

Supersecret 7500-series satellites for years soaked up Soviet communications, while most assumed they performed missile warning missions.

Eavesdroppers in Disguise

By Jeffrey T. Richelson

The Aug. 7, 1968, issue of the *New York Times* carried an article with the intriguing title, “A Secret Payload Is Orbiting by the US.” John Noble Wilford reported that the previous day, an Atlas-Agena D rocket “shot into Earth orbit ... a supersecret payload that may include new military surveillance sensors.” He noted the Air Force would acknowledge an “experimental payload” had been launched from Cape Kennedy, Fla., but nothing more. In addition, Noble wrote that some reporters had been discouraged from asking questions by officials involved in the launch.

An Air Force index of missile launches noted “it was the first closed launch from the Cape since 1963” and that “newsmen assigned various unofficial designations of their own to the payload.”

What the newsmen and other observers had in common was the belief the secret payload was an infrared warning satellite designed to detect Soviet and other nations’ missile launches.

Philip J. Klass, in his 1971 book, *Secret Sentries in Space*, identified the satellite orbited that day as an “Advanced Midas” early warning satellite in geosynchronous orbit. He also disclosed that another was launched on April 12, 1969. Subsequently, other writers would

identify those satellites as Program 949 early warning spacecraft—an identification that would stick for several decades. While they were correct that there was a Program 949 involving the development of early warning spacecraft, the satellites orbited in August 1968 and April 1969 were not products of that program—or missile warning satellites of any kind.

They had a very different mission.

The August 1968 and April 1969 launches were one product of the secret conflict between the Air Force’s Office of Special Projects (Program A of the National Reconnaissance Office) and the CIA over high-altitude space-based eavesdropping. This conflict also was of great interest to the National Security Agency.

In the early years of the NRO the battle was particularly intense. Between August 1963 and September 1965 the two major protagonists were Albert Wheelon—who headed the CIA’s Directorate of Science and Technology and supervised the CIA component of the NRO (Program B)—and Undersecretary of the Air Force and NRO Director Brockway McMillan. One aspect of the conflict concerned future imagery programs, but the battle over space signals intelligence—involving the CIA, NSA, NRO headquarters, and

Program A—was “more obscure, but just as fierce,” according to Thomas R. Johnson’s official history of the NSA.

In 1963, Wheelon proposed the CIA develop and operate a geosynchronous satellite whose primary function would be to intercept Soviet missile telemetry, although communications intelligence would eventually become a significant part of its mission. The proposal would become the basis for the Rhyolite project, whose first spacecraft would arrive in geosynchronous orbit in June 1970.

Wheelon’s proposal helped spur NRO headquarters and the Air Force element of the NRO to push for a different kind of geosynchronous eavesdropper. Communications intelligence (Comint) would be its main mission. As early as 1962, a national intelligence estimate noted the continued Soviet expansion of both landline and microwave links for air defense communications.

Unlike Soviet high-frequency communications that bounced off the atmosphere and into waiting antennas at a variety of US and allied ground stations around the world, microwave communications leaked out into space. What was needed was a space-based system that could gather up the signals when they passed through the atmosphere. According to a former CIA official, NSA was “very much in favor

Canyon satellites sent intercepted Soviet communications to Bad Aibling, West Germany, seen here. The base had a detachment of Canyon personnel.



Photo via wikipedia

of getting Soviet traffic” and had “very little interest in telemetry.”

The Air Force had already explored the use of the low Earth orbiting satellites for communications intelligence, with Comint piggybacked onto satellites used to intercept Soviet radar signals. But such satellites were of limited utility as communication intercept platforms because they were over particular emitters for only brief periods of time, resulting in only snatches of conversations being intercepted. It was like being on an escalator and trying to eavesdrop on a conversation on the escalator going in the opposite direction. What was needed was a satellite in geosynchronous orbit, whose antennas could continuously scoop up the communications from a particular source—everything from hello to goodbye.

Program A and its main contractor, Lockheed, managed to develop a system that did just that. The program producing the Aug. 6, 1968, payload and its successors bore the classified code name Canyon and the unclassified designation Project 827.

Serendipitous Deception

Helping to keep Canyon’s mission secret was the presumption that geosynchronous satellites were too far from Earth

to be effective eavesdropping platforms. Less than a decade earlier, a 1959 issue of the NSA’s classified *NSA Technical Journal* included an article titled “Comint Satellites—A Space Problem.” The author, whose identity remains classified, reported on an NSA study on the feasibility of intercepting communications from space. “There are many target communications signals that might be considered for collection from a satellite at an altitude of a few hundred miles,” the author wrote.

However, when it came to satellites at several thousand miles or “the popularized 24-hour satellite hovering at 22,240 miles,” they operated at distances that were “just too great for present intercept techniques.” The author went on to explain that only “one part out of 10 trillion ... of the power transmitted is available for collection. The rest is gone forever.”

