How to deal with the VLTI : *use the JMMC services !*

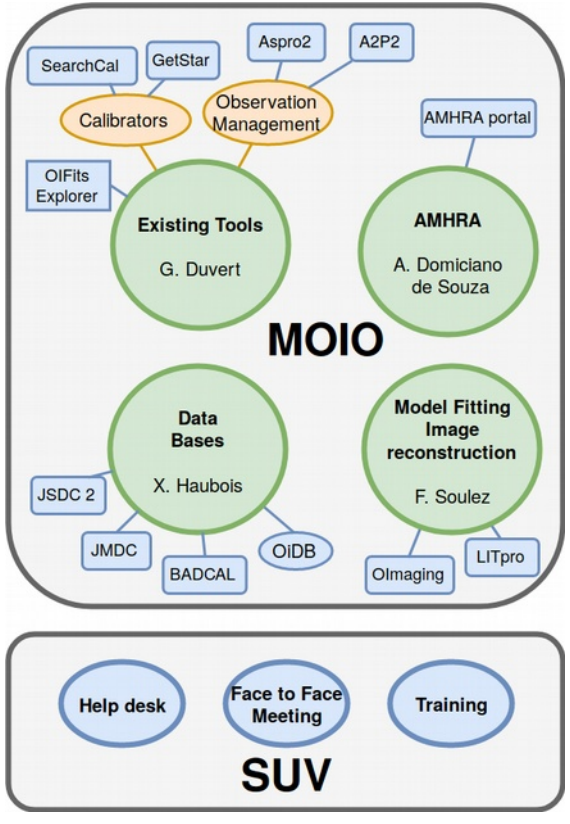
Laurent Bourgès

REF: JMMC-PRE-0000-0029

JMMC = MOIO + SUV services

The Jean-Marie Mariotti Center is the French Center for Infrared & Optical Interferometry:

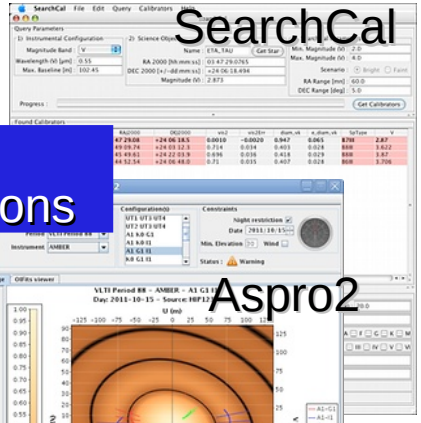
- MOIO service: Software & Service provider
  - R&D network (4 sites ~ 20 scientists)
  - Services are « *VO* » compliant & interoperable
- SUV service: French VLTI Center
  - Support center: face-to-face help to reduce data, perform data analysis
  - Training network



