

ESASky v2.2: Gaia DR2, proper motions, publications, mobile & python

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European Space Agency
ESAC Science Data Centre

IVOA interop, Victoria, 29 October 2017



Goal: to facilitate data discovery and archival science for ALL users

- Multi-wavelength
- Project agnostic
- Exploration



Interface “on top of” all ESA astronomy archives

ESASky - sky.esa.int



ESASky data contents roadmap



ESASky 1.0 (May 2016)

- **All-sky HiPS mosaics:**
 - EXOSAT (ESA)
 - INTEGRAL (ESA)
 - XMM-Newton (ESA)
 - HST (ESA)
 - ISO (ESA)
 - AKARI (ESA)
 - Herschel (ESA)
 - Planck (ESA)
 - JAXA/SUZAKU
- **Science ready data (imaging):**
 - INTEGRAL
 - XMM-Newton
 - HST
 - ISOCAM
 - Herschel
 - JAXA/SUZAKU
- **Catalogs:**
 - 3XMM-DR5
 - XMM Slew
 - XMM OM
 - Hubble Source catalog
 - Hipparcos
 - Planck catalogs

ESASky 2.0 (Oct. 2017)

- **All-sky HiPS mosaics**
- **Science ready data (imaging and spectra):**
 - EXOSAT
 - INTEGRAL
 - XMM-Newton
 - NASA/Chandra
 - JAXA/Suzaku
 - IUE
 - HST
 - ISO
 - Herschel
- **Catalogs:**
 - 3XMM-DR7
 - XMM Slew
 - XMM OM
 - Hubble Source Catalog v2.1
 - Hipparcos
 - Gaia DR1
 - Herschel Point Source Catalogs
 - Planck catalogs

ESASky 2.2 (April 2018)

- **All-sky HiPS mosaics**
- **Science ready data (imaging and spectra):**
 - EXOSAT
 - INTEGRAL
 - XMM-Newton
 - NASA/Chandra
 - JAXA/Suzaku
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 - HST
 - ISO
 - Herschel
- **Catalogs:**
 - 3XMM-DR7
 - XMM Slew
 - XMM OM
 - Hubble Source Catalog v2.1
 - Hipparcos
 - **Gaia DR2**
 - Herschel Point Source Catalogs
 - Planck catalogs



ESASky feature roadmap



ESASky 1.0 (May 2016)

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



ESASky 2.2 (April 2018)

- Link to Vizier/Simbad
- Generation of detailed footprints (spectra)
- On demand overlaying of footprints for JWST pre-planning
- Solar System Objects serendipitous search
- Link to publications
- Proper motion display on images
- Mobile friendly

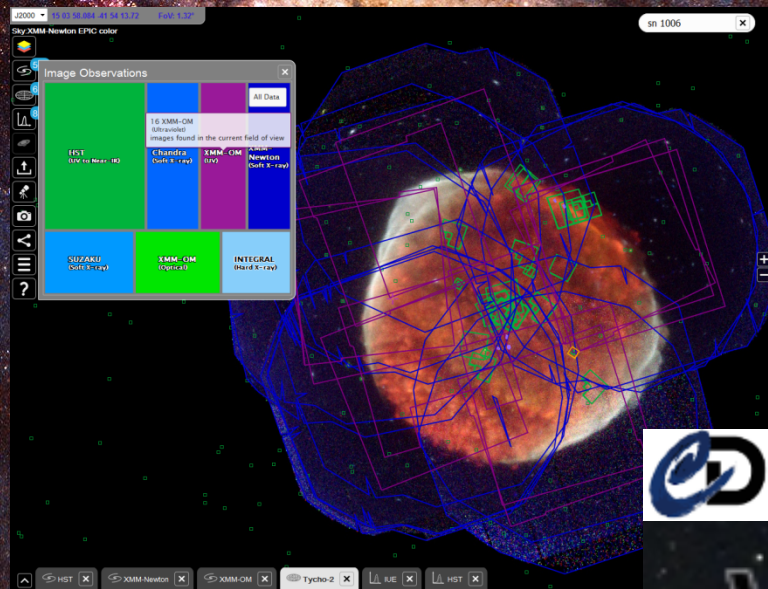


ESASky 3.0 (2019)

- Sample manipulation
- Time-series / time domain
- Observation planning
- State-fullness
- Stacked data visualization
- Mobile app?

