Reconnaissance Satellites in the Early Years of the Cold War

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"Nothing less than the control of the heavens was at stake." –Tom Wolfe

In the first fifteen or so years following the end of World War II, the United States enjoyed a rapid increase in technological gains in both military and civilian arenas. Possibly the most exciting was the development of jet propulsion technology that enabled man to travel faster than ever dreamt possible. The world's first glimpses into this new technology were frightening, though, as they were served up by Nazi V-2 missiles that wreaked random havoc on England in the latter stages of the war.

As the Cold War between the United States and the Soviet Union slowly intensified, US citizens probably had faith that their government and military would protect them from the Red Menace, in spite of the fact that the Soviets were constantly at the US's heels, developing an ever-increasing number of similar technologies that began, startlingly, in 1949 when the Soviet Union exploded its first nuclear device.

The United States began to explore the possibilities of space and what being up there could do for them. Eventually the names of the US satellite programs– Vanguard, Pioneer, Explorer, and Voyager– and of the manned space missions, especially Mercury and Apollo, which culminated with walks on the Moon, were spoken with awe in recognition of what American science could accomplish. One name, however, struck fear instead of inspiring awe in the hearts and minds of many Americans in high and low places– *Sputnik.*

On October 4, 1957, the Soviet Union lobbed the first artificial satellite into orbit around the Earth. It was a puny yet significant piece of metal; it was a black sphere 22 inches in diameter and weighing about as much as an average grown adult male. Its significance, however, weighed much more heavily on the minds of American politicians, scientists, and citizens, many of whom now had to come to grips with the fact that the Soviet Union had a perceived advantage over the United States. This instance of the USSR besting the US created an anxiety that "did not end until Neil Armstrong and Buzz Aldrin took their historic steps in July 1969."[1] The fact that the USSR beat the United States into space began a race that started the militarization of a cold, inhospitable, dangerous, and important region. The Soviet Union quickly took the lead, especially in the technological, political, and psychological arenas of this first phase of the Space Race.

The second successful Soviet launch occurred just one month later. The half-ton Sputnik II satellite reinforced the Soviet advantage, as the first American satellite, Vanguard, was still in development. Perhaps a more chilling realization on the part of the US military was that Sputnik II was the payload on a solid-fuel rocket that not only put it orbit, but proved the Soviets had perfected an intercontinental ballistic missiles (ICBM). After all, if the Soviets could put a heavy payload into orbit, surely they could put a nuclear device on top of that rocket instead of a satellite and send it right across the

[1] Robert Divine, The Sputnik Challenge. New York: Oxford University Press, 1993; p. vii.

Pacific Ocean. Nikita Khrushchev took the opportunity of Sputnik's success to drive home a powerful point: the Soviet ICBM program was more successful and more advanced than that of the United States.[2] Though the public focus was almost always placed on the achievement of space goals, the US and USSR were hard at work developing rocket technology for missile applications, a constant hop-scotching of action, reaction, and deterrents.

It now appears that the Soviets were not fully prepared to take the lead in the space race and were fairly surprised at the furor that the first two Sputniks caused and was forced to concentrate its efforts in space in order to fill the shoes placed before them.[3] President Dwight Eisenhower underestimated the world's response to the Sputniks as well, even though he was fully aware that the USSR was on the brink of breaking the space barrier.[4] The Soviets maintained a military focus in their space program, mimicking to a large extent the focus of their entire society. The United States, however, developed satellites useful for communication and meteorology not specifically geared toward military uses, a diversification which enabled them to develop a wider range of platforms and payloads.

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[2] Walter McDougall, ...The Heavens and the Earth: A Political History of the Space Age. New York: Basic Books, Inc. Pub., 1985; p. 237.

[3] Nicholas Johnson, Soviet Military Strategy in Space. London: Jane's Publishing Co., Ltd., 1987; p. 9.

[4] Johnson, p. 39.

