

The NASA Astrophysics Data System: Overview

Alberto Accomazzi, Michael J. Kurtz

ADS Users Group Meeting
January 17, 2017



Overview

- ADS's mission
- Assessment and recommendations from Review Panels
- ADS Data Holdings and Curation activities
- ADS Usage and Access
- Development History and System Evolution
- System Requirements and User Evaluation
- Highlights of new System Functionality
- Priorities and Implementation Plan
- Q&A

Who is ADS?

- [Alberto Accomazzi](#), PI & Program Manager
 - [Michael J. Kurtz](#), Project Scientist
 - [Carolyn S. Grant](#), Data Ingest and Curation
 - [Edwin A. Henneken](#), System Development and Operations
 - [Donna M. Thompson](#), Data Curation Librarian
 - [Roman Chyla](#), System Architecture and Development
 - [Steve McDonald](#), System Development and Operations
-
- **Vacant**, User Interface and Front-end Development
 - **Vacant**, Back-End Software Development (pipelines)
 - **New**, Back-End Software Development
 - **New**, System Operations and Cloud Computing

ADS's Mission

ADS's mission (1/2)

- Maintain a **comprehensive, timely and complete** database of the scholarly literature in Astronomy & Astrophysics
- Provide **discovery services** to support research in Astrophysics and related fields
- Promote the **use of NASA Astrophysics data** by integrating bibliographies and links to data products generated by NASA missions and hosted by NASA archives

ADS's mission (2/2)

- Provide services for curators and librarians involved in maintaining bibliographies, linking literature and data products, measuring impact
- Interface with publishers and the community to facilitate the implementation of agency policy and government mandates related to Open Access publishing
- Make its efforts in software development freely available under an open-source software license

Unique Community Focus

- Editorial policies reflect community views
 - Making decisions daily on journal inclusion, refereed status
 - Inclusion of gray literature, e.g. conference proceedings
 - Indexing of non-traditional content (catalogs, observing proposals, software) is result of evolution in astronomy scholarly publishing
- Features, Services based on community needs
 - Increasing volume and specialization in the field requires better discovery and analytical services
 - Full-text search essential for maintenance of bibliographies, analytics
 - Additional functionality often requested:
 - ORCID integration, affiliation normalization
 - Citation analysis, visualizations, notifications

Unique ADS functionality

- **Comprehensiveness, timeliness, accuracy, focus**
 - The only literature system where *all* of Astrophysics is represented
 - Properly manages eprint and published content, metrics
 - Includes areas of Physics at the boundary with Astrophysics
- **NASA Astrophysics data, scientific output exposed**
 - Includes observing proposals for most missions, archives
 - Links to data products, integration of bibliographies
 - Allows search of NED & SIMBAD objects, high-level data catalogs
- **Supports wider NASA programs and goals**
 - Science: Earth, Planetary Sciences, Heliophysics covered by ADS
 - R&D: mission planning, instrument building, program evaluation

Assessment and Recommendations from Senior Review Panels

2008 Senior Review (1/2)

Rating: Ranked #1

Overall assessment and recommendations:

The Panel applauds the ADS team for providing an outstanding service to the astronomical community and for extending the ADS service to many international mirror sites. The ADS team made the compelling case that the system was “aging.” In addition to new hardware, a new (open source) database system should be implemented to ensure reliability, maintainability, and long term stability of the ADS. The Panel recommends that NASA continue to fund the ADS at the full level including the “over-guide” budget.

https://smd-prod.s3.amazonaws.com/science-green/s3fs-public/atoms/files/ApArchSR-2008_final.pdf

2008 Senior Review (2/2)

Additional Comments:

- *ADS is so extensively used by the entire professional astronomy community that it is hard to imagine existing without it. By one calculation referenced in the proposal, the efficiency increase to astronomy research in 2002 through the use of ADS is estimated to be approximately 736 full time researchers (compared with otherwise obtaining the information in libraries). The ADS is an enabling tool for research in all of NASA astronomical research programs.*
- *ADS needs to find a way to educate (busy) astronomers on its secondary capabilities and search features to enable them to separate the ‘wheat from the chaff’. This may be helped by providing alternate interfaces (new looks?) to the user.*

2011 Senior Review (1/2)

Rating: Ranked #1

Overall assessment and recommendations:

The new ADS interface and functionality is a significant improvement to the old system, and should be able to meet the standards and expectations of the most web-savvy end-user for at least the next five years. The obviously strong relationship that the ADS team has established with the user community is commendable; the panel encourages the ADS to continue to allow user feedback to help shape and direct the ADS design in the future, particularly with regards to the new tools being made available in this Summer 2011 release. The panel recommends that NASA continue to fund the ADS at the full in-guide budget.

https://smd-prod.s3.amazonaws.com/science-green/s3fs-public/atoms/files/ApArchSR_2011report_final.pdf

2011 Senior Review (2/2)

Additional Comments:

- *[T]he NASA relevancy of the ADS archive comes from its inherent ability to enable science that is closely aligned to NASA SMD's Science and Strategic plans. The ADS provides important information that contributes to all stages of scientific inquiry, beginning with the preparation of proposals that lead to data acquisition and/or analysis in support of NASA-related science investigations and ending with the final publication and dissemination of results.*
- *The team has recognized the need for long-term strategic planning, and is encouraged to initiate the development of a 10-year plan that addresses, among other factors, sustainability of in-house expertise on the staff and maintaining a competitive edge in a rapidly-evolving world of electronic information and new methods of media distribution.*

2015 Senior Review (1/2)

Rating: Excellent

Overall assessment and recommendations:

The panel in general agrees with the ADS prioritized list of tasks and provides the following additional guidance: (1) Maintain continuous current services, (2) Complete transition to new system including transition to the new Ingest Pipeline and incorporate functionalities from the ADS classic to the new system, (3) Improve ADS services incorporating the new database, search/indexing engine, etc., release the new user-interface, incorporate additional functionalities such as the visualization interface, and links to social interfaces such as ORCID needs to be explored.

<https://smd-prod.s3.amazonaws.com/science-green/s3fs-public/atoms/files/NASA-AAPR2015-FINAL.pdf>

2015 Senior Review (2/2)

Additional Comments:

- *The panel recommends that the ADS take the lead and coordinate the following activities amongst all the data archives: (1) provide tools and infrastructure (with MAST) for creating and registering digital object identifiers (DOI), and (2) work with the journals to provide direct linkages to data sets from manuscripts.*
- *The panel recommends that ADS sets up a user group, comprised of a representative user community including a member of the NASA archive community that provides guidance to ADS on (1) annual operations/development plans, (2) prioritization of new tools and infrastructure improvements, (3) applicability to science and (4) access to data.*

Data Holdings and Curation activities

What ADS Aggregates

- We harvest and merge bibliographic data from multiple sources (arXiv, CrossRef, publishers, [Astronomy archives](#), ASCL)
- We enrich metadata via text-mining of the fulltext sources (extract references, acknowledgments, keywords, plots and images)
- We generate and maintain citation and usage networks
- We cross-correlate content (arXiv & published paper, translations, re-publications, [Vizier catalogs](#), [observing proposals](#))
- We collect and maintain [external links](#) to publishers, [archives](#) (SIMBAD, Vizier, NED, MAST, ESO, etc.)
- We incorporate [bibliographies](#) from [institutes](#) and [archives](#)

ADS Data Holdings

- **Bibliographic Data**
 - 11.8M records (2.2 Astronomy, 8.2 Physics) -- up 25% in last 5 years
 - Includes all records from arXiv and publications in relevant journals
- **Links**
 - 90M citation links -- up 80% in last 5 years
 - 667K links to data products, SIMBAD & NED objects
- **Full-text available “from” ADS**
 - 660K articles (4.9M pages) digitized and hosted by ADS (OA)
 - 1.2M articles hosted by arXiv and linked from ADS (OA)
 - 8.6M articles hosted by publishers and linked from ADS (mixed)
- **Full-text indexed in ADS**
 - All of ADS's scanned content & 1.2M articles from arXiv (OA)
 - 3.5M digital full-text documents from all major publishers

