

Commercial Space Transportation

QUARTERLY LAUNCH REPORT

Featuring the
launch results from
the 4th quarter 2004
and forecasts for
the 1st quarter 2005
and 2nd quarter 2005



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1st Quarter 2005

United States Department of Transportation • Federal Aviation Administration
Office of Commercial Space Transportation
800 Independence Ave. SW • Room 331
Washington, D.C. 20591

Introduction

The First Quarter 2005 Quarterly Launch Report features launch results from the fourth quarter of 2004 (October-December 2004) and forecasts for the first quarter of 2005 (January-March 2005) and second quarter of 2005 (April-June 2005). 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 Lockheed Martin, copyright © 2004 Pat Corkery): An Atlas 5, marketed by International Launch Services, sends AMC 16, an SES Americom communications satellite, on its way to geosynchronous orbit on December 17, 2004 from Cape Canaveral Spaceport, Florida.

Fourth Quarter 2004 Highlights

On October 4, 2004, Scaled Composites -- builder of the Tier One suborbital system, composed of the carrier aircraft White Knight and suborbital reusable launch vehicle SpaceShipOne -- conducted the second of two flights required within a two-week period to win the \$10 million Ansari X Prize. Former U.S. Navy pilot Brian Binnie successfully guided SpaceShipOne to an altitude of nearly 112 km (69.6 miles), comfortably over the required 100-km threshold. On November 6, 2004, the Ansari X Prize was formally awarded to Mojave Aerospace Ventures, sponsor of the Scaled Composites team.

On October 5, 2004, Robert Bigelow of Bigelow Aerospace officially announced a successor to the Ansari X Prize: America's Space Prize, which offers \$50 million to the first privately-developed orbital spacecraft capable of flying five people to a 400-km (249-mile) orbit twice within 60 days. No more than twenty percent of the spacecraft's hardware may be expendable, and the vehicle must demonstrate the ability to dock with Bigelow Aerospace's inflatable space habitat in orbit and remain docked for up to six months. Additionally, the spacecraft must complete two orbits per flight, and although the first launch may carry just the flight crew and the weight equivalent of five humans, the second must carry actual passengers. America's Space Prize expires on January 10, 2010.

In October, an independent review board found that the June 28, 2004 partial failure of a Zenit 3SL booster was likely due to distorted data, caused by a short circuit in the cable network of the computer system that transmits fuel flow rate data to the Block DM-SL upper stage main engine control system. The Zenit 3SL fell short of deploying its APStar 5 (also called Telstar 18) payload to geostationary orbit.

The Urals Mining and Metallurgical Company announced it is investing \$25 million in an "International Ground Launch" venture to build an updated launch pad for the Zenit booster at Baikonur Cosmodrome. Commercial flights from this pad are expected to begin in the second half of 2006.

Russia's NPO Energomash disclosed details of its collaboration with South Korea's launch vehicle program. Energomash will provide the first stage of the new booster, whose maiden launch is expected in 2007, while South Korea will build the second stage.

NASA confirmed it was considering shifting ISS components from the Space Shuttle to flights on expendable launch vehicles, including Russia's Proton, Europe's Ariane 5, and the Delta 4 and Atlas 5. However, these considerations remain tentative, pending ongoing talks with ISS international partners.

