SATELLITE VALUE CHAIN: THE SNAPSHOT

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

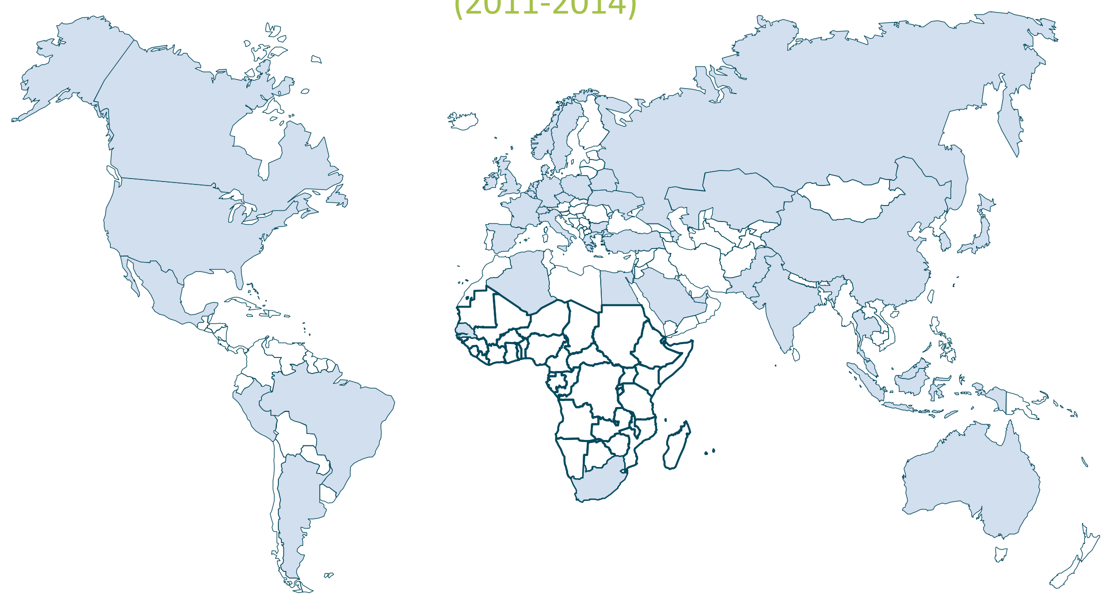
A Euroconsult **Executive Report**

WHO WE ARE / WHAT WE DO

Euroconsult is the leading global consulting firm specializing in space markets. As a privately-owned, fully independent firm, we provide first-class strategic consulting, develop comprehensive research and organize executive-level annual summits and training for the satellite industry.

- 600 customers in over 50 countries
- We participate in over 30 international events each year
- Missions conducted in all world regions on a yearly basis

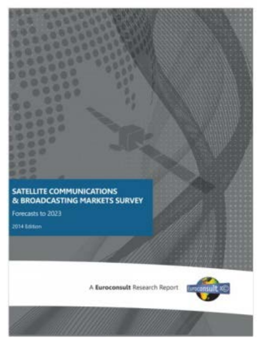
COUNTRIES WITH CUSTOMERS FOR EUROCONSULT SERVICES (2011-2014)

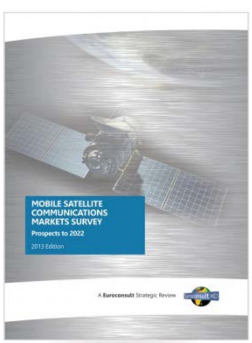


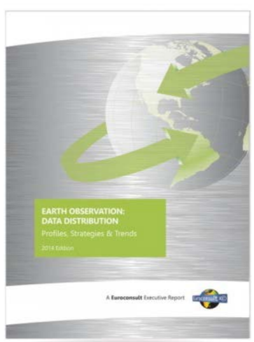
THE BEST OF EUROCONSULT'S 2014 RESEARCH

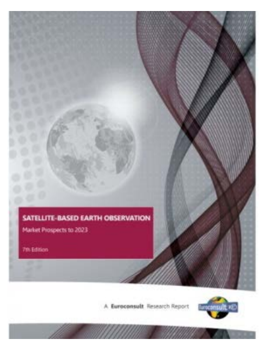
REPORT CONTENT COMES FROM:

