HIGH THROUGHPUT SATELLITES: ON COURSE FOR NEW HORIZONS


A vertical market analysis of major drivers, strategic issues and demand take-up for HTS

- Over 60 pages
- Over 90 graphs & tables
- Comprehensive digital files
  - Including all forecasts in Excel files
- Over 1,500 data points
- Price starting at € 3,000

High Throughput Satellites (HTS) continue to proliferate in 2014 in terms of supply additions (+109 Gbps), system investments (nine new orders) and demand take-up (+40 Gbps). This trend should accelerate considering the 100+ projected new HTS system (payload and satellite) launches over the next decade.

As a result of the extensive investments made by satellite operators, total HTS capacity supply is projected to nearly triple over the next three years from 600 Gbps in 2014 to 1,720 Gbps in 2017. The vast majority of today’s available HTS capacity supply is in Ka-band, although Ku-band has recently seen increased adoption from operators such as Telesat, SES and Eutelsat, while Intelsat plans to include C-band spot beams on IS-33e and IS-35e. Ka-band HTS should remain the dominant frequency band in all vertical markets in terms of capacity usage; nonetheless, Ku-band HTS capacity usage is projected to accelerate from 2017 to reach around 150 Gbps by 2023, largely driven by professional user markets which often have high reliability and availability requirements.

The influx of HTS capacity and global expansion of coverage footprints should unlock growth opportunities in all major market verticals and geographic regions. Consequently, global capacity usage on HTS systems is expected to grow from 107 Gbps in 2014 to reach just over 1,300 Gbps in 2023, a CAGR of more than 30% over the period.
ABOUT HIGH THROUGHPUT SATELLITES

HIGHLIGHTS OF THE EXECUTIVE REPORT:

✓ NEW IN THIS EDITION! Regional market forecasts as well as forecasts by frequency band (Ku vs. Ka)
✓ Highlights the evolution of HTS systems & architectures over the last decade
✓ NEW IN THIS EDITION! HTS system launch and order forecasts – market share by satellite manufacturer
✓ Identifies & assesses the HTS investment plans of all satellite operators
✓ Bottom-up vertical market forecasts until 2023, vertical markets include:

- Consumer Broadband
- Civil Government & Enterprise Networks
- Cellular Backhaul & Trunking
- Commercial Maritime
- Commercial Aviation
- Military Satellite Communications
- Video Services

METHODOLOGY:

Analysis, data and estimates found in the report rely on two complementary approaches:

- In-depth analysis containing interviews with more than 20 stakeholders across the full value chain from around the globe. Interviewed executives represent a mix of satellite operators, service providers, ground equipment suppliers, satellite manufacturers and telecom operators.
- Secondary research includes a review of hard-to-obtain public information, including financial reports, press releases, new articles and industry white papers. Further, we relied heavily on our continuous research on the satellite sector with our recurring research publications including Satellites to be Built & Launched, Satellite Communications & Broadcasting Markets Survey, and Mobile Satellite Communications Survey.

REPORT STRUCTURE

WHO WILL BENEFIT FROM THIS REPORT:

✓ Satellite Operators
✓ Banks & Investors
✓ Service Providers
✓ Equipment Manufacturers
✓ Satellite Manufacturers
✓ Government Agencies
**Consumer Broadband Subscribers**

- **2014**: 2.5 Million
- **2023**: 8.8 Million

**Commercial Ships**

- **2014**: 6
- **2023**: 22,000

**Mobile 3G Sites Satellite Connected**

- **2014**: 20
- **2023**: 6,000

**Business Jets & Commercial Airlines**

- **2014**: 37
- **2017**: 247

**Active HTS Satellite Operators**

- **2014**: 14
- **2017**: 25

**HTS Supply by Frequency Band**

- **2014**: Ku-band 51 Gbps, Ka-band 555 Gbps
- **2017**: Ku-band 185 Gbps, Ka-band 1,535 Gbps

**Total HTS Capacity Usage**

- **2014**: 109 Gbps
- **2023**: 1,310 Gbps

© 2014 Euroconsult. October 2014. All rights reserved.
TABLE OF CONTENTS

EVOLUTION OF HTS SYSTEMS & ARCHITECTURES
> HTS versus regular satellites
> Historic evolution of HTS
> HTS system launch and order forecast
> HTS architecture overview
> Architecture trade-offs: Throughput versus coverage
> Architecture trade-offs: Open systems versus closed
> Architecture trade-offs: Ku versus Ka
> Architecture trade-offs: Fixed beams versus payload flexibility
> Ground segment: Decreasing total cost of ownership

