

# Centre Jean-Marie Mariotti



Réunion annuelle ASOV  
11-12 Octobre 2010

Laurent Bourges / **Gilles Duvert** / Sylvain Lafrasse /  
**Guillaume Mella**

- Présentation du JMMC
- Création de catalogues
  - ESO / JSDC / BadCal
- Mise en place de base de données
  - Publications / Résultats d'observations
- Nouveaux outils / nouvelles fonctions ...

(Aspro2)

# Objectifs du JMMC

Assurer le support aux utilisateurs pour l'exploitation des grands interféromètres optiques:

- Fournir les outils logiciels
- Participer à la formation des utilisateurs
- Participer à la prospective des nouveaux instruments

# La structure du JMMC

- GDR CNRS / Directeur : Alain Chelli
  - Partenaires: CRAL FIZEAU IAS LAOG LESIA ONERA
  - Centres de traitement et d'archivage de données SO5
- Directeur scientifique : Gilles Duvert
- Equipe technique :
  - [jmmc-tech-group@obs.ujf-grenoble.fr](mailto:jmmc-tech-group@obs.ujf-grenoble.fr)
- Support utilisateur :
  - [jmmc-user-support@obs.ujf-grenoble.fr](mailto:jmmc-user-support@obs.ujf-grenoble.fr)
- 5 groupes de travail:

de la préparation d'observation à l'analyse des résultats en passant par la réduction de données.

# Les projets des 5 groupes

- Préparation d'observation:
  - Logiciels **SearchCal / ASPRO**
  - **Catalogues de calibrateurs**
- Réduction de données
  - Pipeline Amber drs ( Midi Vinci )
- Analyse de résultats
  - Modelfitting : **LITpro**
  - Reconstruction d'image : Wisard

# Plus techniquement

## (à Grenoble)

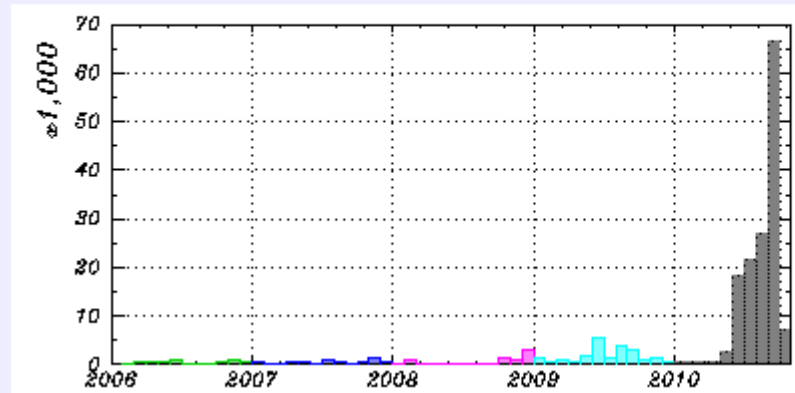
- Administration d'un serveur
  - Serveurs d'applications (prochainement virtualisés)
  - Repository CVS
  - Déploiement automatisé des applications Java (JNLP)
- Site web
  - Pages officielles <http://www.jmmc.fr> & Wiki
  - Flux RSS
  - Listes de diffusion
- Base de données
- .. et du VO...

# Catalogue de calibrateurs ESO

« intégration dans un outils ESO »

- Collaboration initiée en 2008
- Utilise le moteur de **SearchCal** 'mode brillant' pour déterminer des diamètres à partir de photométries
- Rajoutera ~20000 calibrateurs aux ~1500 actuels des outils ESO.
- Fourniture annuelle d'une version en fonction de la configuration du VLTI
- Plusieurs jours d'interrogation VizieR

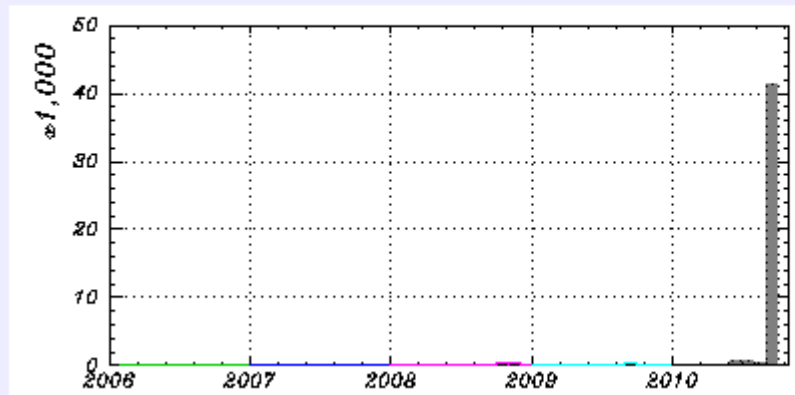
[II/225](#) Catalog of Infrared Observations, Edition 5 (Gezari+ 1999)



The plot shows the number of monthly requests addressed to catalog [II/225](#) on all mirrors.

The raw numbers of monthly requests addressed to catalog [II/225](#) (on all VizieR mirrors) may be found [here](#)

[J/A+A/433/1155](#) Calibrator stars for 200m baseline interferometry (Merand+, 2005)



The plot shows the number of monthly requests addressed to catalog [J/A+A/433/1155](#) on all VizieR mirrors.

The raw numbers of monthly requests addressed to catalog [J/A+A/433/1155](#) (on all VizieR mirrors) may be found [here](#)

Consultation de 15 catalogues...

