

Programmes under Development and Operations

Programmes en cours de réalisation et d'exploitation

(status end-June 2000)

In Orbit / En orbite

PROJECT		1998	1999	2000	2001	2002	2003	2004	COMMENTS	
		JFMAMJJJASON	DJFMAMJJJASON	DJFMAMJJJASON	DJFMAMJJJASON	DJFMAMJJJASON	DJFMAMJJJASON	DJFMAMJJJASON		
SCIENCE PROGRAMME	SPACE TELESCOPE	[Blue bar from 1998 to 2004]								LAUNCHED APRIL 1990
	ULYSSES	[Blue bar from 1998 to 2001]								LAUNCHED OCTOBER 1990
	SOHO	[Blue bar from 1998 to 2002]								LAUNCHED DECEMBER 1995
	HUYGENS	[Blue bar from 1998 to 2004]								LAUNCHED OCTOBER 1997
	XMM-NEWTON	[Green bar from 1998 to 2000, then blue bar from 2000 to 2002]								LAUNCHED DECEMBER 1999
APPLICATIONS PROGRAMME	MARECS-B2	[Blue bar from 1998 to 2001]								POSSIBLE NEW LEASE
	METEOSAT-5 (MOP-2)	[Blue bar from 1998 to 2000]								OPERATED BY EUMETSAT
	METEOSAT-6 (MOP-3)	[Blue bar from 1998 to 2002]								OPERATED BY EUMETSAT
	METEOSAT-7 (MTP)	[Blue bar from 1998 to 2004]								OPERATED BY EUMETSAT
	ERS - 1	[Blue bar from 1998 to 2000]								MISSION ENDED MARCH 2000
	ERS - 2	[Blue bar from 1998 to 2001]								LAUNCHED APRIL 1995
	ECS - 4	[Blue bar from 1998 to 2000]								OPERATED FOR EUTELSAT
	ECS - 5	[Blue bar from 1998 to 2000]								MISSION ENDED MAY 2000

Under Development / En cours de réalisation

PROJECT		1998	1999	2000	2001	2002	2003	2004	COMMENTS	
		JFMAMJJJASON	DJFMAMJJJASON	DJFMAMJJJASON	DJFMAMJJJASON	DJFMAMJJJASON	DJFMAMJJJASON	DJFMAMJJJASON		
SCIENTIFIC PROGRAMME	CLUSTER-II	[Green bar from 1998 to 2000, then blue bar from 2000 to 2002]								RE-LAUNCHED MID 2000
	INTEGRAL	[Green bar from 1998 to 2001, then blue bar from 2001 to 2003]								LAUNCH APRIL 2002
	ROSETTA	[Red bar from 1998 to 1999, then green bar from 1999 to 2002, then blue bar from 2002 to 2004]								LAUNCH JANUARY 2003
	MARS EXPRESS	[Red bar from 1998 to 1999, then green bar from 1999 to 2003, then blue bar from 2003 to 2004]								LAUNCH JUNE 2003
	SMART-1	[Red bar from 1998 to 1999, then green bar from 1999 to 2002, then blue bar from 2002 to 2004]								LAUNCH LATE 2002
	FIRST/PLANCK	[Red bar from 1998 to 2000, then green bar from 2000 to 2007]								LAUNCH FEBRUARY 2007
COMMS / NAV. PROG.	ARTEMIS	[Green bar from 1998 to 2000]								LAUNCH DATE TBC
	GNSS-1/EGNOS	[Green bar from 1998 to 2003]								INITIAL OPS. END 2003
	GALILEOSAT	[Red bar from 1998 to 2000, then green bar from 2000 to 2003]								FIRST LAUNCH 2003
EARTH OBSERV. PROGRAMME	EOPP	[Red bar from 1998 to 2002]								
	EOEP	[Green bar from 1998 to 2004]								INCL. CRYOSAT, SMOS, GOCE
	ENVISAT / POLAR PLATFORM	[Green bar from 1998 to 2001, then blue bar from 2001 to 2004]								LAUNCH JUNE 2001
	METOP-1	[Red bar from 1998 to 1999, then green bar from 1999 to 2003, then blue bar from 2003 to 2004]								LAUNCH MID-2003
	MSG-1	[Green bar from 1998 to 2002, then blue bar from 2002 to 2004]								LAUNCH JANUARY 2002
MANNED SPACE & MICROGRAVITY PROGRAMME	COLUMBUS	[Green bar from 1998 to 2004]								LAUNCH OCTOBER 2004
	ATV	[Red bar from 1998 to 1999, then green bar from 1999 to 2004]								LAUNCH JUNE 2004
	X-38	[Green bar from 1998 to 2001]								V201 TEST FLIGHT MARCH 2002
	CRV	[Green bar from 1998 to 2005]								OPERATIONAL 2005
	NODE-2 & -3	[Green bar from 1998 to 2003, then blue bar from 2003 to 2004]								LAUNCHES FEBRUARY 2003 & SEPTEMBER 2004
	CUPOLA	[Green bar from 1998 to 2003, then blue bar from 2003 to 2004]								LAUNCH MAY 2004
	ERA	[Green bar from 1998 to 2002, then blue bar from 2002 to 2004]								LAUNCH JUNE 2002
	DMS (R)	[Red bar from 1998 to 1999, then green bar from 1999 to 2000, then blue bar from 2000 to 2004]								LAUNCHED 12 JULY 2000
	FREEZER	[Green bar from 1998 to 2001, then blue bar from 2001 to 2004]								LAUNCH AUGUST 2001
	GLOVEBOX	[Green bar from 1998 to 2001, then blue bar from 2001 to 2004]								LAUNCH AUGUST 2001
	HEXAPOD	[Green bar from 1998 to 2003, then blue bar from 2003 to 2004]								LAUNCH OCTOBER 2003
	EMIR	[Red bar from 1998 to 1999, then green bar from 1999 to 2003, then blue bar from 2003 to 2004]								
	MFC	[Green bar from 1998 to 2004]								BIO, FSL, EPM in COLUMBUS
LAUNCHER PROGRAMME	ARIANE-5 DEVELOP.	[Green bar from 1998 to 2000, then blue bar from 2000 to 2004]								V504 LAUNCHED DECEMBER 1999
	ARIANE-5 PLUS	[Green bar from 1998 to 2002, then blue bar from 2002 to 2004]								FIRST LAUNCH APRIL 2002
	FESTIP	[Green bar from 1998 to 2000]								REUSABLE LAUNCHER DEFIN.
	FTLP	[Green bar from 1998 to 2000]								TECHNOLOGY DEVELOPMENT

