



FAA
Commercial Space
Transportation



Quarterly Launch Report

1st Quarter 2006

Featuring Launch results from the 4th Quarter 2005 and
Forecasts for the 1st Quarter 2006 and 2nd Quarter 2006.

Introduction

The First Quarter 2006 Quarterly Launch Report features launch results from the fourth quarter of 2005 (October-December 2005) and forecasts for the first quarter of 2006 (January-March 2006) and the second quarter of 2006 (April-June 2006). 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 references, 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 courtesy of Sea Launch, copyright © 2005): A Zenit 3SL vehicle, marketed by Sea Launch, lifts off from Odyssey Launch Platform in the Pacific Ocean carrying the payload Inmarsat 4 F2 on November 8, 2005.

Fourth Quarter 2005 Highlights

On October 1, the Soyuz ISS 11S mission lifted off from Baikonur carrying the third space tourist, Gregory Olsen, who paid \$20 million for the orbital flight. Soyuz ISS 11S successfully returned to Earth on October 11.

On October 4, the X Prize Foundation kicked off "The Countdown to the X Prize Cup" in Las Cruces, New Mexico, an expo showcasing private space vehicle developments and technologies. Technology demonstrations included Armadillo Aerospace's unmanned vertical-takeoff, vertical-landing vehicle; Starchaser Industries test firing of a Churchill MK2 engine; and two successful flights of XCOR Aerospace's EZ-Rocket plane, piloted by former astronaut Richard Searfoss. In addition to increasing public awareness, the X Prize Foundation intended the expo to serve as a prelude to the future introduction of the X Prize Cup. The X Prize Cup will be an ongoing competition aimed at giving the private "personal spaceflight industry" financial rewards for achieving new technical milestones in such categories as fastest turnaround time between the first launch and second landing, maximum number of passengers per launch, total number of passengers throughout the competition, maximum altitude, and fastest flight time achieved.

On October 19, Lockheed Martin's final Titan 4 rocket launched a classified National Reconnaissance Office (NRO) payload from Vandenberg Air Force Base (VAFB), California.

On November 2, AirLaunch LLC announced it had received a one-year, \$17.8 million contract to further develop its QuickReach launch vehicle concept under Phase 2B of the Defense Advanced Research Projects Agency (DARPA) Force Application and Launch from CONTinental United States (FALCON) program.

Also on November 2, more than a thousand Boeing union employees belonging to the International Association of Machinists and Aerospace Workers went on strike, delaying all Delta launches indefinitely. The strike affects operations at Cape Canaveral Air Force Station (CCAFS) and VAFB, as well as Boeing's rocket manufacturing plant in Decatur, Alabama and other locations. As this report went to press, the strike was still in progress.

On November 16, Congress approved \$16.5 billion for NASA's fiscal year 2006 budget. The sum includes funding for the Crew Exploration Vehicle (CEV), whose manufacturing contract is expected to be awarded in March 2006.

In November, the U.S. Air Force (USAF) awarded SpaceDev a \$2.7 million contract to develop a large 100,000-pound thrust hybrid rocket motor. The motor would yield nine times the power of the similar engine used to boost SpaceShipOne on its suborbital crewed demonstration flights in 2004.

In December, India announced plans to introduce in 2008 an enhanced, indigenously-produced variant of its Geostationary Satellite Launch Vehicle (GSLV) with a geosynchronous lift capacity of 4,000 kilograms, double the current capability.

On December 5, NASA released a draft call for proposals for commercial ISS cargo resupply concepts for post-2010, when the Space Shuttle is due to retire. Several companies are expected to submit proposals, with contracts set to be awarded in May 2006.

