

Report on the  
AURORA Cross-Council Meeting  
held at  
Rutherford Appleton Laboratory

Friday 7th May 2004

**Richard Holdaway**  
**Director, Space Science & Technology**  
**Rutherford Appleton Laboratory**

## **1. Introduction**

PPARC is co-ordinating a bid to Government as part of SR2004 for UK participation in Aurora, including various options for scientific and technical leadership. As part of this process, three Working Groups have been set up: The Science Case; Industrial Engagement, and Cross-Council Engagement. The purpose of the Working Groups and the resultant reports are to provide input to the PPARC bid, and to help inform the key stakeholders (Research Councils, Industry, Government, Intuitions).

This report summaries the outcome of the Cross-Council Aurora Meeting of 7<sup>th</sup> May to explore cross-council interests and support for the ESA Aurora/Inspiration programme.

## **2. Cross-Council Meeting**

The Cross-Council Meeting took place at Rutherford Appleton Laboratory on 7<sup>th</sup> May 2004. A list of attendees is attached at Annex 1.

Six presentations were given, covering primarily medical, geological, and environmental interest. Time was then allocated for widespread discussion. The presentations can be found on the Aurora web site at [www.aurora.rl.ac.uk](http://www.aurora.rl.ac.uk)

## **3. Cross-Council Support**

At the end of the meeting, the following was the agreed position:

1. There was overwhelming cross-council support for robotics exploration of Mars and other parts of the Solar System as appropriate.
2. There was also significant support from some parts of the community for the human component of the Aurora programme for the purposes of planetary geological exploration, medical research and for public outreach. It was recognised that these arguments for participation in the human spaceflight aspects reinforce each other.
3. It was recognised that support for a manned component of Aurora does not currently match UK government plans for space, but given the potential scientific and social benefits of human spaceflight outlined above, an open mind should be kept and there may be a case for asking the government to review its position in this respect.
4. All Research Councils should be strongly encouraged to support the PPARC bid. Furthermore, PPARC would be strongly supported by the wider community in any way felt helpful by PPARC.
5. Areas of UK expertise and scientific interest and of significant importance to the cross-council community were identified, and are shown in Section 4.

4. This section delineates the main scientific/social themes of interest to the UK cross-council community with examples of specific questions.

Planetary exploration

*Continuing investigation of the Moon and inner and outer planets. Are there sub-surface hydrological systems?*

Planet surface morphology

*Are there microstructures in rocks and planetary surfaces or has there been?*

Search for Life

*Is there or has there been life in the Solar System beyond Earth? Are there places beyond the Solar System where life might exist or arise? How did life on Earth start?*

Climate studies

*How does climate on Earth relate to climate on other planets? Do they evolve differently?*

Geoscience

*How old are the rocks on Mars and other planets? How has surface morphology changed? Is Mars volcanically extinct?*

Solar studies

*What is the nature of the physics and chemistry of the Sun and how does it relate to climate on Earth?*

Near-space Environment

*What is the nature of the environment beyond Earth? Do or could organisms exist in the extremes? Likewise for proteins ?*

Effect of weightlessness on human life

*What is the effect of weightlessness on long duration human/animal exposure to zero-g? How does our body react? How does balance function in long duration low-g? How can we prevent muscle wasting and bone loss in space to maintain crew-health and performance during long-term flight ?*

Ageing processes including muscle atrophy

*How does muscle loss in space relate to muscle loss on Earth, and what effect does this have on ageing?*

Cardiovascular systems

*How does the heart react in different environments and under low-g?*

Identification of Earth-like planets

*What evidence is there for extra-solar planets, and in particular Earth-like planets? We already know of over 120 extra-solar planets, so are any Earth-like ?*

### Observation of planetary atmospheres

*What is the nature (physics and chemistry) of the atmosphere of other planets? How did they form? How do/did they disappear?*

### Life in extreme environments

*How does/could life exist at the extremes of environment, e.g. very high/low temperature?*

### Physics and chemical boundaries to life

*What are the extremes? How and why do some simple molecules turn into living molecules?*

### Genetic characteristics of life in extreme environments

*How might organisms evolve (differently) in extreme environments?*

### Evolution of micro-organisms

*Do/can micro-organisms evolve in space?*

### Planetary biomass

*What is the nature of the biomass at the boundary of planetary atmospheres? How does it react to changes in the environment?*

### Oceanic hydrothermal systems

*Do they exist sub-surface?*

### Opportunities for social scientific research

*What can we learn about the management of ultra-complex systems? How do humans react to unknown environment and surroundings? Are there innovative cultural, ethical and social opportunities? How do we rate risk for long duration separation?*

## **Way**

## **Forward**

Attendees agreed to the following actions:

1. To notify their support to their relevant Research Council CEO;
2. To copy that statement statement/letter of support to the CEO PPARC;
3. To lobby their own wider community in support of Aurora.
4. To lobby for support in any other way considered relevant, including through MP's, other Government departments and the media.