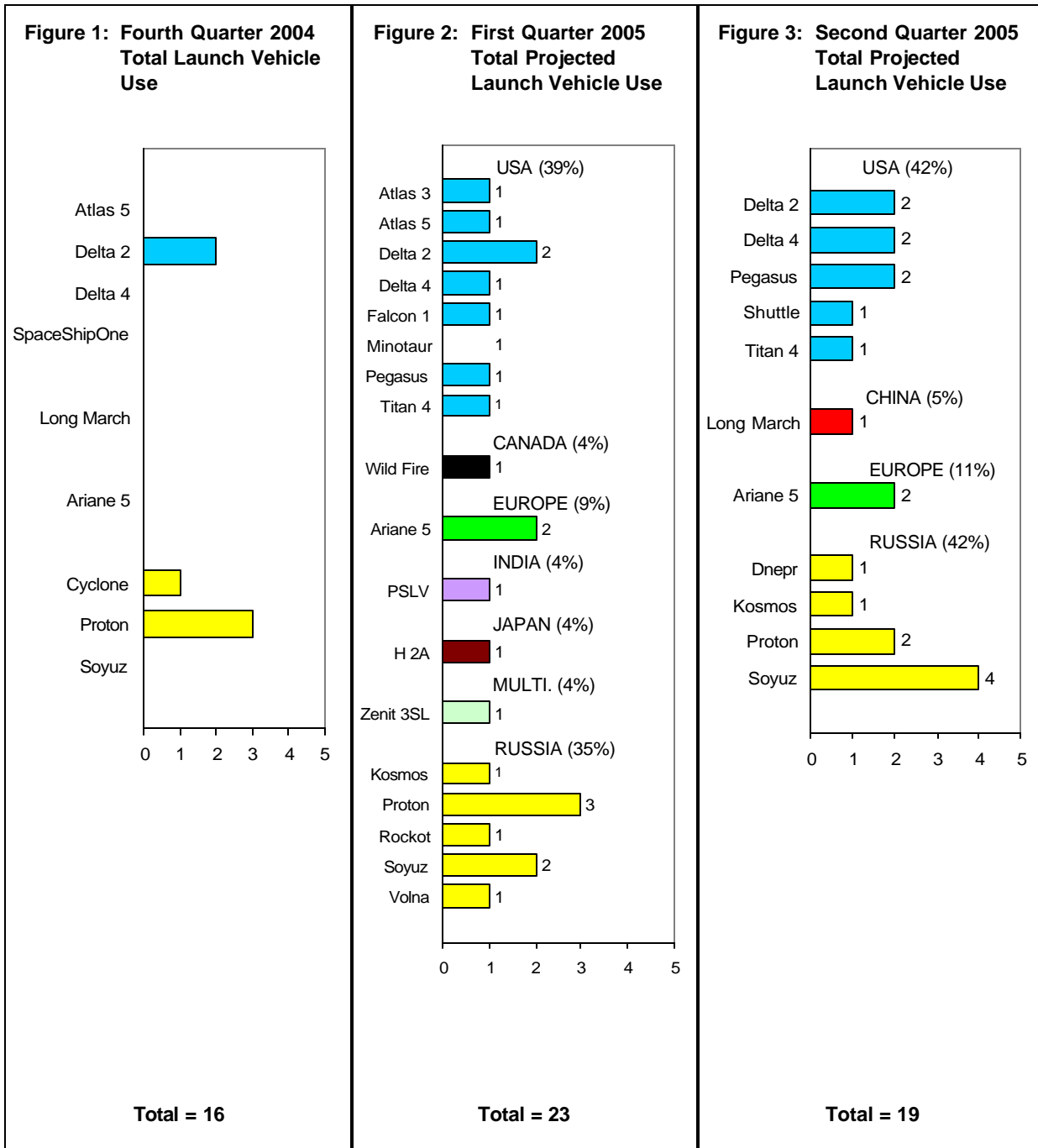
Russia's new Soyuz 2 booster conducted a successful suborbital test flight on November 8, 2004, carrying a dummy payload, Oblik, equipped with temperature and vibration sensors. The Soyuz 2 features an improved digital control system, upgraded first- and second-stage engines, and a payload capacity 1.2 tons greater than the standard Soyuz. Following further test flights, the booster is expected to begin commercial service from Kourou in 2008.

The first launch of Boeing's Delta IV Heavy booster occurred on December 21, 2004, carrying a 6.7-ton dummy payload (named the Heavy Lift Vehicle Operational Launch Service Demonstration Payload, or HLVOLSDP) along with two university nanosatellites, 3CSat 1 and 3CSat 2. The Delta IV Heavy lifted off successfully, but deployed its payloads at a lower altitude than intended (a 36,406-km by 19,027-km orbit at a 13.5-degree inclination, instead of the planned 36,000-km circular, 10-degree-inclination geostationary transfer orbit). Consequently, the two nanosatellites were lost. Officials blamed the partial launch failure on the shutdown of the three first-stage boosters eight seconds early.

On December 24, 2004, a Russian Cyclone 3 booster deployed the oceanography satellite Sich 1M and microsatellite MS-1TK in a lower-than-planned orbit due to a third-stage engine firing that cut off one minute early. The intended orbit was a 640-km by 680-km path; however, the achieved orbit was only 285-km by 645-km. Although Sich 1M is expected to achieve its intended orbit using onboard propulsion, its anticipated service life has shortened from three years to one. MS-1TK, which does not have onboard propulsion, is considered lost.

Vehicle Use

(October 2004 – June 2005)

