**A Brief History of the Space and Missile Systems Center**

The organizational ancestor of the Space and Missile Systems Center was the Western Development Division (WDD), a unit of the Air Research and Development Command created to develop an ICBM as the highest priority of the U.S. Air Force. WDD was activated in July 1954 under its first commander, then-Brigadier General Bernard A. Schriever. The Air Force added responsibility for developing the first military satellite system to the division's original mission in October 1955. Both the missile and space missions remained with the division and its successors through the decades that followed, although the organization was twice split in two along mission lines. By the end of 1962, the organization had already developed, produced, and deployed three first-generation missiles, the Atlas, Titan I, and Thor. Before the decade was over, it had added the more advanced Titan II and Minuteman I, II, and III ICBMs to America's arsenal. It developed the Peacekeeper ICBM during the late 1970s and 1980s.

When the Cold War ended in the early 1990s, the Minuteman and Peacekeeper made up the land-based portion of the U.S. strategic force. The Peacekeeper missiles were removed from their silos during 2002-2005 to meet treaty obligations, and additional Minuteman IIIs were removed during 2007-2008, leaving 450 Minuteman III missiles as the only land-based U.S. ICBMs still on alert. The ICBM program office maintained these under Minuteman life extension programs.

To launch the satellites it was developing, the organization modified Atlas, Titan and Thor missiles and added new upper stages to make them more capable and reliable. These launch vehicles were used not only by the Air Force but also by the National Aeronautics and Space Administration (NASA), created in 1958. During the 1970s, NASA developed a Space Transportation System employing a manned, reusable Space Shuttle to replace most expendable launch vehicles. However, when the Space Shuttle "Challenger" exploded during launch in January 1986, NASA was forced to suspend all Shuttle launches while it investigated the cause of the explosion. The disaster gave added weight to the argument for having a variety of expendable launchers available.

Space Division had already begun the development of a larger, more capable Titan booster known as the Titan IV in 1985. It was launched for the first time in June 1989 and for the last time in October 2005. During the suspension of Shuttle flights, Space Division also 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, and it launched several generations of GPS Block II satellites from 1989 through 2009 with only one failure. Development and production of the Atlas II, an improved version of the Atlas Centaur launch vehicle, began in 1988, and it launched its first Air Force satellite in February 1992. The updated Atlas IIAS launched its last national security satellite in 2004.

SMC successfully carried out a more thorough redesign of launch vehicles known as the Evolved Expendable Launch Vehicle (EELV) program, awarding contracts for the Delta IV and Atlas V versions in 1998 and overseeing successful launches beginning in 2002 for both the Delta IV and the Atlas V. An unbroken string of successful EELV launches continued through 2010. Indeed, Air Force space launches of all kinds continued to build up a record number of successful launches in a row since 1999.

The first Air Force satellite program was known as Weapon System 117L. In 1958, the Advanced Research Projects Agency split it into several separate development programs, including Discoverer (also known as Corona), the Satellite and Missile Observation System (SAMOS), and the Missile Detection Alarm System (MIDAS). It also produced the Agena spacecraft and the control network for orbiting spacecraft that eventually matured into the Air Force Satellite Control Network. The Discoverer program achieved many technological breakthroughs, including the first polar-orbiting satellite, the first three-axis stabilization in orbit, the first satellite maneuver on command, the first recovery of a man-made object from orbit, and the first film return from orbit.

MIDAS performed the first infrared surveillance from orbit and became the first satellite system to detect missiles from space. It was replaced by a more capable infrared surveillance system called the Defense Support Program (DSP), which was first launched in 1970 and has since performed the mission of detecting and reporting on hostile missile launches. The 23rd and final DSP satellite was successfully launched on the first operational Delta IV Heavy EELV in November 2007.

In 1995, SMC issued the first contracts to develop an improved infrared surveillance system known as the Space-Based Infrared System (SBIRS). The space segment of SBIRS would be composed of improved sensors performing missions from different orbits, including highly elliptical orbit (HEO) and geosynchronous orbit (GEO). The first two HEO payloads entered operational service on orbit in 2008 and 2009.

SMC and its predecessors also developed space-based systems to perform a number of other missions, including nuclear surveillance, weather observation, navigation, and communication. Nuclear surveillance was carried out by six pairs of Vela satellites placed into orbit between October 1963 and April 1970, and later by subsystems flown on other satellites.

Weather observation is the mission of the Defense Meteorological Satellite Program (DMSP), which maintains a constellation of at least two weather satellites in near-polar orbits about 450 miles above the earth. Space Systems Division began development and deployment of weather satellites and associated ground stations and weather terminals during the 1960s. DMSP satellites currently in orbit, a generation called Block 5D-3, carry primary sensors that provide images of cloud cover over the earth's surface during both day and night, and they also carry other sensors that provide additional types of data on weather and on the space environment. The most recent Block 5D-3 satellite was launched successfully in October 2009.

