

# Is it STFC Strategy to cease *in situ* space plasma science?

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RAS Astronomy Forum  
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# Rosetta



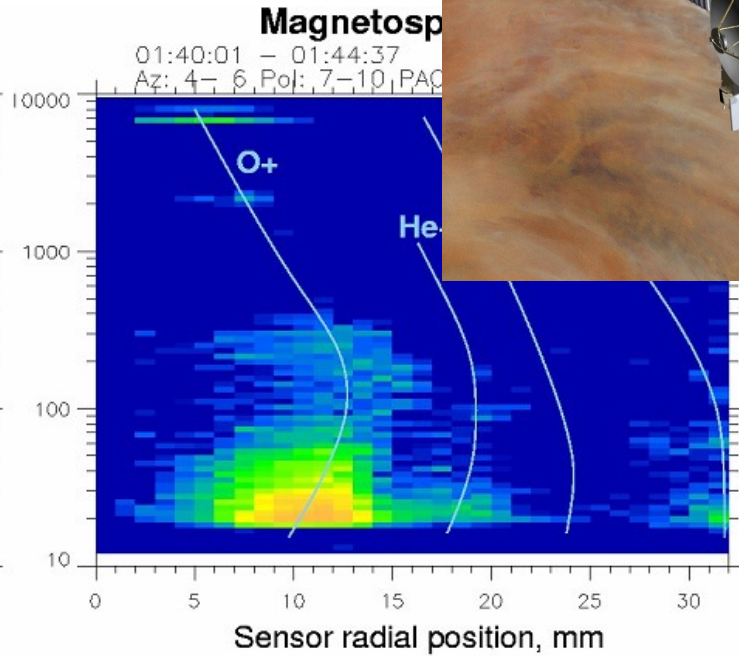
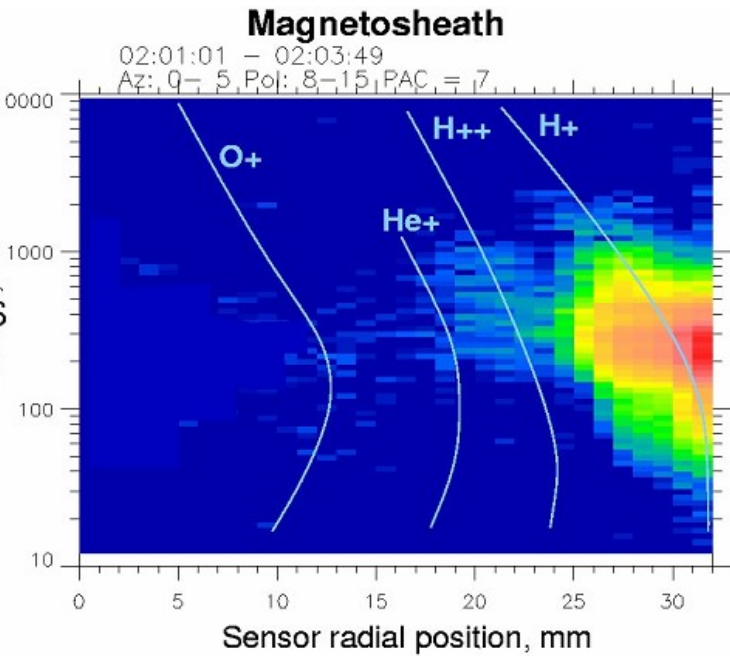
- ESA Comet Rendezvous Mission
- First ever – will follow cometary activity
- Significant UK in situ roles (PI)
- Currently starting 4 year hibernation

