

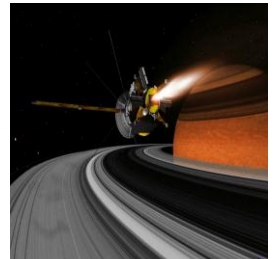
# ***Working in Partnership with Industry & Academia***

***Prof Richard Holdaway***

***Director, RAL Space***

***STFC Rutherford Appleton Laboratory***

***Oxford, UK***

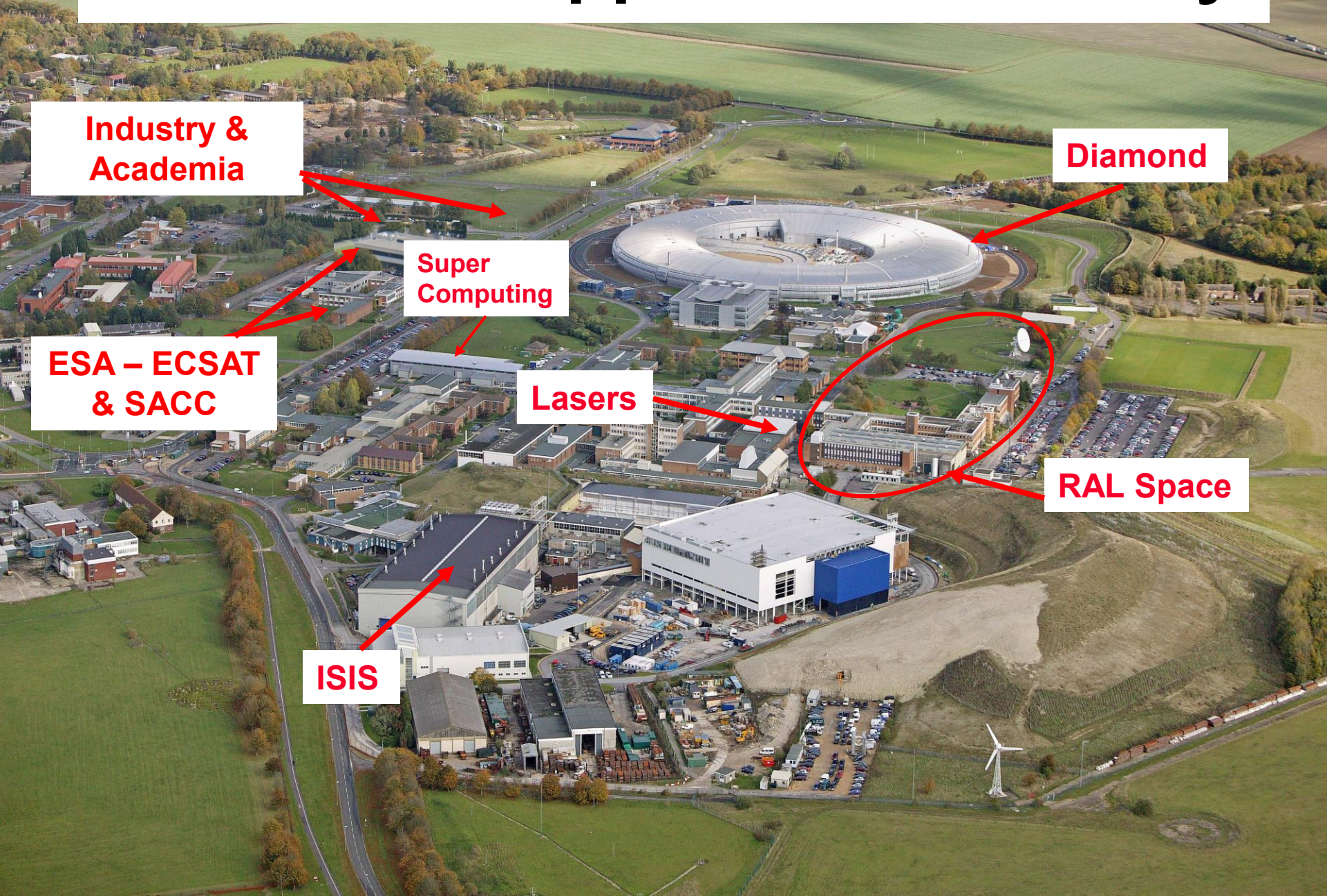


# What does Space do for us?

- Live TV News
- Live Football & other Sport
- Weather forecasts
- Overseas Telephone calls
- Sat Nav (eg cars, lorries, aircraft, military)
- Disaster monitoring (eg floods, hurricanes, earthquakes)
- Environmental monitoring (eg oil spills, fires, farming)
- Security & Border control
- Ship's navigation (GPS)
- Remote telemedicine
- *Protecting Planet Earth*



