

Opportunities in space science and industry



# **Careers** in space

"The space industry covers everything from engineering to science and policy. It's hard work and requires lots of motivation, but ultimately is highly rewarding and a great career". Con Tsang, UK space scientist.

Space technology affects almost every part of our lives: weather forecasting, satellite TV, global communications and satellite navigation. A career in the space industry could include any of these areas and much more. In fact, the UK is a world leader in space technology and science. UK teams are involved in dozens of missions from spacecraft orbiting other planets to the many satellites monitoring the Earth.

The UK space industry is worth some £4.8 billion. British companies manufacture satellites for communications, navigation and research. They provide expertise in computers, control systems and broadcasting. There are also plenty of opportunities available both in the UK and across Europe through the European Space Agency (ESA).

Careers in space might include working on a new satellite or developing technology to map a distant planet. You could be helping to make new discoveries about our Solar System or using satellites to study pollution on Earth. You might be connecting the world's most remote communities or helping aid agencies reach a disaster zone.

Because the opportunities are so varied, the qualifications needed to work in the space industry also vary considerably. Some space-related jobs require technical or engineering qualifications, others good science degrees. Several companies operate apprenticeship schemes and graduate training programmes. ESA runs an internship programme for students and also takes on young graduate trainees.

There are web links to help you find out more on the back of this leaflet.

# Career file:

Name Con Tsang

Job Working towards a PhD in planetary physics on the ESA Venus Express mission.

#### Space

I was always a bit of a space cadet! Astrophysics is a fascinating subject, but I also love flying, so planetary science was a compromise between the scientist and the adventurer.

#### Mission

I work on Venus Express, a European science mission to our nearest planetary neighbour, Venus. It carries sophisticated cameras and instruments designed to investigate the atmosphere at different heights above the surface.

#### Venus

Venus has evolved very differently to Earth in the past for reasons we still do not fully understand. The surface temperature, which is twice as hot as a household oven, is caused by a runaway greenhouse effect. Understanding this effect will help us understand climate change on Earth. Highlights

International trips!

# Science in space

How many other jobs allow you to make new discoveries about the universe? The UK has scientists working on missions to Mars, Venus, Saturn and Mercury. Achievements over the last few years include the landing on Saturn's moon, Titan, the discovery of a frozen sea on Mars and dramatic close-up pictures of the Sun.

Research institutes and universities offer many opportunities, ranging from positions building instruments to explore other worlds, to research posts investigating the galaxy around us. Many of those working in space science have a relevant degree, and often a PhD.

The Rutherford Appleton Laboratory, University College London, The Open University, Imperial College and the University of Leicester are some of the largest employers of space scientists but are by no means the only ones.





1. An image recorded by an instrument on board ESA's Mars Express showing the so-called 'Face on Mars'. Credit: ESA/DLR/FU Berlin (G. Neukum), MOC (Malin Space Science Systems) 2. Venus Express on the launch pad. Credit: ESA/Starstem



1. Dr Kate Lancaster adjusting a laser at the UK's Rutherford Appleton Laboratory. Credit: RAL

Front cover image. The launch of Inmarsat-4 from the Pacific Ocean. Credit: Sea Launch



#### **Career file:** Name Ben Boyse Job

Mission Systems Engineer, EADS Astrium.

#### Mission

ExoMars Rover Project. This is a European Space Agency (ESA) mission to explore the surface of Mars to search for evidence of life. Career

At School I took Maths, Physics and Electronics A-levels to get into an engineering degree at University. I was surprised to find I didn't have to look very far to find a job and there are companies like Astrium that offer graduate schemes with benefits like rotational placement opportunities.

#### Highlight 1

I am fascinated with what is outside of our planet. By working in the space industry, I get a chance to work on complex engineering projects that are not only very challenging innovative and interesting, but also have the end goal of solving some of the questions I have been asking since my childhood, like "What is out there?"

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1. The prototype ExoMars Rover under test in Tenerife. Credit: FADS Astrium 2. Satellite construction at EADS Astrium Credit: EADS Astrium

# **Highlight 2**

I get to play with a remote controlled six-wheeled Mars Rover prototype, the size of a car, every day!

# **Building for space**

The UK is one of the world's leading manufacturers of satellites for communications, navigation and science. EADS Astrium is the largest UK employer in these areas and is responsible for spacecraft such as the enormous Inmarsat-4, one of the world's most advanced communications satellites. Engineers at EADS Astrium are currently working on Europe's first Mars Rover.

