

2007 UPDATE

# THE SPACE REPORT

*The Guide  
to Global  
Space Activity*



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**SPACE FOUNDATION**

[www.SpaceFoundation.org](http://www.SpaceFoundation.org)

[www.TheSpaceReport.org](http://www.TheSpaceReport.org)

The groundbreaking *The Space Report 2006*, released last year, pioneered a new model for understanding the space industry, expanding the traditional three-sector model - civil, commercial, and national security space - into a more precise and comprehensive nine-sector model based on the end use of space products and services.

## The Space Foundation released *The Space Report 2007* in October 2007, an update of *The Space Report 2006*.

*The Space Report 2007* contains global space industry budgets and revenue data for calendar year 2006, which along with the updated Space Foundation Index, reveals dramatic growth in the space economy that is outpacing other markets and indices.

Data for *The Space Report 2007* demonstrate that in 2006 the global space industry grew to nearly \$220 billion in total revenues. This total includes both commercial space activities and government space budgets, an 18 percent increase from 2005. Satellite based products and services and U.S. government space expenditures comprise the two largest segments of the industry at 50 percent and 28 percent of total revenues, respectively. Nearly every sector of commercial space experienced growth in 2006.

In addition, the 2005 global space revenue figure of \$179.65 billion, reported in *The Space Report 2006*,

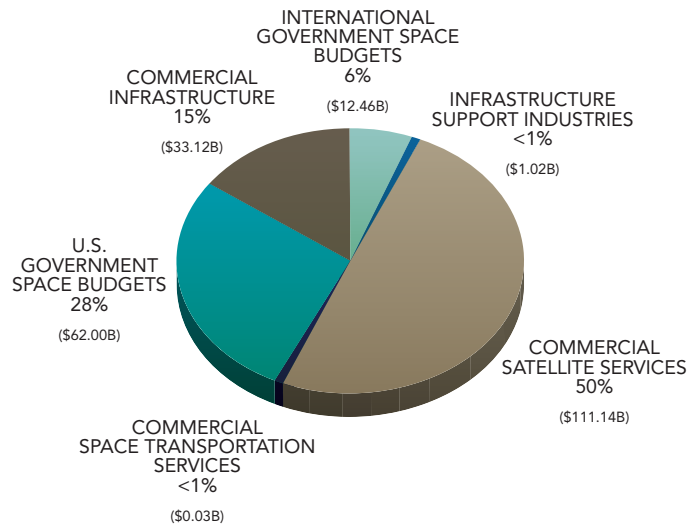
grew to \$186.31 billion. This modified revenue figure is based on the subsequent acquisition of higher fidelity data.

The Space Foundation Index, now in its third year, is a weighted index that tracks the market performance of 31 public companies that derive a significant portion of their revenue from space-related assets and activities. Since its inception in June 2005, the Space Foundation Index has increased by more than 45 percent, outpacing both the NASDAQ and S&P 500 indices, which grew 31 percent and 28 percent, respectively. The Space Foundation Index increased 34 percent between June 30, 2006, and Sept 30, 2007.

*The Space Report 2007* is available online at [www.TheSpaceReport.org](http://www.TheSpaceReport.org).

*The Space Report 2008* will be streamlined for ease of use, some formatting of data will be condensed and improved, and many of the static data and charts will be published as online adjuncts to the printed report. *The Space Report 2008* will be released in April, in conjunction with the 24th National Space Symposium, scheduled April 7-10 at The Broadmoor Hotel in Colorado Springs, Colo.

*The Space Report 2007* aggregates 2006 commercial revenue and government budget data, which together comprise the global space industry. This report also contains several updates to data previously presented in *The Space Report 2006*. These changes increase the 2005 total budget and revenue figure from \$179.65 billion to \$186.31 billion. This reflects improved data for the British and French space agencies, and more accurate figures for both independent research and development (IR&D), and GPS chipset and equipment revenue. The Tauri Group, serving as technical lead, analyzed multiple sources of data for each industry sub-sector (where available) to determine which sources provide the most accurate accounting of the industry. *The Space Report 2008* will include more in-depth discussions of all revenue and government budget data as well as estimates of 2007 global space activity.



**EXHIBIT 1.**  
Percentage Breakdown of Global Space Budgets and Revenues 2006

The long-term trend of growth in the global space industry continued through calendar year 2006. Global space revenues and government space budgets totaled nearly \$220 billion in 2006, an 18 percent increase from 2005 (all figures are listed in then-year dollars). Satellite-based products and services and U.S. government budgets comprised the largest segments of the global space industry, with 50 percent and 28 percent of the total, respectively.

**\* TABLE 1. A Detailed Breakdown of the Global Space Industry for 2006**

TYPE	2005† (IN \$B)	2006 (IN \$B)	2006 SOURCE	DESCRIPTION
Commercial Infrastructure	\$28.70	\$33.12		
Satellite Manufacturing	\$2.30	\$2.92	Satellite Industry Association (SIA)	2006 revenue from production of commercial satellites <sup>1</sup>
Launch Industry (commercial)	\$1.20	\$1.40	Federal Aviation Administration (FAA)	2006 revenue from sale and launch of commercial payloads <sup>2</sup>

\* The data in Table 1 represent a compilation of selected estimates of revenue to industry and government budgets associated with global space activity in 2006. All data collected are from open-source information and select interviews, as noted. Estimates included were selected to provide the most complete and consistent estimate feasible. However, some incompatibilities and inconsistencies remain that cannot be resolved with the available data. In addition, some types of data are not available.

† Sources for 2005 revenue and budget figures are available in *The Space Report 2006*.

