

Programmes under Development and Operations

(status end-September 2001)

In Orbit

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

Under Development

PROJECT	1998	1999	2000	2001	2002	2003	2004	COMMENTS
	JFMAMJJASON	DJFMAMJJASON	DJFMAMJJASON	DJFMAMJJASON	DJFMAMJJASON	DJFMAMJJASON	DJFMAMJJASON	
SCIENTIFIC PROGRAMME	INTEGRAL	[Green bar]	LAUNCH OCTOBER 2002					
	ROSETTA	[Red bar]	LAUNCH JANUARY 2003					
	MARS EXPRESS	[Red bar]	LAUNCH MAY 2003					
	SMART-1	[Red bar]	LAUNCH LATE 2002					
	HERSCHEL/PLANCK	[Red bar]	LAUNCH FEBRUARY 2007					
COMMS./ NAV. PROG.	ARTEMIS	[Green bar]	LAUNCHED JULY 2001					
	GNSS-1/EGNOS	[Green bar]	INITIAL OPS. END 2003					
	GALILEOSAT	[Red bar]	FIRST LAUNCH 2003					
EARTH OBSERV. PROGRAMME	EOPP	[Red bar]						
	EOEP	[Green bar]	INCL. CRYOSAT, SMOS, GOCE					
	ENVISAT 1/ POLAR PLATFORM	[Green bar]	LAUNCH EARLY 2002					
	METOP-1	[Red bar]	LAUNCH 2nd HALF 2005					
	MSG-1	[Green bar]	LAUNCH JULY 2002					
MANNED SPACE & MICROGRAVITY PROGRAMME	COLUMBUS	[Green bar]	LAUNCH OCTOBER 2004					
	ATV	[Red bar]	LAUNCH SEPTEMBER 2004					
	X-38	[Green bar]	V201 TEST FLIGHT OCT. 2003 (UNDER REVIEW)					
	CRV	[Green bar]	UNDER REVIEW					
	NODE-2 & -3	[Green bar]	LAUNCHES FEBRUARY 2004 & JULY 2005					
	CUPOLA	[Green bar]	LAUNCH JANUARY 2005					
	ERA	[Green bar]	LAUNCH UNDER REVIEW					
	DMS (R)	[Red bar]	LAUNCHED JULY 2000					
	MELFI	[Green bar]	LAUNCH SEPTEMBER 2004					
	GLOVEBOX	[Green bar]	LAUNCH APRIL 2002					
	HEXAPOD	[Green bar]	LAUNCH SEPTEMBER 2004					
	MFC	[Green bar]	BIO, FSL, EPM, in COLUMBUS					
LAUNCHER PROGRAMME	ARIANE-5 DEVELOP.	[Green bar]	OPERATIONAL					
	ARIANE-5 PLUS	[Green bar]	FIRST LAUNCH APRIL 2002					
	VEGA	[Red bar]	LAUNCH END-2005					
	FESTIP	[Green bar]	REUSABLE LAUNCHER DEFIN.					
	FTLP	[Green bar]	TECHNOLOGY DEVELOPMENT					

- DEFINITION PHASE
- MAIN DEVELOPMENT PHASE
- ▲ LAUNCH/READY FOR LAUNCH
- OPERATIONS
- ■ ■ ADDITIONAL LIFE POSSIBLE
- ▼ RETRIEVAL
- ■ ■ STORAGE

Integral

The flight-model environmental test campaign has started at ESTEC (NL). The spacecraft containing the Spectrometer (SPI) and Optical Monitoring Camera (OMC) flight models has successfully passed the sine-vibration and shock tests. After integration and functional verification of the remaining flight-model instruments, the test campaign will continue at the beginning of 2002 with electromagnetic compatibility (EMC), acoustic and thermal testing.

The Imager (IBIS) and X-ray Monitor (JEM-X) instrument teams have made good progress in assembling their flight models. JEM-X FM1 has already been integrated on the spacecraft and the delivery of FM2 is planned for December. IBIS has successfully completed its acceptance campaign and is undergoing calibration, with delivery to ESTEC expected, on schedule, in November. The currently foreseen IBIS and JEM-X FM2 delivery dates are fully compatible with Integral's planned October 2002 launch date.

