

Timeline: Britain's hidden role in the space race

 [bbc.com/timelines/zqjgk7h](https://www.bbc.com/timelines/zqjgk7h)

Presented by Maggie Aderin-Pocock Space engineer



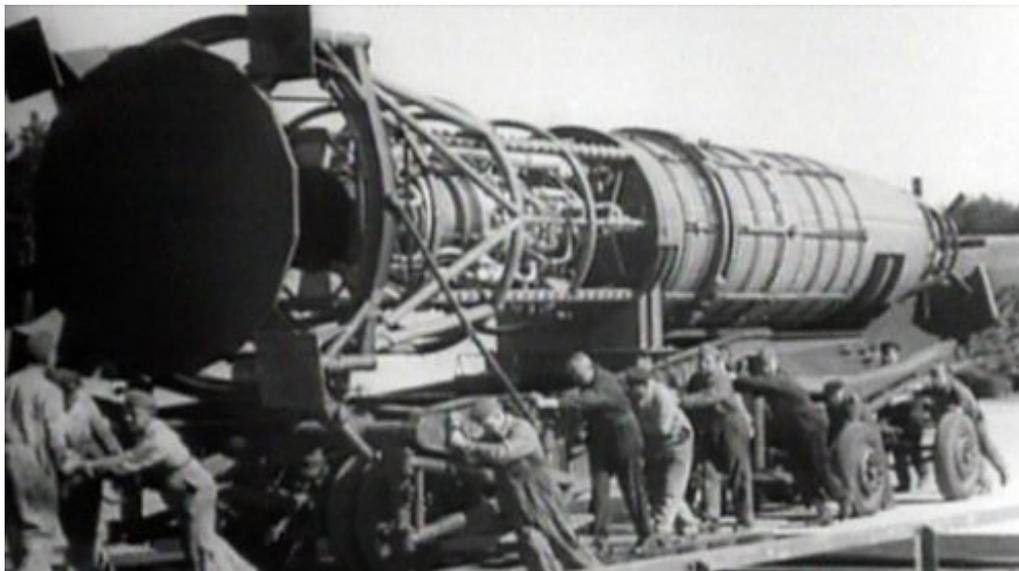
British scientists triumph despite austerity

Britain's space industry is booming. Recently valued at £12bn, its world-leading satellite businesses and contributions to major space projects support more than 115,000 jobs.

Yet to earn a place among the stars, Britain faced political and economic battles. Despite missing out on the glamour of manned-spaceflight, there's more to Britain's space story than you might think – success, missed chances and vital contributions.

December 1946

War-time rockets provide key to the stars



You need to have JavaScript enabled to view this clip.

Royal Navy pilot Capt Eric Brown explains why US scientists still had an advantage over Britain. (Timeshift: British Space Race, BBC Four, 2012)

[Transcript \(PDF 181k\)](#)

The 20th Century explosion of space exploration was not only driven by academic

curiosity but by the rapid development of military technology.