Collaboration is key

<http://sky.esa.int>



International Virtual Observatory Alliance



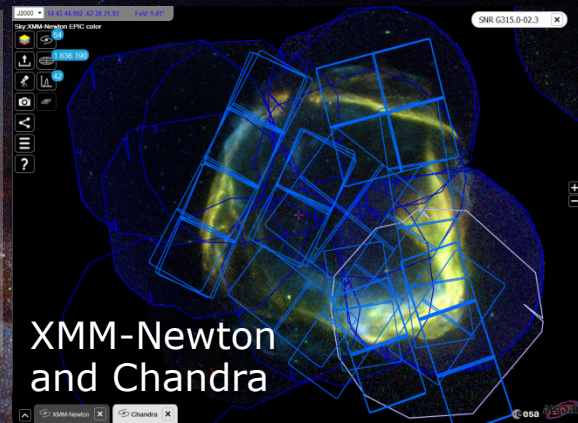
Standards: HiPS

SAMP

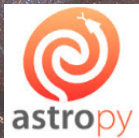


TAP

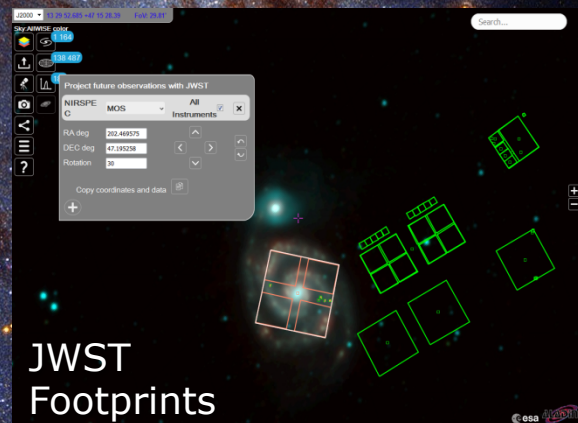
ObsCoreDM MOC



XMM-Newton and Chandra



Dedicated Python module to ESASky



JWST Footprints

Videos with demo tutorials at

<https://www.cosmos.esa.int/web/esdc/esasky-how-to>

ESASky : scalable system architecture

Public layer

- Main application entry-point**
- Dynamic load balancing system based on RR
 - Nodes can be added/removed on-the-fly



- Images server (HIPS)**
- Dynamic load balancing system based on RR
 - Nodes can be added/removed on-the-fly
 - Optional usage of the CDN

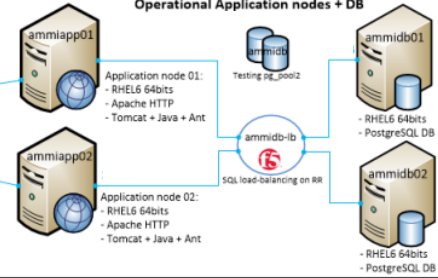


- Development application**
- Dynamic load balancing system based on RR
 - Nodes can be added/removed on-the-fly

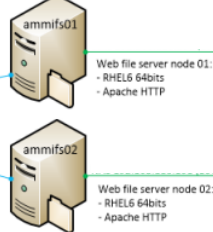


Application layer

Operational Application nodes + DB



Operational File server nodes



Integration Application node + DB



Development Application nodes + DB

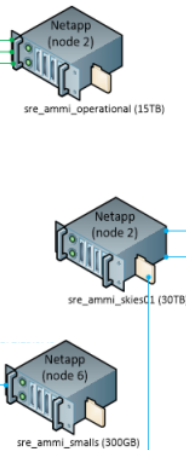


Development File server nodes

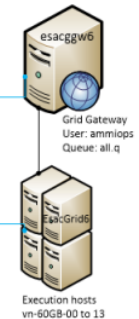


Data layer

Storage system (NetApp)



