GREEN BANK OBSERVATORY

Using the 20 Meter

Brenne Gregory
(Thanks to Sue Ann Heatherly)

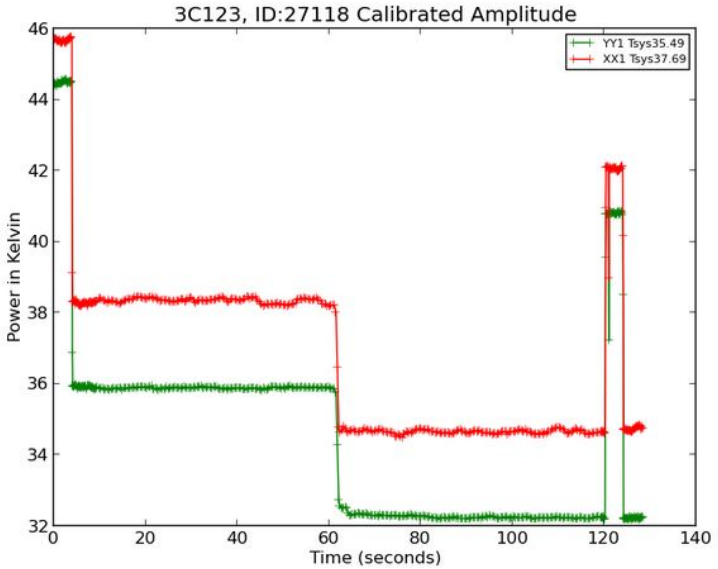
- Built by RSI and funded by US Naval Observatory for Earth orientation observing programs
- Refurbished in 2012 as the first radio telescope in the Skynet Robotic Telescope Network
- Old receivers from the 140ft were revived and adapted for use on the 20 meter
- Used by students around the world

Features

- Fully Steerable
- L-Band receiver 1.3-1.8 GHz
- Angular Resolution = 0.7 degrees
- Beam size of 44 arcminutes
- Sky Patterns: Daisy, Map, OnOff, Track
- Two-Spectral Modes:
  - Low Resolution (wide-band, several filters)
  - High Resolution (narrow-band, 15.625 MHz)
- Pulsar Mode

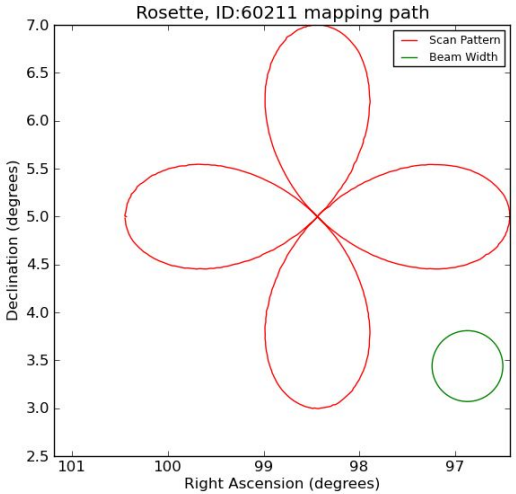
OnOff Sky Pattern

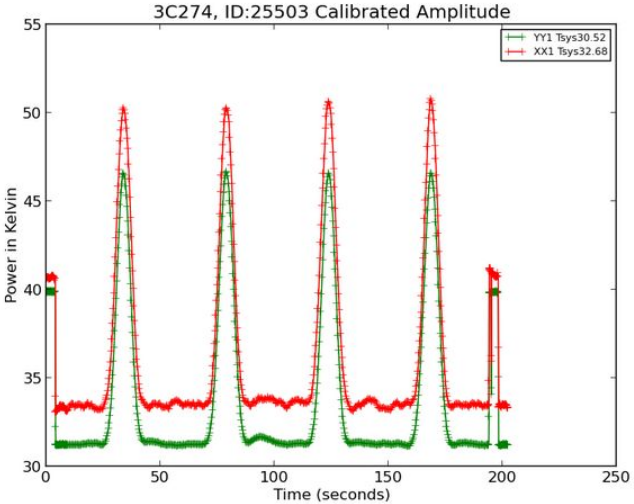
- Spectral resolution: Low or High
- Why:
  - Good for measuring intensity of your object
  - Can average multiple observations together in HIRES mode



