

ESA's future Astronomy Multi-Mission Interface

MMI-Team: Jesús Salgado, Bruno Merín, Fabrizio Giordano, Deborah Baines, Belén López Martí, María H. Sarmiento, Elena Racero, Raúl Gutiérrez

Previous Collaborators: Iñaki Ortiz, Ignacio León, Andy Pollock, Michael Rosa

Acknowledge CDS Support: Pierre Fernique, Thomas Boch

Asterics meeting, Strasbourg, 18 September 2015

The Multi-Mission Interface



- > Goal: to facilitate data discovery and archival science for ALL users
 - Multi-wavelength
 - Project agnostic
 - Exploration



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 - Multi-wavelength
 - Project agnostic
 - Exploration
- Interface to all astronomy archives

Multi-mission interface Herschel XMM-Newton HST Planck Iso Integral EXOSAT Future..

Current status is a first prototype

The Multi-Mission Interface (prototype)



Ingredients of first prototype:

- Access to data in individual archives
- All-sky (aka HiPS)
- Footprints

Use cases of first prototype:

- Explore multi-wavelength skies
- Single and multiple targets
- Images and catalogues only, selected mission

MMI people



ESDC Astronomical Group

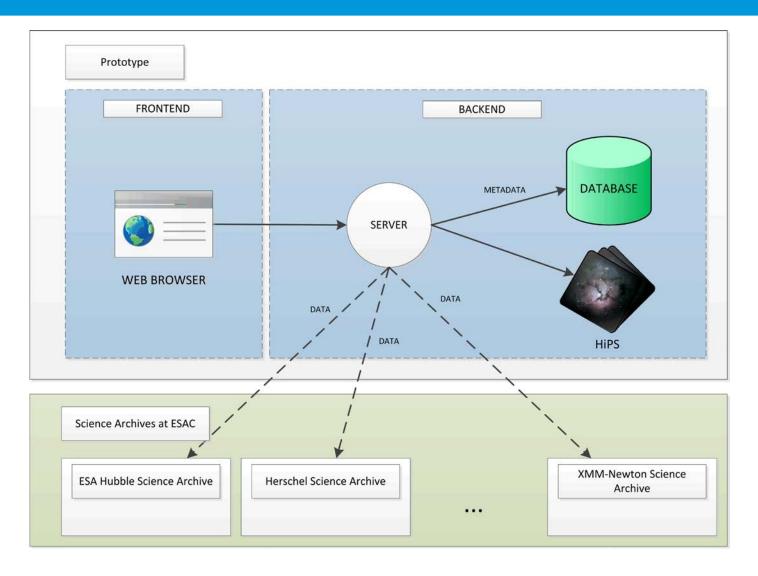
- Bruno Merín (astro archives science lead and MMI product owner)
- Jesús Salgado (astro archives technical lead)

MMI Team

- Fabrizio Giordano (key person, full-time)
- Deborah Baines (science support)
- Elena Racero (part-time, HiPS and footprints)
- María Henar Sarmiento (part-time, GUI)
- Belén López Martí (full-time, HiPS development)

MMI Architecture

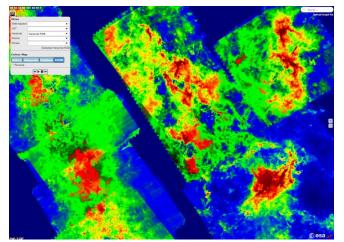


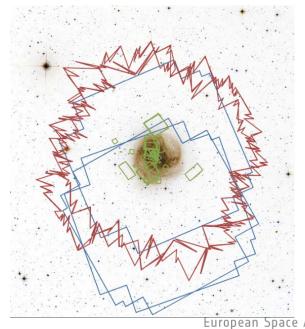


MMI Data



- ➤ HiPS: Hierarchical Progressive Survey (Fernique et al)
 - HEALPix sky tessellation
 - Number of levels depend on pixel angular resolution
 - IVOA standard:
 - Planck (low) 3 levels
 - Herschel (medium) levels
 - HST (high) 14 levels
- Footprints
 - HST: Provided by project
 - Herschel: Footprint Finder (ST-ECF)
 - XMM: Instrumental + pointing

