ESASky Updates

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On behalf of the ESASky team: Fabrizio Giordano, Elena Racero, Henrik Norman, Marcos Lopez-Caniego, Belen Lopez-Marti, Pilar de Teodoro, Jesus Salgado, Bruno Merin, Guido de Marchi
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Version 2.3 released on 27th September 2018:

- Catalogues: 3XMM-DR8 and 3XMM-DR7 EPIC stacked catalogue

- Data: Updated XMM-Newton EPIC data, updated Chandra data and updated HST data (and working towards automatic updates).

- Improved column filtering capabilities, including filtering by ranges of numbers and dates

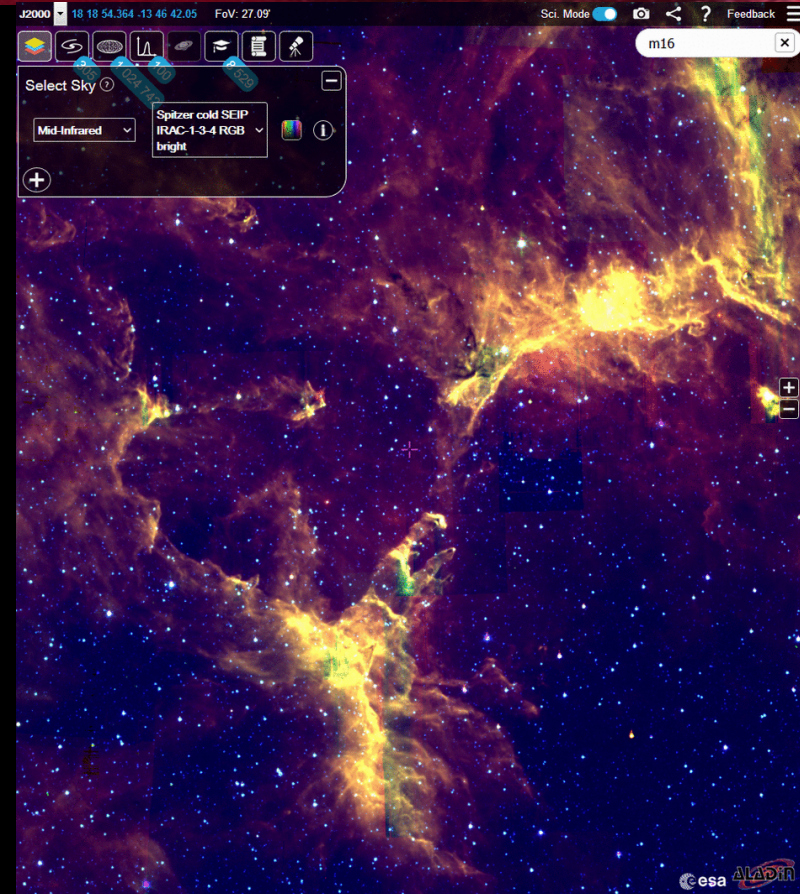# Version 3.0 released on 6th November 2018:

User Interface:

• Science mode/Explorer mode with different functionalities – in response to your recommendations!

• Links to the World Wide Telescope (WWT)

• New look and feel: header bar improvements; resizable data panel; improved filtering of columns; location of icons; more help ? buttons

• Added more logos and acknowledgements to external data centres

• Significant improvements to touch devices

• Improved cross browsers support

New HiPS:

•   Created from the Spitzer Enhanced Imaging Products (SEIP) of the Spitzer Heritage Archive from the IRAC instrument:

  • Spitzer cold SEIP IRAC134 color

  • 'bright' and 'faint' HiPS for IRAC 1, 2, 3, 4 (3.6, 4.5, 5.8 & 8 μm) to optimise the Galactic plane (bright) and extra-galactic regions (faint).

•   Created by ESASky team with support and validation by the Spitzer team in IRSA @ IPAC, Caltech

•   Useful for planning JWST observations

# Version 3.0 released on 6th November 2018:

Solar System Objects:

- Aim: Allow users to search through all ESA astronomical archives for images of moving objects: both targeted and serendipitous!

