

In 1988, the Joint Verification Experiment (JVE) was conducted by the United States and the Soviet Union to evaluate different monitoring techniques for underground nuclear tests in connection with the verification protocols for the Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty. In this experiment, the Soviet Union monitored a nuclear blast in Nevada, and the United States monitored a blast in Semipalatinsk. The JVE included testing of on-site and remote seismic and tele-seismic monitoring techniques and the exchange of geological data for purposes of improving the calibration of seismic monitoring instruments. There were also visits to view ballistic missile re-entry vehicles during the START negotiations. The JVE and the visits to re-entry vehicles unquestionably contributed to the ratification of the verification protocols by both parties.

A more recent example of reciprocal actions involves the Russian-U.S. discussions on accelerated deactivation of nuclear weapons covered under the START provisions and the detargeting of nuclear missiles. While deactivation of ICBM launchers can be readily verified, the deactivation of nuclear weapons per se and the detargeting of nuclear ballistic missiles pose serious, if not insurmountable, verification challenges. It is unlikely that on-site inspections would be acceptable on security grounds and there do not appear to be any CBMs that would contribute to confidence that such actions were being carried out.

One of the most significant recent reciprocal actions has been the moratorium on nuclear testing. Four of the five acknowledged nuclear powers are abiding by the moratorium even after the nuclear test conducted by the fifth power, China. While the moratorium can presage a comprehensive test ban, the moratorium is not legally binding, and determining compliance with this reciprocal action has not posed a verification problem. However, a CTBT will be a legally binding agreement, and designing a regime that would ensure effective verification will pose serious challenges. Although NTM, including seismic detection, and NIM

will deter nuclear testing, these means alone will not provide the required confidence in a comprehensive test ban; some form of on-site inspections will be necessary to resolve ambiguous events. CBMs such as a global Open Skies and exchanges of geological and seismic data would enhance confidence in moratoriums on nuclear testing as well as contribute to monitoring formal testing bans.

Closely related to reciprocal actions are some recent statements on the part of the United States and Russia that have involved both *conditional proposals* and *unilateral actions*. Examples of these types of actions on the part of the United States include the removal of all tactical nuclear weapons from surface ships and multipurpose submarines; the taking off alert of 450 Minuteman II ICBMs; the taking off alert of all heavy bombers; and the deactivation of 19 nuclear missile submarines. These examples can be compared to strikingly similar unilateral actions on the part of Russia: removal of all tactical nuclear weapons from surface ships and multipurpose submarines; the taking off alert of 503 ICBMs; the taking off alert of heavy bombers; and the deactivation of 10 nuclear missile submarines. Verification for these actions, which come out of statements made by the leaders of the two countries rather than negotiated agreements, will be accomplished by NTM, NIM and reciprocal *invited visits*—not on-site inspections.

### Summary

Designing a verification regime—whether it is intended to be a part of a negotiated arms control agreement or rather is intended to confirm reciprocal or unilateral actions—requires a number of steps. The nature and scope of the information required to assure adequate or effective verification should be determined first. Next, there should be an assessment of whether the needed information is and will continue to be available in a reliable and usable manner from existing sources. Lastly, the provisions of the verification regime should be formulated to assure the availability of accurate, timely data