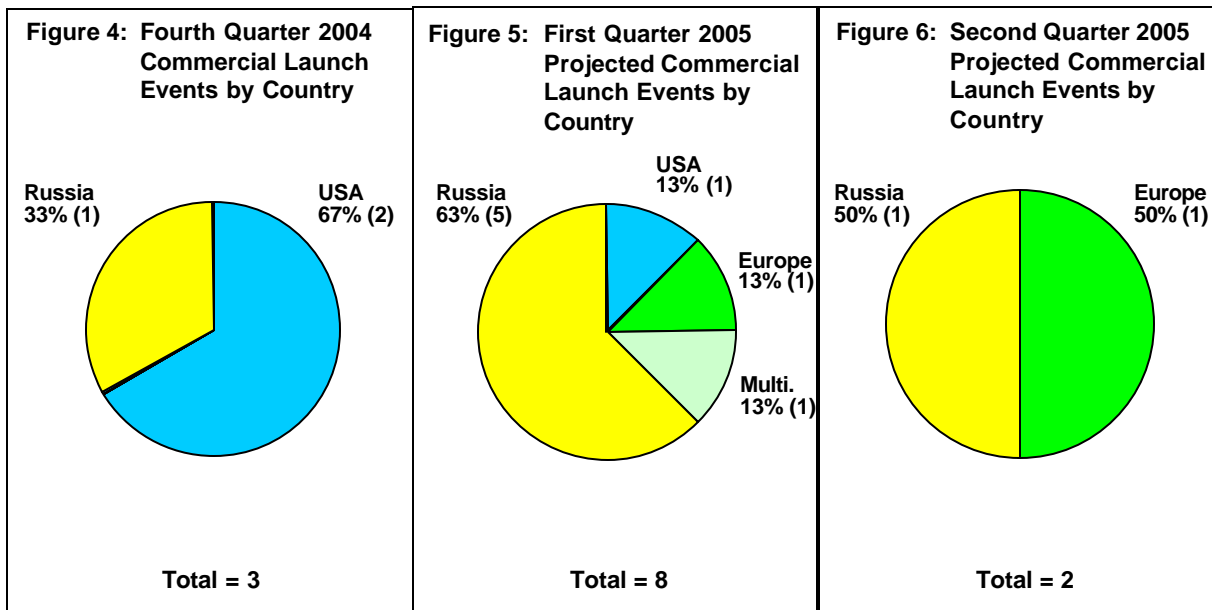


Figures 1-3 show the total number of orbital and suborbital launches (commercial and government) of each launch vehicle and the resulting market share that occurred in the fourth quarter of 2004, as well as projecting this information for the first and second quarters of 2005. The launches are grouped 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

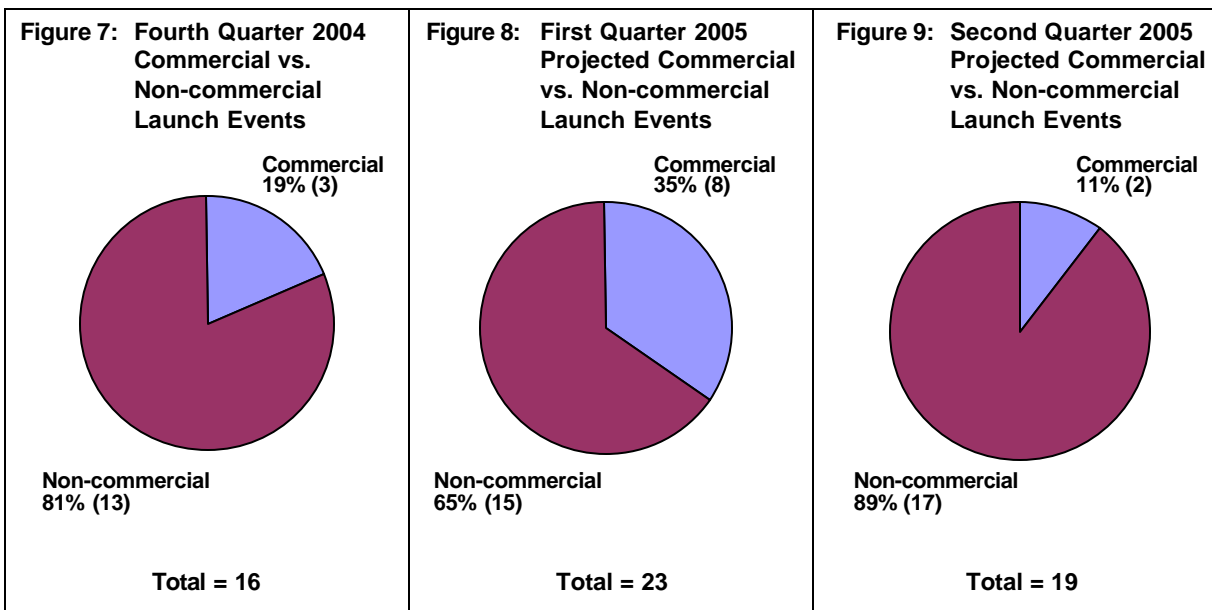
(October 2004 – June 2005)



Figures 4-6 show all *commercial* orbital and suborbital launch events that occurred in the fourth quarter of 2004 and those projected for the first and second quarters of 2005.

Commercial vs. Non-commercial Launch Events

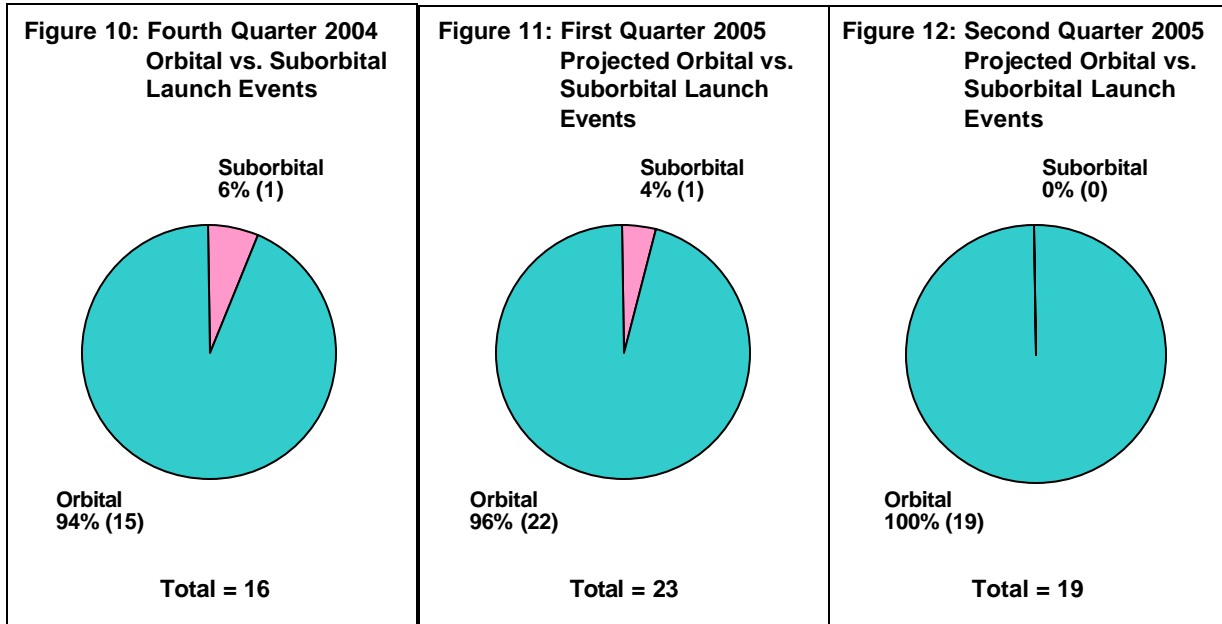
(October 2004 – June 2005)