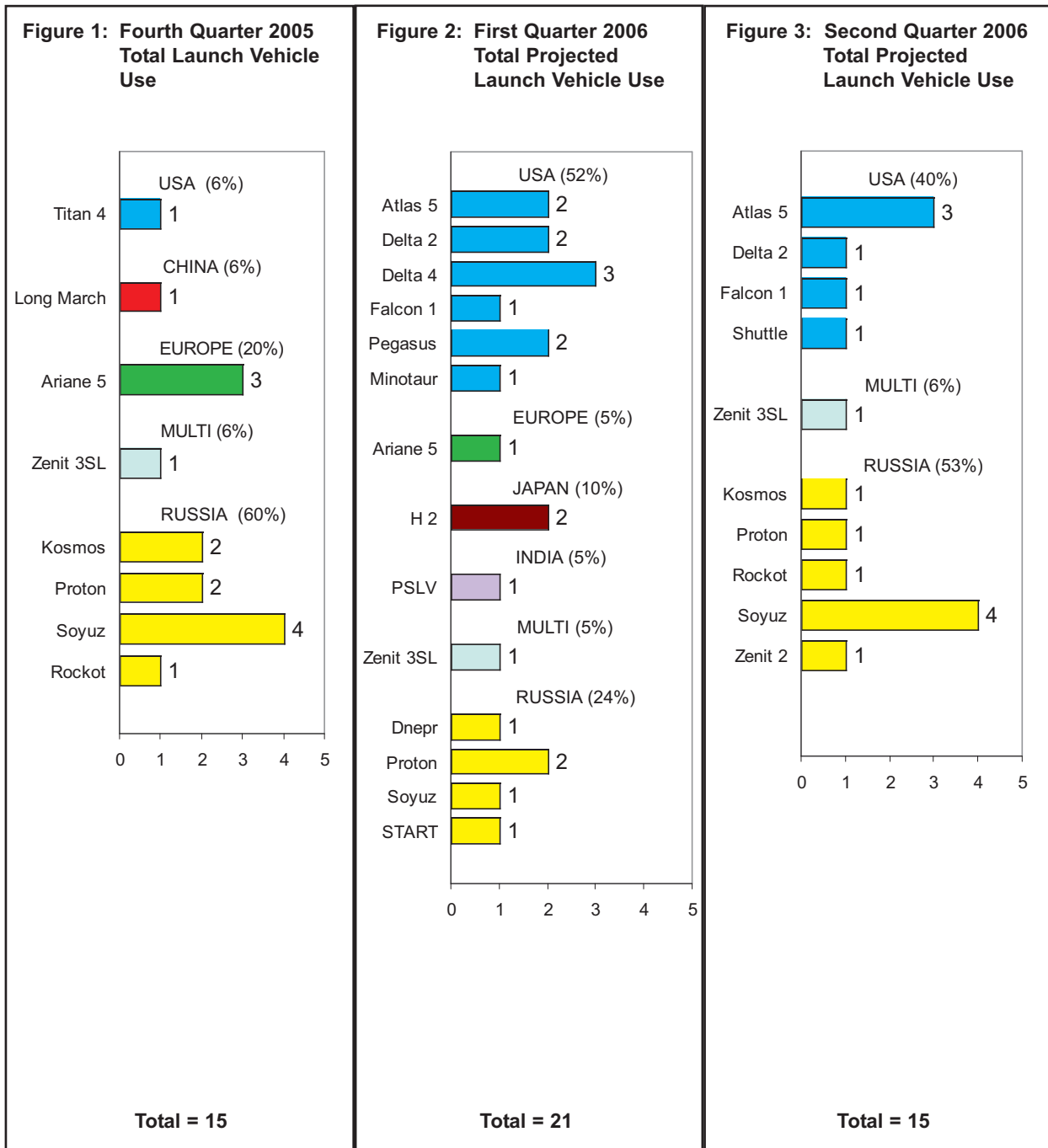
On December 13, Virgin Galactic announced a 20-year lease agreement to use a new spaceport planned in New Mexico for the first flights of its suborbital space tourism service, scheduled for 2008 or 2009. The \$225 million spaceport is expected to be funded primarily by the New Mexico and federal governments. Virgin Galactic will pay fees of \$1 million during each of the first five years of operation, and a larger undisclosed amount after that. The American-British joint venture also revealed that 38,000 people from 126 countries have registered their interest in a space tourism flight, including 100 passengers who have already paid the \$200,000 price in full.

In December, China announced further plans for its lunar space program. The first Chinese lunar orbiter, Chang'e 1, is slated for launch in 2007. A lunar landing mission will follow between 2007 and 2012, with a sample return mission expected between 2012 and 2017. By the end of 2017, China plans to begin the manned phase of its lunar program, with the goal of landing taikonauts on the Moon by a date not yet specified.

Boeing and Lockheed Martin announced that United Launch Alliance, the planned 50-50 merger of their government satellite launch service divisions, would be delayed until next year. Although both companies sought to finalize the merger before the end of 2005, as of late December the proposal was still undergoing regulatory review, so the formal merger is now expected to take effect in 2006.

Vehicle Use

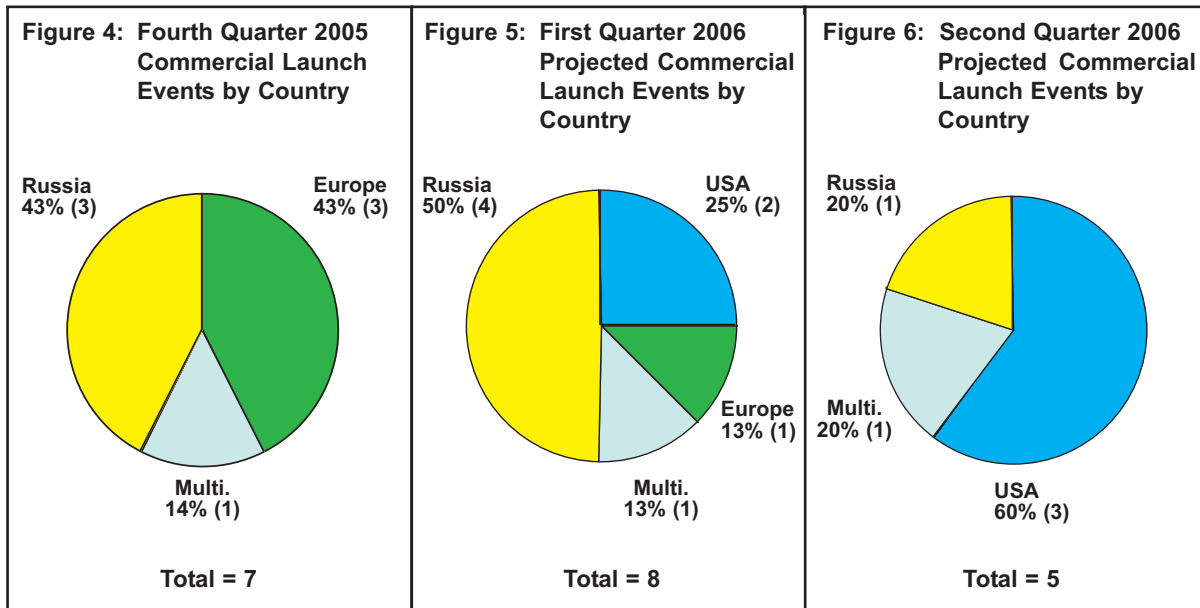
(October 2005 – June 2006)



