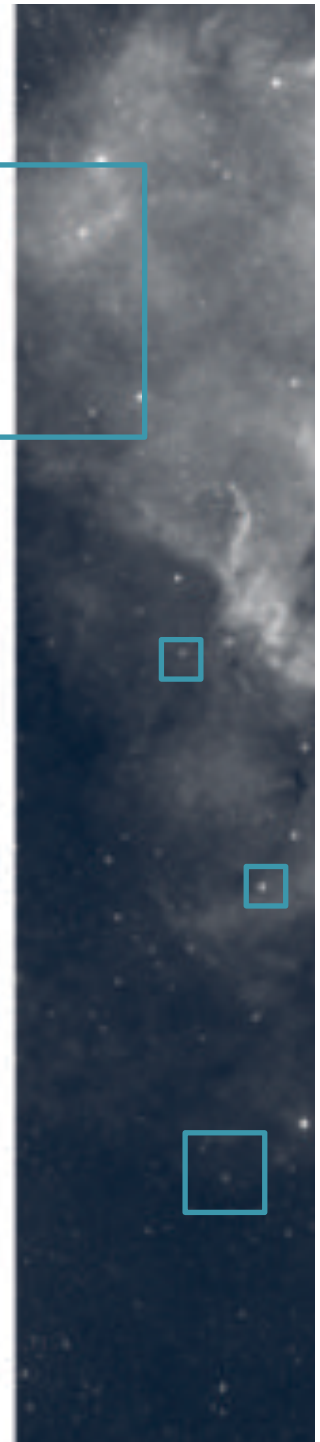
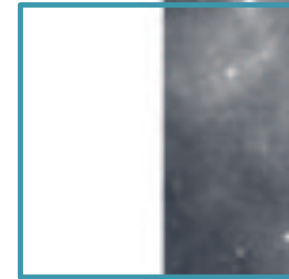


CDS strategy and future plans



CDS Scientific Council, 7-8 November 2016



Future Outlook

- Strengthened CORE services and role of CDS



- Innovative tools and services to support scientific research
- Scientific engagement – visibility, projects
- National / European / International impact
- Science, R&D and planning to ensure quality, relevance and sustainability

Developing the plan

- High level strategy developed for recent evaluations – vision of a CDS reference data centre
 - Provided in the documents
- Planning for operations of core CDS mission
 - Continuation of current model
 - Lots of attention to maintain quality and relevance

Developing the plan

- **Planning at the level of CDS services**
 - Immediate/medium term plans included as part of yesterday's presentations
 - Follows good track record of choices
- **Planning for infrastructure**
 - Coordinated with IT support at OAS
 - Initial phases of planning for 5-10 year timescale

Developing the plan

- **Plan of specific actions is in development**
 - Architecture evolutions of CDS services
 - Big Data infrastructure
 - Relation to future data producing projects
- **Planning involves**
 - CDS expertise... the record is very good!
 - External expertise, because we become more and more engaged with other infrastructures

CDS – High level strategy

An astronomy reference data centre

- Serving the scientific **reference service** needs of the international astronomy community

Mission:

- Collect useful data on objects in electronic form
- Improve them by critical evaluation and combination
- Distribute the results to the international community
- Conduct research using the data

Reference data centre

- Qualified information = Scientific Value
 - Peer reviewed and quality sources
 - Critically evaluated, professionally curated
- Science-driven to maintain relevance and quality
- Reliant on maintaining trust and support of community: *Journals, Authors, Archives, Data Centres, Observatories, Space Agencies*





- Continuing, reliable and stable reference services
 - **Core operational activities** (heavily used services)
 - Science driven developments (all-sky, multi-wave, statistical methods)
 - Flexibility to make innovations
- Certification: DSA (2017-18)
- Part of the global ‘open data’ movement

International Community Role

- Arrangements with astronomy journals need to be maintained
 - A&A, AAS (ApJ, AJ), MNRAS, ...
- Partnership with ADS – *global balance for reference services*
- French & International support CNES, ESO, ESA, NASA-SAO/ADS for community services
- Leadership and participation in IVOA
- Global Data Infrastructures - RDA

