

10:30-12:30	<p><b>Welcome:</b> Victoria Wright, PPARC</p> <p><b>The ESA Challenge:</b> Sergio Volonté, ESA</p> <p><b>Challenges in Earth Observation for Climate Monitoring, Diagnosis and Prediction:</b> Alan O'Neill, Reading</p> <p><b>Instrumentation for Small Satellites, the RAL Experience:</b>                  Richard Holdaway, CCLRC/RAL</p> <p><b>The New ESA Knowledge Transfer Programme:</b> Nathan Hill, PPARC</p>
12:30-13:30	Lunch
13:30-15:55	<p><b>Leveraging the UK Lead in Low Cost Missions for UK Science:</b>                  Alex da Silva Curiel, SSTL</p> <p><b>EADS Astrium Competences:</b> Ralph Cordey, EADS Astrium</p> <p><b>QinetiQ Space Competences:</b> Chris Dorn, QinetiQ Space</p> <p><b>5-minute pitches:</b> (Leicester, Clyde Space, Imperial, Strathclyde, SEA, Orbital Optics, Southampton, Logica, MSSL, Open University)</p>
15:55-16:45	Tea

## “The New ESA Knowledge Transfer Programme”

Partner Company benefits, Knowledge Transfer and spinout companies resulting from UK investment in ESA space science, space exploration and earth observation

**Nathan Hill**

**KITE Club Innovation Advisory Service**

**Science on Low Cost Missions – 24<sup>th</sup> January 2007**

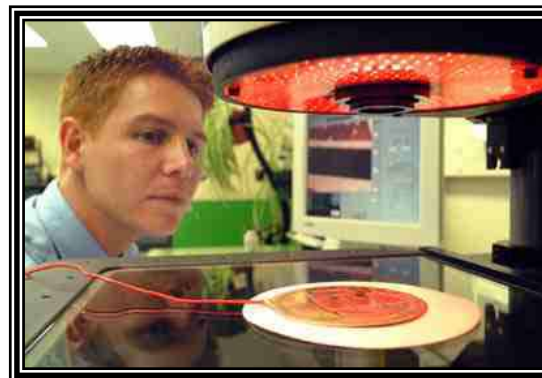
**One Great George Street, Westminster**

## Did you know how UK sponsored ESA research affects you?

Next time you are:

- Making a mobile phone call
- Travelling on a aircraft
- Visiting the doctor, dentist or optician
- Playing a computer game
- Trying to find your way around a city
- Retrieving images from your company database
- Going through a security scanner at an airport
- Taking a picture with a digital camera
- Contacting your bank for information about your account
- Surfing the web

Spare a thought for research in space science, space exploration and earth observation - which has resulted in technological developments in all of these areas, and more - making a huge impact on our day to day lives.