# JSDC

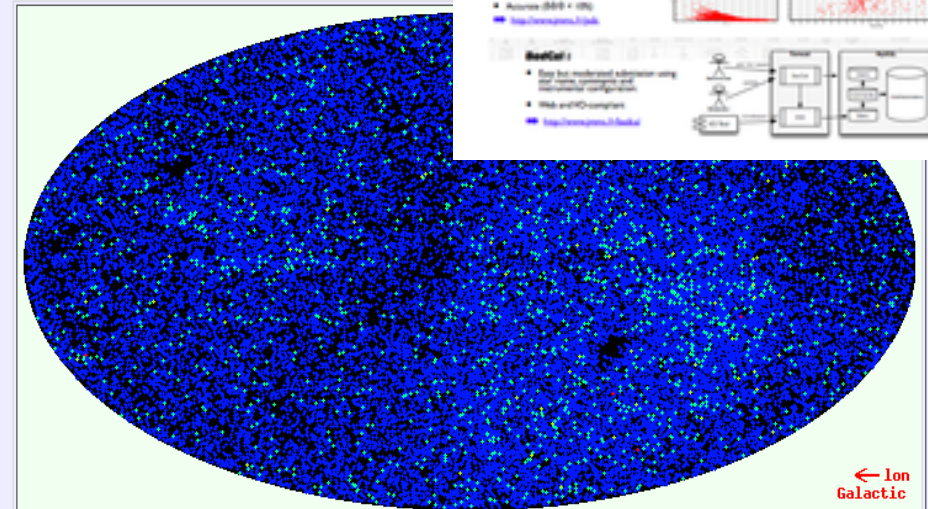
## « JMMC Stellar Diameters Catalogue »

- Premier catalogue JMMC public présenté à SPIE 2010
- Utilise le moteur de **SearchCal** pour déterminer des diamètres à partir des photométries
- Exploite *stilts* pour agréger/filtrer les résultats.
  - 38472 étoiles
  - $-2.8 < \text{magK} < 11.5$
  - $0.01 < \text{LDD} < 20 \text{mas}$
- Exploitation prévue par **SearchCal** pour fournir des calibrateurs à l'utilisateur.

The screenshot shows the title page of the 'Building the JMMC Stellar Diameters Catalog using SearchCal' project. It features logos for CITs, OSUG, LBBG, and JMMC. The page includes a 'Scientific Goal' section with bullet points, a 'Technical Solutions' section with a flowchart, and a 'Results Analysis' section with several plots showing angular diameter distributions and a color-magnitude diagram. A 'SearchCal' section at the bottom describes the software's capabilities.

<http://cdsarc.u-strasbg.fr/viz-bin/w/Footprint?catid=2>

Footprints from VizieR



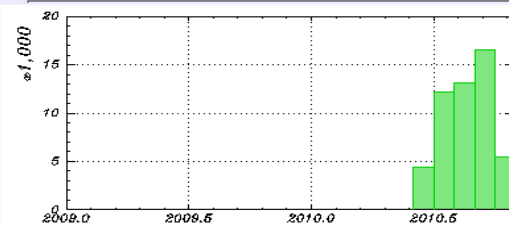
Galactic Ecliptic Equatorial [Help]

strasbg.fr

larity

Stella

[II/300](#) — JMMC Stellar Diameters Catalogue - JSDC (Lafrasse+, 2010)





# BadCal

« Identifier les observations de mauvais candidats »

- Catalogue de mauvais calibrateurs référencé par les astronomes ou centres d'observations.
- Nouvel outil qui devrait prendre la suite d'un ancien outil IAU
- Annoncé en juin 2010
- Interface VO ConeSearch propulsé par DSA
- Mise en place lors d'un stage IUT

The screenshot shows the homepage of the BadCal website. At the top left is the JMMC logo, and to its right is the text 'JEAN-MARIE MARIOTTI CENTER Infrared and Optical Interferometry for Astronomy'. Below this is a navigation bar with links for 'Home', 'Links', 'Search', and a copyright notice. On the left side, there is a vertical menu with links for 'Search', 'Instruments', 'Contribute', 'Documentation', and 'Contact'. The main content area features a welcome message, a search section with input fields for 'Name or Coord.', 'Search Radius (deg)', and radio buttons for 'show 1 star per line' and 'show 1 comment per line', along with a 'Search' button. Below the search section are three buttons: 'Show simple list', 'Show detailed list', and 'View in Aladin applet'. A 'Service description' section follows, explaining that BadCal is an entry to the BadCalibrator database and listing three ways to access it: by source name, by full list parameters, or via the Aladin applet. The page concludes with a paragraph about the database's development and contribution options.

**JMMC** JEAN-MARIE MARIOTTI CENTER  
Infrared and Optical Interferometry for Astronomy

Home | Links | Search | © Jean-Marie Mariotti Center

Search  
Instruments  
Contribute  
Documentation  
Contact

Welcome onto the Dynamic VO-Compliant  
*Bad Calibrators Catalogue for optical interferometry.*

**Search for bad calibrators**

Name or Coord.

Search Radius (deg)

show 1 star per line

show 1 comment per line

**View the bad calibrators list**

**Service description**

BadCal is an entry to the BadCalibrator database developed by the JMMC Working Group "catalogue of calibration sources".

You have different way to access the database:

- A request using the name of a source (call of Simbad)
- An access to the full list (49) restricted to the basic parameters (simple list), or providing access to the full database (detailed list)
- Finally, a third button gives access to the Aladin applet

The BadCalibrator database VO service has been developed by the JMMC Working Group "catalogue of calibration sources" and is used by our [SearchCal](#) tool. The database itself stems from the one originally developed by the IAU working group on optical interferometry (J.D. Monnier, Univ. Michigan, then C. Hummel, ESO), and you can contribute to extend it by [signaling](#) new bad calibrators.

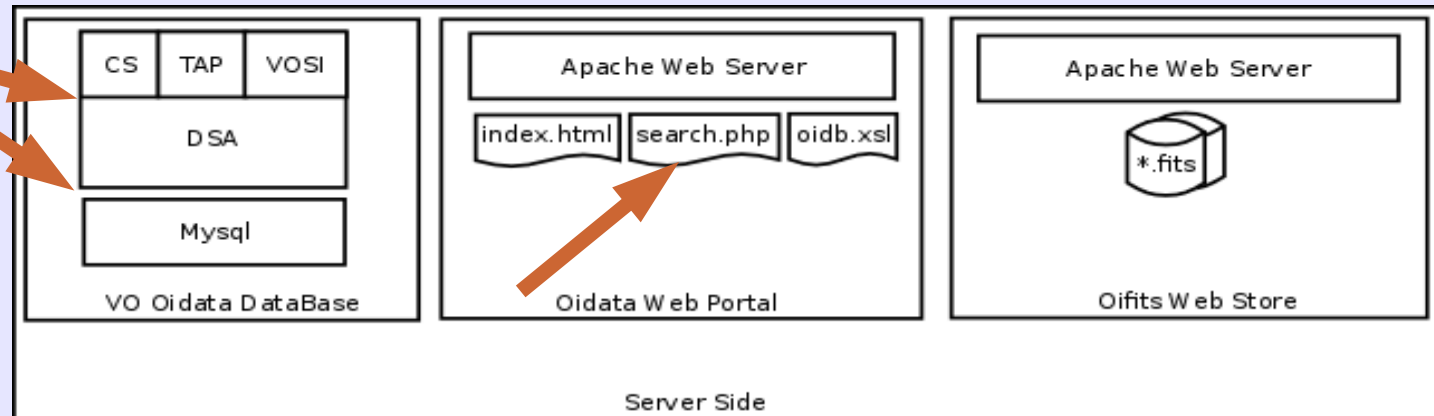
# OiDb:

« Permettre l'accès **VO** à des données d'interférométrie optique »

- Collection de fichiers destinés à la formation et l'évaluation des outils initiée en 2009 (pages web non VO)
- Nouvelles motivations:
  - Sollicitation de l'OCA/Fizeau
  - ObsTap mature
- **DM** basé sur OIFITS
- OIFits: schéma Fits IAU adapté à l'interférométrie optique  
( V2 en préparation )
- Prototype:
  - DSA / PHP
  - Votable / XSL

**DM 'VO'** en cours de réflexion

(Quelles données, quels UCDs Utypes...)



# BibDb

« Base de données des publications en interférométrie optique »

- Remplace l'édition manuelle de pages web
- Intégrée au site web: <http://olbin.jpl.nasa.gov/>
- Utilise:
  - XML=ADS(bibcode)
  - des tags → plots, statistiques...
  - Mysql/php (adodb.inc)
- Géré par P.Lawson et F.Malbet
- Permet de lister les papiers citant les produits du JMMC

## A publication database for optical long baseline interferometry

Fabien Malbet<sup>1</sup>, Guillaume Mella<sup>2</sup>, Peter Lawson<sup>3</sup>, Esther Tallifert<sup>1</sup>, Sylvain Laffrassé<sup>3</sup>

<sup>1</sup> Université Joseph Fourier - Grenoble 1 / CNRS, Laboratoire d'Astrophysique de Grenoble (LAOG) UMR 5571, BP 53, 38041 Grenoble Cedex 09, France  
<sup>2</sup> Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, 91109 USA

### Abstract

Optical long baseline interferometry is a technique that has generated almost 850 refereed papers to date. The targets span a large variety of objects from planetary systems to extragalactic studies and all branches of stellar physics. We have created a database hosted by the JMMC and connected to the Optical Long Baseline Interferometry Newsletter (OLBIN) web site using MySQL and a collection of XML or PHP scripts in order to store and classify these publications. Each entry is defined by its ADS bibcode, includes basic ADS informations and metadata. The metadata are specified by tags sorted in categories: interferometric facilities, instrumentation, wavelength of operation, spectral resolution, type of measurement, target, type, and paper category, for example. The whole OLBIN publication list has been processed and we present how the database is organized and can be accessed. We use this tool to generate statistical plots of interest.

### Rationale

Optical interferometry is a technique which requires a high level of critical subsystems illustrated by the fact that one needs to control at the nanometer level optical path difference which can several hundred meters, or to operate several telescopes with some level of adaptive optics. Furthermore, even for the common professional astronomer the link between the measurements and the astrophysical consequences consists in numerous mathematical operations which are not straightforward to understand. Therefore, despite important financial and human investment, it seemed that the astrophysical return was first limited and then restrained to a few specialized areas even though the gain in spatial resolution is a real breakthrough. This distance between the efforts and the necessary support from the astronomical community and secondly the results contained in the peer-reviewed literature both in instrumentation but also for the astrophysical advances have led the community to get organized and to publicize its results. This was achieved first by establishing a common point of reference, the web site OLBIN (Optical Long Baseline Interferometry Newsletter) edited by P. Lawson, see presentation 7734-97 on Friday afternoon in this conference, by forming the IAU commission #54 and by tracking the publication record in the field. In 2000, the rate of refereed papers published in interferometry was around 30 papers/year was still handable by hand but ten years later this rate reached around 100 papers/year and is still growing. The need to record any new reference in the field is even stronger but it can no longer be done by hand. Therefore we have built a database based on today software capability which in addition allows us to track the evolution of the field using new information that add extra value for the service to the community.

### A bibliographic database directly linked to ADS

The OLBIN publication database has been designed to be connected with the ADS bibliographic database (<http://adsabs.harvard.edu>). A paper in ADS is identified by its bibcode which consists in 19 characters. Our idea was to keep a list of bibcodes and the link to the ADS pages of these papers. However, in order to search into the OLBIN database, one needs to retrieve at least the title, the list of authors and affiliation, the reference (journal, volume and pages), the year of publication and the publication date. With this information we were already able to build automatically the list as it was done before and manage it. However in order to add extra-values to the database, we added tags in order to better define the different entries. Any paper can be labeled by any number of tags. In order to sort out the database, we also created «categories» of tags which are lists of tags of same nature: type of papers, facilities, instruments, astrophysical topics, technique... We then added the capability to search the papers by tags and to return a list classified. Finally, generating automatic pie charts and histograms was relatively simple. Since we are using ADS, the first to do when entering a paper is to check that it is in ADS and if not request it to be registered. Similarly, if mistakes are found then they should be corrected in ADS since it is the most used publication database in astronomy.

Total number of refereed papers published in interferometry

Category	Count
Bibcodes	856
Tags	77
Categorie	8
Authors	1762

### Facility / Astrophysics

Table of the astrophysical topic vs the facility represented with the Cronos Table viewer (<http://www.olsabw.bloggs.ca/Cronos/>)

### General results

#### Type of publications

#### Evolution of type of publication

### Astrophysical topics and objects

Starler parameter	Evolution stars	Hot surface stars	Planets stars	T-Tau stars	Stellar winds	Galaxy stars	Multiple stars
Hypergiants	R-G-B stars	Hot variables	Planets stars	T-Tau stars	Stellar winds	Galaxy stars	Multiple stars
Comets	Wolf-Rayet stars	Cepheid variables	Luminous Blue Variables	Equipotential	Active Galaxy nuclei		

#### Evolution of astrophysical topics

### The web pages

### Perspectives

The first important point is that we need the feedback of the users to correct the citations, the tags and be aware of all papers. This tool could also be the reference for the different groups to list their publications. We may need then to develop specific pages (instruments, interferometers, science...). These pages might also be used by our agencies to evaluate the outcome of interferometry. We could also contemplate to get the citations rate from ADS, but since it changes everyday basically, it would require to update the database on a daily basis. Another important perspective is to link the publications to the actual data.

