



**The Newsletter - Volume 8, Issue 4**  
**4<sup>th</sup> April 2011**

Covers events between 1<sup>st</sup> December 2010 and 28<sup>th</sup> February 2011

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**Appointments**

Chris Brockley-Blatt has been asked to serve as the Education Policy Advisor on behalf of the Institution of Mechanical Engineers on the Parliamentary Space Committee.

**Proposals**

MSSL scientists submitted several proposals in response to ESA's call soliciting proposals for a third medium-class mission (M3) within the long-term science plan known as Cosmic Vision 2015-2025. Out of a total of 47 proposals received by

ESA, four missions were selected for further assessment (launch 2020-2022). Two of these involve MSSL space scientists: LOFT (the Large Observatory For X-ray Timing) and EChO (the Exoplanet Characterisation Observatory).

LOFT will carry two instruments which will be operated in parallel: the Large Area Detector (LAD) and the Wide Field Monitor (WFM). The mission will be devoted to the study of X-ray variability of celestial X-ray sources on time scales of milliseconds, and will provide important insights into the physics of accretion onto compact objects. MSSL will have a lead role in the main instrument,

the LAD, and will develop the design of the the instrument control units, the thermal, mechanical, engineering and software design, the power supply units, and the micro-channel plate detectors. (Silvia Zane, Dave Walton, Berend Winter, Phil Guttridge, Dhiren Kataria, Phil Smith, Roberto Mignani, Alan Smith).

Selection proved disappointing for other groups. It appears that both Alfvén (lead Andrew Fazakerley) and Uranus Pathfinder (lead Chris Arridge) were shortlisted. IMPALAS (lead Chris Owen) and AXIOM (Advanced X-ray Imaging Of the Magnetosphere) (lead Graziella Branduardi-Raymont, with Leicester, Imperial and NASA/GSFC) did not make it to the final selection for the assessment study phase. The interests for plasma science in the ESA cosmic vision program now remain with the Solar Orbiter and EJSM.

Richard Cole, Dhiren Kataria and Chris Owen participated in the preparation of a proposal to ESA in response to the ITT for L-DEPP (Lunar Dust Environment and Plasma Package for Lunar Exploration), submitted in December. The MSSL role is defined as the study and definition of an electron analyzer for the mission. The current status is that the team is responding to questions from ESA in advance of a negotiation meeting scheduled in early April.

UKSEDS have just been given the good news that they have been picked to fly on the UK Space Agency's flagship cubesat mission. Several MSSL students worked on the proposal, and MSSL will continue to have a role in the development of the selected payload (launch 2012).  
<http://tinyurl.com/UKube-1-170311>

The plasma group supported the TopCat proposal for a payload for the Ukube1 cubesat spacecraft. Topcat would use GPS to measure the Earth's plasmasphere and coordinated observations with Cluster are planned if the mission is selected and is successful.

The 'EXACT: A study of the Earth's aurora with a Cubesat' proposal was re-submitted to the European Research Council in early February (Graziella Branduardi-Raymont PI, with support from MSSL science and engineering groups).

Proposal to ESA for continuation of Envisat RA2 Expert Support Contract was submitted 17 Feb (SGB)

Proposal for continuation of Gaia Data Processing Centre (CU6) for 3 years post-launch (MSC & SGB)

## Grants and Contracts Awarded

Adam Masters was awarded an International Travel Grant by the Royal Society to support a two-week visit to the Japanese Aerospace Exploration Agency in July. The aim of the visit is to discuss current understanding of the magnetospheres of Earth and Saturn, and identify the open issues that can be addressed by comparing these very different systems.

Roberto Soria has obtained an ESO visiting grant to spend a month at Santiago, Chile, working with George Hau, to study the candidate intermediate-mass black hole HLX1.

ESA - Contract for Globlce Phase3 was approved and kicked off 22 Feb. (€ 87k) . PI S.Baker.

ESA - Maintenance of the L2 Processing Chains for CryoSat-2, kicked off 15 Mar. (€ 198k) . PI S.Baker.

Award of a CCN on our "Ideas" contract with Vega to provide QA and Monitoring service for CryoSat-2 (€ 80k), PI S.Baker.

## Telescope/Satellite Time Awards/Proposals

Santiago Vargas Dominguez was awarded 7 days observing time to study the magnetism of active solar regions with the Swedish Solar Telescope in La Palma, Canary Islands.

Roberto Soria and the international M83 team:

- obtained 750 ks of Chandra time to study the spiral galaxy M83. The first 160 ks of data were taken on 23-25 Dec. A weekly monitoring of M83 with Swift has also been awarded.
- submitted a proposal for radio observations (3+6 cm) of the M83 galaxy from the Australia Telescope Compact Array, and a Hubble Space Telescope proposal for optical observations of the same galaxy.