Ingest of articles in 2012

ADS's ingestion policies are designed to maximize **efficiency** and **coverage** of relevant content

- **Astronomy** -- broadest possible coverage:
 - 40,835 articles (10 pubs with $n > 1,000$; 51 with $n > 100$) not refereed
 - 27,540 articles (5 pubs with $n > 1,000$; 53 with $n > 100$) refereed
- **Physics** -- core refereed literature:
 - 97,732 articles (8,753 → astro) not refereed
 - 235,257 articles (9,844 → astro) refereed
- **General** -- multidisciplinary publications:
 - 36,976 articles (229 → astro) not refereed
 - 57,988 articles (1,166 → astro) refereed

High-level Data Products Indexed in ADS

- Important datasets are often described in “data” papers
- But can also be available as electronic catalogs
- Greatest majority are from Vizier (close to 10,000 records)
- Once in ADS, they become easily discoverable, citable
- This is how our community has dealt with “data citation” all along

Search Form ▾ title:2MASS X 🔍

Vizier +Infrared Sort: Citation Count ▾

Hide highlights Show abstracts « expand »

1 2006AJ....131.1163S 2006/02 cited: 4,559 PDF CSV HTML

The Two Micron All Sky Survey (2MASS)
Skrutskie, M. F.; Cutri, R. M.; Stiening, R. and 28 more
The [Two Micron All Sky Survey \(2MASS\)](#)

2 2003tmc..book....C 2003/06 cited: 1,144 PDF CSV HTML

2MASS All Sky Catalog of point sources.
Cutri, R. M.; Skrutskie, M. F.; van Dyk, S. and 22 more
The [2MASS All Sky Catalog of point sources.](#)

3 2003yCat.2246....0C 2003/06 cited: 573 PDF CSV HTML

VizieR Online Data Catalog: 2MASS All-Sky Catalog of Point Sources (Cutri+ 2003)
Cutri, R. M.; Skrutskie, M. F.; van Dyk, S. and 22 more
The [VizieR Online Data Catalog: 2MASS All-Sky Catalog of Point Sources \(Cutri+ 2003\)](#)

4 2010AJ....139.2440R 2010/06 cited: 357 PDF CSV HTML

The PPMXL Catalog of Positions and Proper Motions on the ICRS. Combining USNO-B1.0 and the Two Micron All Sky Survey (2MASS)
Roeser, S.; Demleitner, M.; Schilbach, E.

Observing Proposals Indexed in ADS

- Proposals contain early descriptions of current and ongoing science activities
- They provide a direct link to existing or planned observations
- HST, IUE, CXC, NOAO, XMM, KOA, Spitzer, ATNF, Subaru, ...
- 36,000 records, 38,000 data links, 300 citations
- Ongoing ingest rate is 1,000 records/year

<input type="checkbox"/>	Show abstracts				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	<input type="checkbox"/> 2009noao.prop..291G	2009/01	cited: 11		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Probing the Gaseous Halos of SDSS Galaxies at z < 0.4			Gauthier, Jean-Rene; Chen, Hsiao-Wen; Tinker, Jeremy L.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/> 2007sptz.prop40184H	2007/04	cited: 5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	A Spitzer Legacy Survey of the Cygnus-X Complex			Hora, Joseph; Adams, Joseph; Allen, Lori and 13 more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/> 2007sptz.prop40791M	2007/04	cited: 5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Galactic Structure and Star Formation in Vela-Carina			Majewski, Steven; Babler, Brian; Churchwell, Edward and 7 more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/> 2007sptz.prop40021D	2007/04	cited: 5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	A Spitzer Public Legacy survey of the UKIDSS Ultra Deep Survey			Dunlop, James; Akiyama, Masayuki; Alexander, David and 52 more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/> 2003xmm..prop..31E	2003/02	cited: 4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	XMM-Newton Proposal 02006501			Ehle, Matthias	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/> 2009noao.prop..145T	2009/01	cited: 4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Rapid observations of gamma-ray bursts			Tanvir, Nial; Levan, Andrew; Reichart, Daniel and 9 more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/> 2008sptz.prop60020W	2008/11	cited: 4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	GLIMPSE360: Completing the Spitzer Galactic Plane Survey			Whitney, Barbara; Arendt, Richard; Babler, Brian and 49 more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Bibliographies

- **Institutional** bibliographies, highlighting scientific output from research center or project
- **“Telescope”** bibliographies, identifying papers related to their data products
- About 30 bibliographic groups so far, over 330K records
- Help with scientific evaluation of projects and institutions, but also useful in disambiguation

ALMA	ISO	ROSAT
ARI	IUE	SDO
CfA	JCMT	SMA
CFHT	Keck	Spitzer
Chandra	Leiden	Subaru
ESO	LPI	Swift
Gemini	Magellan	UKIRT
Herschel	NOAO	USNO
HST	NRAO	XMM

Data Links

- Have existed between Data Centers and ADS since 1994
 - Maintained by librarians, data archivists, harvested by ADS
 - Bibcode-URL pairs, linking to either individual observations or aggregates
 - Often part of data center's bibliographies, used to compute metrics

Data Links to 2012 articles

Thanks to our ingest of links to archives and objects, the Astronomy collection is particularly “**data rich**”

- **Core journals** (AJ, ApJ, ApJL, ApJS, A&A, MNRAS):
8,942 total articles; 6,499 articles with any data links (157,525 citations)
 - 3,145 articles with links to data products (62,833 citations)
 - 6,291 articles with links to SIMBAD objects
 - 2,008 articles with links to NED objects
- **All other Astronomy articles**:
54,692 total articles; 5,049 articles with any data links
 - 2,270 articles with links to data products
 - 2,987 articles with links to SIMBAD objects
 - 65 articles with links to NED objects