Figures 7-9 show commercial vs. non-commercial orbital and suborbital launch events that occurred in the fourth quarter of 2004 and those projected for the first and second quarters of 2005.

Orbital vs. Suborbital Launch Events

(October 2004 – June 2005)



Figures 10-12 show orbital vs. suborbital launch events that occurred in the fourth quarter of 2004 and those projected for the first and second quarters of 2005.

Launch Successes vs. Failures

(October 2004 – December 2004)

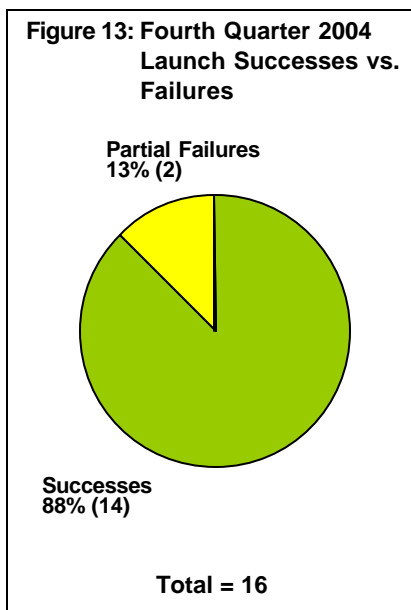
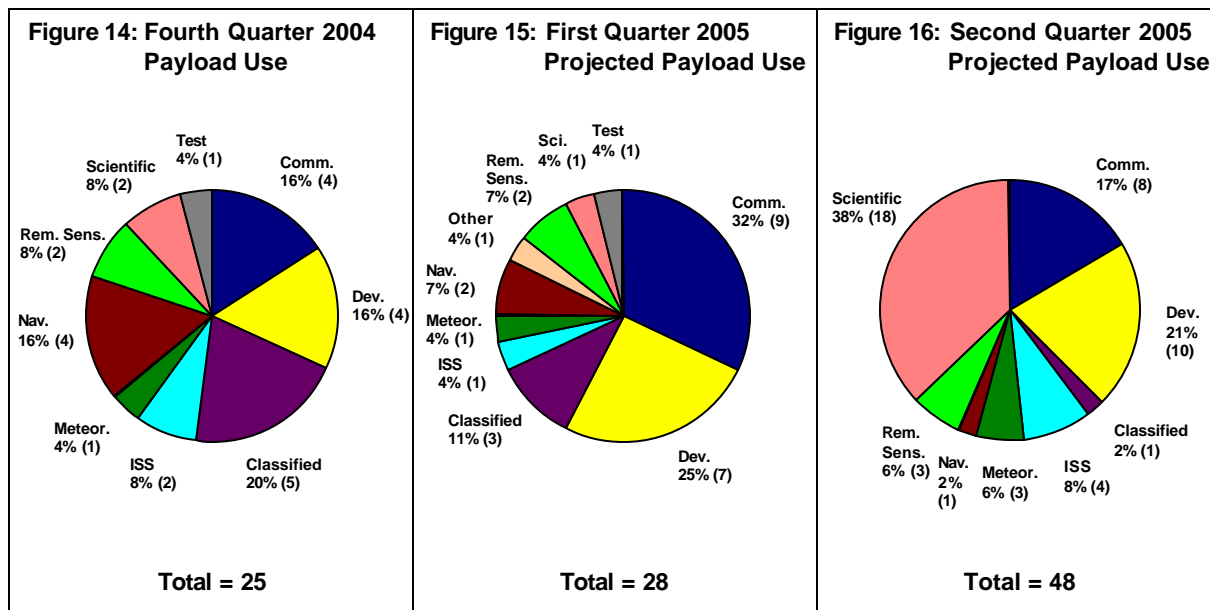


Figure 13 shows orbital and suborbital launch successes vs. failures for the period from October 2004 to December 2004. Partially-successful orbital launch events are those where the launch vehicle fails to deploy its payload to the appropriate orbit, but the payload is either in a useable orbit or is 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)