BENCHMARK OF OPERATORS’ STRATEGIES
> Operator investment strategies
> Operator investment strategies: HTS architecture
> Operator investment strategies: Capacity supply and geographic breakdown
> Operator investment strategies: vertical market focus
> Business model – Overview
> The economic model for the operators

CONSOLIDATED FORECASTS & MARKET TRENDS
> Key market growth drivers
> Key market growth inhibitors
> Capacity pricing
> Consolidated market forecasts – demand and supply
> Consolidated market forecasts – capacity revenues
> Consolidated market forecasts – supply and frequency band analysis
> Regional market forecasts:
  North America, Latin America, Europe, Russia & Central Asia, Middle East & Africa, Asia Pacific and Oceans

VERTICAL MARKET FOCUS
> Consumer Broadband
> Civil Government & Enterprise Networks
> Cellular Backhaul & Trunking
> Commercial Aviation
> Commercial Maritime
> Military Satellite Communication
> Video Services

EACH VERTICAL MARKET FOCUS CONTAINS
1. MARKET OVERVIEW
2. GROWTH DRIVERS & INHIBITORS
3. FORECASTS TO 2023
01 EVOLUTION OF HTS SYSTEMS AND ARCHITECTURES

HTS VERSUS REGULAR SATELLITES

WORLD MAP OF HTS SUPPLY FOR 2014 AND 2017

HISTORIC EVOLUTION OF HTS
- TIMELINE OF HTS EVOLUTION
- NUMBER OF SATELLITE LAUNCHES

HTS SYSTEM LAUNCH AND ORDER FORECAST
- HTS SYSTEM LAUNCH FORECAST
- TOTAL HTS SYSTEM LAUNCHES: OPEN VERSUS CONTRACTED
- MARKET SHARE OF HTS SYSTEMS ORDERS BY SATELLITE MANUFACTURER

HTS ARCHITECTURES OVERVIEW
- NUMBER OF HTS SYSTEM LAUNCHES
- BREAKDOWN OF HTS LAUNCHES BY SYSTEM ARCHITECTURE UNTIL 2014
- BREAKDOWN OF AVAILABLE HTS CAPACITY BY SYSTEM ARCHITECTURE UNTIL 2014

ARCHITECTURE TRADE-OFFS: THROUGHPUT VERSUS COVERAGE
- TOTAL THROUGHPUT PER SATELLITE (IN GBPS)
- THROUGHPUT PER BEAM (IN GBPS)
- TOTAL COVERAGE PER SATELLITE (IN SQ. KM)
- BEAM DIAMETER (IN KM)

ARCHITECTURE TRADE-OFFS: OPEN SYSTEM VERSUS CLOSED

ARCHITECTURE TRADE-OFFS: KU VERSUS KA
- WORLD MAP OF ANNUAL PRECIPITATION (2013)

ARCHITECTURE TRADE-OFFS: FIXED BEAMS VERSUS PAYLOAD FLEXIBILITY
- FLEXIBLE PAYLOADS

GROUND SEGMENT: DECREASING TOTAL COST OF OWNERSHIP
- OVERVIEW OF GROUND EQUIPMENT AND MAJOR SUPPLIERS
- EVOLUTION OF VSAT EQUIPMENT PRICES
- SPECTRUM EFFICIENCY – PREVIOUS STREAM OF INNOVATION

02 BENCHMARK OF OPERATORS’ STRATEGIES

OPERATOR INVESTMENT STRATEGIES: HTS ARCHITECTURE

OPERATOR INVESTMENT STRATEGIES: CAPACITY SUPPLY & GEOGRAPHIC BREAKDOWN

OPERATOR INVESTMENT STRATEGIES: VERTICAL MARKET FOCUS

BUSINESS MODEL – OVERVIEW

THE ECONOMIC MODEL FOR THE OPERATOR
- TOTAL CAPEX REQUIREMENTS
- OPERATOR’S SELLING OPTIONS
- RECENT SAMPLE OF LARGE VOLUME PRE-LAUNCH HTS CAPACITY LEASES

HTS SYSTEMS OVERVIEW BY OPERATOR
03\ CONSOLIDATED FORECASTS AND MARKET TRENDS

KEY MARKET GROWTH DRIVERS

KEY MARKET GROWTH INHIBITORS

CAPACITY PRICING
- Price ranges for selling options
- Wholesale capacity prices by application
- HTS capacity price trends by region
- HTS capacity price trends by application

