COUNCIL FOR SCIENCE AND TECHNOLOGY

Science Landscape Seminar Series: Representative UK Space, Satellites & Astronomy Infrastructure

Notes to reader

This document is to inform discussion only and is subject to the following caveats:

- Inclusion, non-inclusion or otherwise is not intended to reflect on the standing of any organisation or infrastructure.
- We did not include classified defence and intelligence assets.
- Assignment of Research Areas, Eight Great Technologies and Industrial Strategy sectors was based on desk research and may be subject to error. Categories are designed to inform the general discussion and not reflect on individual organisations or infrastructure. Absence of icons in category tables indicates that (in the project team's opinion) a piece of infrastructure cannot be easily categorised.
- If any mistakes have been made, please inform the seminar secretariat on cstinfo@go-science.gsi.gov.uk.

Logo Key

Location

- UK
- EU
- Global

Funding

- Research Councils
- Departmental
- Private Sector
- Charity
- Academic
- European

Research Area

- Arts and humanities
- Biological and medical sciences
- Earth sciences
- Engineering
- Physical, mathematical and computer sciences
- Social and economic sciences

Eight Great Technologies

- Energy Storage
- Big Data
- Satellites
- Robotics and Autonomous Systems
- Synthetic Biology
- Regenerative Medicine
- Agri-Science
- Advanced Materials
- Quantum Technologies

Industrial Strategy

- Life Science
- Aerospace
- Professional Business Services
- Education
- Nuclear
- Oil and Gas
- Automotive
- Offshore Wind
- Information Economy
- Construction
- Agri-tech

List of infrastructure

The infrastructure identified has been categorised in to the lists below. There will be instances when items could fit in to multiple lists and in these cases we have tried to place the infrastructure in the most appropriate list.

Government/Funding

Innovate UK
Met Office
Natural Environment Research Council
Satellite Applications Catapult
Science & Technology Facilities Council
UK Space Agency

Academia

Cardiff University
Cranfield University
Durham University
Imperial College, London
Liverpool John Moores University
Queens University Belfast
Strathclyde University
The Open University
University College London
University of Birmingham
University of Cambridge
University of Leicester
University of Liverpool
University of Manchester
University of Oxford
University of Southampton
University of Surrey
University of Warwick

Government laboratories

British Antarctic Survey
Defence Science and Technology Laboratory
National Physical Laboratory
NERC Earth Observation Data Acquisition and Analysis Service
Rutherford Appleton Laboratory
UK Astronomy Technology Centre
Higgs Centre for Innovation
ECSAT

Learned Societies and Special Interest Groups

Aerospace, Aviation & Defence Knowledge Transfer Network
British Interplanetary Society
Institute of Physics
Northern Ireland Space Office
National Space Technology Steering Group
Parliamentary Space Committee

Royal Astronomical Society
Space Group of the Royal Aeronautical Society
Space Leadership Council
Space Action Network

Trade Groups

ADS
British Association of Remote Sensing Companies
Satellite Finance Network
UK SPACE

Multinational Companies

Airbus Defence and Space
Avanti Communications Group
BAE
CGI
e2v
Inmarsat
Lockheed Martin UK
QinetiQ
Qioptiq Space Technology
Selex ES
Telespazio Vega
Thales Group
Zeeko

SMEs

Clyde Space
Deimos Space
exactEarth
Nottingham Scientific
Observatory Sciences Ltd
Optic Glyndwr
Reaction Engines
Surrey Satellite Technology Newton Launch Systems

Harwell

Harwell Space campus is home to a significant proportion of space related research and industry in the UK. As such we have included a brief guide to the campus and listed some of the facilities available.

Collaborations

Centre for Earth Observation Instrumentation European Space Tribology Laboratory
Copernicus Programme
Galileo Satellite Navigation
National Centre for Earth Observation
National Nuclear Laboratory
National Oceanography Centre

Facilities

Armargh Observatory
Diamond
Jodrell Bank Observatory, Manchester
UK Astronomy Technology Centre, Edinburgh

For all current STFC grants see:
http://www.stfc.ac.uk/gow/sm/kywd.asp?cx=06&sc=0&nv=06&so=oa&kw=match

International/ European Facilities

Cerenkov Telescope Array
European Extremely Large Telescope
European Southern Observatory
European Space Agency
European Space Tribology Laboratory
European Union Satellite Centre
Isaac Newton Group of Telescopes
Joint Astronomy Centre
Square Kilometre Array
EUMETSAT

Government/ public funding

Innovate UK

Formerly the Technology Strategy Board, Innovate UK funds, supports and connects innovative businesses to accelerate sustainable economic growth. Innovate UK provides support to SMEs with high-growth potential, ensures government initiatives attract Innovate UK business to give companies access to public sector customers, and invest in sectors that have the greatest potential for innovation to speed up economic growth. Over the past few years, Innovate UK has provided funding for a significant number of projects, initiatives and studies related to space technology and research. (More info: www.gov.uk/government/organisations/innovate-uk)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Departmental	Multiple	Multiple	Multiple

Met Office

The Met Office is the United Kingdom's national weather service. It is an executive agency and trading fund of the Department for Business, Innovation and Skills. The Met Office uses satellite data extensively in its weather and climate services, and represents the UK in EUMETSAT. Since the addition of severe space weather to the National Risk Register (NRR), the Met Office has also provided the UK's operational space weather service through the Met Office Space Weather Operations Centre (MOSWOC), which was created to provide a UK operational space weather prediction centre. The Met Office also operates high performance supercomputers in support of its operational forecasting capability and climate research along with other collaborative research. (More info: www.metoffice.gov.uk/space-weather)

Location	Funding	Research area		Eight Great		Industrial Strategy
UK	Departmental	Physical, mathematical and computer sciences	Earth Sciences	Satellites	Big Data	

Natural Environment Research Council

The Natural Environment Research Council (NERC) is the leading funder of independent research, training and innovation in environmental science in the UK. This includes research in to the physical, chemical and biological processes on which the planet and life depends, ranging from the deep Earth and oceans to the atmosphere and space. NERC also works with policymakers and industry in order to share their knowledge. (More info: www.nerc.ac.uk)

Location	Funding	Research area	Eight Great		Industrial Strategy
UK	Research Councils	Multiple	Agri-Science	Satellites	Multiple

Science and Technology Facilities Council (STFC)

The Science and Technology Facilities Council (STFC) is a UK government body that carries out civil research in science and engineering. One of the UK's seven publicly funded research councils, it is responsible for supporting, coordinating and promoting research, and innovation and skills development. STFC's areas of focus include particle physics, nuclear physics, space science and astronomy. (More info: www.stfc.ac.uk)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Research Councils	Multiple	Multiple	Multiple

