The governing Council of the European Southern Observatory has today approved the European Extremely Large Telescope (E-ELT) programme – the world’s largest ground-based optical telescope.

Construction will not commence until provisional votes by four of the member states, including the UK, have been confirmed and 90% of the funding required has been secured. The E-ELT is a 39-m diameter optical/infrared telescope, planned to be tens of times more sensitive than any current telescope of its kind. Details of the decision are available from ESO.

Professor John Womersley, Chief Executive of STFC said: “Our commitment to the E-ELT reflects its high priority in our science strategy, the world-leading position of the UK astronomy community, and the potential returns to UK industry. Today’s announcement is an important step towards construction, though the final go-ahead depends of course on obtaining approval by a number of governments (including ours) to such a long term financial commitment.”
World’s largest ground-based telescope is given ‘go ahead’

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The E-ELT will enable astronomers to probe the very highest priority questions in astronomy today. Collecting at least twelve times more light than the current largest optical telescopes, it will push forward our understanding of planets beyond our solar system, including those where life might exist and the nature and distribution of dark matter and dark energy that is thought to make up most of our Universe but as yet is not directly observed or understood.

The UK is playing several leading and key roles in the project. STFC’s UK ATC is coordinating the UK contributions, in collaboration with industry and university partners. The UK, through the University of Oxford and UK ATC in collaboration with other international partners is leading on one of two ‘first light’ instruments, HARMONI, and other UK universities including Durham University are playing key roles in the development of 5 other instruments. This in turn will grant astronomers access to some of the earliest observations carried out on the giant telescope.

Professor Isobel Hook, the UK E-ELT Project Scientist from the University of Oxford, said: “The telescope is set to revolutionise optical and infrared astronomy. Its unique combination of sharp imaging and huge light collecting area will allow us to observe some of the most exciting phenomena in the Universe in much better detail. For example we’ll be able to observe distant galaxies in the process of formation, see the effects of massive black holes on their environment and even search for planets in ‘habitable zones’ beyond our solar system, where life could exist. And perhaps more importantly, the telescope is very likely to make new discoveries that we can’t even imagine now.”

UK industry and research institutions can expect to be richly rewarded for the UK’s involvement in E-ELT. Already around £10 million has been won by the UK for work in the pre-construction phase. Moving into construction phase, the opportunities for industrial contracts will be open to competition within the member states, to at least a value of €800M. Work done so far puts UK industry in a strong position to be successful in bidding against this, especially in the areas of optics manufacture, detectors, software and structural engineering. A UK consortium based at OpTIC Glyndwr in North Wales for example, is developing prototypes for the mirror segments on the primary mirror, aimed at securing potential contracts worth over €100M for manufacturing the production segments in the UK industry.

“Major UK involvement in world-leading astronomical projects is the primary reason the UK joined the European Southern Observatory,” said Professor Gerry Gilmore from Cambridge University who was the UK Council member when the UK joined ESO and Chair of the E-ELT Design Study in its early stages. “UK technology and industry will benefit enormously, and British scientists will be able to lead in the next stages of mankind’s discovery of the nature of time, matter, existence, the origin and far future of the Universe, and the expected discovery of life far outside our own Solar System. The intellectual opportunities are immense, the challenges vast, the potential almost unlimited.”
E-ELT Instrumentation Work

The UK is involved with several Phase A studies: instruments called HARMONI, EAGLE, OPTIMOS-EVE, CODEX, EPICS, METIS. In addition, a project called CANARY, will prototype key concepts in adaptive optics, particularly those required for the EAGLE instrument. These will ultimately provide a suite of mutually-complementary instruments for observations of the faintest planets, stars, and galaxies that are well beyond the reach of existing telescopes.

Professor Niranjan Thatte, Principal Investigator of E-ELT first light spectrograph (HARMONI), University of Oxford, said: “We are privileged to be leading the design and construction of the first spectrograph for the E-ELT, which will revolutionise observational astronomy through the 2020s and beyond. By studying the light from galaxies, distant and nearby, in great detail, we hope to unravel the physical processes that have shaped the cosmos throughout its history.”

Professor Simon Morris, Deputy Head of Physics, Durham University and co-Principal Investigator for the proposed E-ELT instrument EAGLE, said: “The European Extremely Large Telescope will greatly surpass the (already amazing) suite of four Very Large Telescopes. It will have a huge light collecting area, ways of correcting for atmospheric blurring, and the ability to observe large numbers of faint, distant galaxies at once. This will allow UK astronomers, in collaboration with our European colleagues, to solve many current mysteries about the way our own galaxy formed. UK astronomical instrument builders are also very excited to be taking a number of leading roles in the planned cameras and spectrographs for the telescope.”

