



MEETING

Meeting Date 14-15 October 2019

Ref MoMAAUG#3

Meeting Place ESTEC, AJ030/Videoconf

Chairperson Beate Stelzer

Minute's Date 12 December 2019

Participants
AAUG Members : Hervé Bouy, Christopher Conselice, Ioannis Georgantopoulos, Søren Larsen, Sandra Savaglio.
In attendance : Deborah Baines (ESDC Astronomy Archives Science Lead), Guido de Marchi (ESDC Science Lead), Rene Laureijs (Euclid Project Scientist).
VC: Beate Stelzer (AAUG Chair), Marc-Antoine Miville-Deschenes (AAUG member), Bruno Merín (Head of ESDC), Vicente Navarro (GNSS and Science Operations Senior System Engineer), Ruben Alvarez (Head of Sciops technical IT Unit), Jorgo Bakker (Technical Lead Gaia Catalogue Access), Roland Vavrek (Euclid Deputy Project Scientist).
Absent: Jan Tauber (Planck Project Scientist and ESA Astronomy Study and Project Scientist's representative), Eva Villaver (AAUG member) sent their apologies.

Subject Minutes of Astronomy Archives User Group (AAUG) meeting #3.

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Description	Action	Status
The UG is interested in seeing the number of users that access the archives via ESASky. D. Baines to report to the ESASky team.	2018-06-12/02	OPEN Moved to meeting #4. A presentation with the ESASky statistics was distributed to AAUG members.
G. de Marchi and D. Baines to draw up detailed plans for the implementation of a programme to fund the active participation of junior scientists, including those from non-ESA member countries, in conferences with high visibility such as EWASS.	2018-06-12/06	DONE
B. Stelzer and all AAUG members to define the plans for a user survey and questions to be asked to the community.	2018-06-12/08	DONE
G. de Marchi and D. Baines to send to the AAUG the list of publications per mission that are produced by the ESA project scientists.	2019-02-13/01	DONE
ESDC to request SEPP experts to give a presentation about SEPP at the next AAUG meeting.	2019-02-13/02	DONE Presentation this afternoon



Description	Action	Status
D. Baines to forward to the AAUG the videos of the JupyterHub workshop held at ESAC in October 2018.	2019-02-13/03	DONE
G. de Marchi to provide more updated information to the AAUG on the archival research programme and on the possible extra option for archival research visiting scientists: if visitors can go to institutes external to ESA, to work on ESA mission data and provide a deliverable to ESA as the end result.	2019-02-13/04	DONE
The AAUG and ESDC members to hold a telecon to further discuss the archival research programme ideas and to try to have this defined before EWASS.	2019-02-13/05	DONE
AAUG members to send suggestions for questions for a user survey to the AAUG chair.	2019-02-13/06	DONE
ESDC to check the technical issues for creating a survey and the time needed to set up the survey and distribute it to archive users.	2019-02-13/07	DONE
BS, DB and GdM to discuss the proposed survey questions and set up a telecon to be organized between the AAUG and ESDC members to finalize the user survey design.	2019-02-13/08	DONE
ESDC to collate the email addresses of all active astronomy archive users, ready to send out the survey to the collated list.	2019-02-13/09	SUSPENDED Due to the new EU data protection law, the survey could only be sent to subscribers of the ESDC newsletter (subscribers give their consent to receive emails from the ESDC).
ESDC to set up and activate the survey by sending the announcement to the archive mailing lists and active archive users.	2019-02-13/10	DONE
ESDC to send a list of projects and functionalities that are planned for the astronomy archives.	2019-02-13/11	DONE
D. Baines to add to the list of EU projects, the FP7 project DUSTPEDIA, and to send the updated spreadsheet to the AAUG.	2019-02-13/12	DONE
AAUG members to investigate one EU project each, investigate the type of data products from ESA missions that the project will be creating, advise ESDC what to ask the project PI, and if there is enough information at this point, recommend if the data should be added to any of the ESA science archives.	2019-02-13/13	OPEN
ESDC to contact the relevant EU project PIs.	2019-02-13/14	OPEN
D. Baines/B. Stelzer to send a doodle to AAUG and ESDC members to find a date for the next meeting.	2019-02-13/15	DONE
D. Baines to set up an AAUG email list to include all AAUG members, and once set up to add this to the main AAUG web page.	2019-02-13/16	DONE
G. de Marchi/ D. Baines to define a timescale for implementation of the visitor program and the necessary interaction steps with AAUG.	2019-10-14/01	
The AAUG to produce a report for the Astronomy	2019-10-14/02	Due before the AWG