Satellite Applications Catapult

Based in Harwell, near Oxford, the Satellite Applications Catapult (SAC) was established in May 2013 by Innovate UK as one of a network of centres to accelerate the take-up of emerging technologies and drive economic growth. The SAC aims to foster growth across the economy through the exploitation of space and bring together multi-disciplinary teams to generate ideas and solutions in an open environment. (More info: https://sa.catapult.org.uk/)

Location	Funding	Research area		Eight Great	Industrial Strategy
UK	Departmental	Earth Sciences	Engineering	Satellites	

UK Space Agency

The UK Space Agency (UKSA) is an executive agency sponsored by the Department for Business, Innovation and Skills. It is responsible for all strategic decisions on the UK civil space programme and provides a voice for UK space ambitions. Its aims include: encouraging academic research; raising the profile of UK space activities domestically and abroad; supporting the UK space industry; and promoting co-operation in the European Space programme. (More info: www.gov.uk/government/organisations/uk-space-agency)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Departmental	Physical, mathematical and computer sciences	Satellites	Aerospace

Academia

Cardiff University

The Astronomy & Astrophysics research group at Cardiff University studies a range of topics in galactic and extragalactic astronomy and cosmology and the development of astronomical instrumentation related to these topics. Major subjects include: observations of high-redshift galaxies and their implications for both cosmology and galaxy formation; theoretical, computational and observational studies of the formation of stars and planetary systems; the design and construction of astronomical instrumentation, especially at millimetre and sub-millimetre wavelengths, for ground and space-based observatories and for studies of the Cosmic Microwave Background.

Cranfield University

Cranfield University's Space Research Centre is currently active on three space missions. The Centre's research aims cover sustainable space systems, space applications, spacecraft orbits in atmospheres, space system design and business models. The Space Research Centre has access to a range of facilities to support its teaching and research including; a range of professional industry-standard software tools, an airfield, a class 100000 clean room, an electronics laboratory, a hypersonic gun tunnel, a rapid prototyping laboratory, a satellite ground station and a UAV (Unmanned Aerial Vehicle).

Durham University

The Department of Physics at Durham University includes a leading astronomy and astrophysics research centre working in a wide range of fields covering the observational, theoretical and instrumentation aspects of astronomy. The research areas focused on include Extragalactic Astronomy and Cosmology, Computational Cosmology, and High Energy Astrophysics.

Imperial College London

The Imperial Space Lab research activity occurs across the Faculties of Engineering, Natural Sciences and Medicine and Imperial's Business School and ranges from planetary science to navigation and positioning solutions. The aims of the Imperial SpaceLab include: Facilitating multidisciplinary research by encouraging collaboration and facilitating engagement with Government and industry to promote translation.

Liverpool John Moores University

The Astrophysics Research Institute at Liverpool John Moores University (LJMU) is one of the world's leading authorities in astronomy and astrophysics. Its work encompasses a comprehensive programme of observational and theoretical research, telescope operation and instrument development, academic learning and outreach activities. Research interests at the Institute include star formation, stellar evolution, time-domain astrophysics, galaxy formation, dynamics and evolution, and galaxy clusters. The Institute has formal partnerships with several major international projects.

Open University

The Open University's Centre for Earth, Planetary, Space and Astronomical Research (CESPAR) consists of academics who focus on the stars and planetary bodies. With a long-standing international reputation for pioneering research, CESPAR has also been involved in projects including the Huygens probe Surface Science Package that provided the first characterisation of the surface of Titan. The Open University has also been a key player in the Beagle 2 project, and more recently, were involved in the *Philae* comet landing at the end of 2014.

Queen's University Belfast

The Astrophysics Research Centre (ARC) at Queen's University Belfast is committed to pursuing leading-edge research programmes in the observation and modelling of astronomical objects. The Centre concentrates on the study of the local universe, defined as our Galaxy and other nearby galaxies. Purpose built astronomical instrumentation in the Centre helps to address currently important astronomical research themes. The centre actively seeks to use its expertise in other areas and has links with local industry and leading UK and international research laboratories.

Strathclyde University

The Strathclyde Space Institute is a multi-disciplinary venture addressing key challenges in space systems engineering, satellite applications and access to space. The research centre's activities include: Advanced space concept laboratory; the centre for future air-space transport technology; space mechatronics systems technology laboratory and the centre for space science and applications.

University College London

The Mullard Space Science Laboratory at UCL was established in 1966, and has participated in more than 35 satellite missions and over 200 rocket experiments. The Laboratory is the UK's largest university space research group. Their research spans fields ranging from the Earth's climate to the most distant galaxies in the known Universe, using innovative space instruments.

University of Birmingham

The Astrophysics and Space Research Group at the University of Birmingham has four main focuses. Galaxies and Cosmology are studying a wide range of cosmic structures, using multi-wavelength observations, advanced analysis techniques, and cosmological simulations. The Birmingham Stars and Planets group focuses in three areas: massive stars, exoplanets, and compact objects. The Gravitational Physics Group is responding to the challenge that gravitation poses to a 21st century physicist. The Astrophysics and Space Research Group is involved in the design and manufacture of space instrumentation. Currently they are developing both space-borne and ground based gravitational wave detectors.

University of Cambridge

The Institute of Astronomy (IoA) is part of Faculty of Physics and Chemistry within the School of Physical Sciences at the University of Cambridge. The IoA is engaged in teaching and research in the fields of theoretical and observational astronomy. A wide class of theoretical problems are studied, ranging from models of quasars and the evolution of the universe, through theories of the formation and evolution of galaxies and stars, X-ray sources and black holes. A programme on the velocities of

stars is conducted using a 36-inch telescope in Cambridge. Instrumentation development is also an important area of activity, involving charge coupled devices (CCDs) and detector arrays for rapid recording of very faint light and the design and construction of novel spectrographs.

University of Leicester

The University of Leicester's Department of Physics and Astronomy hosts the Space Research Centre (SRC) and the Earth Observation Science (EOS) Group. The SRC carries out a broad array of research into: planetary science; high speed imaging; X-ray, optical, and IR sensors; X-ray optics and polarimeters; life marker experiments, gamma-ray instrumentation, thermal and fast neutron detection and additive manufacturing techniques for space systems. This work includes collaborating with other Research Groups: X-ray and Observation Astrophysics; Earth Observation Science; Radio and Space Plasma Physics groups in implementing both space missions and ground-based facilities and instrumentation.

University of Oxford

Astrophysics research in the Department of Physics at the University of Oxford spans the key themes of cosmology, galaxies and black holes, instrumentation, stars and planets, and telescopes. Researchers address these areas with a combination of theoretical, simulation and observational work. As underlined by the Oxford Centre for Astrophysical Surveys, the Department also leads or plays significant roles in many of the new telescopes that will come online in the next ten years.

