

Delta II, Atlas II, and Atlas III

During the suspension of Shuttle flights, Space Division began procuring two new medium launch vehicles—the Delta II and the Atlas II. Development and production of the Delta II, an improved version of the Delta launch vehicle, began in January 1987. It was procured primarily to launch the constellation of 24 operational Global Positioning System (GPS) satellites, and it launched the initial operational constellation without a single failure.⁸ The Delta II was developed in two consecutive configurations. The first of these launched the first nine GPS satellites from 14 February 1989 to 1 October 1990, while the second, more powerful version launched the later, heavier GPS satellites from 26 November 1990 to 10 March 1994, completing the constellation. During this entire period, a Delta II successfully launched a GPS satellite about every two months, an accomplishment rarely equaled.⁹ Delta IIs also launched other payloads, both military and commercial. On 12 August 1991, and again on 9 April 1993, SMC awarded contracts to Boeing for additional Delta II launch vehicles to replenish the GPS constellation, and they continued to launch replacement GPS satellites, suffering only one failure by early 2003.

Development and production of the Atlas II, an improved version of the Atlas/Centaur launch vehicle, began in June 1988. The Atlas II would be able to launch somewhat heavier payloads in the medium-weight class, and DOD intended it for Defense Satellite Communications System (DSCS) satellites as well as some experimental satellites. It was also used in many commercial launches. Lockheed Martin, the developer, launched the first commercial payload to use an Atlas II on 7 December 1991, and it launched the first Air Force payload, a DSCS III satellite, on 11 February 1992. In 1995, SMC began using a modification of the Atlas II known as the Atlas IIA, which employed a more powerful Centaur upper stage, and Lockheed Martin soon developed a further modification, the Atlas IIAS, which employed four strap-on solid rocket motors. The first military payload to use the Atlas IIAS was launched on 6 December 2000. By early 2003, about 15 military payloads, including four DSCS III satellites, had been launched on the Atlas II, IIA, and IIAS without any failures. In 1999, SMC used the existing Atlas contract to procure launches of a new Atlas vehicle, the Atlas III, that used a single-stage main propulsion unit called the RD-180. The RD-180 was designed and manufactured by a Russian contractor, NPO Energomash. One of the features that made the engine versatile for space launches was that it could be throttled on command to higher or lower thrust while in flight.

Evolved Expendable Launch Vehicle

Programs to develop a new generation of launch vehicles got off to a slow start. In 1987, the Air Force and NASA had begun a cooperative program to develop a more efficient family of boosters to replace the Space Transportation System and expendable launch vehicles. The program was known at first as the Advanced Launch System and later as the National Launch System before Congress ceased to fund it. In 1993, the Air Force and SMC tried a new, more frugal approach known as the Spacelifter program, which intended to develop a new launcher using existing technology. Nevertheless, the Secretary of Defense canceled it for reasons of cost later that year.

Efforts to develop a new, more efficient launcher received a badly needed endorsement when President Clinton signed a National Space Transportation Policy on 5

August 1994. Among other provisions, it assigned responsibility for expendable launch vehicles to DOD and directed DOD to develop improved versions of existing vehicles. The response was SMC's Evolved Expendable Launch Vehicle (EELV) program, which proposed to develop a family of launch vehicles for medium to heavy payloads based on existing vehicles or their components and using existing technology. SMC awarded four contracts for the initial phase of the EELV program on 24 August 1995, and it selected two proposals on 20 December 1996.¹¹ On 16 October 1998, SMC awarded contracts for both concepts covering the final stage of development.

One of the two EELV contracts went to McDonnell Douglas (later acquired by Boeing) for a proposed family of upgraded Delta launchers known collectively as the Delta IV. The Delta IV vehicles shared a first-stage common booster core (CBC) and a cryogenic second stage.¹² The first-stage engine, known as the RS-68, burned liquid oxygen and liquid hydrogen. Versions for somewhat heavier payloads added two to four strap-on solid-rocket auxiliary motors. The heavy version used three CBCs joined together in a line.

The other EELV contract went to Lockheed Martin for its proposed family of upgraded Atlas launchers known collectively as the Atlas V. The Atlas V vehicles also shared a first-stage CBC and second stage. The Atlas V's CBC employed the Russian-built RD-180 engine used in the Atlas III commercial launcher. The second stage consisted of a one- or two-engine cryogenic upper stage.¹³ Heavier versions added one to five strap-on solid-rocket auxiliary motors. The heavy version of the Atlas V also used three CBCs joined together in a line.

SMC awarded contracts on 16 October 1998 that provided launch services for Delta IV and Atlas V missions from both the east and the west coasts during FY 2002-2006. By the year 2000, however, agreements provided for launching the Atlas V from the east coast only and the Delta IV from both coasts. The first launch of the Atlas V, which took place at Cape Canaveral, placed a European commercial telecommunications satellite into the correct orbit on 21 August 2002. The first DOD payload for the Atlas V was scheduled for launch in 2003. The first launch of the Delta IV took place on 20 November 2002, also from Cape Canaveral, and it too placed a European telecommunications satellite into a nominal orbit. The first DOD payload for the Delta IV was a satellite from SMC's Defense Satellite Communications System III (DSCS III) program, which the launcher placed into a nominal geosynchronous orbit from Cape Canaveral on 11 March 2003. The first launch of a Delta IV from the west coast was scheduled to take place early in 2004. It would be the first launch of any kind from SLC-6, the launch complex which had been built originally in 1969 to launch the Manned Orbiting Laboratory.¹⁴ It had been modified later for the Space Shuttle and now had been modified again for the Delta IV.