FAA
Commercial Space
Transportation

Quarterly Launch Report
4th Quarter 2007

Featuring Launch Results from the 3rd Quarter 2007 and
Forecasts for the 4th Quarter 2007 and 1st Quarter 2008

Special Report: U.S. Spaceport Outlook 2007

Introduction

The *Fourth Quarter 2007 Quarterly Launch Report* features launch results from the third quarter of 2007 (July-September 2007) and forecasts for the fourth quarter of 2007 (October-December 2007) and the first quarter of 2008 (January-March 2008). This report contains information on worldwide commercial, civil, and military orbital and commercial suborbital space launch events. Projected launches have been identified from open sources, including industry contacts, company manifests, periodicals, and government sources. Projected launches are subject to change.

This report highlights commercial launch activities, classifying commercial launches as one or both of the following:

- Internationally-competed launch events (i.e., launch opportunities considered available in principle to competitors in the international launch services market);
- Any launches licensed by the Office of Commercial Space Transportation of the Federal Aviation Administration under 49 United States Code Subtitle IX, Chapter 701 (formerly the Commercial Space Launch Act).

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Cover (photo by Carleton Bailie courtesy of the The Boeing Company, copyright © 2007): A Boeing Delta 2 rocket lifts off from Vandenberg Air Force Base on September 18, 2007 carrying the commerical imaging satellite Worldview 1 operated by DigitalGlobe.

Third Quarter 2007 Highlights

On July 16, the National Aeronautics and Space Administration (NASA) signed a contract with Pratt and Whitney Rocketdyne for development of a new engine that will power the upper stages of NASA's planned Ares 1 and Ares 5 launch vehicles. The contract provides for developing and testing of the J-2X engine, successor to the J-2 engines used decades ago in the Saturn 1 and Saturn 5 rockets. The J-2X rocket is planned for use in the Ares 1 rocket, which will launch the Orion crew exploration vehicle, as well as the Ares 5, a heavy-lift booster designed for lunar missions. The $1.2-billion contract runs through 2012 and includes the delivery of multiple test engines; engines for mission use will be procured under a different contract.

In a separate transaction, on August 28, NASA announced its selection of The Boeing Company to manufacture the upper stage of the Ares 1 crew launch vehicle. (The upper stage will feature engines built by Pratt and Whitney Rocketdyne under the July 16 contract.) The Boeing contract, valued at $514.7 million, provides for design and manufacture of test units and six production stages. Boeing will produce between two and six upper stages per year during regular production, depending on NASA needs. If all options of the cost-plus-performance contract are exercised through 2017, Boeing could produce as many as 23 Ares upper stages.

On July 20, Northrop Grumman Corporation announced plans to acquire Scaled Composites LLC, the Mojave, California-based developer of the SpaceShipOne vehicle that captured the Ansari X Prize in 2004. Northrop Grumman, which had previously held a 40 percent stake in Scaled Composites, had increased its ownership to 100 percent earlier in July. Both companies stated that the acquisition would have no effect on Scaled Composites's arrangement to provide a fleet of SpaceShipTwo vehicles for the suborbital space tourism firm Virgin Galactic.

On July 26, 2007, a nitrous oxide flash explosion at Mojave killed three Scaled Composites employees and injured three others. The accident has prompted Mojave Air and Spaceport and Scaled Composites officials to review preventive safety procedures at the launch facility.

On September 6, a Proton rocket carrying the Japanese communications satellite JCSAT 11 failed to reach orbit when the booster's second-stage engines failed to ignite, causing it to crash in Kazakh territory downrange from the Baikonur launch site. The provider for the commercial mission, International Launch Services (ILS), declared a launch anomaly and reported that a Russian State Commission had been convened to investigate the malfunction. The precise failure cause is still being determined.

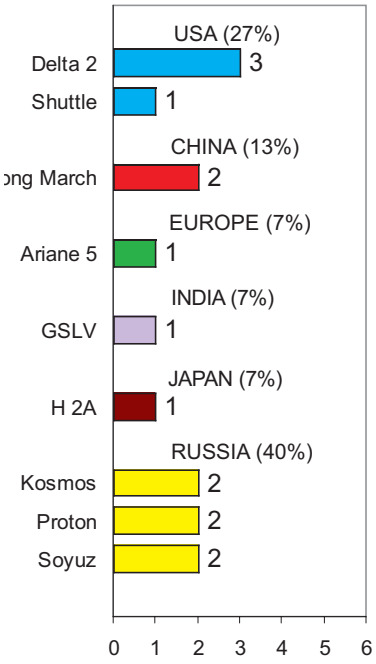
On September 7, NASA took the first step toward terminating its agreement with Rocketplane Kistler (RpK) to develop commercial orbital transportation services (COTS) to the International Space Station (ISS). The $207-million NASA award to RpK, announced in 2006, was contingent upon RpK raising $500 million in private funds to support the development of its K-1 launch vehicle. However, so far in 2007, RpK has missed two deadlines to demonstrate to NASA that it had secured this funding, prompting the agency to give RpK a 30-day notice of award termination. Although NASA will have the option of canceling its agreement at the end of these 30 days, agency and RpK officials have maintained the possibility of RpK continuing with its COTS program should the company raise the necessary money within this period.

On September 13, the X Prize Foundation and the internet search engine company Google unveiled the $30-million Google Lunar X Prize competition. Under the terms of the competition, Google will award $20 million to the first company to develop privately a lunar rover that can soft-land on the Moon, rove at least 500 meters, and return a series of high-resolution images and videos. A $5-million prize will be awarded to the second company to achive the feat. The remaining $5 million will fund bonus prizes, such as discovering lunar water ice. The X Prize Foundation will administer the competition, whose cash prize will expire at the end of 2014.

On September 28, the space tourism company Space Adventures announced its next visitor to the ISS: Richard Garriott, CEO of the North American division of the computer gaming company NCSoft and the son of former astronaut Owen Garriott. Richard Garriott is slated to fly to the ISS aboard a Soyuz vehicle in October 2008. He will be the sixth space tourist to visit the ISS.

