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Dear Dr. Accomazzi

The second meeting of the Astrophysics Data System Users Group was held November 2-3, 2017 in Cambridge, MA. The Users Group represents the many and varied constituencies of the ADS, and we are pleased to draw on our experience to offer advice to the project. We welcomed two new members, Ms. Line Nybakk Akerholt and Dr. Erick Peirson. We are grateful to Ms. Ruth Kneale and Dr. Sandy Payette, both of whom are rotating off, for their service and excellent advice.

Kudos

Over the course of the two days of the meeting, the ADS team presented updates on all aspects of the development and operation of the project. The committee was extremely impressed by both the state of progress as well as the breadth of vision for the future. ADS continues to be the preeminent tool for researchers working in astrophysics and remains an indispensable resource for the community. It has fundamentally changed the way astrophysicists work and represents one of the single best investments NASA has made to support science.

Based on the presentations and current composition of the ADS team, the committee is confident that the ADS project will continue to maintain and expand its leadership role in the coming term. The committee was pleased to see the new personnel added to the team since the previous Users Group meeting. The committee was universally impressed by the quality of the presentations as well as the enthusiasm and dedication exhibited by the team. The committee would like to thank Alberto and the rest of the ADS team for their open and frank discussions during the meeting.

Platform Transition

At the last meeting, the Users Group was introduced to *Bumblebee*, and recommended that "*ADS proceed with an expedited move to the ADS Bumblebee from the classic platform, and discontinue support for the classic platform."* ADS has made significant progress towards fully

deploying and “removing the beta” from *ADS Bumblebee*. Current plans include officially launching *Bumblebee* at the start of 2018, with various levels of deprecation of ADS Classic over time, until the user interface to ADS Classic is fully removed in early 2019, and all links direct to *Bumblebee*. ADSUG approves of this aggressive timeline, and expects to see significant progress toward Classic deprecation before the next ADSUG meeting. It is reasonable to expect complaints by the community upon transition, but the reality is that DAS does not have resources to continue to support two interfaces, nor should they do so. ADSUG recommends that ADS move forward without entertaining calls from the community to extend maintenance of ADS Classic for any longer period. ADSUG also recommends that ADS exploit the learning opportunity afforded by the transition, and to brand ADS (e.g. retire the term *Bumblebee*) appropriately for the future.

Staffing

At the last meeting, the Users Group identified critical vulnerability to loss of staff.
Since our last meeting, ADS has hired new staff, and we were delighted to find that they were well integrated into the project. The new capacity afforded by these hires has greatly reduced the siloed nature of work, increased redundancy between tasks, and created a collaborative atmosphere. The committee also noted the team’s diversity compared to many technical or scientific projects - ADS is to be commended for this. With a growing team, the management load is significant, and we would recommend the team look at structures that distribute this more widely.

The group felt attention should be paid to the medium to long term transition of project leadership, which has been stable for many years. To attract a broad field of excellent candidates, *the project scientist position should be advertised with a substantial component of guaranteed research time*. To accomplish this, the team should begin exploring funding options with NASA and, if necessary, SAO and CfA.

Architecture

ADSUG recognizes that technical documentation, including code, APIs, and high-level architectural documentation, is a valuable project outcome. ADSUG endorses committing resources for such documentation. These products will be valuable to peers in the open access scholarly publishing community, and ADS may find it useful for onboarding of technical staff in the future.

Planetary

During its first meeting, the ADSUG cited the growing importance and prevalence of exoplanet studies and the inevitable confluence of astronomy and planetary science in the literature and data archives. In response to a recommendation from that meeting, the ADS staff conducted a study of what would be required for Planetary Science (PS) to be included in the central “core” of ADS. This would require significant expansion of ADS holdings, an increase in the curation content for ADS, and a growth in the number of external collaborations (e.g. Planetary Data System or PDS).