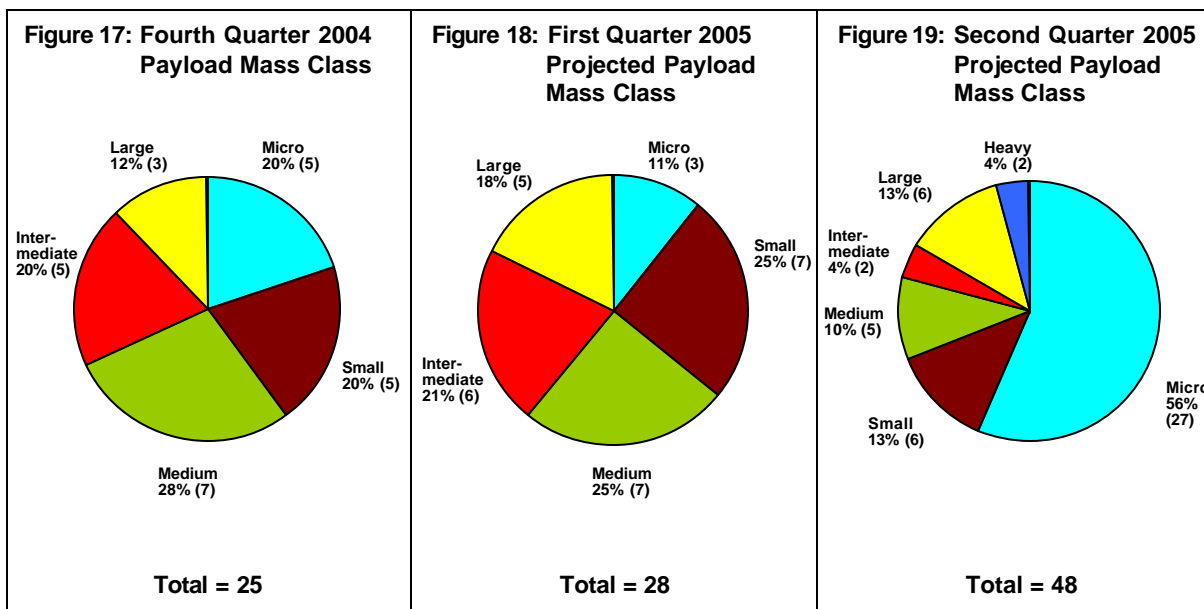
(October 2004 – June 2005)



Figures 14-16 show total payload use (commercial and government), actual for the fourth quarter of 2004 and projected for the first and second quarters of 2005. 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 2004 – June 2005)



Figures 17-19 show total payloads by mass class (commercial and government), actual for the fourth quarter of 2004 and projected for the first and second quarters of 2005. Because the purpose of the mass class measurement is to characterize payloads lifted into orbit, payloads carried on suborbital launches are not included in Figures 17-19. 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 (over 20,000 lbs.).

Commercial Launch Trends (Orbital Launches Only)

(January 2004 – December 2004)

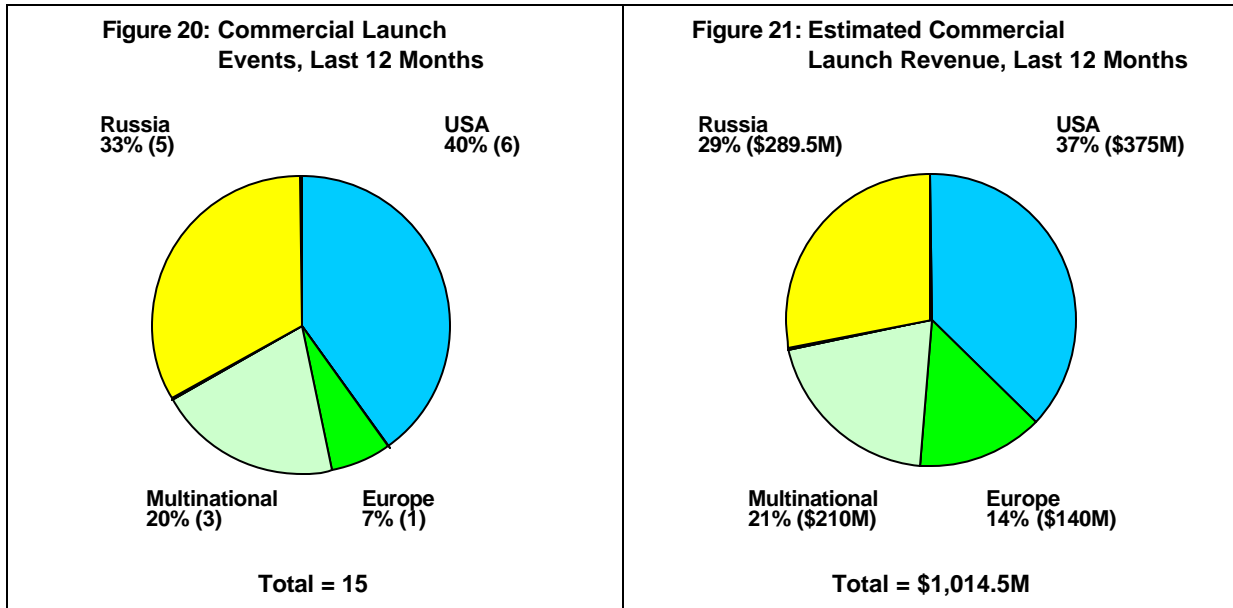


Figure 20 shows commercial orbital launch events for the period from January 2004 through December 2004 by country.

