

Proposal Tools



Tool gateway

SOFIA Data Cycle System

RETRIEVE ARCHIVE OBSERVE
PROPOSE PLAN

DCS Site Map

Message Of The Day

- SOFIA Cycle 6 US Queue Call for Proposals released on May 1st. New Unified Proposal and Observation Tool (USPOT) released.
- [Release Notes](#)

DCS 3.4.0

Welcome to the SOFIA Data Cycle System!

User Support	Proposal Development	Observation Planning	Data Archive & Retrieval
About DCS	Download USPOT	Search Observing Plans	Search Science Archive
Register With DCS	Search Proposals	Search AORs	Search Mission Data Archive
DCS Help Resources	SOFIA Instrument Time Estimator	Download Visibility Tool	Search Missions
	ATRAN		SOFIA Publications

The SOFIA Data Cycle System (DCS) provides tools and infrastructure for both General Investigators (GIs) and Science and Mission Operations (SMO) staff for:

- proposal preparation and submission
- observation and mission planning
- data archiving and distribution

All tools and resources are available using the links above.

To start using the DCS, please [register](#) and check out the documents in the [DCS Help Resources](#) area. In addition, most of the tools have embedded help pages and links.

Be sure to check the Message of the Day for recent news and updates regarding DCS status, including planned downtime for upgrades and maintenance.

[DCS Help Resources](#) • [DCS Site Map](#) • [About DCS](#)

[SOFIA Science Page](#) • [SOFIA Public Site](#)

NASA DLR USRA

Most of the SOFIA tools are available at the SOFIA Data Cycle System

site: <https://dcs.arc.nasa.gov/>



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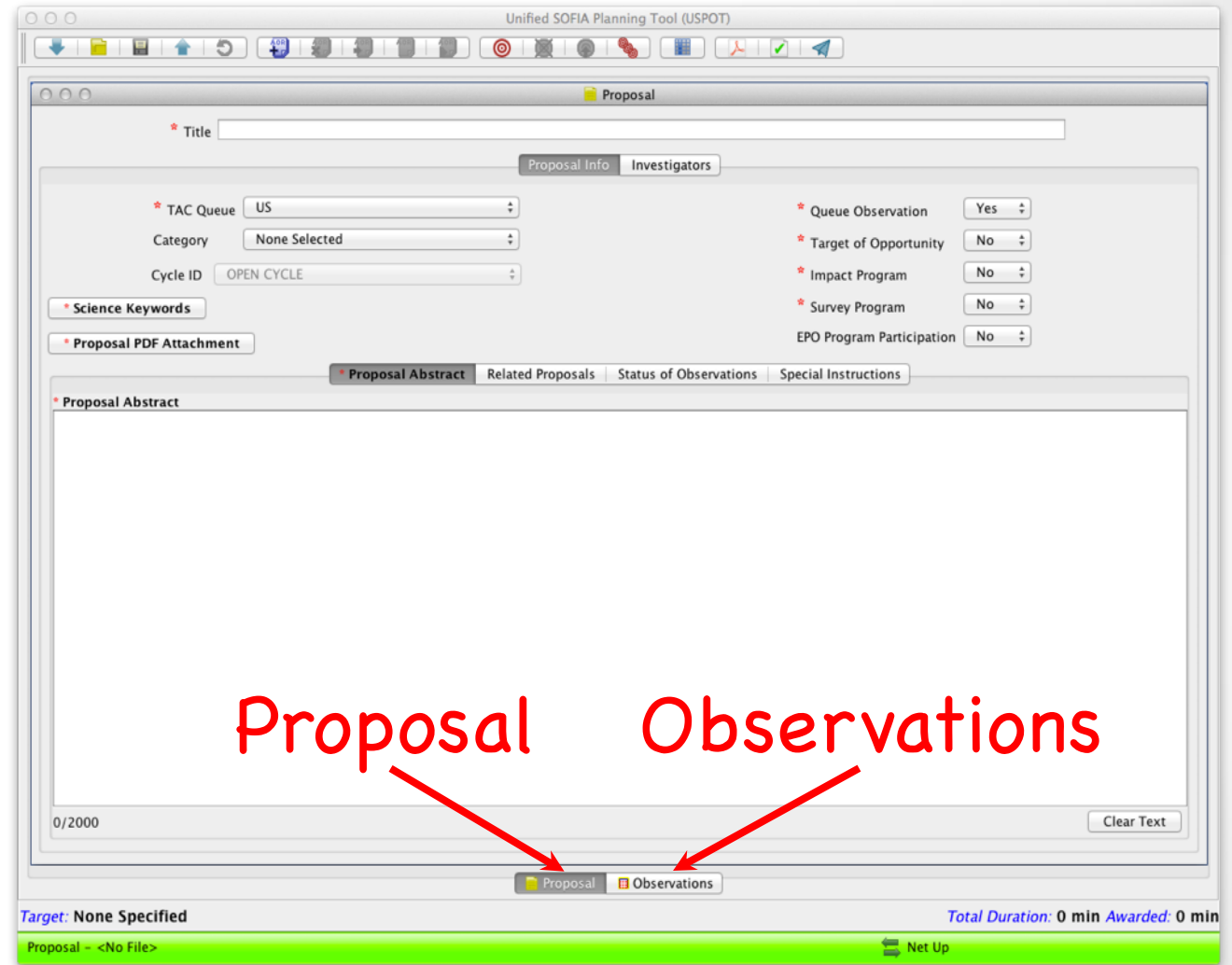


USPOT

The main tool for planning and submitting a proposal is USPOT, the Unified Sofia Proposal and Observation Tool.

