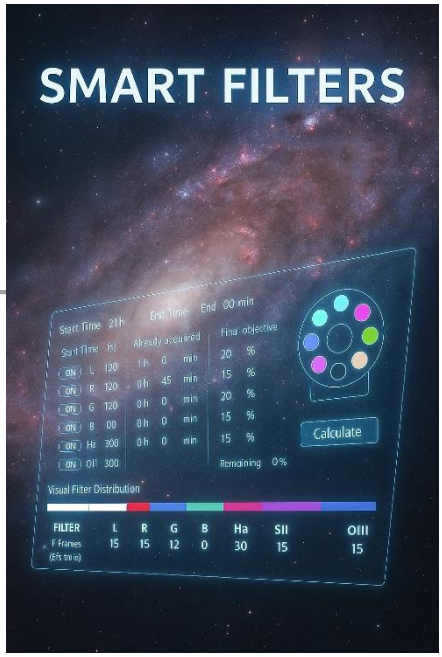
SMART FILTERS

Complete User Guide



GENERAL OVERVIEW

SMART FILTERS is a plugin developed for N.I.N.A. that allows you to accurately calculate **how many subframes** you need to capture in each filter (L, R, G, B, Ha, S, O) in order to **make full use of your available imaging time** and achieve your **desired final balance** between filters.

As an alternative, it is possible to use short loops that respect the target distribution percentages throughout the night. However, this approach leads to frequent autofocus operations, which can result in significant time loss. Moreover, if you rely on filter offsets, their accuracy strongly depends on the mechanical quality of your filter wheel—and even on temperature variations during the night. This method also does not necessarily take previous nights into account and the distribution you want to achieve.

Alternatively, you might prefer **to make smarter use of the night's changing conditions**. For example:

- prioritize **Luminance** and **Blue** filters when the target is high in the sky, to maximize detail,
- use the **Ha** filter while the Moon is still present,
- reserve the **Red** filter for times when the target is lower, as this wavelength is less sensitive to atmospheric turbulence.

At first glance, the calculation may seem simple: assign a percentage of your night to each filter and divide by the exposure time per frame.

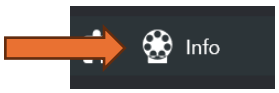
However, in practice, several **complex parameters** come into play:

- Exposure time per frame can vary between L, RGB, or SHO filters.
- Repetitive processes such as dithering, autofocus, and meridian flip consume available imaging time.
- Most importantly, if you have already gathered signal in some filters on previous nights, and in an unbalanced way, **the calculation to reach your global distribution objectives becomes quite tedious.**

With **SMART FILTERS**, all you need to do is enter a few values**. The plugin handles all calculations automatically.**
You can even **save your settings** into different reusable **profiles**.

HOW TO USE THE PLUGIN

Once installed, activate **SMART FILTERS** by clicking its filter wheel icon at the top of the N.I.N.A. window. The plugin window will then appear under the **Imaging** tab.



MAIN WINDOW

1. Define the time range

The first step is to enter the start and end times of your imaging session:

- These times correspond to when you want to start imaging your target, and when to stop.
- You can use the Framing Assistant in N.I.N.A. to help determine these times.

For example: you might choose to start imaging when your target is above 40° altitude and end before it disappears behind a nearby tree.

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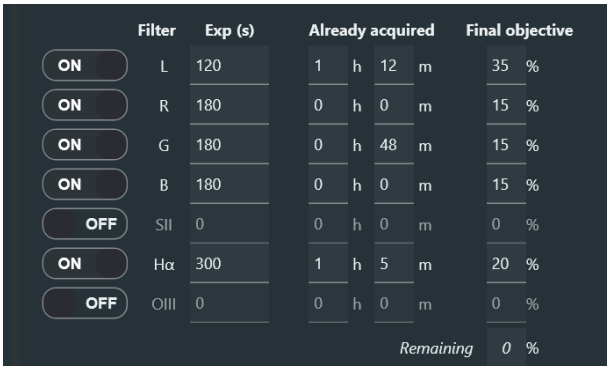
2. Select filters and enter data



For each active filter, enter the following:

- **Exp**: exposure time per frame (in seconds)
- **Already acquired**: total exposure time already collected for this filter during previous nights
  (If you only want to plan for the current night, just enter 0 here)
- **Final objective (%)**: the desired percentage share of this filter in your final stacked image
  (For example, 40% for L, 15% each for Ha, R, G, and B)

The **Remaining** field tells you how much percentage is left to allocate.