Description	Action	Status
Working Group (AWG) on the second year of AAUG activities.		meeting on 27/01/20
D. Baines/G. de Marchi to email the AAUG to set a deadline for renewal/resigning from the Users Group.	2019-10-14/03	Due end October.
B. Stelzer to distribute the 8 remaining EU projects among AAUG members for evaluation.	2019-10-14/04	
D. Baines to distribute the user survey preliminary results document and spreadsheet to the ESA missions whose archives are in the survey, including ESASky.	2019-10-14/05	
D. Baines to provide a summary of the user survey results online at https://archives.esac.esa.int .	2019-10-14/06	
D. Baines to create an in-depth report on the user survey results and send to all stakeholders.	2019-10-14/07	
D. Baines to compile a ratio for each mission relating the number of people responding per archive to the survey with the number of archive users.	2019-10-14/08	
D. Baines/G. de Marchi to email the AAUG after action 2019-10-14/02 is closed: send a doodle for the date of the next AAUG; undertake eventual replacements (if any).	2019-10-14/09	Due end October

WELCOME:

D. Baines opened the meeting on Monday 14th October 2019 by welcoming everyone and summarising the main topics to be discussed during the two days.

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. 3 actions remain open with the following status: **Action 2018-06-12/02:** *The UG is interested in seeing the number of users that access the archives via ESASky. A session to present the ESASky statistics during this meeting was pushed into the next AAUG meeting (Spring 2020) due to a heavy meeting schedule.* **Action 2019-02-13/13:** *AAUG members to investigate one EU project each, investigate the type of data products from ESA missions that the project will be creating, advise ESDC what to ask the project PI, and if there is enough information at this point, recommend if the data should be added to any of the ESA science archives.* This action was discussed later in the meeting (see discussion session 6). **Action 2019-02-13/14:** *ESDC to contact the relevant EU project PIs* Action to be completed based on feedback from Action 2019-02-13/13 and on a project by project case.



PRESENTATIONS:

The following presentations were given and discussion sessions were held on 14th and 15th October 2019

1. Feedback from the ESA Astronomy Archives session at EWASS 2019 and plans for EWASS 2020 (G. de Marchi, D. Baines)
2. The HCV Explorer: interactive interface to the Hubble Catalog of Variables (D. Baines)
3. Science Exploitation Platform: ESA Datalabs (V. Navarro)
4. Visitor Programme (G. de Marchi)
5. AAUG membership renewal/reassignment/substitution
6. Action Item: Horizon 2020 programmes
7. Astronomy Archives User Survey results (D. Baines)
8. ESASky updates (D. Baines)
9. Date and time of next meeting (All)
10. AOB
11. 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/meeting3>

DISCUSSIONS:

Discussions were held during both days of the meeting, during and after presentations, and in dedicated discussion sessions. This section gives a summary of the discussions and is ordered by the above presentations and sessions list.

1. Feedback from the ESA Astronomy Archives session at EWASS 2019 and plans for EWASS 2020

G. de Marchi and D. Baines reported on the ESA Astronomy Archives session at EWASS 2019, Lyon on 26th June 2019. This was a lunchtime session where the following was reported and presented to the community: Status and long-term strategy of the ESDC (D. Baines); the Astronomy Archives Users Group (B. Stelzer); Demo on how to use ESASky (D. Baines); and Demo on using Python/Astropy tools and Jupyter notebooks to explore the ESA Astronomy Archives (M. Lopéz-Caniego). The last half an hour of the session was dedicated to an open floor discussion. The session was well attended, with approximately 80 people in the room, from early career scientists to more senior scientists. Many questions were asked after the presentations and during the discussion session, and questions then continued to be asked at the ESA booth, where demos of the archives and ESASky were also being shown. The page for the EWASS 2019 session can be found here: <https://eas.unige.ch/EWASS2019/session.jsp?id=LS1>



The AAUG asked if we saw an uptake in people using the archives and ESASky after the EWASS session. ESDC reported that we didn't see a large spike as the numbers in the room are comparable or lower than the number of mission archive users per day. However, this type of session raises awareness in the community about our archives, tools and the Users Group and it is an excellent forum for discussions and receiving feedback from the community.