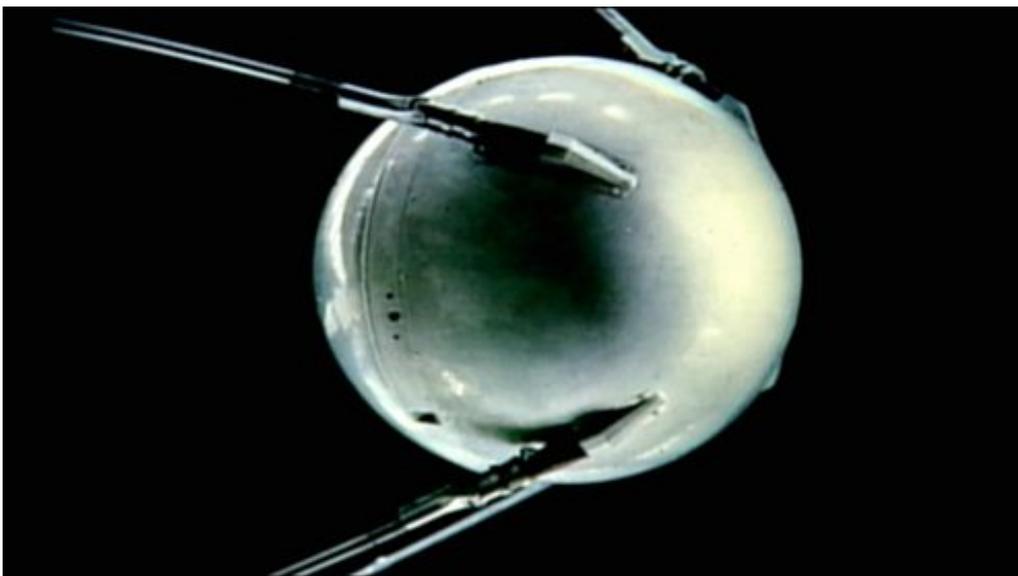
Towards the end of World War Two, Germany had successfully launched the world's first long-range missile – the V-2 rocket. Such was the weapon's potency that 9,000 people were killed in attacks on London, Antwerp and Liege. After Germany conceded defeat its remaining rockets were seized by the US, the USSR and Britain. Ralph Smith from the British Interplanetary Society proposed adapting the V-2 to carry humans into space, but the government rejected his plans due to limited post-war funds.

How a German rocket could have put a Briton in space

The design was totally practical... All the technology existed and it could have been achieved within three to five years.

October 1957

The US seeks help as the Cold War enters space



You need to have JavaScript enabled to view this clip.

A 1957 newscast shows the first pictures of the first satellite to be launched into space. (The Satellite Story, BBC Four, 2007)

[Transcript \(PDF 178k\)](#)

Post-war rivalry between the US and the USSR had triggered the Cold War, starting decades of tension.

In 1955, America announced plans to launch the world's first satellite. In response, the USSR built and deployed their satellite Sputnik – beating the US by four months. The Americans were desperate to track the satellite's launch rocket as it flew over the US.

Jodrell Bank observatory in Cheshire housed one of the few instruments able to do it – the Mark 1 radio telescope. The US pleaded with its creator, Bernard Lovell, to help and so Britain played its part in the first space race milestone.

[How do telescopes let us see so far into space?](#)

April 1960

Discarded weapons kick-start Britain's space programme



You need to have JavaScript enabled to view this clip.

British test rocket Black Knight launches into space in 1958 from Woomera, Australia. (British Pathe)

[Transcript \(PDF 219k\)](#)

Britain had developed its own nuclear weapon strategy in response to the US and Soviet military posturing.

Britain's first military rocket, Blue Streak – together with its test rocket Black Knight – was designed to launch nuclear weapons. Although both rockets proved extremely reliable, Blue Streak was expensive and the project was cancelled in 1960. Yet British scientists and rocket engineers regarded it as an opportunity. They persuaded the government to focus on creating a pan-European space effort. Britain's rockets would now be used for civilian purposes, like launching satellites into space.

April 1962

Britain becomes the world's third space-faring nation



Ariel 1 carried experimental data recorded by British instruments until November 1964.

As the race to explore space intensified, Britain grew eager to collaborate. The US helped take the first British satellite to space.

Ariel 1 was devised by the UK's Science and Engineering Research Council to carry out solar science experiments. UK universities provided most of the scientific instruments and Nasa built and launched the satellite from Cape Canaveral in Florida. It established Britain as the third satellite-operating nation after the US and USSR. Five further Ariel satellites were constructed. Ariel 3 was the first to be fully designed and built in Britain, although it was still launched by an American rocket.

[How the US accidentally fried Britain's first satellite](#)

October 1971

British rocket puts its own satellite into orbit



You need to have JavaScript enabled to view this clip.

Black Arrow engineer John Scott-Scott discusses how he felt at the rocket's final launch. (Timeshift, BBC Four, 2012. Rocket footage by Nick Hill)

[Transcript \(PDF 183k\)](#)

Britain eventually managed to join a select group of nations by independently launching a satellite into orbit from Woomera in Australia.

