



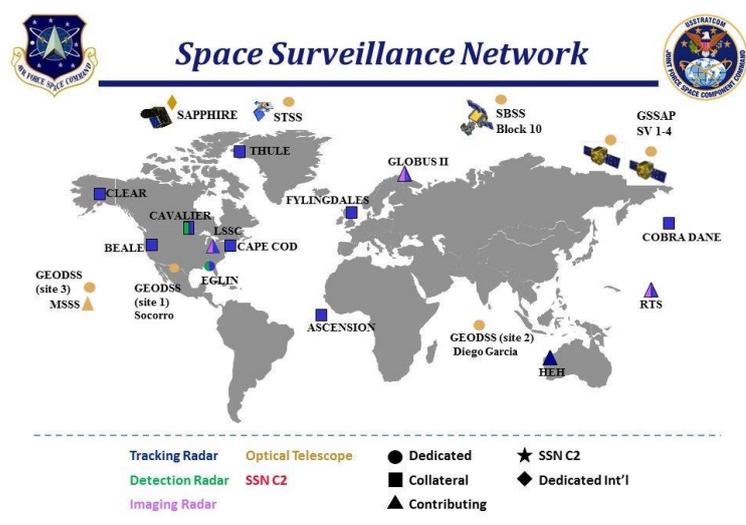
Study Work / Master Thesis (German/English)

Analysis of sensor networks and the potential of different configurations regarding SSA

Space Situational Awareness (SSA) is becoming increasingly relevant in the context of growing numbers of space debris objects orbiting the Earth. In order to maintain safe space activities near Earth in the future, it is essential to have as accurate a picture as possible of the actual space situation. This includes knowledge of the positions of as many human-made objects orbiting Earth as possible. Such data is usually gathered within catalogs that must be kept updated with continuous observations of the contained objects using different kinds of observation sites, e. g. radars or telescopes.

Today, several different catalogues exist. One example is the Space Surveillance Network that is operated by the United States Space Force. It combines different sensor types, such as radars, telescopes and on-orbit sensors to maintain the US space catalog.

During the last years, a tool suite to simulate different aspects of an SSA center has been developed at the Institute of Space Systems. Among other aspects, the tool is capable of simulating radars and telescopes and thereby generate observations of simulated objects orbiting Earth.



In this context, the goal of this work is to analyze existing sensor networks regarding their potential for building and maintaining object catalogs and identify possible improvements.

The following sub-aspects must be considered for the work:

1. Research and familiarization with the basics of observation of objects in Earth orbit, sensor networks and catalogs of space objects
2. Simulate and analyze different sensor networks using the sensor network tool suite

3. Analyze changes to sensor networks and their effects on the performance
4. Identify potential improvements to sensor networks in order to increase their performance

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