University of Sheffield

The Astronomy and Astrophysics Group in the Department of Physics and Astronomy in the University of Sheffield have several key research interests, such as the formation and evolution of stars, the properties of active galactic nuclei and their influence on their host galaxies, and a wide range of astrophysical phenomena at high time resolution. Its key achievements have included the construction, use and exploitation of ULTRACAM, a high time resolution instrument. It has also undertaken world-leading numerical hydrodynamical and N-body simulations.

University of Southampton

The University of Southampton is home to space researchers, ranging from astronomers to engineers. There are three main groups through which space research is undertaken at Southampton. The General Relativity group in Mathematics is modelling sources of gravitational waves. The Astronautics Research Group covers a wide spectrum of fundamental and applied research in space physics and spacecraft engineering. In Physics and Astronomy, research interests include the study of galaxies, black holes and neutron stars.

University of Surrey

The Surrey Space Centre is a Centre of Excellence in Space Engineering. Surrey's small satellite activities started in 1979 as an academic activity at the University, leading to the formation of a highly successful spin-out company Surrey Satellite Technology Ltd (SSTL). They are the world's leading research centre for small, low cost space missions, generating leading research and bringing innovation to their spin-out company SSTL. Airbus Defence and Space acquired SSTL in 2009 and established a long-term strategic collaboration with the University.

University of Warwick

The Centre for Fusion Space and Astrophysics (CFSA), part of the Department of Physics at the University of Warwick focuses on plasma physics applied to the grand challenges of magnetic and inertial fusion power, space physics, solar physics, and astrophysics. Its work spans fundamental theory, observation and the analysis of experimental data, combined with high performance computing. The Centre has a strong record of extensive engagement with space plasma and solar physics.

Publicly funded organisations

British Antarctic Survey (BAS)

Based in Cambridge, BAS is a component of the Natural Environment Research Council (NERC). It employs over 400 staff, and supports three stations in the Antarctic and two stations on South Georgia. It uses a number of satellites to provide imagery on key findings such as the state of the ozone layer over Antarctica. (More info: www.antarctica.ac.uk/index.php)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Departmental	Earth Sciences	Satellites	

Defence Science and Technology Laboratory (DSTL)

DSTL is a Trading Fund of the Ministry of Defence which provides government with research and technical support for UK defence and security. It conducts some research in to Land Battlespace Systems. DSTL has four bases, with headquarters at Porton Down, Wiltshire, and employs around 3,300 people. (More info: www.dstl.gov.uk)

Location	Funding	Research area		Eight Great				Industrial Strategy
UK	Departmental	Physical, mathematical and computer sciences	Engineering	Advanced Materials	Big Data	Automation and Robotics	Satellites	Aerospace

Higgs Centre for Innovation

The Higgs Centre for Innovation is a facility of the Science & Technology Facilities Council that is scheduled to open in 2016. The facility is run in partnership with the University of Edinburgh and will apply business incubation best practice to big data and space technology, enabling start-ups to translate fundamental research capabilities at the UK Astronomy Technology Centre (UKATC) and at wider universities into wider commercial impact. The Centre will house up to 12 small businesses, as well as academic and PhD posts, to provide PhD students the opportunity to gain entrepreneurial experience as they star their research careers. (More info: www.stfc.ac.uk/3287.aspx)

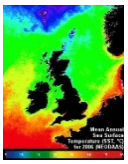
Location	Funding	Research area	Eight Great		Industrial Strategy	
UK	Departmental	Physical, mathematical and computer sciences	Big Data	Satellites	Professional business services	Information Economy

National Physical Laboratory (NPL)

Established in 1900, NPL is the national measurement standards laboratory for the United Kingdom, based at Bushy Park in Teddington. It is the largest applied physics organisation in the UK and employs over 550 scientists. NPL also offers a range of commercial services, applying scientific skills to industrial measurement problems, and manages the MSF time signal. For over 40 years, NPL has worked with space companies and agencies to provide innovation in measurement research, technology and services. (More info: www.npl.co.uk/)

Location	Funding	Research area	Eight Great		Industrial Strategy	
UK	Departmental	Physical, mathematical and computer sciences	Advanced Materials	Satellites	Aerospace	Construction

NERC Earth Observation Data Acquisition and Analysis Service (NEODAAS)



Funded by NERC, the NEODAAS supports UK research scientists with remote sensing data and information. Global data from multiple polar-orbiting sensors are received, archived and processed to facilitate global studies. The Service also receives and processes data from multiple geostationary satellites. (More info: www.neodaas.ac.uk/)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Research Councils	Earth Sciences	Satellites	

Rutherford Appleton Laboratory (RAL)

Part of the Science & Technology Facilities Council (STFC), the Rutherford Appleton Laboratory (RAL) is located on the Harwell Oxford Science and Innovation Campus in Oxfordshire and provides a collaborative environment for research in areas such as astronomy, space science, particle physics and proton science. RAL hosts a number of facilities, including RAL Space, which is involved in more than 200 international space missions. (More info: www.stfc.ac.uk/76.aspx)

Location	Funding	Research area	Eight Great		Industrial Strategy
UK	Research Councils	Multiple	Satellites	Advanced Materials	Aerospace

UK Astronomy Technology Centre

The UK Astronomy Technology Centre (UKATC) is part of the Science & Technology Facilities Council (STFC) and designs, builds, develops, tests and manages major instrumentation projects in support of UK and international astronomy. It has design offices, workshops and test facilities for both ground- and space-based instruments, including a suite of test labs capable of handling the largest and current projected instruments. Recently, the UKATC has collaborated with the European Southern Observatory (ESO) and contributed to the James Webb Space Telescope (JWST). (More info: www.stfc.ac.uk/ukatc)

Location	Funding	Research area		Eight Great	Industrial Strategy
UK	Departmental	Earth Sciences	Physical, mathematical and computer sciences	Satellites	

Learned Societies and Special Interest Groups

Aerospace, Aviation & Defence Knowledge Transfer Network (AAD KTN)

The AAD KTN is a single overarching network spanning Government, Industry and Academia with the principal aim of promoting and enabling innovation in the UK. It is fully funded by Innovate UK and aims to enable new relationships between businesses engaged in R&D activities, influence research priorities, and facilitate the UK's Aerospace Technology Strategy. Membership of the KTN is free. (More info: https://connect.innovateuk.org/web/aadktn/who-we-are)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Departmental	Multiple	Satellites	Aerospace

British Interplanetary Society

The British Interplanetary Society is a think tank on space development. Founded in 1933, the Society has charitable status, and obtains its main income from a worldwide membership. The British Interplanetary Society is devoted to initiating, promoting and disseminating new concepts and technical information about space flight and astronautics through meetings, symposia, publications, visits and exhibitions. (More info: www.bis-space.com/)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Charity	Multiple	Satellites	Aerospace