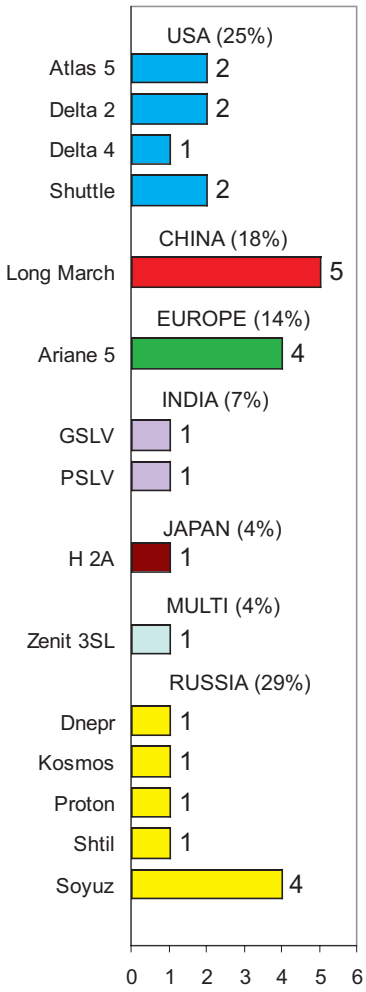
Vehicle Use
(July 2007 – March 2008)

Figure 1: Third Quarter 2007 Total Launch Vehicle Use



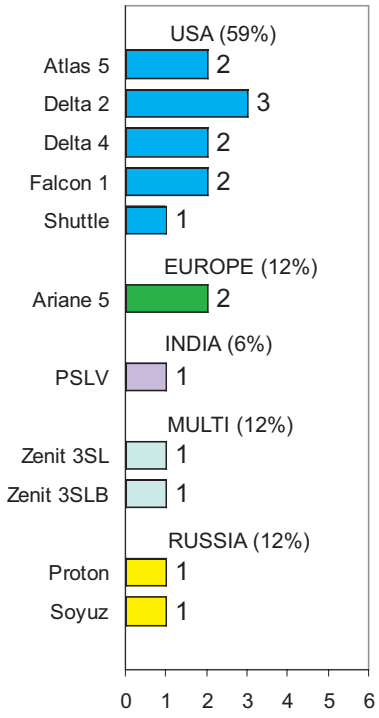
Total = 15

Figure 2: Fourth Quarter 2007 Total Projected Launch Vehicle Use



Total = 28

Figure 3: First Quarter 2008 Total Projected Launch Vehicle Use



Total = 17

Figures 1-3 show the total number of orbital and commercial suborbital launches of each launch vehicle and the resulting market share that occurred in the third quarter of 2007. They also project this information for the fourth quarter of 2007 and first quarter of 2008. The launches are grouped by the country in which the primary vehicle manufacturer is based. Exceptions to this grouping are launches performed by Sea Launch, which are designated as multinational.

Note: Percentages for these and subsequent figures may not add up to 100 percent due to rounding of individual values.

Commercial Launch Events by Country

(July 2007 – March 2008)

Figure 4: Third Quarter 2007 Commercial Launch Events by Country

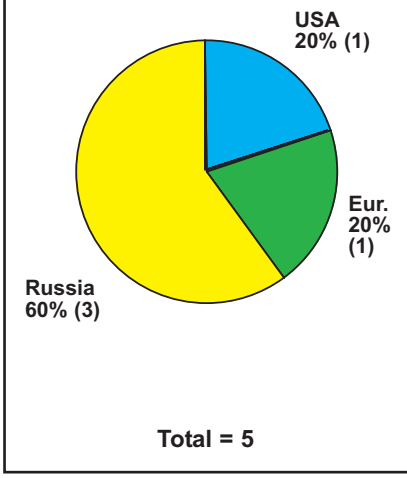


Figure 5: Fourth Quarter 2007 Projected Commercial Launch Events by Country

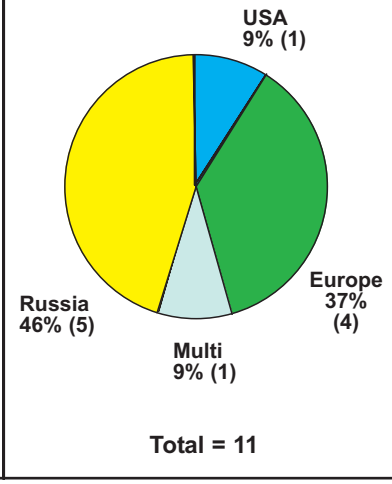
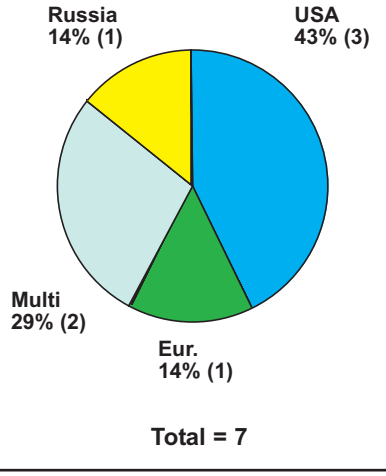


Figure 6: First Quarter 2008 Projected Commercial Launch Events by Country



Figures 4-6 show all commercial orbital and suborbital launch events that occurred in the third quarter of 2007 and that are projected for the fourth quarter of 2007 and first quarter of 2008.

Commercial vs. Non-Commercial Launch Events

(July 2007 – March 2008)

Figure 7: Third Quarter 2007 Commercial vs. Non-Commercial Launch Events

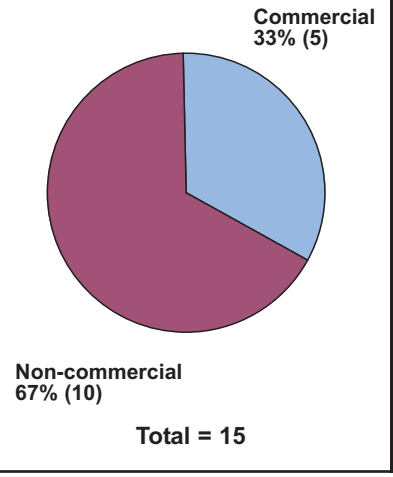


Figure 8: Fourth Quarter 2007 Projected Commercial vs. Non-Commercial Launch Events

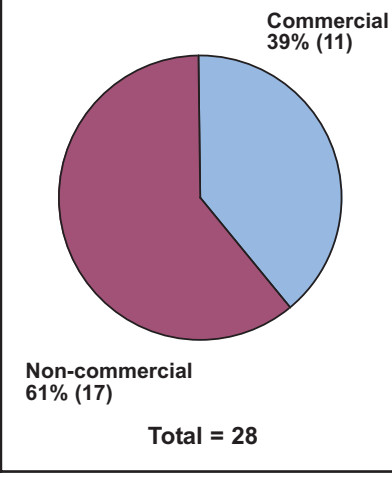
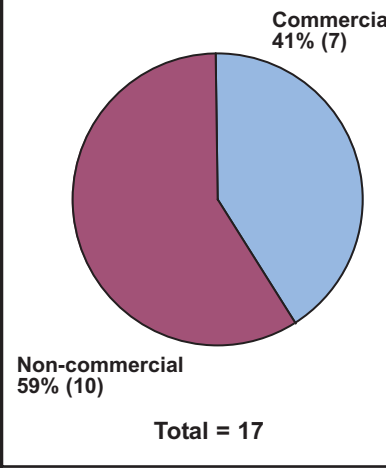


