



# Data model and GIS for the RVS

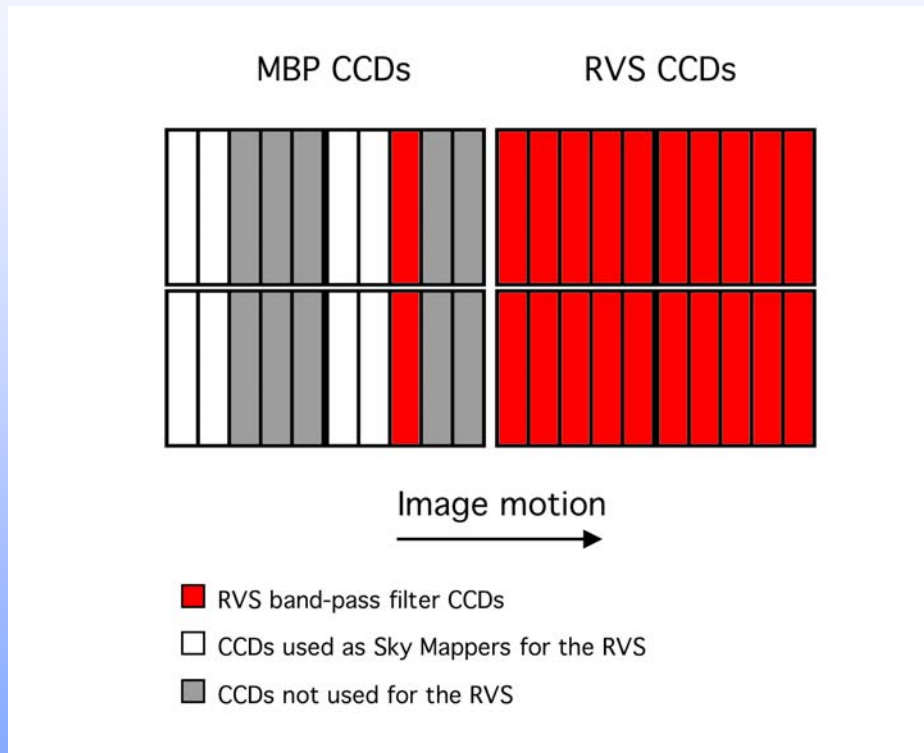
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# Overview

- Operating modes of the RVS
- The data model for the RVS
- Proposal for the RVS GIS

# Operating modes of the RVS



- « Nominal »: the regular operating mode
- « Calibration »: for some calibration tasks

N.B.: some calibration tasks performed in « nominal » mode !



# The data model for the RVS

## *Overview*

- Data model = high-level description of the contents of the database
- Within the GDAAS2 framework
- Main assumptions at the GDAAS2 stage
- The relevant classes of the raw layer
- Initial data treatment



