Programmes in Progress
Status end-June 2003
In Orbit

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPACE TELESCOPE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCHED APRIL 1990</td>
</tr>
<tr>
<td>ULYSSES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCHED OCTOBER 1990</td>
</tr>
<tr>
<td>SOHO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCHED DECEMBER 1995</td>
</tr>
<tr>
<td>HUYGENS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCHED DECEMBER 1997</td>
</tr>
<tr>
<td>XMM-NEWTON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH DECEMBER 2001</td>
</tr>
<tr>
<td>CLUSTER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RE-LAUNCHED MID 2000</td>
</tr>
<tr>
<td>INTEGRAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCHED OCTOBER 2002</td>
</tr>
<tr>
<td>MARECS-B2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DECORPORATED EARLY 2002</td>
</tr>
<tr>
<td>METEOSAT-5 (MOP-2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATED BY EUMETSAT</td>
</tr>
<tr>
<td>METEOSAT-6 (MOP-3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATED BY EUMETSAT</td>
</tr>
<tr>
<td>METEOSAT-7 (MTP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATED BY EUMETSAT</td>
</tr>
<tr>
<td>MSG-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCHED AUGUST 2002</td>
</tr>
<tr>
<td>ERS-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCHED APRIL 1995</td>
</tr>
<tr>
<td>POLAR PLATFORM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCHED MARCH 2002</td>
</tr>
<tr>
<td>ECS-4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>REMOVED FROM ORBIT DEC. 2000</td>
</tr>
<tr>
<td>ARTEMIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCHED JULY 2001</td>
</tr>
<tr>
<td>PROBA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCHED OCTOBER 2001</td>
</tr>
</tbody>
</table>

Under Development

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROSETTA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH FEBRUARY 2004</td>
</tr>
<tr>
<td>MARIS EXPRESS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH JUNE 2003</td>
</tr>
<tr>
<td>VENUS EXPRESS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH NOVEMBER 2005</td>
</tr>
<tr>
<td>SMART-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH AUGUST 2003</td>
</tr>
<tr>
<td>HERSCHEL PLANCK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH FEBRUARY 2007</td>
</tr>
<tr>
<td>EDDINGTON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH EARLY 2008</td>
</tr>
<tr>
<td>DOUBLE STAR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH DECEMBER 2003</td>
</tr>
<tr>
<td>GNSS-1/EGNOS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH JUNE 2004</td>
</tr>
<tr>
<td>GALECIOsat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATIONS START 2004</td>
</tr>
<tr>
<td>EOP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FIRST LAUNCH 2005</td>
</tr>
<tr>
<td>DEEP-PROBE (SNOGLAURUS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATIONS START 2004</td>
</tr>
<tr>
<td>METOP-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATIONS START 2004</td>
</tr>
<tr>
<td>HEG-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATIONS START 2004</td>
</tr>
<tr>
<td>COLUMBUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATIONS START 2004</td>
</tr>
<tr>
<td>ATV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH OCT. – DEC. 2005</td>
</tr>
<tr>
<td>NODE-2 &amp; -3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FIRST LAUNCH SEPT. 2005</td>
</tr>
<tr>
<td>CUPOLA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LAUNCH OCTOBER 2004</td>
</tr>
<tr>
<td>ERA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UNDER REVIEW</td>
</tr>
<tr>
<td>DNS (R)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UNDER REVIEW</td>
</tr>
<tr>
<td>MELE-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UNDER REVIEW</td>
</tr>
<tr>
<td>GLOVERDA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UNDER REVIEW</td>
</tr>
<tr>
<td>EMIR (EELS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UNDER REVIEW</td>
</tr>
<tr>
<td>NFC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UNDER REVIEW</td>
</tr>
<tr>
<td>ARHANES DEVELOP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATIONAL</td>
</tr>
<tr>
<td>ARHANES-5 PLUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATIONAL</td>
</tr>
<tr>
<td>VEGA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPERATIONAL</td>
</tr>
</tbody>
</table>
ISO

Version 6 of the ISO Data Archive was released in July. This upgrades the functionality associated with, and visibility of the Highly Processed Data Products (data reduced systematically ‘by hand’), and allows for the continuous ingestion of ISO catalogues and atlases from the community. Projects focussed on reducing data from selected observing modes are also underway.

