# JCMT Observing Tool
# Tips and Tricks


Graham Bell
Scientific Computing Group
East Asian Observatory

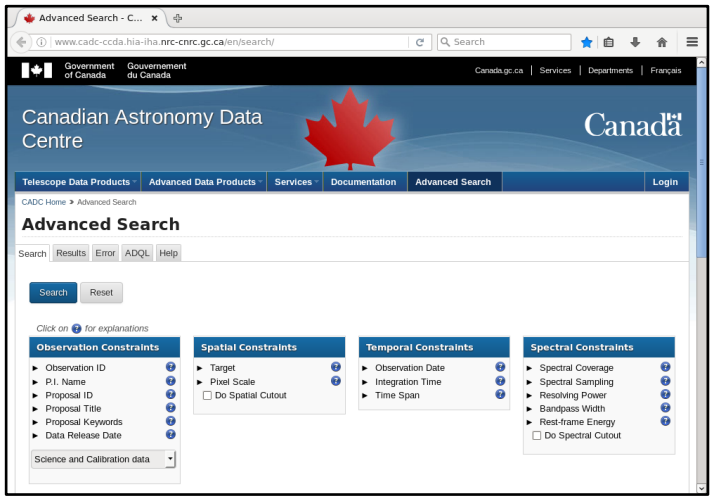
# JCMT OT tips and tricks

- Aims
  - Simplify science programs.
  - Avoid mistakes, e.g. copy & paste errors.

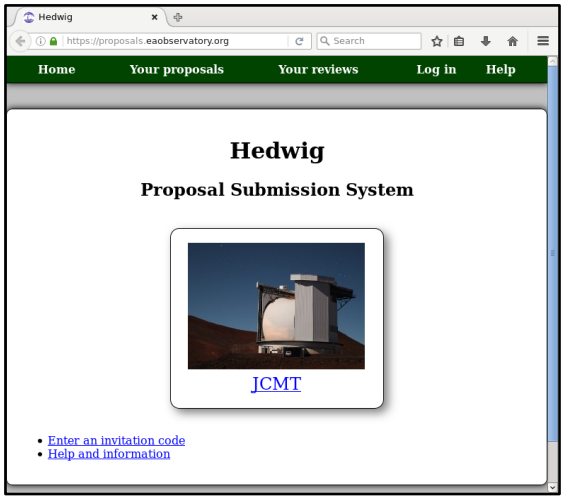
- Overview
  - Target information.
  - Inheritance.
  - Folders.
  - Survey containers.
  - Validation.