TABLE 1. Continued

TYPE	2005 (IN \$B)	2006 (IN \$B)	2006 SOURCE	DESCRIPTION
Ground Stations and Equipment	\$25.20	\$28.80	SIA	2006 revenue from mobile terminals, gateways, control stations, VSAT/USAT, DBS dishes, handheld phones and DARS equipment <sup>3</sup>
<b>Infrastructure Support Industries</b>	<b>\$1.04</b>	<b>\$1.02</b>		
Independent Research and Development (IR&D)	\$0.16*	\$0.17	Defense Contract Audit Agency	Estimate of space industry IR&D not recovered from the government <sup>4†</sup>
Insurance	\$0.88	\$0.85	<i>International Aerospace</i>	2006 industry premiums <sup>5</sup>
<b>Commercial Satellite Services</b>	<b>\$86.91</b>	<b>\$111.14</b>		
Direct-to-Home television (DTH)	\$46.00	\$55.05	In-Stat	2006 direct-to-home TV revenue <sup>6</sup>
Satellite Radio	\$0.81	\$1.59	XM, Sirius, WorldSpace	2006 revenue from XM <sup>7</sup> , Sirius <sup>8</sup> and WorldSpace <sup>9</sup>
Fixed Satellite Services (FSS)	\$9.80	\$11.80	SIA	2006 revenue from transponder agreements, VSAT services, and remote sensing. <sup>10</sup>
Mobile Satellite Services (MSS)	\$1.80	\$2.00	SIA	2006 revenue from MSS satellite services, ranging from narrowband voice to next generation broadband <sup>11</sup>
Global Positioning System (GPS) Equipment and Chipsets	\$28.50‡	\$40.70	ABI Research	Worldwide revenue for all GPS equipment and chipsets <sup>12</sup>
<b>Commercial Space Transportation Services</b>	<b>\$0.03</b>	<b>\$0.03</b>		
Orbital	\$0.02	\$0.02	Space Adventures	2006 revenue from Anousheh Ansari flight <sup>13</sup>
Suborbital	\$0.01	\$0.01	Virgin Galactic, Space Adventures	2006 down payments from customers <sup>14,15</sup>
<b>U.S. Government Space Budgets</b>	<b>\$57.24</b>	<b>\$62.00</b>		
Department of Defense (DoD) Space	\$21.70	\$22.50	Congressional Research Service (CRS)	FY 2006 Budget Request <sup>16</sup>
National Reconnaissance Office (NRO)	\$7.50	\$9.90	Global Security	FY 2006 NRO projection <sup>17</sup>
National Geospatial Intelligence Agency (NGA)	\$2.00	\$2.67	Global Security	FY 2006 NGA projection <sup>18</sup>
Missile Defense Agency (MDA)	\$9.00	\$9.30	MDA	FY 2006 Budget for U.S. Ballistic Missile Defense Program <sup>19</sup>

\* Figure revised by source.

† DDCA IR&D value, multiplied by the ratio of DoD-wide space R&D to overall R&D.

‡ Figure revised by source.

TABLE 1. Continued

TYPE	2005 (IN \$B)	2006 (IN \$B)	2006 SOURCE	DESCRIPTION
National Aeronautics and Space Administration (NASA)	\$16.10	\$16.62	NASA	FY 2006 Operating Budget <sup>20</sup>
National Oceanic and Atmospheric Administration (NOAA)	\$0.90	\$0.96	\$0.96	FY 2006 Budget Request <sup>21</sup>
Department of Energy (DOE)	\$0.03	\$0.04	DOE	FY 2006 Operating Budget <sup>22</sup>
Federal Aviation Administration (FAA)	\$0.01	\$0.01	FAA	FY 2006 Budget Request <sup>23</sup>
<b>International Government Space Budgets</b>	<b>\$12.39</b>	<b>\$13.46</b>		
European Space Agency (ESA)	\$3.70	\$3.52	ESA	FY 2006 Operating Budget Estimate <sup>24</sup>
Russia (Roscosmos)	\$0.70	\$0.87	RIA Novosti	FY 2006 Reported Budget <sup>25</sup>
France (CNES)	\$0.88*	\$0.85	CNES	CNES Budget, excluding ESA <sup>26</sup>
Italy (ASI)	\$0.40	\$0.33	ASI	FY 2006 Operating Budget, excluding ESA <sup>27</sup>
United Kingdom (BNSC)	\$0.12†	\$0.13	BNSC	FY 2006 Operating Budget, excluding ESA <sup>28</sup>
Japan (JAXA)	\$2.50	\$1.46	JAXA Public Affairs	FY 2006 Operating Budget <sup>29</sup>
India (ISRO)	\$0.70	\$0.82	Space.com	FY 2006 Operating Budget <sup>30</sup>
Canada (CSA)	\$0.30	\$0.33	CSA	FY 2006 Operating Budget <sup>31</sup>
China (CNSA)	\$0.50	\$1.50	World Security Institute	2006 Estimated Annual Expenditures <sup>32</sup>
Germany (DLR)	\$0.30	\$0.36	DLR	FY 2006 Operating Budget, excluding ESA <sup>33</sup>
Non-U.S. military space	\$2.29	\$2.29	Euroconsult	2004 Estimate of non-U.S. military space expenditures, excluding China <sup>34</sup>
<b>TOTAL</b>	<b>\$186.31</b>	<b>\$219.78</b>		