Institute of Physics (IoP)

The institute of Physics is a scientific charity devoted to increasing the practice, understanding and application of physics. It has a worldwide membership of around 50,000 and is based in London. It is governed by an elected council of up to 25 members and one of its subsidiaries, IoP Publishing, publishes more than sixty academic journals. (More info: www.iop.org/)

Location	Funding		Research area		Eight Great	Industrial Strategy	
UK	Departmental	Charity	Engineering	Physical, mathematical and computer sciences	Advanced Materials	Aerospace	Construction

National Space Technology Steering Group

The National Space Technology Steering Group (NSTSG) is the principal body that provides relevant agencies with independent technical direction for the National Space Technology Strategy (NSTS). It has a number of objectives, including creating and steering the NSTS to respond to market changes; providing a forum for industry and government stakeholders to discuss the technology needs of industry; ensuring that Government stakeholders and the Space Leadership Council are well briefed on NSTS activities; and complementing UK involvement in research and development programmes. (More info: https://connect.innovateuk.org/web/national-space-technology-strategy/nation-space-technology-strategy)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Departmental	Multiple	Satellites	Aerospace

Northern Ireland Space Office

The Northern Ireland Space Office (NISO) acts as a facilitator for the development of the space cluster and capabilities in Northern Ireland on behalf of Invest Northern Ireland, the Regional Business Development Agency.

NISO creates opportunities for regional industry, research institutions and government to better understand and benefit from space sector programs and activities to engage with space sector stakeholders across Europe and globally.

It encourages space inward investment to Northern Ireland as a contact point for companies interested in developing their portfolio of activities through Northern Ireland and UK to Europe and beyond. (More info: http://armaghplanet.com/html/niso.html)

Location	Funding	Research area		Eight Great	Industrial Strategy	
UK	Private Sector	Earth Sciences	Physical, mathematical and computer sciences	Satellites	Education	Aerospace

Institute of Electronics, Communications and Information Technology (ECIT)

ECIT is a 4000m^2 purpose-built research and innovation facilities in the Northern Ireland Science Park and part of the School of Electronics, Electrical Engineering and Computer Science (EEECS) at Queen's University Belfast. Its four research clusters cover areas such as Secure Digital Systems, Wireless Communication Systems, Speech, Image and Vision systems, and High Frequency Electronics. In the area of space technologies, ECIT works with the ESA, UK Space Applications Catapult Centre and the European High Power Radio-Frequency Space Laboratory, as well as with companies such as Astrium, Thales and QinetiQ. (More info: www.ecit.qub.ac.uk)

Location	Funding	Research area	Eight Great	Industrial Strategy	
UK	Academic	Earth Sciences	Satellites	Education	Aerospace

Parliamentary Space Committee

The Parliamentary Space Committee (PSC) is a cross-party group of MPs and peers in the UK Parliament that focuses on raising awareness of the benefits of the UK's leading role in space. The PSC brings forward these issues to debate in Parliament, as well as holding events with other parliamentary groups on subjects as diverse as Africa, climate change and space tourism. (More info: www.parliamentaryspacecommittee.com)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Departmental		Satellites	Aerospace

Royal Astronomical Society

The Royal Astronomical Society, founded in 1820, encourages and promotes the study of astronomy, solar system science, geophysics and closely related branches of science. The Society has more than 3500 members (Fellows) including scientific researchers in universities, observatories and laboratories, as well as historians of astronomy and others. (More info: www.ras.org.uk/)

Location	Funding	Research area		Eight Great	Industrial Strategy
UK	Private Sector	Earth Sciences	Physical, mathematical and computer sciences	Satellites	Aerospace

Space Action Network

The Space Action Network (SPAN) comprises the heads or equivalent of the principle space research groups across the UK together with representatives from related organisations. The Chair of SPAN sits on the Space Leadership Council. SPAN provides a voice for space-related research in the UK: Earth Observation, Space Engineering and Space Science. The Network acts proactively to coordinate a balanced response to current imperatives such as government or parliamentary consultations or more general issues. (More info: www.spaceaction.net/index.php/component/content/?view=featured)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Departmental	Physical, mathematical and computer sciences	Satellites	Aerospace

Space Group of the Royal Aeronautical Society

The Space Group is the specialist group within The Royal Aeronautical Society (RAeS) that promotes the interests of the Society and its members in astronautics. These interests cover the design and manufacture of spacecraft and launch vehicles, plus the application of space techniques in a variety of fields. The Space Group holds a number of conferences and lectures each year on topics such as Space Tourism, Spy Satellites and Robotic Exploration of other Planets. (More info: http://aerosociety.com/About-Us/specgroups/space)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Private Sector	Multiple	Satellites	Aerospace

Space Leadership Council

The Space Leadership Council was formed in 2010. Its key duties include providing advice to the UK Space Agency on its work plan and future opportunities; offering advice on areas of space activity in which the UK should seek to develop and maintain global leadership; promoting the UK's space industry and scientific excellence in space research, technology and applications. (More info: www.gov.uk/government/news/space-leadership-council-named)

Location	Funding	Research area		Eight Great	Industrial Strategy
UK	Departmental	Physical, mathematical and computer sciences	Engineering	Satellites	Aerospace

Trade groups

ADS

ADS is a trade organisation that advances the UK Aerospace, Defence, Security and Space industries, and represents industries that are vital to the UK economy in terms of driving both growth and prosperity. ADS has priority objectives for its sector activities which include improving the image and profile of represented industries, influencing policy debates of importance for industries, supporting manufacturing and supply chains and encouraging investment in technology and innovation. (More info: www.adsgroup.org.uk)

Location	Funding	Research area	Eight Great		Industrial Strategy
UK	Private Sector		Satellites	Automation and Robotics	Aerospace

British Association of Remote Sensing Companies

The British Association of Remote Sensing Companies (BARSC) promotes the interests of organisations working with remote sensing technology and data. BARSC has a key role in expanding the remote sensing marketplace by ensuring that the requirements of its members are fully represented, and that end-user customers, investors, academia and the public understand the offerings from companies. (More info: www.barsc.org.uk)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Private Sector		Satellites	

Satellite Finance Network

The Satellite Finance Network (SFN) is a financial community of the satellite and space industry which supports the growth of the UK space industry at all levels. Emerging from the Space Innovation & Growth Strategy (IGS) published in 2010, the SFN has delivered on recommendations, such as reform of the Outer Space Act. Recently, the SFN supported a refresh of the IGS, aiming to incentivise investment in the UK space industry over the next five to ten years, and participating in areas related to regulation and access to finance. (More info: www.satellitefinancenetwork.org)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Private Sector		Satellites	

