MEETING

Meeting Date 12 May 2025

Ref ESA-ESDC-GEN-MOM-0065

MoMAAUG#13

Meeting Place WebEx

Chairperson Natalie Webb

Minute's Date 28 May 2025

Participants

AAUG Members: Natalie Webb (AAUG Chair), Hervé Bouy, Christopher Conselice, Ioannis Georgantopoulos, Nuria Huelamo, Søren Larsen

In attendance: Guido de Marchi (ESDC Science Lead), Norbert. Schartel (XMM-Newton Project Scientist and Project Scientist's representative), Deborah Baines (ESDC Astronomy Observatory Science Lead), Rachana Bhatawdekar (ESDC Technical Lead), Jos de Bruijne (ESDC Survey Science Lead & Gaia deputy Project Scientist), Pierre Ferruit (Euclid Mission Manager), Tim Rawle (Ariel Archive Scientist), Marcos Lopez-Caniego (ESASky MTI), Elena Jimenez Bailon (XMM-Newton Support Archive Scientist), Alvaro Labiano (JWST Support Archive Scientist), Hector Perez (ESDC SCO-08 Work Area Manager), Monica Fernandez (ESDC Observatory Archives Technical Lead), Daniela Coia (Euclid Support Archive Scientist), Elena Puga (WinterWay), Hector Canovas (Gaia and Euclid Archive Support Scientist), Pere Blay (INTEGRAL Support Archive Scientist), Javier Espinosa (HST MTI).

Absent: Sandra Savaglio (sent her apologies)

Subject Minutes of the Astronomy Archives User Group (AAUG) meeting #13.

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Description	Action	Status
The ESDC to identify which projects have been accepted in the latest EU calls that will be producing products using ESA data.	2024-02-19/01	OPEN
D. Baines to split the user survey results between early-career scientists and late-career scientists to help identify new trends.	2024-02-19/04	CLOSED
ESDC to find an 8th member of the AAUG and ask for suggestions from stakeholders.	2024-10-22/01	OPEN

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Description	Action	Status
D. Baines to contact the AAUG to start the process of finding a date for the next meeting and the preferred location.	2024-10-22/02	CLOSED
D. Baines to arrange a meeting with the HST PS and AAUG to discuss concerns from the European community regarding possible changes in supporting the high level science products.	2024-10-22/03	CLOSED
G. de Marchi to contact all the current ARVP applicants who are not nationals of an ESA member state to ask if they would, be willing to come for a shorter visit, one week at the beginning and one at the end, while continuing the collaboration online in between.	2025-05-12/01	
D. Baines to start the process of finding a date for the next meeting and the preferred location.	2025-05-12/02	

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WELCOME:

N. Webb and D. Baines opened the meeting by welcoming everyone and summarising the main topics to be discussed during the meeting. The meeting was held online on Monday 12th May 2025.

This was N. Schartel's final AAUG meeting as the ESA Project Scientist's representative before his retirement. N. Webb expressed her sincere gratitude for his valuable contributions, both within the AAUG and during his many years as the XMM-Newton Project Scientist. G. de Marchi echoed these thanks and noted that the ESDC has asked the Head of the Project Scientist Division to suggest of a new representative from the astronomy missions to succeed N. Schartel.

ADOPTION OF THE AGENDA:

The agenda of the meeting was presented and adopted by the AAUG members.

REVIEW OF ACTIONS:

The actions from the previous meeting were reviewed. Two actions remain open: **Action 2024-02-19/01**: *ESDC to identify which projects have been accepted in the latest EU calls that will be producing products using ESA data*. D. Baines said this was ongoing and will be reported before the next AAUG meeting. **Action 2024-10-22/01:** *ESDC to find an 8th member of the AAUG and ask for suggestions from stakeholders.*

Two of the closed actions were briefly discussed: **Action 2024-02-19/04**: *ESDC to split the user survey results between early-career scientists and late-career scientists to help identify new trends.* This action was closed one week before the meeting; therefore, D. Baines showed the findings. In summary, it was found that both the late-career (11+ years since last degree) and early-career astronomers ranked the advanced web-based visualisers and cut-out services as the most important future archival developments. Both early- and late-career astronomers placed these as high priority: a common access point to all ESA Science mission in legacy phase; and access to scientific exploitation platforms. And the early-career astronomers also placed these as high priority: Convert you archive searches into python code or straight into a Jupyter notebook; and improved performance (faster response, fewer limitations). **Action 2024-10-22/03:** *D. Baines to arrange a meeting with the HST PS and AAUG to discuss concerns from the European community regarding possible changes in supporting the high level science products.* This action was discussed some months ago with the HST project scientist and AAUG, with feedback from the December STUC meeting. It was agreed that a meeting was no longer needed between the HST Project Scientist and the AAUG now that NASA are planning to keep the maintenance of all HLSPs (including from the community).

