Application Working group

HiPS discussion: news, standard adaptation, next steps

IVOA Interop Victoria May 2017

Chair: Pierre Fernique
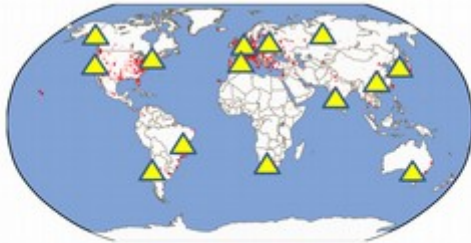Vice-chair: Tom Donaldson

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Remember Santiago...

6 month later : big success
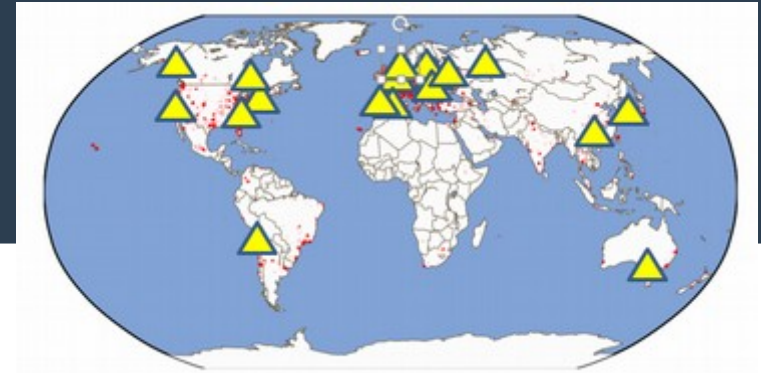
- **HiPS network: 20 HiPS nodes (+8)**
  - Leiden, IRAP, SSC, 3xCDS, AMIGA, svo.cab, IAS, ESAC, JAX + **IPAC, ANU, 2xCADC, HEASARC, China-VO, MPIK, PADC**
  - Not yet official: **ESO, Stellarium AWS/S3, Chili-VO** (in prep)

    => **"HiPS IVOA cloud"** in an heterogenous context +multiple institutes/funding

- **HiPS clients : 8 independent implementations (+4),**
  - Aladin Desktop (java), Aladin Lite (JS/canvas) + derived tools, MIZAR/CNES (JS/WebGL + **Firefly/IPAC (JS), Stellarium (C), Kstar (C?)**, +40 Aladin Lite implementations
  - In preparation : **OpenWWT/china-VO, *Globalsphere*/NAOJ? (WebGL)**

- **HiPS libs : astropy Hipspy** (Google summer of code)

HiPS content status

- **HiPS data**
  - **500** HiPS (**+100**), mirrored 2 times in average
  - **200** TB of pixels/cubes/catalogs

- **New HiPS last months**
  - Big reference surveys: **PanSTARRs**, Skymapper, VISTA, SWIFT, DECaLS, DECaPS, DES, BASS, Gaia2,...
  - Planetary maps (+50)

- **Usage:** about **600 000 HiPS tile queries per day** (all clients & servers) => +200 000 last months

# New: Stellarium

- **Stellarium** supports HiPS since March 2018 (v0.18.0)

  - 17 000 launchs/day, 2 000 000 hits on HiPS server (alaskybis), 100000 HiPS tiles/day (rough estimation)

  - C development (client code + HiPS generation code) only based on IVOA document

  - Deployement of an Amazon S3 HiPS node (on Stellarium funding)

  - Used for sky background, catalog access (GaiaDR2) and planets

New: KStars

- **Kstars** supports HiPS since April 2018
  - Independent development
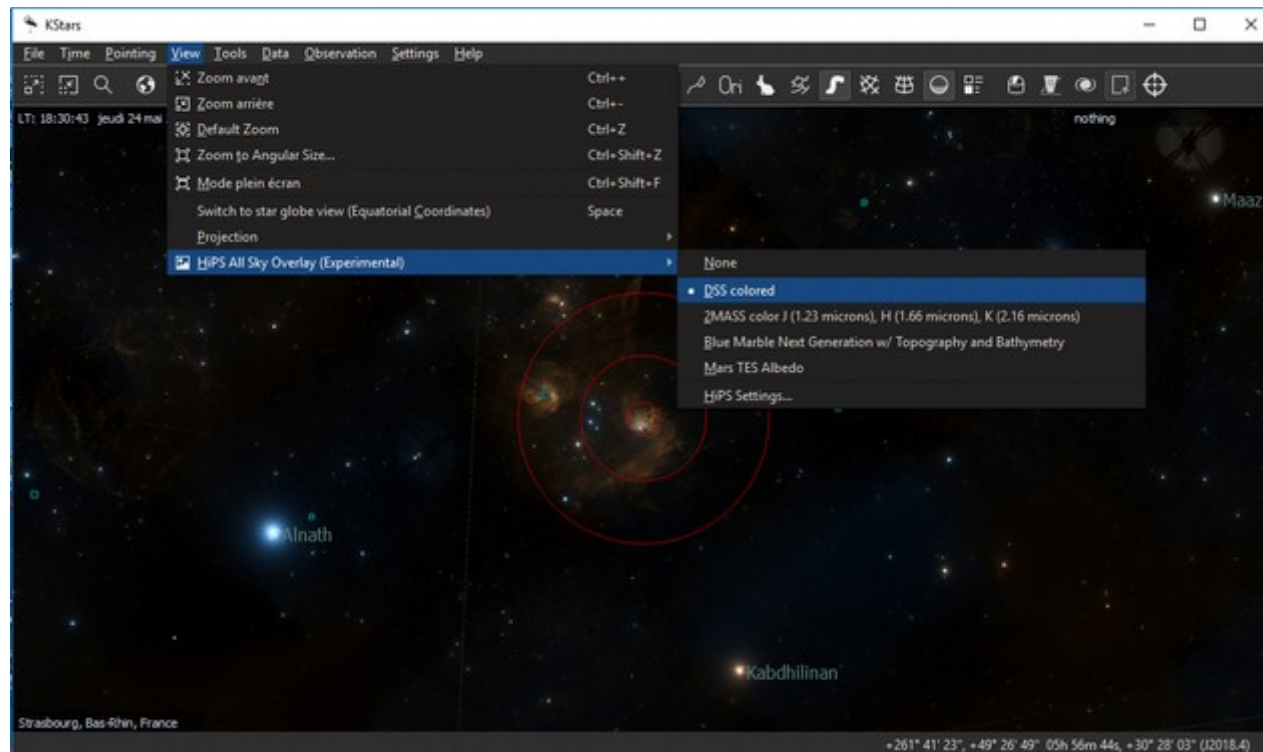
HiPS open questions