Director of STFC’s UK Astronomy Technology Centre, Gillian Wright said: “The E-ELT is an enormously exciting and important project that will enable astronomers to study the universe in unprecedented detail. The major UK involvement in the planned first light instrumentation is a result of our world leading scientific and technical capabilities. This deep involvement in the construction phase will ensure that UK scientists are at the forefront of discoveries with the new telescope.”

The UK instrument programme will be delivered in close collaborations between Durham University, the University of Oxford, STFC’s UK ATC and RAL Space, together with other leading international institutes and UK industry. More information on the UK role in the E-ELT can be found here.
Oxsensis wins UK funding bid to develop Aircraft Fuel Systems sensor with Parker Hannifin

Oxsensis has won a grant from the UK governments Technology Strategy Board, worth £425,000, to develop an aircraft Fuel Quantity Indication System with Parker Hannifin and the Science and Technology Facilities Council (STFC), based at the UK Rutherford Appleton Laboratory.

The project known as Silicon based Optical High Accuracy Pressure Sensor (SOHAPS) will be part funded by the grant from the Technology Strategy Board (an executive non-departmental UK government body) over a 2 year period. SOHAPS will deliver a high accuracy multi-parameter optical sensor for the measurement of pressure and temperature within next generation aircraft fuel systems. There is a trend in the aviation industry towards the use of composite materials, particularly in wing construction and therefore the EMI immunity of optical sensors is a major advantage. This improves the intrinsic safety of the fuel system. The sensor technology developed in SOHAPS, has potential to be applied to engine driven lubrication pumps, hydraulic systems, main engine bearings, landing gear and other major systems.

To achieve this goal, Oxsensis has formed a consortium with Parker Hannifin and the Science and Technology Facilities Council (STFC), based at the UK Rutherford Appleton Laboratory. Oxsensis will design the sensor and draw on the expertise of the STFC to model and fabricate novel sensor head elements. Oxsensis will develop the optoelectronics unit required to interrogate the transducer, providing simultaneous measurements of pressure and temperature from multiple sensors. Parker Hannifin, as a prominent supplier of aircraft fuel systems, will define the specification and test the system under representative conditions.

John Drake, Engineering Director at Oxsensis stated, “We are very keen to broaden our technology base to new applications in the aerospace sector such as within the fuel systems. This further demonstrates the maturity of Oxsensis’ technology as well as confirming that our innovative technology fulfils the needs of customers outside our core gas turbine sector. We are delighted to be working alongside Parker Hannifin in this project, supporting the aviation industry.”
Innovations Grants awarded

**Innovations Partnership Scheme (IPS)**

Dr J Velthuis, University of Bristol, entitled ‘Towards a commercial prototype for Cosmic Ray Tomography’

Professor P Ade, Cardiff University entitled ‘Cryogenic solution to providing continuous operation for THz cameras’

**Mini IPS**

Dr D Hall, Open University entitled ‘Feasibility study of a novel high-speed photon-counting X-ray imaging camera with enhanced sensitivity and spatial resolution’

Professor P Nolan, University of Liverpool entitled ‘Improvement of the sensitivity of germanium detectors for safety and security applications’.

**Follow-on Funding**

Dr E Daw, University of Sheffield entitled ‘FAST real time sine wave Locking And trackiNg devicEs (FASTSINE)’

Dr J Lees, University of Leicester entitled ‘Real Time Extremity Dosimetry’

**IPS Fellowship**

Dr A Boston, University of Liverpool

Professor A Holland, Open University
CERN’s Knowledge Transfer group

At CERN, knowledge and technology transfer is part of the Laboratory’s core mission. The support, facilitation and communication of the many forms of knowledge and technology transfer is the mandate of the Knowledge Transfer group.

Composed of around 15 people and led by electronics engineer Giovanni Anelli, the group provides the CERN community with services in the field of Technology Transfer and Intellectual Property management, Life Sciences and Communications related to knowledge transfer. The Technology Transfer and Intellectual Property Management section, led by the aerospace engineer Enrico Chesta, is a service-oriented unit providing support to all CERN technical departments willing to share their individual competencies and innovative technologies with external partners.

To CERN’s inventors, the section offers support in every step of the Technology Transfer (TT) process, through the help of TT officers, a legal adviser and a patent portfolio manager. To bridge the gap between the Laboratory and external partners, the section offers a wide portfolio of technology transfer opportunities.