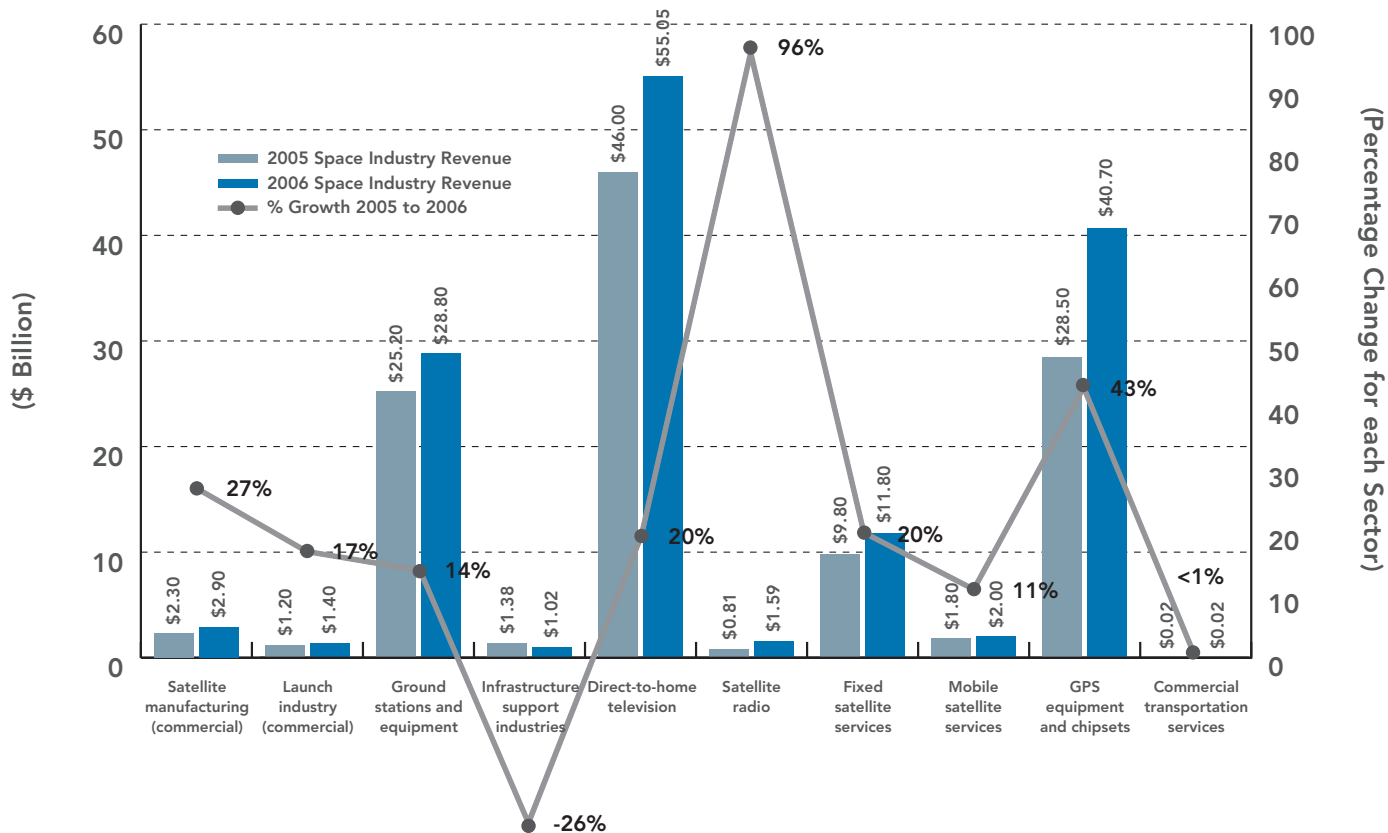
\* Figure revised by source.

† Figure revised by source.

Global commercial revenues in the space industry include those for space infrastructure, products, and services. Nearly every sector of commercial space experienced growth in 2006. Satellite services drove growth, with direct-to-home television and GPS equipment combining to add \$21.25 billion in revenue to the commercial satellite sector. Satellite manufacturing, ground equipment, and satellite radio posted strong gains as well.

GPS applications demonstrated the fastest growth of any market segment, with \$12.2 billion additional revenue, a growth rate of approximately 45 percent. According to ABI Research, expectations for high growth for GPS technology services predicted since the early 1990s, developed in late 2003, as the sector began to experience a major increase in demand and new products.<sup>35</sup> Since 2003, growth in units shipped has been driven by the communications sector, where GPS chipsets for handsets account for 43 percent, in terms of shipments, and 9 percent in terms of revenue.<sup>36</sup> Portable navigation devices have been a strong revenue driver in GPS equipment (26 percent of shipped units and 34 percent of revenue) as many new products have been made available at lower price points.<sup>37</sup> ABI Research projects the market to grow to approximately \$62 billion by 2008.<sup>38</sup>

**EXHIBIT 2. Commercial Space Industry Revenues: Percent Growth 2005–2006**



### **Commercial Infrastructure**

Commercial space infrastructure revenues increased 15 percent in 2006, from \$28.7 billion in 2005 to \$33.12 billion. While all three infrastructure sub-sectors (satellite manufacturing, launch services, and ground stations and equipment) grew from 2005 to 2006, the commercial satellite manufacturing industry experienced the largest percentage growth, with an increase of more than 25 percent.

Satellite manufacturing had a notable year in 2006 with 101 satellite payloads launched, accounting for \$12 billion in revenue. This reverses the slow decline experienced by the satellite manufacturing market from the previous five years. Of this \$12 billion in revenue, commercial payloads represented 25 percent, or \$2.92 billion. Commercial launches were responsible for \$1.4 billion in launch services revenue in 2006 according to the FAA. This represents approximately a 17 percent growth from the \$1.2 billion in revenue in 2005. Ground stations and equipment, the largest sub-sector of commercial space infrastructure, experienced stable growth in 2006, reaching \$28.8 billion, a 14 percent increase from 2005.

### **Infrastructure Support Industries**

The commercial space industry's IR&D expenditures that were not subsequently reimbursed by the Department of Defense (DoD) are estimated at \$173 million in 2005 and \$157 million in 2004, approximately a 10 percent increase.\* This 2004 estimate has been revised since publication of *The Space Report 2006*.

We estimated the space portion of IR&D by applying the ratio of space research and development (R&D) to total R&D within the DoD.† The result is an estimate of the percentage that can be attributed to space-related IR&D. Applying this methodology to the data reported in *The Space Report 2006*, the 2004 value for commercial IR&D was amended to \$157 million.

