



# ConeSearch revision & extension for Time filtering

Marco Molinaro, Ada Nebot

INAF, CDS

CEVO Tech Forum 1 - 5 February 2020, Strasbourg



# Time in ConeSearch: why?

The need from multi-messenger time domain astronomy.

A short story...

*Time Domain astronomer*

Have there been observations between these two dates?

*ConeSearch service*

I don't know when, but I can tell you where...

Not enough!



# Possible Solutions

- Solution 1
  - ST-MOC to define the space and time coverage
    - OK, it works, but it is a bit complicated to use, plus it requires two step approach to get the data (create the STMOC, filter table by STMOC)
- Solution 2
  - Extend ConeSearch to add a time search
    - Advantages: one step approach (query data by interval of time)



# ConeSearch revision solution

## 1 new **optional** parameter: **TIME**

- the time **interval** to be searched for data
  - open or closed interval with numeric values
- interpreted as MJDs
  - values interpreted as **UTC time scale and UNKNOWN reference position**
    - as specified in DALI in the section on literal values
  - MJD values always in days
- constraint is satisfied if the interval intersects the time coverage of the observation

## (VOTable) response addition

- exactly one FIELD, representing the time of the observation, **MUST**
  - have **ucd="time.epoch;meta.main"**
  - have **datatype** set to **"float" or "double"** **ISO? [char]**



# But ConeSearch needs some revision itself...

Simple Cone Search  
Version 1.03

IVOA Recommendation 22 February 2008



## An attempt some time ago...

- Revision started in 2017 tried to
  - Keep up with DALI & VOSI specifications
  - Error Response
  - Resource Registration
  - RA & Dec datatype response
  - MAXREC & RESPONSEFORMAT (keeping SR=0)
  - Fix VOTable response version
  - Metadata discovery solution
  - HTTP methods update
- while moving source to latex
  - included quite some refactoring
  - and left some decisions pending...



# Leftovers...

- Minor/Major revision discussion
- RESOURCE type & number
- ReST vs. query-param I/F
- UCD updates
- EPOCH query param
- Inclusion of ConeSearch-1.03-Erratum1

Major revision automatically cleans most of the above and most deprecated parts of current text. [MMo] was leaning positively towards a major revision but ... yesterday a hack-a-thon happened...



Revision issues roughly work in blocks

- General
  - Erratum, RESOURCE flexibility, ReST-like I/F, UCD1+ update, EPOCH param, discovery of optional parameters
- Time related
  - VOTable response 1.4+ (TIMESYS), TIME parameter, solution for allsky (i.e. ignore position), ST/MOC filtering
- Common
  - Resource registration, ConeSearch+Time service filtering

... other may arise, but we'll keep "simple" in mind.





We will work them out

- Also through GitHub hurdles
- Pushing for server and client take up

still ... we need to identify the proper way to decide whether it would be

- ConeSearch-1.1
- ConeSearch-2.0

(stay tuned for hack-a-thon summary on major revision hurdles...)

However...



*Let's keep it SIMPLE!*

*Thank you for your attention...  
...we're open for discussion!*