Through this tool it is possible to:

- Define targets
- Plan observations
- Overlay observations on images
- Submit a proposal



<https://dcs.arc.nasa.gov/observationPlanning/installUSPOT/uspotDownload.jsp>

USPOT: select a target

The screenshot shows the Unified SOFIA Planning Tool (USPOT) interface. The main window is titled "Observations" and contains a "Target" dialog box. The dialog box has the following fields and options:

- Target Name (required):** IC 63
- Search Method:** SIMBAD (dropdown menu)
- Buttons:** Resolve the Name
- Observation Mode:** Fixed Single (selected), Moving Single
- Coord Sys:** Equatorial J2000 (dropdown menu)
- RA:** 0h59m01.3704s
- Dec:** +60d53m17.808s
- Epoch:** 2000.00
- Proper Motion:**
 - Use Proper Motion
 - PM RA ("/yr): 0.000
 - PM Dec ("/yr): 0.000
- Buttons:** Cancel, OK

At the bottom of the USPOT window, there is a status bar with the following information:

- Target:** None Specified
- Total Duration:** 0 min
- Awarded:** 0 min
- Proposal:** <No File>
- Net Up:** (button)

USPOT: plan an observation

FORCAST_Grism [AOR ID: N/A]

Unique AOR Label: FORCAST_Grism-0000

Target: NGC 7009 Type: SOFIA Fixed Single
316.045321, -11.363406 Equ J2000 or 21h04m10.8770s, -11d21m48.262s Equ J2000

New Target Modify Target ... Target List...

Observing Condition & Acquisition / Tracking

* Exposure Time (sec) 200.000
Cycles 1
Min Contiguous Exp Time (sec) 0.000
Observation Order 1
IR Source Type Point Source

Dither Patt...
 None
 3 point
 5 point
 9 point
 custom

Dither Offset
Dither Coordinate Array
Dither Offset (arcsec) 4.000
ExpTimePerDither (sec) 40.000
Scan Size (arcsec) 16.000

Number	Offset Along Slit(°)	Offset Perp Slit(°)
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* Instrument Configuration GRISM_LWC
* SWC None * LWC FOR_G227 * Slit FOR_LS24

Chop / Nod
Example Rotation Angle (deg) 0.000
* Chop/Nod Style Nod Match Chop
Chop Type Sym
Chop Throw (arcsec) 60.000
Chop Angle Coordinate Sky
Set Chop Angle Ranges
Chop Angle (deg) 0.000
Nod Throw (arcsec) 60.000
Nod Angle Coordinate Sky
Nod Angle (deg) 180.000

(* = required for Phase I)

Observation Est... Comments... Proposal Info...

Cancel Apply OK



USPOT: download field from archive

The screenshot displays the Unified SOFIA Planning Tool (USPOT) interface. A central dialog box is open for configuring a target. The target is identified as **IC 63**, a **SOFIA Fixed Single** type. Its coordinates are given as **14.755710, 60.888280 Equ J2000** or **0h59m01.3704s, +60d53m17.808s Equ J2000**. The dialog includes several sections:

- Buttons:** New Target, Modify Target, Target List...
- Survey Types:** A list of radio buttons for different survey types:
 - POSS2/UKSTU Red
 - POSS2/UKSTU Infrared
 - POSS2/UKSTU Blue
 - POSS1 Red
 - POSS1 Blue
 - Quick-V Survey
 - HST Phase 2 Target Positioning(GSC 2)
 - HST Phase 1 Target Positioning(GSC 1)
 - The best of a combined list of all plates
- Where?:** Radio buttons for plot placement:
 - Put plot in new Frame
 - Put plot in current Frame
- Width (Degrees):** 0.250
- Height (Degrees):** 0.250
- Initial Zoom Level:** No Zoom
- Three Color Plots:** Make this a 3 Color Plot, Color Band: Red

The background shows a star field image. The bottom status bar indicates the target is **IC 63 POSS2/UKSTU Red** and provides summary information: **Total Duration: 87 min Awarded: 0 min**. The bottom-most bar shows **Proposal - <No File>** and **Net Up** status.



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USPOT: generate and overplot AOR

Unified SOFIA Planning Tool (USPOT)

Mouse Control: **%-Left Mouse Button:** Drag to adjust bias (horizontally) and contrast (vertically); double-click to reset.
Shift-Left Mouse Button: Shift the center of image.

IC 63 POSS2/UKSTU Red

Which AORs

Which AORs do you want to Overlay?

Cancel All AORs Checked AORs Selected AORs Current AOR

Target: IC 63 Type: SOFIA Fixed Single Total Duration: 100 min Awarded: 0 min

Proposal - <No File> Net Up Total AORs: 5 / Active: 5



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USPOT: footprint and guide starts

The screenshot displays the Unified SOFIA Planning Tool (USPOT) interface. The main window shows a star field with a large yellow circle representing the footprint and several purple rectangles representing guide star starts. The interface includes a toolbar at the top with various icons for navigation and tool management. Below the toolbar, there are input fields and a 'Mouse Control' section with instructions: '%-Left Mouse Button: Drag to adjust bias (horizontally) and contrast (vertically); double-click to reset.' and 'Shift-Left Mouse Button: Shift the center of image.' The central window is titled 'IC 63 POSS2/UKSTU Red' and shows a star field with a yellow footprint circle and purple rectangles. To the right of the main window, there are control panels for 'HAWC_TOT_C2N-0000' and 'Base Image', each with a checkmark, an 'X' button, and a percentage icon. At the bottom of the interface, there is a status bar with the text 'Target: IC 63 Type: SOFIA Fixed Single' and 'Total Duration: 74 min Awarded: 0 min'. Below the status bar, there is a green bar with the text 'Proposal - <No File>' and 'Net Up' with a double-headed arrow icon, and 'Total AORs: 3 / Active: 3'.