R&D collaborations allow companies and research institutes to work with CERN’s experts with the objective to generate technological results having a potential for commercial exploitation. Collaborative R&D projects can be developed in CERN’s areas of technical expertise, from superconductivity to ultra-high vacuum, from detectors to ICT. Specific high-tech service, technical advices and studies are available through services and consultancy.

On CERN behalf, the section grants licences to commercial and academic partners for the exploitation of its technologies. A selection of these technologies is available through CERN Easy Access IP, a royalty free licence scheme.

The Life Sciences section, led by biologist Manjit Dosanjh, has the role of identifying which particle physics technologies are interesting for biomedical applications, and of catalysing multidisciplinary collaborations between CERN scientists and researchers from medicine and biology-related areas. Successful examples of these activities are the European Network for Light Ion Therapy (ENLIGHT), coordinated by Manjit Dosanjh, and the Physics for Health (PHE) workshop, which was first held at CERN in 2010.

In 2012 the section was active both in the organisation of the ICTR-PHE conference, born from the merging of Physics for Health with the International Conference on Translational Research in Radio-oncology, and in the feasibility study of a research infrastructure for biomedical applications to be established at CERN, an initiative defined during the first PHE workshop. At the same time, the Life Sciences section actively seeks external funding for research and training in the medical physics field. The focus over the past years has been on hadron therapy, and the section now coordinates three EU-funded projects (PARTNER, ENVISION, and ENTERVISION) as well as one of the three pillars of the EU infrastructure project ULICE.

Communications supports the group activities both inside and outside the Organisation, by providing a coherent presentation of the different examples of knowledge transfer, and highlighting the many opportunities for external partners to benefit from CERN’s technical know-how.

Led by Marina Giampietro, KT’s communications enriches CERN’s well-established channels by addressing key KT audiences, such as CERN’s inventors, commercial and academic partners, and Member States representatives.

Learn more about Knowledge Transfer at CERN:
Meet CERN’s Knowledge Transfer team
Download the ‘Knowledge Transfer 2011’ report
Visit CERN knowledge Transfer website
Contact us

Innovations Newsletter
STFC CASE and CASE Plus Studentships

CASE studentships provide support for students working for a PhD with joint supervision by a member of staff at an academic institution and an employee of a UK industrial firm or an organisation in the public service (the ‘co-operating body’). Institutes and units of Research Councils can act as the co-operating body if they are not eligible to act as an academic partner. UK subsidiaries of foreign firms may be eligible to participate.

STFC will award up to five CASE or CASE Plus studentships to start from October 2011. Proposals need to show the real added value of them being a CASE award and are judged on:

- scientific quality and value of the project
- educational value to the student
- novelty of the idea
- strength of industrial collaboration
- impact on wealth creation and quality of life

CASE studentships: a minimum of three years with at least three months spent on the premises of the co-operating body

CASE Plus studentships: operates in the same way as CASE for the first three years but is followed by a fourth year working full-time on the premises of the co-operating body as an employee.

Application process: Proposals should be submitted by a supervisor from an eligible UK university or research establishment through the Research Council Je-S system at https://je-s.rcuk.ac.uk. The closing date is 30 September 2012 for studentships to start in October 2013.

What are the benefits to the co-operating body?

- Have a PhD student undertaking basic research which you might not be able to resource in house
- Access the latest advances in your sector
- Test the value of collaborative research in a cost effective way
- Build closer links with universities and draw on their expertise and facilities
- Develop the skills and knowledge of your staff

What commitment does the co-operating body need to make?

- Joint supervision of the student
- Contributions £2,760 per annum to the student and £1,550 per annum to the academic institution as a contribution to the costs incurred by the academic partner
- Student placement for a cumulative total of 9 months over a 3.5 year award.

For CASE Plus the co-operating body pays 50% of the student’s salary in the fourth year. STFC will contribute the remaining amount up to a maximum of £14,250.

What are the benefits to the academic partner?

- Gain knowledge and insight about the needs, problems and research agendas outside of higher education
- Build relationships which may result in further collaborative research and funding
- Develop pathways to impact

For further information contact studentships@stfc.ac.uk

Full details of the competition will be available from www.stfc.ac.uk/Funding and Grants/642.aspx
The Square Kilometre Array (SKA) is planned to be the world’s largest and most sensitive radio telescope, capable of helping answer questions about the early formation of the Universe.

After a detailed evaluation process to find the best possible site for this exciting proposed facility, the members of the SKA Organisation today agreed on a dual site solution for the Square Kilometre Array telescope, a crucial step towards building the world’s largest and most sensitive radio telescope.

