

# 7th UK - China Workshop

on

Space Science and Technology, Milton Keynes, UK  
31st August to 1st September 2011

## Report



## **Background**

The framework for UK-China agreement of cooperation in Space Science and Technology was first signed in Beijing in January, 2005. Since then, we have organised seven workshops; in Beijing, Harwell, Shanghai, Changsha, Oxford, Wuhan and Milton Keynes. Our aim has been to strengthen bilateral collaboration in the area of space science and technology, and to seek opportunities to work closely together on new projects. We have held extensive discussions in many areas and signed a number of MOU's and individual agreements.

In 2007, China and the UK agreed the establishment of the Sino-UK Joint Space Science and Technology Laboratory at the Beijing University of Aeronautics and Astronautics and Rutherford Appleton Laboratory. The laboratory serves as a platform for collaboration between scientists and engineers of the two countries; in undertaking research, the organization of conferences, the exchange of visiting scientists, and in working together on new and exciting projects.

## **The 7<sup>th</sup> Workshop**

The 7<sup>th</sup> Workshop facilitated both countries in the exchange of science research and engineering technology. 57 scientists, engineers and industrialists from 31 organisations (12 from China and 19 from the UK) met at the Kents Hill Park Conference Centre from 28<sup>th</sup> August – 2<sup>nd</sup> September. The workshop included visits (for the Chinese delegation) to the Open University and to Leicester University, as well as two days of meetings, presentations and discussions with the UK attendees.

A list of UK delegates in attendance is shown in Annex 1

A list of Chinese delegates is shown in Annex 2

A list of Organisations participating is shown in Annex 3

The Workshop concentrated on four themes, viz:

1. Planetary and Lunar Exploration
2. Earth Observation and Climate Change
3. Space Science Mission opportunities
4. Space Technology opportunities

After initial welcoming speeches, a number of invited talks were given by both sides in plenary sessions (the full programme is shown in Annex 4). A copy of the presentation material is being provided to all participants.

## **Workshop Conclusions**

Five areas were identified for further discussion off-line (ie following the Workshop). These will be led by the co-chairs and/or others identified below, and will bring in other attendees and even non-attendees where appropriate:

1. Earth observation data processing, curation and analysis techniques (including the concept of digital Earth): Prof Alan O'Neill (NCEO) and Prof XU Lijun (BUAA) to lead.
2. Lunar and Planetary Exploration: Prof John Zarnecki (OU) and Prof WANG Shuzhi (CSSAR) to lead
3. Atom magnetometers & spectrometers: Dr Martin Caldwell (RAL Space) and Jie Qin (BUAA)
4. Cube Sats: Chris Lee (SciSys) and Prof Xiao Wen (BUAA) to lead
5. Other technologies: By individual contacts

As an example of technologies discussed under section 5 above, UK company SciSys presented its modelling and simulation tool (EAGLE) targeted at space exploration missions requiring entry, descent and landing. This would include Mars, Lunar and Asteroid missions and so of potential interest to system designers in China. The tool has been developed for the European Space Agency (ESA) who would be very interested to cooperate with China in its evaluation and subsequent operation. A point of contact at ESA has been established and UK would be happy to facilitate a discussion about this.

A similarly concrete example of possible collaboration in Earth Observation was presented under section 1 above by UK company Logica. Data from Chinese oceanographic satellites such as the recently launched HY-2A and data from China's network of sea surface buoys was sought to complement data from other countries in Europe, America, Asia and Oceania as part of the ESA-sponsored GlobWave programme – GlobWave is an information and processing resource to facilitate research in global sea wave phenomena.

## Annex 1: List of UK Attendees

Jon Blower	Reading
Janette Boram	RAL Space
Martin Caldwell	RAL Space
Chris Castelli	UKSA
Ralph Cordey	Astrium
Dave Cullen	Cranfield University
Aifric Delahunty	Imperial College
James Endicott	e2v technologies
George Fraser	Leicester University
Alan Fromberg	SEA
Yang Gao	Surrey University
Simon Green	Open University
Bruce Guoxia Yu	STAR-Dundee
Peter Hargrave	Cardiff University
Richard Holdaway	RAL Space
Sue Horne	UKSA
David Iron	Logica
Peter Jan van Leeuwen	Reading University
Chris Lee	SciSys
Roland Leigh	Leicester University
Chris Mutlow	RAL Space
Pat Norris	Logica
Alan O'Neill	NCEO
Phil Owen	Orbital Power
Peter Pool	e2v technologies
Simon Rea	RAL Space
John Remedios	Leicester University
Andy Shaw	NCEO
Alan Smith	MSSL
Martin Sweeting	SSTL
Nick Waltham	RAL Space
Ian Wright	Open University
John Zarnecki	Open University



