

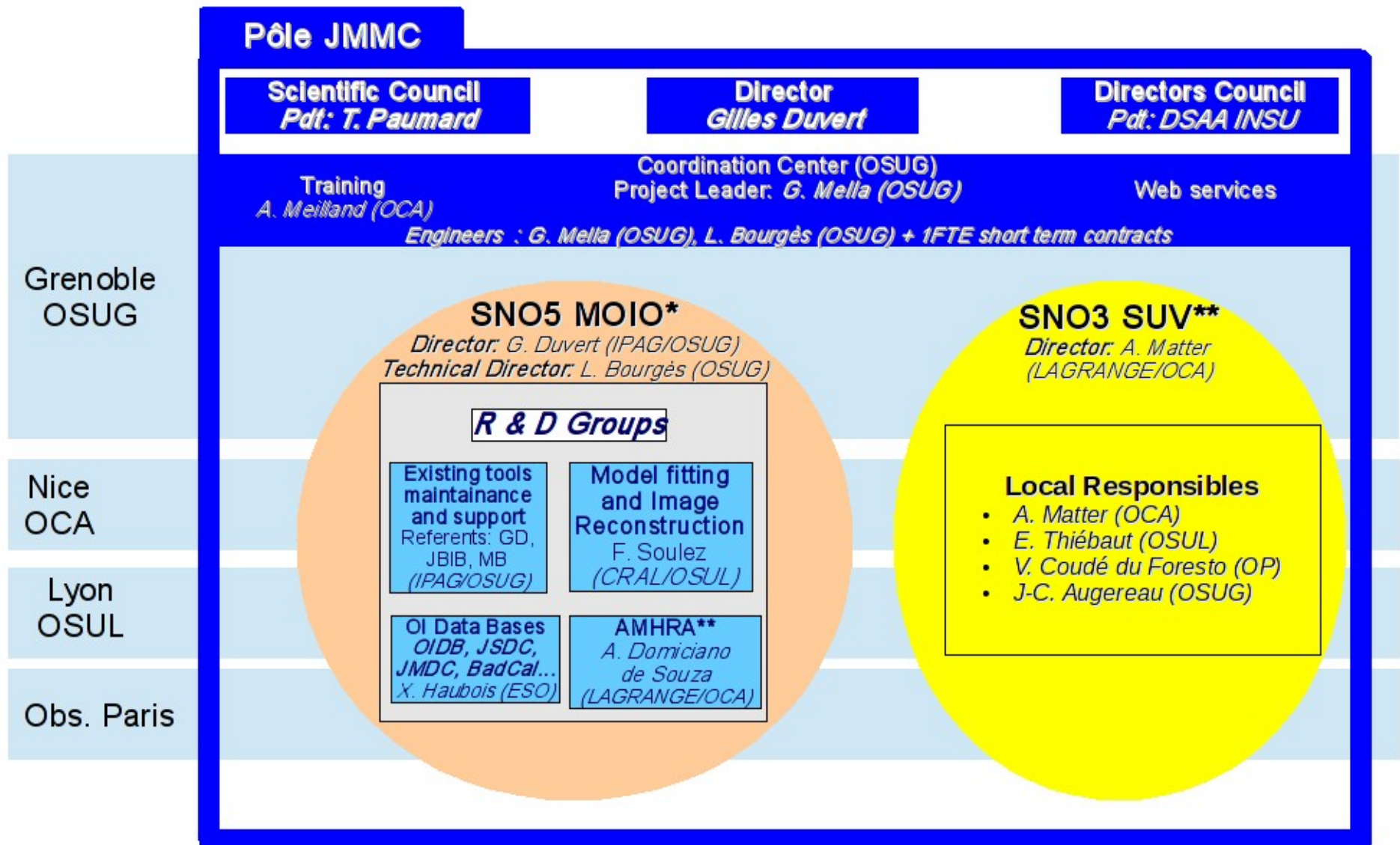
JMMC Services & OV



Gilles Duvert
Guillaume Mella
Laurent Bourgès



Pôle JMMC = MOIO + SUV



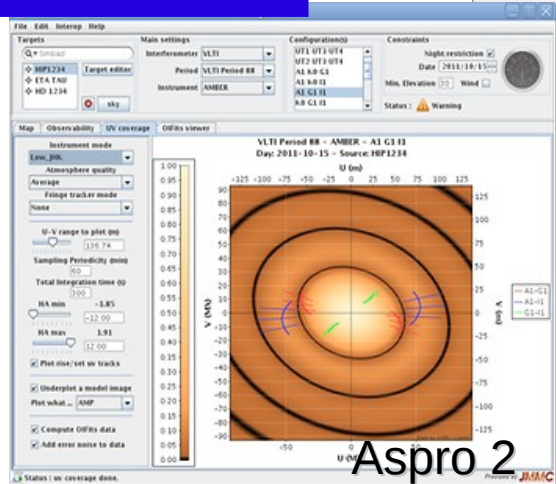
(*) Méthodes et Outils pour l'Interférométrie Optique