Daisy Sky Pattern

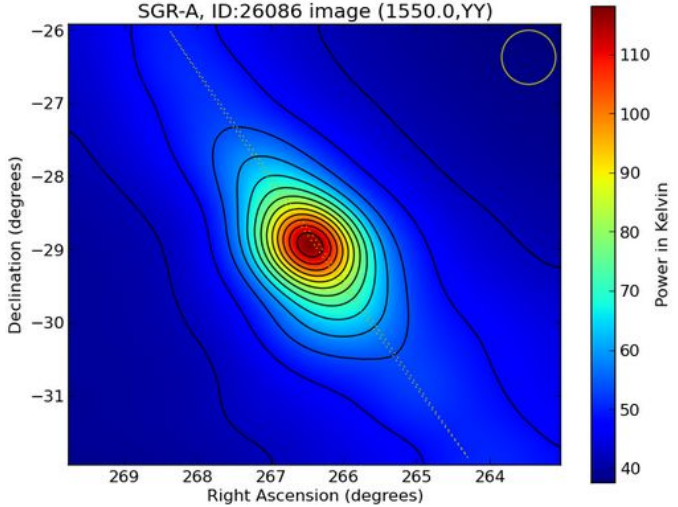
- Spectral resolution: Low
- Why: Good for measuring the strength of a source





Map Sky Pattern

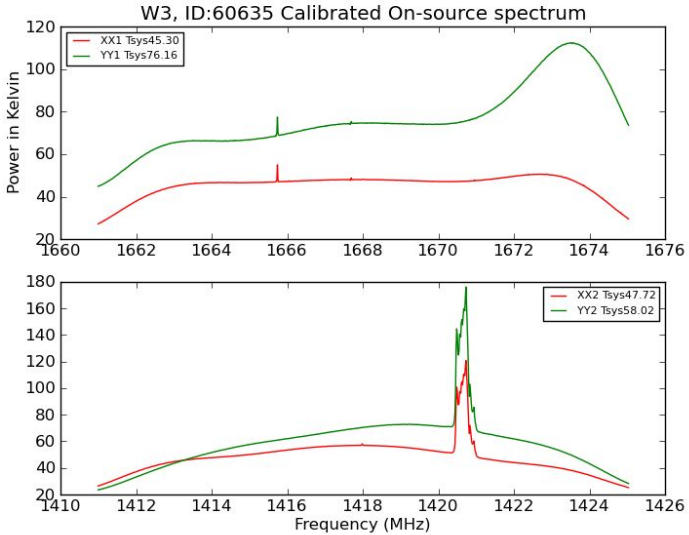
- Spectral resolution: Low or High
- Why:
  - Good for making an image of an area of sky
  - e.g., nebulae, galactic plane



YY1 FITS file

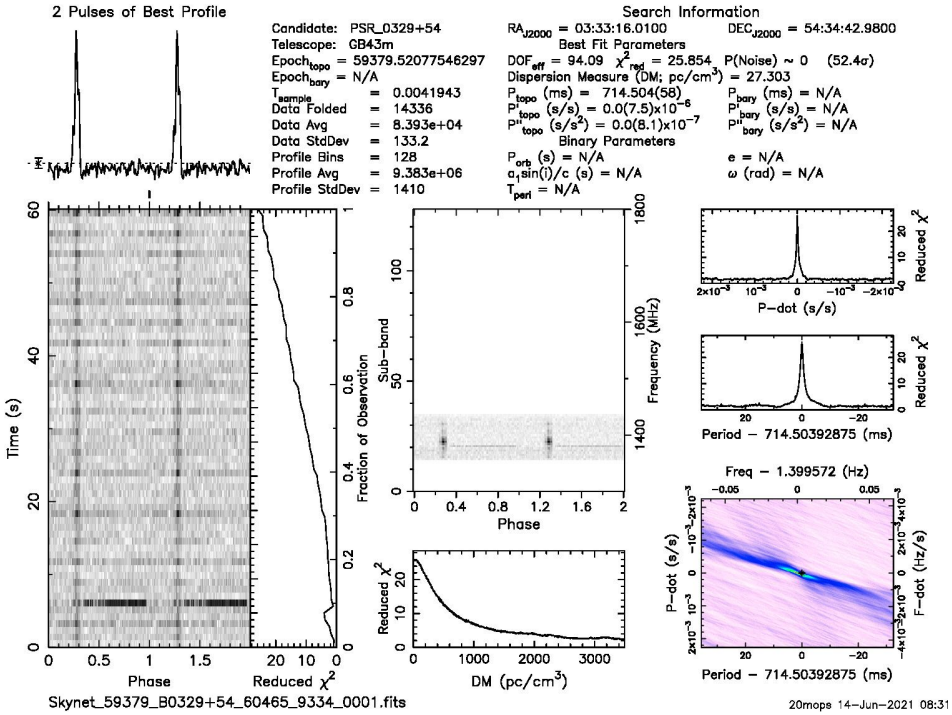
Track Sky Pattern

- Spectral resolution: High
- Why:
  - Good for observing spectra in high-resolution mode