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

Hubble Space Telescope (HST)

On 24 April, Hubble celebrated its 10th Anniversary in orbit. An ESA Press Conference was organised at the Space Telescope European Co-ordinating Facility (ST-ECF) in Garching (D) on 27 April to mark this milestone. The speakers included C. Nicollier and J.-F. Clervoy, the two ESA astronauts who participated in the last Hubble maintenance mission (SM3-A) in December 1999.

Since that maintenance mission, Hubble has continued to operate nominally. The latest Call for Proposals (Cycle 10) was issued in June and offered as observing instruments the Fine Guidance Sensors (FGS), the ST Imaging Spectrograph (STIS), the Wide Field and Planetary Camera 2 (WFPC2), the Advanced Camera for Surveys (ACS) and the Near-Infrared Camera and the Multi-Object Spectrograph (NICMOS) refurbished with a cryo-cooler. The last two Instruments were announced in anticipation of their installation and refurbishment during the next servicing mission (SM3-B) scheduled for mid-2001.

The ST-ECF is actively participating with the Space Telescope Science Institute (STScI) in the design and implementation of the calibration software and procedures for the 'grism' observing mode of the Advanced Camera for Surveys (ACS).

This activity includes participation in the ground testing and in the data evaluation during the scientific verification of the new instrument.

The improved calibration for the Faint Object Spectrograph (a 'post-operation' HST instrument), which has been developed by the ST-ECF, has been tested and implemented in the HST Archive. ASTROVIRTEL, a project aimed at supporting European Archive research and funded by the European Commission (DGXII), has been initiated and the deadline for the First Call for Proposals was 15 June.

Ulysses

At the beginning of June, Ulysses was at a latitude of 57.5 deg south, 3.4 astronomical units (507 million km) from the Sun. The spacecraft remains in excellent condition as it approaches the start of the next polar pass. Data acquisition has been at a consistently high level, regularly exceeding 98% coverage. The second visit to the Sun's southern polar regions officially commences on 8 September when Ulysses reaches 70° latitude, and will last until 16 January 2001. The most southerly latitude of 80.2° will be attained on 27 November.

Although the nutation-like disturbance that affects the spacecraft as the axial boom

receives progressively more illumination is not expected to appear before early December, preparations for dealing with this operational complication are already underway. These include readying the Kourou ground station that will be required to provide support in February/March 2001. A Mission Implementation Plan addressing these specific ESOC activities has been prepared. Given the useful body of experience gained during the 1994/95 nutation episode, the expectation is that no major problems resulting from nutation will occur, even though the solar forcing will be about 1.5 times stronger than on the last occasion.

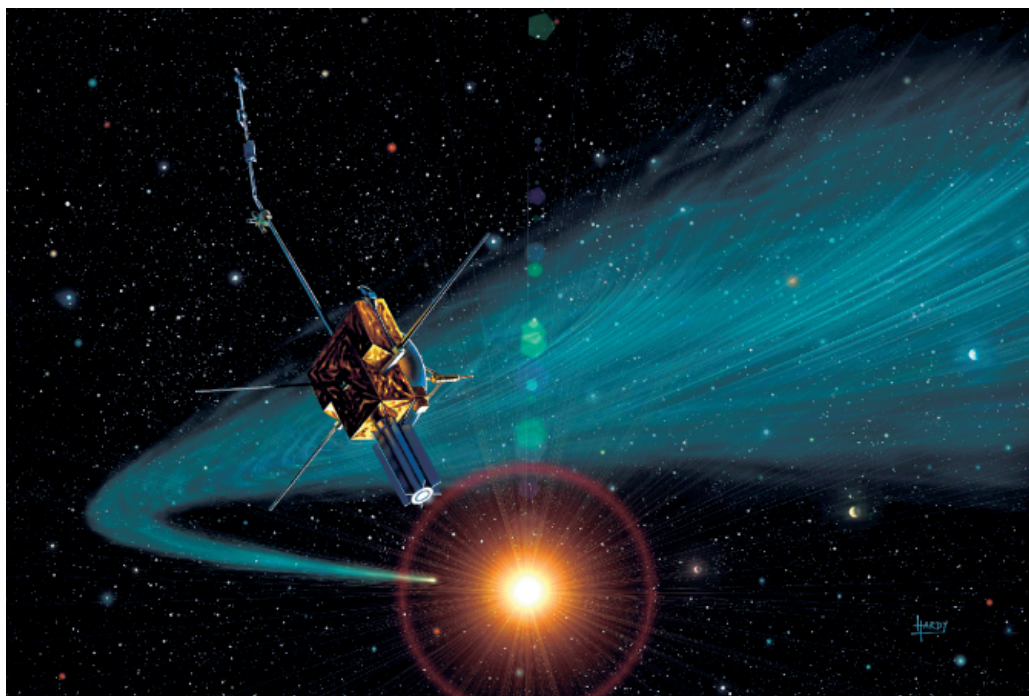
Given the outstanding success of the Ulysses mission to date, and the excellent prospects for new and exciting science in the future, it was recently proposed to extend orbital operations for a period of 2.75 years beyond the already approved end-of-mission date of 31 December 2001. This further extension was approved by the ESA Science Programme Committee (SPC) at its meeting on 6 June.

