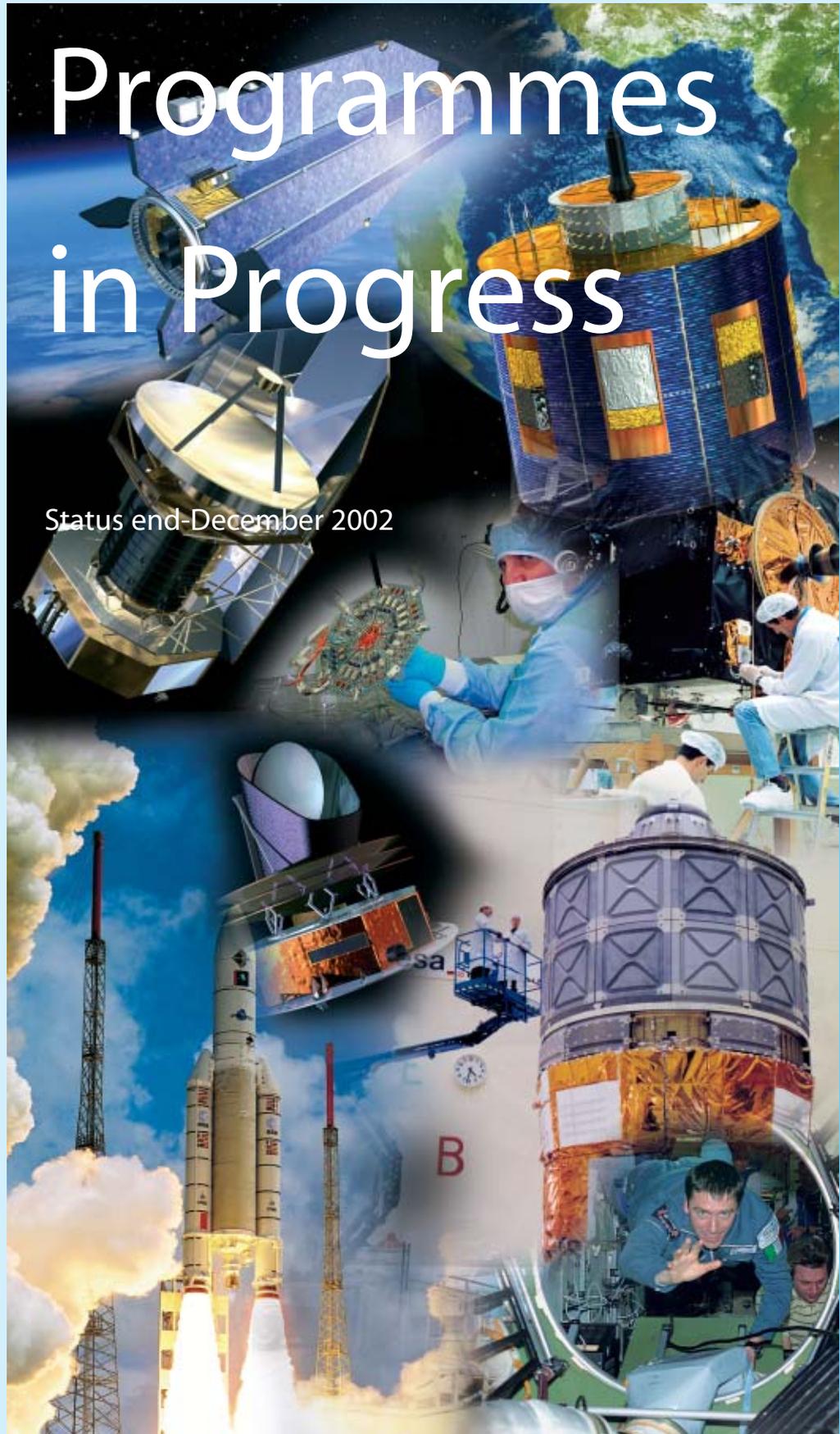


Programmes in Progress

Status end-December 2002



In Orbit

PROJECT	1998		1999		2000		2001		2002		2003		2004		COMMENTS											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F		M	A	M	J	J	A	S	O	N	D	
SCIENCE PROGRAMME	SPACE TELESCOPE	[Blue bar]																								LAUNCHED APRIL 1990
	ULYSSES	[Blue bar]																								LAUNCHED OCTOBER 1990
	SOHO	[Blue bar]																								LAUNCHED DECEMBER 1995
	HUYGENS	[Blue bar]																								LAUNCHED OCTOBER 1997
	XMM-NEWTON	[Green bar] ▲																								LAUNCHED DECEMBER 1999
	CLUSTER	[Green bar] ▲▲																								RE-LAUNCHED MID 2000
INTEGRAL	[Green bar] ▲																								LAUNCHED OCTOBER 2002	
APPLICATIONS/ TECHNOLOGY PROGRAMME	MARECS-B2	[Blue bar]																								POSSIBLE NEW LEASE
	METEOSAT-5 (MOP-2)	[Blue bar]																								OPERATED BY EUMETSAT
	METEOSAT-6 (MOP-3)	[Blue bar]																								OPERATED BY EUMETSAT
	METEOSAT-7 (MTP)	[Blue bar]																								OPERATED BY EUMETSAT
	MSG-1	[Green bar] ▲																								LAUNCHED AUGUST 2002
	ERS - 2	[Blue bar]																								LAUNCHED APRIL 1995
	ENVISAT 1/ POLAR PLATFORM	[Green bar] ▲																								LAUNCHED MARCH 2002
	ECS - 4	[Blue bar]																								OPERATED FOR EUTELSAT
	ARTEMIS	[Green bar] ▲																								LAUNCHED JULY 2001
	PROBA	[Green bar] ▲																								LAUNCHED OCTOBER 2001

