New Spy Satellites Urged for Verification

The Senate Intelligence Committee says the INF Treaty can be adequately verified but new systems are required to ensure compliance with a START treaty

AFTER holding closed-door hearings over the past 6 months on some of the nation's most secret spy technologies, the Senate Select Committee on Intelligence has concluded that the United States would be able to detect any significant cheating by the Soviet Union on the Intermediate-Range Nuclear Forces (INF) Treaty, which was signed by President Reagan and General Secretary Gorbachev last December.

But the committee is far less sanguine about the intelligence community's ability to monitor compliance with any future agreement to reduce long-range nuclear arsenals, such as the so-called START agreement currently under negotiation in Geneva. A major investment in new spy systems will be needed to guard against cheating on such a treaty, the committee has concluded.

Committee chairman David Boren (D–OK) says that a bipartisan proposal is now being drafted to beef up U.S. intelligence in light of the committee's findings. The proposal and the technologies under consideration are highly classified, but outside experts say that the committee is expected to call for more highly sophisticated (and extremely expensive) photoreconnaissance and radar-imaging satellites in order to keep closer tabs on mobile missiles.

The committee's findings, which were unanimous, were delivered last week in a report to the Senate Foreign Relations Committee. The report constitutes the most authoritative assessment so far of U.S. ability to verify Soviet compliance with the INF Treaty, which will eliminate all U.S. and Soviet ground-based missiles with ranges between 500 and 5500 kilometers.

The INF Treaty sets up a precedent-setting regime of on-site inspections and monitoring. The committee has concluded that these measures, backed by satellite reconnaissance and other intelligence gathering, cannot rule out cheating entirely but will make it "exceedingly difficult, costly, and risky for the Soviets to develop or maintain a militarily useful, covert force of ballistic missiles . . . which violates the INF Treaty."

The treaty itself specifies the missiles to be destroyed by each side and the sites where they are deployed, maintained, and produced. Shortly after the accord is formally ratified—which is expected to be some time this spring—inspectors from each country will visit the other's missile sites to verify the number of missiles and their launchers. Over the following 3 years, they will witness the destruction of the weapons. In addition, short-notice examinations of missile sites will be permitted for 13 years after the treaty comes into force to ensure that no missiles remain.

Senator Boren. *Intelligence committee chairman is putting together a proposal.*

These measures will be sufficient to verify destruction of the designated weapons, the committee says. To guard against clandestine production of replacements, the treaty provides for constant monitoring by on-site inspectors of the entry and exit points of factories where intermediate-range missiles are now manufactured. It also prohibits testing of all ground-based missiles with ranges between 500 and 5500 kilometers.

The committee points to two routes by which the Soviets could conceivably circumvent the treaty, but it argues that neither is particularly worrisome. The first involves cruise missiles. The INF Treaty outlaws ground-launched cruise missiles but places no restrictions on a sea-launched version of the same weapon. The two are virtually impossible to tell apart, however.

This raises the possibility that the Soviets could build up a force of outlawed ground-launched cruise missiles disguised as sea-launched weapons. However, the committee points out that troops would have to be trained to use the weapons and a supporting infrastructure would be required, all of which could be detected by the United States. "The Soviets could not have much confidence that they could maintain or deploy a ready ground-launched cruise missile force banned by the INF Treaty without being caught," the committee concludes.

The second possibility is that the Soviets could have more SS-20 missiles than they have admitted. Indeed, the leading opponent of the treaty in the Senate, Jesse Helms (R–NC), has publicly charged that the Soviets have a large number of undeployed SS-20s hidden away, outside the inspection provisions of the treaty. The committee itself acknowledges that the intelligence community is divided on this possibility, but it says that the military significance of such a force would be at best short-lived and "would vanish entirely within a decade." In the absence of testing, which is banned by the treaty and would be readily detectable, the reliability of a covertly maintained cache of SS-20s would erode rapidly, the committee says.

The committee is confident that compliance with the INF Treaty can be adequately monitored in part because the treaty will eliminate an entire class of weapons and their associated infrastructure and testing. A START agreement, which would reduce the numbers of long-range missiles but not do away with them completely, would be more difficult to verify. Highly intrusive on-site inspection is likely to be required, together with the ability to conduct detailed monitoring of remaining weapons systems—particularly mobile missiles—from spy satellites. "We are moving into a verification business that requires 24-hour-a-day monitoring by remote sensing," says Michael Krepon, head of the verification project at the Carnegie Endowment for International Peace.

For the past decade, the chief U.S. tool for monitoring treaty compliance and other military targets has been a series of highly sophisticated intelligence satellites, known as KH-11s. An instrument equivalent to the space telescope but pointing toward the earth instead of into space, the KH-11 relays detailed images to ground stations in digital form from low polar orbits.

There are currently believed to be two KH-11s in orbit, one of which was launched in December 1984 and is therefore already well beyond its planned 3-year lifetime. The

other was lofted last November with the first launch of a Titan rocket since a similar vehicle exploded at the Vandenberg Air Force Base in April 1986.

According to William Burrows, author of *Deep Black: Space Espionage and National Security* (Random House, 1986), these are the last two KH-11s. They will be superseded by new generation of spy satellites, known as KH-12s, which will be able to maneuver to change the area of their coverage. They will carry their own fuel into orbit and will be periodically topped up by astronauts from the space shuttle.

