ESO telbib: Linking In and Reaching Out

Uta Grothkopf, and Silvia Meakins

European Southern Observatory, Karl-Schwarzschild-Str. 2, 85748 Garching near Munich, Germany, library@eso.org

Abstract.   Measuring an observatory's research output is an integral part of its science operations. Like many other observatories, ESO tracks scholarly papers that use observational data from ESO facilities and uses state-of-the-art tools to create, maintain, and further develop the Telescope Bibliography database (telbib). While telbib started out as a stand-alone tool mostly used to compile lists of papers, it has by now developed into a multi-faceted, interlinked system. The core of the telbib database is links between scientific papers and observational data generated by the La Silla Paranal Observatory residing in the ESO archive. This functionality has also been deployed for ALMA data. In addition, telbib reaches out to several other systems, including ESO press releases, the NASA ADS Abstract Service, databases at the CDS Strasbourg, and impact scores at Altmetric.com. We illustrate these features to show how the interconnected telbib system enhances the content of the database as well as the user experience.

1.   Introduction

The ESO Telescope Bibliography (telbib[1]) is a database of refereed papers published by the ESO user community. All papers use data — partly or exclusively — from ESO facilities that have been acquired by the authors during their own observations or obtained from the ESO archive. Various statistics and reports derived from telbib are available; they include only papers based on data from telescopes and instruments for which observing time was evaluated by the ESO OPC (Observing Programmes Committee) and exclude papers based on visitor instruments.

The telbib database is compiled by scanning the major astronomical journals for scientific papers that contain any of the ESO-defined keywords (e.g., telescope and instrument names). All papers included in the database have been manually inspected to ensure that they directly use ESO observational data. The main purpose of the telbib database is to link resources from the published literature to the archived data that were used in the papers, and from the observing proposals to all papers published based on the data. The telbib database is also used to measure ESO's scientific output, for instance the productivity (number of papers) and impact (number of citations). In addition, telbib can provide the ESO management as well as project scientists with information to evaluate the performance of individual telescopes and instruments, and to put ESO in context with other observatories. Ultimately, statistics derived from the telbib database may help to define guidelines for future observing facilities.

---

[1]`http://telbib.eso.org`

In this paper, we will explain how the telbib database has been expanded to become a multi-faceted, interlinked system with diverse content that provides an enhanced user experience with easy access to outside resources.

2.   Overview of the telbib network

In the ESO Telescope Bibliography network, the telbib database is located at the centre. It rests on two strong pillars from which information is imported and to which content is also fed back in return: the ESO archive[2] and observing schedule[3] and the ADS abstract service.[4] In addition, telbib connects with three other services, namely ESO press releases,[5] the CDS portal,[6] and the Altmetric[7] website.

In the following sections, we will provide an overview of the links embedded in telbib that reach out to these services, as well as those linking back into the telbib database. For automated downloads of records, we provide an API (Application Programming Interface). An overview of the telbib network is shown in Figure 1. Further information about telbib and the workflow applied to curate the database can be found in Meakins and Grothkopf (2012).

3.   Linking in: Populating the telbib database

Once a paper has been identified as eligible for the telbib database, the librarians start to process the record via the telbib backend template. The template contains various areas into which content is either imported or entered manually. The first step in the curation of telbib records is for the system to access the NASA ADS Astrophysics Data System in order to import bibliographic information and other metadata (e.g., bibcode, authors, title, journal, volume, pages, abstract, citations, etc.) via the ADS XML interface. Since we also import author affiliations, we take special care to identify ESO authors so that we can later run statistics on this parameter, if needed.

The second, equally important resource that provides telbib with content is the ESO archive/observing schedule. The telbib backend allows direct access to the ESO program IDs located in the observing schedule via an AJAX request. This connection is initiated as soon as the first digits of a program ID are entered into the corresponding field in the template. While in the beginning this feature was only available for observations carried out at ESO's La Silla Paranal Observatory and the APEX telescope, a similar link has now been established to query the ALMA archive.

Obviously, a tool like the AJAX connection between the telbib backend and the archive/observing schedule can only be used once the respective ESO program IDs

---

[2]`http://archive.eso.org/eso/eso_archive_main.html`

[3]`http://archive.eso.org/wdb/wdb/eso/sched_rep_arc/form`

[4]`http://adsabs.harvard.edu/abstract_service.html`, `http://adslabs.org/adsabs`

[5]`http://www.eso.org/public/news/`

[6]`http://cdsportal.u-strasbg.fr/`

[7]`http://www.altmetric.com/`

Figure 1.   Schematic overview of the telbib network including resources outside of telbib from where information is obtained and to which content is returned.

are known, meaning if authors follow the ESO policy on publications with ESO data[8] which asks authors to clearly state the programs. However, this happens only in 60–70% of the papers we inspect. If there is an incomplete list of program IDs, we use other ways to identify the observations. Often a manual search of the ESO archive based on author names, instruments, observing dates or astronomical objects mentioned in the paper lead to the relevant program IDs. If this still does not provide us with all observations that were used in the paper, we consult instrument scientists or other experts at ESO for advice, or communicate directly with the authors, see Kitt and Grothkopf (2010).

