JCMT Observing Tool

Introduction

Tips and Tricks

JCMT OT Introduction

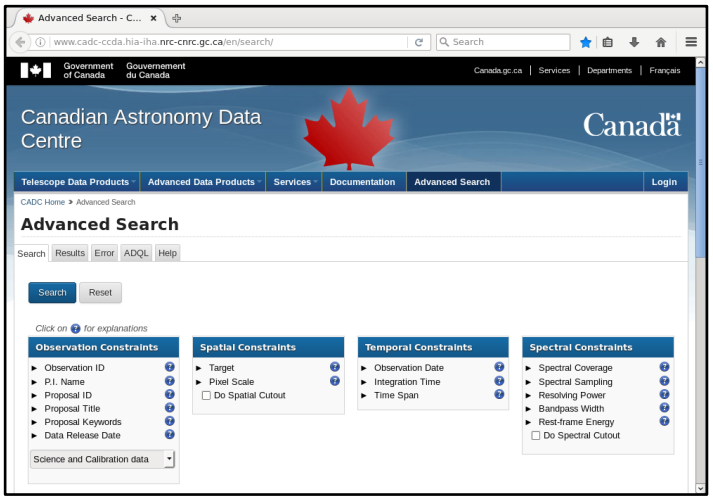
- The MSB life cycle.
- Introduction to the OT.
- The MSB libraries.
- Creating an MSB.
- Target information.
- The position editor.

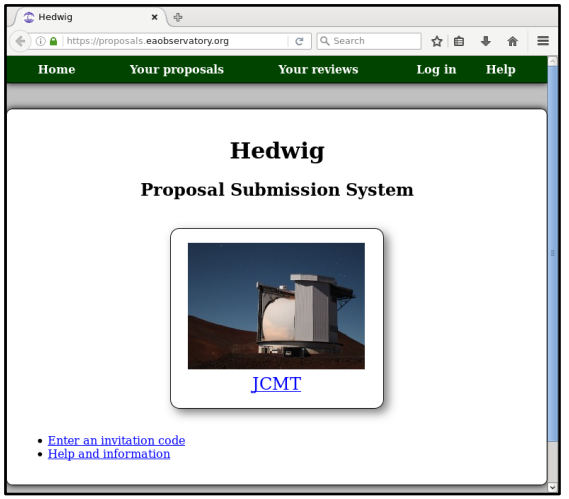
MSB life cycle — what is an MSB?

- “Minimum schedulable block”.
- Smallest useful observing unit.
  - One or more observations.
  - Typically 30 – 60 minutes.
  - Always observed in its entirety.

MSB life cycle — role of the OT

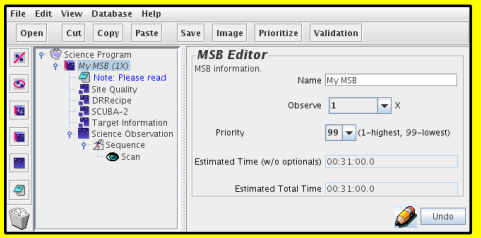
CADC



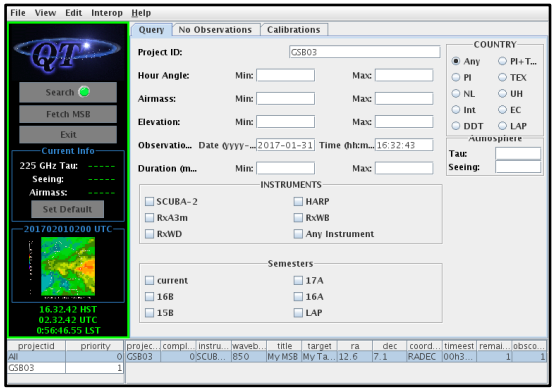


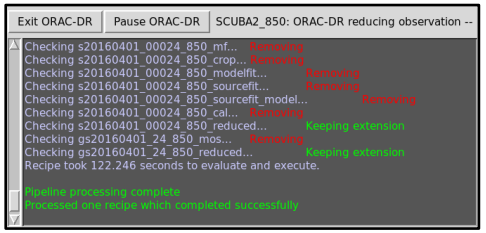
Hedwig

OT

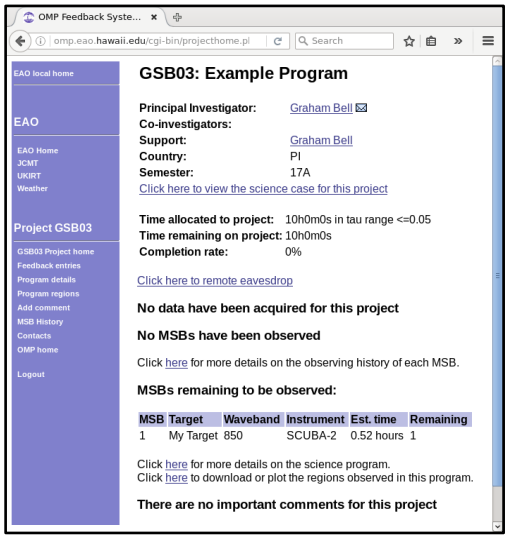


QT





ORAC-DR

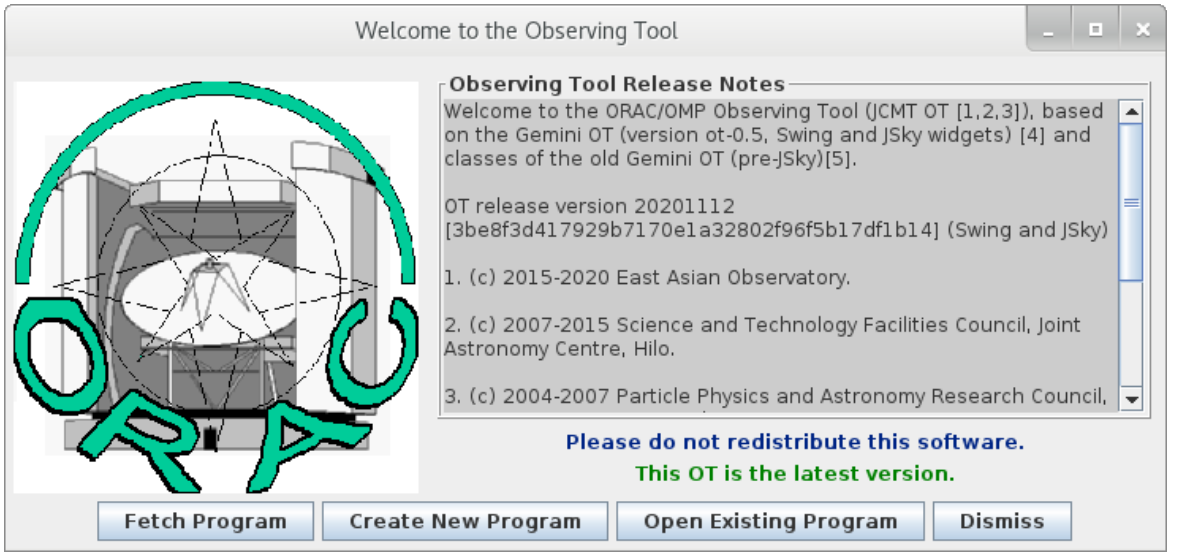


OMP

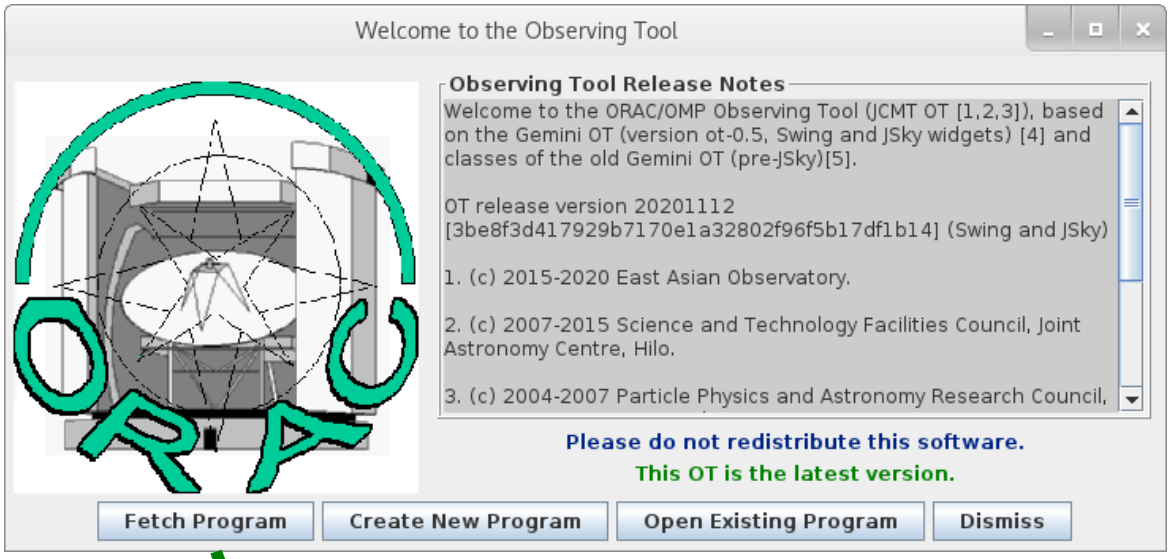
Introduction — starting the OT

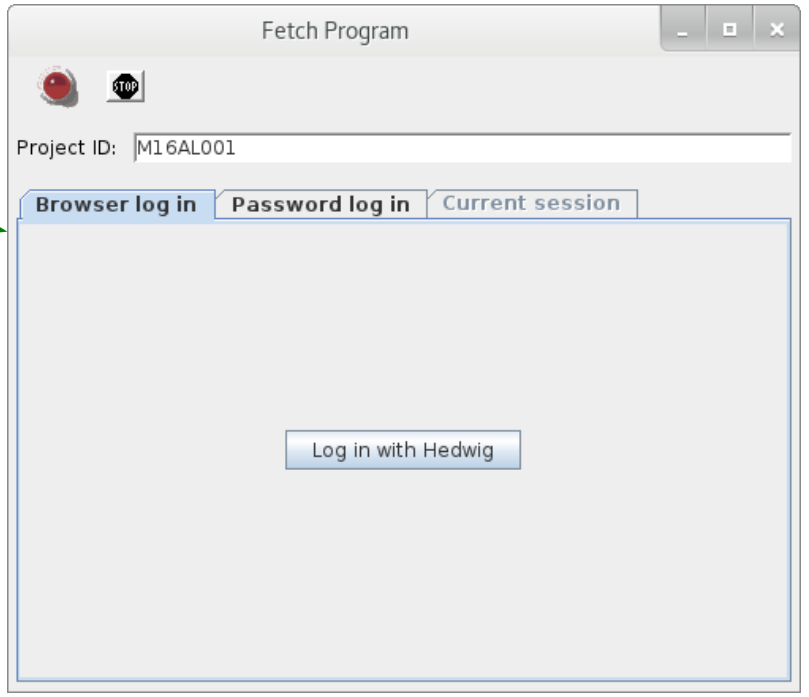
$ wget https://ftp.eao.hawaii.edu/ot/jcmtot.jar

$ java -jar jcmtot.jar



Introduction — fetching a program





To fetch an existing program: enter project ID and log in with Hedwig.

Introduction — components

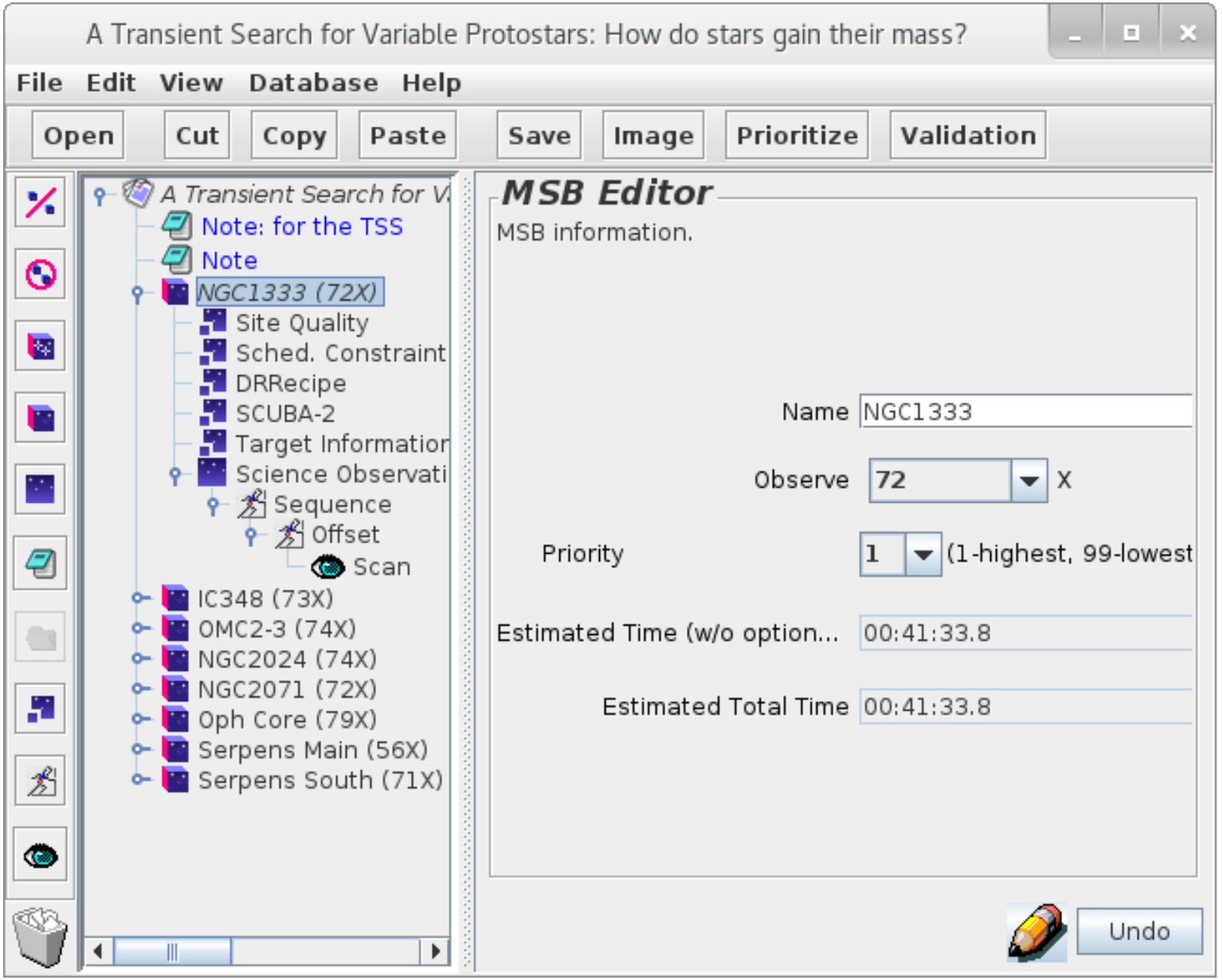
MSB

Observation

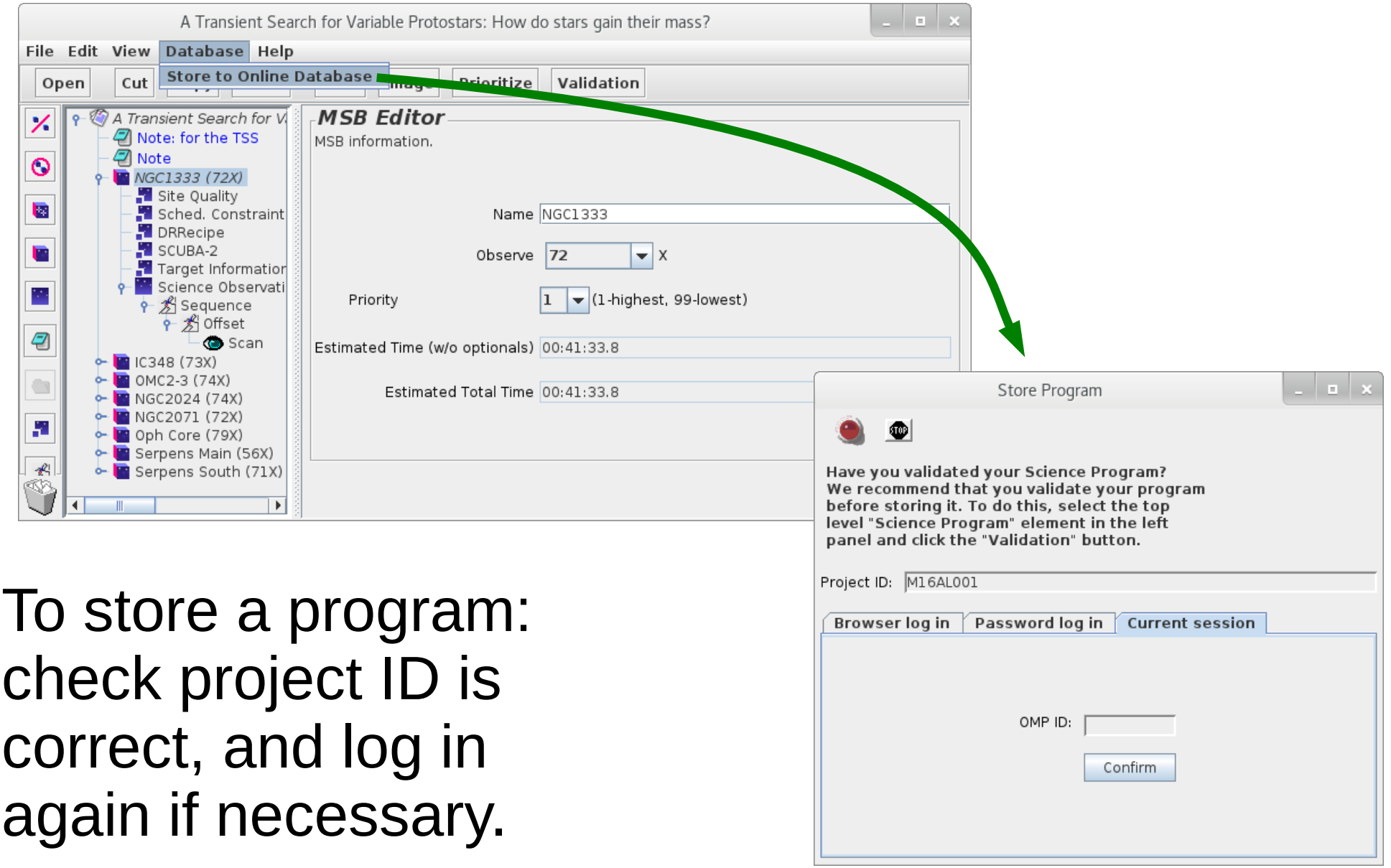
Component

Iterator

“Eye”