Under Development

PROJECT	1998		1999		2000		2001		2002		2003		2004		COMMENTS											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F		M	A	M	J	J	A	S	O	N	D	
SCIENTIFIC PROG.	ROSETTA	[Red bar] [Green bar] ▲																								LAUNCH UNDER REVIEW
	MARS EXPRESS	[Red bar] [Green bar] ▲																								LAUNCH MAY 2003
	SMART-1	[Red bar] [Green bar] ▲																								READY FOR LAUNCH MARCH 2003
	HERSCHEL/PLANCK	[Red bar] [Green bar]																								LAUNCH FEBRUARY 2007
COMMS/ NAV. PROG.	GNSS-1/EGNOS	[Green bar]																								INITIAL OPS. START 2004
	GALILEOSAT	[Red bar] [Green bar]																								FIRST LAUNCH 2005
EARTH OBS. PROG.	EOPP	[Red bar]																								
	EOEP/CRYOSAT/GOCE/ SMOS/ADM-AEOLUS	[Green bar] ▲																								LAUNCH GOCE FEB. 2006/ SMOS 2006/ADM-AEOLUS OCT. 2007
	METOP-1	[Red bar] [Green bar] ▲																								LAUNCH 2nd HALF 2005
MSG-2/3	[Green bar] ▲																								LAUNCH MSG-2 JAN. 2005 LAUNCH MSG-3 2008	
MANNED SPACE & MICROGRAVITY PROGRAMME	COLUMBUS	[Green bar] [Blue bar] ▲																								LAUNCH OCTOBER 2004
	ATV	[Red bar] [Green bar] ▲																								LAUNCH SEPTEMBER 2004
	NODE-2 & -3	[Green bar] ▲																								LAUNCHES FEBRUARY 2004 & NOVEMBER 2006
	CUPOLA	[Green bar]																								LAUNCH JANUARY 2005 (UNDER REVIEW)
	ERA	[Green bar]																								LAUNCH UNDER REVIEW
	DMS (R)	[Red bar] ▲																								LAUNCHED JULY 2000
	MELFI	[Green bar] ▲																								LAUNCH MARCH 2003
	GLOVEBOX	[Green bar] ▲																								LAUNCHED MAY 2002
	HEXAPOD	[Green bar] ▲																								LAUNCH OCTOBER 2005
	EMIR/ELIPS	▲ EDEN ▲ FAST/APCF/AGHF FLUIDPACK/ BIOBOX/MOMO-2 BIOPAN-3 ▲ MOMO-3 ▲ APCF ▲ FLUIDPACK/ BIOPAN ▲ APCF-6 BIOBOX-6/ ARIAS/BIOPACK/ FAST2EBISTO ▲ MATROSHKA ▲ EMCS																								
	MFC	[Green bar] ▲																								BIO, FSL, EPM, PCDF, EXPOSE with COLUMBUS
LAUNCHER PROGRAMME	ARIANE-5 DEVELOP.	▲ V303 [Green bar] ▲ V304 [Blue bar]																								OPERATIONAL
	ARIANE-5 PLUS	[Green bar] ▲																								QUALF. LAUNCH UNDER REVIEW
	VEGA	[Red bar] [Green bar]																								FIRST LAUNCH DEC. 2005

- [Red square] DEFINITION PHASE
- [Green square] MAIN DEVELOPMENT PHASE
- [Blue triangle up] LAUNCH/READY FOR LAUNCH
- [Blue square] OPERATIONS
- [Blue square] ADDITIONAL LIFE POSSIBLE
- [Red triangle down] RETRIEVAL
- [Green square] STORAGE

ISO

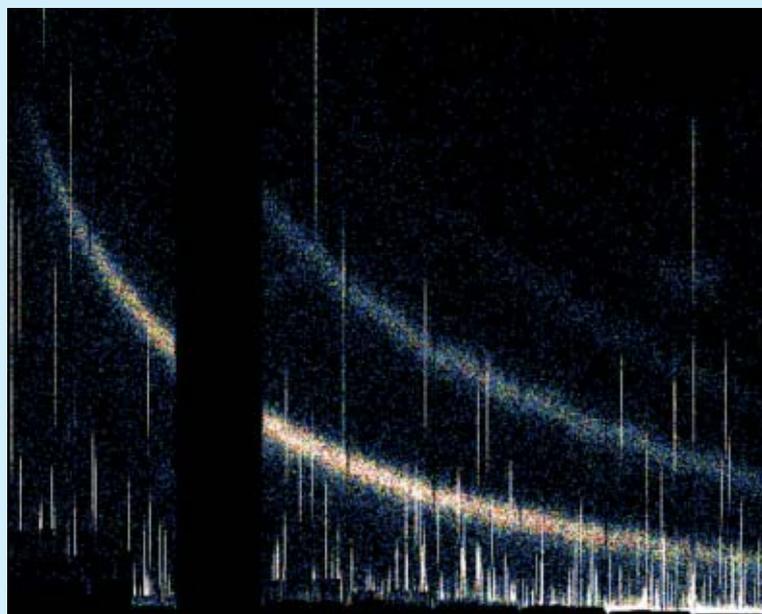
The ISO Data Centre's Active Archive Phase activities (planned to last until end-2006) continue to run smoothly. A new version (5.3) of the Archive was released in December, with enhanced capabilities for the Survey Products viewer, which is now also used by the XMM-Newton Science Archive. The ISO Data Archive now has more than 1350 users. It is always busy, with between 50 and 100 downloads being made per month, accessing typically 5% of the product content and with 20 to 30% of the usage coming from the USA.

Work on documentation continues well, with the recent delivery of the Proceedings of the Conference 'Exploiting the ISO Data Archive - Infrared Astronomy in the Internet Age' held at Sigüenza (E) in June to ESA Publications Division for printing and distribution (as ESA SP-511). The legacy versions of the remaining ISO Handbook volumes (ISOCAM and ISO) are being finalised. ISO continues to have a significant presence in the refereed literature also, with some 150 papers covering almost all areas of astronomy having appeared in 2002 alone. More than 900 refereed papers based on ISO data have already been published.