PRESENTATIONS:

The following presentations and discussion sessions were held on 12th May 2025:

1. Euclid Science Archives (M. Lopez-Caniego)
2. ESA Astronomy Archives session at EAS 2025 (G. de Marchi)
3. Archival Research Visitor Programme status (G. de Marchi)
4. Date and time of next meeting
5. AOB
6. Closed session

The slides of the presentations are available on the ESAC Science Data Centre (ESDC) public web site, under the heading Archives User Groups, Astronomy: https://www.cosmos.esa.int/web/esdc/aaug/meeting13

DISCUSSIONS:

Discussions took place during and after each presentation. This section presents a summary of the discussions and is ordered by the scheduled agenda given above.

1. Euclid Science Archive

M. Lopez-Caniego gave a presentation on the Euclid Science Archive, which was made public on 19 March 2025. Several other instances of the Euclid archive had been running silently for months to support the various activities of Euclid. In total there are four archive instances: the Euclid Science Archive (SAS) with the public data release; an instance to serve the internal data releases before they go public; an on the fly instance to serve all the levels 1, 2 and 3 products generated by the consortium; and a regression instance to serve the products from the different regression testing campaigns. Therefore, the Euclid Science Archive is a collection of archive user interfaces, backends and databases under the same umbrella that serve different needs from the Euclid mission at different points in time. The archive also includes an instance of ESASky that has been customised to the needs of Euclid. At the time of the Q1 release, selected high-level data products released in the SAS were also released in the main ESASky web application. Additionally, three very high resolution colour maps of the Euclid Deep Fields, in HiPS format, were produced by the ESASky team using inputs from the consortium. Since all ESASky content is accessible through the customised instances integrated into the SAS, these high-resolution outreach HiPS are also available via the Euclid archive.

In addition, the Euclid Q1 data volumes from the archive were mounted in the ESA Datalabs servers, and a dedicated Euclid Q1 Datalab environment was created and made available in the platform. This environment not only provides access to the Q1 data volume, but also includes with the Euclid astroquery module and other pre-installed software necessary for accessing and analysing the data directly from the filesystem. The Euclid astroquery module, developed by the ESDC, allows users to query the Euclid databases, offering access to both the data and metadata, long with the exact file paths (as seen from within Datalabs) for each Euclid product released in Q1 and stored in the archive. This setup allows users to work with the data directly within Datalabs without having to download files locally.

The next challenges for Euclid come with the next data release DR1, where over 2 PB of products will be made available, first to the consortium, then to the public. ESA is therefore planning to provide users the necessary tools and services to discover and analyse data in the science platform.

H. Bouy congratulated the Euclid team and asked about the availability of spectral products. He mentioned that he had been attempting to access the spectra but found the process to be challenging. P. Ferruit and H. Canovas explained that the spectra are being provided using the IVOA standard called DataLink, which associates each spectrum with a specific source identification. H. Canovas further elaborated that DataLink enables users to discover related data products and services connected with a primary dataset. This is particularly useful when a catalogue entry or observation has additional, more detailed resources, such as spectra, that are not directly included in the main catalogue.

H. Bouy then asked whether it was possible to query the spectra by sky position, rather than by source ID. H. Canovas confirmed that position-based queries are indeed possible. He pointed out that within the Euclid Science Archive, the ADQL search area includes example queries, specifically the sixth example in the list demonstrates how to query spectra by position. While acknowledging that this is helpful for a small number of sources, H. Bouy emphasised that his aim is to download tens of thousands of spectra, for example, to apply machine learning algorithms. He asked how such large-scale downloads could be achieved. In response, M. Lopez-Caniego referred him to the notebook examples available in ESA Datalabs, which provide guidance for bulk access and analysis.