# Rutherford Appleton Laboratory



**Industry &  
Academia**

**Diamond**

**Super  
Computing**

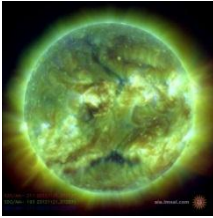
**ESA – ECSAT  
& SACC**

**Lasers**

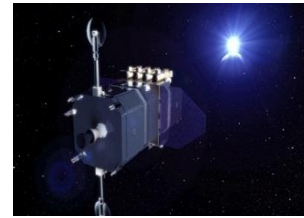
**RAL Space**

**ISIS**

**“Led by Science - Enabled by Technology”**



***Targeting Growth  
and Impact  
with Industry***



**£20M turnover (of which £10M is Overseas)**

**Primary customer: UK Government (BIS, MoD, DECC, RC's ...)**

**+**

**25 Space Agencies (inc NASA, ESA, UKSA, JAXA, ROSCOSMOS, CNSA, ISRO ...)**

**30 Institutes (inc JPL, GSFC, Sandia, NRL, USAFRL, Met Office ...)**

**60 Companies (inc Airbus, Lockheed, Thales, Telespazio, SSTL, Galileo, ...)**

**40 Universities (inc MIT, Cal-Tech, Oxford, Cambridge, IC, UCL, Surrey, Southampton )**

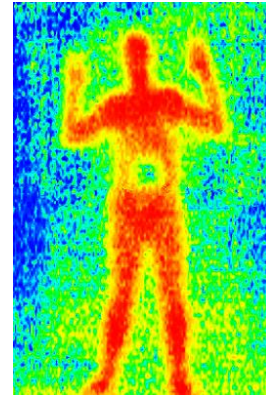
**+ Sat App's Catapult, ESA Harwell (ECSAT), ESA BIC, ...**

**A Gateway to 170 organisations in 34 countries**

# Innovation: Science to Technology to Impact



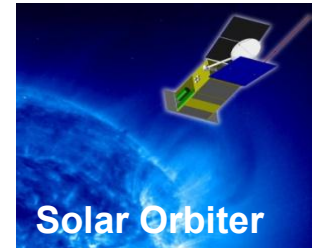
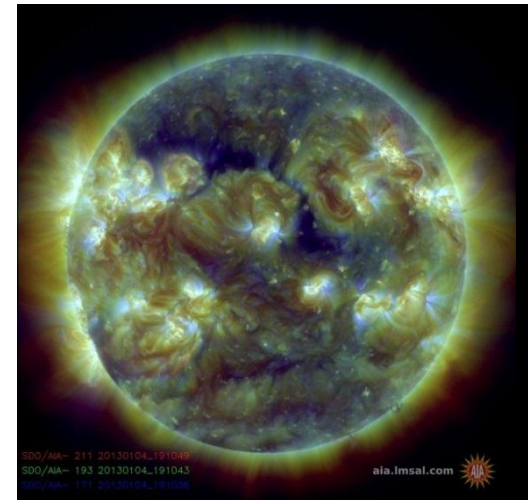
**\$70K**