The British satellite launcher Black Arrow was based on its earlier test rocket, Black Knight. It successfully released the satellite Prospero into low-Earth orbit – the only time a British satellite has been taken to space using solely British technology. Despite this triumph, the project's funding had already been cut by the government, which could not see the commercial value of building rockets. Prospero is still in space today, expected to circle Earth for the rest of the century.

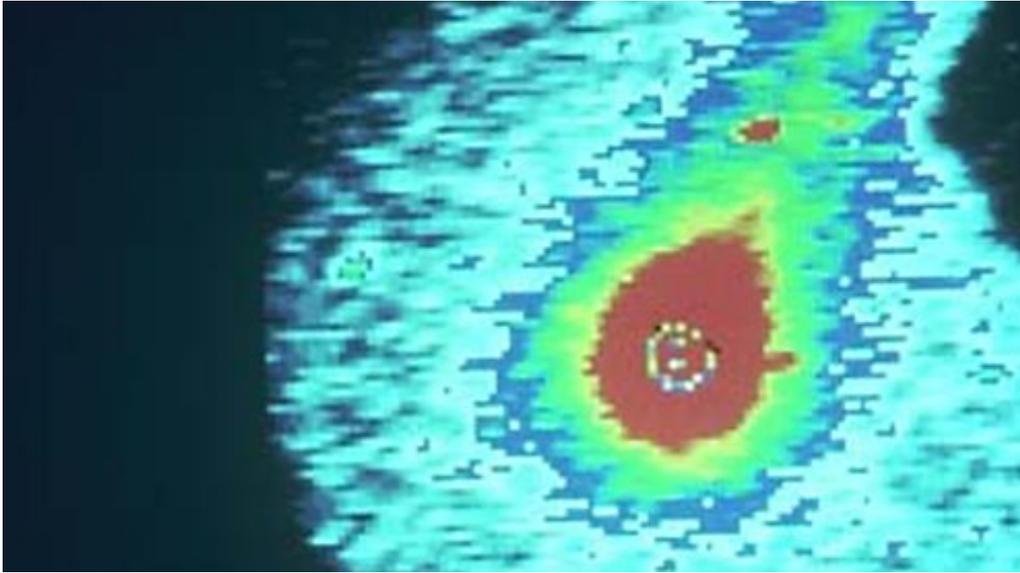
Should Britain build another space rocket?

There was pride in getting it away... but there was also a lot of regret because the project had been cancelled. People were upset.

May 1975

European Space Agency: Britain teams up with her neighbours

Esa



Over 18.5 years, the International Ultraviolet Explorer imaged 104,470 celestial objects, including Comet Bradfield.

As the government cut back its independent space ambitions, Britain again focused on collaborating with other nations.

Ten European states founded the European Space Agency (Esa) in 1975, with the ambition to create a space capability that didn't rely on the US, and to consolidate space technology across Europe. Because of its recent successes, Britain found itself at the forefront of the collaboration, supplying much of Esa's original technology and expertise. It was heavily involved in many early projects, including the world's first high-orbit telescope – the International Ultraviolet Explorer.

Around this time...

Early 1980s

Emerging tastes

From: Northern Ireland: Through food and television

1981 to 1982

'No more nukes!'

From: The Longer View: Nuclear explosion

January 1985

Britain gets a National Space Centre

Nasa



The Columbus laboratory now forms part of the International Space Station.

As Esa flourished, the UK government established the British National Space Centre (BNSC) to coordinate national and international space activities.

The BNSC became the third biggest financial contributor to Esa's science programme and promised commitment to its three major projects – the Columbus space laboratory, Ariane 5 launcher and Hermes spaceplane. But within two years, British political interest waned and investment dropped. Incoming Department of Trade and Industry minister Kenneth Clarke branded Esa a "hugely expensive club" and called its three programmes "frolics in the sky". BNSC's budget was frozen and its influence diminished.

July 1985

Giotto: Britain leads a bold mission to Halley's comet



You need to have JavaScript enabled to view this clip.