H. Bouy expressed that the current process is somewhat confusing for users and suggested the development of a single, user-friendly interface that would allow easy access to all spectra and support large-scale downloads. M. López-Caniego added that using the astroquery python module is a practical alternative, as it simplifies interaction by hiding the complexities of the underlying protocols. Notably, astroquery includes a get_spectra command designed for this purpose. J. De Bruijne commented that the ESDC should consider publishing a worked example in the user guide to demonstrate this specific use case for accessing and downloading spectra.

N. Webb asked about the data volume and whether ESASky would be able to provide the images in the next data release. M. Lopez-Caniego responded that the HiPS (Hierachical Progressive Surveys) data should be available. He explained that ESASky displays the metadata, footprints, and HiPS, but does not host the actual images. Instead, ESASky redirects users to the Euclid archive, where the full image data can be accessed.

N. Webb also asked about the number of users accessing the Euclid Archive and ESASky following the data release. The ESDC reported that visits to ESASky increased fivefold within the first week after the release. In March alone, ESASky recorded over 44,000 visits. One week after the release, the Euclid Archive processed more than 880,000 queries and handled approximately 96,000 download requests, corresponding to 17 TB of science data.

The AAUG expressed strong appreciation for the extensive work done on both the Euclid archive and the Euclid Data Space. As a result, a recommendation was issued in support of the initiative (see ***Recommendation 2025-05-12/01***)

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2. ESA Astronomy Archives session at EAS 2023 and plans for EAS 2024

G. de Marchi presented the plans for the ESA Space Science Archives lunch session, to be held at the 2025 EAS annual meeting in Cork on Tuesday 24th June. As in previous years, the aim of the session was to create awareness about the ESA Space Science Archives, create awareness about the AAUG and to engage the community in providing ideas and inputs. The structure this year will be similar to last year and will be 1.5 hours long. The session will include an introduction to the ESDC, a presentation about the AAUG, a presentation on the Archival Research Visitor Programme, a presentation and demo on how to access the Euclid Q1 data, the latest features and data in ESASky and a hands-on ESASky demo. And there will be a 20 to 30 minutes discussion session at the end.

G. de Marchi asked who from the AAUG plans to attend the EAS and are available for the lunch session. As in previous years, it was decided to set up a panel on the podium for the question and answers session which will also include any of the AAUG members who can attend. G. de Marchi asked if the AAUG had any suggestions about questions to raise during the discussion session, either now or in the coming weeks. Most likely, ESDC will ask similar questions to those asked in the 2023 survey.

The EAS 2025 ESA Astronomy Archives lunch session page can be found here: https://eas.unige.ch/EAS2025/session.jsp?id=LS2. In addition to the session, ESA will again have a booth and members of the ESDC will give archive and ESASky demos throughout the week to participants (both scheduled and on-the-fly demos).

3. Archival Research Visitor Programme status

G. de Marchi presented a summary on the Archival Research Visitor Programme. The latest call closed on 30th April 2025 and 25 applications were received. As in previous years, the majority of proposals are to use astronomy archives (on average about two thirds of the proposals). Most applications were to use data from the large observatories or surveys, and it was commented that the missions included in the proposals do not always automatically imply the area of research, for example Gaia to study asteroids and INTEGRAL and Rosetta for magnetic fields. It was also noted that machine learning is becoming popular, with 20% of proposals including some machine learning.

The gender distribution among applicants continues to be approximately two to one, with two-thirds male and one-third female. ESA has implemented several measures to enhance the number of female applicants, including a fully advertised double-anonymous review process. G. de Marchi commented that this is probably a reflection of the gender distribution in the various fields in the community. ESA will keep monitoring this, but the ratio of two to one is common also to the ESA fellowships.

The country and nationality distribution continues to be very wide, and the programme accepts “strong” applications from non-ESA countries. Regarding the country distribution of the proposals, based on the location of the applicant’s institution rather than their nationality, the acceptance rate is 29%, and from ESA members states it is 30%. Some larger countries do better, such as France and the UK at 42%, others are in line, such as Italy (31%) and Germany (29%). Greece is high at 50% and Spain is lower at 20%. For the smaller countries the statistics are uncertain due to the smaller number of applicants. ESA management said there are too few applications from Germany and from the smaller countries. The ARVP is widely advertised through the EAS and AAS job lists, as well as via national astronomical societies across Europe. G. de Marchi asked the AAUG for suggestions on how to further increase the programme's visibility, particularly to the smaller European countries.