CONSOLIDATED MARKET FORECASTS – DEMAND AND SUPPLY
- Total HTS capacity demand by region
- Total HTS capacity demand by vertical market
- Total HTS capacity supply by region
- HTS capacity fill rates by region

CONSOLIDATED MARKET FORECASTS – CAPACITY REVENUES
- Total HTS capacity revenues by vertical market
- Total HTS capacity revenues by region
- HTS capacity and revenue breakdown by vertical market (2014 and 2023)

CONSOLIDATED MARKET FORECASTS – SUPPLY AND FREQUENCY BAND ANALYSIS
- HTS supply forecast – excluding supply targeted for consumer broadband
- Regional fill rates excluding supply targeted for consumer broadband
- Total Ku-band vs. Ka-band HTS supply
- Total HTS capacity usage by frequency band

REGIONAL MARKET FORECASTS - NORTH AMERICA, LATIN AMERICA, EUROPE, RUSSIA & CIS, MIDDLE EAST & AFRICA, ASIA PACIFIC, OCEANS:
- Ka-band HTS supply forecast by operator
- Ka-band HTS capacity usage by application
- Ku-band HTS supply forecast by operator
- Ku-band HTS capacity usage by application

04\ VERTICAL MARKET FOCUS

CONSUMER BROADBAND – OVERVIEW
- Maximum household expenditures on broadband for average and minimum wage workers classes in selected countries
- Distribution options of consumer broadband operators

CONSUMER BROADBAND – FORECASTS
- Subscribers by region and total service revenues
- HTS capacity usage for consumer broadband
- HTS capacity usage splits by frequency band
- HTS capacity usage revenues for consumer broadband

CIVIL GOVERNMENT & ENTERPRISE NETWORKS – OVERVIEW
- Overview of enterprise & government sub-segments
- Sample of capacity contracts signed with HTS systems

CIVIL GOVERNMENT & ENTERPRISE NETWORKS – FORECASTS
- HTS terminals in service by region
- HTS capacity usage
- HTS capacity usage split by frequency band
- HTS capacity usage revenues
TABLES & GRAPHS CONTINUED

04\ VERTICAL MARKET FOCUS Continued

CELLULAR BACKHAUL & TRUNKING – OVERVIEW
- Transmission cost comparison of cellular backhaul alternatives
- Latency associated with satellite and microwave backhaul usage
- Sample of capacity contracts signed with HTS systems

CELLULAR BACKHAUL & TRUNKING – FORECASTS
- HTS capacity usage for cellular backhaul & trunking
- Total traffic carried by HTS for trunking versus cellular backhaul
- HTS capacity usage split by frequency band
- HTS capacity usage revenues for trunking & backhaul

COMMERCIAL AVIATION – OVERVIEW
- Global flight traffic roadmap with HTS system coverage
- In-flight entertainment service providers frequency band strategies
- Overview of primary service provider contracts

COMMERCIAL AVIATION – FORECASTS
- HTS terminals in service
- HTS capacity usage – by region
- HTS capacity usage – split by frequency band
- HTS capacity usage revenues

COMMERCIAL MARITIME – OVERVIEW
- World map of shipping routes density
- Overview of major HTS operators and systems targeting maritime market

COMMERCIAL MARITIME – FORECASTS
- HTS terminals in service and total service revenue
- HTS capacity usage for commercial maritime
- HTS capacity usage split by frequency band
- HTS capacity usage revenues for commercial maritime

MILITARY SATELLITE COMMUNICATION – OVERVIEW
- Overview of addressable markets for major MILSATCOM applications
- US & ISAF troops and contractors in Afghanistan
- Share of unmanned aerial vehicles with satellite links
- Intelsat General: support to U.S. DOD UAV missions (2011-2013)

MILITARY SATELLITE COMMUNICATION – FORECASTS
- HTS capacity usage for MILSATCOM
- HTS capacity usage scenario analysis
- HTS capacity usage – KA-band vs. KU-band
- HTS capacity usage revenues for MILSATCOM

VIDEO SERVICES – OVERVIEW
- Overview of applications and requirements of video services over HTS systems
- Breakdown of local US DTH channels by frequency band
- Benchmark of news gathering solutions

VIDEO SERVICES – FORECASTS
- HTS capacity usage for video services
- HTS capacity usage by sub-segment
- HTS capacity usage for video services by frequency band
- HTS capacity usage revenues for video services
Celebrating over 30 years of expertise

Euroconsult is the leading global consulting firm specializing in space, satellite and broadcast markets. As a privately-owned, fully independent firm, we provide first-class strategic consulting, develop comprehensive research, and organize executive-level annual summits for the industry. With 30 years of experience, Euroconsult is trusted by more than 570 clients in over 50 countries. We rely on a multi-cultural team of over 30 full-time experts based in Paris, Montreal and Washington, D.C., and permanent representation in Japan, complemented by a network of senior affiliate consultants.

