NASA ADS Users' Group (ADSUG) Report 2020

The fifth meeting of the Astrophysics Data System Users' Group (ADSUG) was held in November 2020 via Zoom. We welcome new members Andrew Casey, JJ Kavelaars and Jenny Novacescu. The meeting was chaired by Bryan Gaensler and Chris Lintott.

Kudos and existing priorities

The ADS team have, in the last year, done an extraordinary job in extraordinary circumstances. The deployment of the new front end and the support offered to the community during the transition was carried out in an exemplary fashion, and the team are to be commended for reaching this long standing goal! Despite the pandemic, they have adapted to be able to continue to provide a very broad community of users with a vital service. This effort was recognised in the results of the senior review, which rated ADS's submission as 'excellent', and in the resulting support for the project, including the award of a full FTE for a project scientist, something the users' group has long supported.

The ADSUG agrees with the team that they should continue to prioritize system reliability. It is a recommended practice that application and staff readiness for a recovery workflow are performed on a periodic basis. For a small team like ADS, this is especially important due to attrition and the risks from the global pandemic; it is a real possibility that multiple staff could become unavailable to respond to situations affecting the availability and reliability of the ADS services. The team should consider proactive measures, like IT emergency response drills, that help assess staff readiness for situations affecting ADS services. In functional areas of the system where expertise is limited to few staff members, consider training options to fill gaps. The transparency on challenges that remain for backend modernization is appreciated.

Phasing out ADS Classic

Expertise in the classic codebase and infrastructure, which still underpins many backend functions, is limited to a few individuals. Continuing to rely upon and extend it presents an operational risk and a source for additional technical debt. Often a new feature implemented in legacy code can be achieved on a shorter timescale using more modern approaches and the effort spent on Legacy implementation would have been better spent on porting to a new architecture. This transition work should therefore be prioritized.

During a transition phase between the new and classic back-ends there will be a higher risk for failures/errors. We recommend minimizing the time spent running a hybrid system (i.e. old and new systems running in parallel) during the transition. Concluding the effort to phase out the classic codebase and infrastructure will generate opportunities to pursue other priorities. For example, having a completely cloud-native infrastructure may allow ADS to better leverage technology options as compared to running in a hybrid environment. The ability to scale out may become even more important if the anticipated API development encourages expanded use of ADS services within the community.

API Development

The application programming interfaces (APIs) established by the team allow for powerful programmatic workflows. There continues to be strong uptake of the API, evidenced by a significant amount of traffic even after accounting for large research services.

We encourage ADS to work with the open-source community to broaden the capabilities of clients that make use of the APIs that ADS has to offer, and to maintain strong collaborative relationships with peer projects with inter-dependent APIs (e.g., INSPIRE, arXiv). The existing API services (e.g., library, export, metrics) already available in ADS are guaranteed to have substantial uptake within the community once an open-source client is available (possibly within `astropy`). Improved client software will emphasise the need for up-to-date documentation of all API service end-points, and all fields available to those end-points. It is hoped that any undocumented items would become apparent by extending client capabilities, but the team may want to consider the use of services that generate API web documentation from code (e.g., swagger). This would help keep API documentation up-to-date as new functionality is rolled out across the ADS services. The team is to be commended for their plans to make additional services available through API endpoints (e.g., the resolving service). The move to microservices that enable scaling with load will also be important when fully documented API clients become available.

Staffing

The staffing of ADS staff have built an amazing service that is critical to most astrophysics research. Keeping those staff engaged and productive requires that they have opportunities to pursue creative expression and see projects conclude. The delays in finding replacements for the Project Scientist and UI/UX positions may overburden existing staff and reduce the effectiveness and agility of the team. In particular, the Project Scientist position is meant to provide insight and leadership for the development of new capacities that are in tune with the evolving user community. Reliance on (admittedly committed and excellent) Emeritus Staff to fill this role may slow the innovation cycle within the ADS. The importance of the PS role has been recognized in the ambition to make this a full FTE position, making even clearer the need to fill this position expeditiously. The move to a full FTE position also provides the opportunity to expand the role to provide some assistance in managing the expanding ADS staff.

