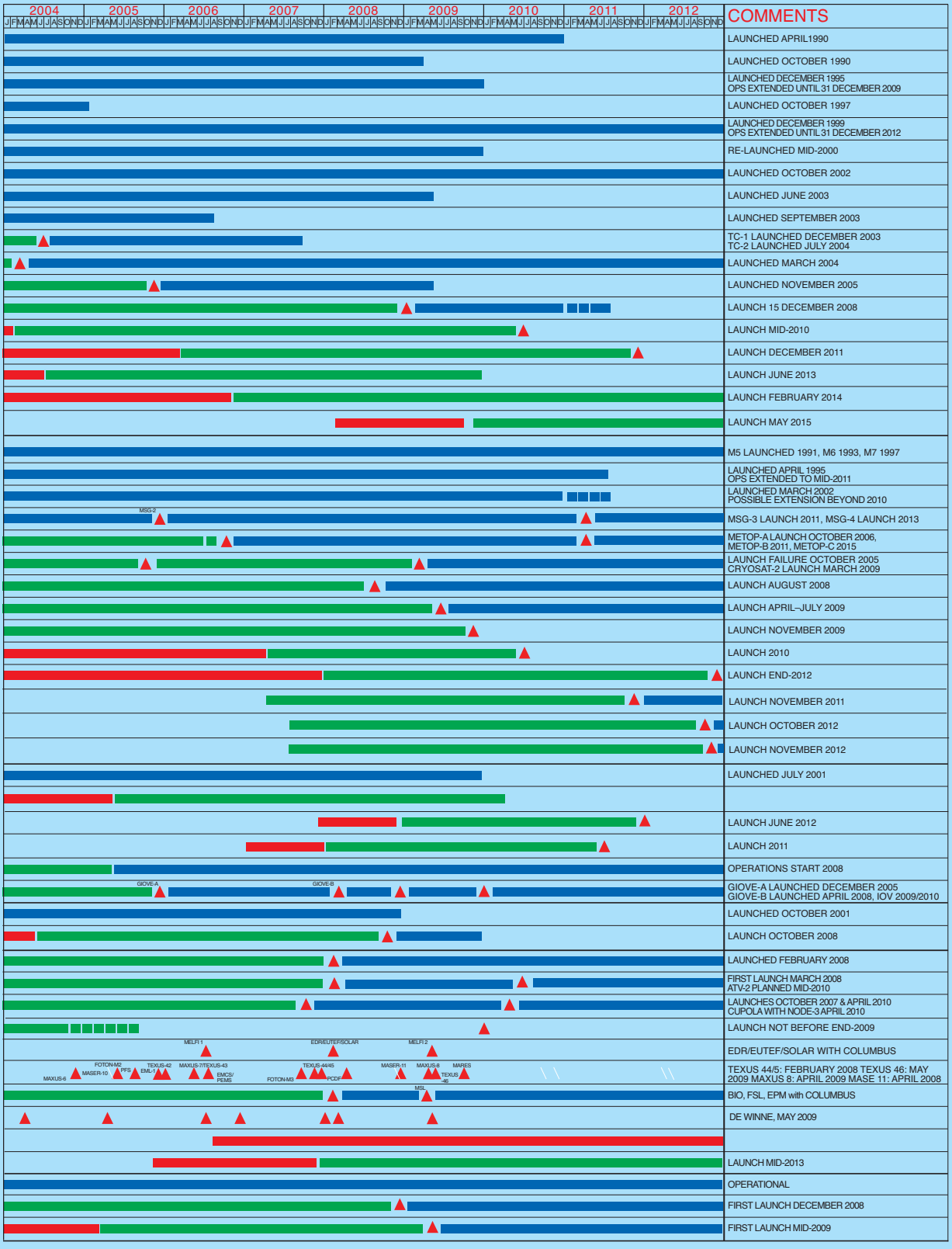
Programmes in Progress

Status mid-May 2008

	PROJECT
SCIENTIFIC PROGRAMME	SPACE TELESCOPE
	ULYSSES
	SOHO
	HUYGENS
	XMM-NEWTON
	CLUSTER
	INTEGRAL
	MARS EXPRESS
	SMART-1
	DOUBLE STAR
	ROSETTA
	VENUS EXPRESS
	HERSCHEL/PLANCK
	LISA PATHFINDER
	GAIA
	JWST
	BEPICOLOMBO
	SOLAR ORBITER
EARTH OBSERVATION PROGRAMME	METEOSAT-5/6/7
	ERS-2
	ENVISAT
	MSG
	METOP
	CRYOSAT
	GOCE
	SMOS
	ADM-AEOLUS
	SWARM
	EARTHCARE
	SENTINEL-1
	SENTINEL-2
	SENTINEL-3
COMMS./NAV. PROGRAMME	ARTEMIS
	ALPHABUS
	ALPHASAT
	SMALL GEO SAT.
	GNSS-1/EGNOS
	GALILEO
TECHNOL PROG.	PROBA-1
	PROBA-2
HUMAN SPACEFLIGHT, MICROGRAVITY & EXPLORATION PROGRAMME	COLUMBUS
	ATV
	NODE-2 & -3 & CUPOLA
	ERA
	ISS BARTER & UTIL. PREP.
	EMIR/ELIPS
	MFC
	ASTRONAUT FLT.
	AURORA CORE
	EXOMARS
LAUNCHER PROG.	ARIANE-5
	VEGA
	SOYUZ AT CSG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COMMENTS
LAUNCHED APRIL1990
LAUNCHED OCTOBER 1990
LAUNCHED DECEMBER 1995
OPS EXTENDED UNTIL 31 DECEMBER 2009
LAUNCHED OCTOBER 1997
LAUNCHED DECEMBER 1999
OPS EXTENDED UNTIL 31 DECEMBER 2012
RE-LAUNCHED MID-2000
LAUNCHED OCTOBER 2002
LAUNCHED JUNE 2003
LAUNCHED SEPTEMBER 2003
TC-1 LAUNCHED DECEMBER 2003
TC-2 LAUNCHED JULY 2004
LAUNCHED MARCH 2004
LAUNCHED NOVEMBER 2005
LAUNCH 15 DECEMBER 2008
LAUNCH MID-2010
LAUNCH DECEMBER 2011
LAUNCH JUNE 2013
LAUNCH FEBRUARY 2014
LAUNCH MAY 2015
M5 LAUNCHED 1991, M6 1993, M7 1997
LAUNCHED APRIL 1995
OPS EXTENDED TO MID-2011
LAUNCHED MARCH 2002
POSSIBLE EXTENSION BEYOND 2010
MSG-3
MSG-3 LAUNCH 2011, MSG-4 LAUNCH 2013
METOP-A LAUNCH OCTOBER 2006,
METOP-B 2011, METOP-C 2015
LAUNCH FAILURE OCTOBER 2005
CRYOSAT-2 LAUNCH MARCH 2009
LAUNCH AUGUST 2008
LAUNCH APRIL–JULY 2009
LAUNCH NOVEMBER 2009
LAUNCH 2010
LAUNCH END-2012
LAUNCH NOVEMBER 2011
LAUNCH OCTOBER 2012
LAUNCH NOVEMBER 2012
LAUNCHED JULY 2001
LAUNCH JUNE 2012
LAUNCH 2011
OPERATIONS START 2008
GIOVE-A
GIOVE-B
GIOVE-A LAUNCHED DECEMBER 2005
GIOVE-B LAUNCHED APRIL 2008, IOV 2009/2010
LAUNCHED OCTOBER 2001
LAUNCH OCTOBER 2008
LAUNCHED FEBRUARY 2008
FIRST LAUNCH MARCH 2008
ATV-2 PLANNED MID-2010
LAUNCHES OCTOBER 2007 & APRIL 2010
CUPOLA WITH NODE-3 APRIL 2010
LAUNCH NOT BEFORE END-2009
MELFI 1
EDR/EUTEF/SOLAR
MELFI 2
EDR/EUTEF/SOLAR WITH COLUMBUS
MAXUS-6
FOTON-M2
MASER-10
PFS
EML-1
TEXUS-42
MAXUS-7/TEXUS-43
EMCS/
PEMS
FOTON-M3
TEXUS-44/45
PCDF
MASER-11
MAXUS-8
TEXUS
-46
MARES
TEXUS 44/5: FEBRUARY 2008 TEXUS 46: MAY 2009 MAXUS 8: APRIL 2009 MASE 11: APRIL 2008
MSL
BIO, FSL, EPM with COLUMBUS
DE WINNE, MAY 2009
LAUNCH MID-2013
OPERATIONAL
FIRST LAUNCH DECEMBER 2008
FIRST LAUNCH MID-2009
DEFINITION PHASE
LAUNCH/READY FOR LAUNCH
MAIN DEVELOPMENT PHASE
OPERATIONS
STORAGE
ADDITIONAL LIFE POSSIBLE

Ulysses

The third northern solar polar pass was completed on 15 March. In spite of the reduced data rates following the X-band anomaly in mid-January and the transition to an S-band mission, key parameters characterising the solar wind, magnetic field and energetic particles continued to be measured. The picture that emerges shows great similarity to that observed in 1995, during the first northern polar pass, with the spacecraft immersed in the fast solar wind flowing from the Sun's northern polar coronal hole.