UKspace

UKspace is the trade association of the UK space industry. Its role includes acting as a leading voice for Britain's space industry; growing the UK's share of the global space market; and promoting greater awareness within the government, media and public of the industry. UKspace is also a focal point for any organisation commercially involved in space systems and related services in the UK, as well as providing a primary forum for industry dialogue within the government and other international stakeholders. (More info: www.ukspace.org)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Private Sector		Satellites	

Multinational Companies

Airbus Defence & Space

Airbus Defence and Space is a division of Airbus Group responsible for defence and aerospace products and services. Airbus Defence and Space was formed in January 2014 from the former EADS divisions Airbus Military, Astrium, and Cassidian. It works on a number of important space systems including the Automated Transfer Vehicle, which helps supply the International Space Station. (More info: http://airbusdefenceandspace.com)

Location	Funding	Research area	Eight Great	Industrial Strategy
Global	Private Sector	Engineering	Satellites	Aerospace

Avanti Communications Group

Avanti Communications Group plc. sells satellite data communications services to telecoms companies which use them to supply enterprise, institutional and consumer users. Avanti launched its first satellite, HYLAS 1 in 2010, which was the first superfast Ka-band satellite in Europe. Its second satellite, HYLAS 2, was launched in 2012 to extend Avanti's coverage to Africa, the Caucasus and the Middle East. The group also owns a multiband satellite called ARTEMIS, and has two further satellites under construction. (More info: www.avantiplc.com)

Location	Funding	Research area		Eight Great	Industrial Strategy
EU	Private Sector	Engineering	Physical, mathematical and computer sciences	Satellites	Professional Business Services

BAE Systems

BAE Systems is a multinational defence, security and aerospace company, and among the world's largest defence contractors. The company is focused on a variety of areas of products and services, including civil and military aviation, defence, electronics and systems integration, cyber and intelligence and IT and information systems. (More info: www.baesystems.com)

Location	Funding	Research area		Eight Great		Industrial Strategy	
Global	Private Sector	Engineering	Physical, mathematical and computer sciences	Automation and Robotics	Advanced Materials	Aerospace	Construction

CGI Group

CGI Group is a Canadian multinational information technology consulting, systems integration, outsourcing and solutions company. CGI provides consulting services on a number of industries, including to the public sector and government space programmes. CGI has more than 36 years of experience in delivering complex, mission-critical space systems. They are a European leader in military satellite communications as well as civilian space agencies such as the European Space Agency. (More info: www.cgi-group.co.uk)

Location	Funding	Research area	Eight Great		Industrial Strategy
Global	Private Sector	Physical, mathematical and computer sciences	Satellites	Big Data	Professional Business Services

e2v

e2v is a global manufacturer that designs, develops and manufactures technology systems and components. They work on a number of sectors including civil aerospace, defence and space. e2v has designed and delivered CCD and CMOS imaging sensors for over 150 space missions for major space agencies including NASA, ESA and JAXA. The company also offers supply chain management of sensors, arrays and sub-systems for space science, Earth observation and astronomy. (More info: www.e2v.com)

Location	Funding	Research area	Eight Great			Industrial Strategy
Global	Private Sector	Engineering	Satellites	Advanced Materials	Automation and Robotics	Aerospace

Inmarsat

Inmarsat is a British satellite telecommunications company, offering global mobile services. Inmarsat's network provides communications services to a range of organisations with a need to communicate in remote regions or where there is no reliable terrestrial network. They have particular expertise in the areas of maritime and aviation services. Inmarsat own and operate a total of 11 spacecraft flying in geostationary orbit above the Earth delivering the companies network coverage. (More info: www.inmarsat.com/)

Location	Funding	Research area	Eight Great	Industrial Strategy
Global	Private Sector	Engineering	Satellites	

Lockheed Martin UK

Lockheed Martin UK, headquartered in London, is the UK-based arm of Lockheed Martin Corporation. Lockheed Martin UK specialises in the development, integration and sustainment of advanced technology systems, products & services. Based at the UK Space Gateway in Harwell, Oxford the company operates a UK space technology office currently focusing on areas including environmental monitoring, space exploration, global security and small communications satellites. (More info: www.lockheedmartin.co.uk/)

Location	Funding	Research area	Eight Great		Industrial Strategy
Global	Private Sector	Engineering	Satellites	Advanced Materials	Aerospace

QinetiQ

Founded in 2001 and based in Hampshire, UK, QinetiQ is a multinational defence technology company with over 9,000 employees and revenue of over £1bn. It partners with many organisations, including the UK government, NASA and the ESA. Space-related research includes lightweight space telescopes, space communications and satellite platforms. (More info: www.qinetiq.com/Pages/default.aspx)

Location	Funding	Research area		Eight Great			Industrial Strategy
Global	Private Sector	Engineering	Physical, mathematical and computer sciences	Advanced Materials	Automation and Robotics	Satellites	Aerospace

Qioptiq Space Technology

Qioptiq Space Technology are specialists in the manufacture of radiation stable micro-sheet cover glass for the space industry. The company has a dedicated glass smelter housed in the UK to offer fully integrated manufacturing capability. Qioptiq entered the space business in 1970 as Pilkington Space Technology. Their cerium-doped glass components have been used on over 2,500 satellites worldwide. Qioptiq Space Technology also supplies both solar cell coverglass and optical solar reflectors (OSR), supplying over 80% of global demand. (More info: www.qioptiq.com/space.html)

Location	Funding	Research area		Eight Great		Industrial Strategy
Global	Private Sector	Engineering	Physical, mathematical and computer sciences	Advanced Materials	Satellites	Aerospace

Selex ES

Selex ES is an international leader in electronic and information technologies for defence systems, aerospace, data, infrastructures, land security and protection and sustainable 'smart' solutions. Selex ES has contributed to a large number of space projects such as star trackers AASTR, the ExoMars Drill System and the IRES, a two axis infrared Earth horizon sensor. (More info: www.selex-es.com)

Location	Funding	Research area		Eight Great			Industrial Strategy
Global	Private Sector	Engineering	Physical, mathematical and computer sciences	Satellites	Big Data	Automation and Robotics	Aerospace

Telespazio VEGA

Telespazio VEGA, a subsidiary of Telespazio SpA, is a professional consulting, software intensive technology and space enabled services company based in Luton. The company works with space agencies, satellite operators and manufacturers around the world. Its business units include geo informational data, network and connectivity and satellite data acquisition. (More info: www.telespazio-vega.com)

Location	Funding	Research area	Eight Great		Industrial Strategy
UK	Private Sector		Satellites	Big Data	Aerospace