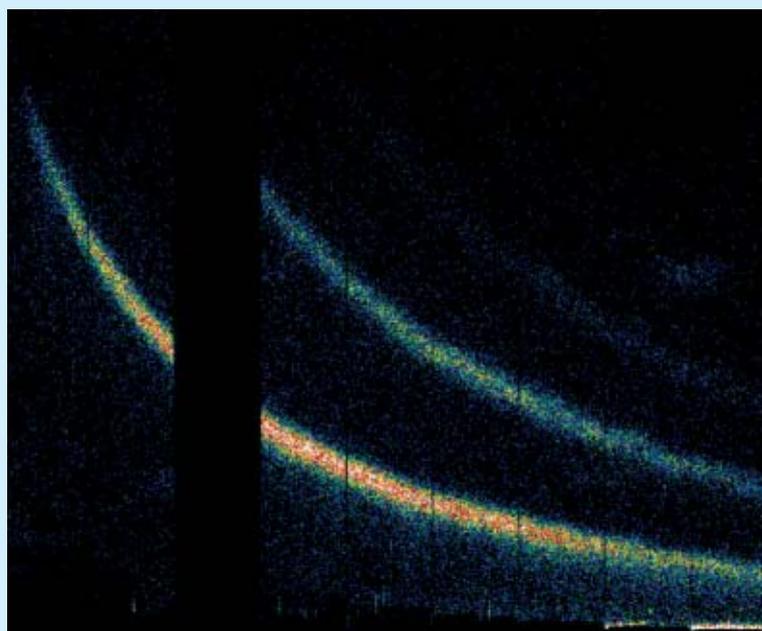
Activities will now focus on implementing selected projects leading to 'Expert Reduced Data' for ingestion into the ISO Data Archive. The first sets of systematically reduced data have already been captured, including a spectral atlas of over 300 stars.

XMM-Newton

Operations continue to run smoothly. Almost no time has been lost recently due to enhanced solar activity or the non-availability of ground stations due to their use to support launches. Following successful investigations into operating the onboard X-ray detectors at around -115°C instead of the previous -80°C , the operational temperatures of most of them have now been lowered. This step ameliorates some of the effects of radiation damage caused by spending over 2.5 years in space. This is nicely illustrated by the results



Operating at -80°C



Operating at -110°C

The improved spectral response of XMM-Newton's Reflection Grating Spectrometer (RGS-1) by operating at -110°C

displayed at:
http://xmm.vilspa.esa.es/external/xmm_news/it_ems/cooling02/index.shtml

Preparations for the upcoming orbit-maintenance manoeuvre and the next eclipse season, in February/March 2003, have been finalised.

Data processing and shipment is once again nominal following the interruption related to the instrument cooling exercise mentioned above. More than 2300 observation sequences have been executed and the data for 2100 of these

has been shipped. Version 1.5 of the XMM-Newton Science Archive (XSA) was successfully released as planned, in mid-November, for use by the wide astronomical community.

In March 2003, a new Call for Observing Proposals will be issued for the next 16 months of observing time, which are open to all astronomers worldwide.

By the end of December, some 225 papers based on XMM-Newton data had been published in the refereed literature.

Integral

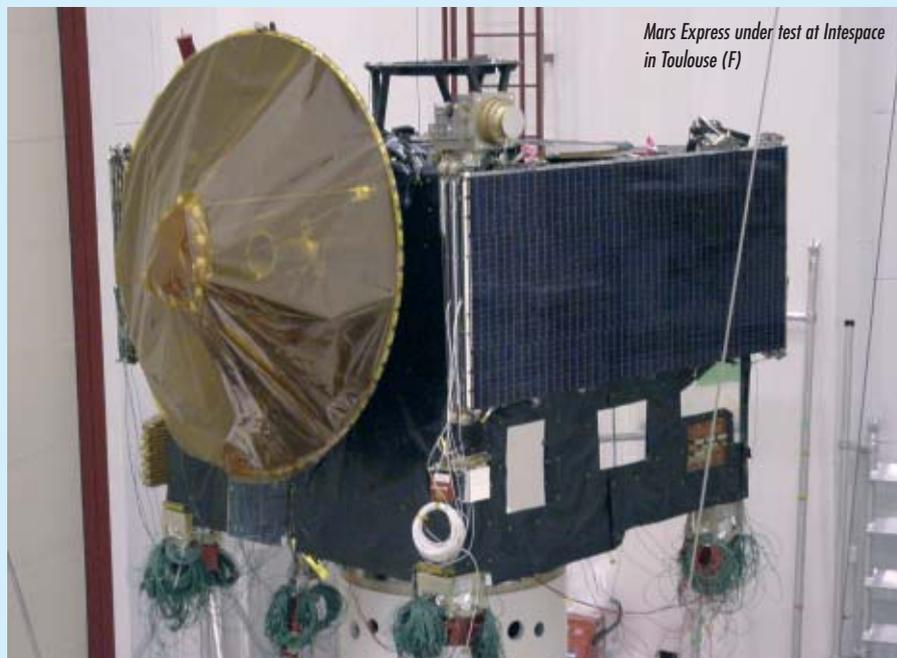
The Mission Commissioning Results Review in December concluded that the spacecraft payload and ground segment have been successfully commissioned and that in-orbit performance complies with mission specifications. The smooth in-orbit commissioning has resulted in an expected satellite lifetime of more than 5 years. The fine-tuning and calibration of the scientific instruments is expected to be completed by end-March 2003.

Rosetta

The Rosetta spacecraft and ground segment were ready for the opening of the launch window on 13 January. However, as a result of the launch postponement, decided upon jointly by Arianespace and ESA, the spacecraft is now being defuelled and put into a non-hazardous state. Alternative mission scenarios are being studied by all parties, with the aim of briefing the Science Programme Committee (SPC) on the various options at the end of February, with a view to a final decision being taken at the May 2003 SPC.

Mars Express

The spacecraft is currently in a special chamber at Intespace in Toulouse (F) to verify its insensitivity to electromagnetic radiation.



Mars Express under test at Intespace in Toulouse (F)

This is the last in a long campaign of tests to demonstrate the spacecraft's ability to survive the launch and space environments. All results indicate that the spacecraft meets the design requirements.

A highly successful press event was held in collaboration with Ferrari in early September, when a small container holding some 'Ferrari-red paint' was mounted on the spacecraft in the presence of a very large group of media representatives.

Preparations for the launch campaign are in full swing, in close co-operation with Starsem, the Russian launch-service provider. The telecommunications facilities are being

installed to allow the spacecraft to be operated remotely from ESOC in Darmstadt (D) for training purposes. The Project team has also inspected the Baikonur facilities and concluded that the launch campaign can start in late February 2003 as planned.

The ground-segment preparation has progressed according to plan, with ESOC being assigned time slots for remote spacecraft operation to test some of its in-flight procedures.

SMART-1

During the last months, the fully integrated flight-model spacecraft has been undergoing system functional and performance testing at ESTEC in Noordwijk (NL), followed by the environmental test campaign (EMC, thermal-vacuum and vibro-acoustic), all of which have been completed successfully. The on-board software has also been subjected to extensive verification testing. In December, an end-to-end electric-propulsion test was successfully performed in ESTEC's HBF-3 chamber, commanding the engine to fire at different power levels, as will be needed during SMART-1's flight. The engine performed flawlessly.



