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RISK MITIGATION AND SATELLITE WARNING SYSTEMS FOR GLOBAL ASSET SECURITY IN
PREPARATION FOR A FUTURE CARRINGTON EVENT**Abstract**

1859 saw one of the most significant coronal mass ejection events (CME) ever recorded, the Carrington Event, whose effects were registered in substantial damage to existing infrastructure. Lower scale events have been recorded since then, and additional events will inevitably be repeated in the near future. CMEs can cause various types of damage related to space assets, such as power shortages and technology failures. The consequences for these damages can affect a wide variety of human activities, such as telecommunications, power supply, transportation systems, and data storage infrastructure. The capacity to predict the intensity of CMEs is limited, which poses a higher risk to an unknown severity of consequences. New scientific missions such as ESA's Lagrange are being launched to provide timely and accurate measurements of space weather. Though the study of solar weather has become a key point of interest for monitoring and implementing an early warning system, the impact of a Carrington-level event could be catastrophic. In this work, the authors explore the substantial risks to space assets and satellite infrastructure in the event of an intense Carrington occurrence. The work contains an assessment of the potential impact that a Carrington-level event could have on key industry sectors, including an analysis of mitigation plans already underway using data from both the UK Met Office and NOAA. The simultaneous development of a satellite infrastructure capable of registering flux levels of CME events would provide vital early warning and severity prediction information. As leverage, the consequences for ignoring risk and mitigation planning are explored using previous solar event magnitudes and economic losses that ensued following electronic disruptions. The findings also encompass readiness levels and preparedness of the space asset owners regarding service disruption and studies the possibilities for insurance against similar natural disaster events. The consequences of CMEs can be mitigated through clear decisive action and satellite warning technology development. The role satellites can play in registering crucial flux cutoff levels, forming part of an emergency warning service plan, is key to keeping our global infrastructure and humanity safe.