Service overview

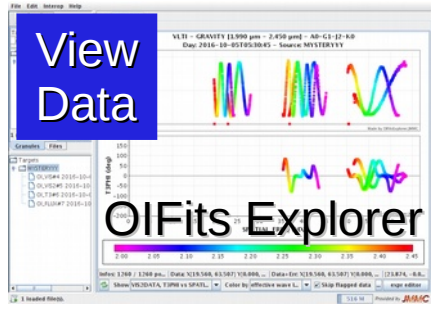
+ Training

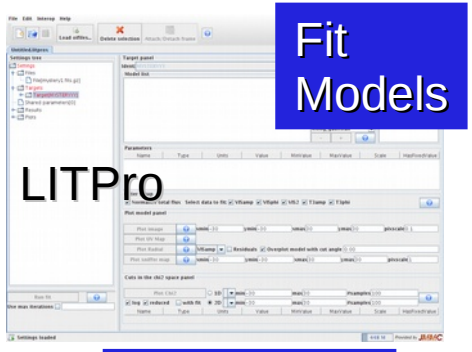
+ User Support

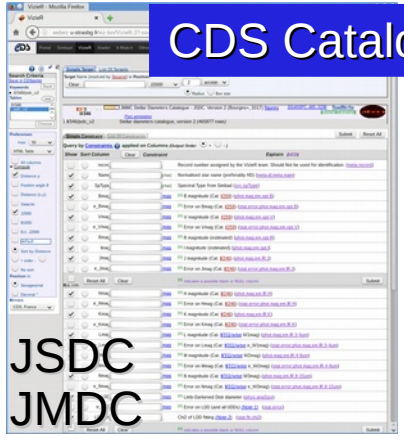


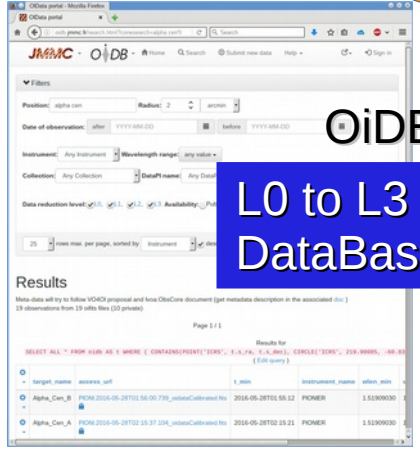
Reduce data

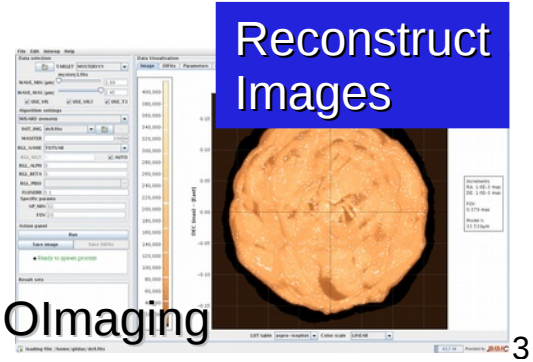
amdlib
pndrs







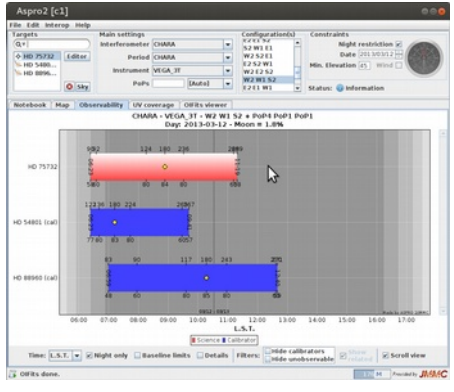




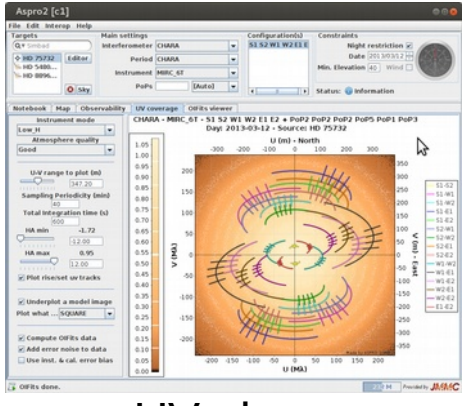
ASPRO2: **A**stronomical **S**oftware to **PR**epare **O**bservations

Complete observation preparation tool for VLTI / CHARA (all instruments)

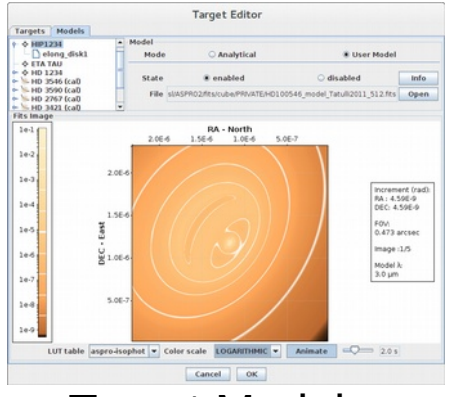
- Estimates observation feasibility (proposal preparation)
- Simulates data sets with proper noise modeling in OIFITS format
- Feeds directly OBs to ESO p2
- Handles & shares your large source lists, helps night scheduling