(**) Support Utilisateur VLTI

(***) Analyse et Modélisation en Haute Résolution Angulaire

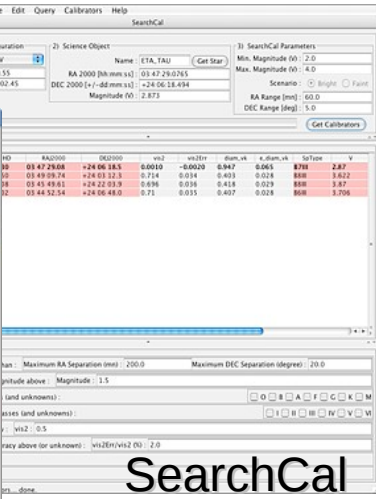
Services : boucle complète

Prepare Observations

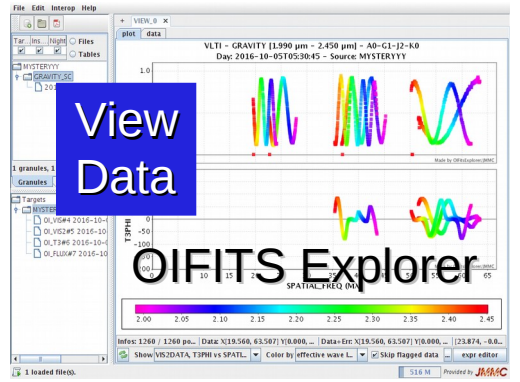


Aspro 2

Reduce data
amdlib
pndrs



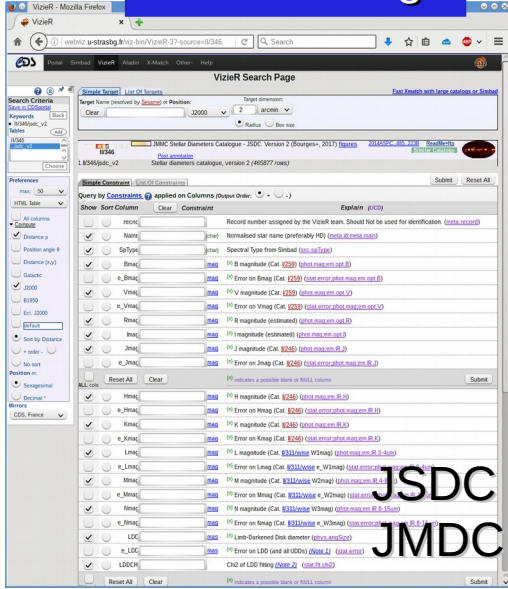
SearchCal



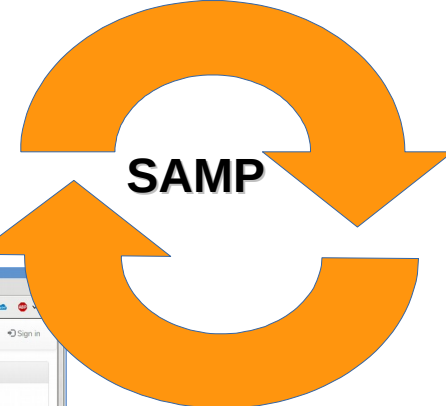
View Data

OIFITS Explorer

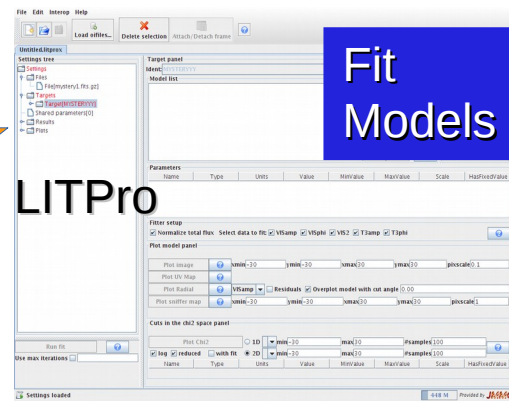
CDS Catalogs



JSDC
JMDC

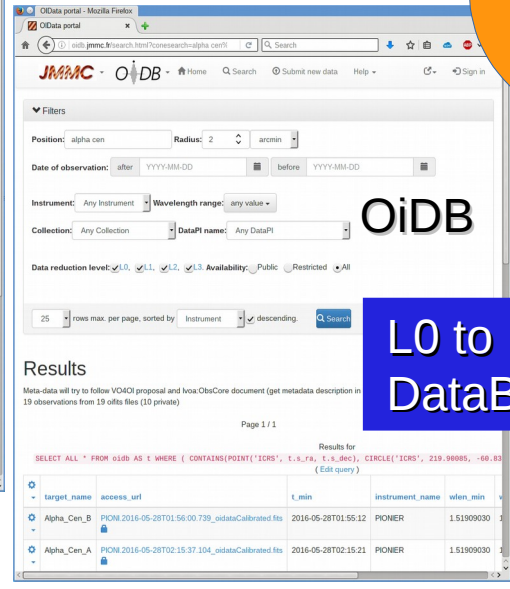