SOFIA archive

Duplication checking is done by exploring the previous SOFIA observations archived in the DCS.

To use the DCS one needs to register and sign-in.

Also, the call for proposals contains a table of ROC targets (Reserved Observation Catalog).

The screenshot shows the SOFIA Data Cycle System (DCS) AOR Search page. The page title is "SOFIA Data Cycle System" and the URL is "https://dcs.sofia.usra.edu/observationPlanning/AORSearch.jsp". The page features a navigation bar with "RETRIEVE", "ARCHIVE", "PROPOSE", "PLAN", and "OBSERVE" buttons. Below the navigation bar is a "Sign In" section with "Email" and "Password (Forgot password)" fields. A "Message Of The Day" section contains a "DCS 3.4.0" update notice. The main "AOR Search" section includes a "Get AORs for matching criteria" button and a search form with the following fields:

- Cycle Number: All Cycles
- Primary Investigator: First Name, Last Name
- Instrument: ALL
- Target Type: ALL
- Target: NGC 7009, SIMBAD Position, NED Position
- Spatial Area: RA (hh:mm:ss) 21:04:10.88, Dec (deg:mm:ss) -11:21:48.26, Search Radius (arcsec) 60, Equinox 2000
- Results Per Page: 50

Buttons for "Submit" and "Reset" are located below the search form. The footer contains links for "DCS Help Resources", "DCS Site Map", "About DCS", "SOFIA Science Page", and "SOFIA Public Site", along with logos for NASA, DLR, and USRA.

<https://dcs.arc.nasa.gov/dataRetrieval/SearchScienceArchiveInfo.jsp>



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Herschel archive

During observation planning have a look at existing Herschel observations to avoid duplications and/or obtain flux estimates.

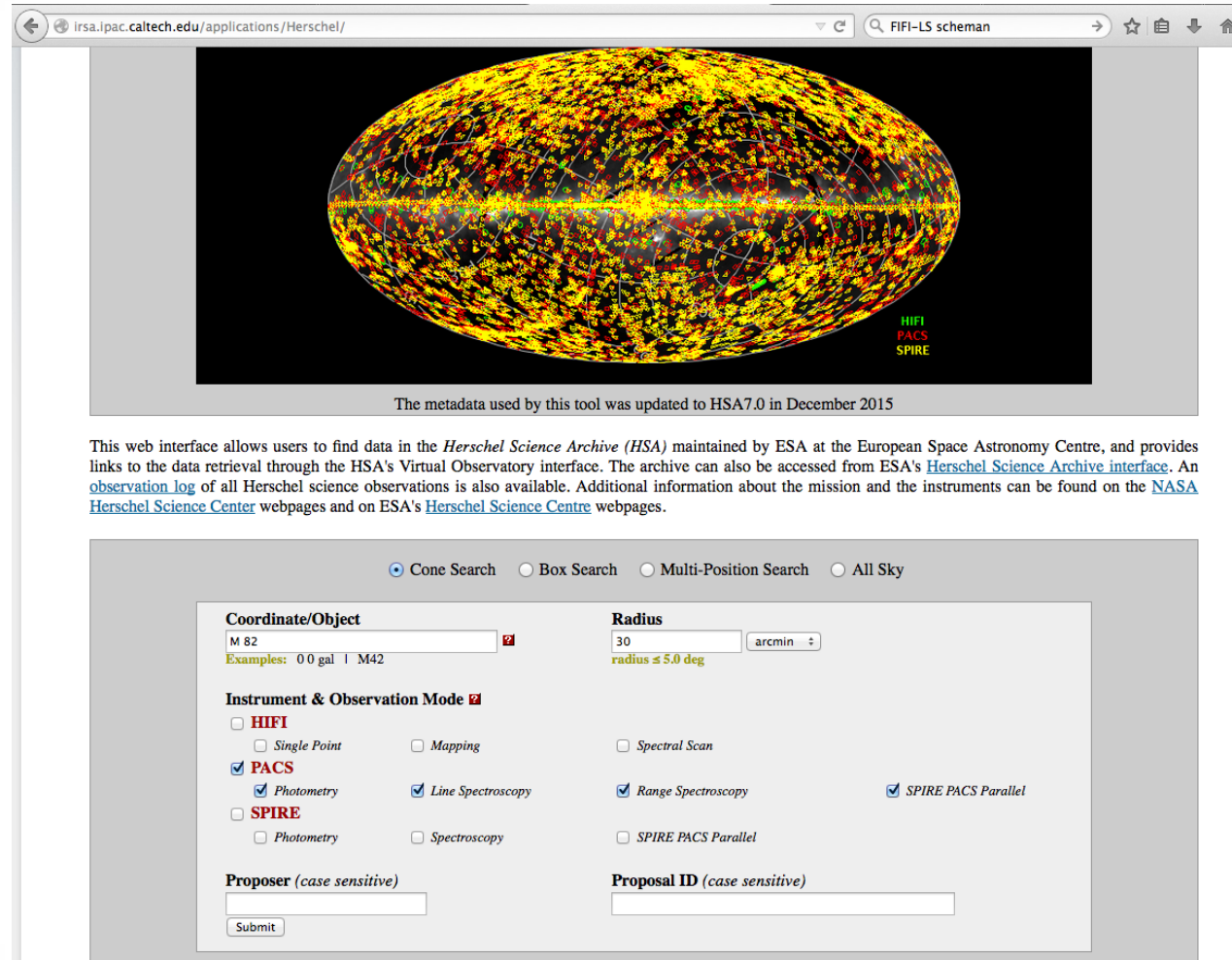
The screenshot shows the Herschel Science Archive search interface. At the top, there is a navigation bar with "EUROPEAN SPACE AGENCY" and "ABOUT ESAC" links, and a "SIGN IN" button. The main header features the "herschel science archive" logo and the ESA logo. The search interface is divided into several sections:

- BASIC SEARCH:** Includes fields for Target Name (M 82), Radius (5 arcmin), and Targets File. A dropdown menu shows "SIMBAD and NED". Below these fields, it states "M 82 resolved by SIMBAD and NED" with coordinates "RA: 148.968458 Dec: 69.6797".
- OBSERVATION CONSTRAINTS:** A tabbed interface with "Observation", "Instrument", "Proposal", "Pipeline Processing", "Date", and "Publications" tabs. The "Instrument" tab is active, showing "Instrument: PACS" and "Observing Mode: PACS Photometry".
- CURRENT RESULTS:** A bar chart showing the number of results for different categories: Pipeline (2), UPDP (2), HPDP (0), and Publications (6). Below the chart, a table lists the counts: Pipeline Products: 2, UPDP: 2, HPDP: 0, and Publications: 6.

<http://archives.esac.esa.int/hsa/whsa/> - search

Herschel archive through IRSA

The Herschel archive is also available through the IRSA site.



The screenshot shows a web browser window at irsa.ipac.caltech.edu/applications/Herschel/. The main content is a 3D visualization of the Herschel Science Archive data, showing a dense field of points in yellow, orange, and red, with a grid overlay. A legend in the bottom right corner identifies the instruments: HIFI (green), PACS (red), and SPIRE (blue). Below the visualization, a text box states: "The metadata used by this tool was updated to HSA7.0 in December 2015".

Below the visualization is a search form with the following sections:

- Search mode: Cone Search, Box Search, Multi-Position Search, All Sky
- Coordinate/Object: . Examples: 0 0 gal | M42
- Radius: . radius ≤ 5.0 deg
- Instrument & Observation Mode :
 - HIFI
 - Single Point
 - Mapping
 - Spectral Scan
 - PACS
 - Photometry
 - Line Spectroscopy
 - Range Spectroscopy
 - SPIRE PACS Parallel
 - SPIRE
 - Photometry
 - Spectroscopy
 - SPIRE PACS Parallel
- Proposer (case sensitive):
- Proposal ID (case sensitive):
-

<http://irsa.ipac.caltech.edu/applications/Herschel/>

ETC

- Online Exposure time calculators are available for each instrument:

Exposure Time Estimation

EXES - exposure times should be obtained from the [on-line calculator for EXES observations](#), maintained by the Instrument PI, Matthew Richter (UC Davis).

[FIFI-LS on-line time estimator](#).

FLITECAM imaging - [on-line calculator](#), [SITE](#).

[FLITECAM grism observation calculator](#).

FORCAST imaging - [on-line calculator](#), [SITE](#).

[FORCAST grism observation calculator](#).

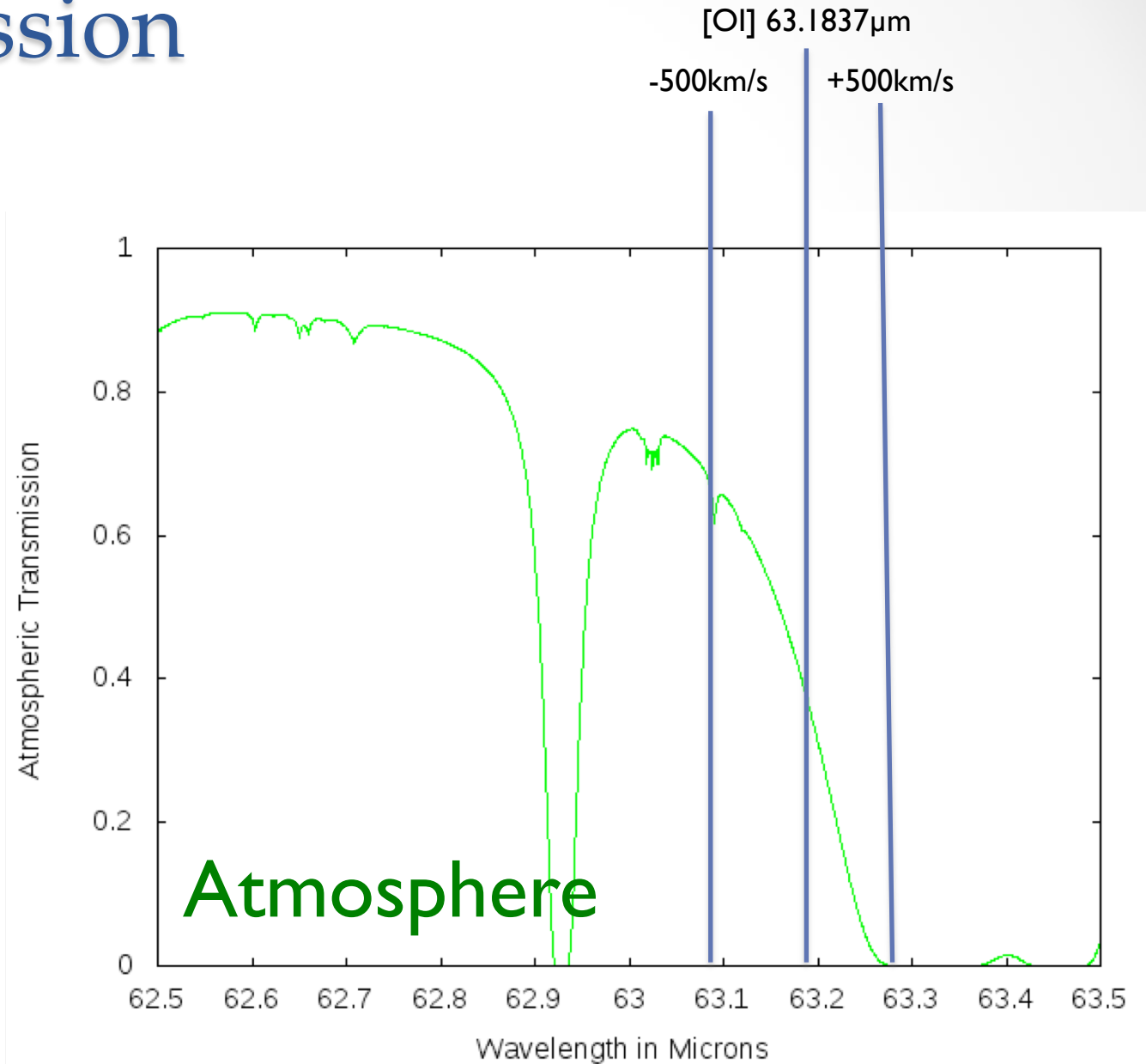
FPI+ - [on-line calculator](#), [SITE](#).

