

Impact summaries from grants received between 21/04/09 – 04/11/09 which have now started

Grant Reference	Proposal Received	Principal Investigator & Research Organisation	Impact Summary
ST/H003525/1	10/06/2009	Dr R Ambrosi, Leicester	The extended phase B will enable the UK team to explore the design changes needed to the detector assembly in order to meet the new scientific and engineering requirements that will emerge from the redefined ExoMars mission. The design changes may have an impact on the format of CCD selected for the flight programme.
ST/H003568/1	16/06/2009	Dr J Pye, Leicester	<p>For astronomers worldwide: JWST will be the premier astronomical observatory of the next decade, from its launch in 2014. Specifically, MIRI will provide a major step forward in imaging and spectrometry in the mid-infrared. Observing time on JWST will be open to competitive proposals.</p> <p>For astronomers in the European Consortium developing MIRI: there will be opportunities for involvement in the JWST Guaranteed-Time observation programme.</p> <p>For the institutes and countries involved in developing MIRI: the project provides extension of current expertise in order to deliver a 'next generation' instrument, utilising the varied heritage and skills of the institutes and their staff, in the areas of science, engineering and management.</p> <p>For industry in the EU (including the UK): it provides engineering challenges to provide the MIRI sub-assemblies. The University of Leicester has procured major equipment items for hardware under its responsibility with several engineering companies around the UK, especially those that specialise in low-volume, high-precision items. It has fostered a close working relation with these companies, and appreciation of possible areas for Knowledge Exchange.</p> <p>For engineering and technical staff at the University: the development of MIRI has provided substantial professional development both in engineering skills and their application, and in interpersonal and management skills in working successfully in a large, multi-national team, and with frequent liaison with staff at ESA and NASA.</p> <p>For the general public (of all ages): University staff are actively involved in public-engagement activities which feature JWST. It is expected that the relevant agencies (NASA, ESA, STFC ...) will heavily publicise JWST results in the same way that NASA has for the Hubble Space Telescope. The University will expect to play an active role in PR, alongside these agencies. The University has close links with the National Space Centre.</p> <p>For government and its agencies: the MIRI project provides an excellent example of a well-run, large, complex, long-duration, multi-national project at the fore-front of science.</p>