ISO continues to have a significant presence in the refereed literature, with more than one thousand articles drawing upon ISO data, and covering almost all areas of astronomy, having appeared since late 1996! A press release was issued to mark this milestone.

The Proceedings of the symposium ‘Exploiting the ISO Data Archive – Infrared Astronomy in the Internet Age’ have been published (ESA SP-511) by ESA Publications Division, and the Proceedings of the conference ‘The Calibration Legacy of the ISO Mission’ are in press (ESA SP-481). The Legacy version of the 5-volume ISO Handbook is also being finalised by ESA Publications Division.

Integral

Integral continues to operate smoothly, performing observations on behalf of the astronomical community and guaranteed-time holders. 93% of the available time is allocated for scientific observations, with the remainder being used for spacecraft manoeuvres and maintenance activities. With this good overall efficiency, all available high-priority targets should be observed by the end of 2003, as planned. The Integral Science Operations Centre (SOC) at ESTEC is busy preparing the Announcement of Opportunity to the scientific community for proposals to cover the second year’s observing programme.

A shortage of telemetry had been a concern since launch, but the situation is now much improved after a software patch uploaded in May increased the telemetry rate by 25%. At the same time, the necessary improvements in the ground segment were introduced to cope with the increased telemetry rate.

Integral passed a major milestone when the Mission Performance Verification Review was successfully completed: “The Board concluded that the Integral spacecraft, instruments, and ground segment are all performing extremely well, and that there are no major open issues”. The Board did not find any reason “to doubt that Integral would be able to carry out its foreseen 5-year mission (2 year nominal and 3 year extended) and that further extensions might be possible.”

The Integral Science Data Centre (ISDC) is routinely sending data and processed science products to observers. In addition, the ISDC has released the Off-line Science Analysis software to allow observers to perform more detailed analysis of their data at their home institutes. On 1 May, a gamma-ray burst (GRB030501) was detected in the field of view of Integral’s gamma-ray imager by the automatic software running at the ISDC, and an alert was sent to the astronomical community giving the burst’s position to within 4 arcmin (about 1/10th the diameter of the full Moon) just 30 seconds after the burst started.

A special issue of Astronomy & Astrophysics later this year will provide detailed descriptions of the instrument performances and calibration and the first scientific results from the early mission phase. One of the highlights is the clear detection by the gamma-ray spectrometer (SPI) of line emission from radioactive aluminium (26Al) after only a few months of operation. This gamma-ray line reveals where new atoms have recently been created by supernovae—the huge explosions signalling the end of massive stars. The clear detection of this line so early in the mission opens up the exciting possibility of making more detailed studies of this and other gamma-ray lines using Integral.

PROBA

The PROBA spacecraft has continued to perform well. This has allowed the planned Earth-observation science programme to be pursued and more complete exploitation of the data products delivered by the CHRIS instrument on board PROBA. The installation of the receiving equipment at ESA’s Kiruna station in Sweden has been completed and it now routinely receives CHRIS data, which are then fed into the processing chain to generate added-value products.
The EO science programme has been augmented with a dedicated field experiment in support of the SPECTRA Phase-A. Successful image acquisitions were made over the Barrax test site near Albacete, Spain, on three consecutive days in July. An extensive field measurement campaign involving 10 different European institutions and some 40 scientists, and including soil, vegetation and atmospheric measurements, was carried out in parallel with the CHRIS acquisitions.

The performance of the CHRIS instrument in particular, and of the PROBA platform as a whole, indicate that further exploitation of the platform and EO instruments is desirable, and the necessary funding is therefore being actively sought.

SMART-1

In the early months of the year, the SMART-1 flight model successfully completed all of its system tests. The Mission Flight Acceptance Review (MFAR) Board, meeting on 8 July, confirmed the spacecraft’s readiness for air shipment to the Kourou (Fr. Guiana) launch site, which will take place on 15 July. The launch campaign itself has already been prepared in detail, and all of the main spacecraft preparation activities will be completed before the end of July. The spacecraft will then be handed over to Arianespace for the combined operations. The MFAR also confirmed the flight-readiness of the payload, so that everything is now in place to start the launch campaign.

Preparation of the Mission Operations Centre (MOC) at ESOC and the Science and Technology Operations Co-ordination (STOC) at ESTEC is proceeding on schedule. The Ground Segment Readiness Review for the STOC has been successfully completed, and the MFAR confirmed the overall readiness of the SMART-1 Ground Segment.