GREAT - exposure times should be calculated using the [GREAT on-line time estimator](#). The calculations are based on the "[Guide to observation planning with GREAT](#)", which also contains detailed information about the instrument.

HAWC+ - [on-line calculator](#), [SITE](#).

ETC: sky transmission

- For spectroscopic observations, it is critical to check the atmosphere's transmission at the *observing* wavelength.
- For EXES, FIFI-LS, and GREAT the Earth's orbital velocity may be important and is included in the time estimators.



ATRAN

<https://atran.arc.nasa.gov/cgi-bin/atran/atran.cgi>

- The atmospheric transmission as a function of wavelength may be obtained using the on-line tool [ATRAN](#) developed and kindly provided to the SOFIA program by Steve Lord: <mailto:sdlord2007@gmail.com>
- The use of ATRAN is *necessary* for planning SOFIA high-resolution spectroscopic observations.
- Also for medium resolution spectroscopy – e.g. FIFI-LS observations of [O I], the Doppler shift of atmospheric lines can have significant impacts on the sensitivity
- For spectral regions clear also from the ground (e.g. $\lambda=10-13\text{mm}$), very strong motivation must be provided for using e.g. SOFIA/EXES instead of Gemini/TEXES



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ATRAN

Input Parameters

Give the **Observatory Altitude** (in feet; < 60000 ft):

Choose the closest value of the **Observatory Latitude**:

Give the desired **Water Vapor Overburden** (in microns; 0 if unknown):

Choose the **Number of Atmospheric Layers** (usually 2):

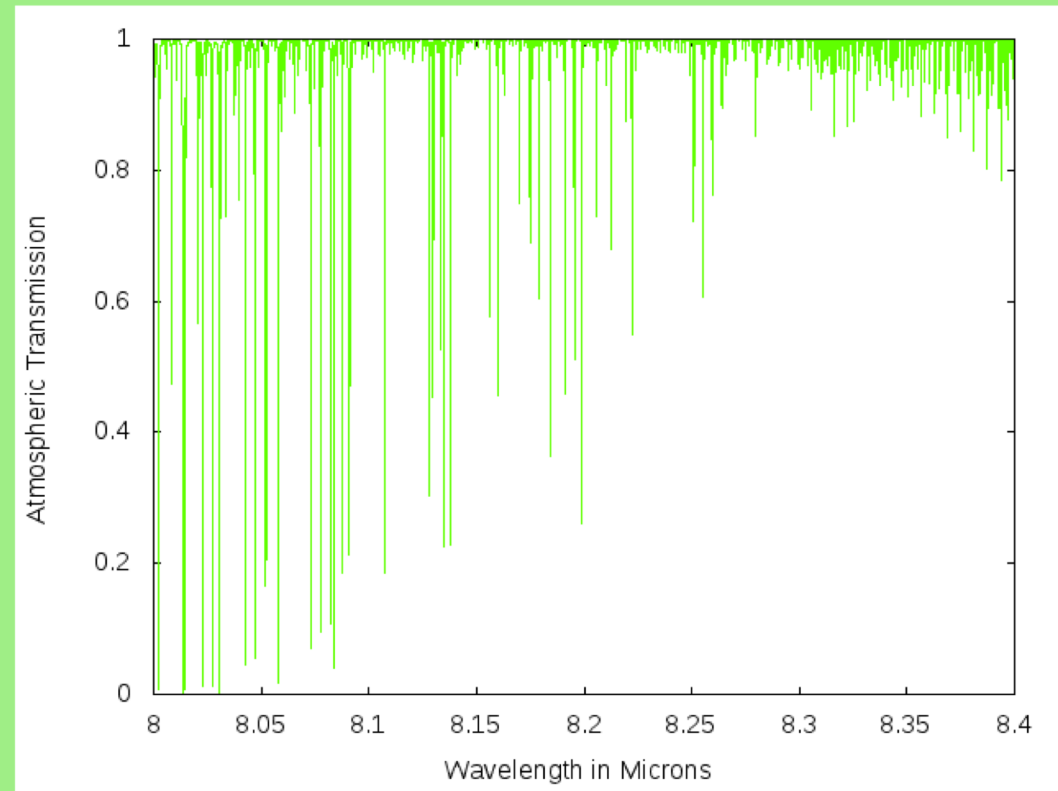
Give the **Zenith Angle** of Observations (between 0 and 90 deg):

Give the desired **Wavelength Range** (min and max in microns; min > 0.85):

