

ASTRO(2004)7
Att : Astro(2004)2
Astro(2004)3,corr.
Astro(2004)4,corr.
Astro(2004)5
Astro(2004)1, rev.1
ANNEX
Paris, 13th August 2004

EUROPEAN SPACE AGENCY
ASTRONOMY WORKING GROUP

Report of 117th Meeting
held on 15-16 January 2004
at ESA Headquarters, Paris

Those present:

Members of the
Working Group:

C. Turon (Chair)
C. Aerts
A. Bazzano
J. Cernicharo
P. De Bernardis
C. Done
A. Goobar
T. Henning
R.J. Ivison
J.P. Kneib
E. Meurs
A. Quirrenbach
P. Schneider
M. van der Klis
W.W. Zeilinger

(Apologies were received from Pedro Viana who was unable to attend)

Invited Experts:

U. Frisk (item 7)
A. Hjalmarson (item 7)

ESA:

S. Volonte (Executive Secretary)
The Director of Science: D. Southwood,
and A. Gimenez, J. Clavel, M. Kessler
G. Pilbratt, J. Tauber, P. Jakobsen, H. Olthof

The Chair, Dr. Catherine Turon, welcomed the new members and invited all the members around the table to introduce themselves and describe their fields of interest and activities.

1. Adoption of Agenda (ASTRO(2004)1)

With the addition of items 10.4 COROT, and 11.3 GAIA, the Agenda **was adopted.** Although the items were taken in a different order, they are reported here in the order of the Draft Agenda.

The AWG was informed that the Director of Science would address the meeting at the end of the afternoon regarding the update on the Science Programme (item 3).

2. Approval of report of previous meeting

It was agreed that the reports of the 116th and 117th meeting would be circulated to AWG as soon as possible after the meeting.

3. Science Programme update

The Director of Science, David Southwood, reported on the outcome of the ESA Council meeting of 17-18 November 2003 when the Science budget for 2004 was approved after cancellation of Eddington and the BepiColombo lander element. The issues of affordability of the Science Programme and its restructuring were not addressed. Council concentrated its discussions on the launcher programme and EGAS (European Guaranteed Access to Space) without reaching a consensus. As a result, a further Council meeting was needed in January 2004 to settle these essential issues. However the cancellations of Eddington and the BepiColombo lander were vigorously questioned by many delegations to the extent that the Director General had to remind Council that the contents of the Science programme remained a prerogative of the SPC advised by the advisory bodies.

It was clear that the only possibility to reinstate the missions would be to obtain an increase in the Level of Resources (LoR) at the next Council meeting at Ministerial level scheduled for the end of 2004. To illustrate the point, D. Southwood showed 2 financial scenarios, one based on a 3% increase in LoR in 2006-2008 and the other, cash limited in LoR at the present level as from 2006. The first scenario would allow to reinstate Eddington while the second would completely disrupt the programme.

D. Southwood then commented on the new NASA vision for exploration and the possible consequences on the exploration initiative being proposed by the DG of ESA. In this new international programmatic context, the Director of Science was seeking advice from the advisory structure to prepare the case for the forthcoming decision on the LoR.

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After an exchange of questions and clarifications, the issue of the lack of outreach initiatives was raised by the AWG. G. Cavallo, Head of the ESA Science Communication division clarified the situation. However the AWG felt that ESA Science PR activities would need to be well improved in the future.

In ending, the Director of Science thanked the AWG for their comments and reiterated that ESA would need AWG's support in the coming months. Any suggestion from the group would be welcome and could be e-mailed to Sergio Volonte for his attention.

4. JWST – SMP

By means of a PC presentation, P. Jakobsen, the Project Scientist, gave a brief status report on JWST (see Annex 3.1). He then introduced the JWST Science Management Plan (SMP) of which a draft copy had been sent to AWG before the meeting. An updated version dated 15th January was distributed during the meeting. Clarifications were given on the various possibilities for participation of the European astronomical community as well as on their access to Guaranteed Time Observations (GTO) and open time. The AWG emphasized that the GTO return to the instrument teams would be best used if dedicated to large, coherent observing programmes.

S Volonte also reported briefly on the approval by SPC of the MIRI multilateral agreement.

A recommendation on the adoption of the JWST SMP was formulated, see document ASTRO(2004)2.

5. Planck – SMP

After a brief report on the status of Planck (see Annex 2.2), the Project Scientist, J. Tauber highlighted the changes introduced in the revised version of the Planck Science management Plan (SMP) which had been sent to AWG before the meeting. The changes included a new deliverable, the Early Release Compact Source Catalogue, to be issued early to the wide community, the implementation of the Planck Science Office to manage the scientific operations of the satellite, and some cosmetic changes reflecting closely the present situation in the project.

The AWG noted the complementarity between the Planck and Herschel missions. Many of the sources to be accessible in the Planck Early Release Compact Source Catalogue would be strong candidates for follow-up observations with Herschel. The synergy would only be exploited if the Planck catalogue could be released before the AO for observing time on Herschel.

The AWG therefore supported the revised version of the Planck SMP and a recommendation for its approval was formulated, see document ASTRO(2004)3.