Efforts to delay hydrazine freezing will continue in the coming months. It is very difficult to estimate exactly when the hydrazine will freeze since predictions are based on thermal modelling rather than actual temperature measurements in telemetry. However, a projected mission operations end date of 1 July 2008 has been agreed. It is possible that operations could continue beyond that date but it is also possible that the mission will end earlier.

Once freezing occurs, it may be possible to thaw the fuel again for a while by switching off instruments but the science mission will essentially be over. When thawing is no longer possible, the loss of manoeuvrability will result in an increasing Earth off-pointing angle and the loss of telemetry after about a week.

SOHO

Barely three months after SOHO observed the first active region of new Solar Cycle 24 on 4 January 2008, old Solar Cycle 23 returned in late March, when three big active regions with magnetic polarity of the old cycle appeared. This suggests that currently there are two solar cycles in progress at the same time.

Solar Cycle 24 has begun, but Solar Cycle 23 has not yet ended. Strange as this sounds, it is perfectly normal. Around the time of solar minimum – i.e., new – old-cycle spots and new-cycle spots frequently intermingle. Eventually Cycle 23 will fade to zero, giving way in full to Solar Cycle 24. Based on this latest spate of 'old' activity, solar physicists think that the next solar maximum probably will not arrive until 2012

XMM-Newton

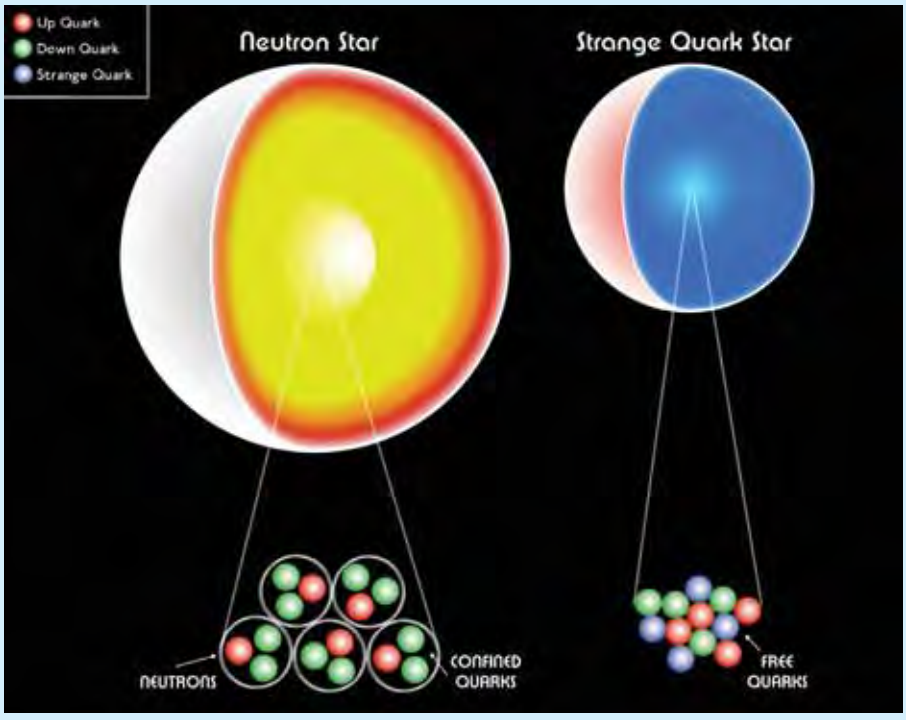
XMM-Newton has given astronomers and physics a valuable new insight into the most exotic stars in the Universe. Known as neutron stars, the composition of these extremely dense stellar objects has always been something of a puzzle. Now, XMM-Newton has revealed that they almost certainly resemble over-sized atomic nuclei whereas other postulated exotic models containing uncommon particles, such as pions, kaons or quarks (quark star), can be excluded.

Astronomers worldwide have reacted very positively to the announcement of the symposium on 'The X-ray Universe 2008' taking place in Granada, Spain, 27–30 May 2008. Abstracts for more than 350 contributions, either talks or posters, have been submitted.

Cluster

The electron diffusion region at the heart of the reconnection process can be 100 times larger than previously expected, revealed scientists at the University of California (Berkeley) (Phan et al.) in *Physical Review Letters*. This study used a combination of Cluster observations and numerical simulations. For the first time, the simulations could use a box large enough to observe this phenomenon. This has an impact on future missions where the

Continuum image, magnetic map and He II 304 Å image showing three big active regions of old Solar Cycle 23 on 27 March 2008, almost three months after the first active region of new Solar Cycle 24 was observed by SOHO on 4 January 2008 (SOHO/MDI, SOHO/EIT, ESA, NASA)



A neutron star/quark star interior. In a neutron star (left), the quarks that comprise the neutrons are confined inside the neutrons. In a quark star (right), the quarks are free, so they take up less space and the diameter of the star is smaller (NASA/CXC/M.Weiss)

reconnection process is a prime scientific objective and these results show that the probability to observe the electron diffusion region is greatly enhanced.

The 15th Cluster/Double Star workshop was held in Tenerife on 9–15 March 2008 and attended by around 120 people. The workshop incorporated the first Cluster Active Archive (CAA) school which aimed at providing the attending community with an in depth overview of the CAA data products and tools. A refereed proceedings book is being compiled.

Double Star

After the recovery of Double Star TC-2 in November 2007, the instruments were switched on and acquired data in December 2007 and January 2008. Instrument operations were then interrupted during the eclipse season starting end January until end March. In April, data return has started slowly with a data return of 4 hours per 12-hour orbit. In May the power on board the spacecraft will increase and full orbit instrument operations are planned.

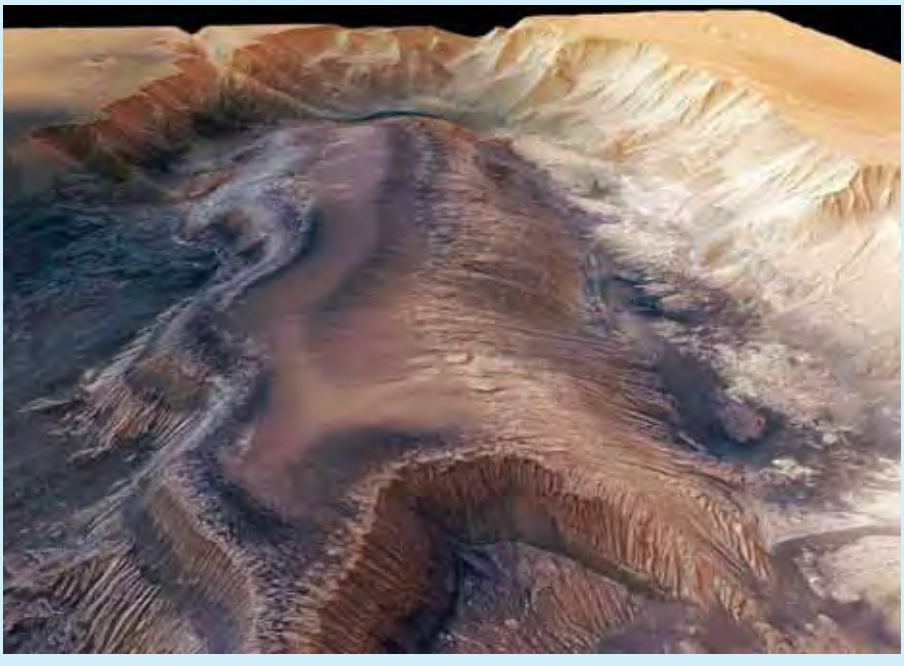
Integral

The peer review process of the proposals received in response to the Announcement of Opportunity AO-6 for Integral open time 'Key Programme' observations was completed in January 2008. The TAC recommended Key Programmes were approved by ESA's Director of Science. The Announcement of Opportunity AO-6 for Integral (standard) open time observing proposals and for proposals on targets associated with the above six Key Programmes, opened on 10 March as scheduled.

Mars Express

Several important scientific papers about Mars were published over the last two months. The first one reported the detection of dust haze in Valles Marineris, observed by HRSC and OMEGA. The haze appeared thinner after three days and disappeared in nine days. It was limited to a 2-km layer at

Perspective view of Hebes Chasma obtained by the High Resolution Stereo Camera (HRSC) on ESA's Mars Express spacecraft. Hebes Chasma is located at approximately 1° South and 282° East. The HRSC obtained image data on 16 September 2005 with a ground resolution of approximately 15 m/pixel (ESA/DLR/FU Berlin (G. Neukum))



the bottom of the canyon. This is a very good example of a multi-instrument study.

The second paper was about atmospheric water vapour above the Tharsis volcanoes, observed by OMEGA. The most striking result is the increase of water vapour mixing ratio from the valley to the summit of volcanoes. The enrichment is possibly generated by the local circulation characteristics of the volcanic region. A third paper focused on a good comparison between model and ultraviolet emissions of CO_2^+ and CO during the summer season at northern mid-latitudes.

Rosetta

The Rosetta mission is proceeding nominally and according to plan. Both the spacecraft and the ground segment are operating flawlessly. After the second Earth swingby, the spacecraft went into a three-month cruise phase with a passive payload check-out successfully executed in early January 2008. The final trajectory correction manoeuvre after the Earth swingby was performed on 21 February 2008.

Several configuration changes took place following the evolution of the Earth and Sun distance. All operations were conducted according to plan. A new TM modulation scheme with higher TM bit rates was validated and is now successfully used.

A test of the asteroid flyby scenario was successfully run in the second half of March. The ground segment has been upgraded to support the new TM bit rates, both at ESA and NASA stations. This will guarantee a higher science data return for the mission.

