

objects of 6 inches from 80 miles distance has been reported. The KH-11 records events in its field of view as digital electronic impulses instead of film. These can be transmitted directly to earth almost instantaneously, though the resolution is poorer than for photographs.

When events outrun the ability of satellites to be moved into position, reconnaissance planes can be used. The SR-71 or "Blackbird" can fly at more than 2000 mph at heights up to 85,000 feet. Its three cameras can film 100,000 square miles in an hour. It can produce three dimensional images of a 150 square mile area sharp enough to permit identification of mailbox on a country road.

Typically, one monitoring system will provide clues for additional investigation by other systems. All reconnaissance satellites are used in concert with sensors intended to monitor electronic communications; this combination of methods was used in October 1973 when it appeared the USSR was about to send troops into the Middle East war. These "surrogate ears" are located aboard satellites, aircraft, ships, submarines and at ground stations. They monitor not only telephone traffic but also radio, microwave and satellite communications as well as radar emissions and telemetry from missile tests. The primary listening satellites are the Rhyolite, Chalet and Magnum. The geosynchronous Rhyolite monitors information from Soviet missile tests. A different type of listening satellite known as White Cloud can intercept submarine and ship communications while another at a lower altitude monitors military radar transmissions. Supplementing these satellites are U-2, SR-71 and RC-135 aircraft.

The most important ground-based radar is Cobra Dane on Shimya Island off Alaska. It can detect an object the size of a basketball at 2000 miles. A similar radar called Cobra Judy is located on a ship. In addition, there is a world-wide network of ground-based antennas which monitor communications. These include antennas on tops of embassies.

Much of the information obtained from these monitoring devices is inferential. For example, in the case of a missile test, design details can be deduced from telemetry; radar returns permit estimates of velocity and acceleration; and imagery helps identify the fuel used and the missiles' point of impact.

Other satellites make up the Satellite Early Warning System which senses infra-red radiation emitted when an ICBM is launched. They can also detect nuclear explosions in the atmosphere and in space. Sensors on the new NAVSTAR navigation satellites will check for any nuclear detonations in space using x-ray, optical and electromagnetic pulse sensors. The data collected should permit the location of a nuclear detonation to within a mile almost immediately. The space-based Teal Ruby infra-red detection system is scheduled to be tested in 1986. It is intended to track flight paths of aircraft and possibly ICBMs.

The US also employs seismometers to detect underground nuclear blasts. Older Vela satellites monitored x-rays, gamma rays and