The mission analysis has been updated to match this new launch date. Good progress has been made regarding ground-station coverage during the transfer-orbit injection. The ground-segment verification activities are progressing as planned.

The Proton launcher manufacturing and adaptation activities are also progressing satisfactorily. The Russian Space Agency has confirmed that it can provide a launcher to suit the recently revised Integral completion schedule. A detailed launch-system-development and launch-campaign schedule has been agreed with our Russian partners.

The mission's Time Allocation Committee (TAC) has finalised its work concerning the observation proposals in response to the Announcement of Opportunity (AO-1). The observation programme for the first year of the nominal mission is now defined.

Integral sine-vibration test being successfully completed in the ESTEC facilities in Noordwijk

Mars Express

Three main activities took place during the third quarter of the year. Firstly, the structural model, consisting of flight structure, flight propulsion system and subsystem mass dummies, was shipped from Alenia in Turin (I) to the Intespace test facility in Toulouse (F). In September and October, the entire mechanical qualification programme was successfully completed. This campaign included the vibration, acoustic, shock and clamp-band-release tests, as well as other activities. Meanwhile, the structural model is already back at Alenia, and the start of the flight-model programme is awaited.

In parallel with the activities at Intespace, electrical testing of all subsystems continued on the Electrical and Functional Verification Bench at Astrium SAS in Toulouse. Also this task is now nearing completion with the preparations for the final Integrated System Test, foreseen for

late-October/early-November, having been completed. Immediately after the successful conclusion of this test, the bench will be dismantled and the hardware transported to Turin for the flight-model programme.

Last but not least, the Mission Critical Design Review was held in early July. Chaired by two senior ESA managers, the Review Board looked at all aspects of the mission, i.e. spacecraft, payload, ground segment, launcher and science operations. The Board made several recommendations to the Project and concluded that the review was successful.

In close collaboration with the launch-service provider, the launch and cruise phase to Mars has been optimised, allowing an extension of the launch window. Its opening, and thus the most likely launch date for Mars Express, is now 23 May instead of 2 June 2003.



Herschel/Planck

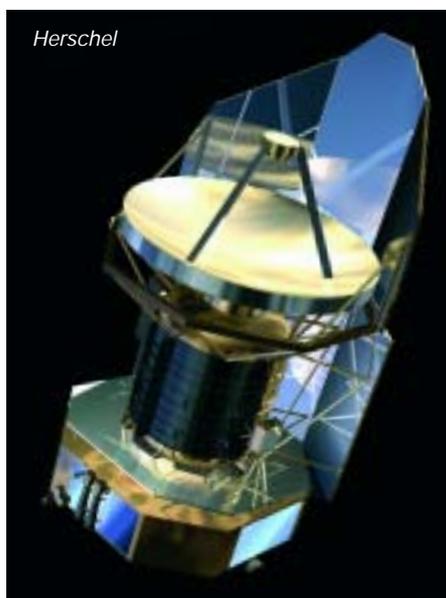
The technical work within the industrial core team, with Alcatel Space Industries as Prime Contractor, which initiated the industrial development and implementation phase for Herschel and Planck, continued throughout the summer period. The focus now is on the consolidation of the conceptual designs for both spacecraft, taking due account of the challenging technical needs and the review of the requirements to be placed on the lower level subcontractors. The major achievement within the last few months was the successful completion of the first system-level review, namely the Herschel/Planck Requirements Review. Started on 1 August with the distribution of the documentation, it was successfully completed with the Review Board meeting on 12 October.

The second main activity, the build-up of the complete industrial consortium up to mid-2002, has started well with the selection of the subcontractors for the first of the four procurement batches. The procurement process, from preparation of the ITT documentation all the way through to the archiving of the winning bid once the contract is kicked-off, is being conducted by Industry under rigorous guidelines set by the ESA Project Team in order to guarantee a fair and competitive procurement process.

Outside the main development contract for the Herschel/Planck spacecraft with Alcatel Space Industries, it is worth noting that the evaluation of the offer for the 3.5 m silicon-carbide telescope for Herschel, a direct delivery from ESA to the Prime Contractor, was also completed in this period. Following the successful contractual negotiations between ESA and Astrium SAS, the development work for this activity has started.

