

# Satellites in ICT Space:

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An Analysis of the Satellite Industry's Competitive Viability in the Information  
and Communications Technology Market

Cary Ingram  
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# Satellites in ICT Space

## Executive Summary

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After the market bust of the late 1990s, the satellite industry has struggled to regain a competitive profile in the information and communications technology (ICT) market. The prevailing view has been that the global mass deployment of optical fiber and terrestrial broadband wireless technology would cause the satellite industry to stagnate and eventually decline into relative obscurity. Instead, satellite technology has been able to sustain and expand upon its traditional functions in the ICT market, and is finding complimentary roles with emerging technologies to deliver services to various market segments. Despite prognostications of the industry's imminent demise, the various sectors of the satellite industry have experienced strong growth over the past 5 years, and there are various opportunities for the industry to secure and expand a firm competitive position in the ICT market.

The satellite industry is experiencing robust growth as the overall ICT market grows, but there are still significant challenges. Technology limitations in delivering next generation interactive services, high capital expenditure requirements, substantial international market access barriers, and the continuing threat from advanced terrestrial wireless applications are just some of the hurdles still facing the industry. There are even diverse views within the industry's own executive ranks on the best competitive position of satellite technology. For instance, some mobile satellite services operators still see the voice segment as the "killer app" to gaining deeper penetration into the consumer ICT market, but others have expressed reservations about satellites being an efficient platform to deliver voice applications directly to consumers, and portend advanced media applications as the answer to the end-user market.

Despite the challenges, there are a number of major trends driving positive growth forecasts. The most significant development is the global demand for converged, sophisticated services in communications, data, and media. The demand for advanced applications is driving up satellite utilization rates, and is causing all sectors of the industry to experience significant gains. The prospects are especially high in the emerging economies of Asia-Pacific, Africa, and the Middle East regions. The rising income of consumers is creating even more demand for advanced, value-added services. Another driver is the development of new technology and applications. Emerging technologies such as Ancillary Terrestrial Components (ATC)<sup>1</sup>, Internet Protocol (IP) applications, and High Definition media are creating new opportunities for gaining larger footprints in the end-user market, and developing new sources for revenue growth. An overall assessment will show that the satellite industry has solid competitive viability in the ICT market, and significant opportunities for greater expansion.

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<sup>1</sup> ATC: a terrestrial wireless device utilized to relay and boost satellite signals in urban areas and penetrate inside buildings enabling Mobile Satellite Service operators to provide complete voice and data services.

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## Overview of Satellite and Space Industry

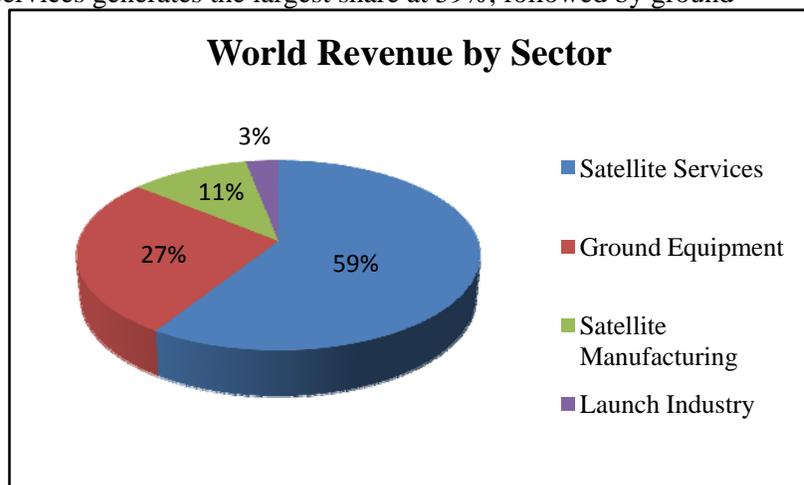
The global satellite industry has shown consistent and steady growth since the market bust of the late 1990's. During the six-year period 2001-2006, the satellite industry has experienced a compound annual growth rate (CAGR) of 10.5% in revenue generation.<sup>2</sup> Industry revenues for 2006 alone totaled more than \$106 billion, a 19% increase over 2005.<sup>3</sup> The satellite industry represents a small share of the global \$3 trillion telecommunication industry<sup>4</sup>, but the satellite industry's average revenue growth has been ahead of the 9.8% CAGR of the overall telecom industry during the 2001-2006 time period. Based on emerging trends and developments occurring in the satellite industry, it is likely that the industry will continue to exhibit strong revenue growth over the foreseeable 5-10 year period.