The Final Mission Analysis Review took place on 25 June at Arianespace in Etoy. No technical issues remain unresolved concerning either the launcher interfaces or the launcher itself, but a few minor issues need to be formally closed out at the Launch Readiness Review on 11 July. Launch preparations are on schedule for the Ariane-5 vehicle (V162) carrying its triple cargo of Insat-3E, e-Bird and SMART-1 to lift off on 28 August at 23:04 GMT.
Herschel/Planck/Eddington

The Herschel/Planck development effort is proceeding at a good pace, with the detailed design of the components for the two spacecraft fully underway. Some critical hardware elements are already being manufactured, including the helium tanks and the vacuum vessel for the Herschel cryostat, the cryogenic radiator baffle for the Planck payload module, and a number of other components that need to be ready early next year in time for the first integration activities. Similarly, the activities associated with the software definition for the two spacecraft are progressing and being used as inputs for the definition of the spacecraft operations. All of these activities are being consolidated at spacecraft level, and form the inputs for the next major overall technical review in the life of the project, namely the Critical Design Review (CDR) to be held in spring 2004.

Good progress has been achieved in the preparation and manufacture of the very specialised facilities needed to validate the performance of Herschel and Planck under cryogenic conditions, in particular the Belgian facilities for the optical testing of the Planck reflectors and the 3.5 m Herschel telescope at ultra-low cryogenic temperatures. Another special facility, the Cryogenic Vibration Facility, has already been used to vibration test an early model of the Herschel PACS instrument's cryogenic optical unit.

Progress is also being made on the scientific instruments themselves, with the instrument teams building and integrating elements of the qualification models of the focal-plane units. However, uncertainties in the funding status of the instrument consortia in some countries are affecting the activities and impacting completion of the instrument activities and unit deliveries. Activities are focussed on solving short-term problems, but the tight funding situation is expected to continue.

For the new Eddington mission that is now part of the programme, two parallel definition studies were started in April (at Alcatel Space and Astrium GmbH) and the first major results will be presented in September. Another contract has been placed with the British company E2V for the development of the CCDs for the Eddington instrument. In parallel, ESA has formally exercised a contractual option with Alcatel for the delivery of a recurrent Herschel spacecraft bus for Eddington.

Mars Express

Two Antonov heavy-lift cargo aircraft left Toulouse (F) airport on 19 and 21 March carrying 48 tonnes of equipment for the launch campaign in Baikonur, Kazakhstan, including the Mars Express spacecraft and Beagle-2. Their departure was preceded by the Flight Acceptance Review, which gave the green light for transport to the launch site.

The preparations at Baikonur went very smoothly and no problems were encountered during the 12-week-long campaign. This allowed the launch to be moved forward by a few days to 2 June. The Soyuz/Fregat launch vehicle blasted off at 23:45 local time, injecting the spacecraft onto a perfect departure trajectory to Mars.

The spacecraft has since been checked out and the near-Earth phase of the scientific-instrument commissioning has been successfully completed. Whilst these activities are coming to an end, the preparations for Mars arrival will soon commence with simulation and training sessions.

Venus Express

The Venus Express project has seen two major reviews: the Mission Preliminary Design Review was successfully completed in March and more recently the Intermediate Design Review for the Ground Segment has been successfully concluded. The contract for provision of the launch services has been signed with Starsem, which means that Venus Express will be launched on a Soyuz/Fregat vehicle from Baikonur, like Mars Express. The launch window will open on 26 October 2005.

The spacecraft mechanical structure is now ready at Contraves in Zurich (CH) and is awaiting transportation to Astrium Ltd. for integration of the propulsion system. In terms of electrical testing, the transfer of the electrical test bench from Mars Express to Venus Express is nearly complete. Integration of the first engineering models of the scientific instruments has started.
**Rosetta**

At its May 2003 meeting, the ESA Science Programme Committee decided on the new Rosetta baseline mission. This will be to comet Churyumov-Gerasimenko, with a launch by an Ariane-5 G+ in February 2004. The scientific community has confirmed that this comet is as interesting scientifically as Wirtanen and various observation campaigns to better characterise it have already commenced. Back-up scenarios, including a launch to the same comet one year later using a more powerful launch vehicle (Ariane-5 ECA or Proton), will continue to be studied.