On the telescope of the second spacecraft, where the telescope reflectors are provided via a collaboration with the Danish Space Research Institute (DSRI), progress has also been made and a development contract has been awarded to Astrium GmbH (Germany) after a competitive tender action.

With respect to the scientific instruments, progress is according to plan and the instrument teams are heading towards their major next formal review, which will



release the start of manufacture of the first hardware-development models. The critical development issues identified in the recent instrument reviews are being followed up and closed out one by one. The consolidation of the instrument interfaces with the spacecraft will be completed by year's end.

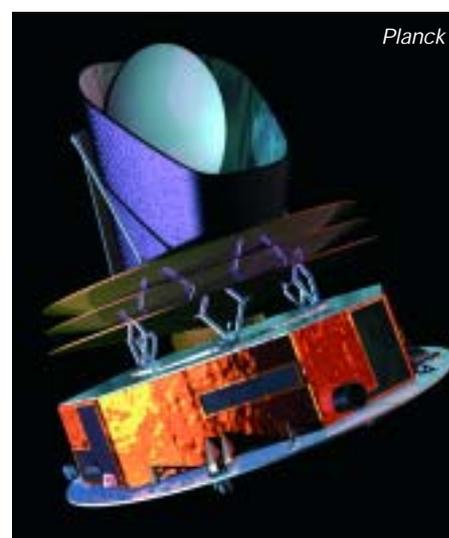
The co-ordinated parts procurement for Herschel and Planck, originally initiated by ESA to support the scientific-instrument development, has now been handed over to the Prime Contractor and will also include the other parts procurement for the two spacecraft.

The activities initiated with CSL (Liege) for the development of a facility to allow vibration testing of the Herschel instrument's focal-plane units at cryogenic temperatures is approaching the Critical Design Review. The facility will be ready for instrument-unit testing by the end of 2002.

Artemis

The spacecraft is still in its parking orbit at an altitude of 31 000 km. The start of the orbit-raising phase, using the ion-propulsion system on board has been postponed until about mid-December. The new software that has to be written to support the revised operating modes has turned out to be more complicated, and is consequently taking more time to prepare, than expected.

However, whilst in parking orbit, the spacecraft bus subsystems have been



fully commissioned and the satellite's good health has been confirmed. Also, the ion-propulsion elements have been tested and operated for some time, demonstrating their ability to function over longer periods than planned, which will be required for the orbit-raising manoeuvres.

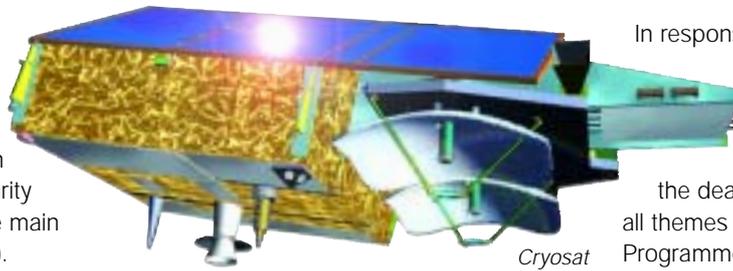
In the course of November, preliminary payload check-outs will be conducted. These tests can be performed for short periods only (a few hours every five days), because the frequencies allocated can only be used from the satellite's nominal position. At other times, when the satellite is drifting along its orbit, the transmitters have to be off to avoid interfering with other satellites in the geostationary arc.

In its parking orbit, Artemis is drifting around the Earth at a rate of 3 deg/hour. To maintain contact with the satellite, therefore, a network of tracking stations has had to be set up around the world – in Fucino (Italy), Dongara (Aus.), South Point (Hawaii) and Santiago (Chile) – to ensure full satellite control at all times. This network will have to be maintained until Artemis reaches its nominal operating position. This major milestone should be achieved in June 2002, provided the planned orbit-raising manoeuvres can indeed be initiated in December.

Earth Observation Envelope Programme (EOEP)

During the last months, Astrium GmbH, the Prime Contractor for the CryoSat project, has concentrated its activities on

consolidation of the satellite design resulting from Phase-B. Thanks to the technical contributions provided by some 25 industrial partners, the design has now reached a level of maturity that will form the baseline for the main development phase (Phase-C/D).