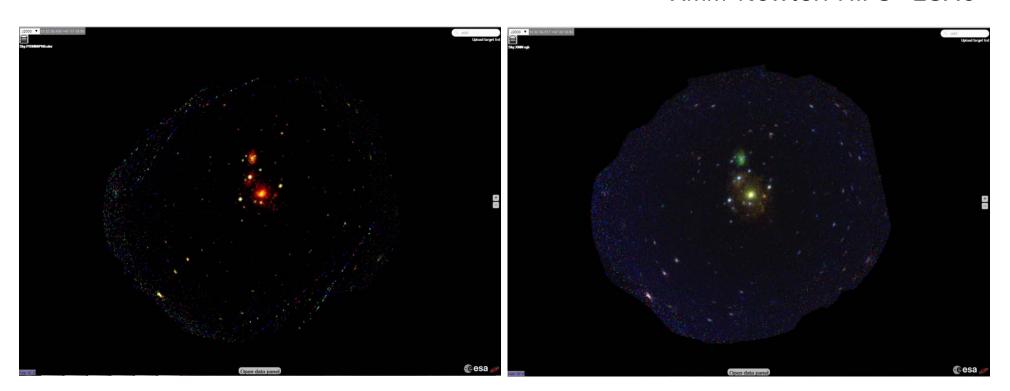




HiPS generation: Support from Projects



XMM-Newton HiPS -ESAC



Credits: Pedro Rodríguez XMM-SOC, Elena Racero ESDC

Prototype – Backend Data Access



- Apache HTTP Server
 - Serves HiPS requests
- Java Servlet container
 - Serves TAP & Target Resolver requests
- Database
 - PostgreSQL DB
 - Spherical data types library (PgSphere)
 - Footprints -> Spherical data types
- Usage of IVOA Protocols & Standards
 - TAP requests
 - ADQL translation to SQL + PgSphere
 - Storage of STC-S footprint information











Prototype - Frontend



- Running on a Web Browser (HTML5/CSS3)
- ➤ Google Web Toolkit
 - Aladin Lite wrapper (JSNI)
 - Data Visualization (Highcharts)
- Usage of IVOA Protocols
 - TAP accessing archive metadata
 - STC-s describing complex FoVs
- Astronomical services access (Simbad)
 - Target coordinates resolver
 - Angular size resolver



Multi-Mission Interface technology roadmap



ESA Astronomy Multi-Mission Interface Roadmap (technology)

(summer 2014)

- · Web interface
- All-sky HiPS mosaics from CDS
- Detailed footprints (imaging)
- · Multi-target functionality

First Release (fall 2015)

- Scientific validation of footprints and ESA all-sky HiPS
- · Download management
- Multi-target summary table
- Interoperability with VO tools
- Documentation
- Helpdesk Support
- Hardware scaling requirements
- Refactoring of prototype into robust and stable application

Second release (fall 2016)

- Link to Vizier/Simbad
- Generation of detailed footprints (spectra)
- Imaging and spectroscopic data
- Online visualization of data
- Sample manipulation
- Time-series
- · Observation planning
- State-fullness
- Massive data visualization

MMI data content roadmap



ESA Astronomy Multi-Mission Interface Roadmap (data contents)

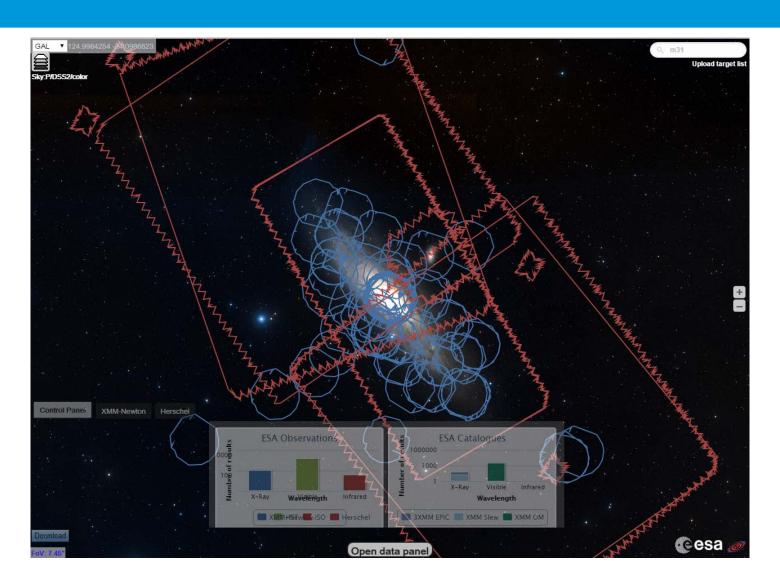
(summer 2014) · All-sky HiPS mosaics: XMM-Newton (CDS) · HST (CDS) Planck (CDS) Herschel-SPIRE (ESA) · Science ready data (imaging): XMM-Newton HST (core) Herschel-SPIRE · Catalogs: 3XMM-DR4 XMM Slew XMM OM

(fall of 2015) All-sky HiPS mosaics: EXOSAT (ESA) INTEGRAL (ESA) XMM-Newton (ESA) HST (ESA) ·ISO (ESA) AKARI (ESA) Herschel (ESA) Planck (ESA) Science ready data (imaging): EXOSAT INTEGRAL XMM-Newton HST ISOCAM Herschel Catalogs: 3XMM-DR4 XMM Slew XMM OM Hubble Source catalog Hipparcos AKARI catalogs Planck catalogs

(fall of 2016) All-sky HiPS mosaics ·Science ready data (imaging and spectra): EXOSAT INTEGRAL XMM-Newton HST ISOCAM Herschel Catalogs: •3XMM-DR4 XMM Slew MO MMX Hubble Source catalog Hipparcos Gaia AKARI catalogs Herschel Point Source Catalogs Planck catalogs

MMI-Demo





MMI release timeline



Adding all the remaining data

Refactoring the code for scalability

25 September: Tech-Talk @ ESAC and first internal release to ESAC for feedback

26 October: Focus demo @ ADASS2015 and first public release



THANK YOU

Jesus Salgado

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