

Table 1

Ground Resolution Required for Treaty Verification and Crisis Monitoring (in metres)

Object	Detection	Recognition	Identification	Description
Troop Units or				
Bivouacs	20.0	2.1	1.2	0.30
Headquarters	3.0	1.5	0.9	0.15
Supply Dump	1.5	0.6	0.3	0.03
Vehicles	1.5	0.6	0.3	0.05
Artillery and				
Rockets	0.6	0.3	0.15	0.05

Source: Dietrich Schroerer, Science, Technology, and the Nuclear Arms Race (New York: John Wiley and Sons, Inc., 1984), p.376.

increased, more data is transmitted to ground stations, requiring greater expenditures of electrical energy drawn from the satellite's solar cells. Moreover, data management is complicated by receipt of many finely detailed images, a problem to which the discussion now turns.

Difficulties may be experienced in the analysis and interpretation of data received from the monitoring systems. One problem that bedeviled interpretation in the past was the quality of the images, particularly the clarity of photographs from overhead sensors. With the use of advanced computer enhancement techniques — spatial filtering and contrast enhancement, for example — the problem of blurred or highly degraded photographs has been largely overcome.

The greatest obstacle to timely interpretation, however, remains the system's ability to handle ever-increasing quantities of data with limited human and material resources. To illustrate the magnitude of the problem, 10 000 to 100 000 person-years would be needed to examine one complete picture of North America at a ground resolution of 10 cm.¹⁰ To eliminate some of the data burden, coverage of areas in which illegal activities are not expected may be less exacting; for example, the resolution of satellite-borne sensors may be lowered over seemingly "safe" areas. This practice, however, can lead to "surprises" when forbidden activities are first discovered at locations only superficially monitored before.

In general, evasion and concealment also hampers target identification. However, the incorporation of these factors within the framework of this model is problematic. Evasion refers to the co-ordination of the movements of the unauthorized unit(s) with the anticipated search pattern of the surveillance system so as to remain outside the "swath" at any given time. A violator intentionally attempting to circumvent the treaty is likely to try to evade detection in order to preserve strategic and tactical surprise. In these circumstances, the model does not apply. This situation is better modeled by a two-person game with various search and evasion strategies for the inspector and the inspectee respectively.¹¹