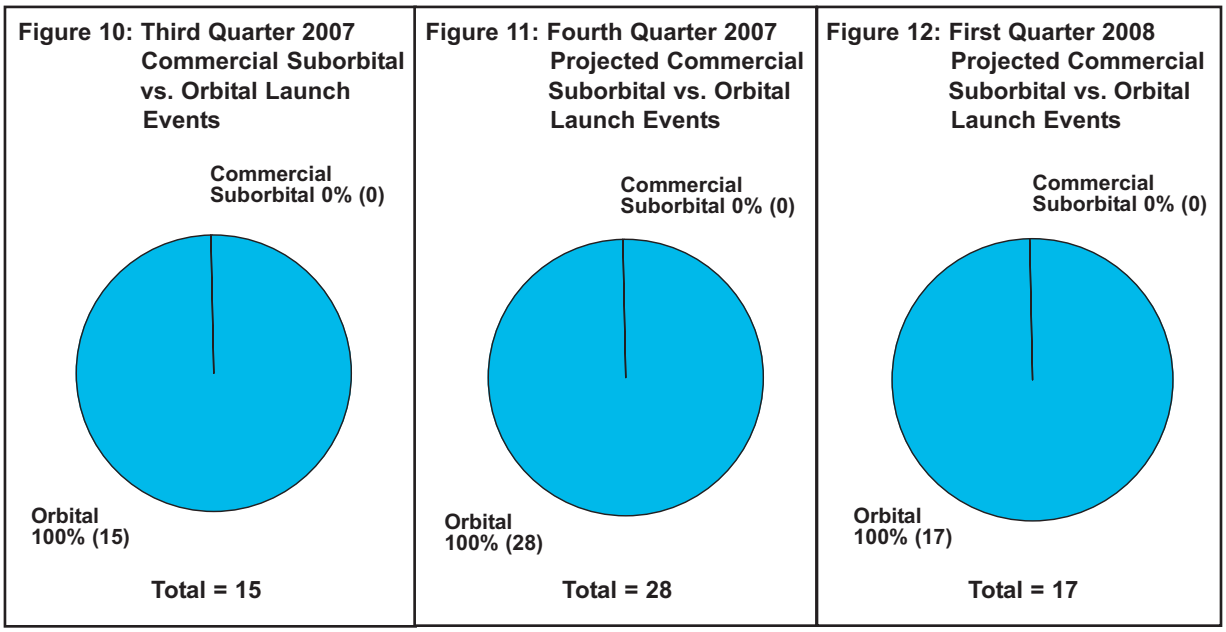
Figure 9: First Quarter 2008 Projected Commercial vs. Non-Commercial Launch Events



Figures 7-9 show commercial vs. non-commercial orbital and suborbital launch events that occurred in the third quarter of 2007 and that are projected for the fourth quarter of 2007 and first quarter of 2008.

Orbital vs. Commercial Suborbital Launch Events

(July 2007 – March 2008)



Figures 10-12 show orbital vs. FAA-licensed commercial suborbital launch events (or their international equivalents) that occurred in the third quarter of 2007 and that are projected for the fourth quarter of 2007 and first quarter of 2008.

Launch Successes vs. Failures

(July 2007 – September 2007)

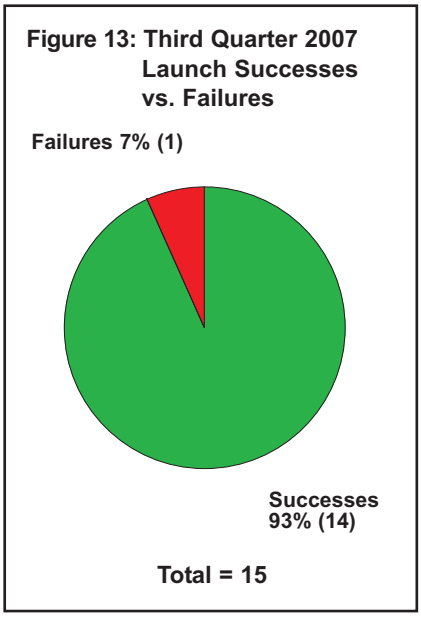
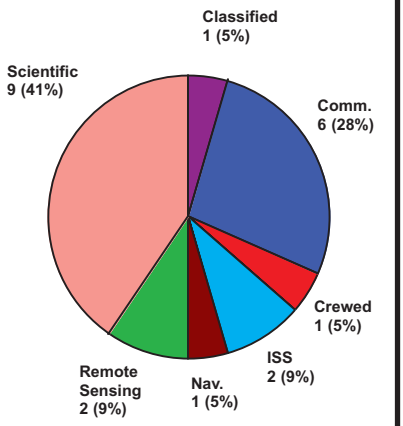


Figure 13 shows orbital and commercial suborbital launch successes vs. failures for the period from July 2007 to September 2007. Partially-successful orbital launch events are those where the launch vehicle fails to deploy its payload to the appropriate orbit, but the payload is able to reach a useable orbit via its own propulsion systems. Cases in which the payload does not reach a useable orbit or would use all of its fuel to do so are considered failures.

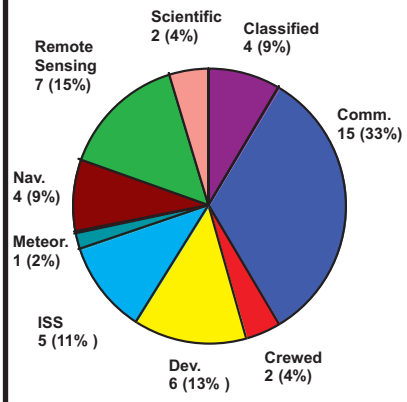
Payload Use (Orbital Launches Only)
(July 2007 – March 2008)

Figure 14: Third Quarter 2007 Payload Use



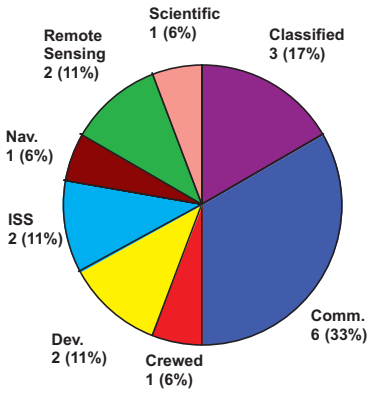
Total = 22

Figure 15: Fourth Quarter 2007 Projected Payload Use



Total = 46

Figure 16: First Quarter 2008 Projected Payload Use

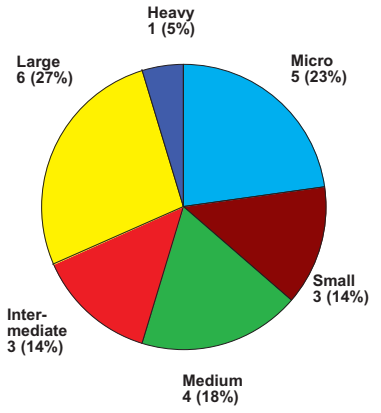


Total = 18

Figures 14-16 show total payload use (commercial and government), actual for the third quarter of 2007 and projected for the fourth quarter of 2007 and first quarter of 2008. The total number of payloads launched may not equal the total number of launches due to multi-manifesting, i.e., the launching of more than one payload by a single launch vehicle.