Until recently, the nationality of visitors had not been an issue. However, at the beginning of this year, ESA introduced escorting rules for non-member state visitors. These rules require that someone working at ESA needs to always accompany the visitor while on site, expect in designated areas such as the canteen. Normally the ARVP receives around 33% of its applications from nationals of non-member states and awards 22% of its visits to them. However, the current call shows a notable shift, with 56% of applications coming from non-member state nationals. G. de Marchi has proposed to management that, for this call, selected citizens from ESA non-member states be invited for two short one-week visits, one at the start and one at the conclusion of the programme. This approach is currently more feasible at ESTEC, which offers more designated working areas in open-access zones. Between visits, collaborations would continue remotely. Visitor offices in non-restricted areas are expected to become available at both ESAC and ESTEC by mid-2026.

D. Baines asked if the Centre of Astrobiology (CAB) at ESAC is considered a restricted zone, and if not, if there are possibilities to host visitors there given that the hosts are sometimes from CAB. N. Huelamo commented that there is very limited space at CAB for visitors. H. Bouy commented that this implies a strong commitment from the ESA scientists who will be the host. G. de Marchi remarked that it will be made clear to the hosts. It will also be easier if the visitor has two or more hosts.

N. Webb commented that it is a very fair to maximise the participation from a diverse range of nationalities. However, she noted that this round presents a challenge: applicants applied under the assumption they could come for three months, but are now being informed that restrictions prevent this. She suggested that while future applicants can be informed via the website, the current situation is more difficult. The only option may be to contact the affected applicants directly to explain that this is a new policy, though she acknowledged this might be awkward. G. de Marchi agreed and emphasised the need for ESA to contact applicants from non-member states to inform them of the new rules and possibly suggest postponing their visits. However, he acknowledged that this may not be feasible for everyone, especially those whose planned visit is tied to thesis work. As an alternative, he proposed a hybrid approach, starting the visit in person and continuing the collaboration online. He stressed the need to find a creative solution.

S. Larsen agreed that clear communication will be crucial going forward to ensure future applicants understand the situation from the outset. H. Bouy asked how many applicants requested short visits. G. de Marchi replied that while there were some, the majority request three months He explained that, in some European countries, PhD students are required to spend three months abroad at a different institute as part of their doctoral training, which accounts for the preference for longer visits.

C. Conselice suggested contacting all the applicants who are not nationals of an ESA member state to ask

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whether they would, in principle, be willing to come for a shorter visit, one week at the beginning and one at the end, while continuing the collaboration online in between. If the applicants confirm their continued interest under these conditions, the review of their applications can proceed. G. de Marchi agreed to take this action (***Action 2025-05-12/01***).

During the closed session, ***Recommendations 2025-05-12/02 and 2025-05-12/03*** on the ARVP were formulated from the above discussions.

4. Date and time of next meeting

The next meeting will be held in person in the autumn. D. Baines took the action to start the process of finding a date and location for the next meeting (***Action 2025-05-12/02***).

5. AOB

D. Baines raised an action related to ESASky. A request has been given to the ESASky team to develop a multi-mission search interface that provides users with a summary of all available data from ESA astronomy missions for a given target or region in the sky. The goal is to allow users to easily download all relevant data in one step. Currently, ESASky requires users to click through multiple panels and download data from each mission separately, which can be cumbersome. As background, the request originated from ongoing discussions about multi-mission interfaces. Notably, last year N. Schartel provided valuable feedback, highlighting that XMM-Newton users are interested in accessing data across all wavelength regimes.

Currently, ESASky only provides download access to the highest level science products and does not offer a quick, comprehensive summary of all available data, across all processing levels, for each mission in a given region of the sky. The ESASky team is actively working to address this, and D. Baines showed a preliminary prototype that connects to some of the ESA missions which currently expose their data through an IVOA ObsCore table (Observation Core Components). ObsCore provides a consistent structure for describing observational datasets, such as sky position, spectral coverage, time range, and data type, across different missions and archives. Therefore, it has been relatively easy to create a prototype accessing the ObsCore tables. However, not all ESA missions currently provide ObsCore tables, so the ESASky team is now working on integrating access from the remaining ESA astronomy missions.

D. Baines said the key question for the AAUG is whether this functionality should be incorporated directly into the ESASky interface, or if it should remain as a separate tool. To help inform this decision, the team plans to rapidly prototype an integrated version within ESASky, possibly as an additional, simplified mode with a cleaner interface tailored for quick multi-mission data discovery.

