

RAVENS

Proposition de mission ESA M3

Coordinateur de la proposition: Steve Milan (University of Leicester)

Consortium: Calgary, Bergen, APL/JHU, FMI, Kiruna, Irlande, MSSL, CESR...

Concept de Mission: Basé sur les deux satellites magnétosphériques de KuaFu

I. Dandouras, pour l'Atelier PNST/SHM, Paris, Octobre 2010

□ The Ravens mission will monitor the **global response of the magnetosphere to incoming solar wind disturbances** using a suite of remote-sensing instrumentation:

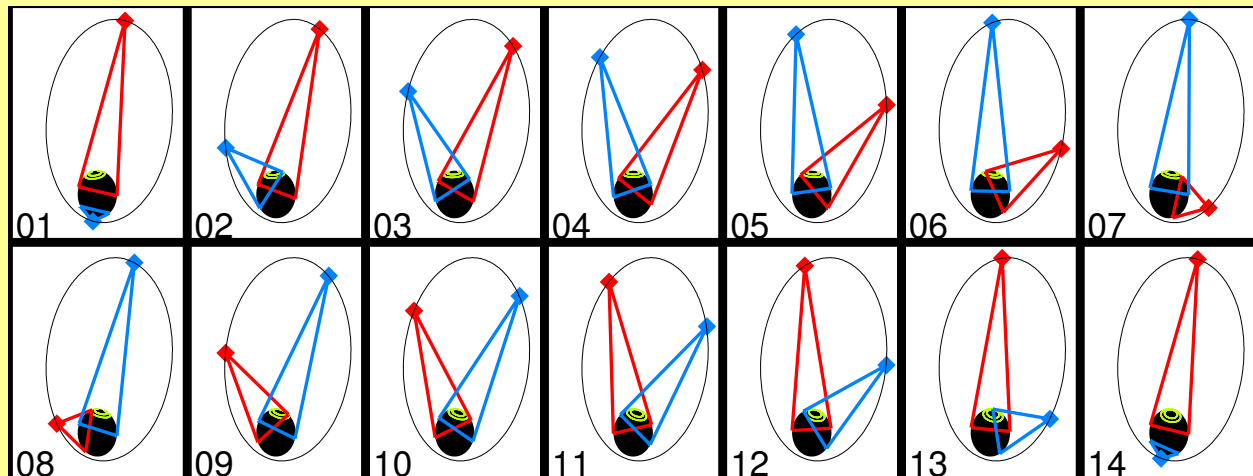
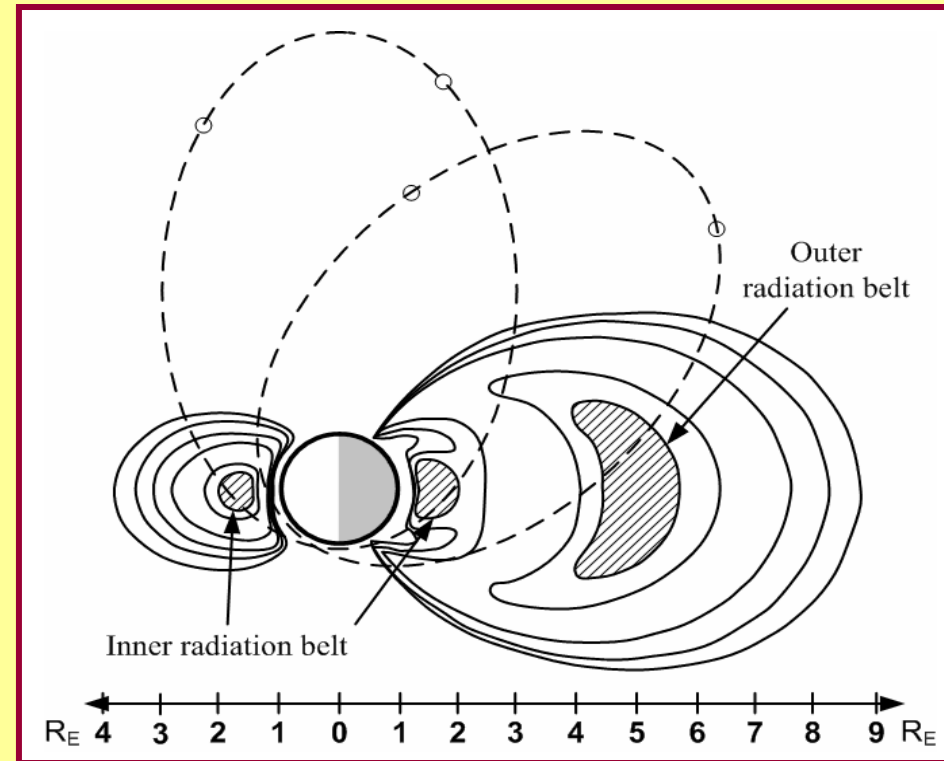
- Far Ultraviolet (**FUV**) and **X-ray auroral** imagers
- Extreme Ultraviolet (**EUV**) **plasmasphere** imagers
- Energetic neutral atom (**ENA**) **ring current** imagers
- In situ payload: TBD

□ Ravens will provide **for the first time:**

- continuous measurements of the northern hemisphere auroras
- frequent and systematic measurements of the southern hemisphere auroras
- continuous and stereoscopic remote-sensing of the plasmasphere and ring current

The RAVENS orbit

- Two identically-instrumented spacecraft in identical highly-elliptical polar orbits
- Baseline orbit 7-8 X 1.8 R_E, high inclination
- Spin stabilized
- One of the spacecraft will always be in a position to monitor northern auroral activity
- One spacecraft will always be in a position to monitor the plasmasphere and ring current, and twice each orbit stereoscopic views will enable reconstruction of 3D plasma structures



The Ravens mission will provide a step-change in our understanding of our immediate space environment and address fundamental problems :

- **How does the global magnetosphere respond to incoming solar wind disturbances?**
 - How do **geomagnetic storms propagate** through the magnetospheric system, from dayside coupling region to magnetotail, to inner magnetosphere, ionosphere and atmosphere, and **how and where is energy dissipated?**
 - How is **plasma accelerated to form the enhanced plasma pressure in the ring current** and how does the associated 3D pressure-driven current system control **space weather in the inner magnetosphere?**
 - How does the **plasmasphere erode and refill through the course of storms?**
 - What **internal feedback mechanisms modulate the magnetospheric response to the solar wind**, including plasmaspheric plumes and ring current modification of the magnetotail?
- **Why are the northern and southern hemisphere auroras not symmetric?**