By the end of March 2008, Rosetta was 65.3 million kilometres (0.43 AU) away from Earth, and 211.65 million kilometres (1.41 AU) away from the Sun. The spacecraft is now in Near Sun Hibernation Mode until July 2008 when it will be reactivated to execute a payload check-out in preparation of the flyby phase at asteroid 2867 Steins with closest approach on 5 September 2008.

Venus Express

A very successful Science Working Team workshop with about 60 participants was held 3–8 March in La Thuile, Italy. Most scientific fields were addressed during the 11 topical sessions and many new results were presented.

Sulphur dioxide (SO_2) has now been detected also above the clouds and at a fairly high temporal and spatial variability. This is of great interest for determining possible present volcanism, however no conclusions have been drawn yet. Possible alternatives could include dynamical (transportation) effects and/or chemical cycles not yet accounted for.

Further new data include detailed multilevel maps of atmospheric circulation, improved understanding of the polar phenomena (including vortex dynamics), three-dimensional thermal structure maps of the atmosphere, surface temperature and emissivity maps derived from spectral window infrared data, high-quality plasma and magnetic field measurements, to mention just a few of the many exciting topics.

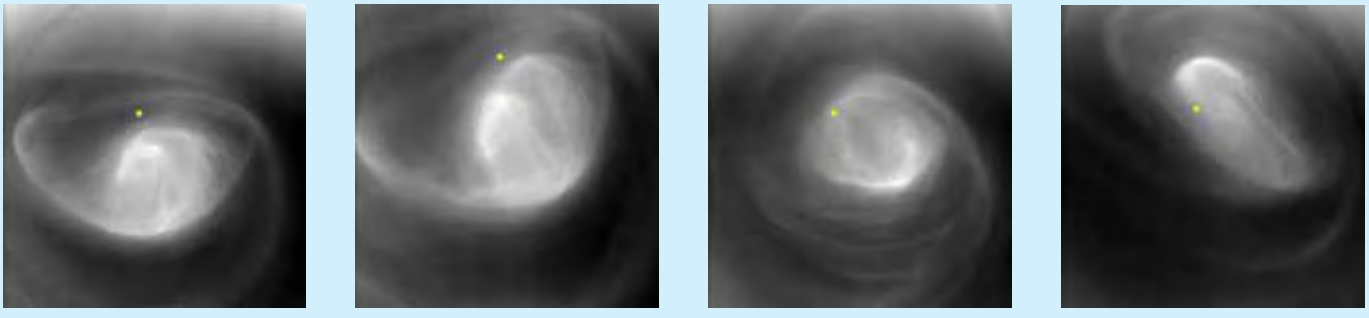
Many of these results are now being written up for papers to appear in two dedicated issues of a major journal. The first issue is expected to appear mid-2008. The total number of papers for these two issues is expected to reach about 60.

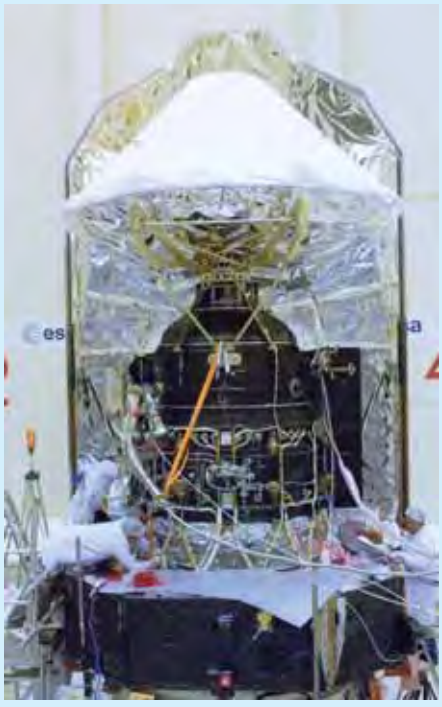
COROT

COROT has been in orbit for more than one year and has in the meantime acquired more than 40 000 light curves with unprecedented length and photometric precisions as precise as 1 part per million for the brightest objects.

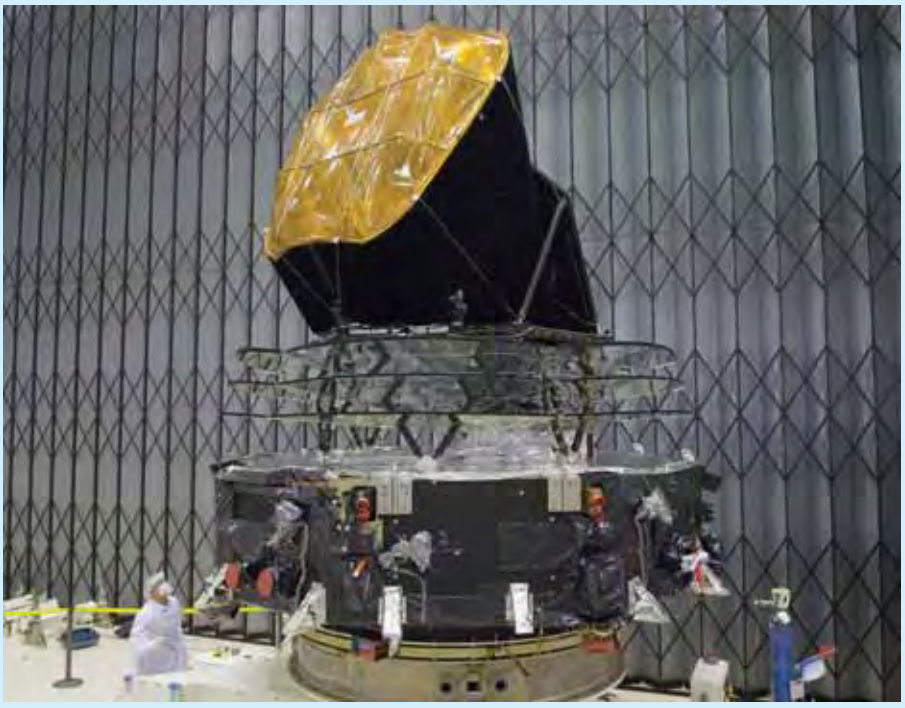
Several hundred extrasolar planet candidates are being followed up from space and the ground, and the first confirmed new extrasolar planets have been reported in scientific journals. The lightcurves of dozens of objects belonging to several different classes of stars are being analysed for the acoustical variations caused by waves

The 'eye of the hurricane' on Venus, as seen by the Visible and Infrared Thermal Imaging Spectrometer (VIRTIS) on board Venus Express. These pictures show a region in the venusian atmosphere about 60 km from the surface, at a wavelength of about 5 μm. In the first image (left), the dipole assumes an eye-like shape and from here until the last image, it is possible to see how its shape evolves rapidly in a span of only 24 hours. The second image is taken 4 hours after the first of the series, and the third after one complete Venus Express orbit. Here the vortex has become more circular and less elongated. The yellow dot in the image indicates the location of the south pole (ESA/VIRTIS/INAF-IASF/Obs. de Paris-LESIA/Univ. Oxford)





Herschel spacecraft fully integrated at ESTEC Test Centre in the final preparation for environmental testing



Planck spacecraft at ESTEC Test Centre during the spacecraft balancing campaign

travelling through the stellar body and carrying information from the central parts.

Literally thousands of new eclipsing binaries and variable stars – some with unprecedented small amplitudes – have also been discovered.

Hinode

The formation of the slow solar wind has been debated for many years. Now evidence of persistent outflow at the edges of an active region (measured by the EUV Imaging Spectrometer on board Hinode) has been found by a team of scientists led by L.K. Harra from the Mullard Space Science Laboratory, UK. They identify these regions with the source regions of at least part of the slow solar wind.

The measured Doppler velocities range between 20 km/s and 50 km/s and are consistent with a steady flow seen in Hinode's X-Ray Telescope. The results are published in the 1 April issue of *Astrophysical Journal* and were presented at the RAS National Astronomy Meeting in Belfast on 2 April.

Herschel/Planck

The development of both Herschel and Planck spacecraft has made very good progress. Both flight models are now in the acceptance test phase.

With arrival of the Herschel flight model at ESTEC at the end of 2007, the cryostat evacuation and bake-out started. Shortly afterwards the cryostat was cooled down and the liquid helium tank filled. In parallel, the functional testing started with verification of the spacecraft and the instruments. As major functional test the integrated system test was started and the system validation test completed. After some final close-out activities on the spacecraft, Herschel was ready for the integration of the solar array, the sunshade and finally the 3.5 m-diameter Herschel telescope. Now the system is fully integrated and prepared for the upcoming mechanical test campaign.

The Planck flight model has completed the first integrated system test, followed by the radiated EMC test in the anechoic chamber in the test facilities of Thales Alenia Space in Cannes and the system validation test. As part of the EMC test, the alignment of the Planck telescope was verified by a focus position measurement at operational frequencies (at 320 GHz). After completion of the testing in Cannes, Planck was shipped to ESTEC for a fine balancing exercise in April 2008.

The ground segment development on the mission operation side in ESOC has demonstrated a well-advanced development commanding the spacecraft during the system validation tests on both spacecraft that went very successfully.

With the acceptance test campaign under way, the programme is moving well towards the launch date at the end of 2008.