### Evolution of the publications

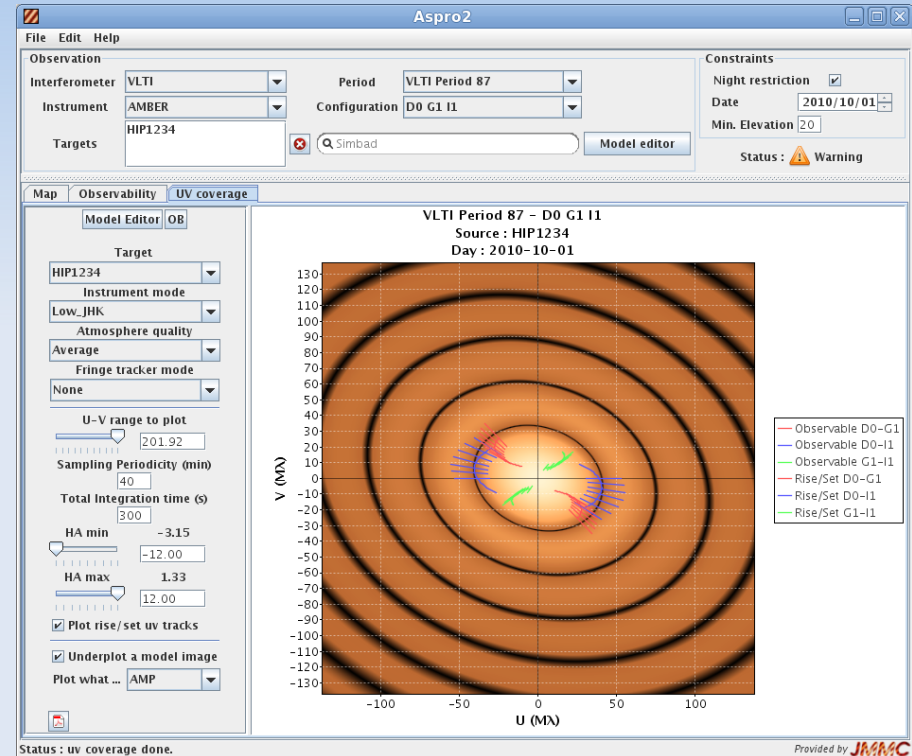
#### For the different facilities

#### For the different main topics

**Do not forget:** <http://olbin.jpl.nasa.gov> and <http://www.jmmc.fr/bibdb>

Le dernier né : Aspro2

# JMMC - Aspro 2



ASOV – Octobre 2010  
Laurent Bourgès / Gilles Duvert



# Introduction

- Préparation des observations en interférométrie optique (VLTI et CHARA)
- Projet démarré Septembre 2009
- Première version publique Septembre 2010 pour "Call for Proposal" (ESO / CHARA)
- 75% des fonctionnalités de Aspro 1 + interface dynamique et nouveautés (OB ...)
- Application autonome (Java) multi plateforme (\*nix, mac, windows) déployée avec Java Web Start (maj auto) : [Aspro 2](#)

# Composants utilisés

- **JskyCalc 1.2** by J. R. Thorstensen, Dartmouth College : éphémérides (sun / moon), position d'une source : seule librairie java disponible
- **nom.tam.fits** by Dr Thomas A. McGlynn, HEASARC : Gestion des fichiers FITS : corrections pour type Complexe, gestion des colonnes (comment, unit) et fournies à l'auteur
- **JFreeChart** : plots vectoriels (export SVG/PDF)
- **JSAMP 1.1** by Mark Taylor, AstroGrid : Gestion du protocole VO SAMP
- **Service SIMBAD** (CDS) pour récupérer les informations d'une source par identifiant

# Modèle de données

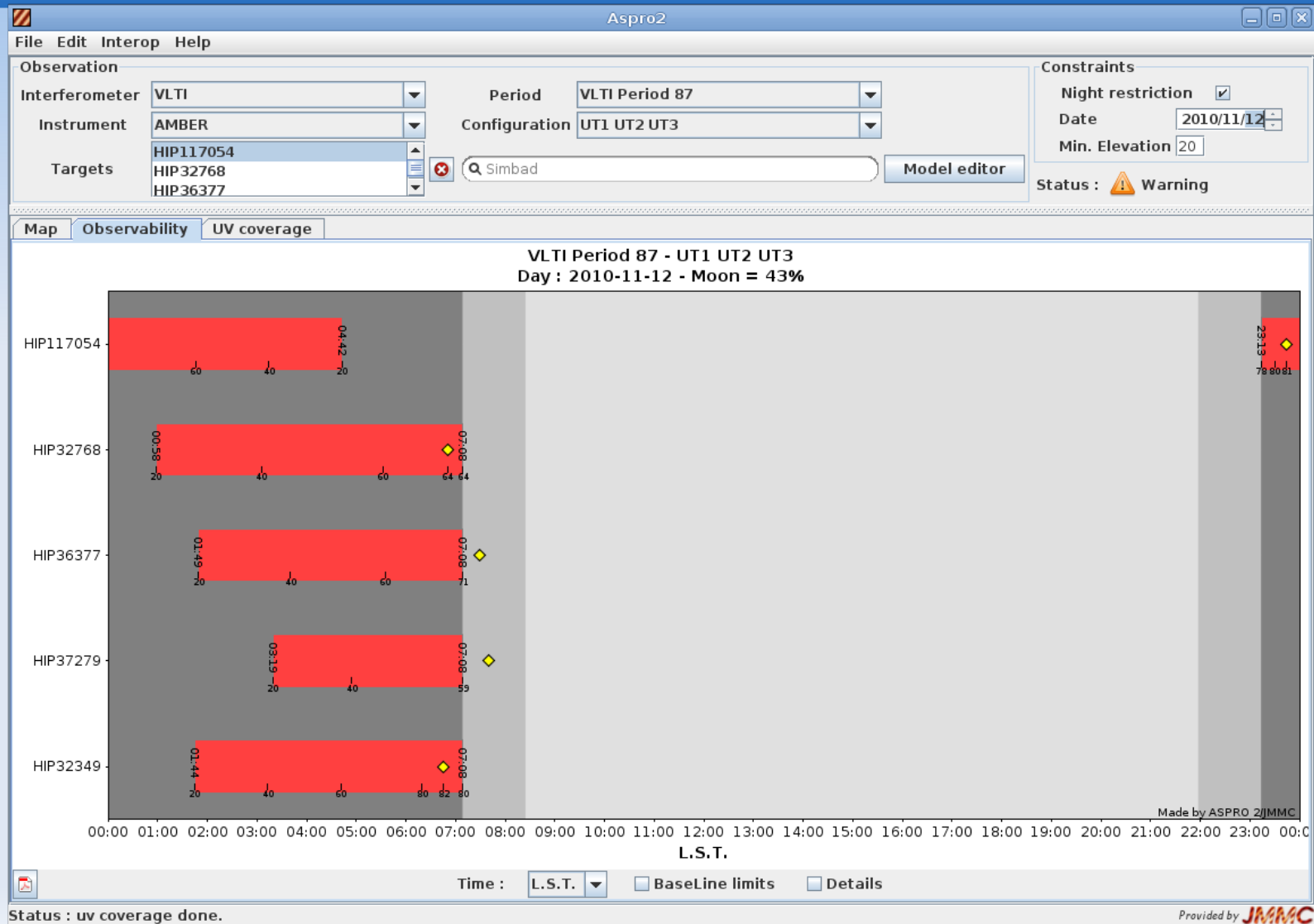
- Configuration des interféromètres (CHARA / VLTI), instruments, configurations disponibles
- Description des observations (sources, configuration instrumentale) et des modèles analytiques des sources
- Simulation des observations : OIFits
- Format XML (xsd) disponible [Aspro 2 DM](#) : évolution / extension rapide de la configuration
- **But : définir un data model interférométrie pour le VO (qui peut contribuer ?)**