Euroconsult research focuses on the assessment of the industry including its structure, market players, revenues and dynamics. Research reports include long-term trends, commercial/programmatic and economic benchmarking, up-to-date information, and ten year forecasts supported by key ratios. With research published on an annual and biennial basis, these surveys have been used as reference tools by most public and private stakeholders involved in our sectors of expertise.

- Industrial companies
- Government programs & policies
- Satellite communications
- Earth observation
- Digital broadcasting
- and more...

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

OTHER SELECTED RESEARCH PROVIDED BY EUROCONSULT
Visit our Online Store at euroconsult-ec.com/shop

Military Satellite Communications, 2014 Edition
Video Content Management & Distribution, 2014 Edition
Prospects for In-Flight Entertainment and Connectivity, 2014 Edition
Please complete this form and return by e-mail to reports@euroconsult-ec.com or by fax to + 33 1 48 05 54 39. If you have any questions about ordering, would like to enquire about specific corporate licenses or would like to order for multiple locations and/or legal entities, please contact reports@euroconsult-ec.com or call +1 (514) 903-1001. **All prices are in Euros. All orders must be prepaid** (if not possible, please contact us). Applicable VAT taxes will be added in Euros.

### Payment Information

**Company VAT n° (required for all companies)**

**Credit Card**

- [ ] VISA
- [ ] Mastercard
- [ ] AMEX

- **Cardholder Name** (as it appears on card)

- **Cardholder Number**

- **Expiration Date** (month/year) | **Cryptogram** (last 3 digits on the back)

- **Cardholder’s Signature**

**Bank Transfer**

(All bank charges are to be paid by the sender)

to EUROCONSULT, please NOTE IMPERATIVELY:

Swift-BIC code: CC FR FR PP

IBAN: FR76 3005 6007 9407 9403 1853 321
Account n° 07940318533
HSBC, 171 Rue de Rennes, 75006 Paris, France.

**Cheque or Money Order Enclosed**

Payable to Euroconsult:
86 Blvd. Sebastopol, 75003 Paris, France

---

### Invoicing Address

(Please use capital letters)

- **First name** __________________________
- **Last name** __________________________
- **Company name** __________________________
- **Occupation** __________________________
- **Address** __________________________
- **Zip Code** __________ City __________
- **State** ________ Country __________
- **Phone** __________ Fax __________
- **E-mail** __________________________

---

### Delivery Address

(If different from invoicing address)

- **First name** __________________________
- **Last name** __________________________
- **Company name** __________________________
- **Occupation** __________________________
- **Address** __________________________
- **Zip Code** __________ City __________
- **State** ________ Country __________
- **Phone** __________ Fax __________
- **E-mail** __________________________

---

### Product Table

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>eFiles (Including additional Excel tables for key figures and a PDF of the report)</td>
<td>€ 3,000</td>
<td></td>
</tr>
<tr>
<td>Additional eFiles license(s) Qty:</td>
<td>€ 300</td>
<td></td>
</tr>
<tr>
<td>Enterprise license</td>
<td>€ 7,500</td>
<td></td>
</tr>
</tbody>
</table>

**Product Total in Euros (€)** __________
Please read this license agreement carefully.
By using the report files, you are agreeing to adhere by the terms of this license.

**SINGLE USER LICENSE**

a) This product is licensed only for a team working together on a project, working on the same site in the same company. The person signing this agreement is responsible for the use of the research report files. Euroconsult must be informed of all users of the research files before use. The information may not be shared with other company sites or other work teams in the same or other companies in any form, neither photocopied nor reproduced, including for internal use. The content of the report files may not be stored, transferred, or copied to any type of electronic storage device.

b) No part or extract, in any format whatsoever, must be transmitted to any other organization, including cooperative entities and subsidiaries. All licenses purchased at the additional copy price are for internal use only by the organization ordering (same company name, same location as indicated on original order form). Euroconsult must be informed of the users of the additional licenses purchased.

c) All data or information extracted from the report files for use in other documents must rightfully use the copyright reference: *Euroconsult, name of report, year*. Before any other use of the information contained in the report files, prior written consent by Euroconsult is required.

d) This Agreement shall in all respects be governed by the laws of the Republic of France. The user agrees that the proper jurisdiction and forum for the resolution of any claim arising under this license shall be at Euroconsult’s sole option.