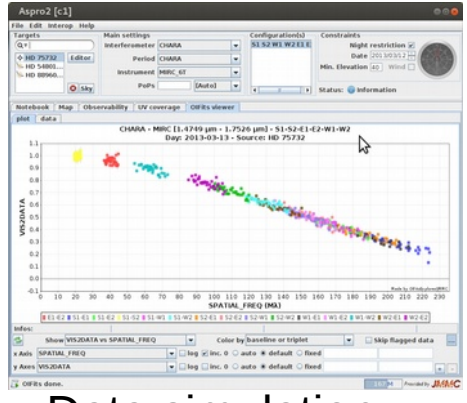
Observability



UV plane



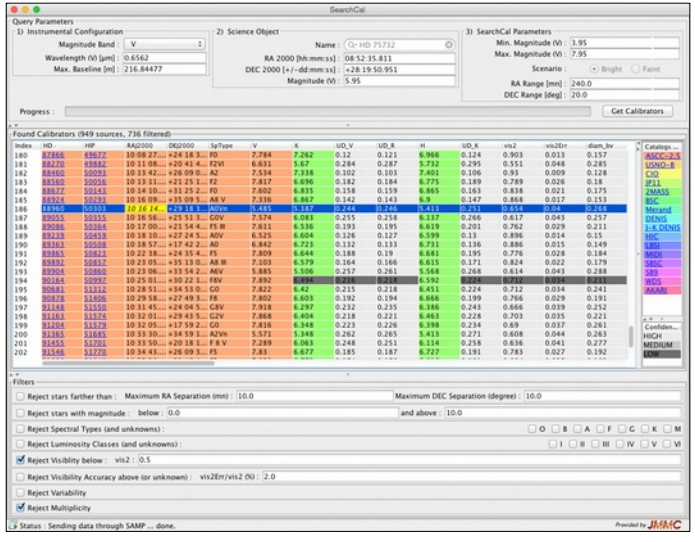
Target Model

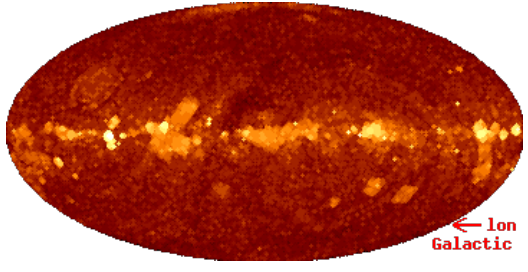


Data simulation

SearchCal / JSDC 2

- SearchCal service: 20 years of expertise in finding calibrator stars i.e. expected visibility is accurately known
  - Search Calibrator stars close to your science object and its photometry
  - Filter results (SP type, luminosity, V2 …)
  - Based on JSDC 2 + Faint mode (2.5m stars)
- JSDC 2: CDS Vizier II/346 ~ 465 877 stellar diameters => ESO calibrator list