Content obtained from the observing schedule includes various parameters. Most importantly, the ESO program ID is used to identify the observations, but we also import information about the observing mode (service or visitor mode observations), observing type (e.g., Normal, Large, Target of Opportunity programs), and the instruments used for the observations. For ALMA and APEX data, which are cooperative projects among various organisations, we identify the partner during whose observing time the data were taken. In addition, for each program we indicate whether the data are proprietary observations obtained by the authors or were obtained from the ESO archive and no overlap exists between authors and PI/CoIs of the observations).

Along with the details described above, we also make sure that other information is recorded in the telbib record. If a given paper was mentioned in an ESO press release,

---

[8]`http://www.eso.org/sci/observing/policies/publications.html`

the URL of the press release is noted in a field that will in the public interface result in an active link to the corresponding PR webpage. Other tags, for instance describing the use of the ESO archive or identifying specific surveys, are entered at this stage and will later allow us to run statistics on these features or provide further links in the public telbib interface.

At this point, the telbib record is complete and ready to be pushed over to the public interface (Figure 2).

Figure 2.   Marked-up record in the telbib backend. Information has been imported from the ESO archive and ADS or has been added by the librarians.

4.   Reaching out: Providing access to other resources

The public telbib interface[9] gives users access to basically all information entered during the curation process. Many details, including author names, instruments, and telescopes, as well as program IDs are hyperlinked; selecting these links will initiate a new search for that name, keyword or tag.

The most important connector is the 'data' tag that leads from the telbib frontend directly to the corresponding data in the ESO archive. Depending on whether or not the data are already publicly available, they can be requested by astronomers to be used

---

[9] http://telbib.eso.org

in their own research. This functionality is also available for ALMA observations. In case users start their search in the ESO archive and find observations of their interest, they will see for each program ID how many papers using the data have already been included in the ESO telescope bibliography, along with a link to the telbib frontend where more details about the publications are available. In this way, the system provides access from telbib to the data files and from the observations back to the resulting papers.

ESO has chosen not to host a repository of papers included in the telbib database. Instead, for each record a link is available to the ADS Abstract Service from where full texts of papers can be retrieved, in PDF or HTML format, or manuscripts that were deposited by the authors at the arXiv astro-ph eprint server.[10] In return, ESO provides ADS with bibcodes of all papers that pertain to the telbib bibliography. They can be retrieved through the ADS Classic interface by entering a criterion (e.g., the publication year) in the main search area and selecting 'References from ESO/Telescopes' in the filters area. All records in the results list will have D (data) links that take users to the public telbib interface and from there to the ESO archive where the data can be accessed.

If a paper was featured in an ESO press release, the URL has been added to the telbib record and is made available through the public interface. Likewise, all ESO press releases that resulted in scientific papers show 'Science data' links on the PR webpage which are connected to the telbib database so that again the loop from telbib to another resource and from there back into telbib, is closed.

One of the content fields that we import from ADS, along with lots of other meta-data, is the abstracts of papers. We have implemented into the telbib code a script called 'Stabilobj', written by Sébastian Derriere at CDS that allows users to hover over text which will then highlight astronomical objects mentioned in abstracts. As soon as the script recognizes the object, a pop-up window offers access to databases at the CDS, including SIMBAD, VizieR, and the general CDS portal. Users can choose from these options to move over to the corresponding database where the astronomical object will already be pre-selected so that the respective information can be accessed seamlessly.

The traditional way of measuring the impact of scientific papers is through cita-tions. For telbib, citations are imported from the ADS and updated on the fly when an individual record is displayed in the frontend. In addition, so-called alternative metrics are gaining importance. These include article level metrics that refer to the use of and discussion about scientific papers, including for instance tweets on Twitter, coverage in newspapers and magazines, or blog entries related to a given publication. One platform that pulls together and analyses such online activity is Altmetric.com. The impact of a paper as measured by Altmetric is indicated by a so-called score, a weighted value that takes into consideration both quality and quantity of the activity in social media. For each entry in the telbib database, the Altmetric score is checked at the time of display of the record in the public interface and a link is provided to the website where additional information about these so-called alternative metrics can be found.

