Enhanced capabilities of the ESO Science Archive Facility user interfaces

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Phase 3 Data Products Web User Interfaces

The ESO Phase 3 denotes the process of preparation, submission, validation and ingestion of science data products for storage in the ESO Science Archive Facility and subsequent publication to the scientific community.
The substantial upgrade of the Phase 3 cyber infrastructure [1], which entailed a change of the underlying data model, as well as the need to integrate new data types, especially data cubes, gave an opportunity to also revamp the Phase 3 query user interface.

Above the new Phase 3 generic interface to all data product types.
Example for querying by data type, i.e. for 3-D data cubes and science catalogs, in combination with a positional constraint (RA-DEC search box.); the result page displays the available science data products: some calibrated MUSE data cube and some scientific object-catalogs from the VMC, one of the ESO public surveys [2]. When mouse-hovering a catalog link, a (ajax) query is executed and the retrieved catalog metadata are displayed in a tooltip (see figure above).
Catalogs can either be downloaded, or a link can be followed to reach the query form (shown here below) to search the content of the specific catalog.
By default, only the best version of a product is displayed; clicking on the product version the user can examine the product history (see below). Clicking on the lens icon detailed information of the dataset is displayed (bottom).

The Phase 3 Product Version History is shown when the user clicks on a product version

Abstract

The ESO Science Archive Facility (SAF) provides access to raw data, science products and ambient information for the La Silla-Paranal observatory. Through the user interfaces, the archive users browse/query/request and download raw data and the quickly-growing content of science-ready data products (images, flux maps, spectra, data cubes, source tables, catalogs) [Phase 3]. The SAF user interfaces provide support to queries for the ESO approved observing programs, their abstracts, and scheduling information. The ambient conditions of the different sites can also be browsed to obtain (download/display) measurements of seeing, coherence time, precipitable water vapour, and other parameters, like the vertical profile of the atmospheric turbulence, important to support new adaptive optics requirements, following the upgrade of the Paranal Astronomical Site Monitoring instrumentation. Here we review the recent developments, highlighting the new capabilities available to the users (e.g., Special Access), the new look&feel, and the architectural choices taken to provide a smooth, informative, and responsive user experience (Aladin Lite, jQuery, Ajax, enriched physical data model, etc.).

- Motivations:
  - New content: data cubes, catalogs FITS files; Ambient data.
  - New data model for improved Phase 3 data submission
  - New requirements: Ambient, Phase 3, Special Access
- Guiding principles for the interfaces:
  - Smooth, fast, and intuitive users' experience
  - Trade-off: UI performance vs. data model complexity:
    - Fetch info only when needed (AJAX, jQuery)
- Phase 3 Improvements in Query Forms: [left and central bottom panels]
  - Restyling:
    - Top menu to navigate across different Phase 3 UIs
    - Text made visible when user needs it (click "read more…")
    - Collection's pull-down menu uses jquery-ui-multiselect-widget for improved user's experience
  - Adaptive pull-down menus:
    - Ability to remove from pull-down menus values not relevant to the user's selected Phase 3 collection
    - Ability to query for a specific data release of a collection
- Phase 3 Improvements in Query Results
  - Tools to interact with the result table now available:
    - Button to toggle between sexagesimal and decimal coord.s
    - Button to show/hide columns with no information
    - Ability to dynamically filter records matching user's strings
    - Ability to open Aladin Lite [3] and display products' location
    - Ability to interact between Aladin Lite and table of results:
      - Aladin Light fixed at the top, table results scrolls underneath
      - Highlight in Aladin Lite the table record under examination
      - Highlighting table record by clicking Aladin Lite's marker
      - Dynamic filter applies also to what displayed in Aladin Lite
    - Histogram of available product types can be displayed in Aladin Lite and used to hide/show different types (cubes, spectra, images, etc.)
  - Ability to visualise the version history of a product
  - Showing (using color scheme) status of products:
    - Current (no highlighting), obsolete (orange), deprecated (red)
  - Allowing users to easily reach the catalog query interface relevant to the selected catalog FITS product
  - Linking catalog query results for spectroscopic catalogs back to the actual archived spectra originating the catalog measurements
  - Showing the status of the provenance of a product of products
- Ambient Conditions: [top right panel]
  - New instruments/measurements of atmospheric parameters
  - New interfaces available to download the data
  - Graphical Monitor used to visually explore by the night.
- Special Access: [bottom right panel]
  - The new archive query interfaces for raw data allow users with special permissions (telescope operators, commissioning teams, etc.) to browse/download privileged data.

New Ambient Web User Interfaces

The Paranal ASM (Astronomical Site Monitoring) has been upgraded in April 2016 in order to solve some obsolescence issues of the old ASM system and to support new adaptive optics requirements.
The measurements (seeing, coherence time, vertical profile of the turbulence, precipitable water vapour, etc.) from the various instruments are accessible either graphically or can be browsed/downloaded using dedicated archive query interfaces.

See: http://archive.eso.org/cms/eso-data/ambient-conditions.html

Special Access Web Interfaces

- Requirement: Telescope operators and other users with special permissions (e.g., Instrument teams, user support scientists, etc.) on some particular set of archived raw data (e.g. all data from a commissioning run, etc.) must be able to browse and download those data, including technical, test, and hidden data which are otherwise not visible to the regular archive user community.
- Solution:
  - New permissions have been defined in the ESO Access Control system, which can be assigned to particular users or groups of users.
  - The regular archive user interfaces for raw data have been modified to present either their public-face to the regular users, or a new special-access-face to logged-on users.
  - A logged-on user is given full metadata and data access (read "browsing and download capabilities") to all the archive raw data for which he holds the necessary permissions.
  - This is obtained by interfacing the archive query forms with the ESO User Portal which passes on the account identifier of the logged-on user; the account id is used to generate the necessary SQL to identify all the archive assets the user has access to. This SQL is added to the regular SQL that the regular archive interface generates according to the user's inputs.
- Implementation:
  - mod_auth_cas apache module used to interface with the ESO User Portal (CAS single sign-on)
  - Stylesheets and jQuery are used to present very differently the public and the special-access faces of the same user interfaces, whose underneath logic remains unchanged.

Public (up) and CAS (right) faces of the same query interface (instr: GRAVITY)

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