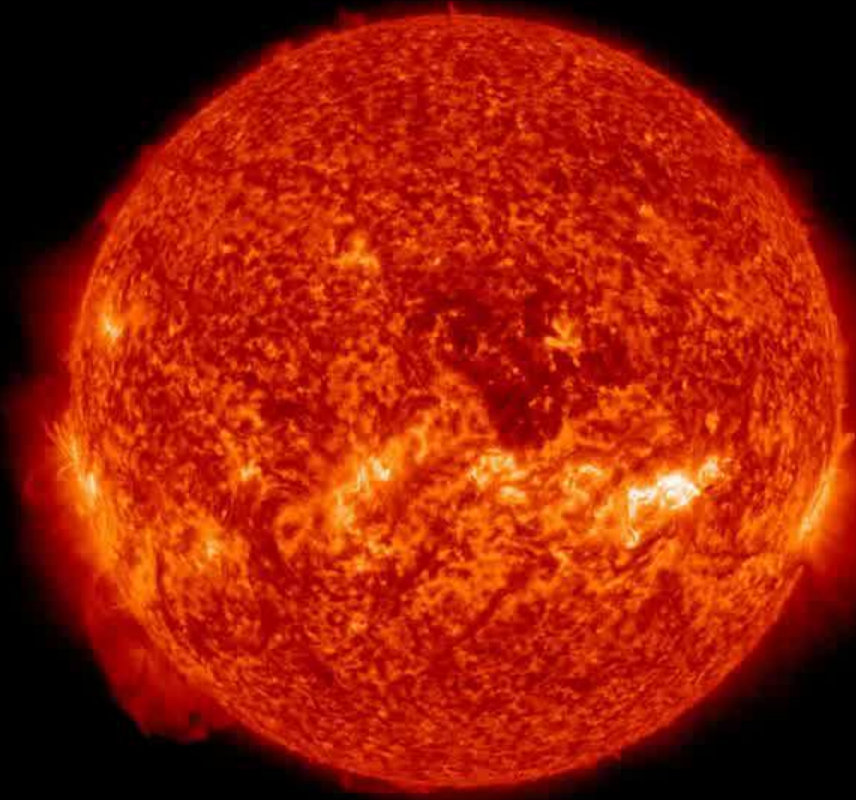


**\$30M**

# Solar Science in partnership

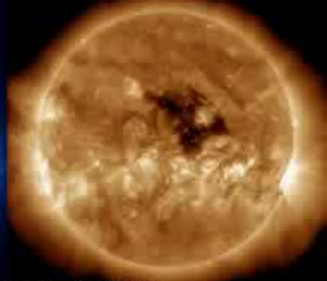
- 10 Solar missions over 30 years
- From Solar Physics & Chemistry to Earth climate, and Space weather