The flight-model spacecraft will remain in Kourou until the start of the new launch campaign at the end of October. The fuel has been off-loaded from the spacecraft but, due to concerns about stress corrosion cracking, the oxidizer has been left in the tank. Minor payload refurbishments are taking place and the final version of the flight software will be tested during the summer.

The engineering qualification model is still being used at ESOC to validate flight procedures, and is also serving as a test bed for the latest, more robust flight software.

All other new mission-preparation activities have been defined and are on schedule.

**MSG**

The in-orbit commissioning activities for the first of the Meteosat Second Generation (MSG) spacecraft, MSG-1, have been completed. The second part of the Commissioning Results Review, conducted by Eumetsat, will take place in mid-July. All tests have confirmed better than specified performance by the Imaging system. Due to the RF power-amplifier failure already reported, meteorological products and data are now being distributed using an alternative dissemination system.

The tests on the Search and Rescue transponder have also been completed and its performance is fully compliant with requirements.

The MSG-2 satellite-level ground testing activities have also been completed. The Pre-storage Review (PSR) was successfully held in early June, allowing the satellite to be put into storage. Pending a confirmation of the launch date, currently scheduled for January 2005, activities will resume in spring 2004.

For MSG-3, electrical integration activities started in May. Integration of the satellite bus is complete and integration of the main payload is in progress. Completion of satellite integration is planned for end-July, with the Integrated System Test (IST) due to start in August.

**Double Star**

All European payload elements for DSP-E, the equatorial satellite, had been readied for acceptance and delivery to Beijing by mid-May as planned. The sudden outbreak of SARS in April, however, posed a significant threat to the Double Star Project. Planned preparatory meetings were quickly replaced by video-conferences, but acceptance and interactive tests requiring interactive working by both parties became impossible due to the severe travel constraints.

A recovery plan was established and detailed test support was provided through remote data transfer, web cams and interactive messaging dialogues with European teams working especially early in the mornings. This allowed all pre-launch activities to be completed very successfully and both the payload and the CSSAR subsystems were delivered to Beijing by 10 July for integration into the spacecraft.

The 6th CNSA-ESA Coordination meeting held in Paris from 15 to 18 July confirmed the December 2003 launch date target for DSP-E. The spacecraft environmental test programme has been adjusted to compensate as much as possible for the SARS-induced delay. The Ground Segment Implementation Review was also successfully held in Paris, and the delayed installation of Chinese equipment at ESA’s Villafranca ground station has been successfully completed.

After the current spacecraft functional system testing, DSP-E will begin its environmental test programme in August with the thermal testing. The launch campaign at Xichang is planned to start at the beginning of November.

Testing of MSG-2’s electronically de-spun antennas on the Compact Antenna Test Range (CATR) at Alcatel in Cannes, France (photo courtesy of Alcatel)
MetOp

A number of major milestones have been reached in the MetOp programme: firstly the Satellite Qualification Review, combined with that of the payload module and ASCAT, has been successfully concluded. The Review’s findings were, in general, very positive and the recommendations made have been or are being implemented.

Secondly, although with a little delay, assembly and integration of the first flight-model satellite (MetOp-1) has started at Astrium Toulouse (F), following the deliveries of the payload and service modules. The major test campaign now underway includes radio-frequency compatibility and vibration testing at the Intespace facilities in Toulouse.

Thirdly, the first flight model of the IASI instrument, provided by CNES, has been completed and is being delivered for integration on MetOp-2. Some problems remain with this model, which will necessitate an exchange with flight model 2 towards the end of 2004. This first delivery will, however, allow interface verification for this important instrument.

A solution has been identified for the degradation found in the GOME-2 instrument gratings, and it is anticipated that it can be implemented in time to exchange this instrument prior to the first MetOp launch.

Other instrument issues are under control, and the impacts on the assembly, integration and test (AIT) schedule are being worked through. The programme scheduling remains consistent with Eumetsat’s recently defined launch period as the 4th quarter of 2005.

Work within the MetOp project team is now focussing on definition of the so-called ‘variable baseline tasks’, covering such activities as the launch campaign, the commissioning phase, the support to routine operations, and the storage/destorage activities for the second and third MetOp spacecraft. In addition, the case for enhancement of the MetOp-3 payload is being examined, to allow Eumetsat to take a decision on this option - which would replace the AVHRR and AMSU instruments by more state-of-the-art sensors - by the end of the year.