Smaller companies such as Surrey Satellite Technology Limited (SSTL) also design and manufacture spacecraft and instruments. SSTL has built the Disaster Monitoring Constellation of satellites which detect and monitor natural and man-made disasters and environmental damage. Technology company, QinetiQ, is behind the development of TopSat, a small satellite that has produced remarkable images of the Earth. Computer systems specialist, LogicaCMG, provides software and support systems for spacecraft. Other companies produce advanced instruments, components and software.

Most companies offer training opportunities and several have schemes for new graduates. EADS Astrium runs an apprenticeship scheme to train skilled technicians and engineers. These companies also employ well qualified engineers, scientists and software developers.

## Using space

Increasingly, space technology is being used to benefit people on Earth. There are lots of career opportunities in the areas of satellite communication, broadcast and navigation. With the development of broadband, digital broadcasting and 3G phone technology, many people are being employed in this rapidly growing sector. There are also opportunities in areas which use satellite data, for example in weather forecasting, pollution monitoring and mapping.

Many of the key companies, such as Inmarsat and Avanti Communications, are based in the UK. Careers range from satellite operations to marketing new technologies or developing new TV or satellite navigation services. The Met Office runs a placement scheme and there are careers in climate science available at UK universities and research institutions.



### Name

Carole Plessy-Gourdon

.loh Program Manager, Inmarsat Mission

I work in a team that is currently reviewing the orbital location, and possible relocation, of the Inmarsat satellites. There are ten Inmarsat satellites in various orbits over the equator, at a distance of about 36,000km from the Earth.

#### Career

I studied Telecoms and Aeronautics at University. I joined Inmarsat for a five-month internship to complete my degree and have stayed for eight years so far!

#### Highlight 1

Relocation of the fleet of satellites provides me with a rare opportunity. I work independently and with people from different backgrounds. Working with specialists, and with some very clever people, helps me to continue to learn through my job.

#### Highlight 2

One of my most exciting roles was solutions manager for our sponsorship of the World Rally Championship, in which Inmarsat technology was used to maintain data links for the race organisers and teams in remote locations.





1. Satellite images such as this one of Greenland's ice cap are used by scientists to monitor the Earth's changing climate. Credit: Envisat, ESA

2. Carrying out survey work in the Arctic in preparation for a mission to monitor the retreat of the ice caps. Credit: AOES Medialab

# Finding out more

Here are links to websites of some of the organisations which provide careers advice or can give you further information:

#### www.bnsc.gov.uk/learningzone

Useful information in the Learning Zone section and a good overview of the space industry.

www.esa.int The ESA website has a comprehensive careers section.

www.connexions-direct.com

Impartial careers advice for UK students.

#### www.uk.seds.org

UK Students for the Exploration and Development of Space (UKSEDS) is a volunteer youth organisation aimed at promoting space and related activities to a wider audience.

#### www.spaceschooluk.org

Space School UK is a residential school held at the University of Leicester. It takes place during the summer holidays and is aimed primarily at students who are preparing for GCSEs and A-levels.

#### www.spacecentre.co.uk/careers

An extensive list of links to space-related employers.



1. Inmarsat-4 under construction at EADS Astrium. Credit: EADS Astrium



1. Satellites are used to monitor pollution. This image shows the plume of smoke from the fire at the Buncefield oil depot in 2005. Credit: ESA 2. The Hinode spacecraft witnesses a solar eruption. UK scientists are playing a major role in this mission. Credit: NAOJ

The websites below provide details of some of the major companies in the UK space industry:

#### www.astrium.eads.net

Visit the careers section for information and advice on working for EADS Astrium.

#### www.sstl.co.uk

SSTL holds open evenings and there are lists of contacts on the site.

www.inmarsat.com Inmarsat has a careers section on its website.

www.qinetiq.com Extensive careers information on the site.

#### www.logicacmg.com The technology company runs a graduate recruitment programme.

www.vega-group.com Vega work on many space missions.

#### www.astos.org.uk/

The Association of Specialist Technical Organisations for Space, a UK trade association for small and medium sized companies operating in the space sector.

#### www.barsc.org.uk/

The British Association of Remote Sensing Companies website includes a list of members involved in remote sensing activities.

#### Contact

This is one of a series of leaflets on UK space activities produced by the British National Space Centre (BNSC).

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BNSC co-ordinates UK civil space activities to benefit science, enterprise and the environment and represents the UK at the European Space Agency and at other international fora.