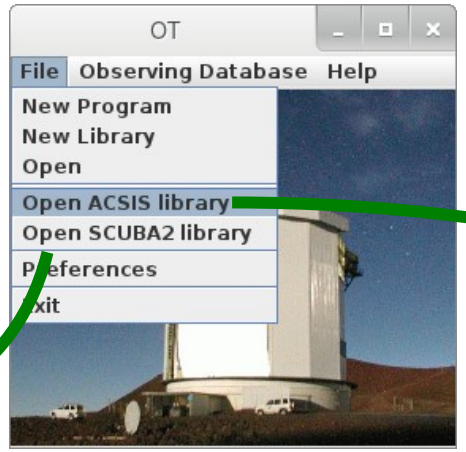
Introduction — storing a program

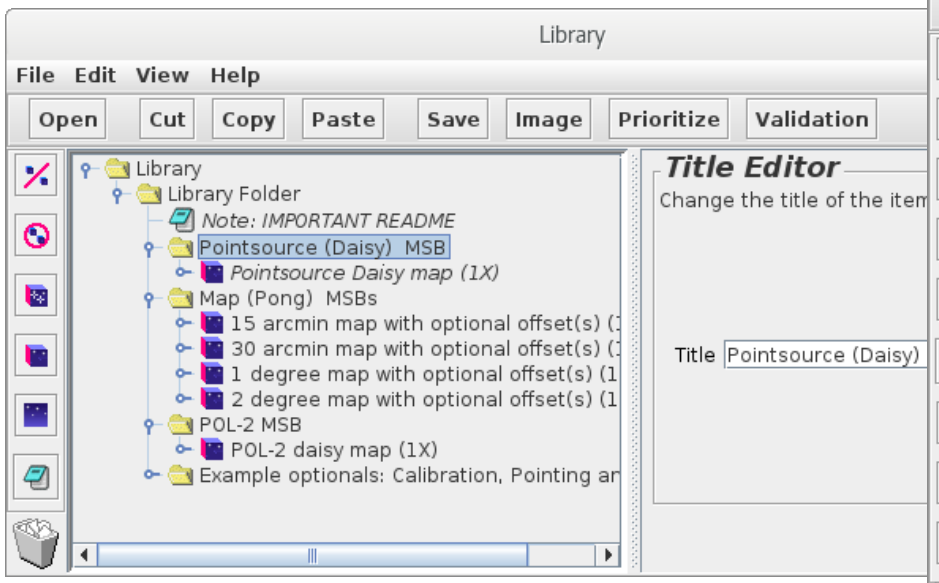


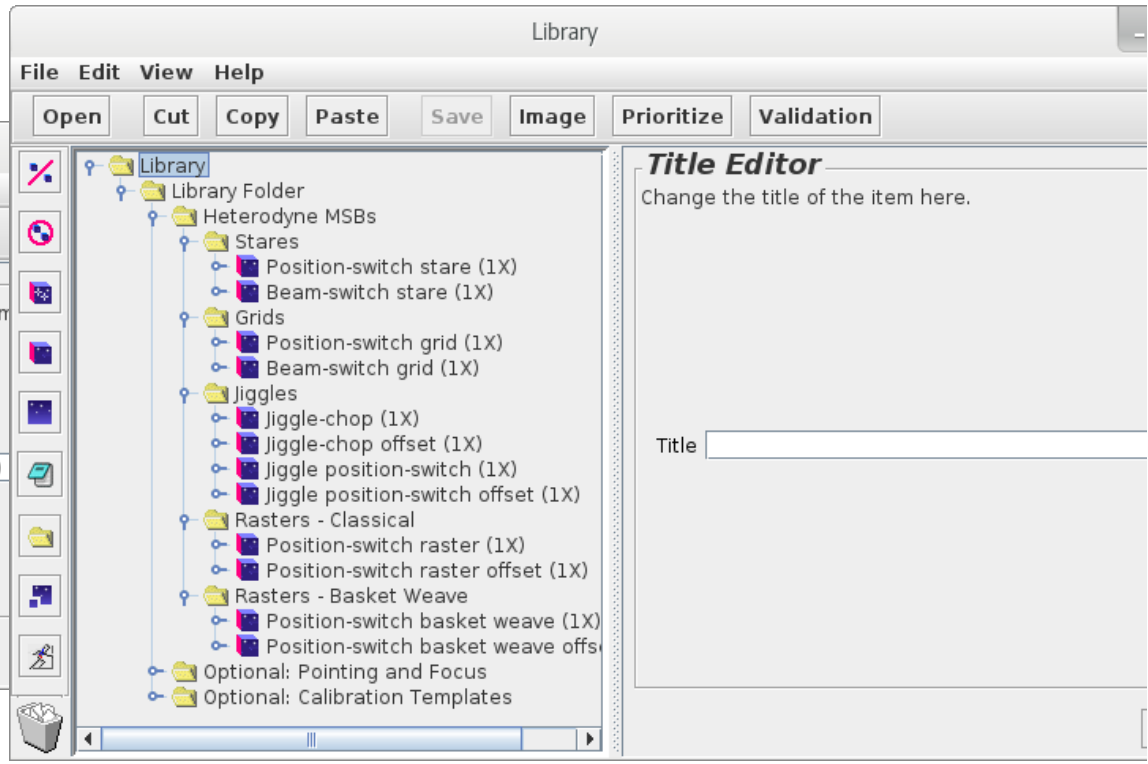
To store a program: check project ID is correct, and log in again if necessary.

Introduction — the MSB libraries

There are libraries of examples for ACSIS and SCUBA-2.

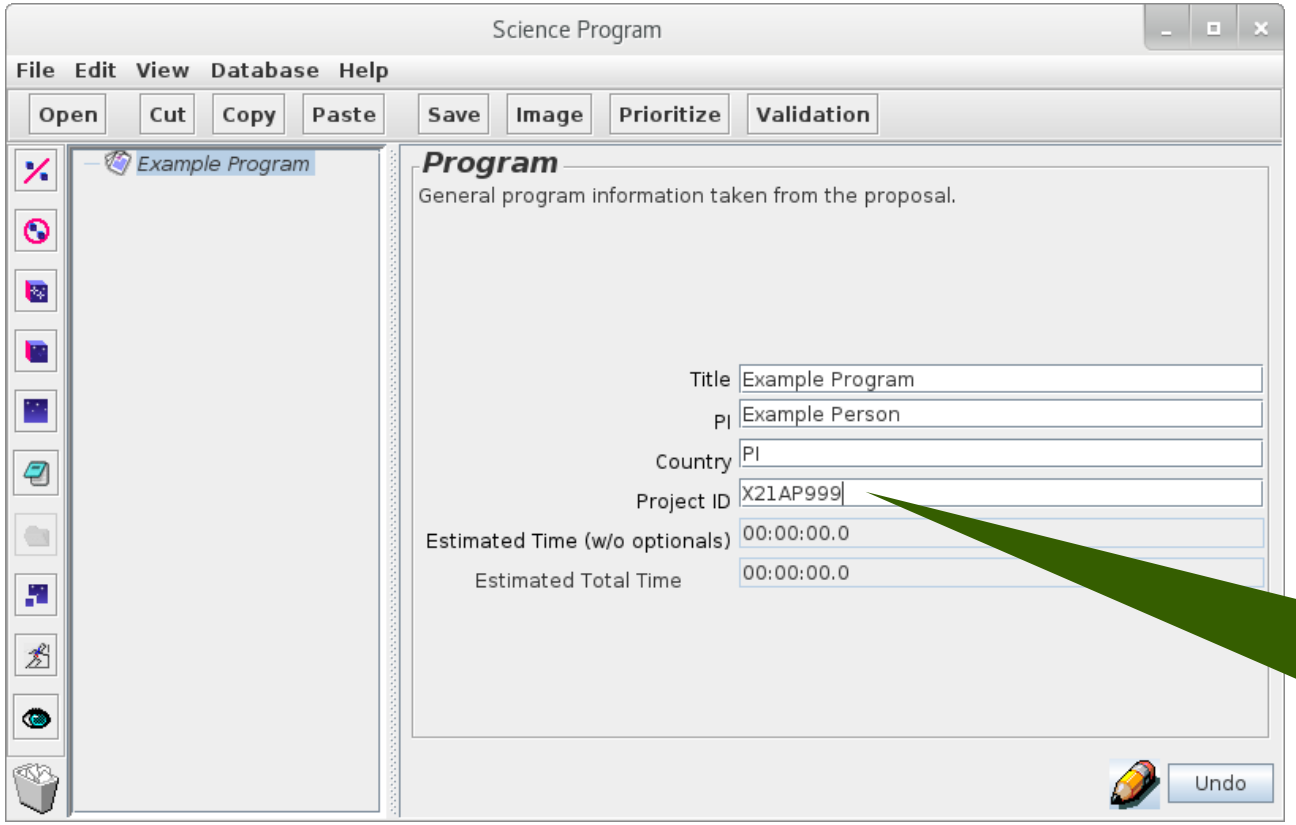






Creating an MSB — the project

- A new project contains just the “program” entry.

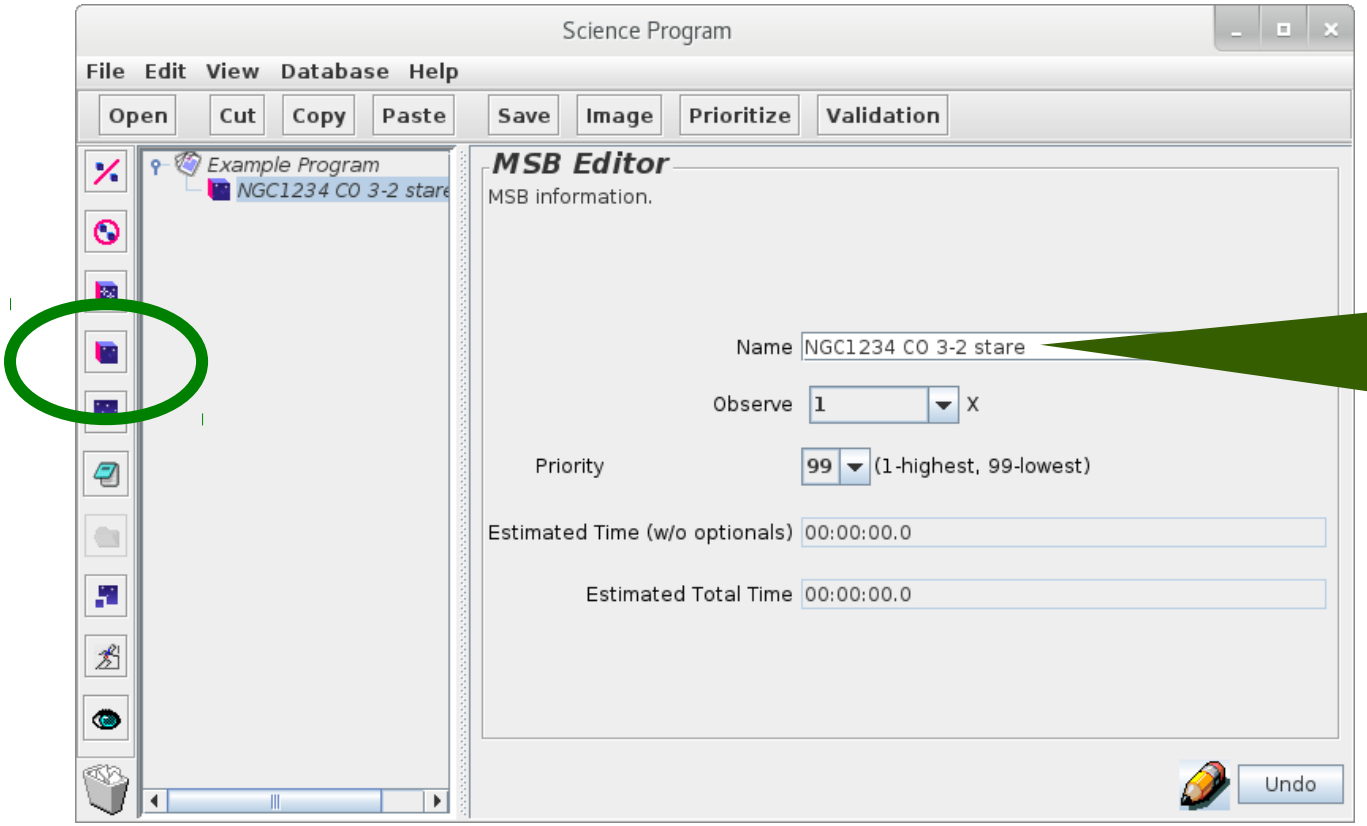


Project ID

Used to identify project when uploaded to the OMP.

Creating an MSB — the MSB folder

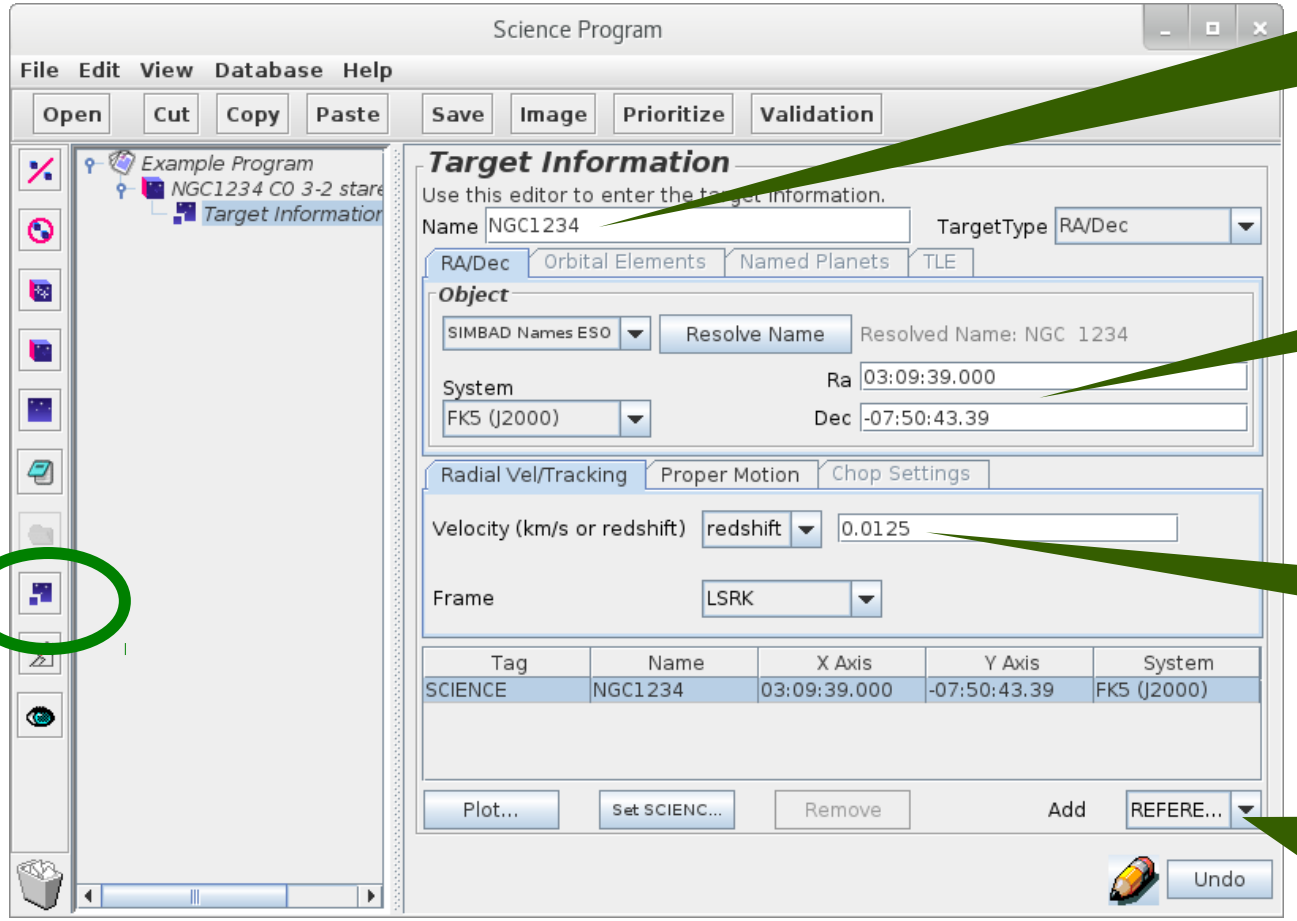
- An MSB can be added from the toolbar.