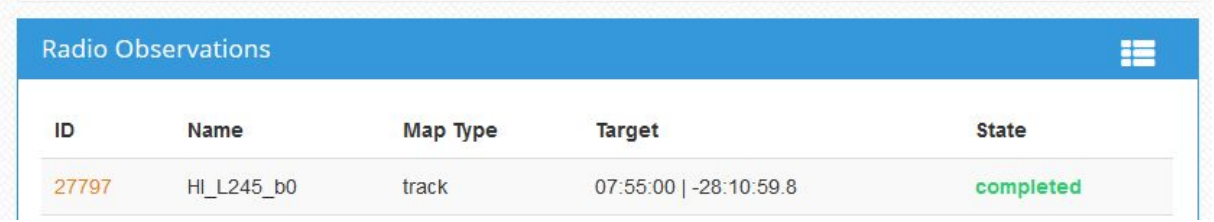
Pulsar Observation

- Spectral resolution: Low
- Why:
  - Good for observing known pulsars



Data Products

- Data are archived at www.gb.nrao.edu/20m
- Under Radio Observations



Searching the Archive

Skynet 20m: Education and Science Collaboration

Links	UNC Skynet	NEW 20m skynet status display	Log of 20m results	Search projects	latest observation	NRAO Skynet wiki	NRAO Skynet main(this page)

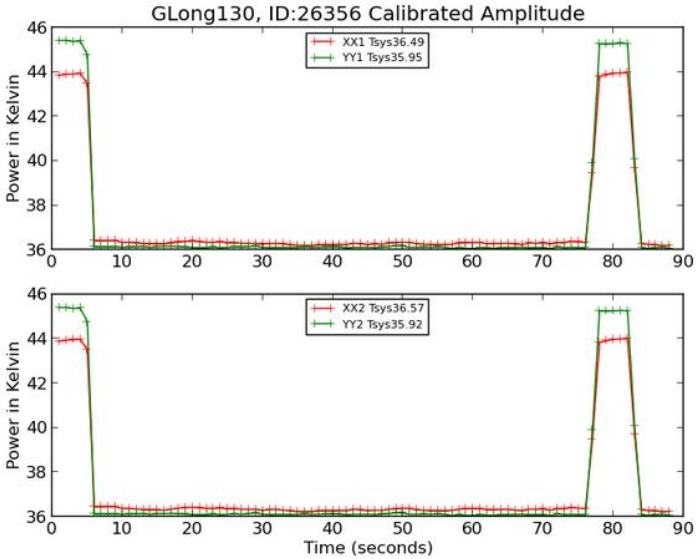
Skynet is a world wide network of astronomical telescopes operated by the University of North Carolina at Chapel Hill. The NRAO has developed a 20m radio telesc
located at the Green Bank Observatory in West Virginia and provides observations at 1.3 to 1.8 GHz and 8 to 10 GHz.

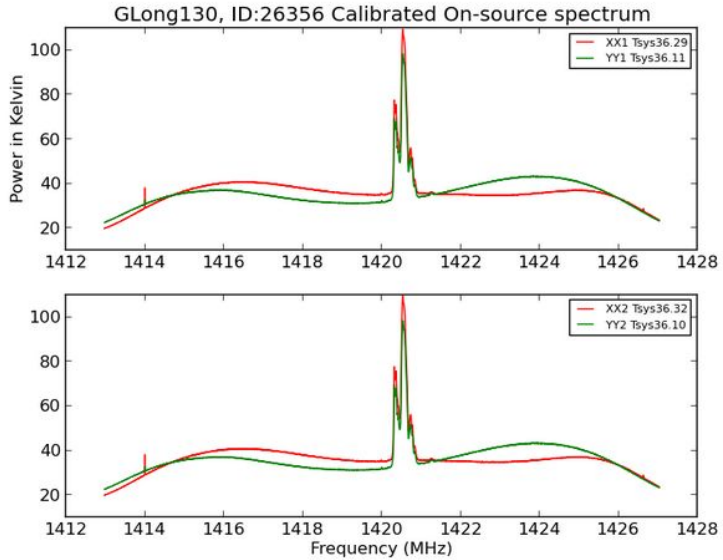
Skynet Junior Scholars
Skynet Junior Scholars Forum

Observing Advice for Skynet Users
Example Data
Explanation of data files.