Thales Group

Thales Group is a French multinational company that designs and builds electrical systems and provides services for the aerospace, defence, transportation and security markets. Through their subsidiary, Thales Alenia Space, they provide commercial, scientific and defence space services for a range of clients including Copernicus, NASA and the International Space Station. (More info: www.thalesgroup.com/en/worldwide/space)

Location	Funding	Research area		Eight Great			Industrial Strategy
Global	Private Sector	Engineering	Physical, mathematical and computer sciences	Satellites	Advanced Materials	Automation and Robotics	Aerospace

Zeeko

Zeeko Ltd is a UK based technology company established in 2000 with ultra-precision polishing solutions for optics and other complex surfaces. Zeeko progressed from a start-up company to polishing ultra-precision surfaces for telescope mirrors and other optical surfaces. The company has been involved in work with space agencies such as NASA in the development of manufacturing astronomical optics. (More info: www.zeeko.co.uk)

Location	Funding	Research area		Eight Great		Industrial Strategy
UK	Private Sector	Engineering	Physical, mathematical and computer sciences	Advanced Materials	Automation and Robotics	Aerospace

SMEs

SMEs play a vital role in Space research and a small selection has been included below. UK Space operates the SME Forum, which provides a low-cost route to a range of expertise and resource for this part of the space industrial community.

For summaries of all UK Space SME forum members see link: www.ukspace.org/space-organisations/smeforum/sme-forum-members/

Clyde Space

Founded in 2005 Clyde Space is a supplier of small and micro spacecraft systems. The majority of their work focuses on high performance power subsystems, DC-DC Converters, lithium polymer batteries and high efficiency solar panels, typically for small satellite missions. Approximately 80% of Clyde Space sales are outside of the European Union and over 95% outside of the UK.

Deimos space

Deimos Space UK Ltd is a wholly owned subsidiary of Elecnor Deimos created in 2013 to address the UK and export market for space systems, services and applications. Deimos Space UK is located on the Harwell Oxford campus and offers expertise in the following areas: mission and flight engineering; ground segment systems; flight software systems; global navigation satellite systems; remote sensing applications; and space situational awareness.

exactEarth

Established in 2009, exactEarth is a data services company that leverages advanced microsatellite technology to deliver vessel monitoring solutions characterised by high performance, reliability, security, and simplicity. It is jointly owned by COM DEV International Ltd and HISDESAT Servicios Estratégicos S.A.

Glyndwr Innovations

Glyndwr Innovations is a provider of innovative product development engineering and technology consulting. The company specialises in designing and manufacturing unique or prototype hardware or low volume production required in particular by the space sciences, aerospace and defence, astronomy and medical markets. The Optro-electronics Technology and Incubation Centre (OpTIC) is a facility part of Glyndwr whose successes include a complex large 500mm lens for the pan-STARRS (Panoramic Survey Telescope & Rapid Response System) project located on Hawaii.

Magna Parva

Magna Parva is a private-held SME specialising in engineering solutions for space with an emphasis of prototype and concept development of technologies, subsystems and instrumentation. This includes next generation technology development over a wide range of disciplines that can deliver step change in capability for communications, science and exploration missions. Clients and partners include the European Space Agency, Airbus Defence & Space and Thales Alenia Space.

Newton Launch Systems

Newton Launch Systems is a British company aiming to develop and manufacture a range of small launch vehicles for placing small payloads into a variety of Earth orbits and sub-orbital space. The initial focus of the company is nano-satellites and small microsatellites with a view to increasing the size capability in the future.

Nottingham Scientific Ltd. (NSL)

NSL is a UK-based SME that specialises in the development of GNSS-based technologies and applications. NSL develops solutions for commercial and governmental markets where there is a high degree of assurance placed on the accuracy, availability and integrity of positional and timing information.

Observatory Sciences Ltd

Observatory Sciences is a developer and supplier of software for the control of ‘big science’ systems and instruments, including large telescopes and synchrotrons. Observatory Sciences is behind some of the world’s high-profile astronomy and physics projects, using its expertise to provide a range of bespoke systems development, consultancy and project management services tailored to the needs of individual clients.

Pixalytics

Pixalytics is an independent consultancy company specialising in Earth observation, combining cutting edge scientific knowledge with satellite and airborne data to provide answers to questions about our planet’s resources and behaviour. The company conducts scientific research and development, consultancy and provides Earth observation products and services in water, marine, coastal and urban and land management.

Reaction Engines Ltd. (REL)

REL is a privately held company and was formed in 1989 to develop the technologies needed for an advanced combined cycle air-breathing rocket engine class called SABRE that will enable aircraft to operate at speeds of up to five times the speed of sound or fly directly into Earth orbit.

Surrey Satellite Technology Ltd. (SSTL)

SSTL is an independent British company within the Airbus Defence & Space group and have been delivering small satellite missions for over 25 years. Amongst other services, they provide in-house design, manufacture, launch and operation of small satellites, deliver space training and development programmes and provide consultancy services.

Harwell Space Cluster

The Harwell space cluster hosts a core group of space sector organisations at the Harwell Oxford Science and Innovation campus. The clustered environment enables an integrated approach for growth in the space sector. The site is part funded by the Science and Technology Facilities council but also hosts multinational companies as well as the UK headquarters for the European Space Agency.

Key facilities hosted at the Harwell space cluster include:

- The Satellite Applications Catapult: The Catapult was established in May 2013 by Innovate UK to accelerate the take-up of emerging technologies and drive economic growth by supporting UK industry and encouraging the development and commercial exploitation of space and satellite-based products, services and applications. The Catapult has incorporated the activities of the International Space Innovation Centre (ISIC) into its programme.
- RAL Space, STFC's Space Science and Technology Department, is involved in more than 200 international space missions including Herschel, the largest space telescope ever launched, which is examining the early stages of star birth and galaxy formation.
- Diamond Light Source Ltd is the UK national synchrotron radiation facility. Electrons are sped up to near light speeds and these bright beams can then be used by scientists to study a vast range of subject matter, from new medicines and treatments for disease to innovative engineering and cutting-edge technology.
- Central Laser Facility (CLF) one of the world's leading laser facilities, its high power lasers can recreate the conditions inside stars while its small, compact lasers have medical, security and environmental applications
- ISIS pulsed neutron and muon source is a pioneering research centre in the physical and life sciences. ISIS has an impact in fields such as energy, biotechnology, materials development and information technology.
- The European Centre for Space Applications and Telecommunications (ECSAT) is ESA’s new facility in the United Kingdom. It is based at the Harwell Science, Innovation and Business Campus in Oxfordshire. ECSAT is the most recent addition to ESA’s operational sites across Europe. First opened in 2009, ECSAT will be developed by ESA following agreements reached between the UK and ESA in November 2012. ECSAT will support activities related to telecommunications, integrated applications, climate change, technology and science.