Fit Models



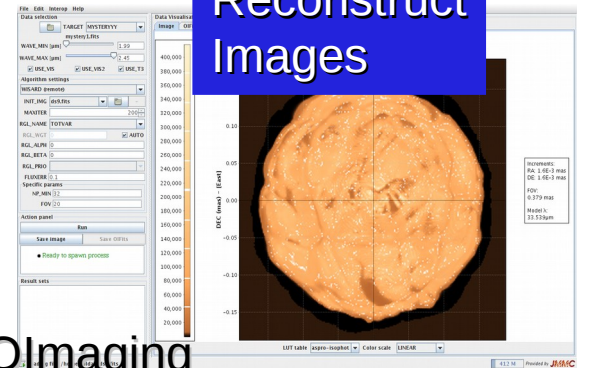
LITPro

OiDB



L0 to L3
DataBases

Reconstruct Images



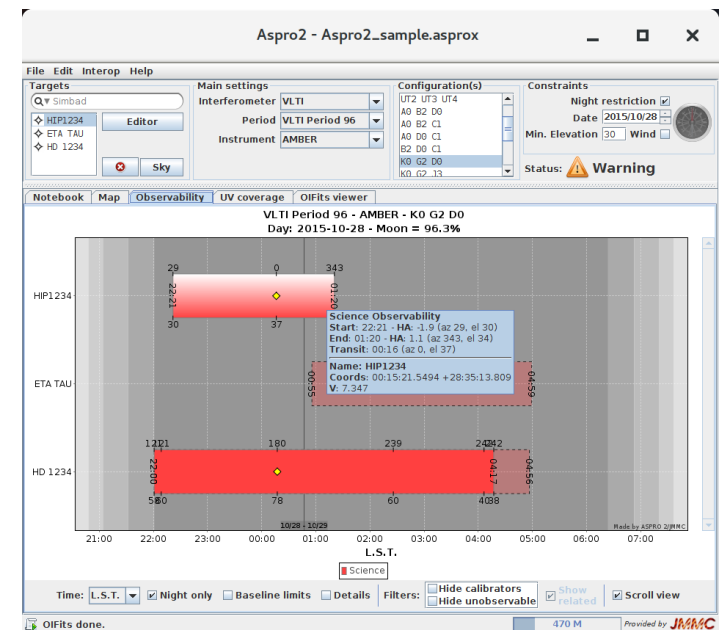
OImaging

Formats & Standards

- **OIFITS 2**: données interférométriques VIS, VIS2, T3
- Images / Cubes FITS : modèles
- **SAMP** : interopérabilité entre logiciels JMMC et topcat, Simbad, VizieR, Aladin
 - Difficulté avec web / https
- **VOTable 1.x** :
 - plusieurs versions / namespaces à supporter