The ADSUG committee is concerned that the delays in filling open positions may indicate that the process for recruitment is flawed. Given that searches are not finding the desired candidates, new strategies may lead to better outcomes. Exposing, during the advertising process, the benefits of working within SI and with the ADS group may help improve the rate of appropriate applicants. In particular, the long and somewhat opaque hiring process that the academic community finds normal is not appropriate for the more agile ‘IT Crowd’. A process that enables moving from posting a position to making an offer on a timescale of weeks should be developed. This process would require a very dedicated and focused effort on higher, active searching. While attempting to fill these critical roles, ADS could consider short term contract

position for the UI/UX work (similar to having contributions from an emeritus Project Scientist). Given the level of effort that staffing actions required, going through failed actions drains the resources that are needed to pursue high-priority activities in development of the ADS mission.

Educating the User Community

ADS offers extensive advanced searching and functionality. However, challenges remain in building awareness and getting the core community to adopt these tools and promote them among their own research groups.

The ADSUG recommends the following actions to build awareness of basic search techniques and promote use of advanced functionality.

Consider UX methods of highlighting new and sophisticated features in the UI itself, such as persistent tooltips on new elements or options that need to be dismissed, notifications of new feature announcements from the top nav bar, and listing announcements from the homepage. Also consider gamification for encouraging adoption of features, for example a check list in a user's setting panel that lists signing up for myADS, subscribing to the newsletter, creating custom export formats, linking to ORCiD, trying sophisticated queries, bookmarking blog, join public discussion forum (if one is created), etc. Consider easing adoption of myADS by including pre-canned and customized example queries in the myADS settings. Also consider boosting visibility and subscription to the newsletter by moving to the front page of UI instead of two clicks in, and/or auto-subscribe for new users. Consider using myADS to promote new ADS features and to make ADS announcements as well.

Consider advertising new features and past promotions through society newsletters that link back to the ADS help pages, blog, and newsletter subscription page. Work with AAS, RASC, IAU, ASA, ASP, NASA subordinates like DPS to advertise newest ADS features and re-promote ADS 2.0 features and user education content.

Consider ways (such as through a forum) to facilitate the community to help itself troubleshoot and share capabilities. For example, the community often needs to create custom export formats or generate metrics reports for funding and institutional reporting events that are outside the scope of ADS itself to support.

Consider implementing a program similar to the AAS Ambassadors/Agent program. Identify a key contact at each major institution to help promote ADS functionality, provide initial basic troubleshooting, etc. Responses to local contacts is anecdotally higher than generic posts from organizations. It is acknowledged this could take substantial resources to initiate and may not be necessary if other user education initiatives are given priority.

ADS should continue to promote its indexing capabilities and functionality for end users through video tutorials, social media presence (like Astronomers facebook group), and continue to offer major workshops, sessions, etc. at major meetings such as AAS, IAU, AGU, DPS and other

NASA related conferences. It is understood that visits to the ADS virtual booth and attendance in ADS workshops in 2020 may have been negatively impacted by the pandemic in 2020. The ADSUG strongly encourages ADS not to stop promotion through traditional means. Depending on attendance in last ADS API hack day and community interest, ADS should continue to host and coordinate hack days.

Accessibility and Usability

The ADSUG commends the ADS team on the work done to advance accessibility of the service over the last year, and on the ambitious goals that ADS envisages going forward. We emphasize the point made by the ADS team that accessibility affects 15% of users, and we strongly endorse the stated goal from ADS to ultimately meet the WCAG 2.0 standard.

We recommend that ADS maintain accessibility as an existing priority going forward. We suggest an approach wherein work on accessibility is an ongoing process rather than a specific task to be completed; this topic should be prioritized and resourced with this principle in mind. One possible approach is that ADS should set for itself accessibility milestones to be achieved in each coming year, to ensure steady ongoing progress toward a longer-term goal.