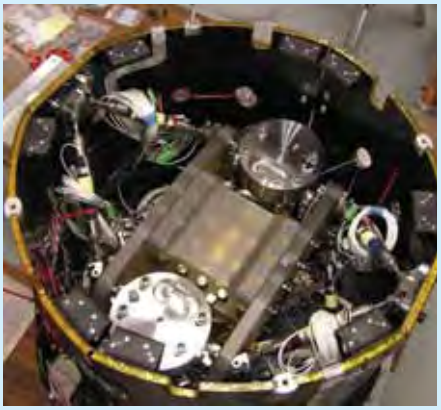
LISA Pathfinder

The LISA Pathfinder development is in progress despite some delays in the schedule. The main engineering activities are related to the finalisation of the spacecraft design, in preparation for the spacecraft CDR. Most of the subsystems have already had their own subsystem CDRs and many equipment suppliers have delivered their flight models.

The science module FM structure that was damaged during the static test has been repaired and will be used in the summer together with the propulsion module structure for a combined acoustic test and separation test. A new FM structure is being built by Oerlikon Space (CH) to be used for flight. The onboard software development is proceeding. Two test set-ups (Real Time Test Benches), one at Astrium GmbH for Drag Free Attitude Control (DFAC) and one at Astrium Ltd for the other system tests, are proceeding in parallel initially with electrical units and later with flight units until spacecraft flight model integration.

The two European micropropulsion technologies (needle indium thrusters and slit caesium thrusters) continue their challenging development to prove the readiness of the technologies. Problems are solved and progress is made: in particular for the slit FEEP, a test of the complete thruster assembly was performed successfully, from lid cover opening to priming and continuous nominal thrust. However also in this area the advancement has been less than planned, mainly due to difficulties intrinsic to uncharted technologies. It is now expected to select the technology suitable to the needs of LISA Pathfinder only towards the end of 2008.

For the LISA Technology Package (LTP), after completion of the system CDR, the work is focused on the critical subsystems, e.g. caging mechanism, electrode housing and Data Management Unit software. Other subsystems previously causing concern, like the electrostatic suspension front-end electronics, have now been successfully



The LISA Technology Package Central Assembly mounted inside the LISA Pathfinder science module flight structure under vibration test at Astrium GmbH in Friedrichshafen

tested at EM level and the flight models are being manufactured. All the LTP Electrical Models (ELM) have been built and delivered to Astrium GmbH for the Real Time Test Bench. The LTP schedule is however driven by the mentioned critical subsystem and affects the overall programme schedule.

The launch is expected to take place in the second half of 2010.

Microscope

Testing on the T-SAGE accelerometer is ongoing at ONERA with good results. CNES has initiated the procurement of the payload structure, and completed the microdisturbances analysis on the MLI. In the micropropulsion area, following a joint ESA/CNES status review, it was recognised that a decision cannot be made now on the thruster technology to be adopted for Microscope: objective criteria have been defined for selecting between FEEP and cold-gas micropropulsion, with identification of the tests required to fulfil these criteria.

Gaia

Following the successful close-out of the Preliminary Design Review (PDR), the Gaia project entered Phase-C/D during which the spacecraft will be built and tested. The contractual coverage for this phase has been intensively negotiated with the prime contractor Astrium with a view to sign the contract in late spring 2008. Despite these negotiations, the normal work continues.

One of the major achievements in this period was the start of the production of the optical bench, also known as the 'torus'. This 3 m-diameter torus consists of 17 different and complex elements, brazed together to form a lightweight structure carrying all mirrors and the entire focal plane assembly while still meeting the extremely demanding stability requirements. Meanwhile, the first element is ready for sintering.

The implementation of the science ground segment moves ahead as well. The first meeting of the Steering Committee of the Data Process and Analysis Consortium (DPAC) has taken place. Its immediate task will be to staff the project office overseeing the implementation by the distributed national centres.

BepiColombo

A major mass increase was identified by the BepiColombo team in the frame of the planned design freeze in preparation for the PDR. Detailed system design activities revealed severe mass problems. Furthermore, subcontractor proposals contained mass values higher than allocated on system level. A mission 'Tiger Team' was set up to address this issue in detail. The Tiger Team reported that to satisfy all mission requirements an Ariane-5 launch was needed. The impact on the programme will be addressed by the Science Programme Committee in June.

The work on key technologies is continuing in parallel with the selection of contractors for, in particular, multilayer insulation, solar arrays including blocking and shunt diodes, high-temperature rotary joint and high gain antenna.

The Instrument Science Requirements Review were successfully completed for all Mercury Planetary Orbiter payload. Subsequently, the related Experiment Interface Control Documentation has been updated and signed for all experiments. The experiment performance is demonstrated as compliant with the scientific objectives, with overall payload resources being marginally within allocation.

A short-term workplan was agreed with the Principal Investigators, including Instrument Preliminary Design Reviews (IPDR) in the period March 2008 to Autumn 2008. The BELA and MIXS experiment definitions are progressing, with a more robust/compact laser design and a more elaborate optical design respectively.

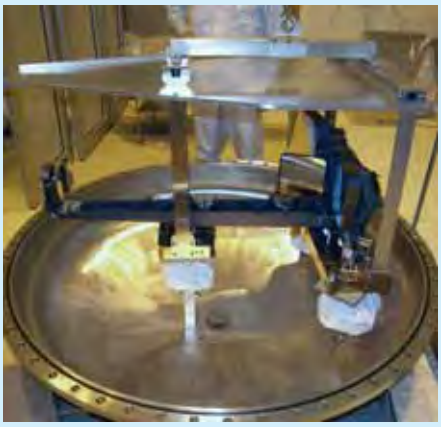
The PDR for the Mercury Magnetospheric Orbiter (MMO) was completed successfully in March 2008.

JWST

The JWST Mission PDR and the Non-Advocate Review have been passed successfully. The JWST project can therefore formally enter the Implementation Phase. The tight cost constraints imposed for the project for 2008–10 have been eased, thus eliminating the need to further delay system activities. The overall programme is therefore stabilising and the launch date remains unchanged, June 2013.

Significant progress has been made on the ESA-developed NIRSpec infrared spectrograph. The optical bench qualification model proof-load testing has been successfully completed and the flight optical bench manufacturing has been completed. The cryogenic performance test of the input Three Mirror Anastigmatic mirror assembly was passed successfully with wave-front errors well within specification. These two milestones qualify the mechanical and optical design philosophy of NIRSpec.

Intensive work with breadboard models continues for the grating and prism mount



JWST NIRSpec Fore Optical Assembly Qualification Model after successful testing at Sagem, France

and for the refocus mechanism mirror. The main issue is the cryo-deformation of the optical components. Recovery from problems with contamination and damage of the flight bearings for the filter and grating wheel mechanism is ongoing. Several mitigations actions are ongoing to keep a positive schedule margin.

The MIRI Verification Model completed the first cryo-test campaign successfully. 'First light' was seen by both the imager and spectrograph. Both the MIRI Cooler PDR and the imager qualification review were passed successfully. The cryo-cooler is developed by JPL. The contamination control cover flight and spare models have been successfully delivered.

The JWST/Ariane-5 Launcher Interface Control Document is in the final review process. Signature is planned for June.

Solar Orbiter

Building on the two parallel study contracts, placed with Alcatel Alenia Space and EADS Astrium, in which the Heat Shield technology breadboards were tested successfully, the Solar Orbiter Phase-B1 was initiated in March 2008. This Definition Phase is being performed by an industrial team led by Astrium Ltd and includes Astrium GmbH and Thales Alenia Italy.

The definition phase will be performed in 2008 and 2009 and will culminate in a System Requirements Review. The spacecraft baseline design relies heavily on the reuse of technology and equipment from the BepiColombo project.

Many proposals were received from Europe and USA in response to the Solar Orbiter Payload Announcement of Opportunity released in October 2007. They have been under scientific and technical evaluation by both ESA and NASA. When the selection process is completed, the spacecraft definition will be adjusted to take into account the detailed payload complement as selected.

Solar Orbiter will be built by ESA and launched by NASA. It will carry a significant number of US payload contributions. The measurements performed by the instruments on Solar Orbiter will be coordinated with those performed by NASA's Inner Heliospheric Sentinels, to be launched two years later

In parallel, technology development activities are ongoing in several key elements such as a Sun-filter window, detectors, polarisers and sun sensors.

LISA

The Mission Formulation activity performed by Astrium GmbH is proceeding well and the contract is approaching completion in July 2008. The mission architecture is being finalised and requirement specifications are being prepared. All the material will be subject to the Mission Design Review to be held in June.

Technology activities are ongoing in the field of pointing mechanisms; a new invitation to tender for the Optical Bench has recently been issued and an update of the technology plan has been prepared to reflect the results of the Mission Formulation. This input will be merged with that of other Cosmic Vision candidate missions to prepare a general

coordinated plan. All technologies required by LISA will be at least at TRL 5 at the time of start of the Implementation Phase for the L1 mission, at the end of 2011.

Cooperation with NASA in the system engineering area is producing good results. A costing exercise for the US part has recently been completed and results presented to NASA HQ on related to potential respective roles and responsibilities of the partners.

Currently both projects are preparing the required material and documentation for the Astro2010 Decadal Review, performed by the NRC on NASA mandate.

GOCE

After completion of the environmental test campaign, the full satellite functional test campaign was also completed, leading to the Flight Acceptance Review held in March/April. The satellite is ready for shipment to the launch site. One issue related to the loss of some telemetry packets during switch-over between the nominal and redundant command and data management units (the central on-board computer) was reported recently and will be fixed prior to shipping the satellite.