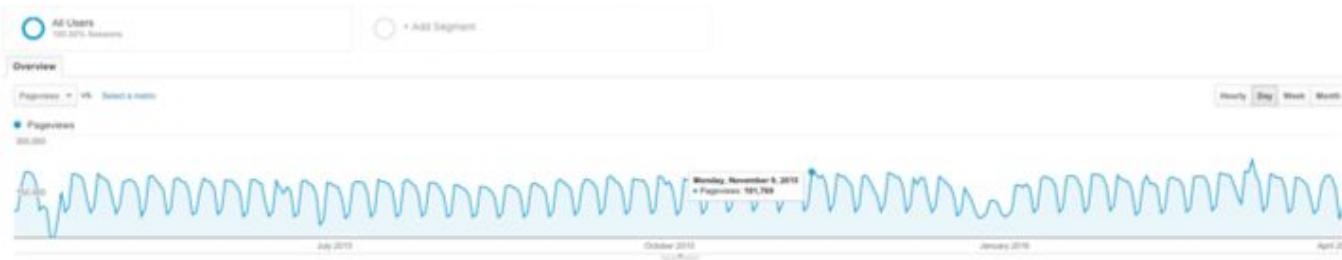
Usage and Access

Usage: Population

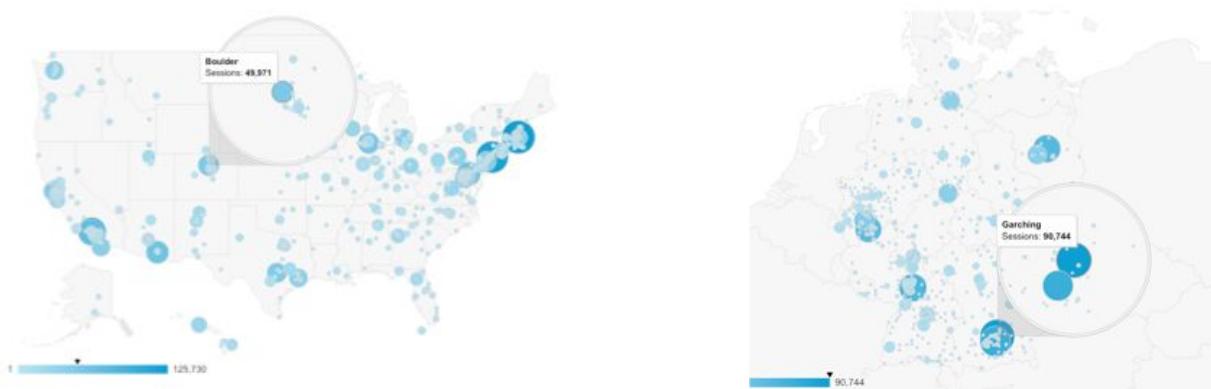
- 10M Total ADS users (cookies), of which...
- 3.9M Returning users (within a year), of which...
- 55K “Regulars” (multiple visits/month), of which...
- 40K Have created a login account, of which...
- 17K Have signed up for notifications (myADS)
- 3.5K Have active ADS libraries

Usage: Sessions (1/2)

ADS use is stable, with ~200K pageviews on heavy days



ADS use is concentrated in astronomy centers

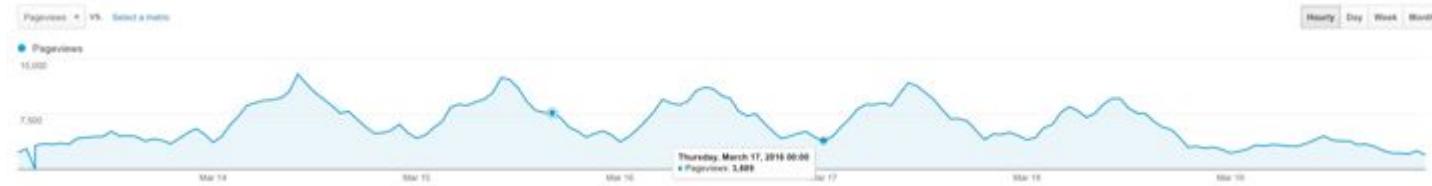


Usage: Sessions (2/2)

ADS routinely has 300-400 simultaneous users



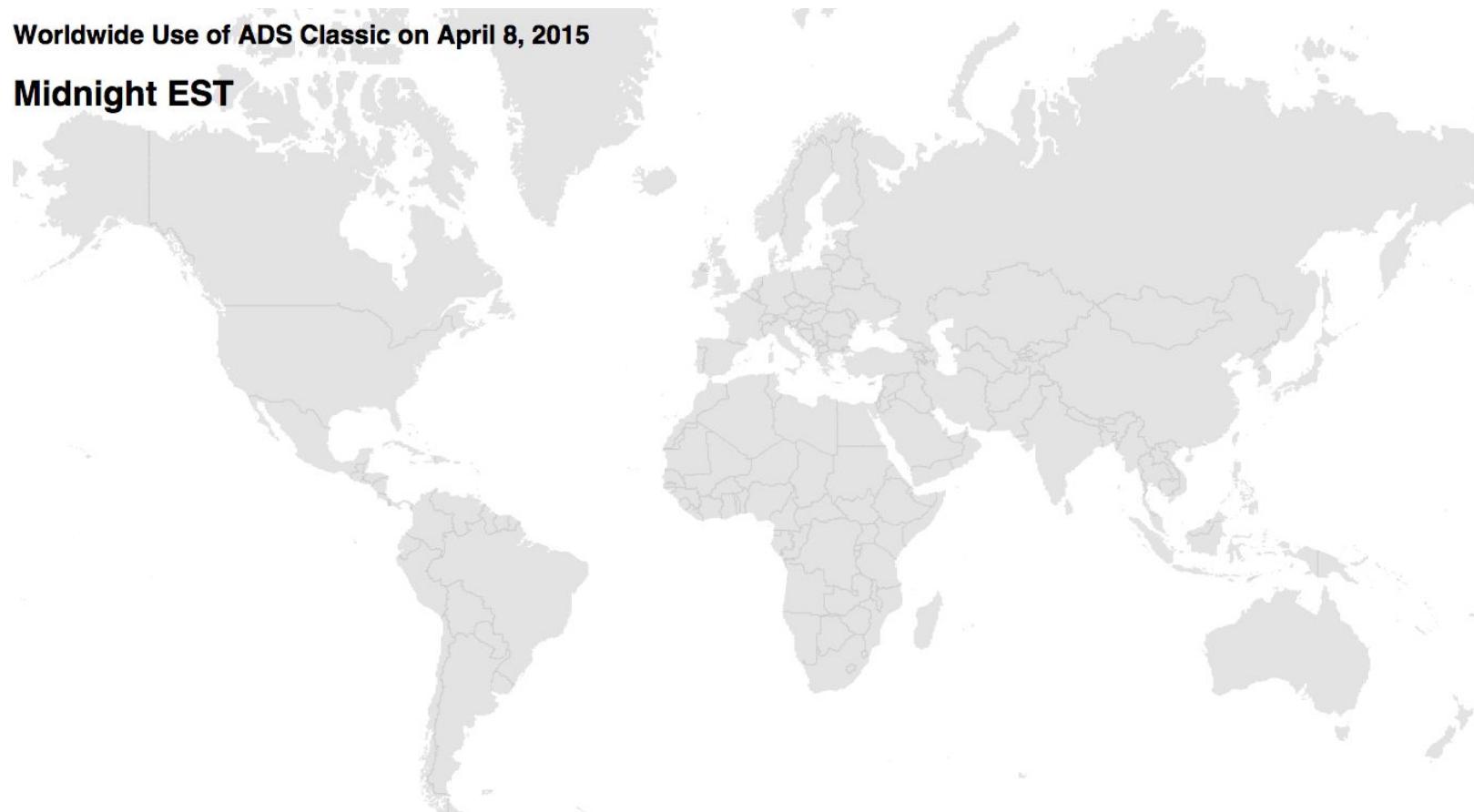
During the work week ADS never averages below one pageview per second