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ST/H003614/1	22/06/2009	Dr W Pike, Imperial College	<p>Communications and Engagement. We will be engaging with the planetary science community, the seismological community, the general public and the education sector. Past work as part of the ExoMars community has already created good links with other planetary science researchers in the UK, Europe and the World. This engagement will continue through the UK Micropenetrometer Consortium. The first steps to engaging the UK seismological community have been made and SEIS-UK has been supporting our existing test activities. The public have been engaged through broadcast and web media on the major news outlets. We expect this public outreach to continue and grow. The PI has given many talks on the microseismometer and planetary exploration in general to local schools and schools throughout the UK that have visited Imperial as part of the College's outreach activities.</p> <p>Collaboration The major collaboration in this work is between Imperial and Oxford. Imperial will be responsible for the fabrication of the micromachined sensors and preliminary testing. Oxford will develop the electronics and perform testing on the integrated system. A wider group of collaborators is in the UK Micropenetrometer Consortium which was established with MSSL as the lead organization. The Consortium holds regular workshops and maintains a website and has organized systems tests such as a rocket-sled impact test at Pendine last year. The Oxford collaboration is a well established collaboration with previous work done on for the ExoMars SEIS instrument and NetLander Mars mission. The Micropenetrometer Consortium is two years old.</p> <p>Exploitation and Application The original design for the microseismoemter came out of a research contract with Kinemetrics Inc, Pasadena, CA, USA (KMI) and two patents have been filed by KMI. KMI have granted a license to Imperial and Oxford to develop the design for space applications. Outside of the commercial area of interest of KMI and its parent company, there is scope to apply this technology to other areas, and KMI. Patent protection will be sort as appropriate - Imperial Innovations, Imperial's technology transfer office, has an excellent track record of helping protect and develop technology as it becomes available.</p> <p>Capability The impact activities will mainly be undertaken by the PI both as a member of the various collaborations outlined above as well as through individual media activities.</p>
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ST/H003622/1	23/06/2009	Prof M Sims, Leicester	<p>The Life Marker Chip instrument has many applications both in terms of terrestrial science and potential commercial applications.</p> <p>Variations of the LMC could be used to look for Life in extreme environments on Earth e.g. glaciers, sub-glacial lakes.</p> <p>Regarding terrestrial applications of the technology, our initial thoughts on potential markets and a brief summary of the potential applications are described below.</p> <ol style="list-style-type: none"> 1. Medical diagnostics. The device could be used for the detection of biomarkers indicative of different diseases or medical condition. Potential for rapid diagnosis in doctors' surgery, or at patient bedside. Such a device could have applications in the developing world. 2. Bio, chemical and radiological defence. Potential for rapid real time detection of toxic airborne and/or surface contaminants on the front line. 3. Veterinary Medicine. Rapid in field detection of animal infection 4. Oil/mineral exploration. On site analysis of geological samples 5. Forensic analysis. Potential for real time sample analysis at scene of crime. Road side testing for drug impaired drivers. 6. Environmental monitoring. Local air quality monitoring, detection of pollutants. On site sampling of river water quality. 7. Product and Production Monitoring. Potential use in product quality sampling (incoming goods, process monitoring, output product quality monitoring)
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ST/H003886/1	14/07/2009	Dr I Hutchinson, Leicester	<p>High performance, compact, space qualified CCD cameras will continue to have many important applications in the fields of astronomy, earth observation and planetary exploration. The Raman camera development will strengthen the UK's position by pushing the state-of-the-art in this area still further. The potential terrestrial applications of a compact, rugged and low power Raman spectrometers are many. Some important potential applications include: 1. Geological fieldwork / The identification of minerals and geomarkers 2. Forensic science / Prof Edward's team at Bradford are currently evaluating Raman spectroscopy for forensic crime-scene analysis and for the detection of contraband biomaterials (e.g. drugs of abuse, ivory, animal products and resins) and precursors to explosives manufacture. Results from the testing and characterisation of the portable instrument will be published and presented at conferences in order to ensure that industry (and collaborators) will have the opportunity to benefit from this research.</p>
ST/H004025/1	27/07/2009	Prof A Coates, University College London	<p>The investigation team and the wider ExoMars team will benefit from the context and scientific information provided by the PanCam data from Mars. UK and European planetary science community will benefit from the colour, multispectral and digital terrain model (DTM) data, from the surface of Mars.</p> <p>PanCam images from the surface of Mars will have high value for public outreach and appreciation of science. They are the most immediate way of appreciating the rover surroundings during the mission. In addition the DTM data can be made accessible to the public via a standard web browser interface to allow them to explore the surface of Mars (as seen by the rover). We are keen to assist with media enquires and will provide frequent updates to a UCL PanCam website during development.</p> <p>PanCam data will be valuable for educational resources and presentation to school children. This is exactly the type of information to enthuse the next generation of scientists and engineers. Preparations and testing of data distribution networks will start towards the end of the instrument development phase.</p> <p>In addition to instrument-based activities we will participate fully in ESA outreach and PR plans.</p> <p>UK industry will directly benefit from provision of the filters. In addition we will investigate low-cost ground-based applications for this technology in resource monitoring and environmental protection areas.</p>

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ST/H004165/1	27/08/2009	Dr M Irwin, Cambridge	<p>A key objective of the Vista Data Flow System (VDFS) is to provide cost-effective and timely delivery of vital science data and service products from the ESO VISTA telescope to the UK community in general, and in particular, to the UK PIs of the ESO Public Surveys. The broad reach of these data products and the accompanying processing expertise will be a fundamental input in the research of the majority of UK astronomers and graduate students and will benefit a wide range of end users:</p> <ul style="list-style-type: none"> - The UK and European astronomical research community will benefit from access to relevant, high quality, science data products, produced with the CASU processing system, ranging from VISTA and VST at ESO, to future missions such as the Dark Energy Survey, thus enabling them to carry out a wide range of competitive astrophysical research programmes. - Many of the techniques developed by CASU (definition of advanced algorithms used in the mining of outliers in large datasets, statistical methods, calibration frameworks, analysis of large multi-dimensional, temporal data) will have wider applicability across other scientific domains. - The Global Virtual Observatory projects in the UK and Europe will benefit from these major new fundamental science data products that will be delivered into the Virtual Observatory from CASU. - STFC will benefit from the investment in supporting a UK Leadership role in these optical/ near-infrared data processing activities, which will bring significant scientific leverage into the UK astronomy exploitation of these missions. - UK astronomy instrumentation groups will benefit, since the photometric and spectroscopic data processing and pipeline systems developed will have wider relevance. Thus new instrument designs could take advantage of CASU processing components adapted to meet the demands of their data flow needs. The VDFS project has an overall integrated management structure involving external agents such as the VISTA PI, a representative from the UK PIs of the public surveys, in addition to members of the CASU and WFAU groups. <p>Communication and engagement with the wider community is via helpdesk systems, web pages, and periodic meetings with the user community. As an example, as soon as VISTA is formally handed over and Science Verification is complete, we will be organising a meeting with all VISTA public survey PIs and their representative to disseminate knowledge gleaned to date on the VISTA system and its properties as relevant to impact on science products. This is expected to develop into a similar forum that has been successfully deployed for UKIDSS survey on UKIRT-WFCAM.</p>
ST/H004181/1	01/09/2009	Prof A Coates, University College London	<p>Team development and technology development for plasma instrumentation for the Europa-Jupiter System Mission. This mission represents humankind's next step in exploring the outer solar system and the technology development proposed will allow the team to propose the instrument in 2011 with an increased TRL. The mission will also be of high interest to the public and the proposers have significant experience in outreach activities. The proposal will develop techniques which may eventually benefit UK industry via collaborative activities.</p>