As well as the major science facilities, there are around 50 space industry stakeholders at the site, including:

- Lockheed Martin: an American global aerospace, defence, security and advanced technology company with worldwide interests.

- KEIT Ltd.: a spin-out from STFC, adapting a spectrometer originally developed to measure water vapour on Mars to have applications on Earth
- MDA Space & Robotics Ltd.: producers of next generation robotic systems to meet the future needs of human space infrastructure.
- Neptec: specialists in the development, production, integration, operation and support of intelligent spaceflight sensors and equipment

Collaborations

Centre for Earth Observation Instrumentation and Space Technology

The key aim of the Centre for Earth Observation Instrumentation (CEOI-ST) is to develop UK capabilities in future space instrumentation for Earth Observation through the teaming of scientists and industrialists. It is funded by the UK Space Agency with parallel technology investment from industry. CEOI-ST is led by Airbus DS in partnership with QinetiQ, University of Leicester and Rutherford Apple Laboratory. (More info: www.ceoi.ac.uk/)

Location	Funding		Research area		Eight Great	Industrial Strategy
UK	Private Sector	Departmental	Earth Sciences	Physical, mathematical and computer sciences	Satellites	

Copernicus

Copernicus is a European system for monitoring the Earth. It consists of a complex set of systems which collect data from multiple sources: earth observation satellites and in situ sensors such as ground stations, airborne and sea-borne sensors. The Copernicus programme is coordinated and managed by the European Commission. The development of the observation infrastructure is performed under the aegis of the European Space Agency for the space component and of the European Environment Agency and the Member States for the in situ component. More info: www.copernicus.eu/)

Location	Funding	Research area		Eight Great	Industrial Strategy
EU	European	Earth Sciences	Physical, mathematical and computer sciences	Satellites	

Galileo

Galileo is Europe's own global navigation satellite system, providing a highly accurate, guaranteed GPS service under civilian control currently being developed. The fully deployed Galileo system consists of 30 satellites positioned in three circular Medium Earth Orbit planes at 23,222km altitude above the Earth, and at an inclination of the orbital planes of 56 degrees to the equator. The definition, development and In-Orbit Validation phases of the programme has been through ESA and co-funded by with the European Commission. (More info: www.esa.int/Our_Activities/Navigation/The_future_-_Galileo/What_is_Galileo)

Location	Funding	Research area		Eight Great	Industrial Strategy
EU	European	Engineering	Physical, mathematical and computer sciences	Satellites	

National Centre for Earth Observation

The National Centre for Earth Observation (NCEO), part of NERC, is a partnership of over 100 scientists from UK institutions whose mission is to unlock the full potential of Earth observation data. Scientists at the Centre use data from Earth observation satellites to monitor global and regional changes in the environment, as well as to learn more about the Earth system and improve predictions of future environmental conditions. The NCEO works closely with the UK satellite industry and international space organisations to ensure scientific understanding is delivered to the wider community. (More info: www.nceo.ac.uk)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Research Councils	Earth Sciences	Satellites	

National Nuclear Laboratory

The National Nuclear Laboratory (NNL) plays a crucial role in the UK and global nuclear industry. As a business, they operate in three core areas: waste management and decommissioning, fuel cycle solutions and reactor operations support. They also help develop power systems for spacecraft, based on radioactive materials. (More info: www.nnl.co.uk)

Location	Funding	Research area	Eight Great		Industrial Strategy
UK	Research Councils	Physical, mathematical and computer sciences	Advanced Materials	Satellites	Nuclear

National Oceanography Centre

The National Oceanography Centre (NOC) is part of NERC and is a centre of excellence for oceanographic sciences with a remit to provide leadership and national capability in marine sciences, from coast to deep-ocean. Their basic mission includes undertaking international competitive marine science in an Earth system context. They are also involved in managing, developing, coordinating and innovating high quality, large research infrastructure, equipment pools, facilities, databases and other science enabling functions for the benefit of the whole UK science community. (More info: www.noc.ac.uk)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Research Councils	Earth Sciences	Satellites	

Facilities

Armagh Observatory

The Armagh Observatory, founded in 1789, houses around 25 astronomers actively studying stellar astrophysics, the Sun, the Solar System astronomy and the Earth's climate. Funded by the Department of Culture, Arts and Leisure for Northern Ireland and the Science and Technology Facilities Council, their aim is to advance knowledge and understanding of astronomy through research and publishing. (More info: www.star.arm.ac.uk)

Location	Funding	Research area	Eight Great	Industrial Strategy	
UK	Departmental	Physical, mathematical and computer sciences		Aerospace	Education

Diamond Light Source (DLS)

DLS is the UK's Synchrotron and is operated by Diamond, a not-for-profit limited company funded as a joint venture by the UK Government through the Science & Technology Facilities Council (STFC) in partnership with the Wellcome Trust. The synchrotron is free at the point of access through a competitive application process, provided that the results are in the public domain. Over 3000 researchers from both academia and industry use Diamond to conduct experiments, assisted by approximately 500 staff. (More info: www.diamond.ac.uk/Home.html)

Location	Funding		Research area		Eight Great	Industrial Strategy
UK	Research Councils	Departmental	Engineering	Physical, mathematical and computer sciences	Advanced Materials	

Jodrell Bank Observatory, Manchester (facility)

The Jodrell Bank Observatory is part of the Jodrell Bank Centre for Astrophysics at the University of Manchester. Hosting a number of radio telescopes, the main Lovell Telescope is the world's third largest steerable radio telescope. Having played important roles in astronomical research since its establishment after World War II, Jodrell Bank Observatory continues to work alongside scientists and engineers in research and education. (More info: ww.jodrellbank.net)

Location	Funding	Research area	Eight Great	Industrial Strategy
UK	Academic	Physical, mathematical and computer sciences	Satellites	Aerospace

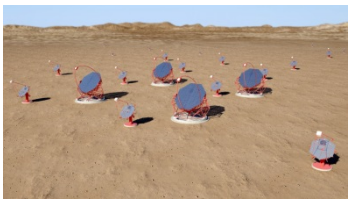
UK Astronomy Technology Centre, Edinburgh

The UK Astronomy Technology Centre is the national centre for astronomical technology. The ATC designs and builds instruments for many of the world's major telescopes, as well as manage projects both within the UK and collaborations with international partners. The ATC's scientists also carry out observational and theoretical research into key astronomical questions. (More info: www.stfc.ac.uk/ukatc)

Location	Funding		Research area		Eight Great		Industrial Strategy
UK	Departmental	Academic	Physical, mathematical and computer sciences	Earth Sciences	Satellites	Automation and Robotics	Aerospace