Due to a recent failure of the 'Breeze' upper stage rocket on the Proton launcher, however, the Russian State Commission had put on hold all activities related to the Breeze programme, including Rockot launches. As a consequence, GOCE is facing a delay in the Rockot launcher readiness of probably three months, putting back the launch date accordingly.

The Ground Segment Readiness Review was successfully completed at the end of February. All ground segment facilities have been accepted and subject to overall validation. The time until launch will be used to fine-tune the operational configuration of the various facilities. A final series of System Validation Tests was also performed

GOCE inside the Large Space Simulator at ESTEC

successfully with exchange of commands/ telemetry between ESOC and the satellite protoflight model in ESTEC.

Several Launch and Early Operations Phase simulations have been performed in ESOC involving industry and ESA engineers. They were organised in the two teams that will carry out the 24-hr satellite operations during the first few days after the launch.

A GOCE press day took place at ESTEC on 3 April to advertise the flight readiness of the satellite and ground segment, and to provide the opportunity to brief the press before shipment of the satellite to the launch site in Plesetsk.

CryoSat-2

CryoSat-2 is almost fully integrated, only missing two items of equipment and the solar arrays. The solar arrays are needed later in the programme and will be installed just before shipping the satellite for environmental testing at IABG in mid-July 2008. System testing has proceeded to plan, with the major milestone being the full testing of the main payload, the advanced SIRAL radar. This test represented a full system demonstration, with captured data being fed through the CryoSat ground segment. The first System Validation Test was also performed in March, where the satellite was in contact with ESOC to validate the command and control system. This test went smoothly, thanks to the excellent preparation and working practices established between the ESA and industrial teams.

Overall the satellite activities are proceeding well and on schedule. Similarly the ground segment upgrade from the original CryoSat mission is complete and the full system is undergoing testing, called the Ground Segment Overall Validation, which will demonstrate its readiness to support the mission after launch.

The launcher to be used for CryoSat has changed from a Rockot to a Dnepr. This was driven by the limited availability of Rockot launchers in the required time period. Even with this change, a delay to November 2009 (from March 2009) is necessary to allow for preparation of the launch vehicle. This means the satellite will spend time in storage before the launch campaign.

SMOS

The Thermal Vacuum Test at satellite level, with folded antenna arms, was passed without any significant problem. The antenna arms were suspended beneath the antenna zero-g jig and deployed one by one, using live pyrotechnic firings. This campaign was successfully completed with only one end-of-travel sensor needing realignment. The

SMOS satellite with Rockot launcher adaptor

recorded pyrotechnic shocks were in line with the equipment qualification limits.

The satellite was moved to Thales Alenia Space's Compact Antenna Test Range and the arms unfolded for the Radiofrequency Autocompatibility Test. This test confirmed previous element-level tests with no interference identified between the platform and the sensitive payload. However, a minor payload internal interference was observed in one specific mode of one of the X-band transmitters.

The satellite level test programme is now basically complete with only a few remaining activities (mass properties, propulsion system leak test, multilayer insulation repair) before satellite storage until to launch.

As the Russian launch service provider is experiencing production bottlenecks for the third Breeze KM stage, a launch of SMOS is now expected from 15 April to 15 July 2009.

The ALADIN primary mirror during inspection at Astrium Toulouse

ADM-Aeolus

The first flight model of the transmitter laser assembly of the ALADIN instrument was installed in a thermal vacuum chamber at Galileo Avionica Firenze's premises. First operational tests of the laser in vacuum showed some unexpected performance variations of the laser output energy and beam characteristics. These effects were investigated and could be pinned down to a larger than expected air-to-vacuum shift of the transmission characteristics of an optical element inside the laser master oscillator. An alternative supplier of the optical component was found and characterisation tests at ESTEC confirmed that the air-to-vacuum shift of the replacement part is negligible.

After reassembly and realignment of the transmitter laser assembly a new sequence of vacuum tests was started which confirmed nominal operation of the laser master oscillator. With the achievement of nominal performance of the master oscillator the further stages of the transmitter laser assembly, the amplifier section and the harmonic section generating the ultraviolet laser beam, could be operated in vacuum at full energy for the first time. A certain amount of beam shift of the output beam is as yet unexplained and needs further investigation.

During the course of the preparation for further vacuum tests an anomaly at the level of the master oscillator occurred, which prevented the continuation of the vacuum test sequence. Investigations into the causes of the output beam shift and the master oscillator anomaly are in progress.

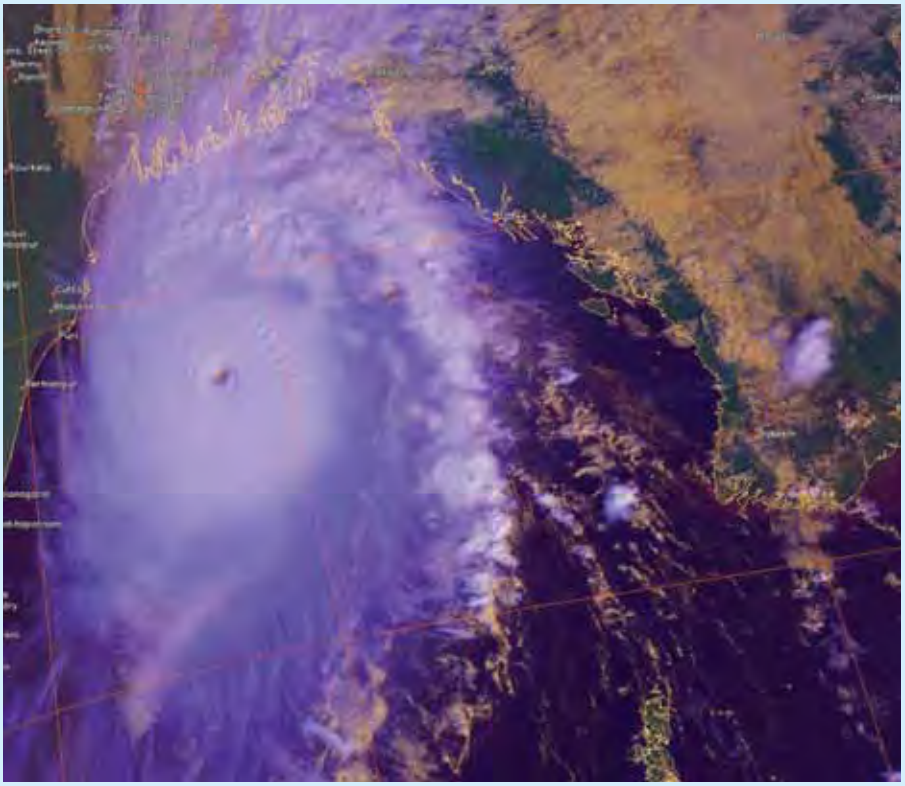
The ALADIN optical bench assembly has been fully completed and a comprehensive set of performance and optical characterisation tests demonstrated good performance of the unit.

The satellite platform programme at Astrium Ltd continues nominally. A 'micro-vibration test' confirmed the compatibility of the fibre-optic gyroscope with the vibration levels generated at satellite level by the reaction wheels.

Swarm

The major elements of the mission are in progress. The procurement activity has been completed with the adjudication of the Level 1b processor contract and the selection

Analysis of the plasma potential around Swarm spacecraft confirming potential of the spacecraft is below 2V. With this, the electric field measurement performances can be achieved



Tropical Cyclone Sidr was the fourth named storm of the 2007 North Indian Ocean cyclone season. The storm formed in the central part of the Bay of Bengal, and quickly strengthened to reach peak sustained wind speeds of 215 km/h. The storm made landfall near Bangladesh on 15 November causing large-scale evacuations and thousands of casualties. The MetOp-A AVHRR image shows Sidr a few hours before landfall (Eumetsat)

of the MGSE contractors. The satellite consortium is now complete.

Development/manufacturing reviews are going on for all satellite units and instruments. The magnetic signature of the optical bench as measured by the Niemegk magnetic observatory confirmed that the magnetic signature of the SIC mast supporting the vector magnetometer (VFM) sensor head is not compatible with the Swarm mission performance need. Astrium implemented a back-up solution where the mast supporting the VFM sensor head will be in carbon fibre while the support of the star tracker (STR) will remains in SIC material.

The mechanical, thermal design and manufacturing dossier of the structure has matured significantly. The CDR for the structure is planned for April this year.
A significant step forward has been achieved by all parties for the definition of the interfaces between the EFI instrument and the satellite.

The AIT activity preparation initiated during the last quarter with the development of the Real-time Test Bench for the satellite software and interfaces verification is in progress. The EFI and ASM instrument CDR are now respectively scheduled for June and September 2008. Rockot and Dnepr are confirmed as viable launchers for Swarm, following the completion of a preliminary coupled load analysis. The ground segment PDR for the definition of the operation facility and the payload data processing and archiving centres is now scheduled for September.

Metop

MetOp-A

The HRPT anomaly investigations concluded the root cause to be the CLY-38 transistors. Dedicated tests in ESTEC and Louvain revealed the sensitivity of these transistors to heavy ions. The transistors on MetOp-B and MetOp-C HRPTs will be replaced by Mitsubishi transistors, once they successfully pass their radiation testing. MetOp-A instrument performance is excellent. Level 1B products from GOME-2, ASCAT and GRAS are declared operational.