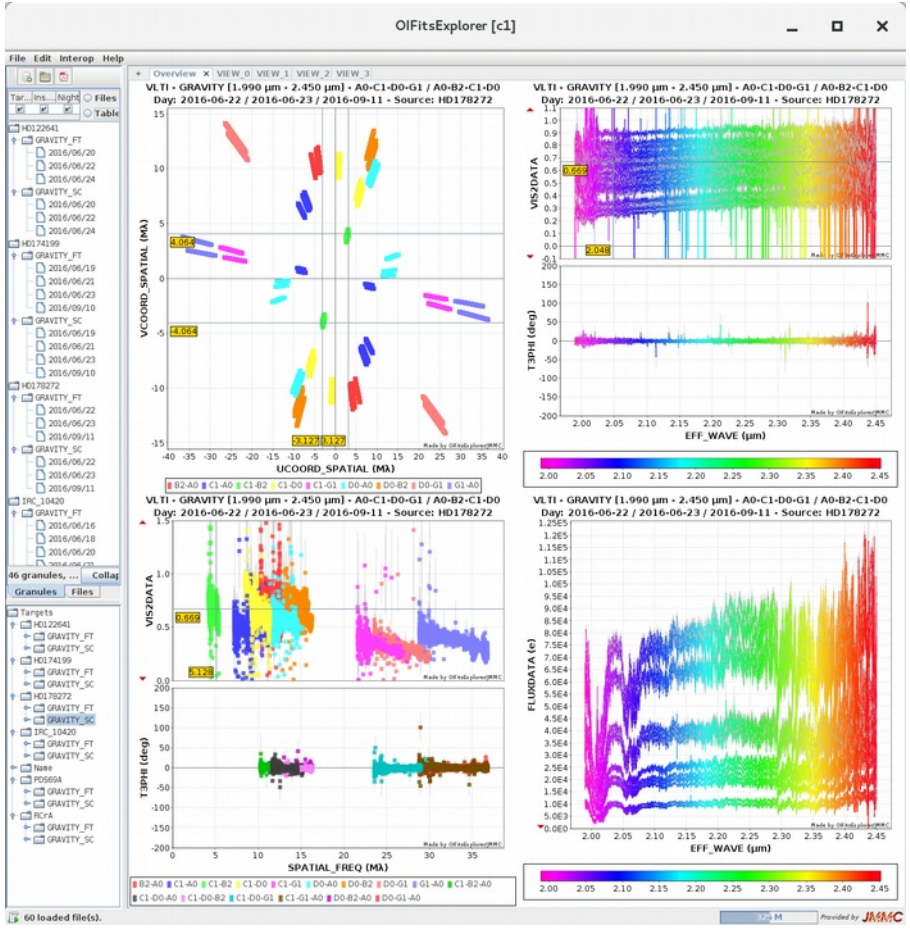




"Pseudomagnitudes and differential surface brightness: Application to the apparent diameter of stars." by Chelli A., Duvert G., Bourgès L. et al., 2016, A&A, 589, 112

OIFITS Explorer

- OIFITS standard has been instrumental in the success of Optical Interferometry
- OIFITS Explorer allows to load, select / merge & visualize OIFITS files (even a large collection)
- *New*: export selection to OIFits file
- Visualization:
  - UV plane
  - V2, T3, VIS, flux…
  - Extra quantities: HA, PA, SNR…

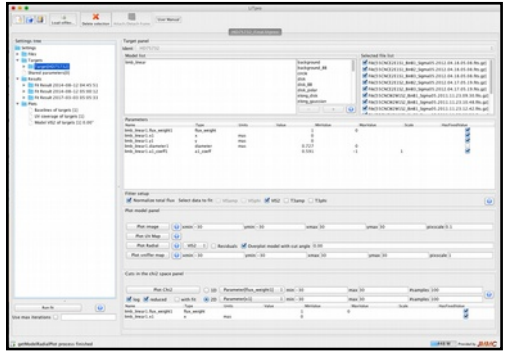


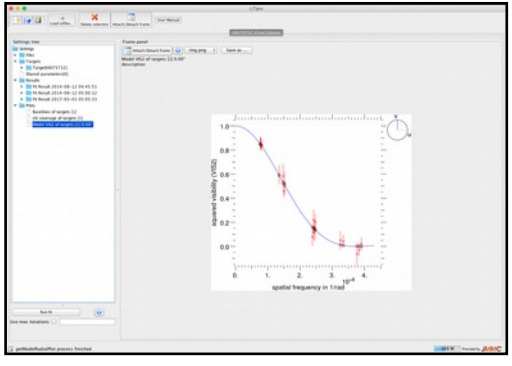
LITpro model fitting

LITpro fits a model, built from elementary analytical functions, on observation data (OIFITS)

- Provides lots of functions (disk, black-body, gaussian)
  + elongated / stretched variants
- Runs Fit:
  - Results: parameters with error bars + chi2
  - Plots: residuals + chi2 map
- Work in progress:
  - Genetic algorithm ~ global Fitter
  - User functions to expand existing model functions