British professor John Zarnecki reveals how he became a project manager for the mission. (Destination Titan, BBC Four, 2011. Giotto images from Esa)

[Transcript \(PDF 222k\)](#)

Against this turbulent political backdrop, British space scientists and engineers nevertheless continued to help Esa achieve audacious breakthroughs.

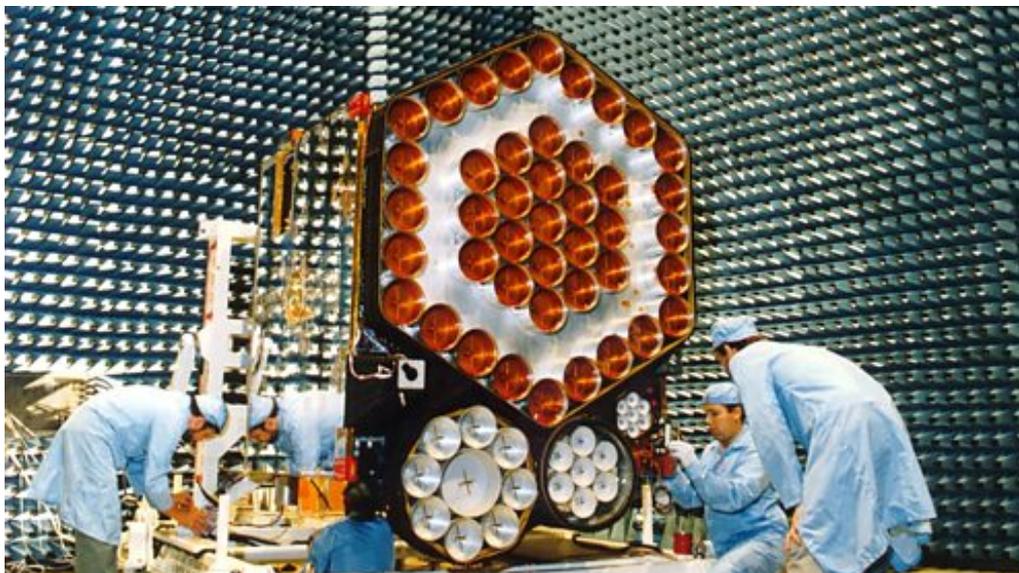
Esa's Giotto spacecraft was built by British Aerospace in Bristol. It flew within 600km of the nucleus of Halley's comet, becoming the world's first spacecraft to study a comet up close. It made new discoveries about Halley's dust and water vapour. Despite being hit by several objects, the spacecraft survived the rendezvous and was guided to a second target – comet Grigg-Skjellerup. The mission's success helped to boost British space science at a much needed time.

[What did Giotto discover about Halley's water? Did the ancient Greeks first spot Halley's comet?](#)

October 1990

Britain established as a world leader in satellites

Airbus Defence and Space



After constructing Inmarsat-2 F1, three more Eurostar E1000 satellites were built for British telecommunications firm Inmarsat.

Alongside astronomy missions, British engineers continued to pioneer ever more advanced satellite technology.

Hertfordshire-based telecommunications firm Inmarsat contracted British Aerospace (now Airbus Defence and Space) to design and build its flagship Eurostar satellite.

Inmarsat-2 F1 was the first commercial satellite with a digital system reprogrammable while in orbit, bringing new simplicity and accuracy. It operated for 23 years, outlasting its intended 10-year lifespan. Since then, more than 50 British Eurostar satellites have been launched providing mobile, broadband and secure communications.

What happened to the rest of the Inmarsat-2 satellites?

May 1991

Helen Sharman is the first Briton in space

Getty Images



Helen Sharman launched on 18 May 1991 and spent eight days in space.

As the UK had no government-funded human spaceflight programme, a group of British companies instigated Project Juno to send a Briton to space.