Continuation of French/European/ International Roles

- Infrastructure de Recherche (IR)
- ASOV – (new role of technology exchange between SO5 services)
- Leading IVOA, Leading Euro-VO, (contribute to IAU)  
- CDS role within global astronomy reference data centres
- Contribute to Open Data movement and initiatives

□ Some expected highlights

- Scientific use of Gaia mission data in CDS services
(interoperable with all other data in CDS services and unique value-added capabilities for cross-identification)
- New era of data publication: CDS associated data service *(discoverable, useable, citable, quality-assured)*
 - *Time domain metadata, Multi-messenger metadata*
- All-sky astrophysics *(Hierarchical approach to Big Data using CDS HiPS systems, Aladin and Aladin Lite)*
- ASTERICS: interoperability of ESFRI and other project (e.g LSST) data (-2019)
- Major project/mission/survey data at CDS



CDS in European and International Project Proposals

- **New projects:**
 - AENEAS (SKA Data Centre Design Study)
- **Future proposals to prepare:**
 - Virtual Observatory operations
 - Following planning done in ASTRONET
 - ASTERICS follow-on Infrastructure Cluster
 - Other calls (Science and data infrastructures)
 - CDS Scientists' projects

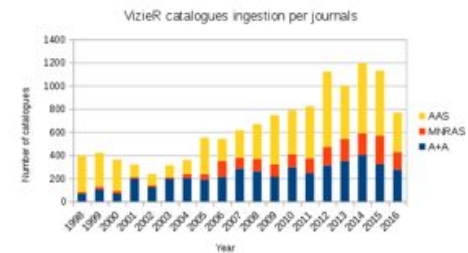


CDS Strategy

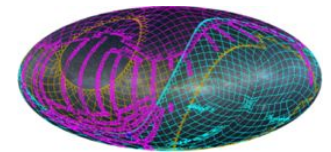
Current Strategic Drivers:	Highlighted Activity Areas:
<ul style="list-style-type: none"> • Maintain the services at the highest possible level in terms of content and functionalities 	<ul style="list-style-type: none"> → Core Operational Activities → Science Support Activities → Documentation Activities
<ul style="list-style-type: none"> • Add functions to the core services in line with CDS expertise, user needs and R&D results 	<ul style="list-style-type: none"> → Service Improvement Activities
<ul style="list-style-type: none"> • Take into account the change in scale of CDS activities due to the increase of publication volume and large surveys 	<ul style="list-style-type: none"> → Data Curation Improvement Activities → Team management Activities
Current Strategic Axes:	
<ul style="list-style-type: none"> • Evolution of Astronomy 	<ul style="list-style-type: none"> → Community Engagement Activities
<ul style="list-style-type: none"> • Technological Evolution 	<ul style="list-style-type: none"> → Infrastructure Maintenance and Planning Activities → New Service Development and Innovation Activities
<ul style="list-style-type: none"> • VO Aspects 	<ul style="list-style-type: none"> → VO Development Activities
<ul style="list-style-type: none"> • CDS role in scientific data curation 	<ul style="list-style-type: none"> → Collaboration with Partners

Challenges

- **Management of increasing journal volume**
 - Challenge is to maintain the quality
 - Roughly linear response required



- **Scalability of services to Big Data**
 - Exponential increase – smart and structural response needed
 - Hierarchical approach is defined (HiPS/MOC) and demonstrated to work
 - But we need to define the infrastructure to run it on



- **Define the role of CDS with respect to big projects**
- **Maintain innovation to stay at the forefront**
 - science reference services, data curation, tools and standards

SIMBAD 2018-2022



- Continuation as reference service for astronomical objects with science driven improvements:
 - Gaia global improvement to coordinate accuracy
 - Major operation to include Gaia in SIMBAD
 - Spectroscopic surveys – e.g. WEAVE
- Continue multi-interface approach
 - Web interface, TAP (ADQL), APIs
- Text mining technologies to improve process
- **Support *biblio/technical/science* team**