Figures 1-3 show the total number of orbital and suborbital launches (commercial and government) of each launch vehicle and the resulting market share that occurred in the fourth quarter of 2005, as well as projecting this information for the first quarter of 2006 and second quarter of 2006. 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.

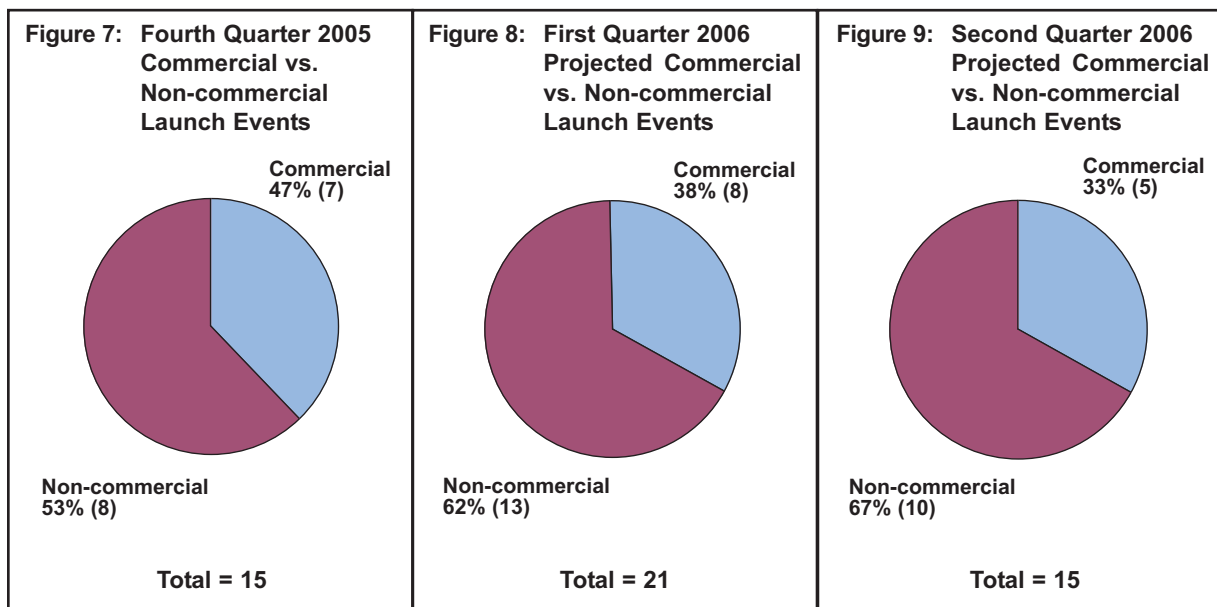
Note: Percentages for these and subsequent figures may not add up to 100 percent due to rounding of individual values.

Commercial Launch Events by Country
(October 2005 – June 2006)