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# Venus Express



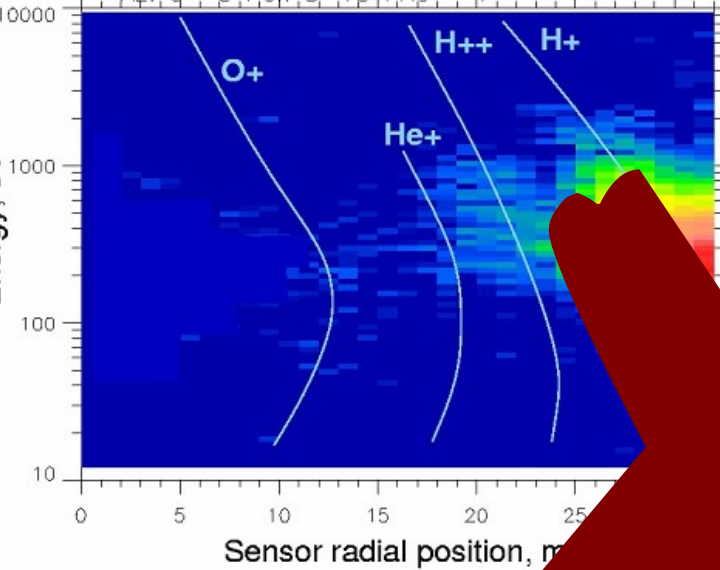
- First/only ESA mission to Venus
- Important breakthroughs on clouds and upper atmosphere (UK atmos instr)
- Bow shock and escaping planetary ions (UK CoIs particles + fields hardware)
- Mission extended to 2012 to enable lowering of pericenter altitude: first ever in-situ observations of polar upper atmosphere

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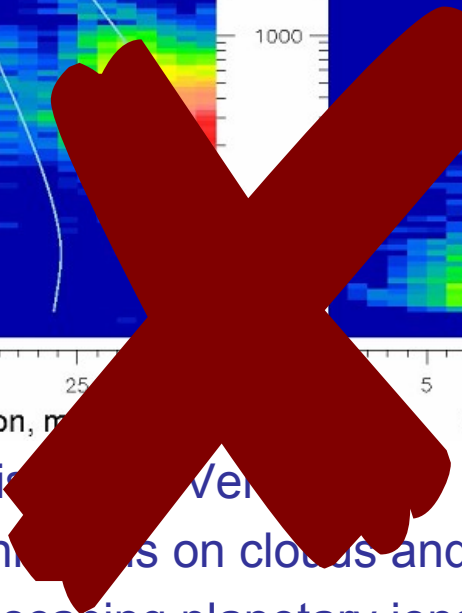
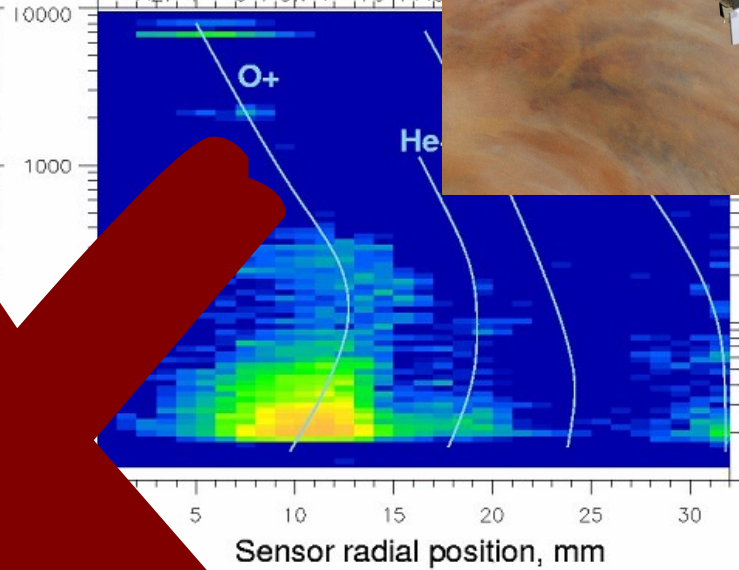
### Magnetosheath