# MSB life cycle

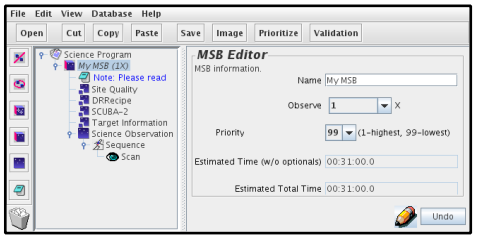
## CADC




## Hedwig

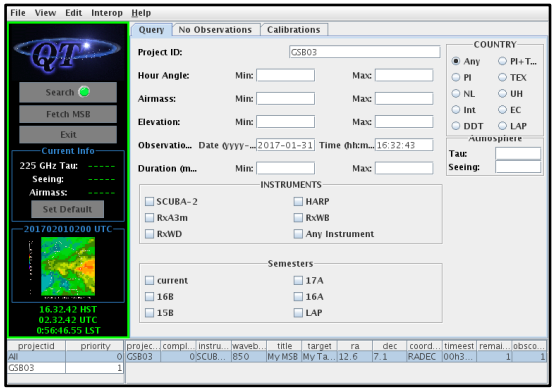



## OT

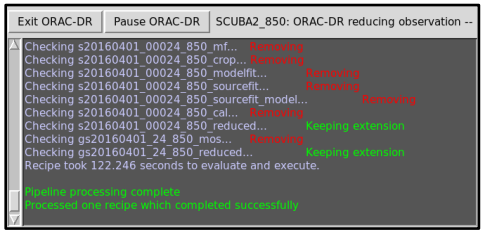



## OMP


## QT



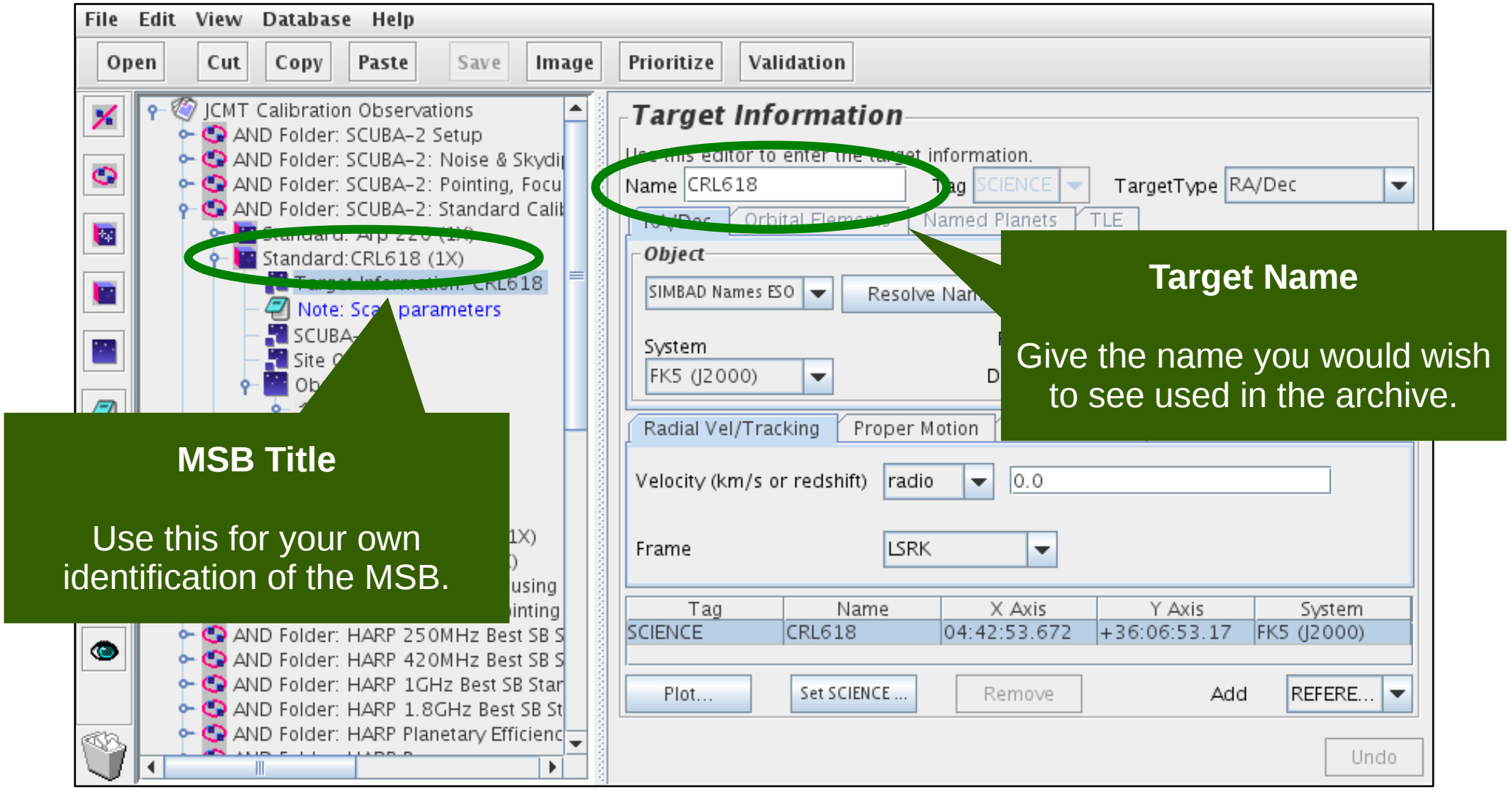

## ORAC-DR



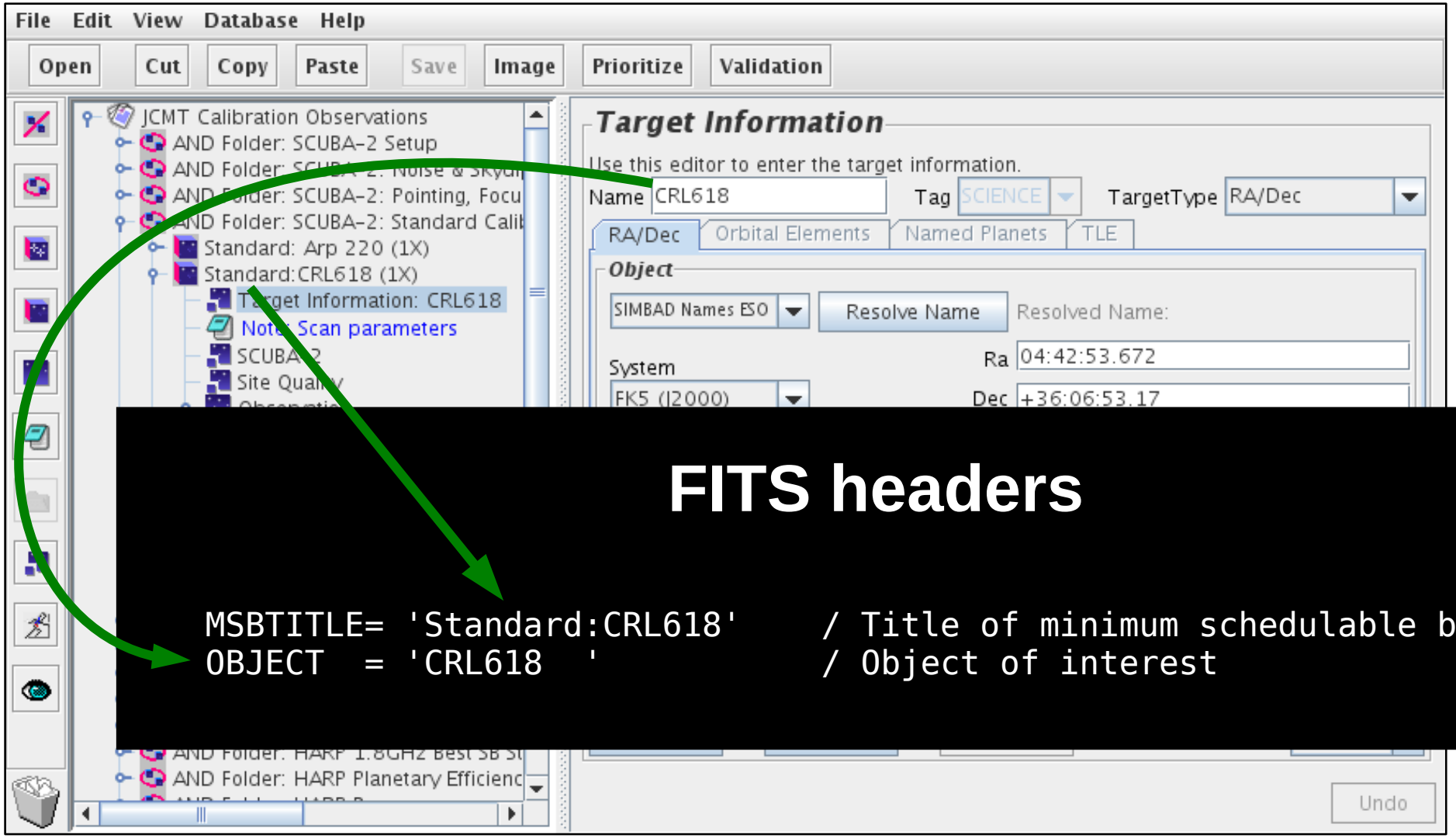
# Target information — tips

- Try to give the target’s usual name.
  - Use the name you would want to see in the archive.
- Make use of offset iterators.
  - Define locations relative to a fixed target.

# Target information and MSB title



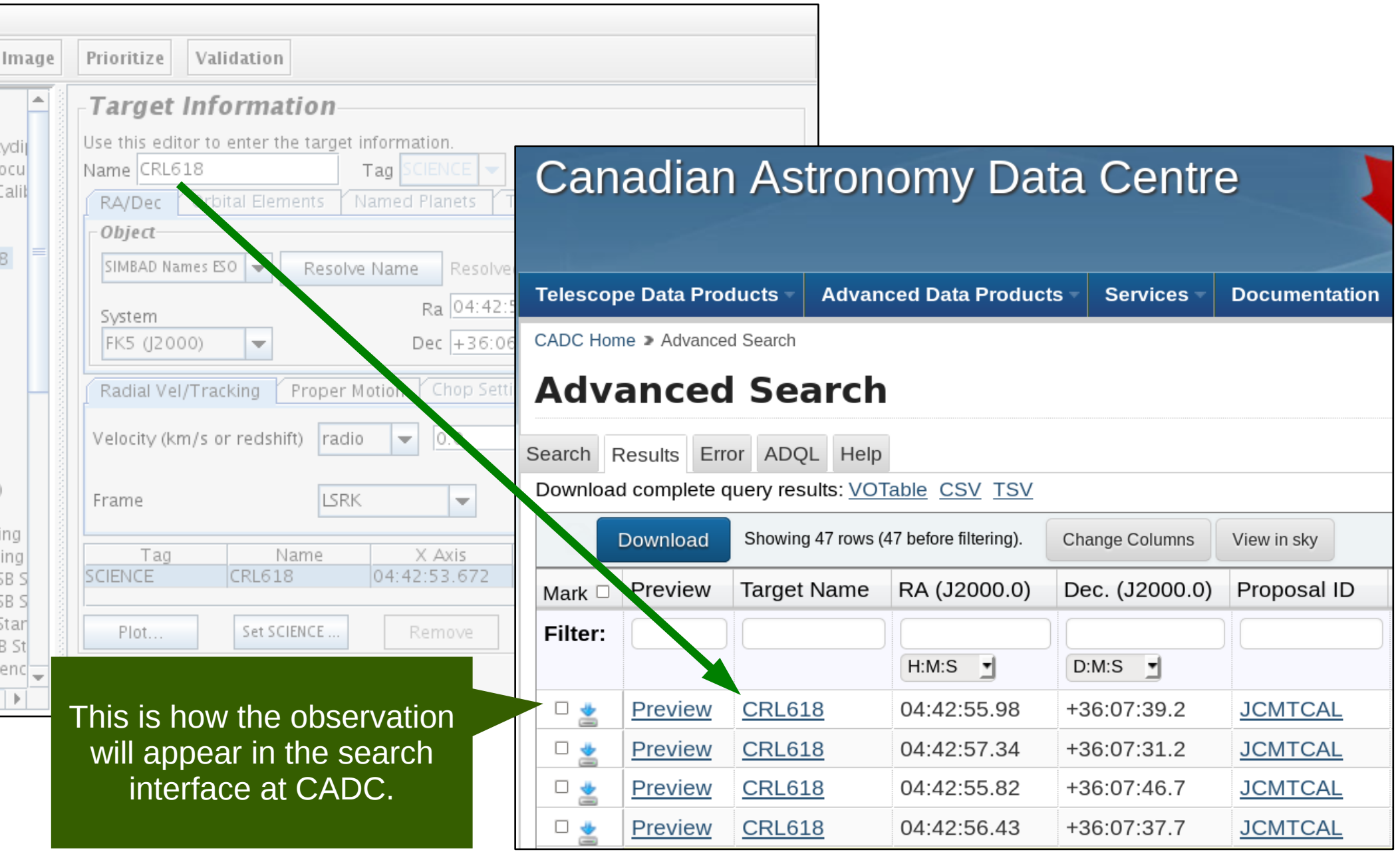
# Target information — FITS headers




## FITS headers

```
MSBTITLE= 'Standard:CRL618'    / Title of minimum schedulable block
OBJECT  = 'CRL618  '           / Object of interest
```

# Target information — CADC



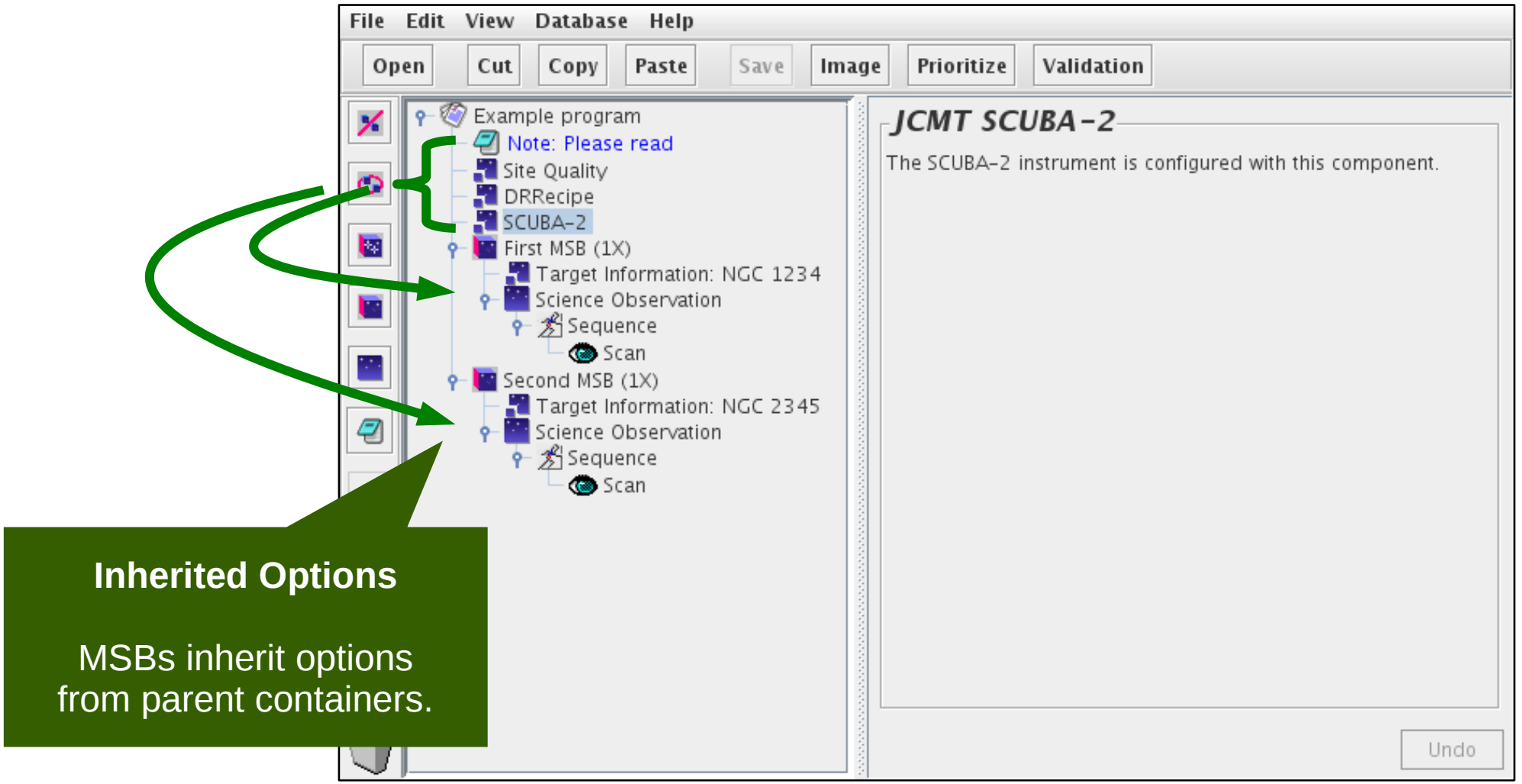

This is how the observation will appear in the search interface at CADC.

