



# **TDIG / Apps Session**

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Chairs & Vice-chairs

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# Introduction to the session

- Time Series related topics
  - Data Model status
  - Description of time metadata in VOTable
  - Implementation and usage
  - Connecting space coverage to time coverage
- VOEvents related topics
  - Registry: how to discover VOEvents services and streams?



# Time Series Data Model

- What to expect from a Time Series Data model?
- What are the dependancies and why?
- What is the status of those dependancies?
- Are there shortcuts?



## What (I think) a Time Series DM could eventually do

- **The IDEA in mind:** An **ideal time viewer** able to connect:
  - sources,
  - images,
  - spectra,
  - measurements,
- a model describing the data and the relations could help doing so



## What (I think) a Time Series DM could eventually do

- **The IDEA in mind:**
- In complex datasets identify what's varying with time and what is not
- Display measurements as a function of time
- Simultaneously visualise the catalogue positions in the sky
- Navigate through any image /spectra available through VO (multi-lambda / messenger)
- Show the photometric information around any source of interest
  - As a function of time (light-curve viewer) → variability-classification
  - As a function of wavelength (photometric-viewer) → SED-classification



# Time Series Data Model

## Dependancies and status

- **CubeDM**
  - describes the sparse nature of a time cube (e.g. data points, light-curves, spectra, images, ...)
- **CharacterizationDM**
  - describes the parameter space of observed data to facilitate discovery (e.g. bounds in wavelength, sky location, ... )
- **PhotDM**
  - photometric system
- **MeasureDM**
  - Defining the nature of any measurement
- **CoordinatesDM**
  - describing coordinate system

[See Victoria 2018 presentation if you want to know more details on the model](#)



# Time Series Data Model Dependancies and status

Working Draft

## • CubeDM

- describes the sparse nature of a time cube (e.g. data points, light-curves, spectra, images, ...)
- [www.ivoa.net/documents/CubeDM/20180516/index.html](http://www.ivoa.net/documents/CubeDM/20180516/index.html)

Recommendation

## • CharacterizationDM

- describes the parameter space of observed data to facilitate discovery (e.g. bounds in wavelength, sky location, ... )
- [www.ivoa.net/documents/latest/CharacterisationDM.html](http://www.ivoa.net/documents/latest/CharacterisationDM.html)

Recommendation

## • PhotDM

- photometric system
- [ivoa.net/documents/PHOTDM/20131005/index.html](http://ivoa.net/documents/PHOTDM/20131005/index.html)

Working Draft

## • MeasureDM

- Defining the nature of any measurement
- <https://volute.g-vo.org/svn/trunk/projects/dm/STC/Meas/doc/WD-Meas-1.0.pdf>

Working Draft

## • CoordinatesDM

- describing coordinate system
- [ivoa.net/documents/Coords/20190320/index.html](http://ivoa.net/documents/Coords/20190320/index.html)



# Time Series Data Model

## Dependancies and status

- **But... my data are light curves!**
  - Do I have to use all these data models as they currently are?
- **Are there shortcuts?**
  - **Yes!** You don't need to import all the elements of a data model to describe your data.
  - Import the TimeSeriesDM elements you are interested in:
    - Photometry,
    - Positions
    - Time
  - Describing only the elements of interest for your case – this reduces a lot! And this is how I understand data models (if you don't have spectra you don't need to describe them...)
- But if you would like to have it all, then well, it should be possible to describe the most complex case too.





# Time Series Data Model Dependancies and status

- **But I want it now!**
  - Patience...
  - Participate in the revision of the documents to avoid the result wont meet your expectations.
  - And meanwhile take a close look at:
    - **TIMESYS**
      - Metadata on [VOTable1.4](#) to describe time
      - Services implementations: Vizier beta, DachS
      - Client implementation: Aladin proto, STILT, STILTS, TOPCAT
      - Validator: [votlint](#)
    - **STMOC**
      - Coverage of space and time of catalogues and image collections
      - See the Note under the IVOA Documents!
- **OK, what next?**
  - Stay tuned !