Name

Allows you to identify your project's MSBs.

Creating an MSB — the target



Name

Ideally the common name of the target.

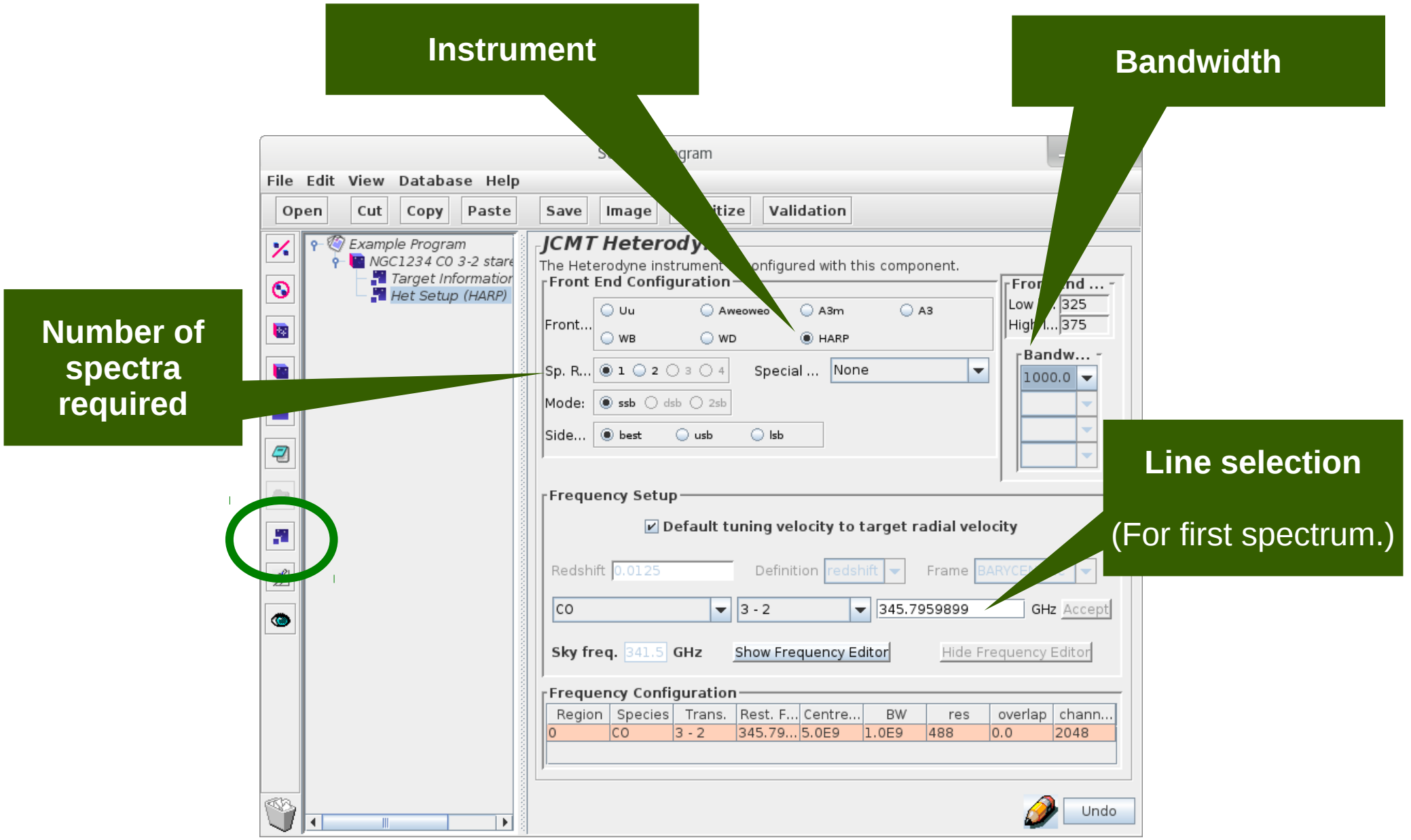
Coordinates

Redshift or radial velocity

Additional coordinates

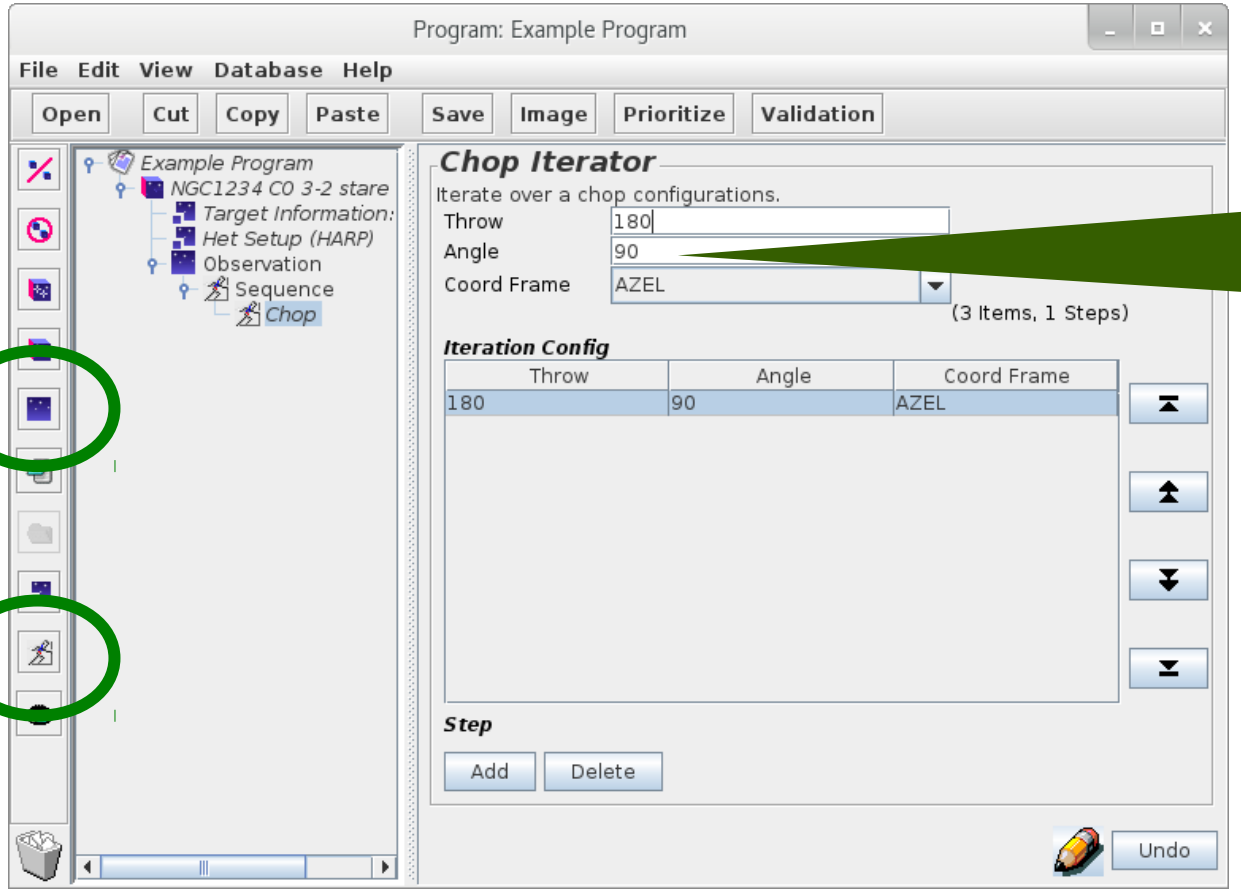
Some types of observations require a reference position.

Creating an MSB — the instrument



Creating an MSB — chop iterator

- This MSB will use beam-switching (“chopping”).
- A chop iterator is added configure chopping.



Chop settings

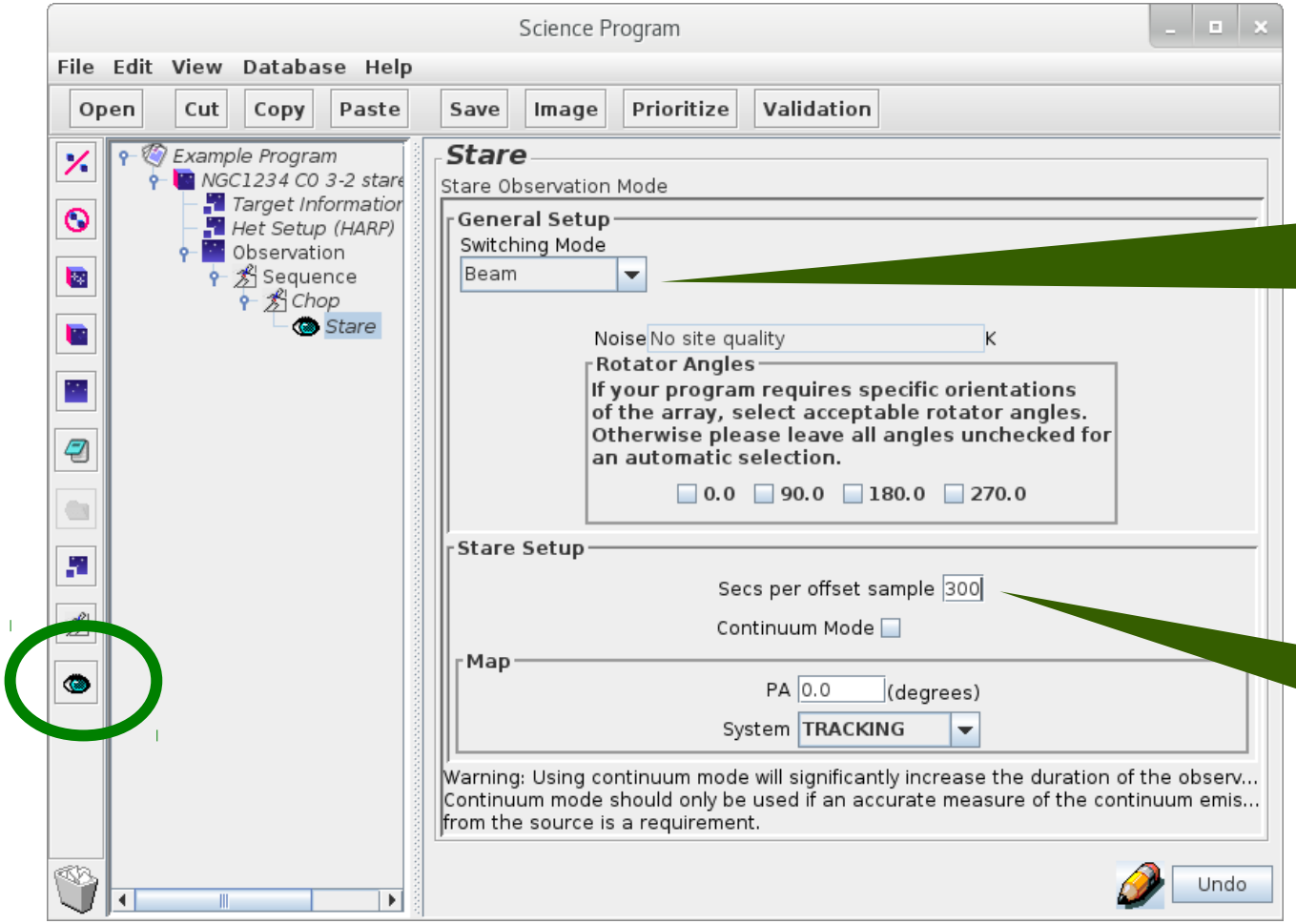
90º in Az. / El.

↓

Chop in azimuth.

Creating an MSB — stare eye

- An “eye” instructs the telescope to take data.



Switching mode

“Beam” switching to match use of chopping.

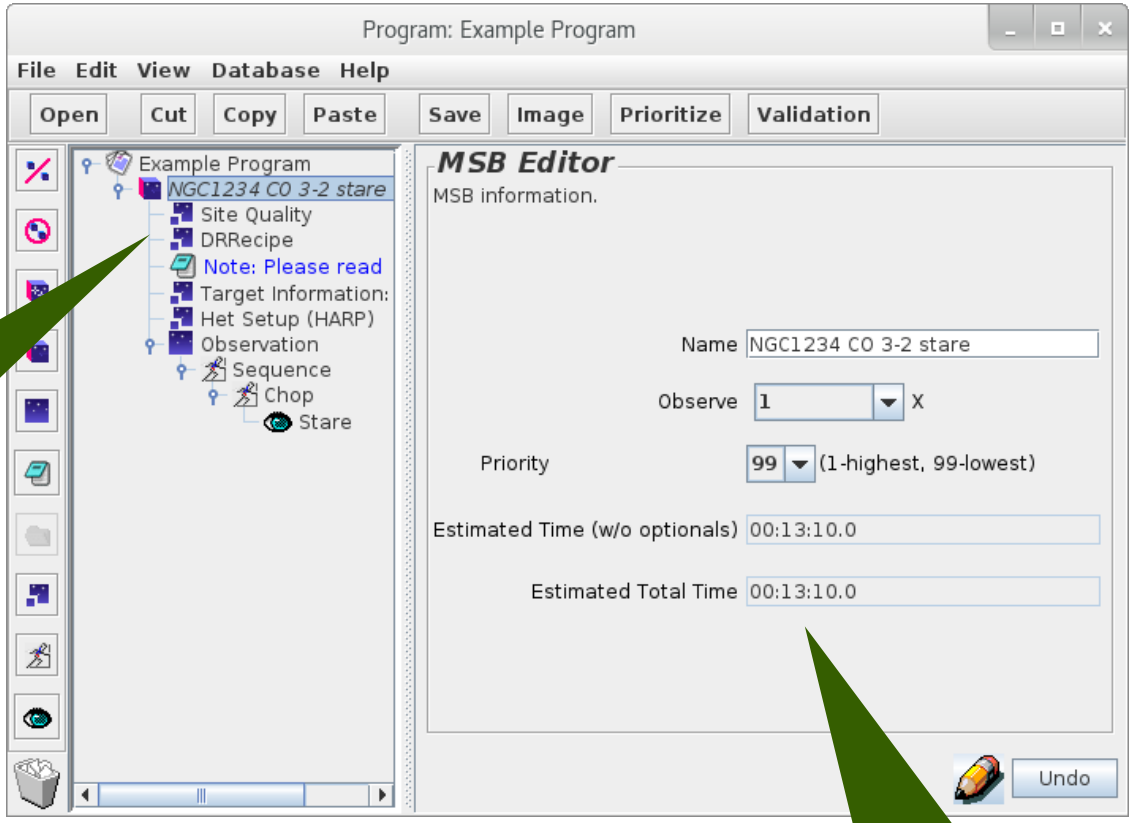
Time

300 seconds
(5 minutes)

