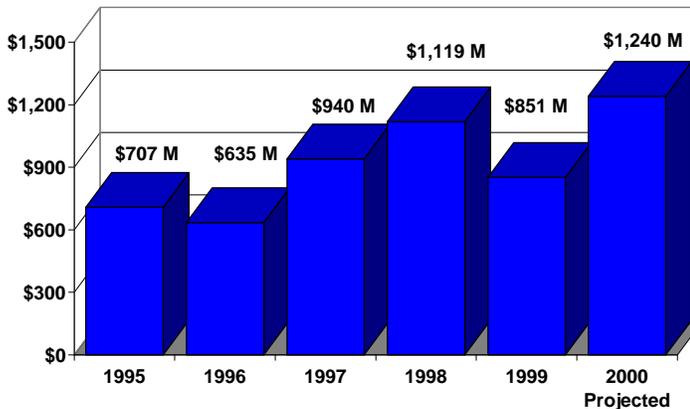
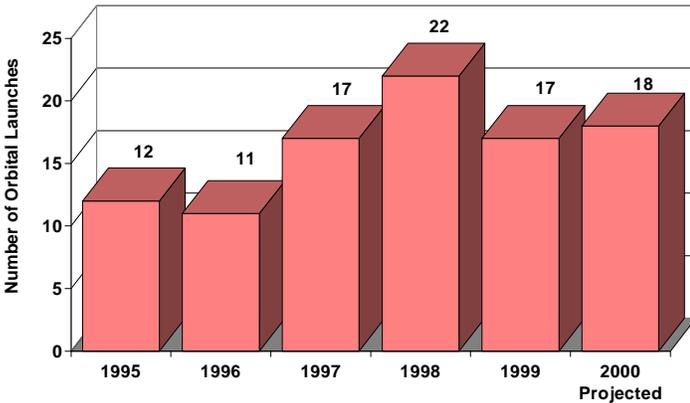


17 FAA-LICENSED LAUNCHES CONDUCTED IN 1999

In 1999, U.S. launch providers conducted 17 launches licensed by the Federal Aviation Administration's (FAA) Office of the Associate Administrator for Commercial Space Transportation (AST). Of the 17 FAA-licensed launches, 13 were conducted for commercial or international customers and two were conducted for U.S. Government agencies, all from U.S. launch ranges. The remaining two launches were conducted by the international Sea Launch joint venture. The 17 FAA-licensed launches were valued at approximately \$851 million including:

- 13 launches for commercial clients, worth \$672 M
- 2 launches for the U.S. Government, worth \$94 M
- 1 operational launch by Sea Launch, worth approximately \$85 M (no revenues were received for the test launch)

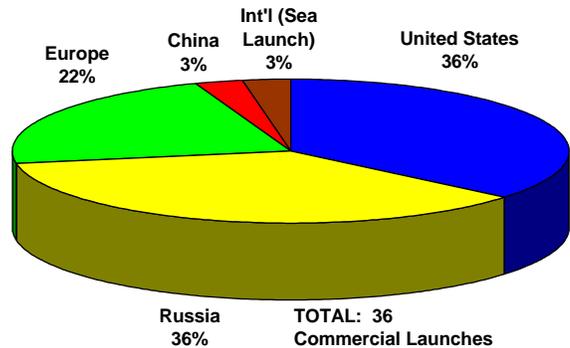
Launch failures caused delays in multiple vehicle programs and prompted governmental and internal program reviews. Delays in certain satellite programs also depressed the anticipated launch rate.



WORLDWIDE COMMERCIAL MARKET SHARES FOR 1999

Thirty-six commercial launches were conducted in 1999 by launch providers in four countries and the international Sea Launch partnership. The United States and Russia each captured 36 percent of these launches with 13 launches apiece. Europe's Arianespace conducted eight commercial launches for a 22 percent share. Sea Launch and the China Great Wall Industry Corporation each had a three percent market share with one launch each (the demonstration launch for Sea Launch was not included).