Figure 21 shows estimated commercial launch revenue for orbital launches for the period from January 2004 through December 2004 by country.

Commercial Launch Trends (Suborbital Launches Only)

(January 2004 – December 2004)

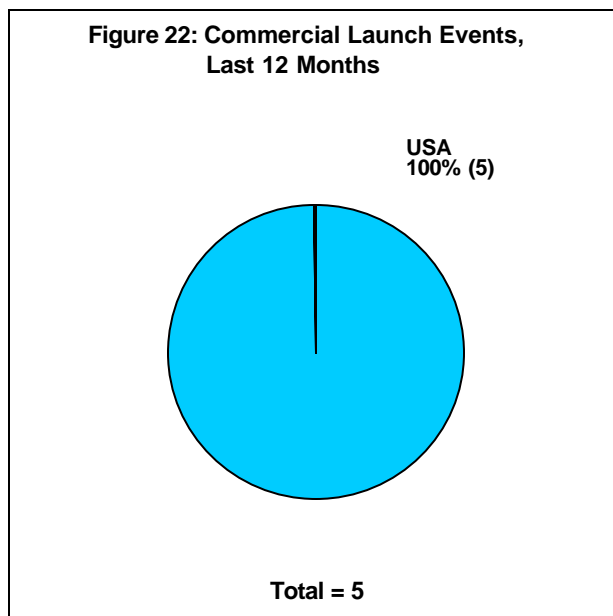


Figure 22 shows commercial suborbital launch events for the period from January 2004 through December 2004 by country.

Commercial Launch History (January 2000 – December 2004)

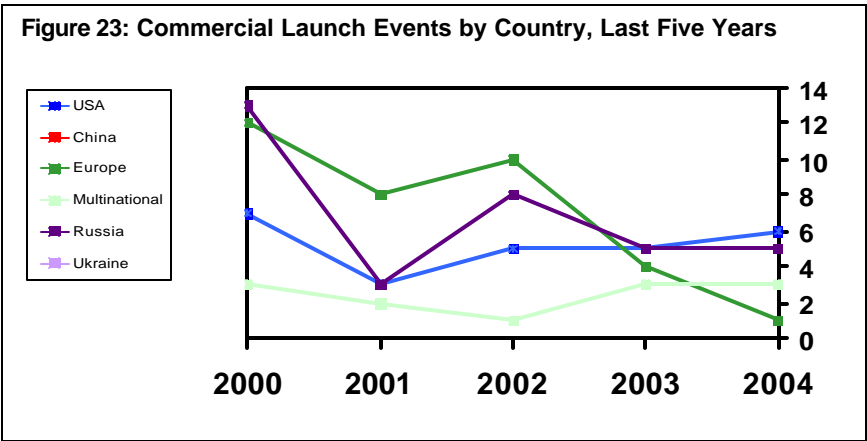


Figure 23 shows commercial launch events by country for the last five full years.

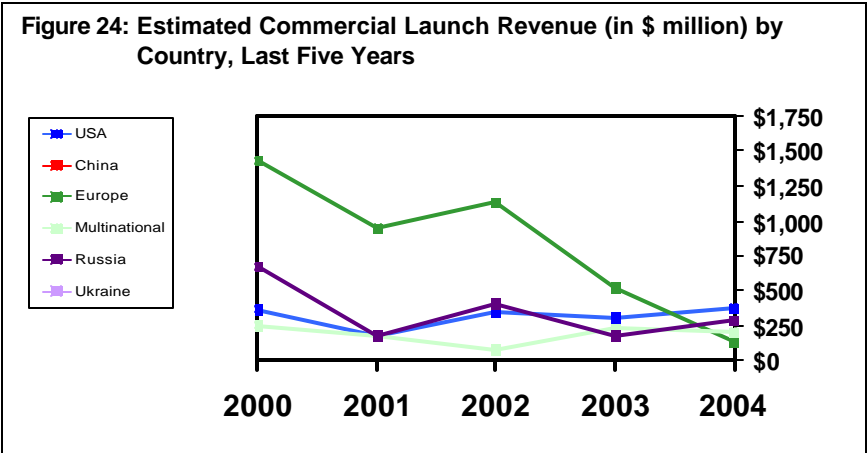


Figure 24 shows estimated commercial launch revenue by country for the last five full years.

