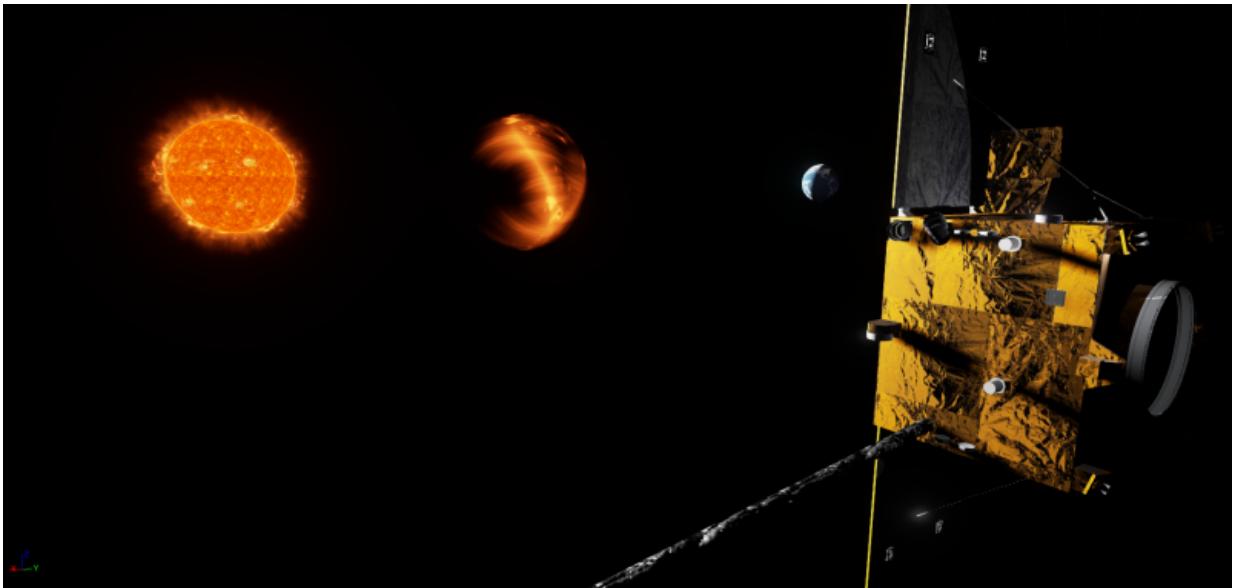


Carrington-L5 mission to provide five-day space weather forecasts

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Coronal mass ejections (CME), billion-tonne solar plasma eruptions moving towards the Earth at up to 2500 kilometres per second, can cause extensive and expensive disruption by damaging power, satellite and communication networks. A UK consortium is proposing an operational mission, called Carrington-L5, to give a five-day warning of hazardous solar activity that could inflict severe damage to our infrastructure. The mission concept will be presented at the National Astronomy Meeting in Llandudno by Dr Markos Trichas of Airbus Defence and Space (UK).

In response to the UK government adding solar storms to the National Risk Register of Civil Emergencies in 2011, the Met Office Space Weather Operations Centre (MOSWOC) was created to protect the country from the serious threats posed by [space weather events](#). Current warnings of CME arrival at Earth use facilities like SOHO, STEREO and SDO. However, none of these are designed to provide 24/7 data, necessary for accurate and timely forecasts and all the spacecraft are ageing rapidly, with some of them having spent more than two decades in space. More importantly, STEREO, which provided essential data for early warnings, is now behind the Sun and is unable to communicate any data back to Earth. With the current spacecraft configuration, the accuracy of CME arrival time forecasts has been significantly degraded.

The goal of the consortium is to replace data provided by the STEREO satellites, through a new [mission](#) capable of providing continuous data from a stable orbit, necessary for the Met Office to provide 5-day forecasts and increase the accuracy of CME arrival forecasts. The proposed Carrington-L5 mission is named after the British scientist who monitored the strongest geomagnetic storm on record, the event of 1859. To provide the necessary warning time, Carrington-L5 will utilize a gravitational balance point, known as L5, which would allow it to trail the Earth in its orbit around the Sun by about 150 million kilometres. From this perspective, the spacecraft would have a view of what's happening on the surface of the Sun several days in advance of when an active area spins round towards Earth.

The Carrington-L5 mission concept study is led by Airbus Defence and Space (UK), in collaboration with the Met Office, Mullard Space Science Laboratory, Rutherford Appleton Laboratory and Imperial College London. The proposed mission will reuse systems developed by Airbus for previous space missions, in order to minimise the cost. It will carry all instruments identified by MOSWOC as critical, and will be able to operate for at least a decade even under extreme [space weather](#)

conditions.

"Within the UK, we have the heritage and experience to create this mission on a relatively short timescale and at a low overall cost," said Trichas. "All components we are planning to use for the Carrington-L5 spacecraft and payload have flown before or are in an advanced stage of development. This will minimise the cost of procurement and massively increase the benefits to our economy while allowing the growth of the UK [space](#) industry."

Provided by Royal Astronomical Society

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