Grid Infrastructure EsacGrid6

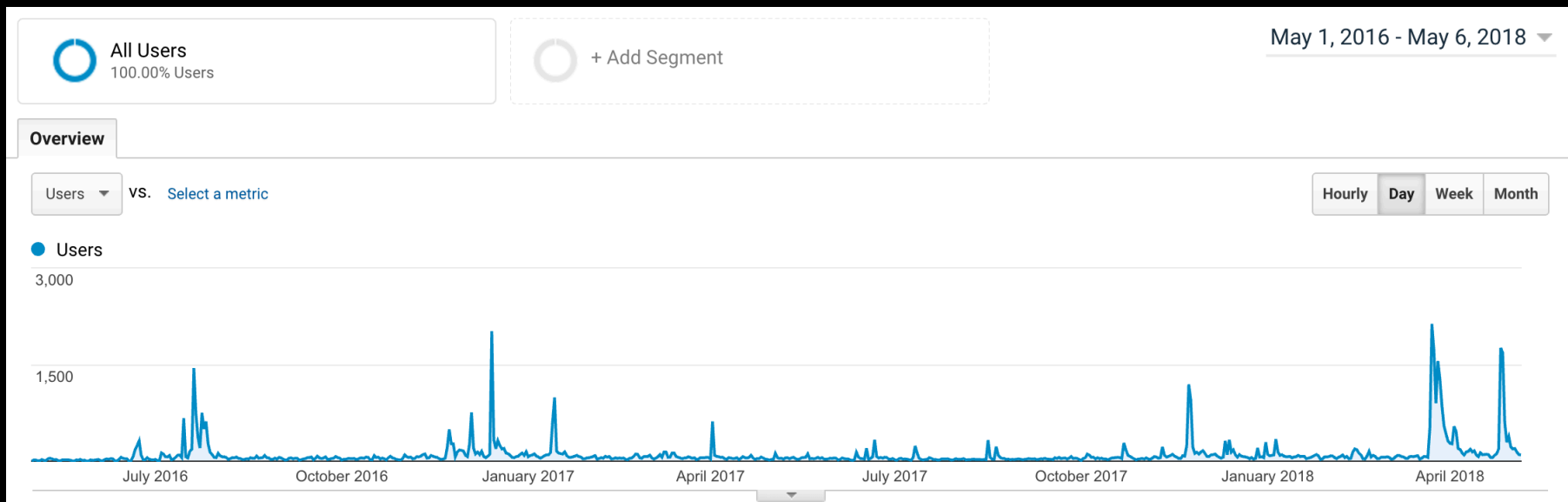


Version 2.5 (2017-04-27)
R.Prieto, A.Lorca, SITU

The story so far..