The ESDC submitted a request for another lunchtime session next year at the European Astronomical Society Annual Meeting (formerly EWASS), Leiden, 29th June to 3rd July 2020, with a similar agenda. The session has been approved and the day will be decided and communicated by the EASAM organisers in a few months.

2. The HCV Explorer: interactive interface to the Hubble Catalog of Variables

A presentation and demo were given by D. Baines on the interactive interface to the Hubble Catalog of Variables (HCV), called the HCV Explorer. The first release of this interface coincided with the release of the catalogue, on 24th September 2019 (Bonanos, A. Z. et. al. 2019, A&A, 631, 3).

The AAUG asked more details about the catalogue, for example types of variables in the catalogue, variability indices used, the expert classifications and percentage of artifacts. G. de Marchi and D. Baines gave details as given in Bonanos et. al. 2019. The AAUG asked if future versions of the catalogue are planned. ESDC replied that it is a possibility, since the pipeline is now at STScI and could potentially be run against new versions of the Hubble Source Catalog. Improvements to the functionalities in the HCV Explorer were given by AAUG members, such as adding an editable search radius; bringing a highlighted source in crowded regions to the top of the sky visualisation layer.

D. Baines also demonstrated a Jupyter notebook example of a typical science use case using the HCV light curve data by accessing the archive programmatically (via astroquery modules). This notebook is available from the HCV Explorer help pages.

Finally, AAUG members asked if the Hubble mission has any plans in the future to provide the rejected sources information, since astronomers may be interested in details on sources that were just below the significance level of being classified as a candidate variable. The current catalog contains candidate variables with five or more data points in light curves, less than five were not included. This led to a discussion that variables with less than five epochs of observations would be very interesting to include in a possible future extended version of the catalogue (see **Recommendation 2019-10-15/04**).

3. Science Exploitation Platform: ESA Datalabs

V. Navarro gave a presentation on the currently ongoing ESA datalabs project, ESA's multi mission science exploitation and preservation platform project. After the presentation the AAUG asked about the amount of computing power ESA will be able to offer to the community via ESA datalabs. V. Navarro explained that initially there will be a self-registration phase, where the project will be able to assess the number of users.



Since each user will have a quota the project will be able to assess the initial amount of computing power that could be offered per user. They are also looking at different areas where ESA has experience, such as the Gaia mission database space, and are assuming to be able to offer processing power similar to the processing power offered by SciCloud. Datalabs will offer users a predefined number of cores and if the user wants to do something special, they will need to ask for additional resources and justify why they need the additional resources. Additionally, all users need to be registered, therefore resources will be controlled. And users will only be able to access resources that are in an approved list (a white list). The design of the system allows code to be run in datalabs or to be sent to a possible cloud system in the future.

A question was raised related to user support and how to help users to optimise their code for the platform. V. Navarro explained that there will be different types of users of this platform, e.g. scientific users interested in using the Jupyterlab environment and running notebooks; and scientific developers creating complex algorithms needing a container, and eventually for the code to be offered as an end user product within datalabs. Datalabs will have a constrained environment but also give guidelines on how to write a well-defined pipeline or container that can be reused and offered to the community in ESA datalabs. Regarding the archives, V. Navarro explained that there are plans to add links within the archives to ESA datalabs, such as 'send data to datalabs', but there are no plans to replace the archives with the platform (the roles of datalabs and the archives are very different). The AAUG asked about mission remote software, for example the XMM-Newton RISA software, and how this links with the datalabs project. V. Navarro explained that datalabs could run RISA software in a virtual machine, and that there are plans to provide a datalab or notebook offering this. Finally, the AAUG asked about the quality control on the code and datalabs created by users. V. Navarro confirmed that the idea is for ESA to first perform a quality assessment of the code before it can be offered to the whole community.

The AAUG gave its support and recommendations to the ESA datalabs project in **Recommendation 2019-10-15/03**.

4. Visitor Programme

G. de Marchi started the discussion session on the Archival Research Visitor programme by summarizing the latest ideas and developments for the programme. The aims of the Archival Research Visitor programme are for community scientists to come to ESAC and ESTEC for some time to do scientific research using the data in the archives, to maximise the scientific return from ESA missions and to give visibility to the ESA archives. The programme has been approved by ESA management, and the aim is for it to launch next spring. G. de Marchi presented a document with questions and answers trying to capture all the aspects of the programme and a number of points for discussion that had been prepared for this meeting.