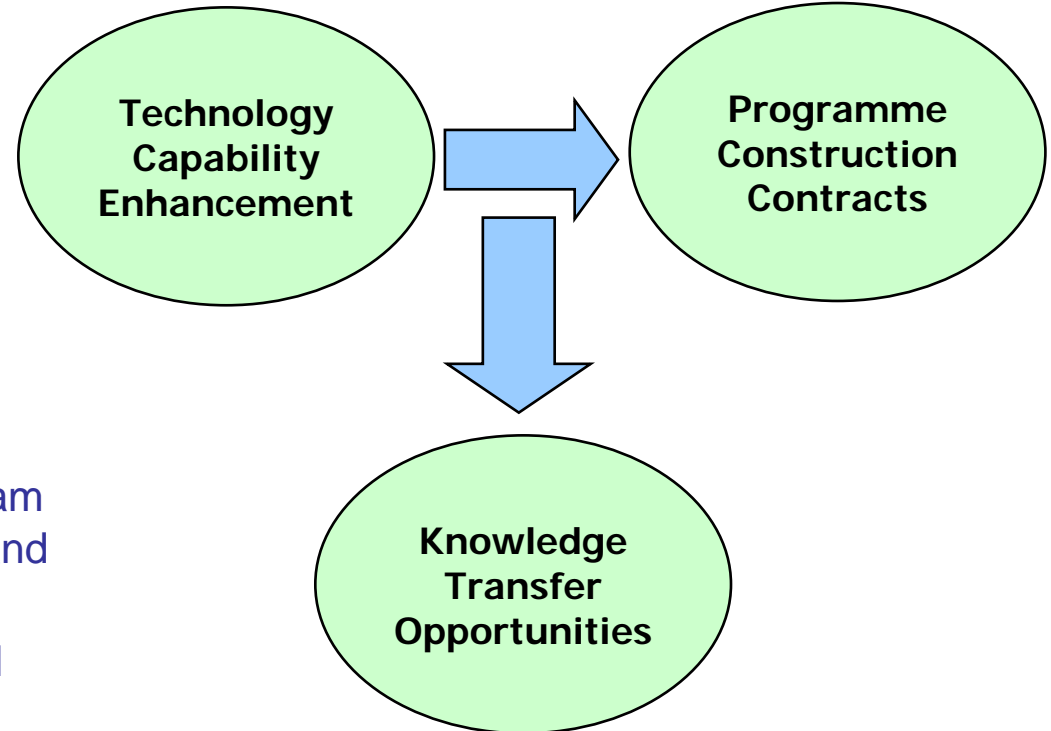


## Industry Engagement Strategy

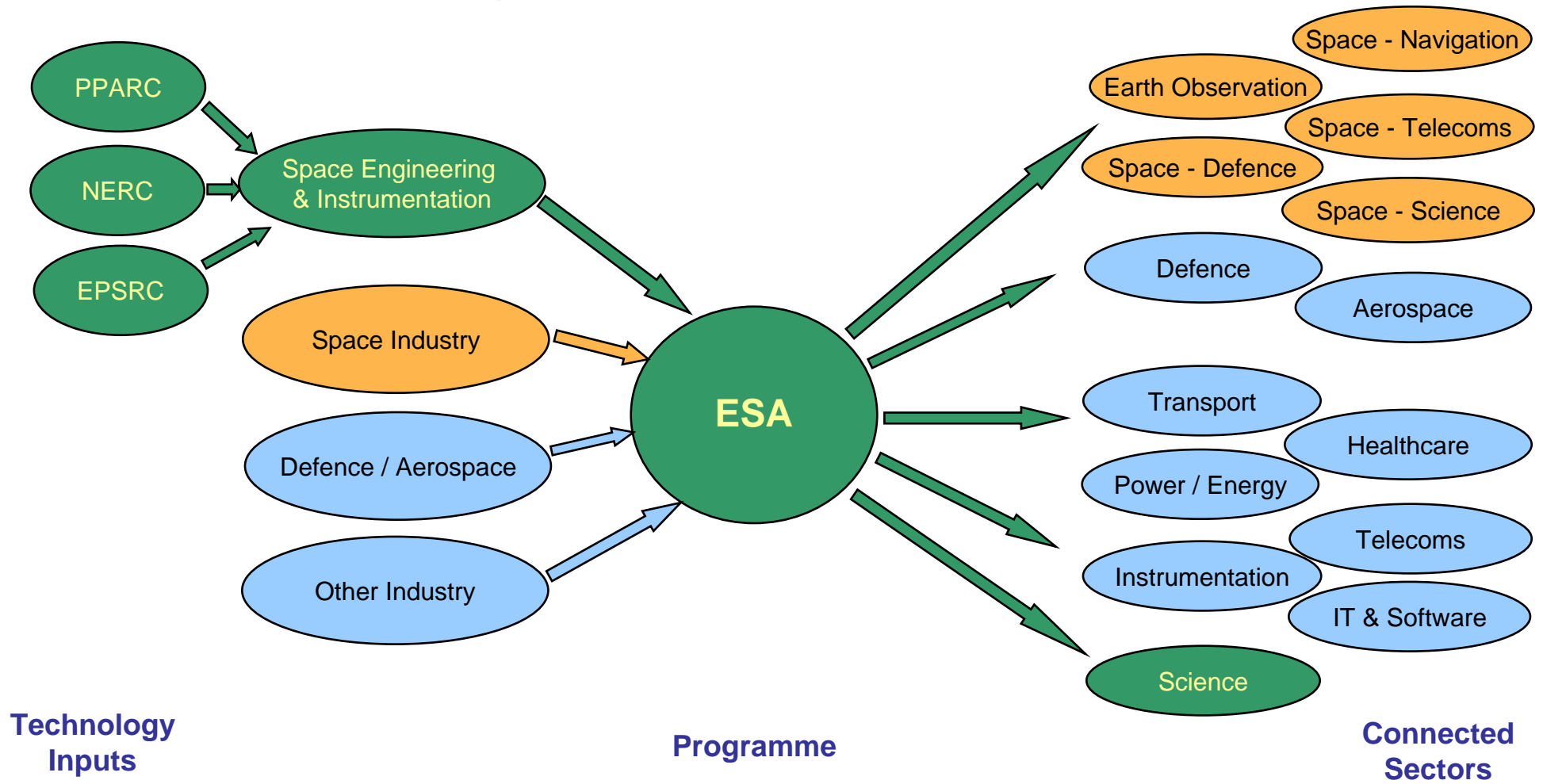
- Spread technologies to broader market areas:
  - Through industry & interdisciplinary collaborative research
  - By supporting entrepreneurial activity in our community
- Support UK academic and industrial leadership in the PPARC programme through Programme Technology Development