MetOp-B and MetOp-C

Although the MetOp Payload Modules PLM-1 and PLM-3 are in long-term storage, there are still some AIT activities to be performed that require dismounting of the instruments for repair, recalibration and/or alignment, to be performed in blocks. Block activities on PLM-1 (MetOp-B) were finished, with the PLM-1 re-entering storage, and block activities on PLM-3 just started. The MetOp Service Modules are kept in hard storage at Astrium Toulouse's premises, waiting for the restart of AIT activities in 2009 for a planned MetOp-B launch in 2011.

MSG

Meteosat-8/MSG-1

On 1 February, the Meteosat-8 spacecraft again experienced an event similar to that of May last year. In the light of this, an object impact is no longer considered probable. Investigations into other causes are ongoing but are so far not conclusive. The performance of the imaging service has not suffered from this: the satellite experiences larger thermal gradients during eclipse nights, but all parameters remain in the nominal area.

The dynamic disturbances of the satellite spin axis were eliminated by using a different setting of the thermal control system. The spacecraft was moved to 9.5°E, the same orbital location that was used by the first generation, to continue the rapid scanning service (producing one image between 15°N and 70°N every five minutes).

Meteosat-9/MSG-2

Meteosat-9 is Eumetsat's nominal operational satellite at 0º longitude (Meteosat-8 is its back-up). Satellite and instruments performance are excellent.

MSG-3

Both MSG-3 and MSG-4 are in intermediate storage at Thales Alenia Space, Cannes, awaiting the restart of the AIT campaign in spring 2010 to prepare MSG-3 for its launch, currently foreseen for early 2011. MSG-4 is still awaiting its completion of the MSG-4 Pre-Storage Review. The MSG-4 launch is planned not earlier than 2013.

Sentinel-1

Sentinel-1 is a mission carrying a Synthetic Aperture Radar (AR) in C-band in response to user requirements issued by the European Commission and to ensure continuity of radar observation initiated with ERS-1/2 and continued with Envisat ASAR. Weighting about 2.3 tons, it is scheduled for launch at the end of 2011 and is designed for a 7-year lifetime (with consumables for 12 years of operation).

The industrial team is led by Thales Alenia Space Italy as prime contractor (responsible for the spacecraft and the Transmit-Receive Modules). Astrium GmbH is responsible for the SAR instrument and antenna, and Astrium Ltd is responsible for the SAR electronics subsystem. The Phase-B2 has started in May 2007 and will culminate with the PDR starting in May 2008. The completion of the industrial team through competitive Invitations to Tenders will be finalised soon.

Sentinel-2

Sentinel-2 is the optical multispectral mission of the GMES space component programme ensuring continuity and further development of the SPOT/Landsat land observing missions (vegetation and human settlement). This mission is based on the concurrent operations of two satellites flying on a unique sun-synchronous orbit with a separation of 180°. This orbital configuration, combined with the very wide 290-km instrument swath, provide a 5-day revisit between +83° and –56° latitude. A versatile set of 13 observation and calibration bands ranging from VNIR to SWIR provide a range of spatial resolution between 10 m and 60 m.

Artist's impression of Meteosat-9/MSG-2 in orbit, spinning at 100 rpm

Following contract signature for the first satellite model between ESA and prime contractor Astrium GmbH on 17 April 2008, phase B2 activities are intensifying in two directions: the consolidation of the baseline satellite design, including ground segment and launcher external interfaces, and the organisation of about 65 platform and payload instrument procurement actions. The multispectral instrument constitutes the project critical path and a number of procurements related to the two instrument detection chains have already been finalised (detectors, filters). The Sentinel-2 Payload Instrument and System PDR should start in September 2008. The Satellite FAR is scheduled in July 2012, with a launch on Vega (back-up launcher Rockot) in October 2012.

Sentinel-3

The signature of the phase B2-C-D-E1 contract on 14 April represented the official start of the Sentinel-3 development phase, even though the Phase-B2 industrial kick-off already took place mid-October 2007 and the technical activities have been proceeding at a pace.

During the past months, few trade-offs took place following the recommendations raised during the proposal evaluation period and expressed at the kick-off. At platform level, the structural configuration has been revised resulting with a selection of a compromise configuration containing the best elements from the Prima concept and from the Phase-B2 Sentinel-3 configuration derived from the Proteus concept. The power sub-system architecture has also been discussed to ensure compliance with the ESA/ECSS requirements. The maximum power point tracking boost technology has been selected as a baseline power management approach, together with a reconfiguration concept implemented in hardware through the on-board computer.

All support specifications have undergone a preliminary review involving ESA, having

reached a status for which they can be used as a good basis for all procurement activities. The execution of the procurement tasks through competitive Invitations To Tender represents the main effort in this phase of the programme. Approximately 100 procurement contracts are required to obtain the remaining satellite and support equipments and to complete the industrial set-up. Most of them are planned during the 12 months duration of the Phase-B2. The first offers were received and are currently under evaluation.

The first major programme review is the PDR, planned for August 2008. This is about the same time that the PDR of the four Sentinel-3 instruments will take place.

Artemis

On 1 April 2008, Artemis completed its fifth year of in-orbit operations and will reach seven years in orbit in July.

Artemis has recently fulfilled another important mission objective with the data relay support to the ATV *Jules Verne* during the initial stages of its journey to the ISS. At 05:46 UTC, 9 March 2008, the first telemetry link with *Jules Verne* was established as planned, to be followed by the first telecommand at the next orbital pass. One of the propulsion burns of the ATV was performed with a telecommand sent through Artemis, due to a gap in the TDRSS coverage, demonstrating once again the interoperability of the European space infrastructure.

The docking of ATV to the ISS marked the beginning of a new operational phase for Artemis. In fact, Envisat operations, which had been suspended due to mutual incompatibility with ATV during the free-flying phase, have been resumed fully. As a consequence, the dual Ka- and S-band steerable reflector of Artemis is constantly tracking the two spacecraft from orbit to orbit. Thanks to a very carefully planned onboard duty cycle, Artemis system availability has also remained very high during the combined ATV/Envisat operations, exceeding 99.0%. ATV will be supported for the entire duration of its mission, until the planned deorbiting in August 2008. Artemis is currently the baseline data relay system for the subsequent ATV flights.

This important operational achievement comes in the wake of an exceptional 2007, in which Artemis proved the solidity of the system architecture and of the potential for data relay satellite systems.

The first flight of the Italian CIRA Unmanned Space Vehicle (USV) took place on 24 February 2007 when the USV was lifted by a stratospheric balloon to an altitude of 20 km and then released over the drop zone off the eastern coast of Sardinia. The vehicle fell, reaching a speed of Mach 1.05, and was tracked by the Artemis S-band steerable antenna. Telemetry data were relayed to the Artemis Mission Control Facility in Redu, Belgium. The experiment was considered a success by CIRA, with over 80% of the original telemetry data received and processed during the flight. A second flight is now foreseen in October 2008.

Vega

Industrial activities relevant to the additional slice of Vega development declaration, in particular the Zefiro motor recovery plan, the Zefiro-9A and the testing of the AVUM engine, as recommended by the System CDR, were successfully negotiated.
The first development model of the AVUM propellant tank, manufactured according to the new welding procedure, has been assembled and successfully tested at burst pressure. The Qualification Review of the Interstage 0/1 was achieved during the Steering Board on 7 February.

On 27 March, the second-stage motor for Vega completed a static firing test at the Salto Di Quirra Interforce Test Range in Sardinia, Italy. This was the second and final firing test for the Zefiro-23.

A sequence of photos showing the development of the Soyuz launchpad at the Guiana Space Centre (CSG)

Qualification Flight preliminary analyses of the Lares mission are ongoing to prepare the safety submission data package and to confirm the possibility to tune the first mission as required for Vega launcher qualification.

Soyuz at CSG

The CDR of the Mobile Gantry took place from 26–29 February. The production was supervised on a day-to-day basis. So far, a two-week delay was reported and corrective actions were requested to meet the planned target of delivery at the end of August in French Guiana.

Soyuz Launch Site activities were conducted in line with a final acceptance review planned at the end of August. Equipment factory acceptance test is in progress and the Service Cabin is confirmed arriving on the first ship.

A Soyuz consultation committee took place in French Guiana on 27 March to demonstrate the readiness of the European launch site to the Russians.

FLPP

The Expander Demonstrator has been tested for a period of over 4000 s in total, including six reignition tests, which is a first-ever achievement in Europe for a cryogenic engine.

Within Main Stage Propulsion activity, pre-burner tests were performed successfully with two more European 'firsts': highest combustion pressure and highest mass flow per injector. Coupled pre-burner and main combustion chamber tests have also been performed.

An industry day was organised in ESTEC on 5 February gathering together all parties to share knowledge of the important volume of results produced under this programme.