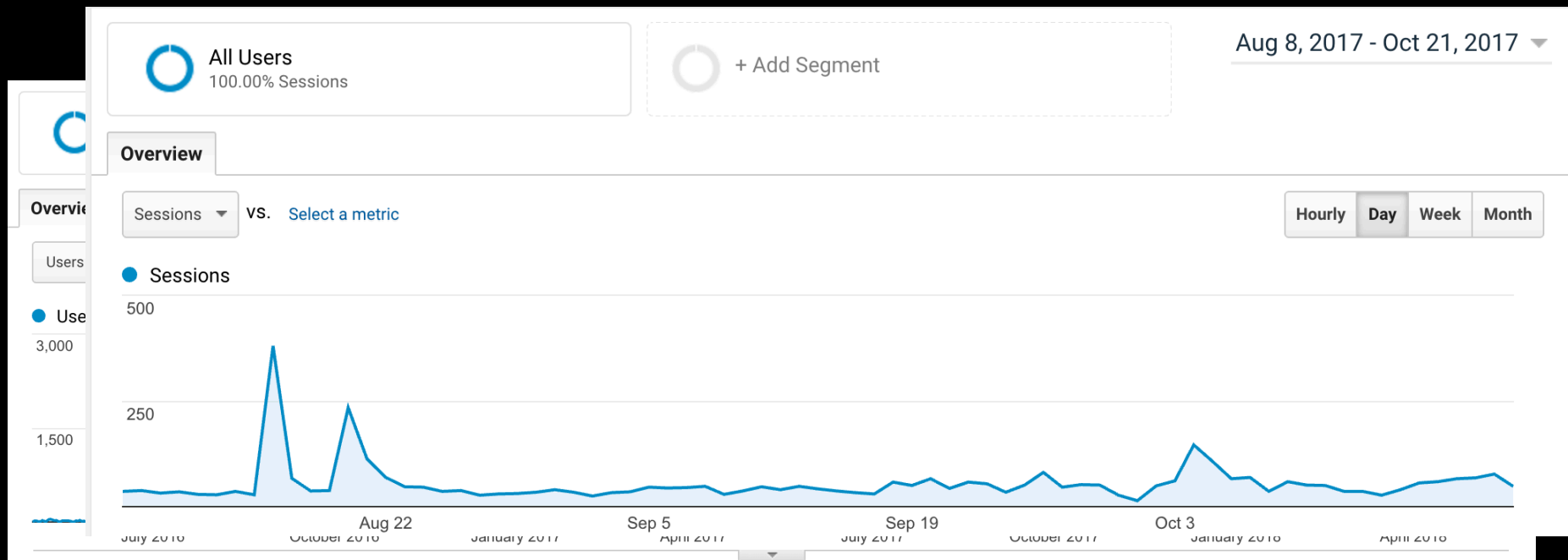
Used by 56,000 users, with peaks at announcements or events..



The story so far..



Used by 56,000 users, with peaks at announcements or events..



The story so far..