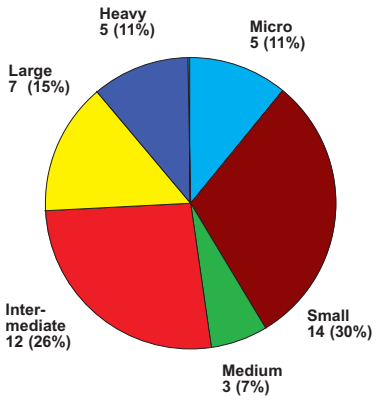
Payload Mass Class (Orbital Launches Only)
(July 2007 – March 2008)

Figure 17: Third Quarter 2007 Payload Mass Class



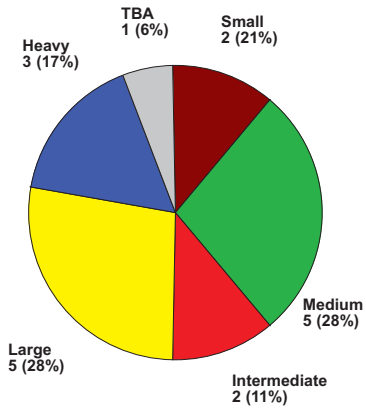
Total = 22

Figure 18: Fourth Quarter 2007 Projected Payload Mass Class



Total = 46

Figure 19: First Quarter 2008 Projected Payload Mass Class



Total = 18

Figures 17-19 show total payloads by mass class (commercial and government), actual for the third quarter of 2007 and projected for the fourth quarter of 2007 and first quarter of 2008. The total number of payloads launched may not equal the total number of launches due to multi-manifesting, i.e., the launching of more than one payload by a single launch vehicle. Payload mass classes are defined as Micro: 0 to 91 kilograms (0 to 200 lbs.); Small: 92 to 907 kilograms (201 to 2,000 lbs.); Medium: 908 to 2,268 kilograms (2,001 to 5,000 lbs.); Intermediate: 2,269 to 4,536 kilograms (5,001 to 10,000 lbs.); Large: 4,537 to 9,072 kilograms (10,001 to 20,000 lbs.); and Heavy: over 9,072 kilograms (20,000 lbs.).

Commercial Launch Trends (Orbital Launches Only)
(October 2006 – September 2007)

Figure 20: Commercial Launch Events, Last 12 Months

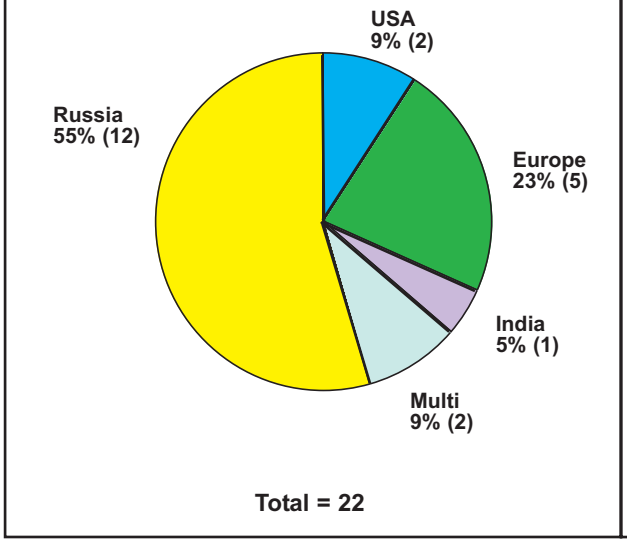


Figure 21: Estimated Commercial Launch Revenue, Last 12 Months

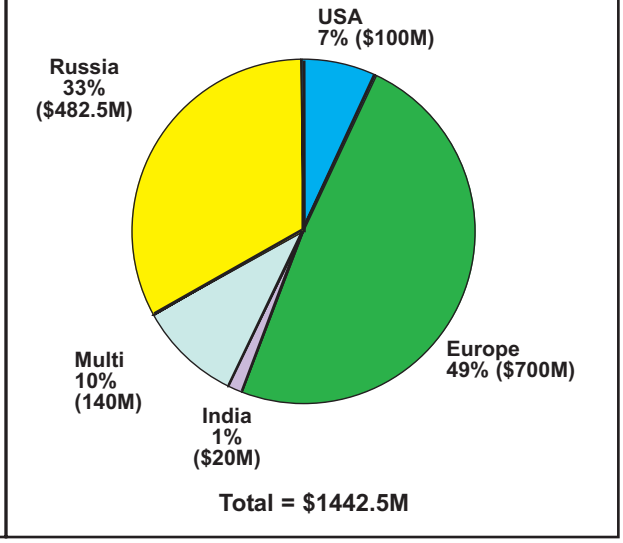


Figure 20 shows commercial orbital launch events for the period of October 2006 to September 2007 by country.

Figure 21 shows estimated commercial launch revenue for orbital launches for the period of October 2006 to September 2007 by country.

Commercial Launch Trends (Suborbital Launches and Experimental Permits)
(October 2006 – September 2007)

Figure 22: FAA-Licensed Commercial Suborbital Launch Events (or Their International Equivalents), Last 12 Months