- GOVERNMENT SPACE PROGRAMS: STRATEGIC OUTLOOK, BENCHMARKS & FORECASTS
- SATELLITES TO BE BUILT & LAUNCHED BY 2023
- SATELLITE COMMUNICATIONS & BROADCASTING MARKETS SURVEY: FORECASTS TO 2023
- MOBILE SATELLITE COMMUNICATIONS MARKETS SURVEY
- EARTH OBSERVATION: DATA DISTRIBUTION
- SATELLITE-BASED EARTH OBSERVATION: MARKET PROSPECTS TO 2023









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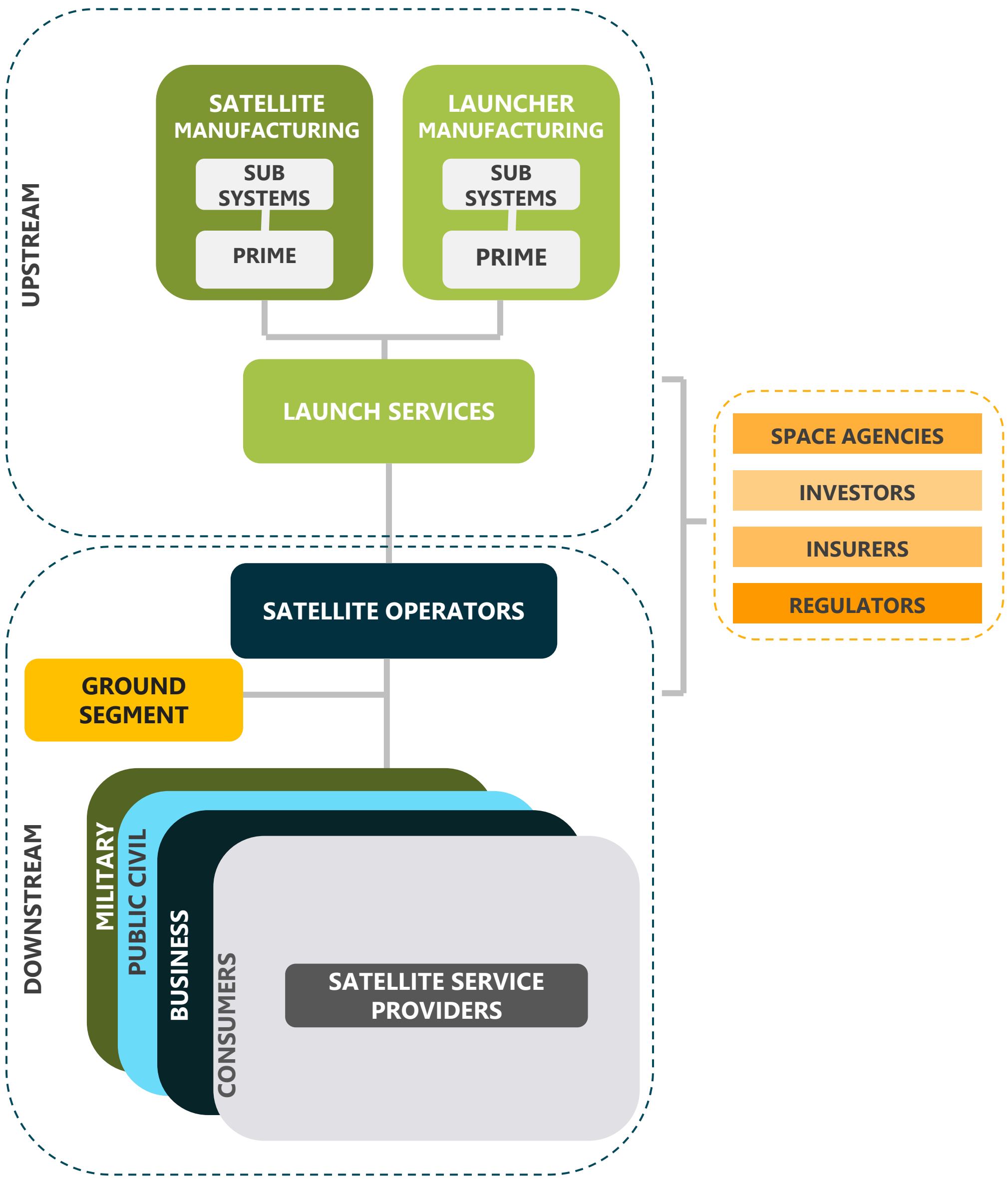