# Inheritance — tips

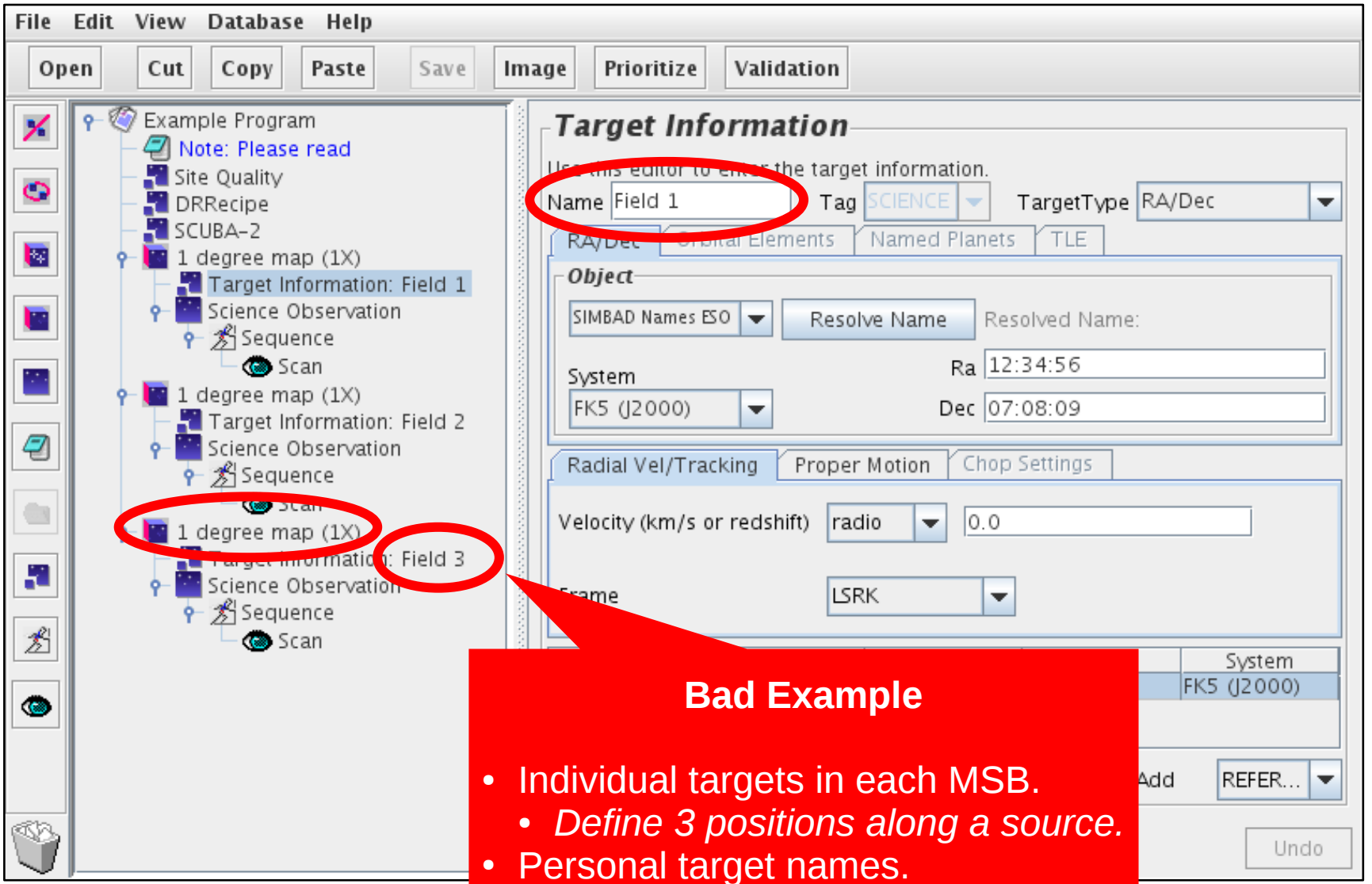
- Science programs are hierarchical:
  - Top level
    - ➔ Folder
      - ➔ MSB
        - ➔ Observation

- Observations inherit options from parents.
  - Instrument, target, site quality, DR recipe, notes.