The first point for discussion was the purpose of the programme. The AAUG members agreed that it will be sufficient to present the programme as a programme that invites applications from scientists who are interested in exploiting data in the ESA archives. AAUG members asked what the difference is between this programme and the other ESA visitor programme. G. de Marchi explained that the difference is that for the current ESA visitor programme, someone in ESA can suggest that one of their collaborators could come to ESA for a visit of typically 1 to 2 weeks to give a talk and to collaborate on a scientific project that should lead



to a paper. Whereas the Archival Research Visitor Programme will be for the community to apply and propose a research topic to exploit publicly available data in the ESA science archives, and it will be for a longer period of time, typically 1 to 3 months.

The next question discussed was who should have access to the programme, since this is ESA funding. The AAUG members agreed that the more practical approach could be that anyone from an Institute within an ESA member state or collaborating state can apply, regardless of their nationality. A discussion followed on visas for non-EU nationals, if and when they will be needed, and to provide this information to applicants and if the programme can cover this as an expense. It was agreed that this will be looked into (as part of **Action 2019-10-14/01**).

The AAUG then discussed how to encourage early career scientists (within 10 years from their PhD) to apply. It was agreed for the first round to keep it as open as possible, since the number of people who will apply are unknown, but to add in the call that early career scientists are particularly encouraged to apply. The AAUG asked typically how many people per year will the funding allow. G. de Marchi confirmed that the agreed ESA funding for the programme allows around 20 months a year, which will be of the order of about 12 people per year, depending on the length of the visits. A visit is foreseen to typically last 1 to 3 months, but maybe some projects could be feasible for a few weeks. It will also be possible for multiple visits to ESAC or ESTEC if needed. Regarding the funding, the AAUG agreed that an indication on the amount of funding per day will be very useful for the applicants, therefore this will be stated in the dedicated web page.

The AAUG then discussed the best wording for describing what needs to be given in a proposal, for example, which type of expertise the applicant expects to gain, the proposed time and duration of the visit. This was followed by a discussion on when the applications will be reviewed and who will be on the review committee. G. de Marchi said the initial idea is for the committee to be made up of the three ESDC Lead Scientists in the three areas (Astronomy, Planetary and Heliophysics), at least one representative from each of the three archive User Groups, and the ESDC Lead Scientist (G. de Marchi); resulting in a committee containing at least seven reviewers who are a mixture of people working internally at ESA and externally in the community. And the User Group representatives will rotate per round. The AAUG members declared their availability to contribute to the selection process (see **Recommendation 2019-10-15/01**).

G. de Marchi explained that the idea is for the proposals to be reviewed twice per year (6 months apart) and an initial estimate for the number of proposals that are expected to be received is of the order of 15 per round (with two rounds per year). All committee members will review all proposals. The AAUG agreed that adding a deadline for each submission round is a good idea, and placing them away from the main observatory deadlines. A call for proposals will be announced before the submission deadline and the results will be announced within two months after the submission deadline. The AAUG commented that a good website will be needed, giving all the details of the programme, the application form, and also showing the results from previous rounds. Following on from this, how applicants can find out about the type of expertise at ESAC and ESTEC was discussed. An idea is for each ESA internal person interested in working with and training visitors to provide some information online about their scientific and/or technical expertise (similar to the ESA Science Faculty pages). It is planned that all areas of research are covered by this programme, however ESA will need to find the connection between the expertise of the people at ESA and the people who are applying. If no connection can be found, this will need to be flagged for the proposals review meeting. Finally, the



AAUG suggested that it might be useful for applicants if within the first call, a few examples are given of programmes that could be proposed.

A short discussion followed on the deliverables for each project. The initial ideas are for the visitors to give a presentation at ESAC or ESTEC, and at the end of their stay to produce a short report summarizing the project and, for example, giving feedback on any issues they encountered. This will be valuable feedback to improve the archives. The AAUG suggested adding that any higher-level science products resulting from the programme should be made available to the community. Additionally, it will be encouraged that a paper results from the visit, with relevant acknowledgements to the data, archives and the visitor programme.