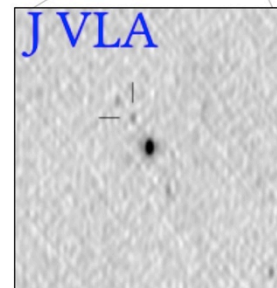
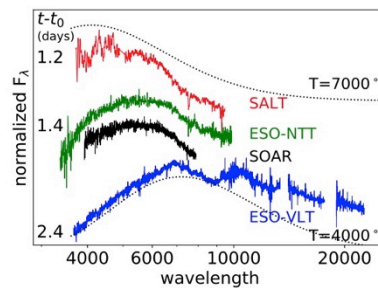
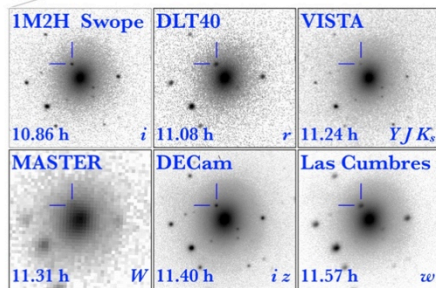
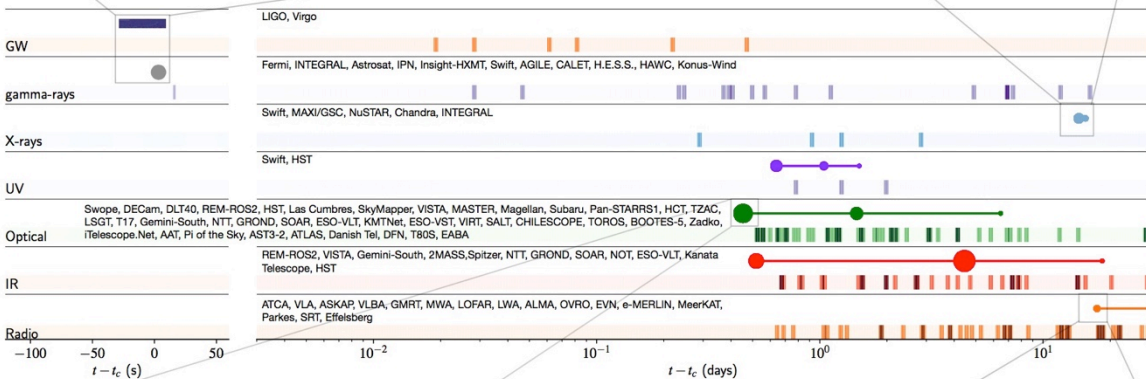
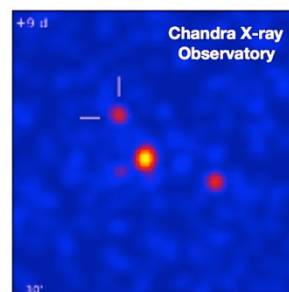
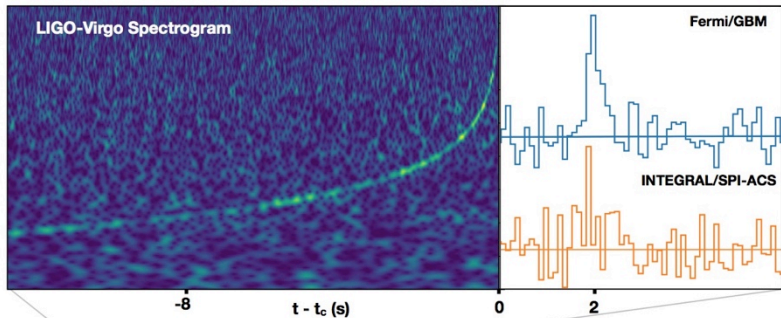


