NEWS RELEASE

Observatory Sciences Limited awarded contract by UK ATC for VISTA telescope primary mirror control system software

*** Observatory Sciences will create software to control 4m mirror of innovative VISTA telescope at the Cerro Paranal Observatory of ESO, the European Southern Observatory.**

(21st August 2003) Observatory Sciences Limited, an independent European provider of astronomy and astrodynamics consultancy and systems, has been awarded a contract by the UK Astronomy Technology Centre (UK ATC), to design and implement the primary mirror control software for the VISTA telescope. A good track record of on-time within-budget delivery in this specialist area was an important aspect of Observatory Sciences' bid in the competitive tender.

VISTA, the Visible and Infrared Survey Telescope for Astronomy, is a 4.1m diameter wide field of view telescope to be completed in 2006. It will become the world's largest and most effective facility for making sky surveys using the largest infrared camera ever constructed and will become part of the Cerro Paranal Observatory of the European Southern Observatory (ESO) located at an altitude of 2635m, in the Atacama Desert, Chile, which offers the darkest, clearest, driest and most stable skies accessible in the Southern Hemisphere. Construction of VISTA is financed by a grant from the UK's Particle Physics and Astronomy Research Council (PPARC) to the VISTA Consortium of 18 UK universities led by Professor Jim Emerson of Queen Mary, University of London. UK ATC are responsible for managing production of VISTA for the VISTA Consortium.

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VISTA's primary goal is to produce infrared surveys of large regions of the southern sky to levels 10-100 times fainter than existing surveys, mapping the faint stars and galaxies in the Universe over a much larger volume of space and much more quickly than has previously been possible. These surveys will be exploited both to do science directly and to select promising candidates for detailed study by the four 8.2m Unit Telescopes comprising the ESO VLT (Very Large Telescope).

VISTA's novel optical design optimises the telescope and camera as a single instrument to cover ~0.4 square degree of sky (equivalent to about twice the size of the full Moon) with each exposure of its infrared camera (64 million infrared sensitive picture elements or pixels each of size 0.34 arc seconds) allowing it to obtain deep images of large areas of sky in a short time. The design has an unusually highly curved (f/1) primary mirror of 4.1m diameter whose shape stability will be a dominant factor determining the image quality achieved. High image quality is crucial as it affects the faintness of objects that can be detected, as well as how well structural detail in extended objects can be determined. The mirror needs to be thin to reduce its weight, yet strong enough to be held in shape by the active mirror support system against the effects of gravity in various telescope orientations, and of wind load.

Observatory Sciences' contract with UK ATC is for the design and implementation of the software which will adjust the position and shape of the VISTA telescope's primary mirror. The mirror control system hardware consists of a set of 84 supports which carry a share of the external forces during changing conditions. These include different telescope positions and variable wind gusts as well as gravity. As the telescope changes position, so the loads on the primary mirror alter. At a rate of 50 times a second, the software will calculate the forces to be applied by the active supports to compensate for the ongoing changes and ensure that the mirror maintains optimal shape for best possible image quality at all times.

"Observatory Sciences is experienced in designing and producing software used to control large telescopes. For example, the company was responsible for several telescope and instrument control systems software projects for the Gemini 8m telescope. This was an important factor in our selection of Observatory Sciences as the winner of the competitive tender for this part of VISTA," commented Malcolm Stewart, head of software at UK ATC.

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"Observatory Sciences' work will be crucial to realising the image quality inherent in the VISTA design, and hence in enabling us to make the many new discoveries expected from our surveys," commented Jim Emerson of Queen Mary, University of London, the VISTA Consortium Director.

"We are delighted to have been chosen to work with UK ATC on this project. VISTA is a ground-breaking new telescope which will offer astronomers the possibility of making highly exciting discoveries," said Philip Taylor, director, Observatory Sciences.

Technology details

The control system will use VME-based hardware running Wind River's VxWorks on a Power PC processor. The higher level software will run on a Hewlett-Packard Unix workstation. Communications to the control hardware will be via CANbus (Control Area Network bus).

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Observatory Sciences Limited: Notes for editors

Observatory Sciences Limited is an independent UK-based company which provides consultancy and systems to scientific research organisations and technical clients. It specialises in developing integrated observing and observation analysis systems, including software for the control of telescopes and instruments used in space and astronomy. The company offers extensive experience of employing the latest technologies in the design, commissioning and operation of major astronomical facilities.

Observatory Sciences provides complete project management and support for public and private sector clients — among them the UK Ministry of Defence; the Gemini Observatory; UK Astronomy Technology Centre (UK ATC); Defence Evaluation and Research Agency (DERA), now Defence Science & Technology Laboratory (DSTL); the Royal Observatory Greenwich; Natural Environment Research Council (NERC); British National Space Centre (BNSC) — in areas which include:

- Design and development of instrument and equipment control software
- Astrodynamics and satellite tracking consultancy
- Data assessment and analysis systems
- Embedded systems design, programming, management of outsourced production
- Systems procurement and integration
- Facility management and operation
- Robotic/remote data acquisition
- Feasibility surveys
- Training and skills transfer
- Systems maintenance and upgrade
- Performance audits
- Problem analysis and holistic solution recommendation.

Observatory Sciences has unusual depth and breadth of expertise in the development, management, delivery and operation of astronomical and space-related projects, and a track record of success. The company has grown steadily since its launch in 1998.

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The UK Astronomy Technology Centre is located at the Royal Observatory, Edinburgh (ROE). It is a scientific site belonging to the Particle Physics and Astronomy Research Council (PPARC). The mission of the UK ATC is to support the mission and strategic aims of PPARC and to help keep the UK at the forefront of world astronomy by providing a UK focus for the design, production and promotion of state of the art astronomical technology. The UK ATC manages the VISTA project on behalf of the Particle Physics and Astronomy Research Council.
Website: www.roe.ac.uk/atc/

The VISTA Consortium is led by Queen Mary University of London and consists of: Queen Mary University of London, Queen's University of Belfast, The University of Birmingham, University of Cambridge, Cardiff University, University of Central Lancashire, University of Durham, The University of Edinburgh, University of Hertfordshire, Keele University, Leicester University, Liverpool John Moores University, University of Nottingham, University of Oxford, University of St Andrews, University of Southampton, University of Sussex, University College London.

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The European Southern Observatory (ESO) is an intergovernmental, European organisation for astronomical research. It has ten member countries. ESO operates astronomical observatories in Chile and has its headquarters in Garching, near Munich, Germany.
Website: www.eso.org