N. Webb suggested to try and keep the functionality within ESASky, otherwise users just don't know where to go and look for the data. And the more things that are in one place, the better well know it becomes. S. Larsen agrees that it is useful to have one entry point if you want to find ESA data, you go to sky.esa.int. And that's it, users don't have to remember all kinds of different sites.

N. Webb suggested that the functionality should ideally be kept within ESASky, as users may otherwise be unsure where to find the data. She emphasised that consolidating tools in a single platform increases visibility and usability, the more features available in one place, the better known and more widely used the tool becomes. S. Larsen agreed, highlighting the importance of having a single, clear entry point for accessing ESA data. He noted that directing users to sky.esa.int as the go to source simplifies the experience and avoids the need for users to remember multiple different websites (see ***Recommendation 2025-05-12/05***).

RECOMMENDATIONS

The following recommendations were formulated by the AAUG:

Support for the Euclid Data Space

Recommendation 2025-05-12/01: Since the launch of the Euclid observatory on 1st July 2023, the Euclid observatory has taken a wealth of data. Considerable work has been undertaken to provide the community with the public Euclid data and products, resulting in the 'Euclid Data Space'. The AAUG congratulates all of the staff that have worked hard to produce this fantastic resource and recommends that the support is maintained and to continue to improve and upkeep this important facility. The AAUG also recommends that resources are found to ensure that the infrastructure remains commensurate with the data, for example that the archive has sufficient storage for the very large volumes of data and that ESA ensures that the transfer rates of the data are sufficiently high, allowing data to be downloaded in a reasonable timeframe. The AAUG recommends that the access to spectra could be further improved by allowing the user to undertake a cone search to select spectra and allow bulk download of these data.

The Archival Research Visitor Programme

Recommendation 2025-05-12/02: The AAUG is happy that the Archival Research Visitors Programme continues to see high numbers of quality applications from astronomers from a wide variety of backgrounds. The AAUG understands the recent restrictions that have been implemented at ESA with regards to access of the different ESA sites for certain nationalities, but recommends that as much space as possible is made available in the open area of ESTEC and ESAC which will allow laureates with restricted access to come and stay and work at ESA on archival research. This diversity in research is necessary to improve creativity and these visitors will help raise the profile of the fantastic data available for scientific research worldwide. The AAUG understands that this non-restricted working space will take time to be made available and therefore the AAUG recommends that the next open call for programmes should be in 12 months time, rather than in 6 months, allowing time for the space to be made available. Information should be provided in the text of the call so that applicants know that they may be limited to certain areas of ESA during their visit. However, there is still a problem of the laureates of the current call. The AAUG recommends contacting laureates who have restricted access to ESA facilities to inform them of the recent changes in the rules and suggest a one week visit, before remote working and then a second visit of a week to finalise the work.

Recommendation 2025-05-12/03: The AAUG appreciates the work presented showing the provenance of the Archival Research Visitors Programme applicants and the laureates, and understands that it appears that some countries may be under-served by the programme. However, the countries all have very different astronomy population sizes, making the comparison difficult. The AAUG recommends normalising the numbers of applicants and laureates by the number of astronomers in each country and then re-assessing whether some countries are under-served.

Multi-mission search

Recommendation 2025-05-12/04: Work to provide a rapid archive search of multiple missions at a time is extremely useful, especially now that so many scientists are carrying out multi-wavelength analyses. It is important to continue this development and the AAUG recommends introducing a new button into ESASky to allow users to access this facility directly from ESASky. This will allow ESASky to remain the 'to go to' interface for cross-mission searches, increasing its visibility and also its functionality.

Additional items discussed during the AAUG meeting

Recommendation 2025-05-12/05: The NASA budget for 2026 is being proposed to congress and contains a large number of very significant cuts to the astrophysics part of the budget. Should this proposal be passed by congress, many missions will be halted and this may also mean that the data archives pertaining to these missions may become unsupported or even taken off-line, as was done for the NIST data. ESA has built excellent archive infrastructure and is therefore one of the only facilities in the world that could be in a position to copy existing archives and ensure that they remain available to astronomers. The AAUG strongly encourages ESA to consider making a mirror or a back-up copy of the archives for missions under threat if at all possible, to preserve the data and ensure that further science can be done over the decades to come. Discussion with other agencies may be one way to reinforce the effort needed to host the copied archives. Other national agencies that may be able to help with this could be for example JAXA, CNES, DLR (TBC).