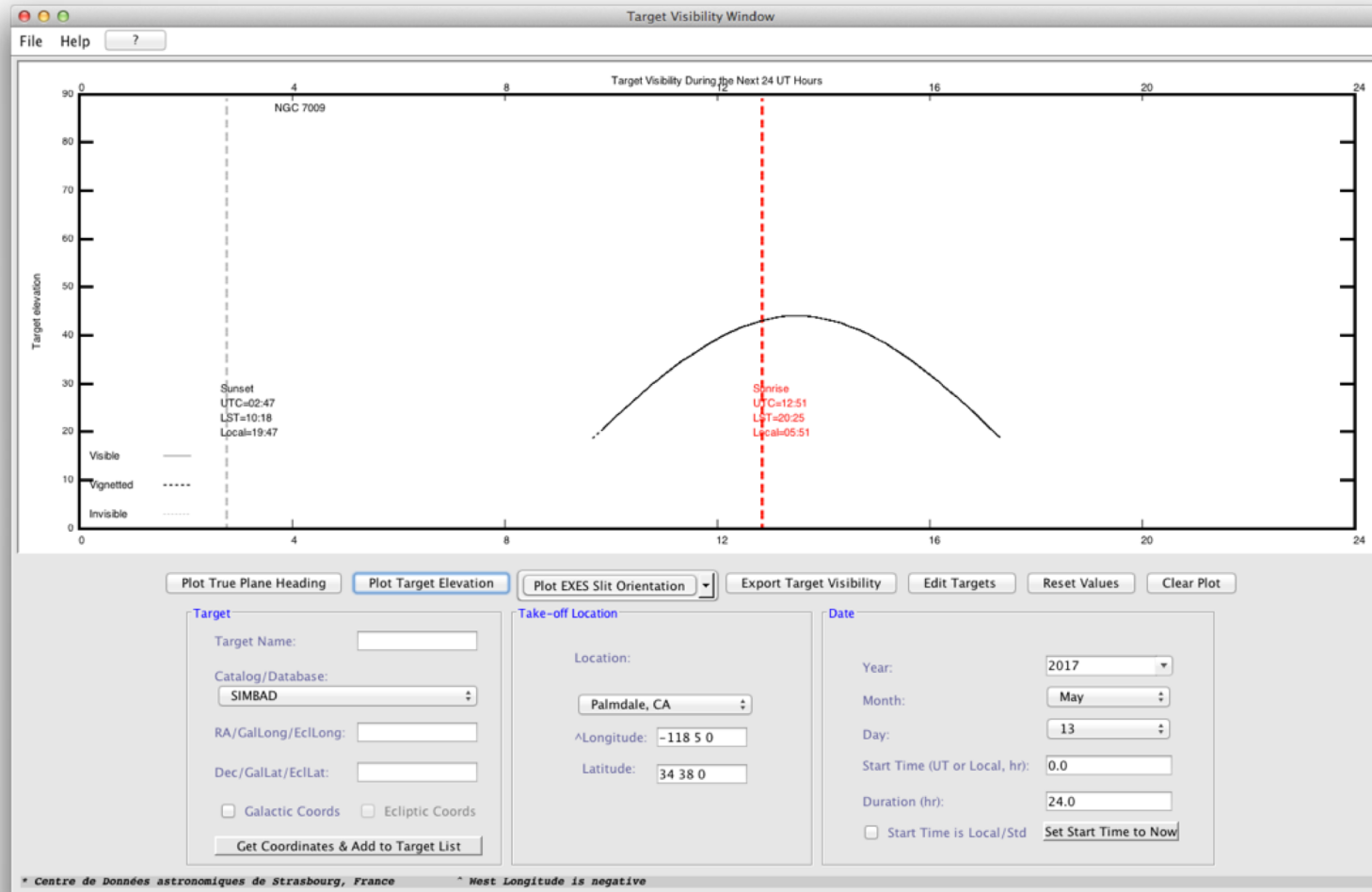
Give the **Resolution R** for Smoothing (0 = No Smoothing):

Comments for the plot :

Model of the atmosphere can be obtained by specifying the altitude, the zenith angle of observation, the water vapor burden, and the instrumental resolution.



VT (visibility tool)