Radio Skynet Observation: Skynet_57806_GLong130_26356_26684

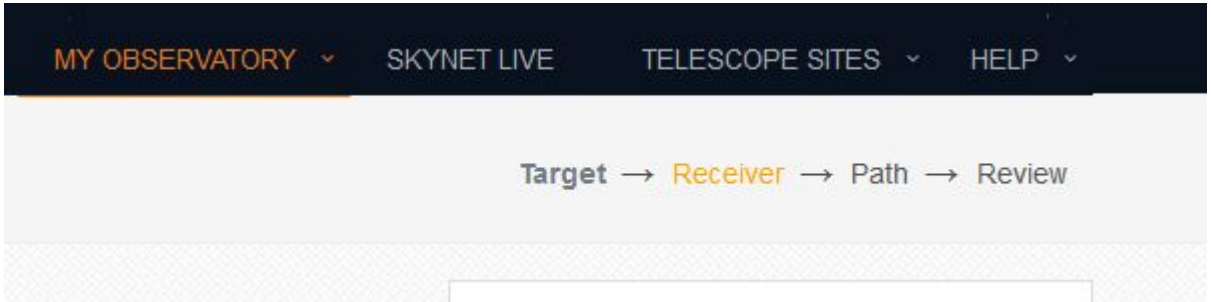
Continuum Raw data Calibrated Calibration Info	**Spectra** Calibrated	2017-02-22 02:38:20 (UT) Observer: jcastronomy_10861 HIRES track; filter 1355_1435; 88 secs	Latest Log	20m Info 20m Skynet	
Data File Description.					