Concerning SIRAL, the CryoSat Radar Altimeter, Alcatel (F) has successfully demonstrated the performance of the Solid-State Power Amplifier on a dedicated breadboard. This important milestone validates the technology of one of the most critical elements of the SIRAL instrument.

The GOCE space-segment industrial activities have continued to focus on the consolidation of the satellite configuration and associated budgets and on the competitive selection process for the various equipment suppliers. The efforts spent on the satellite configuration have allowed an overall configuration to be identified in terms of volume, shape, dimensions, etc., capable of accommodating either a micropulsion assembly based on cold gas or one based on Field-Emission Electric Propulsion (FEED). However, it will only be possible to complete the satellite design activities to the level of detail necessary for holding the GOCE Preliminary Design Review (PDR) after the final selection of the micro-propulsion technology, which is still pending. The GOCE PDR will therefore have to be shifted to the first quarter of 2002.

The Proceedings of the first International GOCE User Workshop at ESTEC have been distributed to the participants and individual papers have also been made available publicly on the GOCE Explorer web site.

The preparations for Earth Watch led to the adoption of the Earth Watch Declaration and Implementing Rules by the Earth Observation Programme Board (PB-EO) on 20 September.

Support to Eumetsat has continued within the post-MSG consultation activities. In particular, ESA experts are reviewing the observation requirements established by the user application experts.

After evaluation of the two proposals for the Aladin instrument second phase

(manufacturing and testing of pre-development model), Astrium SAS has been selected as the contractor for this phase, with the kick-off taking place on 8 October. The PDM development and test contract should last two years.

The Invitation to Tender (ITT) for the APEX instrument's Phase-C/D was issued in August, with a submission deadline of 25 October. To ensure optimum coordination with the EOEP-funded elements, ESA will perform the technical management of Phase-C/D.

In the market-development area, five new short-term contracts and five new longer-term contract opportunities have been selected as a result of two ITTs issued in May and in July. All of these activities target the exploitation of the new capabilities offered by Envisat.

Earth Observation Preparatory Programme (EOPP)

Step 2 of the implementation mechanism for the second cycle of Earth Explorer Core Missions (mission assessment) has been completed. The five ESA Reports for Mission Assessment (ESA SP-1257) have been published and will be presented at the Third Earth Explorer Consultation Meeting in Granada, in Spain, in October. After this Consultation Meeting, the Earth Science Advisory Group (ESAC) will make its recommendation for the selection of the three missions for which Phase-A activities should be started. Following the ESAC recommendation, the Executive will submit an implementation proposal to the Agency's Earth-Observation Programme Board (PB-EO) for discussion at its November meeting.

Coordination with NASDA on EarthCARE has continued in the context of the recent ESA – Japan Meeting held in Tokyo in September.

In response to the Call for Proposals for the second cycle of Earth Explorer Opportunity Missions, 29 outline proposals were received by the deadline. These proposals address all themes of ESA's Living Planet Programme and use a variety of active and passive remote-sensing techniques, exploiting the full electromagnetic spectrum. They are backed by hundreds of scientists from Europe, Canada and elsewhere. The proposed missions require single-satellite, satellite-formation or satellite-constellation implementations, in low Earth orbit and in geostationary orbit. The massive response illustrates the very high interest in the programme.

The Phase-A for SMOS is proceeding according to plan. A Preliminary Requirements Review is planned in October. The scientific review will proceed in parallel. After these two reviews, the proposal for full implementation will be submitted to the PB-EO in November.

International Space Station

ISS Overall Assembly Sequence

Three assembly flights have taken place in the third quarter of 2001. The Airlock 'Quest', the third MPLM logistics flight (which included ESA's Advanced Protein Crystallisation Facility) and the Russian Docking Compartment 1 'Pirs'. The third crew, Expedition-3, is already in orbit. In addition, two Russian 'Progress' logistics flights have been launched. To date, 15 of the planned 49 assembly flights have been completed.

The first scientific experiments have been operated, principally after the MPLM flight in August, and the ESA Global Time System (GTS), which was successfully installed on the Russian Service Module 'Zvezda', should be switched-on later this year.

The ISS Assembly Sequence was updated in June to include some detailed changes to flights up to early 2004 and the deletion of the Propulsion Module from the configuration. The Columbus launch remains scheduled in October 2004.