The completed MSB

Additional Components

- Site Quality
- DR Recipe
- Note



Total Time

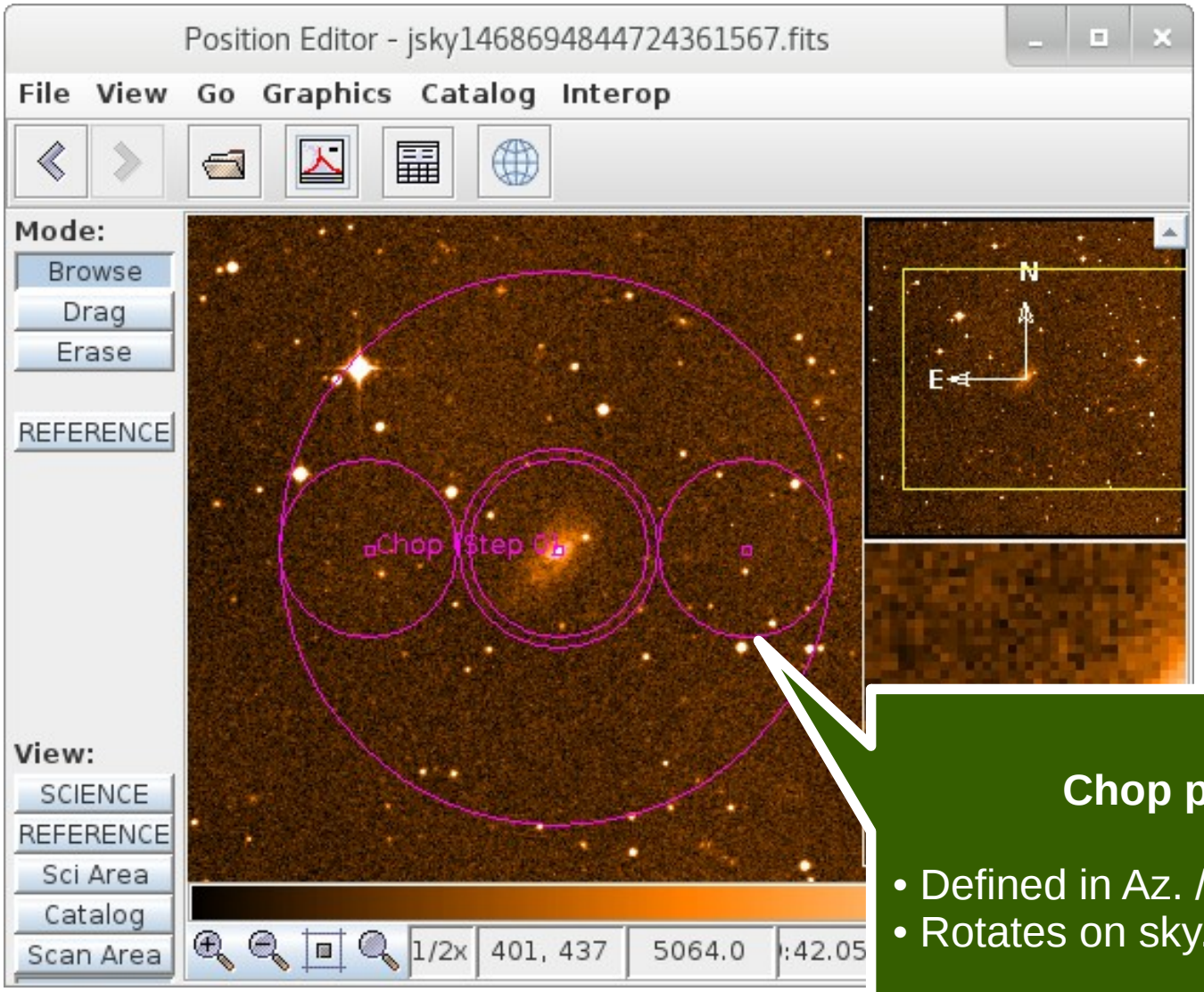
2 × 5 minutes
+ overhead estimate

Position editor — tips

- This can be used to visualize part of an MSB.
  - Scan areas.
  - Reference and offset positions.

- Common pitfalls.
  - Only shows the currently selected component.
  - Plotting tool only supports some projections.

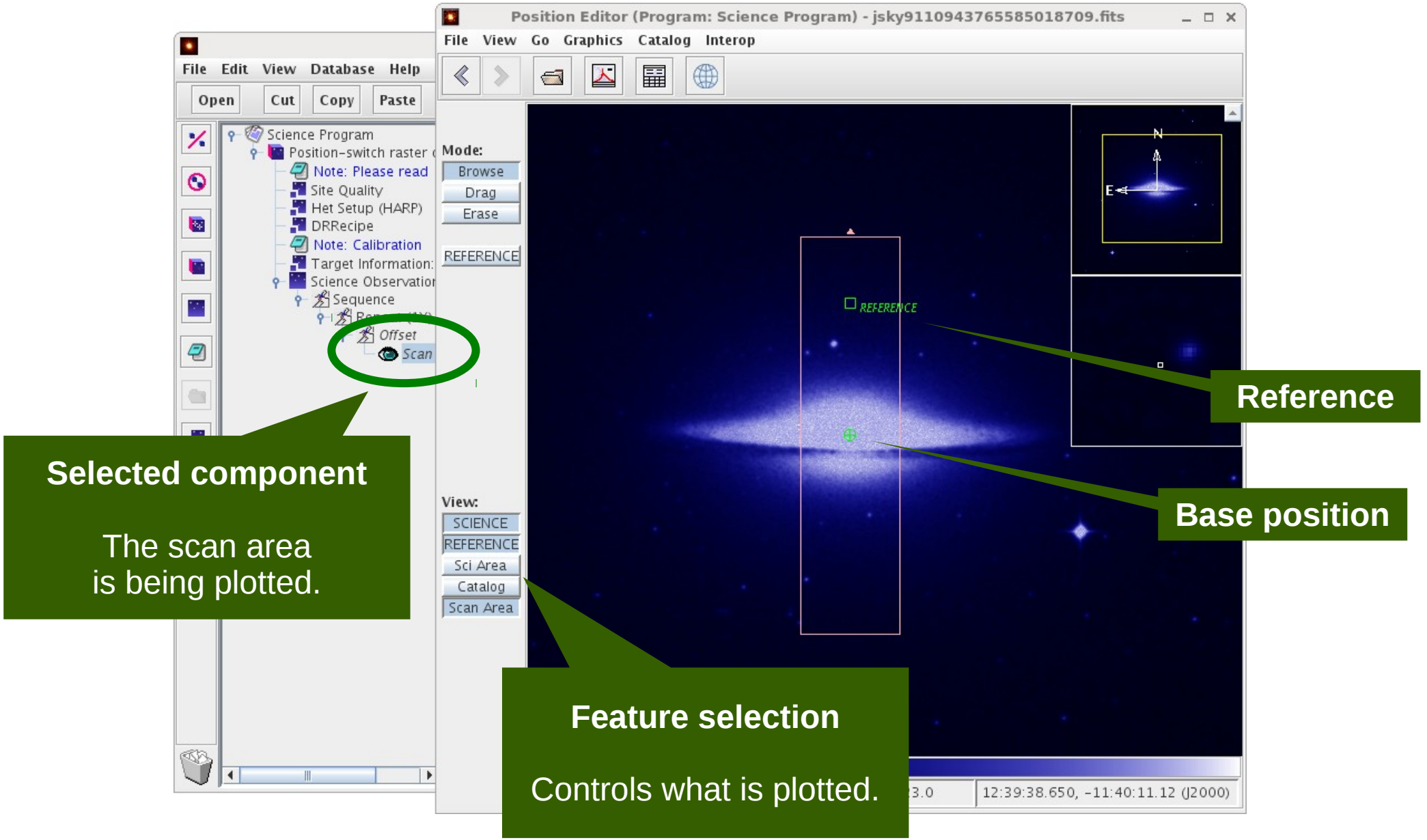
Position editor — chop position



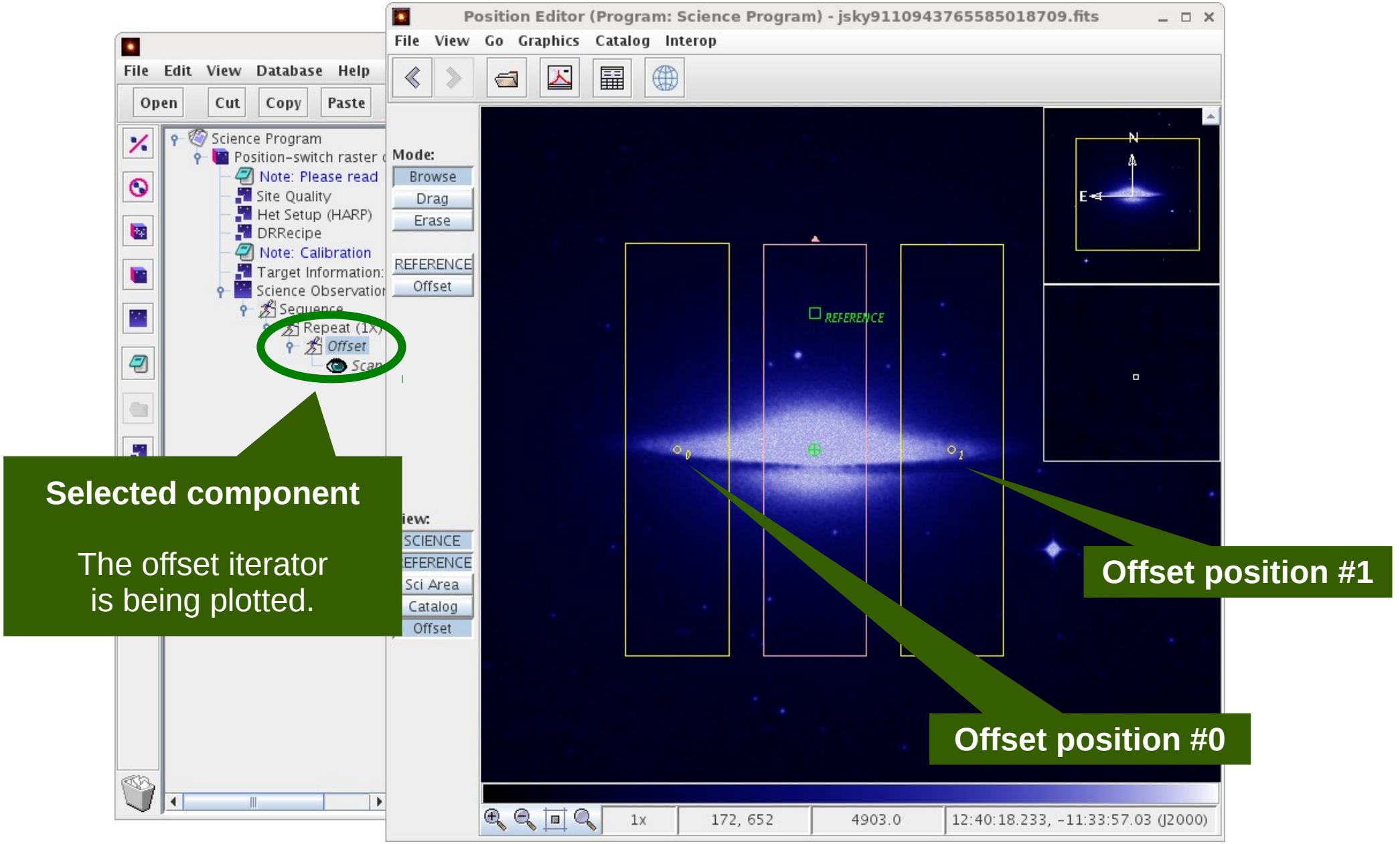
Chop position

- Defined in Az. / El. coordinates.
- Rotates on sky.

Position editor — scan area



Position editor — offset iterator



JCMT OT Tips and Tricks

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

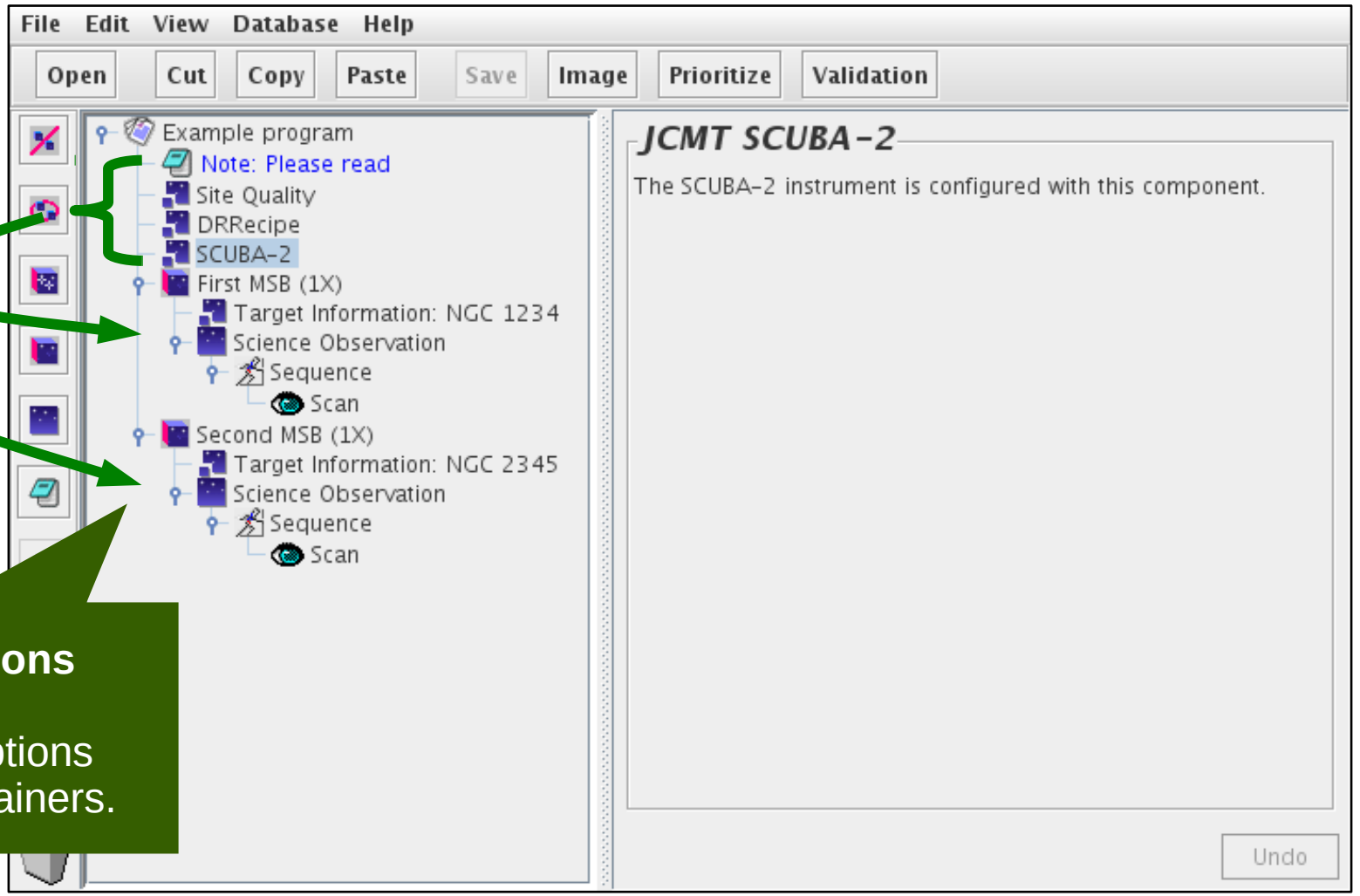
- OT features
  - Inheritance.
  - Folders.
  - Survey containers.
  - Validation.