Huygens

The Cassini/Huygens spacecraft entered the asteroid belt in mid-November last year. Distant observations of asteroid 2685 Masursky were carried out by the Orbiter cameras on 23 January. The spacecraft then exited the asteroid belt in mid-April and it is now well on its way towards a

distant encounter with Jupiter in late December 2000. Planning for the six-month long Jupiter observations is well advanced and continuous observation of Jupiter will start in early October.

The fifth Huygens Probe checkout was successfully carried out on 2 February, and all Probe instruments performed as expected. On 3 and 4 February, an in-flight, end-to-end test of the Probe-to-Orbiter radio link was carried out. While the Probe itself remained turned off, a NASA Deep Space



Artist's impression of Ulysses crossing the distant tail of Comet Hyakutake

Network (DSN) station in Goldstone was used to transmit a simulated Probe radio signal to the Huygens Probe Support Equipment on board Cassini via Cassini's High-gain Antenna (HGA). The objectives of the test were to: (i) carry out an in-flight characterisation of Huygens' receiver performance in mission configuration, and (ii) perform a calibration of the Automatic Gain Control (AGC) signal strength, to validate the mission link budget that had been established before launch.

Integral

The spacecraft, launcher and ground-segment activities have continued according to the master schedule agreed at the payload review in April. Launch is planned to take place in April 2002.

The spacecraft Service Module (SVM) flight-model integration is nearing completion. A revised detailed flight-model Assembly, Integration and Testing (AIT) schedule is being finalised to take into account the late payload deliveries.

A Proton launcher Mission Preliminary Design Review (MPDR) was completed in early July.

The second part of System Validation Test (SVT-B) has been successfully completed. The test demonstrated that the satellite Service plus Payload Module configuration functions as planned. SVT-B included the execution of operational scenarios to validate relevant flight procedures. At a later stage, when the payload has been integrated, similar tests will be conducted to ensure that the Mission Operations Centre (MOC) will also be able to control the scientific instruments on board Integral.

The development of the four scientific instruments making up the Integral payload is progressing according to the agreed completion schedule.

Rosetta

The spacecraft engineering (EM) model is currently being integrated at Alenia in Turin (I). The EM structure, which is the structural thermal model (STM) refurbished after its environmental testing, is being



Participants in the Integral Proton launcher Mission Preliminary Design Review

equipped with the various spacecraft subsystems, including power, data handling and attitude control. Five of the ten EM experiments have already been delivered and their integration will begin in late July, by which time the rest of the units will have arrived at Alenia.

All of the actions arising from the spacecraft Hardware Design Review (HDR) in November 1999 have now been closed and the Review has been formally finalised.

Payload development is also proceeding according to plan. After the delivery of the EM units, the experimenter groups have started to work on the flight units. In November 1999, a Review of the Lander identified critical items that were endangering the planned deliveries. A Task Force was set up, which included an augmented group from the Lander management team at DLR (Cologne) and ESA team members. This Task Force has now addressed all of the open areas and at a management meeting at the beginning of July all parties agreed that, although the Lander's development was still a major challenge, the programme was now compatible with the Rosetta system schedule.

Development of the ground segment is still proceeding according to plan.

unveil a face of the Universe that has so far remained hidden, studying how the first galaxies and stars formed and evolved. Other targets will be the clouds of gas and dust where new stars are being born, discs out of which planets may form, and cometary atmospheres packed with complex organic molecules.

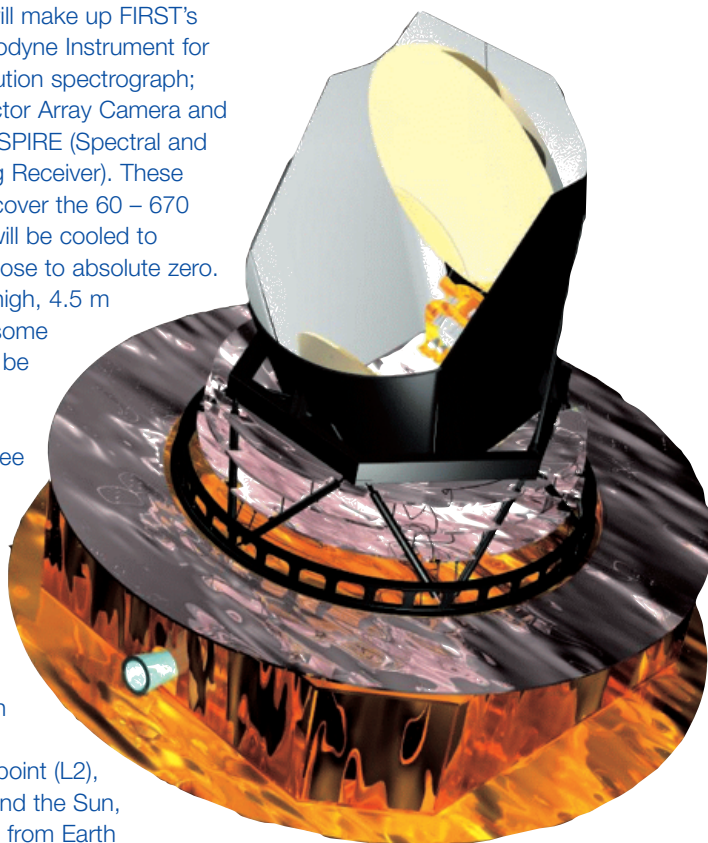
FIRST/Planck

ESA's Far-Infrared and Submillimetre Telescope (FIRST) will be the first space observatory to cover the full far-infrared and submillimetre waveband. FIRST will



