A global Database for Optical Interferometry

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and the rest of the JMMC team

Optical Interferometry

- Very high angular resolution (~a few mas)

- Objects: anything that is not too faint (H,K < 8-9)

- Stellar diameters, stellar environments/surfaces, compagnon detection,...

- Instrument stability, atmospheric conditions,etc —> reduced data are precious

- ~10 OI facilities in 2005, today : 5-6

- Heaps of unexploited data —> need for a bigger user community

OI Papers

Pie chart legend:
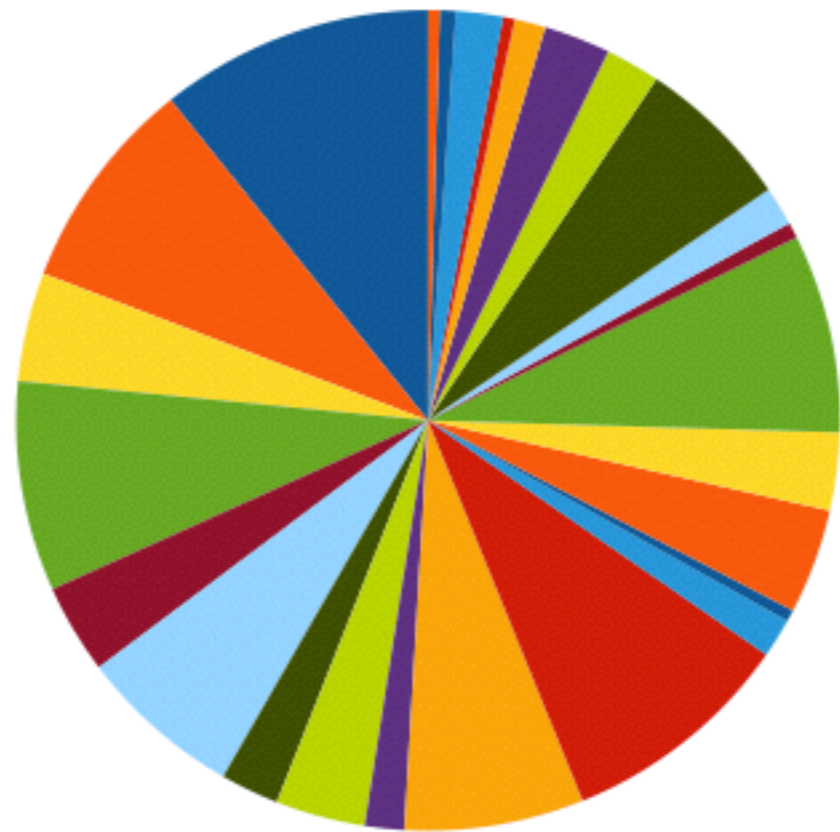
- Mira variables
- Cepheid variables
- Rapidly rotating stars
- Dust shells of late type stars
- Subgiant stars
- Supergiants
- Galactic Center
- Debris disks
- Low-mass stars
- Exoplanets
- Young massive stars
- R CrB stars
- Asteroids
- Herbig Ae/Be stars
- Be stars
- T Tauri Stars, FU Orionis stars
- Active Galactic Nuclei
- Giant stars
- Novae
- AGB and Post-AGB stars
- Dwarf stars
- Wolf-Rayet stars
- B[e] stars
- Luminous Blue Variables
- Carbon stars
- Exozodiacal Dust

