The Ariel programme

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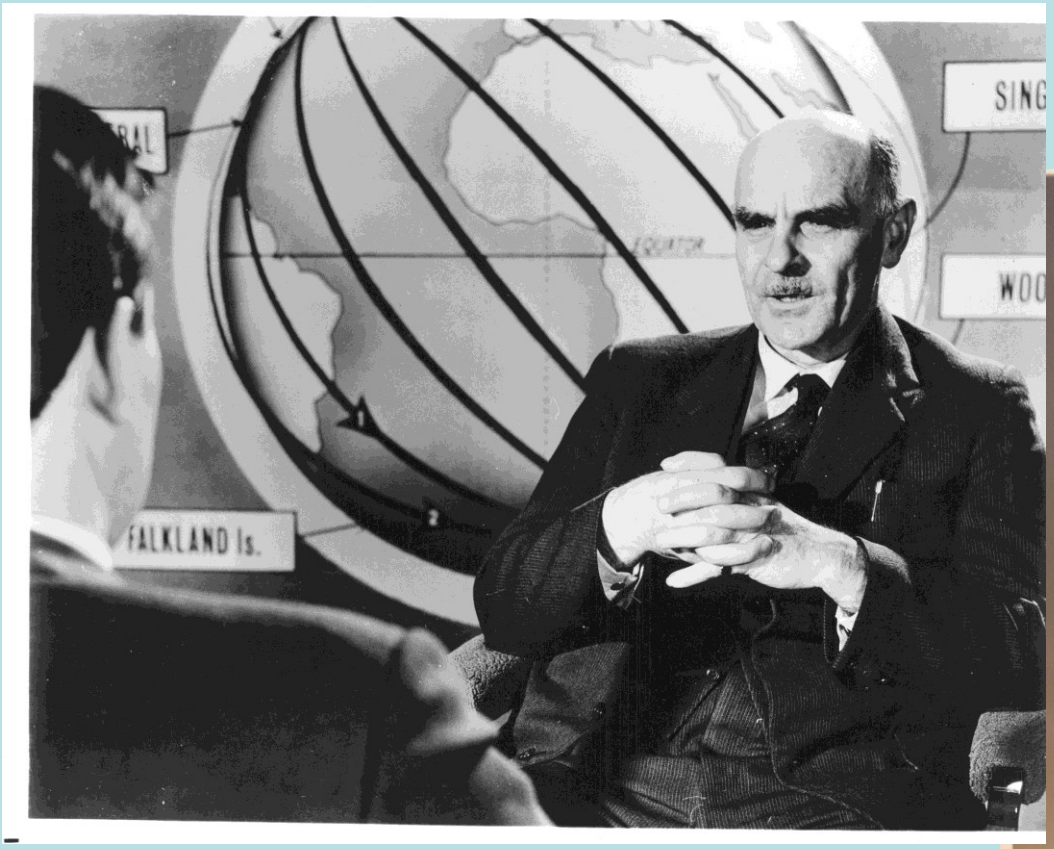
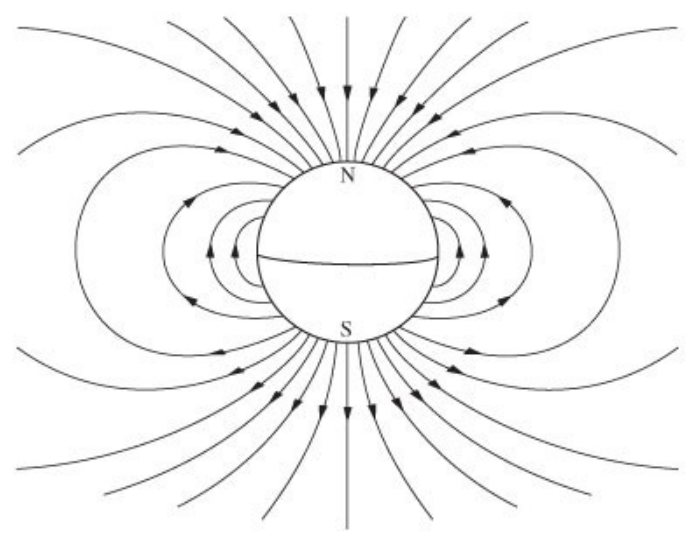
The start of space activities in the UK