6. Herschel key programmes

G. Pilbratt, the Project Scientist, gave a status report (see Annex 2.1) by means of a PC presentation. He then introduced the document “Herschel Space Observatory Observing Programmes” (HSC/DOC/0369), dated 9 January 2004, which had been circulated to AWG before the meeting. This document complemented and clarified the previously adopted Herschel Science Management Plan (SMP) regarding the issue of the implementation of Key Projects (KP) and the related changes in the proprietary periods.

The major changes introduced with respect to the existing SMP were the:

- decoupling of Open Time (OT) and Guaranteed Time (GT) for Key Projects (KP),
- simplification of KP rules for minor GT owners,
- requirements for KP time applicants to demonstrate data reduction capabilities, and make the data products and reduction tools public at the end of the proprietary period,
- shortening of the proprietary period for all observations.

The AWG welcomed the procedure for implementation of the KP proposed by the Herschel Science Team. However, in order to maximize the scientific return of this short-lived mission, the AWG recommended that the start of the data proprietary period coincided with the data delivery date to the data owner, and that the schedule for data release be adjusted to maximize the amount of data accessible in the public domain at the time of release of post-launch AOs.

On this basis, the AWG endorsed the document Herschel/HSC/DOC/0369, and recommended that the SMP be amended accordingly as formulated in document ASTRO(2004)4.

7. Evaluation of ODIN proposal

The programmatic context of the ODIN proposal for ESA support to operations was recalled by the Executive (H. Olthof). The proposal had been submitted by the Swedish National Space Board (SNSB) in response to ESA’s annual call for support to nationally led projects released in July 2003. The AWG was asked to evaluate the scientific value of the ODIN proposal in the overall context of the ESA Science Programme.

Documents on the Science results and mission operations had been circulated to AWG prior to the meeting. Handouts were distributed during the meeting.

With the aid of PC presentations and handouts distributed during the meeting, the ODIN Project Manager, Urban Frisk, of the Swedish Space Corporation, and the Project Scientist, Ake Hjalmarsen, of the Onsala Space Observatory, reported on the technical status of the mission and highlighted the scientific results. They also presented the proposed return to the European scientific community resulting from the

requested ESA support to ODIN operations. This was followed by a question and answer session for clarifications.

The ODIN representatives having left the meeting room, the proposal for ESA involvement in the extension of science operations was thoroughly discussed and evaluated.

The AWG concluded, however, that it could not support the ODIN proposal for ESA to support scientific operations as formulated in the attached recommendation (see document ASTRO(2004)5).

8. RSSD support to missions in orbit

The role of Mission Manager

A. Gimenez, Head of the Research and Scientific Support Department (RSSD/ESTEC) of the Science Directorate, introduced the new structure of the department. He then explained the respective roles of the Project Scientist and Mission Manager in the operations phases of science missions. This is detailed in the attached presentation.

The Project and Study Scientist Reports (see ANNEX) which had been circulated to AWG before the meeting, were introduced respectively by J. Clavel and M. Kessler, and items of concern were discussed.

9. Satellites in orbit

(M. Kessler)

- 9.1 ISO: no issue
- 9.2 XMM-Newton: no issue
- 9.3 INTEGRAL: The AWG raised again concern about the repartition of guaranteed and open time with the Russian partner. It was noted that this issue was resolved in a more satisfactory manner in the AO-2 process.
The 5th INTEGRAL workshop was announced for 16th February in Garching.

10. Projects under development

(J. Clavel and M. Kessler)

- 10.1 Herschel : no issue
- 10.2 Planck: concerns were voiced regarding the large level of financial support in the preparation of mission exploitation in the US compared to the situation in Europe.
- 10.3 ASTRO-F: no issue
- 10.4 COROT: no issue

11. Project in preparation and ongoing Study

- 11.1 JWST: no issue
- 11.2 Eddington: it was agreed that a full presentation of the results of the ongoing definition studies would be presented at the next meeting.
- 11.3 GAIA: no issue
- 11.4 Smart-3: the Executive Secretary indicated that a meeting had been agreed with CNES at the end of January to discuss possible areas of future coordination or collaboration on a future formation flying mission.

12. Future Mission Studies

- 12.1 IRSI-Darwin: no issue
- 12.2 XEUS: no issue.
- 12.3 ISS payloads (Euso, Lobster, Rosita): The Executive Secretary confirmed that there would be a presentation by the PI, of the phase A study results of the EUSO payload at the next AWG meeting jointly with FPAG. He then reported briefly on the joint SPC- PB/MSM working group set up to define an ESA policy for the use of the ISS for scientific payloads

13. Any other matter

Communication

In preparation of the case for an increase of LoR at the forthcoming Ministerial conference and in response to the invitation for suggestions by the Director of Science, C. Turon, invited the AWG to reflect on ideas for input to the long term plan (2015-2025). Several AWG members commented but the emphasis was on the need to develop a more efficient communication approach.