DCal 1 spectrum Dcal 2 spectrum

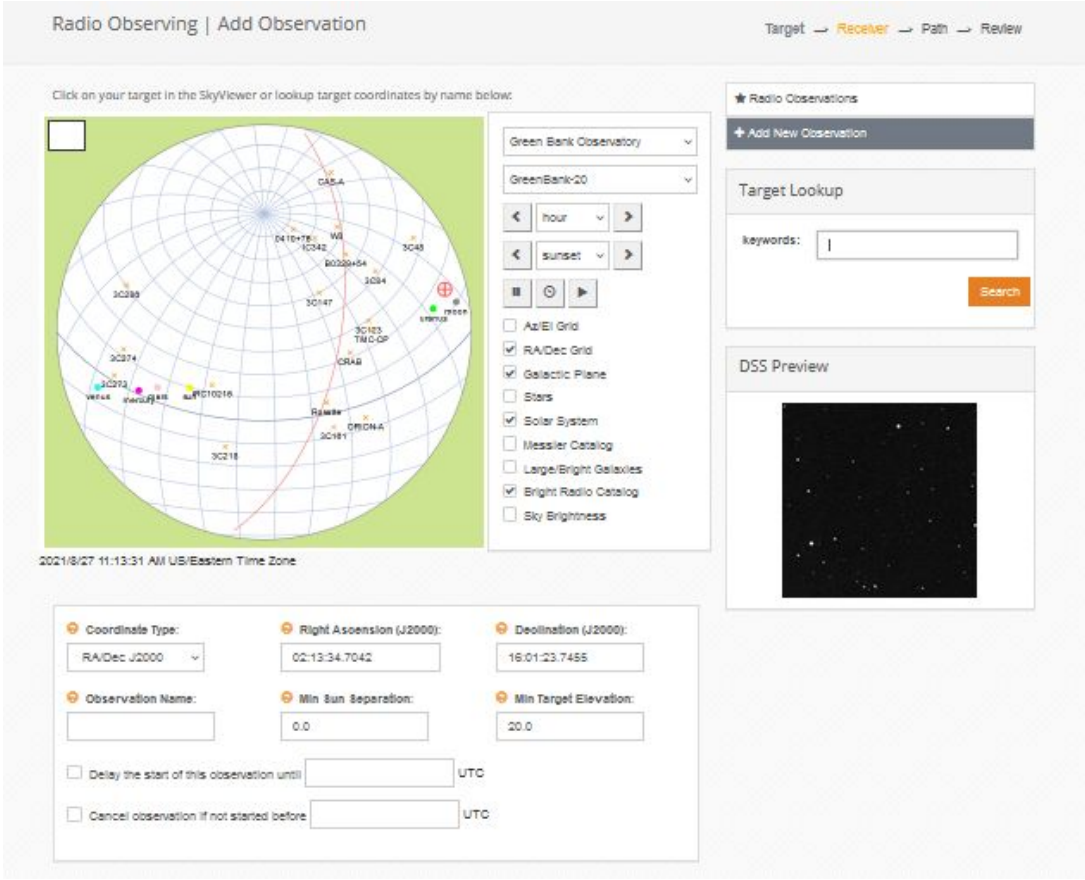
Setting Up Your Observations



https://skynet.unc.edu/radio_obs

Target Selection

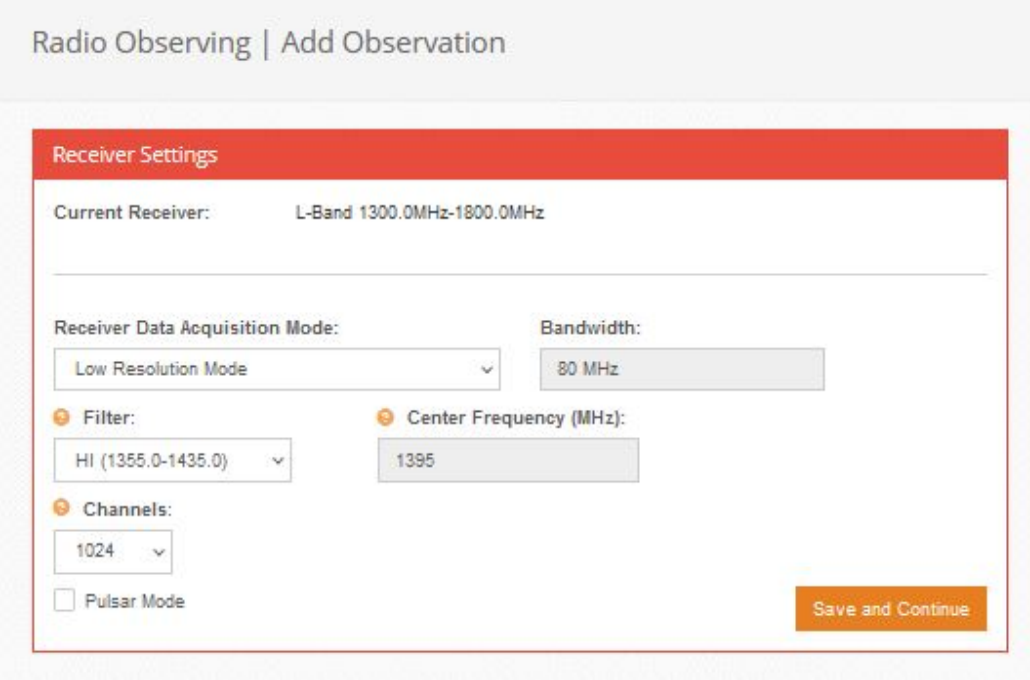
- Type in target and search or click on it in the Skyviewer
- You can just add in the coordinates
- Create an observation name - include your group number



Setting Up Your Observations

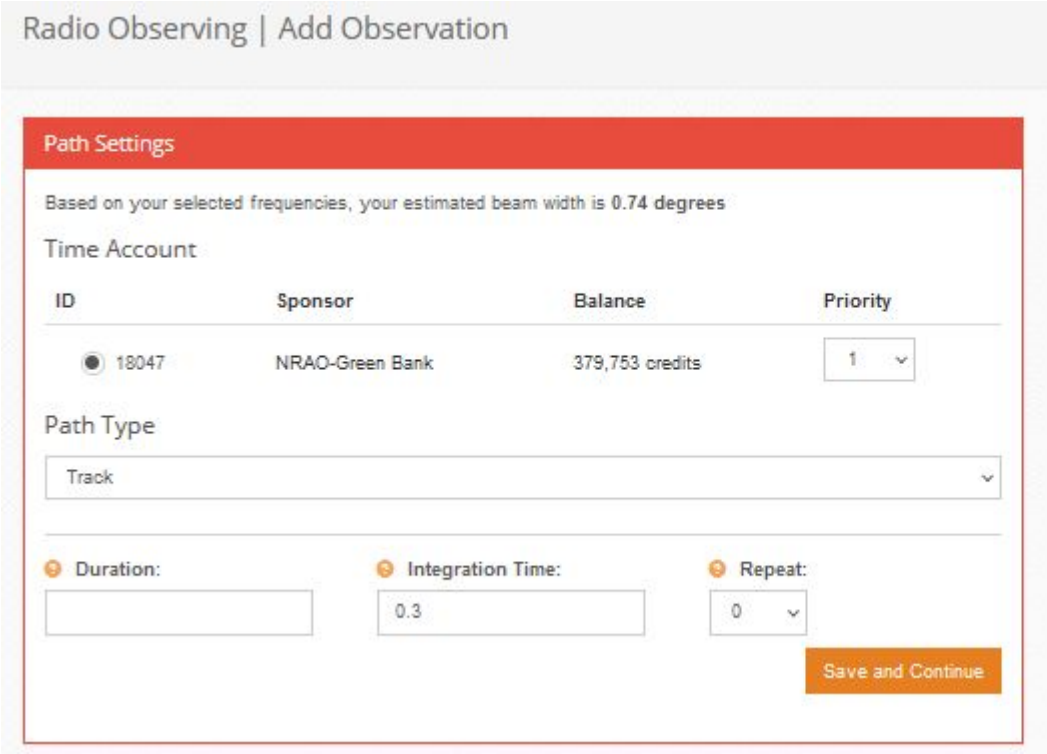
- At the bottom of the Target selection page is a visibility target graph
- Click save and continue at the bottom