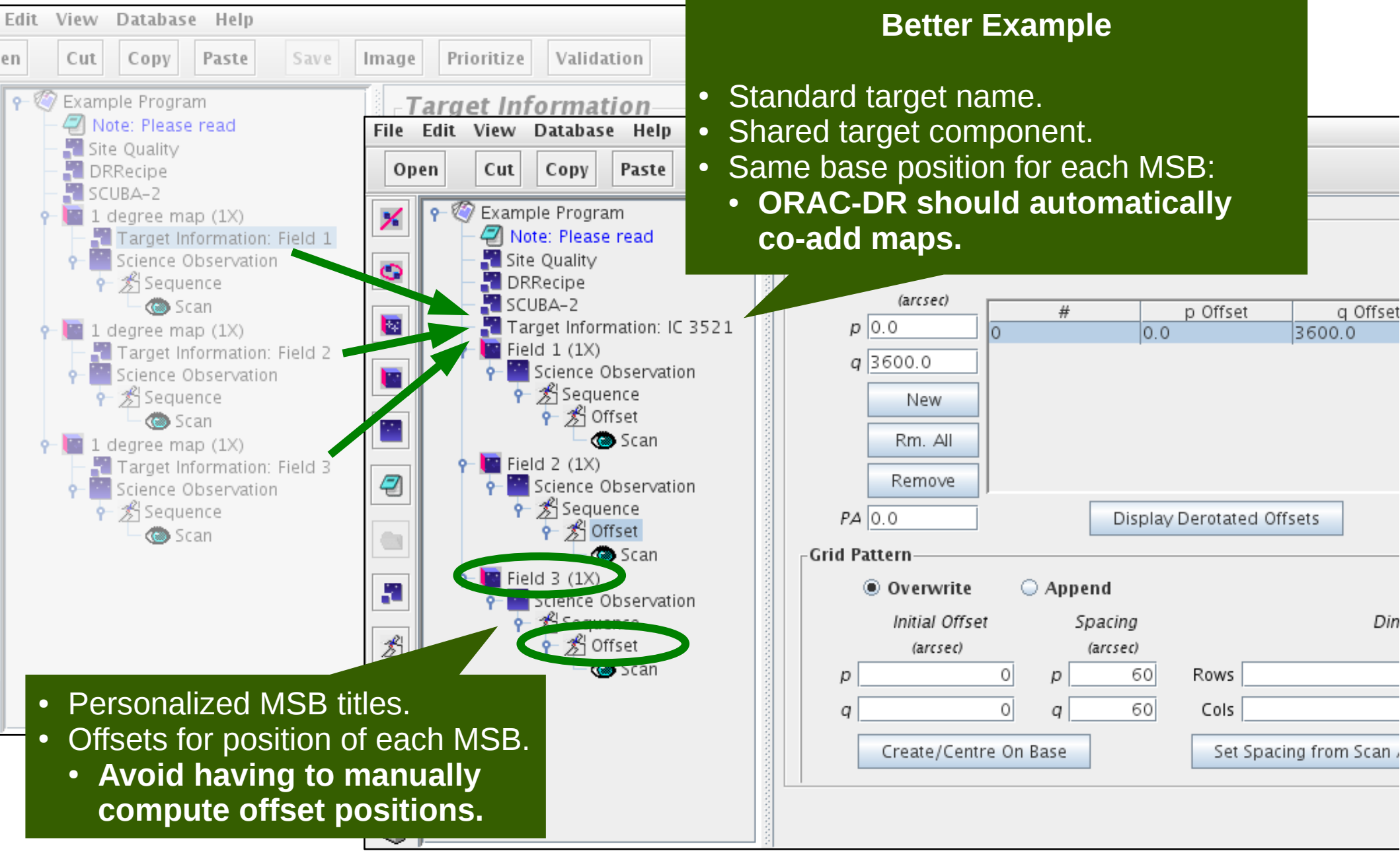
# Inheritance — example



# Target information without inheritance



# Inheritance — target information

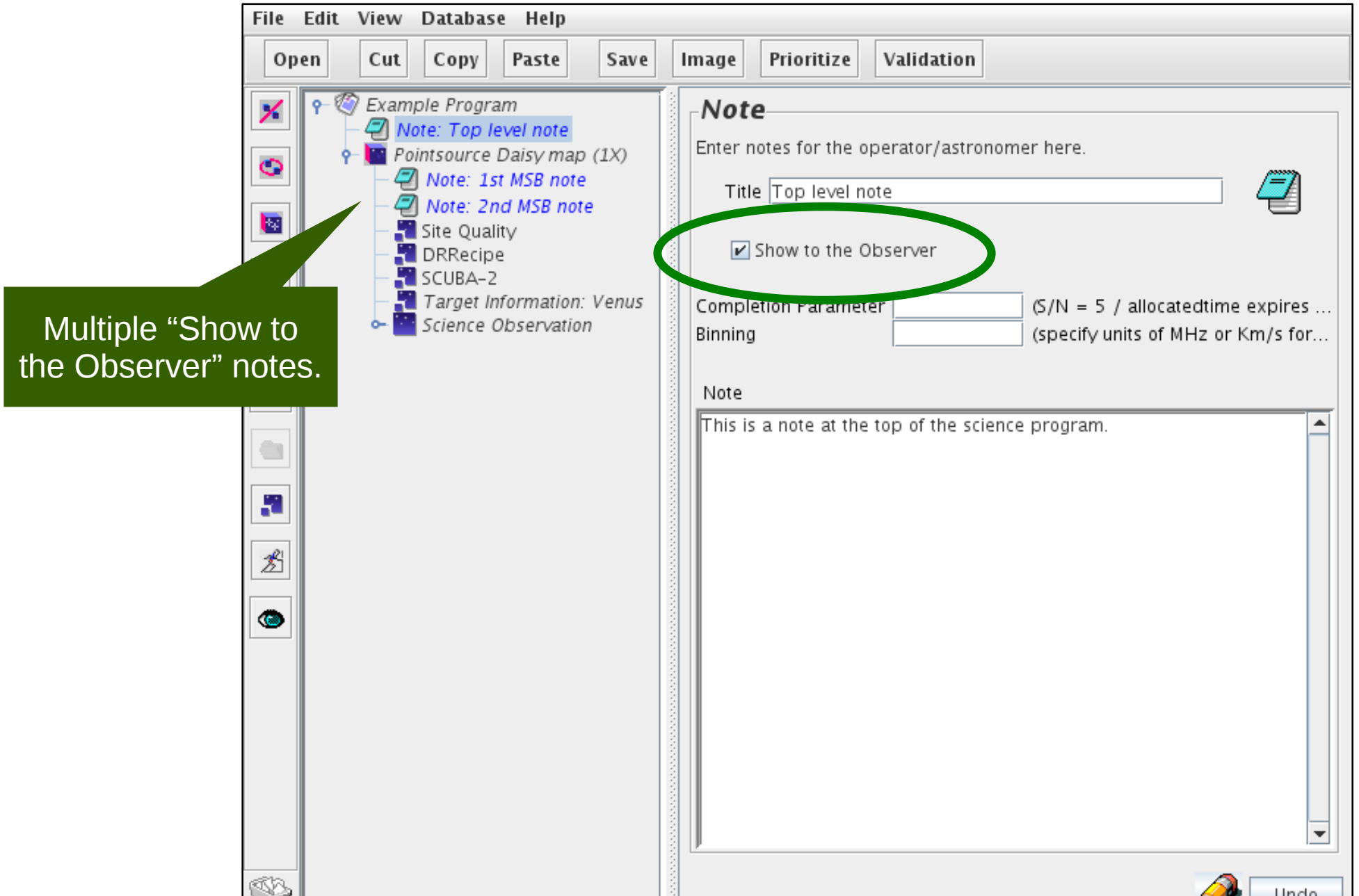



**Better Example**

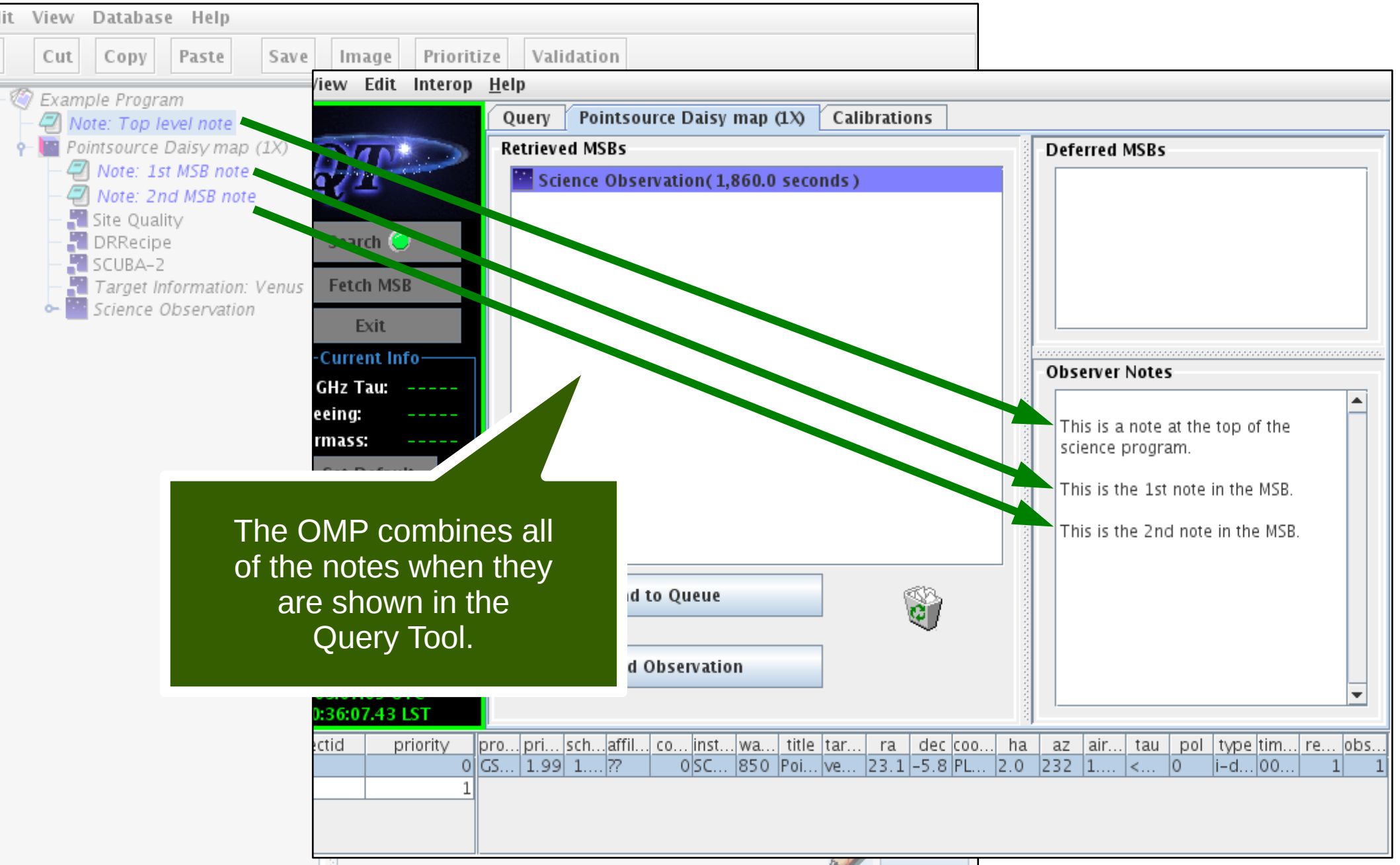
- Standard target name.
- Shared target component.
- Same base position for each MSB:
  - **ORAC-DR should automatically co-add maps.**

- Personalized MSB titles.
- Offsets for position of each MSB.
  - **Avoid having to manually compute offset positions.**

# Inheritance — notes



# Inheritance — notes in QT




The OMP combines all of the notes when they are shown in the Query Tool.

# Inheritance — warnings

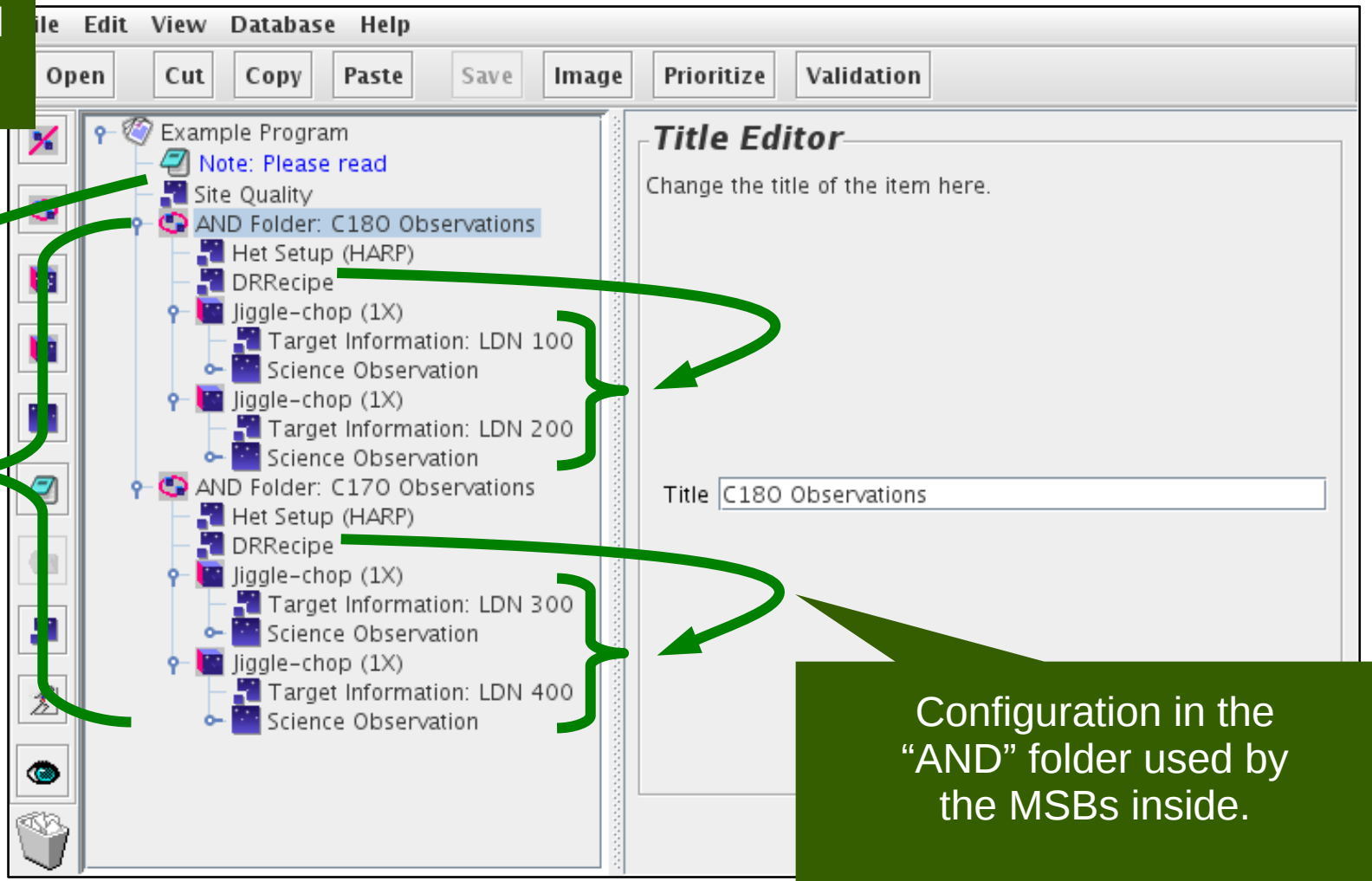
- Warnings:
  - Parent options **after** the MSB are included too.
  - Target information & heterodyne setup must be at the same level when using target's radial velocity.
  - DR recipe must be at same or lower level than instrument.

# Folders

- “AND” folders
  - Organize MSBs into groups.
- “OR” folders
  - Select alternative MSBs.