# Observability 1/2

- L'observabilité des sources dépend de :
  - Interferometer configuration
  - night restriction for the observation date
  - chosen minimum elevation
  - delay line compensation for the selected base lines
  - telescope shadowing (VLT)
  - CHARA'S Pipes Of Pan (PoPs)
- Pourrait être généralisé à d'autres types d'observation ?

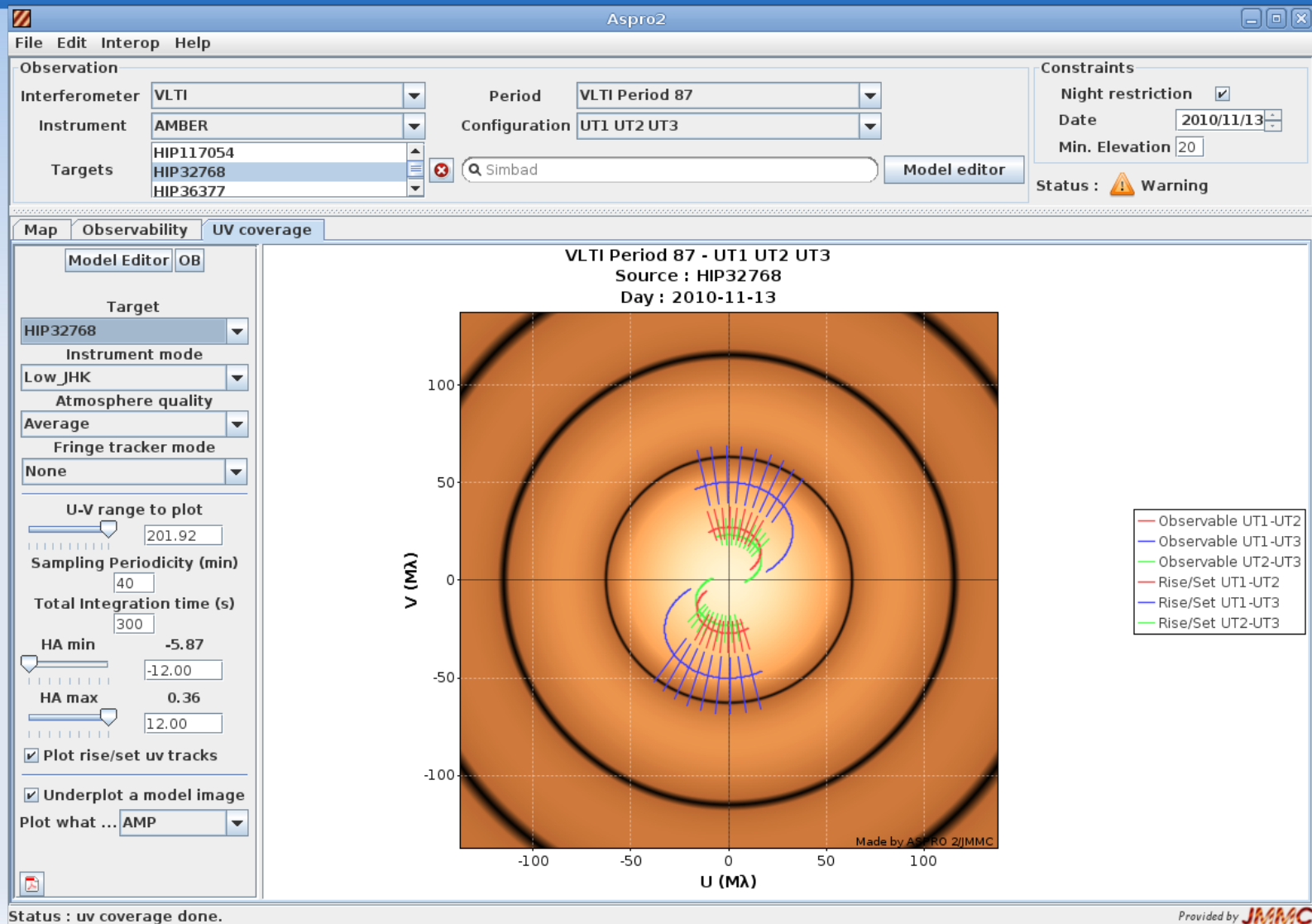
# Observability 2/2



# UV Coverage 1/2

- La couverture du plan UV dépend de :
  - l'observabilité de la source
  - le modèle analytique de la source
  - la configuration instrumentale (bande spectrale, sampling time ...)
  - L'atmosphère (seeing, airmass)
  - les lignes de base (base lines)
- Plot zoomable et dynamique