Receiver



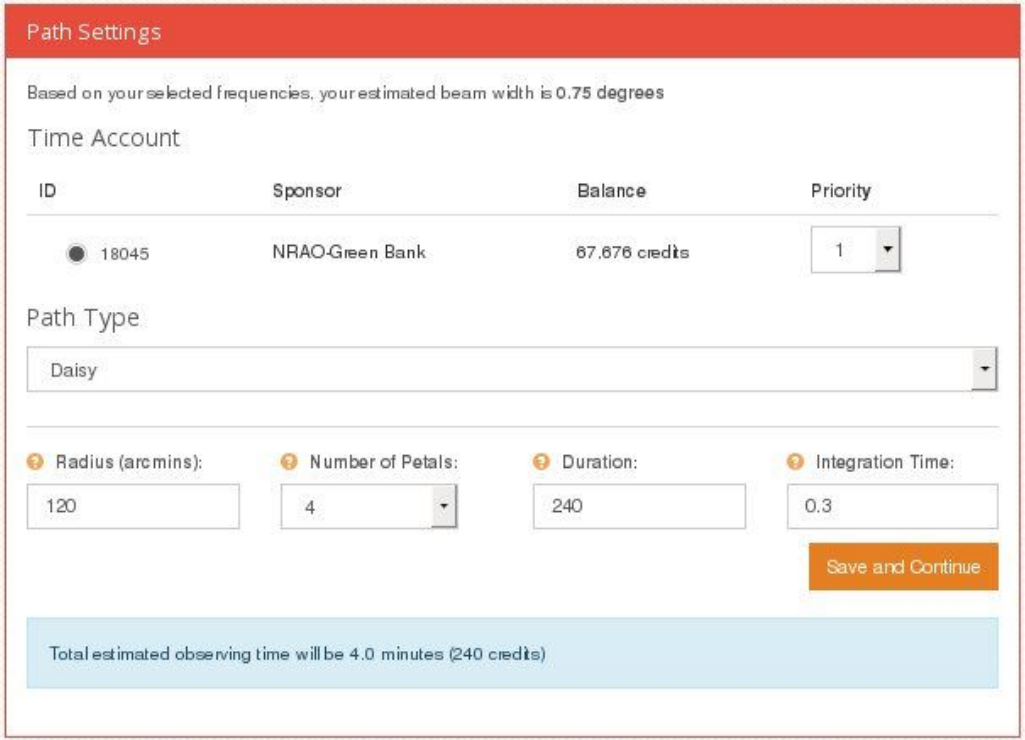
- Select Low or High resolution
- Select Filter
- If high resolution, your two bands need to have center frequencies spaced as multiples of 15.625 MHz