There are four main sectors comprising the satellite industry. Satellite services, satellite manufacturing, ground equipment, and launch services are the main components of industry revenue generation. Based on 2006 revenue estimates, satellite services generates the largest share at 59%, followed by ground equipment (27%), satellite manufacturing (11%), and launch services (3%).<sup>5</sup> In addition to being the largest source of revenue for the industry, the satellite services sector is expected to be the main driver of future industry growth.

The competitive landscape of the satellite industry's global market is relatively fragmented. There are a number of large international players in the various sectors of the satellite industry, such as

Lockheed Martin, SES Global, and EADS. There are also small to medium size niche and regional equipment producers, systems integrators, and service providers that compete at various levels of the industries value chain of products and services.

As can be seen in the following chart, the top 20 companies in the global satellite and space market, in terms of revenue, accumulated almost \$73 billion in total sales of products and services in 2006, over 68% of the industry's total. Among these top 20, the services sector, including Direct Broadcast Services (DBS) companies, brought in over \$34 billion in revenue followed by the manufacturing sector with over \$28 billion in revenue (totals include only companies classified as principally in either services or manufacturing). Within the group of top 10 global satellite and space industry companies, six of the major players are based in the U.S., including Direct TV, EchoStar (DISH), Lockheed Martin, Boeing, Northrop Grumman, and Raytheon.<sup>6</sup>



<sup>2</sup> Source: Satellite Industry Association and Futron Corporation Study

<sup>3</sup> Source: Satellite Industry Association and Futron Corporation Study

<sup>4</sup> Source: Telecommunications Industry Association Market Review and Forecast Report

<sup>5</sup> Source: Satellite Industry Association and Futron Corporation Study

<sup>6</sup> Source: Space News; August 2007

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## Ranking Satellite and Space Industry Firms

No.	Company	2006 Revenue	Industry Sector	No.	Company	2006 Revenue	Industry Sector
1	DirecTV	14,755	SVS-DBS	11	United Space Alliance	1,921	MFG
2	EchoStar (DISH)	9,839	SVS-DBS	12	SES Global	1,900	SVS
3	Lockheed Martin	9,809	MFG	13	Garmin	1,774	Ground
4	Boeing	8,150	MFG	14	EchoStar Corp. (SAT)	1,525	SVS-FSS
5	Northrop Grumman	4,953	MFG	15	Alliant Techsystems Inc.	1,485	MFG
6	EADS Astrium	4,220	MFG/SVS	16	Eutelsat	1,050	SVS
7	Raytheon	4,190	MFG/SVS	17	Telesat	411	SVS
8	Thales Alenia Space	2,180	MFG	18	JSAT Corp	326	SVS
9	Intelsat	2,100	SVS	19	Star One SA	196	SVS
10	SAIC	1,970	SVS	20	SingTel Optus	192	SVS

Revenue in USD millions

Source for Revenue Figures: Space News

Demand for the industry's products and services ranges across the entire spectrum of customer segmentation. Clients include the federal government, military, private enterprises, and the individual consumer. Generally, each sector of the industry has a particular competitive position within the wider ICT market. Evolutions in technology, customer demands, the regulatory environment, and overarching dynamics within the ICT market are causing satellite firms in most sectors, especially service providers, to realign their customer targeting and segmentation.

Prospects for the satellite industry appear strong. Market drivers such as increasing demand on capacity by high definition broadcast services, economic ascension of emerging market countries, and the introduction of more sophisticated end-user hardware and applications are positioning the industry for healthy growth into the future. In fact, Futron Corporation expects demand for satellite capacity to grow at 5% a year between the years 2006 and 2015, and the demand for transponder<sup>7</sup> capacity to outpace supply by 2014. Furthermore, it is expected that over 960 satellites will be launched over the next decade, and that the overall space industry will be valued at around over \$145 billion within the next five years.<sup>8</sup> Despite the strong trends for the industry, it is the enduring competitive viability of the industry within the wider ICT market that will demonstrably influence its future growth.

