

SPACE DEBRIS SYMPOSIUM (A6)
Modelling and Risk Analysis (2)

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THE EFFECTS OF SOLAR MAXIMUM ON THE EARTH'S SATELLITE POPULATION AND SPACE
SITUATIONAL AWARENESS**Abstract**

The rapidly approaching maximum of Solar Cycle 24 will have wide-ranging effects not only on the number and distribution of resident space objects, but also on vital aspects of space situational awareness, including conjunction assessment processes. The best known consequence of high solar activity is an increase in the density of the thermosphere, which, in turn, increases drag on the vast majority of objects in low Earth orbit. The most prominent evidence of this is seen in a dramatic increase in space object reentries. Due to the massive amounts of new debris created by the fragmentations of Fengyun-1C, Cosmos 2251 and Iridium 33 during the recent period of Solar Minimum, this effect might reach epic levels.

However, space surveillance systems are also affected, both directly and indirectly, historically leading to an increase in the number of lost satellites and a decrease in the routine accuracy of the calculation of their orbits. Thus, at a time when more objects are drifting through regions containing exceptionally high-value assets, such as the International Space Station and remote sensing satellites, their position uncertainties increase. In other words, as the possibility of damaging and catastrophic collisions increases, our ability to protect space systems is degraded. Potential countermeasures include adjustments to space surveillance techniques and the resetting of collision avoidance maneuver thresholds.