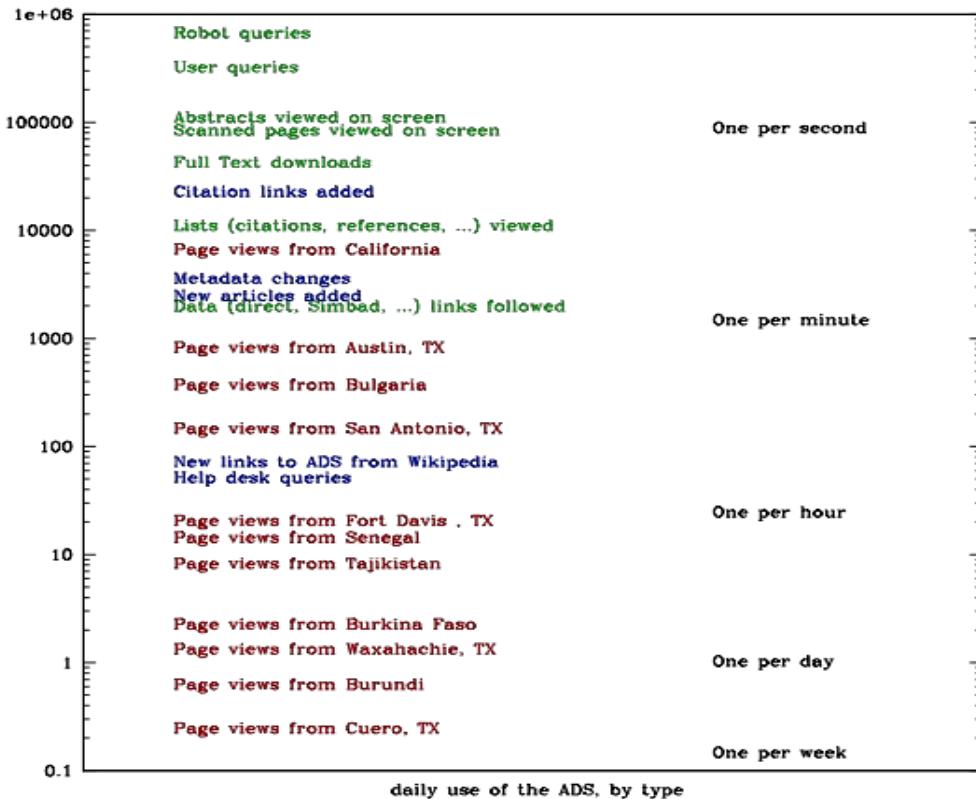
A Day in the life of ADS: User Sessions

Worldwide Use of ADS Classic on April 8, 2015

Midnight EST



A Day in the life of ADS: Events



Events:
Page views
Curation activities
Search

Development History and System Evolution

System Evolution

		<i>SR Recommendations</i>
1992	ADS Classic: Custom-built search, limited to metadata fields (title, authors, abstract)	<i>“New interface”</i> <i>“wheat from chaff”</i> (2008)
2011	ADS Labs Streamlined Search: a new “skin” over ADS Classic, introduces facets (filters) of top N results for query refinement and selection	<i>“10-year plan”</i> <i>“keep competitive edge”</i> (2011)
2013	ADS Labs 2.0: Invenio-based metadata store, new search engine, full-text search functionality, scalable facets over collections, API	<i>“complete transition”</i> <i>“improve services”</i>
2015	ADS Bumblebee: mongoDB data store, microservices API, client-side dynamic page loading, responsive design, cloud platform	<i>“release new interface”</i> (2015)

1994 - ADS Classic

SAO/NASA ADS Astronomy Query Form for Alberto Accomazzi

Sitemap What's New Feedback Basic Search Preferences FAQ HELP

Check out ADS Labs !

Databases to query: [Astronomy](#) [Physics](#) [arXiv e-prints](#)

Authors: (Last, First M, one per line) SIMBAD WEB ADS Objects
 Exact name matching Object name/position search
 Require author for selection Require object for selection
(OR AND simple logic) (Combine with: OR AND)

Publication Date between and
(MM) (YYYY) (MM) (YYYY)

Enter **Title Words** Require title for selection
(Combine with: OR AND simple logic boolean logic)

Enter **Abstract Words/Keywords** Require text for selection
(Combine with: OR AND simple logic boolean logic)

Return items starting with number

ADSLabs Full Text Search: Search within articles

myADS: Personalized notification service

[Private Library](#) and [Recently read articles](#) for Alberto Accomazzi

2011 - ADS Labs Streamlined Search

SAO/NASA ADS Astronomy Query Form for Alberto Accomazzi

Sitemap What's New

Send Query

Databases

Authors: (Last, First, Title, Object)
 Exact name
 Require all
(OR AND)

Publication

Enter Title
(Combine with other fields)

Enter Abstract
(Combine with other fields)

ADSLink

Private Library

Send Query

ads/labs
NASA

ADS Labs Streamlined Search

NASA

Home Labs Home ADS Classic Help aaccomazzi@cfa.harvard.edu - Sign off

Astronomy  SEARCH

Author First author Title Object Examples

Sort by Most recent  What people are reading 
 Most relevant 
 Most cited 
 Most popular 

Explore the field 
 What people are reading 
 What experts are citing 
 Reviews and introductory papers 

myADS Recommended Recently read

2013arXiv1309.3181S: Shefer, Y.: PDR Model Mapping of Obscured Line Emission and the Line-of-Sight Structure of M17-SW
2013arXiv1308.3064A: Abdullah Al-Wassai, F.: The Classification Accuracy of Multi-Metric Learning Algorithm on Multi-Sensor Fusion
2013arXiv1309.3106D: de los Reyes, R.: Influence of aerosols from biomass burning on the spectral analysis of Cherenkov telescopes
2013arXiv1309.3042A: Aerts, C.: Ensemble Asteroseismology of the Young Open Cluster NGC 2244
2013arXiv1309.2992P: Plavchan, P. P.: Precision near-infrared radial velocity instrumentation I: Absorption Gas Cells
2013arXiv1309.2991P: Plavchan, P. P.: Precision near-infrared radial velocity instrumentation II: Non-Circular Core Fiber Scrambler
2013arXiv1309.3256N: Nellore, A.: Recovery guarantees for exemplar-based clustering
2013arXiv1309.3233K: Király, F. J.: Efficient Orthogonal Tensor Decomposition, with an Application to Latent Variable Model Learning
2013arXiv1309.3223O: Oveis Gharan, S.: Partitioning into Expanders
2013arXiv1309.3103H: Häusler, C.: Temporal Autoencoding Improves Generative Models of Time Series

The ADS is operated by the Smithsonian Astrophysical Observatory under NASA Grant NNX12AG54G
Contact: ads at cfa.harvard.edu or through the feedback form.

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2013 - ADS Labs 2.0

SAO/NASA ADS Astronomy Query Form for Alberto Accomazzi

Sitemap What's New

Send Query

Databases

Authors: (Last, First, Middle)
 Exact name
 Require all words
(OR AND)

Publication

Enter Title
(Combine with other fields)

Enter Abstract
(Combine with other fields)

Return results

ADS Classic

Private Library

Send Query

The ADS is operated by the Smithsonian Astrophysics Data System
Contact: ads at cfa.harvard.edu or through the feed

ads labs
NASA

ADS Labs Streamlined

ADS 2 ADS Classic Mirrors

NASA

Home Labs Home ADS Classic

Home Search Feedback Help

Log in / Sign up

The SAO/NASA Astrophysics Data System

Search the ADS Dashboard

Author	First Author	Title	Year	Publication	Fulltext	Object
Query the ADS database						

+ options

Trending Useful Instructive

ADS Labs Integrated search

This interface allows you to search metadata and full-text of the 10 million bibliographic records in ADS. Some of its features are:

- Interactive filtering of results, integrating bibliographic and observational metadata
- A powerful query syntax, which includes fielded searches and "second order" operations on document sets
- Scalable visualizations of results and bibliometrics

We have some [help text available](#) to get you started, but you may want to just try the system out and see how it goes.

Caveats and Weasel words

Please remember that this is interface is work in progress, and the data available through it are not always up to date compared to ADS Classic (this is particularly true for citations at the moment). At this point we are looking for feedback regarding the system functionality and user experience, so feel free to comment on your likes and dislikes. Thanks!

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Smithsonian Astrophysical Observatory
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NASA

2015 - ADS Bumblebee

The screenshot shows two side-by-side interfaces for the SAO/NASA Astrophysics Data System (ADS).

Left Panel (ADS Labs Streamlined):

- Header:** SAO/NASA ADS Astronomy Query Form for Alberto Accomazzi, Sitemap, What's New.
- Search Bar:** Author: (Last, Exact name, Require all, OR, AND), Publication, Enter Title (Combine with previous), Enter Abstract (Combine with previous).
- Sort by:** Most recent, Most relevant, Most cited, Most popular.
- Explore the ADS:** Author, First Author, Title, Object.
- Results:** A list of search results with titles like "Interactive filtering of results, integrating bibliographies", "A powerful query syntax, which includes file", and "Scalable visualizations of results and bibliographies".
- Caveats and Weasel words:** A note about the interface being work in progress.
- Bottom:** © The SAO/NASA Astrophysics Data System, The ADS is operated by the Smithsonian Astrophysical Observatory under NASA Grant NNX12AG54G, Terms and Conditions.