ADM-Aeolus

Almost all of the subsystem Invitation-to-Tender (ITT) packages have been issued, and the majority of subsystem suppliers have been selected. Negotiations with Galileo Avionica for supplying the critical laser transmitter have been completed and the subcontract kicked-off. The latter includes a realistic programme for the qualification and life-testing of the solid-state laser pump diodes.

The project internal Instrument Baseline Review has been held and preparations for the Satellite Preliminary Design Review in August and September are well underway.

Svalbard in Norway has been chosen as the primary station for the reception of measurement data. It will be complemented for marginal orbits by existing Canadian facilities, so that no new ground station will be required.

The contract proposal for Phases-C/D/E1 will be presented to ESA’s Industrial Policy Committee (IPC) in September, with the Phase-C/D kick-off tentatively scheduled for 1 October.

CryoSat

Development of the CryoSat satellite is progressing well and more of the protolflight-model equipment has been delivered to EADS-Astrium in Friedrichshafen (D). Mechanical integration of the structure manufactured by Contraves (CH) is planned to start this summer.

On the payload side, development of the SIRAL altimeter is also progressing. A major milestone has been achieved with the successful vibration testing of the antennas manufactured by Saab (S). They are now being prepared for electrical performance testing.

The Critical Design Review has recommended optimisation of the Assembly, Integration and Verification (AIV) approach, which is a critical activity in such a challenging schedule- and cost-driven programme. As a consequence, however, the CryoSat launch has to be rescheduled to end-September 2004.

Following the review conducted in April in Moscow, a detailed technical agreement has been reached with Eurockot/Khrunichev for procurement of the CryoSat launcher.

The ground-segment-related activities are progressing according to plan. The algorithms for Level-2 processing of the scientific data have been delivered. The CryoVex campaign, which forms part of the CryoSat Calibration/Validation activities, was successfully conducted in April in the Fram Strait.

GOCE

Activities on the space-segment side continue to focus on detailed consolidation of the satellites’s design. To date, following a top-down approach, about two-thirds of the equipment-level Preliminary Design Reviews (PDRs) have been successfully closed out, allowing development of the engineering models needed for the overall test and verification programme to start. The PDR for the
Gradiometer Front-End Electronic Unit (FEEU) is among those successfully completed, allowing release finally of the important engineering-model manufacturing activities.

Inspection of the accelerometer sensor head, which had been submitted to mechanical testing during the second half of March, revealed an unacceptable transfer of material between one stop and the proof mass. It was subsequently decided to modify the shape of the stops and to repeat the test to have final confirmation that the current accelerometer sensor head design is able to withstand the launch environment.

An endurance test conducted on three emitters for the Micro-Newton Propulsion Assembly (MPA) terminated anomalously. Although sparking has been identified as the most probable cause of the failure, further time-consuming investigations are needed to resolve the problem conclusively. The overall schedule is therefore likely to be affected.

Turning to the Ion Propulsion Assembly (IPA), test activities relating to micro-vibrations induced by the xenon feed assembly have yet to be completed. These breadboard-based tests are needed to verify that tiny vibrations induced by the feed system do not cause significant disturbances within the bandwidth of the Gradiometer instrument. On a positive note, a 500 h endurance test on the ion thruster has been successfully completed, and a 4500 h test started in June.

The procurement proposal for a non-competitive launcher procurement from Eurockot was approved by ESA’s Industrial Policy Committee (IPC) in June. The documentation supporting the related Request for Quotation (RFQ) has been also completed.

On the ground-segment side, the contractor responsible for the Payload Data Segment (PDS), including the Instrument Data Processor (Level-0 to Level-1), was selected in June. The study of the functions and tasks to be performed by the Calibration and Monitoring Facility, responsible for science data quality monitoring and calibration monitoring, is progressing according to plan. A first Announcement of Opportunity (AO) for GOCE Level-1B product external calibration and validation was released in May; proposals from the scientific community are due in July.

SMOS

A programme proposal for the full ESA part of the SMOS programme is being prepared for approval by the Agency’s Earth Observation Programme Board (PB-EOP) in September. In anticipation of a positive outcome, an RFQ was sent to the payload Prime Contractor, EADS-CASA (E), in June; its proposal is expected in mid-September.

The ground-segment Phase-A will be concluded in July. Continuation into a Phase-B for the Payload Data Processing Centre is under negotiation with the Spanish authorities, who are funding this as a national undertaking.

