

Enterprise Monitoring of Declared Warhead Movements - A Novel Systems Level Approach to Arms Control Verification

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Introduction of Novel Systems Level Concept

The objective of the enterprise monitoring concept is to explore a potential alternative to traditional warhead verification techniques which can be considered intrusive and run the risk of releasing classified design information.

In this concept, the verification regime would begin with the acceptance of the host country's declaration. At this point, all warheads are considered treaty accountable items, and there is no need to confirm every warhead through traditional verification measures to assure a declared item is authentic. This concept allows the monitoring party to simply accept the host declaration and immediately begin monitoring the enterprise to verify the consistent handling and security over all declared treaty accountable items (TAI). Over the course of the treaty, overall confidence both that all declared items were in fact warheads, and that the treaty partner met its obligations under the treaty, may be achievable without the implementation of a technically intrusive monitoring regime. Confidence develops over the treaty lifetime, and is due to the fact that over time, the treaty partners will have a much better understanding of the processes, flows, patterns, and capabilities of the enterprise of the treaty partner.

Additionally, this concept builds upon precedence and existing capabilities of current treaties. Under New START, coordinates for launchers and facilities and movements of launchers are exchanged. Similarly, this could be extended to warheads in a future treaty, where movements, status, and location could all be provided to the treaty partner. Over time, a baseline "enterprise template" is captured, and deviations from the expected enterprise flow would be addressed with more intrusive measures such as on-site inspections and traditional non-destructive assay (NDA) measurements to resolve anomalies. In this concept, the use of NDA measurements may be considered as chain of custody measures to confirm item integrity and authenticity rather than lengthy warhead verification measurements.

This concept considers the idea of monitoring the enterprise through which the warhead will interact throughout its lifecycle. There are many activities which must be performed on the warhead in order to ensure its continued viability. In addition to these activities, there are also security measures one would expect to see when transporting or working on or around a real warhead. Monitoring of these activities and seeing consistency in the movement, operations, operational security postures, and handling of a warhead or a stockpile of warheads will lead to confidence in the authenticity of warheads being monitored. Some of this information could be acquired using national technical means (NTM), a type of data explicitly allowed in a treaty, rather than through on-site inspections.

There are potential advantages and disadvantages which must be considered as well. Most importantly, it does not require intrusive measurements on the warhead itself, and confidence may be gained over entire stockpile "simultaneously". However, confidence is not instantaneous. Unlike

traditional warhead verification techniques, confidence will grow over the course of the treaty through verification of the consistency or pattern of operations of the nuclear weapon enterprise. Also, Information gained about operational security posture may be sensitive; however, it could be provided as part of a treaty. Finally, at a given point in time, it may not be possible to verify that a presented TAI is an authentic warhead through declarations alone. This concept must consider the declarations, in conjunction with NDA and on-site inspections to provide the verification in the truthfulness of a declaration and the authenticity of the number of declared items.

Assessment of Transparency and Confidence vs. Protection of Sensitive Information

Enterprise monitoring presents a novel method for performing warhead verification as part of a future arms control treaty. However, there is still significant research, assessments, and evaluations which remain to be performed. At the highest level, more research is required to understand two very important aspects of this concept. First, what is the impact on host operational security requirements? This concept trades off protection of nuclear weapon design information for operational security information, and an assessment of the potential vulnerabilities must be understood. For example, the movements, timing, and frequency of lifecycle activities are currently considered sensitive, if not classified. The same sensitivities apply to the location of specific weapons. How does the release of this type of information impact operational security, and what are the potential ramifications? As part of this analysis, an assessment of the gains and losses for both host and inspector with respect to the level of fidelity of declarations must also be included. And how does the fidelity of the declarations affect overall regime confidence? Second, what would an enterprise monitoring regime need to look like in order to be a feasible alternative to a traditional warhead verification regime, and what are the trade-offs?