Satellite insurance premiums remained relatively constant through 2006, dipping slightly from \$.88 billion to \$.85 billion. This figure includes third party liability insurance, in-orbit policies, pre-launch insurance, and launch insurance.

### **Commercial Satellite Services**

Satellite services remains the dominant sector, accounting for 50 percent of space economic activities and approximately \$111.14 billion in revenue, a growth of 28 percent from 2005. GPS equipment and chipsets drove this growth, increasing 43 percent to \$40.7 billion in 2006 to become one of the largest revenue producers in the space industry. Direct-to-home television revenues also experienced strong growth, with a 20 percent increase to \$55 billion. Satellite radio revenues nearly doubled in 2006, increasing 96 percent

\* The data for 2005 are used as a proxy for 2006 in this document, as these data are always released a year later.

† This differs from the approach used in *The Space Report 2006*, which used the relationship between DoD space R&D and DoD aerospace R&D. This previous approach overstates the proportion of space IR&D. The Defense Contract Audit Agency tracks the value of DoD-wide IR&D.

to \$1.59 billion. XM Satellite Radio's revenues grew from \$560 million in 2005 to \$933 million in 2006, while those of Sirius Satellite Radio grew from \$250 million to \$637 million. The growth trend continued in the fixed satellite services and mobile satellite services sub-sectors with 20 percent and 11 percent growth, respectively.

### ***Commercial Space Transportation Services***

The orbital personal spaceflight industry continued to move forward at a measured pace. Anousheh Ansari became the fourth private individual to travel into space on September 18, 2006. Her orbital flight and stay aboard the International Space Station (ISS) were booked through Space Adventures, which brokers a payment of approximately \$20 million to the Russian Space Agency for orbital trips to the ISS. Ansari's contract prohibited discussion about its value; however, at the time of her flight, the Space Adventures advertised price was \$20 million. This has since changed to \$30-40 million.<sup>39</sup> While Ansari was the sole customer for this service in 2006, software developer Charles Simonyi made a similar flight in April 2007. Space Adventures also announced an agreement with Richard Garriott, son of former astronaut Owen Garriott, to fly into space in October 2008.<sup>40</sup> Garriott will be the sixth "private space explorer" for Space Adventures.

Virgin Galactic continues to collect deposits from customers for future suborbital space flights on SpaceShipTwo, which is still in development. In 2006, Virgin Galactic collected \$11 million in additional passenger deposits from their 2005 level of \$14 million. To date, Space Adventures has collected \$3 million in deposits for suborbital flights.

Worldwide government spending on space programs in 2006 increased or remained constant for nearly every major space agency, with the Japanese Aerospace and Exploration Agency (JAXA) as the notable exception. The total of these budgets was \$74.5 billion in 2006, a seven percent increase from 2005.

## **U.S. Government**

U.S. government space spending, which makes up more than 80 percent of global government space budgets, grew 8 percent to \$62 billion in 2006. The U.S. DoD and the National Aeronautics and Space Administration (NASA) are the two largest space agencies in the world, with fiscal 2006 budgets of \$22.5 billion and \$16.6 billion, respectively.

A portion of the 8 percent growth in U.S. space spending can be attributed to a 30 percent increase in budget estimates for the National Reconnaissance Office (NRO) and the National Geospatial-Intelligence Agency (NGA).<sup>41</sup> Global Security provided budget estimates for both 2005 and 2006,<sup>42</sup> as actual intelligence budgets are classified.\* Other U.S. government spending has remained relatively consistent, with modest growth in all civil and military agencies' space spending.

## **International Governments**

International government space budgets held steady as a whole, with moderate growth in Europe, Russia, and Asia offsetting reductions to the Japanese space program. Overall international government funding increased by approximately 1 percent to \$12.46 billion in 2006.<sup>†</sup> Non-U.S. space budgets represent about 5 percent of global space economic activity. The European Space Agency (ESA) is the largest international space agency with a budget of \$3.5 billion, followed by the French, Japanese, and Chinese agencies.

The French space agency, Centre Nationale d'Etudes Spatiales (CNES), has a budget of approximately \$.85 billion for 2006, excluding ESA contributions. This is a nominal decrease from the \$.88 billion CNES budget in 2005, but is an increase in real terms considering the change in value of the Euro from 2005 to 2006. For the period of 2005-2010, France intends to commit approximately \$5 billion to space programs, and the budget is projected to continue to grow under increased attention from the French government.<sup>43</sup>

The Japan Aerospace Exploration Agency (JAXA) was the only major international space agency to reduce spending in 2006. Its budget was cut significantly in 2006 to approximately \$1.5 billion (from \$2.5 billion in

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\* These numbers from Global Security are projections from budget data released in 1997 and 1998. In these years, intelligence budgets were declassified in response to Freedom of Information Act litigation. The director of Central Intelligence has since declined, with congressional consent, to release any other budget totals for other years. The figures presented in Table 1 use the same ratios as in the 1998 reports and have been projected to 2006 levels, adjusted for inflation and perceived agency need. Global Security considers these numbers to be accurate within about \$1 billion. The budget number used in this document is considered to be their conservative, minimum budget estimate. According to Global Security, their maximum possible budget for these agencies would be about one-third greater, or about \$13.2 billion for the NRO and about \$3.6 billion for the NGA.

† All international budgets are converted into U.S. dollars standardized to April 2006, the beginning of most international fiscal calendars.