## Sector Analysis

### Satellite Services

In terms of revenue, the satellite services sector is the largest sector of the industry, and is projected to be the main driver of growth. The services sector brought in over \$62 billion in revenue for the industry in 2006, a 19% increase over 2005 revenues. Analysts project that services will continue to experience strong growth in demand. Largely, it is this sector that has the greatest market potential for rapid expansion within the ICT sphere, but it also has some of the greatest threats to the industry's overall competitive viability and growth prospects.

<sup>7</sup> Transponder: an active wireless device located on communications satellites that respond to and transmit signals along particular bands and frequencies. These devices have the ability to perform multiplexing and compression functions. One orbiting satellite can have anywhere from 10 to 100 transponders.

<sup>8</sup> Source: Euroconsult

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The services sector is comprised of three main business segments, Fixed Satellite Services (FSS), Mobile Satellite Services (MSS), and Direct Broadcast Services<sup>9</sup> (DBS). The DBS segment represents the largest source of the sector's revenue with over \$48 billion worth of services, followed by FSS (\$12.1 billion), and MSS (\$2 billion). Each business segment has particular opportunities and threats impacting its respective business activities.

## *Direct Broadcast Services*

The Direct Broadcast Services segment has a unique profile in the industry when it comes to technology trends impacting the satellite industry's business activities. The dominant revenue generator in the segment is Direct-to-Home (DTH) satellite TV services. The global DTH business is dominated by Direct TV, EchoStar, and BSkyB, and the DTH business has a strong competitive position in their competitive sphere of the ICT market. One of the major trends driving industry growth is the increased global popularity of pay-TV services. As is the case with other wireless services in the ICT market, the relative low cost terrestrial infrastructure requirements to reach the end-user is giving satellite technology a strong competitive position in comparison to wire-line applications. The DTH market grew about 10% in 2006 to over 89 million subscribers world-wide, and is expected to reach an estimated 178 million by 2015.<sup>10</sup> Additionally, DTH operators have been at the forefront of the mass deployment of High Definition Television (HDTV). Even though HDTV content has been lacking, DTH service providers are leading the global uptake in High Def subscriptions.<sup>11</sup>

Satellite technology has given DBS/DTH services an advantage in its business segment, but there are also current technological constraints that may limit its future ability to compete. DTH operators not only face competition from traditional Multiple System Operators (MSOs), or cable television operators, but also new entrants in the form of telecom carriers utilizing Internet Protocol Television (IPTV) to deliver pay-TV services. MSO and telecom carriers can deliver complete triple-play services that meet the pricing and quality of service demands of the consumer market. DTH operators have yet to achieve the same level of standards in all three business lines of voice, video, and data. Furthermore, the DTH market is currently limited to one-way only broadcast services, while consumers are demanding more interactive services, such as video-on-demand. The number of households subscribing to IPTV world-wide is expected to reach 30 million by 2011.<sup>12</sup> Unless the DBS/DTH service providers can deploy technology that meets the increasingly complicated demands of the end-user, the segment could see their leading position quickly erode, and IPTV uptake expand even faster than currently forecast.

## *Mobile Satellite Services*

When it comes to finding a competitive business model in the ICT market, the MSS segment is experiencing the greatest market flux and realignment. MSS operators experienced an 18% growth in revenues in 2006, driven mostly by the growth in voice traffic.<sup>13</sup> The NSR study, "Mobile Satellite Services, 3<sup>rd</sup> Edition", projects that total annual revenues for the MSS market could reach \$4.9 billion by 2012. MSS operators have largely worked on delivering global voice and data services to the land, maritime and aeronautical market segments. The customer base has mostly been within vertical industries that operate in remote areas such as forestry, oil and gas extraction, mining, and transoceanic shipping. New developments in technology, business models, and regulations, however, are encouraging MSS providers to make a renewed push into the commercial and consumer voice and data markets.