The PR subject came up again and the last recommendation on the subject made by AWG in April 2003 (ASTRO(2003)7,rev.1) was reviewed. A Science Communication document proposed by J.P. Kneib was handed out. The AWG acknowledged the effort made by ESA for the establishment, maintenance and improvement of the AWG web site, now reachable through the “Director’s Desk”, in the ESA Science web site. The AWG also acknowledged the new ESA Science web site, in place since June 2003, very rich in information and multimedia supports with regular news and direct connections to the mission web pages. The problem remained to make journalists change their habits, and have a growing desire to come and interrogate the site. In the context of the preparation of the Ministerial Conference, the AWG insisted that the effort be strongly continued, especially in view of the high interest of the general public for astronomical topics.

In concluding, C. Turon reminded the AWG to send to her ideas for the next 20 years in order to discuss the subject at the next meeting. She would draw up a list and centralise. She would also send to AWG the results of the XPG exercise to which there had been no follow up. She would see to having the presentations of the 3 XPG groups put onto the Website.

ESO-ESA meeting

S. Volonte gave a brief report on the ESO-ESA meeting held in Garching, Germany, on 15-16 September 2003 to discuss the possible coordination of ground based and space borne observations in Astronomy, Cosmology and Fundamental Physics missions. A summary of the meeting is attached (see document ESA/SPC(2003)50).

14. Date and place of next meetings

The next meetings were decided to be held at ESA Headquarters, Paris, on :

13-14 May (starting at 14.00 hrs on the 13th) and

27-28 September (starting at 14.00 hrs on the 27th)

NB. This meeting will now be held at ESTEC, Noordwijk.

ASTRO(2004)2
Paris, 16th January 2004

EUROPEAN SPACE AGENCY

ASTRONOMY WORKING GROUP

Recommendation on Adoption of the

James Webb Space Telescope ESA Science Management Plan

At its 117th meeting held on 15-16 January 2004 in ESA Headquarters, Paris, the Astronomy Working Group (AWG) discussed a draft ESA Science Management Plan for the European participation in the James Webb Space Telescope (JWST), which was introduced at the meeting by Peter Jakobsen, the ESA Project Scientist for JWST.

The plan describes the structure of the scientific advisory bodies of the JWST project, and opportunities for European scientists for participation during the development phase. It briefly describes the status of Guaranteed Time Observers (GTOs), and the expected allocation of GTO time. The general policies for General Observer time and for data access rights are summarized.

The participation of ESA in JWST ensures that the European astronomical community will have access to the observing time on JWST on equal footing with US astronomers, with a guarantee of at least 15% of the open observing time for European astronomers.

An important additional opportunity for participation of European scientists in JWST is through membership of the NIRSpec Instrument Science Team. An Announcement of Opportunity to fill six positions on this team is expected to be issued in February or March 2004. The NIRSpec Team will collectively hold 900 hours of GTO time, and advise the Project Scientist on the best use of this time for the benefit of European astronomy.

The European MIRI Consortium will be represented on the MIRI Instrument Science Team, and will be responsible for 50% of the GTO time (i.e. 450 hours) for that instrument. In the opinion of the AWG this time would also be used best if dedicated to large coherent projects.

The AWG recommends approval of the ESA Science Management Plan for the James Webb Space Telescope.

ASTRO(2004)3,corr.
Paris, 16th January 2004

EUROPEAN SPACE AGENCY

ASTRONOMY WORKING GROUP

Recommendation on revision of the Planck Science Management Plan

At the 117th meeting held on 15-16 January 2004 at ESA Headquarters, Paris, the Astronomy Working Group (AWG) considered the proposed updating of the Planck Science Management Plan from the version approved by AWG, SSAC and SPC in May 1997 (ESA/SPC(97)27).

The AWG supports the revised version of the Science Management Plan, which includes the addition of the Planck Science Office to maximize the scientific return of the mission, and the replacement of the impractical external Announcement of Opportunity by an Early Release Compact Source Catalogue.

In addition, the complementarity between ESA's Herschel and Planck missions means that many of these sources would be strong candidates for follow-up observations with Herschel. The limited lifetime of Herschel means this synergy can only be exploited if the catalogue is released substantially before the final Announcement of Opportunity to the community to propose for time on Herschel.

The AWG therefore recommends approval of the changes to the Science Management Plan by the SPC, and urges ESA to coordinate the scientific schedules of the Planck and Herschel missions.

ASTRO(2004)4,corr.
Paris, 19th January 2004

EUROPEAN SPACE AGENCY

ASTRONOMY WORKING GROUP

Recommendation on Herschel Observing Programmes

The Astronomy Working Group (AWG) at its 117th meeting held on 15-16 January 2004 at ESA Headquarters, Paris, considered the document “Herschel Space Observatory Observing Programmes” (HSC/DOC/0369), dated 9 January 2004.

This document complements and clarifies the previously adopted Herschel Science Management Plan (SMP).

The major changes introduced with respect to the SMP are:

- decoupling Open Time (OT) and Guaranteed Time (GT) for Key Projects (KP),
- simplification of KP rules for minor GT owners,
- requirement for KP time applicants to demonstrate data reduction capabilities, and make the data products and reduction tools public at the end of the proprietary period,
- shortening of the proprietary period for all observations.