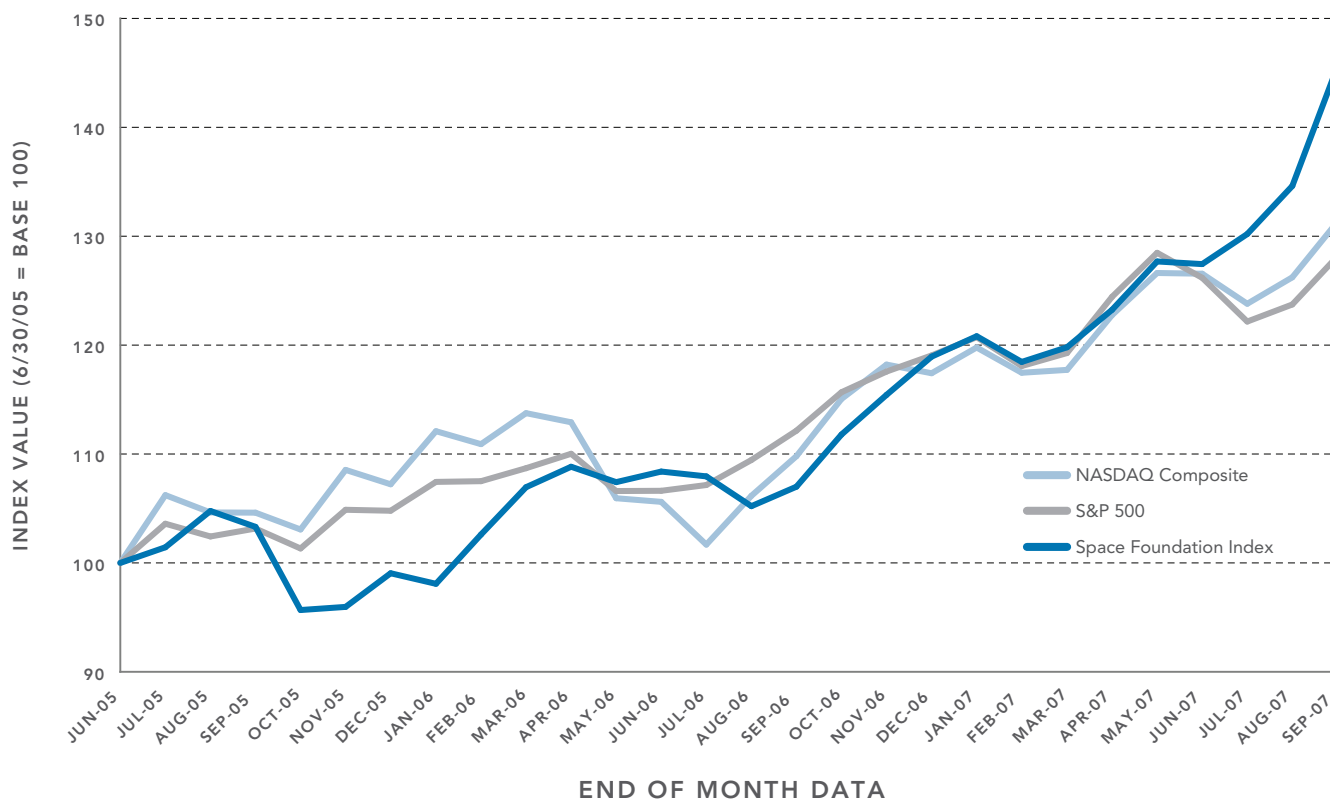
2005). The reduction is attributed to changing priorities within the government after more than a decade of economic stagnation. Keiji Tachikawa, currently the head of JAXA, has stated the cuts are pushing the program to near collapse.<sup>44</sup> The JAXA budget has been cut each year since 2003.<sup>45</sup>

Although the Chinese space budget is not published, the vice administrator of the China National Space Administration, Luo Ge, stated in 2005 that the Chinese space budget was around \$500 million. There is much speculation as to how much money the Chinese government is spending on space; secrecy, purchasing power parity, and overlap between military and civil spending complicate estimating efforts. China's space budget is generally estimated between \$1.5 billion and \$2 billion, with some media estimating as high as \$3 billion.<sup>46</sup> In October 2006, Sun Laiyan, administrator of the China National Space Administration, stated that China's space budget was less than one-tenth of NASA's budget.<sup>47</sup> Using all these data as a basis, a value of \$1.5 billion is used here for Chinese expenditures on space.

Indian, Russian, and European governments continue to increase space spending. Expenditures include improved infrastructure, particularly global positioning, navigation and Earth observation systems, and launch capacity. Non-U.S. military estimates are based on 2004 data and include the United Kingdom, France, Russia, Germany, Belgium, Spain, Italy, and Israel.

The Space Foundation Index, now in its third year, is a weighted index that tracks the market performance of 31 public companies that derive a significant portion of their revenue from space-related assets and activities. Since its inception in June 2005, the Space Foundation Index has increased by more than 45 percent, outpacing both the NASDAQ and S&P 500 indices, which grew by 31 percent and 28 percent, respectively. The Space Report 2006 included index data through June 30, 2006, and grew 8.4 percent in its first year. Over the ensuing 15 months through Sept. 30, 2007, the Space Foundation Index increased by an additional 34 percent. This growth has been fueled by the strong performance of GPS equipment, direct-to-home television, and space infrastructure companies within the index.

**EXHIBIT 3. Space Foundation Index vs. Other Market Indices**



Advancers led decliners by a 3:1 ratio in the past 15 months. Leading advancers included Garmin, Trimble Navigation, and Gilat Satellite Networks, which more than doubled in market capitalization over the past 15 months. Orbital Sciences, EchoStar, DirecTV, Lockheed Martin, Loral, Harris, Raytheon, LodgeNet Entertainment, and Comtech Telecommunications all experienced at least 40 percent growth over the same time frame. Leading decliners included Sirius Satellite Radio, SiRF Technology Holdings, TerreStar, Integral Systems, and GenCorp.