Vizier 2018-2022




- Continue as reference service for catalogues and associated data
- Heavily interlinked and citable (DOI etc.)
- Associated Data service operations
 - Data associated with journal publication
 - Specific projects on model of CoRoT, LAMOST
 - Dedicated interface + VO: images, cubes, spectra
 - Access service operational now – with custom data ingestion
 - Author pipeline for submitting data to become operational 2017
- Technical evolution: modular, incremental
 - Challenge: next version of Vizier

Aladin 2018-2022



- High level image and information integration
 - Aladin tools + HiPS reference database
 - multi- λ , multi-messenger, time axis
- Aladin Desktop, Aladin Lite
- Expect customisation & embedding to accelerate – *ESA, NOAO DataLab, JAXA, +*
- HiPS applications: server side computations
- Communication to promote scientific capabilities



2018-2022

- **XMatch**
 - Operational multi-catalogue probabilistic Xmatch
 - Explore integration with CDS TAP-ADQL services
 - Server side visualisation / filtering
 - Maintain leading position
- **Portal** – CDS service integration
 - Showcase, and leading the way for next generation CDS service web interfaces
 - New architecture emerging from this effort
- **Dictionary of Nomenclature**
 - *Contribute to / take responsibility* at IAU level

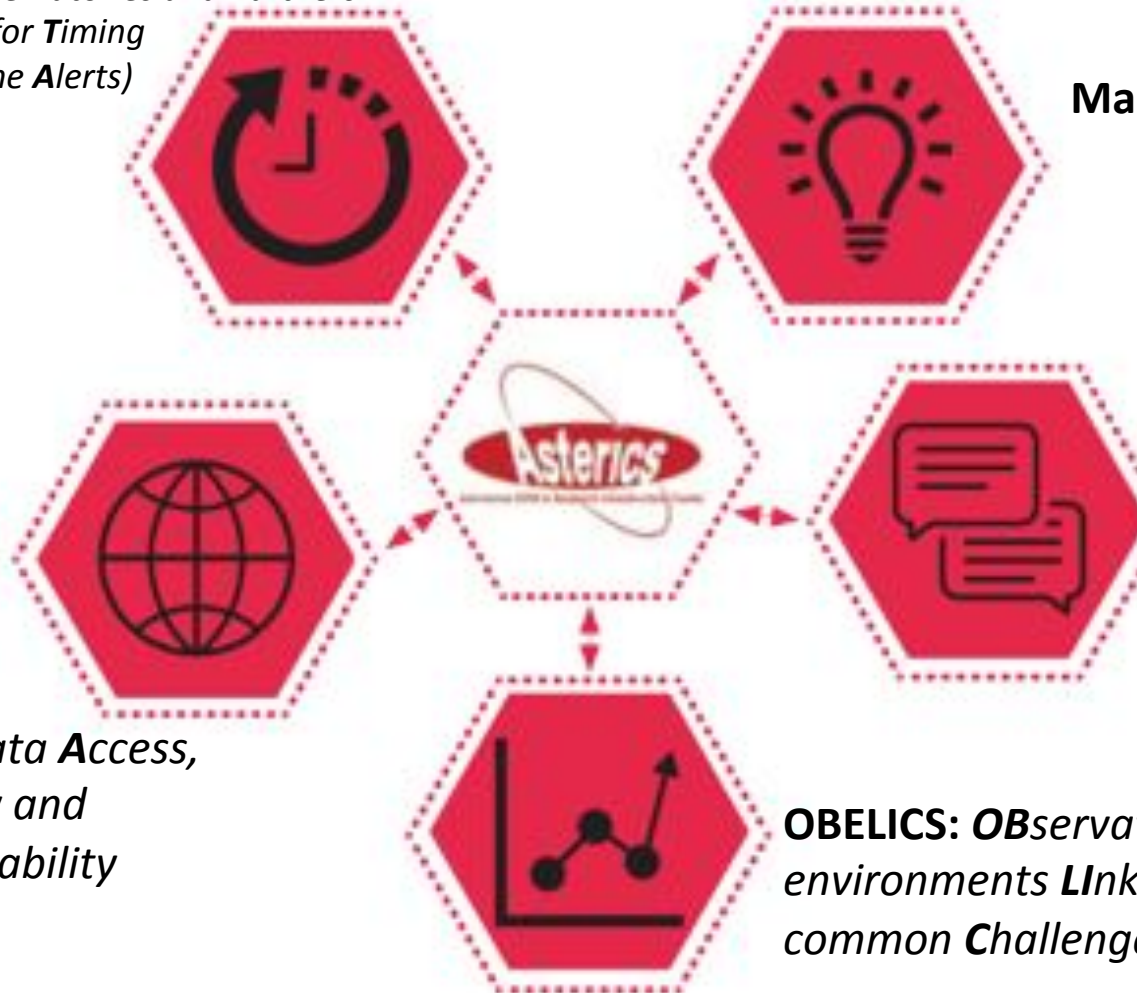
R&D 2018-2022

- R&D to support core CDS services
- Local & Cloud – bring ‘computing to the data’
- Data / Text mining
- Visualisation – interfaces/interactions
immersive 3-D
- Big Data – continuous R&D for CDS needs
 - Build on HiPS success
 - Follow-on from experiments Hadoop & Spark wrt X-Match

CDS and VO

- Participation in defining the astronomy interoperability framework
- Implementation in CDS services
- Leadership of Working Groups
- MA – Deputy Chair of IVOA (since Oct 2016)
- Engagement with projects
 - ASTERICS

CLEOPATRA: *Connecting Locations of ESFRI Observatories and Partners in Astronomy for Timing and Real time Alerts)*



Management

DECS: *Dissemination, Engagement and Citizen Science*

DADI : *Data Access, Discovery and Interoperability*

OBELICS: *OBservatory E-nvironments LInked by common Challenges*