Right Panel (ADS 2 interface):

- Header:** ADS 2, ADS Classic, Mirrors, Home, Search, Feedback, Help, Log in / Sign up.
- Search Bar:** Search the ADS, Dashboard.
- Navigation:** Author, First Author, Title, Year, Publication, Query the ADS database, Trending, Useful, Instructive.
- Forms:** Classic Form, Modern Form, Paper Form.
- Search Results:** A search for "author:accomazzi, a" showing results for "huchra, john", "huchra, john", "dark energy", "year:2000", "2000-2005", "gravitational waves", "ApJ", "property:refereed", "astronomy", "database:astronomy", "OR", and "planet OR star".
- Bottom:** Use a classic ADS-style form, Learn more about searching the ADS, Access ADS data with our API, NASA, CfA, CfA logo, adshelp[at]cfa.harvard.edu, ADS Blog, ADS Help, @adsabs, Is ADS down? (or is it just me...).

1994 - ADS Classic

aaccomazzi@cfa.harvard.edu | my Account | Sign off

SAO/NASA Astrophysics Data System (ADS)

Query Results from the ADS Database

Retrieved 200 abstracts, starting with number 1. Total number selected: 313. Total citations: 23327

Go to bottom of page

Sort options ▾

#	Bibcode Authors	Cites Title	Date	List of Links												
				A	Z	E	F	L	X	D	R	C	S	N	U	H
1	2001ApJ...553..47F Freedman, Wendy L.; Madore, Barry F.; Gibson, Brad K.; Ferrarese, Laura; Kelson, Daniel D.; Sakai, Shoko; Mould, Jeremy R.; Kennicutt, Robert C., Jr.; Ford, Holland C.; Graham, John A.; and 5 coauthors	2235.000	05/2001	A	Z	E	F	L	X	D	R	C	S	N	U	H
	Final Results from the Hubble Space Telescope Key Project to Measure the Hubble Constant															
2	1986ApJ...302L...1D de Lapparent, V.; Geller, M. J.; Huchra, J. P.	802.000	03/1986	A	Z	E	F	G		R	C	S		U	H	
	A slice of the universe															
3	1983ApJS...52...89H Huchra, J.; Davis, M.; Latham, D.; Tonry, J.	733.000	06/1983	A	Z	E	F	G		R	C	S	N	O	U	
	A survey of galaxy redshifts. IV - The data															
4	1982ApJ...257..423H Huchra, J. P.; Geller, M. J.	589.000	06/1982	A	Z	E	F	G		D	R	C	S	N	O	U
	Groups of galaxies. I - Nearby groups															
5	1994ApJ...427..628F Freedman, Wendy L.; Hughes, Shaun M.; Madore, Barry F.; Mould, Jeremy R.; Lee, Myung Gyoon; Stetson, Peter; Kennicutt, Robert C.; Turner, Anne;	495.000	06/1994	A	Z	E	F	G		D	R	C	S	N	O	U
	The Hubble Space Telescope Extragalactic Distance Scale Key Project. I: The discovery of Cepheids and a new distance to M81															

2011 - ADS Labs Streamlined Search

aaccomazzi@cfa.harvard.edu | my Account | Sign off

SAO/NASA Astrophysics Data System

Query Results from the ADS Database

Retrieved 200 abstracts, starting with number 1. To

#	Bibcode	Cites
1	2001ApJ...553...47F	2235.00
	Freedman, Wendy L.; Madore, Barry F.; Gibson, Brad K.; Ferrarese, Laura; Kelson, Daniel D.; Sakai, Shoko; Mould, Jeremy R.; Kennicutt, Robert C., Jr.; Ford, Holland C.; Graham, John A.; and 5 coauthors	Final Re
2	1986ApJ...302L...1D	802.000
	de Lapparent, V.; Geller, M. J.; Huchra, J. P.	A slice c
3	1983ApJS...52...89H	733.000
	Huchra, J.; Davis, M.; Latham, D.; Tonry, J.	A surve
4	1982ApJ...257..423H	589.000
	Huchra, J. P.; Geller, M. J.	Groups
5	1994ApJ...427..628F	495.000
	Freedman, Wendy L.; Hughes, Shaun M.; Madore, Barry F.; Mould, Jeremy R.; Lee, Myung Gyoon; Stetson, Peter; Kennicutt, Robert C.; Turner, Anne;	The Hul a new d

ADS Labs Streamlined Search

Home Labs Home ADS Classic Help aaccomazzi@cfa.harvard.edu - Sign off

author:"Huchra, John" redshift - **Most cited** Top 200 results More ▾

NO FILTERS APPLIED

FILTER BY:

Authors

- Huchra, J. (200)
- Geller, M. (66)
- Mould, J. (36)
- Illingworth, G. (28)
- Davis, M. (26)