    => astro-physical & polychromatic models





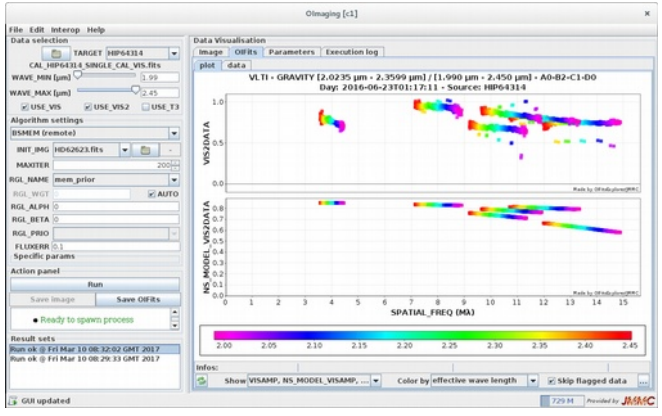
OImaging

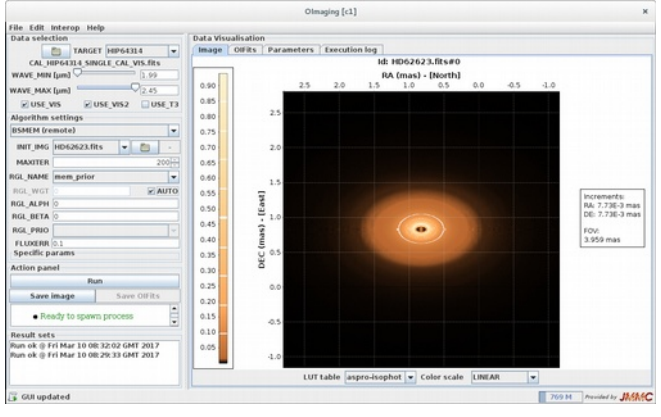
New: Oimaging provides a generic interface to run image reconstruction software:

- Based on OIFITS + FITS image (OI_Image extension for parameters)
- Integration of BSMEM / WISARD / MiRA, running remotely on JMMC server (docker)
- Visualization of images, plots (residuals)

Future:

- Improve prior-image generation, data selection, image comparison, job processing
- *Contact us to integrate your imaging software !*



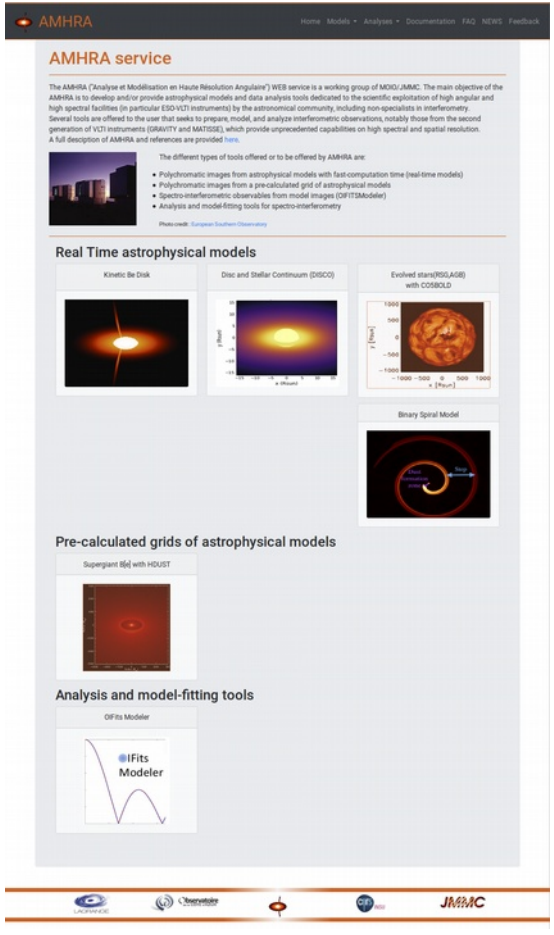


AMHRA "**A**nalyse et **M**odélisation en **H**aute **R**ésolution **A**ngulaire"

https://amhra.oca.eu/

New: AMHRA is a portal to the state-of-the-art models of stellar environment and surfaces.