Used by 56,000 users, with peaks at announcements or events..



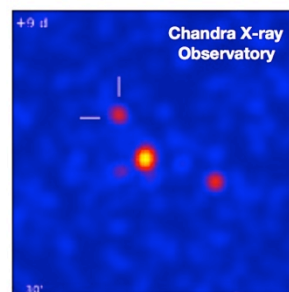
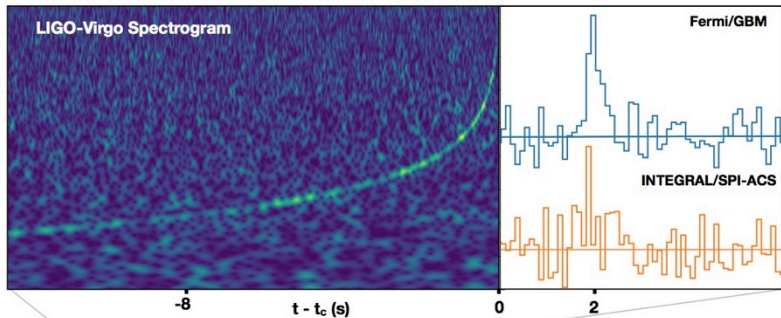
The story so far

Used by 56,000 users, with

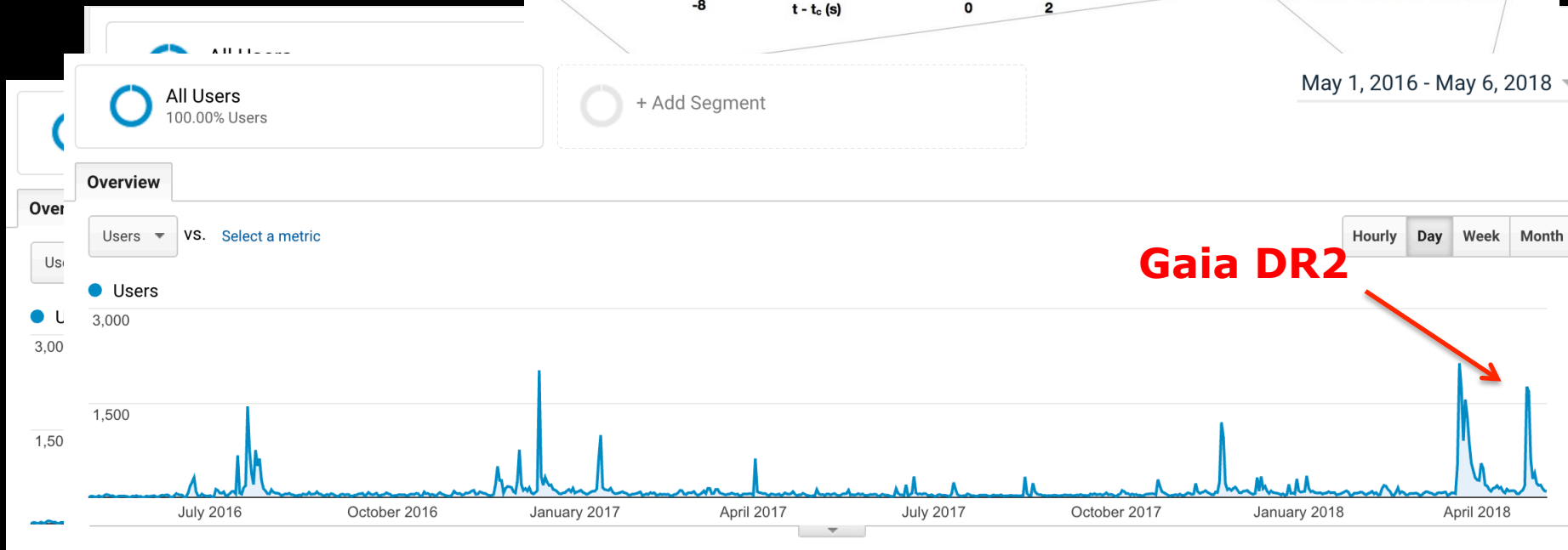


The story so far

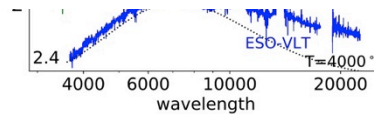
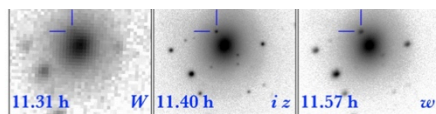
Used by 56,000 users, with



May 1, 2016 - May 6, 2018



ESA UNCLASSIFIED - For Official Use



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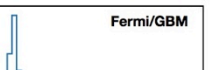
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The story of