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<sup>9</sup> DBS segment includes revenues from direct-to-consumer satellite services for satellite television, satellite radio, and data broadband services.

<sup>10</sup> Source: Futron Corp

<sup>11</sup> Source: "HDTV Fails to Meet Early Expectations"; Mark Holmes; Via Satellite; September 2007.

<sup>12</sup> Source: "IPTV: Threat or Opportunity for Satellite"; Mark Holmes; Via Satellite; July 2007.

<sup>13</sup> Source: Satellite Industry Association and Futron Corp.

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The competitive structure of the MSS segment is in the middle of significant restructuring. Each competitor is utilizing various technological innovations and business models to find success. The main players currently listed in the MSS segment include Inmarsat, TerreStar, ICO Global Communications (ICO), Mobile Satellite Ventures (MSV), Thuraya, Iridium, and Globalstar. Inmarsat, Globalstar, Thuraya, MSV, and Iridium are the only operators that have functioning satellite constellations. The relatively new entrants, TerreStar and ICO are just beginning to deploy the initial infrastructure, i.e. satellites, to begin offering services. In terms of annual revenue in 2006, Inmarsat is the leading competitor with over \$500 million in annual sales, followed by Iridium with \$212 million, and Globalstar at \$137 million.<sup>14</sup>

There are a number of developments in the industry that are causing the MSS segment to experience significant shifts in its competitive structure. A number of operators, especially the new players, are attempting to leverage spectrum licenses they have obtained to operate new hybrid satellite-cellular networks by developing ancillary terrestrial components (ATC). This could potentially facilitate MSS operators to gain a larger footprint in the end-user data and communications market. Many of the firms foresee these hybrid networks enabling them to deliver the high level quality of service at price-points that will make them more competitive with traditional terrestrial wireless service providers such as Verizon, AT&T, and T-Mobile. Additionally, some MSS firms such as ICO are looking to deepen their service offerings with new applications such as mobile television through the DVB-SH (Direct Video Broadcast to Satellite Handhelds) standard. The auction of 700 MHz spectrum in the United States also represents an opportunity for MSS operators to further leverage ATC technology. If the service providers can gain access to the spectrum, then there is even greater potential to develop applications that will penetrate the national consumer and commercial market. Successful deployment of ATC technology and the potential use of 700 MHz spectrum will be especially important if MSS operators hope to reach the end-user in urban environments, and become a viable competitor to terrestrial wireless.

Despite the current optimism surrounding the potential of the MSS business segment, significant challenges remain. Analysts expect 10-15% of the segment's growth over the next ten years will be attributable to the deployment of ATC technology, but those figures are accounting for ATC being utilized more for broadband applications rather than the sought after voice applications market.<sup>15</sup> It is also questionable whether the expensive capital expenditure (capex) requirements to effectively deploy ATC technology will actually enable the MSS operators to offer services at competitive price points to the commercial and consumer segments. Many questions also remain over what business models would be affective, and even how to measure business success during the initial deployment of new services. Implicitly, much of the potential of the MSS-ATC technology is being modeled on the assumption that advanced value added services of terrestrial wireless technology will not "leapfrog" the segment before it even has a chance to prove itself. The assumption could be a costly set-back for some of the emerging MSS players if the "leapfrog" contingency is not accounted for in the operators' strategic planning.

The massive build-out currently occurring in the industry also has the potential of creating more capacity supply than demand. There are loud calls for the industry to consolidate from the current six to seven players down to no more than three. It is expected that the large capex required to successfully deploy and implement the MSS-ATC networks will force consolidation to take place. Even further restructuring will occur if the operators fail to affectively penetrate the commercial and consumer voice market as deeply as they are aiming.

It is estimated that there were over 700,000 handheld satellite phones in the world-wide market in 2007. This is in sharp contrast to the 134 million wireless handsets that were sold in the U.S. market alone for

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<sup>14</sup> Source: Space News; August 2006

<sup>15</sup> Source: "Two Studies Forecast Moderate Growth of Mobile Satellite Services"; Peter B. de. Selig; Satellite News; July 2007.