# UV Coverage 2/2



# Autres fonctionnalités

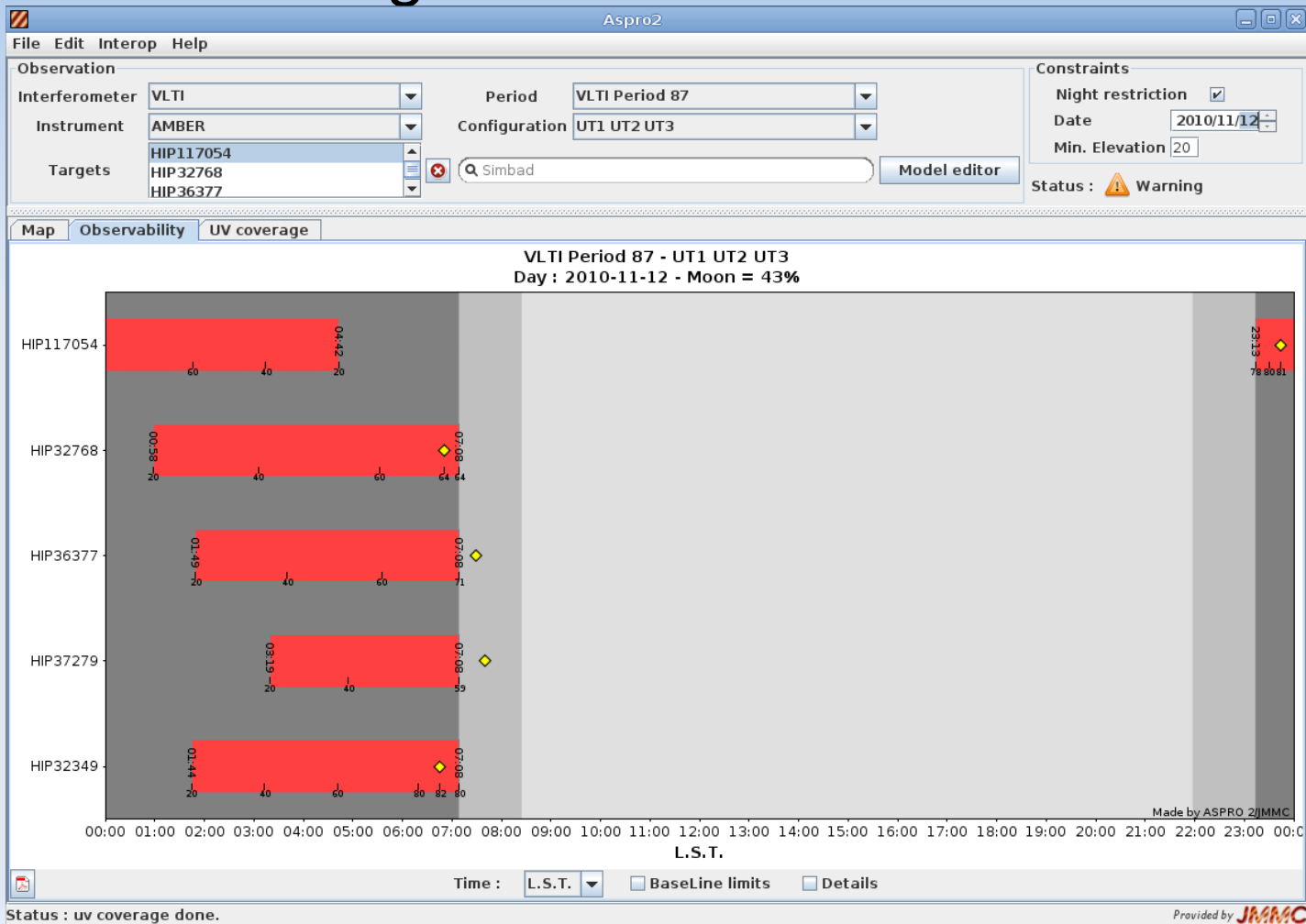
- Export des plots au format PDF
- Export "Observing blocks" (ESO / CHARA)
- Simulation d'observations avec modélisation du bruit instrumental :
  - Format OIFits (standard IAU)
  - Module **OITools** du JMMC pour lire / écrire / valider le format OIFits
  - Futur : OIFits explorer pour exploiter les observations (visibilité, cloture de phase) ...

# Intégration SAMP

- Aspro 2 :
  - Envoi du message 'fr.jmmc.litpro.start.setting' à LITpro : source, ses modèles + données OIFits
  - Traitement du message 'table.load.votable' (VOTable au format SearchCal) : calibrateurs
- SearchCal : Traitement du message 'fr.jmmc.searchcal.start.query' : recherche de calibrateurs pour la source donnée par Aspro 2
- LITpro : Traitement du message 'fr.jmmc.litpro.start.setting' : préparation du "fit" des données fournies

# Démo SAMP 1/4

- Aspro 2 sends target 'HIP 32768' to SearchCal



# Démo SAMP 2/4

- **SearchCal** searches calibrators and send votable back

The screenshot shows the SearchCal application window. The title bar reads "SearchCal". The menu bar includes "File", "Edit", "Query", "Calibrators", "Interop", and "Help".

**Query Parameters**

- 1) Instrumental Configuration:** Magnitude Band: K, Wavelength (K) [μm]: 2.0045, Max. Baseline [m]: 102.43383.
- 2) Science Object:** Name: Q HIP32768, RA 2000 [hh:mm:ss]: 06:49:56.168, DEC 2000 [+/-dd:mm:ss]: -50:36:52.415, Magnitude (K): 0.336.
- 3) SearchCal Parameters:** Min. Magnitude (K): -1.664, Max. Magnitude (K): 2.336, Scenario: Bright (selected), RA Range [mn]: 240.0, DEC Range [deg]: 20.0.