Artist's impression of the FIRST spacecraft

Three instruments will make up FIRST's payload: HIFI (Heterodyne Instrument for FIRST), a high-resolution spectrograph; PACS (Photoconductor Array Camera and Spectrometer); and SPIRE (Spectral and Photometric Imaging Receiver). These instruments, which cover the 60 – 670 micron waveband, will be cooled to temperatures very close to absolute zero. Approximately 9 m high, 4.5 m wide and weighing some 3 tonnes, FIRST will be launched in 2007, together with the Planck spacecraft (see below). The two satellites will separate shortly after launch and will be operated independently thereafter. They will orbit a virtual point in space known as the second Lagrangian point (L2), between the Earth and the Sun, about 1.5 million km from Earth



Artist's impression of the Planck spacecraft

The Planck satellite has also been designed to help answer key questions about the Universe for humankind. It will analyse with the highest accuracy ever achieved the first light that filled the Universe after the Big Bang, the so-called 'Cosmic Microwave Background (CMB) radiation'.

Planck's payload will include a 1.5 m telescope that will focus radiation from the sky onto two arrays of highly sensitive radio detectors, the so-called Low-Frequency and High-Frequency Instruments. Together they will measure the temperature of the CMB over the sky, searching for regions that are very slightly warmer or colder than average. More than 40 European and some US scientific institutes will participate in the design and construction of these instruments, which will cover the wavelength range from 1 cm to one-third of a millimetre, i.e. from the microwave to the far-infrared.

The 1.5 tonne, 4 m high and 4.5 m wide spacecraft will rotate slowly in orbit to sweep a large swath of the sky each minute. It will cover the complete sky twice in about 15 months. Operating fully automatically for an expected 15 months of routine operations, it will dump the data that it acquires once per day over a 3 h period.

The industrial Invitation to Tender (ITT) for the FIRST/Planck mission will be issued by the Agency in September 2000. The main development phase (Phase-B) is planned to start in June 2001, with launch of the two spacecraft currently foreseen for February 2007.

EOEP

This is the second quarterly report on the Earth Observation Envelope Programme (EOEP). By the end of the period, the industrial Phase-A studies for the Cryostat mission had been completed and were under review, the industrial offers for the GOCE mission were in evaluation, Phase-A studies for the SMOS were in negotiation, and the Aeolus-ADM instrument pre-development design studies had been initiated. The Call for Ideas for market development had attracted more than eighty proposals, which have been evaluated and a selection made for initiation of this new activity.

EOPP

The Call for Ideas for the next cycle of Earth Explorer Core Missions assessment and study was released to the Earth Observation scientific communities of Europe and Canada at the end of June.

Meanwhile, work has continued on the potential candidate missions remaining from a last cycle. The previous Earth Radiation Mission (ERM) is the subject of joint actions between ESA and NASDA and has been renamed Earth CARE (Clouds, Aerosol and Radiation Experiment).

During the last quarter, considerable effort has also been devoted to Earth Watch activities, following the ERSIS study. A number of preliminary technical actions have been identified.

Meteosat Second Generation

The MSG-1 flight model spacecraft is presently undergoing optical vacuum testing to verify the performances of the cold channels of the SEVIRI instrument. End-to-end spin tests will then follow. The final test programme is presently under review pending the preparation of the MSG-1 flight model for storage, since the October 2000 launch date has been shifted by Eumetsat to January 2002 due to non-availability of its ground segment and the Ariane-4 launcher.

The Flight Acceptance Review (FAR) is maintained for August 2000 as planned, but certain elements of it may be postponed until the spacecraft comes out of storage to avoid the unnecessary repetition of activities.

Analysis of flight data from the Ariane-505 launch in March confirmed predicted shock loads, resulting in the selection of an Ariane-4 launcher for MSG-1. For MSG-2 and MSG-3, a new batch of Ariane-5 launchers with improved shock performance will be available. Due to the non-availability of Ariane-4 at the time of their launch dates, a special qualification programme for these two spacecraft is being planned in order to make them compatible with future Ariane-5 shock loads.

The Eumetsat Council, at its June 2000 meeting, approved the procurement plan for a fourth flight model, MSG-4, and the procurement of the necessary obsolete parts for this model, and two potential further models, MSG-5 and MSG-6.

Metop

Integration of the engineering model of the Payload Module is now in full swing, with the avionics already fully integrated and the first instruments being assembled and tested. Notably, the Data Collection System and the Search and Rescue panels have completed their panel-level integration at Alenia Aerospazio in Rome (I), and will be the next items for integration at Astrium in Friedrichshafen (D).

A solution to the HIRS synchronisation problem has been found, requiring only a minor modification to the instrument, which - once verified by the instrument supplier - will allow resolution of this issue.

A significant change to the Metop baseline is being prepared following the Eumetsat Council's approval of the start of the procurement of Soyuz-ST launch vehicles from Starsem, in place of the currently baselined Ariane-5. Work now has to start in Industry to provide a detailed confirmation of the initial assessment regarding the compatibility of this launch vehicle, and to prepare all necessary changes to the programme.