Outil pivot de gestion des Observations (sources + config) : préparation / suivi / intégration avec outils des observatoires

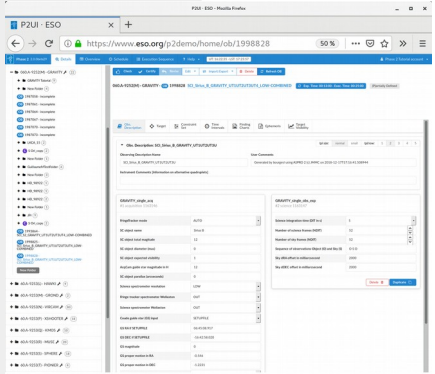
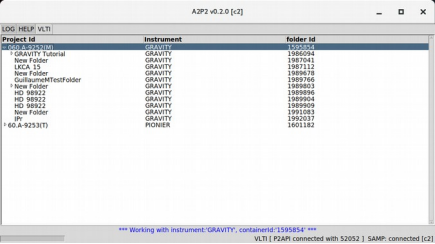
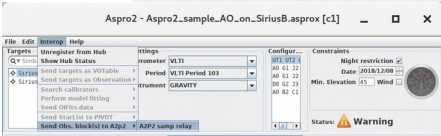
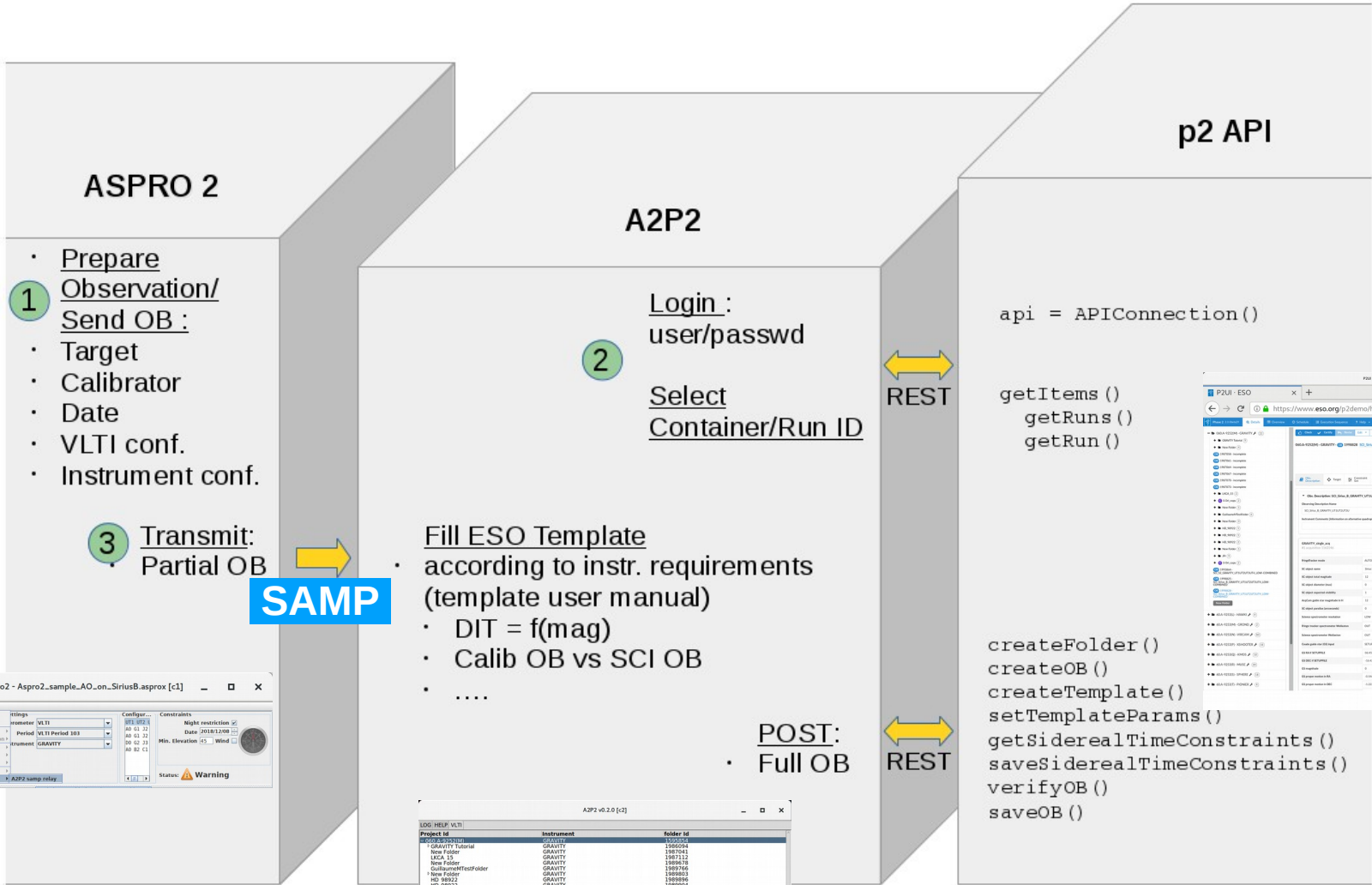
- **Description** interféromètres VLTI / CHARA + instruments GRAVITY, MATISSE...
 - Lien avec référentiels VO ?
- Import / export sources, O.B
- Modèles image / cube FITS
 - Lien vers AMHRA
- Simulation données / ETC