The navigation mission is carried out by the Global Positioning System (GPS). The system consists of satellites that broadcast navigation signals to the earth, a control segment that maintains the accuracy of the signals, and user equipment that receives the signals, processes them, and derives its own location in three dimensions. The first GPS test constellation was launched in 1978, and the initial operational system of 24 second-generation (Block II) GPS satellites was completed in March 1994.

In the following fifteen years, SMC developed several generations of improved GPS Block II satellites, known successively as Block IIA (advanced), Block IIR (replacement), and Block IIR-M (modernized replacement). In March 2009, the last Delta II rocket dedicated to GPS launched the last satellite in the Block IIR-M series.

EELVs would deploy the next and final generation of improved GPS Block II satellites—known as Block IIF (follow-on)—as the constellation needed to be replenished. A Delta IV launched the first GPS IIF in May 2010. SMC initiated the development of a new GPS space segment known as Block III in May 2008. Block III would feature a number of military and civil improvements, including compatibility with European and Japanese satellite navigation systems.

SMC and its predecessors developed a wide variety of military communications satellites. Project Score, launched in 1958, was the world's first communications satellite and a feasibility demonstration for communications transponders in orbit. The first operational military system was known as the Initial Defense Communications Satellite Program (IDCSP), and it employed 26 small, sub-synchronous satellites launched during 1966-1968. It was followed by the more sophisticated, geosynchronous Defense Satellite Communications System Phase II (DSCS II), launched during 1971-1989. The next phase consisted of the Defense Satellite Communications System Phase III (DSCS III), launched during 1982-2003. Various tactical communications satellite systems included the Fleet Satellite Communications (FLTSATCOM) system, launched during 1978-1989.

During the 1990s, SMC introduced Milstar, a highly sophisticated, space-based communications system combining the virtues of tactical and strategic communications. The first Milstar satellite was successfully launched in 1994 and the last in 2003. SMC also developed several systems to handle increasing military communications demands. These included the Global Broadcast Service (GBS) to transmit very large volumes of data during hostilities.

In 2000, SMC initiated the development of the Wideband Global SATCOM (WGS) system to replace both GBS and DSCS III with a vastly enhanced, high-capacity, worldwide communications system using a constellation of six satellites. The first WGS launch was in 2007 and two more WGS satellites were successfully launched in 2009.

Another recent program, the joint-service Advanced EHF (AEHF) system, will augment and replace Milstar as DOD's strategic and tactical communications system. The space segment will consist of four geosynchronous satellites, each providing more communications capacity than the entire Milstar constellation. SMC awarded the initial contracts for AEHF in 2001. An Atlas V launched the first AEHF satellite on 14 August 2010.

Although the majority of SMC's research and development has been focused on the mission areas described in this essay, the organization has also managed many major efforts that cannot be easily categorized. One example of such efforts is the development and support for launch vehicles used in NASA's manned Mercury and Gemini programs during 1958-1966. Another example is the research and technology development for space-based portions of DoD's Strategic Defense Initiative of 1983-1993. A continuing program with many applications is the enduring work of the Space Test Program in providing experimental spacecraft, launches, and other flight opportunities for all DoD agencies from 1967 to the present.

To control military satellites in orbit, SMC and its predecessors also developed progressively more capable and more highly automated ground control systems. The Air Force Satellite Control Network occupied its first permanent control center in 1960 in Sunnyvale, California. SMC developed an improved control center known as the Consolidated Space Operations Center in Colorado at a facility later named Schriever Air Force Base. Building 400 was turned it over to Air Force Space Command for operation in 1993. A series of modernization projects improved operations at remote tracking stations as well.

SMC's headquarters facilities have a long history of their own. When the organization was formed in 1954, its offices were located with those of the Ramo-Wooldridge Corporation, which provided non-profit systems engineering support. Both organizations at first occupied the site of a former church and parochial school in Inglewood, California, and soon moved to the Arbor Vitae office complex near Los Angeles International Airport.

The headquarters remained here between 1955 and 1964. The Air Force acquired the land of the current Los Angeles AFB from the Navy in October 1962 and soon designated it as Area B. SMC's predecessor, Space Systems Division, moved its headquarters in 1964 to the Area A facilities in El Segundo, California, while the Aerospace Corporation, the new non-profit corporation for technical support, occupied its own facilities across the street. However, the headquarters for the Ballistic Systems Division (1961-1967 and 1989-1990) and the Ballistic Missile Office (1979-1989) was located at Norton AFB, California.

In 1999, SMC began work on an innovative plan for acquiring new buildings with seismological improvements. In essence, land in the southwest part of the base (Area A) was traded to private developers for new office buildings in the northeast part of the base (Area B). SMC moved its headquarters and organizations into the current facilities in early 2006 and dedicated them as the Schriever Space Complex.