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the same year.<sup>16</sup> MSS operators must produce feature rich hand-held devices at competitive prices if they are to find a viable competitive space in the larger ICT market. Inmarsat introduced a handheld sat-phone priced around \$500, but the “groundbreaking” phone has been described as being relatively “bulky with limited features”.<sup>17</sup> Despite the progress being made, the handset situation is illustrative of the many hurdles the MSS segment still must clear before it can become a truly viable competitor in the end-user ICT market.

## Fixed Satellite Service

The Fixed Satellite Services (FSS) segment is one of the industry segments that has the most secure competitive position within the information and communications technology market. In 2006, FSS operators sold over \$12 billion in services, a 20% increase over 2005.<sup>18</sup> Furthermore, transponder fill rates<sup>19</sup> (the utilized capacity) increased from 58% in 2004 to 70% in 2006.<sup>20</sup> As demand for more advanced information and communications services expands world-wide, the FSS segment is poised to benefit from increased rates of growth in capacity demand.

In the last few years, the segment has experienced a high degree of consolidation among FSS operators, and has created a relatively segmented competitive field. By any measure, the industry leader is Bermuda based Intelsat. In terms of 2006 annual revenues, it held over 26.3% of the market, followed by SES (24.9%), Eutelsat (12.7%), Telesat (7.4%), and the remaining 28.7% is fragmented amongst smaller, regional and niche operators.<sup>21</sup> Among the roughly 250 commercial satellites in orbit, Intelsat leads with 51, followed by SES with 36, Eutelsat owning 23, Telesat at 15, and the remaining platforms are owned by various regional, national, and niche operators.<sup>22</sup> Despite the high degree of consolidation in the FSS segment, the orbits are becoming even more crowded as newly cash-rich emerging market countries launch their own national satellite fleets and applicable operations. In a number of cases, however, these new platforms aren’t needed based on market demand, but rather as a contribution toward national pride. Some of these new entrants will become challenges to the growth of incumbent operators into emerging markets.

<b>Top 5 FSS Operators</b>			
Company	2006 Revenue	Satellites in Orbit	Location
Intelsat	2,100	51	Bermuda
SES	1,900	36	Luxembourg
Eutelsat	1,050	23	France
Telesat	411	15	Canada
JSAT Corp	326	8	Japan

Revenue in USD millions

Source of Revenue Figures: Space News

FSS operators are enjoying growth from the overall trends hitting the wider ICT market. One of the biggest drivers of capacity demand is the global mass deployment of HDTV. The demand for satellite television has already brought an increase in revenues for FSS companies, but the capacity hungry HDTV signals are intensifying the already robust expansion in transponder utilization. Another driver of growth in the industry is the demand for more sophisticated value added services by consumers in developed and,

<sup>16</sup> Source: TIA’s 2007 Telecommunications Market Review and Forecast

<sup>17</sup> Source: Space News; September, 2007

<sup>18</sup> Source: Satellite Industry Association and Futron Corp.

<sup>19</sup> Transponder fill rate is an important indicator of demand for services on communications satellites.

<sup>20</sup> Source: Satellite Industry Association

<sup>21</sup> Source: Space News; June, 2007

<sup>22</sup> Source: Space News; June, 2007

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to a larger degree, emerging economies. As backhaul conduits for terrestrial voice, video, and data communications, the new advanced applications and services being offered by ICT service providers and the reciprocal uptake by consumers are causing an explosion in demand for transponder capacity. Additionally, the FSS segment is seeing strong growth from government and military clients, and for integrated services for new applications such as IPTV.

One of the interesting growth areas for FSS operators is the end-user broadband services market. FSS operators' broadband services have traditionally been focused on enterprise broadband applications servicing customers in the banking, retail, and vertical industries groups. Currently, operators are expanding into consumer markets that have yet to be reached by terrestrial broadband services. In 2006, broadband services in the commercial and consumer market contributed over \$300 million to the sector's revenues.<sup>23</sup> The main two competitors in U.S. consumer satellite broadband service, WildBlue Communications and Hughes Network Systems, counted 650,000 U.S. subscribers at the end of 2007, a 15% increase over 2006.<sup>24</sup> Satellite broadband has been able to provide services to customers that do not have affordable access to terrestrial broadband. Satellite operators also have an advantage in that operating costs are largely fixed. Thus, assuming the end-user ground equipment is not subsidized, adding an additional customer results in virtually no increase in cost for the satellite services company.