Half of the 36 commercial launches worldwide deployed payloads to LEO in 1999. Prior to 1997, only one to two LEO launches were conducted each year. In 1999, four Delta vehicles deployed 16 Globalstar satellites and 24 more Globalstar satellites were deployed by six Soyuz vehicles. Two Iridium payloads were launched on one Long March 2C vehicle from Jiquan in China, and the Dnepr and Cosmos small launch vehicles launched commercially from Russia's Baikonur launch site in Kazakhstan.



FAA-LICENSED LAUNCH VEHICLES

	United States							Int'l (Sea Launch)
Vehicle	Pegasus	Taurus	Athena 1	Athena 2	Delta 2	Delta 3	Atlas 2	Zenit 3SL
1999 Launches	3	1	1	2	10	1	5	2
Licensed Launches	2	1	1	2	4	1	4	2
Last 10 Years	25/28 (89.3%)	4/4 (100%)	2/3 (66.7%)	2/3 (66.7%)	81/82 (98.8%)	0/2 (0%)	53/55 (96.4%)	2/2 (100%)
LEO (lb.)	1,015	3,300	1,755	4,350	11,220	18,280	19,050	35,000
GTO (lb.)	--	1,290	--	--	4,060	8,400	8,200	11,050

CY 1999 Worldwide Commercial and/or FAA-Licensed Launch Events

Date	Vehicle	Site	Payload	Operator	Manufacturer	Use	Coml Price	L	M
United States									
1/26/99	† Athena 1	Spaceport FL	Formosat-1	Nat'l Space Prog. Office (NSPO)	TRW	Development	\$16-17M	S	S
2/16/99	† Atlas 2AS	CCAS	* JCSAT 6	Japan Satellite Systems (JSAT)	Hughes	Communications	\$90-105M	S	S
4/12/99	† Atlas 2AS	CCAS	* Eutelsat W3	Eutelsat	Aerospatiale	Communications	\$90-105M	S	S
4/27/99	† Athena 2	VAFB	* IKONOS 1	Space Imaging Inc.	Lockheed Martin Corp.	Remote Sensing	\$22-26M	F	F
5/4/99	† Delta 3	CCAS	* Orion F3	Orion Network Systems	Hughes	Communications	\$75-90M	F	F
5/17/99	†‡ Pegasus XL	VAFB	TERRIERS	Boston University/NASA	AeroAstro	Scientific	\$12-15M	S	F
			MUBLCOM	ARPA	Orbital Sciences Corp.	Communications			
6/10/99	† Delta 2 7420	CCAS	* Globalstar (4 sats)	Globalstar, Inc.	Space Systems/Loral	Communications	\$45-55M	S	S
7/10/99	† Delta 2 7420	CCAS	* Globalstar (4 sats)	Globalstar, Inc.	Space Systems/Loral	Communications	\$45-55M	S	S
7/25/99	† Delta 2 7420	CCAS	* Globalstar (4 sats)	Globalstar, Inc.	Space Systems/Loral	Communications	\$45-55M	S	S
8/17/99	† Delta 2 7420	CCAS	* Globalstar (4 sats)	Globalstar, Inc.	Space Systems/Loral	Communications	\$45-55M	S	S
9/23/99	† Atlas 2AS	CCAS	* Echostar 5	Echostar	Space Systems/Loral	Communications	\$90-105M	S	S
9/24/99	† Athena 2	VAFB	* IKONOS 2	Space Imaging Inc.	Lockheed Martin Corp.	Remote Sensing	\$22-26M	S	S
11/22/99	†‡ Atlas 2A	CCAS	GBS 10	DoD	Hughes	Communications	\$75-85M	S	S
12/4/99	† Pegasus XL/HAPS	Wallops	* Orbcomm (7 sats)	Orbcomm	Orbital Sciences Corp.	Communications	\$12-15M	S	S
12/21/99	† Taurus 1	VAFB	Kompsat	Korea Aerospace Rsrch. Inst.	TRW/KARI	Remote Sensing	\$18-20M	S	S
			ACRIMSAT	NASA	Orbital Sciences Corp.	Scientific			
			* Celestis 3	Celestis, Inc.	Celestis, Inc.	Other			
Europe									
2/26/99	Ariane 44L	Kourou	* Arabsat 3A	Arabsat	Alcatel Espace	Communications	\$100-125M	S	S