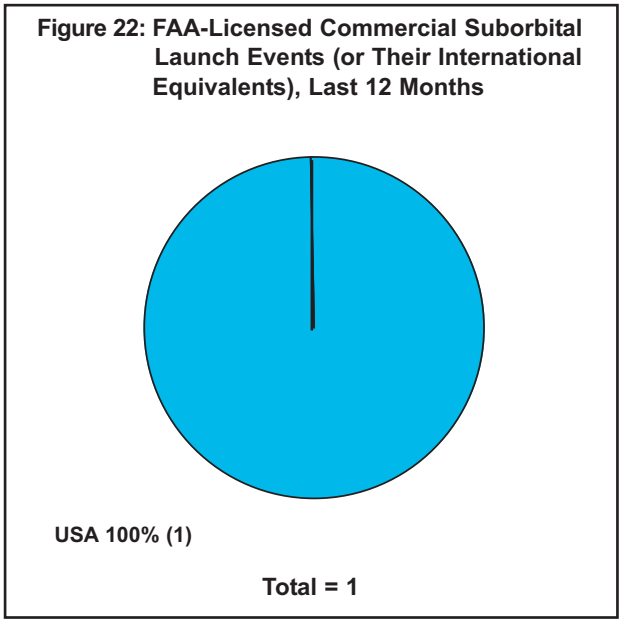


Figure 23: FAA Experimental Permit Flights, Last 12 Months

Flight Date	Operator	Vehicle	Launch Site
10/19/2006	Armadillo Aerospace	Pixel	Las Cruces International Airport, NM
10/20/2006	Armadillo Aerospace	Pixel	Las Cruces International Airport, NM
10/21/2006	Armadillo Aerospace	Pixel	Las Cruces International Airport, NM
10/21/2006	Armadillo Aerospace	Pixel	Las Cruces International Airport, NM
10/21/2006	Armadillo Aerospace	Pixel	Las Cruces International Airport, NM
11/13/2006	Blue Origin	Goddard	West Texas Launch Site, TX
3/22/2007	Blue Origin	Goddard	West Texas Launch Site, TX
4/19/2007	Blue Origin	Goddard	West Texas Launch Site, TX
6/2/2007	Armadillo Aerospace	Pixel	Oklahoma Spaceport, OK
6/2/2007	Armadillo Aerospace	Pixel	Oklahoma Spaceport, OK

Figure 22 shows FAA-licensed commercial suborbital launch events (or their international equivalents) for the period of October 2006 to September 2007 by country.

Figure 23 shows suborbital flights conducted under FAA experimental permits for the period of October 2006 to September 2007.

Commercial Launch History
(January 2002 – December 2006)

Figure 24: Commercial Launch Events by Country, Last Five Years

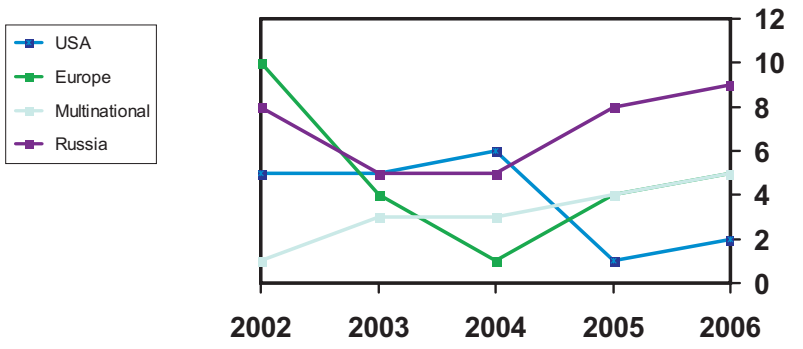


Figure 24 shows commercial launch events by country for the last five full calendar years.

Figure 25: Estimated Commercial Launch Revenue (in $ millions) by Country, Last Five Years

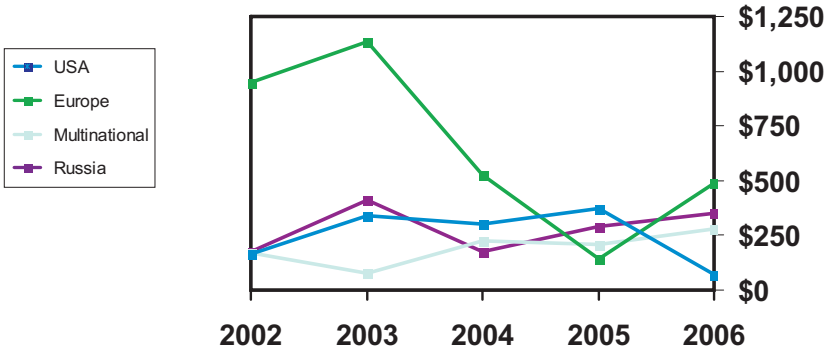


Figure 25 shows estimated commercial launch revenue by country for the last five full calendar years.

U.S. Spaceport Outlook 2007

Introduction

The majority of U.S. space traffic still revolves around the six federal launch sites: Cape Canaveral Air Force Station (CCAFS) and Kennedy Space Center (KSC) in Florida; Vandenberg Air Force Base (VAFB) and Edwards Air Force Base (AFB) in California; Wallops Flight Facility (WFF) in Virginia; and Reagan Test Site on Kwajalein Island. At the same time, the emergence of entrepreneurial space ventures has fostered demand for a separate class of space facilities devoted to commercial orbital and suborbital launches. The introduction of new vehicles tailored to the commercial market and the arrival of space tourism as a reality have demonstrated the robustness of the commercial space sector, as well as its need for launch sites that can accommodate its distinct requirements.

As a result, non-federal commercial spaceports have taken on new prominence. Since 1996, six have been licensed by the Federal Aviation Administration Office of Commercial Space Transportation (FAA/AST). One other, Blue Origin West Texas Launch Site, hosted the first experimental permit for a reusable suborbital rocket in September 2006. Additionally, eight more non-federal spaceports have been proposed and may be in development: Spaceport Alabama in Alabama; Cecil Field Spaceport in Florida; Spaceport America in New Mexico; South Texas Spaceport in Texas; West Texas Spaceport, also in Texas; Spaceport Washington in Washington; Spaceport Sheboygan in Wisconsin; and Chugwater Spaceport in Wyoming.

This special report focuses on the six FAA-licensed non-federal spaceports. Issuance of a spaceport license is an indication that the FAA has formally determined that a "launch or re-entry site will not jeopardize public health and safety, property, U.S. national security or foreign policy interests, or international obligations of the United States." Since all U.S. commercial spaceports will eventually be required to meet this standard, it is instructive to examine recent developments at those spaceports that already have.

In preparing this report, personnel at each FAA-licensed non-federal launch site were queried about the challenges facing their spaceport and commercial spaceports in general. Their responses are aggregated and discussed in the first section of this report.

The second section of the report, in turn, reviews recent developments at each of these six spaceports. By discussing spaceport challenges and recent developments together, the report is intended to provide industry with a snapshot of the U.S. commercial spaceport outlook thus far in 2007.

Spaceport Challenges

Each FAA-licensed non-federal spaceport was asked to describe the challenges facing both its facility and the

commercial spaceport sector in general. This section summarizes the feedback received, which fell into four main categories: financial concerns, international competition concerns, flight tempo concerns, and encroachment concerns.

Financial Concerns

Several respondents noted that although states and other entities have been relatively supportive of funding spaceport initiatives, financial resources remain a concern. Since suborbital space tourism ventures remain nascent, the first spaceport to host a fully operational space tourism venture may acquire a financial position allowing it to outstrip the development of other commercial spaceports. While respondents were confident of the prospects of all spaceports in the long run, in the shorter term competition for financial resources—or simply a lack of funding at the level needed to quickly develop new capabilities—was a concern. In the words of one respondent: "We, like all launch facilities and sites, could use additional funding to develop enhanced capability needed to support emerging space access vehicles and systems."