LIGO-Virgo Spectrogram

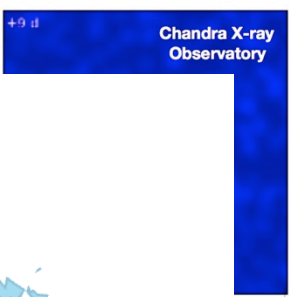


Fermi/GBM



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Chandra X-ray Observatory



Use

April 6, 2018

Week Month



April 2018



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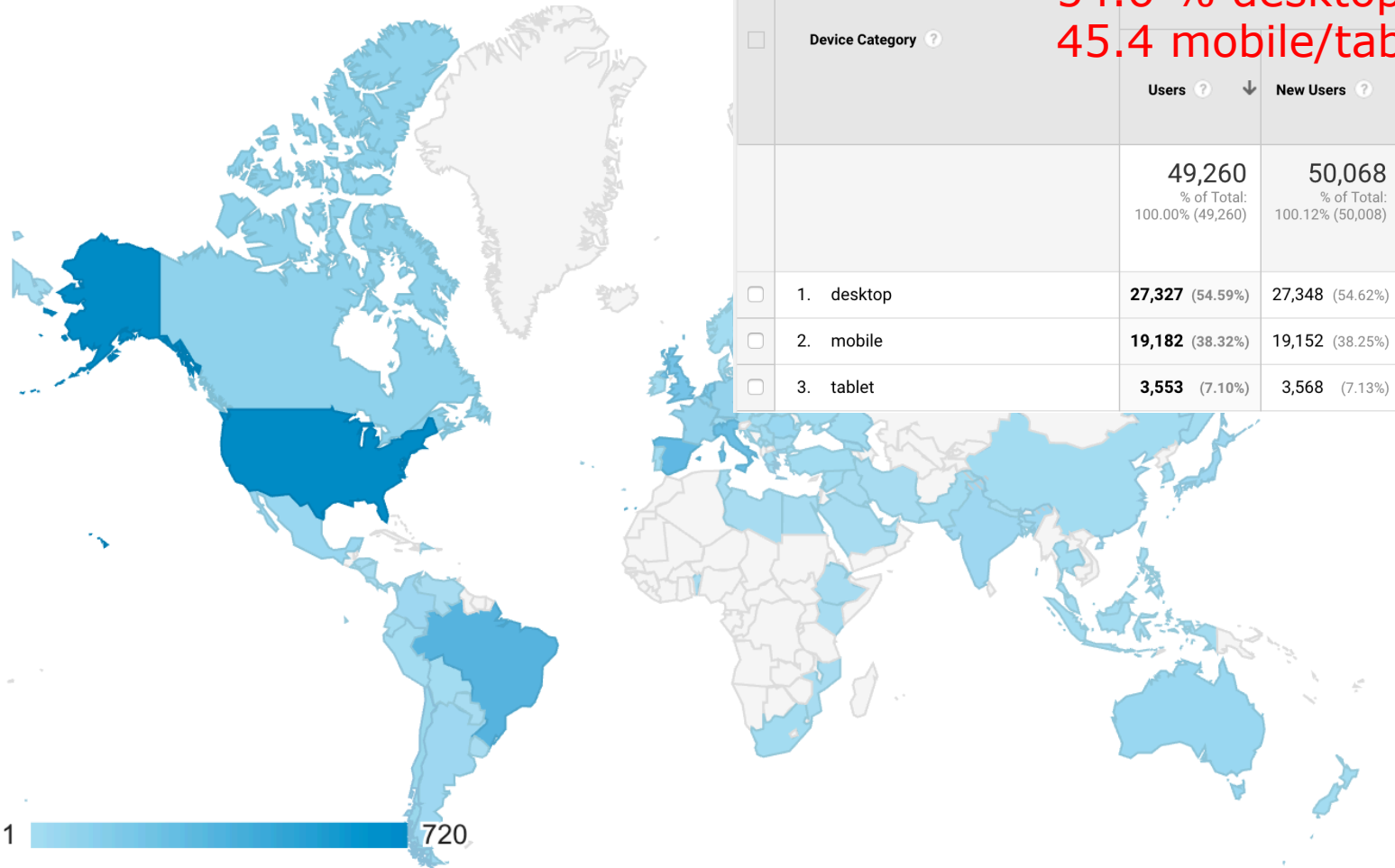


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720

The story of

Use



54.6 % desktops
45.4 mobile/tablets

Device Category ?		Users ?	New Users ?	Sessions ?
		49,260 % of Total: 100.00% (49,260)	50,068 % of Total: 100.12% (50,008)	78,130 % of Total: 100.00% (78,130)
<input type="checkbox"/>	1. desktop	27,327 (54.59%)	27,348 (54.62%)	47,651 (60.99%)
<input type="checkbox"/>	2. mobile	19,182 (38.32%)	19,152 (38.25%)	25,526 (32.67%)
<input type="checkbox"/>	3. tablet	3,553 (7.10%)	3,568 (7.13%)	4,953 (6.34%)

Week Month



- Current ESASky v2.2
 - Gaia DR2 data + WISE + 2MASS catalogues
 - Proper motion and catalogues symbol
 - Publications feature and API
 - Mobile and tablet friendly
- Future versions
 - Time-domain visualizations
 - VO data collections (via queries to TAP servers)
 - FITS on web
- We are open to all collaborations !! Please contact us !