The MIRAS Demonstrator Pilot Project 1 (MDPP1) has come to an end with the successful image validation test and a full three-segment arm deployment test. MDPP2 is continuing with various demonstrations of critical subsystems at breadboard level.

International Space Station

Highlights

On 27 May the ESA Council, meeting at Ministerial Level, approved the unblocking of 124.1 MEuro of the Exploitation Programme Period-1 funding (2002-2004) for the International Space Station (ISS); a decision on the unblocking of the remaining 171.9 MEuro should be taken before end-2003.

The October 2003 Spanish Soyuz mission carrying ESA astronaut Pedro Duque has been named ‘Cervantes’ and the April 2004 Dutch Soyuz mission carrying ESA astronaut André Kuipers will be called ‘DELTA’.

Space infrastructure development

The qualification test campaign on the flight model of the Columbus laboratory has been completed and the Qualification Review is underway. The Rack Level-Test Facility (RLTF) qualification/acceptance has been completed and the RLTF has already been used with Biolab.

Node-2 for the ISS arrived at Kennedy Space Center (KSC) on 1 June and the transfer of ownership to NASA took place on 18 June.

The Crew Review for the Cryogenic Freezer (CRYOS) took place on 19/20 May at KSC and the System Requirement Review (SRR) action closeout meeting was held on 13 June.

Integration of the Cupola flight unit is continuing, but the start of the acceptance test campaign for the flight unit is on hold pending completion of technical investigations involving the window titanium springs.

Automated Transfer Vehicle (ATV) flight-model manufacture and integration is progressing well. The first flight model of the Russian Docking System has been delivered and manufacture of the Refuelling System flight

The flight model of Biolab during its testing in the Columbus Rack-Level Test Facility (RLTF) in Bremen, Germany
model has been completed. The ATV Flight Segment System Critical Design Review (CDR) was also concluded successfully.

Testing of the flight model of the European Robotic Arm (ERA) has been completed except for the ground-to-space Integrated Mission Test. The Qualification/Acceptance Review (QR/AR) has been declared successful pending the completion of some identified actions/activities.

The –80 degC Freezer (MELFI) was checked at KSC after its removal from the Multi-Purpose Logistics Module (MPLM) and is being kept in storage pending the resumption of Space Shuttle flights.

The Hexapod’s delivery is now planned for November 2003.

Operations and related ground segments
A company has been selected to build the Columbus Control Centre (COL-CC) Infrastructure subsystem, and offers for provision of the Wide Area Network service have been evaluated. The COL-CC development schedule is still critical, but its credibility is substantially improved. The communications nodes for Houston and Huntsville (USA) have been successfully installed and tested, and the Interconnect Ground Subnet (IGS) phase-2 communications nodes have been delivered.

The ATV Control Centre (ATV-CC) Design and Development and Operations Preparation contracts were signed on 17 April.

Following its return to nominal operation, the Microgravity Science Glovebox (MSG) has been in use for NASA’s experiments.

The DMS-R computer on-board the ISS Service Module is continuing to perform without problem.

Utilisation planning, payload development and preparatory missions
Four of the Microgravity Application Promotion (MAP) continuation proposals recently received have been recommended for continuation and have been endorsed by the Life and Physical Science Advisory Committee (LPSAC) and the European Utilisation Board (EUB).

EuTEF development is progressing, with its Critical Design Review (CDR) successfully completed in May, while the CDR for SOLAR was initiated in May and is to be completed in September 2003. EXPOSE’s relocation from the EXPORT assembly (with coarse pointing device) to the EuTEF assembly (without such pointing) has been implemented.

The Columbus External Payload Adaptor (CEPA) developed by NASA for delivery to ESA and required to mount the external payloads has completed its CDR. However, some technology-transfer issues are hampering its development and the availability of data required for analytical integration.

The contract for the main development phase (Phase-CD) for the Atomic Clock Ensemble in Space (ACES) is ready to be awarded, as CNES has confirmed the development of PHARAO.

The procurement of parts and hardware manufacture for Matroshka is in progress, with launch planned for January 2004.

The flight model of Biolab has successfully completed the interface testing with Columbus.

Integration of the flight model of the European Physiology Module (EPM) has been completed and the interface testing with the Columbus laboratory is planned for July.

System flight-model integration for the Fluid Science Laboratory (FSL) is complete and testing will be completed during the summer.

All of the laboratories to be carried into space in the Columbus module are on schedule for the October 2004 launch, with flight-model deliveries now approaching.

