

IAF SPACE SYSTEMS SYMPOSIUM (D1)
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MITIGATION STRATEGY AGAINST SOLAR FLARES

Abstract

Since we are in the vicinity of the variable magnetic star, Sun, the extreme space weather events associated with solar currents are capable of causing large scale technological damage mainly to the Electrical power systems and communication systems, thereby hindering human day-to-day activities. It can be valued that if an event as such happened in 1859 observed by Carrington was to happen again then a total monetary sum of more than 50 trillion dollars would be the global loss.

This paper works on building mitigation strategy by creating a magnetic shield with the help of satellite clusters placed in horizontal and inclined orbits thereafter connecting them with conducting coils. This stabilized web like structure produces synchronized magnetic field hence increasing the Earth's total magnetic strength resulting in increased resistance offered to the solar wind currents. The cluster of satellites will also be affected due to such events therefore, by installing magnetic deflectors on the satellite, approaching particles can be deflected away from the Earth and also shielding the satellite's components.

The working mechanism of satellite clusters and conducting coils is based on Lenz law. Since there will be change in flux due to the high velocity ionic particles, current will be induced to oppose the action of magnetic field created by the ionic particles, therefore the velocity of ionic particles can be reduced and further it will not penetrate through the Earth's atmosphere.

Since the outburst of solar flares seems likely to occur in the future decades, there has to be necessary aids to tackle such events. Employing a cluster of satellites and the conducting coils is a tremendous task. The technique presented here is a stepping stone aimed at defending the high energy ionic particles reaching Earth. In the future, one can work on replacing conducting coils by other non-physical conductors.