International Competition Concerns

In addition to financial crunches, some respondents noted that the emergence of overseas commercial spaceports could create a more competitive environment. The space tourism company Space Adventures currently offers its full-duration flights to the International Space Station (ISS) on Russian vehicles because of their cost-effectiveness—but this may limit the market for similar efforts based in the United States. Similarly, Space Adventures and Prodea Systems have discussed plans for commercial spaceport projects in the United Arab Emirates and in Singapore near Changi International Airport. While some respondents indicated that overseas spaceports could function as rivals, however, others saw them playing a more complementary role: a global network of commercial spaceports could also eventually facilitate suborbital spaceflight as a mode of international passenger transit.

Flight Tempo Concerns

A third common sentiment was that although vehicle development remains steady, routine commercial spaceflight—particularly in the suborbital tourism sector—is not yet a reality. As one respondent noted, "out of 14 firms engaged in RLV development, none are flying people to space or have made plans to do so in this year or next." The limited number of fully operational RLVs translates into a limited number of planned launches in the short term. Since the pace of spaceport development is ultimately a reflection of market demand, only so much spaceport development can take place until a consistent launch market arises. Although spaceports anticipate increased demand for their services and are creating infrastructure accordingly, respondents expected infrastructure development tempos to remain level until flight tempos materialize and then increase.

Encroachment Concerns

Finally, respondents agreed that spaceports must avoid becoming victims of their own success through the

encroachment of commercial and residential development. Spaceports are purposely located in sparsely populated areas with similarly unpopulated flight corridors to reduce risk to inhabitants on the ground in case of a mishap. However, because people tend to favor housing as close to their place of work as possible, there is a risk that as a spaceport becomes more successful and employs more people, those people will move into the vicinity of the spaceport, causing logistical, safety, and regulatory difficulties. Respondents observed that careful city planning in conjunction with local and state governments will be needed to avoid this potential obstacle to future spaceport operations.

Key Spaceport Developments in 2007

FAA-licensed non-federal spaceports were also asked to review new developments at their respective facilities since the beginning of 2007. Three of these six spaceports are co-located with federal launch sites: California Spaceport (at VAFB); the spaceport operated by Space Florida (at CCAFS); and the Mid-Atlantic Regional Spaceport (at WFF). The remaining three are the Kodiak Launch Complex near Kodiak, Alaska; the dual-use Mojave Air and Space Port in California; and the Oklahoma Spaceport near Burns Flat, Oklahoma.

California Spaceport

California Spaceport at Vandenberg Air Force Base became the first commercial spaceport licensed by the FAA on September 19, 1996. It is operated and managed by Spaceport Systems International (SSI), a limited partnership of ITT Federal Service Corporation.

As of the third quarter 2007, California Spaceport and SSI had been awarded a number of new contracts. In March, SSI was awarded the Minotaur IV Launch Services Space Based Surveillance System (SBSS) Launch Task Order. This contract enables California Spaceport to play an ongoing role in the "swords to plowshares" project of transitioning retired Peacekeeper missiles into launch vehicles for SBSS satellites. It enables California Spaceport to modify its facilities, including upgrades to its clean rooms and payload integration infrastructure, rocket gantry improvements, inert solid ground testing equipment, and new pad electrical and mechanical interfaces.

This contract was followed by two other significant business developments. In June, NASA awarded SSI an indefinite delivery/indefinite quantity contract to perform payload processing services for NASA missions launching from VAFB. In July, SSI's contract to process National Reconnaissance Office (NRO) satellites was extended from October 2010 to October 2015.

Also in July, SSI's Satellite Operations Team was presented with ITT's 2007 Gold Circle of Quality Award.

Space Florida

Space Florida, created on May 30, 2006, consolidates Florida's space and aerospace entities and coordinates all space-related issues in Florida. At FAA/AST's 10th Annual Space Transportation Conference in February 2007, Bill McCarthy, Director of Spaceport Operations and Planning for

Space Florida, noted that "Florida has an unmatched full service transportation infrastructure for supporting commercial aerospace projects. A conservative estimate might say that Florida has somewhere on the order of $6 billion…worth of transportation infrastructure specifically related to space."

On March 1, 2007, Space Florida launched its Strategic Business Plan, which provides a blueprint for space-enabled economic development in Florida. Objectives of the plan include:

- Identifying opportunities to encourage existing small business ventures and new business opportunities to expand and diversify into Florida's aerospace enterprise.
- Claiming a large share of the emerging global market for horizontal launches, including suborbital tourism, transportation and cargo, and orbital payload delivery.
- Capturing a larger share of the supply chain for space vehicles and related equipment.
- Broadening the state's presence in the space industry beyond launch activity to include the research and development, design, manufacturing, assembly, testing, launch, and servicing of space vehicles.

Space Florida issued a release welcoming the decision by the United States Air Force (USAF) in April to allow Space Exploration Technologies (SpaceX) to use Launch Complex-40 at CCAFS, with which Space Florida is co-located. SpaceX's plans to deploy its Falcon vehicles at CCAFS is expected to bring new jobs and economic development to the spaceport.

On April 26, Space Florida sponsored Dr. Stephen Hawking's historic zero-gravity flight from KSC. The same day, Space Florida announced the renaming of its microgravity center to honor the acclaimed cosmologist and theoretical physicist. The new name will be the Stephen Hawking Microgravity Education and Research Center.

Mid-Atlantic Regional Spaceport

Mid-Atlantic Regional Spaceport (MARS) followed its inaugural Minotaur launch of Tacsat-2 in December 2006 with a second successful Minotaur deployment, this time of the NFIRE satellite, on April 26, 2007.

MARS is in the process of constructing a $4-million logistics and processing facility at WFF that includes high bay and clean room environments. In 2006, MARS began Phase 2 construction of a 30,000-square-meter (100,000-square-foot) high bay within the facility. In conjunction with WFF, MARS has also constructed a mobile Liquid Fueling Facility capable of supporting a wide range of liquid-fueled and hybrid rockets.

During the first half of 2007, MARS made significant upgrades to the thermal and environmental systems on the Pad 0-B Gantry. With new heaters and duct systems, the pad will maintain needed temperature and humidity levels inside the enclosure surrounding the vehicle.

The spaceport plans to continue building its reputation for small- to medium-sized low Earth orbit (LEO) mid-inclination launches, to support further operationally responsive space (ORS) missions for the Department of Defense

(DoD), and to eventually host cargo delivery and space tourism flights.

Kodiak Launch Complex

The Kodiak Launch Complex (KLC) is the first licensed launch site not co-located with a federal facility. It is also the first new U.S. launch site built since the 1960s. Today, it is self-sustaining through launch revenues and receives no state funding: the state of Alaska provides tax-free status and has contributed the land on which the spaceport resides.