CDS and big projects

- LSST – connections with IN2P3
 - French LSST Data Access Centre
 - Visit of Dominique Boutigny (Jan/Feb 2017)
 - Define possible interfaces CDS-DAC
- SKA
 - Expression of interest sent to National planning, as requested October 2016

CDS and HPC

- X-Match use case as presented in R&D
- INSU has guided HPC expertise to the CDS Council – Denis Veynante
 - Meeting planned at CDS Dec 16, 2016

Staff

- Maintain special profile of interlinked Scientific, Technical & Documentalist work
 - Inseparable for meeting real scientific needs
- **Aim for core data ingestion work on permanent staff**
 - Danger of retrograde periods (long training time for documentalists ~1 year)

Infrastructure

- Sustainability of servers and computing
 - Constantly evaluated, but 2018-2022 will need consideration of major long term planning
- The environment is changing
 - Unistra data centre will become operational 2018/19
 - Major data centres being organised in France
 - Demand for computing next to the data
 - Big Data (e.g. LSST 2023-25)



Observatoire astronomique
de Strasbourg

*"Astronomy Librarianship
in the era of Big Data and
Open Science"*

Strasbourg
June 6-9, 2017

LISA VIII

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Library and Information Services in Astronomy

"Astronomy Librarianship in the era of Big Data and Open Science"

Strasbourg, European Doctoral College, France, June 6-9, 2017

Library and Information Services in Astronomy (LISA) is a series of scientific meetings for librarians and scientists that aims to provide a platform to discuss the state of the art of information maintenance, retrieval, delivery, and preservation and to learn from invited experts the directions in which our profession is moving.

LISA conferences cover such diverse topics as organization and management of books, journals, and specialized materials; electronic publishing (note that astronomy is a leader in the field); bibliographic and full text databases of astronomical literature; reports on collaborative projects.





- IVOA Meeting at CDS ? 2018?
- ADASS Meeting in Strasbourg 2020?
- HiPS workshop idea...



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