The SMART-1 electric-propulsion thruster firing in the ESTEC test chamber. The plume is visible due to the excited xenon (Xe+) ions: the central part shows a greenish light (high-energy emission), while the ions close to the cathode, on the right, emit a reddish glow (lower energy). The white annular core is where the plasma (Xe+ and e-) is generated, maintained and accelerated

The Flight Acceptance Review (FAR) began in December and will be concluded with a Review Board meeting in mid-February. Parallel acceptance reviews are being held for the electric-propulsion subsystem, procured directly by the Agency from SNECMA (F) and integrated by the Swedish Space Corporation (S), and for the payload instruments, also procured by the Agency and delivered as customer-furnished equipment. These reviews will report to the Mission Acceptance Review to be held after the FAR.

Ground segment

Preparation of the Mission Control facilities at ESOC (D) and the Science and Technology Operation Co-ordination facility at ESTEC (NL) is going according to plan. The simulation campaign has started at ESOC, with ESTEC and industry participation. The procedures now being finalised will be tested as part of the second System Validation Test (SVT-2) in February 2003.

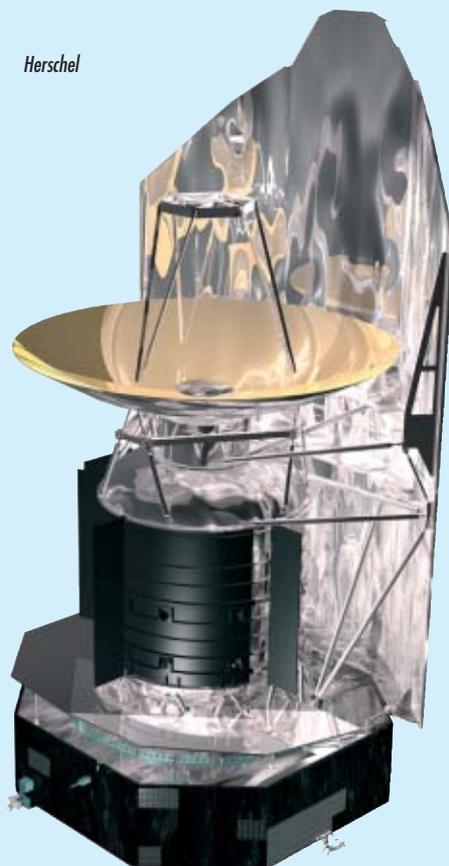
Launcher

The spacecraft will be ready for launch at the end of March 2003 and all of the launch interfaces have already been defined. The Project is currently awaiting a launch commitment from Arianespace in order to finalise everything for a specific launch opportunity.

Herschel/Planck/ Eddington

During the autumn of 2002, the procurement activities leading up to the selection of all of the industrial consortium's subcontractors have continued apace. As a result, a number of new contractors have been brought into the industrial consortium in the last three months for important project items, including the Herschel and Planck solar arrays, the Herschel instrument optical bench assembly, the Cryostat control unit and internal and external multi-layer insulation and software, as well as a number of units for the attitude control and management systems of both spacecraft. Consequently, the Herschel/Planck procurement activities are nearing completion.

Herschel



The spacecraft design and development activities made further progress with the holding of the Herschel/Planck Spacecraft Preliminary Design Review (PDR) in the last quarter of the year. The overall system design is now complete and the development phase has been defined in detail. Several unit and subsystem preliminary design reviews have confirmed that the lower-level design is stable and progressing nominally. Detailed design work will now lead to the completion of spacecraft-hardware manufacture by the end of 2003.

Development of the spacecraft telescopes continues to run smoothly. Production of the flight-model segments for the giant Herschel 3.5 m silicon-carbide telescope is proceeding according to plan at Astrium SAS (12 'pie-type' segments are needed for the complete primary mirror). Formal acceptance of the manufactured elements took place at the end of December. Development of the Planck reflectors at Astrium GmbH is progressing well, with the full secondary reflector scheduled for completion in April.

Further progress was made with the detailed definition of the accommodation for the two spacecraft on an Ariane-5 E/CA launcher during a meeting with Arianespace in late December.

Mission Operations Centre development activities at ESOC are going according to plan, with the buildup of the Herschel/Planck MOC team who will be commanding the satellite from the ground.

The technical development of the scientific instruments is generally proceeding as planned, but financial problems are still affecting progress.

Work has also continued on the Eddington mission, which is to be integrated into the existing ESA Herschel/Planck project structure and will make use of the recurring Herschel spacecraft bus for which the Agency holds a contractual option. The establishment of a consistent Herschel/Planck/Eddington concept has progressed both technically and financially. As the next step for Eddington, ESA will contract parallel system-definition studies to industry starting in spring 2003, eventually moving into a mission-implementation phase in 2004.

Planck



Venus Express

After conditional approval of the mission by ESA's Science Programme Committee (SPC) in July 2002, the Project and Astrium SAS initiated all of the contractual activities needed to ensure the spacecraft's readiness for launch in November 2005, whilst still respecting the SPC-imposed constraints. The latter were removed in November when the SPC gave the green light for the full Venus Express implementation. Thanks to starting work in July, the Project was able to conduct the first major project review – the System Requirements Review – by the end of 2002, and preparations for the Preliminary Design Review began immediately thereafter.

The Science Working Team held its first formal meeting in December.

Artemis

Hurrah! Artemis has reached geostationary orbit. What many people thought impossible during the first days after the launcher malfunction during the satellite's launch has nevertheless become a reality. After perhaps the longest transfer orbit of any communications satellite, Artemis finally arrived at its nominal operating position on 31 January 2003. Its ion engine had been propelling the satellite at a rate of 15 km/day for the last several months, something for which such an engine had never previously been used. It was also a first in terms of the flexibility of the spacecraft's attitude control system. Thanks to the cleverness of its designers, operators and outstanding hardware elements, it was possible to successfully perform previously unspecified manoeuvres that had not been ground-tested and qualified in the classical sense.

With Artemis safely on station, a detailed payload performance test programme is now being conducted, to allow formal operations to start in March. There is further good news in that Artemis still has the potential to operate for its nominal 10-year lifetime.