# “AND” folders

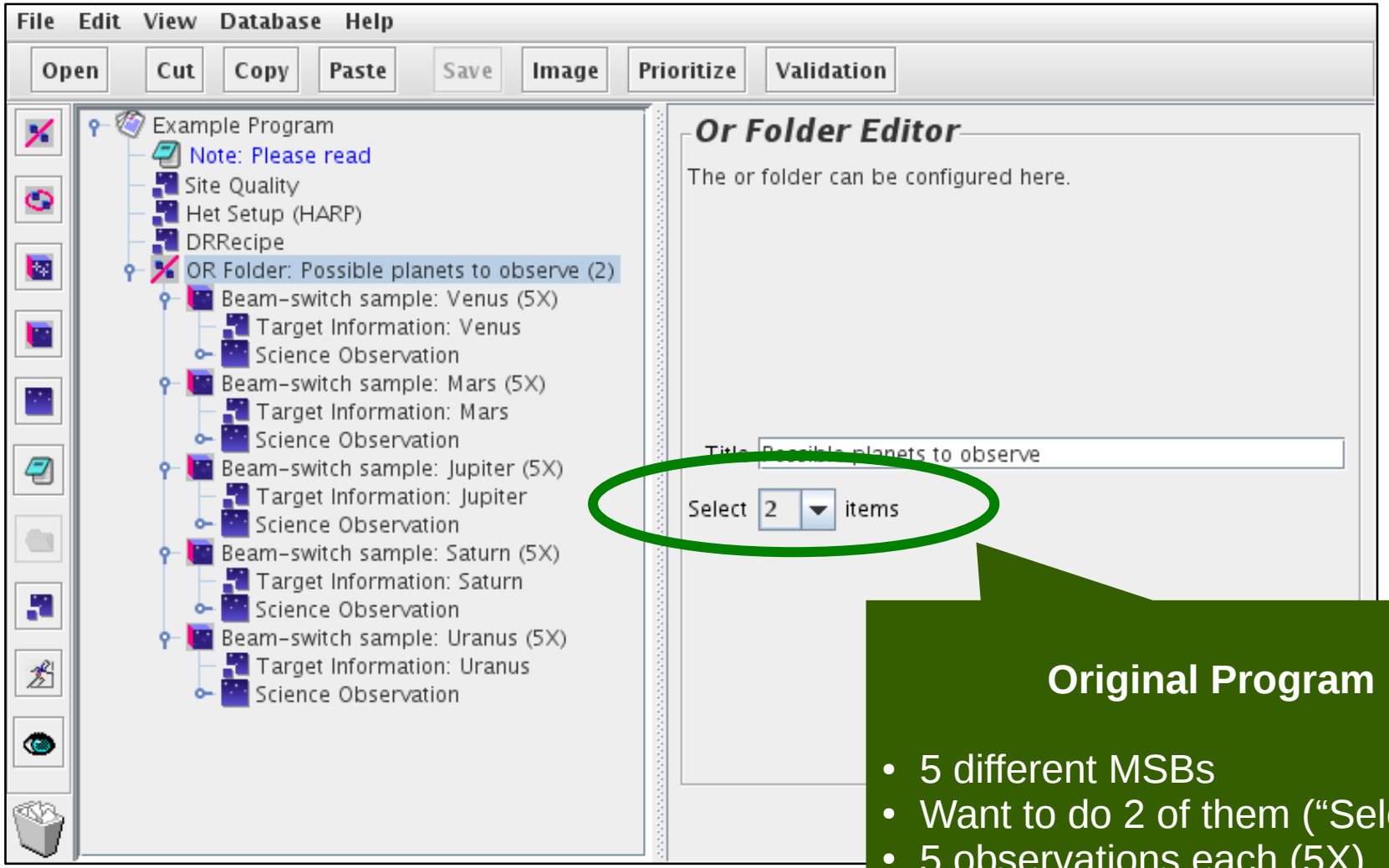
Configuration at the top level used by all MSBs.




Configuration in the “AND” folder used by the MSBs inside.

“AND” folder does not affect when MSBs are observed.

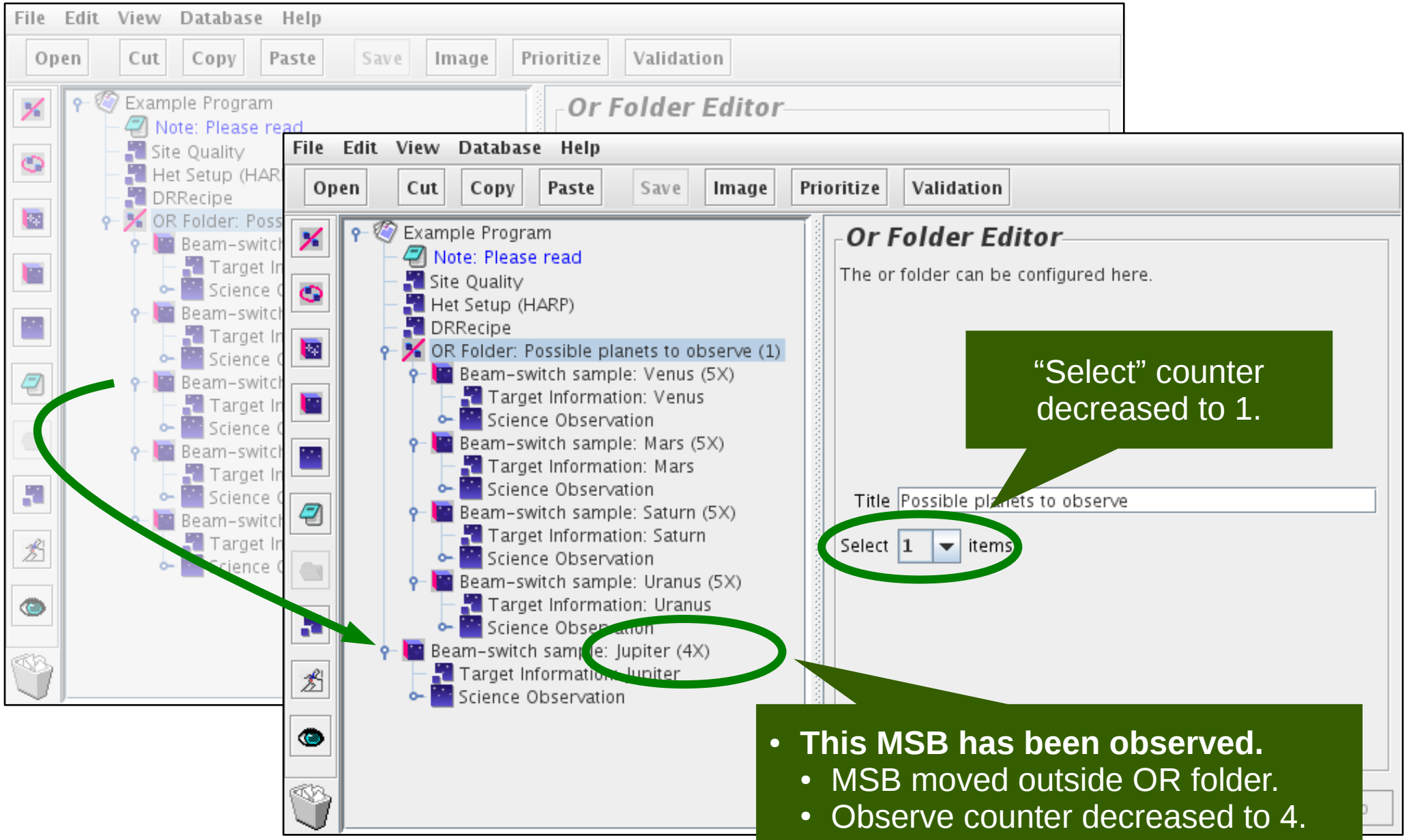
# “OR” folders



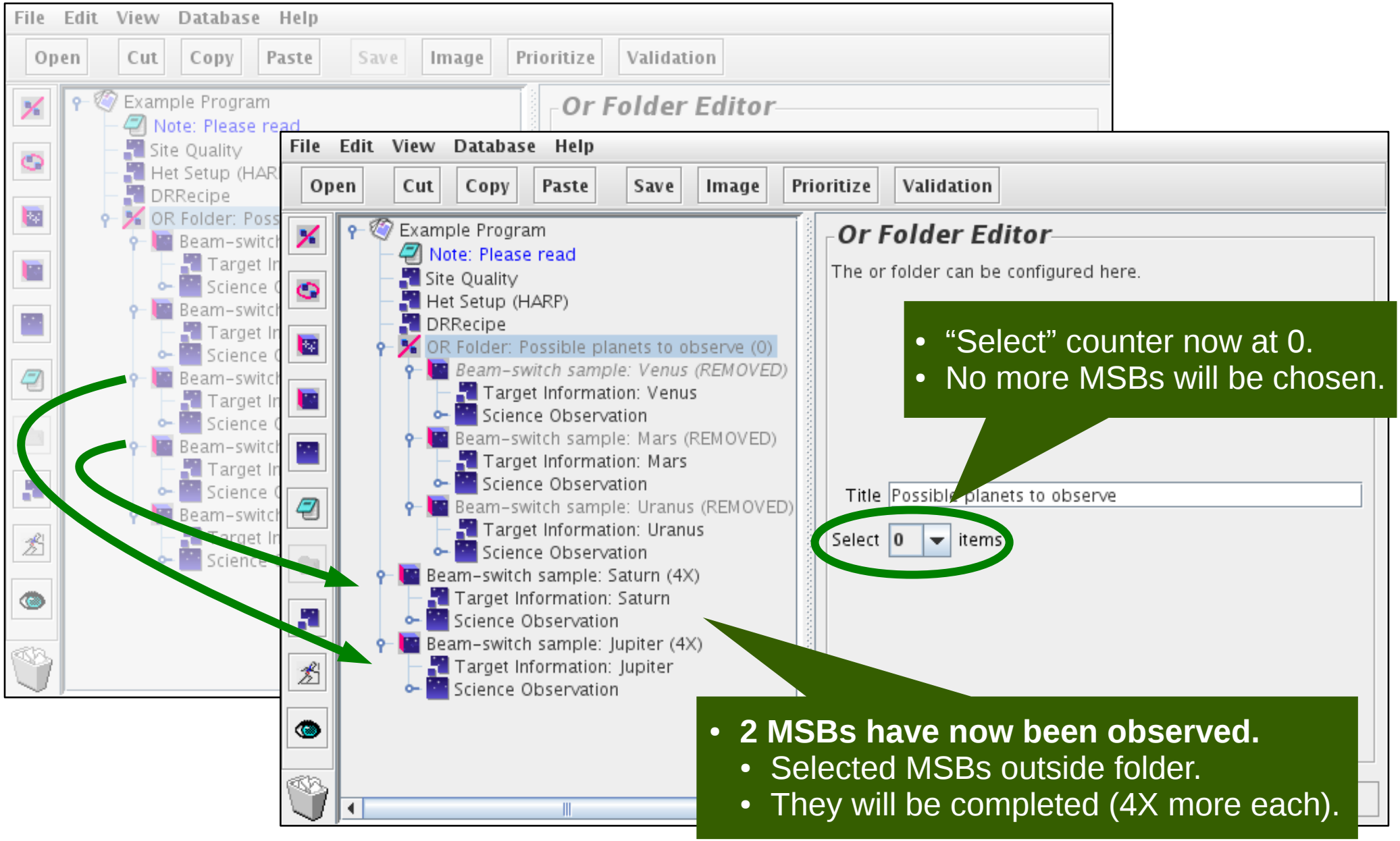

**Original Program**

- 5 different MSBs
- Want to do 2 of them (“Select” 2)
- 5 observations each (5X)