THE SATELLITE VALUE CHAIN

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

IN SPACE

≈ 30 COMPANIES
$2.8B
5Y CAGR: -7%
EBITDA: <10%

≈ 10 COMPANIES
$1.7B
5Y CAGR: -3%
EBITDA: <10%

≈ 50 COMPANIES
$14.5B
5Y CAGR: 5.5%
EBITDA: 50-80%

ON EARTH

≈ 5,000 COMPANIES

$185B
5Y CAGR: 13%
EBITDA 5-30%

KEY FIGURES

SATNAV 32%
EO 2%
SATCOM 66%

$204 BILLION
Cumulated turnover*

12%
Last 5 year CAGR

9% IN SPACE
91% ON EARTH

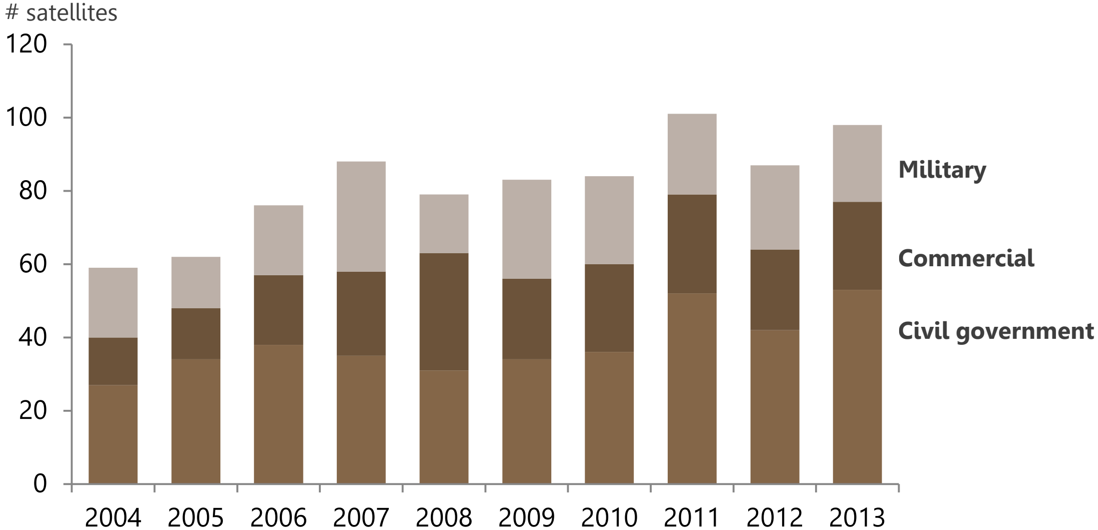
KEY TRENDS

CONSOLIDATION	NEW PLAYERS
CONVERGENCE	INTEGRATION
INNOVATIONS	PRICE PRESSURE
PARTNERSHIPS	COMPETITION
NEW MARKETS	MATURITY