International Facilities

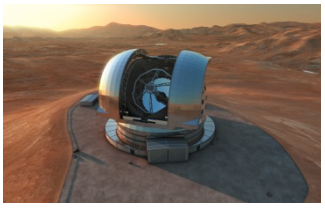
Cherenkov Telescope Array (in development phase)



The Cherenkov Telescope Array (CTA) is a multinational initiative to build the next generation of ground-based, very high energy gamma-ray instrument to serve as an open observatory to a wide astrophysics community. It is hoped that the project will provide a deep insight into non-thermal high-energy universe. The key aims of the CTA are based around three themes: understanding the origin of cosmic rays and their role in the universe; understanding the nature and variety of particle acceleration around black holes; searching for the ultimate nature of matter and physics beyond the Standard Model. (More info: www.cta-observatory.org)

Location	Funding	Research area	Eight Great	Industrial Strategy
Global	European	Physical, mathematical and computer sciences	Satellites	

European Extremely Large Telescope



The European Extremely Large Telescope (E-ELT) will be the largest optical and infra-red telescope ever built. Scientists and engineers from all over Europe are working on plans for a telescope with a mirror that is over 39 metres in diameter. This increased area will enable the study of objects at a much greater distance, while also allowing the study of celestial objects with unrivalled spatial resolution. The proposed research will involve studying extra-solar planets, resolved stellar populations in a representative sample of the Universe, the physics of high redshift galaxies and cosmology and fundamental physics. (More info: www.eso.org/public/teles-instr/e-elt/)

Location	Funding	Research area	Eight Great	Industrial Strategy
EU	European	Physical, mathematical and computer sciences	Satellites	

European Southern Observatory

The European Southern Observatory (ESO) is an intergovernmental science and technology organisation in astronomy. It carries out a programme focused on the design, construction and operation of powerful ground-based observing facilities for astronomy. ESO operates three observing sites in the Atacama Desert region of Chile: La Silla, Paranal and Chajnantor. Each year, about 2000 proposals are made for the use of ESO telescopes, requesting between four and six times more nights than are available. (More info: www.eso.org/public/)

Location	Funding	Research area		Eight Great	Industrial Strategy
Global	European	Physical, mathematical and computer sciences	Earth sciences	Satellites	

European Space Agency (ESA)

The ESA's mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world. ESA is an international organisation with 20 Member States. By coordinating the financial and intellectual resources of its members, it can undertake programmes and activities beyond the scope of any single European country. (More info: www.esa.int/ESA)

Location	Funding	Research area			Eight Great	Industrial Strategy
EU	European	Physical, mathematical and computer sciences	Earth Sciences	Engineering	Satellites	Aerospace

European Space Tribology Laboratory

European Space Tribology Laboratory (ESTL) works in partnership with the European Space Agency (ESA) as Europe's focus for expertise in space tribology. ESTL specialises in providing solutions to friction, wear and lubrication issues of precision mechanisms operating in vacuum. ESTL has operated over the past 40 years and with every major ESA programme. (More info: www.esrtechnology.com/centres/estl)

Location	Funding	Research area		Eight Great	Industrial Strategy
EU	European	Engineering	Physical, mathematical and computer sciences	Advanced Materials	Aerospace

European Union Satellite Centre

Established in 2002The European Union Satellite Centre (previously EUSC) is the agency of the EU that gathers information through satellite imagery. The centre is in Torrejón de Ardoz in Spain. Other countries that have an association agreement with the SatCen can also use its resources. Although it is autonomous in its daily operations, the High Representative Federica Mogherini is responsible for its operational direction. (More info: http://europa.eu/about-eu/agencies/regulatory_agencies_bodies/security_agencies/eusc/index_en.htm)

Location	Funding	Research area	Eight Great	Industrial Strategy
EU	European	Earth Sciences	Satellites	Aerospace

Square Kilometre Array (SKA) (in development phase)

The SKA is a radio telescope project to be built in Australia and South Africa. It will operate over a wide range of frequencies and its size will make it 50 times more sensitive than any other radio instrument. Construction of the SKA is scheduled to begin in 2018 for initial observations by 2020. The headquarters of the project are located at the Jodrell Bank Observatory in the UK. (More info: www.skatelescope.org/)

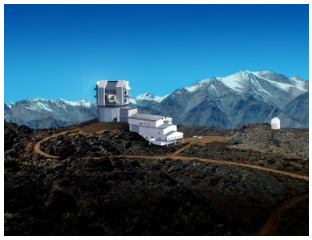
Location	Funding	Research area	Eight Great	Industrial Strategy
Global	Global	Physical, mathematical and computer sciences		Education

European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT)

EUMETSAT's purpose is to gather accurate and reliable satellite data on weather, climate and the environment, and to deliver them on a sustained and timely basis to users world-wide. Satellite data has become indispensable for the forecasting of weather at all ranges to produce timely warnings and other information to support public and private decision making. EUMETSAT is an intergovernmental organisation with 30 Member States. (More info: www.eumetsat.int)

Location	Funding	Research area	Eight Great	Industrial Strategy
EU	European	Earth Sciences	Satellites	Aerospace

Large Synoptic Survey Telescope



The Large Synoptic Survey Telescope (LSST) is a planned 8.4m wide-field “survey” reflecting telescope that will photograph the entire available sky every few nights with a three-billion pixel digital camera. The LSST will provide time-lapse digital imaging of faint astronomical objects across the entire sky. It has been identified as a national scientific priority in reports by diverse national panels, including several National Academies of Science. Construction of the telescope is currently underway on its Chilean site, and it is scheduled to be completed in 2019. (More info: www.lsst.org)

Location	Funding	Research area	Eight Great	Industrial Strategy
Global	Global	Physical, mathematical and		

Very Long Baseline Array

The Very Long Baseline Array (VLBA) is a system of ten radio-telescope antennae, each with a dish measuring 25 metres in diameter. From Mauna Kea on the Big Island of Hawaii to St. Croix in the US Virgin Islands, the VLBA spans more than 8000 km, providing astronomers with the sharpest vision of any telescope on Earth or in space. (More info: www.vlba.nrao.edu)

Location	Funding	Research area	Eight Great	Industrial Strategy
Global	Global	Physical, mathematical and		

Isaac Newton Group of Telescopes

The Isaac Newton Group of Telescopes (ING) operates the William Herschel Telescope, Isaac Newton Telescope and Jacobus Kapteyn Telescope optical telescopes for the Science and Technology Facilities Council (STFC), the Netherlands Organisation for Scientific Research (NWO) and Instituto de Astrofísica de Canarias (IAC). The STFC, NWO and IAC have entered into collaborative agreements for the operation of and the sharing of observing time on the ING telescopes. (More info: www.ing.iac.es)

Location	Funding		Research area	Eight Great	Industrial Strategy
EU	European	Departmental	Earth Sciences		