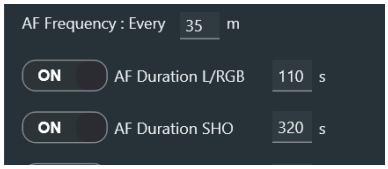
SETTINGS

This section lets you configure all parameters that impact your **actual usable imaging time**.

Tolerance

This setting allows you to account for unexpected events (e.g., lost guiding, additional autofocus, weather interruptions, etc.).
A good starting value is **2 to 3%,** which you can adjust as you gain experience.

Autofocus



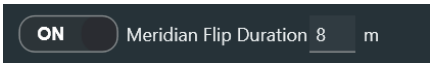
- Specify the autofocus **frequency** (in minutes)
- Check the box if you want autofocus operations to be included in the calculation
- Enter the **average duration** of an autofocus event:

- An autofocus with RGB filters is typically shorter than with SHO filters, due to shorter subframe times
- However, the frequency is generally the same for all filters

💡 *Tip: You can check the **HFR History or N.I.N.A.** logs to estimate this frequency based on previous sessions.*

Meridian Flip

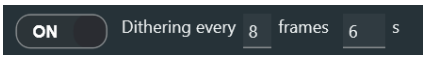
Check this option if a flip is expected during the session, and enter its total duration, including:



- The flip itself
- Settle time
- Plate solving / astrometry
- Re-centering
- Restarting guiding
- A possible autofocus afterward

Example: on my setup, the complete flip process takes around 8 minutes, everything included.

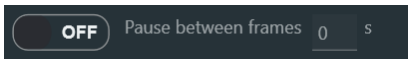
Dithering



- Check this box if you want dithering taken into account
- Enter the dithering frequency (e.g., every 8 frames) and its average duration (e.g., 7 seconds)

Pause Between Frames

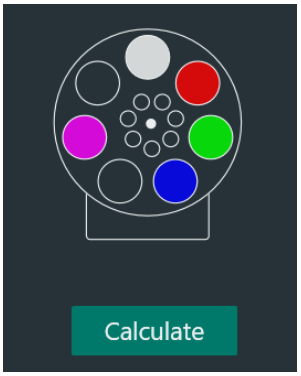
- Enable this option if your setup imposes a short pause between subframes (e.g., readout time, hardware lag)
- Enter the pause duration in seconds



On modern CMOS sensors and setups, this delay is generally negligible, but if your system is affected, you can account for it here.

CALCULATE

Once all fields are filled out, click the **Calculate** button.
The plugin will compute:



- The **number of subframes** to schedule for each filter

1. **The effective imaging time**

- **Time lost** due to technical operations
- The **final distribution** of your filters

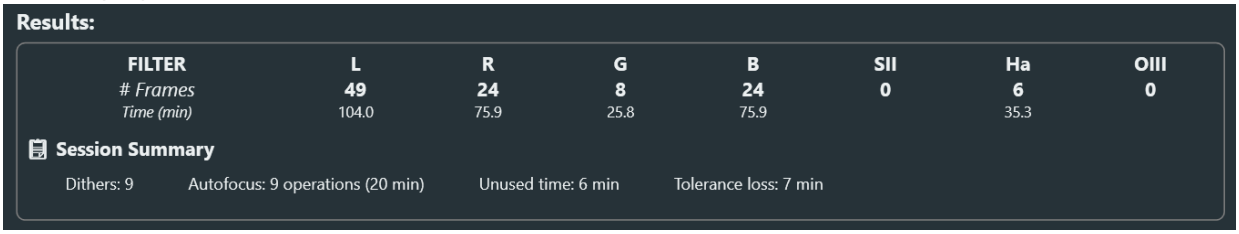
RESULTS

Filter Distribution Segment

A **colored bar** gives you a visual representation of the **final distribution** between filters.

