

The *SPiRiT* Scheduler

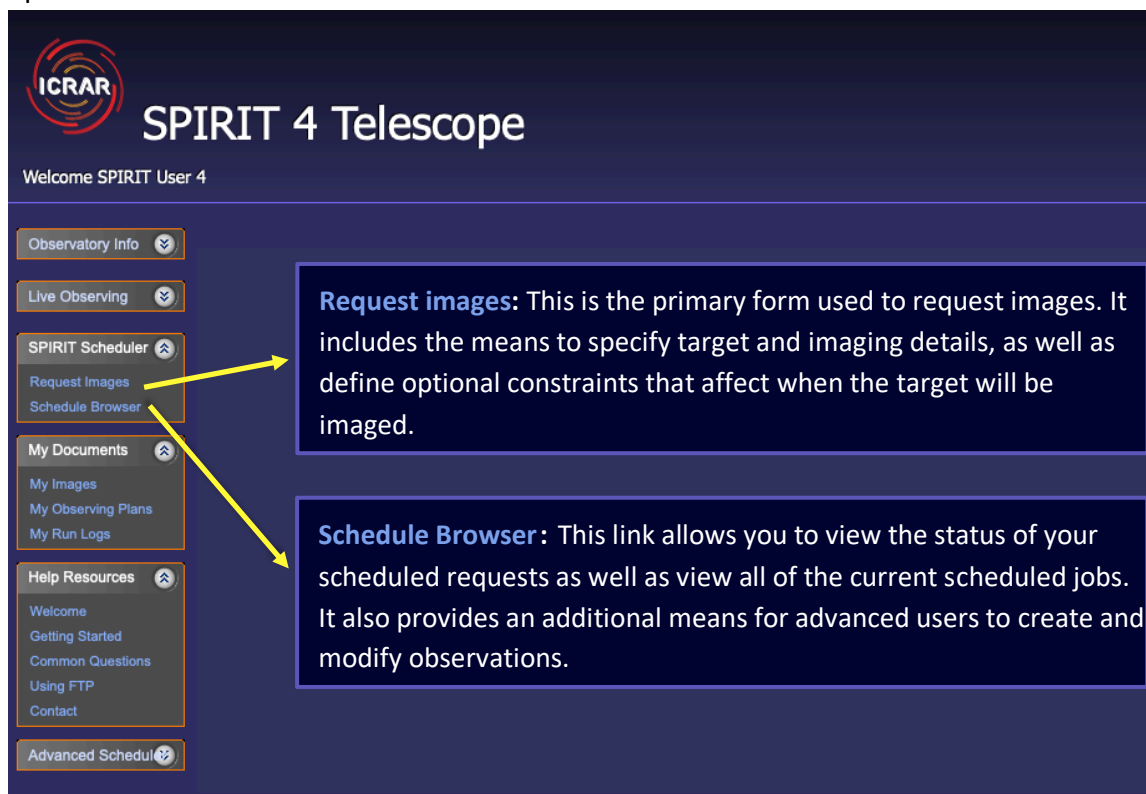
The *SPiRiT Scheduler* allows users to submit observation requests that are automatically scheduled. It is the default mode of operation for all new *SPiRiT* telescopes, unlike the ‘live observing’ modes used for the original *SPiRiT 1 & 2* telescopes.

What is a scheduler?

A scheduler is an advanced piece of software that combines image requests from many users and dispatches them according to target visibility and optional user-defined constraints. It takes all of the work out of figuring out the best time to image a target of interest, while also making telescope use more efficient and productive. Unlike live observing modes, users do not book or interact with the telescope in real time, though requests and live telescope operations can still be monitored via the *SPiRiT* web interface.

Using the *SPiRiT Scheduler*

The *SPiRiT Scheduler* menu is accessed from the *SPiRiT* web interface. There are two menu options:



The screenshot shows the SPIRIT 4 Telescope web interface. The top navigation bar includes the ICRAR logo, the text 'SPIRIT 4 Telescope', and a welcome message 'Welcome SPIRIT User 4'. A sidebar menu on the left contains several sections: 'Observatory Info', 'Live Observing', 'SPIRIT Scheduler' (with sub-items 'Request Images' and 'Schedule Browser'), 'My Documents' (with sub-items 'My Images', 'My Observing Plans', and 'My Run Logs'), 'Help Resources' (with sub-items 'Welcome', 'Getting Started', 'Common Questions', 'Using FTP', and 'Contact'), and 'Advanced Scheduling'. Two yellow arrows point from the 'Request Images' and 'Schedule Browser' sub-items to text boxes on the right. The 'Request Images' box explains that this is the primary form for requesting images, allowing users to specify target and imaging details and optional constraints. The 'Schedule Browser' box explains that this link allows users to view the status of their scheduled requests and all current scheduled jobs, and also provides a means for advanced users to create and modify observations.

