

ABOUT EUROCONSULT // TRAINING PROGRAMS

- Interdisciplinary training on all aspects of the space industry – markets, financial, policy, technical, program management, etc.
- Build your own program or benefit from packaged programs based on your needs
- Benchmarking, profiling, best practices and lessons learned from key players
- Flexibility in choosing a training location, ranging from on-site training at your office, at our offices or in prestigious third-party locations
- Exposure to training in a variety of mediums and formats, from videoconferences to seminars and hands-on exercises, over a few hours, days or week-long sessions

We organize tours of government/private industry facilities and meetings with high-level international executive & officials:

TRAINING SESSIONS
Visits of public and private organizations in one or several countries to

Connect with executives and facilitate cooperation

Identify best practices for operations and innovation

- Groups of 10-20 executives
- Duration up to 5-10 days to facilitate cooperation
- We can organize sessions in most world regions

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