An independent high-level task force, the ISS Cost and Management Evaluation

Panel, has been appointed to evaluate the serious projected cost overrun of the NASA part of the Space Station and to propose corrective future actions.

Columbus Laboratory

The integrated mechanical flight-unit assembly (the so-called 'PICA') has been transported from Turin (I) to the Prime Contractor in Bremen in an Airbus Beluga. There, the flight unit will be equipped with the functional boxes and the acceptance testing will commence next year.

Meanwhile, the electrical test model is undergoing functional qualification testing, including Columbus/ISS interface tests with NASA. Qualification tests should be completed in the first quarter of 2002.

Columbus Launch Barter

Nodes-2 and -3

The system-level modal-survey test has been successfully conducted and the flight-unit integration of Node-2 has been initiated. The harnesses have all been delivered, as has much of the secondary structure. The Node-3 Critical Design Review (CDR) is planned for Spring 2002 and preparation for this is now underway.

Crew Refrigerator / Freezer (RFR)

The Preliminary Design Review (PDR) has been successfully completed.



PICA arriving in Bremen, Germany

Arrival of the ATV at the ESTEC test facilities for environmental testing



Cryogenic Freezer (CRYOS)

The System Requirements Document (SRD) agreement with NASA should be finalised in November.

Cupola

The Neutral Buoyancy Test in the NASA/JSC pool has been successfully conducted and the few minor recommended changes are being incorporated into the design. The CDR has been completed, with no serious discrepancies being found. Manufacture of the flight-unit cylindrical and dome sections is underway, as is that of the window frames.

Automated Transfer Vehicle (ATV)

The pressurised cargo-carrier structural/thermal model (STM) has been delivered to ESTEC in Noordwijk (NL) in preparation for environmental tests. The STM's electrical and propulsion bays are nearing completion and will be integrated with the cargo carrier at ESTEC, before testing begins at the end of the year. Equipment and subsystem CDR campaigns have been initiated.

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

The X-38 deliveries are continuing and the integration of the orbital flight-test vehicle (V201) is well underway at the integration site at NASA/JSC.

Negotiations have been advanced with industry for the initial CRV activities, and the PATP contract has been agreed with the new joint prime contractors.

Following up a request from NASA, discussions have taken place on a potentially expanded role for Europe in the overall CRV programme. This would change the basis of ESA's participation from that of supplier of interesting technology elements for the vehicle to fundamental participation in the system design, system functions and the delivery of major assemblies (which would still include the technological items).

Ground-segment development and operations preparation

In response to the Request for Quotation (RFQ) for the Columbus Control Centre, DLR (D) has released the lower-level subsystem RFQs. After their evaluation, an integrated offer for the Control Centre will be submitted.

The RFQ for the ATV Control Centre is being prepared for release in the last quarter of this year and the offer for the ATV Control Centre Operations Preparation Definition Phase has been received from CNES (F). The RFQ for the equivalent contract with DLR (D) was released in July and the offer is expected in October.

Utilisation

Preparation

Meeting on 13 September, the European Utilisation Board (EUB) focussed on the issue of access policy for the Space Station. There remained some open points, mainly related to revenue policy and utilisation rights.

Later in the month, the Space Station User Panel (SSUP) advised on how an Announcement of Opportunity (AO) for technology payloads on the ISS could be formulated, emphasising innovation and technology topical teams.

On 27/28 September, the International Microgravity Strategic Planning Group met and the Agencies involved in the recent

global AO converged on a shortlist of projects that will require definition studies. Bilaterally with ESA, NASA indicated a clear intention to co-operate in the joint utilisation of ESA-developed facilities.

Hardware development

A study has shown that relocation of the Atomic Clock Ensemble in Space (ACES) to the Columbus External Payload Facility is feasible and a proposal for the Microwave Link is now under evaluation.

The System Requirements Review for the SOLAR/EXPORT facility was successfully completed in September.

Phase-C/D of the European Technology Exposure Facility (EuTEF) was kicked-off in August and the PDR for the European Drawer Rack (EDR) is planned for December.

The Requirements Definition Phase for the User Support and Operation Centres (USOCs) is nearing completion and an ESA-led review is planned for end-2001.