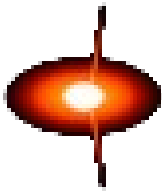


A2P2

- A2P2 : outil open-source python
 - <https://github.com/JMMC-OpenDev/a2p2> pour collaboration avec instrument scientists
 - Passerelle SAMP pour transmettre O.B (obxml) vers ESO P2 (API REST)
- Perspectives :
 - Intégration avancée CHARA
 - intégration portail de gestion des observations (demandes, suivi logs L0)

A2P2 workflow





AMHRA

SAMP ?

"Analyse et Modélisation en Haute Résolution Angulaire"

- Interface web d'accès aux modèles astrophysiques :
 - Calcul en temps réel
 - Grille pré-calculée
- Interopérabilité ?
 - Format FITS cube
 - SAMP + https: statut ?
- VO ? UWS, VO SimD... ?

AMHRA service

The AMHRA ("Analyse et Modélisation en Haute Résolution Angulaire") WEB service is a working group of MOIG/JMMC. The main objective of the AMHRA is to develop and/or provide astrophysical models and data analysis tools dedicated to the scientific exploitation of high angular and high spectral facilities (in particular ESO-VLT instruments) by the astronomical community, including non-specialists in interferometry. Several tools are offered to the user that seeks to prepare, model, and analyze interferometric observations, notably those from the second generation of VLT instruments (GRAVITY and MATISSE), which provide unprecedented capabilities on high spectral and spatial resolution. A full description of AMHRA and references are provided [here](#).

