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Tailcatcher: A software tool for the finding of potential cometary tail crossings

Geraint H. Jones (1,2)
(1) Mullard Space Science Laboratory, University College London, UK,
(2) The Centre for Planetary Sciences at UCL/Birkbeck, London, UK (g.h.jones@ucl.ac.uk)

Abstract

As part of the Europlanet 2020 Research Infrastructure Planetary Space Weather Services (PSWS), University College London's Mullard Space Science Laboratory (MSSL) has developed software to allow the prediction of possible comet tails crossings. Comet's ion tails are produced when cometary gases are ionized and join the solar wind that flows almost radially outwards from the Sun. Spacecraft can cross these comet tails if they are both downstream of the comet's nucleus at the correct time, and that the solar wind speed is within a range that allows the cometary ions to arrive at the spacecraft when it is downstream. Several such instances of serendipitous comet tail crossings are known to have occurred.

The software – *Tailcatcher* – allows spacecraft trajectories to be uploaded, and a database of all known comets is searched for periods when nuclei were upstream of the spacecraft path to allow solar wind within a reasonable velocity range to arrive at the spacecraft to allow detection and analysis. We shall give examples of the software in use, demonstrating its ability to "predict" known tail crossings.

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