Sir Harrie Massey

Skylark launch

The scientific context

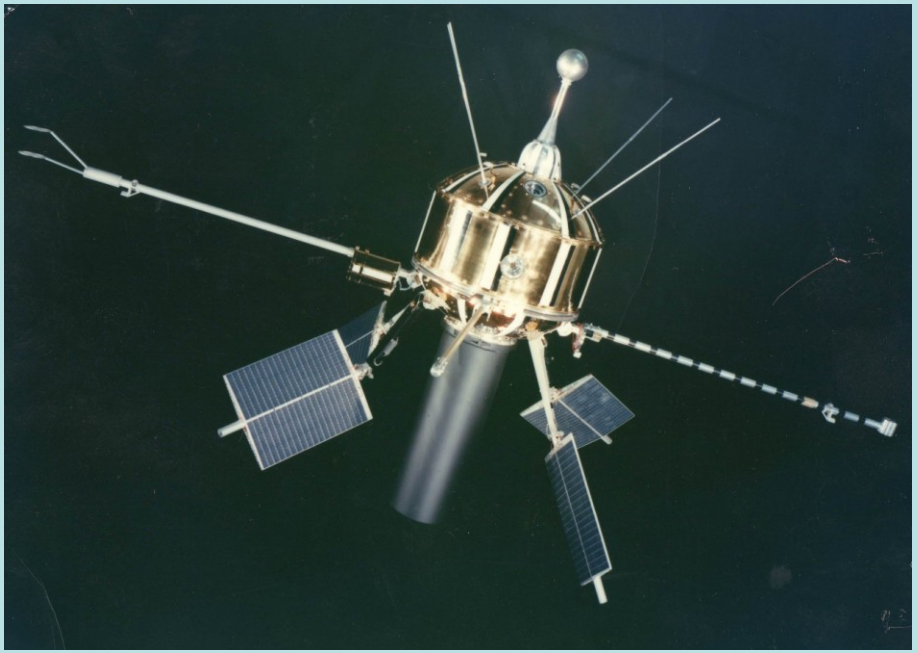


Magnetosphere—1954

1 H atom/cc, 100 K

Heliosphere—1954

Ariel 1—payload and people



Electron density by RF probe—Jim Sayers and John Wager (Birmingham)

Electron density and temperature by Langmuir probe—Robert Boyd and Peter Willmore (UCL)

Ion composition by ion probe—Robert Boyd and Peter Willmore (UCL)

Solar X-ray Spectrum—Robert Boyd and Peter Willmore (UCL) and Ken Pounds (Leicester)

Solar Lyman alpha flux— Jim Bowles and Peter Willmore (UCL)

Cosmic ray flux— Harry Elliot, Bob Hynds, John Quenby and Alastair Durney (ICL)

Measurement of solar aspect angle— John Alexander, Peter Bowen and Peter Willmore (UCL).

NASA project team– Bob Baumann, John Shea and Bob Bourdeau

SRMU—Mac Robins and Eric Dorling

The launch

Ariel 2—Ariel 6

Ariel 2: Launch 27/03/64 Mass 68.0 kg

Galactic Radio Noise —Francis Graham-Smith (Cambridge)

Atmospheric Ozone— Ken Stewart (Met Office)

Micrometeoroid flux— Roger Jennison (Jodrell Bank)

Ariel 3 Launch 05/05/67 Mass 89.8 kg

First UK-built spacecraft in Ariel series

Langmuir Probe—Jim Sayers (Birmingham)

Radio Frequency Capacitance Probe—Jim Sayers (Birmingham)

Galactic Radio Noise Sources—Francis Graham-Smith (Cambridge)

Molecular Oxygen Distribution—Ken Stewart (Met Office)

Terrestrial Radio (Thunderstorm) Noise—John Murphy (RSRS)

VLF Receiver, Fixed-Frequency Signal Strength —Tom Kaiser (Sheffield)

Ariel 4 Launch 11/12/71 Mass 99.5 kg

First Ariel to have controlled pointing

Langmuir Probe—Peter Willmore and Chris Goodall (Birmingham)

MHz Band Noise (E Field)—Francis Graham-Smith (Cambridge)

VLF-ELF Receiver—Tom Kaiser (Sheffield)

Low-Energy Proton and Electron Differential Energy Analyzer—Lou Frank (Iowa)

Langmuir Probe—Bob Dalziel (RSRS)

VLF Impulse Counter—Fred Horner (RSRS)

Ariel 5 Launch 15/10/74 Mass 130.5 kg

Rotation Modulation Collimator—Robert Boyd (MSSL) and Peter Willmore (Birmingham)