The AWG welcomes this progress, especially regarding the availability of the data products and reduction tools, and the shortening of the proprietary period.

Considering that Herschel is a time limited mission, and in order to maximize its scientific return, the AWG recommends that the data proprietary period start at the date of the observation, and that the schedules for data release and Announcements of Opportunities be adjusted to maximize the amount of data in the public domain by the time of the post-launch AOs.

On this basis, the AWG endorses the document Herschel/HSC/DOC/0369, and recommends that the SMP be amended accordingly.

ASTRO(2004)5
Paris, 16th January 2004

EUROPEAN SPACE AGENCY

ASTRONOMY WORKING GROUP

Recommendation on *Odin*

At the 117th meeting held on 15-16 January 2004 at ESA Headquarters, Paris, the Astronomy Working Group (AWG) considered the request to ESA from the Swedish National Space Board to support the operations of the *Odin* astronomy mission for 1 year from April 2004 at a cost of 1.0 M€

The AWG recognised the value of *Odin's* first 3 years of scientific achievements – the water vapour observations in several astrophysical environments and the low abundance limits determined for oxygen in molecular clouds, for example – and is aware of potential synergy with the *Herschel* mission.

Considering the long integration times required and the limited number of viable targets, the AWG is of the opinion that *Odin* is suited as a PI mission but does not offer sufficient scientific opportunities to the broader ESA community.

Therefore and given the present financial climate, the AWG regrets that it cannot recommend the requested ESA support to *Odin* operations.

EUROPEAN SPACE AGENCY
ASTRONOMY WORKING GROUP

117th Meeting

to be held on
15-16 January 2004

*(starting at 14.00 hrs on the 15th
and foreseen to end at 16.00 hrs on the 16th)*

at ESA Headquarters, Paris
(Room 137)

Draft AGENDA

1. Adoption of Agenda (ASTRO(2004)1, rev.1)
2. Approval of report of previous meeting
3. Science Programme update
4. JWST - SMP
5. Revision of Planck SMP
6. Herschel key programmes
7. Evaluation of ODIN proposal
8. RSSD support to missions in orbit
The role of Mission Manager
9. Satellites in orbit
 - 9.1 ISO
 - 9.2 XMM-Newton
 - 9.3 Integral
10. Projects under development
 - 10.1 Herschel
 - 10.2 Planck
 - 10.3 Astro-F
 - 10.4 COROT

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11. Project in preparation and ongoing Study
 - 11.1 JWST
 - 11.2 Eddington
 - 11.3 GAIA

12. Future Mission Studies
 - 12.1 IRSI-Darwin
 - 12.2 Xeus
 - 12.3 ISS payloads (Euso, lobster, Rosita)

13. Any other matter
 - ESO-ESA meeting

14. Date and place of next meeting(s)

ANNEX

Project and Study Scientist Reports for AWG # 117

06-01-2004

Report compiled, using inputs from Study and Project Scientists by:

- Jean Clavel, Astrophysics Missions Division,
- Martin Kessler, Science Operations & Data Systems Division.

1 Satellites in orbit

1.1 HST: Bob Fosbury (9 January 2004)

The HST observatory is operating nominally with all instruments functioning. The Phase I deadline for the 13th Cycle of HST observations is on the 23 January 2004 with the peer review taking place in Baltimore at the end of March. Notification to the PIs of successful proposals is on 4 April.

The American Astronomical Society has just announced to its membership the award of the Society's 2004 George Van Biesbroeck prize to Rodger Doxsey of the STScI. This prestigious prize, awarded annually since 1979 to one member of the Society, "honors a living individual for long-term extraordinary or unselfish service to astronomy, often beyond the requirements of his or her position."

HST observing in 2003 has included many very large survey programmes that build on the earlier successes of the Hubble Deep Fields (HDF). In addition to the GOODS Treasury programme carried out with the Advanced Camera for Surveys (ACS) and reported at the September AWG meeting, the ACS is currently being used for an Ultra Deep Field (UDF) exposure within the GOODS area of the Chandra Deep Field - South (details can be found at <http://www.stsci.edu/hst/udf>). This is a direct successor to the HDF and the STScI director is devoting a large allocation of discretionary time (412 orbits) to a single pointing in order to go as deep as possible - up to 1.5 magnitudes fainter than the original WFPC2 HDF in some bands. As a supplement to the primary imaging observations being taken with the Wide Field mode of the ACS, several other HST instruments will be used in parallel to produce both additional images and slitless spectroscopic data. The UDF observations will be completed in January 2004 and a full public data release is expected in mid-February or soon thereafter.

An interesting aspect of the UDF parallels is a deep observation with the grism mode of the ACS high resolution camera. This will be by far the deepest observation using this particular setup. All the data processing for this slitless spectroscopy will be carried out at the ST-ECF who are responsible for the HST grism software developments.

1.2 Infrared Space Observatory (ISO) active archive phase: Alberto Salama

The ISO Data Centre Active Archive Phase activities continue to run smoothly. A new version of the ISO Data Archive (IDA V.6.1) was released, associated with a new interoperability mechanism, fully compliant with the Virtual Observatories standards. This was demonstrated at the XIII ADASS conference hosted by CDS, Strasbourg, in October 2003 and will be an important element of the second demo of the Astrophysical Virtual Observatory planned for 27-28 January 2004, now also including ISO.