In addition, Air Force work on development of a missile launch detection satellite, an officially classified but publicly known effort, diverted attention from the use of geosynchronous orbit for the even more highly classified Canyon effort. Thus, in October 1973, by which time four Defense Support Program (DSP) missile warning satellites had been orbited, the Air Force, CIA, and NRO produced a short study focused on “NRP Security Via ‘White’ Programs”—NRP being an

Canyon was lofted into space by an Atlas-Agena such as this one, launching from Pad 14 at Cape Canaveral, Fla.



NASA photo

abbreviation for the National Reconnaissance Program. The study observed that “there have evolved several planned or fortuitous relationships” between NRO and “white” Air Force programs, and “all Cape Kennedy launches of DSP and NRO satellites have been reported by the media as ‘warning satellite’ launches.”

This meant that all the Canyon satellites, launched from Cape Kennedy had, since the first DSP launch in November 1970, been reported as early warning DSP launches.

Though the initial DSP launch occurred after the first three Canyon launches, in 1966 the Air Force had established Program 949 as the follow-on to the Midas early warning effort—which led to the assumption that Canyon launches in 1968, 1969, and 1970 were products of that effort. But while the 949 program led to an early warning satellite, it did not do so until the first DSP satellite was launched. None of the envisioned 949 test satellites were ever built, much less orbited.

It would only be decades later that the true mission of those launches would become clear.

The first Canyon satellite, designated 7501—7500 for the program, 01 for the mission number—was poised to deliver the communications intelligence NSA wanted when something went very wrong.

The spacecraft arrived in its proper orbit, with a 20,256-mile perigee and 24,335-mile apogee and 10.2-degree inclination. Thus, the satellite traced a figure eight while rising above the equator and then falling below it as it moved between its highest and lowest altitudes. But in maneuvering the satellite, a ground controller made a critical error that sent the bird into an uncontrollable spin, turning it into a highly classified, expensive piece of space junk.

The failure of 7501 left American signals intelligence personnel in at least four locations—at the Pentagon, in Los Angeles (headquarters for the Air Force Office of Special Projects), at Fort Meade, Md. (home of NSA), and in Bad Aibling, West Germany—gravely disappointed.

Between the arrival in 1952 of the Army Security Agency’s 328th Communications Reconnaissance Company and its closure in 2004, Bad Aibling would host a number of different eavesdropping missions—including the interception of Soviet satellite communications, the monitoring of high-frequency communications from the Soviet Union and Eastern Europe, and the receipt of data from unmanned intercept sites in Cyprus and Oman.



An explosion seconds after launch in August 1998 destroyed the last of the 7500-series satellites.

Over those years, the composition of personnel at the base would also change. An official history of the station noted that during the 1950s and first half of the 1960s Department of Defense civilians—NSA personnel—“were rarely seen, except as visitors.” That “began to change in the late 1960s, [for] DOD civilians were required to provide technical expertise and leadership in support of the station’s mission.” The late 1960s was the beginning of the Canyon launch effort, and along with DOD civilians, the station became home for the Lockheed employees who were responsible for manning the consoles used to operate the satellites.

The Canyon contingent at Bad Aibling had an unclassified designation—Project Wildbore—although as was the case with Project 827, what Wildbore referred to was highly classified. But first they would have to wait for a working satellite before their highly classified activities could begin.

Fortunately for the Wildbore contingent not only did the next two launches place their satellites in orbit, there were no fatal mistakes on the ground. Soviet communications traffic started to arrive in large quantities at their Bavarian ground station—courtesy of the satellite’s 30-foot-diameter mesh antenna. Tapes of the intercepts would be taken to Munich and then flown to Fort Meade.

Not that everything went smoothly. Communication between the satellite and ground station would cut out on occasion, or a satellite would simply stop working. The fourth launch, on Dec. 4, 1971, failed to place satellite 7504 in orbit. According to Matthew M. Aid, author of *The Secret Sentry*, a book on the National Security Agency, Canyon had “every teething problem” a new system could experience.

The next—and last—three Canyon launches on Dec. 20, 1972, June 18, 1975, and May 23, 1977, all placed their spacecraft in the proper orbit and experienced fewer problems than earlier spacecraft. Along with the intermittently working 7502 and 7503, they delivered “very high value Comint data,” according to the former CIA official.

This data wasn’t restricted to intercepts of Soviet air defense and other microwave communications. The very-high-frequency communications of Arab nations, including those to and from surface-to-air missile sites, were sucked up by Canyon antennas. Thus, it is likely that Canyon contributed to the intense US intelligence effort during the Yom Kippur War of 1973.

Those antennas might have also been of assistance to American pilots engaged in

the Vietnam air war, since they intercepted the ultra-high-frequency communications of the North Vietnamese Army, including those between firing batteries and regimental headquarters. Those intercepts could have proved particularly useful during the December 1972 air offensive against Hanoi and Haiphong, which began on Dec. 18 with 129 B-52 sorties.