Since the Space Foundation Index was first introduced in *The Space Report 2006*, six new component companies have been added. These include Orbcomm and GlobalStar, who both had Initial Public Offerings since June 2006, as well as Hughes Communications, ICO Global Communications, GeoEye, and Globecom Systems. Five other companies were removed from the index as they were unable to maintain minimal requirements for inclusion.

The Space Foundation Index was been prepared by ISDR Consulting, LLC on behalf of the Space Foundation. This index is a modified market capitalization weighted index of representative space companies listed on U.S. market exchanges. Companies were selected based upon an evaluation of several criteria, including percentage of revenues attributable to space-related products and services, market capitalization, trading volume, and which U.S. exchange the securities or ADRs were listed on. Consideration was also given to providing diverse representation across various space-related markets. Space revenues include launch vehicle, satellite, and related ground segment manufacturing of components and systems; satellite communication services and capacity leasing; space-related positioning and remote sensing data and services and related equipment (including GPS chipsets); and space-related software, operations, and support services. Space revenue estimates were based upon a review of multiple sources, including *Space News'* Top 50 lists, company Web sites, SEC filings, as well as internal experience.

The index was initiated with a level of 100 as of June 30, 2005. Changes in the index value were driven by changes in the market capitalization of the component companies (price multiplied by number of shares outstanding of each company). The contributions of certain component companies' market capitalization to the index were discounted to adjust for lower percentage of revenues attributable to space-related products and services. The level of the index was not directly altered by stock splits, stock dividends, or trading halts, nor was it affected by new listings, additional issuances, delistings, or suspensions.

This document is provided for informational purposes only and does not constitute an offer to buy or sell or a solicitation of an offer to buy or sell any security or instrument or to participate in any transaction or strategy. The data used to calculate the index values are based upon information generally available to the public from sources which ISDR Consulting, LLC and the Space Foundation believe to be reliable and accurate. Neither the Space Foundation nor ISDR Consulting, LLC makes any guarantee or warranty as to the accuracy or completeness of the data set forth and it should not be relied upon as such. The Space Foundation may have as corporate sponsors some of the companies mentioned herein.

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**TABLE 2. Space Foundation Index Data**

	COMPARATIVE DATA			ACTUAL INDEX VALUES	
	NASDAQ	S&P 500	Space Index	NASDAQ	S&P 500
Jun-05	100.00	100.00	100.00	2056.96	1191.33
Jul-05	106.22	103.60	101.44	2184.83	1234.18
Aug-05	104.62	102.43	104.78	2152.09	1220.33
Sep-05	104.61	103.15	103.30	2151.69	1228.81
Oct-05	103.08	101.32	95.66	2120.3	1207.01
Nov-05	108.55	104.88	95.95	2232.82	1249.48
Dec-05	107.21	104.78	99.05	2205.32	1248.29
Jan-06	112.10	107.45	98.09	2305.82	1280.08
Feb-06	110.91	107.50	102.62	2281.39	1280.66
Mar-06	113.75	108.69	106.97	2339.79	1294.87
Apr-06	112.91	110.01	108.85	2322.57	1310.61
May-06	105.93	106.61	107.44	2178.88	1270.09
Jun-06	105.60	106.62	108.38	2172.09	1270.2
Jul-06	101.68	107.16	107.95	2091.47	1276.66
Aug-06	106.16	109.44	105.22	2183.75	1303.82
Sep-06	109.79	112.13	107.00	2258.43	1335.85
Oct-06	115.06	115.66	111.80	2366.71	1377.94
Nov-06	118.22	117.57	115.43	2431.77	1400.63
Dec-06	117.42	119.05	118.95	2415.29	1418.3
Jan-07	119.79	120.73	120.83	2463.93	1438.24
Feb-07	117.46	118.09	118.46	2416.15	1406.82
Mar-07	117.73	119.27	119.79	2,421.64	1,420.86
Apr-07	122.76	124.43	123.25	2,525.09	1,482.37
May-07	126.62	128.48	127.69	2,604.52	1,530.62
Jun-07	126.56	126.19	127.44	2,603.23	1,503.35
Jul-07	123.79	122.16	130.21	2,546.27	1,455.27
Aug-07	126.22	123.73	134.32	2,596.36	1,473.99
Sep-07	131.33	128.16	145.57	2,701.50	1,526.75

**TABLE 3. Space Foundation Index Composition**

INFRASTRUCTURE COMPANIES			
<i>Space Segment Sub-System Manufacturers &amp; System Integrators</i>		<i>Ground Segment &amp; Satellite Component Manufacturers</i>	
<u>Ticker</u>	<u>Company</u>	<u>Ticker</u>	<u>Company</u>
BA	Boeing Co.	GRMN	Garmin Ltd.
LMT	Lockheed Martin Corp.	TRMB	Trimble Navigation Ltd.
RTN	Raytheon Co.	SIRF	SiRF Technology Holdings Inc.
NOC	Northrop Grumman Corp.	HUGH <sup>1,2</sup>	Hughes Communications, Inc.
HRS	Harris Corp.	VSAT <sup>1</sup>	Viasat, Inc.
ATK	Alliant Techsystems Inc.	CMTL	Comtech Telecommunications Corp.
ORB	Orbital Sciences Corp.	GILT <sup>1</sup>	Gilat Satellite Networks Ltd.
LORL <sup>1</sup>	Loral Space & Communications, Inc.	ELMG	EMS Technologies Inc.
GY	GenCorp Inc.	GCOM <sup>2</sup>	Globecom Systems, Inc.
		ISYS	Integral Systems Inc.
SATELLITE SERVICES COMPANIES			
<i>Consumer/Retail Services</i>		<i>Enterprise/Government Services</i>	
<u>Ticker</u>	<u>Company</u>	<u>Ticker</u>	<u>Company</u>
DTV	DirecTV Group, Inc.	HUGH <sup>1,2</sup>	Hughes Communications, Inc.
BSY	British Sky Broadcasting Group plc	VSAT <sup>1</sup>	Viasat, Inc.
DISH	EchoStar Communications Corp.	LORL <sup>1</sup>	Loral Space & Communications, Inc.
SIRI	Sirius Satellite Radio Inc.	SAT	Asia Satellite Telecommunications Holdings Ltd.
XMSR	XM Satellite Radio Holdings Inc.	TSTR	TerreStar Corporation
LNET	LodgeNet Entertainment Corp.	ICOG <sup>2</sup>	ICO Global Communications
		GSAT <sup>2</sup>	Globalstar Inc.
		GEOY <sup>2</sup>	GeoEye
		GILT <sup>1</sup>	Gilat Satellite Networks Ltd.
		ORBC <sup>2</sup>	Orbcomm, Inc.
<sup>1</sup> Company has major operations in more than one industry segment <sup>2</sup> Company was added as a new component to the Space Foundation Index in 2007 Composition of Space Foundation Index			