Inheritance — tips

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

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

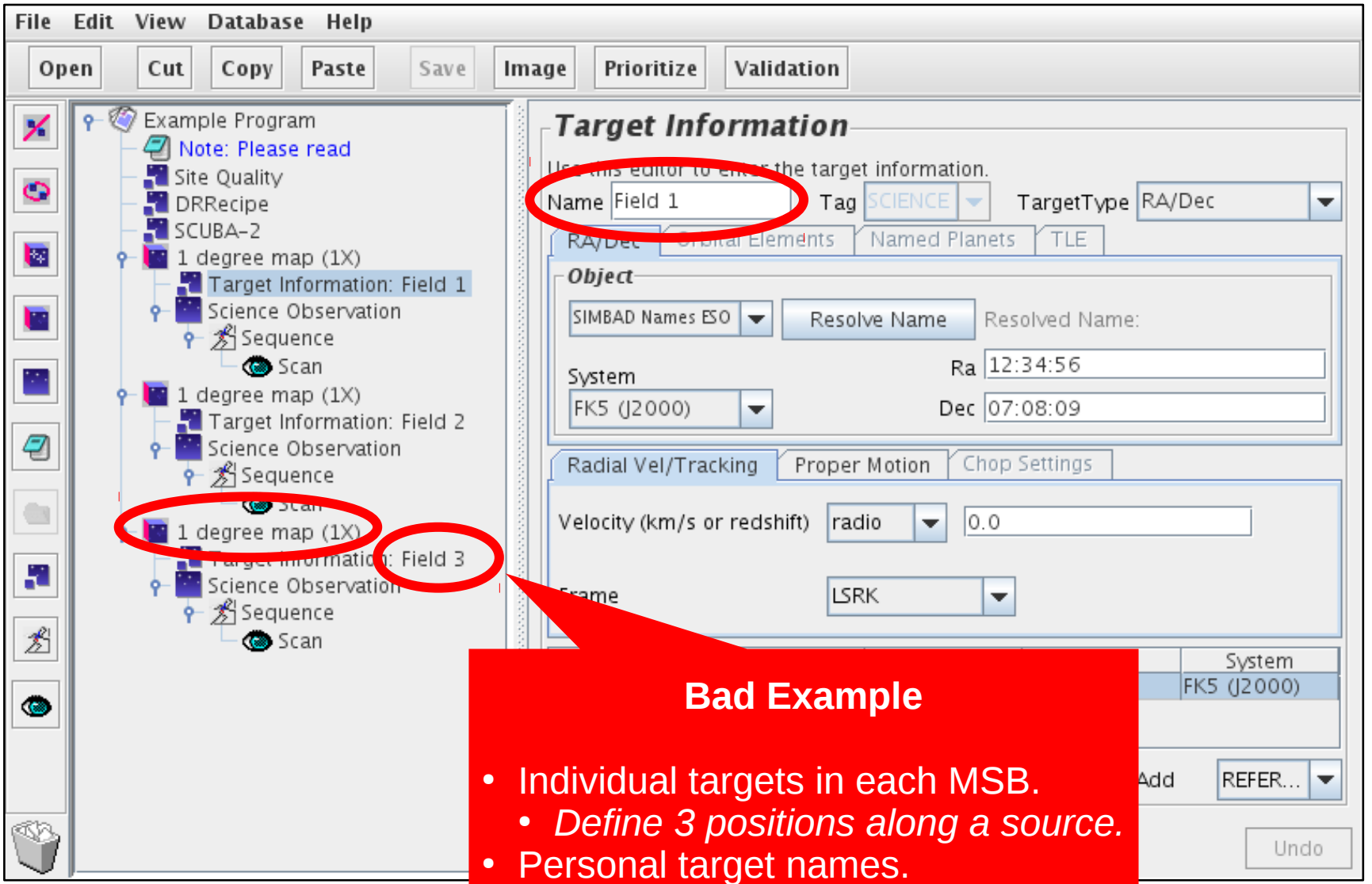
Inheritance — example



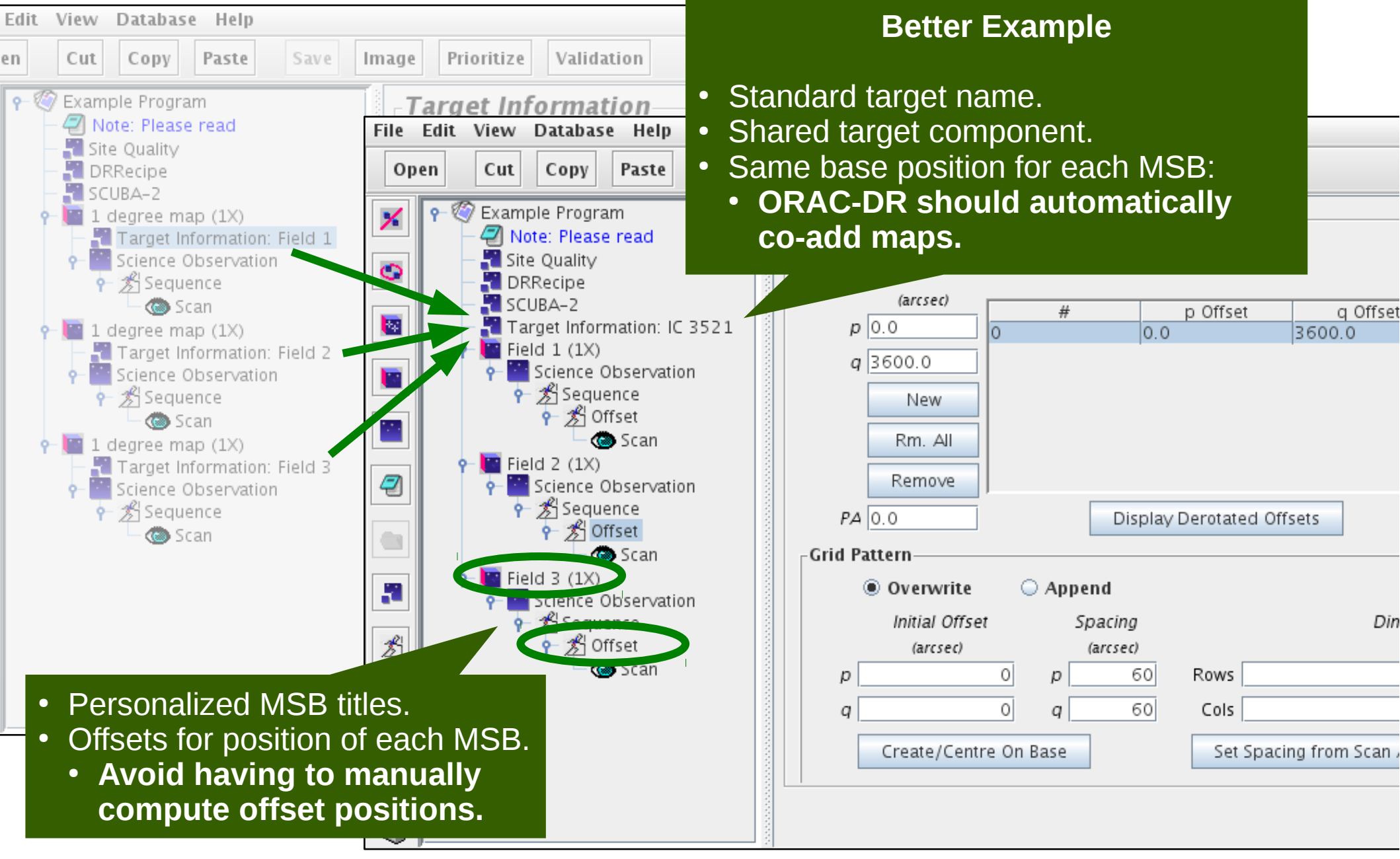
Inherited Options

MSBs inherit options from parent containers.

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.**

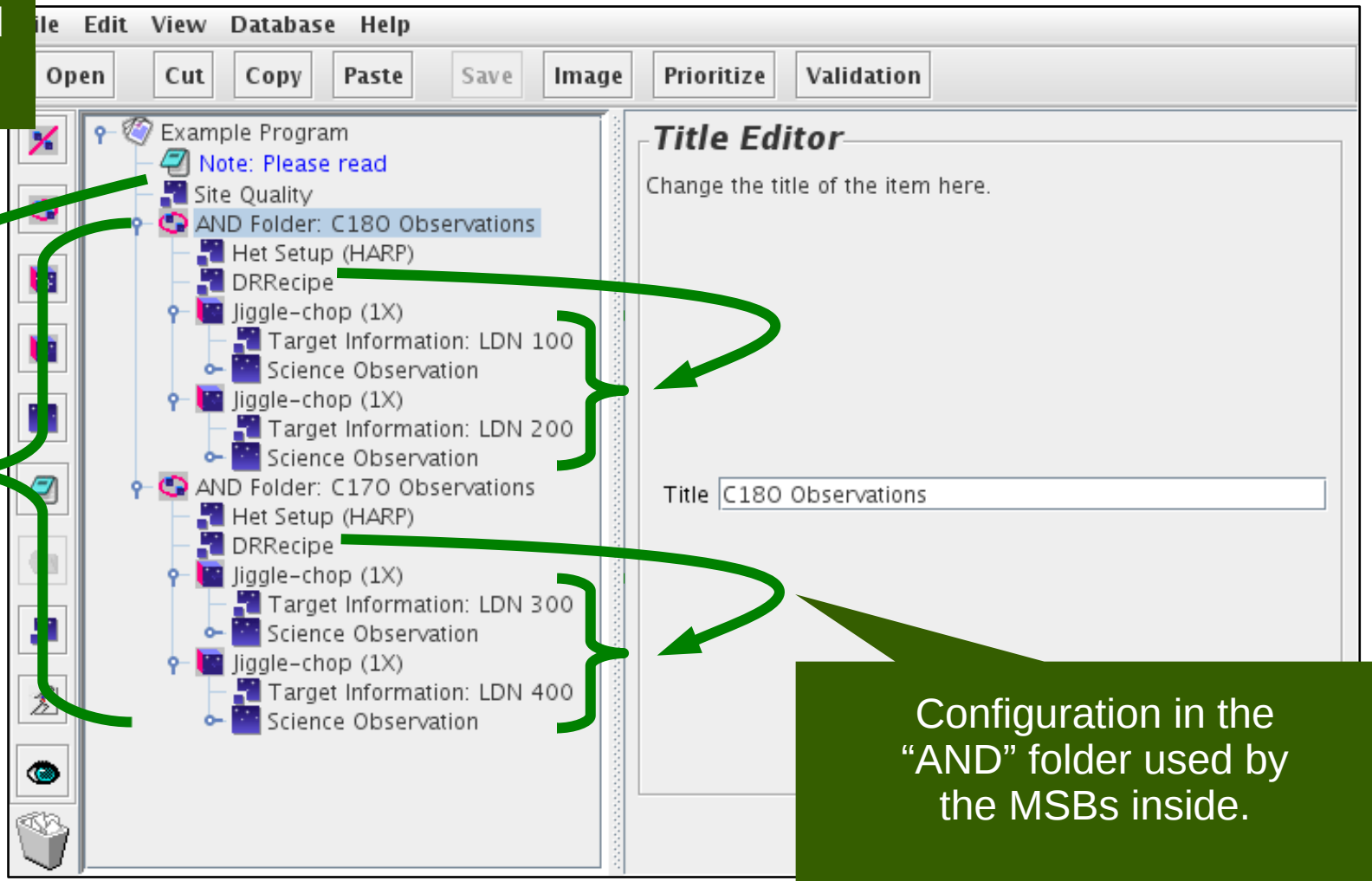
- Personalized MSB titles.
- Offsets for position of each MSB.
  - **Avoid having to manually compute offset positions.**

Folders

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

“AND” folders

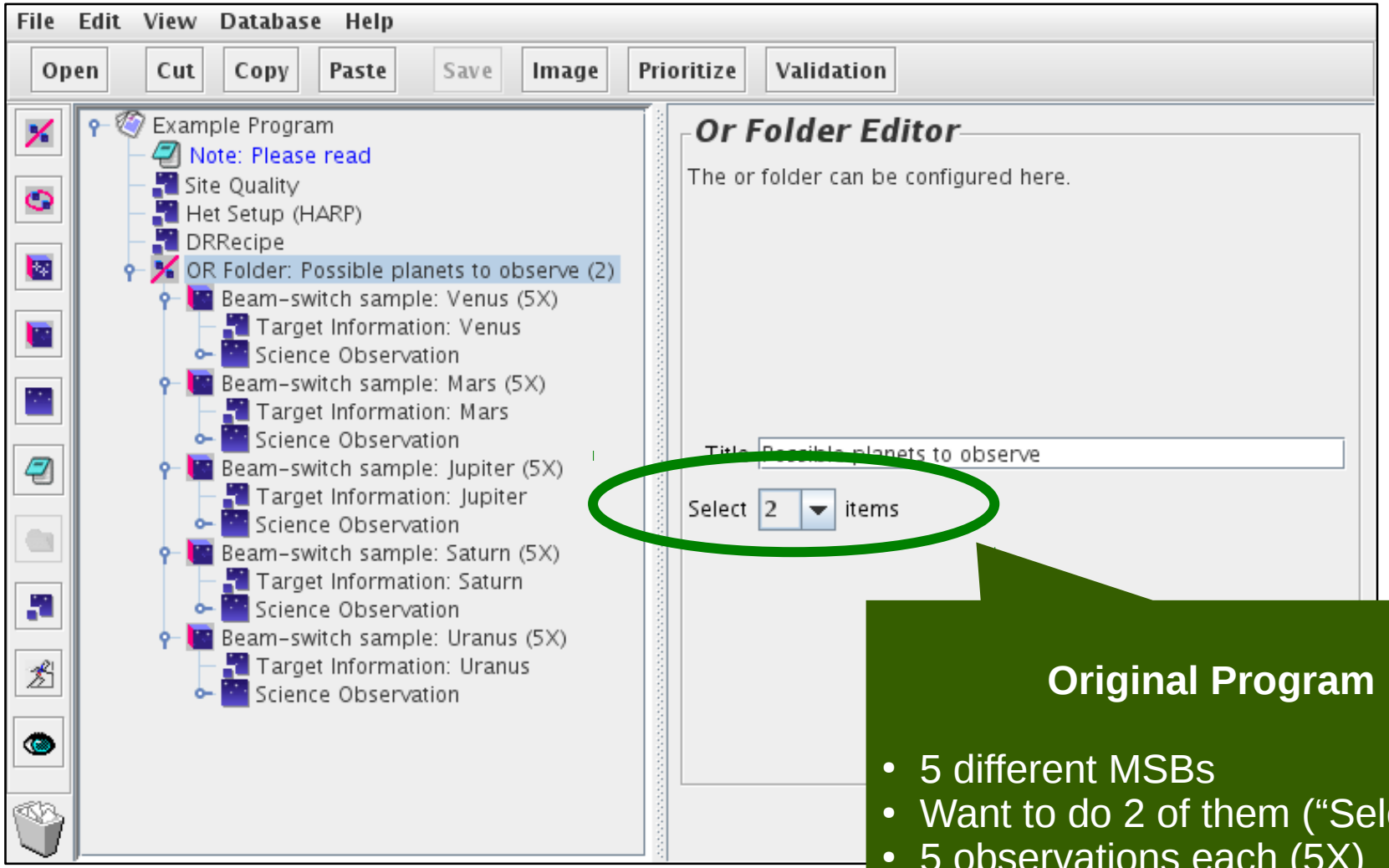
Configuration at the top level used by all MSBs.



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

“AND” folders do not affect when MSBs are observed.