Systematic data reduction projects of ISO spectroscopic modes have been completed and the products are being ingested in the archive.

Detailed requirements for the observations data quality report have been consolidated, for the next major release of the IDA, planned for spring 2004. The IDA continues to be heavily used, with about 60 users downloading every month typically the equivalent of 10% of its scientific observations content.

The legacy version of the ISO Handbook (5 volumes, 1200 pages) has been released on the Web and is being distributed to all PIs of ISO observing proposals as well as some 300 libraries worldwide.

ISO continues to have a significant presence in the refereed literature with more than 1100 articles drawing upon ISO data having appeared since late 1996. ISO papers cover all areas of astronomy.

1.3 XMM-Newton: Fred Jansen

XMM-Newton operations continue to run smoothly. Five full revolutions (around 0.5 Msec of observing time) were lost due to the solar outbursts from 26 October to 7 November but there was no damage to the satellite. The use of the Santiago antenna from 15 – 25 Dec (Kourou was required in support of Mars Express) led to some more telemetry drops than usual. However, almost none of these affected the science return. Preparations for the spring 2004 eclipse season have started.

The overall programme completion status of the observing programme is as follows:

- Guaranteed time: 98.9 %
- AO-1 programme: 96.2 %
- AO-2 programme: 99.0 %
- AO-3 programme: 7.0 %

During AO-2, some 12% of the approved category C targets have been observed. Completion of all of the above observing programmes is expected by early 2005. Currently, over 3060 observation sequences have been executed and the data for 2970 of these has been shipped.

Version 2.5 of the XSA (XMM-Newton Science Archive) will be released mid-January 2004. This version will contain, amongst others, on-the-fly event list extraction. The next release of the XMM-Newton data analysis software, SAS 6.0, is expected in March 2004 and will contain many improvements, amongst which a much more extended and robust processing of OM data.

Several Targets-of-Opportunity (ToO) and discretionary time targets were observed;

- GRB031203
- GRB030329
- XTE J0055-727
- GRB040106
-

The first of these (GRB031203) was triggered by an INTEGRAL detection and followed up by XMM-Newton with its fastest response to date: within 6 hours of the trigger XMM-Newton was on target and observing. This observation showed a time-dependent, dust-scattered X-ray halo around the GRB source. The halo appeared as concentric ring-like structures centered on the GRB location. The expansion of the radius of these structures is consistent with small-angle X-ray scattering caused by a large column of dust along the line of sight to a cosmologically distant GRB. The rings are due to dust concentrated in two distinct slabs in the Galaxy located at distances of 880 and 1390 pc, consistent with known Galactic features (Vaughan et al. astro-ph/0312603).

Some 436 papers have been published in the refereed literature, either directly or indirectly based on XMM-Newton observations.

In November, the SPC, following recommendations from the AWG and SSAC, unanimously approved the extension of XMM-Newton operations until end March 2008 together with the associated increase in its cost at completion (CaC).

1.4 Integral: Chris Winkler

Operations continue to run smoothly but were, obviously, disrupted by the solar storms in the October/November period. Instruments were switched off and science operations were suspended. Nominal operations were resumed on 7 November. The output from the solar arrays fell by some 0.2 A, compared to the total decrease of about 0.5 A during the first year in orbit. However, the power margin is still very healthy.

After the period of high solar activity, the overall instrumental background was higher, leading to increased count rates and - for IBIS/ISGRI - to gaps in the telemetry. The ISGRI count rate returned from a value of 1800 cts/s on 11 November to 660 cts/s on 17 November. Note that the normal count rate level is 550-600 cts/sec. The measured ISGRI spectrum was initially different compared to the normal spectrum due to the presence of fluorescence lines, but the situation has improved. The SPI Ge detector performance was not degraded by the high solar activity within the measurement accuracy.

The performance of the spacecraft remains fully nominal. No unexpected behaviour or malfunctions have occurred.

No further erosion of the JEM-X anodes has been seen. Tests on the JEM-X flight spare model are on-going to understand the cause of the observed gain drift on the flight model. The JEM-X PI has requested to swap JEM-X1 and JEM-X2 operations after the next Crab calibration in Spring 2004.

The third SPI annealing was successfully performed in November after a successful delta-qualification (five cycles) of the SPI cryo-cooler had been completed on ground. On 6 December, the counting rate from SPI detector #2 dropped to zero. The HK parameters showed that the problem is localized in the GeD preamplifier: the offset of the preamp has a non-nominal value. All the other parameters are correct and stable. Recovery attempts were performed with no success. Currently, the SPI teams are working on understanding the reason for the failure and looking to propose some other recovery actions. The behaviour and performances of the other 18 detectors remain nominal. The science impact is essentially a loss of some 5% in effective area.

Instrument and ISDC teams are currently evaluating the in-flight sensitivity of the payload using latest observational data with a view to verify or update the estimated sensitivities as published in the AO-2 documentation.