SDO/AIA 131 2014-01-01 00:00:02 UT

SDO/AIA 131 2014-01-01 00:00:25 UT



SDO/AIA 34 2014-01-01 00:14:08 UT

SDO/AIA 308 2014-01-01 00:07:08 UT

SDO/AIA 198 2014-01-01 00:14:12 UT

# Solar Orbiter

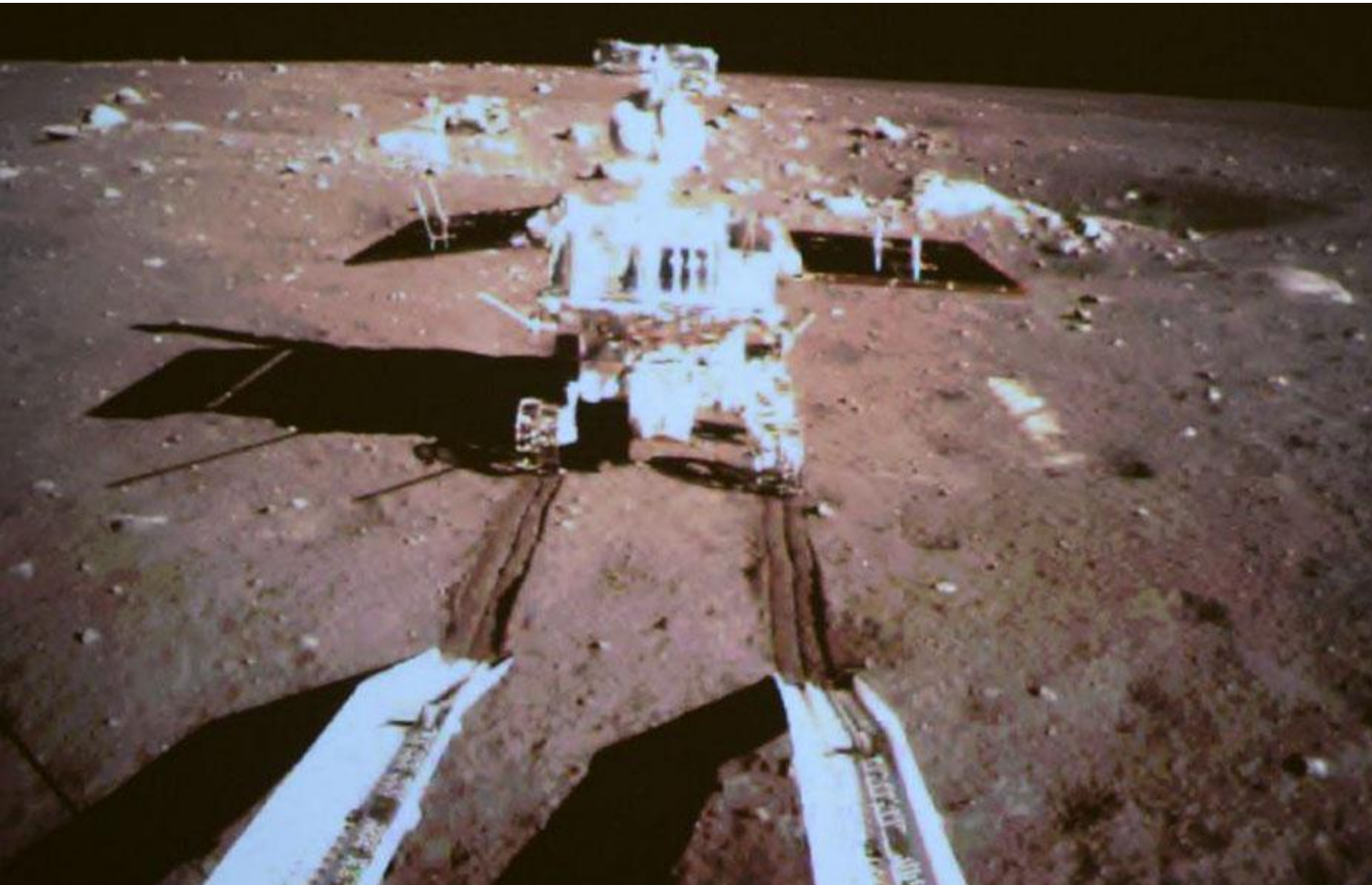




# **RAL Space: A National AIT/TVAC Facility (5/15)**



# China: An opportunity or a threat?



# Newton

- **£12M with China for Agri-Tech**



- **£500K with Chile**



# How did the Moon originate?



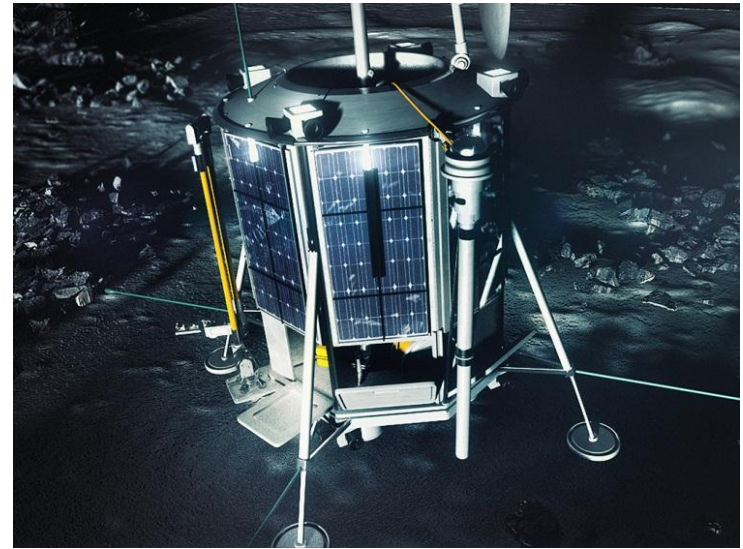
# A New Lunar Mission for Everyone



**The perfect partnership**

# Innovative Science and Technology

- **Where did the Moon come from?**
- **Lunar/Earth 4.5B years ago**
- **Precision landing**
- **Robotic operations**
- **Drilling 20m – 100m below surface**



# A Unique Public and Private Archive

- Record of Earth's human history
- Digital memory and DNA archives
- Archives preserved for a billion years



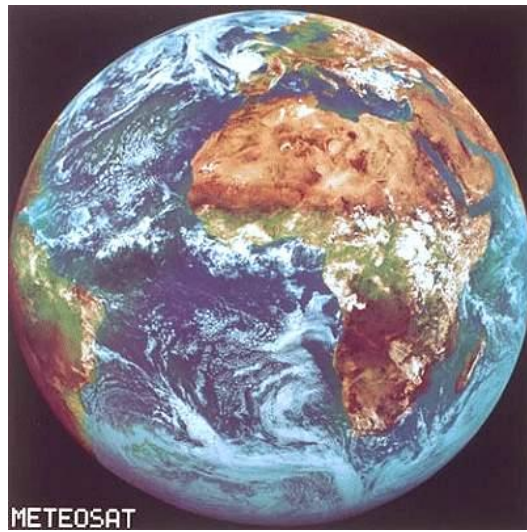
# **An Inspiring Education Programme**

- **Educational engagement & legacy**
- **Inspiring a generation**
- **Online interaction & direct involvement**

**[www.lunarmissionone.com](http://www.lunarmissionone.com)**







## ***In Summary: Partnerships are key to what we do***

- ***The UK strength is Innovation***
- ***Industry + Academia***
- ***Across Europe (within ESA)***
- ***USA, Russia, India, Japan..***
- ***Across political boundaries (China)***