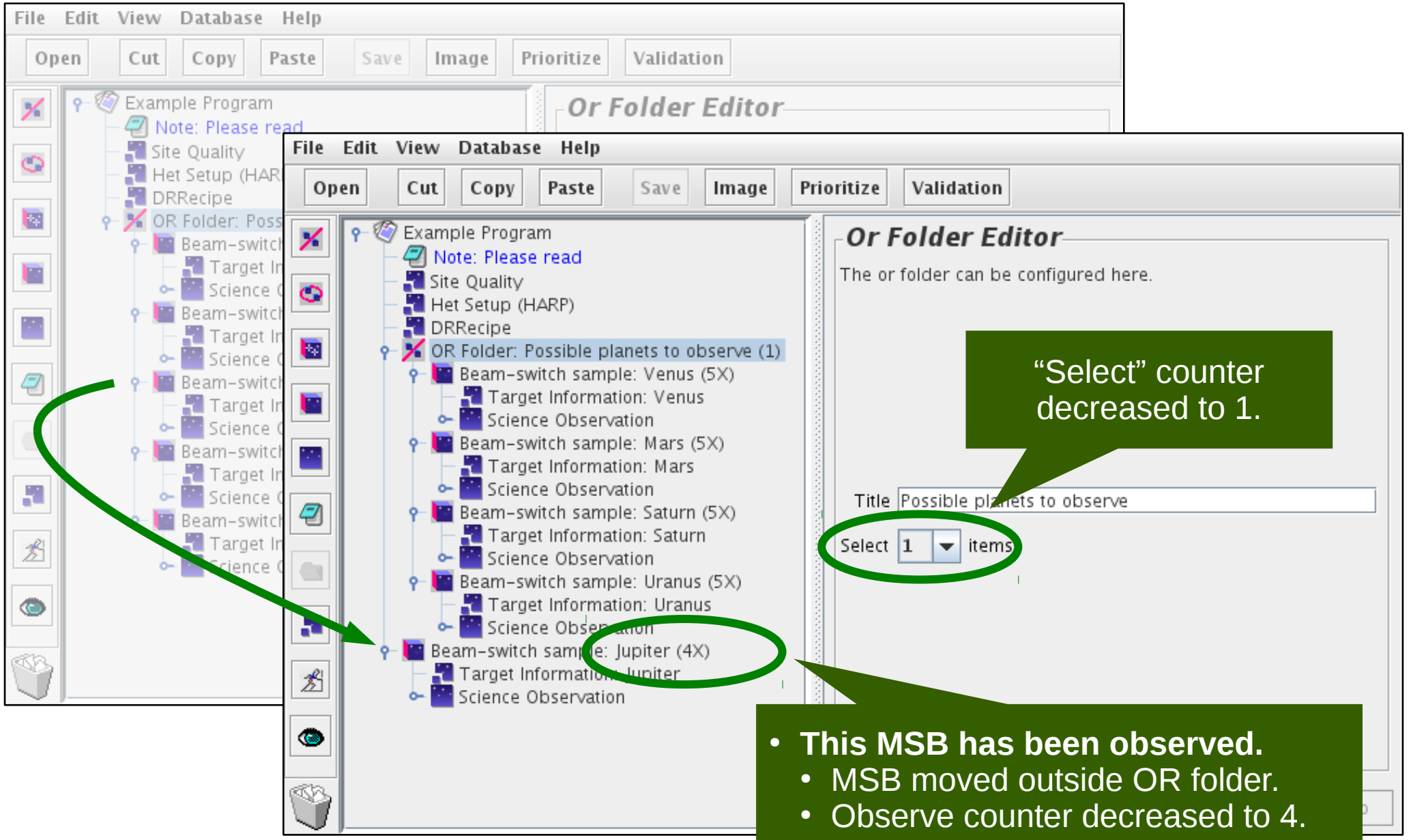
“OR” folders



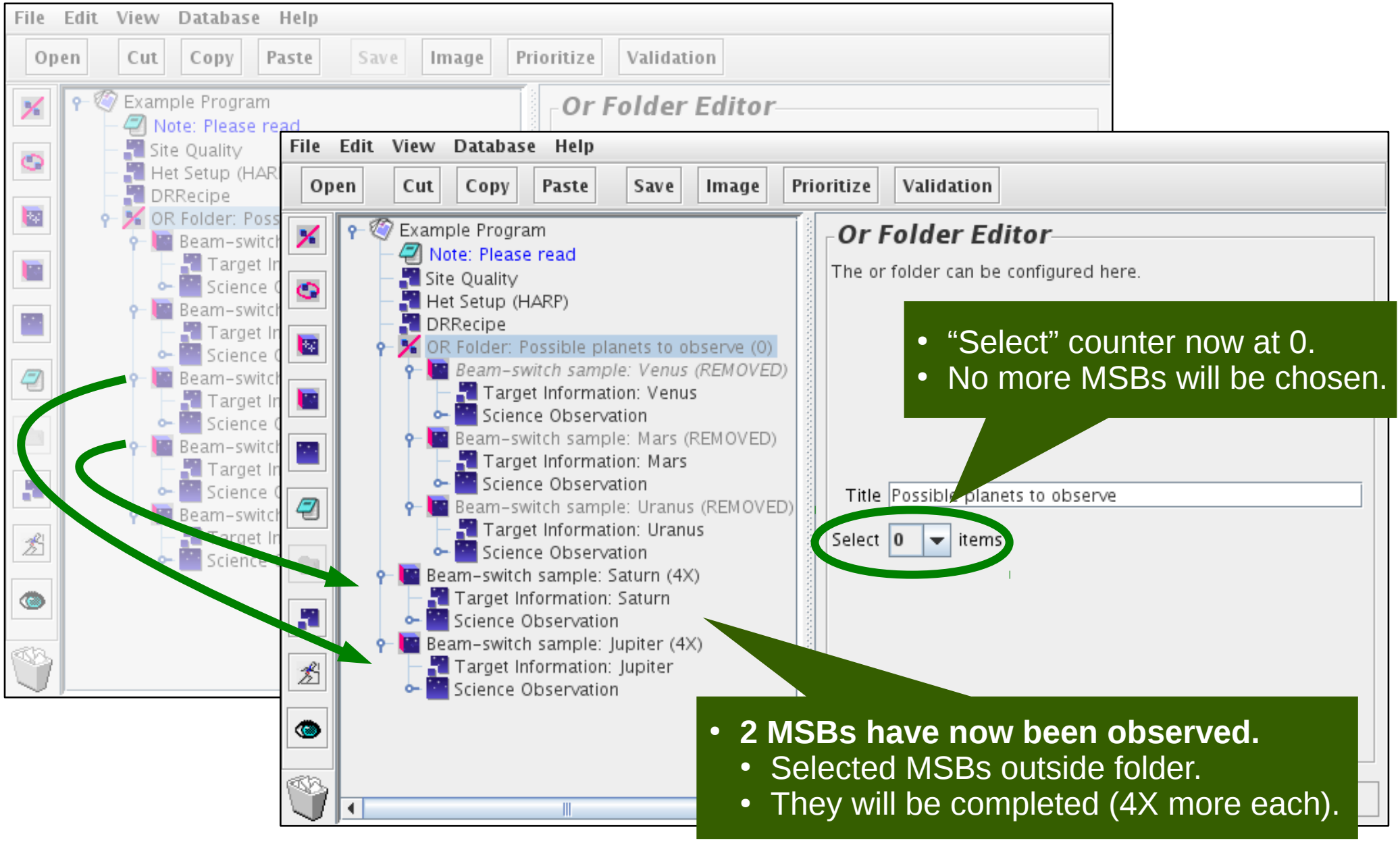
Original Program

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

“OR” folders — during selection



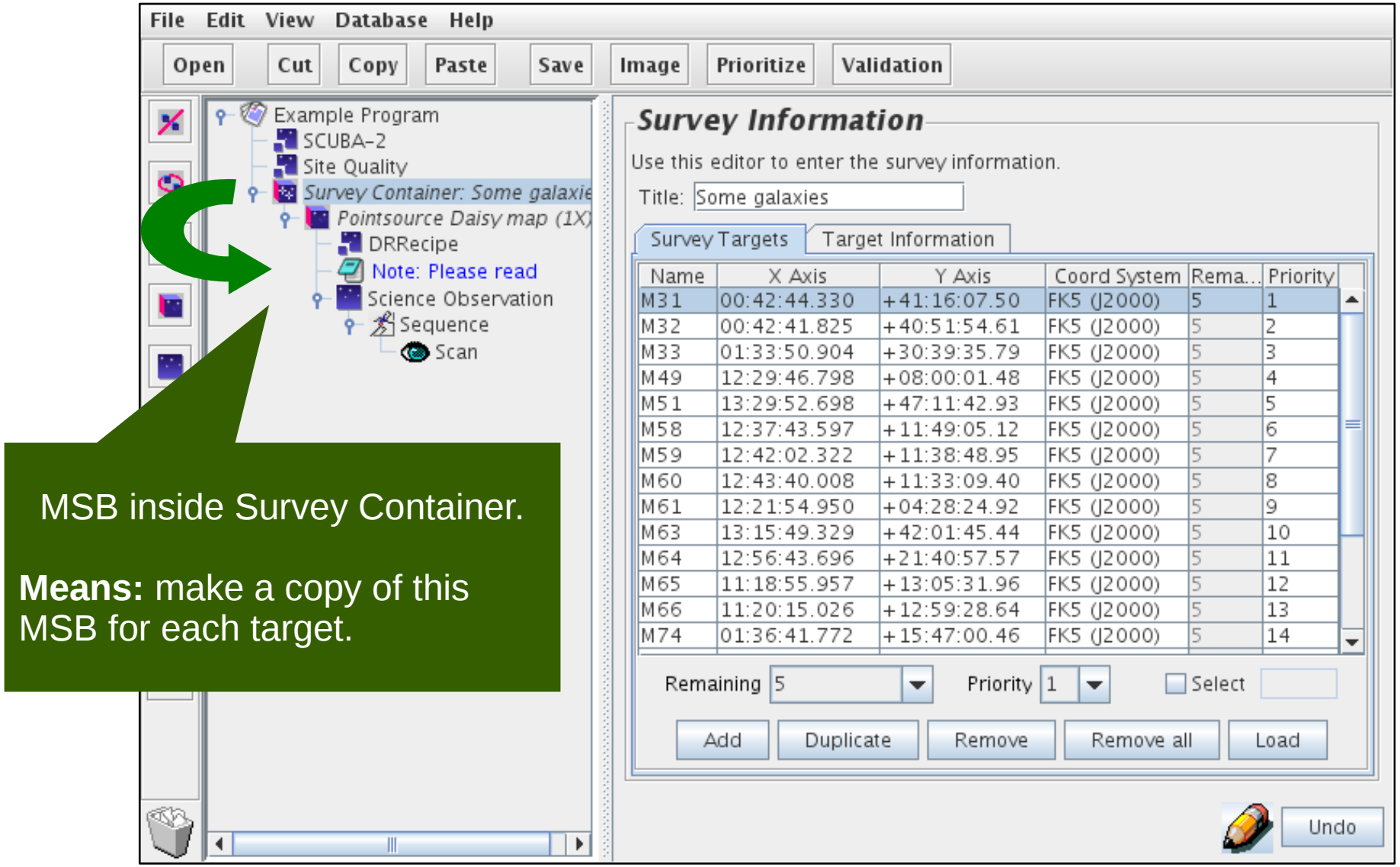
“OR” folders — after selection



Survey containers

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

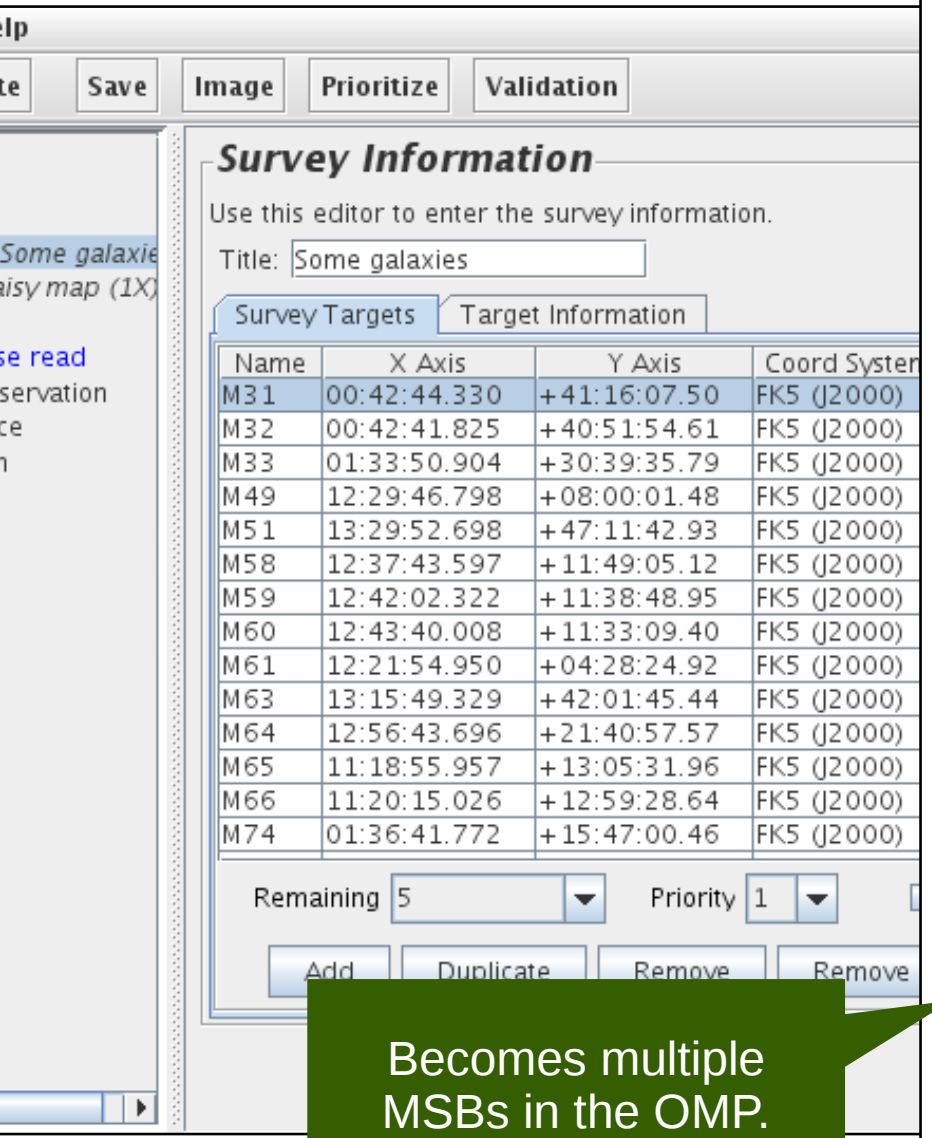
Survey container — example



MSB inside Survey Container.

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

Survey container — in the OMP



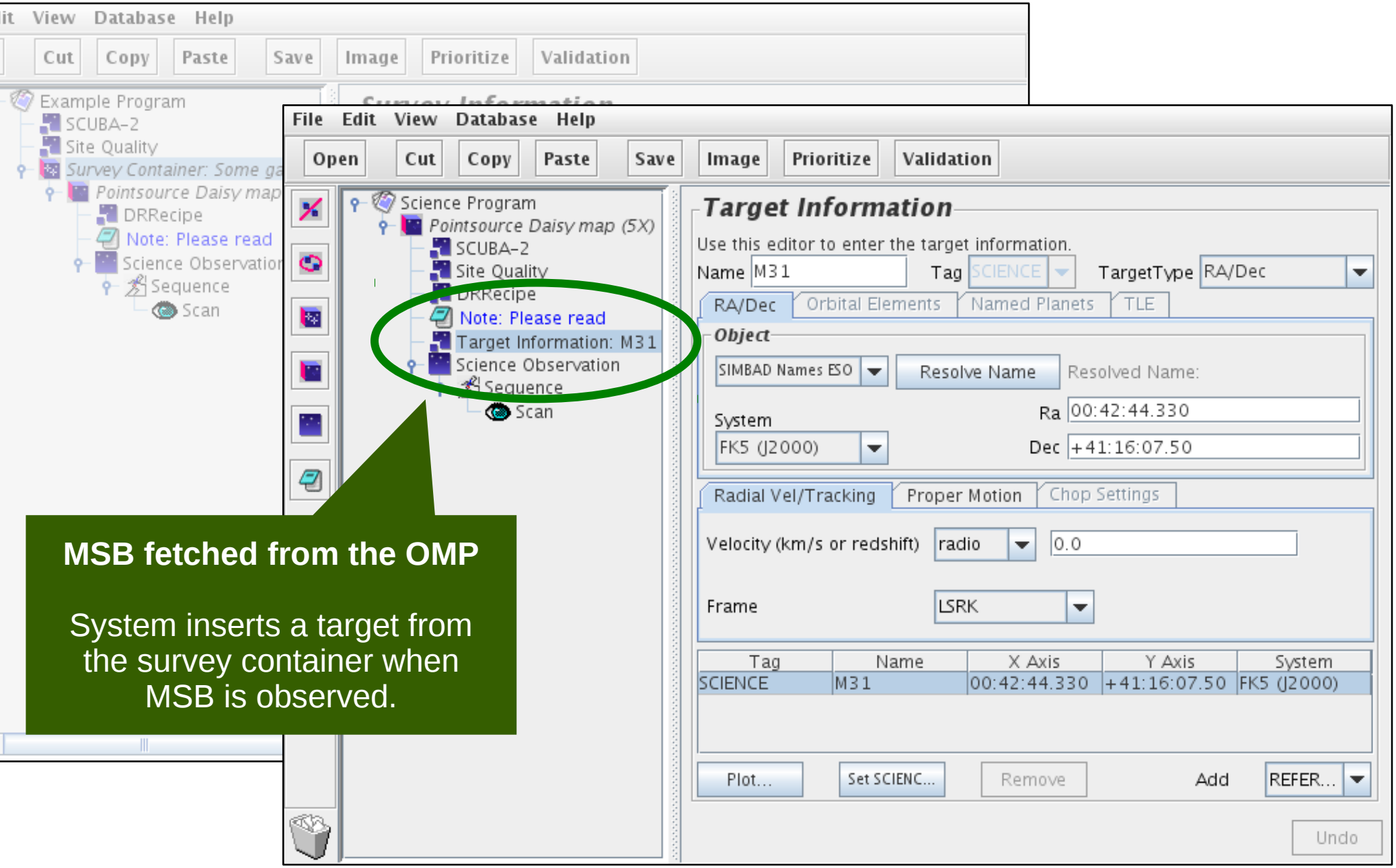
Becomes multiple MSBs in the OMP.