Fourth Quarter 2004 Orbital and Suborbital Launch Events							
Date	Vehicle	Site	Payload or Mission	Operator	Use	Vehicle Price	L M
10/4/04	√ + SpaceShipOne (suborbital)	Mojave Airport	* SpaceShipOne Flight 17P (Suborbital)	Scaled Composites	Development	N/A	S S
10/14/04	Soyuz	Baikonur	Soyuz ISS 9S	Russian Federal Space Agency (Roscosmos)	ISS	\$30-50M	S S
10/15/04	√ Proton M	Baikonur	* AMC 15	SES Americom	Communications	\$70M	S S
10/19/04	Long March 3A	Xichang	Fengyun 2C	China Meteorological Administration	Meteorological	\$45-55M	S S
10/30/04	Proton K	Baikonur	* Express AM1	Russian Satellite Communciation Co.	Communications	\$60-85M	S S
11/6/04	Delta 2 7925-10	CCAFS	Navstar GPS 2R-13	U.S. Air Force (USAF)	Navigation	\$45-55M	S S
11/6/04	Long March 4B	Taiyuan	Ziyuan 2C	China National Space Administration (CNSA)	Remote Sensing	\$25-35M	S S
11/8/04	Soyuz 2 1A	Plesetsk	Oblik (Suborbital)	Rocosmos	Development	\$30-50M	S S
11/18/04	Long March 2C	Xichang	Experiment Satellite 2	CNSA	Development	\$20-25M	S S
11/20/04	Delta 2 7320	CCAFS	Swift	National Aeronautics and Space Administration (NASA)	Scientific	\$45-55M	S S
12/17/04	√ + Atlas 5 521	CCAFS	* AMC 16	SES Americom	Communications	\$70M	S S
12/18/04	Ariane 5G	Kourou	Helios 2A	Delegation Generale pour l'Armement (DGA)	Classified	\$125-155M	S S
			Essaim 1	French MoD	Classified		S S
			Essaim 2	French MoD	Classified		S S
			Essaim 3	French MoD	Classified		S S
			Essaim 4	French MoD	Classified		S S
			Parasol	Centre National d'Etudes Spatiales (CNES)	Scientific		S S
			Nanosat 01	Instituto Nacional de Tecnica Aeroespacial (INTA)	Communications		S S
12/21/04	Delta 4 Heavy	CCAFS	HLVOLSDP	U.S. Air Force	Test	\$140-170M	P P
			3CSat 1	University of Colorado	Development		P F
			3CSat 2	University of Colorado	Development		P F
12/24/04	Soyuz	Baikonur	Progress ISS 16P	Roscosmos	ISS	\$30-50M	S S
12/24/04	Cyclone 3	Plesetsk	Sich 1M	Ukraine Space Agency (NKAU)	Remote Sensing	\$20-25M	P P
			MS-1TK	NKAU	Development		P P
12/26/04	Proton K	Baikonur	Kosmos 2411	Russian Ministry of Defense (MoD)	Navigation	\$60-85M	S S
			Kosmos 2412	Russian MoD	Navigation		S S
			Kosmos 2413	Russian MoD	Navigation		S S

√ Denotes commercial launch, defined as a launch that is internationally competed or FAA-licensed.

+ Denotes FAA-licensed launch.

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

L and M refer to the outcome of the Launch and Mission (immediate status of the payload upon reaching orbit): S = success, P = partial success, F = failure

Note: All launch dates are based on local time at the launch site at the time of launch.

Note: All vehicle prices are estimates.

First Quarter 2005 Projected Orbital and Suborbital Launch Events						
Date	Vehicle	Site	Payload or Mission	Operator	Use	Vehicle Price
1/12/05	Delta 2 7925H	CCAFS	Deep Impact	NASA	Scientific	\$45-55M
1/20/05	Kosmos 3M	Plesetsk	Kosmos TBA 19 Tatiana	Russian MoD Lomonosov Moscow State University	Navigation Development	\$12M
1/27/05	Atlas 3B	CCAFS	NRO A5	USAF	Classified	\$65-75M
2/2/05	✓ Proton M	Baikonur	* WORLDSAT-2	SES Americom	Communications	\$70M
2/11/05	✓ Ariane 5 ECA	Kourou	* XTAR EUR MaqSat B2 SloshSat-FLEVO	XTAR Arianespace European Space Agency (ESA)	Communications Test Development	\$125-155M
2/28/05	Soyuz	Baikonur	Progress ISS 17P	Roscosmos	ISS	\$30-50M
2/2005	PSLV	Satish Dhawan Space Center	Cartosat 2 VUSat	Indian Space Research Organization (ISRO) ISRO	Remote Sensing Development	\$15-25M
3/1/05	✓ Volna	Barents Sea	Cosmos 1	The Planetary Society	Development	\$0.8-1.5M
3/1/05	Delta 4 Medium-Plus	VAFB	NRO L-22	U.S. Department of Defense (DoD)	Classified	\$70-85M
3/2/05	Pegasus XL	VAFB	DART	NASA	Development	\$14-18M
3/10/05	✓ + Atlas 5 431	CCAFS	* Inmarsat-4 F1	Inmarsat	Communications	\$70M
3/16/05	✓ Soyuz	Baikonur	* Galaxy 14	Pan American Satellite Corp. (PanAmSat)	Communications	\$30-50M
3/19/05	Delta 2 7320	VAFB	NOAA N	National Oceanic and Atmospheric Administration (NOAA)	Meteorological	\$45-55M
3/25/05	✓ Rockot	Plesetsk	Cryosat	ESA	Remote Sensing	\$12-15M
3/31/05	Proton K	Baikonur	* Express AM2	Russian Satellite Communication Co.	Communications	\$60-85M
3/2005	Ariane 5G	Kourou	Syracuse 3 A * Telkom 2	French MoD PT Telekomunikasi	Communications Communications	\$125-155M
3/2005	Minotaur	Wallops Flight Facility	XSS-11	USAF	Development	\$12-17M
3/2005	Falcon 1	VAFB	TacSat 1 * Celestis 5	USAF Celestis, Inc.	Development Other	\$6M
3/2005	✓ Proton M	Baikonur	* DirecTV 8	DirecTV, Inc.	Communications	\$70M
1Q/2005	H 2A 202	Tanegashima	MTSat 1R	National Space Development Agency (NASDA)	Navigation	\$70-100M
1Q/2005	Titan 4B	VAFB	NRO T1	National Reconnaissance Office (NRO)	Classified	\$350-450M
1Q/2005	✓ + Zenit 3SL	Odyssey Launch Platform	* XM 3	XM Satellite Radio, Inc.	Communications	\$70M
1Q/2005	Wild Fire (suborbital)	Kindersley	* Wild Fire Test Flight (Suborbital)	da Vinci Project	Development	N/A