The success of Hughes and WildBlue in the U.S. market is serving as a model for satellite broadband expansion in other regions. For example, in Western Europe, Eastern Europe, and Turkey, it is estimated that there will be 15 million households unable to access affordable broadband service via terrestrial applications by 2010.<sup>25</sup> The number of underserved homes is even greater in Asia-Pacific, Middle East, and African regions. Broadband via satellite is seen as a key application for remedying the lack of broadband service to various regions of the world. Whether the firms use a pure satellite play or a hybrid service utilizing satellite and terrestrial wireless broadband applications, these underserved markets are potentially lucrative sources of additional revenue for FSS operators.

Overall, FSS operators stand to benefit from prevailing trends in the broader ICT market. The FSS segment is well positioned to continue experiencing increased rates of growth as the global economy expands and consumer incomes grow.

## Communications Satellite and Component Manufacturing

The communications satellite and satellite component manufacturing sector is being lifted by the same high level of growth within the ICT market that is boosting the services sector. Reflecting the robust demand for new satellites, manufacturing had the highest rate of revenue growth (54%) in the satellite industry in 2006.<sup>26</sup> U.S. manufacturers held almost 42% of the global \$12 billion in revenue and represented 57% of the revenue growth for 2006.<sup>27</sup> In 2007, U.S. manufacturers exported over \$806 million in communications satellites and satellite parts.<sup>28</sup> Major trends affecting the satellite industry are helping drive demand in the manufacturing sector.

The global demand for advanced services in the wider ICT industry is helping push demand for new satellites. The new services such as wireless broadband, HDTV, and mobile television are stretching the limits of current fleet capacity. Exacerbating the situation is the need to replace older fleets of satellites that are reaching the end of their life cycle.

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<sup>23</sup> Source: Satellite Industry Association and Futron Corp.

<sup>24</sup> Source: "WildBlue Sticks to Its Strategy Despite Likely New Competitor"; Peter B. de Sleding; Space News; January, 2008

<sup>25</sup> Source: "Satellite Broadband in Europe"; Mark Holmes; Via Satellite; December, 2007

<sup>26</sup> Source: Satellite Industry Association and Futron Corp.

<sup>27</sup> Source: Satellite Industry Association and Futron Corp.

<sup>28</sup> Source: International Trade Administration

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Government and military demand is also contributing to the growth. In fact, government payloads comprised 75% of the revenues generated in 2006.<sup>29</sup> A large segment of growth in government contracts is the demand for fully integrated mobile wireless voice and data communications that can be utilized world-wide for military and emergency services. Besides the expected practical demands for sensory, communications, and geographic information systems (GIS), many governments of emerging market countries are ordering satellites to fulfill ambitions of developing domestic space industries.

The competitive structure of the manufacturing sector is usually dominated by large contractors, but actual market share fluctuates from year to year based on the number of platforms ordered. For 2006, based on the number of publicly announced orders for non-LEO (Low-Earth Orbit) satellites, EADS Astrium held the greatest share of the market at 38.9%, and is followed by Thales Alenia Space with 27.7%, Loral Space Systems at 11.2%, Boeing Satellite Systems International Holdings with 11.1%, and Lockheed Martin and Orbital Sciences Corp. tying at 5.6%.<sup>30</sup> Within the commercial communications manufacturing market, it is mainly EADS, Thales, Loral, and Orbital competing. Lockheed and Boeing mostly concentrate on government and military contracts. The major players will soon experience competitive pressures from new entrants from emerging market countries including China, India, and Russia, which are aggressively developing their own space industries.