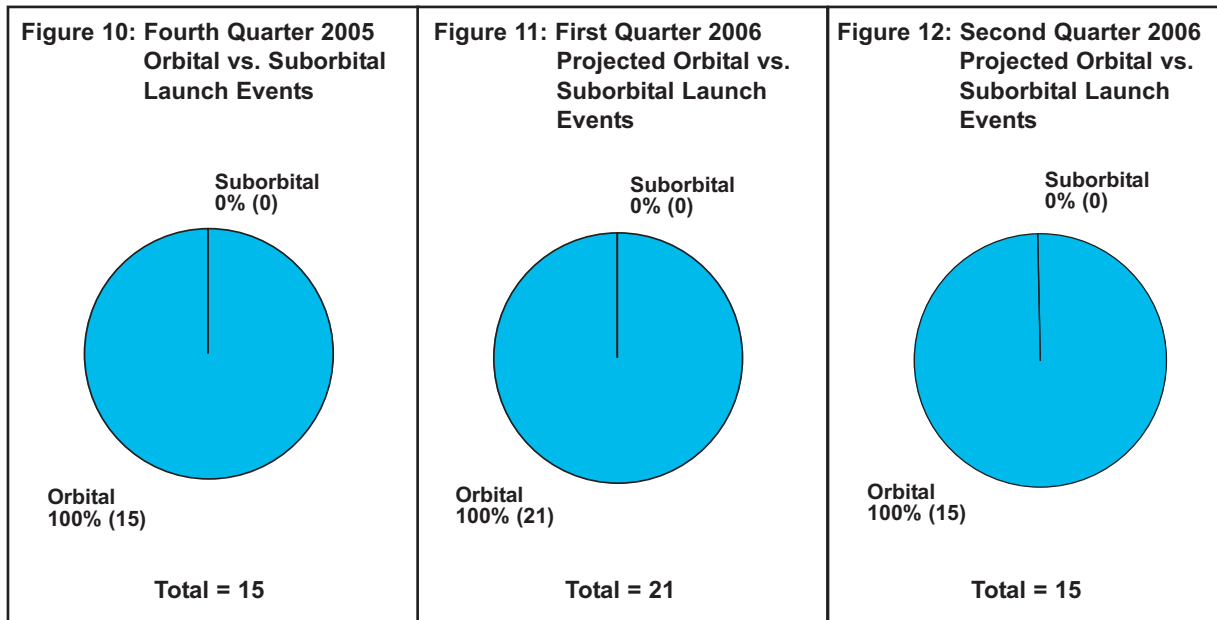
Figures 4-6 show all *commercial* orbital and suborbital launch events that occurred in the fourth quarter of 2005 and that are projected for the first quarter of 2006 and second quarter of 2006.

Commercial vs. Non-commercial Launch Events
(October 2005 – June 2006)



Figures 7-9 show commercial vs. non-commercial orbital and suborbital launch events that occurred in the fourth quarter of 2005 and that are projected for the first quarter of 2006 and second quarter of 2006.

Orbital vs. Suborbital Launch Events
(October 2005 – June 2006)



Figures 10-12 show orbital vs. suborbital launch events that occurred in the fourth quarter of 2005 and that are projected for the first quarter of 2006 and second quarter of 2006.

Launch Successes vs. Failures
(October 2005 – June 2006)

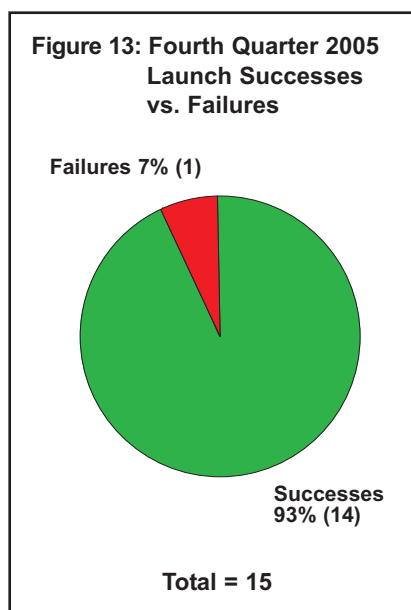
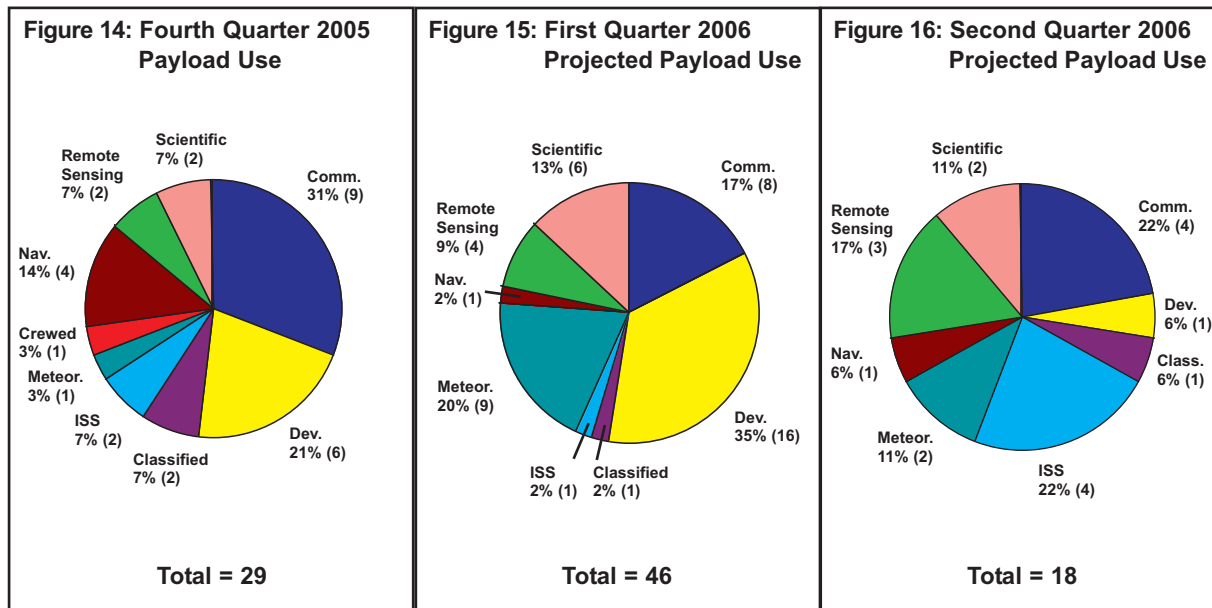