- 1 Futron. State of the Satellite Industry Report, June 2007, p. 9, 13-15. Retrieved July 11, 2007, from <http://www.sia.org/PDF/2007StateofSatelliteIndustryReport.pdf>.
- 2 Federal Aviation Administration (FAA). Commercial Space Transportation: 2006 Year In Review, January 2007, p. 3, 7. Retrieved July 11, 2007, from [http://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/media/2006YIR.pdf](http://www.faa.gov/about/office_org/headquarters_offices/ast/media/2006YIR.pdf).
- 3 Futron. State of the Satellite Industry Report, June 2007, p. 9, 19-20. Retrieved July 11, 2007, from <http://www.sia.org/PDF/2007StateofSatelliteIndustryReport.pdf>.
- 4 Department of Defense Independent Research and Development. "Recovery of IR&D Costs," July 2006. Retrieved July 17, 2007, from <http://www.dtic.mil/ird/stats/index.html>.
- 5 Radhakrishna, Rao. "Space Insurance Business Strives To Find Feet," International Aerospace Magazine, January-February 2007, p. 37-38, 40. Retrieved July 17, 2007, from <http://www.internationalaerospaceindia.com/2007/jan-feb/internationalaerospaceindia5.pdf>.
- 6 InStat. Michael Inouye (Research Analyst), August 21, 2007.
- 7 XM Satellite Radio. XM Satellite Radio 2006 Annual Report, p. 1. Retrieved July 12, 2007, from <http://library.corporate-ir.net/library/11/115/115922/items/249680/XMAR2006.pdf>.
- 8 Sirius Satellite Radio. Sirius Satellite Radio 2006 Annual Report and Proxy Statement, p. 3. Retrieved July 12, 2007, from <http://investor.sirius.com/downloads/2006AR.pdf>.
- 9 WorldSpace, Inc. Consolidated Statement of Operations, December 2006. Retrieved via fax from Stuart M. Fishkin (Senior Vice President-Finance & Treasurer) July 6, 2006.
- 10 "Satellite Industry Revenues," Via Satellite Magazine, July 2007, p. 32. Retrieved July 18, 2007, from <http://www.viasatellite-digital.com/viasatellite/200707/?pg=32>.
- 11 Futron. State of the Satellite Industry Report, June 2007, p. 10. Retrieved July 11, 2007, from <http://www.sia.org/PDF/2007StateofSatelliteIndustryReport.pdf>.
- 12 ABI Research. Christine Gallen (Marketing Director), September 20, 2007.
- 13 Space Adventures, Ltd.. Space Adventures' Programs. Retrieved August 15, 2007, from <http://www.spaceadventures.com/company/programs>.
- 14 Virgin Galactic. "Virgin Galactic Appoints George Whitesides as Senior Advisor," June 21, 2007. Retrieved August 15, 2007, from <http://www.virgingalactic.com/htmlsite/news.php>.
- 15 Space Adventures, Ltd.. Stacey Tearne (Vice President of Communications), August 21, 2007.
- 16 Congressional Research Service (CRS). "U.S. Military Space Programs: An Overview of Appropriations and Current Issues," Open CRS, August 7, 2007. Retrieved July 13, 2007, from <http://www.opencrs.com/document/RL33601/>.
- 17 Global Security.org. FY2006 Intelligence Budget, October 2005. Retrieved July 5, 2007, from <http://www.globalsecurity.org/intell/library/>.
- 18 Ibid.
- 19 Missile Defense Agency (MDA). Historical Funding for MDA F Y85-07. Retrieved July 5, 2007, from <http://www.mda.mil/mdalink/pdf/histfunds.pdf>.
- 20 National Aeronautics and Space Administration (NASA). National Aeronautics and Space Administration President's FY 2007 Budget Request, January 2006. Retrieved July 5, 2007, from [http://www.nasa.gov/about/budget/FY\\_2007/index.html](http://www.nasa.gov/about/budget/FY_2007/index.html).
- 21 National Oceanic and Atmospheric Administration (NOAA). FY 2006 Budget Highlights: National Environmental Satellite, Data and Information Service, February 2005. Retrieved July 2, 2007, from <http://www.publicaffairs.noaa.gov/budget2006/>.
- 22 Department of Energy (DoE), Office of Management, Budget and evaluation/CFO. Department of Energy FY2006 Vol. 3: Energy Supply and Conservation, February 2006, p. 666. Retrieved July 2, 2007, from [http://www.mbe.doe.gov/budget/07budget/Content/Volumes/vol\\_3\\_ES.pdf](http://www.mbe.doe.gov/budget/07budget/Content/Volumes/vol_3_ES.pdf).
- 23 Department of Transportation (DOT). Budget in Brief: Fiscal Year 2007, February 2006, p. 24-27. Retrieved July 2, 2007, from <http://www.dot.gov/bib2007/bib2007.pdf>.
- 24 European Space Agency (ESA). ESA Facts and Figures, June 6, 2007. Retrieved July 6, 2007, from [http://www.esa.int/esaCP/GGG45XG3AEC\\_index\\_0.html](http://www.esa.int/esaCP/GGG45XG3AEC_index_0.html).
- 25 "Russia remains leader in spacecraft launches - space agency," RIA Novosti, December 26, 2006. Retrieved September 14, 2007, from <http://en.rian.ru/russia/20061226/57833667.html>.
- 26 Centre Nationale d'Études Spatiale (CNES). CNES Budget, May 2007. Retrieved September 11, 2007, from [http://www.nauka.gov.pl/mein/\\_gallery/27/54/27541/20070525\\_CNES.pdf](http://www.nauka.gov.pl/mein/_gallery/27/54/27541/20070525_CNES.pdf).
- 27 Agenzia Spaziale Italiana (ASI). Piano Triennale di Attività 2006 – 2008, May 11, 2006. Retrieved September 11, 2007, from <http://www.asi.it/html/ita/news/PTA%202006-2008%20approvato%20delibera%2017-2006.pdf>.
- ESA. ESA Annual Report, 2007. Retrieved September 11, 2007, from [http://www.esa.int/esapub/annuals/annual06/ESA\\_AR2006.pdf](http://www.esa.int/esapub/annuals/annual06/ESA_AR2006.pdf).
- 28 British National Space Centre (BNSC). How Are We Funded? Retrieved July 10, 2007, from <http://www.bnsc.gov.uk/content.aspx?nid=5551>.

