Approved for Release: 2014/09/10 C06122499

Meeting A Collection Challenge

Unconventional (b)(1) History (S)

Kenneth A. Kress

"The development of unconventional (b)(1) imaging is one example of how intelligence needs and technology struggled to come together and eventually produced important new capabilities."

Kenneth A. Kress is the senior scientist of the CIA's Office of Research and Development.

(b)(3)(c)

Technical information, ranging from satellite images to samples of chemical effluents, provides important intelligence. Applications of technology for intelligence require dedicated effort, some good luck, and generous slices of time to develop. The path from discovery of a new technical collection technique to the production of intelligence is often usually long and difficult. This is true because of the ever-changing needs of intelligence, evolving opportunities proffered by technology advances, and omnipresent resistance to accept new approaches. The development of unconventi(b)(1) imaging is one example of how intelligence needs and technology struggled to come together and eventually produced important new capabilities. The following story shows how intelligence organizations often at first resist but then embrace new technology to solve problems. (U)

Intelligence issues wax and wane. Nuclear proliferation became a hot issue after the Soviets joined the nuclear club in 1949. For the first time, the United States itself seriously faced the threat of nuclear weapons. In 1951, the Atomic Energy Commission formally reviewed the possibility of clandestine infiltration of nuclear weapons into the United States.[1] The threat was deemed unlikely because the weapons in 1951 were large and difficult to make and deliver. Nevertheless, the official concern about nuclear proliferation had begun. (U)

Expanding Nuclear Club

During the next two decades, the United Kingdom and then France and China joined the nuclear club. Small, rogue nations seemed a long way from being a nuclear threat. Attention was given to countering the Soviet nuclear capabilities by ensuring US nuclear capabilities were superior. The threat from other nations also seemed to be diminished because proliferation activities were mostly observable. Nuclear tests were done on top of the ground and in the atmosphere. These activities could be observed by various means such as imagery of test preparations, seismic detection of the explosions, and environmental samples of fallout after the tests. Eventually, the launching of the VELA satellites, which detect energy from a nuclear test anywhere on the surface of the earth, further increased the confidence that proliferation would be detected. (U)

After India tested a nuclear weapon in 1974, concern about nuclear proliferation was reinvigorated. The test unequivocally showed that the status of the Indian nuclear weapons program was surprisingly advanced. This test was done underground and, consequently, difficult to detect or distinguish from natural events. Underground nuclear tests with 150 kilotons of explosive yield or greater were detectable with the extant seismic network, but the Indian test was well below the limit. Furthermore, because the Indian test was underground, it shielded observation from the VELA satellites and eliminated

Approved for Release: 2014/09/10 C06122499

SECRET
(b)(1)
Approved for Release: 2014/09/10 C06122499

> **"The promise of all-weather, day-and-night, worldwide imagery was a seductive challenge for the Air Force."**

environmental fallout. Intelligence had new collection challenges. (U)

In the late 1970s, the Carter administration raised sensitivities to expanding nuclear proliferation. Popular literature[2], books,[3] and government studies[4] all concluded that the knowledge to build a weapon was widely available. Indeed, it was only the lack of access to special nuclear materials that prevented many nations from building a nuclear arsenal. Diplomatic activity such as the Non-Proliferation Treaty was pushed and intelligence interest increased. (U)

(b)(1)

Monitoring the Threat

The Intelligence Community was tasked to monitor the nuclear threats worldwide, including small, clandestine underground tests. In response, the Office of Research and Development (ORD) of CIA created a modest R&D program focused on

(b)(1)

Approved for Release: 2014/09/10 C06122499

Approved for Release: 2014/09/10 C06122499

(b)(1)

(b)(1)

Approved for Release: 2014/09/10 C06122499

Approved for Release: 2014/09/10 C06122499

(b)(1)

(b)(1)

Approved for Release: 2014/09/10 C06122499

Approved for Release: 2014/09/10 C06122499

(b)(1)

(b)(1)

Approved for Release: 2014/09/10 C06122499

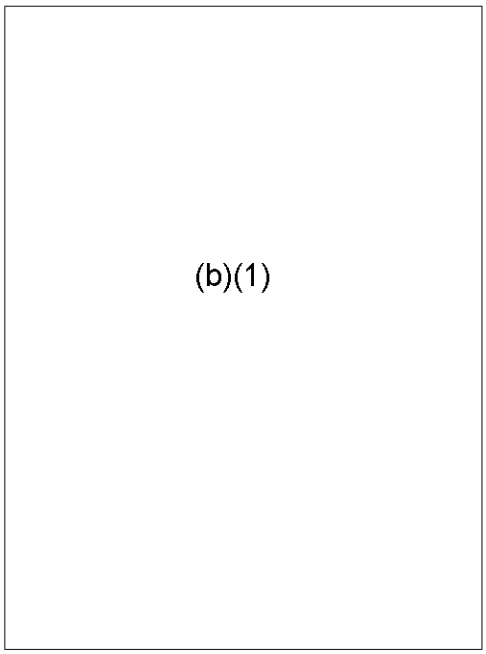
Approved for Release: 2014/09/10 C06122499

(b)(1)

(b)(1)

Approved for Release: 2014/09/10 C06122499

Approved for Release: 2014/09/10 C06122499



Approved for Release: 2014/09/10 C06122499

Approved for Release: 2014/09/10 C06122499

Approved for Release: 2014/09/10 C06122499