ADSUG continues to believe that the ADS services would be of tremendous value to the entire PS community. There is currently no service that provides the complete and authoritative coverage of PS analogous to the one ADS provides for Astrophysics. It is already the case that

a large number of Planetary Scientists use ADS regularly even though the current holdings are not complete. The feedback ADS has received from selected planetary scientists has been strongly supportive of expanding ADS coverage for PS. It is inevitable that broader exposure of ADS capabilities to the PS community will further bolster support for this expansion.

But expanding the core ADS to include PS will require additional resources both at ADS and among the PS archives to provide the necessary interfaces and metadata that will be needed by ADS. This may require coordinated funding efforts by both the NASA Astrophysics (for ADS) and Planetary Science Divisions (for PDS, for example). We encourage the ADS project to engage the agency and the PDS nodes in discussions of funding opportunities and coordination between the community and the Divisions.

As a first step, ADSUG recommends that ADS begin with a focused effort to improve coverage of exoplanets and related topics, *ensuring complete coverage of exoplanets within the core content and services*. This will provide a high-value return for the broadest user community at a modest cost to the agencies. This focused effort will also serve as an important proof-of-concept for the general expansion of the core to include PS.

External Funding and Collaborations

ADSUG commends ADS for its collaborations with peers on problems in the scholarly publishing space, and specifically recognizes ADS' collaboration with AAS/CERN/Zenodo and others concerning software citation. This work has proceeded successfully without detracting from progress on ADS Bumblebee. ADS has successfully acquired external funding for collaborative projects, e.g. from the Alfred P. Sloan Foundation and the American Astronomical Society. ADSUG encourages ADS to continue to pursue opportunistic collaborations with peers, and to further develop external funding for those projects as appropriate.

Blue Sky Session

The ADSUG expressed strong support for an "R&D" component for all archives. In recognition of the importance and value of unfettered thinking for the rapidly evolving area of archives and data science, the ADSUG concluded its meeting with a "blue sky" session. The ADSUG and ADS staff participated. It was agreed that the ideas and suggestions presented need not be "in scope" or represent consensus recommendations. Many ideas were discussed, of which a few are given below.

Recommender Systems

As the volume of papers published continues to grow, recommender systems are likely to become more important. ADS should seek to provide such systems that take advantage of its uniquely deep, long-lived archive, building on the existing *myADS* functionality, and develop an understanding of user needs and affordances through audience research. An example use case would be generating a library on a topic that contains all the recommended readings for a student embarking on a new project.

ADS has a role in providing recommendations that go beyond relevant papers, to include people and institutions. Researchers contemplating strategic partnerships should be able to use

ADS to address such questions as: What institutions have contributed most to a particular field? Who are the current experts in that field?

Astronomy Clearinghouse

Many searches astronomers perform, both inside and outside ADS, involve both text and data. *ADS could be the literature and data clearing house for astronomers*. ADSUG envisions a future in which *all* such searches are enabled by ADS, its data linkages and its deep knowledge of the citation graph by collaborating with and providing services to archives. As an example, a user at HEASARC might want to search for all XMM and Chandra data referenced by papers about supermassive black holes, which is at present impossible in an integrated way. To achieve the goal of being the portal for astronomers would require continued deepening of relationships between ADS and NASA, US ground-based, and international astronomical data systems. It also requires collaboration to scope out what services would be used by many of these systems.

Beyond Business as Usual

The ADS groups has grown in size, and it may be possible to entertain new relationships and activities. As a form of public service, ADS could host a “hack day” or sponsor an intern program. ADS could partner up with librarians to further develop classification schemas, taxonomies and thesauri.

In conclusion of the “Blue Sky” section, the ADSUG encourages ADS to continue its tradition of leadership to foster innovation in archives and data science to the benefit of its broad community of users.

Sincerely yours, on behalf of the ADS Users Group.

Dr. Kathryn Flanagan
Chair, Astrophysics Data System Users Group

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