## Key Connections with Business

- **Technology Capability**
  - Developing early-stage technology capability for ESA programmes
- **Business Opportunities**
  - At construction stage
- **Knowledge Transfer**
  - Benefits to upstream and downstream space sector, aerospace, defence and other sectors
  - Skills and experience of current and future staff



## Knowledge Transfer in the Space Sector



## Support Programmes

- **ESA Technology Transfer Network**
  - Supporting Technology Transfer from ESA programmes
  - UK representation through JRA Technology
- **European Space Incubator and ESINET**
  - Supporting spinout formation and incubation
  - UK representation through Hertfordshire Business Incubation Centre
- **European International Space Station Business Club**
  - Offering the opportunities that space offers to European industry, from research in weightlessness, to technology demonstration, to sponsorship



**esINET**



**ibc.**  
European ISS Business Club

## Support Programmes (cont.)

- PPARC KITE Club
  - Established business network includes defence, security, aerospace, space sector activities
  - Recent additional funding for ESA activities by the UK Office of Science and Innovation and delivered on behalf of BNSC partners
- Research Facilities group of the Sensors Knowledge Transfer Network
  - Aims to provide industry with a joined-up approach to the market for Research Facilities
  - Space is included as a 'Research Facility'

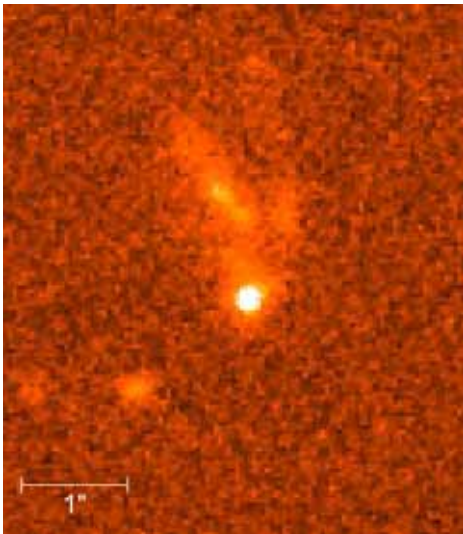


## Technology Examples

- Solar Arrays
- Electric Propulsion
- Synthetic-Aperture Radar
- Cryogenics
- AOCS Sensors
- Robotics
- Aerothermodynamics
- On-board Radio Navigation Receivers
- Thermal and Space Environment Software Tools and Interfaces
- Energy Storage (Batteries)
- Microprocessors and Microelectronics
- Mechanisms and Motors
- Chemical Propulsion
- Ground-System Software
- On-board Computers and Data Systems
- On-board Payload Data Processing Systems
- On-board Software
- TTC Transponders
- Pyrotechnic Devices
- Thermal Heat Pipes and Fluid Loops
- Power Management and Distribution
- Inflatable and Deployable Structures
- Solar Array Drive Mechanisms and Deployable Booms
- Upper Stage Propulsion

## From the violent universe to homeland security

- PPARC has supported technology for gamma astronomy for over 40 years
- This and further support for two PPARC/RSE Enterprise Fellowships led to the formation of Symetrica in 2002
- In November 2006, Smiths Detection announced a \$222m contract for handheld radiation instrumentation for the US Department of Homeland Security for dirty bomb detection
- Each instrument incorporates Symetrica detectors and electronics