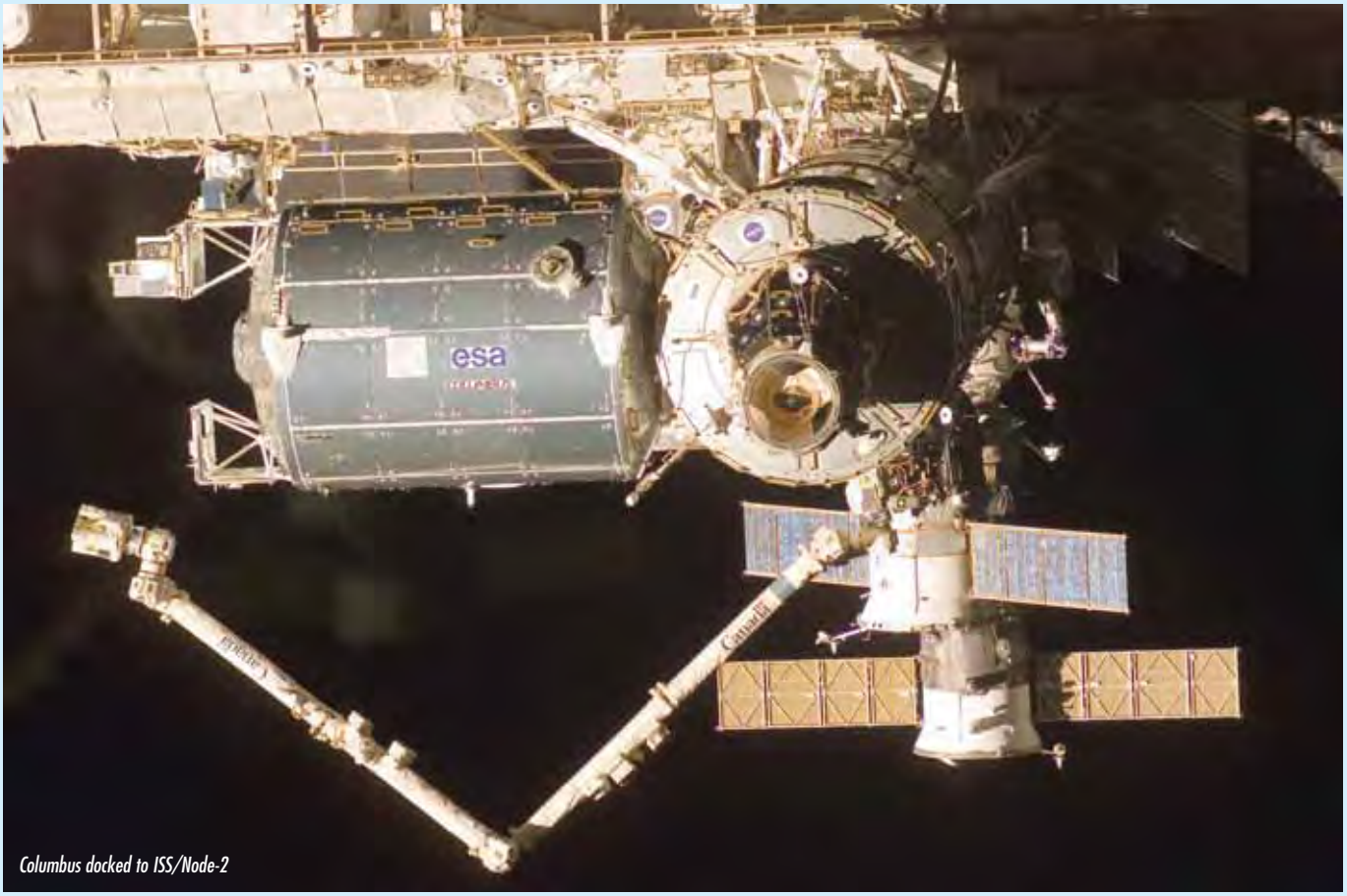
The FLPP Expander Demonstrator engine on teststand P4.1 at Lampoldshausen, Germany

Human Spaceflight, Microgravity and Exploration

International Space Station

After months of hard work by NASA engineers, ESA's Columbus laboratory was launched in the cargo bay of Shuttle *Atlantis* on 7 February from the Kennedy Space Center (KSC). Flight STS-122/1E also carried ESA astronauts H. Schlegel (D) and L. Eyharts (F) to the ISS.

On 11 February, the 7 m-long, 12.8 tonne Columbus module was attached to the Harmony (Node-2) module of the ISS. After external payloads were successfully deployed and Columbus was attached to Harmony, on-orbit commissioning tasks were performed by the crew. On 20 February, Space Shuttle



Columbus docked to ISS/Node-2

Atlantis STS-122 landed at KSC, Florida, returning Schlegel back to Earth.

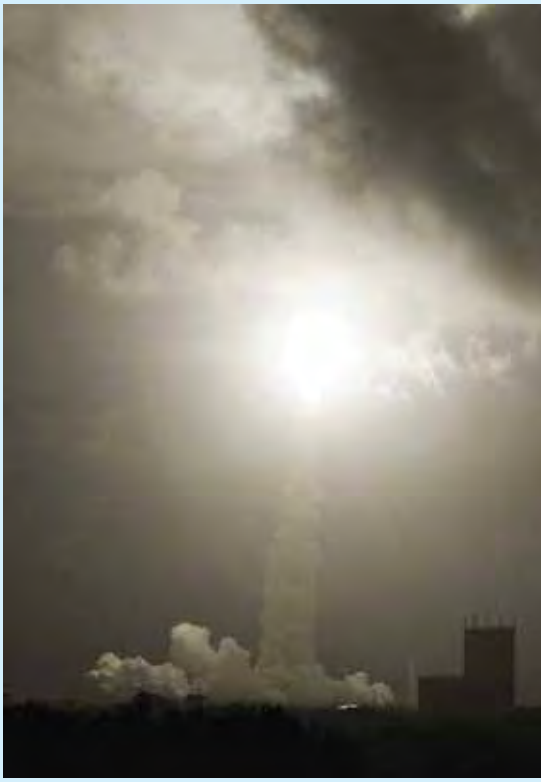
On 9 March 2008 the first of ESA's Automated Transfer Vehicles, ATV *Jules Verne*, was launched into a low Earth orbit by an Ariane-5 ES launcher. This was the culmination of more than 11 years of development and production. The lift-off occurred at 05:03 CET (04:03 UT) from Europe's Spaceport in Kourou, French Guiana. The rendezvous and docking of the ATV occurred with the ISS as planned on 3 April 2008.

A still from a video camera on the ISS showing the ATV docking

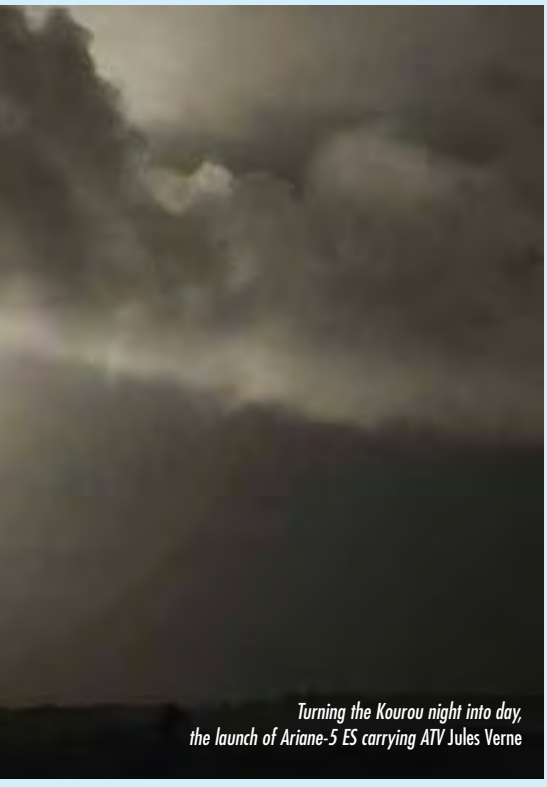
On 11 March, Space Shuttle *Endeavour* (STS-123) lifted off at 07:28 CET (06:28 UT) from KSC, on a 16-day mission to the ISS. This mission continued ISS assembly, carrying aloft the logistics module of the Japanese Kibo laboratory and a Canadian remote-controlled high-precision robot, called 'Dextre' or the Special Purpose Dextrous Manipulator (SPDM). *Endeavour* returned to Earth with Eyharts on 27 March.

Space Infrastructure Development and Exploitation

Following the docking of Columbus to Node-2 on 11 February, the Columbus Control Centre (Col-CC) operations teams took charge of activating the Columbus systems on 12 February. Despite some early problems, Columbus activation was successfully completed on 14 February 2008.



Columbus Control Centre, Oberpfaffenhofen, Germany



Turning the Kourou night into day, the launch of Ariane-5 ES carrying ATV Jules Verne

The Columbus payload hardware: the multi-user payload racks Fluid Science Lab (FSL), Biolab, European Physiology Modules (EPM) and the European Drawer Rack (EDR) were activated. EuTEF and SOLAR were installed on Columbus's external accommodation sites during the Flight 1E's third EVA on 15 February 2008. Both have both been turned on and are now operating well.

SOLAR deployment

SOLAR mounted outside Columbus

EuTEF mounted outside Columbus

The CoI-CC operations teams are settling into routine operations after the intense operations of the STS-122/1E mission. The relocation of the EXPRESS-3 and MSG Payload Racks from the US Destiny laboratory to the Columbus laboratory was performed nominally during Increment 16.

After the launch of ATV on 9 March, the ATV Control Centre (ATV-CC) operations teams took control of the vehicle and conducted an almost perfect mission, leading to a spectacular Demonstration Day 2 on 31 March.

During the launch, a degradation of a thermal blanket occurred which means that more heat would be lost to space than originally designed for. However, there was additional power available to compensate for this heat loss, with the perfect functioning of all the power generation subsystems. Therefore there was no effect on the nominal operation of the spacecraft.