- 29 Japanese Aerospace Exploration Agency (JAXA). Fukuda Kyoko (JAXA Public Affairs), July 9, 2007.
- 30 Jayaraman, K.S.. "Record-Setting Indian Space Budget Includes Funds for Large Satellites," Space News, March 6, 2007. Retrieved July 5, 2007, from [http://www.space.com/spacenews/archive06/Isro\\_030606.html](http://www.space.com/spacenews/archive06/Isro_030606.html).
- 31 Canadian Space Agency (CSA). Report on Plans and Priorities, September 11, 2006. Retrieved July 23, 2007, from <http://www.space.gc.ca/asc/eng/resources/publications/rpp-2006.asp#section3-2>.
- 32 World Security Institute. China-US Dialogue On Space: Budget. Retrieved July 17, 2007, from <http://www.wsichina.org/www/program.cfm?programid=3&charid=1>.
- 33 German Aerospace Center (DLR). DLR at a glance. Retrieved July 17, 2007, from [http://www.dlr.de/en/desktopdefault.aspx/tabid-636/1065\\_read-1465/](http://www.dlr.de/en/desktopdefault.aspx/tabid-636/1065_read-1465/).
- 34 Boehinger, S. Europe and Space Economic Dimension. Retrieved August 21, 2007, from [http://www.euroconsult-ec.com/pdf\\_news/Europe%20and%20space%20the%20Economic%20Dimension.pdf](http://www.euroconsult-ec.com/pdf_news/Europe%20and%20space%20the%20Economic%20Dimension.pdf).
- 35 ABI Research. Location-Based Services: Operator Strategies, Revenue Opportunities, Subscribers, Devices, and Applications for Mobile LBS, 4Q 2006. Retrieved September 16, 2007, from [http://www.abiresearch.com/products/market\\_research/Location\\_Based\\_Services](http://www.abiresearch.com/products/market_research/Location_Based_Services).
- 36 ABI Research. Global Navigation Satellite System Receiver Shipments to Increase Sevenfold by 2011, September 20, 2006. Retrieved September 17, 2007, from <http://www.abiresearch.com/abiprdisplay.jsp?pressid=726>.
- 37 Ibid.
- 38 ABI Research. Christine Gallen (Marketing Director), September 20, 2007.
- 39 Space Adventures, Ltd.. Scheduled ISS Missions. Retrieved September 20, 2007, from [http://www.spaceadventures.com/index.cfm?fuseaction=orbital.Scheduled\\_ISS\\_Missions](http://www.spaceadventures.com/index.cfm?fuseaction=orbital.Scheduled_ISS_Missions).
- 40 Space Adventures, Ltd.. Space Adventures Announces 1st Second Generation Astronaut, September 28, 2007. Retrieved October 1, 2007, from <http://www.spaceadventures.com/index.cfm?fuseaction=news.viewnews&newsid=554>.
- 41 Global Security.org. John Pike (Director), July 15, 2007.
- 42 Ibid.
- 43 Johnson, Rebecca. "Europe's Space Policies and Their Relevance to ESDP," RedOrbit, March 28, 2007. Retrieved June 6, 2007, from [http://www.redorbit.com/news/space/883287/europes\\_space\\_policies\\_and\\_their\\_relevance\\_to\\_esdp/index.html?source=r\\_space](http://www.redorbit.com/news/space/883287/europes_space_policies_and_their_relevance_to_esdp/index.html?source=r_space).
- 44 Talmadge, Eric. "Japanese Space Agency in Severe Budget Crisis," Space.com, April 28, 2005. Retrieved July 18, 2007, from [http://www.space.com/news/jaxa\\_trouble\\_050428.html](http://www.space.com/news/jaxa_trouble_050428.html).
- 45 Ibid.
- 46 World Security Institute. China-US Dialogue On Space: Budget. Retrieved July 17, 2007, from <http://www.wsichina.org/www/program.cfm?programid=3&charid=1>.
- 47 "Chinese Annual Space Budget Exceeds 2 Billion Dollars," Space Daily, October 12, 2006. Retrieved June 6, 2007, from [http://www.spacedaily.com/reports/Chinese\\_Annual\\_Space\\_Budget\\_Exceeds\\_Two\\_Billion\\_Dollars\\_999.html](http://www.spacedaily.com/reports/Chinese_Annual_Space_Budget_Exceeds_Two_Billion_Dollars_999.html).