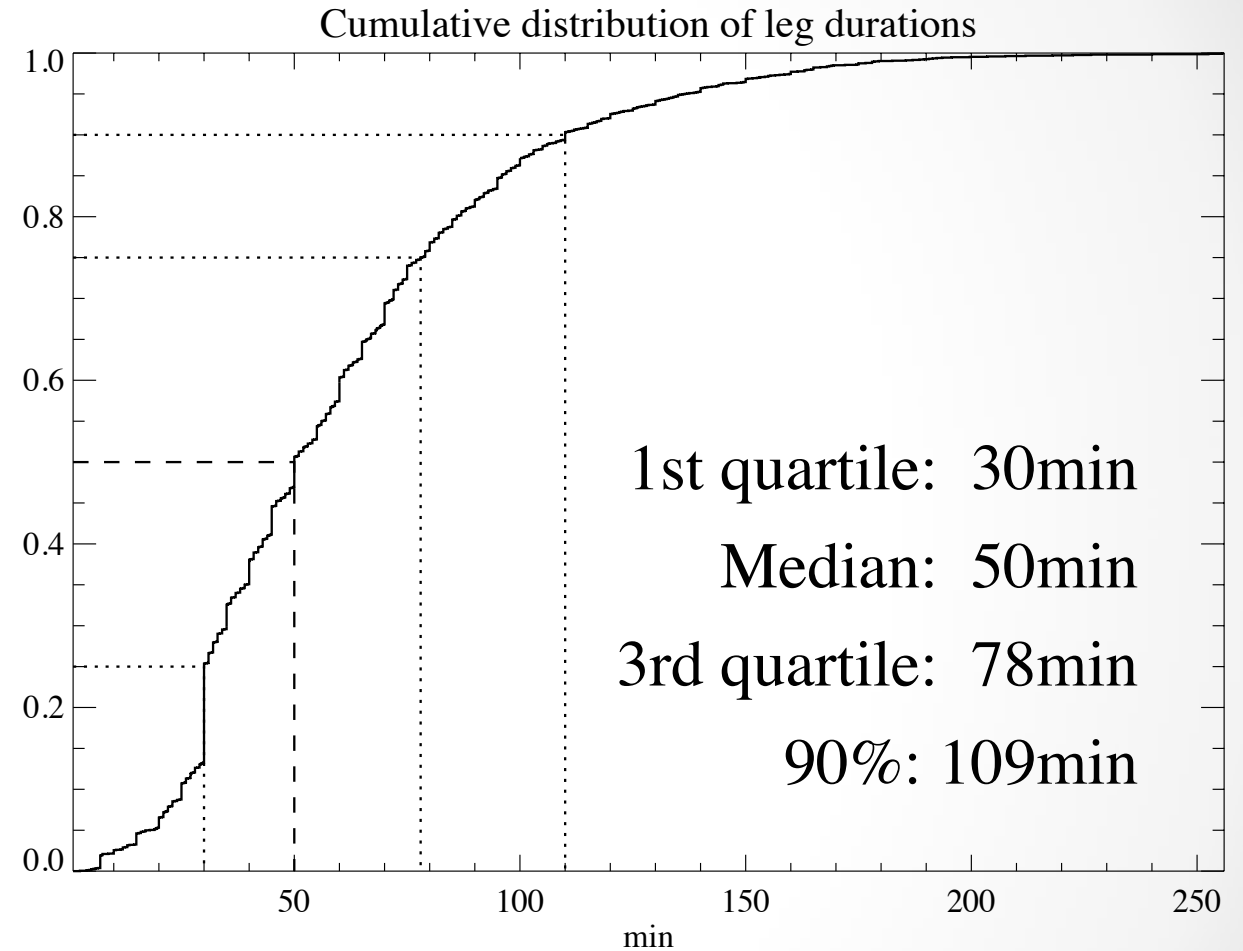
Target visibility, as well as the direction of the plane to observe the target, can be checked through the visibility tool: <https://dcs.arc.nasa.gov/observationPlanning/installVT/>

Tips & tricks: leg duration

When planning an observation it is good to know that it will be performed in legs.

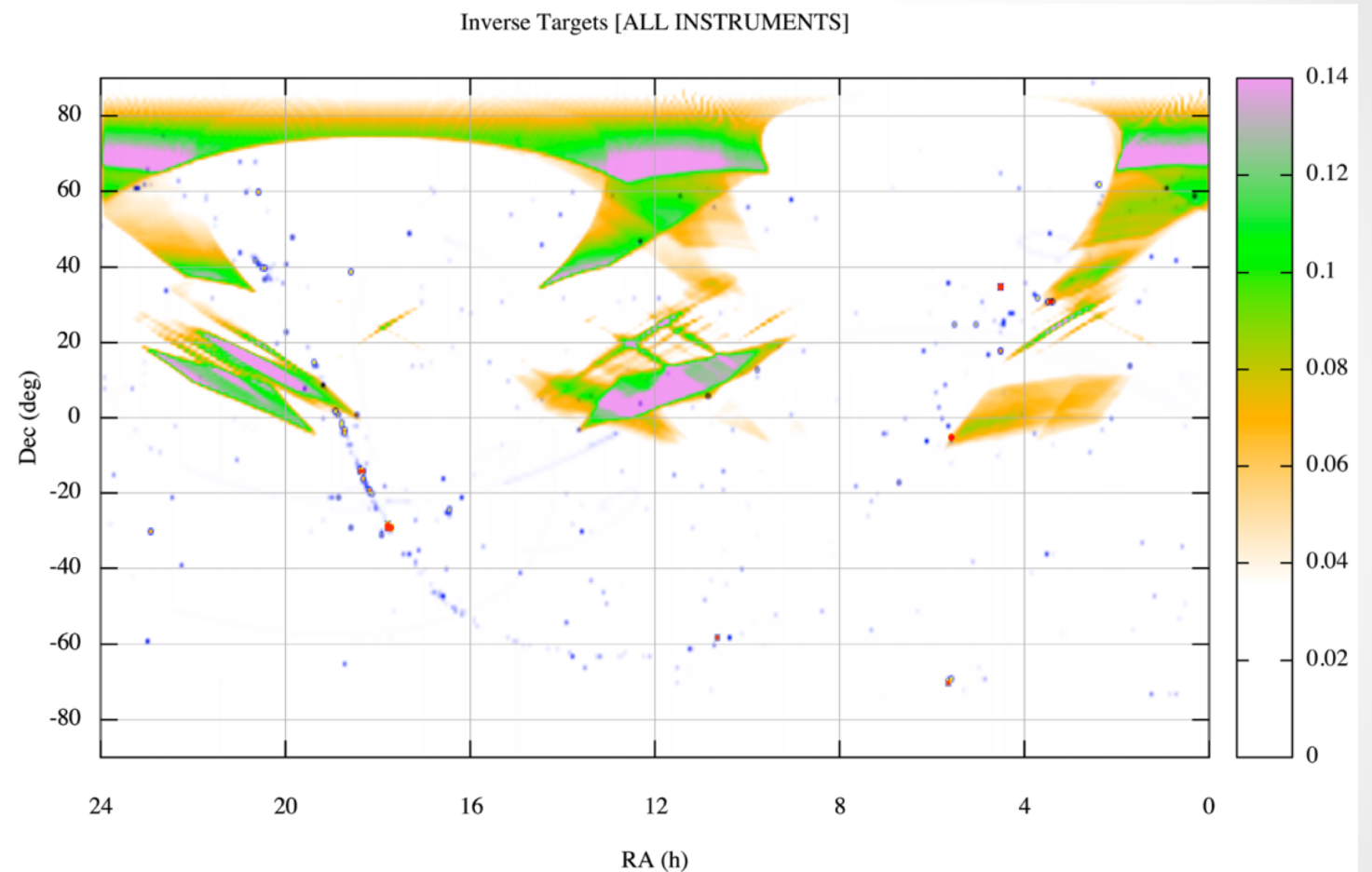
- 75% of scheduled legs are <80 min.