Instructions

Requests can be made well in advance at any time during the day or night. The form has three main sections that must be completed.

1. Start by selecting or entering your name and institution

If you have used the *SPIRIT Scheduler* on this telescope before, select your name from the drop-down list.

If this is your first time, create a yourself as a new 'project'

The screenshot shows the 'Request Images' interface. At the top, there is a 'Help' button. Below it is the 'Project and Target Details' section. It contains two fields: 'Select Existing Student / Project:' with a dropdown menu and a 'Refresh Project List' button, and 'Create New Student / Project:' with a text input field containing 'Willetton SHS Tom Jones' and an example 'Eg. UWA Phys3003 Alice Smith'.

IMPORTANT: Ensure the project title includes your institution and full name:

Example 1: *UWA Phys 3003 Alice Smith*

Example 2: *Willetton SHS, Tom Jones*

2. Enter the target and imaging details

The format and use should be familiar to you if you have used *SPIRIT* before.

Enter target name and select 'Get Coordinates' or manually enter the object's J2000 coordinates. Enter your image count, filter and exposure details.

*Hint: For multiple images that will be stacked later, small movements between successive images, called "dithering", can help to average out defects on the CCD sensor. A default random dithering can be applied by entering **-1.0** into the **Dithering** box.*

The screenshot shows the 'Target and Imaging Details' form. It includes fields for 'Target Name' (NGC 5139), 'Right Asc. (hrs)' (13:26:48.12), and 'Declination (deg)' (-47:28:58.8). There is a 'Get Coordinates or Ephemeris' button. Below these is the 'Exposure Details' section, which is a table with columns for 'Use', 'Count', 'Filter', 'Duration', and 'Binning'. The table has five rows, with the first three rows checked. The 'Dithering' field is set to -1.0.

Use	Count	Filter	Duration	Binning
<input checked="" type="checkbox"/>	1	Clear	15	1
<input checked="" type="checkbox"/>	5	B	45	1
<input checked="" type="checkbox"/>	30	v	30	1
<input type="checkbox"/>		Clear		1
<input type="checkbox"/>		Clear		1

Important: Before proceeding, double check your target and exposure details.

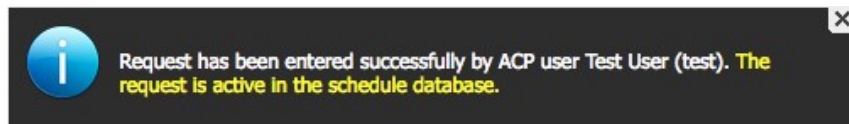
3. Submit your request:

Ensure this box is checked

Click "Submit" ONCE.

The screenshot shows the 'Submit' form. It has a 'Submit' title and a checkbox labeled 'Enable requests immediately (make sure this is ticked before selecting Submit Request)'. Below this is the text 'IMPORTANT: Submit each observation only ONCE !' and a 'Submit Request' button.

Success !



The Schedule Browser

After creating your first project, you should add your email address to receive automated notifications on the status of your imaging:

ACP Expert at SPIRIT 4 Telescope

The screenshot displays the 'Project Information Page' for a project named 'spiritgen4 test'. The page is titled 'This project belongs to SPIRIT User 4'. The form contains the following fields and buttons:

- Project Name: spiritgen4 test
- Description: Submitted via web Schedule Image Series form.
- Observers: (empty field)
- External ID: (empty field)
- Contact Name: SPIRIT User 4 [ACP spiritgen4]#
- Contact Mail: tom.jones@email.here (circled in red)
- Contact Org: (empty field)
- Buttons: Pause, Delete, Save Changes
- Buttons: Resubmit All Plans, Resubmit Failed Plans, Disable All Plans

A red arrow points from the 'spiritgen4 test' item in the left-hand navigation menu to the 'Contact Mail' field.

The Schedule Browser allows you to view the status of all requests. It also allows you to modify or delete your existing requests. The Schedule Browser presents additional features in your plans and observations that you should avoid modifying unless you are an advanced user of the *SPIRIT Scheduler*.

