SAMOS TO THE MOON:

The Clandestine Transfer of Reconnaissance Technology Between Federal Agencies

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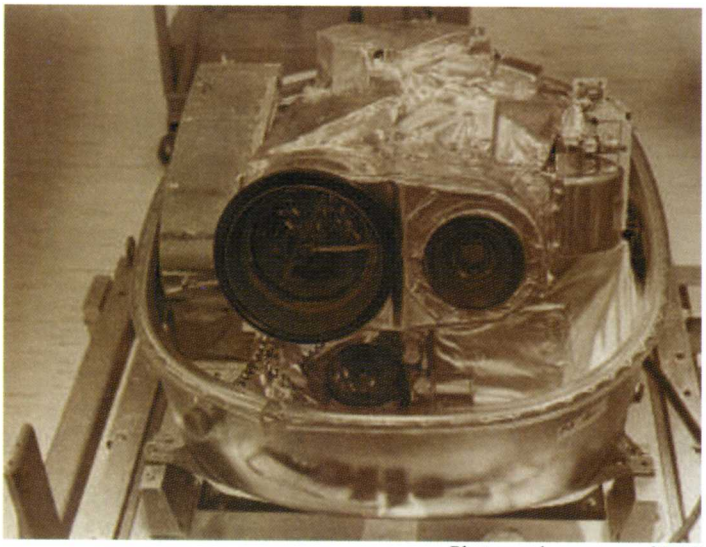
Among those who share a passing interest in the history of astronautics, two popular myths remain in vogue. The first contends that the U.S. Air Force, which began American work on reconnaissance satellites with the SAMOS Project, failed in the late 1950s in its efforts to create a near real time film imaging system. Second, and entirely dependent on the first axiom, the electro-optical imaging system developed later by the National Reconnaissance Office (NRO) represents the first application of near real time satellite imaging. The actual story, as you might suppose at this point, is rather different.

Photograph courtesy of EKC

SAMOS-Lunar Orbiter Camera Showing Film Track

Conceived in the mid-1950s, the novel SAMOS imaging system at that time represented cutting edge technology—a near real time analog film-readout satellite. The Eastman Kodak Company



Photograph courtesy of EKC

SAMOS-Lunar Orbiter Camera with Lenses Installed

built the E-1 (preliminary) and E-2 (advanced) payloads. The E-1 featured a six-inch focal length lens in a camera that spooled a special two-component EKC Bimat (positive) film, and SO-243 (negative) film. The exposed negative film, converged with the gelatin-coated SO-111 Bimat film, was developed in a semi-dry chemical process, and then was scanned by a Columbia Broadcasting System flying spot line-scanner that consisted of a cathode-ray tube and a rotating anode having a high intensity spot of light. A photomultiplier converted the light passing from the scanner through the film into an electrical signal whose strength varied with the density of the emulsion layer of the film. The images were then radioed to Earth as frequency-modulated analog signals, to be assembled much in the manner of a wire photo, each image built up in swaths.

Judging SAMOS a national asset like the U-2, and one that ought not be directed by a military service, in late August 1960 President Dwight D. Eisenhower removed SAMOS from the control of the regular Air Force and assigned it to a new civilian office in the Department of Defense. A small contingent of Air Force officers and civilians responsible for SAMOS now reported to the director of the new office, Under Secretary of the Air Force Joseph V. Charyk. But, when launched into a low-Earth orbit in late 1960 and early 1961, SAMOS E-1 imaging payloads encountered problems—and not just the normal ones associated with electronic component or launch vehicle malfunctions. Like the CORONA Project that recovered film capsules, the E-1 readout payload also was a film-limited system and did not have a long life on orbit. Second, it had no image storage and recall capability, and had to transmit its take to a ground station on the next pass. Third, the images were not encoded; for security reasons that meant the film had to be read-out over the continental United States. Finally, SAMOS, operating at a