

## Effects of the space environment on satellites and space operations

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Satellites operate in a strange, hostile environment. In addition to the large variations in temperature, weightlessness, and a high vacuum, there are variations in the radiation environment and in the plasma that constantly bathes a space craft. The radiation environment can undergo changes of orders of magnitude and the plasma environment varies both regularly and irregularly over time. Orbits vary as a result of variations in density changes in the neutral atmosphere. In addition, communications operated as a part of the satellite system experience problems in the environment in a similar way. The changes are due to variation in the output of the sun. Their intensity occurs in cycles of various periods, but a major one is the so-called eleven-year solar cycle, which will peak in intensity around the year 2000. Forecasts, warnings, and indices that describe the variations can alleviate some of the risks and losses associated with the effects of the environment