- **Is this new outreach/planetarium usage a good thing ?**
  - For IVOA standard and knowledge dissemination, certainly yes !

- **Is it manageable ?**
  - Probably yes, but…
  - Convince them to use HiPS network "correctly" => share the effort
  - Mirror some HiPS on their own HiPS node
  - Create categories for HiPS node / HiPS clients ?

HiPS future large surveys

- **LSST**
  - HiPS sky viewer for LSST EPO (cf. ADASS P3-140 poster)
  - Adoption of RFC-441 "Request to adopt HiPS and MOC as standard DM data products"
    "HiPS and MOC are becoming the standard in representing all-sky images and coverages. This RFC requests that DM adopt those two standards and make the corresponding data products to fulfill the above DMS requirement. This does not replace any other data products that DM already committed to generate."

- **Euclid ?**

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Feedback on the standard...

- **Too few HiPS nodes** declared in the **VO registry** (4/20)
  - Too complex action? Alternative solution by delegation (purx ?)
- **A few HiPS providers forgets time to time to update their HiPS list**
  - Bad impact on the HiPS network (HiPS success is based on a shared effort). Please keep it up-to-date
- **"properties" file globally correctly fill out. Thanks**
- **a few pre-IVOA HiPS => not valid. Should be updated**
- **A few mirrored HiPS not synchronized. Please check them**

  => Next interop: An Ops report on HiPS usage
- **CORS or not CORS ? Problematic for JS clients.**

HiPS standard adjustement
(from implementor feedback)

- Proposal: **Discourage "low resolution enablers" usage** (allsky file)

- Only used to avoid client subdivision process for low order tiles.

- In practice, **complicates the live** of clients and servers

- Bring "*too simple*" clients (keeping big distorsions)

4.3 Low resolution "enablers"

The drawing of the lowest HiPS orders that correspond to large sky regions (>30 deg) can be difficult because of:

a) the high level of distortion of these tiles when a basic/fast 4 corners bilinear drawing method is used (see section 6).

b) the large number of tiles required for drawing large regions, even at low HiPS order.

To ease the client drawing process, two enablers may be implemented for the lower orders: order omission and Allsky preview.

4.3.1 Order omission

The low orders: order 0 (12 tiles), order 1 (48 tiles), order 2 (192 tiles) **may** be simply omitted, meaning that the survey files are not provided at these low resolutions.

4.3.2 *Allsky* preview file

The tiles at low orders (0 to 3) may be packaged together into a unique file called *Allsky*. These files **must** be located in the *NorderK* corresponding directory (where K is between 0 and 3). The associated regular tiles **must not** be removed, notably for supporting basic HiPS clients. The method to generate the *Allsky* file depends on the nature of surveys:

- *Image HiPS Allsky:* The *Allsky* file is built as an array of tiles, stored side by side in the left-to-right order. The width of this array **must** be the square root of the number of the tiles of the order. For instance, the width of this array at order 3 is 27 ((int)sqrt(768)). To avoid having a too large *Allsky* file, the resolution of each tile **may** be

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Discourage "Allsky" file alternative Encourage low order tiles generation

- **Actually both are optional in the IVOA document**

    => no impact, no modification of the standard document, nor clients and servers.

- **Aladin Desktop already ok**

- **Could require an upgrade for "not fully HiPS compatible" clients** (Aladin Lite, Stellarium) **which requires Allsky file.**

- **Hipsgen will continue to generate both low order tiles and allsky** (at least for 2 or 3 years)

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Next steps...

- **Do we have to specialize HiPS nodes**
  - ex: only for scientifical usage, only for me… ?
- **Do we have to manage global stats ?**
- **Encourage HiPS contributors to use HiPS true pixels (FITS tiles):**
  - Skyview already does it
  - Dynamical colored tile mixer prototype [server side]
  - XMM/ObAS+CDS tool (crop FITS cutout on the fly [server side])
  - SIAv2 CDS server (in preparation)