## Ground Equipment<sup>31</sup>

The Ground Equipment sector is the second largest revenue generator for the industry, and, just like the manufacturing sector, is benefiting from larger trends in the ICT market. Global equipment revenue totaled about \$29 billion in 2006, a 14% increase over 2005.<sup>32</sup> Much of the growth in the industry is driven by end-user consumer hardware such as satellite radio and DTH receivers. Additionally, one of the main growth areas is forecast to be the equipment rollout needed for the mass deployment of advanced vehicle telematic services. A significant source of the increase in revenue generation for the sector is attributable to the higher prices equipment producers are receiving for high-end devices.<sup>33</sup> The demand for consumer hardware will continue to expand as more sophisticated devices are needed to interact with the advanced services being introduced by ICT industry service providers.

By examining the number of end-user terminals in the market at the end of 2006, the relative size of the satellite industry's consumer market and the respective share of the market for each business segment can be gauged. Currently, as can be seen in the following charts, the largest share of the end-user market (84%) is held by the Direct-to-Home satellite T.V. segment, but other applications, particularly satellite broadband, are expected to increase their share of the market, and be a catalyst for even faster growth for the ground equipment sector. If competitive business models can be implemented as successfully as in the U.S., satellite broadband service will be an important means for continued expansion for the equipment sector.

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<sup>29</sup> Source: Satellite Industry Association

<sup>30</sup> Source: Via Satellite; July 2007

<sup>31</sup> Satellite Ground Equipment Includes: Gateways, NOCs, Satellite News Gathering Equipment, Flyaway Antennas, Virtual Small Aperture Terminals (VSATs), Sat TV Dishes, Sat Radios, Sat Phones

<sup>32</sup> Source: Satellite Industry Association and Futron Corp.

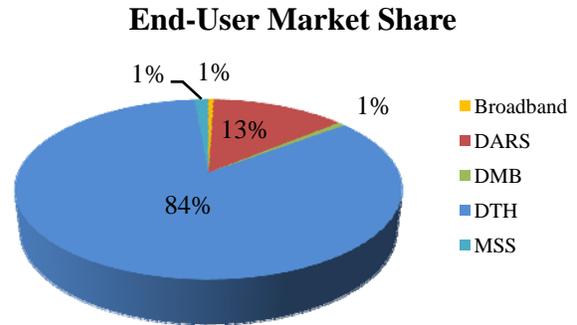
<sup>33</sup> Via Satellite; July 2007

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Number of Terminals in Service for 2006	
Service/Application	*No. Units
Broadband	565
DARS <sup>34</sup>	14,152
DMB <sup>35</sup>	750
DTH	88,737
MSS	1,473
<b>Total Units</b>	<b>105,677</b>

\*In thousands

Source: Satellite Industry Association



The major players in the sector include many of the service providers that also supply the end-user equipment. Operators such as Direct TV, Inmarsat, and Hughes Network Systems are major producers of the ground equipment in the consumer and commercial market. Other manufacturers include Garmin, Globecom, and ViaSat.

The satellite ground equipment sector should strongly track, if not outpace, the growth of the overall ICT market. The trends in the ICT industry are extremely complimentary to the equipment sector's business activities and expansion goals into the commercial and consumer device market. The main threat to the sector is the possible cannibalization of revenues caused by convergence of mobile handheld data and communications devices. For instance, the market for GPS (Global Positioning System) handheld receivers is already threatened by the integration of GPS applications into mobile telephony and data devices. Such convergence trends may challenge as well as compliment the sectors potential market growth. The technology shakeout in the hand-held device market will be a determining factor for the ground equipment sector's future earnings prospects.

<sup>34</sup> DARS: Digital Audio Radio Service via satellite

<sup>35</sup> DMB: Direct Multimedia Broadcast via satellite

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## Relevant Industry Trends, Developments, and Issues