Following completion of the TAC review process, the AO-2 observing programme, oversubscribed by about a factor 2, was endorsed by ESA and begun on 18 Dec as planned. To achieve the required Russian return in the Open Time and in view of maximising the overall science output from the mission, the INTEGRAL Science Working Team agreed to waive issues of duplication with a long observation of the Galactic Centre region. Long- and short term schedules are available on the WWW.

Three ATELs were issued reporting the discovery of the new transient IGR J17544-2619 (ATEL 190) and reporting new outbursts of the sources IGR J17464-3213 (ATEL 189) and IGR J17544-2619 (ATEL 192). By chance, XMM-Newton observations of the field of IGR J17544-2619 were executed before the detection with INTEGRAL providing pre-outburst images. While INTEGRAL continued to observe the Galactic Centre region, XMM-Newton executed a ToO observation providing an accurate position of IGR J17544-2619 and a good X-ray spectrum. A recent new IGR source detection (IGR J16316-4028) has been identified as a possible hard X-ray counterpart to the yet unidentified Compton/EGRET source 3 EG J1631-4033 (ATEL 201).

On 3 December at 22:01:28 UTC, INTEGRAL imaged the 7th Gamma-Ray Burst (GRB) in the field of view of the gamma-ray instruments. The long wait for this new burst (the previous one was in May) has certainly been worthwhile: it was long (30s), and bright (peak flux 1.2 photons cm⁻² s⁻¹). The burst was detected by IBAS and a position with an accuracy of 6 arc minutes was sent out within 10 s of its occurrence (GCN 2459). Follow-up observations were performed by XMM-Newton, which detected two sources in the INTEGRAL uncertainty region (GCN 2464). Further optical and near IR observations revealed a new optical source consistent with one of the XMM-Newton sources possibly a galaxy at $z \sim 0.1$.

On 4 January 2004 at 19:13 UTC another, 60s long, GRB (peak flux ~ 0.6 /cm²/s) in 20-200 keV) was detected in the FOV. The alert with error radius of 3.2 arcmin was sent out only 15 s after the burst trigger. XMM performed a TOO follow up observation.

A number of press releases and information notes were released during the reporting period on hidden black holes discovered by INTEGRAL (some of the new IGR sources); on mapping of the Galaxy in the light of nuclear lines; and on the Galactic Centre black hole. More than 240 abstracts have been submitted for the 5th INTEGRAL workshop (16-20 February 2004, Munich).

At its 105th meeting, on 5-6 November, the SPC –following recommendations from the AWG and SSAC– unanimously approved the extension of INTEGRAL operations until end 2008 together with the associated increase in its CaCs. In its recommendation, the AWG wished to review the science output of INTEGRAL in two years time – it is suggested that this be done at the autumn 2005 AWG meeting, with relevant information being made available to the AWG in advance.

2 Projects under development

2.1 Herschel: Göran Pilbratt

Further to the previously reported SPIRE Instrument Hardware Design Review (IHDR) in July, the equivalent PACS review took place in November 2003. The HIFI IHDR will be held later in December 2003 and will be orally reported at the meeting. Although, unlike SPIRE, PACS has not formally changed its model philosophy, the Cryogenic Qualification Model (CQM) is a rather crude approximation of the Flight Model (FM). Like for SPIRE, this increases the reliance on subsystem level verifications and is in effect transferring risk from the CQM to the later FM programme. Having said this, very clear and impressive progress has nevertheless been made on many aspects of the PACS hardware development, including crucial improvements in the performances of the spectrometer cryogenic readout electronics, and promising photometer bolometer detector chain test results.

All three instruments are under severe schedule pressure. An area of special concern remains the development of the Data Processing Units (DPU) - common to all three Herschel instruments - by IFSI (Frascati) and Carlo Gavazzi Space under ASI funding. Despite special efforts by ESA and ASI, problems are not completely solved and schedule damage is being made. At the SPIRE and PACS IHDR reviews, the Boards made clear recommendation that the instrument level test and calibration & characterisation periods should not be further compressed as this would seriously endanger their scientific performance in-orbit.

Industry is now reporting schedule problems as well. However, they are announcing a host of recovery actions, including schedule recovery at subsystem level, staggered deliveries, optimisation of testing programmes, and the introduction of double shifts during the AIT phase.

The brazing of the second Herschel telescope primary mirror (FM2) took place at the beginning of November. In contrast to the failed brazing of FM1 (reported at the last meeting), this second brazing was completely successful. The FM2 is now considered the flight unit, and will soon be subjected to grinding, polishing, and coating. Although the initial brazing problem caused a small delay, the telescope schedule is fully compatible with and does not drive the overall industrial schedule.

It is planned to make a special effort in 2004 to provide information to the community regarding Herschel scientific performance and observing opportunities at various conferences; the presentation material will also be posted on the web.

2.2 Planck: Jan Tauber

The qualification model of the primary reflector has been produced. It has some defects, but these are understood and of no concern. The schedule for cryogenic testing of the reflector has slipped, which could potentially impact on the telescope integration and test schedule. The previously reported problem with the lifetime reduction of the 20 K sorption cooler is not resolved yet and is the subject of dedicated reviews involving the H/P Project, JPL, and the instrument teams.