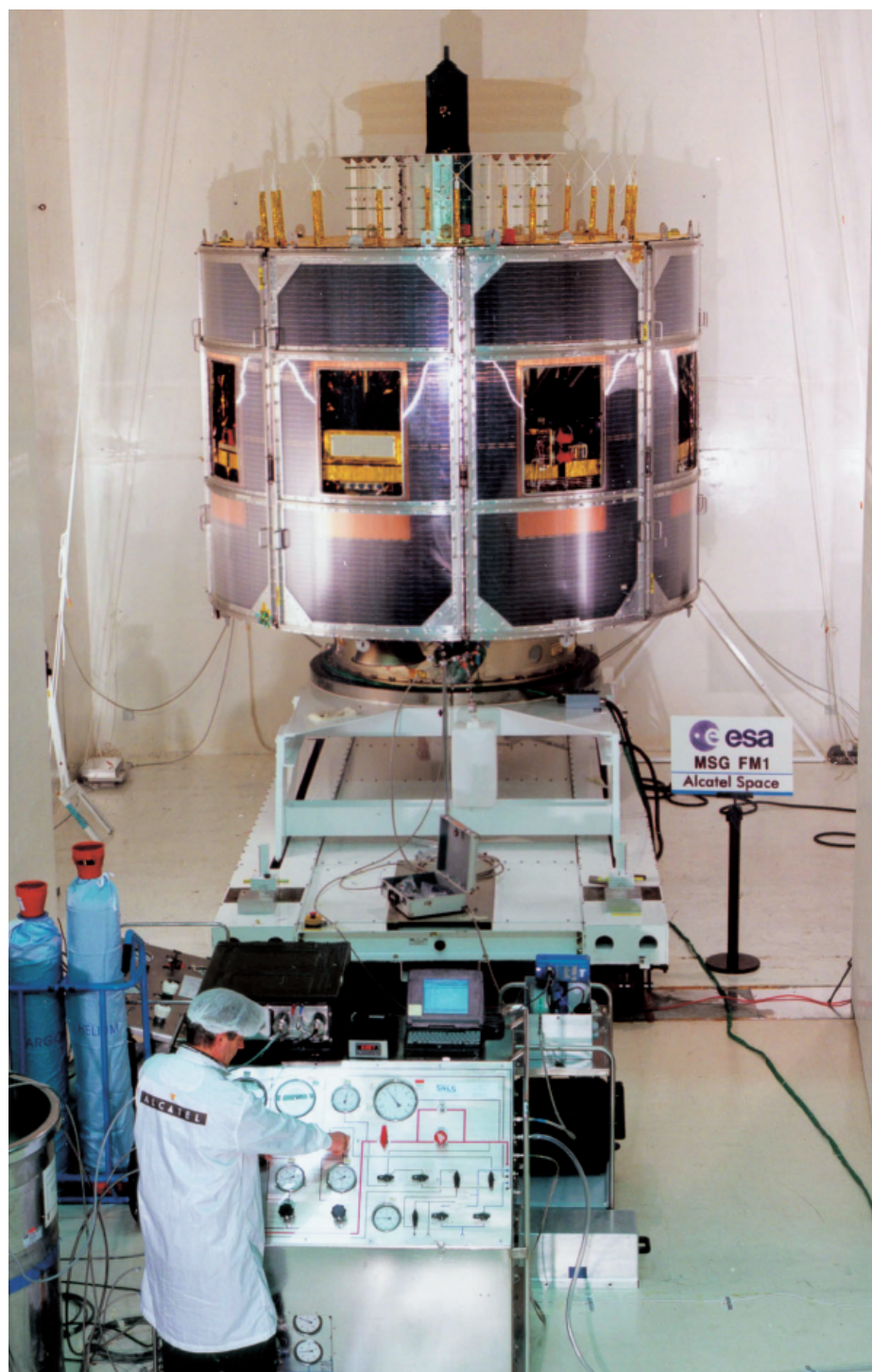
Work continues with Industry to reassess and optimise the development programme and logic, especially for the first flight model, in view of the actually anticipated customer furnished instrument delivery dates.

Envisat

System

The system activities have been focussing on:

- supporting the satellite system tests
- performing the Ground Segment Overall Verification (GSOV) tests to verify interface compatibility between the satellite and the ground segment (PDS and FOS)
- progressing the in-orbit commissioning preparations with the payload calibration and validation teams.



Satellite and payload

Two thirds of the satellite system tests have been performed during the second quarter of 2000. The remaining tests, requiring an updated version of the Payload Module Computer (PMC) software, will be performed during the fourth quarter of the year.

The solar array is currently being installed on the satellite to make it complete and ready for the acoustic and mechanical tests planned to be performed in the LEAF and on the HYDRA facilities, respectively, at ESTEC during the third quarter of 2000.

The MSG flight model under test at Alcatel Space (F)

The Radio Frequency Compatibility (RFC) test, planned for this autumn, will be the last opportunity for deploying the ASAR antenna and completing its radiating panel (14 of the 20 tiles are currently installed). The EMC and RFC tests will be performed within a special large RFC enclosure to be assembled in the HYDRA test hall during the summer.

The satellite Assembly, Integration and Test (AIT) schedule is being regularly scrutinised and the necessary work-around solutions introduced to ensure its continued compatibility with the target launch date of end-June 2001.

Ground segment

The Flight Operations Segment (FOS) has successfully driven phase-1 of the Satellite Verification Tests (SVT-2), executed as part of the satellite system tests. SVT-2 is a key test for demonstrating compatibility between the satellite and the Flight Operations Control System implemented at ESOC in Darmstadt (D). Phase-2 of this test will be executed with the updated PMC software version available in the fourth quarter of this year.

The Payload Data Segment (PDS) Version 2, accepted during the first quarter, has been used to start training operators. The PDS version V3 is currently being implemented and an integration/validation logic has been defined to ensure timely availability of this PDS upgrade.