MSBs remaining to be observed:

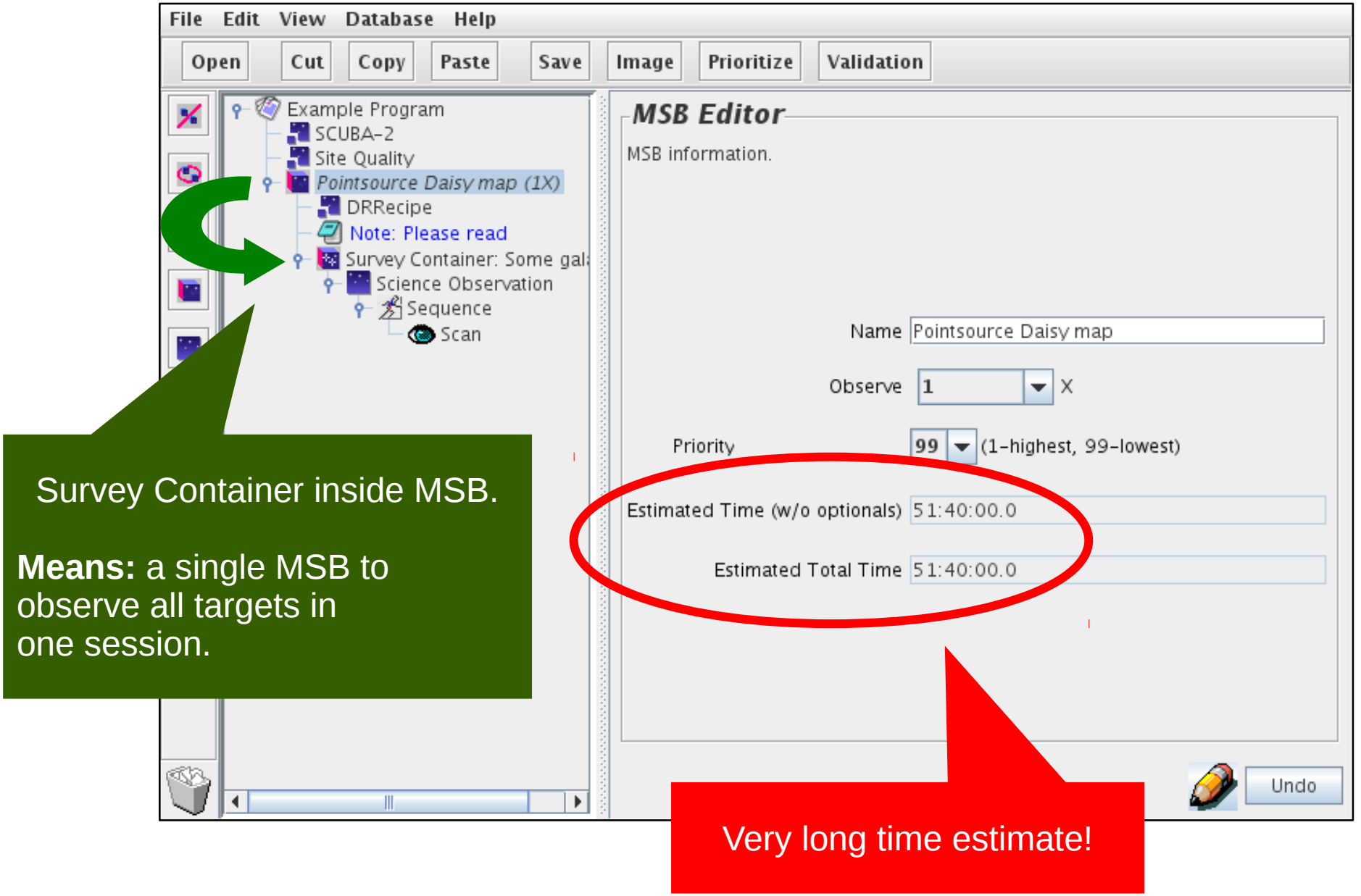
MSB	Target	Waveband	Instrument	Est. time	Remaining
1	M31	850	SCUBA-2	0.52 hours	5
2	M32	850	SCUBA-2	0.52 hours	5
3	M33	850	SCUBA-2	0.52 hours	5
4	M49	850	SCUBA-2	0.52 hours	5
5	M51	850	SCUBA-2	0.52 hours	5
6	M58	850	SCUBA-2	0.52 hours	5
7	M59	850	SCUBA-2	0.52 hours	5
8	M60	850	SCUBA-2	0.52 hours	5
9	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.

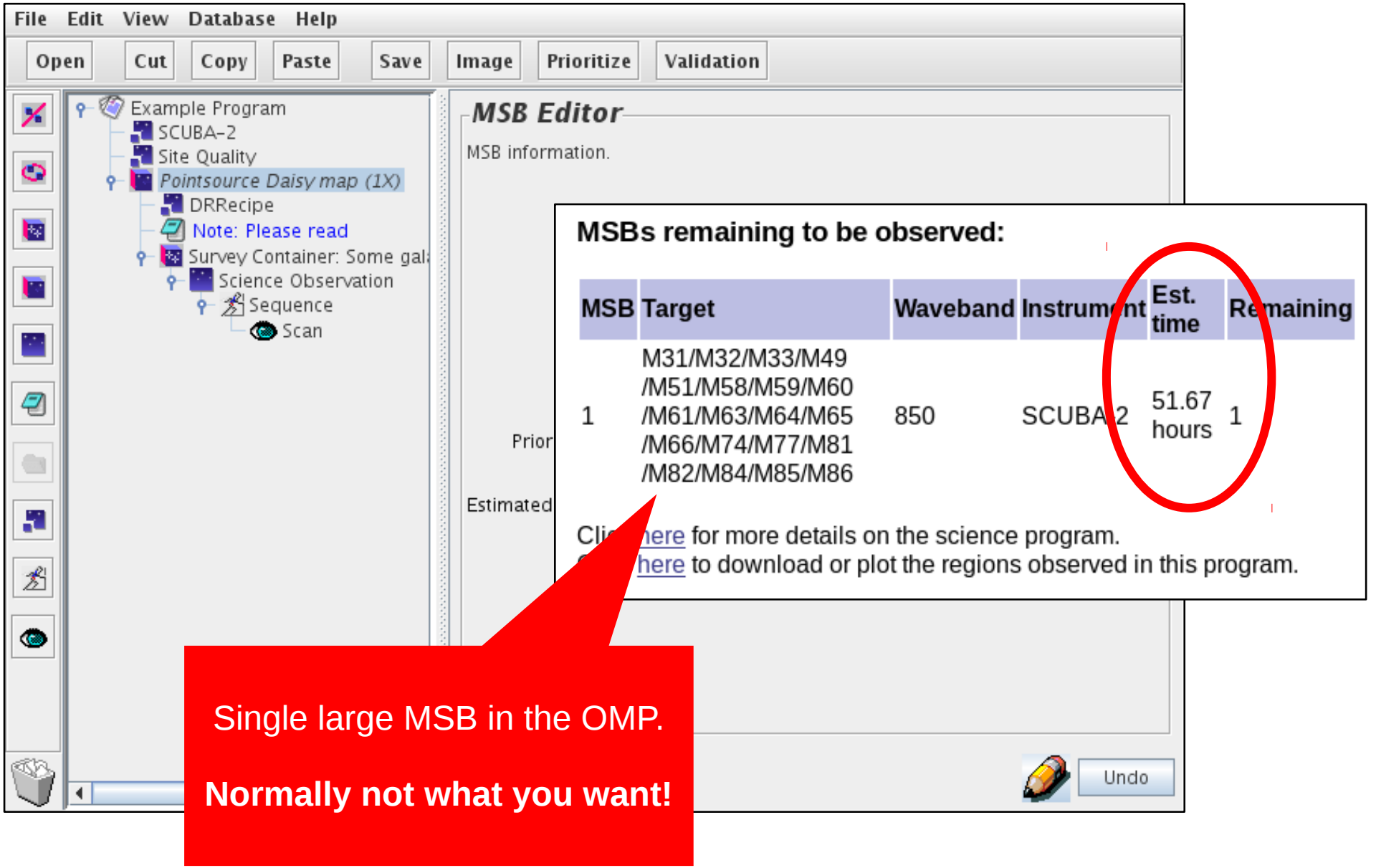
Survey container — fetched MSB



Survey container in MSB



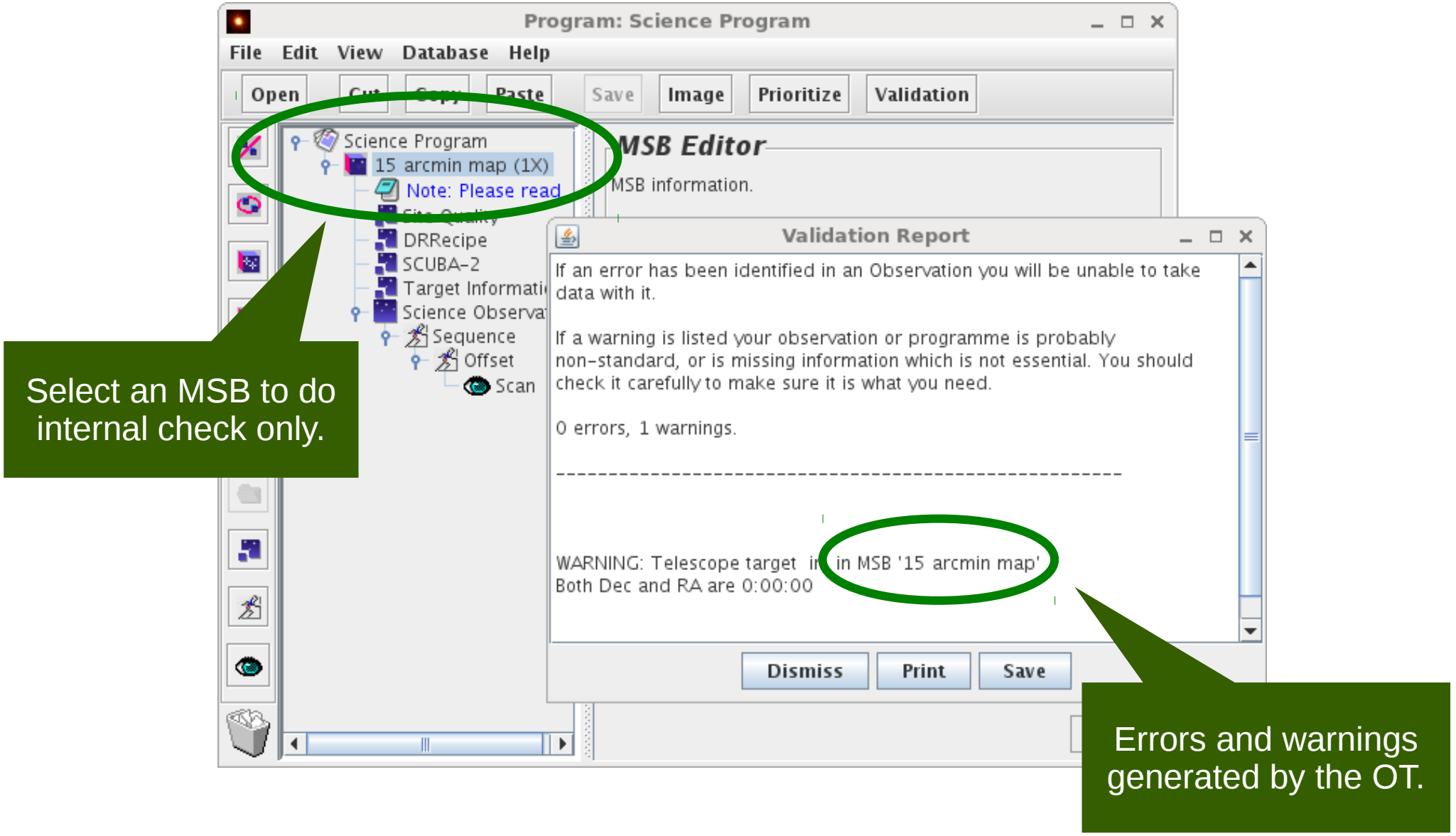
Survey container in MSB — OMP



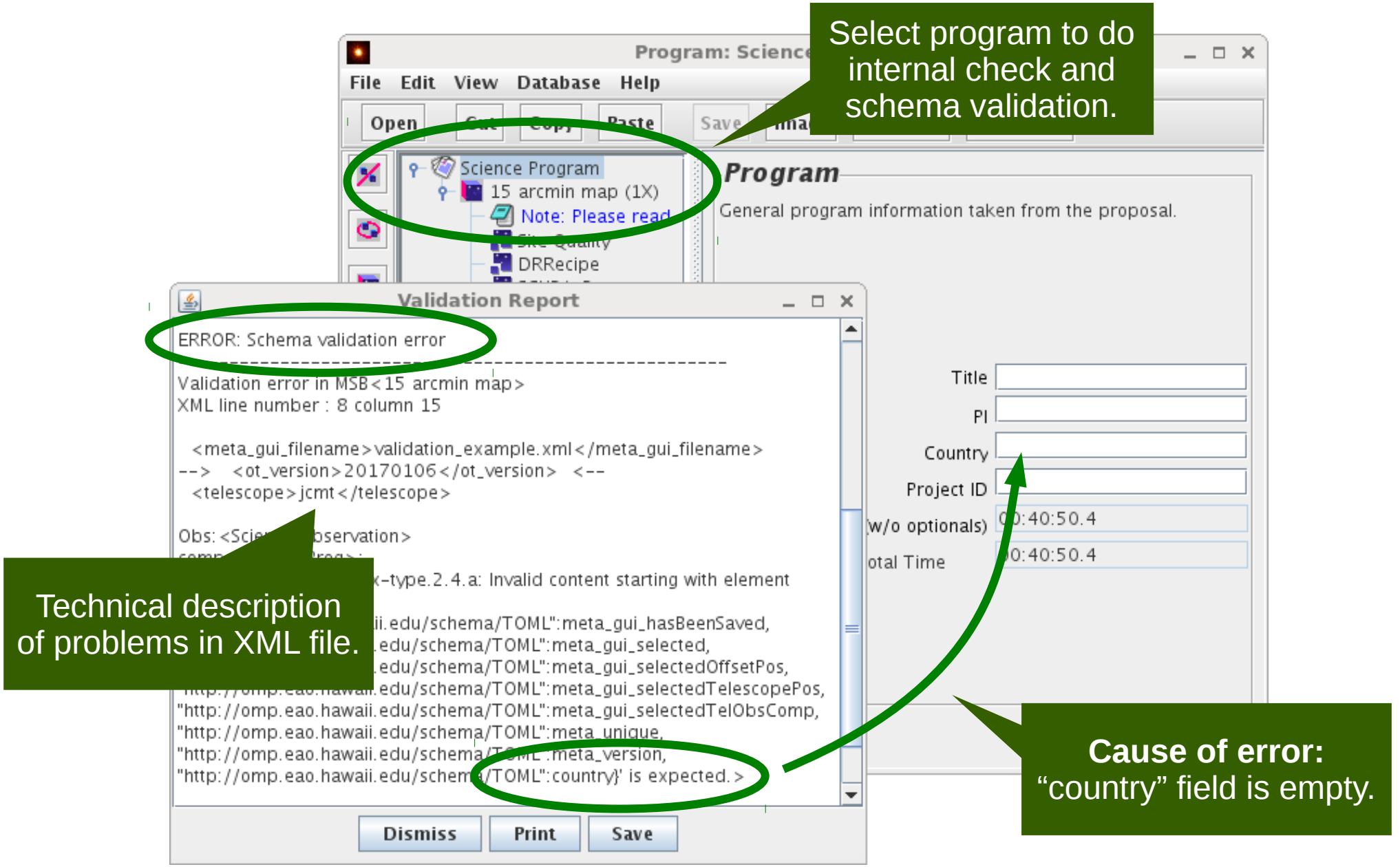
Validation — overview

- 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



Links

- OT Resources:
  - Download:
    - https://www.eaobservatory.org/jcmt/observing/software-installation/#observing-tool
  - Documentation:
    - https://www.eaobservatory.org/JCMT/observing-tool

Tutorials.

  - Basics:
    - http://www.eaobservatory.org/JCMT/observing-tool-tutorials/jcmt_ot_basics.html
    - http://www.eaobservatory.org/JCMT/observing-tool-tutorials/ot_basics_tutorial_files.tar.gz
  - Tricks:
    - http://www.eaobservatory.org/JCMT/observing-tool-tutorials/jcmt_ot_tricks.html
    - http://www.eaobservatory.org/JCMT/observing-tool-tutorials/ot_tricks_tutorial_files.tar.gz

additional slides

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.

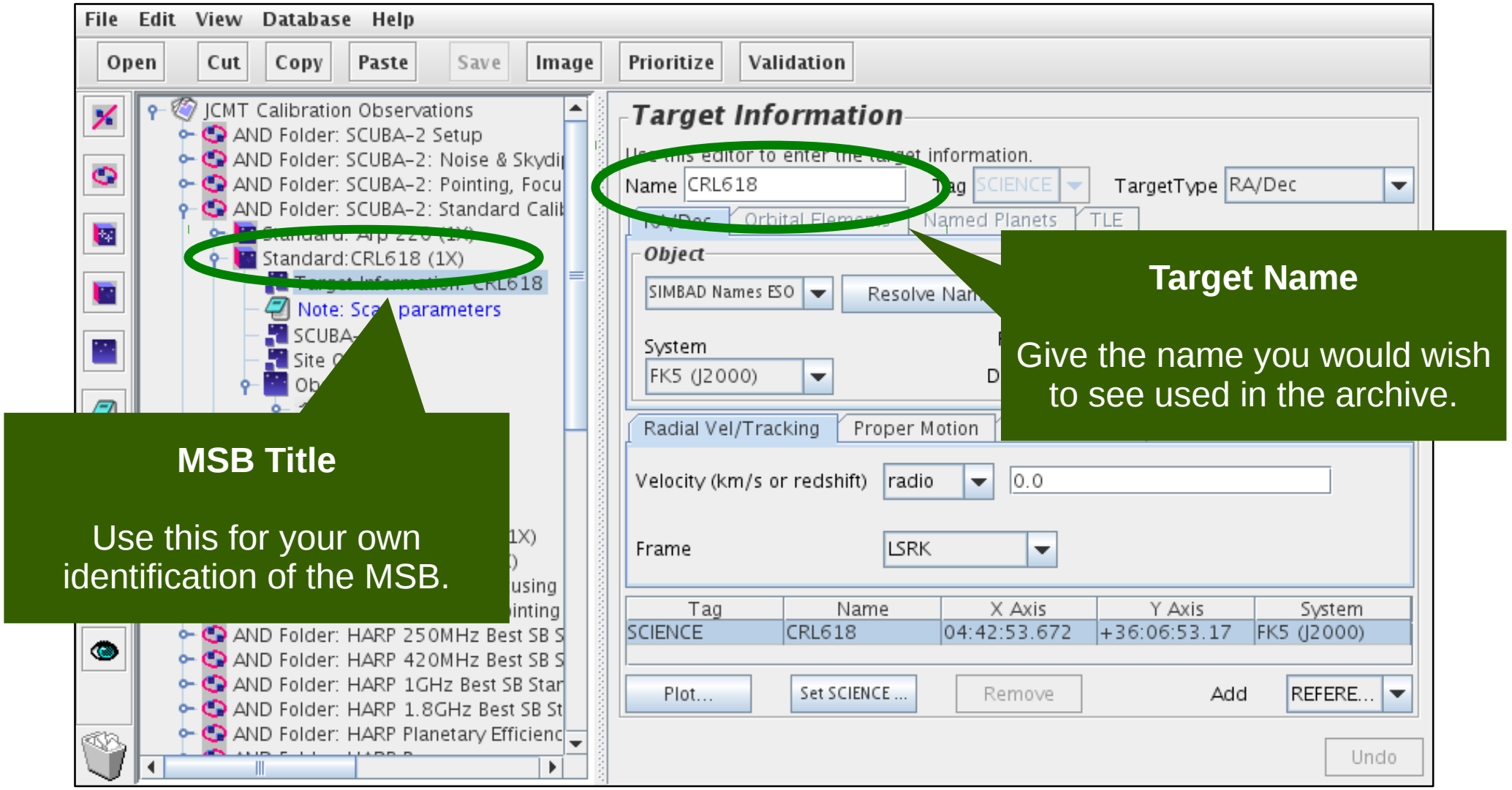
Common pitfalls (2/2)

- 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.
  - Information pasted into the OT (e.g. notes) may not be saved.

