making such an accusation). Alternatively, the technical evidence may be ambiguous, leading the political leadership to conclude that there are insufficient grounds to confront the potential violator. Both this contingency and the one in which no untoward activities have been uncovered represent "failure" (a violation is not detected) for a given trial.[8]

Property (3) — The probability of detection for each "look" equals the ratio of the area searched (the "swath") to the coverage area. With current technologies, the coverage area cannot be constantly watched in its entirety, i.e., the "swaths" for satellite and airborne sensors are not conterminous with the area to be monitored.[9] Thus, the area is surveyed in a series of "looks," each examining some part of the region. This is analogous to shining a flashlight on a large table — each "look" of the sensor system represents a circle of light illuminating a portion of the table. The probability that the target falls within this "circle of light" is simply the ratio of the area searched to the total area of the monitored region. For example, assume the coverage area includes all of Eastern Europe and the western Soviet Union (5.96 million km^2 from the inter-German border to the Urals) and that the swath cut by a satellite-borne surveillance system in this region is 777 000 km^2 (2 400 x 320 km). The ratio of the swath to the coverage area is approximately 1:8. Thus, the probability that the target will be in the area observed in one "look" of the sensor system equals 1/8.

Property (4) —It is assumed that the monitoring area is searched at random and there is no restriction on the number of times a region within this area can be surveyed, i.e., examining a region in one "look" does not preclude its being searched in subsequent "looks." Strictly speaking, no surveillance system's search pattern is completely random. The locations it monitors are spatially related to each other; the system's position at time "t+1" invariably depends upon it's position at time "t." Nevertheless, the flexibility of movement for aircraft allows them to approximate most easily a random search pattern. Satellite-borne sensors are somewhat more problematic since they normally follow regular and predictable orbital paths; in some instances they can be manoeuvred but this is done only at a cost to the operational life of the satellite, e.g., in the depletion of fuel supplies. For wide-area coverage, however, the relatively high frequency of visits over time renders the satellite search pattern effectively random in the long-term. Thus, the model can also be applied to the satellite surveillance case.

As defined here, the verification problem — detection of militarily significant, inadvertent treaty violations — can be interpreted in terms of the binomial experiment. Although admittedly an abstraction from reality, the essential elements of the problem correspond to the properties of the experiment.