# “Or” folders — during selection



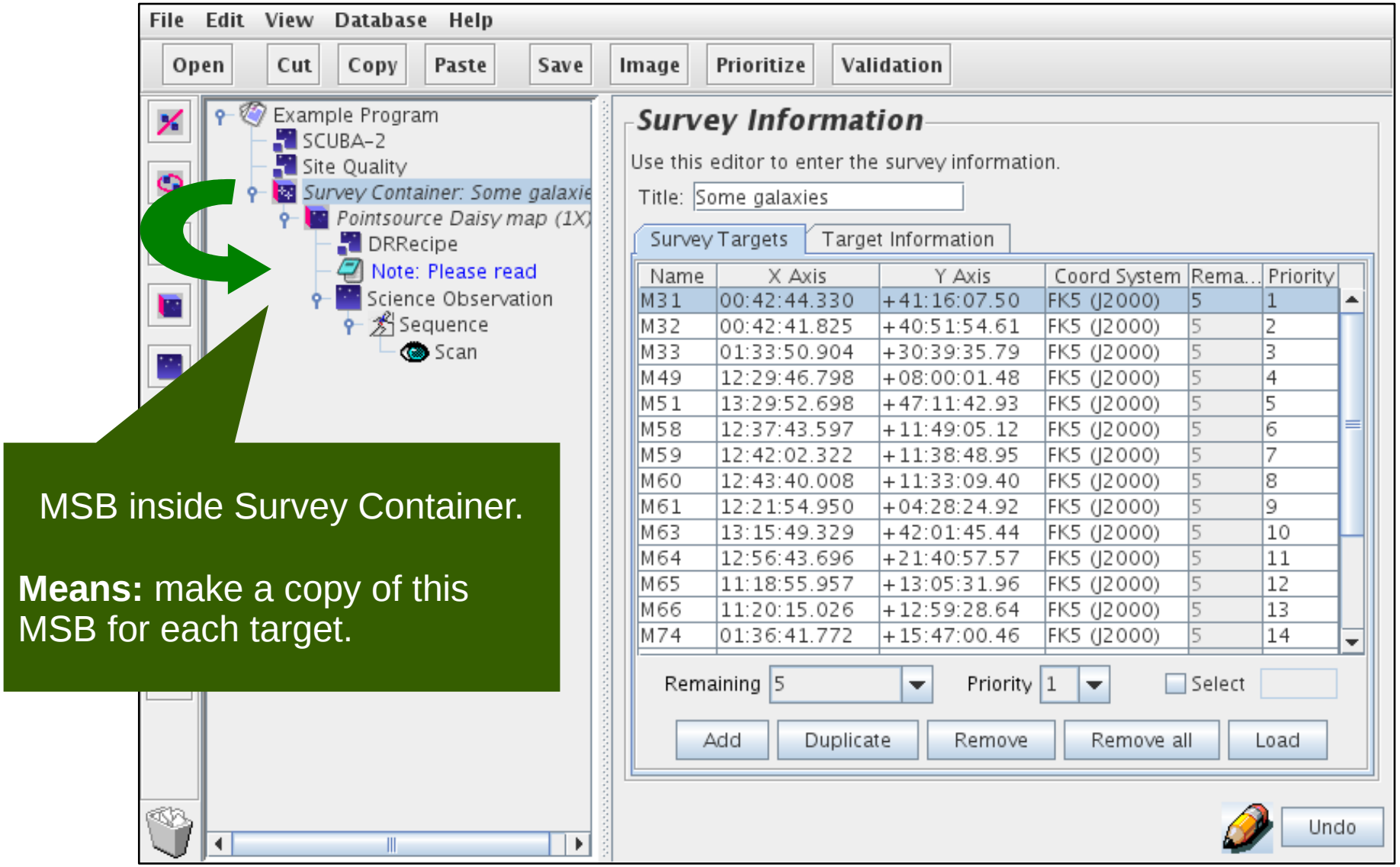
# “Or” folders — after selection



# Survey containers

- Repeat an observation for multiple sources.
- Source list can be loaded from a file.

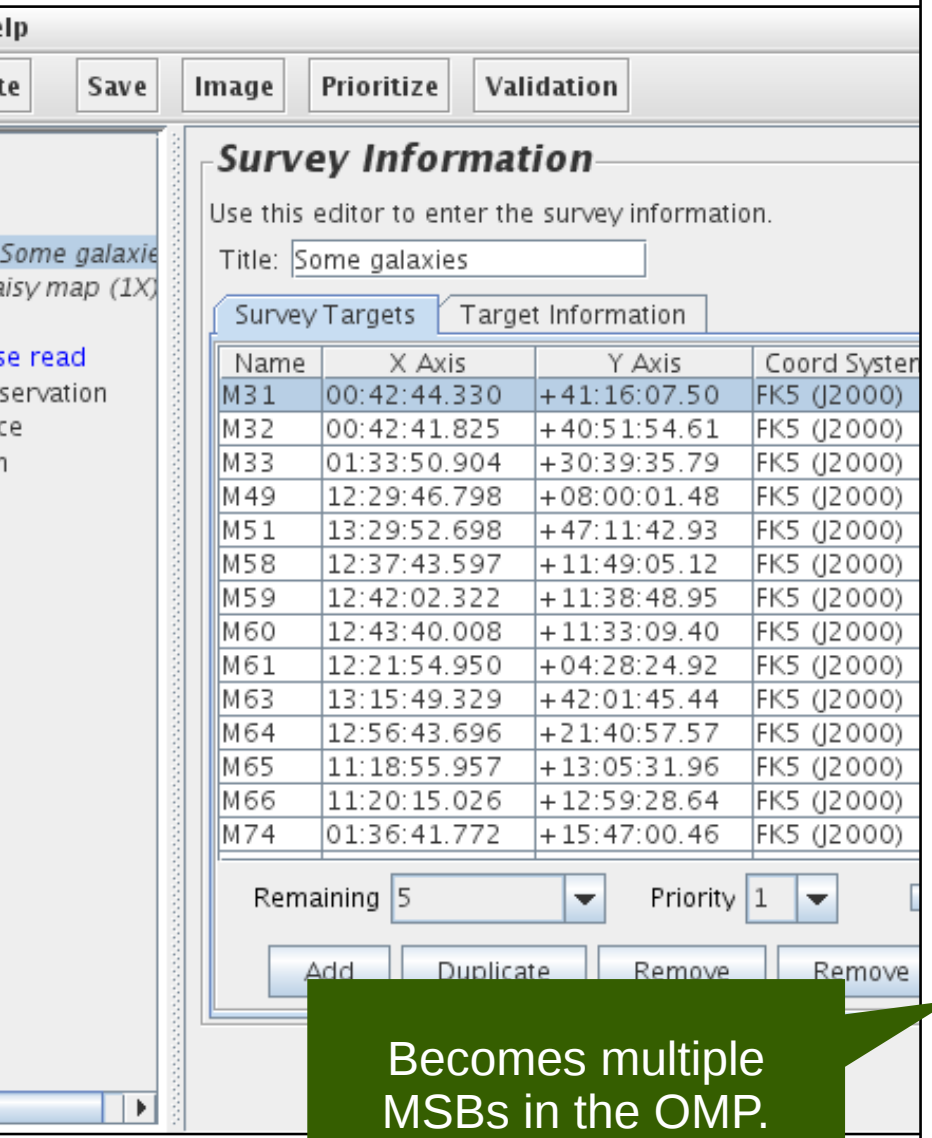
# Survey container — example




MSB inside Survey Container.