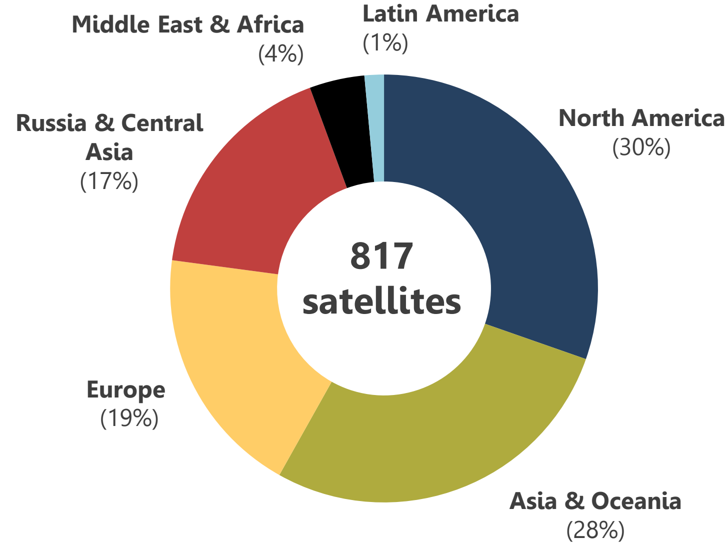
* Not eliminating double-counting of revenues within the industry's supply chain.