We note the distinct usability and accessibility issues that arise on different types of devices (desktop, tablet, smartphone, screenreader, etc.), and emphasize that even small improvements can make a huge difference to usability for various subsets of users.[1]

Enhancements and Improvements to current capabilities

We applaud the creativity and persistence of the ADS team in ongoing additions to and improvement of functionality across the entire service over the last year. It is both important and appreciated that the team continues to make time to enhance the core service.

The ADSUG's main comment in this area relates to the recommendation engine. This is a potentially useful capability, but only if the recommendations are extremely good (e.g., at the level already produced by myADS, or better). This is difficult and should not be a priority, given the existence of myADS and other tools (e.g. arXivsorter, arXangel). Relevant and potentially more useful efforts that fall within this general area include integration of UAT, ability to search embedded publication tags for telescopes/facilities/software, etc.

Expansion

[1] For example, anything that needs cutting and pasting is trivial on a desktop, but is often cumbersome on a smartphone.

Expansion into NASA's other fields, now being considered, offers tremendous opportunities and risks for ADS - its current success depends on a deep understanding of the community it serves and attention to that community's changing needs. This should not be threatened by expansion.

ADS will need to understand deeply the cultures of the fields which they are expanding into. Each is different! Therefore we recommend moving field by field - in planetary and, to some extent heliophysics, ADS has already made substantial progress to understanding, and so we recommend expansion into these fields, first. This can build on existing work in particular to consider short-term, high impact expansion in planetary (as explained in previous reports).

In earth sciences and bio/physical sciences, substantial effort is required to understand the user community, scope of the literature, the publishing landscape, the relationship with existing archives, the status of data archiving etc etc. This scoping exercise is a substantial piece of work in its own right and will require dedicating staff time and funding. NASA may also need to provide encouragement to its communities/archives/institutions/publishers to engage with ADS and its work.

Realism is needed to understand what resources and time are needed to provide a useful service to each division's scientific community. This may mean providing services at different levels to different communities in the short and medium term.

This approach also minimises the risk of expansion to existing priorities and operational stability (see above), as well as the challenges in hiring given ADS's current constraints. Any substantial increase in the number of staff will also need to account for an increase in management capacity.

Conclusion

In this most unusual of years, the ADS team have made substantial progress and, with the support from the senior review, are better placed to secure the medium to long term future of this essential surface than for many years. The value of ADS to the scientific communities it serves is remarkable, and we are confident that this will remain the case for many years to come.

Chris Lintott for the ADS Users Group

Appendix: Wish list of Additional Items

Given the large number of possible things to work on and the often hidden complexity underneath many seemingly simple user requests, the ADSUG recommends that ADS should be setting its own priorities as to future improvements or additions to current capabilities. In case it is helpful, here are various features that the ADSUG would welcome consideration of:

- A push to index and link to more theses, including those from outside the USA.[2]
- Linking to data and research artefacts deserves more focus. In particular, the ADSUG agrees that workflows and pipelines to index data sets, notebooks, software are essential in order to serve the community well in the next one-two years. Conversations with major entities such as CrossRef, DataCite and Zenodo will be essential to doing this well.
- Consideration of indexing other material authored by astronomers, such as articles in The Conversation and Astrobites, and possibly AAS Nova as well.
- Augmentation of frequency of reindexing and updates to indexed records, so that updates do not lag up to 1-2 weeks.
- Offering example notebooks that demonstrate how to conduct custom or complex calculations on bespoke citation metrics.
- Indexing of conference materials (e.g., talk slides, conference programs, e-posters, speaker videos)
- Ongoing improvement to feedback form interface (e.g., copying information over from the referring page, as currently happens for the “Missing/Incorrect record form”), or even facilitating common requests (e.g. article/arXiv linking) with clicks directly from the search results.
- Links to referee reports (where available) as an associated work or otherwise linked to indexed publication entry

[2] This will be an important consideration for ADS’s planned expansion into other fields. Coverage of relevant theses is an essential component of any expansion.