- All SSO objects now added (asteroids etc, over 800,000 objects)

- Search for SSO imaging data from:
  - HST, Herschel and XMM

- Created a pipeline using s\w from IMCCE Paris (in collaboration with J. Berthier and B. Carry), spacecraft kernels -> ephemerides. Cross-match against mission observations.
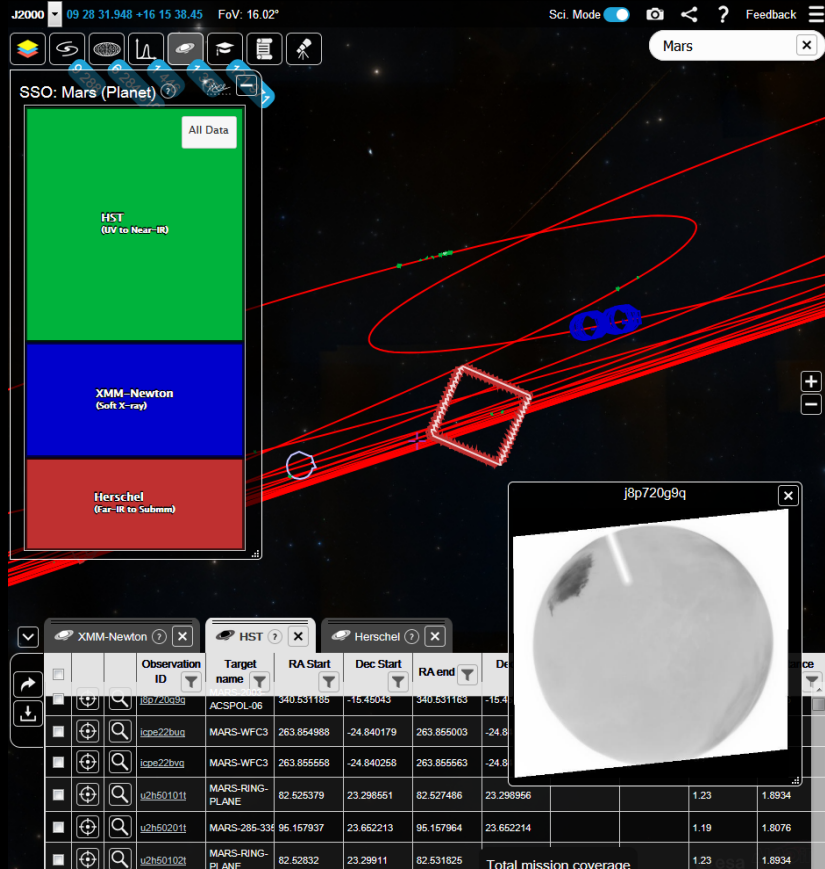
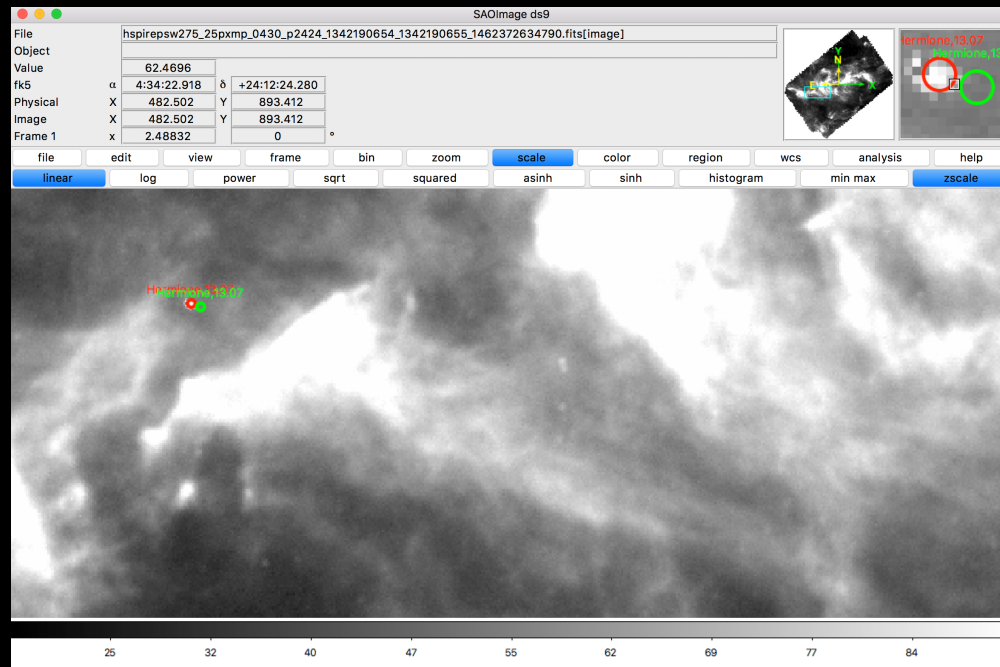## HST Near Earth Object (NEO) population: Total #Detections
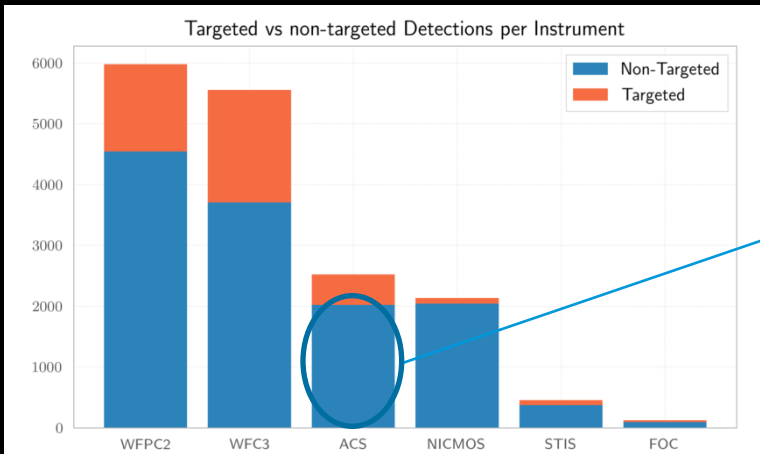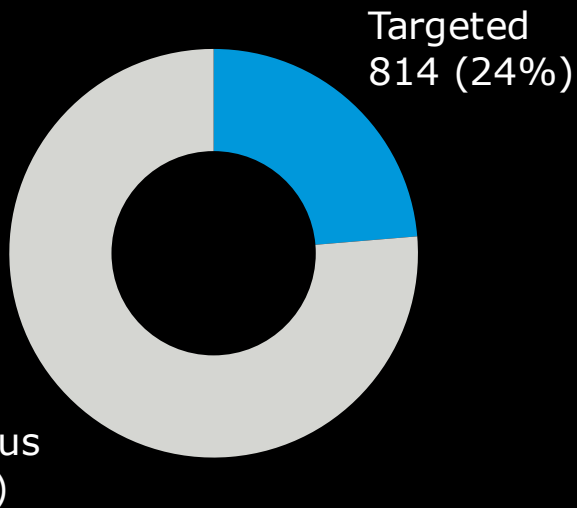