A 2006 report on the economic impact of the Alaska Aerospace Development Corporation (AADC) on Kodiak Island and the State of Alaska enumerated positive economic trends generated by the spaceport. Among the impacts:

- AADC functions as an important producer of high-wage jobs in Kodiak, counterbalancing declines in other industries.
- The KLC creates 45 direct and 72 indirect jobs in Kodiak.
- AADC has a significant positive impact on the Kodiak economy through local purchases of goods and services, spending $6.7 million with 82 Kodiak businesses in 2005.
- AADC spending has an overall impact of $24 million on the Kodiak economy.

In 2006, the KLC Range Safety and Telemetry System (RSTS) was further upgraded with the addition of eight new redundant antenna links. These improvements have facilitated two launches so far in 2007, bringing the total number of successful launches staged from KLC since its inception in 1998 to 12. On May 25, the Missile Defense Agency (MDA) performed a test using a Strategic Targets System (STARS) rocket. On September 28, a mock warhead fired from KLC was successfully intercepted by an anti-missile interceptor launched from VAFB.

Mojave Air and Space Port

Mojave Airport in Mojave, California, became the first inland launch site licensed by the FAA on June 17, 2004, allowing Mojave Air and Space Port to support suborbital launches of reusable launch vehicles (RLVs).

Mojave has seen considerable job creation in the RLV sector over the last three years. The facility itself has added hundreds of jobs in four sectors: aviation, space, rail, and renewable energy. Infrastructure upgrades have facilitated this impressive job growth: following the construction of three taxiways, which were completed in 2006, Mojave expects to begin construction of a looped water system in October this year. The new supply system will provide water to hangar areas and other portions of the facility. Additionally, Mojave is in the process of upgrading its Automated Weather Observing System (AWOS).

On July 26, 2007, a nitrous oxide flash explosion at Mojave killed three Scaled Composites employees and injured three others. In the wake of this tragic industrial accident, Mojave Air and Spaceport and Scaled Composites are reviewing preventive safety procedures. Unrelated to this incident, Mojave has also been considering plans for a crash

fire rescue response facility that would provide immediate support for RLVs that land with technical difficulties or crew medical emergencies.

Oklahoma Spaceport

After seven years of development, in June 2006, the Oklahoma Spaceport became the sixth commercial spaceport licensed by the FAA in June 2006. The Oklahoma state legislature created the Oklahoma Space Industry Development Authority (OSIDA) in 1999. Currently, the state of Oklahoma provides one hundred percent of the operational funding for OSIDA. However, the spaceport expects to be financially independent in the future, particularly now that it holds a commercial launch site operator license.

In addition to hosting Rocketplane Global, Inc. as it develops its Rocketplane XP suborbital spaceplane, Oklahoma Spaceport also provides a venue for Armadillo Aerospace test flights. On June 2, 2007, Armadillo launched the first flight under the new experimental permit rules from a licensed spaceport. This flight was under a complete Lunar Lander Challenge Level 1 (LLC1) operational profile. Representatives from the X Prize Foundation and FAA/AST observed the flight.

On July 13, the Oklahoma State Legislature approved $2 million in funding for upgraded security fencing and control tower improvements. Planners list enhancing the facility's operational control room and hosting phased-array radar tests among future spaceport development steps.

Conclusions and Outlook

Overall, respondents from all six FAA-licensed non-federal spaceports generally held a positive view of prospects for their respective launch sites. Although commercial spaceports are still in their infancy, the steady growth in the number of vehicles under development that aim to serve both the commercial orbital and reusable suborbital launch sector promise significant markets. This growth, combined with the ongoing spaceport infrastructure improvements described for each spaceport, indicate that the outlook for U.S. commercial spaceports is strong and poised to expand in the next five to ten years.

Third Quarter 2007 Orbital and Suborbital Launch Events

Date		Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price	L	M
7/2/2007	√	Kosmos 3M	Plesetsk		SAR Lupe 2	German Ministry of Defense (MoD)	Classified	$12M	S	S
7/5/2007		Long March 3B	Xichang	*	Chinasat 6B	China Satellite Communications Corporation (China Satcom)	Communications	$60M	S	S
7/7/2007	√	Proton M	Baikonur	*	DIRECTV 10	DIRECTV	Communications	$70M	S	S
8/2/2007		Soyuz	Baikonur		Progress ISS 26P	Russian Federal Space Agency (Roscosmos)	ISS	$40M	S	S
8/4/2007		Delta 2 7925H	Cape Canaveral Air Force Station (CCAFS)		Phoenix	University of Arizona Department of Planetary Sciences	Scientific	$50M	S	S
8/8/2007		Shuttle Endeavour	Kennedy Space Center (KSC)		STS 118	National Aeronautics and Space Administration (NASA)	ISS	N/A	S	S
					ISS 13A.1	NASA	Crewed			S
8/14/2007	√	Ariane 5 ECA	Kourou	*	Spaceway 3	Hughes Communications	Communications	$140M	S	S
				*	BSAT 3A	BSAT	Communications			S
9/2/2007		GSLV	Satish Dhawan Space Center	*	Insat 4C R	Indian Space Research Organization (ISRO)	Communications	$40M	S	S
9/6/2007	√	Proton M	Baikonur	*	JCSAT 11	JSAT	Communications	$70M	F	F
9/11/2007		Kosmos 3M	Plesetsk		Kosmos 2429	Russian MoD	Navigation	$12M	S	S
9/14/2007		Soyuz	Baikonur		Foton M3	European Space Agency (ESA)	Scientific	$40M	S	S
					YES 2	ESA	Scientific			S
9/14/2007		H 2A 2022	Tanegashima		Kaguya	Japan Aerospace Exploration Agency (JAXA)	Scientific	$85M	S	S
					µLabSat 2	JAXA	Scientific			S
					µLabSat 2 Subsat	JAXA	Scientific			S
					RSAT	JAXA	Scientific			S
					VRAD	JAXA	Scientific			S
9/18/2007	√	+ Delta 2 7925-10	Vandenberg Air Force Base (VAFB)	*	WorldView 1	DigitalGlobe	Remote Sensing	$50M	S	S
9/19/2007		Long March 4B	Taiyuan		CBERS/Ziyuan 2B	China Academy of Space Technology (CAST)	Remote Sensing	$50M	S	S
9/27/2007		Delta 2 7925H	CCAFS		Dawn	NASA	Scientific	$50M	S	S

√ Denotes commercial launch, defined as a launch that is internationally competed or FAA-licensed. For multiple manifested launches, certain secondary payloads whose launches were commercially procured may also constitute a commercial launch. Appendix includes suborbital launches only when such launches are commercial.

\+ Denotes FAA-licensed launch.

* Denotes a commercial payload, defined as a spacecraft that serves a commercial function or is operated by a commercial entity.

Notes: All prices are estimates, and vary for every commercial launch. Government mission prices may be higher than commercial prices. Ariane 5 payloads are usually multiple manifested, but the pairing of satellites scheduled for each launch is sometimes undisclosed for proprietary reasons until shortly before the launch date.