Figure 13 shows orbital and suborbital launch successes vs. failures for the period from October 2005 to December 2005. Partially-successful orbital launch events are those where the launch vehicle fails to deploy its payload to the appropriate orbit, but the payload is able to reach a useable orbit via its own propulsion systems. Cases in which the payload is unable to reach a useable orbit or would use all of its fuel to do so are considered failures.

Payload Use (Orbital Launches Only)

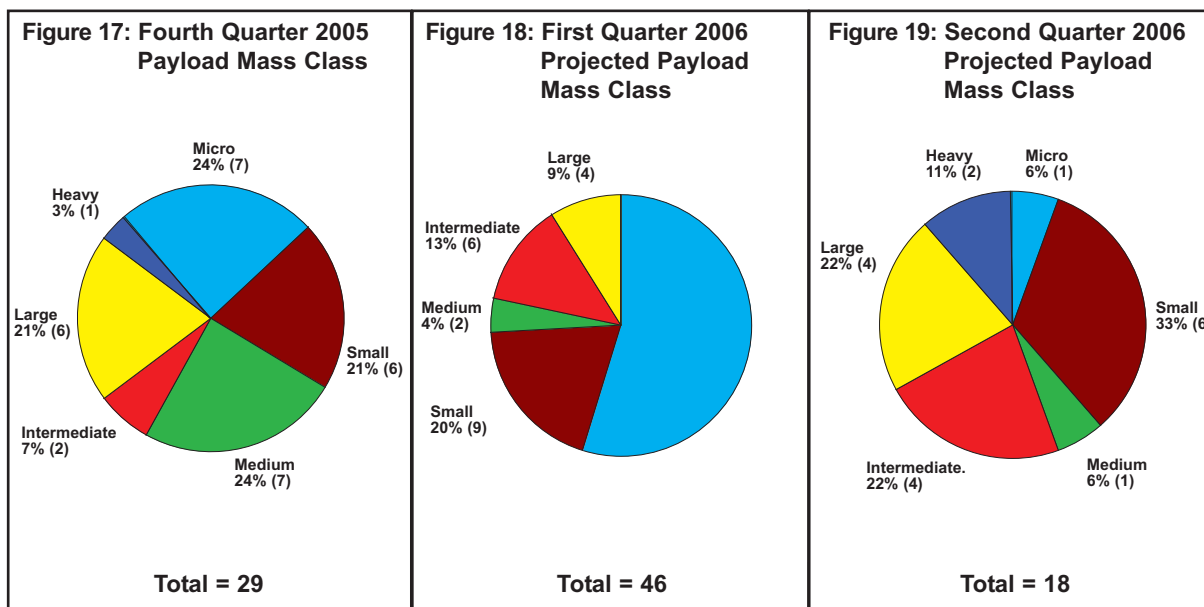
(October 2005 – June 2006)



Figures 14-16 show total payload use (commercial and government), actual for the fourth quarter of 2005 and projected for the first quarter of 2006 and second quarter of 2006. 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)

(October 2005 – June 2006)



Figures 17-19 show total payloads by mass class (commercial and government), actual for the fourth quarter of 2005 and projected for the first quarter of 2006 and second quarter of 2006. 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)
(January 2005 – December 2005)