Path



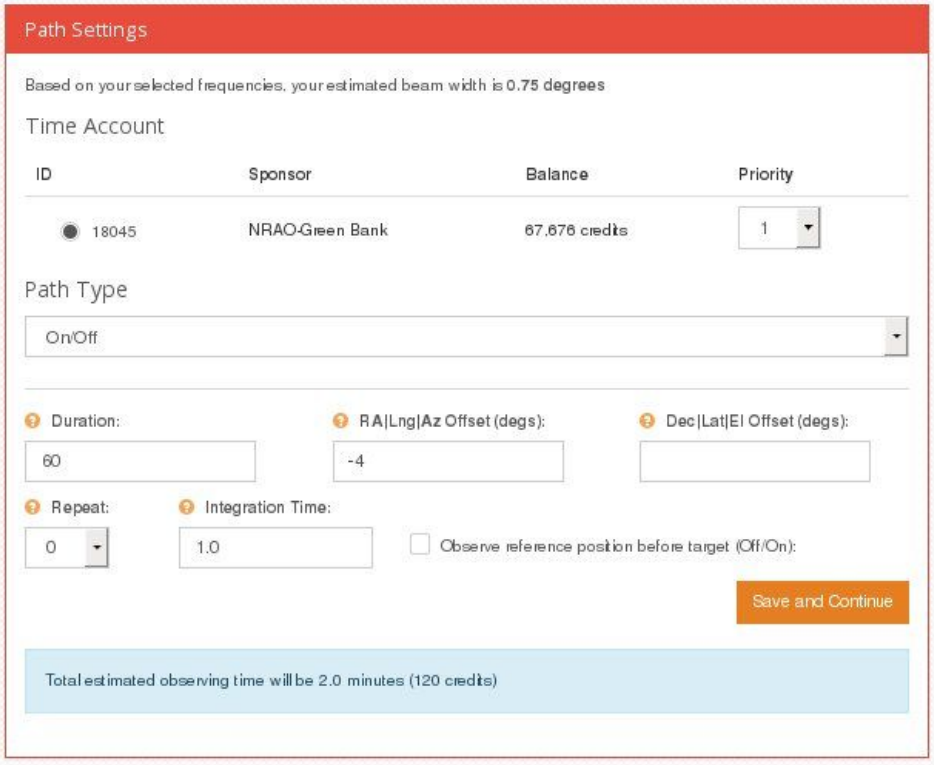
- Choose Track or OnOff for spectra
- Choose Daisy or Map for images
- Complete the additional info for each field
- At this stage you can see how much the observation will cost (in credits)

Daisy Path



- Radius: 90 to 120 arcminutes
- Number of Petals: Use 4 for a quick look, 8-12 for a more complete map
- Integration Time: 0.2 or 0.3 seconds is usually good
- Duration: 180 seconds for 4 petals and 360 seconds for 8 petals