SATELLITE MANUFACTURING & LAUNCH SERVICES // SATELLITES PER YEAR OVER THE DECADE

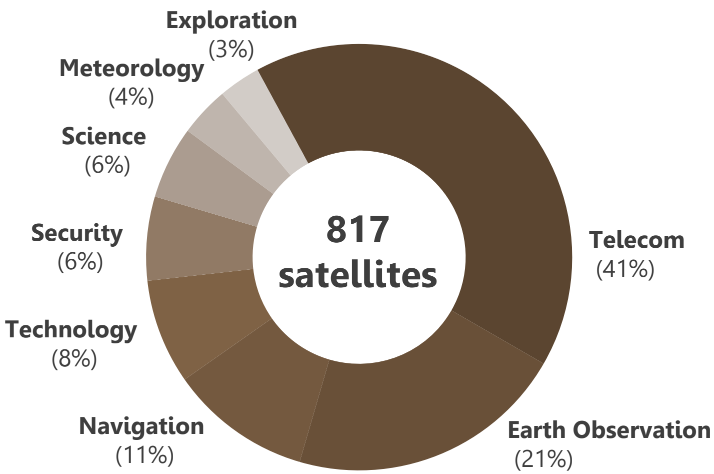
SATELLITES LAUNCHED WORLDWIDE OVER THE DECADE



BREAKDOWN BY REGION OF OPERATORS

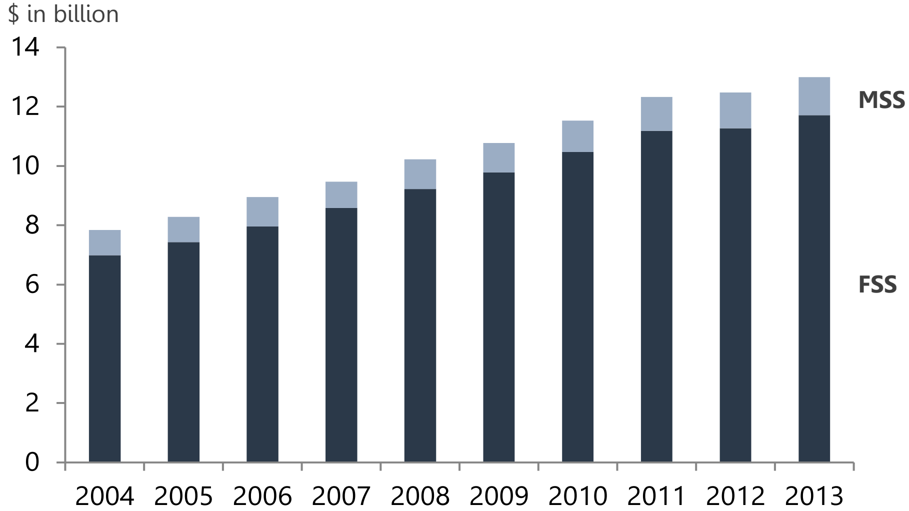


BREAKDOWN BY APPLICATION

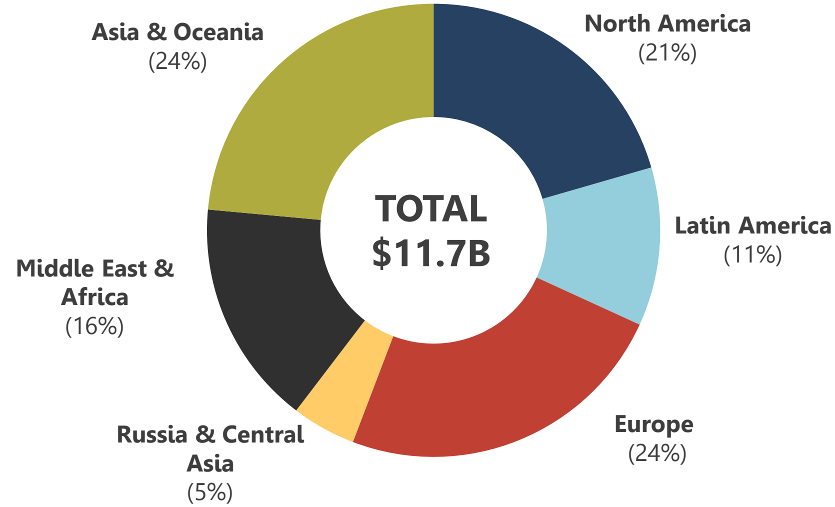


- A total of 817 satellites (>50kg of launch mass) have been launched worldwide over the decade by 3 types of clients, i.e. an average of 82 units/year.
- Governments represent almost three quarters of the total with 382 satellites for civilian agencies (47%) and 215 for military agencies (26%). The 212 commercial satellites account for less than one third of demand (26%), principally for telecommunications services.
- Telecommunication is by far the largest application with 335 satellites while Earth observation is second with 175 satellites. Together the two applications account for two thirds of the total. The rest of 307 satellites distributes over 6 applications.
- Two regions dominate in satellite demand (North America & Asia) that together launched almost 500 satellites. This dominance reflects the large government and commercial demand in these two regions.

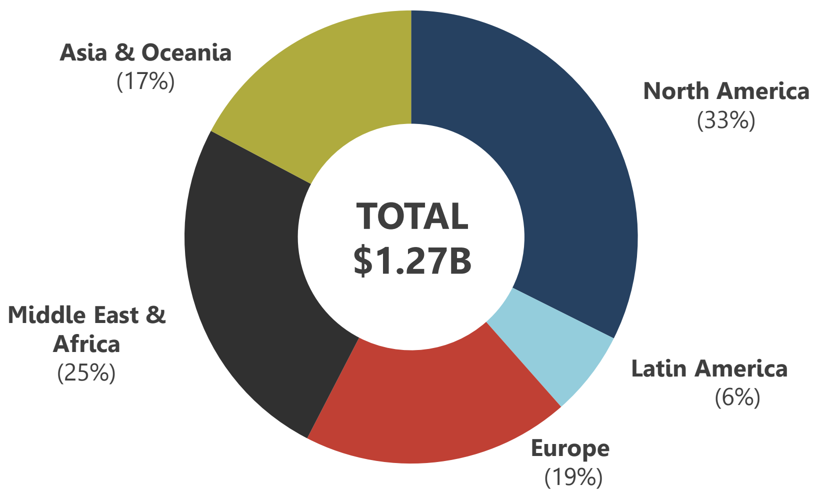
SATELLITE OPERATORS WHOLESALE REVENUE



FSS WHOLESALE REVENUE BY REGION (2013)