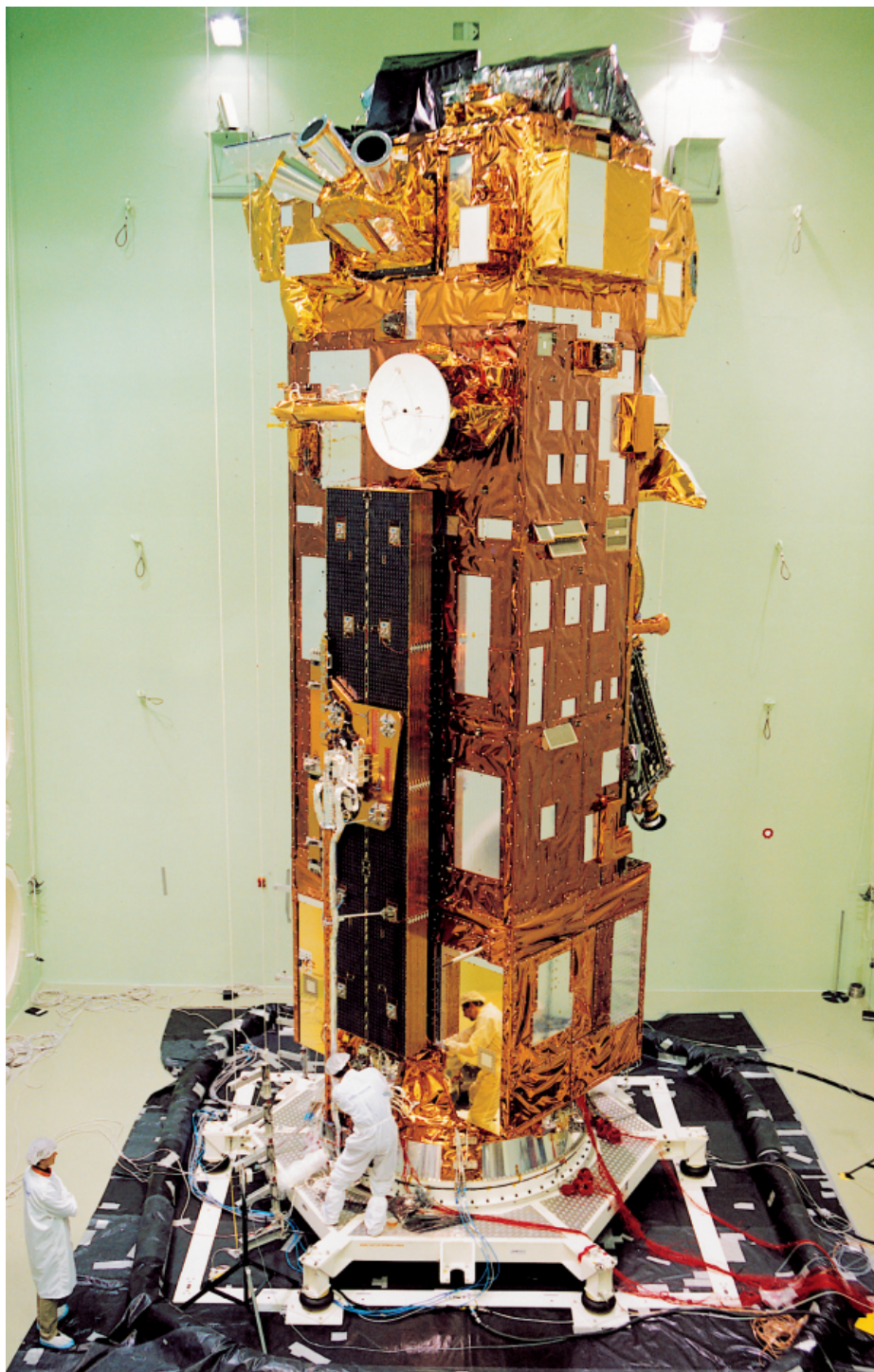
The Processing and Archiving Centre (PAC) implementation activities are in progress. Discussions have been held and agreement reached with the PAC providers to ensure that they will benefit from the PDS V3 improvements when procuring the PDS generic elements.

Following evaluation of the offers received in response to the Invitation to Tender (ITT), two commercial distributors which are already charged with distributing ERS products have been selected.

International Space Station

European participation in the ISS Exploitation Programme

The Executive's procurement proposal for the Exploitation Phase Operations Contract was unanimously approved at the June meeting of ESA's Industrial Policy Committee (IPC). A Preliminary Authorisation to Proceed (PATP) has been prepared and released to Industry. This PATP constitutes the framework within which the Preparatory Phase Activities will be conducted. A Statement of Work for the Operations Preparation Detailed Definition Phase has been prepared and will shortly be released to Industry.



Envisat under test in the LEAF facility at ESTEC (NL)

The Executive has launched Calls for Interest to companies and other entities interested in participating in an organisation to develop commercial utilisation of the ISS. Two separate Calls for Interest have been released, one for Research and Technology Development and the other for Innovative Markets. In connection with the release of the Calls for Interest, an ISS Information Day was held at ESTEC (NL) for potential business developers on 16 June.

A Pathfinder project on global branding/sponsoring has been started.

Further Pathfinder projects are being prepared

ISS Overall Assembly Sequence

A first draft of the ISS Assembly Sequence (Revision-F) was issued by NASA in May for review and comment by the International Partners. This first draft, which retained the Columbus launch date in October 2004, was generally

satisfactory to ESA. However, a second draft was released in late June, in which the total number of Shuttle flights per year was reduced from 8-9 to 7-8, as a consequence of which the proposed launch date for Columbus was shifted to May 2005. ESA rejected this further slippage in launch date and is currently working with NASA to restore the October 2004 date, for which a number of options have been identified. NASA currently proposes to baseline Revision-F at the next Space Station Control Board meeting on 26 July.