They negotiated a seat on the Soyuz mission to the Russian Mir space station alongside two Soviet cosmonauts. The advert went out: 'Astronaut wanted. No experience necessary'. A 27-year-old British chemist named Helen Sharman came across the opportunity while working for Mars Chocolate. She was selected from 13,000 applicants and trained intensely for 18 months in Star City. On board the spacecraft, she carried out medical and agricultural experiments and photographed the British Isles.

Why did it take 19 years to send another woman to space? What makes space travel so dangerous?

Around this time...

October 1997

British technology sent to explore Saturn's moons



You need to have JavaScript enabled to view this clip.

British Prof John Zarnecki and his team explain why the mission was a success. (Destination Titan, BBC Four, 2011. Footage from Esa)

[Transcript \(PDF 223k\)](#)

As other nations continued to explore new ground, British scientists helped to drive forward the most ambitious deep space mission yet.

In 1997 Cassini-Huygens was launched into space. The mission was a joint venture between Nasa, Esa and the Italian Space Agency to fly by Saturn. On board the spacecraft was the Huygens lander, which successfully descended onto Saturn's largest moon Titan. The Open University designed Huygen's Surface Science Package, a complex set of sensors, to analyse Titan's atmosphere and ground. The scientists' data revealed Titan has a solid rather than liquid surface.

[See the first images of Titan taken by the Huygens probe](#)

December 2003

Beagle 2: Success or failure?



You need to have JavaScript enabled to view this clip.

Professor Pillinger refused to believe the mission was a failure. (The Sky at Night, BBC Four, 2015. Beagle images from Esa, Mars image from Nasa)

[Transcript \(PDF 173k\)](#)

By the turn of the century, Esa scientists dared to explore the possibility of life beyond Earth in its first attempt to touchdown on another planet.

The Mars Express mission tasked British lander Beagle 2 with searching for signs of life on the red planet. The work was spearheaded by the charismatic Professor Colin Pillinger of the Open University. His passionate press appearances captivated the British public's imagination. The mission's call sign was composed by the band Blur and one of its tools painted by artist Damien Hirst. The lander was deployed in late 2003 but no contact was ever made. Two months later it was declared lost.

[BBC News: Tribute to Colin Pillinger](#)

December 2005

British company helps pioneer global satellite navigation

ESA – P. Carril (artist impression)



British built satellite GIOVE-A marked the first step towards Europe's new global navigation satellite system, Galileo.

European ambitions in space were about transforming daily life too, as Esa began work on a new global satellite navigation system.

No longer needing to rely on the US GPS and Russian Glonass systems, Europe's own network of satellites called Galileo will provide real-time positioning with metre-accuracy and the most precise readings at high latitudes. Surrey Satellite Technology Ltd (SSTL) was commissioned to build the prototype satellite GIOVE-A, followed by the innovative measuring instruments on the first 22 Galileo satellites. The system is due to begin offering services in late 2016, with full functionality by 2020.

What does a more accurate sat-nav system mean?

There were a lot of people who recognised our expertise, but who thought this might be beyond us. We didn't feel that and this is our vindication.

May 2009

Tim Peake becomes the first British Esa astronaut



You need to have JavaScript enabled to view this clip.

“It reflects on the tremendous direction the UK space industry is going...” Tim Peake speaks to BBC News after being assigned to a space mission.

[Transcript \(PDF 175k\)](#)

Since 1983 Esa had been sending Europeans into space alongside Nasa and Russian astronauts. In 2009 it selected its first ever British recruit.

Army major and test pilot Tim Peake was chosen from 8,413 applicants. The selection surprised many as, at this time, the British government had not contributed funds to the International Space Station (ISS), maintaining its focus on unmanned space research and commercial ventures. But Tim was chosen on personal merit, according to Esa, and has already begun to inspire a new generation of space enthusiasts in Britain. He has since been chosen to spend six months on the ISS from December 2015.

[How Tim Peake became a British astronaut - in his words](#)[Take a tour inside the International Space Station](#)

March 2010

UK Space Agency opens

Reaction Engines



Skylon's hybrid engine SABRE is being developed by the Oxfordshire company Reaction Engines.