The different types of tools offered or to be offered by AMHRA are:

- Polychromatic images from astrophysical models with fast-computation time (real-time models)
- Polychromatic images from a pre-calculated grid of astrophysical models
- Spectro-interferometric observables from model images (OIFitsModeler)
- Analysis and model-fitting tools for spectro-interferometry

Photo credit: European Southern Observatory

Real Time astrophysical models

Kinetic Be Disk

Disc and Stellar Continuum (DISCO)

Evolved stars(RSGAGB) with COSBOLD

Binary Spiral Model

Pre-calculated grids of astrophysical models

Supergiant [O] with HDUST

Analysis and model-fitting tools

OIFits Modeler

iFits Modeler



SAMP

VOTable

SearchCal / JSDC

Estimation de diamètres stellaires à partir des photométries

- SearchCal Server: utilise VizieR VOTABLE astrores !
 - Catalogue JSDC : [VizieR II/346](#)
 - CDS Xmatch pour préparer candidats (SIMBAD x TYCHO2) ~ 2,5 M
 - Crossmatch 'maison' avec VizieR (pm) avec 2MASS, AllWise...
 - GetStar : simcli
- ? maintenance des interfaces 'has been' ?
- Evolutions demandées:
 - Focus sur Étoiles brillantes pour mission PLATO
 - Mise à jour (mesures JMDC, Simbad SPTYPE) ?
 - Étendre catalogue sur tout Simbad...

SearchCal [c1]

Query Parameters

1) Instrumental Configur... 2) Science Object 3) SearchCal Parameters

Magnitude Band: K RA 2000 [hh:mm:ss]: 03 47 29.07655 Max. Magnitude [0]: 5.0

Wavelength [0] [um]: 2.2 DEC 2000 [-j:dd:mm:ss]: -24 06 18.4883 Magnitude [0]: 2.636

Scenario: Bright Faint

RA Range [min]: 120.0 DEC Range [deg]: 5.0

Progress: Get Calibrators

Found Calibrators (394 sources, 372 filtered)

Index	dist	ID	RA2000	DEC2000	vis2	vis2Err	diam_chi2	LDD	e_LDD [1]	Catalog
1	2,955E-6	23630	03 47 29.0762	+24 06 18.4788	0,916	0,014	0,009	0,942	8,28	ASCC-2
2	1,671	22885	03 41 18.0744	+25 00 29.3940	0,955	0,002	0,695	0,628	2,3	USNO-2
3	2,281	24354	03 51 36.6223	+22 01 53.8852	0,94	0,01	0,181	0,725	8,2	CDS
4	4,329	22259	03 36 04.9130	+27 35 35.4948	0,959	0,002	0,322	0,593	2,37	IP11
5	4,445	25804	04 04 41.7154	+22 04 54.9300	0,619	0,056	0,042	1,98	8,6	2MASS
6	4,839	24531	03 28 21.2774	+26 16 14.2768	0,961	0,002	1,124	0,383	2,34	IRK
7	6,881	20880	03 20 38.2877	+26 55 38.5320	0,966	0,002	0,24	0,545	2,37	Melan-1
8	6,978	20946	04 16 41.6004	+26 21 28.7028	0,919	0,015	0,101	0,85	8,92	DENIS
9	8,027	22348	04 19 27.2849	+28 08 11.5092	0,897	0,022	0,087	1,007	9,81	LKDR
10	8,266	27482	04 21 15.2582	+27 21 00.8856	0,523	0,06	0,044	2,308	7,97	IRK
11	8,807	18927	03 10 27.0463	+26 53 46.4352	0,624	0,033	0,01	1,276	9,75	LS1
12	9,295	18787	03 11 37.7645	+19 43 36.0264	0,67	0,052	0,006	1,818	9,17	MJO1
13	10,036	28531	04 31 13.1738	+23 20 45.8196	0,793	0,038	0,056	1,395	9,75	SBC
14	11,431	29246	04 37 24.5962	+25 43 38.5428	0,934	0,01	0,093	0,76	7,53	SBP
15	12,753	20832	04 43 05.0359	+26 14 35.0664	0,963	0,002	1,611	0,57	2,21	WDS
16	15,641	31254	04 55 34.5811	+27 12 08.7156	0,644	0,003	1,048	0,7	2,37	AKARI
17	15,842		04 57 01.4546	+25 49 36.8328	0,94	0,004	0,247	0,735	2,99	HP2
18	17,649	16713	02 31 47.8277	+21 22 31.0332	0,952	0,007	0,073	0,649	7,28	
19	18,939	14876	02 24 40.0411	+27 39 34.2972	0,941	0,009	0,538	0,718	7,59	Confiden...
20	22,815	12827	02 06 55.9885	+26 19 24.2040	0,967	0,002	0,575	0,531	2,37	HIGH
21	23,944	12525	02 03 32.8649	+27 28 55.1028	0,964	0,002	1,444	0,955	2,19	MEDIUM
22	25,051	12132	01 59 35.6834	+21 03 30.8520	0,899	0,019	0,003	0,947	9,75	LOW

