

# Reconnaissance Satellite

Subjects: Others

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A reconnaissance satellite or intelligence satellite (commonly, although unofficially, referred to as a spy satellite) is an Earth observation satellite or communications satellite deployed for military or intelligence applications. The first generation type (i.e., Corona and Zenit) took photographs, then ejected canisters of photographic film which would descend back down into Earth's atmosphere. Corona capsules were retrieved in mid-air as they floated down on parachutes. Later, spacecraft had digital imaging systems and downloaded the images via encrypted radio links. In the United States, most information available is on programs that existed up to 1972, as this information has been declassified due to its age. Some information about programs prior to that time is still classified, and a small amount of information is available on subsequent missions. A few up-to-date reconnaissance satellite images have been declassified on occasion, or leaked, as in the case of KH-11 photographs which were sent to Jane's Defence Weekly in 1984.

Keywords: digital imaging ; observation satellite ; satellite images

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## 1. History

On 16 March 1955, the *United States Air Force* officially ordered the development of an advanced reconnaissance satellite to provide continuous surveillance of "preselected areas of the Earth" in order "to determine the status of a potential enemy's war-making capability".<sup>[1]</sup>

## 2. Types

There are several major types of reconnaissance satellite.<sup>[2]</sup>

Missile early warning*Main pages: Engineering:Defense Support Program and Engineering:Space-Based Infrared System*  
Provides warning of an attack by detecting ballistic missile launches. Earliest known are Missile Defense Alarm System.

Nuclear explosion detectionIdentifies and characterizes nuclear explosions in space. Vela (satellite) is the earliest known.

Photo surveillanceProvides imaging of earth from space. Images can be a survey or close-look telephoto. Corona (satellite) is the earliest known. Spectral imaging is commonplace.

Electronic reconnaissanceSignals intelligence, intercepts stray radio waves. Samos-F is the earliest known.

Radar imagingMost space-based radars use synthetic aperture radar. Can be used at night or through cloud cover. Earliest known are the Soviet US-A series.

## 3. Missions

Examples of reconnaissance satellite missions:

- High resolution photography (IMINT)
- Measurement and Signature Intelligence (MASINT)
- Communications eavesdropping (SIGINT)
- Covert communications
- Monitoring of nuclear test ban compliance (see National Technical Means)
- Detection of missile launches

On 28 August 2013, it was thought that "a \$1-billion high-powered spy satellite capable of snapping pictures detailed enough to distinguish the make and model of an automobile hundreds of miles below"<sup>[3]</sup> was launched from California's Vandenberg Air Force Base using a Delta IV Heavy launcher, America's highest-payload space launch vehicle.

On 17 February 2014, a Russian Kosmos-1220 originally launched in 1980 and used for naval missile targeting until 1982, made an uncontrolled atmospheric entry.<sup>[4]</sup>

## 4. Benefits

Reconnaissance satellites have been used to enforce human rights, through the Satellite Sentinel Project, which monitors atrocities in Sudan and South Sudan.

During his 1980 State of the Union Address, President Jimmy Carter explained how all of humanity benefited from the presence of American spy satellites:

...photo-reconnaissance satellites, for example, are enormously important in stabilizing world affairs and thereby make a significant contribution to the security of all nations.<sup>[5]</sup>

Additionally, companies such as GeoEye and DigitalGlobe have provided commercial satellite imagery in support of natural disaster response and humanitarian missions.<sup>[6]</sup>

During the 1950s, a Soviet hoax had led to American fears of a bomber gap. In 1968, after gaining satellite photography, the United States' intelligence agencies were able to state with certainty that "No new ICBM complexes have been established in the USSR during the past year."<sup>[7]</sup> President Lyndon B. Johnson told a gathering in 1967:

I wouldn't want to be quoted on this ... We've spent \$35 or \$40 billion on the space program. And if nothing else had come out of it except the knowledge that we gained from space photography, it would be worth ten times what the whole program has cost. Because tonight we know how many missiles the enemy has and, it turned out, our guesses were way off. We were doing things we didn't need to do. We were building things we didn't need to build. We were harboring fears we didn't need to harbor.<sup>[7]</sup>

## 5. In Fiction

Spy satellites are commonly seen in spy fiction and military fiction. Some works of fiction that focus specifically on spy satellites include:

- *The OMAC Project*
- *Enemy of the State (film)*
- *Body of Lies (film)*
- *Ice Station Zebra*
- *Parmanu: The Story of Pokhran*

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