Bar chart legend:
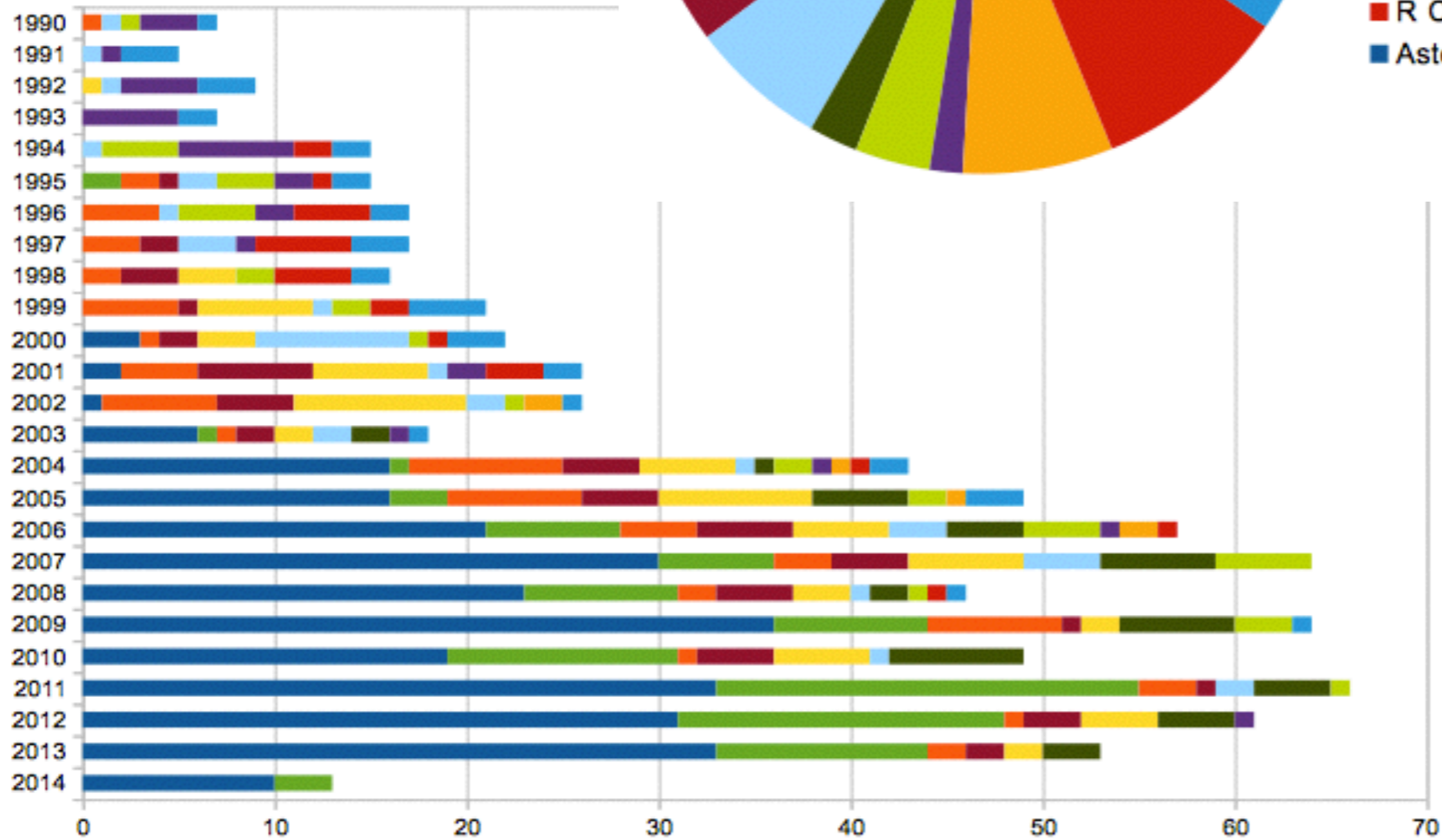
- COAST
- GI2T
- LBTI
- Mark III
- SUSI
- Keck
- ISI
- PTI
- NPOI
- IOTA
- CHARA
- VLTI

> 1100 articles since 1970
From the OLBIN publication database
http://jmmc.fr/bibdb/

Diffusion of OI data

Creation of a database:

- Promote, preserve and <u>centralize</u> interferometric data
- Easy to use for non specialists
- Improve operability within the VO philosophy
- Dynamise collaborations, boost data analysis

+ a public web portal:

- Access to calibrated science-ready data
- Browse weekly updated observation logs

The content of the database

- L0 metadata (observation logs)

- **OIFITS files**, the « standard » format
  —> arrays of Vis/phase + keywords (small files)

