

Modelling Multilateral Verification

A key distinction between this project and verification studies conducted previously is a multilateral focus reflecting the verification provisions of many agreements such as the Stockholm Document. Consequently, one research direction concentrated on modelling and analyzing multilateral verification.

There are many possible configurations for a multilateral verification scheme. Four different cases are illustrated in Figure 2. Figure 2a is the situation of bilateral reciprocal inspection, such as seen in existing superpower agreements. Previous game theory analysis has been applied to models based on this structure. Figure 2b represents a multilateral inspection scheme, with an independent inspectorate. An example of this situation is the IAEA. Figure 2c illustrates the structure of multilateral reciprocal inspection. The Stockholm Document specifies this form of multilateral verification. Finally, Figure 2d represents the situation where there are many parties, but each of two (or more) alliances has an inspectorate. A possible example of this form of multilateral inspection may result from the Conventional Arms Reduction Talks.

A comprehensive model of multilateral verification would be very complex. For models including an inspectorate, at least two kinds of players are required. In some cases, each player would have a large number of strategies available. For example, each signatory of the Stockholm Document can inspect each other signatory. Also there may be many types of violation.

Such a complex multilateral analysis is not possible with current tools and methodologies. It is necessary to simplify the problem in an appropriate manner in order to provide insight into the fundamental forces governing the participants' behaviours.

To this end a simple model of multilateral verification was developed. Details about this model are contained in Appendix C. This model has the following characteristics:

- * There are n players, each of whom can either violate or not.
- * The inspectorate is not a (strategic) player in the model; rather, it is represented by a probability of detecting violations, which may be different for different violators. This simplification can apply to all of the verification structures shown in Figure 2.