

Chapter Eight

Summary

Arms races and military competition can lead to highly destabilizing and dangerous situations. Strategic stability can, however, be improved by the introduction of arms control treaties with effective verification procedures. It is towards this goal that any reasonable proposals must lead.

Astronomical techniques show promise for their use in verification strategies for space-based weapons systems. Since the launching of the first satellites in the late 1950's, their observation and tracking have been a high priority for military defence. These tasks were first performed under the auspices of the civilian MOONWATCH program, then hurriedly updated to Baker-Nunn photographic camera sites. As soon as these were in operation, it was obvious that they were still unsatisfactory because of their non-real-time nature.

Photometric observations were the next to be tested, with the technology borrowed directly from astronomy. Eventually, on-line electro-optical systems were developed that improved both resolution and the capability of real-time requirements. Throughout the development of sensors for tracking purposes, the instruments and technology used have been primarily astronomical in nature. A point has been reached now, however, where military astronomy technology has surpassed civilian astronomy technology. GEODSS sites, in fact, have been petitioned by astronomers to install "black boxes" to store stellar data for later transfer to laser disks and distribution to astronomical institutions. Asteroid surveys have also been performed with GEODSS equipment with some success.

Optical satellite surveillance is an extremely crucial element of the NORAD SPACETRACK system. In addition to the civilian telecommunications' need to maintain an accurate record of satellites, there is a very real need for military tracking. Since radar is accurate only to about 5,000 kilometres in altitude, optical systems are needed for high-orbit satellites. GEODSS thus fills a gap in surveillance systems. The TEAL AMBER sensor and its future generations will improve resolution greatly over the next decade, and the use of active systems, such as lidar satellite tracking, may supplement observations to a larger extent.

Satellite tracking is becoming more important at the present time as the implications of ASAT systems become better understood. Observations of satellite manoeuvres can lead to information on the operation of military missions in space. These observations can be used by verification groups to assess the extent to which space is becoming militarized.

The concept of the verification of space systems is worthy of pursuit, but another set of procedures must be developed for ground-based sensors. From a purely astronomical standpoint, the suggestion that GEODSS sites turn over stellar data is an interesting one. But a satellite verification group could make use of tracking data as well. An independent group could analyze the tracking data for unusual or unwarranted space activity. This is providing, of course, that the information is releasable. If not, since the technology is available, then independent GEODSS sensors could be built.

The Baker-Nunn camera at Cold Lake, Alberta, which was removed from service because of its non-real-time capability, was given to the University of Calgary for astronomical use. If other existing Baker-Nunn systems were replaced by electro-optical systems with a near-real-time capability Baker-Nunn cameras might then be made available to astronomical institutions and/or reserved for possible future use by verification groups.

Not to be excluded from consideration is a possible catalog of satellite-to-satellite observations. If a verification group was granted even partial access to such a catalog for the purposes of the verification of satellite intent and inspection, the arms control features would be valuable indeed. If these data were to be made available bilaterally, then the effect would be inherently stabilizing.

Many arms control verification proposals involving satellite reconnaissance and other types of space systems have been made during the course of arms talks. These have ranged from the use of satellite reconnaissance to detect the construction of missile bases to the actual on-site inspection of launch platforms. This shows exactly how valuable space systems are for the prospects of arms control.

