Cluster Mission update
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THEMIS/ARTEMIS SWT
Fall 2011
• As mentioned last year, Cluster was granted an extension up to the end of 2014. This is subject to a mid-term review on its technical capability in Summer 2012.
• Spacecraft went through lowest altitude since launch – 250 km spacecraft 2
• Current operations focus on continued auroral acceleration region activities and implementation of the Cluster guest investigator GI programme.
• Cluster team is preparing a proposal for a further extension to 2016 which will be submitted and considered in autumn 2012.
Our refereed publication rate is healthier than ever with **1567**, with **58** PhDs based on Cluster data.

2011 is best year for Cluster publications, with at least 213 this year.
Harri’s baby-Cluster Active Archive CAA

- OVER 1300 USERS

- All high res best quality Cluster data

~ one Terabyte download per month

- Implementation of final archive in Madrid ongoing

- Will roll out new user interface in next 12-24 months

- http://caa.estec.esa.int
AO called for new operations based on spacecraft separation and instrument mode to carry specific science investigations.

6 successful GI’s selected, one already implemented (as reported by Brian Walsh yesterday)

A. Retinò - multi-scale reconnection studies
B. Walsh – energetic electrons at m/pause
C. Foullon – flank waves etc
D. Yordanova – small scale turbulence
E. Yordanova – multi-scale turbulence
F. Pitout – particle acceleration in cusp
Z. Pu – comparative reconnection studies

First time such an astronomy concept has been implemented in our area.

Considering a repeat call for 2015-2016 extension.
The graph shows the inter-spacecraft distance (Km) over time. The x-axis represents the date from January 2001 to January 2012. The y-axis represents the distance in kilometers, with a logarithmic scale.

Two lines are plotted:
- Pink line labeled C1, C2, C3
- Green line labeled C3, C4

Colored markers represent different events:
- Red circle: Cusp
- Green square: Tail
- Blue circle: Auroral zone
- Pink circle: Solar wind
- Yellow circle: GI operations

The graph indicates fluctuations in the distance over time, with notable changes around the years 2005 and 2010.
Cluster future:
SWARM - ESA Earth observation mission – 3 spacecraft constellation to provide the best ever survey of the geomagnetic field and its temporal evolution.

Launch mid-2012
3 month commissioning
48 month operational lifetime

490, 530 km altitude.
Orbit Evolution 2006 - 2014

Diagram showing the evolution of orbits from 2006 to 2014 in GSE coordinates. The diagrams illustrate the paths of different years, with specific years marked by different colors. The paths are labeled with GSE coordinates and include annotations for the Bow Shock and Magnetopause.
Spacecraft will progress back out to higher ecliptic altitudes on 2015-2016.
Different inclination – now cluster crosses XY place near apogee from South to North

What science will we get from 2015 + 2016
2013-2014 opportunities – TWINS not shown but obviously included

Cluster at high latitude and providing measurements at large radial distances
Cluster, THEMIS and RBSP
Dayside, 2 February

Cluster at z GSE=0

Cluster at z GSE=0

2015

Cluster

THEMIS

RBSP

2016

magnetopause

Bow Shock

magnetopause

Cluster

THEMIS

RBSP

European Space Agency
Cluster, THEMIS and RBSP
Tail, 2 August

Cluster at z GSE=0

2015

Cluster
THEMIS
RBSP

2016

magnetopause

Bow Shock

Cluster
THEMIS
RBSP

magnetopause

Bow Shock
Cluster, THEMIS and RBSP
Tail, 2 August

Cluster at z GSE=0

MMS conjunctions

What science will we get from 2015+2016 Cluster, THEMIS and RBSP
GEOTAIL – HOPING TO EXTEND UNTIL END OF 2015 FOR END OF THIS YEAR

2009 - 2012

2009  2012

2013 - 2016
For your 2012 schedule:

Cluster-Themis-Artemis workshop

1 October – 5 October 2012, Colorado

Organization just beginning with LASP colleagues (Dan Baker and Xinlin Li)