Requiring a very long leg complicates flight planning/scheduling and reduces the probability of the target being observed.



Tips & tricks: complementary sky positions

- Because some sky positions are more popular, there is a need for targets in **complementary positions** in order to maximize observing time during a flight.
- A map of the sky showing the most desired complementary positions is available on the SOFIA site.
- ***These targets will have a high probability of being scheduled even if graded with priority 3.***



<https://www.sofia.usra.edu/science/proposing-and-observing/proposal-calls/cycle-6/complementary-sky-positions-cycle-6>

SOSPEX - cube visualization

To display archival spectral cubes from FIFI-LS, GREAT, and PACS it is possible to use a new user-friendly Python GUI:

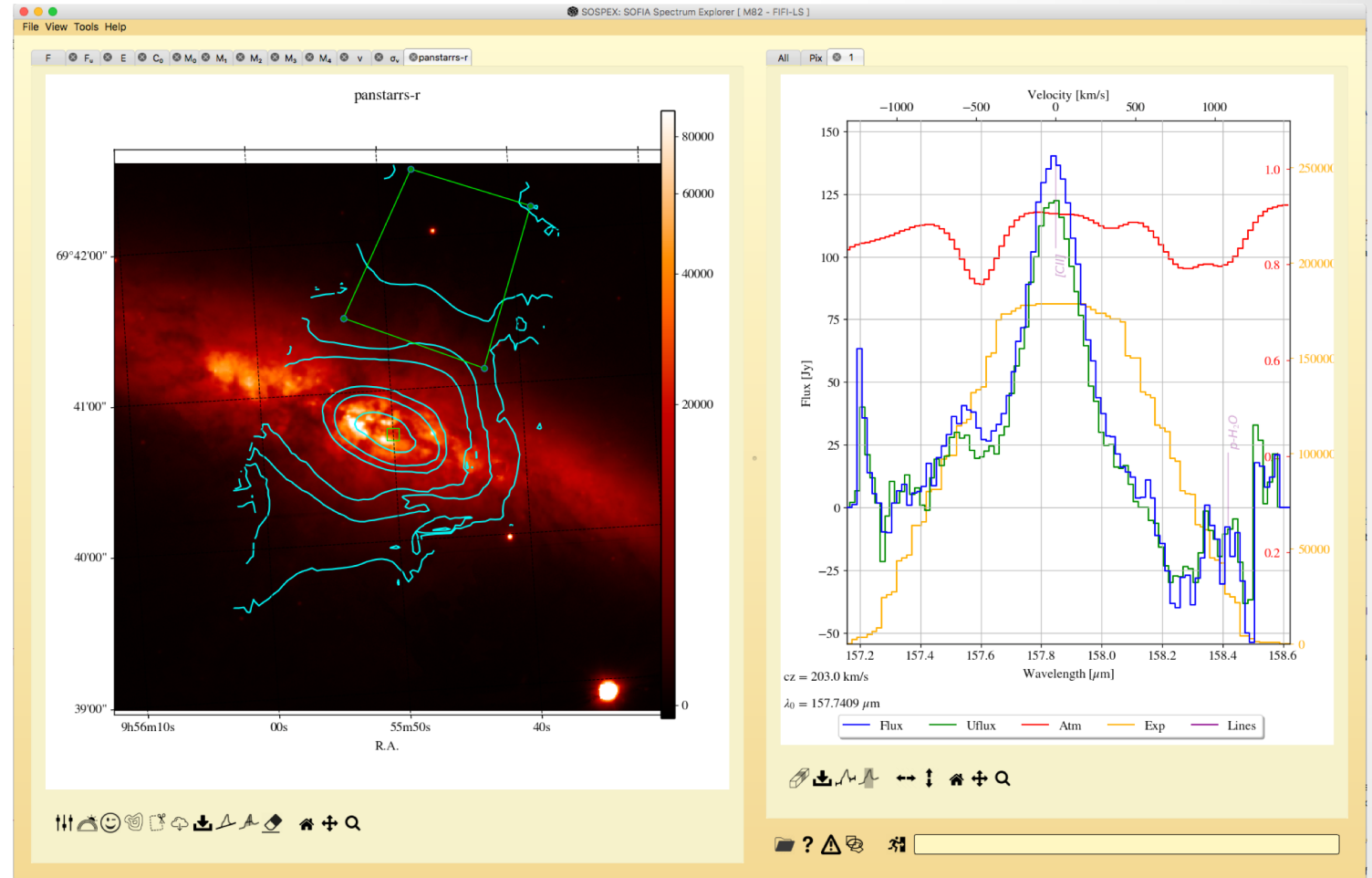
Sofia SPectral Explorer

The software can be installed via the anaconda installer:

```
conda install -c darioflute sospex
```

Capabilities:

- Navigate cube planes and spectra through tabs
- Allow cube manipulations (cut/crop)
- Compute continuum and moments across cubes
- Extract flux in custom apertures
- Export/import defined apertures
- Download images from web archives
- Overlap contours on other images



M82 outflow observed with FIFI-LS overplotted on optical image

<https://github.com/darioflute/sospex/blob/master/README.md>