Public and political attitudes to space had come a long way since the 1980s. In 2010 Tim Peake helped to launch the new UK Space Agency (UKSA).

The new government agency replaced the BNSC. It was to bring all British space activities together and further grow its space industry, which by now was valued at £6bn and sustained almost 70,000 jobs. It announced funding for a British project called SABRE, a hybrid rocket engine to be developed for a potential spaceplane called Skylon. If successful, the spacecraft could carry larger payloads into space than currently possible, and fly passengers anywhere in the world in just four hours.

[Get more information on UK space missions](#)

Around this time...

December 2013

Major Esa missions rely on British tech



You need to have JavaScript enabled to view this clip.

Maggie visits Chelmsford company e2v to find out how they made Gaia's vital imaging sensors. (The Sky at Night, BBC Four, 2015)

[Transcript \(PDF 175k\)](#)

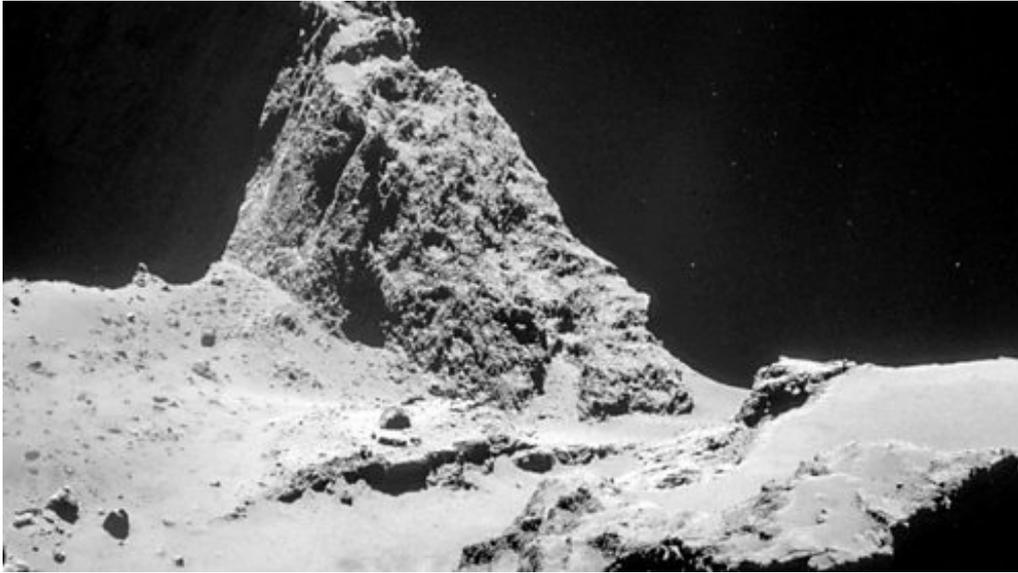
By 2013 Esa launched Gaia – one of its 'cornerstone' missions, meaning world-class scientific projects that require major advances in technology.

The Gaia space observatory aims to image a billion Milky Way objects like stars, planets and quasars in detailed 3D. It was initiated as two other cornerstone missions drew to a close – the Herschel and Planck observatories mapping infra-red and cosmic microwave background radiation, respectively. Britain had been a key partner in all three missions, supplying expertise and leadership as well as instruments and designs. Gaia's camera sensor, the largest in the world, was built in Chelmsford.

[How do we know the Big Bang actually happened? Witness the launch of the Herschel and Planck satellites](#)

November 2014

Rosetta mission makes history



You need to have JavaScript enabled to view this clip.

Maggie visits The Open University to find out how the Ptolemy instrument works. (The Sky at Night, BBC Four, 2015. Images from ESA/Rosetta/NAVCAM)

[Transcript \(PDF 181k\)](#)

A year later Esa's fourth cornerstone mission Rosetta achieved a momentous feat, with British scientists and engineers again playing an integral role.