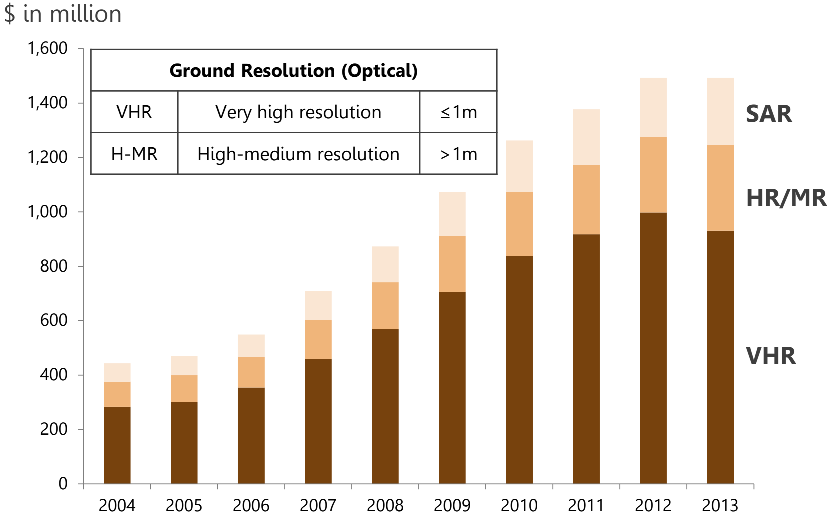
MSS WHOLESALE REVENUE BY REGION (2013)



- Total satellite operators' revenues derived from wholesale operations stood at $13b in 2013, with the vast majority (~90%) generated by FSS operators.
- The wholesale of satellite capacity is the primary revenue source for FSS operators. Although mature regions (North America and Europe) still represent 45% of total FSS wholesale revenues, overall revenue growth in recent years has been largely driven by emerging regions (2008-2013 CAGR: 8%)
- Total MSS wholesale revenue reached $1.27B in 2013. Emerging and mature regions have been growing at a similar pace and equally contribute about 50% to total MSS wholesale revenues.

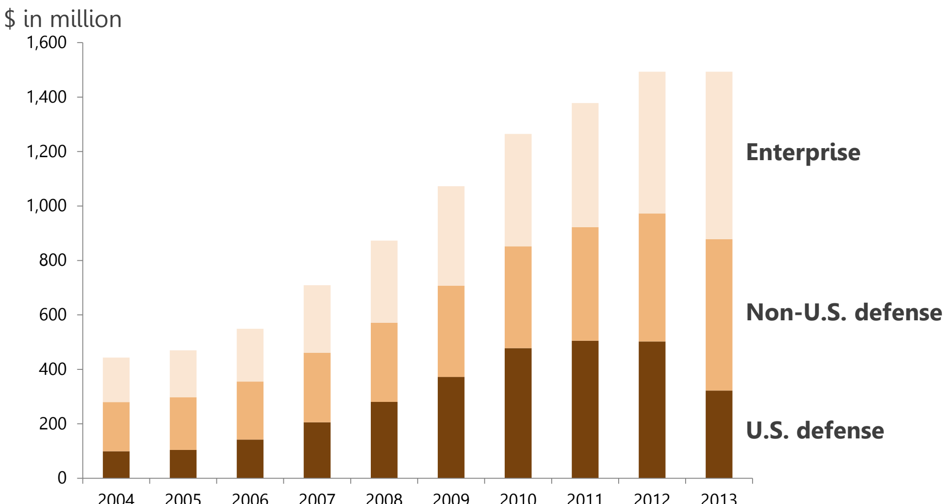
EARTH OBSERVATION // SATELLITE OPERATORS