✓ Denotes commercial launch, defined as a launch that is internationally competed or FAA-licensed.

+ Denotes FAA-licensed launch.

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

Note: 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.

Note: All vehicle prices are estimates.

Second Quarter 2005 Projected Orbital and Suborbital Launch Events						
Date	Vehicle	Site	Payload or Mission	Operator	Use	Vehicle Price
4/15/05	Soyuz	Baikonur	Soyuz ISS 10S	Roscosmos	ISS	\$30-50M
4/2005	Proton K	Baikonur	* Express AM3	Russian Satellite Communciation Co.	Communications	\$60-85M
4/2005	√ + Ariane 5 TBA	Kourou	* Spaceway 2	Hughes Network Systems	Communications	\$125-155M
4/2005	Dnepr 1	Baikonur	EgyptSat	National Authority for Remote Sensing and Space Sciences	Remote Sensing	\$8-11M
			* AKS 1	CNES	Development	
			* AKS 2	CNES	Development	
			* Cubesat TBA	The Aerospace Corporation	Development	
			HAUSat 1	Hankuk Aviation University	Scientific	
			ICEcube 1	Cornell University	Scientific	
			ICEcube 2	Cornell University	Scientific	
			ION	University of Illinois	Development	
			KUTESat	Kansas University	Scientific	
			Mea Huaka'l	University of Hawaii	Scientific	
			Merope	Montana State University	Scientific	
			Ncube	Norwegian Student Satellite Project	Scientific	
			Polysat 1	Cal Poly Aerospace Engineering	Development	
			Polysat 2	Cal Poly Aerospace Engineering	Development	
			Rincon 1	University of Arizona	Scientific	
			Sacred	University of Arizona	Scientific	
			SaudiComsat 3	Space Research Institute	Communications	
			SaudiComsat 4	Space Research Institute	Communications	
			SaudiComsat 5	Space Research Institute	Communications	
			SaudiComsat 6	Space Research Institute	Communications	
			SaudiComsat 7	Space Research Institute	Communications	
			Saudisat 3	Space Research Institute	Scientific	
			SEEDS	Nihon University	Scientific	
5/22/05	Pegasus XL	Kwajalein Island	C/NOFS	USAF	Scientific	\$14-18M
5/26/05	Delta 2 7420	VAFB	Calipso	NASA	Scientific	\$45-55M
			CloudSat	NASA	Scientific	
5/31/05	Soyuz	TBA	Foton M2	ESA	Scientific	\$30-50M
5/2005	Pegasus XL	CCAFS	TWINS A	NASA	Scientific	\$14-18M
5/2005	Delta 2 7925-10	CCAFS	Navstar GPS 2RM-1	USAF	Navigation	\$45-55M
5/2005	√ Kosmos 3M	Plesetsk	Topsat	British Defense Ministry	Development	\$12M
			China DMC+4	Beijing Landview Mapping Information Technology Ltd	Remote Sensing	
			Ncube-2	Norwegian Student Satellite Project	Development	
			SSETI Express	Aalborg University	Development	
			UWE-1	University of Wurzburg	Scientific	
			XI-V	University of Tokyo ISSL	Development	
6/5/05	Delta 4 Medium	VAFB	DMSP 5D-3-F17	DoD	Meteorological	\$65-75M
6/10/05	Soyuz	Baikonur	Progress ISS 18P	Roscosmos	ISS	\$30-50M
6/30/05	Titan 4B	CCAFS	NRO T5	NRO	Classified	\$350-450M
6/2005	Ariane 5G	Kourou	MSG 2	Eumetsat	Meteorological	\$125-155M
6/2005	Proton K	Baikonur	RadioAstron	Russian Academy of Sciences	Scientific	\$60-85M
2Q/2005	Shuttle Discovery	KSC	STS 114	NASA	ISS	\$350-400M
			ISS LF-1	NASA	ISS	
2Q/2005	Delta 4 Medium	CCAFS	GOES N	NOAA	Meteorological	\$65-75M
2Q/2005	Soyuz	Plesetsk	Resurs DK 1	Roscosmos	Remote Sensing	\$30-50M
2Q/2005	Long March 3B	Xichang	Sinosat 2	CNSA	Communications	\$50-70M

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