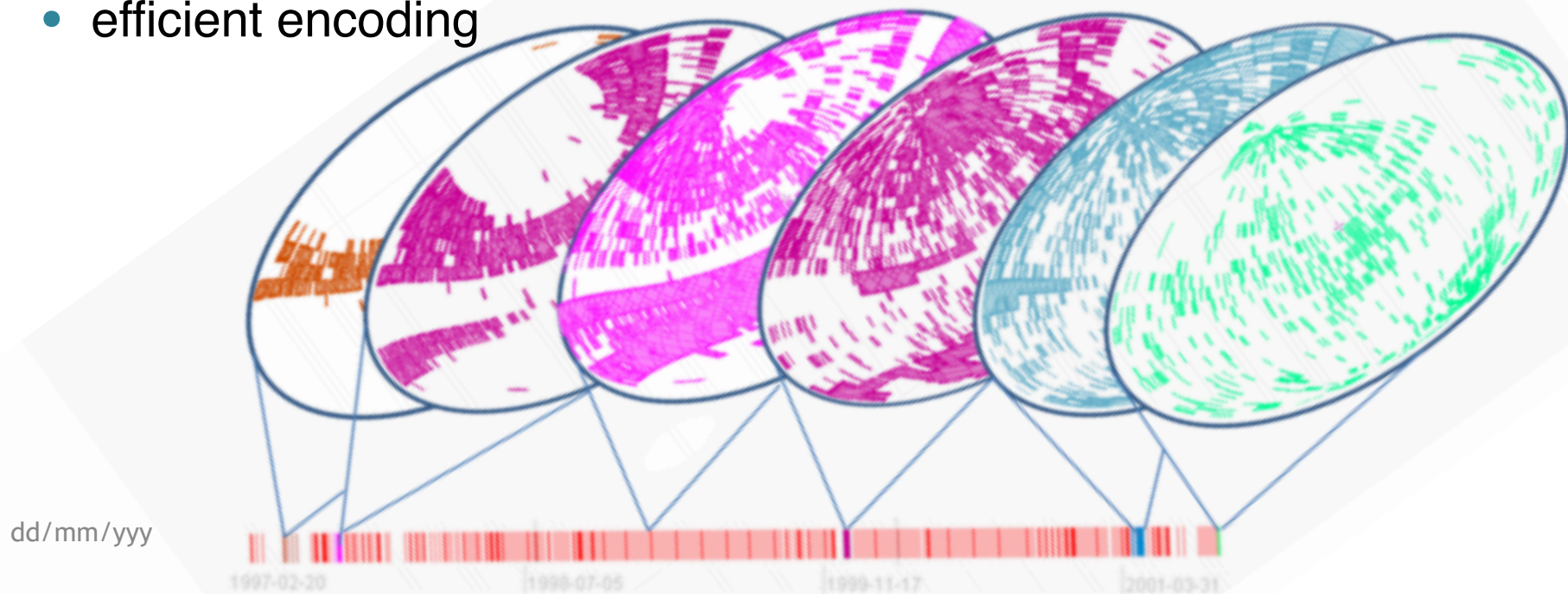# MOC status

Ada Nebot

Les auteurs : Pierre Fernique (CDS), Ada Nebot (CDS), Daniel Durand (CADC), Matthieu Baumann (CDS), Thomas Boch (CDS), Giuseppe Greco (EGO-Virgo), Tom Donaldson (STScI/NASA), Francois-Xavier Pineau (CDS), Mark Taylor (University of Bristol), Wil O'Mullane (Rubin Observatory), Martin Reinecke (Max Plank), Sébastien Derrière (CDS)

CENTRE DE DONNÉES ASTRONOMIQUES DE STRASBOURG

ESCAPE
European Science Cluster of Astronomy &
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☐ MOC 2.0: Find data

- MOC < 2.0 defines space coverage
- MOC 2.0 extends to temporal domain: defines space-time coverage for
  - tables, catalogues, collection of images, …
- Defined using four basic building blocks:
  - discretization
  - unique reference system
  - hierarchization
  - efficient encoding

1997-02-20   1990-07-05   1999-11-17   2001-03-31

MOC 2.0: Use Cases

- Allows us to:
    - Perform fast operations (unions, intersections, …)
    - Compare coverages of multiple datasets
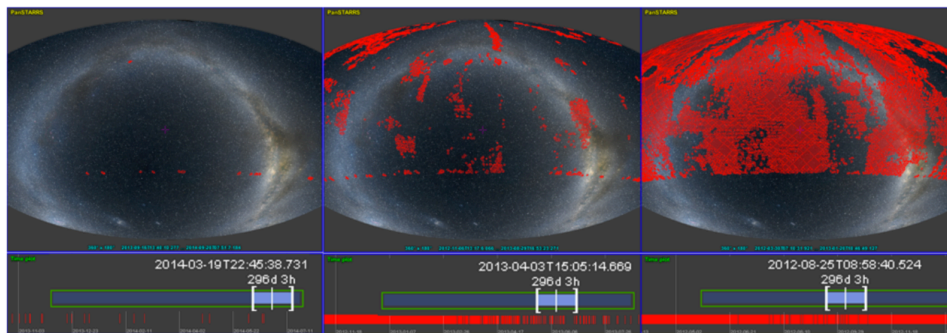   - Query databases using MOC

