The Ravens concept

Ravens will comprise two identical spacecraft in an elliptical $7 \times 2 R_E$ polar orbit with apogee above the northern pole. The spacecraft will be phased such that one spacecraft is at perigee while the other is at apogee. One spacecraft will always be in a position to monitor northern auroral activity, and twice each orbit the two spacecraft will be ideally located to view both northern and southern hemisphere auroras simultaneously. One spacecraft will always be able to monitor the plasmasphere and ring current, and twice each orbit stereoscopic views will enable reconstruction of plasma structures.

✅ Continuous auroral imaging
✅ Conjugate auroral imaging

Science goals

How does the global magnetosphere respond to incoming solar wind disturbances?
- How do geomagnetic storms propagate through the magnetosphere?
- How is plasma accelerated to form the enhanced plasma pressure in the ring current?
- How does the plasmasphere erode and refill?
- What internal feedback mechanisms modulate the magnetospheric response to the solar wind?

Why are the northern and southern hemisphere auroras asymmetric?
- Are auroral signatures of magnetopause reconnection symmetric?
- How and when are magnetotail signatures of energy unloading asymmetric?
- What creates complicated magnetospheric topologies?
- What do asymmetries auroras imply for the global interhemispheric current system?

Proposed payload

UVAMC - Ultraviolet Auroral Monitoring Cameras - University of Calgary
FUVSI - Far Ultraviolet Spectrographic Imager - University of Liège
XIR - X-ray Imager for Ravens - Universities of Bergen, Leicester
WFAI - Wide-Field Auroral Imager - University of Leicester
EPI - EUV Plasmasphere Imager - Mullard Space Science Laboratory
NAIR - Neutral Atom Imager for Ravens - University of Ireland, JHU/APL, IRF

For further information, see the original proposal to the ESA M-class call at [www.ion.le.ac.uk/ravens](http://www.ion.le.ac.uk/ravens) or contact steve.milan@le.ac.uk

Ravens is named after Muninn and Huginn, the ravens who flew forth each day to gather news to bring back to the Norse god Odin.