A General Designers' Review was held in Moscow on 26 June, during which the readiness of the Service Module, Mission Control, and the launch site to enter final launch preparation was reviewed in detail. No problems were identified, and the Service Module was cleared to enter the final phase of launch preparation, with a target launch window of 12/14 July, subject to the successful launch of the second Phase-2 modified Proton on 5 July.

Columbus laboratory

Significant potential delays in the flight-unit integration schedule are arising from quality problems associated with fibre-optic cables (this is an ISS-wide problem, not Columbus unique). Otherwise, on the flight unit, the acceptance pressure testing (proof tests and leakage tests) of the primary structure is complete, and integration is underway to complete the modal-survey configuration. The results of

the neutral-buoyancy tests at NASA are being incorporated. Testing on the electrical test model is proceeding, with the manually commanded data-management, electrical-power-distribution and video functions all having been completed. The Data Management Subsystem Critical Design Review (CDR) has been successfully conducted, and the PICA CDR closeout review is underway. Preparations are well ahead for the Columbus System CDR later this year.

Columbus Launch Barter

Nodes-2 and -3

Negotiations with NASA have been completed to incorporate the effects of the many NASA-driven design changes into a revision of the Columbus Launch Barter. The corresponding effects on the industrial return are also being evaluated. The schedule for the Node-2 delivery meets the revised Assembly Sequence need dates, but NASA now plans to have Node-2 spend 20 months at Kennedy Space Center for various tests prior to launch, making it schedule-critical for all subsequent launches (which include Columbus and the JEM). Node-3 is not at all critical.

Cryogenic Freezer Racks

The negotiation of NASA requirements was successfully completed at an ESA/NASA meeting in June. The Invitation to Tender (ITT) for Phase-B/C/D was also sent out in June. The deadline for proposal submission by Industry is September 2000.

Cupola

The dome and ring forging are now in final machining and will be delivered to the Prime Contractor this summer. Following the Design Consolidation Review in the spring, the two major areas of concern have been addressed. That relating to thermal robustness during launch-to-activation and during Cupola in-orbit transfer from one location to another has been satisfactorily resolved. The change from one-crew to two-crew member EVAs is, however, still being resolved to determine solutions with the least impact. The internal layout/secondary structure design concept has now been established and detailed design has begun.

Automated Transfer Vehicle (ATV)

The ATV Preliminary Design Review (PDR) took place as planned in Les Mureaux (F), from 15 to 26 May 2000. The PDR Pre-Board met on 29/30 May and concluded that a number of key issues need further consolidation prior to the PDR Board meeting, which has now been rescheduled for end-October. As a consequence of this delay, launch of the first ATV is now expected to take place in mid-2004.

Clarification has been obtained regarding the complementary development tasks to be performed in support of ATV as part of the Ariane-5 Plus programme.

A contract with Arianespace for nine launches was signed on 7 June in Berlin. This is the largest contract ever signed by Arianespace at one time with a single customer.

X-38/CRV and Applied Re-entry Technology (ART)

X-38 deliveries and activities continue, although some delays have occurred. Programmatic adjustments have been made to keep the project within its allocated budget. The next series of drop tests, this time of the updated aerodynamic shape corresponding to that of the operational Crew Return Vehicle (CRV), are in preparation. NASA has delivered the V131R test vehicle to Dryden Air Force Base.



Participants in the ISS Information Day at ESTEC (NL) on 16 June

Following the evaluation of industrial cost estimates for the ESA CRV items, a re-evaluation of the project's scope and contributions has been conducted. Further negotiations with NASA have taken place re the potential barter for CRV and good progress has been made. The NASA Phase-1 start up has been delayed until the end of the year, and the corresponding ESA Request for Quotation (RFQ) is also on hold pending confirmation of the new subscription levels. Selected early ESA CRV activity tasks have nevertheless been initiated, principally in the areas of aero/thermodynamics, avionic analyses and man/machine interface display requirements and developments.

Ground-segment development and operations preparation

The kick-off meeting for the Columbus Control Centre Phase-B2 Extension was held on 28 June. The ATV Control Centre activities have been expanded to address specifically the task sharing between the Control Centre and the flight vehicle, as recommended in the ATV Preliminary Design Review. Competitive Phase-B studies have been kicked-off for the ATV Crew Trainer. In addition, initial discussions with Russia have taken place to determine their ATV training obligations stipulated by the ATV Integration Contract. Development of the ATV cargo-integration software tools has been initiated.

Utilisation

Promotion

The European Utilisation Board (EUB) meeting in May was primarily devoted to presentations by EUB members on national and ESA user programmes for ISS utilisation preparation. The 50th meeting of the Space Station User Panel (SSUP) was held in June with the current members. The next SSUP meeting will have a new Chairman and several new members. The Panel's terms of reference are still being reworked to reflect more applications and commercialisation aspects.

At its June meeting, the ESA Industrial Policy Committee (IPC) endorsed a second group of Microgravity Application Projects (MAPs). A MAP-related project submitted to the European Commission for funding has been approved. By the end of June, there were seven MAP projects for which contracts had been signed, another seven projects that were near kick-off, and nine projects for which

contract preparation was in progress. As of end-June, the total MAP funding amounted to 44 MEuro.

Preparation for commercial utilisation

A Call for Interest to identify companies and entities to set up the commercial business development for ISS was issued in mid-June and replies are due by end-July. These replies will be carefully evaluated and those companies retained will be invited for more detailed discussions with a view of establishing high-level commitments.

