verification decision, a decision-maker must use whatever information is available to decide either to

- **Accept:** to conclude that the suspect event in question is actually consistent with applicable arms control regime(s); or

- **Alarm:** to single it out for special attention and action.

The true "state" (i.e. condition or status) of the situation is generally unknown to the decision-maker and outside his/her control. We distinguish two cases only, according to the decision-maker's interests. The situation is

- **Red** if, knowing the true state, the decision-maker would prefer to Alarm; and

- **Green** if, knowing the true state, the decision-maker would prefer to Accept.

This Basic Verification Decision Problem is shown in matrix form in Figure 1, where

- **rows** represent the decision-maker's possible choices;

- **columns** represent possible true states of the world;

- **cells** represent possible outcomes.

Note that this model applies to a verification decision about a specific suspect event; any connections to other decisions or events are not modeled explicitly. Neither are "shades of grey" allowed; intermediate action choices for the decision-maker, and intermediate levels of gravity of the true situation, are not included.

In the context of arms-control verification, to Alarm means to accuse publicly, to make military preparations, to threaten or impose sanctions, etc., and to Accept means to take no special action as a consequence of the suspect event. A situation is Red if some or all of the aforementioned actions are indeed warranted; it is Green otherwise.

Of course, the essential difficulty of the Basic Verification Decision Problem is that a decision-maker may be required to decide on an action without certain knowledge of the true situation. It can be presumed that the decision-maker combines whatever knowledge he/she does have, along with judgment and experience, to come to a decision. But, nonetheless, a verification decision is often a decision taken under uncertainty, and the action selected may, in hindsight, prove to be wrong.

An **information source** is any activity or procedure that may be used to give the decision-maker additional data with which to make an inference about the true state of the situation. Commonly employed information sources include aerial monitoring, in which photographic or other images are obtained by an over-flying aircraft or a reconnaissance satellite, and on-site inspection, in which a specially trained and equipped inspection team makes a direct, hands-on examination of equipment and facilities. Other information sources include intelligence assessments, the detailed re-examination of existing images, etc.

Different information sources can have very disparate properties, including some that can

Figure 1:

Basic Verification Decision Problem

		True Status	
		Green	*Red*
DECIDE	Accept	Accepted Compliance	Successful Violation
	Alarm	False Alarm	Detected Violation