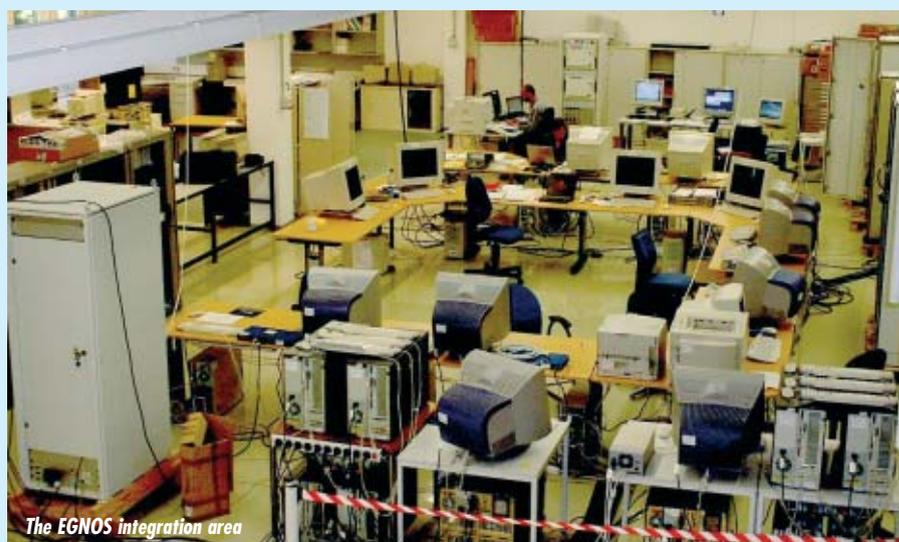
EGNOS

The EGNOS ground-segment elements are now the final stages of qualification, all having been delivered and integrated into the system AIV platform at Langen in Germany. System-level integration and verification activities are now proceeding at full speed, having already validated all key software interfaces, towards System Factory Qualification in June 2003.

All of the 40 sites planned to host the EGNOS elements have been characterised by means of specific measurement campaigns, and all hosting entities have begun to upgrade their infrastructures to meet the EGNOS

requirements. Deployment of the first EGNOS elements at their final sites was started at the end of 2002, which should enable first EGNOS test Signal in Space to be transmitted by the second quarter of 2003. Activities will continue in parallel to achieve full system deployment during 2003.

ESA's partners in the EGNOS Programme (European Air Traffic Service Operators) have set up a consortium that is intended to become the future EGNOS operating entity. All partners are working towards the Operational Readiness Review planned for April 2004 and the subsequent Initial Operations Phase of the EGNOS System.



The EGNOS integration area

In parallel, the EGNOS Test Bed (ESTB) continues its transmissions, with excellent service availability, via dual broadcasts from both the Inmarsat AOR-E and IOR satellites. Successful system demonstrations have been performed in Cairo, Nice and Bordeaux, and more are planned in Dakar. The ESTB signals are also being used for a number of other GNSS-application promotional activities.

Meteosat Second Generation (MSG)

Following the handover of MSG-1 spacecraft operations to Eumetsat at the end of

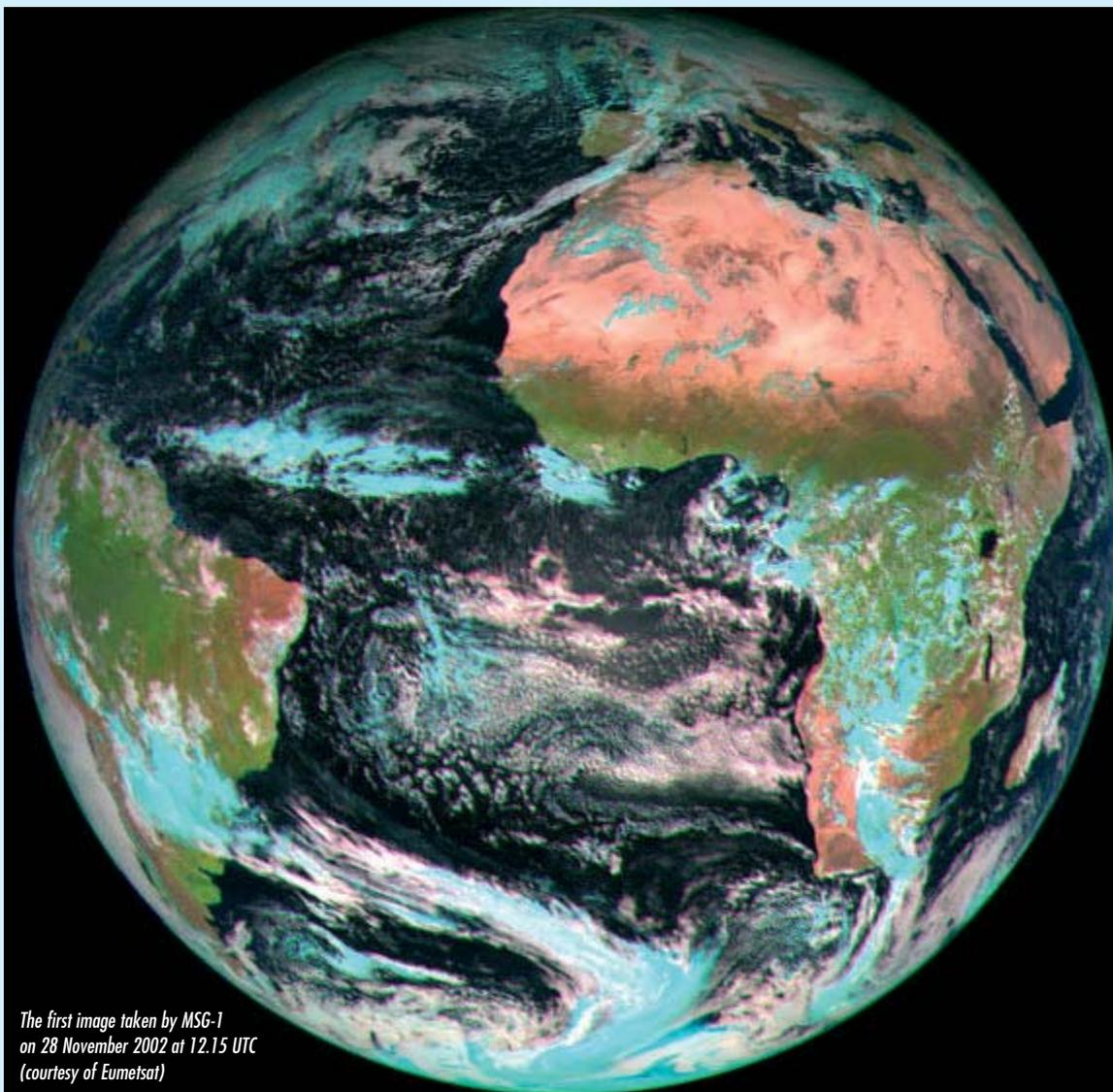
September, the satellite commissioning had to be put on hold on 25 October as a result of a solid-state power amplifier switch-off anomaly onboard the spacecraft. This anomaly, which is still under investigation, does not endanger the mission. The raw data gathered by the spacecraft can still be downlinked without any problem. However, an alternative solution may have to be found for the planned relay of processed data to users via the spacecraft. Investigation is on-going and looks promising.