On 12 November 2014, Rosetta's Philae lander touched down on comet 67P after a ten-year journey through the Solar System. The UK space industry was key to meeting this unprecedented challenge, designing and building many of the mission's components. The Open University's Ptolemy instrument found molecules on the comet's surface containing carbon, hydrogen and oxygen – key elements for life as we know it. The discovery added to the evidence that comets might have kick started life on Earth.

[Interactive: Can you land on a comet?As it happened: Rosetta comet landing](#)

January 2015

Beagle 2: Found at last!



You need to have JavaScript enabled to view this clip.

Maggie discovers why scientists lost contact with Beagle 2. (The Sky at Night, BBC Four, 2015. Images from the University of Leicester and ISRO/MOM)

[Transcript \(PDF 181k\)](#)

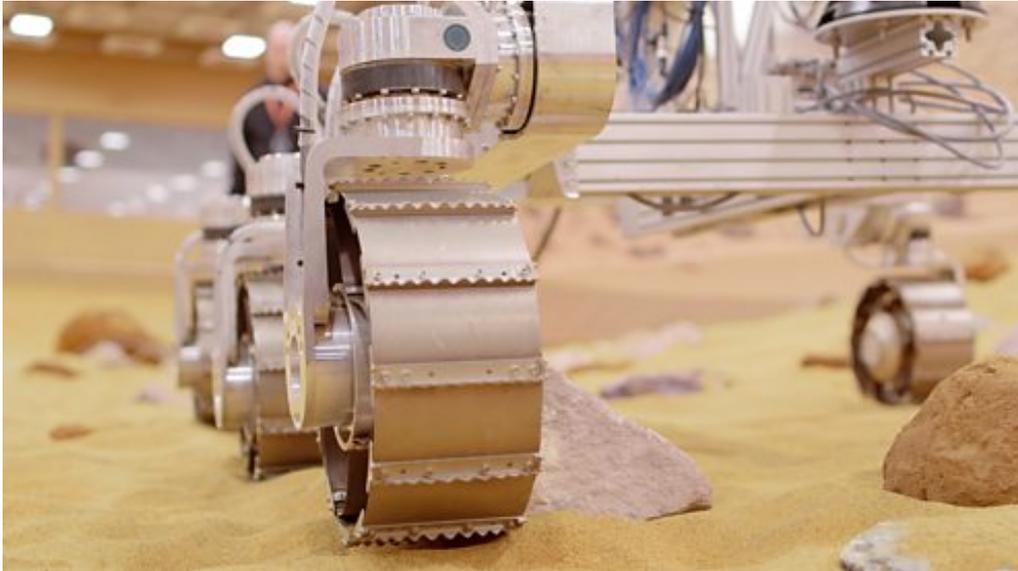
Eleven years after it was declared lost on Mars, the Beagle 2 lander was spotted by Nasa's Mars Reconnaissance Orbiter.

Images hinted the lander's solar panels had not deployed fully, masking its radio antenna needed for communication with Earth. But the lander appeared intact, proving it was successfully protected by its entry capsule and cushioning. Its location was also astonishingly near the target landing site. To have come so close to success provided some vindication for the mission's British scientists, but unfortunately came too late for leader Professor Colin Pillinger who died the previous year.

[Colin] was always adamant that this was by no means a failure. There were so many successes in this mission and this proves yet another one.

Future

Britain's future in space



You need to have JavaScript enabled to view this clip.

Maggie visits the 'Mars Yard' in Stevenage to find out why British engineers are building a new Mars rover. (The Sky at Night, BBC Four, 2015)

[Transcript \(PDF 227k\)](#)

Today the space industry is one of the fastest growing sectors in the UK economy, generating a turnover of £12bn a year – double that of a decade ago.

Where space exploration was once considered a military necessity or costly pastime, it is now recognised for its economic and scientific value. Britain thrives as a world leader in satellite technology. Its astronomers continue to help pioneer ambitious endeavours, such as the James Webb Space Telescope (JWST), built to image the Universe with unprecedented clarity. And as the next space race to Mars warms up, Britons remain at the forefront of ever more daring missions into the unknown.

[How will the JWST help us see deeper into the Universe? Should we build a village on the Moon?](#)