COMMERCIAL DATA SALES: OPTICAL & RADAR

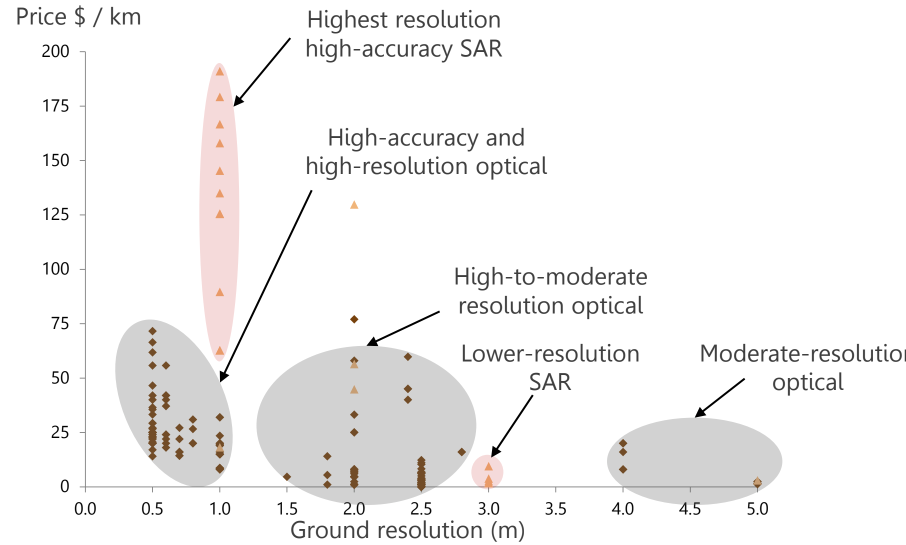


Ground Resolution (Optical)		
VHR	Very high resolution	≤1m
H-MR	High-medium resolution	>1m

COMMERCIAL DATA SALES: END USER



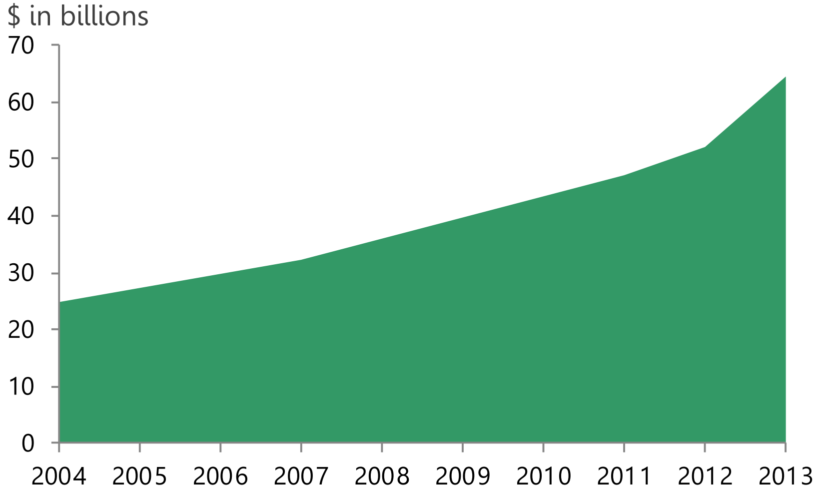
COMMERCIAL DATA PRICES



- Market driven by defense requirements for VHR datasets. VHR optical totals 62% of all data sales ($930 million).
- U.S. defense spending dropped 36% between 2012 and 2013 overall negatively impacting VHR sales (-7% over 2012)
- Defense sales outside of the US remain strong reaching $560 million (14% 5-year CAGR). Limited number of countries globally operate high resolution systems to support Image Intelligence (IMINT) applications.
- Pricing driven by ground resolution and geolocation accuracy: higher resolutions and accuracy = more complex and costly systems, leading to higher data prices

