



Welcome to the first issue of the annual newsletter from the Mullard Space Science Laboratory – UCL's Department of Space and Climate Physics. This newsletter aims to give an overview of the international space activities in which MSSL has been involved over the last year.

Next event: Summer Open day on 2nd September 2006 – see back page.

RECENT HIGHLIGHTS

New Laboratory Director

2005 saw in a new Director, Prof. Alan Smith. Alan replaced Prof. Keith Mason who took on the prestigious role of Chief Executive and Deputy Chair of the Particle Physics and Astronomy Research Council. With a background in astrophysics Alan has worked at MSSL for over 15 years. His most recent roles include Director of the Centre for Advanced Instrumentation Systems and Director of Space Applications for the Smart Optics Faraday Partnership.



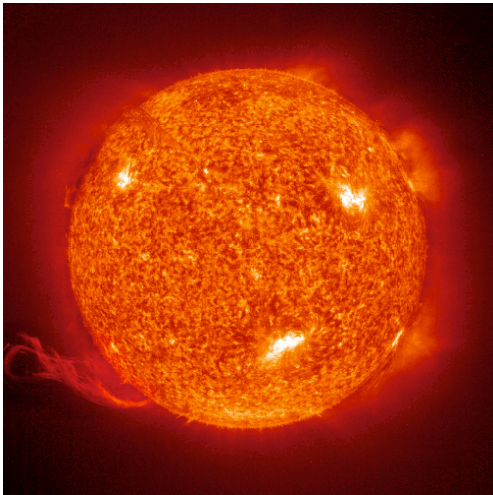
Global Drought Monitor

On 22nd November 2005 a global drought monitor was launched. This is a free Internet application that monitors the severity of drought worldwide on an ongoing basis. The product will aid humanitarian relief by assisting warnings of potential food, water and health problems. The Global Drought Monitor will also benefit the general public, government and industry by improving awareness of droughts and their impacts. Further information can be found on the website:

<http://drought.mssl.ucl.ac.uk>.

10 Years in the Sun

The world's flagship solar mission, SOHO, celebrated 10 years in space on 2nd December 2005. In total there are 12 instruments on board SOHO which probe the Sun's every detail. The Coronal Diagnostic Spectrometer (CDS) is led from the UK and carries the Grazing Incidence Spectrometer (GIS) which was designed and constructed at MSSL. GIS contributes to the mission science by determining the characteristics of the hot charged gasses of the Sun's atmosphere such as the temperature, density and the ratios of constituent chemical elements.



SOHO observes the Sun from a special vantage point known as L1. This region is 1.5 million km away from the Earth toward the Sun and gives continual coverage of the Sun so scientists now have uninterrupted observations of our local star for a complete solar cycle.

Image copyright: Courtesy of SOHO/EIT consortium. SOHO is a project of international cooperation between ESA and NASA

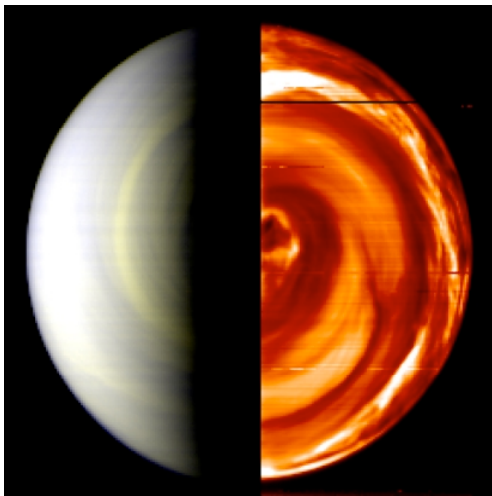
Deep Impact

One the most dramatic events of 2005 was the dare-devil collision of a washing machine sized probe with comet Tempel 1. The mission, called Deep Impact, was a NASA mission but was watched by astronomers all over the world as it gave the first glimpse of the interior of a comet. MSSL contributed by studying the event in optical, ultraviolet and X-ray wavelengths using ground-based telescopes and the Swift satellite. The observations revealed the comet to be much more loosely held together than previously expected, indicated by the huge amount of material ejected in the collision. Because so much material was thrown out, the accompanying spacecraft could not see the crater formed! The newly liberated material produced X-rays as it interacted with the solar wind. These X-rays were detected by the Swift satellite.

