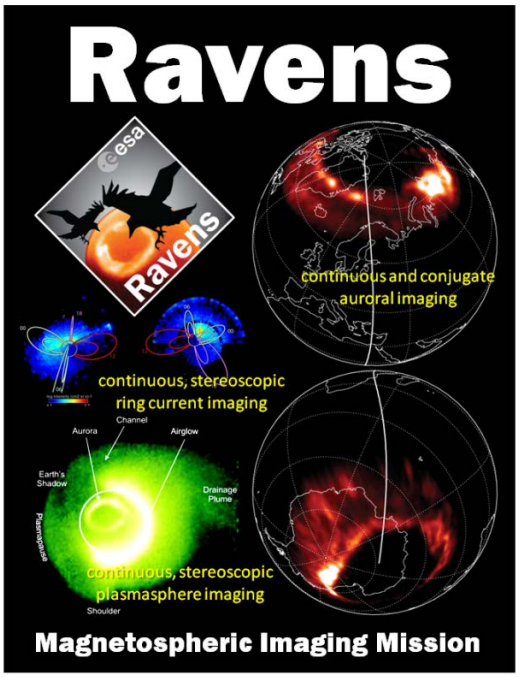

RAVENS / KuaFu-B

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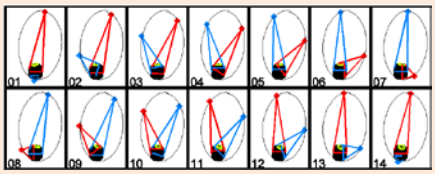
Ravens is named after Muninn and Huginn, the ravens who flew forth each day to gather news to bring back to the Norse god Odin.

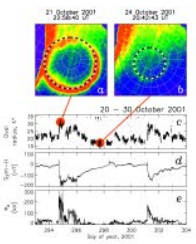
The Ravens concept

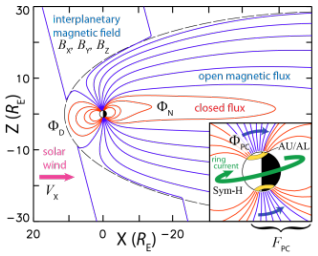
Ravens will comprise two identical spacecraft in an elliptical $7 \times 2\ R_E$ polar orbit with apogee above the northern pole. The spacecraft will be phased such that one spacecraft is at perigee while the other is at apogee. One spacecraft will always be in a position to monitor northern auroral 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**

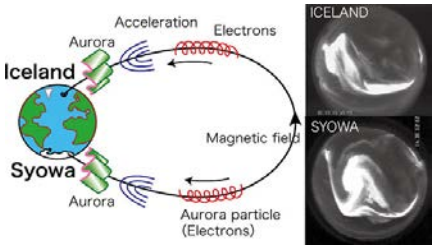


Continuous auroral imaging Changes in the size of the polar cap quantify the rates of magnetic reconnection at the magnetopause and in the magnetotail, the engine of magnetospheric dynamics.





Conjugate auroral imaging Asymmetries in the auroras between the northern and southern hemispheres indicates differences in the acceleration regions, in the field-aligned current systems, or different source regions (e.g. northern and southern lobe reconnection sites). Asymmetries are expected in substorm auroras, transpolar arcs, and dayside reconnection signatures, probing the structure of the magnetosphere.



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

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