- L2,L3 : REDUCED science-ready OIFITS

Observations

↓

L0 Raw data

↓ Reduction

L1 OIFITS

↓ Calibration

L2,L3 OIFITS

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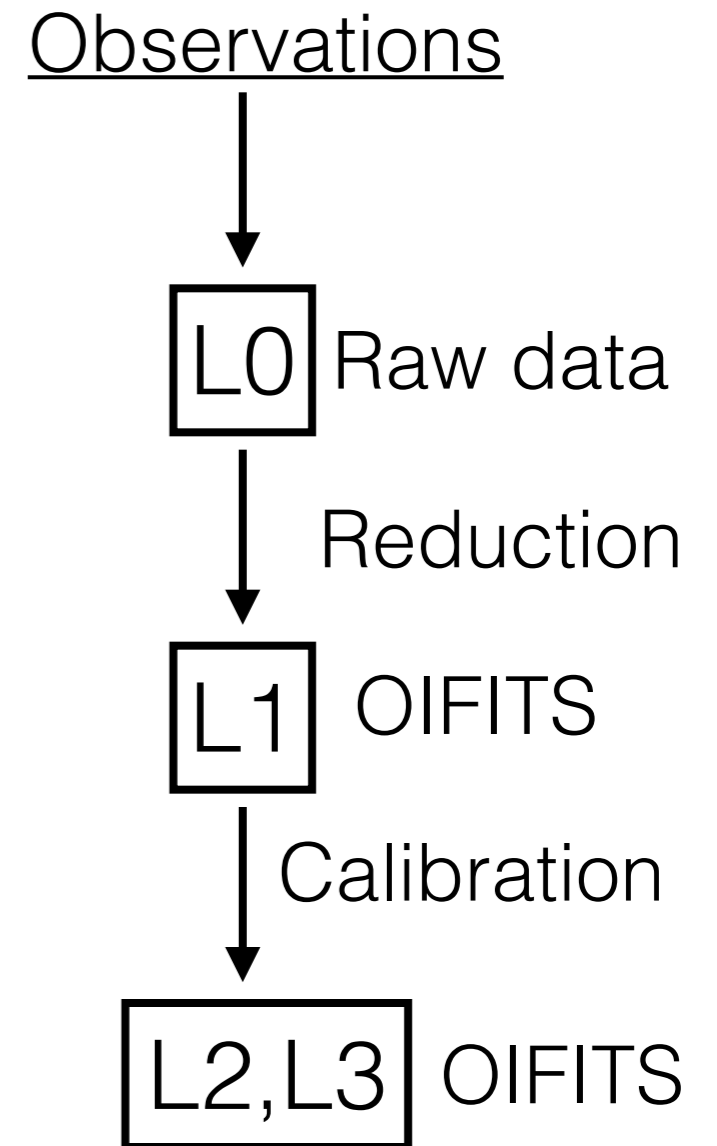
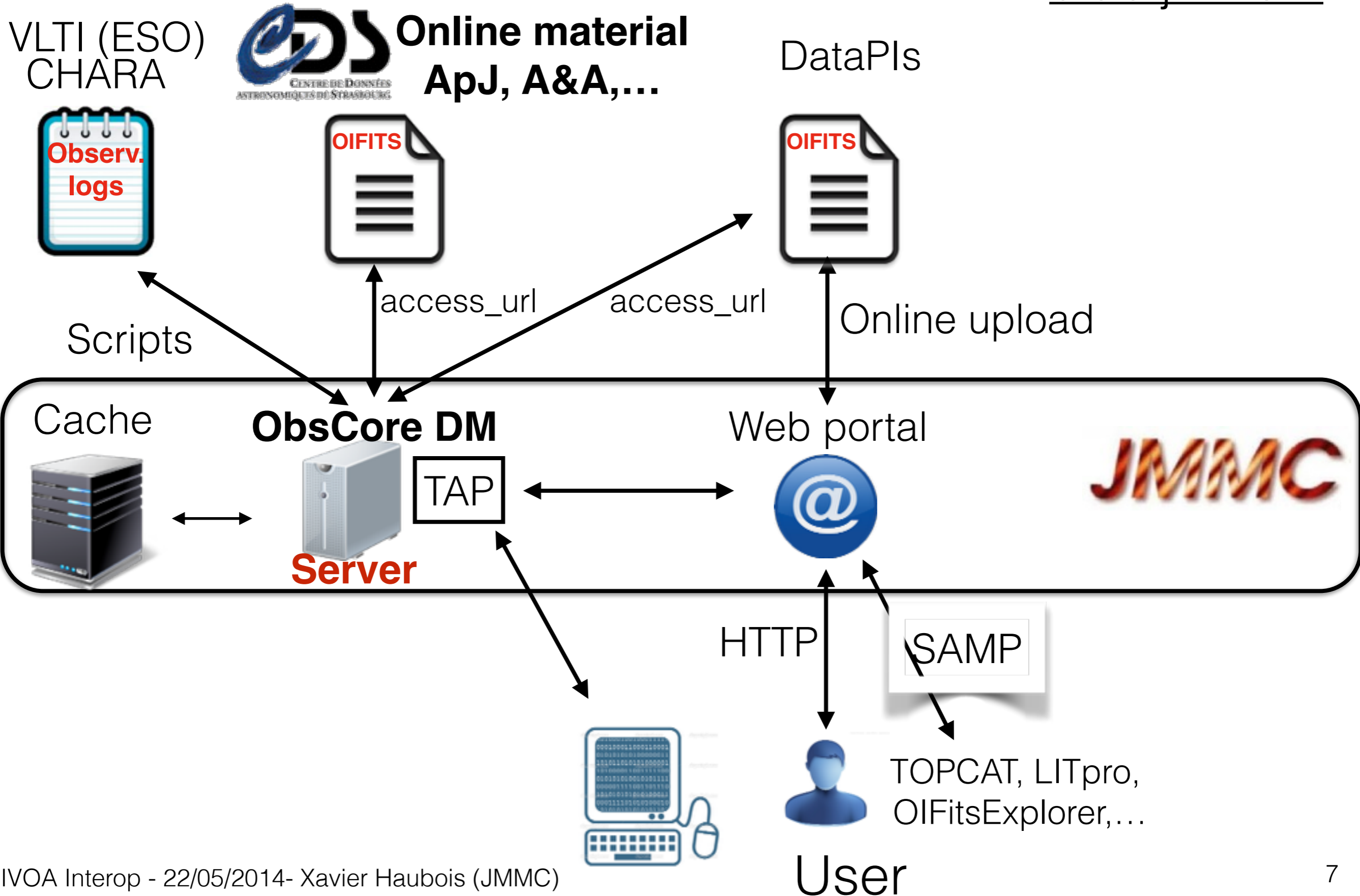# The OIDB guidelines