Progress: [ ] **Get Calibrators**

**Found Calibrators**

Index	dist	HD	RA 2000	DE 2000	vis2	vis2Err	diam vk	e diam vk	UD V	UD J	UD H
1	10.217	63744	07 48 20...	-47 04 39...	0.659	0.0090	1.657	0.114	1.525	1.593	1.606
2	10.509	39523	05 49 49...	-56 09 59...	0.545	0.018	2.02	0.139	1.86	1.942	1.958
3	16.668	73155	08 34 43...	-49 56 39...	0.507	0.051	2.058	0.142	1.886	1.973	1.99
4	21.038	74772	08 44 23...	-42 38 57...	0.607	0.044	1.778	0.123	1.652	1.717	1.73

**Filters**

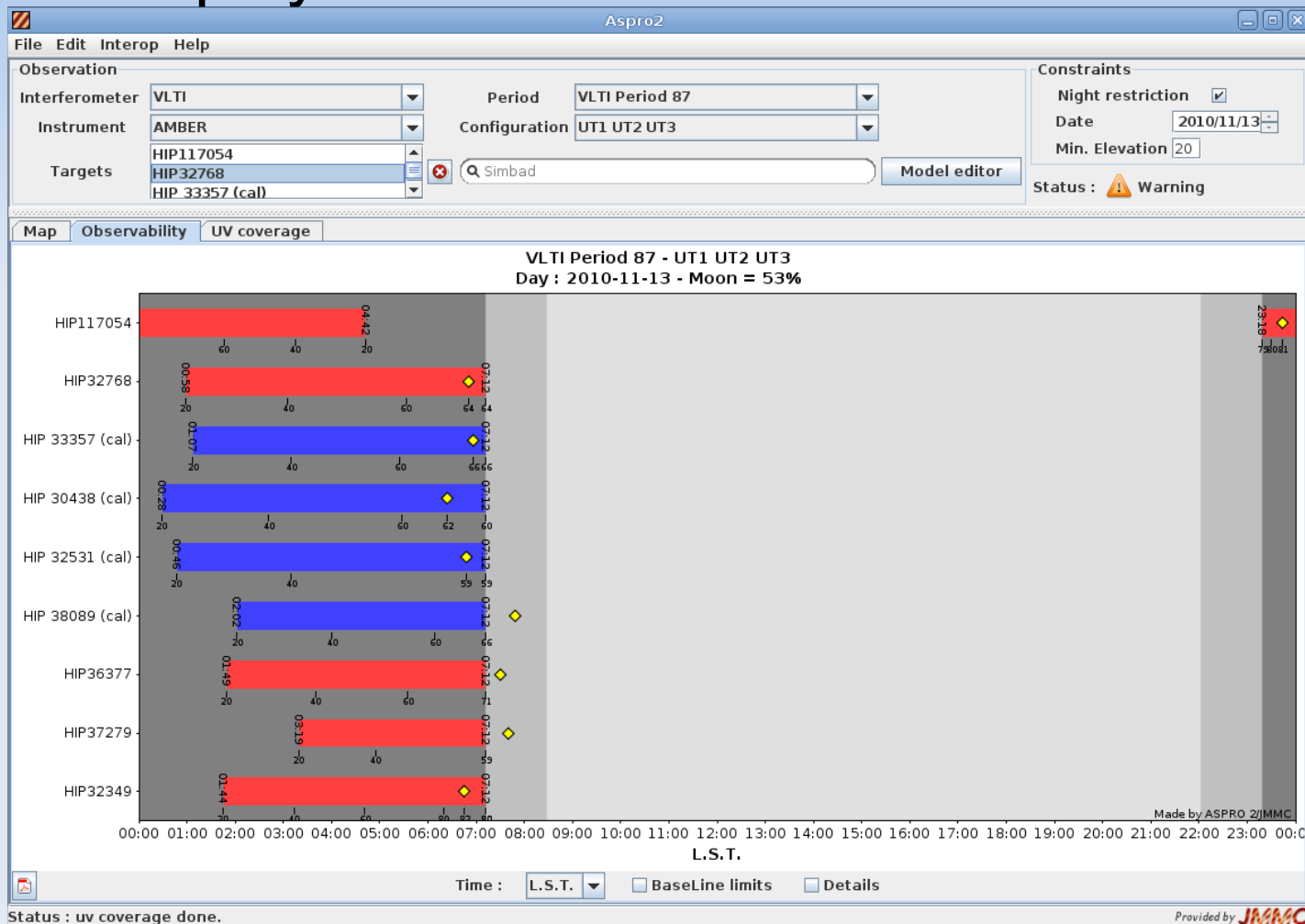
- Reject stars farther than : Maximum RA Separation (mn) : 10.0 Maximum DEC Separation (degree) : 10.0
- Reject stars with magnitude above : Magnitude : 1.5
- Reject Spectral Types (and unknowns) :  O  B  A  F  G  K  M
- Reject Luminosity Classes (and unknowns) :  I  II  III  IV  V  VI
- Reject Visibility below : vis2 : 0.5
- Reject Visibility Accuracy above (or unknown) : vis2Err/vis2 (%) : 2.0
- Reject Variability
- Reject Multiplicity