**Means:** make a copy of this MSB for each target.

# Survey container — in the OMP



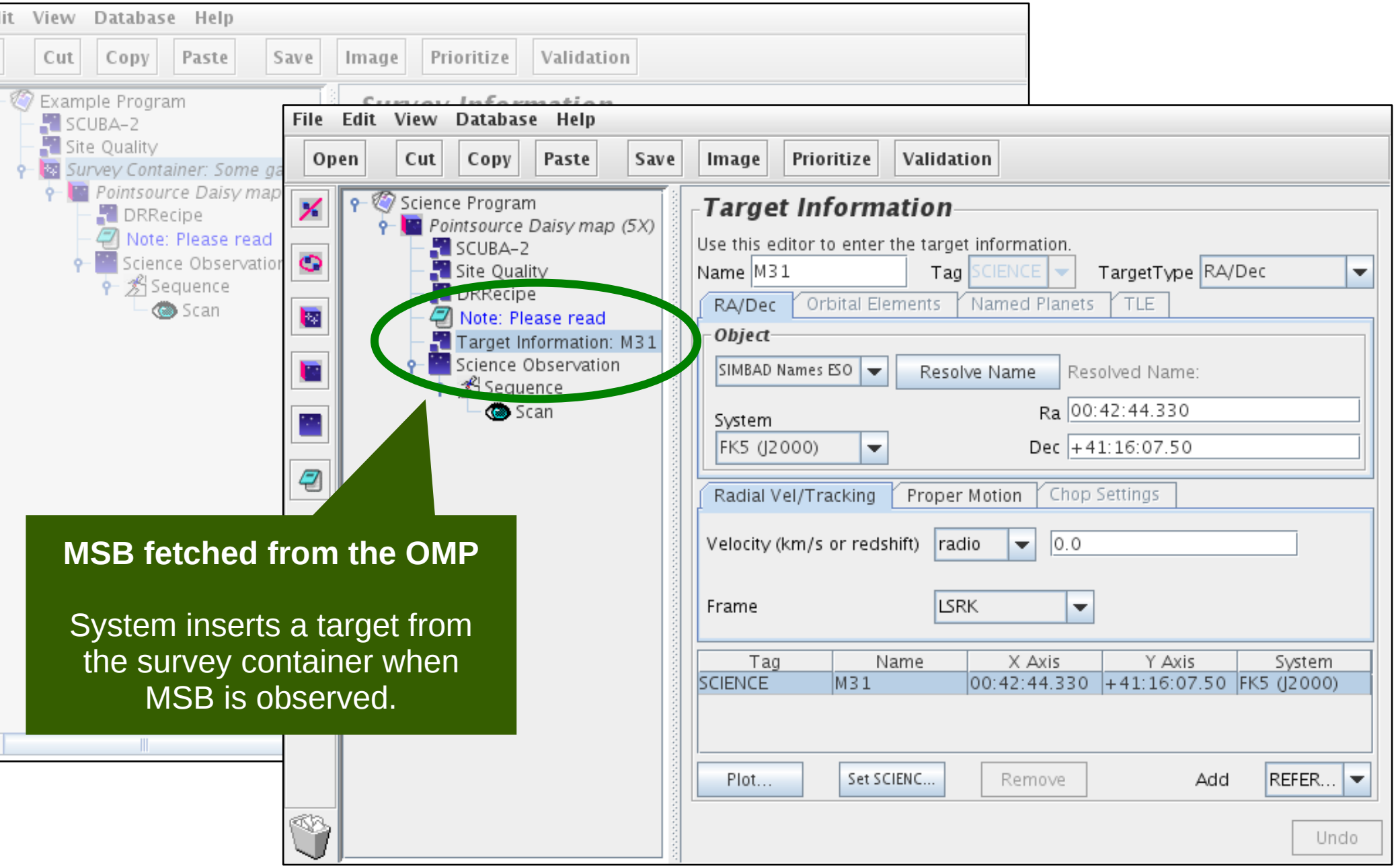

Becomes multiple MSBs in the OMP.

**MSBs remaining to be observed:**

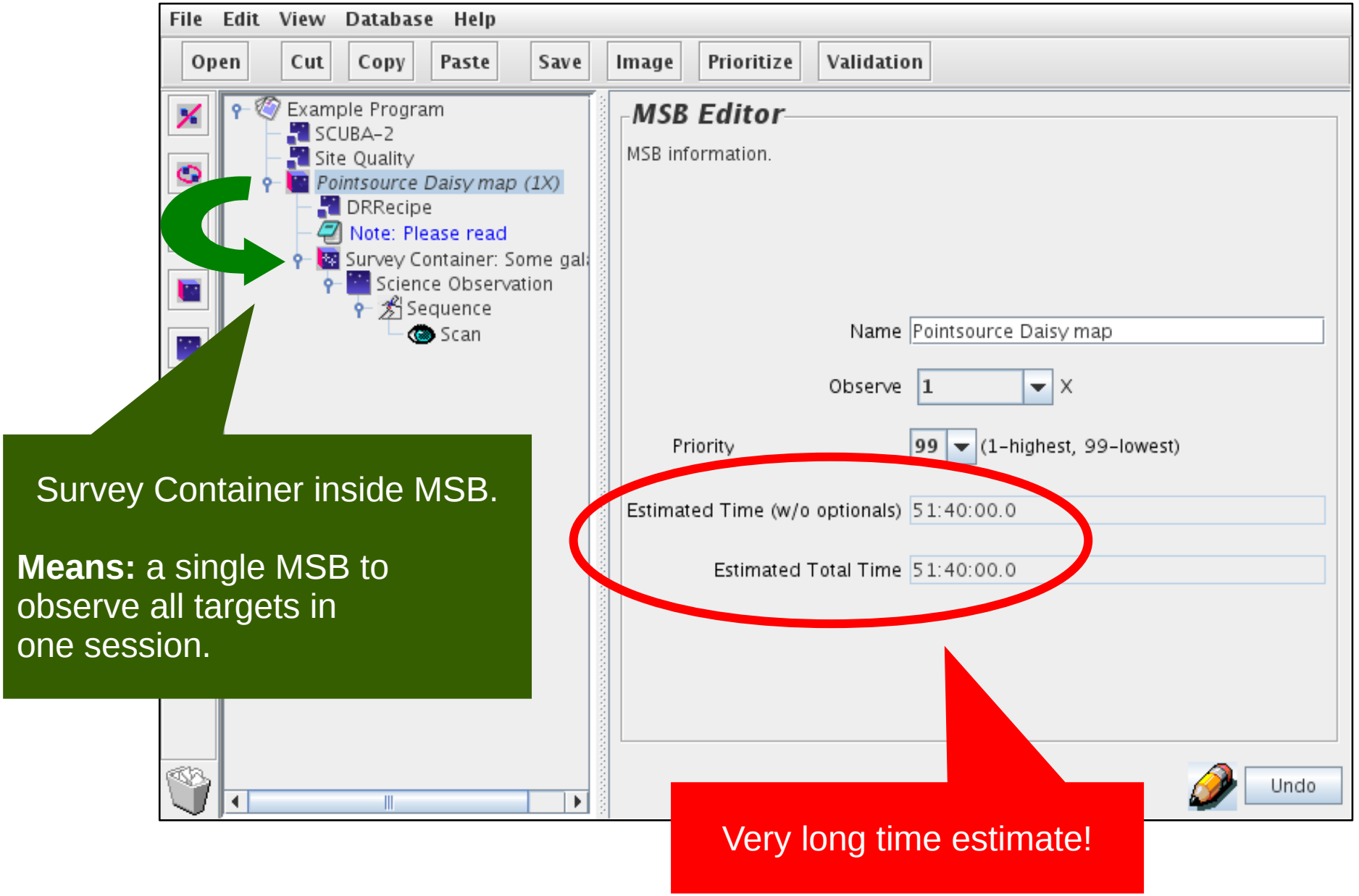
| MSB | Target | Waveband | Instrument | Est. time | Remaining |
|---|---|---|---|---|---|
| 1 | M31 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 2 | M32 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 3 | M33 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 4 | M49 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 5 | M51 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 6 | M58 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 7 | M59 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 8 | M60 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 9 | M61 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 10 | M63 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 11 | M64 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 12 | M65 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 13 | M66 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 14 | M74 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 15 | M77 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 16 | M81 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 17 | M82 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 18 | M84 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 19 | M85 | 850 | SCUBA-2 | 0.52 hours | 5 |
| 20 | M86 | 850 | SCUBA-2 | 0.52 hours | 5 |

Click here for more details on the science program.
Click here to download or plot the regions observed in this program.