## AURORA / INSPIRATION MEETING

CR3 R61 7<sup>th</sup> May 2004

NAME	INSTITUTION	E-MAIL
Richard Holdaway	RAL	<a href="mailto:R.Holdaway@rl.ac.uk">R.Holdaway@rl.ac.uk</a>
Cockell Charles	BAS	<a href="mailto:cscoc@bas.ac.uk">cscoc@bas.ac.uk</a>
Crawford Ian	UCL/Birbeck	<a href="mailto:i.crawford@ucl.ac.uk">i.crawford@ucl.ac.uk</a>
Curtis Jeremy	RAL	<a href="mailto:w.j.curtis@rl.ac.uk">w.j.curtis@rl.ac.uk</a>
Davey Nick	Imperial College	<a href="mailto:n.davey@imperial.ac.uk">n.davey@imperial.ac.uk</a>
Dunkin Sarah	RAL	<a href="mailto:s.k.dunkin@rl.ac.uk">s.k.dunkin@rl.ac.uk</a>
Fong Kevin	UCL	<a href="mailto:k.fong@ucl.ac.uk">k.fong@ucl.ac.uk</a>
Fraser Peter	University of Aberdeen	<a href="mailto:p.fraser@abdn.ac.uk">p.fraser@abdn.ac.uk</a>
Grady Monica	Natural History Museum	<a href="mailto:m.grady@nhm.ac.uk">m.grady@nhm.ac.uk</a>
Harridge Stephen	UCL	<a href="mailto:s.harridge@rfc.ucl.ac.uk">s.harridge@rfc.ucl.ac.uk</a>
Jayakumar Prakash	Chelsea & Westminster Hospital	<a href="mailto:Pjay007@doctors.org.uk">Pjay007@doctors.org.uk</a>
Jones Vicky	EPSRC	<a href="mailto:Vicky.jones@epsrc.ac.uk">Vicky.jones@epsrc.ac.uk</a>
Joy Katherine	UCL	<a href="mailto:K.Joy@ucl.ac.uk">K.Joy@ucl.ac.uk</a>
Kelly Simon	Open University	<a href="mailto:s.p.kelley@open.ac.uk">s.p.kelley@open.ac.uk</a>
Loveridge Nigel	Cambridge University	
McGregor Alison	Imperial College	<a href="mailto:a.mcgregor@imperial.ac.uk">a.mcgregor@imperial.ac.uk</a>
Mecklenburg Susanne	NERC	<a href="mailto:smme@nerc.ac.uk">smme@nerc.ac.uk</a>
Nangalia Vishal	Queen Elizabeth Hospital, London	<a href="mailto:vishal@spacesurgeons.com">vishal@spacesurgeons.com</a>
Narici Marco	Manchester Metropolitan University	<a href="mailto:m.narici@mmu.ac.uk">m.narici@mmu.ac.uk</a>
Nowicky Alex	Brunel University	<a href="mailto:Alixander.nowicky@brunel.ac.uk">Alixander.nowicky@brunel.ac.uk</a>
Pitman Mark	MRC	

Rawlinson Steve	Imperial College	<a href="mailto:s.rawlinson@imperial.ac.uk">s.rawlinson@imperial.ac.uk</a>
Rennie Michael	University of Nottingham	<a href="mailto:Michael.Rennie@nottingham.ac.uk">Michael.Rennie@nottingham.ac.uk</a>
Rittweger Joern	Manchester Met University	<a href="mailto:j.rittweger@mmu.ac.uk">j.rittweger@mmu.ac.uk</a>
Rouse Paul	ESRC	<a href="mailto:Paul.Rouse@esrc.ac.uk">Paul.Rouse@esrc.ac.uk</a>
Strutton Paul	Imperial College	<a href="mailto:p.strutton@imperial.ac.uk">p.strutton@imperial.ac.uk</a>
Sykes Ben	BBSRC	<a href="mailto:ben.sykes@bbsrc.ac.uk">ben.sykes@bbsrc.ac.uk</a>
Turner Ray	Ex RAL	<a href="mailto:Ray@rtturner84.fsnet.co.uk">Ray@rtturner84.fsnet.co.uk</a>
Wright Ian	Open University	<a href="mailto:i.p.wright@open.ac.uk">i.p.wright@open.ac.uk</a>
Wykes Victoria	UCL	<a href="mailto:V.Wykes@ucl.ac.uk">V.Wykes@ucl.ac.uk</a>
Zarnecki John	The Open University	<a href="mailto:J.C.Zarnecki@open.ac.uk">J.C.Zarnecki@open.ac.uk</a>