NASA’s Human Research Facility (HRF-2), including the ESA Pulmonary Function System, is installed in the Multi-Purpose Logistics Module (MPLM). However, it will be de-integrated because of the launch delay due to the grounding of Shuttles following the Columbia disaster.

Flight-model integration of the Materials Science Laboratory (MSL) is progressing, with the delivery of several subsystems.
ISS education

Habla ISS, the first ESA website for primary schools, was launched in Spain on 16 April. Some 13 000 Spanish schools have been asked to participate in educational activities linked with the visit of ESA astronaut Pedro Duque to the ISS in October 2003.

The Spanish Soyuz Mission VIDEO-2 hardware and student experiments APIIS, Thebas, and Winograd Kit were successfully launched on a Progress vehicle in June.

Commercial activities

The study phase (Phase-A) for RapidEye was initiated in April.

ISS Branding definition has been completed, and the communication plan defined. Contacts with major European corporations are continuing for prime and mission sponsorship, and contacts with Dutch companies for sponsor-ship of the Dutch Soyuz Mission have been initiated. The ISS Business Club statute has been approved and the Business club formally created. The club was publicly launched at the Paris airshow in Le Bourget on 19 June.

Astronaut activities

The Training Readiness Review for the ESA-provided Advanced Payload Training was successfully concluded on 15 April. A total of 27 Payload Training lessons for all four ESA Payloads - EDR, FSL, MSL, EPM - are ready for implementation.

The ATV Crew Training Mock-up, and the refurbished Columbus Crew Training Mock-up were delivered to the European Astronaut Centre (EAC) in Cologne-Porz, Germany, in April.

An Instructor Training Course took place at EAC from 5 to 23 May for participants from industry and User Operations Centres (USOCs). Three EAC instructors gave some of the lessons and are now also certified to teach the corresponding lessons in NASA Instructor Training Courses.

The Multilateral Crew Operations Panel (MCOP) meeting on 18/19 June at the Gagarin Cosmonaut Training Centre near Moscow resulted in formal flight assignments for ESA astronauts Pedro Duque and André Kuipers as On-Board Engineers for Soyuz Missions 7S and 8S, respectively. Both will fly in the left seat of the Soyuz TMA during all flight phases. ESA astronaut Gerhard Thiele was proposed as the back-up for André Kuipers.

Artemis

Artemis commissioning in geostationary orbit was successfully completed by the end of March. It was demonstrated that satellite performance is very satisfactory and that all functions and services can be provided as specified, often with good margins. The propellant lifetime is nominally 10 years without inclination control; the satellite's attitude being controlled to offset the effects of orbit inclination on the users. Interface tests with users have also been completed, and all elements of the system are functioning well.

The following operational services are currently being provided:
- The L-band land mobile payload is being utilised to about 50% capacity for the EMS service under contract to Telespazio, providing low-data-rate and voice services to small mobile users (trucks, boats).
- Spot-4 is using the optical data relay for Spot Image data reception in Toulouse (F). Currently about one link per day is being used, but this will increase to several passes per day later in the year.
- Envisat has now increased its usage to 5 links per day for reception of its ASAR and MERIS instrument data at ESRIN (l).

In the operational period from 1 April to 30 June, there were some 160 communications sessions to Envisat and 100 to Spot-4. The optical ground station at Tenerife also used 50 links with Artemis for atmospheric attenuation-experiment purposes.

Data relay offers a number of benefits to earth-observation missions: longer contact times, real-time transmissions, higher volume of data, and greater flexibility of data selection.

To date, several hundred successful data links have been provided and, although there are occasional service failures, the success rate of link acquisition is now very high, increasing from 98% towards 100% as the process becomes routine.

More recently, Artemis supported an Envisat Earthwatch data acquisition in response to an emergency Charter request by the Portuguese Civil Protection authority – hence the European Data Relay service is a reality.

The Artemis navigation transponder will form an invaluable element of the operational EGNOS system. EGNOS is currently preparing its operational interfaces from its Scanzano earth station in order to integrate the navigation payload on Artemis into the EGNOS system over the next few months, in preparation for the operational phase in 2004.

Artemis also continues to support technology programmes and a number of experimental uses of the LLM payload are planned in the near future. As a result of the cost of the recovery operation, new funding is needed to continue planned operations beyond the first year in orbit. A series of meetings with Participating States has been held to seek agreement on a proposed programme extension.