

# Radio visibility metadata extraction for discovery with ObsTAP

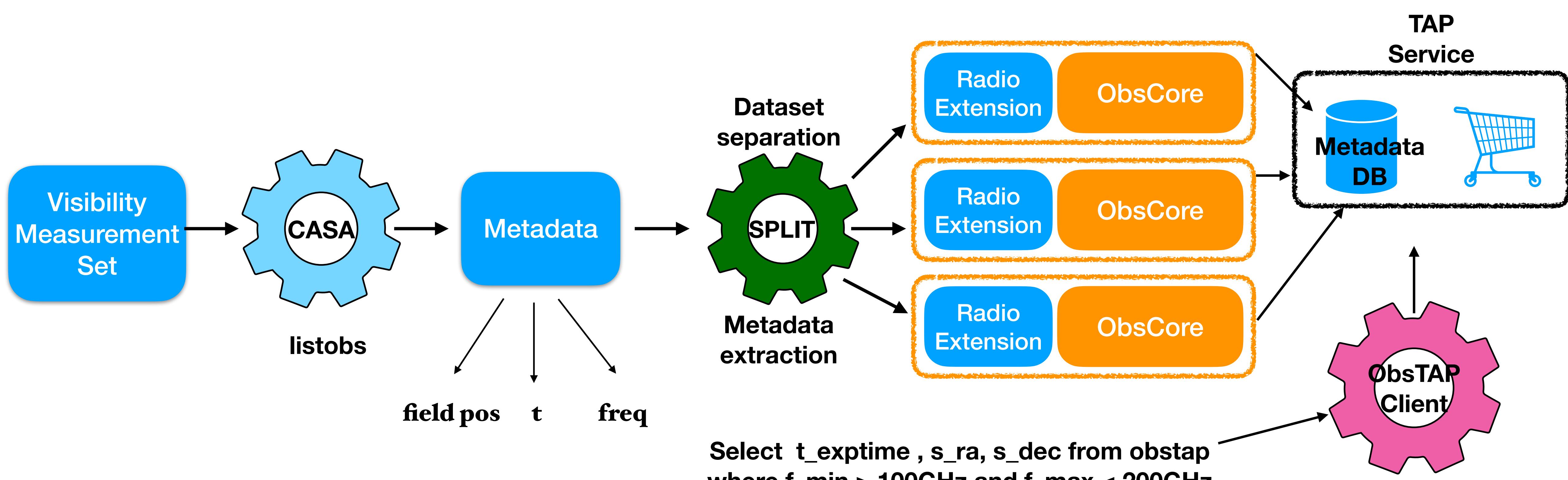


## Goal

This work explores the metadata needed to query radio astronomical archives and retrieve radio visibility data through the IVOA ObsTAP protocol.  
It shows how to feed the existing Obscore keywords for this case and how to extend the ObsTAP TAP-SCHEMA with specific features for interpreting the content of radio visibility data before selection for science analysis.

## Visibility datasets description

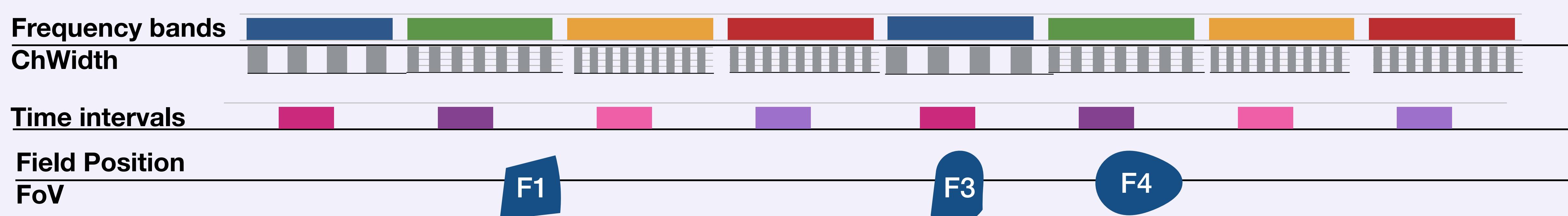
A process to exploit and formalize metadata existing in Measurement sets files in a VO oriented framework has been set-up, using examples from various radio visibilities archives.  
The **SPLIT** procedure has been set up following the scheme and the rules given below :



## Feeding and extension rules

The Measurement Set format for radio visibility observations gathers multiple exposures at various pointings (fields) obtained in a variety of spectral settings. It wraps them together in one container. CASA tools allow to build some interpretation maps like uv-Coverage maps, amplitude/phase histogram w.r.t uv distance and others, generated as explanatory products.

On the contrary, a dataset for multi-wavelength search via ObsTAP requires features separation in order to express how data are spanned on the spatial, spectral, temporal and observable axis.