Roberto Soria, J.W. Broderick (University of Southampton) and K. Pottschmidt (University of Maryland) submitted a proposal for radio observations of the Galactic microquasar GRS 1758-258 from the Australia Telescope Compact Array.

Roberto Soria, L. Zampieri, T. Roberts and several other collaborators submitted a joint Hubble Space Telescope proposal for the optical monitoring of two ultraluminous X-ray sources, with the goal of determining their binary periods.

## Mission Status and Developments

**Cassini** - ELS working well. Several presentations at AGU meeting. Gethyn Lewis attended the SPIS/SPINE meeting, Uppsala, 18-19 Jan.

**Cluster** – The Cluster spacecraft continue to work well. During this period solar wind and bowshock observations have been a priority, and some coordination with Hinode observations has been ongoing at MSSL.

Work continues by all instrument teams on the Cluster Active Archive; much of the planned content is now available for 2001-2009.

Andrew Fazakerley attend the Science Operations Working Group meeting at ESA HQ (1/2 Dec). The meeting included discussion of proposals from the wider science community for targeted Cluster observations to tackle specific scientific questions.

Andrew Fazakerley gave a presentation on the need for SPIS spacecraft-plasma interaction simulations of Cluster and Solar Orbiter at the SPINE meeting in Uppsala (17-18 Jan).

Iryna Rozum, Natasha Doss and Andrew Fazakerley participated in a Progress Meeting with representatives of the Cluster Active Archive at MSSL on Feb 24/5. Iryna delivered a presentation.

**Double Star** - Work continues on a Double Star data archive, which at the present time consists mostly of raw data reprocessing in China seeking to recover “missing” raw data or improve quality of “noisy” raw data, which was a problem during some parts of the mission.

**EJSM** – A number of meetings and instrument proposal at SDT level – Andrew Coates attended the JuMMP meeting in Paris, 3 Dec. Also as an SDT member AJC attended the meetings in ESTEC, 14 Jan, the community presentation on 3 Feb in Paris and an SDT meeting on 4 Feb.

**ExoMars** – Instrument development continuing. Papers at RAS discussion meeting (see below). Mast interface meeting at TASI, Turin, 23-24 Feb attended by C.Leff, B.Hancock, B.Winter.

**PanCam** - Claire Cousins of UCL CPS has provided a recommended set of geology filter centre wavelengths for the ExoMars PanCam. She has also worked with Matt Gunn at Aberystwyth University to determine the optimum filter band passes. This information will feed into the PanCam filter RFQ to be released shortly.

Craig Leff, Andrew Griffiths and Peter Muller of MSSL all had poster presentations at the 2nd UK Participation in Aurora meeting of the RAS on 14 Jan. The meeting highlighted past and present UK exploration plans, primarily for Mars

After a successful review with ESA, PanCam began low-temperature qualification testing of printed circuit boards to be used in the instrument on Mars. The expected environment on the

Martian surface will be much colder, and have more temperature cycling, than most components are typically qualified for.

Craig Leff gave a presentation at MSSL about MER surface operations, giving background into how Mars surface operations were planned and used for that mission, and providing some insight into how future missions (e.g., MSL, ExoMars) might operate.

Craig Leff, Barry Hancock and Berend Winter all participated in an ExoMars Mast Interface meeting in Torino on 23-24 Feb at TASI, prime contractor for the ExoMars mission.

**Solar Orbiter** - Work is proceeding on the design and development of the EAS sensor for the SWA consortium. UKSA held an ‘Update’ meeting to review progress at Imperial College on 6 Dec, at which SWA was represented by Chris Owen and Chris Brockley-Blatt. There have been a number of face-to-face technical meetings between SWA team members, ESA and Astrium UK. Technical telecons and visits have also occurred between MSSL and our partners on SWA/EAS, LPP Paris.

Andrew Fazakerley gave a presentation to a meeting with ESA and Astrium on EMC requirements for Solar Orbiter on behalf of the SWA team (17 Feb). This was further developed into a Technical Note.

**Venus Express and Mars Express** – Instruments working well. Andrew Coates attended the ASPERA team meeting in Uppsala, 7-9 Dec and presented on ionospheric photoelectrons at Venus.

#### **Publications – Refereed Published**

Andrews, D.J., A. J. Coates, S. W. H. Cowley, M. K. Dougherty, L. Lamy, G. Provan, and P. Zarka, Magnetospheric period oscillations at Saturn: Comparison of equatorial and high-latitude magnetic field periods with north and south Saturn kilometric radiation periods, *J. Geophys. Res.*, 115 (A12), CitelID A12252, 2010.

