



BNSC report to IPDA July 2009

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STFC / Rutherford Appleton Laboratory

2009/7/10



Organisation

- BNSC is a partnership of organisations

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BNSC Partnership

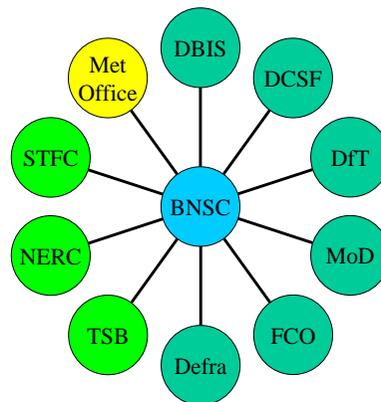
The Met Office

Science and
Technology
Facilities Council

Natural Environment
Research Council

Technology Strategy
Board

Department for
Environment,
Food and Rural
Affairs



Department for
Business,
Innovation and
Skills

Department for
Children, Schools
and Families

Department for
Transport

Ministry of Defence

Foreign and
Commonwealth
Office



Organisation

- BNSC is a partnership of organisations
 - BNSC office located with research councils
- STFC
 - Pays international subscriptions
 - ESA, ESO, CERN, etc.
 - Funds science
 - Operates laboratories
 - RAL, Daresbury, ATC, Chilbolton

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Planetary Groups



- Open University
- Imperial College
- Oxford University
- Mullard Space Science Laboratory
- Leicester University
- Aberystwyth (rovers)
- RAL (instrumentation)

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Missions



- Cassini / Huygens
- Rosetta
- Mars Express
- Venus Express
- ExoMars
- BepiColombo

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Possible future missions



- ESA
 - Europa Jupiter System Mission
 - Jupiter Ganymede orbiter
 - NEO sample return
- Other
 - MoonLITE (study)

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Instruments



- Ptolemy (Rosetta)
- Aspera-3 (Mars Express)
- Aspera-4 (Venus Express)
- D-CIXS (SMART-1)
- **C1XS** (Chandrayaan)
- MIXS (BepiColombo)
- Raman-LIBS (ExoMars)

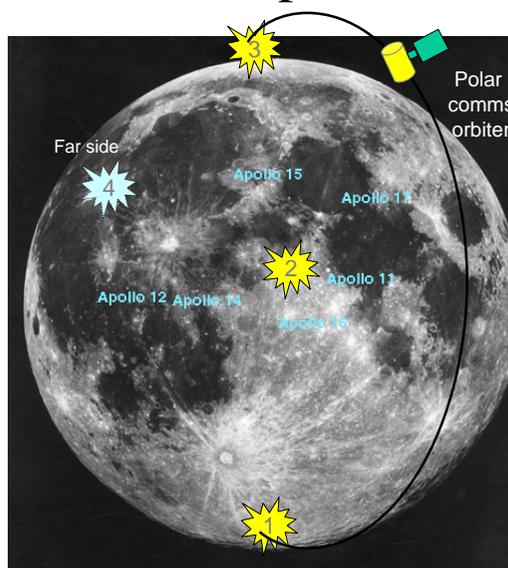
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- Remotely sensed
 - Imagery
 - Spectroscopy
- In-situ
 - Particles
 - Magnetic fields
- Surface
 - All the above
 - Rock and atmospheric samples

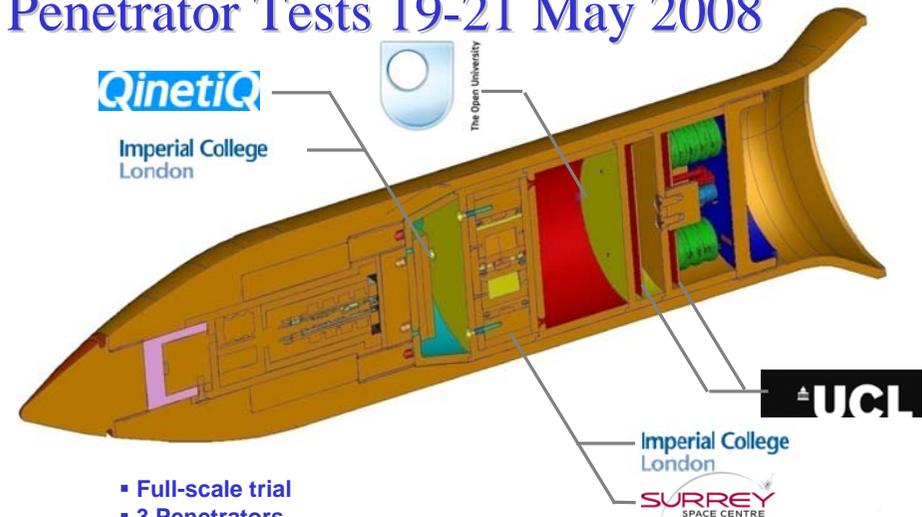
- Have extensive archives of astronomical, atmospheric and Earth Observation data
- Use ESA or NASA for planetary archives
- Access to data
 - Grid access used to for astronomical data (Virtual Observatory) and atmospheric / EO
 - AstroGrid project software is complete

MoonLITE Mission Description



- **Delivery and Communications Spacecraft (Orbiter).** Deliver penetrators to ejection orbit. Provide pre-ejection health status, Provide relay communications.
- **Orbiter Payload:** 4 Descent Probes Each containing 10-15 kg penetrator + 20-25 kg de-orbit and attitude control system. Communications payload.
- **Landing sites:** Globally spaced Far side, Polar region(s), One near an Apollo landing site for calibration.
- **Duration:** >1 year for seismic network. Other science does not require so long (perhaps a few Lunar cycles for heat flow and volatiles much less).
- **Penetrator Design:** Single Body for simplicity and risk avoidance. Battery powered with comprehensive power saving techniques.

Penetrator Tests 19-21 May 2008

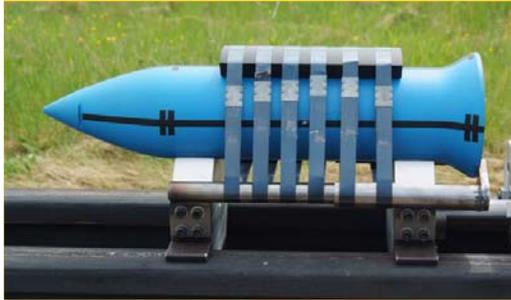


- Full-scale trial
- 3 Penetrators,
- 0.56m long, ~13kg, Aluminium
- 300m/s impact velocity
- Normal Incidence
- Dry sand target



Impact Trial - Configuration

- Rocket sled
- Penetrator



Penetrator in flight towards target



Penetrator reaches target at 700
mph/300m/s



Penetrator entering target