Figure 2: PanSTARRS observations and the associated spatial and temporal coverage within three different periods of time. The volume of the PanSTARRS MOC at a temporal resolution of about 17 minutes and spatial resolution of 52 arcsec is 320 MB.
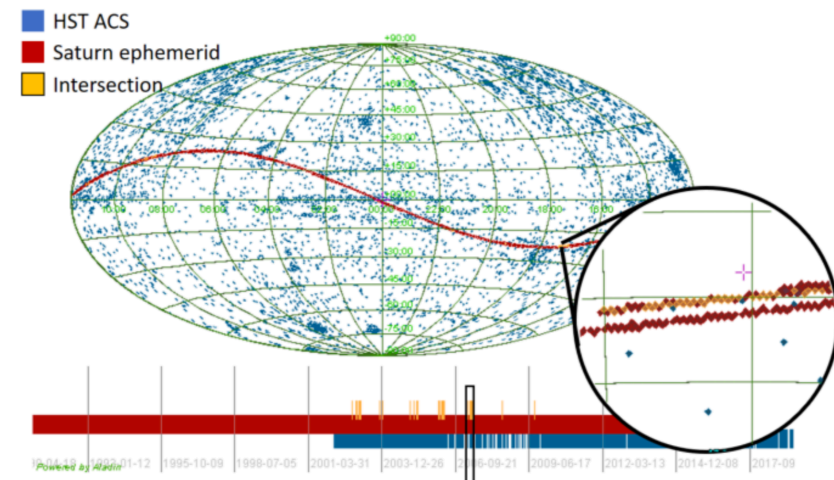

Figure 3: Intersection of HST ACS observations and Saturn ephemeris Space-Time-MOC

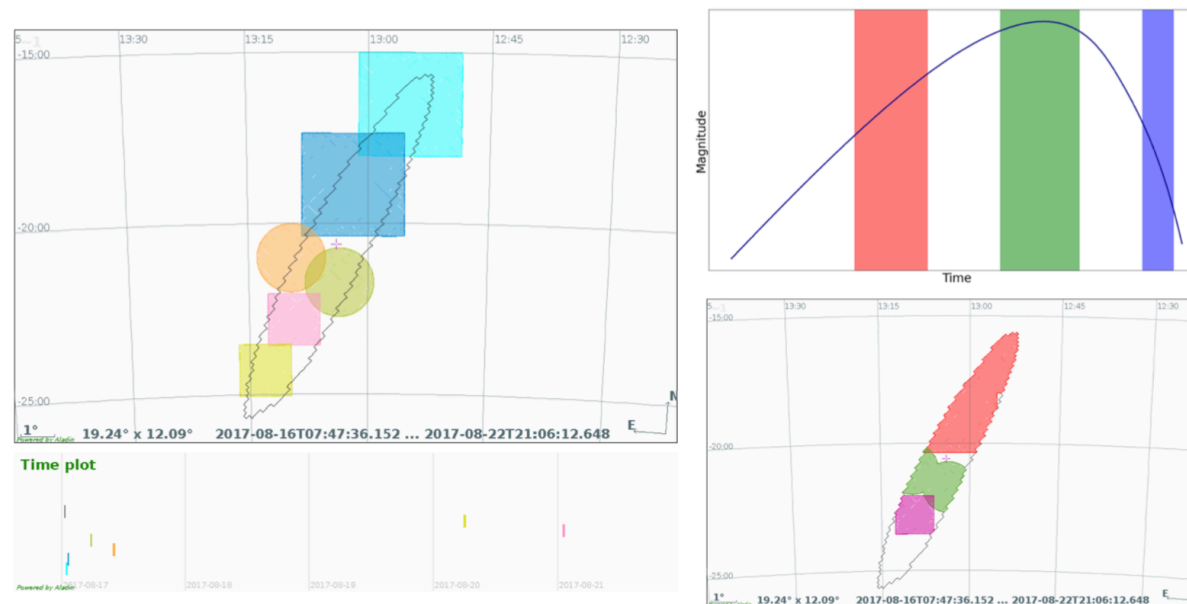- Usage for Gravitational Wave localisation and EM follow-up prioritisation

Figure 4: A mock electromagnetic follow-up campaign of a gravitational-wave sky localization over a time period (left). A schematic kilonova light-curve with the observations temporal coverage (top right) and associated spatial coverage (bottom right).

MOC 2.0: Status

https://www.ivoa.net/documents/MOC/20201112/index.html

MOC: Multi-Order Coverage map

Version 2.0

IVOA Working Draft 2020-11-12

Working group
    Applications
This version
    http://www.ivoa.net/documents/moc/20201112
Latest version
    http://www.ivoa.net/documents/moc
Previous versions
    Version1.1
    Version1.0
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Editor(s)
    Pierre Fernique, Ada Nebot, Daniel Durand

- WD distributed in November 2020
- Presented at interop & ADASS
- Comments received through the Apps mailing list

MOC 2.0: Status

- **Documentation:**

  https://www.ivoa.net/documents/MOC/20201112/index.html

- **Implementations:**

  - MOC & Aladin: java

    http://aladin.u-strasbg.fr/java/stmoc/index.html

  - MOC & Python: mocpy

    https://cds-astro.github.io/mocpy/

    Jupyter Notebooks with examples

- **Validator:**

  - MOCServer

    http://alasky.unistra.fr/MocServer/lint

MOC 2.0: Next steps

- Next steps:
  - Update document taking into account comments, mainly
    - Reintroduce ASCII serialisation
    - Relax the language to allow for future implementations of non celestial MOCs (e.g. planet surface)
  - Publish new version
    - through the ivoa/documents webpage
    - on GitHub with help of Apps WG
  - Towards std:
    - Upgrade the reference implementations and validator and check their compatibility with the updated doc
    - Create a specific page in the IVOA wiki for RFC period
    - PR at or near the May 2021 Interop meeting