- 1st rule: We don't touch the datafiles

- 2nd rule: WE DON'T TOUCH THE DATAFILES !

- One server that hosts/links to remote data files

- Data quality, quick-look plots

- **Interoperability** tools within the VO

- Statistics of the downloads

- Curation: manage the data along their evolution

- Bridge between data users and observers

- Realisation started in December 2013

Architecture

VLTI (ESO) CHARA

Online material ApJ, A&A,…

DataPIs

Observ. logs

OIFITS

OIFITS

Scripts

access_url

access_url

Online upload

Cache

ObsCore DM

Web portal

TAP

Server

HTTP

SAMP

TOPCAT, LITpro, OIFitsExplorer,…

User

Observation logs (L0 metadata)

OIData portal   Home ▾   Help ▾   ⚠ Prototype under development, do not use in productio

[HD135742 ⬍]

[Search]

L0 metadata

ObjectName Identifiers	Observation Date MJD	Instrument + instrument mode	Wavelength range (microns)	Run/Program ID	Number of telescopes	Telescopes configuration	Notes	Published	PI contact details
HD135742	2012.07.21 2456129.000000	VEGA MR720-R	0.72	V38	3	W2-W1-S2			challouf mounir
HD135742	2012.07.22 2456130.000000	VEGA MR720-R	0.72	V38	3	W2-W1-S2	Abort		challouf mounir
HD135742	2012.07.22 2456130.000000	VEGA MR720-R	0.72	V38	3	W2-W1-S2	Abort		challouf mounir
HD135742	2012.07.22 2456130.000000	VEGA MR720-R	0.72	V38	3	W2-W1-S2	11 blocs only, density		challouf mounir

- Updated on a weekly basis
- CHARA instruments: VEGA, CLIMB, CLASSIC for now
- ESO, NPOI are next

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Granularity

- OIFITS = « Container format », not scientifically meaningful per se

- 1 granule = 1 target / 1 night / 1 instrument mode / 1 OIFITS

- Metadata for 1 granule = subset of an OIFITS keywords

- Create dataset IDs and provide DOIs to reference them in publications.

Query interface

Position: [Name or coordinates] [J2000 ⌄] **Radius:** [2] [arcmin ⌄]

Date of observation: between [YYYY-MM-DD] and [YYYY-MM-DD]

Instrument: [Any Instrument ⌄]

Wavelength range: ☐ U ☐ B ☐ V ☐ R ☐ I ☐ J ☐ H ☐ K ☐ L ☐ M ☐ N ☐ Q

Collection: [Any Collection ⌄]

DataPI name: [Any DataPI ⌄]

Data reduction level: ☐L0, ☐L1, ☐L2, ☐L3.