## Annex 2: List of Chinese attendees

CHU Zhongyi	Beihang University
Dong Haifeng	Beihang University
FU Liping	Center for Space Science and Applied Research, Chinese Academy of Science
GAO Tianrong	China Great Wall Industry Corporation
GUO Ziqi	Institute of Remote Sensing Applications, CAS
HE Wei	Embassy of the People's Republic of China
HU Zhaohui	Beihang University
HUANG Danian	Jilin University
LUO Jun	Huazhong University of Science & Technology
QIN Jie	Beihang University
QUAN Wei	Beihang University
WAN Shuangai	Beihang University
Wang Xingxing	Earth Observation Centre of CNSA
WANG Jindong	Center for Space Science and Applied Research, Chinese Academy of Science
WANG Shuzhi	Center for Space Science and Applied Research, Chinese Academy of Science
WANG Xiaoming	Twenty First Century Aerospace Technology Co. Ltd
WANG Xiaoyong	China Academy of Space Technology
WANG Yan	China Aerospace Science and Technology Corporation
XIAO Wen	Beihang University
XU Li jun	Beihang University
ZHANG Shijie	Harbin Institute of Technology
ZHANG Yuchi	Beihang University
ZHENG Dan	Beihang University
ZHOU Binqun	Beihang University
ZHOU Zebing	Huazhong University of Science & Technology

## Annex 3: List of Participating Organisations

### China:

Embassy of the People's Republic of China  
Chinese National Space Administration (EOC)  
Chinese Academy of Science (CSSAR)  
Chinese Academy of Science (IRSA)

China Academy of Space Technology  
China Aerospace Science and Technology Corporation  
China Great Wall Industry Corporation  
Twenty First Century Aerospace Technology Co. Ltd

Beihang University  
Harbin Institute of Technology  
Huazhong University of Science & Technology  
Jilin University

### UK:

National Centre for Earth Observation  
RAL Space  
UK Space Agency

Astrium  
E2v technologies  
Logica  
Orbital Power  
SciSys  
SEA  
Star-Dundee  
SSTL

Cardiff University  
Cranfield University  
Imperial College London  
Leicester University  
Mullard Space Science Lab  
Open University  
Reading University  
Surrey University

## Annex 4 – Workshop Programme

### Wednesday 31st August

**08:30 Coffee/Tea and Registration**

**09:00 Welcome and Opening Speeches**

**09:00** Welcoming speeches from the UK side

**09:15** Welcoming speeches from the Chinese side

#### **Earth Observation Session**

- |              |   |   |               |                  |
|--------------|---|---|---------------|------------------|
| <b>09:30</b> | 1 | Overview of Earth Observation from Space in the UK  | Alan O'Neill  | NCEO             |
| <b>09:50</b> | 2 | China Earth Observation System                      | WANG Xingxing | CNSA - EO Centre |
| <b>10:10</b> | 3 | Turning Earth Observation Science into Applications | Andy Shaw     | NCEO             |
| <b>10:30</b> | 4 | China Surveying and Mapping Camera Technology       | WANG Xiaoyong | CAST             |

**10:50 Coffee/Tea break**

- |              |    |  |                              |                      |
|--------------|----|--|------------------------------|----------------------|
| <b>11:10</b> | 5  | Data Assimilation for Earth Observation  | Peter Jan van Leeuwen        | Reading University   |
| <b>11:30</b> | 6  | Small Satellite Formation Flying System Based on Space Exploration & New Technology  | CHU Zhongyi                  | BUAA                 |
| <b>11:50</b> | 7  | Dynamic Data Visualisation   | Jon Blower                   | Reading University   |
| <b>12:10</b> | 8  | Miniaturized Vacuum Ultraviolet airglow/auroral Imager   | FU Liping                    | CSSAR, CAS           |
| <b>12:30</b> | 9  | New Mission Ideas for Air Quality and Greenhouse Gas Measurements from Space   | John Remedios / Roland Leigh | Leicester University |
| <b>12:50</b> | 10 | Research on the Application of System Simulation in Satellite Test and Flight Control Based on Satellite XX-1Flight Control Simulation and Support | WANG Xiaoyong                | CAST                 |