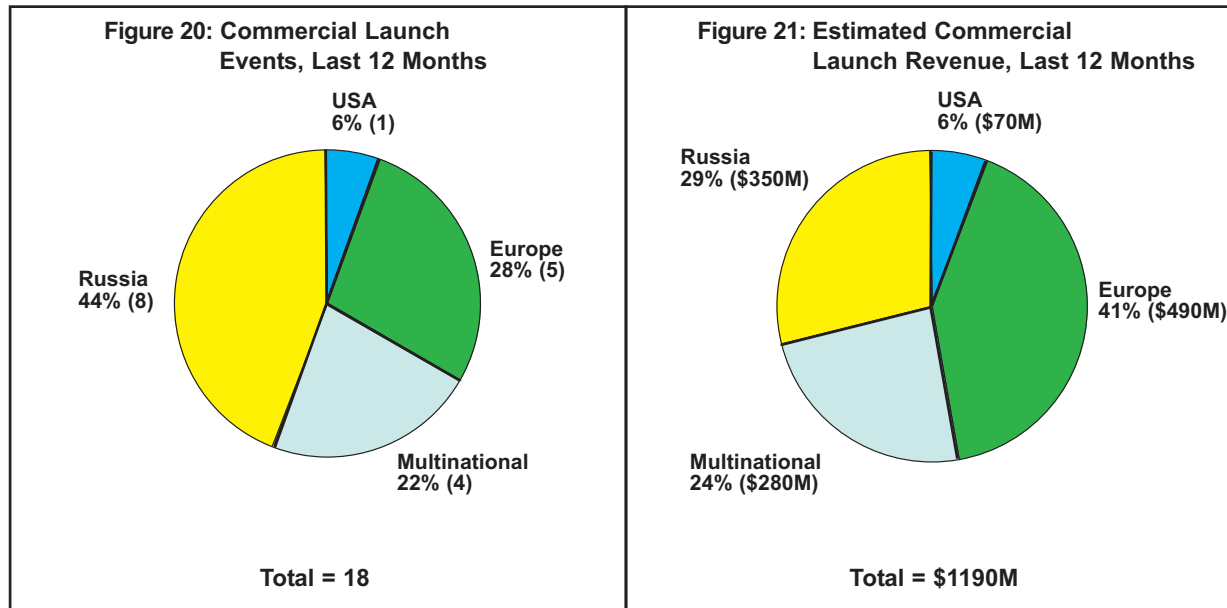


Figure 20 shows commercial orbital launch events for the period of January 2005 to December 2005 by country.

Figure 21 shows estimated commercial launch revenue for orbital launches for the period of January 2005 to December 2005 by country.

Commercial Launch Trends (Suborbital Launches Only)
(January 2005 – December 2005)

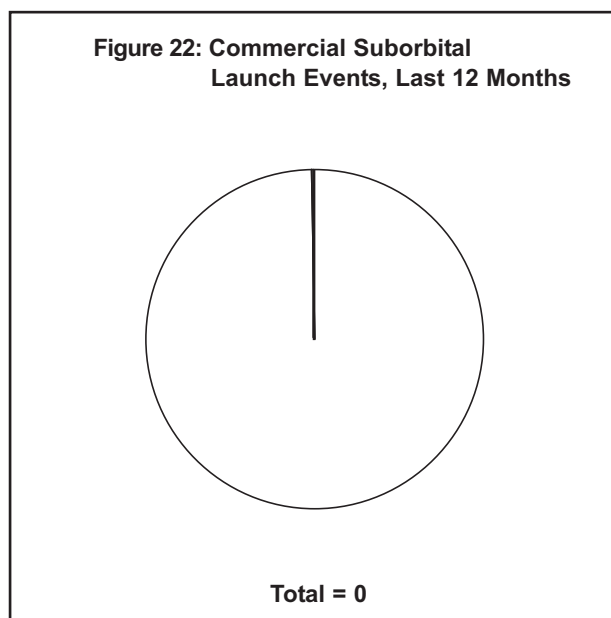


Figure 22 shows commercial suborbital launch events for the period of January 2005 to December 2005 by country.

Commercial Launch History
(January 2001 – December 2005)

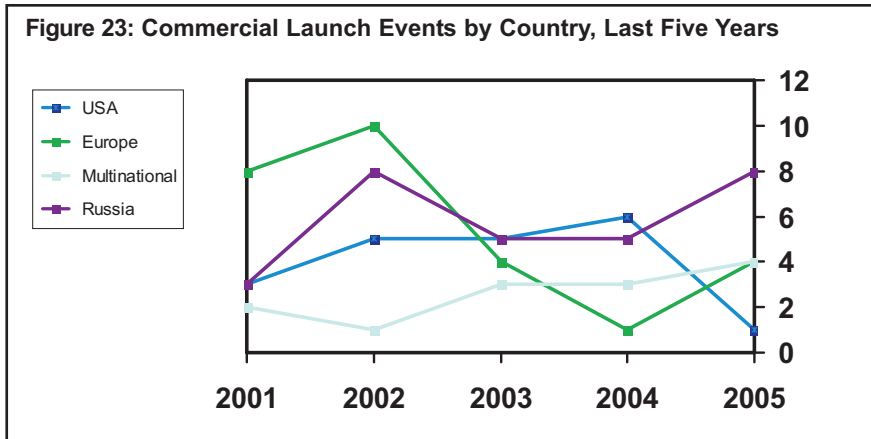


Figure 23 shows commercial launch events by country for the last five full years.

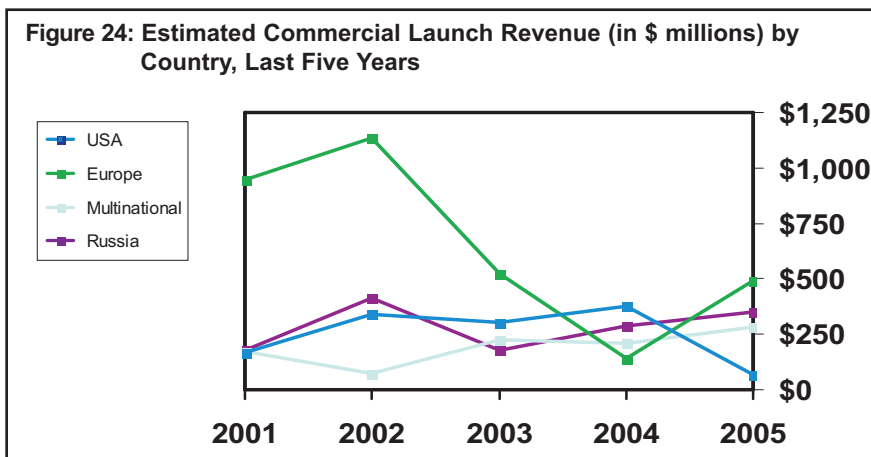


Figure 24 shows estimated commercial launch revenue by country for the last five full years.