Fourth Quarter 2007 Projected Orbital and Suborbital Launch Events

Date		Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price
10/9/2007		Atlas 5 421	CCAFS		WGS 1	US Department of Defense (DoD)	Communications	$75M
10/10/2007		Soyuz	Baikonur		Soyuz ISS 15S	Roscosmos	ISS	$40M
10/17/2007		Delta 2 7925-10	CCAFS		Navstar GPS 2RM-4	US Air Force (USAF)	Navigation	$50M
10/21/2007	√	Soyuz	Baikonur	*	Globalstar Replacement 5	Globalstar	Communications	$40M
				*	Globalstar Replacement 6	Globalstar	Communications	
				*	Globalstar Replacement 7	Globalstar	Communications	
				*	Globalstar Replacement 8	Globalstar	Communications	
10/23/2007		Shuttle Discovery	KSC		STS 120	NASA	Crewed	N/A
					ISS 10A	NASA	ISS	
10/2007		PSLV	Satish Dhawan Space Center		Cartosat 2A	ISRO	Remote Sensing	$20M
					AAUsat 2	Aalborg University	Development	
					CanX-2	University of Toronto	Development	
					Cute 1.7 + APD 2	Tokyo Institute of Technology	Development	
					Delfi C3	Delft University	Development	
					Polaris	Israeli MoD	Classified	
10/2007	√	Dnepr 1	Baikonur		THEOS	Thai Geo-Informatics and Space Technology Development Agency (GISTDA)	Remote Sensing	$9.5M
10/2007	√	Ariane 5 GS	Kourou	*	Optus D2	Singtel/Optus	Communications	$140M
				*	Intelsat 11	Intelsat	Communications	
11/1/2007	√	Kosmos 3M	Plesetsk		SAR Lupe 3	German MoD	Classified	$12M
11/2/2007		Delta 4 Heavy	CCAFS		DSP 23	USAF	Classified	$155M
11/2007		Atlas 5 401	CCAFS		NRO L-24	National Reconnaissance Office (NRO)	Classified	$75M
11/2007	√	+ Zenit 3SL	Odyssey Launch Platform	*	Thuraya 3	Thuraya Satellite Communications Company	Communications	$70M
11/2007	√	Ariane 5 ECA	Kourou		RASCOM 1	Regional African Satellite Communications Organization (RASCOM)	Communications	$140M
				*	Horizons 2	Intelsat	Communications	

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Fourth Quarter Orbital and Suborbital Launch Events (Continued)

Date		Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price
12/5/2007	√	Delta 2 7420	VAFB		Cosmo-Skymed 2	Agenzia Spaziale Italiana (ASI)	Remote Sensing	$50M
12/6/2007		Shuttle Atlantis	KSC		STS 122	NASA	Crewed	N/A
					Columbus Laboratory	ESA	ISS	
					ISS 1E	NASA	ISS	
12/23/2007		Soyuz	Baikonur		Progress ISS 27P	Roscosmos	ISS	$40M
12/2007	√	Soyuz	Baikonur	*	RADARSAT 2	Telesat Canada	Remote Sensing	$40M
4Q/2007		Long March 3A	Xichang		Chang'e 1	China National Space Administration (CNSA)	Scientific	$50M
4Q/2007		Long March 2C	Xichang		HJ 1A	CNSA	Remote Sensing	$22.5M
					HJ 1B	CNSA	Remote Sensing	
					HJ 1C	CNSA	Remote Sensing	
4Q/2007	√	Shtil	Barents Sea		Sumbandila	University of Stellenbosch	Development	$1.5M
4Q/2007		H 2A	Tanegashima		WINDS	JAXA	Development	$85M
4Q/2007		Long March 2D	Jiuquan		SJ 9	CNSA	Scientific	TBA
4Q/2007		GSLV Mark 2	Satish Dhawan Space Center	*	Insat 4D	ISRO	Communications	TBA
4Q/2007		Proton (SL-12)	Baikonur		Glonass K R7	Russian MoD	Navigation	$72.5M
					Glonass K R8	Russian MoD	Navigation	
					Glonass K R9	Russian MoD	Navigation	
4Q/2007	√	Ariane 5	Kourou	*	Star One C2	Star One	Communications	$70M
4Q/2007		Long March 4B	Taiyuan		Fengyun 3A	China Meteorological Administration	Meteorological	$50M
4Q/2007	√	Ariane 5	Kourou		Skynet 5B	Paradigm Secure Communications	Communications	$70M
4Q/2007		Long March 3B	Xichang	*	APStar 6B	APT Satellite	Communications	$60M
				*	Chinasat 9	Chinese Telecommunications Broadcasting Satellite Corporation	Communications	

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First Quarter 2008 Projected Orbital and Suborbital Launch Events

Date		Vehicle	Site		Payload or Mission	Operator	Use	Vehicle Price
1/25/2008		Delta 4 Heavy	CCAFS		NRO L-26	NRO	Classified	$155M
1/28/2008		Atlas 5 411	VAFB		NRO L-28	NRO	Classified	$75M
1/2008		Ariane 5 ES-ATV	Kourou		ATV 1	ESA	ISS	$100M
1/2008	√ +	Atlas 5 421	CCAFS	*	ICO G1	ICO Global Communications	Communications	$70M
1/2008	√	Zenit 3SL	Odyssey Launch Platform	*	DirecTV 11	DIRECTV	Communications	$70M
2/5/2008		Delta 2 7920H	CCAFS		GLAST	NASA	Scientific	$50M
2/14/2008		Shuttle Endeavour	KSC		STS 123	JAXA	ISS	N/A
					Kibo	NASA	Crewed	
2/21/2008		Delta 2	VAFB		STSS Block 2010 Risk Reduction	Missile Defense Agency (MDA)	Classified	$50M
3/2008		Soyuz	Baikonur		GIOVE B	ESA	Navigation	$40M
3/2008	√	Zenit 3SLB	Baikonur	*	Amos 3	SpaceCom Limited	Communications	TBA
1Q/2008	√	Proton M	Baikonur	*	Thor 5	Telenor AS	Communications	$70M
1Q/2008	√	Ariane 5	Kourou	*	Superbird 7	Space Communications Corporation	Communications	$70M
1Q/2008		PSLV	Satish Dhawan Space Center		Oceansat 2	ISRO	Remote Sensing	$20M
1Q/2008	√ +	Delta 2 7420	VAFB	*	GeoEye 1	GeoEye	Remote Sensing	$50M
1Q/2008		Delta 4 Medium-Plus (5,4)	CCAFS		WGS 2	DoD	Communications	$90M
1Q/2008		Falcon 1	Kwajalein Island	*	Flight 3	Space Exploration Technologies Corporation (SpaceX)	Development	$7M
1Q/2008	√ +	Falcon 1	Kwajalein Island		RazakSAT	Malaysia National Space Agency	Development	$7M

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