In the United States, James Killian was appointed to head up the President's Science Advisory Committee (PSAC), which was formed late in the same year as the Sputnik launches. He came to the PSAC from MIT, where he was president of the university, and was given the power to consult with all governmental agencies up to and including the Joint Chiefs of Staff and could initiate action through orders.[5] Killian, placed in charge of the PSAC to ensure a high level of scientific expertise was achieved[6], absorbed the existing members of the Science Advisory Committee and added to them several noted physicists and chemists. To add a specifically military view to the new committee, the PSAC included General James Doolittle, an Army Air Force hero best remembered for leading daring B-24 raids on Tokyo during W.W.II.

Killian and Eisenhower developed a policy that focused on eliminating redundancies between military and scientific goals for space. Defense was Eisenhower's primary objective, but he was committed to securing results over attaining specific goals. Even though both men wanted to avoid a protracted and costly space race with the Soviet Union, neither was able to prevent the popular push behind an international competition. In a largely successful move designed to ensure that scientific goals were pursued in addition to military ones, the National Aeronautics and Space ~~Agency~~ Administration (NASA) worked with the Department of Defense (DOD) and parallel programs developed. One

[5] Divine, p. 48.
[6] McDougall, p. 151.

program of open scientific research and its sister program of secret military applications both forged ahead and defeated Eisenhower's attempt to completely prevent redundancies.[7]

So intent was Killian on tempering the military's use of space with civilian interests that, along with Edwin Land of Polaroid, he offered Eisenhower the option of a special reconnaissance aircraft that could feasibly be developed and used until satellite technology improved enough to allow space reconnaissance. Oddly enough, the Air Force opposed this plan and preferred the continued development of high powered launch platforms and photographic equipment that could be installed aboard satellites. This stance was supported by a very important member in the US missile community, Werner von Braun, who assured satellite proponents that "So far as photo reconnaissance is concerned, I believe a very high quality of photos can be obtained...the atmosphere is much more transparent from without than from underneath."[8] In the late 1950's and early 1960's, the culmination of Killian's idea, the U-2 high-altitude reconnaissance aircraft, gathered much of the US's photographic information from eight miles above the Earth.

The U-2 program, as many military programs, took a long time, cost much more than anyone imagined, and was only marginally successful until technology caught up

[7] McDougall, p. 170.
[8] McDougall, p. 224.

with the ideas. The concept of the U-2 started life as an ambiguous aircraft called Aquatone. Aquatone was initially realized in the form of a British bomber, which American scientists improved and renamed B-57. From constant improvements in jet propulsion came Bell's M-67 project and the XF-104 Starfighter. The M-67 was rechristened as X-16 and saw limited service, while the XF-104 was adapted to high altitudes and renamed the CL-282. After constant testing and design improvements, the CL-282 put the X-16 out of business and was officially named U-2.[9] When satellite reconnaissance technology improved to the point where it was cost-effective, information could be gathered from 13 times higher than the U-2 could achieve and would avoid touchy situations such as having to negotiate for the return of Gary Powers, a U-2 pilot downed over the Soviet Union.

In the wake of the Sputnik launches and casting a shadow over the development of the future U-2, Eisenhower and Soviet Premier Nikolai Bulganin toyed with the idea of banning military exploitation of space; this early attempt at a unilateral ban could have closed off the key arena of the Cold War before it really opened. However, Eisenhower manipulated the wording of the proposed agreement and Nikita Khrushchev inadvertently supported the twisted wording. The 1959 agreement between Bulganin and Eisenhower was to allow "peaceful" uses of space; by avoiding the term

[9] William Burrows, Deep Black: Space Espionage and National Security. New York: Random House; pp. 71-3.

"nonmilitary"[10], both nations had the option of putting military payloads into space in the name of preserving peace.

At a summit meeting in May 1960, Khrushchev made the statement that "any nation in the world that wanted to photograph Soviet areas by satellite was completely free to do so." Even though this statement was directly contradicted by official USSR policy that extended their sovereignty straight up from their borders,[11] the United States took free reign in continuing to develop "peaceful" reconnaissance satellites. The Soviet Union could hardly have been expected not to respond in kind. Therefore the agreement of the previous year became nothing more than wasted ink and wasted time. It is disheartening to think that by the use of one word over another, two nations began to pour billions upon billions of dollars into running a race that would never really be won.