Swift's "day job" is detecting distant, natural explosions called gamma-ray bursts the largest explosions in the Solar System since the Big Bang. The bursts can occur anywhere in the sky and the satellite must manoeuvre itself to the correct location in only seconds. Swift's extraordinary speed and agility enabled scientists to follow Tempel 1 day by day to see the full effect of the Deep Impact collision.

Express to Venus

On 11th April this year the European Space Agency's Venus Express mission finally reached the Earth's sister planet after a 5 month journey. A team at MSSL helped build ASPERA-4, an instrument onboard that will explore one of the key differences between Venus and Earth. Venus lacks a magnetic field which means its atmosphere escapes as the solar wind (a gale of charged particles from the Sun) erodes the unprotected gases. The first data are been taken and analysed by a team at MSSL. In particular the scientists are looking to understand the fundamental processes taking place, including how electrons produced by sunlight at the top of the atmosphere might pull the atmosphere away.



Venus Express carries onboard an instrument that peers below the thick Venesian clouds using a 'window' in the infra-red portion of the spectrum. The image to the left is a composite of the day half (left) and night half of the planet (right). The day half shows sunlight reflected from the tops of clouds, whereas the night portion is seen by peering below the cloud using the infra-red window.

Image copyright: ESA/CNR-IASF, Rome, Italy, and Observatoire de Paris, France

The Universe at Your Computer

The huge datasets being generated by modern astronomy have led to the development of a new tool for researchers, the virtual observatory (VO). The VO brings together a worldwide grid of space science data, applications, computational power and storage. UK scientists can access these resources through AstroGrid, currently under development by staff at MSSL. AstroGrid provides a simple mechanism for searching hundreds of astronomy and solar data centres around the world. Scientists can then download the data to their own computers, upload it to AstroGrid's "virtual storage space" or run the data in specialised visualisation applications. Previously, scientists that wanted data from multiple satellites or ground-based telescopes had to request files from individual data centres; AstroGrid allows users to search all VO-enabled data centres with a single request. The software combines powerful concepts such as consolidated data searches, reusable workflows, remote processing and storage capabilities which perform the mundane tasks of data analysis leaving more time for the scientist to concentrate on science. For more information, please visit:

<http://www.astrogrid.org>.

LOOKING FORWARD

Summer Open Day

MSSL is inviting alumni to attend an open day to discover the latest research taking place together with current and future missions. A programme will be sent to interested parties closer to the time. The open day will be held on 2nd September 2006 at 2pm and talks, children's activities and a BBQ will be on offer. Please contact Libby Daghorn for more information and free tickets:

E-mail: ead@mssl.ucl.ac.uk
Phone: 01483 204100

Solar-B

The next major launch for MSSL will be the Japanese-UK-US mission Solar-B. This mission is the daughter of the hugely successful Yohkoh satellite which observed the X-ray Sun for a solar cycle. The launch date is currently set for late summer 2006 with the blast off from Uchinoura Space Center at Uchinoura Kagoshima. MSSL has a long history of developing space instrumentation and is responsible for the Extreme Ultraviolet Imaging Spectrometer onboard. The main aim of Solar-B is to provide a new and comprehensive view of the dynamic solar atmosphere.

New Facilities

MSSL is currently embarking on two ambitious projects to provide state-of-the-art calibration facilities and a new laboratory onsite. The calibration facilities will include two calibration chambers in which instrumentation will be tested to ensure they are ready for the harsh space environment. They will be the best of their kind in the country. The new laboratory will make MSSL's advanced science base available to a broader science community which in the first instance includes the search for the mass of the neutrino; the aim of the SuperNEMO project. Instrumentation for this project will be built at MSSL.

Staying Connected

For more up-to-date news stories from MSSL see our News web pages:

www.mssl.ucl.ac.uk and click on 'MSSL News'