Fourth Quarter 2005 Orbital and Suborbital Launch Events							
Date	Vehicle	Site	Payload or Mission	Operator	Use	Vehicle Price	L M
10/1/2005	Soyuz	Baikonur	Soyuz ISS 11S	Russian Space Agency (Roscosmos)	ISS	\$40M	S S
10/8/2005	✓ Rocket	Plesetsk	Cryosat	European Space Agency (ESA)	Remote Sensing	\$13.5M	F F
10/12/2005	Long March 2F	Jiuquan	Shenzhou 6	Chinese National Space Administration (CNSA)	Crewed	\$60M	S S
10/13/2005	✓ Ariane 5G	Kourou	Syracuse 3 A	Delegation Generale pour l'Armement (DGA)	Communications	\$140M	S S
			* Galaxy 15	Pan American Satellite Corp. (Panamsat)	Communications		S S
10/19/2005	Titan 4B	Vandenberg Air Force Base (VAFB)	NRO L-20	National Reconnaissance Office (NRO)	Classified	\$400M	S S
10/27/2005	✓ Kosmos 3M	Plesetsk	Beijing 1	Beijing Landview Mapping Information Technology Ltd	Remote Sensing	\$12M	S S
			Mozhayets 5	Mozhaiskiy Military Space Engineering Academy	Development		S S
			Ncube-2	Norwegian Student Satellite Project	Development		S S
			Rubin 5	OHB System	Development		S S
			SSETI Express	Aalborg University	Development		S S
			Sinah-1	Iran Ministry of Defense (MoD)	Classified		S S
			Topsat	British Ministry of Defense (MoD)	Development		S S
			UWE-1	University of Wurzburg	Scientific		S S
			XI-V	University of Tokyo	Development		S S
11/8/2005	✓ + Zenit 3SL	Odyssey Launch Platform	* Inmarsat-4 F2	Inmarsat	Communications	\$70M	S S
11/9/2005	Soyuz	Baikonur	Venus Express	ESA	Scientific	\$40M	S S
11/16/2005	✓ Ariane 5 ECA	Kourou	* Spaceway 2	Hughes Network Systems	Communications	\$140M	S S
			* Telkom 2	PT Telekomunikasi	Communications		S S
12/21/2005	Soyuz	Baikonur	Progress ISS 20P	Roscosmos	ISS	\$40M	S S
12/21/2005	✓ Ariane 5G	Kourou	* Insat 4A	Indian Space Research Organization (ISRO)	Communications	\$140M	S S
			MSG 2	Eumetsat	Meteorological		S S
12/21/2005	Kosmos 3M	Plesetsk	* Gonets D1M 1	Smolsat	Communications	\$12M	S S
			Kosmos 2416	Russian Ministry of Defense (MoD)	Communications		S S
12/25/2005	Proton K	Baikonur	Glonass K R1	Russian MoD	Navigation	\$72.5M	S S
			Glonass K R2	Russian MoD	Navigation		S S
			Glonass K R3	Russian MoD	Navigation		S S
12/28/2005	Soyuz	Baikonur	GIOVE A	ESA	Navigation	\$40M	S S
12/29/2005	✓ Proton M	Baikonur	* AMC 23	SES Americom	Communications	\$70M	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.

+ 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 multi-manifested, but the pairing of satellites scheduled for each launch is sometimes undisclosed for proprietary reasons until shortly before the launch date.