Keywords

Data

SIMBAD Objects

Vizier Tables

Refereed status

Dates

from: 1977 to: 2012

1. [2001ApJ...553...47F](#) Cited by 2235 [E F X D RCSNU]
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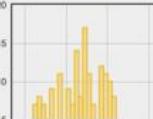
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6. [2000AJ....119.2498J](#) Cited by 489 [E F X RCSNU]
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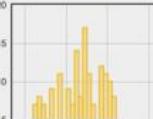
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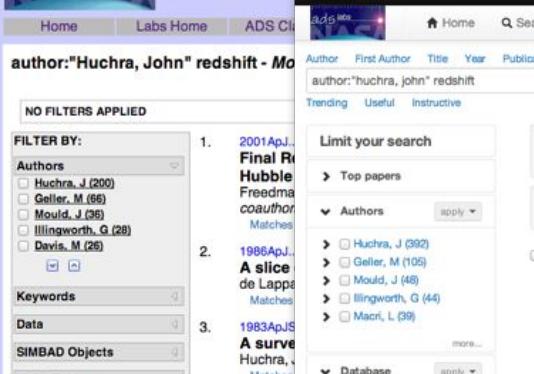
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Affiliation:	AA/The Observatoires, Carnegie Institution of Washington, Pasadena, CA 91101, AB/The Observatoires, Carnegie Institution of Washington, Pasadena, CA 91101, NASA/IPAC Extragalactic Database, California Institute of Technology, Pasadena, CA 91125, AC/Centre for Astrophysics and Supercomputing, Swinburne University of Technology, Hawthorn, Victoria 3122, Australia, AD/Rutgers University, New Brunswick, NJ 08854, AE/Department of Terrestrial Magnetism, Carnegie Institution of Washington, 5241 Broad Branch Road NW, Washington, DC 20015, AF/National Optical Astronomy Observatories, PO Box 26732, Tucson, AZ 85726, AG/Research School of Astronomy and Astrophysics, Australian National University, Weston Creek Post Office, Weston, ACT, Australia 2611, AH/Steward Observatory, University of Arizona, Tucson, AZ 85721, AI/Department of Physics and Astronomy, Bloomberg 501, Johns Hopkins University, 3400 North Charles Street, Baltimore, MD 21218, AJ/Department of Terrestrial Magnetism, Carnegie Institution of Washington, 5241 Broad Branch Road NW, Washington, DC 20015, AK/Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, AL/Institute of Astronomy, Madingley Road, Cambridge CB3 0HA, UK, AM/Lick Observatory, University of California, Santa Cruz, CA 95064, AN/Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, AO/Dominion Astrophysical Observatory, Herzberg Institute of Astrophysics, National Research Council, 5071 West Saanich Road, Victoria, BC V8Z 4M6, Canada, Guest User, Canadian Astronomy Data Centre, which is operated by the Herzberg Institute of Astrophysics, National Research Council of Canada.)
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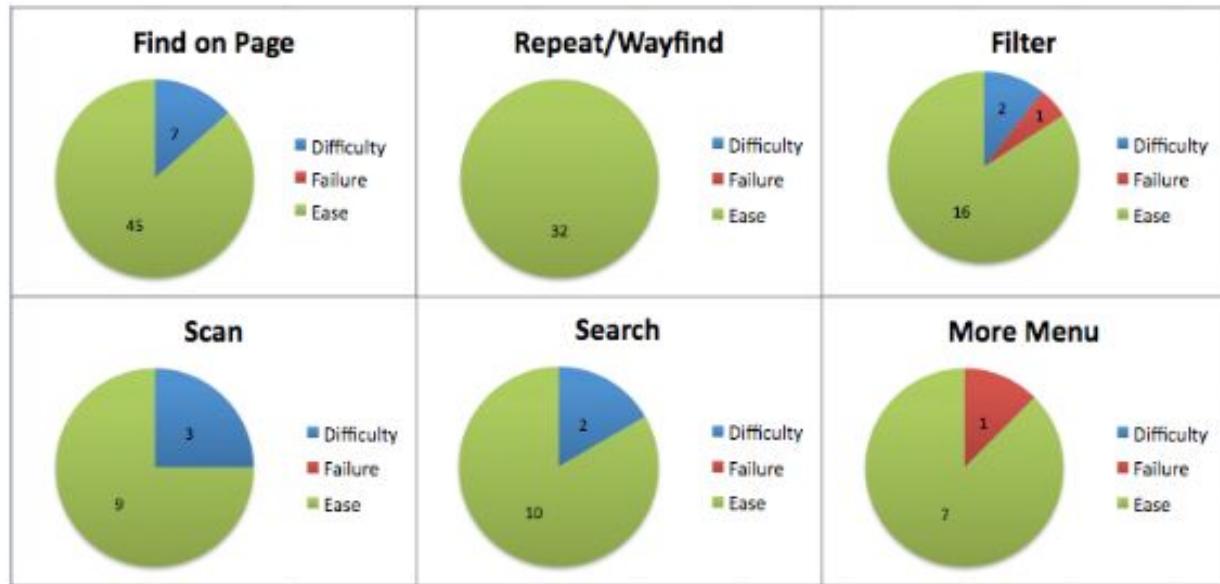
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Unfielded search (AND)	<i>Accomazzi ADS bibliography</i>
Positional searches	<i>pos(aff:SAO, 2)</i>
Citation search	<i>citations(author:“Kurtz, M”)</i>
Remove self-citations	<i>citations(author: “Kurtz, M”) -author:“Kurtz, M”</i>

For more information, please see: <http://adsabs.github.io/help/search/search-syntax/>

Usability Studies (2011/12)

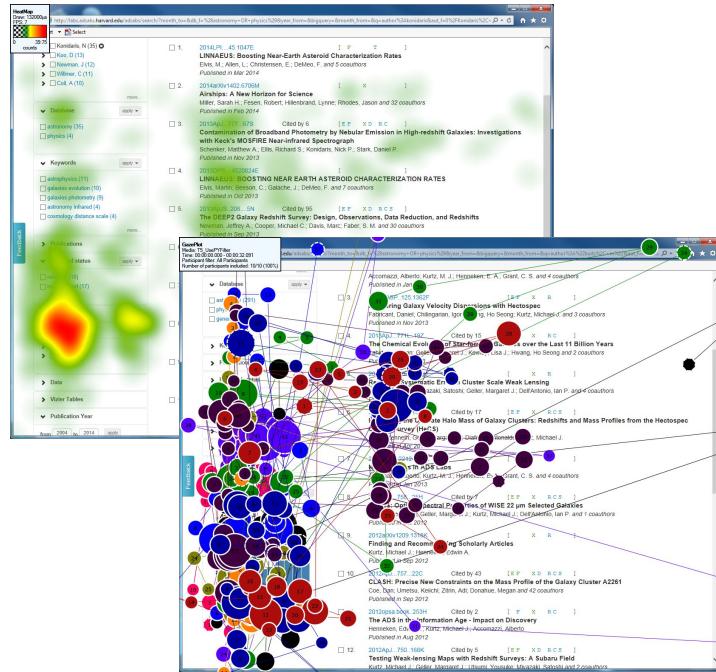
LIS531Y Usability and User Experience Research
Fall 2012
Instructor: Rong Tang

The Most Usable Practicable Dissemination:
A Usability Study of the NASA ADS Labs User Interface
by
Jennifer Prentice and Jeremy Guillette
November 27, 2012



Usability studies by Library & Information Science Simmons students on Streamlined Search in 2011, 2012

User Experience Study (2014)



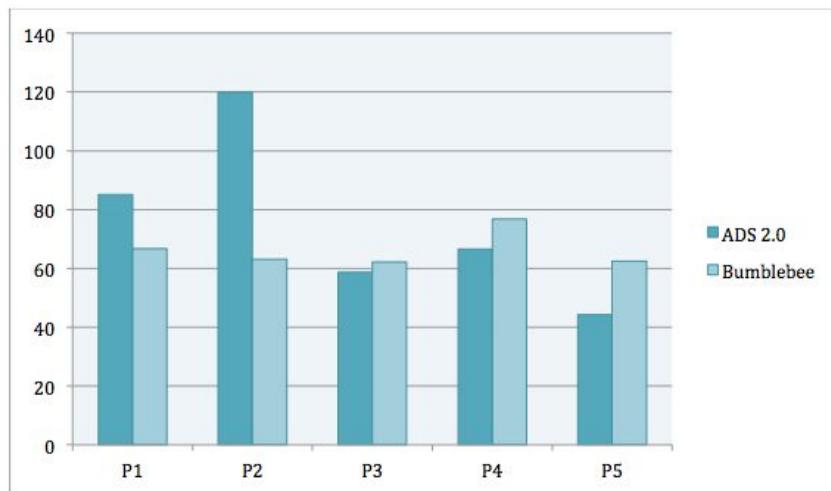
User Feedback -- ADS 2.0 vs. Classic



ADS 2.0 User Experience and Eye Tracking Study (2014). Prof. Rong Tang, Simmons College

A/B Testing (ADS 2.0 vs. Bumblebee)

Average time on task (seconds; lower is better)



Interface Preference (post-session survey)

Question	ADS 2.0	Bumblebee
Which interface do you find easier to use?	0	5
Which of these retrieval mechanisms better facilitates your overall searching?	0	5
Which interface had the most useful search results layout?	1	4

Survey	Question	P1	P2	P3	P4	P5
Pre-session	ADS 2.0 Ease of use	6	n/a	n/a	5	5
Post-session	ADS 2.0 Ease of use	5	4	5	5	5
Post-session	Bumblebee Ease of use	6	5	6	5	6

Usability testing of Bumblebee vs. ADS Labs 2.0 (2014)

Highlights of New System Functionality

<https://ui.adsabs.harvard.edu>

Priorities and Implementation Plan

First Priority: Maintain Current Services

- **Community dependence on ADS require 24/7 operations**
 - Critical for research, paper, proposal writing
 - Only way to keep up with current literature given rate of publication
 - ADS used by people and applications around the clock
- **Current system vulnerable and not sustainable**
 - ADS Classic is not maintainable technology -- 20yr old code lacks scalability and is hard to maintain
 - Project requires stability -- redundancy of skills best insurance against resignations, illnesses
- **Rate and variety of data indexed expected to increase**
 - Publications, citation rates indicate sustained growth in content
 - Non-traditional content now being cited will require ADS indexing

Second Priority: Complete Transition

- Reproduce ADS Classic front-end functionality
 - Integration of NED object search
 - Support all export options, bibliographic report for grant submission
 - Implement personalizations -- fully featured user libraries, notifications
 - Increase reliability and service capacity
- Implement back-end functionality to support new system
 - Metadata, full-text processing workflow
 - Reference resolution framework
 - Integration of links and observational metadata
 - Processing and serving of full-text scans
- Adapt to changing industry standards, new requirements
 - Use of DOIs instead of journal, volume, page causes nomenclature issues
 - More complex metadata needed to support ORCID, FundRef, etc.