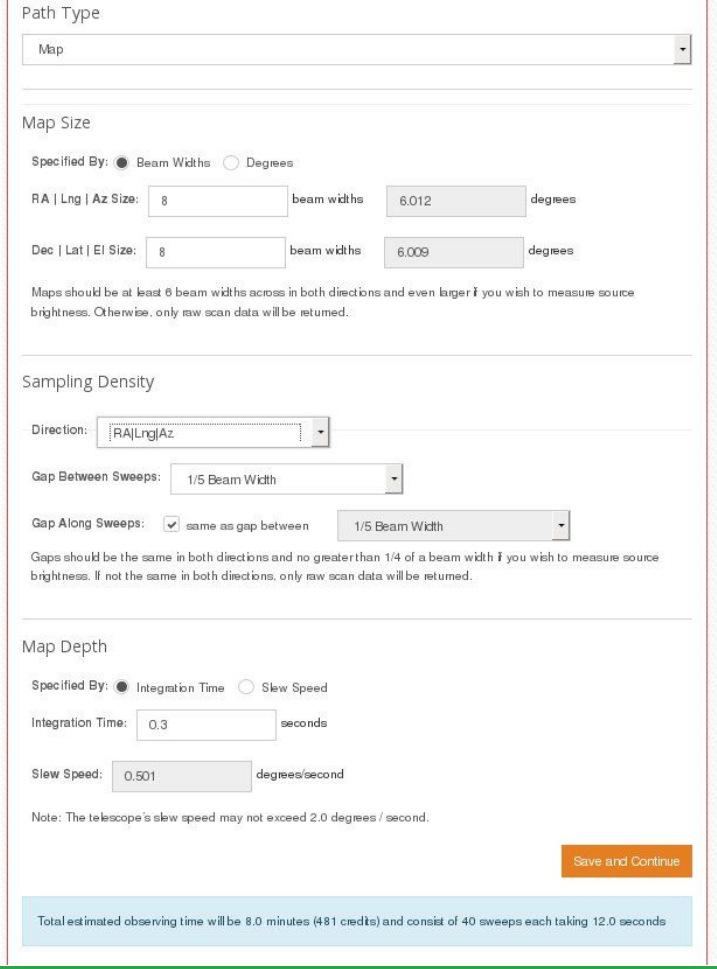
OnOff Path



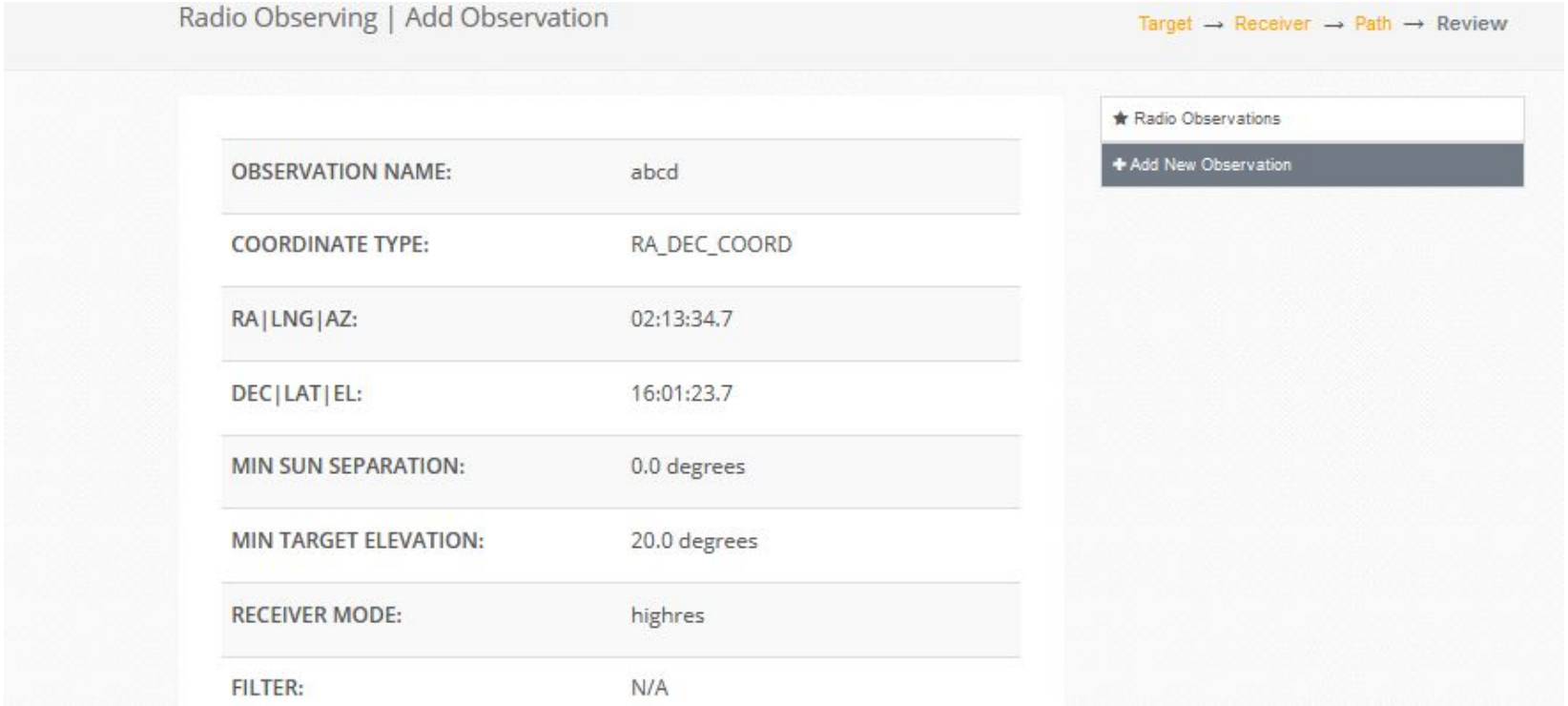
- If doing continuum observations, this is good for measuring flux density of an object
- If doing spectral line, good for observing fainter objects
- Duration: 30-60 seconds or 200-300 for hydrogen in nearby galaxies
- Offset: a few beamwidths

Mapping Path

- Map size is specified by either “Beam Widths” or “Degrees”
- Gaps between sweeps:
  - For quick or large scale: 1/4 or 1/3
  - For more detailed: 1/5 or 1/10
- Gap along sweep: keep this box checked
- Map depth: do not increase to more than 2 seconds



Review and Submit



GREEN BANK
OBSERVATORY

greenbankobservatory.org

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