First Quarter 2006 Projected Orbital and Suborbital Launch Events						
Date	Vehicle	Site	Payload or Mission	Operator	Use	Vehicle Price
1/17/2006	Atlas 5 551	Cape Canaveral Air Force Station (CCAFS)	New Horizons	NASA	Scientific	\$92.5M
1/19/2006	H 2A 202	Tanegashima	ALOS 1	Japan Aerospace Exploration Agency (JAXA)	Remote Sensing	\$85M
1/2006	Delta 2 7925-10	CCAFS	Navstar GPS 2RM-2	U.S. Air Force (USAF)	Navigation	\$50M
2/9/2006	Falcon 1	Kwajalein Island	FalconSat 2	Department of Defense (DoD)	Development	\$6M
2/15/2006	H 2A 2024	Tanegashima	MTSat 2	Japan Ministry of Transport	Meteorological	\$85M
2/21/2006	✓ Proton M	Baikonur	* Arabsat 4A	Arab Satellite Communications Organization (Arabsat)	Communications	\$70M
2/21/2006	✓ Ariane 5 ECA	Kourou	* Hot Bird 7A SpainSat	Eutelsat Hisdesat SA	Communications Communications	\$140M
2/28/2006	Pegasus XL	VAFB	Space Technology 5A Space Technology 5B Space Technology 5C	NASA NASA NASA	Development Development Development	\$16M
2/2006	✓ + Zenit 3SL	Odyssey Launch Platform	* Echostar X	Echostar Communications Corporation (Echostar)	Communications	\$70M
2/2006	✓ + Delta 4 Medium-Plus (4,2)	CCAFS	GOES N	National Oceanic and Atmospheric Administration (NOAA)	Meteorological	\$70M
2/2006	Delta 2 7420	VAFB	CloudSat Calipso	NASA NASA	Scientific Scientific	\$50M
3/22/2006	Soyuz	Baikonur	Soyuz ISS 12S	Roscosmos	ISS	\$40M
3/2006	Atlas 5 521	CCAFS	WGS 1	DoD	Communications	\$75M
3/2006	Minotaur	VAFB	Formosat 3 A Formosat 3 B Formosat 3 C Formosat 3 D Formosat 3 E Formosat 3 F	National Space Program Office (NSPO) NSPO NSPO NSPO NSPO NSPO	Meteorological Meteorological Meteorological Meteorological Meteorological	\$14.5M
3/2006	Delta 4 Heavy	CCAFS	DSP 23	USAF	Classified	\$155M
3/2006	✓ Dnepr 1	Baikonur	BelKA ALMASat 1 AtmoCube Baumanets CanX-2 CubeSat RAFT Funsat JAESat Master Satellite JAESat Slave Satellite KatySat 1 KiwiSat PolySat 3 SaudiSat 4 UniSat 4 UCISat 1	National Academy of Sciences of Belarus University of Bologna University of Trieste Bauman Moscow State Technical University University of Toronto US Naval Academy University of Florida Australian Space Research Institute Australian Space Research Institute Stanford University Amsat ZL Cal Poly Aerospace Engineering Space Research Institute (S.A.) University of Rome University of California Irvine	Remote Sensing Development Scientific Development Development Development Development Development Development Development Development Scientific Development Development	\$9.5M
1Q/2006	Delta 4 Medium	VAFB	DMSP 5D-3-F17	DoD	Meteorological	\$70M
1Q/2006	✓ + Pegasus XL	Kwajalein Island	C/NOFS	USAF	Scientific	\$16M
1Q/2006	✓ Proton M	Baikonur	* Hot Bird 8	Eutelsat	Communications	\$70M
1Q/2006	PSLV	Satish Dhawan Space Center	Cartosat 2 Anusat SRE 1	ISRO ISRO	Remote Sensing Communications Development	\$20M
1Q/2006	✓ START 1	Svobodny	* EROS B	Imagesat International N.V.	Remote Sensing	\$8.5M

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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 multi-manifested, but the pairing of satellites scheduled for each launch is sometimes undisclosed for proprietary reasons until shortly before the launch date.

Second Quarter 2006 Projected Orbital and Suborbital Launch Events						
Date	Vehicle	Site	Payload or Mission	Operator	Use	Vehicle Price
4/10/2006	Soyuz	Baikonur	Progress ISS 21P	Roscosmos	ISS	\$40M
4/2006	Kosmos 3M	Baikonur	Vietnamsat	Vietnamese Ministry of Post and Telecommunications	Remote Sensing	\$12M
			Thai-Paht 2	Thai MicroSatellite Co.	Remote Sensing	
4/2006	√ + Atlas 5 411	CCAFS	* Astra 1KR	SES Astra	Communications	\$70M
4/2006	Soyuz	Baikonur	Galileo System Test Bed 2	ESA	Navigation	\$40M
4/2006	Atlas 5 411	VAFB	NRO L-28	NRO	Classified	\$75M
5/26/2006	Delta 2 7925H-10L	CCAFS	STEREO A	NASA	Scientific	\$50M
			STEREO B	NASA	Scientific	
5/2006	Shuttle Discovery	KSC	STS 121	NASA	ISS	N/A
			ISS ULF-1.1	NASA	ISS	
6/30/2006	Soyuz	Baikonur	Progress ISS 22P	Roscosmos	ISS	\$40M
6/2006	Zenit 2	Baikonur	Meteor 3M N2	Russian Meteorological Service	Meteorological	\$37.5M
2Q/2006	√ + Atlas 5 521	CCAFS	* AMC 14	SES Americom	Communications	\$70M
2Q/2006	√ + Falcon 1	Kwajalein Island	RazakSAT	Malaysia National Space Agency	Development	\$6M
2Q/2006	Proton K	Baikonur	KazSat 1	JSC Kazsat	Communications	\$72.5M
2Q/2006	√ Rockot	Plesetsk	Kompsat 2	Korea Aerospace Research Institute (KARI)	Remote Sensing	\$13.5M
2Q/2006	Soyuz	Baikonur	Metop 1	Eumetsat	Meteorological	\$40M
2Q/2006	√ + Zenit 3SL	Odyssey Launch Platform	* Galaxy 16	Panamsat	Communications	\$70M

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