Work presented at ESA SSW11 @ESTEC.
Credits: M. Mahlke
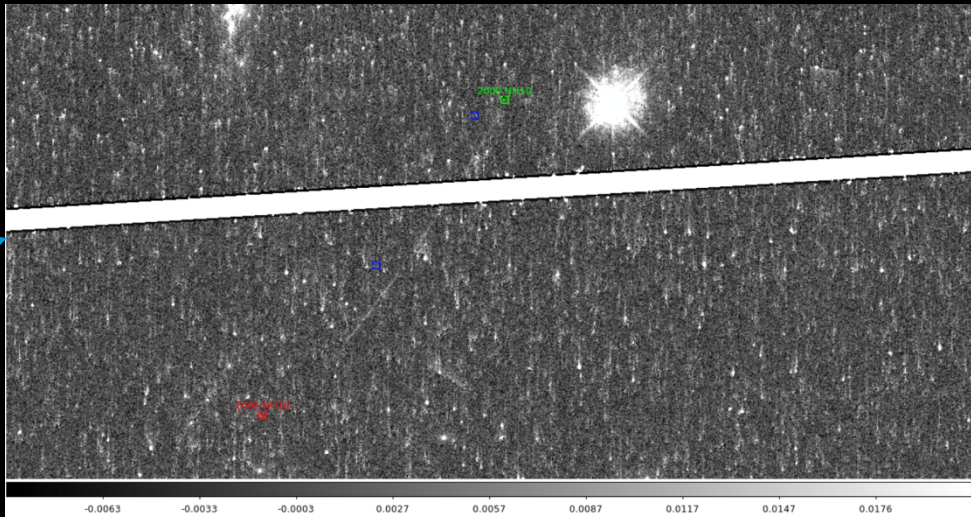
Example 1: a non-targeted observation from ACS for NEO 2000 NH10. Green and red regions mark calculated start and end of asteroid streak by the ESASky algorithm.

ESASky v3.0: SSO examples

Herschel total #detections of SSOs ($m_v < 18.0$)

Targeted
814 (24%)

Serendipitous
2623 (76%)

- A Jupyter wi...

- Idea came a...
(headed by Alys...
for the following...

  • Fulfils AP...
  http://glue...

  • Large per...
  statistics fo...