Third Priority: Improve Services

- **Support Data, Software, non-traditional Scholarly Content**
 - Identification of software and data products required for reproducibility
 - Formal citation and indexing essential for providing credit
 - Blogs, posters, presentations are now being cited in scholarly literature
 - Community must vet content, ADS will provide discovery (“if it’s not in ADS it doesn’t exist”)
- **Expanded use of ADS libraries**
 - Librarian use for creating bibliographies, tracking data products
 - Library sharing will support collaborative curation, publishing of collections
- **Improving search via disambiguation and classification**
 - Author disambiguation, claiming via ORCID (supported by AAS, others)
 - Institution disambiguation via Ringgold standard
 - Concept extraction using Unified Astronomy Thesaurus (AAS/ADS)

Programmatic Highlights for FY17-18 (1/2)

- Data Curation and Indexing
 - a. Update metadata model to allow for non-bibliographic content indexing (software, data)
 - b. Complete affiliation normalization and mapping
 - c. Expand metadata aggregation to include additional OA repositories, article versions
 - d. Implement flexible metadata enrichment pipeline
 - e. Import ORCID mappings from arXiv and other collaborators
- Service Hosting and Deployment
 - a. Create robust mirroring and failover strategy for services in AWS
 - b. Optimize response for user queries vs. API requests
 - c. Scale up service capacity and responsiveness by two orders of magnitude
- System Architecture
 - a. Make metrics and visualization services scalable on large collections
 - b. Enable third-party authentication via industry standards
 - c. Provide interoperability with emerging online authoring environments

Programmatic Highlights for FY17-18 (2/2)

- Search functionality
 - a. Implement NED searches, facets
 - b. Improve relevancy, add sort options (by author name, # of authors, norm. citations, etc.)
 - c. Implement highly used export formats natively, (custom format, bibtex, XML)
 - d. Implement reporting tools (e.g. author/affiliation page for proposal writing)
 - e. Implement linkout service for fulltext, other internal/external resources
- Personalizations
 - a. Keep track of recent searches, recently read articles, saved searches
 - b. Upgrade the myADS notification system to use new search engine and user accounts
 - c. Integrate ORCID claiming into user profiles, notifications
- Transition ADS classic Search Engine infrastructure
 - a. Update curation and management of ancillary knowledge bases (synonyms, schema)
 - b. Make website search-engine and third party application friendly
 - c. Optimize UI for mobile apps, crawlers, web applications and widget embedding
 - d. Retire ADS Classic user interface and search engine

Notional Program for FY19-22

1. Operations and Development

- a. Continue system maintenance focusing on reliability, currency, completeness
- b. Re-engineer data ingest pipeline and decouple it from ADS Classic legacy code
- c. Implement best practices in curation, including record-level and field-level provenance
- d. Support metadata enrichment at database scale through supervised text mining
- e. Re-implement reference parsing and resolution based on new API
- f. Update the ADS citation management system using modern relational databases technology

2. New Efforts and Initiatives

- a. Provide real-time harvesting, aggregation, and indexing of resources
- b. Use machine-learning techniques to improve document classification, recommendations
- c. Support collaborative research environments and next-generation e-publishing systems
- d. Leverage annotations in support of distributed curation and indexing
- e. Implement context-sensitive auto-complete suggestions
- f. Support researcher, institution, funder focused pages based on ORCID, Fundref standards

Resources

- ADS “Bumblebee” Interface: <https://ui.adsabs.harvard.edu>
- “Recent Developments and Initiatives in Scholarly Publishing” (May 2016) :
<http://wiki.ivoa.net/internal/IVOA/InterOpMay2016-DCP/IVOA2016PublishingUpdate.pdf>
- “Automatic Construction of Evaluation Sets and Evaluation of Document Similarity Models in Large Scholarly Retrieval Systems” (Jan 2016): <https://ui.adsabs.harvard.edu/#abs/2016arXiv160101611K/abstract>
- “ADS Services in support of the Discovery, Management and Evaluation of Science Data” (Dec. 2015):
<https://ui.adsabs.harvard.edu/#abs/2015scop.confE...3A/abstract>
- “Measuring Metrics - A forty year longitudinal cross-validation of citations, downloads, and peer review in Astrophysics” (Oct. 2015): <https://ui.adsabs.harvard.edu/#abs/2015arXiv151009099K/abstract>
- “Introduction to DOIs and some thoughts on data citation” (Oct. 2015):
<http://wiki.ivoa.net/internal/IVOA/InteropOct2015DCP/Accomazzi-DOI-Overview.pdf>
- “The White House Open Access Mandate: Implications for Astronomy” (May 2013):
http://wiki.ivoa.net/internal/IVOA/InterOpMay2013DCP/OA_DCP.pdf
- “Annotations, Paper Claiming and ORCID” (May 2013):
<http://wiki.ivoa.net/internal/IVOA/InterOpMay2013NewTech/NewTechAccomazzi.pdf>
- “The Unified Astronomy Thesaurus” (Oct 2012):
<http://wiki.ivoa.net/internal/IVOA/InterOpOct2012DCP/UAT-Update.pdf>
- “Data Citation in Astronomy” (Oct 2011): <http://wiki.ivoa.net/internal/IVOA/InterOpOct2011DCP/DataCitations.pdf>
- NASA Open Access Plan in response to OSTP Memo (Dec 2014):
http://science.nasa.gov/media/medialibrary/2014/12/05/NASA_Plan_for_increasing_access_to_results_of_federally_funded_research.pdf

Q&A

Backup Material

Panel Questions

- **What strategies do the Archives use for providing citations to the data they provide?**
ADS has a well-established system in place to track citation to all of its records, including papers, observing proposals, catalogs, software.
- **What user/community outreach activities do the archives do to advertise their data products?**
ADS attempts to have a presence at the major conferences in Astronomy (AAS, DPS, etc), and Library Science (LISA, SLA). Our overguide proposal includes an increase in instructional material and on-line presence to promote and support the new system and its features.
- **What is the data backup and hardware/software refresh policies do the archives perform?**
On average, upgrade of storage on a 3-year cycle and major computing components on 2-year cycle. With move to the cloud comes much greater flexibility in provisioning hardware. Goal for software is continuous integration (currently applies to new system components).
- **Show examples of cross-archive linkages**
ADS has data links to: Chandra (10,840), Spitzer (2,133), HEASARC (14,079), NED (65,483), MAST (20,775), NExSci (1,393), plus more; cross-archives links can be discovered via ADS.
- **What ongoing activities are the Archives doing to conform to community standards?**
PM was chair of IVOA Data Curation & Preservation IG, promoting use of DOIs, indexing of data & software products; ADS early partner of arXiv, ORCID, FundRef, OA initiatives



adsabs / adsabs-dev-api

Watch 20

Developer API service description and example client code

36 commits

2 branches

0 releases

2 contributors



branch: master ▾

adsabs-dev-api / +



Added link to Andy Casey's ads-python library



Ibjay authored on Feb 10, 2014

latest commit bfb00d3fb0



examples Fixed a few problems with the facet_authors.py example that prevented

2 years ago



.gitignore Initial commit

2 years ago



README.md Added link to Andy Casey's ads-python library

a year ago



adsabs-dev-api

Developer API service description and example client code.

