

8.2 System Elements (Continued)

The space segment would comprise of a number of identical spacecraft as defined in sections 6.0 and 7.0 of this report orbiting earth in the four regions of space as identified in section 2.0. Considering the utilization of space discussed in section 2.0 and the mission analysis concerns of section 5.0, four operational satellites are required to survey all of the utilized regions of space. Two spacecraft deployed into two distinct low earth orbits are able to survey the necessary regions of the low earth orbit domain between them. Another satellite initially launched in the Molniya semi-synchronous orbit would also be capable of reaching the circular semi-synchronous orbits should the requirement arise. A fourth satellite placed into the geosynchronous orbit would enable the surveillance of this region of space. A fifth satellite would be retained on the ground to act as a spare should one of the other satellites fail to achieve orbit or function for the full duration of its life due to mechanical or electrical failures. Additionally, the fifth reserve satellite could investigate an unidentified satellite launched into a new orbital regime which is unattainable from the four in-situ spacecraft should this event occur.

A full five spacecraft complement with four in space and one on-ground spare is probably the maximum spacecraft investment required to cover all the utilized regions of space to a high degree of effectiveness. Alternative lower spacecraft investment schemes can be envisaged at the penalty of reduced system effectiveness or at increased launch vehicle state of readiness investments. For example, a three spacecraft complement with two satellites launched into the low earth orbit domain could survey the region of space where there exists the largest threat for potential spacebased weapons, and a third satellite in reserve for launch on demand situations into higher orbit domains. This scenario decreases the space segment investment by two satellites and launch vehicles at the cost of being unable to investigate more than one incident in the semi-synchronous and geosynchronous orbits. Postulating