MIDAS

by Harry Waldron

In the long strategic poker game that absorbed America and the Soviet Union, the cards changed dramatically in the fall of 1957, even though the stakes did not. It was no secret that the Soviets had been developing the most powerful missile yet built, the R-7 ICBM. That weapon, the world's first intercontinental ballistic missile, successfully flew flight tests of 4,000 miles laden with dummy H-bombs on 21 August and 7 September 1957. On 4 October 1957, the Soviets again proved the weapon's capability by using it to place the world's first artificial satellite and four tons of rocket debris into an orbit with an apogee of 588 miles. They launched a heavier satellite a month later. The options for the U.S., whose first operational ICBM, the Atlas, was still in development, were very limited. The Strategic Air Command announced that one third of its bombers would remain on 24-hour alert, and some would remain airborne, to foil an atomic Pearl Harbor launched by such ICBMs against its bases. For another two years, until the first Atlas missile went on strategic alert in October 1959, SAC's bombers would be the only possible nuclear response. American and Canadian forces began laying plans to complement the Distant Early Warning radars with the Ballistic Missile Early Warning System to gain the 15 minutes necessary for SAC's alert crews to scramble. Unfortunately, 15 minutes' warning did not allow time for cautious evaluation, and radar systems were not foolproof. SAC wanted even a few more minutes to respond, but it needed independent verification of an ICBM attack even more.

As it happened, a solution for early verification and warning was already under development at the Air Research and Development Command's Western Development Division (WDD) in Los Angeles. Infrared detection of missile launches had been one of three primary missions of the earliest Air Force development program for a reconnaissance satellite. The program as a whole was known as WS-117L or the Advanced Reconnaissance System, and the missile-detection component was called Subsystem G. It had formally begun with design contracts issued by Air Research and Development Command at Wright-Patterson AFB in November 1955. The Command transferred the program to WDD in February 1956. The division's successors, beginning with the Air Force Ballistic Missile Division (AFBMD), continued to develop the satellite systems based on WS-117L. DOD gave direction of the program to the Advanced Research Projects Agency (ARPA) in March 1958 but returned most control over it to the Air Force in November 1959.

While in authority, ARPA decided to develop the primary missions of WS-117L as separate space systems, and it named the development program for missile detection the Missile Defense Alarm System (MIDAS). It directed AFBMD to develop an experimental system in ARPA Order 38-59, issued on 5 November 1958. The eventual operational requirements for MIDAS would have to be much more demanding than those for the contemporary Discoverer/ Corona program. It would need greater reliability if it were to be the basis for a nuclear counterattack, and its technology—infrared detection and tracking rather than visible-light imaging—was less advanced.

MIDAS' ultimate success was as phenomenal as Corona's, but its initial failures were just as discouraging. It began its life as a separate program when AFBMD placed the effort under a separate contract with Lockheed effective 1 July 1959. The immediate technical goal was to place an infrared sensor and telescope in a rotating turret in the nose of an Agena spacecraft. The first two such satellites would be tested in 261-mile circular orbits. Eventually,

eight operational satellites in 2,000-mile polar orbits were to constantly monitor launches from the Soviet Union. Unfortunately, the program's first four satellites did not detect any missiles, the first because of a launch failure on 26 February 1960, and the last three (launched 24 May 1960, 12 July 1961, and 21 October 1961) because of early on-orbit failures.

DOD did not trust the proposed system's reliability. Therefore it kept the program in a research and development phase rather than approve its transition to an operational system in 1962. By then, imagery from the Corona Program's successes in 1961 had shown the Soviet missile threat to be much smaller than expected. Furthermore, US ballistic missiles were already becoming operational and making SAC's strategic response more survivable. The MIDAS program was lengthened, renamed Program 461, and wrapped more tightly in security restrictions. The next two launches (9 April 1962 and 17 December 1962) ended in an early on-orbit failure and a launch failure. Finally, a satellite launched on 9 May 1963 operated long enough to detect 9 missile launches. After another launch failure on 12 June 1963, the last Program 461 satellite, launched on 18 July 1963, operated long enough to detect a missile and some Soviet ground tests. Thus the seventh and ninth launches proved the feasibility of space-based missile detection and early warning using infrared sensors. DOD initiated a new program late in 1963 to develop an improved system, which ultimately became the Defense Support Program.

Data collection and analysis continued until 1968 under Lockheed's contract for Program 461 to support the next early warning program. Three additional launches in 1966, using improved spacecraft and sensors, demonstrated the system's increasing reliability and longevity. Although the launch on 9 June 1966 failed, the launches on 19 August and 5 October 1966 placed their spacecraft into highly useful orbits, where their infrared sensors gathered data for a year, reporting on 139 American and Soviet launches. In a few years, after SMC's predecessor the Space and Missile Systems Organization (SAMSO) had built an operational Defense Support Program on the MIDAS program's technological foundations, early warning would be earlier and more confident.