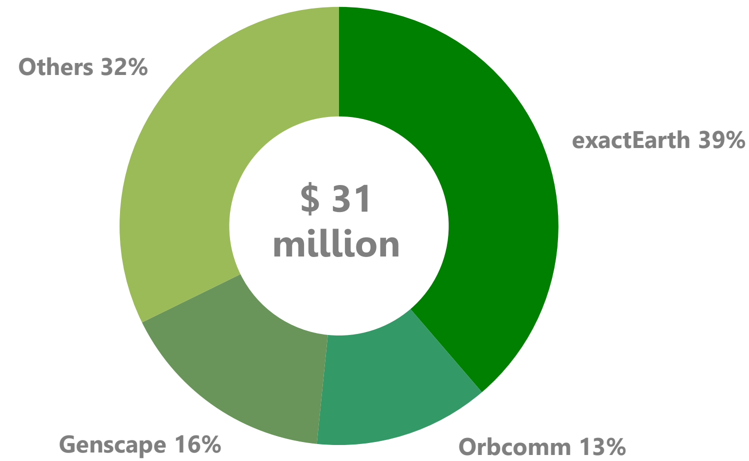
SATELLITE NAVIGATION // GNSS SERVICE MARKET

GLOBAL GNSS MARKET SIZE

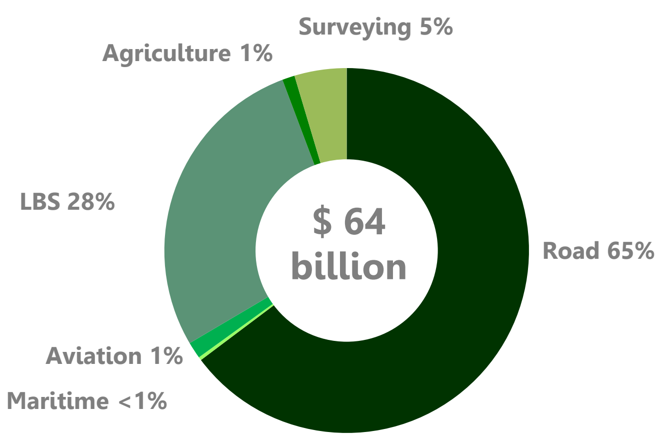


Source: Euroconsult & GSA

AIS PROVIDER MARKET SHARE 2013



GNSS REVENUE BY APPLICATION 2013



Source: GSA

- The GNSS market value includes value directly derives from the GNSS terminals and services.
- The GNSS market has been growing at 10% CAGR in the last 10 years.
- The Location based service (LBS) is the largest segment.
- Road is the second largest segment in revenue. Regulations, insurance and driver assistance systems are the main drivers for the market.
- The AIS service relies on the positioning information provided by GNSS systems.
- Satellite AIS is an emerging and fast growing market. Satellite AIS service is mainly used by government authorities for maritime traffic monitoring and security reasons.
- Satellite AIS has also big potentials in business applications: commodity price speculation, insurance, and logistics, etc.

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

2015 RESEARCH REPORTS

- ✓ Mobile Satellite Communications Markets Survey
- ✓ Profiles of Government Space Programs
- ✓ GEO Comsat Payloads
- ✓ Africa Satcom Market
- ✓ Latin America Satcom Market
- ✓ Latin America Earth Observation Market
- ✓ Prospects for Small Satellites Market
- ✓ Satellites to be Built & Launched
- ✓ Maritime Telecom Solutions by Satellite
- ✓ Prospects for Cellular Backhaul
- ✓ Trends & Prospects for Emerging Space Programs
- ✓ Satellite Communications & Broadcasting Markets Survey
- ✓ Satellite-Based Earth Observation Markets Survey
- ✓ Company Profiles: Analysis of FSS Operators
- ✓ Government Space Programs: Benchmark & Forecasts
- ✓ Prospects for In-Flight Entertainment & Connectivity
- ✓ High Throughput Satellites
- ✓ The Satellite Value Chain

ABOUT EUROCONSULT // EXECUTIVE SUMMITS AND EVENTS

Summit for
Satellite Financing

Latin American Satellite
Communication & Broadcasting
Summit (LATSAT)

Symposium
on Market Forecasts

Summit on
Earth Observation Business

Customized brainstorming workshops

**PROMOTING FORWARD THINKING AND FACILITATING PROJECTS AND DEALS
FOR OVER 1,000 EXECUTIVES FROM 50 COUNTRIES**

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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