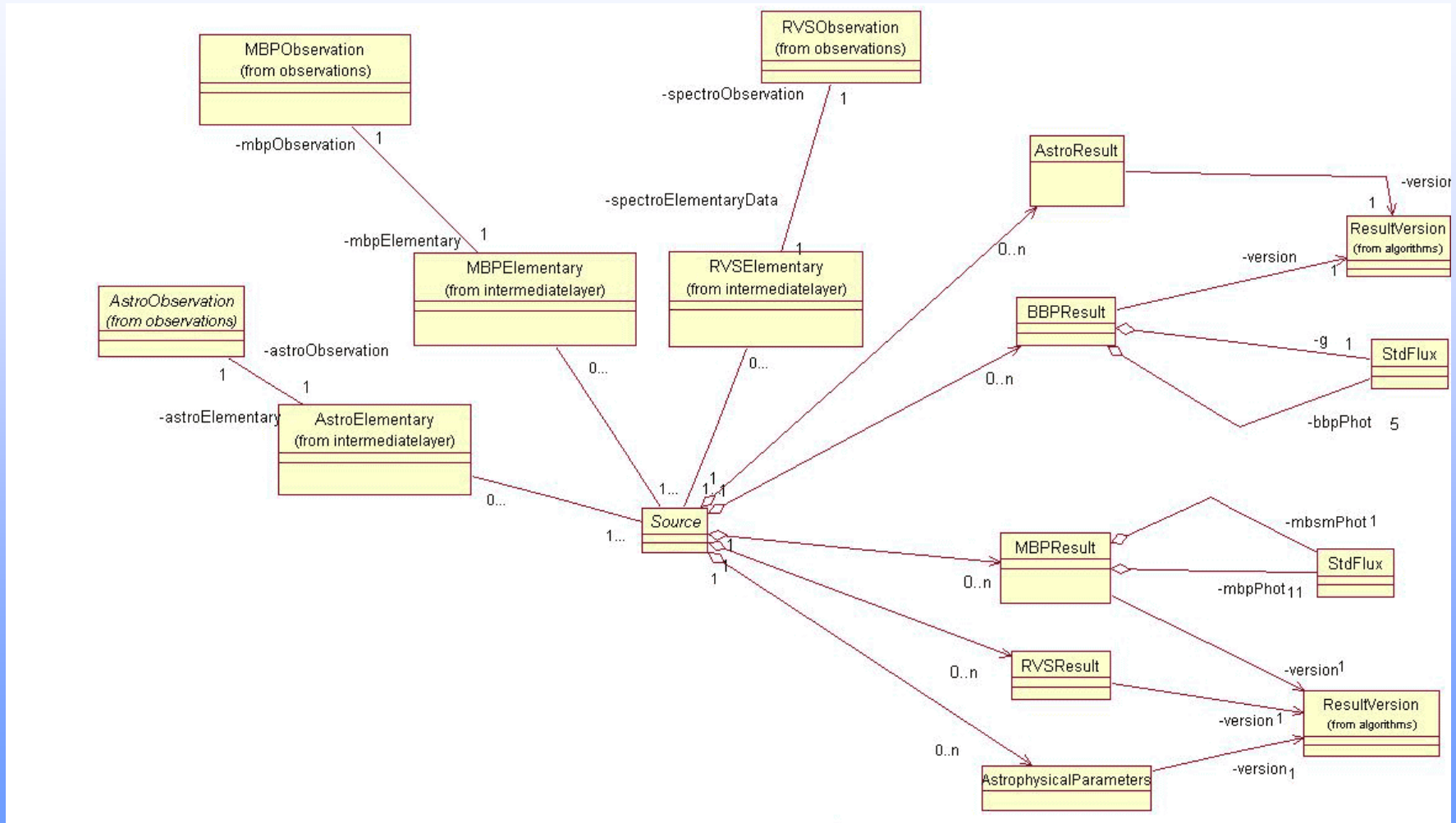
# The data model for the RVS

## *The GDAAS2 framework*

- Data package: 3 different « layers »
  - « rawlayer » = telemetry ( $\Rightarrow$  telemetry definition)
  - « intermediate layer » = intermediate data
  - « source layer » = data for the sky objects
- + « auxiliary » = extra data
- + « GIS » = results from the GIS



# The data model for the RVS





# The data model for the RVS

## *Main assumptions at the GDAAS2 stage*

- No spectrum overlap  
⇒ one spectrum = one window (of raw data)
- No spectrum distortion (tilt, length variation...)  
⇒ a unique type of window (length, width)

⇒ extrapolation of the data model for astro !



# The data model for the RVS

## *The relevant classes of the raw layer*

- rawlayer/satellite/instrument/Detection
- rawlayer/satellite/instrument/RVSDetection
  - window position, operating mode
- rawlayer/satellite/ccd
  - SSMWindow
  - RVSSWindow
- rawlayer/observations/RVSObservation
  - window position, operating mode
- rawlayer/observations/Observation
- rawlayer/observations/TDITimeRef







# The data model for the RVS

## *Initial data treatment*

- From the raw layer to the intermediate layer
  - RVSelementary class
    - ObjectID
    - Version
    - Data for cross-matching (field angles)
    - DetectionTime
    - Spectrum
      - $\lambda$
      - relative flux



# Proposal for the RVS GIS

## *Overview*

- Global approach
- Source updating
- Calibration



# Proposal for the RVS GIS

## *Global approach*

- Use of the framework proposed for the astro GIS (see L. Lindegren, GAIA-LL-34):
  - Source processing: estimate the stellar parameters for a given star
  - Calibration: for a given « calibration unit »
  - Attitude processing: for a given attitude interval
  - Global processing: estimate the global parameters
- but:
  - Only 2 steps (source processing, calibration) instead of 4



# Proposal for the RVS GIS

## *Source processing*

- Estimation of the radial velocity (and other source-related quantities)
  - choice of the template (e.g. using MBP data) for the cross-correlation
  - cross-correlation, giving the radial velocities ( $\leftarrow$  calibration,...)
  - updating of the series of RVs, and corresponding standard errors
  - diagnosis of the type of source we are dealing with: constant RV, if not, binary, multiple system...
  - updating of the « mean » RV and standard error, if meaningful, using a robust weighting method



# Proposal for the RVS GIS

## *Calibration (I)*

- In « nominal » operating mode
  - $\lambda$ -pixel relation
    - Using a subset of « suitable » stars (many narrow lines, photometrically and RV stable...)
    - Zero point fixed using stars with accurate ground-measured RV
  - Other calibrations
    - Calibration of the Pixel Response NonUniformity
    - Calibration of the bias in the estimation of the sky background between the RVF CCD and the "mean" RVS CCD
    - PSF profile AL and AC
    - ...



# Proposal for the RVS GIS

## *Calibration (II)*

- In « calibration » operating mode
  - Focal plane geometry (used for the computation of the average CCD)
    - Basically, perform a  $\lambda$ -pixel calibration on each CCD individually
    - Centroiding in the AC direction
  - Other calibrations
    - PSF profile AL and AC
    - relative response of each CCD
    - ...



# Proposal for the RVS GIS

## *Calibration (III)*

- In « dedicated » operating mode
  - CCD biases
  - ...





Thanks for your attention !!