2- to 10-KeV Sky Survey—Ken Pounds (Leicester)

High-Resolution Source Spectra—Robert Boyd, Pete Sanford and John Ives (MSSL)

Bragg Crystal Spectrometer (BCS)— Ken Pounds (Leicester)

High-Energy Cosmic X-Ray Spectra —Harry Elliot and John Quenby (ICST)

All-Sky Monitor—Steve Holt (GSFC)

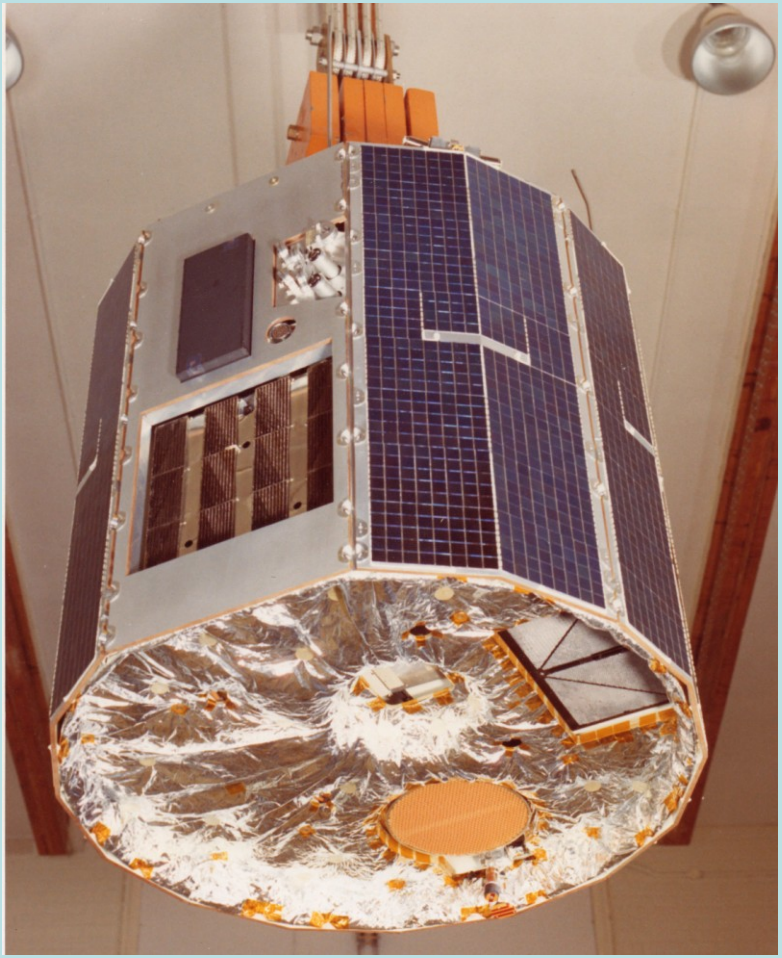
Ariel 6 Launch 02/06/79 Mass 154.5 kg

Cosmic Ray Spectrum— Peter Fowler (Bristol)

X-Ray Proportional Counter Spectrometer—Kenneth Pounds (Leicester)

X-Ray Grazing Incidence Telescope—Robert Boyd and Mike Cruise (MSSL) and Chris Goodall (Birmingham)

Ariel 5



Milestones

1953—Massey organises Oxford conference on potential of space science
1955—Skylark rocket programme approved (Massey says “yes!”)
1957—Sputnik 1 launch (bombshell!)
1958—NASA set up
1959—US offers free satellite launches to all nations
—Ariel programme (6 launches!) agreed
—Ariel 1 payload approved
1961—Prototype instruments taken to GSFC
1962—Ariel 1 launch (second attempt)
—Starfish explosion (July)
1964—Ariel 2 launch
1967—Ariel 3 launch (first Ariel spacecraft built in UK)
1971—Ariel 4 launch (first with attitude control)
1974—Ariel 5 launch
1979—Ariel 6 launch, programme comes to an end
1987—UK instruments launched in bilateral programmes total 55
partners include US, Japan, Germany, France and USSR
—UK instruments launched by ESA total 23

Summary

- After the Sputnik 1 launch, UK space science developed at an extraordinary rate, exceeded only by the US
- Reasons were vision (Massey), excitement, good funding and minimal bureaucracy
- Good investment in instrument development
- From the start, provided focus for industrial development
- University base fostered education and training in space science and technology