Finally, an action was raised on G. de Marchi / D. Baines to define a timescale for implementation of the visitor program and the necessary interaction steps with the AAUG (**Action 2019-10-14/01**). The AAUG expressed its satisfaction with the decision to implement an archival research visitor programme and gave further recommendations in **Recommendation 2019-10-15/01**.

5. AAUG membership renewal/reassignment/substitution

AAUG members will reach their two years term in the group in the first half of 2020. The letter of appointment for each AAUG member states an appointment for an initial two years. This period is renewable and it was expressed that the ESDC are more than happy if any AAUG members wish to stay for a longer term. G. de Marchi noted that a report from the AAUG to the Astronomy Working Group (AWG) for the second year of AAUG activities is required by the next AWG meeting (27-28 January 2020; **Action 2019-10-14/02**). ESDC asked if any members wishing to finish their term could suggest names of potential replacements within their field. The AAUG chair expressed her interest in continuing for an additional year, covering two more AAUG meetings, after which time she will step down due to other commitments. Ideally a new chair should be identified and join the second meeting of next year, to allow some time for handover. AAUG members also expressed their interest in continuing. An action was raised for D. Baines / G. de Marchi to email all the AAUG members to set a deadline for renewal or resignation from the AAUG (**Action 2019-10-14/03**).

6. Action Item: EU Horizon 2020 and FP7 projects

During the previous AAUG meeting there was a dedicated session to discuss EU Horizon 2020 and FP7 projects that use ESA archival data and produce high level or user provided products and if these products should be added to the relevant ESA science archives. 12 relevant large EU projects were identified before and during the previous AAUG meeting, 4 of which are already being followed by the relevant ESA missions (XMM-Newton and Planck). Two actions are open from this meeting, **Action 2019-02-13/13** and **Action 2019-02-13/14**, for the AAUG members to investigate one EU project each, investigate the type of data products from ESA missions that the project will be creating, advise ESDC what to ask the project PI, and if there is enough information at this point, recommend if the data should be added to any of the ESA science archives; and for the ESDC to then contact the relevant EU project PIs respectively. The project scientists of any relevant missions will be consulted before contacting any EU project PIs and will be kept in the loop.



AAUG members raised the point that there are some other ESA funded projects (the PRODEX projects) that are also producing high level science products from ESA mission data. These could also be looked at by the AAUG members to see if a suggestion should be made to add any of the data to the relevant ESA science archives. G. de Marchi described another solution that the ESDC is offering, the Guest Storage Facility, that is being used by the Planetary and Heliophysics areas. This facility allows the community to store, forever, any high-level science products created by the community, with the aim that the data will then not be lost because project funding finishes, people move institutes, etc. It could be a good solution for some of the astronomy PRODEX or EU projects. ESDC confirmed that what is the Guest Storage Facility now, will be added to the ESA datalabs in the near future. The AAUG agreed to work on Action 2019-02-13/13 in the coming months and for B. Stelzer to distribute the 8 remaining EU projects among AAUG members for evaluation (**Action 2019-10-14/04**).

7. Astronomy Archives User Survey results

D. Baines gave a presentation showing the initial results from the Astronomy Archives User Survey. 210 responses to the survey were received. The AAUG noted that PhD students and postdocs were underrepresented in the survey with respect to staff astronomers. It was suggested that ways to enhance the reach of this important group of archive users should be studied (see **Recommendation 2019-10-15/02**). The AAUG discussed the country representation of the survey respondents, some European countries are underrepresented, others slightly over represented, but in general the representation appears ok. Looking at the archive usage, and given that the Gaia archive and the XMM-Newton Science archive (the two archives with the largest number of users) are used by many of the respondents, the AAUG conclude that the survey responses seem to be quite representative of the community. The AAUG commented that some clear results come from the question asking to rate planned and possible archive developments, with the top being to develop advanced visualisation and cut-out services (see **Recommendation 2019-10-15/02**).

The following actions were raised on D. Baines: to distribute the preliminary results document and spreadsheet to the ESA missions whose archives are in the survey, including ESASky (**Action 2019-10-14/05**); to provide a summary of the user survey results online at <https://archives.esac.esa.int> (this was stated in the first page of the survey; **Action 2019-10-14/06**); to create a more in-depth report, including more plots, to send to all stakeholders (**Action 2019-10-14/07**); and to come up with a number in terms of representative user survey participants for each mission, and relate the number of people that have responded with the number of archive users and compile a ratio for each of the missions (**Action 2019-10-14/08**).