The original plan was to launch the KH-12s on shuttle flights from Vandenberg, according to Burrows. The Challenger disaster, followed by the decision to mothball the shuttle launch complex at Vandenberg, have put a crimp in these plans, however. John Pike, of the Federation of American Scientists, who closely follows what public information there is on the highly classified spy satellite program, says one KH-12 is currently scheduled for a shuttle launch next March from Cape Canaveral, followed by a second in April to be launched by a Titan from Vandenberg. Two more are believed to be planned for launch in subsequent years for a total of four in orbit simultaneously. With shuttle servicing, the KH-12s are estimated to last about 15 years.

There is speculation that the Senate Intelligence Committee may be calling for one or two more KH-12s to increase the frequency of coverage, especially of regions where mobile missiles are deployed. Pike and Jeffrey Richelson, author of *The U.S. Intelligence Community* (Ballinger, 1985), point out that several interests will be competing to position the KH-12s for their own needs. These range from the Air Force for targeting purposes to tactical commanders who want information on troop movements in Eastern Europe. The committee may therefore be concerned that treaty monitoring could be shortchanged.

Another likely proposal is for a fleet of radar-imaging satellites that can penetrate cloud cover and see at night. Although the KH-11s and KH-12s are believed to have infrared capabilities which provide some night vision, they cannot see through clouds. Radar imagers have been flown on the shuttle, but the first public indication that the technology is also being developed for intelligence purposes came last year in a book on the CIA written by *Washington Post* reporter Bob Woodward (*Veil*, Simon & Schuster, 1987), in which he detailed a dispute over funding for a radar satellite codenamed Lacrosse. Richelson says he believes the satellite is now ready for launch. ■

COLIN NORMAN

EPA Bars Use of Nazi Data

Environmental Protection Agency (EPA) Administrator Lee Thomas last week barred the use of human data from Nazi experiments in assessing the risk of a hazardous chemical now under regulatory review.

Thomas's decision came after he received a letter signed by 22 agency scientists protesting the use of the information. The incident has touched off a dispute among EPA scientists and others about the ethics of using the results of the Nazi experiments and, also, about the scientific quality of the studies.

EPA is currently considering air pollution regulations on phosgene, which is widely used in the manufacture of pesticides and plastics. A billion pounds of phosgene is produced annually in the United States. As a part of the agency review, EPA scientists have been developing a new mathematical model to analyze how different doses affect the lungs. Scientists in EPA's pollution assessment branch proposed using the Nazi data based on the recommendations of ICF-Clement, Inc., an environmental consulting firm based in Washington, D.C. EPA had contracted with the firm to develop a dose-response model and provided the Nazi data to the firm for consideration.

In assessing risk, scientists often depend solely on animal models to predict effects on people. Human data are preferred, but they are seldom available. With phosgene, the Nazi experiments provided "comparatively more information" than the existing anecdotal data and epidemiological studies of workers, says John Vandenberg, the EPA project officer in charge of the phosgene review.

The Nazis conducted the experiments on prisoners in France to develop an antidote to phosgene, which had been used in chemical warfare. Phosgene destroys enzymes in the lungs, causing fluid buildup, which can lead to death by "drowning." The Nazi's reports about the experiments were revealed during war crime trials in France when they were entered as evidence.

Judith Bellin, an EPA toxicologist who initiated the protest letter, called the data "valueless" with regard to their scientific quality. They were flawed on several counts, she asserts. The reports themselves note that the prisoners were "almost all in a weak and underfed condition." They did not say how pulmonary edema was measured. Different kinds of controls should have been used. The weight and sex of the subjects were not recorded. And Bellin says that it looks as though the Nazis "fiddled with the data" because results from only 36 subjects are reported although 40 are mentioned in the description of the methodology.

Vandenberg says,"We won't argue that the experiments were well reported or well designed, but compared to what we had, they offered a measure of improvement. They obviously had a lot of flaws. But we felt compelled to use it because it provided dose-response data."

Todd Thorslund, vice president of ICF-Clement, also defends using the information. For example, the poor health of the prisoners is not necessarily a drawback in developing a model, he said. EPA is often concerned about the health of sensitive populations, so using the Nazi results produces a conservative model. The lack of information about sex and weight of the subjects is not very important in this case, he said, because phosgene is so toxic that "it's the dose in the air that makes the difference."

If similar information about exposure and effects had been available from studies examining accidental exposure to workers, these data "would have been considered gold," said Thorslund. Ila Cote, an EPA scientist who helped oversee the project concurs. She said, "If unintentional exposure had occurred in an occupational setting [and produced equivalent information], we would have used it."

Bellin says that no matter what the quality of the data is, the Nazi experiments were so heinous that the information should not be utilized. In the letter to Thomas, agency scientists said that some of them "feel that the data, no matter how valid, should never be used." But "some have suggested that such data (if scientifically sound, and verifiable) should be used if some 'good' to humans can result."

It is not clear if the human data would have predicted a different dose-response effect compared to using animal data alone. In light of Thomas's prohibition against using the Nazi results, "we're going to look at the animal data now," Vandenberg says. ■ MARJORIE SUN