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Momcheva, I &
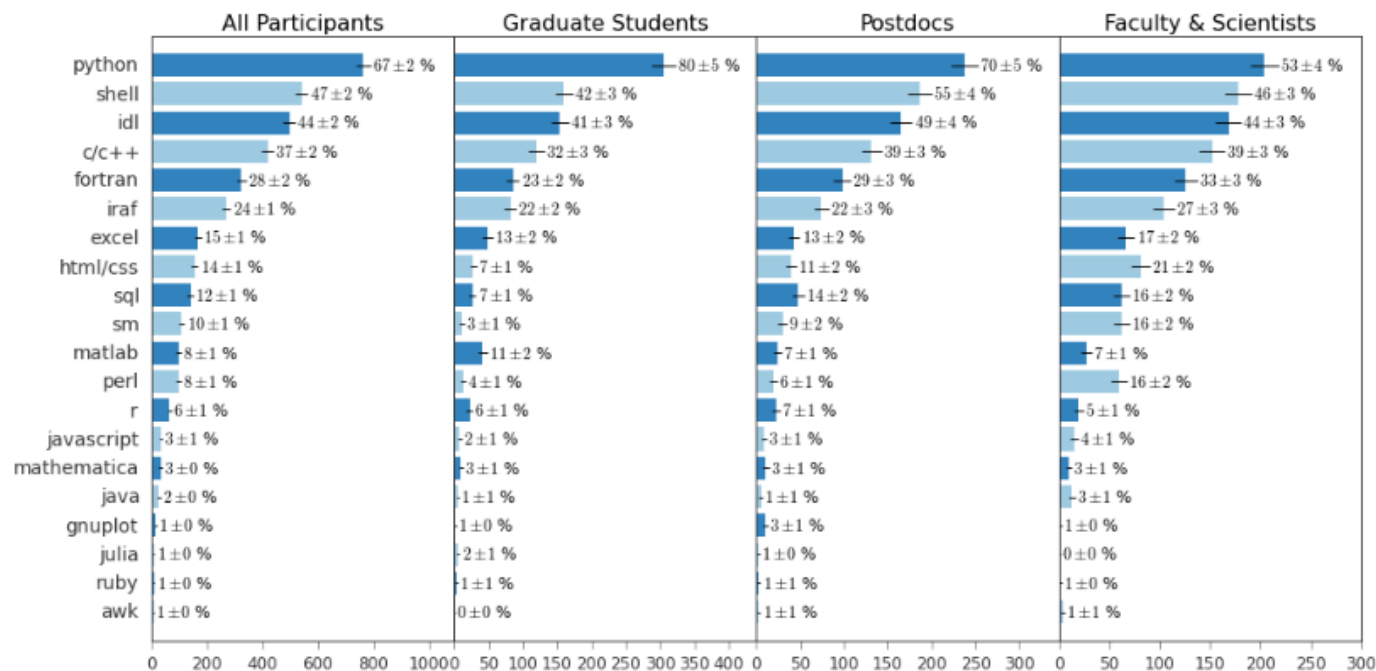Tollerud, E (2015)
arXiv:1507.03989

FIG. 10.— Responses to the prompt "Select any of these that you regularly use in your research", sub-divided by career stage. The options listed included: IDL, IRAF, Python, C, Fortran, Perl, Javascript, Julia, Matlab, Java, R, SQL, Shell Scripting, STAN, Figaro, Ruby, HML/CSS, Supermongo (labeled "sm"), and Excel or other spreadsheets (labeled "excel"). Respondents could add additional tools not listed using an "Other" box. Among the tools in this plot, four items were added by respondents: C++, Mathematica, gnuplot and awk. Note that the x axis varies between panels.

pyESASky

- A Jupyter widget to visualise ESASky in Jupyter notebooks

- Idea came about when collaborating with the WWT/Glue team from Harvard (headed by Alyssa Goodman) during July/August. Decided to develop the widget for the following reasons:

  - Fulfils API requirements to include ESASky in the Glue application http://glueviz.org

  - Large percentage of astronomers now using python (Astropy) and the statistics for python astroquery modules are impressive:

    astroquery.esasky: 25,000 queries in 10 months
    astroquery.gaia: 20% of Gaia archive users: 100,000s queries/month &↑

  - Can lead to improvements in the UI side (user added footprints, tables etc)

- pyESASky Beta is currently being developed, along with example Jupyter Notebook use cases.

Demo

European Space Agency

Short- to medium-term:

- SSO functionality updates

- Release pyESASky version 1.0

- Prototype for new IVOA protocols (in integration version): ObsLocTAP & ObjVis

- Data: Spitzer images, spectra and catalogues; ALMA data (almost ready); Automatic update of data from missions in operation; include data from other missions / telescopes

- Allow user provided tables, footprints and catalogues from VizieR

- Updates to the viewer (inc. tuning the contrast of the images)

- Time Domain

Conclusions

➢ AAUG recommendations from June were extremely useful!

Where the AAUG can help:

➢ Identify the most important functionalities for ESASky.

➢ Monitor the development to ensure it's best meeting the needs of the user community within the resources available.

ESASky v3.0

- HiPS: 9 Spitzer cold SEIP IRAC

- Science mode / Explorer mode with different functionalities.

- Improved SSO functionality, with refined cross-matches and new objects.

- Links to the WWT; New loook-and-feel; improved Header and resizable data panel; improvements to touch devices; improved cross browsers support