For answers to some frequently asked questions check out the [wiki](#).

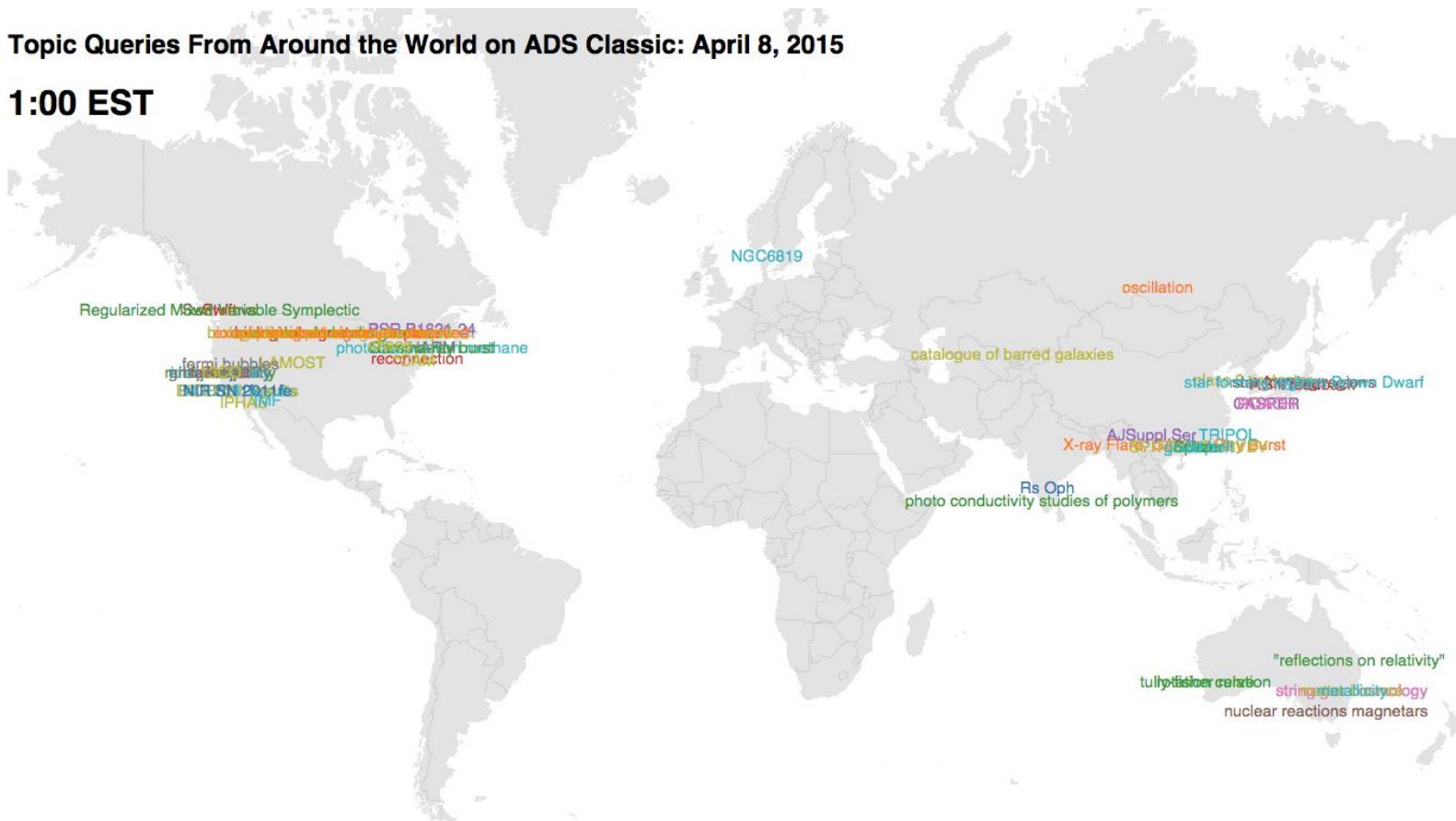
For bugs, feature requests or even random questions feel free to use the [issues](#) section.

Table of Contents

A Day in the life of ADS: Sample Queries

Topic Queries From Around the World on ADS Classic: April 8, 2015

1:00 EST



Open Access: ADS, the OSTP Mandate, and NASA Policy

- ADS already performs most of the goals outlined in the 2013 Office of Science & Technology Policy for NASA Astrophysics
- Our community is compliant because of delayed open access, existence of arXiv and ADS as repository linking to Open Access and non-OA full-text
- *Decision by NASA to have full-text deposited in PubMed Central does not affect the need for disciplinary repositories such as ADS, INSPIRE, PubMed (all providing services for specialized search and discovery)*

ADS and Scholarly Publishing

- **New industry-wide initiatives and standards**
 - ORCID (standard author ID): adopted by all major journals, ORCID search and claiming now integrated in ADS
 - FundRef (standard funding reporting): adopted all major agencies in US and abroad, will be used for impact analysis in ADS
 - DataCite: DOIs assigned to data products, software, gray literature
- **Google Scholar**
 - Comprehensive index across a wide range of disciplines, but no or negligible curation effort
 - Uses ADS as an indexing source, among others
 - Unknown indexing policies, low accuracy of metrics
 - Business model, long-term future unknown

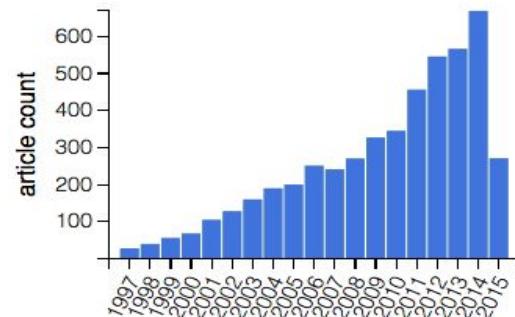
Support for Discovery and Curation

Many data products, software, instruments, are not formally cited in literature. Discovery and evaluation can be done by selecting papers citing the core articles, as well as ones mentioning the product(s). Examples:

- DAOPHOT: 6929 papers (3921 citations / 3008 mentions not in citations)
[citations\(title:DAOPHOT and author:stetson\) OR full:DAOPHOT](#)
- RVSAO: 662 papers (402/260)
- Advanced Camera for Surveys: 9620 papers (925/8695)
- HIRES: 3145 papers (888/2257)

Acknowledgement searches are also possible now that we have full-text (with limitations):

- Acknowledgments to ADS: [ack:ADS](#)



Guideline and Augmented FTE requests	FY16		FY17		FY18		FY19		FY20	
	Guide	Aug								
1. Bibliography Support	2.73	0.80	2.73	0.80	2.73	0.80	2.57	0.96	2.41	1.12
a. Bibliographic ingest	1.73	0.40	1.73	0.40	1.73	0.40	1.57	0.56	1.41	0.72
b. Indexing /archiving/databases	1.00	0.40	1.00	0.40	1.00	0.40	1.00	0.40	1.00	0.40
2. Development	3.25	1.00	3.00	1.25	2.50	1.75	2.50	1.75	2.50	1.75
a. search functionality	0.80	-	0.80	-	0.80	-	0.80	-	0.80	-
b. user tools	0.68	-	0.55	0.13	0.30	0.38	0.30	0.38	0.30	0.38
c. software maintenance	1.78	1.00	1.65	1.13	1.40	1.38	1.40	1.38	1.40	1.38
3. User Support	0.73	0.20	0.73	0.20	0.73	0.20	0.69	0.24	0.65	0.28
4. Hardware and Licenses	-	-	-	-	-	-	-	-	-	-
5. Management	1.98	-								
Total	8.68	2.00	8.43	2.25	7.93	2.75	7.73	2.95	7.53	3.15
Grand Total	10.68									