Before it was over there were 729 B-52 sorties. They faced at least two obstacles: the massive barrages of SAMs fired by the NVA personnel and a work stoppage, at two bases in the area, by radio intercept operators whose target was North Vietnamese air defense activities. Canyon was also useful in monitoring the China-North Vietnam border during the Christmas offensive, given the fears that attacks might serve as a catalyst for further Chinese support to North Vietnam.

Canyon may also have been one of the sources of Comint on the extensive Chinese military exercises in the fall and winter of 1970-1971, in which "every military region participated to some degree" and involving "some of the most extensive exercise activity ever reflected in Comint," according to a Defense Intelligence Agency report.

Prime Betrayal

It was not until 1990 that Canyon's existence and mission were revealed in the media, well after the program had ended in 1983. But word of the program's existence and mission arrived at KGB headquarters at least eight years before that, in 1975. The Soviets then took countermeasures to reduce the take from the satellite eavesdroppers.

Once Canyon spacecraft began sending back intercepts the volume of material continued to grow, involving thousands of intercepted messages each week and far exceeding the capability of NSA to process and exploit. It was two years before some of the intercepts were processed. A solution to the problem was found in the cooperation of two key Sigint allies, Britain and Canada, that had not been previously told of the program's existence. They both learned of the program and received an offer at the same time: Assist with translating the Russian-language messages and receive access to the product. Both allies agreed, one result being that virtually every Russian-language instructor assigned to Canadian signals intelligence training classes was pulled out of class and sent to headquarters during 1971 and 1972.

Unfortunately, for the security of the program, one of the members of the

British Sigint agency, the Government Communications Headquarters (GCHQ), who learned of the eavesdropping effort, was Geoffrey Arthur Prime.

Over the years of his government service, Prime developed a mild fondness for the Soviet regime that turned into complete sympathy and led to betrayal. In January 1968, while an airman in the RAF, Prime made contact with a Soviet officer, letting Soviet intelligence know he wanted to hear from them. His request was passed not to the KGB's Foreign Directorate but to representatives of its Third Chief Directorate, responsible for security in the armed forces and low-level espionage against Western troops stationed in Germany. But what mattered most was that Prime became a Soviet asset, code-named Rowlands. At the KGB's urging, he obtained a position with GCHQ and in September 1968 began working at the London Processing Group (LPG), which translated and transcribed Russian and other foreign language intercepts.

At what point Prime learned specifically of the Canyon program is not clear. In March 1976, he arrived at GCHQ headquarters at Cheltenham to become a linguist in the agency's "Special Sigint" Division, which handled Soviet traffic. At that time he was given a Byeman clearance, necessary to receive details about satellite reconnaissance programs. Of course, in revealing to the Soviets what he had been working on during his years at the LPG, it is possible that he allowed the Soviets to deduce the existence of an intercept program targeting the specific communications links monitored by Canyon.

In September 1977, overwhelmed by pressure, Prime quit GCHQ, took jobs as a taxi driver and salesman, and broke off contact with the KGB. His espionage career was discovered in 1982, but only after he was arrested for molesting young girls. That arrest ensured he could do no further damage to the US and British Comint efforts, but all sorts of great damage was already done.

Five years before the Canyon operations ceased and Project Wildbore ended, Canyon had already spawned a successor, originally code-named Chalet. In June 1978, the first satellite from the successor program reached geosynchronous orbit. The lineage from Canyon to Chalet was so strong that the numerical designation for the first Chalet was 7508.

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Bettmann/Corbis photo

Geoffrey Prime's role as a spy was not discovered for several years after he lost his nerve and quit supplying information to the Soviet Union.

That first Chalet had similar orbital parameters to the Canyon satellites, but there was one significant difference. Rather than the ground station being located at Bad Aibling, data from the new satellites would be transmitted to the massive Menwith Hill ground station in the United Kingdom. Like Bad Aibling, it had a number of missions.

By the next launch, in October 1979, Chalet had become Vortex, and the spacecraft had been modified to allow it to intercept missile telemetry in addition to communications. Eventually a three-satellite constellation would permit extensive targeting of the Soviet Union, the Middle East, and Asia. The satellites would vacuum up the communications of Soviet missile and nuclear research and development and testing sites, Israeli and Arab communications (plus Iraqi communications during Operations Desert Shield and Desert Storm), and an assortment of Chinese communications.

In 1998, a launch explosion prevented the last of the 7500 series satellites from reaching orbit.

By that time another—still classified—successor program, with first launch in 1994, had placed several eavesdropping satellites in orbit. Even these satellites could trace their origin to the decision to develop a geosynchronous spacecraft whose primary mission was communications intelligence—the decision to build Canyon. ■