02:01:01 - 02:03:49  
Az: 9 - 5, Pol: 8 - 15, PAC = 7



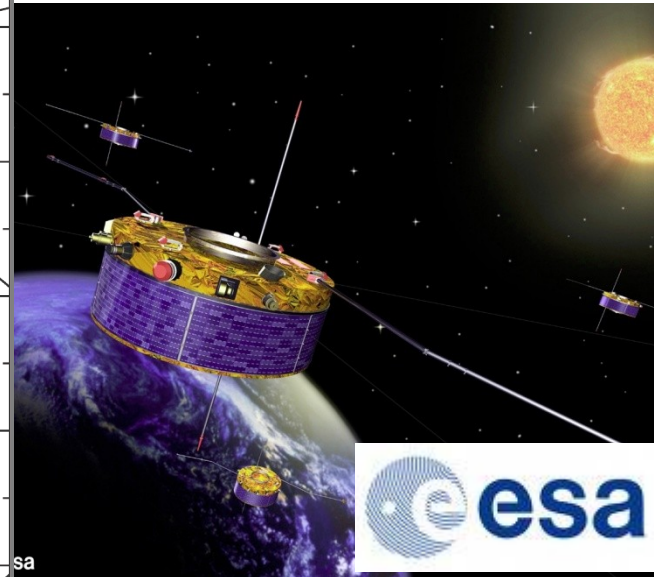
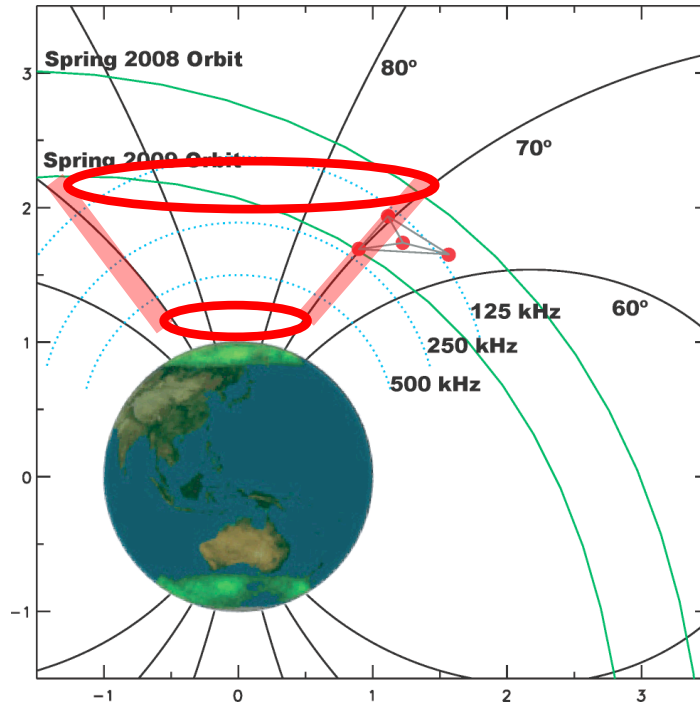
### Magnetosphere

01:40:01 - 01:44:37  
Az: 4 - 6, Pol: 7 - 10, PAC = 7



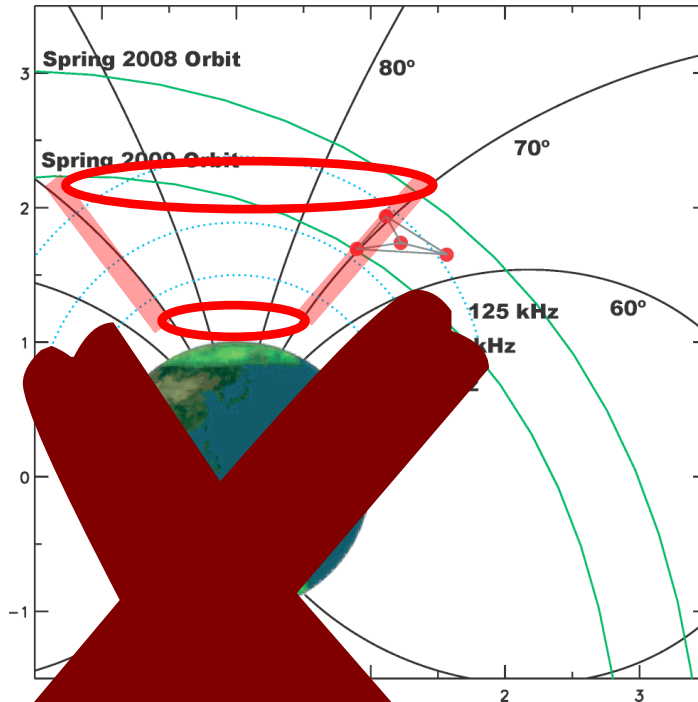
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# Cluster