- Provides polychromatic images, ready to use models in ASPRO, LITpro, OImaging
  - Fast computation time: Kinetic Be Disk, Disc and Stellar Continuum, Evolved stars, Binary Spiral Model
  - Pre-calculated grid: Supergiant B[e]
  - *Soon*: stellar emission profiles (better than limb-darkening laws)
- Provides analysis tools to compare observation data with these models (OIFits Modeler)



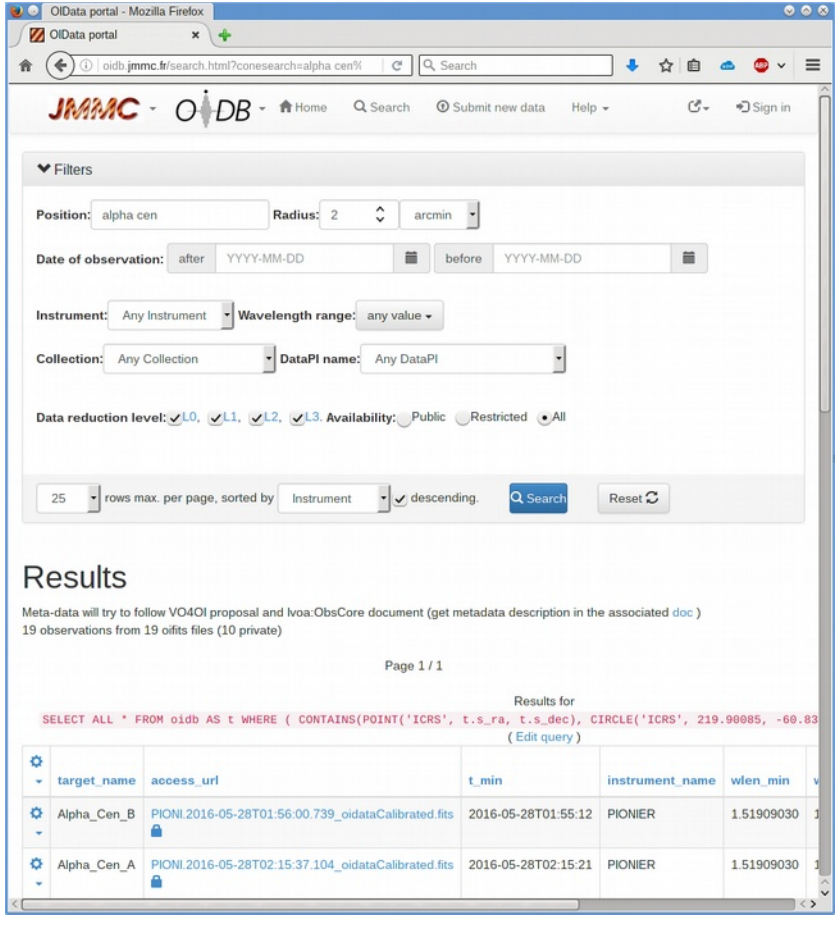
Optical Interferometry DataBase

http://oidb.jmmc.fr

The worldwide database of Optical Interferometry observations

- Query & download OIFITS files
- Observation logs
  - ESO / VLTI
  - CHARA: Classic / Climb, Vega
- Observation data:
  - Reduced PIONIER data
  - Published data

Please upload your published datasets !



Last word ...

http://www.jmmc.fr/

- Visit www.jmmc.fr to get software & access freely JMMC services
- Feedback is welcome:
  - Bug reports & Enhancement requests
  - User support
- SUV helpdesk is now open !
- JMMC contributes to Open-Source: https://github.com/JMMC-OpenDev

Thank you for your attention !