A gamma-ray burst

Credit: PRC99-09, STScI OPO, A. Fruchter (STScI) and NASA



Gamma-ray Detector: credit Smiths Detection

## The New ESA Knowledge Transfer Programme

- Secure substantial new Knowledge Transfer outcomes (collaborative R&D, licences, spinout formation etc.) that demonstrate increased Economic Impact of UK investment in ESA (and space more generally)
- Deliver this as a PPARC KITE Club activity on behalf of BNSC Partners
- Integrate with the range of industry engagement initiatives supported by stakeholders

## What are we doing?

- Technology Market Evaluations
  - Mapping of UK space technology research groups to missions & harmonisation themes
  - Autonomous Systems
  - Downstream space technologies
- KITE Club Workshops and Business Briefings
- Promoting Funding Opportunities
  - Programme Technology Development, Collaborative Development and FP7 opportunities
- Research Facilities theme of the Sensors KTN
- Outcomes
  - Collaborative Development Projects
  - Spinouts & Licences

## Support from the Innovation Advisory Service

- Active support from specialist Innovation Advisors for partnerships, projects and funding
- Sector support:
  - Healthcare & Life Science Technology
  - Security, Defence, Aerospace & Space
  - Instrumentation & Research Facilities
  - Plus others – e.g. computer games, financial services
- Workshops and business briefings programme
- Publicity and technical publications
  - KITE Club web site
  - *Frontiers* magazine
  - KITE Club newsletter / Technology & Industry News
- Support for entrepreneurship
  - Individual support
  - Funding and skills

## Collaborative Research & Development

- Industry-supported research
- PIPSS (PPARC)
  - £375k (FEC) for up to 3 year partnerships
  - £80k (FEC) for mini-PIPSS pilot projects (<1yr)
  - Discipline Hoppers (with MRC)
  - NB PPARC/MOD £2.75m defence & security call now open – 1<sup>st</sup> bids 3.4.07
  - Partnership Research Grants (NERC)
  - >£25k (FEC) typically £100-250k <3year projects (50% funded)
- Knowledge Transfer Partnerships (DTI, Research Councils)
- Technology Programme Collaborative R&D (DTI, Research Councils)
- EU Framework 7: Note UK FP7 Space Information Day 28.2.07 in London

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## Skills Transfer and Capacity-Building

- PIPSS Fellowships (PPARC)
- CASE and CASE-Plus Studentships (PPARC, NERC, EPSRC)
- Royal Society Industrial Fellowships (NERC, EPSRC)

## Spinouts and Entrepreneurship

- Support from Innovation Advisory Service
- PPARC/RSE Enterprise Fellowships
- Environmental Young Entrepreneurs Scheme (YES)
- Follow-on Fund (NERC, PPARC)
- Innovation Fund (NERC)
- UK Research Councils' Business Plan Competition
- ESINET fund being raised
- Rainbow Seed Fund for PPARC, CCLRC and NERC

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## Programme Technology Development

### Consultation

- Space Exploration Strategy

### Current Themes

- Aurora / Exomars
- Solar Orbiter
- LISA
- XEUS

### Funding

- ESA Programmes
- BNSC Support (GSTP)
- PPARC Project Research and Development
- PPARC Calls (so far CREST for ExoMars, ELT and SKA)

## Forthcoming Events

- Scottish Industry Workshop – 21.2.07 (KITE Club / SUPA / Photonics KTN)
- **Advanced Instrumentation Industry – 22.2.07 (Sensors KTN)**
- Midlands Industry Workshop – 6.3.07 (KITE Club)
- Spintronics – 8.3.07 (GlobalWatch and Sensors KTN)
- Vacuum Technologies – 14.3.07 (KITE Club)
- **Autonomous Systems – 21.3.07 (KITE Club & Sensors KTN)**
- **UK Framework 7 Space Information Day – 28.2.07 (BNSC)**
- **FAC/ASTOS event – 28.3.07**
- **Defence, Security & Aerospace SIG – 18.4.07 (KITE Club)**
- **Meet the Buyer – 26.6.07 (UKTI / Sensors KTN)**
- Healthcare SIG (KITE Club)
- **Technologies for LISA (KITE Club)**

## What next?

- Investigate technology opportunities
- Join networks and talk to the people
- Register for KITE club
- Register on KTN databases
- Participate in workshops
- Make business out of space

**Thank you for listening**

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