Accommodation hardware development

The submission of new conversion proposals from industry covering the main development Phase (Phase-C/D) for the European Drawer Rack (EDR) and the European Stowage Rack (ESR) at reduced cost is expected by end-July. Some interface-related issues still need to be resolved.

Development of the scientific instruments for the SOLAR and EXPORT Coarse Pointing Devices (CPDs) is in progress. Delivery of the flight models is expected by March 2003.

Astronaut activities

The newly established European Astronaut Centre (EAC) Team started its activities on 1 April by integrating the available DLR expertise and training infrastructure. On 21 June, an ESA/CNES Arrangement defining CNES's participation in the EAC Team was signed in Paris. Negotiations concerning the integration of available ASI experts are underway.

On its post-flight tour to Europe, the STS-99/Shuttle Radar Topography Mission crew, which included the European astronaut Gerhard Thiele, met German Chancellor Gerhard Schröder in Berlin and visited EAC in Cologne.

On 17 May, EAC celebrated its 10th Anniversary with an event attended by some 250 guests and international media representatives, as well as all 16 European astronauts. A full article on the event will appear in ESA Bulletin No. 104.

Early deliveries

Data Management System for the Russian Service Module (DMS-R)

Following successful completion of all Service Module integrated system testing at Baikonur, the DMS-R Certificate of

Qualification (COQ) was signed off by RSC-Energia, clearing the DMS-R for launch.

The ESA DMS-R Support Plan for the Service Module launch campaign was also agreed with RSC-Energia in May. Under this Plan, ESA and its Contractor personnel will be located at Baikonur, Mission Control (TsUP), and RSC-Energia throughout the Service Module launch and early in-orbit operations, including ISS docking approximately two weeks after launch.

European Robotic Arm (ERA)

The ERA flight model is now reaching its final stages of assembly prior to commencing its test campaign. The first major tests planned are vibration and EMC testing, both of which are to be carried out at ESTEC (NL). Problems with some parts of the flight model have delayed completion of the integration, however, with the consequence that the previously planned early functional testing has been delayed until after the ESTEC tests. This will delay flight-model delivery until June 2001.

Delivery of the Mission Preparation and Training Equipment (MPTE) is still awaited and is now scheduled for August.

A meeting has been held with NASA on ERA safety issues, with no major problems being identified.

Laboratory Support Equipment (LSE)

In June, the MELFI (Minus Eighty-Degree Laboratory Freezer) Training Unit was delivered to NASA and accepted by ESA and NASA. Qualification testing of all major MELFI subsystems is in progress. Qualification of the electrical subsystem has been completed. System-level testing is now planned to start by end-July.

Manufacture of critical flight-unit parts for the Microgravity Science Glovebox (MSG) and integration of the engineering unit are ongoing. The interface to the International Sub-Rack has been agreed with NASA. The software-interface discussions with NASA (resulting from NASA's request to use the Express Rack protocol) are continuing, but it is still planned to finalise the Software Interface Control Document (ICD) by mid-July.

The data package for the Critical Design Review (CDR) for the Hexapod pointing

system will be completed by end-July. The ISS technical requirements for External Payloads remain unstable and some recently received requirement changes, especially for thermal and contingency power, remain critical. Once the CDR data package has been reviewed, ESA and NASA will recheck the technical requirements for stability.

Microgravity

EMIR programmes

After its installation in Spacehab in mid-November 1999, the MOMO (Morphological Transitions in a Model Substance) facility had to wait for its flight on the STS-101/Spacehab logistics mission to the Zarya/Unity configuration of the ISS until 19 May this year. From the data retrieved from the Digital Tape Recorder (DTR) following the return of MOMO to ESTEC, it became evident that not all data were properly recorded. The available data, including the MOMO housekeeping data, are currently under evaluation.

Without significant improvements, such as replacement of the ageing DTR by a data downlink or a more advanced onboard data-storage device, and the implementation of a telescience capability allowing MOMO to be controlled from the ground, a re-flight is neither recommended nor foreseen.

The 28th ESA parabolic-flight campaign – the fifth with the Airbus A-300 – was conducted successfully from 22 to 26 May, performing a total of 11 experiments. A summary of the campaign activities can be found in the 'In Brief' news section of this Bulletin.

Development activities in preparation for the STS-107 Spacehab flight in 2001 have continued. The ESA facilities scheduled to fly on this mission are Biopack, Biobox, the Facility for Absorption and Surface Tension (FAST) and the Advanced Respiratory Monitoring System (ARMS).

In June, the Microgravity Programme Board approved a complement of experiments for flight with Fluidpac on a Foton mission in 2002 and on the Maxus-5 sounding rocket in 2002. Maxus-4 and Maser-9 are being prepared for flights in 2001.

The Preliminary Design Reviews (PDRs) for EXPOSE and PCDF (Protein Crystallisation Diagnostics Facility) were completed. The development activities for the life-sciences facilities for the International Space Station (MARES, EMCS, Matroshka) are in progress. The Matroshka development contract, with DLR as prime contractor, was kicked-off in May and signed in June.

Microgravity Facilities for Columbus (MFC)

The engineering-model subsystems of Biolab, the Fluid Science Laboratory (FSL) and the Materials Science Laboratory (MSL) in the US Lab have been manufactured and their Critical Design Reviews (CDRs) are nearing completion. Engineering-model integration has been completed for Biolab. A Crew Evaluation Review has also been completed successfully.

The PDRs of the subsystems for the European Physiology Modules (EPMs) have been successfully completed, including the results of breadboarding.

The Agency's Microgravity Programme Board (PB-MG) and Industrial Policy Committee (IPC) have approved the study and design phase (Phase-A/B) for MSL, which is to be performed in co-operation with DLR and Astrium. The Request for Quotation (RFQ) will be sent to industry by the end of September.