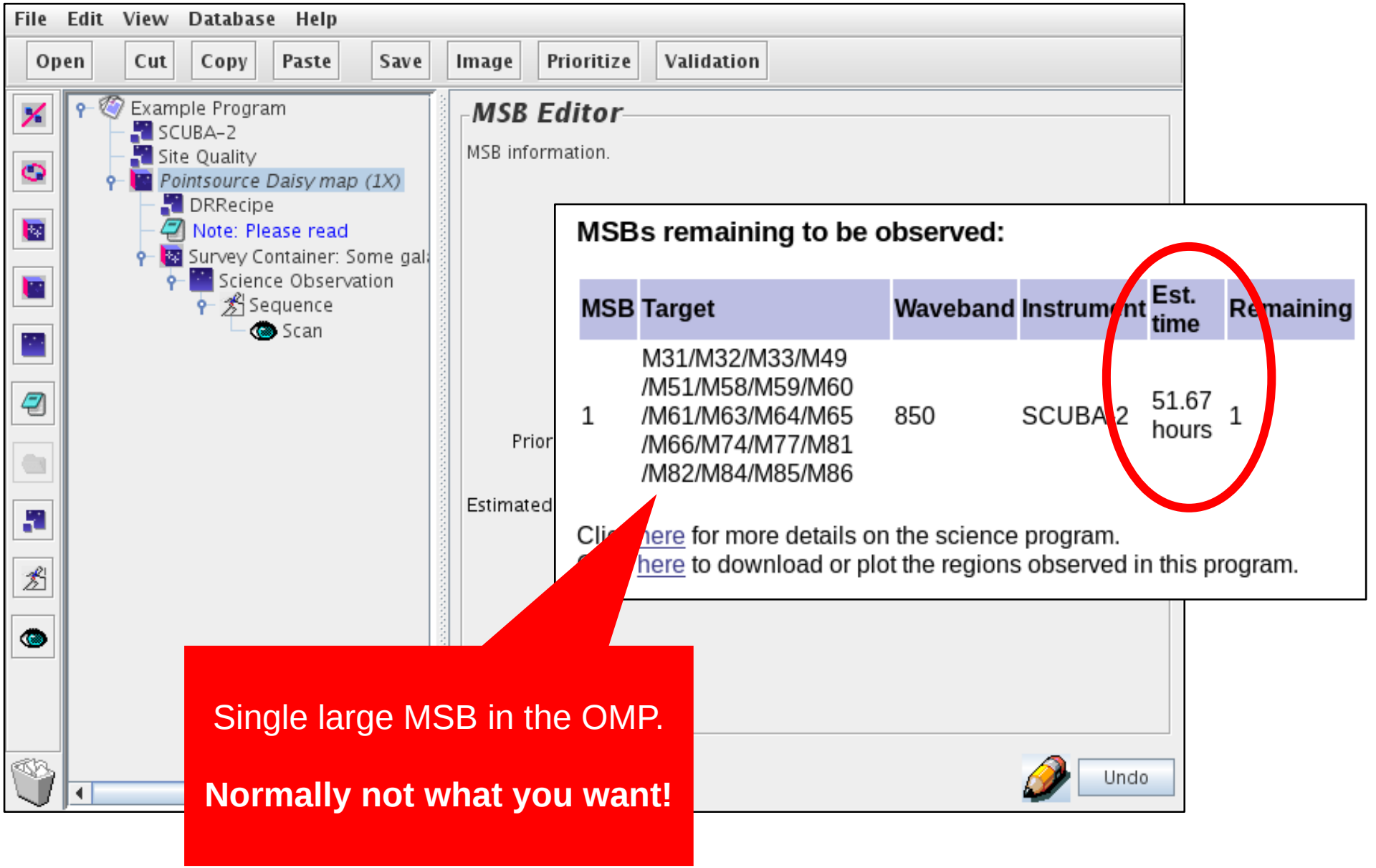
# Survey container — fetched MSB



# Survey container in MSB



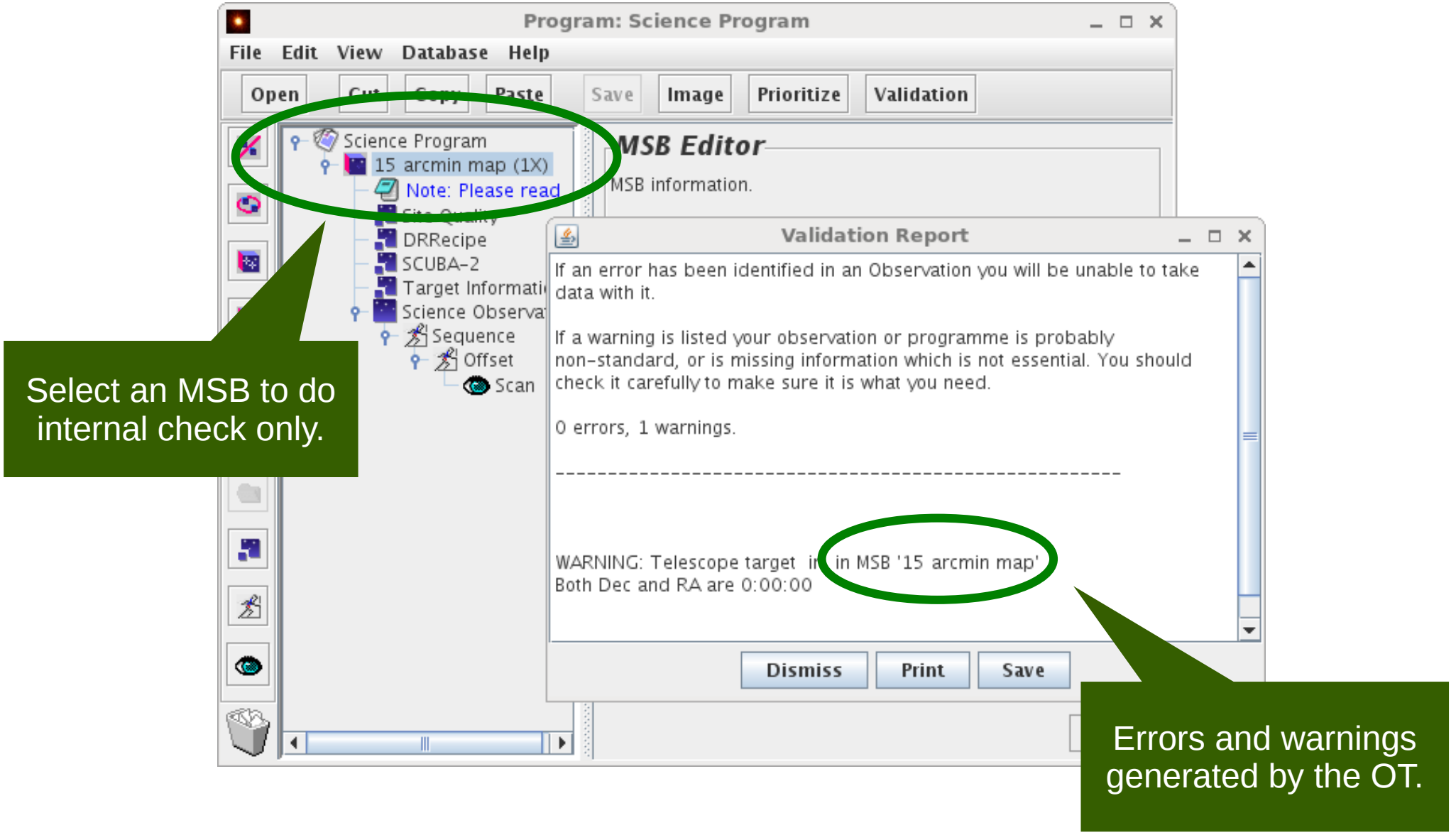
# Survey container in MSB — OMP



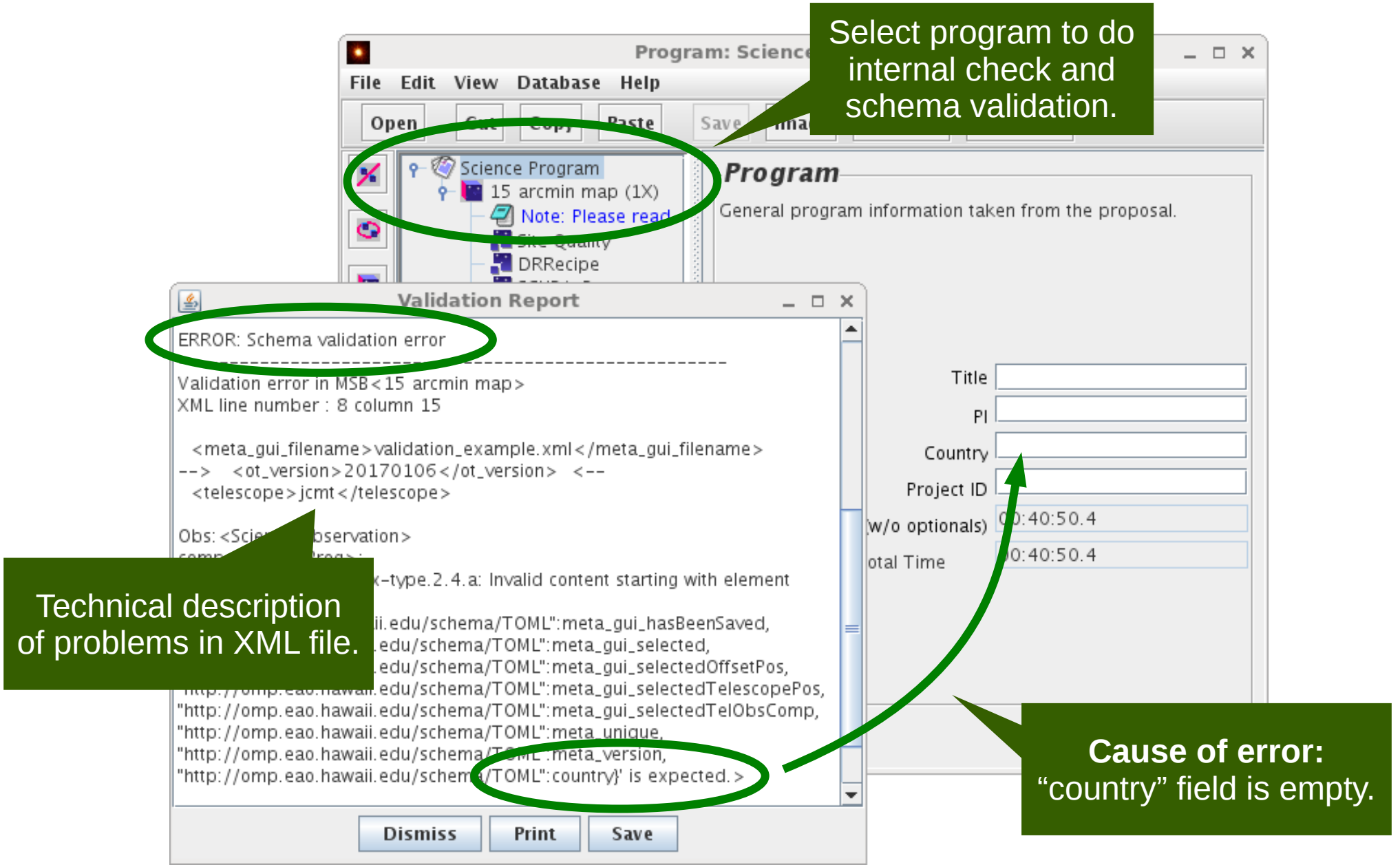
# Validation — overview

- Validation of a single MSB:
  - Internal check only.
- Validation of whole program:
  - Internal check of each MSB.
  - XML schema validation of program.

# Validation — internal check



# Validation — XML schema validation



# Common pitfalls (1/2)

- Some MSBs can be hard to observe:
  - Long time.
  - Strict constraints (e.g. opacity, scheduling).
  - Widely-spaced targets.

- “Observe” counter vs. “Repeat” iterator.
  - MSB “observe” counter: do MSB multiple times.
  - “Repeat” iterator: extends duration of the MSB.

# Common pitfalls (2/2)

- Program may have been updated by the OMP.
  - Message: “Science Program has changed on disk”.
  - Fetch program from OMP database before editing.
- Must use Oracle’s version of Java.
  - OpenJDK can appear to work at first but problems often occur.
- Sometimes updates only saved on key-press.

# Tutorials

- Basics tutorial
  - Installation and basic usage of the OT.
- Tricks tutorial
  - Practice of techniques from this presentation.

- Tutorials & example files can be found here:

  http://www.eaobservatory.org

  /jcmt/science/reductionanalysis-tutorials/