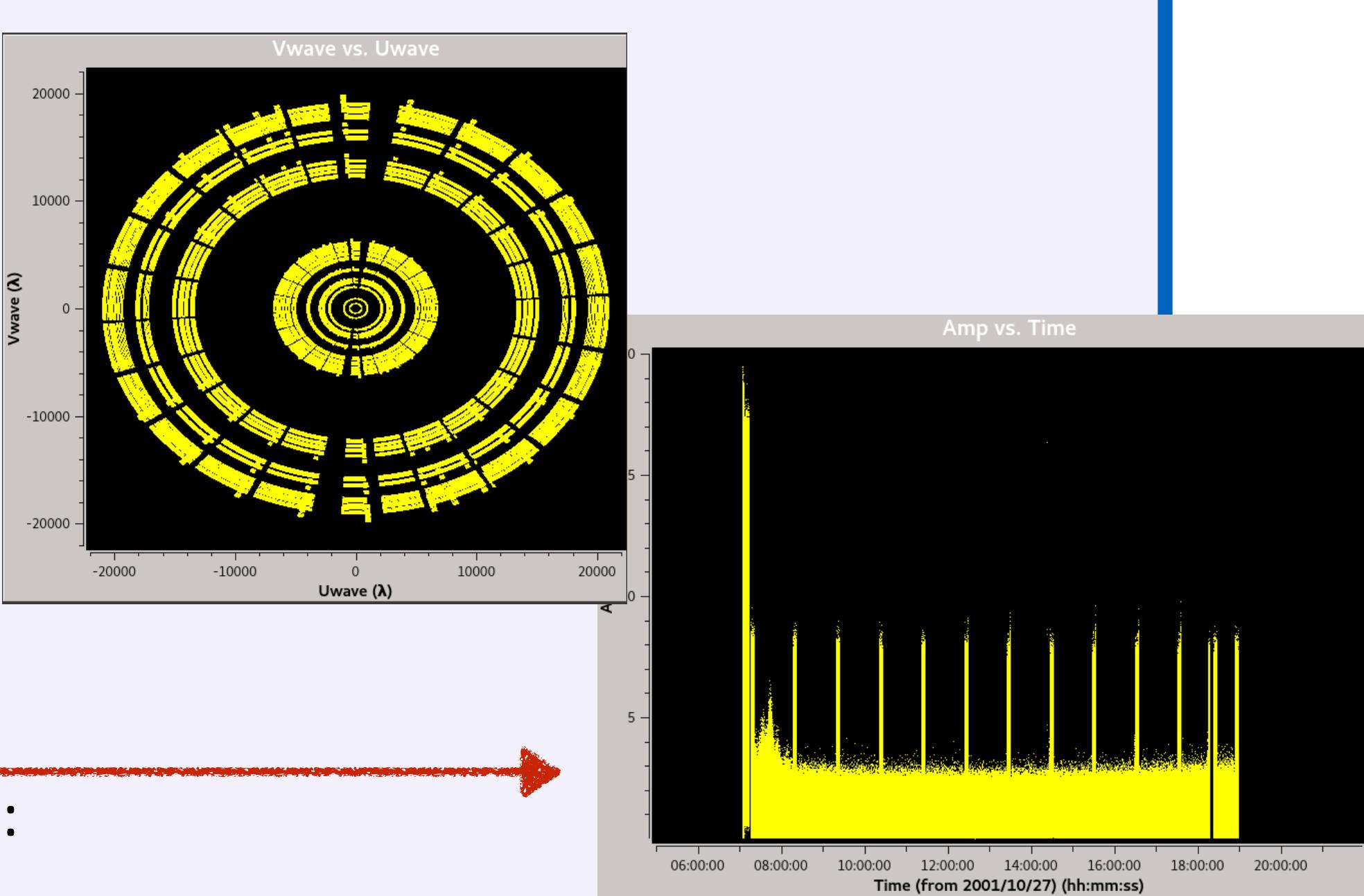
In the **SPLIT** process we consider an ObsCore dataset to be a **subset** of contiguous or overlapping **SpectralWindows** of **same Channel Width** for a given **Field**.

An ObsCore metadata record for such dataset would read

- **dataproduct\_type = visibility**
- **o\_ucd = stat.Fourier**
- Time and spatial keywords apply for each listed radio field as defined in the IVOA Obscore specification.
- **s\_resolution** is estimated from the longest base line
- **access\_url** for radio data can branch a **DataLink service** providing access to
  - \* Full listobs metadata result file
  - \* Measurement Set zip file
  - \* Explanatory plots (uv coverage, antennae positions, amplitude/phase graphs, ...)

A Radio extension table is under study to gather specific radio properties of these data sets :

- **f\_min** and **f\_max** expressed in MHz for the spectral interval covered
- **em\_\*** ObsCore keywords are also used, and filled by unit conversion to meters, in order to allow multi-wavelength queries.
- uv coverage ellipse approximation or beam estimate (**b\_max**, **b\_min**, **b\_angle**) to summarize the beam shape is also considered.



This work highlights how to feed and extend an ObsCore TAP SCHEMA using existing radio metadata, here originating from a Measurement Set file. A List of keywords for the Radio ObsCore extension is proposed [here](#). see also our short video



Mireille Louys, K.A.Lutz, Y.Stein, A.Egner, F.Bonnarel

[mireille.louys@astro.unistra.fr](mailto:mireille.louys@astro.unistra.fr)