The ASKAP and MeerKAT precursor dishes will be incorporated into Phase I of the SKA which will deliver more science and will maximise on investments already made by both Australia and South Africa. The majority of SKA dishes in Phase I will be built in South Africa, combined with MeerKAT. Further SKA dishes will be added to the ASKAP array in Australia. All the dishes and the mid frequency aperture arrays for Phase II of the SKA will be built in Southern Africa while the low frequency aperture array antennas for Phase I and II will be built in Australia.

Minister for Universities and Science David Willetts said: “This agreement marks an important phase in the development of the Square Kilometre Array. The decision for a dual site maximises use of the investments already made in both locations. It also ensures that all the great experience already gained can be put to best use designing and delivering the next phase of the project, in which UK scientists will play a key role. I’m grateful to the SKA Members, especially South Africa and the Australia-New Zealand consortium, for their willingness to engage in such constructive discussions, united by a common purpose - delivering inspirational science from the SKA.”

For full details on site selection process please see the SKA project press release.
“This is great news for the UK,” said Paul Alexander, Professor of radio astronomy and Head of the Astrophysics Group at Cambridge University. “SKA will help us to answer questions about how the first stars and galaxies formed after the Big Bang, and how they have evolved, as well as the role of magnetism in the cosmos, the nature of gravity, and possibly even whether there is life elsewhere in the Universe. The prospect of UK scientists like myself taking a leading role in the discovery of such important new science is really exciting.”

Richard Schilizzi, Professor of radio astronomy and Head of the SKA Group in the University of Manchester, added: “The SKA will be one of the top global science projects of the 21st century. The findings of this project will benefit many other areas, such as information and communication technologies (ICT), wireless communication, sensor technology and renewable energy.”

The Science and Technology Facilities Council (STFC) is providing funding for the UK’s involvement in the project’s detailed design phase, enabling UK institutes (Universities of Cambridge, Oxford and Manchester) and industry to participate in the international work collaborations needed to progress SKA to construction readiness. STFC also provides funding to support operation of the SKA Project Office, based at Jodrell Bank Observatory near Manchester.

“This hugely important step for the project allows us to progress the design and prepare for the construction phase of the telescope.” said Dr Michiel van Haarlem, Interim Director General of the SKA Organisation.

STFC Chief Executive Professor John Womersley, who chairs the SKA Board of Directors, said: “This decision was reached after very careful consideration of information gathered from extensive investigations at both candidate sites in South Africa and Australia-New Zealand.”

Factors taken into account during the site selection process included levels of radio frequency interference, the long term sustainability of a radio quiet zone, the physical characteristics of the site, long distance data network connectivity, the operating and infrastructure costs as well as the political and working environment.

The agreement was reached by the Members of the SKA Organisation who did not bid to host the SKA (the United Kingdom, Canada, China, Italy, the Netherlands). The Office of the SKA Organisation will now lead a detailed definition period to clarify details of the implementation.

Scientists and engineers from the UK and around the world, together with industry partners, are participating in the SKA project which is driving technology development in antennas, data transport, software and computing, and power. The influence of the SKA project extends beyond radio astronomy. The design, construction and operation of the SKA have the potential to impact skills development, employment and economic growth in science, engineering and associated industries, not only in the host countries but in all partner countries.
EO Instrumentation Challenges for UAVs & CubeSats –
CEOI/RSPSoc Challenge Workshop
Tuesday 10th July 2012, University of Nottingham

The Centre for Earth Observation Instrumentation (CEOI) will be holding its next Challenge Workshop – Challenges for EO Instrumentation for UAVs & CubeSats on Tuesday 10th July 2012 at the University of Nottingham. This event is being held in association with the Remote Sensing and Photogrammetry Society (RSPSoc).

The challenge workshop will explore the technology and instrumentation challenges for Earth Observation from Unmanned Autonomous Vehicles (UAVs) and CubeSats. There are a number of small and large UAV systems now on the market and recently there has been a growth in interest in use of CubeSats for EO. Both platforms require compact instruments but there has not been a commensurate development in such instrumentation. The workshop’s goal is to bring together EO scientists and instrumentation developers to investigate opportunities for instrumentation and payload development for science and commercial uses. The challenge workshop format includes presentations by leading researchers/technologists and discussion sessions to allow all attendees to contribute.

Further information on this Workshop and a draft agenda are available on the CEOI website via the following link

Another date for your diary ….

The Joint NCEO/CEOI Annual Science Conference will be held at the University of Nottingham from Monday 17th to Thursday 20th September 2012