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Topic	Impact/Relevance
<b>Global agreement at 2007 WRC<sup>36</sup> to preserve C-Band spectrum for Satellite Services Industry.</b>	<ul style="list-style-type: none"><li>▪ Preservation of this spectrum will allow satellite service operators to provide unimpeded global communications, data, and media services.</li><li>▪ Decision preserved the industry's ability to compete with emerging advanced wireless technologies.</li></ul>
<b>Harmonized Spectrum Management in the European Union</b>	<ul style="list-style-type: none"><li>▪ Centralized management authority would create more efficient market environment for providing satellite services in the European region.</li></ul>
<b>U.S. International Traffic in Arms Regulations (ITAR) and Export Licensing (U.S. Manufacturing)</b>	<ul style="list-style-type: none"><li>▪ Restrictions on the exportation of certain satellite technology are hurting the ability of U.S. manufacturers to compete in the global market.</li><li>▪ U.S. producers are limited in the number of contracts they can compete for in high growth regions of the world.</li><li>▪ Some advocate that the export licensing restrictions need to be updated.</li></ul>
<b>Industry Consolidation</b>	<ul style="list-style-type: none"><li>▪ High Capex costs and debt loads are likely to drive further consolidation.</li><li>▪ Consolidation in some segments may be needed to avoid supply "glut".</li></ul>
<b>Growing Income in Emerging Market Countries</b>	<ul style="list-style-type: none"><li>▪ Consumers are demanding more advanced, converged services in data, communications, and media.</li><li>▪ Greater need for capacity is driving up utilization rates.</li><li>▪ Increased demands for space platforms, components, and ground equipment.</li></ul>
<b>FCC ATC Decision on Satellite and Terrestrial spectrum<sup>37</sup></b>	<ul style="list-style-type: none"><li>▪ FCC decision cleared the way for MSS operators to develop hybrid satellite-cellular services without additional acquisition of spectrum.</li></ul>

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<sup>36</sup> WRC: World Radio Conference is the decision making body concerning global use of radio spectrum held by the International Telecommunications Union.

<sup>37</sup> In 2004 the FCC issued a ruling that satellite operators that operated in the L and S band could provide terrestrial service in the same spectrum without having to obtain additional licenses.

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## Industry SWOT Analysis in ICT Market

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Strengths	Weaknesses
<ul style="list-style-type: none"><li>▪ Industry sectors tracking growth of ICT market.</li><li>▪ Strong demand for satellite services.</li><li>▪ Fixed operating costs.</li><li>▪ Decreasing cost of end-user equipment</li><li>▪ More sophisticated satellites replacing older fleets.</li></ul>	<ul style="list-style-type: none"><li>▪ High Capex for start-up.</li><li>▪ Industry debt load.</li><li>▪ Limited ability to provide two-way interactive services.</li><li>▪ Data transfer rates consistently lag other technologies.</li><li>▪ Continuing fragmented standards for new next generation services such as satellite mobile T.V.</li></ul>
Opportunities	Threats
<ul style="list-style-type: none"><li>▪ Decreasing cost of space platforms and components.</li><li>▪ Robust demand from government and military.</li><li>▪ Emerging technologies and applications such as ATC, mobile video/media, and IP<sup>38</sup> applications.</li><li>▪ Growing incomes in emerging market countries.</li><li>▪ Sophisticated next generation services require greater bandwidth.</li><li>▪ Underserved markets for communication and broadband services</li></ul>	<ul style="list-style-type: none"><li>▪ Emerging technologies such as IPTV, WiMax, and other advanced terrestrial wireless solutions.</li><li>▪ High market access barriers in emerging market countries.</li><li>▪ Tight credit markets could limit access to financial capital for growth.</li></ul>

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<sup>38</sup> IP: Internet Protocol

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## Conclusion

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The satellite industry is a definitive pillar in the global ICT market. The industry has been able to make gains in stride with the growth of the overall market for information and communications technology products and services. The prevailing trends, developments, and emerging opportunities in the industry insure that satellite technology and services will not be shutout of the wider market, but there are also significant challenges and barriers in place.

The challenges are especially acute for operators seeking to penetrate deeper into the end-user commercial and consumer markets. Competing technology, quality of service issues, articulation of successful business models, and pricing pressures are just some of the factors challenging satellite service providers to move closer to the end-user.

For most industry segments in the ICT market, the end-user market, both enterprise and consumer, is the main growth area. Ultimately, it will be the ability of the satellite industry to move beyond just being the backhaul function for information and communications technology or only serving the vertical industries market that will determine the industry's future growth prospects and its level of competitive viability.

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