8. ESASky updates

D. Baines gave a 10 minute demo of the latest features in ESASky. Since the meeting schedule was rearranged due to some unforeseen circumstances (a cancelled flight), there was no time left to present the statistics for ESASky. It was agreed that the ESASky statistics and updates will be presented in a dedicated session in the



next AAUG meeting (see **Action 2018-06-12/02**). The planned presentation with the ESASky statistics was distributed to AAUG members at the end of the meeting.

9. Date and time of next meeting

An initial date for the next meeting (Spring 2020) could not be identified, therefore a doodle will be sent to the AAUG and ESDC members to fix the dates for the next meeting (**Action 2019-10-14/09**). It was also suggested that the meeting could be held just before or after a meeting to evaluate the first Archival Research Visitor proposals, if dates coincide well.

10. AOB

The ESDC asked if the AAUG had any suggestions for the next AAUG meetings, such as the length of the meetings. The AAUG agreed to continue meetings over two days and suggested more participation from scientists of the individual astronomy missions, to hear their opinions on archival developments (see **Recommendation 2019-10-15/05**). ESDC also suggested we could remind the mission scientists, perhaps when the approved minutes are distributed internally within ESA, that if they have any requests or suggestions, to join the next AAUG open sessions and raise them there.

RECOMMENDATIONS

The following recommendations were formulated by the AAUG:

Archival Research Visitor Programme

Recommendation 2019-10-15/01: The AAUG welcomes the decision to implement an Archival Research Visitor Programme [along the lines previously discussed with this advisory group that led to *Recommendation 2019-02-13/02*]. ESA is encouraged to open the first call for this new opportunity by the end of this year. The AAUG members declare their availability to contribute to the selection process.

The experiences that will be made during the first year of this new program should be shared with the AAUG and possible improvements to the scheme -- e.g. in terms of the selection process, the requirements for the proposals, the duration of the visits, etc. -- should consider feedback from the visitors as well as from the supporting ESA staff.

User Survey

Recommendation 2019-10-15/02: The AAUG is pleased to see that the User Survey was completed successfully. The variety of profiles of the participants demonstrates the broad appeal of the ESA Astronomy



Archives from academics (the majority of survey participants) to school teachers and amateur astronomers. The AAUG noticed that PhD students and post-docs are underrepresented with respect to staff astronomers. Ways should be studied to enhance the reach of this presumably important group of archive users.

The overall level of satisfaction manifested by the survey participants is very high. The individual responses express great appreciation of the recent development efforts by the ESDC, highlights being e.g. the ESASky tool and ADQL queries.

The AAUG deems the development of the ESA Astronomy Archives to be proceeding at an impressive pace. The AAUG recommends ESA that the features identified by the users through the survey as requiring improvements should be considered in the further development of the Astronomy Archives and ESASky.

SEPP / ESA datalabs

Recommendation 2019-10-15/03: The AAUG strongly supports ESA's activities to make the space-based data gathered from its astronomy missions and associated data available in a maximally standardized format through the Science Exploitation and Preservation Platform (SEPP) project. The exploration and eventual implementation of novel ways of data and software handling are essential for an optimized exploitation of the enormously increasing data amounts provided by the current and future astronomy missions. The SEPP initiative is, therefore, seen by the AAUG as a cornerstone of the Long-Term Data Preservation plan.

The possibility to include science user provided data and analysis codes into the ESA Astronomy Archives is regarded as an important part of this process [see *Recommendation 2018-06-12/01*]. However, the AAUG recognizes the associated security risks, and the ESA is encouraged to address this issue.

HCV Explorer

Recommendation 2019-10-15/04: The Hubble Catalogue of Variables (HCV) is an excellent example of added scientific value resulting from systematic data archiving. The development of a user friendly interface, the *HCV Explorer*, to access the HCV database is expected to increase the exploitation of this large collection of variable sources. The AAUG would appreciate if, as a next step, ESA looked into preparing an extended version of the catalogue, e.g. including variables with less than five epochs of observations, using multiple HST instruments to search for variability, and ingesting future versions of the Hubble Source catalogue (HSC).

Representation of individual astronomy missions in AAUG open sessions

Recommendation 2019-10-15/05: The AAUG welcomes stronger participation by ESA staff scientists of the individual astronomy missions in the open sessions of the AAUG to share their experiences and ideas on archival developments.