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- Tao, X., R.M. Thorne, R.B. Horne, S. Grimald, C.S. Arridge, G.B. Hospodarsky, D.A.Gurnett, A.J. Coates and F.J.Crary, Excitation of electron cyclotron harmonic waves in the inner Saturn magnetosphere within local plasma injections *J. Geophys. Res.*, 115, CitelD A12204, 2010.
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### In press

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#### **Publications - Non-refereed Published**

- Soria, R., Long, K.S., Bianchi, L., Blair, W. P., Ghavamian, P., Kuntz, K.D., Plucinsky, P.P., & Winkler, P.F., "Discovery of a Transient ULX in M83", 2010, *ATel*, 3092, 1
- Young, D.T. and A.J.Coates, Cassini Plasma Spectrometer Explores Saturn's Magnetosphere, *Space Research Today* (COSPAR information bulletin), no. 179, 81-90, 2010.

#### **Invited Talks and Conferences**

2010 Fall Meeting of the American Geophysical Union in San Francisco, 13-17 Dec.

Colin Forsyth and Andrew Walsh gave invited talks on their recent work using data from the Cluster spacecraft

Chris Arridge and Adam Masters attended and made the following presentations. Planetary science group was represented on nine additional papers:

Arridge, C S, N A Achilleos and P. Guio, Modulation of the jovian ring current and magnetodisc due to impulsive volcanic activity on Io.

Coates, A.J., A. Masters; A. P. Walsh; A. N. Fazakerley; M. K. Dougherty, Differences in the structure of a planetary magnetopause boundary layer.

Jones, G.H.; E. Roussos; A. J. Coates; F. J. Crary, Surface charging of Saturn's moon Rhea.

Kanani, S.J.; G. H. Jones; G. R. Lewis; D. T. Young; C. S. Arridge; A. J. Coates; A. N. Fazakerley, On low energy electron spikes associated with Saturn's moon Enceladus.

Masters, A.; M. F. Thomsen; S. V. Badman; C. S. Arridge; A. J. Coates; M. K. Dougherty; D. T. Young, Superrotating plasma in Saturn's dawn magnetosphere.

Ramanjooloo, Y, G.H. Jones and C.S. Arridge, The solar wind interaction with Comet Machholz (C/2004 Q2) as revealed by amateur images.

Colin Forsyth attended the AGU Chapman conference on Relationship Between Auroral Phenomenology and Magnetospheric Processes in Fairbanks, Alaska. Colin gave a contributed talk on auroral acceleration observed by Cluster.

Chris Owen, Dhiren Kataria and Alan Smith travelled to Moscow to discuss the ongoing collaboration between UCL (MSSL and the Institute for Risk & Disaster Reduction) and the Institute of Physics of the Earth, Russian Academy of Sciences (and other Russian and FSS Institutes). The aim is to define and eventually building the Twinsat mission to identify and understand possible Earthquake precursor signatures that appear in the ionosphere. A media event resulted in a number of newspaper articles (15-18 Feb).

RAS discussion meeting on UK participation in the Aurora programme, RAS, 14 Jan. Presentations were given by Andrew Griffiths and Craig Leff:

Leff, C. E., A. D. Griffiths, B. K. Hancock, A. J. Coates, and the PanCam Team, The ExoMars Panoramic Camera (PanCam) Instrument.

Griffiths, A.D., C.E. Leff, A.J. Coates, J.-P. Muller, R. Jaumann, J.-L. Josset, G. Paar and D. Barnes, Scientific Objectives of the ExoMars Panoramic Camera (PanCam).

Cousins, C.R., A.D. Griffiths, I.A. Crawford, B.J. Prosser, M.C. Storrie-Lombardi, M.Gunn, and L.E. Davis, Selection of the Geological Filters on the ExoMars PanCam instrument.

Roberto Soria gave a presentation on radio-loud and radio-quiet microquasars at the annual ANITA meeting (Astronomical Society of Australia), Perth (Feb).

Lucie Green gave a talk on solar activity as part of the LIFT conference space session.

Rob Bedington completed his internship at INAOE, Mexico, presented his work and graduated from the ISCAI 2010 at Universidad Complutense de Madrid in December.

Tom Nordheim gave a talk on the [REXUS/BEXUS](#) programme at the UKSEDS meeting in Manchester (26/27 Feb). The programme provides European students with the opportunity to propose payloads for sounding rockets and stratospheric balloons. Tom was the project manager for [I-BATE](#) (ISU-Balloon ATC Technology Experiment) which was successfully flown on the BEXUS 10 balloon flight on October 9 and again on the BEXUS 11 flight on November 23. The purpose of the instrument is to provide proof of concept for space-based air traffic control.