Filters

Reject stars farther than: Maximum RA Separation (mn): 10.0 Maximum DEC Separation (degree): 10.0

Reject stars with magnitude: below: 0.0 and above: 10.0

Reject Spectral Types (and unknowns): B A F G K M

Reject Luminosity Classes (and unknowns): I II III IV V VI

Reject Visibility below: vis2: 0.5

Reject Visibility Accuracy above (or unknown): vis2ERRvis2 (%): 2.0

Reject Variability

Reject Multiplicity

Reject Invalid Object Types

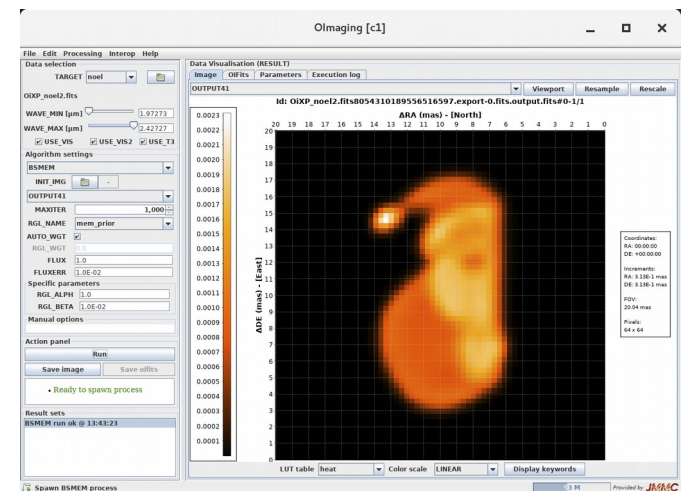
Diameter quality: Maximum chi square: 2.0 Maximum relative error (%): 10.0

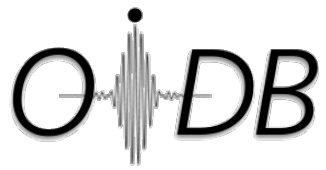
searching calibrators... done. 436 M Provided by JMMC

OImaging

Interface de reconstruction d'images

- Format OIFITS + OI_Image extension = format d'échange compact
- UWS service (taplib) \Leftrightarrow 3 logiciels BSMEM, WISARD, MiRA (1 image Docker)
- Evolution vers Kubernetes pour mises à jour plus souples : redis pour les files d'attentes + 1 image Docker par logiciel scientifique
- Release publique : Noël 2018





Optical Interferometry DataBase

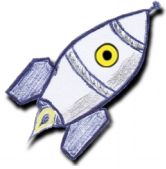
SAMP

TAP

VOtable

- Import Observation Logs ESO (VizieR TAP B/ESO)
- TAP (taplib) + 'data links' (quick plots, pdf)
- TODO : déclarer service dans Registry
- Besoin SUV d'instances privées pour collaborations :
 - Droits d'accès par groupe ?
 - Embargo données ?
 - Synchronisation ?





AppLauncher & Java Web Start

- Java Web Start (JNLP) support ?
 - Deprecated in JDK 11
 - Solution : OpenJDK + IcedTea-Web 11 ?
 - Alternatives :
 - Full jar + check for updates
 - JDK+application package ? Too big !
- Evolution AppLauncher pour fournir javaws ou d'autres formats (jar, zip) via registry ?

Conclusion

- VO rocks ! Votable, UWS, ObsTAP + SAMP très bénéfique : FAIR
- Forte dépendance sur les services CDS (Simbad, VizieR) et SAMP
- Maintenance à faire des interfaces CDS et librairies VO 'deprecated' dans les services du JMMC (manpower)
- Contributions Open Source ++