Figure 3 shows a sample record in the public telbib interface, illustrating the links to the CDS portal, the NASA ADS Abstract Service, Altmetric.com, the ESO press re-lease page, and the ESO archive. Table 1 gives an overview of the information resources

---

[10]`http://arxiv.org/archive/astro-ph`

that link from and to the telescope bibliography, along with the respective identifiers used in the telbib network.
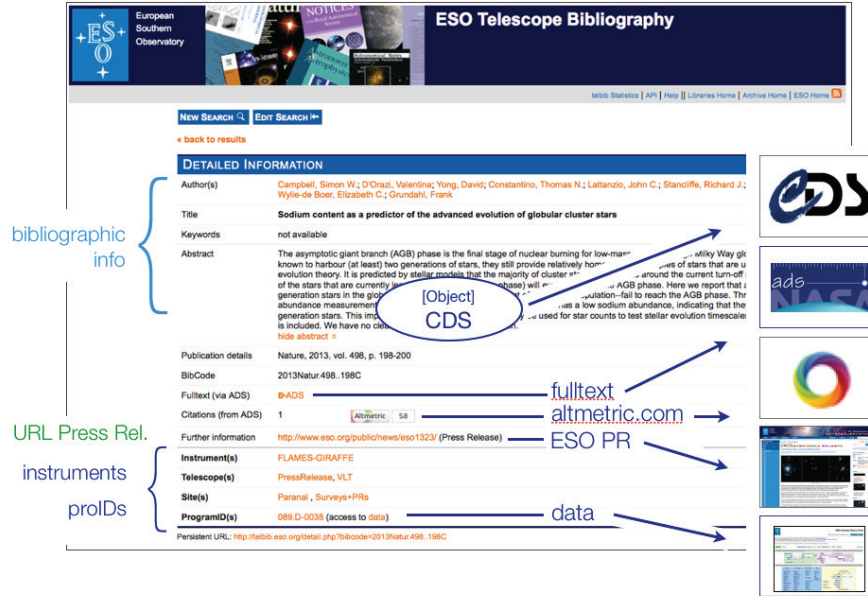

Figure 3.   Detailed view of a record in the telbib fronted with links to the CDS portal, the ADS Abstract Service, Altmetric, ESO Press Releases and the ESO Archive

From	To	Identifier
ADS	telbib	bibcode
ESO arc/obs sched.	telbib	ESO program ID
ESO press releases	telbib	bibcode
telbib	ADS	bibcode
telbib	ESO arc/obs sched.	ESO program ID
telbib	ESO press releases	bibcode
telbib	CDS	object name
telbib	Altmetric.com	DOI (Digital Object Identifier)
anywhere	telbib	parameters defined by API

Table 1.   Overview of links to and from telbib, along with the respective identifiers

5. Semi-automated access: telbib API

In order to enable automated queries of the telbib database, we provide an API[11] (Application Programming Interface) that allows interested users to retrieve structured content. Various parameters are available, including author, year from/to, program ID, and instrument. Queries result in replies that are XML files which can be further processed in order to extract and organize information.

6. Outlook

We are constantly trying to further enhance the telbib network by implementing new features that enable easier and more diverse knowledge discovery for our users. Some of our future plans for features and improvements are detailed below.

- Explore telbib's overlap with other major observing facilities. This could be done by checking for bibcodes that are also included in the telescope bibliographies of other large observatories.

- The ESO Observing Proposals Office (OPO) is in the process of developing a new system to handle observing proposals and assign program IDs. This might also affect the structure of the ESO observing schedule and the naming scheme of programs. Since these are essential information sources for telbib, we have to make sure that telbib continues to interact seamlessly with the revised system.

- In addition to raw data, the ESO archive provides an increasing number of pre-reduced data, so-called data products, which typically originate from surveys and other large programs carried out at ESO telescopes. Data products often cannot be identified through one specific proposal ID as they may encompass a large number of observations. Similarly, complex sets of archival data requested by authors from the ESO archive cannot be well described by program IDs, but might require a complex request syntax to reproduce the search that the requesters had originally carried out in the ESO archive. In such cases, we need to provide a telbib infrastructure that allows correct and precise linking between telbib and the archive.

Maintaining and further enhancing the telbib network is not without challenges. In addition to an ever growing number of published papers as well as ESO facilities, survey names and other tags that have to be tracked every year. Also, the overall complexity of the telbib system has increased considerably. We need to balance the wish for new and more sophisticated features with the need for high usability and efficient use of the system.

During the past years, telbib has developed into a multi-faceted resource that provides access to diverse content. By enabling researchers to explore different aspects of publications and data and easily navigate across various knowledge resources, the interlinked telbib network actively supports astronomers in their research.

---

[11]`http://telbib.eso.org/api-docu.php`

Acknowledgments.   We cordially thank Sébastian Derriere, CDS, for the permission to use the Stabilobj script.

References

Kitt, S., Grothkopf, U. 2010, in ASP Conf. Ser., Vol. 433, LISA VI. (San Francisco: ASP), 109
Meakins, S., Grothkopf, U., 2012, in ASP Conf. Ser., Vol. 461, ed. Ballester, P., Egret, D. & Lorente, N.P.F. (San Francisco: ASP), 767 `http://xxx.lanl.gov/abs/1112.5375`

Poster session (Courtesy: E. Jiménez-Fragozo)