The Launch Early Operations Phase (LEOP) activities were nominal. The ATV collision avoidance manoeuvre was demonstrated on 12 March. On 27 March, orbit burns were initiated from ATV-CC to move the ATV from its parking orbit and, on 29 March, Demo Day 1 was successfully conducted to bring the ATV to within 3.5 km of the ISS and demonstrate its capability to perform navigation using relative GPS. On 31 March, Demo Day 2, the ATV manoeuvred to within 11 m of the ISS, demonstrating its guidance and navigation capabilities using its optical sensors. All systems performed nominally and docking occurred on 3 April 2008.

SPERO

The 'Study on a Columbus external platform capability for small payloads' (SPERO) is ongoing with industry. A Call for Interest for small payloads using the SPERO platform has been released on 12 March to more than 3000 addresses all over Europe.

65 letters of interest have been received from industry, universities, research institutes and national space agencies. Proposals cover various areas of research: exobiology, astrophysics, Earth observation, materials science, technology demonstrators, robotics, etc. This result confirms the overwhelming interest in developing SPERO.

ATV Production

The ATV Production Readiness Review (1.2) is due to be concluded on 17 April, releasing the ATV02 system integration and ATV03 equipment procurement. The ATV-2 launch is scheduled for the second quarter of 2010. The ATV rack design has been optimised and qualification tests are currently running without any problems.

Utilisation

The ISS Increment 16 experimental programme has been running since October 2007 with four long-term experiments in human physiology (ETD and Immuno) and radiation research (Matroshka and Altcriss). The first Columbus experiment,

ATV Control Centre, Toulouse, France

WAICO Run#1, was started in the Biolab on 28 February by astronaut Eyharts.

A significant software bug in the SOLAR Sun-tracking algorithm forced the first solar observation period to be skipped. The SOLAR Coarse Pointing Device software patch was uploaded and the parameters optimised. All instruments have now been commissioned, are active and are providing science data. The EuTEF science programme has started.

The Foton-M3 post flight activities continued nominally in the first quarter of 2008. The data download from the TELESUPPORT mass memory device was completed and the data distributed. A full mission report was received from TsSKB-Progress The Foton Co-ordination Board meeting and Post Flight Review (PFR) were held 10–14 March at ESTEC. The progress of the Polizon scientific experiment evaluation was presented and the experiment samples from the TUBAF experiments were handed over to the Russian experimenters.

The TEXUS-44 and TEXUS-45 sounding rockets were successfully launched from Esrange, in Sweden on 7 and 21 February 2008 respectively. The 48th ESA Parabolic Flight Campaign was performed in March. The new contract for the 2008 and 2009 drop tower campaigns at ZARM/Bremen (D) has been signed. So far, three drop-tower experiment campaigns, with 35 drops in total have been undertaken in 2008.

The MULTIGEN-1 – Batch 1-A (Multigeneration Plant Growth in Space) experiment was completed aboard ISS in the European Modular Cultivation System (EMCS) during week 46. The dried-out plants have been returned to ground with STS-122/1E mission. ANITA continues to operate flawless in the US laboratory Destiny and provides invaluable ISS atmosphere composition data.

The Long-Term Medical Survey (LTMS) prototype device has been shipped to Concordia for testing on site. The final presentation of the Technologies for Psychological Support (TPS) took place on 11 January.

Astronauts

As members of the STS-122 crew, ESA astronauts H. Schlegel and L. Eyharts were launched to the ISS on 7 February on board Space Shuttle *Atlantis*.

During STS-122, Eyharts supported the docking of Columbus, first at the controls of the Station's robotic arm, to extract the European module from the Shuttle's cargo bay, and later by activating the motorised bolts from inside the Harmony Node-2 to secure the junction. He then assisted the third spacewalk of the mission by operating the station's robotic arm.

Schlegel performed the second of the three STS-122 spacewalks (Schlegel's first ever spacewalk) on 13 February with fellow astronaut Rex Walheim of NASA. He also coordinated the other two spacewalks during the mission, supporting the Columbus module's transfer from the Shuttle payload bay to the ISS, plus the transfer of two payload suites, SOLAR and EuTEF, to the external platforms on Columbus.

Both ESA astronauts participated in the outfitting and commissioning of the Columbus laboratory. Commissioning of the European laboratory will be finalised by the resident ISS crew of the Expedition 16 and 17 increments.

As if in a scene from a science fiction movie, Schlegel moves along a truss section of the ISS in the darkness of a 'night' part of an orbit. Taken during Schlegel's 6 hr 45 m spacewalk, this image gives an impression of the scale of the ISS (NASA)

Eyharts had joined the ISS Expedition 16 crew as Flight Engineer for 33 days, but when *Endeavour* docked with the ISS on 13 March he swapped crew assignments again, this time with NASA astronaut Garrett Reisman, and joined the crew of STS-123 for the return to Earth.

As a qualified mission specialist in robotics, Eyharts contributed to the STS-123 assembly mission as operator of the Station's robotic arm alongside Reisman and Bob Behnken, another NASA mission specialist. Together, they added a new module to the ISS – the Japanese Experiment Logistics Module, Pressurised Section (JLP) – and supported the assembly and activation of the Canadian-built Dextre robotic telemanipulator.

ESA officially announced that astronaut F. De Winne (B) will be a crewmember of Increment 20/21 starting in May 2009, with A. Kuipers (NL) as his back-up. De Winne and Kuipers started Japanese Experiment Module system training at JAXA in January. Kuipers continued his Russian Onboard Segment training at the Gagarin Cosmonaut Training Centre, Moscow, in February and March.

STS-122 and Expedition 16 crews including Hans Schlegel and Léopold Eyharts inside Columbus (NASA)

Exploration

ExoMars – The Enhanced Mission

An ExoMars (full 2 metre) drilling test has been successfully completed. Phase-B2 has been kicked-off to cover the prime and the core contractors. All main Phase-B2 contracts have been negotiated successfully. The Pasteur Payload accommodation and the Sample Processing Distribution System (SPDS) design are under review to improve the bio-barrier designs. A dedicated Humboldt payload design meeting was held in the ESTEC Concurrent Design Facility, resulting in agreements on instrument layout and deployment methods.

The ExoMars Instrument Multilateral Agreement (IMA) was endorsed at the Human Spaceflight, Microgravity and Exploration Programme Board on 12 February.

The ESA/Roscosmos ExoMars Cooperation Agreement was ratified by Council (Russian Partners Agreement still pending). The

Eyharts with one of two plaques bearing 800 names and signatures of people from ESA, Astrium and consortium companies who contributed to the Columbus project (NASA)

ESA/NASA LOA was signed by the NASA Partner on 21 March. Generally, the project is moving towards a system PDR at the end of 2008.

Core Element

The activities of the International Mars Exploration (IMEWG)/iMARS Working Group have further progressed with a refinement of the Mars Sample Return (MSR) mission concept. A working meeting took place in Windsor (UK) on the 18/20 March. The preparation of the 8 July IMEG meeting and the MSR conference (9/10 July) is progressing well, and the iMARS Preliminary Report is under preparation. On the same subject, a Technical Assistance Agreement (TAA) between ESA and NASA/JPL has been signed to allow more detailed engineering work to be performed on the single MSR mission elements.

The proposal for the High-Velocity Re-entry Demonstration activity (CP20) has been received and is under evaluation.

The updated Systems Requirement Review (SRR) Data Package for ARES has been received and reviewed.

The latest (Phase-B2) ExoMars rover concept

An ITT for a Pressurised Lunar Rover Study has been published. The deadline for proposals is 14 May after an extension of the bidding period.

GSTP Interim Technology Phase

All of the International Berthing Docking Mechanism (IBDM) activities are progressing well. In the GSTP-funded interim technology phase, the mechanical design and ground verification activities of the IBDM are nearing completion with Verhaert (B). For the European Berthing Docking Mechanism (EBDM), two units of the new hook design have been completed and a stiffness test has been conducted. The avionics and simulation activities have progressed as planned. All the electronic hardware has been built and the unit tested. The software has been completed, tested and preliminarily deployed to the target processor.

The industrial activities for the closure of the technical issues raised by the EXPERT Integrated Project Review have been completed. ESA has negotiated an acceptable proposal for the complete Phase C/D with the industrial prime contractor, with a target launch in June 2010, assuming a start of the full development in June 2008. All the payloads have completed the Critical Design Review, and the Qualification Review shall be completed by autumn 2008.

CSTS

As a result of the trade-off analysis on vehicle system concepts, Roscosmos and ESA, together with their respective industries, have arrived at the conclusion that the new crew transportation spacecraft must be based on the cone-shape body option.

The parties have agreed to proceed with a detailed design phase of the advanced Crew Space Transportation System (CSTS). It has been concurred that as this takes place, a Russian launch vehicle of 18-tonne payload capability to be launched from the Vostochny cosmodrome, will be used as the design baseline. It is assumed that the flight tests will be conducted in 2015, with the first manned launch to be performed in 2018.

In view of the experience of the parties involved, the Russian side will be responsible for the design and development of the crew (re-entry) capsule, while the European side will be responsible for the design and development of the service/propulsion module. At the same time, RSC Energia will be in charge of the overall integration of the CSTS development activities.

By October 2008 it is planned to complete the preparation of documents that will define technical and programmatic aspects of the vehicle concept, which will enable the parties to make decisions on launching the CSTS project activities. An intermediate system concept report will be prepared in June 2008 to be reviewed jointly by ESA and Roscosmos.