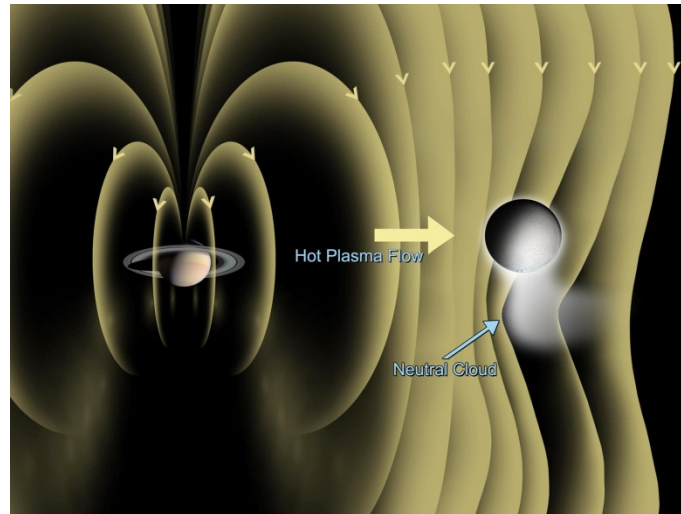
- 1<sup>st</sup> separation of 3D space and time in astrophysically-relevant plasmas
- Important results include extensive reconnection in solar wind, cusp regions of magnetosphere, shock acceleration parameters, ...
- Large UK hardware PI roles
- Extended to 2012 as orbit evolves to measure 3D auroral acceleration region

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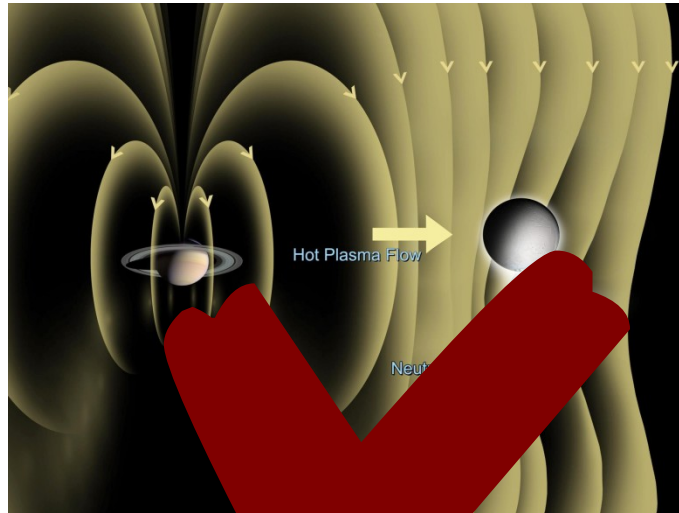
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# Cassini



- Flagship to Saturn – no return likely for at least 20 years
- UK PI and CoI roles on in situ payload (plus others – large community)
- UK discovery by magnetometer of atmosphere on Enceladus one of BBC's 8 science highlights of the noughties
- Mission extension to 2017 waiting final NASA approval. Targets low (eventually submerged!) orbits in polar regions so MAG can reveal workings of strange symmetric internal magnetic field

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# NUAP Questions Requiring in situ data

- 2.1. How does solar activity affect the near-Earth space environment as well as those of other planets, and how does the Sun affect civilization?
- 3.4. Is there a universal model of magnetospheres and atmospheres?
- 5.2. What are the fundamental processes that transport, convert and release energy in plasmas?
- 5.3. How and where are particles accelerated in nature?

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# **Lack of new missions (none approved) + Stopping/discouraging science exploitation of these missions**

- Leads to loss of technical competence
- Undermines National Capability (distributed across several HEIs + RAL) in
  - Magnetometry
  - Thermal plasma detectors
  - High-energy particles
- Damages international recognition of community (UK leads/lead roles in several initiatives including Solar Orbiter, Cross-Scale, Europa-Jupiter System Mission)
- Reduces confidence in future collaborations
- Restricts UK ability to monitor and characterise space hazards/space weather
- Closes potential for small national/bi-lateral missions promoted by emerging UK Space Agency

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