Status : searching calibrators... done. Provided by **JMMC**



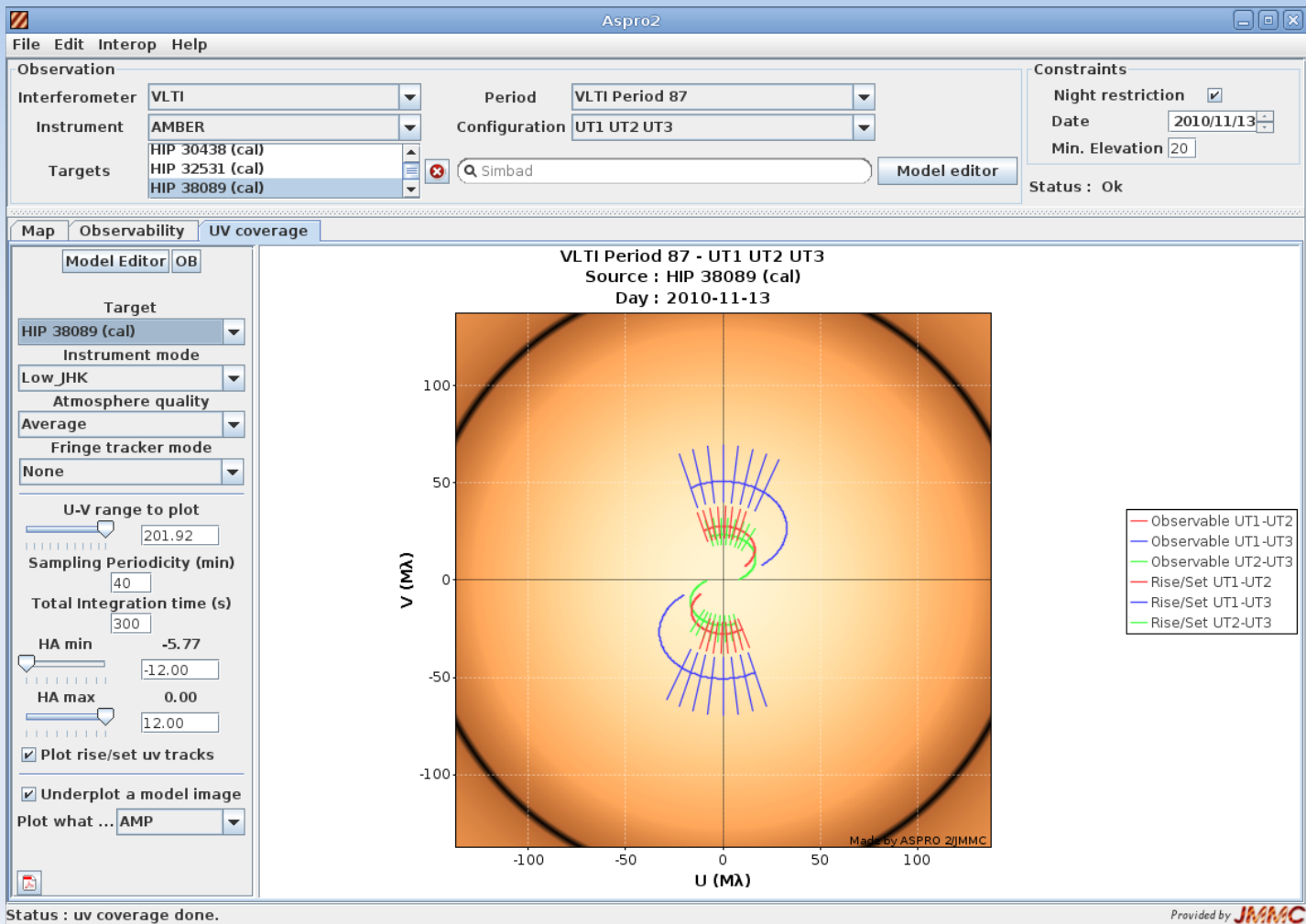
# Démo SAMP 3/4

- Aspro 2 displays calibrators in blue



# Démo SAMP 4/4

- Calibrator Uniform disk model



# Conclusion Aspro

- Aspro 2 utilise le VO (Simbad, SAMP)
- Besoin d'un data model pour décrire les observations en interférométrie optique = surcouche VO du format OIFits
- Questions ?

# Remarques 1/2

- **SearchCal** peut envoyer les calibrateurs à Aladin
- **Jsamp 1.1**: le hub externe ne marche pas avec Java Web Start (bug signalé à Mark Taylor)
- **VOTable** :
  - Problèmes namespaces (1.0, 1.1, 1.2) en XSLT
  - Evolutions de SAVOT ?
    - Version 2.6 (06/2005) : VOTable 1.0 and 1.1
    - Dépendances (kXML ...) ??

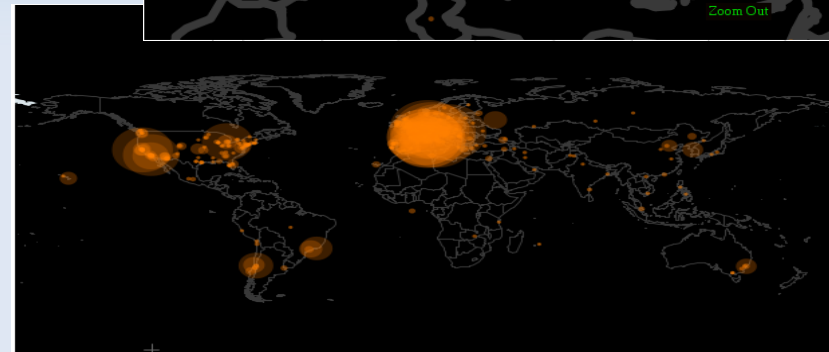
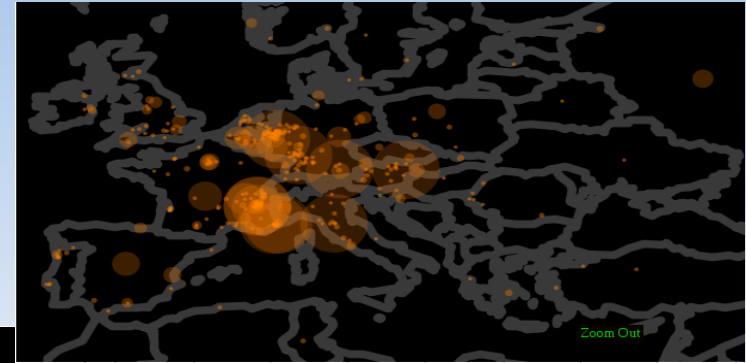
# Remarques 2/2

- **VOTable AstroRes:** le serveur SearchCal utilise "encore" les sorties CSV. Est-ce encore un format utilisé? ...à implementer dans DSA (pour le couplage avec BadCal) ?
- **Crossmatch par coordonnées:** Problèmes dans certains catalogues (signalé à Francois Ochsenbein).
- **Sortie XML ADS :** pb de parsing des affiliations (fixé par une nouvelle version courant 2011)
- **ObsTap et l'interférométrie optique:** Demande d'expertise envisagée après quelques itérations sur nos maquettes.

# Prochainement en ligne:

## « Coin du développeur »

- Regroupe des infos techniques, liens...
- Prochainement mise en ligne d'une librairie OIFITS Java
- Prévision de partager le code commun de toutes les applications JMMC Java
- Tendence de mutualisation à l'observatoire (SVN, TRAC, virtualisation Proxmox...)
- Un registry à Grenoble ;-)



Nombre d'Ips différentes ayant lancé une application