Industrial development of the LFI instrument is advancing. ASI and Laben appear to have reached an agreement for interim funding of the Italian institutes. Full funding, however, will take more time to be agreed and implemented. Development of the HFI instrument is largely nominal, although the schedule has slipped: delivery of the qualification model is now expected in August 2004 rather than April/May. It is not clear if and how this will impact the overall system schedule. The Hardware Design Review took place in November and the report is currently being written up. NASA eventually agreed to provide the funds missing for the development of 100 GHz Polarisation Sensitive Bolometers. The Project Scientist expresses its gratitude to the AWG for issuing their resolution, which certainly helped in securing NASA's decision.

The spacecraft development schedule remains critical, with essentially no margins for contingencies; a new official schedule is expected from Project & Alcatel in the January timeframe. Development of the ground segment is progressing nominally.

On December 3, a meeting was held between the Herschel and Planck PIs and Prof. Southwood to review problem areas. The meeting was fairly constructive and resulted in a number of practical steps being taken to address these problems. Among other things, it was agreed to organise PR events at the time of the QM deliveries next year in an attempt to correct the rather negative public image, which both missions currently suffer from.

NASA has started to fund the scientific activities of the US teams involved in Planck to a total amount of about 40 M\$ over the mission duration! This is at least an order of magnitude larger than the European funds currently earmarked for the scientific exploitation of Planck data. In fact, the NASA level of support is similar to the total effort required to develop and operate a Data Processing Centre (estimated to ~300 man-years). Even for formal tasks, NASA's investment is substantial, with a peak of 10 people foreseen at IPAC for the preparation and delivery of the Early Release Compact Source Catalogue. The PIs are trying to integrate the US team more closely into their activities. However, this huge disparity between US and European funding allocation is bound to have a strong impact on the scientific exploitation of Planck data.

2.3 COROT

The currently planned launch date of COROT is June 2006, with a 3 months margin in the schedule. The recent System level Preliminary Design Review (PDR) was successful and the project is preparing for the Ground Segment PDR. The schedule is marginal for the Payload and most likely test activities will have to be reduced to meet the overall schedule. The problems with the prism in the exo-planetary camera have been solved. It is expected that the launcher will be decided in January or February 2004. The schedule is converging and the project manager is confident that the launch date will be met. The last meeting of the COROT community (Berlin, December 2003) has attracted 25% more participant than the previous

one, showing the vitality of the community and its interest in asteroseismology and in exoplanetary science.

2.4 ASTRO-F: Martin Kessler

The target launch date of August 2005 has not yet been formally confirmed by JAXA/ISAS. This will be a significant point on the agenda of the next project Committee meeting, now scheduled for 19 January. Activities related to upgrades to Kiruna are nearing completion and work is underway in detail on the pointing reconstruction. The timescale for issuing an “AO” for ASTRO-F observations is still under discussion with the Japanese in conjunction with the overall schedule discussions.

3 Projects in preparation

3.1 JWST: Peter Jakobsen

Definition of the JWST mission is progressing well. The architecture of the 16 element hexagonal JWST telescope has been frozen, and present efforts focus on finalizing the detailed pointing, alignment and stability requirements of the Science Instrument suite. The NASA Mission and Observatory level System Requirements Review will be held on December 16-18.

The release of the ESA Invitation-to-Tender for the NIRSpec Implementation Phase was delayed by a month to December 15 to allow a number of detailed interface requirements to be straightened out with NASA. Completion of the Tender Evaluation process is now expected in mid-April 2004, together with the selection of one of the two consortia that have led the definition studies as NIRSpec prime contractor. Progress on the definition of the two NASA-provided NIRSpec subsystems remains steady. NASA will procure the NIRSpec HgCdTe detector arrays single-source from Rockwell, while NASA GSFC will build the associated detector electronics. The projected performance in the critical areas of dark current and read noise is encouraging. The prototype Micro-Shutter Array (MSA) has successfully undergone cryogenic and lifetime testing and will be the subject of a joint ESA/NASA Confirmation Review on December 17.

Progress on MIRI also remains steady, although the instrument failed to pass its formal System Requirements Review on November 4-5, primarily due to an incomplete definition and flow-down of the observatory level requirements from the NASA side. The definition of the MIRI Optics Module was found to be in good shape. A Delta Review will be held early February once the Observatory level System Requirements Review has been successfully completed and outstanding issues settled. The impact on the MIRI schedule is expected to be negligible. Due to lack of commitment from ASI, Italy is now no longer a member of the European MIRI Consortium. The missing Italian contributions are instead being picked up by Belgium and the UK. The funding of MIRI now appears secured, with all agencies now ready to sign a formal agreement with ESA.

3.2 GAIA: Michael Perryman

All major ongoing technology development activities are on track for completion at the end of 2004. GAIA remains on schedule to enter Phase B2 (implementation phase) at the beginning of 2005, compatible with a launch in mid-2010. Activities in ESTEC and in the scientific teams remain focused on this launch date. Recent technical highlights are the start of testing of the prototype CCD's, good advance on the highly complex issue of payload data handling (accommodating the star selection and window assignment), and the start of testing of the SiC high-stability optical bench. Difficult areas remain: thermal and mechanical stability, CCD and focal plane, radiation environment, on-board data handling, and telemetry rate.