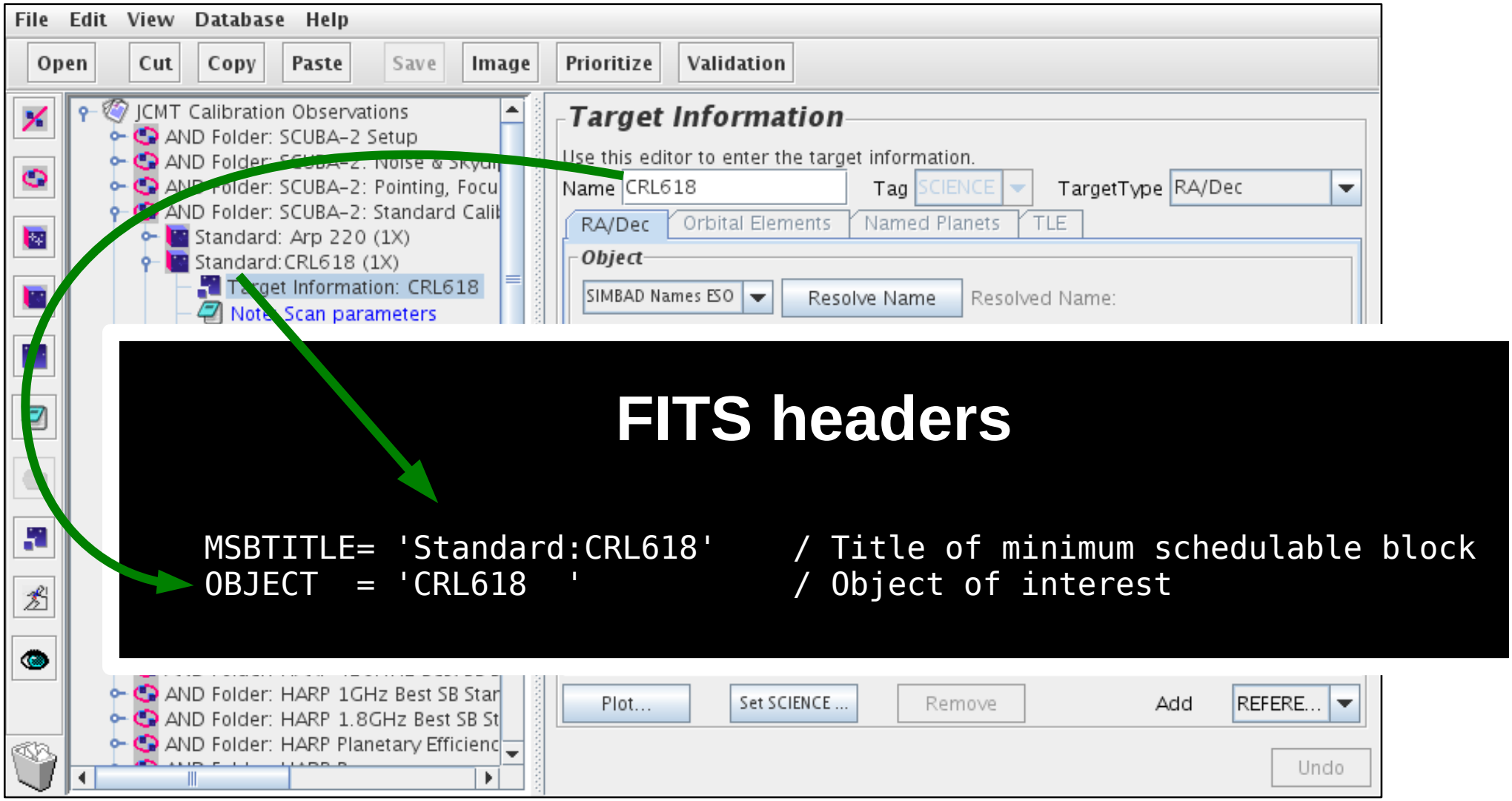
Target information — tips

- 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.

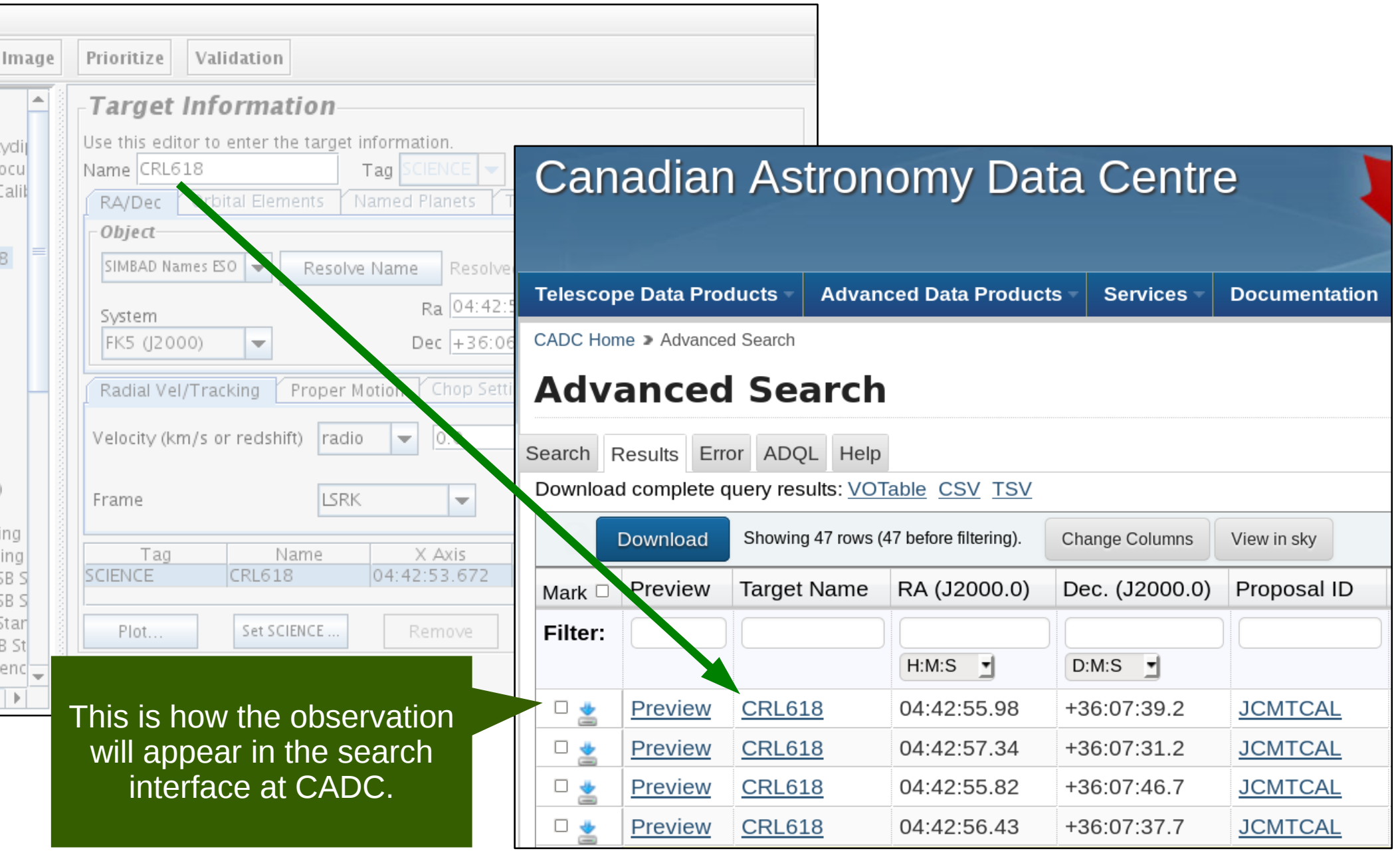
Target information and MSB title



Target information — FITS headers

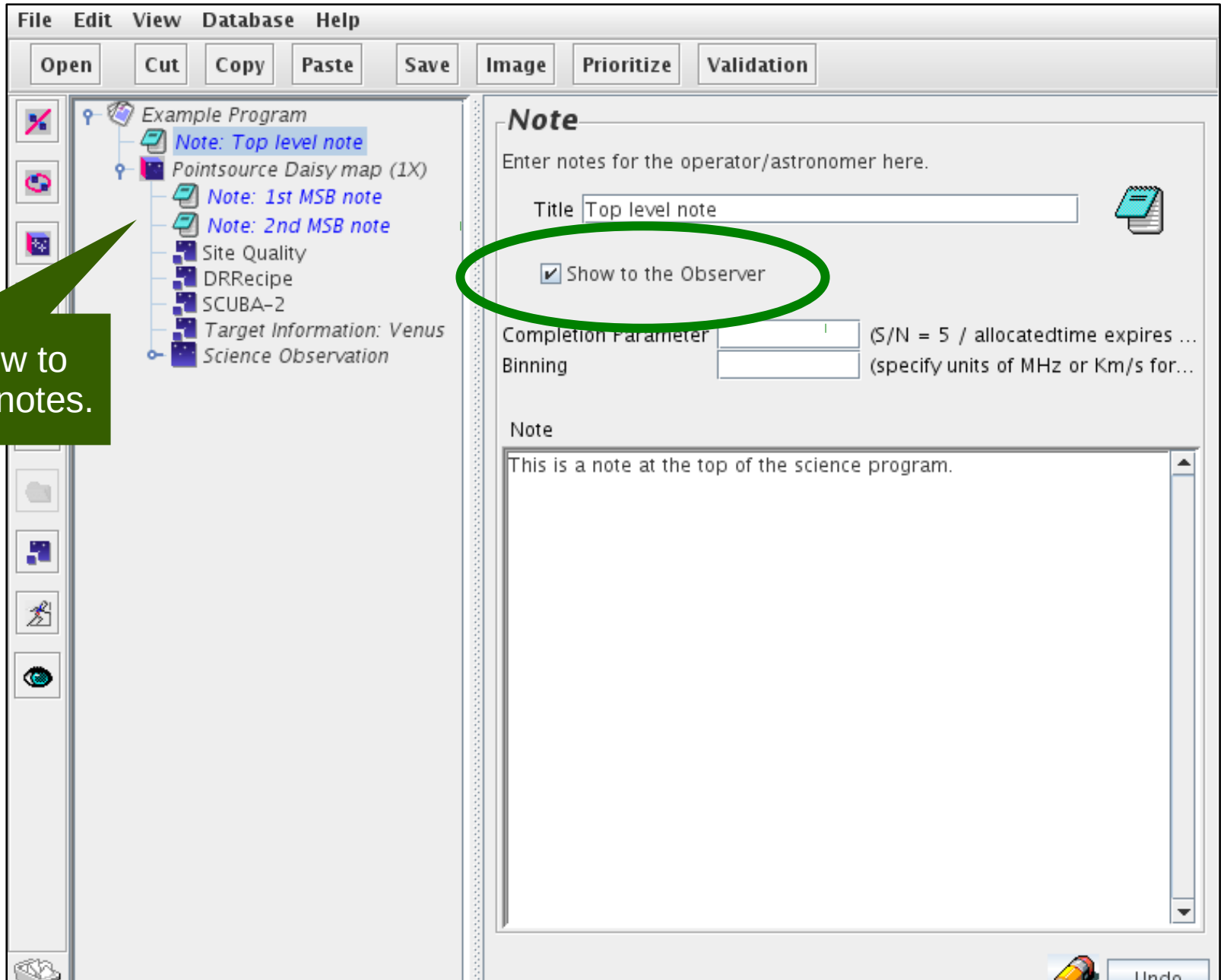


Target information — CADC



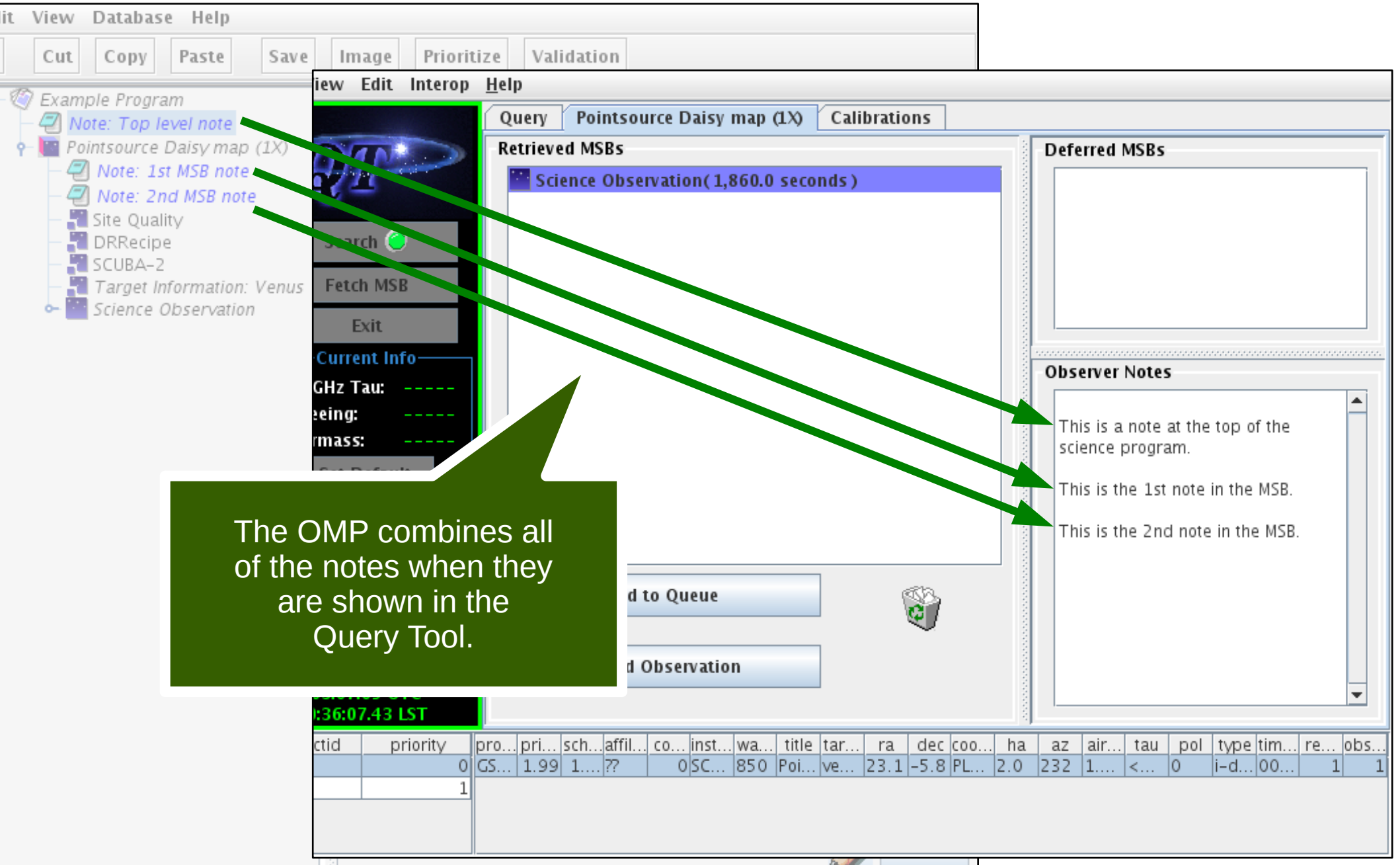
This is how the observation will appear in the search interface at CADC.

Inheritance — notes



Multiple “Show to the Observer” notes.

Inheritance — notes in QT



Inheritance — warnings

- Parent options **after** the MSB are included too.
- Some components need to be able to find other components:
  - DR recipe must be at same or lower level than instrument.
  - Heterodyne setup must be at same or lower level than target information when using target's radial velocity.