Meanwhile, the commissioning activities have restarted and are planned to continue until mid-March. Apart from this anomaly, the MSG-1 spacecraft shows an outstanding performance, which was confirmed by its impressive first image taken on 28 November.

The MSG-2 system-integration activities have now been completed and the satellite prepared for environmental testing at Alcatel in Cannes (F). The thermal-vacuum testing was completed by the end of December. The satellite should go into storage at the end of May 2003 to await its launch, which is now foreseen for January 2005. Once MSG-2 has been put into storage, the integration team at Alcatel will resume its work on MSG-3.

MetOp

Major technical progress has been made with the very successful thermal-balance/thermal-vacuum testing of the MetOp-1 protoflight



The first image taken by MSG-1 on 28 November 2002 at 12.15 UTC (courtesy of Eumetsat)

modules, with two tests being conducted in parallel: on the Payload Module in the Large Space Simulator (LSS) at ESTEC in Noordwijk (NL), and on the Service Module in the Intespace facility in Toulouse (F). Detailed correlation work is now underway to ensure that the thermal design is fully valid, which should be confirmed by the MetOp Qualification Review, planned for mid-2003.

Production of the first IASI flight-model instrument (equipped with functional, but not flight-quality detectors) is proceeding on schedule, and preparations for its integration and testing are well advanced. The impacts of the retrofitting of the sensor module for the first MetOp and for MetOp-3 have still to be worked out. A solution for the radiation sensitivity of the ASCAT switching unit has been identified and is being implemented.

The GOME-2 instrument continues to make good progress. In particular, a late modification to incorporate a quasi-volume diffuser - which replaces the existing alumina diffuser and is used to provide a reference solar spectrum - has been successfully qualified and is now being retrofitted to the instruments. This modification will result in a significant improvement in GOME-2's ability to measure atmospheric trace gases.

The GRAS engineering model has been used without problems throughout the MetOp-1 Payload Module testing. The first flight model is nearing the end of its acceptance review process. Solutions to the antenna metallisation problem are still being identified.

With the qualification phase of the project now nearing completion, greater emphasis is being placed on launch and operations preparation. Here much progress has been made with Eumetsat in defining in detail the organisation of the launch, early-orbit, switch-on and commissioning phases.

ADM-Aeolus

The design of the instrument receivers, based on the pre-development model, has been refined. Instrument interfaces both internally

and to the platform have been defined. The Instrument Requirements Specification is close to agreement. Instrument operations have been reviewed and a requirements specification for the instrument control unit produced.

The platform's electrical design is sufficiently complete to specify equipment items. The operational requirements on the satellite have been defined and reviewed. The Model Based Development and Verification Environment, which will be used to verify software and procedures, has been analysed in some detail.

The prime contractor is Astrium Stevenage (UK) and the core consortium includes Astrium Toulouse (F) which is responsible for the instrument, and Astrium Friedrichshafen (D) which is responsible for the platform's electrical subsystems. Subcontractors to supply subsystems and equipment for the satellite will be selected through almost fifty competitive ESA-supervised Invitations to Tender (ITTs). The first ITT (for the transmitter lasers) has been opened to limited competition between Astrium and Galileo. A further eight ITTs are under review at ESA and will be released shortly.

Plans for one ground and two airborne campaigns with a specific instrument have been discussed with DLR Oberpfaffenhofen (D). These campaigns will be conducted as a cooperative activity with significant funding from DLR.

Mission assumptions have been agreed with ESOC (D) as a basis for planning the Flight Operations segment. Agreement has also been reached with ESRIN (I) on the organisation of the Payload Data Segment, and the technical work will begin shortly.

CryoSat

The main development (Phase-C/D) activities are progressing well and some of the flight-model elements, such as the high-pressure tank for the attitude-control system and the antennas for the telecommunications

subsystem, are ready to be shipped to Astrium GmbH, the satellite Prime Contractor.

On the payload side, tests on critical elements of the SIRAL altimeter are progressing well at Alcatel Toulouse (F). Thales (F) has already manufactured the main electronic boards of the DORIS instrument for restitution of the CryoSat orbit.

Definition of the interfaces between the satellite and the Eurokot launcher is now well advanced and details are being discussed with Krunichev.

Development of the ground segment is going according to plan and definition of the algorithms for the level-2 processing is well under way. Agreement has been reached on the plan for the CryoSat validation campaigns, with preliminary activities foreseen for 2003 in the framework of the Cryovex campaign.

GOCE

Space-segment development has entered a stage (Phase-C/D) characterised by detailed consolidation of the satellite's design, based on equipment-level Preliminary Design Reviews (PDRs). These PDRs have already been successfully concluded for many equipment and payload units, and steady progress is being made in all remaining areas.