Results Table

This displays:



- **The number of subframes to capture** per filter
- **The total used imaging time**
- Any **unused time** remaining at the end of the session (if applicable)

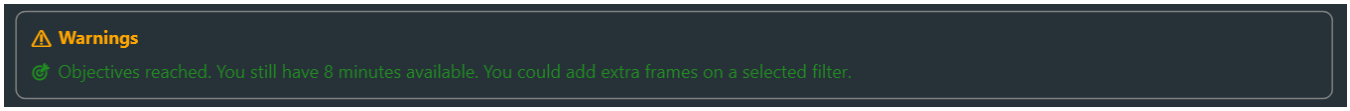
SMART FILTERS will also display a **message** if there are a **few unused minutes left at the end**. It will suggest adding a few extra frames, even if this means slightly exceeding the percentage target for a filter. This has no real impact, and it's better to make full use of the available time.

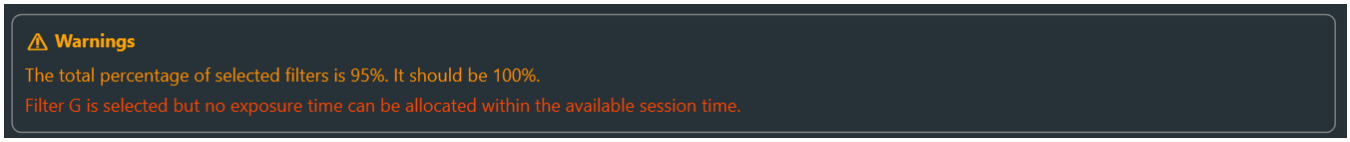
WARNINGS SECTION

This section notifies you of:

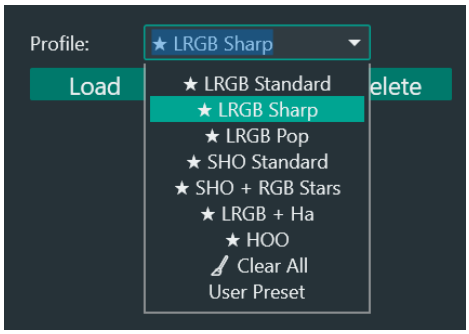
- Missing or zero exposure times
- Unreachable objectives
- A total percentage different from 100%
- Or other issues in your input

It will also inform you if your targets have been met but some time remains available, encouraging you to add extra frames to optimize your session.





PROFILE MANAGEMENT



In the **Settings** tab, you'll find the profile management section.

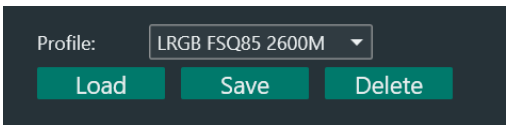
Predefined Profiles

Several profiles are included to help you get started:

- **LRGB Standard**: evenly distributed exposure time across all filters
- **LRGB Sharp**: more emphasis on luminance (useful for faint objects or fine details, such as galaxy extensions or IFNs)
- **LRGB Pop**: more weight on RGB filters for richer colors
- **SHO + RGB Stars**: combines SHO signal with natural-looking RGB stars

The **Clear All** profile resets all input fields to zero but does **not** delete your custom profiles.

Create Your Own Profile



- Enter a **profile name** in the provided field
- Click **Save**

Your exposure times, distribution targets, and other settings will be saved for future use.

CONCLUSION

SMART FILTERS is an essential tool for anyone looking **to plan their imaging sessions intelligently**, balance exposures across multiple nights, and save time.

Whether you are a beginner or an experienced astrophotographer, this plugin turns a **manual headache into a clear and automated plan**—fully integrated into your N.I.N.A. workflow.