On the scientific side, the 16 GAIA working groups remained fairly active, with 6 meetings being held between November and December. A major milestone was achieved in October with the successful processing of simulated observations of one million stars observed over 5 years. During November, the prototype data analysis system was subjected to a three weeks review by one GAIA ESA team member and two external scientists, who made well-identified recommendations for improvements to the system. As presented to the AWG at its October meeting, once this prototype development activity is completed, the plan is to issue an AO for the provision of the full scale GAIA data processing system.

Funding problems remain with some national authorities. Even though the funding requests are currently rather modest (e.g. 1-2 FTE in Denmark and Germany), some requested support has not been forthcoming (notably in these two cases noted). Some further support in certain countries is needed and AWG's support here could be valuable.

At its October 2003 SMEX selection round, NASA did not approve AMEX, the proposal for a US lead astrometric mission with financial and scientific support from DLR (NASA news release, 4 Nov).

Additional information is available on the GAIA web site (www.rssd.esa.int/Gaia), which maintains an up-to-date record of overall status, technical progress, working group meetings, and much else.

3.3 SMART-3: Malcolm Fridlund

Nothing worth reporting

3.4 Eddington: Fabio Favata

Following the cancellation of Eddington from the ESA science program, it was nevertheless decided to complete the ongoing industrial definition activities. The contracts with Alcatel and Astrium will thus proceed until their normal end date of April 2004, and so will the procurement of the first CCD's from E2V.

To fully support these studies, the Eddington Science Team and Payload Consortium have been appointed, for the duration of this phase, along the lines of the AWG selection. Despite the current context, two institutes belonging to the Eddington Payload Consortium have declared their interest in subjecting the flight quality CCD chips procured through the E2V contract to a detailed characterization and a series of Eddington-specific tests. The definition activities for the scientific ground segment are also being wrapped up, with the aim of producing a self-contained documentation package.

The proceedings of the Eddington Workshop, which took place last April in Palermo, have been sent to press.

4 Ongoing Studies

4.1 IRSI-Darwin: Malcolm Fridlund

Darwin technological studies are progressing nominally. The contracts for the definition study of the Ground-based European Nulling Interferometer Experiment have been kicked-off, and the GENIE science team held its first meeting on December 1. Preparation of the second joint Darwin/TPF conference, to be held next July 26-29 in San Diego, is underway. The conference will focus on SIRTf results relevant to exo-planet studies.

4.2 XEUS: Arvind Parmar

Results from SCI-A tests on lightweight high-spatial resolution mirror optics suitable for XEUS and other applications continue to show very promising results. A Nature paper and patent application are under preparation. The Invitation To Tender for the joint D-SCI/D-MSM XEUS system study is being prepared. SCI-A will also investigate mission scenarios which become possible with lightweight deployable optics, i.e. direct injection to L2 using a Soyuz-Fregate 2B completely bypassing the ISS. The report of the XEUS Instrument Working Group has been published as SP-1273. The potential NASA X-ray mission Constellation-X now appears to be in a similar timeframe to XEUS. Clearly some form of teaming between XEUS and Constellation-X would be beneficial once the European solution to the XEUS optics becomes known.

4.3 ISS payloads (EUSO, Lobster, Rosita): Arvind Parmar & Jean Clavel

EUSO:

The Instrument Phase-A review was held as planned on October 30. The review board identified several problems with the proposed design and recommended to extend the instrument Phase-A study to February 2004 in order to resolve these issues. From discussions with NASA representatives, it appears that NASA Code S (Office of Space Science) may not wish to utilise all their allocation of ISS resources. This may allow EUSO to be accommodated on the ISS Main Truss (a NASA location), in return for an ESA barter provision. This is potentially a more favourable location for EUSO, and it is proposed to extend the mission level Phase A study till around April 2004 to investigate this possibility. The Portuguese authorities have agreed to fund the development and operation of the EUSO Science Data Centre. Whilst, the financial support must, as a rule in Portugal, be requested each year, the proposal includes a total budget of 4 M€ as well as the required funding profile between 2003-2013.

LOBSTER:

The Lobster instrument Phase A Review Board met on 12th November. They concluded that the instrument design is mature, that the science objectives are important, well formed and capable of being met by the proposed design. The main issues to be closed before the end of

the Phase A study are related to safety, thermal design, contamination, the effects of micro-vibration, schedule and the maximum acceptable data latency for downlink.

ROSITA:

As well as proposing Rosita to ESA as an ISS payload, the PI proposed a *similar* mission to NASA (the Dark Universe Explorer, or DUO) as a free-flyer in the last SMEX round. Of the 36 SMEX proposals submitted, five including DUO, were selected for a 5 month duration implementation feasibility studies. From these five, two missions will be down-selected for flight in 2007-08. The selection of DUO confirms the continued importance of Rosita-type science. Until the situation with DUO is resolved, only minor activities in preparation for an eventual Phase A ITT release for Rosita will be performed.