Astronaut activities

'Principles regarding Processes and Criteria for Selection, Assignment, Training and Certification of ISS Crew Members', covering increment and visiting crews including non-professional visitors, have been presented by the Multilateral Crew Operations Panel to the Multilateral Control Board.

ESA Astronauts R. Vittori and F. De Winne (backup) started training on 6 August in Star City for a Soyuz Taxi Flight to the International Space Station in April 2002.

For the second period of ISS Advanced Training at Johnson Space Center (JSC), P. Nespoli was proposed to replace R. Vittori. Due to severe NASA security restrictions, the start of his training period was delayed until October.

Preparations for the Andromède mission, with Claudie Haigneré on board, are on track (see 'In Brief', elsewhere in this issue, for the latest news). The crew has passed all tests and examinations and is ready to fly the mission, which is scheduled to take place from 21 to 30 October.

Early deliveries

Data Management System for the Russian Service Module (DMS-R)
The in-orbit operation of DMS-R is proceeding nominally.

European Robotic Arm (ERA)

The ERA flight model is undergoing functional qualification testing at the Prime Contractor. The work on the Mission Preparation and Training Equipment is experiencing further delays, which will have an impact on the ERA system-level schedule. A credible ERA launch date is not expected before next Spring.

Preparations in progress for the Andromède mission (21 - 30 October), with ESA Astronaut Claudie Haigneré and the two Russian crew members



Laboratory Support Equipment (LSE)

The first flight unit of the -80°C Freezer (MELFI) is undergoing final verification, and shipment in October of the Microgravity Science Glovebox (MSG) to NASA is being prepared.

The engineering unit of the Hexapod pointing system is currently under test.

ISS Exploitation Programme

A Multilateral Commercialisation Group has been set-up and is currently establishing the programme guidelines for commercial utilisation of the ISS. NASA has provided their draft Commercialisation Policy as an input to this activity.

The approach for a Public-Private Partnership between ESA and private or institutional investors has been agreed and industry has offered the Agency their possible contributions in kind and/or cash, which are in excess of 30 MEuro. The Exploitation Contract RFQ has been released to industry. Due to changes in content established during the elaboration of the Exploitation Programme Proposal for the Ministerial Council, it was agreed that industry would provide, in October, a binding offer only for Period-1 of the exploitation phase. At the same time, a high-level commitment for the entire programme, in line with the approved Programme Proposal, will be provided and a formal binding offer will follow early in 2002.

Microgravity**EMIR programmes**

Preparations have continued for ESA's participation in the STS-107 Spacehab mission, which has been delayed until June 2002.

Discussions with NASA have continued regarding the uncertain status of the future R-2 Spacehab mission, which would be a major flight opportunity for ESA payloads. At the same time, investigation of other flight opportunities has begun.

An Inquiry Board has reported on the parachute failure during the re-entry of the Maxus-4 sounding-rocket flight and preparations have continued for the Foton-M1 mission.

The Advanced Protein Crystallisation Facility (APCF) was flown to the ISS's Destiny module in August and has operated well since then.

In discussions with representatives of the NASA Office of Biological and Physical Research, an Agreement has been reached on enhanced co-operation in the Life Sciences area.

Microgravity Facilities for Columbus (MFC)

Manufacturing and assembly of the engineering models of Biolab, the Fluid-Science Laboratory (FSL) and the Materials Science Laboratory (MSL) are well advanced. Manufacturing of the flight models of these facilities has started and closeout of the Critical Design Review (CDR) for MSL was successfully completed.

The results of a study of the feasibility of accommodating the Biolab in the US Destiny module, as a possible early flight opportunity in co-operation with NASA, are positive and further assessment is continuing.

Mechanical qualification of the Standard Active Containers for the European Physiology Module (EPM) has been completed and early work on the Electromagnetic Levitation Furnace for the MSL has started.

Ariane-5 Plus**ESC-A**

The modal-survey test campaign for the upper composite, including the ESC-A stage's full-scale mechanical model



Artist's impression of Ariane-5 Plus

(known as the 'Maquette Dynamique', or MD) was completed in July. The results were generally close to the predictions. After refurbishment, the MD stage model alone will be submitted to the vibration test campaign. In parallel, integration began of the 'Maquette Ergols' full-scale model dedicated to testing all of the electrical and fluid systems, as well as the ground-handling procedures at CSG.