Sort by [Instrument ⌄] ☑ descending.   Max rows per page: [25 ⌄]

🔍 Search

- Form on a web portal -> ADQL query
- Underlying TAP interface, not yet exposed

Results

	target_name	access_url	s_ra pos.eq.ra	s_dec pos.eq.dec	em_min	em_max	instrument_name	nb_channels	nb_vis	nb_vis2	nb_t3
⚙ -	HD163506	89Her_24Aug2011_CHARA-VEGA_672nm.fits	00:00:00	+00:00:00	0.67250000	0.67250000	VEGA	1	0	1	0
⚙ -	HD163506	89Her_08Jun2011_CHARA-VEGA_672nm.fits	00:00:00	+00:00:00	0.66999996	0.66999996	VEGA	1	0	1	0
⚙ -	89 HER	89Her_23Jun2001-28Jul2001_PTI_K.fits	17:55:25.189	+26:02:59.974	2.10600000	2.10600000	PTI	1	0	1	0
⚙ -	89 HER	89Her_2001-2003_PTI_H.fits	17:55:25.189	+26:02:59.974	1.65300000	1.65300000	PTI	1	0	1	0
⚙ -	89_her	89Her_15-16Jun2003_IOTA_H.fits	17:55:24.1000	+26:02:58.999	1.65000000	1.65000000	IONIC3_v2	1	0	3	1
⚙ -	HD_163506	89Her_03-04-07Jul2012_CHARA-CLIMB_K.fits	17:55:25.189	+26:02:59.966	2.13290000	2.13290000	CHARA_NIRO	1	2	0	1
⚙ -	HD_163506	89Her_03-04-07Jul2012_CHARA-CLIMB_H.fits	17:55:25.189	+26:02:59.966	1.67310000	1.67310000	CHARA_NIRO	1	1	0	1
⚙ -	HD_163506	89Her_01May2012_CHARA-CLASSIC_K.fits	17:55:25.189	+26:02:59.966	2.13290000	2.13290000	CHARA_NIRO	1	1	0	0
⚙ -	HD_163506	89Her_01May2012_CHARA-CLASSIC_H.fits	17:55:25.189	+26:02:59.966	1.67310000	1.67310000	CHARA_NIRO	1	1	0	0
⚙ -	hd165524_E0-G0-H	89Her_31Mar2008_VLTI-AMBER_JHK.fits	18:05:30.142	+21:38:47.868	1.08547400	2.47941500	AMBER	49	0	49	49
⚙ -	HD9362	89Her_27Jun2012_VLTI-AMBER_JHK.fits	01:31:15.365	-49:04:22.332	1.12996300	2.56382700	AMBER	46	0	46	46
⚙ -	89her_E0-G0-H0_0	89Her_13Apr2007_VLTI-AMBER_JHK.fits	17:55:25.190	+26:03:00	1.08088100	2.47948200	AMBER	49	0	49	49
⚙ -	FKV1468	89Her_09Oct2011_NPOI_R2.fits	17:55:25.189	+26:02:59.966	0.56180000	0.85860000	6way_OB02	16	0	14	0
⚙ -	FKV1468	89Her_09Oct2011_NPOI_R1.fits	17:55:25.189	+26:02:59.966	0.56160000	0.86280000	6way_OB01	16	0	14	0