			SkyNet 4E	British Defense Ministry	Matra Marconi	Communications			
4/2/99	Ariane 42P	Kourou	* Insat 2E	ISRO	ISRO	Communications	\$65-85M	S	S
8/12/99	Ariane 42P	Kourou	* Telkom 1	PT Telekom	Lockheed Martin Corp.	Communications	\$65-85M	S	S
9/4/99	Ariane 42P	Kourou	* KoreaSat 3	Korea Telecom	Lockheed Martin Corp.	Communications	\$65-85M	S	S
9/25/99	Ariane 44LP	Kourou	* Telstar 7	SkyNet	Space Systems/Loral	Communications	\$90-110M	S	S
10/19/99	Ariane 44LP	Kourou	* Telstar 12	Orion Network Services	Space Systems/Loral	Communications	\$90-110M	S	S
11/13/99	Ariane 44LP	Kourou	* GE 4	GE Americom	Lockheed Martin Corp.	Communications	\$90-110M	S	S
12/21/99	Ariane 44L	Kourou	* Galaxy 11	PanAmSat	Hughes	Communications	\$100-125M	S	S
Russia									
2/9/99	Soyuz	Baikonur	* Globalstar (4 sats)	Globalstar, Inc.	Space Systems/Loral	Communications	\$35-40M	S	S
2/15/99	Proton	Baikonur	* Telstar 6	SkyNet	Space Systems/Loral	Communications	\$75-95M	S	S
3/15/99	Soyuz	Baikonur	* Globalstar (4 sats)	Globalstar, Inc.	Space Systems/Loral	Communications	\$35-40M	S	S
3/21/99	Proton	Baikonur	* AsiaSat 3S	Asiasat	Hughes	Communications	\$75-95M	S	S
4/15/99	Soyuz	Baikonur	* Globalstar (4 sats)	Globalstar, Inc.	Space Systems/Loral	Communications	\$35-40M	S	S
4/21/99	Dnepr 1	Baikonur	* UoSat 12	Surrey Satellite Tech. Ltd.	Surrey Satellite Tech. Ltd.	Scientific	\$10-20M	S	S
4/29/99	Cosmos	Kapustin Yar	Abrixas	DLR	OHB System	Scientific	\$12-14M	S	S
			* MegSat 0	Meggiorin	Meggiorin S.p.A.	Communications			
5/21/99	Proton	Baikonur	* Nimiq 1	Telesat Canada	Lockheed Martin Corp.	Communications	\$75-95M	S	S
6/18/99	Proton	Baikonur	* Astra 1H	SES	Hughes	Communications	\$75-95M	S	S
9/22/99	Soyuz	Baikonur	* Globalstar (4 sats)	Globalstar, Inc.	Space Systems/Loral	Communications	\$35-40M	S	S
9/26/99	Proton	Baikonur	* LMI 1	LMI	Lockheed Martin Corp.	Communications	\$75-95M	S	S
10/18/99	Soyuz	Baikonur	* Globalstar (4 sats)	Globalstar, Inc.	Space Systems/Loral	Communications	\$35-40M	S	S
11/22/99	Soyuz	Baikonur	* Globalstar (4 sats)	Globalstar, Inc.	Space Systems/Loral	Communications	\$35-40M	S	S
China									
6/11/99	Long March 2C	Taiyuan	* Iridium (2 sats)	Iridium, Inc.	Lockheed Martin Corp.	Communications	\$20-25M	S	S
Int'l (Sea Launch)									
3/27/99	†⊗ Zenit 3SL	Sea Launch Platform	* DemoSat	Sea Launch	Hughes	Test		S	S
10/9/99	† Zenit 3SL	Sea Launch Platform	* DirecTV 1R	DirecTV, Inc.	Hughes	Communications	\$75-95M	S	S

† Denotes FAA-Licensed launch.

‡ Denotes FAA-Licensed launch of U.S. Government payload. Not included in worldwide commercial launch market.

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

⊗ The demonstration launch for Sea Launch was FAA-Licensed, but not included in the worldwide total of commercial launches.

L/M refers to the outcome of the launch and mission: S = success, P = partial success, F = failure.