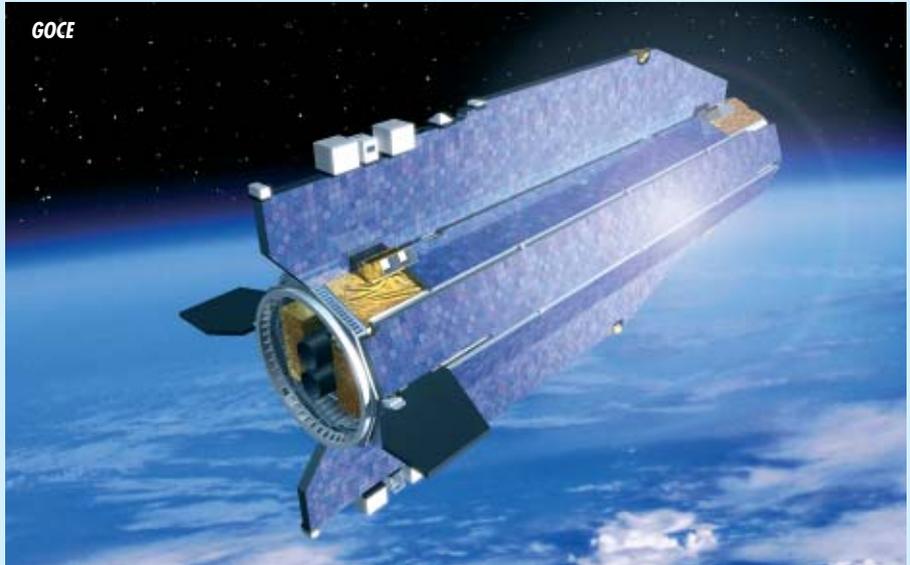
The build-up of the GOCE industrial consortium is very close to completion. The last Tender Evaluation Board (TEB), in November 2002, dealt with the selection of the Independent Software Validation contractor. Subcontractors have recently been engaged for the harness, magnetic torquer, thermal-control hardware and RF suitcase.

Significant effort has been made to kick-off schedule-critical activities related to the micro-Newton propulsion system. Negotiations concerning the solar generator have progressed with the TEB-recommended supplier and urgent work has been initiated due to its impact on the overall schedule. The thermal-cycling testing of representative photovoltaic coupons has continued, and

preliminary results are available from the two potential European photovoltaic-assembly suppliers.

Some delay has occurred in preparing for the mechanical testing of an accelerometer sensor head equipped with the chosen stop material/coating, intended to demonstrate that the current accelerometer design will withstand the launch vibrations. The test should now take place in February 2003. Breadboarding of key gradiometer front-end electronics functions has also recently started, allowing the testing of vital performance-related design characteristics.

Activities on the ground-segment side have focused on completion of the Ground Segment Requirements Review (GSRR). The completeness, consistency and feasibility of the ground-segment concept and architecture have been reviewed, together with the requirements for the Flight Operations Segment (FOS) and the Payload Data Segment (PDS). The Review Board concluded that the ground segment is sufficiently well defined to kick-off the related development activity. Consequently, emphasis in the project activities has shifted towards finalisation of the documentation relevant to the Invitation to Tender (ITT) addressing the development of the GOCE PDS (data processing up to Level-1b). In addition, a study is in preparation for the Calibration and Monitoring Facility (CMF), which will incorporate critical scientific-product quality monitoring and related system health-check functions during nominal operations as well as the payload calibration phases.



SMOS

The payload design phase (Phase-B) was successfully kicked-off at the end of October, with a seamless transition from the extended study phase (Phase-A). A first round of progress meetings with subcontractors has taken place, allowing a number of critical internal interface issues to be addressed.

Preparations are proceeding to formalise ESA-CNES cooperation in the SMOS programme, as well as for the 'system support' to be provided by CNES and Alcatel.

The ground-segment Phase-A study with GMV, Indra and INSA was kicked-off in October and is producing the first output.

The MIRAS Demonstrator Pilot Projects 1 and 2 are nearing completion. The full three-segment arm deployment test in particular was very impressive and highly successful.

International Space Station

Research and applications programmes

An update of the Assembly Sequence (Rev. F) has been signed by all Partners, including the Columbus launch for 7 October 2004 and the ATV launch for 27 September 2004. The Columbus launch will include five payload racks and two external payloads, of which one rack and one external payload will need to be confirmed by NASA as a function of Shuttle mass availability.

Assembly flights 9A and 11A carried the first starboard and port truss segments to the Station, both of which were successfully installed.

At the Heads of Agency meeting in Tokyo on 6 December, all Partners unanimously endorsed Option Path Four, as recommended by the Multilateral Programme Planning Team

Three-segment arm deployment testing of the MIRAS Demonstrator for SMOS



(MPPT). This Path is based on improving utilisation productivity from 2003 to 2006/7, permanently increasing utilisation capacity using the existing rescue capability (Soyuz) from 2006/7 to 2010, and continuing beyond 2010 to increase utilisation capacity using existing and new crew-rescue capabilities (Orbital Space Plane).

Space infrastructure development

Acceptance testing of the Columbus Laboratory's flight model and formal qualification testing of its electrical test model are progressing well. The first part of the major hardware and software compatibility qualification test has been finalised.

Node-2 flight-unit integration is on schedule. All four avionics racks have been integrated and the electrical tests completed. Integration of the cables and actuators of the common berthing mechanisms has also been finalised.

The System Requirements Review for the Cryogenic Freezer (CRYOS) was completed in December.

Machining of the Cupola's flight unit dome and welding of the dome/ring was completed and the dome has been delivered. Acceptance testing of the shutter mechanism and flight-unit harness has been completed, as well as all Structural Test Article (STA) activities. The Cupola's launch is now planned for January 2008.

Discussions have been held with Arianespace and CNES regarding the launcher configuration for ATV flights. Currently under assessment is a proposal to use the last two available EPS (Storable Propellant Stage) upper stages for the first two ATV flights, and the future cryogenic stage, known as ESC-B, for the remaining flights.

NASA has formally cancelled the X-38 project, and detailed consultations relating to the termination of the project will start in the near future.

Operations and related ground segments

The ATV Control Centre (ATV-CC) Preliminary Design Review (PDR) has been successfully completed. The ATV-CC Phase-C/D proposal

has been technically negotiated, but further negotiation on price is required. The Columbus Control Centre (COL-CC) system PDR was concluded at the beginning of December. The Tender Evaluation Board for the Phase-C/D proposal concluded that a contract could be placed provided that all open actions from the PDR have been successfully closed out.

The ground segment set up for the 'Odyssey' mission successfully supported the flight and, based on the experience gained, activities are underway to set up the required infrastructure with NASA and the Russian TsUP for the 2003 Taxi Flight involving ESA Astronaut Pedro Duque.

Utilisation planning, payload development and preparatory missions

Eight Microgravity Application Promotion (MAP) continuation proposals have been recommended for continuation and three for re-submission.