### Media Broadcasts and Features

Chris Arridge:

- interviews on Uranus and the Uranus Pathfinder mission concept to Astronomy Now (leading to a special article in Astronomy Now), Skymania (online coverage), and Discovery: Space (online coverage on discovery.com and msnbc.com).

A number of articles appeared in the press in relation to the TwinSat discussions in Moscow (see above). These included articles in the Independent (<http://www.independent.co.uk/news/world/europe/satellite-project-to-predict-earthquakes-will-help-save-lives-2219299.html>), the Moscow News (<http://themoscownews.com/international/20110218/188431118.html?referfrommn>).

Andrew Coates:

- Interview for The Times, 16 Dec (quote appeared in Martian water, essence of Neanderthal: the scientific marvels of the past decade, 17 Dec);

Interviews for BBC 1 O'Clock News, and Sky News, on robotic and human missions to Mars, 14 Feb.

Lucie Green:

- several interviews on the increase in solar activity and 360 observations of the Sun made by STEREO on:  
BBC Breakfast;  
BBC Radio 4 Today programme;  
BBC World;  
BBC Surrey;  
BBC Surrey and Sussex;  
BBC 6 O'clock News;  
BBC Five Live;  
Radio Wales;
- wrote a women in science article in the Times' Eureka magazine (on Annie Jump Cannon);
- interviewed on BBC Stargazing Live on BBC 2;
- interviewed on Sky at Night 700th episode;
- interviewed on 10 O'clock Live show.

Ian Hepburn:

- BBC South today: interview and presentation on the Moon Rocks from the Apollo missions, Park Mead School, Cranleigh, 6 Jan.

### PhDs awarded

Kimberley Steed successfully defended her PhD entitled "Solar influences in the Heliosphere: understanding coronal mass ejections and their associated magnetic clouds".

### Outreach

Chris Arridge:

- talk entitled "Strangers and Giants: Uranus and Neptune" at AstroFest 2011;
- talk to A-level students entitled "I'm a Space Scientist," Royal Observatory, Greenwich;
- participated in a "Maths in Context" event at Warden Park School, West Sussex.

Chris Brockley-Blatt:

- held a Space Engineering Workshop for the GCSE Physics Class at Davison CE High School for Girls, Worthing (18 Feb). With Chris' help, the group has been awarded a £3000 RS grant for space science teaching. The girls will visit MSSL in April.
- evening lecture on SPIRE and Engineering at MSSL, to the Sussex and Surrey area branch of the Institution of Mechanical Engineers. It was well attended and enjoyed by everyone.

Andrew Coates gave talks on:

- “Robotic exploration of the solar system: present and future”, Stratford on Avon Astronomical Society;
- “The Science and Engineering of Missions to Jupiter: From Cassini to EJSM”, Institution of Engineering and Technology, Birdcage Walk, London. This is the first joint space engineering event, organised by Chris Brockley-Blatt as part of the future collaborations on space science and engineering between the Institution of Mechanical Engineers and the Institution of Engineering and Technology;
- “UCL’s involvement in planetary missions: Cassini, Venus Express, Mars Express, Rosetta & ExoMars”, UCL Diploma Club.

Andrew Fazakerley/Andrew Walsh:

- attended a meeting at the Royal Society for the launch of this year’s Royal Society Summer Exhibition. Andrew Fazakerley is leading a team that will showcase Cluster.

Lucie Green :

- Hooke Lecture at Westminster School, London;
- arts/science project visit to Jo Richardson School, Dagenham;
- talk at the Royal British Legion’s visit to MSSL.

Louise Harra:

- public lecture at UCL entitled “The Sun and ... the end of the world ?”.

Ian Hepburn conducted space science talks and activities at:

- Park Mead Primary School, Cranleigh, for year 5 children;
- Brookham primary School, year 5 children;
- Horsham Brownie group visit to MSSL;
- Ferring Primary School, reception class and year 5 children;
- Loosely Fields School, Godalming, "alien invasion day" whole Junior school activity.

Roberto Soria:

- public lecture for the UCL Science Centre on "Time Travel and Wormholes";
- article on Black Hole Jets for the popular monthly magazine Australasian Science.

## Other News

The UKSEDS Conference held at Manchester University on 26/27 February saw Roger Duthie stand down as UKSEDS chair. The event brought together students from universities across the UK (plus some from Russia!), with presentations from academia and industry, chances for students to network and discuss ongoing UKSEDS projects.

## Next Issue

The next issue of The Newsletter (Volume 9, Issue 1) will be published in June 2011. This will cover activities from 1 March 2011 to 31 May 2011.