Until 1961, the United States government had a policy of openness ~~that has not been seen since~~ regarding military applications for space. From 1961 on, however, any space mission with a specifically military application was shrouded in secrecy.[12] Initially the majority of these missions involved reconnaissance satellites. The Soviet Union began its photo reconnaissance satellite program in earnest in 1962; it operated much the same

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[10] Paul Stares, The Militarization of Space: U.S. Policy, 1945-1984. Ithaca, NY: Cornell University Press, 1989; p. 55.

[11] McDougall, p. 109.

[12] Stares, p. 64-5.

as the rest of Soviet military programs: quantity over quality. Soviet technology was never as advanced as American but they more than made up for it by putting more platforms in space than the Americans did.[13] The bulk of the Soviet satellite program was centered on photo reconnaissance missions and, keeping with the "peaceful" intent of the 1959 agreement, were reportedly used to keep an eye on the strategic missile reserves of enemies of the USSR. The main workhorse of the Soviet surveillance satellite fleet was the Kosmos platform, of which 700 were launched between 1962 and 1986.[14]

Photo reconnaissance satellites could have been the single most important factor in keeping the Cold War from becoming hot during the early 1960's. With more success than even von Braun could have predicted, photographs from outer space quickly became the backbone of intelligence gathering. While geosynchronous satellites populated the Clark Belt 22,300 miles above the Earth to facilitate communications, photo reconnaissance satellites were placed into low orbits on inclined planes to travel across the Earth.[15] This low, inclined orbit enabled the various governments to plan passes over specific regions in order to gather information.

Photographs transmitted by a United States photo reconnaissance satellite were key in defusing two situations. First, satellite photographs of the Soviet Union enabled American intelligence officers to determine that the number of actual Soviet ICBM

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[13] Johnson, p. 53.
[14] Johnson, p. 59.
[15] Emily Toone, *A Handbook for Satellite Technology*. George Mason University Master's Thesis, 1989; pp. 4-7.

but Eisenhower didn't release this to the public

capable launching sites was vastly overestimated. This eased some of the nuclear hysteria that had American citizens in its grip since the early 1950's. Second, President John F. Kennedy used surveillance satellite photographs to aid his decisions during the Cuban Missile Crisis.[16] Photographs taken of Cuba during this period showed the US how many and where suspected missiles could be located.

These two political victories came at a dear price and followed a series of dismal failures. The Keyhole photographic hardware system had been in development since just before the Kennedy administration and was in its fourth generation by 1962; its specifications and those of the U-2 program were of equal secrecy. As it was improved, the Keyhole system was installed in a series of larger and more expensive satellites. The Keyhole 4, 5, and 6 generation systems were part of the Corona, Argon, and Lanyard satellite systems respectively. These three systems, along with the Samos series of surveillance satellites, were nearly unilateral failures. Out of the more than 20 spacecraft that were built in these four series, only three of them returned film to Earth. The only Corona spacecraft to return film had passed through a cloud of radioactive debris left behind by a high-atmosphere nuclear test, thereby ruining the film that could only be recovered by special military aircraft.[17] The United States has only recently achieved a near-perfect success rate, enabled by modern digital technology, the eleventh generation

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[16] Johnson, p. 56.

[17] Jeffrey Richelson, America's Secret Eyes in Space: The U.S. Keyhole Spy Satellite Program. Harper Collins Pub., 1985; pp. 66-8.

of Keyhole photographic systems, and the Lacrosse series of satellites launched during the late 1980's.[18]

While there is no doubt as to the lead position in the Space Race resting securely with the United States right now, in the early days of the satellite phase of the competition the Soviet Union had a definite technological, political, and psychological advantage. Sputnik and Kosmos put to shame the American Vanguard and highly touted Samos satellites. American politicians seemed to have taken second place personally, and poured a huge amount of money into the various spacecraft programs. The psychological advantage the Soviets enjoyed ended when the Apollo 11 astronauts stepped on the moon, but until then the United States was forced to play catch-up.

Very [redacted] Good. I'm glad you found the McDougall book.

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[18] Richelson, p. 227.

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