Manufacture of the first flight hardware items has started. Besides some small items, which are still in the final design phase, the main attention is on the design justification, considering the final load data set. The re-use of existing equipment, in this case developed for Ariane-4 and re-used on Ariane-5, is again proving to be less simple than expected, especially when trying to justify the design and identify the margins within the new environment. The cycle of qualification reviews will start during the last quarter of 2001.

ESC-B, Vinci

For ESC-B, the development activities are focusing on some fundamental architectural and system choices, such as the attitude-control system. In parallel, the main launcher system inputs are being elaborated, and they are to be reviewed during the system concept review later this year. The development of the ESC-B Vinci engine has now completed a first important phase, which involved the successful achievement of all of the major subsystem Preliminary Design Reviews (PDRs). This has allowed the development logistics and the associated planning to be harmonised. Currently, more component tests are being realised (i.e. powder metallurgy impeller, ceramic bearings, casting process, etc.) in order to prepare for the subsystem development tests, which represent the next major milestone.

Vega

The major milestone foreseen for 2002 is the placing of the Vega Development Contract with the company ELV, a joint venture between the Italian Space Agency and Fiat Avio. Before committing to the full development activities, an intense launcher System Preliminary Design Review was conducted in June and July 2001.

The conclusions reached by the Review Board recognised that very significant efforts have been made by Industry and the ESA Project Team during this initial phase of the Vega launcher's development. The preliminary system definition, the development plan and design-to-cost and organisation aspects were among the main technical and programmatic issues that were reviewed. The Board assessed the design of the Vega launcher as being sound and largely based on proven technology, and it concluded that it provides a correct basis for the Request for Quotation for the Development Contract.

As far as the Vega ground segment is concerned, a Joint Working Group composed of representatives from ESA, CNES, Arianespace and ELV was tasked with reassessing the choice of a launch site for Vega in Kourou, in the light of the new schedule and on additional technical and operational factors. The Group completed its activity at the end of June. Both the ELA-1 and ELA-2 sites (the latter becoming available for Vega after the conclusion of Ariane-4 launches) were considered, in combination with various options for the implementation of the Control Centre required for Vega.

Although the ELA-3 solution had the advantage of meeting the requirements of the programme better in terms of synergy and of facility sharing with Ariane-5, it was felt that it would be difficult to optimise without putting a strain on investment costs. The combined operations of Ariane-5 and Vega would have made ELA-3 a single-point failure within the European space transportation system. The ELA-2 solution was felt to be too expensive in terms of initial investment, in association with the costs of dismantling Ariane-4 infrastructure. A schedule conflict was also identified, which would lead to a shift of 18 months in the timing of Vega's first flight. The Working Group therefore concluded that, for the integration and launch of Vega, the ELA-1 solution is the cheapest option and the only one that fits within the programme budget allocations for this segment.

As far as the launch Control Centre is concerned, the group concluded that the use for Vega of a dedicated centre accommodated within the existing CDL-3 would allow substantial investment savings without incurring additional exploitation costs.

Finally, the P80 (Vega's first stage) management scheme assigning project-management responsibility to CNES in Evry (F) has been agreed in detail, and it has already been adopted at working level pending its formalisation. The Request for Quotation for the full P80 Development Contract was prepared according to the ESA procurement procedure, and was issued to Fiat Avio on 9 July, resulting in the industrial proposal being under evaluation during the month of October.

From the P80 perspective, the Vega System Preliminary Design Review has been positive insofar as no major incompatibility has been identified between the first-stage motor and the overall launcher system.

The build-up of the management team both at ESRIN in Frascati (I) and at CNES in Evry (for the P80) has progressed significantly, with the recruitment of ESA internal and external staff, with the Italian Space Agency (ASI) and CNES contributing three and one additional staff member, respectively.

PROBA

Following a three-week launch campaign at Shar in India, PROBA was successfully placed in orbit on 22 October by a PSLV launcher provided by ISRO/Antrix.

Contact with the spacecraft was established during the first orbit.

Following verification of the spacecraft's health, the commissioning activities were started from a dedicated ground segment located at ESA's Redu station in Belgium. Commissioning should be completed by the end of the year.



Launch of PROBA on 22 October