The Microgravity Science Glovebox (MSG), which is installed in the Destiny Laboratory on the ISS, experienced a loss of power during an experiment on 20 November. The problem has been isolated; troubleshooting is continuing and the engineers are assessing the options for resolving the problem in-orbit.

During the 'Odyssey' mission, there were eight days of intense activities during which the scientific and educational programmes, composed of 23 experiments, were performed.

The -80°C Freezer (MELFI FU 1) completed all of the acceptance tests at Kennedy Space Center (KSC), and has been integrated into the Multi-Purpose Logistics Module (MPLM) ready for launch in March 2003 on the ULF1 flight.

Hexapod flight-unit integration is progressing and delivery to NASA is now foreseen for April 2003.

The SOLAR Instrument Intermediate Design Review process has been completed.

The EXPOSE on EuTEF Critical Design Review (CDR) was kicked-off in December and completion is envisaged in February 2003.

The Payload System Requirements for the Atomic Clock Ensemble in Space (ACES) Review (SRR) was concluded in December, but the contract for its further development (Phase-C/D) has been put on-hold due to uncertainties surrounding the Pharo atomic clock.

The Critical Design Review (CDR) for Matroshka is in progress and should soon be completed.

The Data Management System for the Russian Service Module (DMS-R) is fully operational in orbit.

The European Robotic Arm (ERA) qualification programme is still ongoing, with the Flight Unit Qualification/Acceptance Review set for March/April 2003.

Several ATV follow-on production scenarios have been established between ESA and industry, and have been assessed from the technical, production-schedule and risk points of view. The industrial proposal will be submitted in Spring 2003.

The Russian Soyuz launcher carrying the unmanned Foton-M1 research satellite exploded some 30 seconds after lift-off. The flight carried 44 ESA-supported experiments.

All six ESA microgravity payloads were ready for flight in Spacehab on the ill-fated STS-107 Space Shuttle mission.

The preliminary acceptance of the Science Reference Model for Biolab has taken place. The flight-model subsystem procurement/manufacture has been completed and delivery is in progress. The flight-model integration is also progressing, along with training-model development.

The Fluid Science Laboratory (FSL) subsystem flight-model assembly, integration and testing is approaching completion and flight-model integration is in progress. The Canadian Space Agency has delivered the first Microgravity Vibration Isolation System (MVIS) hardware for integration. Training-model development has been initiated.

The engineering model of the Material Science Laboratory (MSL in US Lab) has been completed and preparations are in hand for testing the NASA Quench Module Insert (QMI); engineering-model delivery to NASA is expected early in 2003. Flight-model subsystems have been completed and flight-model assembly initiated. The Seebeck Diagnostic flight model has been delivered to ESA.

The European Physiology Module (EPM) flight-model manufacturing is almost complete and flight-model integration and training-model procurement have been initiated. NASA's Human Research Facility (HRF-2), including the EPM contribution, the Pulmonary Function System (PFS), has been integrated into the MPLM and is scheduled for launch on ULF-1 in March 2003.

A successful Crew Review of the Multi-electrode Electro-Encephalogram Mapping Module (MEEMM) has been completed.

ISS education

A pilot version of the ISS Education Kit for teachers of 12-15 year olds has been distributed to schools and other educational establishments. The final version will be produced in all of the ESA Member State languages.

In November, the ISS Education Programme (and ISS Education Kit) was presented to the 'European Council of International Schools' (ECIS) in Berlin.

Fifty students were selected to participate in the final of the SUCCESS contest (student experiments for ISS), which was held in the Erasmus User Centre at ESTEC. The winner of the contest will be announced in Spring 2003.



ESA astronaut Frank De Winne working with the Microgravity Science Glovebox aboard the ISS

In December, the ISS Education Programme for the European Astronauts Soyuz Missions was finalised. This programme has defined likely activities or student experiments for the different age groups.

Specific educational activities for the ISS Education Programme on the Spanish-sponsored Soyuz Taxi Flight have also been finalised. Students have developed twelve experiments based on Newton's Laws of Motion.

Commercial activities

The policy for commercial manned spaceflight missions with professional astronauts has been prepared for official release. The first such project has been assessed using the new internal evaluation procedure.

The joint ESA/Industry Cooperation Agreement Steering Board has approved the Strategic Marketing Plan 2003-6 and the detailed Marketing Plan 2003.

A number of Pathfinder Project proposals have been received and are being evaluated. The Rapid Eye project has been committed to a bridging phase and preparations for Phase-B activities are underway as the overall financing is secured.

Astronaut activities

The 'Odyssey' Soyuz Taxi Flight, with ESA astronaut Frank De Winne as Flight Engineer, was launched from Baikonour in October. The very successful mission was completed on 10 November when the crew landed safely in Kazakhstan. EAC staff at TsUP, ESTEC and the European Astronaut Centre (EAC) provided mission support during launch and landing, and the Medical Operations Consoles at EAC were used for real-time mission support.

On 8 October, ESA astronaut Pedro Duque began training in Russia for the Spanish-sponsored Soyuz Taxi Flight, scheduled for April 2003.

The welcoming of the French astronaut Philippe Perrin into the European Astronaut Corps on 17 December completed the process of integrating national astronauts.

Vega Small Launcher / P80

In the third quarter of 2002, the Vega contract negotiations progressed with the revision and finalisation of the technical, programmatic, and contractual baselines. The interfaces between the launch vehicle, P80 stage and ground segment have been further refined. A number of subsystem design reviews have also taken place and an Avum Working Group has jointly reassessed and defined the modifications needed to comply with the re-entry strategy agreed with Launch Safety Authority.

Other activities related, for example, to safety and reliability, controllability, guidance, navigation and control-law definition, have been progressing according to plan. A Vega Exploitation Group, including the Integrated Project Team (IPT) and Arianespace, has started holding regular meetings to exploit synergies with Ariane-5, to define overall cost-reduction options, and to follow the volatile evolution in the launch market.

On the ground-segment side, the scope and working procedures for the Engineering Support Contract have been defined in detail between IPT and CNES-SDS (Sous-Direction Sol), and a revised proposal is expected in mid-February. Work has also started on the definition of the industrial contracts to be issued in the spring for the main areas of development at the Vega Launch Base: namely, civil engineering, metal structures, fluid systems and the control bench. A baseline for the CSG buildings to be used by Vega has also been agreed.

The P80 stage development contract is close to signature and the activities are progressing as planned under the leadership of the P80 Integrated Team based in Evry (F).