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ST/H004211/1	08/09/2009	Dr R Mann, Edinburgh	<p>The focus of WFAU's work is to support and enhance the research undertaken by professional astronomers, but its likely beneficiaries include a wider community of academics from other disciplines, companies in the commercial IT sector, educators and members of the general public: we address each of these classes of beneficiaries in turn.</p> <p>Academics from other disciplines</p> <p>Astronomy is ahead of many disciplines in developing, and adhering to, standards for recording metadata and for aiding interoperability between data resources. WFAU staff are in demand, therefore, as speakers at multi-disciplinary workshops (e.g. those organised by the Digital Curation Centre and the e-Science Institute) to describe the Unit's work as an example of best practice in scientific data curation. WFAU has also provided detailed material for case studies developed by the DCC and several academic and commercial organisations producing reports on aspects of data curation (e.g. for JISC). This engagement with wider data curation community will continue under the aegis of this grant, with WFAU disseminating best practice through publications in the data curation literature and further workshops: these are typically made available on the WWW, and so can be of benefit to a wider community of researchers.</p> <p>WFAU enjoys a long-standing collaborative relationship with computer science (CS) researchers in the University of Edinburgh's School of Informatics, as aspects of our work provide either demanding applications of new CS techniques or the stimulus for new methods. This interaction has led to the publications in the CS literature in the areas of machine learning, data management and multi-agent systems, and we intend to continue this collaboration through this grant.</p> <p>The commercial IT sector</p> <p>WFAU's sky survey curation activities produce challenging computational requirements. On the hardware side, we intend to continue our long-standing relationship with a local hardware supplier, Eclipse Computing of Lugar, Ayrshire, who have, in the past, lent us hardware to prototype high-performance databases systems and collaborated with us in their evaluation. In this way, they can continue to exploit our motivation for building systems meeting our requirements as a means to develop expertise that they can deploy in commercial settings that have similar workloads to our own.</p> <p>On the software side, we intend to become involved in the SciDB (www.scidb.org) initiative, which is developing a new open source data management system which extends the relational model: this would secure UK involvement in the development of this exciting new technology and aid its adoption by UK companies in domains (e.g. oil exploration, pharmaceuticals) facing similar data management and analysis scalability challenges.</p>
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			<p>Educators and the general public</p> <p>WFAU has an established record in outreach, inherited from its previous incarnation as the UK Schmidt Telescope Unit (UKSTU) of the ROE. WFAU staff provide popular computer-based displays at the annual ROE Open Days, and these will be enhanced during the period of this grant through use of new technologies, such as Google Sky and Microsoft's WorldWide Telescope. These technologies could be developed for outreach purposes in two ways: (i) firstly, we could post online static KML files that users could upload into their Google Sky installation and view a guided tour of highlights of WFAU-curated sky survey datasets, with explanatory text for educators, providing an updated version of the widely-used teaching packs produced by UKSTU; (ii) for more serious amateur astronomers we could generate KML files dynamically from queries against our databases, so that they could interact with our data through the medium of Google Sky. By presenting astronomical data in a readily accessible format, using modern computational techniques, this could aid development of IT skills, as well as dissemination of information about astronomy.</p>
ST/H004254/1	10/09/2009	Prof P Roche, Oxford	<p>The most direct beneficiaries are the UK astronomers and their collaborators who use the Gemini telescopes for their research.</p> <p>We will maintain our support for Public Outreach and work to publicise the results obtained from Gemini.</p> <p>Indirect benefits will result from the continuity of the UK agreement to support Gemini until at least the review point in 2012 specified by the International Agreement.</p>