IMPORTANT: Avoid using the Schedule Browser to create new projects, plans or observations. Always use the *Request Images* web form to create new requests.

While it is possible to use the browser to resubmit failed plans, you should first ascertain the reason why the observations failed before resubmitting (otherwise the plan may simply fail again). Inspect your log files for information or seek help.

Downloading Images

Images and log files should always be downloaded using FTP, rather than the web *My Documents* interface. Contact us for information on how to use FTP.

Optional constraints

The *Request Images* form has optional sections that can be used to further refine the observing parameters. Avoid specifying constraints unless you are an advanced user or have specific requirements. It is easy to create impossible scenarios if you over specify constraints. For example, a target that never reaches a specified altitude within an hour angle constraint on a night where the moon is up, etc.

Optional Constraints (click here to expand)

IMPORTANT: Use with CAUTION !

Horizon: Target to be imaged above this altitude (degrees)

Hour Angle: Target to be imaged within this HA range (Hours -E, W)

Air Mass Range: Target to be imaged within this air mass range (max, min) ⓘ Use with CARE

Moon Avoid: Moon avoidance in distance (degrees) and phase (days) ⓘ Moon Avoid Help

Moon Down: Target to be imaged only when moon is below below horizon

Sky Condition: Target imaged only if sky conditions are at least this good

- The Scheduler will always allow your object to rise higher in the sky than the minimum specified horizon limit, particularly if there are few active requests.
- Hour angle is defined east and west of the meridian using -ve and +ve integers respectively. For example, using a range of -1 to 1 will only image the target when it is within 1 hour of the meridian.

Tip: use Stellarium to check that your target does in fact reach any altitude or hour angle constraints you specify for the time frame you hope to acquire your images.

- Air Mass can be used optionally to define a target altitude constraint.
- Moon avoidance requires two parameters. These are explained in detail by selecting [Moon Avoid Help](#). If in doubt, leave blank. Avoid checking *Moon Down* unless you absolutely require images to be taken when the moon is below the horizon.
- Sky condition can be ignored for SPIRIT use.

Priority and Series

The priority and series section includes additional advanced options.

Priority and Series

Priority: (Optional. Prioritise your targets. Higher number = higher priority)

Repeat Series: Repeat entire image set this many times (see help for details)

Time Spacing: (sec, start to start) Spacing Tol: (sec, early/late)

Best Efforts: For very long series imaging only (will run even if series terminates early)

- The priority field allows you to assign arbitrary priority for your targets. Use this only if you wish to define *relative importance* to a number of different targets in your list.
- Repeat series provides options for multi-band imaging. The default (Repeat Series = 1) will acquire the images you have specified once. The entire imaging sequence can be repeated by setting a value greater than 1 which effectively provides two different options for obtaining multiple sets of filtered images:

For example, you wish to obtain a set of B,V,R images for a target and you want 5 images through each filter:

- Specifying a Count of 5 for each filter and leaving Repeat Series set at 1 will produce B,B,B,B,B, V,V,V,V,V, R,R,R,R,R in that order for your target.

- Leaving the Count as 1 but changing the Repeat Series to 5 will instead produce the sequence as B,V,R, B,V,R, B,V,R, B,V,R, B,V,R for your target.

If you increase the number of *Repeat Series*, you will also be presented with optional *Time Spacing* and *Spacing Tolerance* settings. These can be left blank unless you require gaps between your sets, such as those that might be used when obtaining data to produce the light curve of a variable star.

- *Time Spacing* is the time between the start of each set. It is important to allow sufficient 'spacing' for each set of images to complete with the specified time.
- *Spacing Tolerance* provides some leeway for starting the next series which can be useful on a busy night.

In the following example, the image series will be undertaken 3 times (Repeat Series = 3), with a spacing of 30 minutes between the start of each set (Time Spacing = 1800 sec), and a tolerance of 5 minutes (Spacing Tol: = 300 sec).

Priority and Series

Priority: (Optional. Prioritise your targets. Higher number = higher priority)

Repeat Series: Repeat entire image set this many times (see help for details)

Time Spacing: (sec, start to start) Spacing Tol: (sec, early/late)

Best Efforts: For very long series imaging only (will run even if series terminates early)

- Best Efforts is useful for very large repeat series that span more than one night. It forces the series to run even if the scheduler determines that it can't fit into the available hours of a single night.