- Export VO Tables

- SAMP—> TOPCAT, JMMC apps: OIFitsExplorer,LITpro…

LITpro

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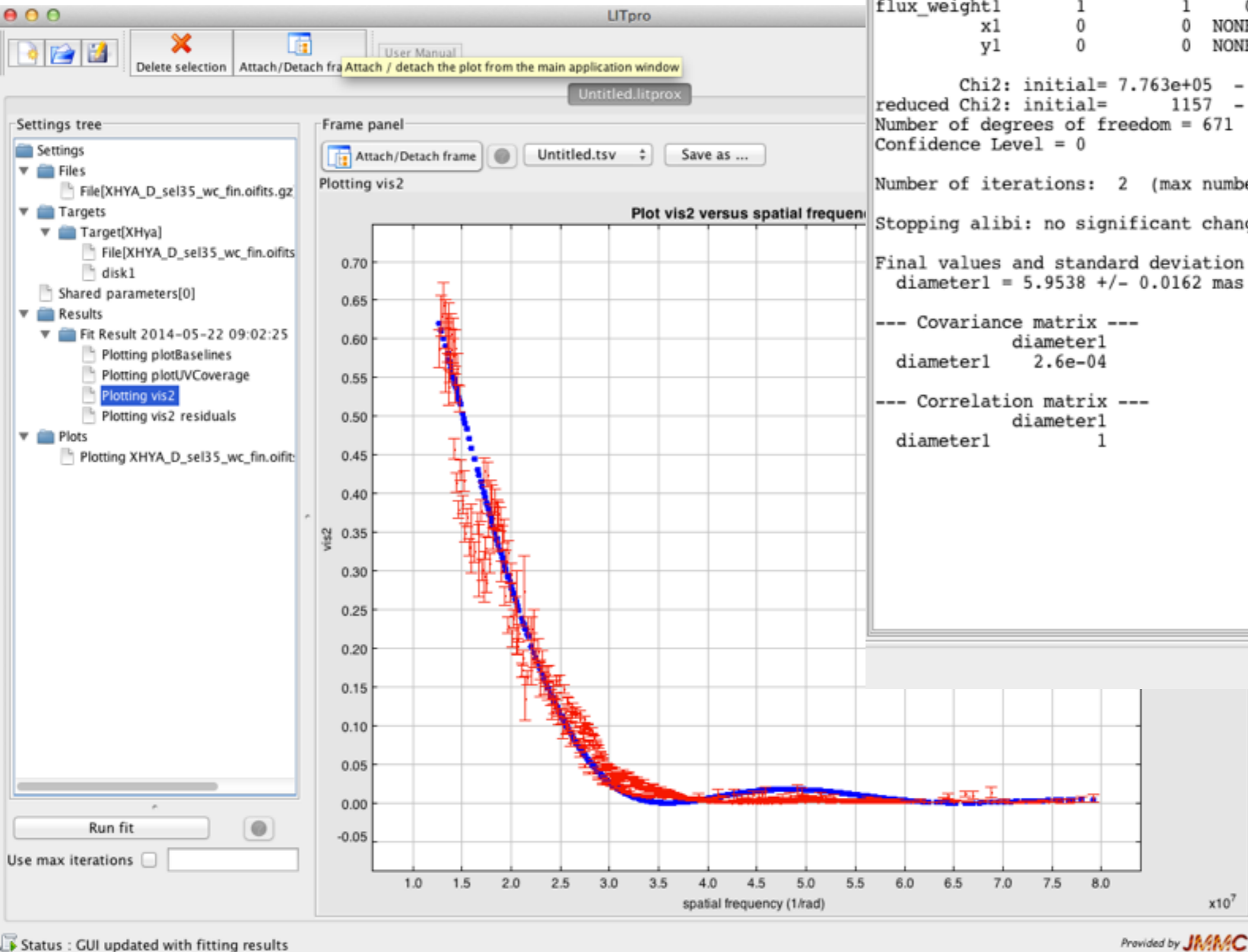
VO tools in the OIDB

TAP:

- We experienced some services with Astrogrid DSA but have to move on

- Was easy to switch between 2 other libs (GAVO/DaCHS and CDS/TAPlib) for tests

- TAP is used internally,

- TAPlib set very well onto our server framework (eXist-db / J2EE app)

SAMP:

- We use SAMP for communication with other VO tools

- Persistent mode for SAMP (from Ivan Zolotukhin)

- It stimulated some technical dev at JMMC that integrate VO applications in web pages
——> pres G. Mella

VO tools in the OIDB

ObsCore

- Very convenient basis

- Implementation of certain metadata is yet to be clarified: obs_id , obs_publisher_id (several IDs?)

- <u>Additionnal columns</u>: nb_channels, nb_vis, nb_vis2,nb_t3, subdate, <u>quality_flag</u>, telescope_config, instrument_mode, astronomical_keywords, comments

Coming soon

Status:

- Everything is almost here except the back office, we are entering a test period.

- OIDB Version 1.0 delivered ~ end 2014

Perspectives:

- L1 data for specialists ?

- Tutorial for OI newcomers

- Ingest OIFITS files from more instruments

- Coordination with local databases

VO objectives:

- Push the interferometric data collection on a regular basis to help discovery and wide reuse

- Declare our portal and TAP service into the Registry

- Provide some Datalink services

- Definition of a new standard (OIFITS2) is starting: how VO compliant will it be ?