**13:10 Lunch**

#### **Deep Space and Planetary Exploration Session**

- |              |   |   |            |  |
|--------------|---|---|------------|--|
| <b>14:00</b> | 1 | A Survey of China Lunar Exploration Project | Xu Lijun   | CNSA - Lunar Exploration Centre            |
| <b>14:40</b> | 2 | Multi-site study of Mars using Penetrators  | Alan Smith | MSSL                                       |
| <b>15:00</b> | 3 | Concept Research of Mars Penetrator         | HU Zhaohui | Shanghai Academy of Spaceflight Technology |
- 15:20 Coffee/Tea break**
- |              |   |   |               |                 |
|--------------|---|---|---------------|-----------------|
| <b>15:40</b> | 4 | Detecting volatiles on comets             | Ian Wright    | Open University |
| <b>16:00</b> | 5 | Chinese Mars Exploration Mission Analysis | WANG Xiaoyong | CAST            |

<b>16:20</b>	6	The Life Marker Chip (LMC) experiment on ExoMars	Dave Cullen	Cranfield University
<b>16:40</b>	7	Asteroid sample return missions	Simon Green	Open University
<b>17:00</b>	<b>End of Session</b>			
<b>19:00</b>	<b>Reception</b>			
<b>19:30</b>	<b>Workshop Banquet</b>			

## Thursday 1st September

### 08:30 Coffee/Tea and Registration

#### Generic Technologies Session

<b>09:00</b>	1	Progress on Atomic Magnetometer in BUAA	DONG Haifeng	BUAA
<b>09:20</b>	2	Laser-pumped magnetometer technology for space	Martin Caldwell	RAL
<b>09:40</b>	3	Progress on Atomic Interferometer in BUAA	ZHANG Yuchi	BUAA
<b>10:00</b>	4	Far-IR/sub-mm/mm-wave satellite technology for Earth observation and astronomy applications	Peter Hargrave	Cardiff University
<b>10:20</b>	5	The Development of Small Satellite in HIT	ZHANG Shijie	HIT
<b>10:40</b>	6	Software technology for planetary exploration	Chris Lee	SciSys
<b>11:00</b>	<b>Coffee/Tea break</b>			
<b>11:20</b>	7	The application of a fluxgate magnetometer for space environment exploration in CHINA	WANG Jindong	CSSAR,CAS
<b>11:40</b>	8	Planetary robotics and autonomy	Yang Gao	Surrey
<b>12:00</b>	9	Long Working Distance DHM for space application	XIAO Wen	BUAA
<b>12:20</b>	10	Millimetre Wave Technology for EO and Interplanetary Missions	Simon Rea	RAL
<b>12:40</b>	11	CSSAR Space Science Cooperation with Europe	WANG Shuzhi	CSSAR,CAS
<b>13:00</b>	12	Miniaturised Seismometers	Aifric Delahunty	Imperial College
<b>13:20</b>	<b>Lunch</b>			
<b>UK Space Agency and Industry Presentations</b>				
<b>14:20</b>	1	Introduction to the UK Space Agency	Chris Castelli	UKSA
<b>14:40</b>	2	Space based solar power	Philip Owen	Orbital Power
<b>15:00</b>	3	CCDs for Earth Observation	James Endicott	e2v technologies Ltd



<b>15:20</b>	4	STAR-Dundee: whom you can rely on to develop SpaceWire Systems	Bruce Guoxia	STAR-Dundee
<b>15:40</b>	5	Two Earth Observation topics: Marine Applications and Precise Calibration	Pat Norris	Logica
<b>16:00</b>	<b>Coffee/Tea break</b>			
<b>16:20</b>	6	SEA and Precision Radar Transponders for Improving and Extending Space Instrument Performance	Alan Fromberg	SEA
<b>16:40</b>	7	UK view of space Public Private Partnerships	David Iron	Logica
<b>17:00</b>	8	Closing discussion and actions	All	
<b>17:30</b>	<b>End of Workshop</b>			