

Star Catalog Version 2

User's Guide

1. What is STARCAT?

The STARCAT software is a tool used to search star catalog files. Its 2 main functions are to provide Main Catalogs and manage the User List:

Main Catalog – There are numerous standard astronomical catalog available. User can specify a search coordinates and starcat will search the indicated catalogs and list the nearby stars.

User List – User can load their object list (a text file of objects) into the user list window.

Starcat can send skew request to the TCS using these catalogs lists, and query the TCS for its position for new search coordinate. These catalog lists can be view in a variety of formats, and sorted based on different fields. Starcat calculates the observed positional information on all listed objects. Is also display a diagram of the sky showing where the stars are located related to the IRTF's view of view.

STARCAT runs on a Sun Workstation. It is a Unix/X11 application developed using the GTK+ toolkit by the NASA Infrared Telescope Facility

If you have questions or comments concerning STARCAT, you may contact the author of the software via email at denault@irtf.ifa.hawaii.edu or by calling the IRTF. The IRTF home page is <http://irtf.ifa.hawaii.edu/>.

2. Setting up your user account

Since STARCAT is an IRTF in-house software application, it is already installed on all IRTF workstations. If you wish to have this application installed on your own workstation, please see the IRTF computer staff for more information. This section will cover the startup configuration file `.starcat-init`.

When STARCAT starts up, it searches for the file `.starcat-init` in your home directory. If this file exist, STARCAT expects it to contain STARCAT commands. See the STARCAT Command Dictionary for the syntax. Using a text editor you can place instructions in this file to configure when STARCAT starts up. For example, the file may contain the following instructions to set the search radius, and load the user catalog from the user's home directory.

```
Radius 4000
Userload /home/user/userlist.txt
```

3. Starting STARCAT

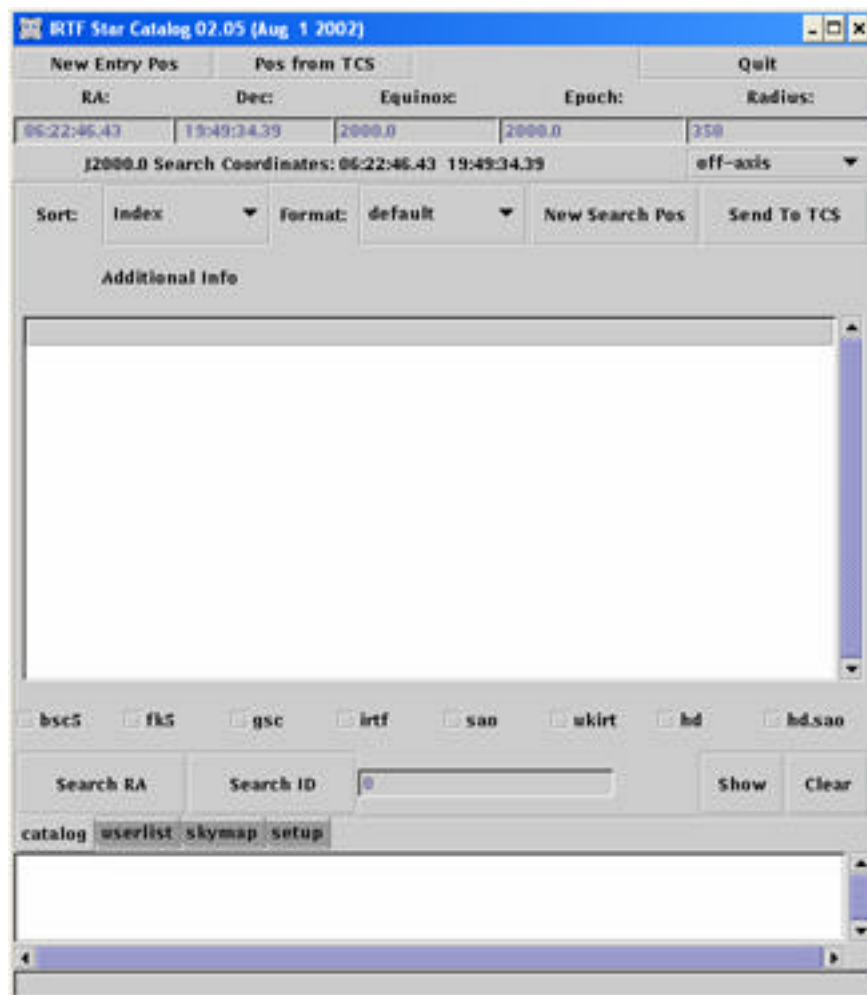
The STARCAT program is a Xwindows application. You should be running an X server on your console. Openwindows is the default X server for sun workstations. There are two methods to start STARCAT:

1. Starting STARCAT using the workspace menu. The workspace menu has been configured to include a selection to start up an instance of the STARCAT program. Press the menu (right) mouse button on the workspace to bring up the workspace menu. Then click on "Programs" with the menu button to display its submenu. Select 'STARCAT2' with the select (left) button to begin execution of the STARCAT program.

2. To start STARCAT from a xterm or shelltool window, type 'starcat2' in the window.

```
unix% starcat2 &
```

At this point the base window of the application should appear on your screen. Figure 3.1 is the base window:



4. Entering Search Coordinates

The Main function of Startcat is to search for stars using some common astronomical catalog. Before searching we must enter search coordinates. The following panel allows you to enter and view the current search parameter.

New Entry Pos		Pos from TCS		Quit	
RA:	Dec:	Equinox:	Epoch:	Radius:	
15:08:41.31	19:49:34.39	2000.0	2000.0	250	
J2000.0 Search Coordinates: 15:08:41.31 19:49:34.39					off-axis ▼

Figure 4.1 – The Search Panel

There are 3 method to entering search parameters:

1. Manually entering the position: Type in the RA, Dec, Equinox, Epoch and Radius information. Press the **New Entry Pos** button to notify starcat of your input. The J2000 Search Coordinates label should up to indicate this new position.
2. To use the current TCS position as your search position, press the **Pos From TCS** button. The J2000 Search Coordinates label should up to indicate this new position.
3. Using a position from the Catalog data. If you have catalog data loaded in the Main or User catalog list. You can highlight an entry and use that positions as your search position. After highlighting a catalog entry, the **New Search Pos** button. The J2000 Search Coordinates label should up to indicate this new position.

4.1 About the Radius Parameter

Search will look for star at the J2000.0 search coordinates. Stars within the search radius will be placed in the main catalog. The Radius has 2 widget associated with it. The text field and pull down menu.

The pull down menu has selection which determine is the radius is automatically. The options are:

Off-axis – The radius is set to the field of view of the off-axis camera (250 arcseconds).

Tip-tilt – The radius is set to the field of view of the tip-tilt camera (160 arcseconds)

Cshell – The radius is set to the field of view of the cshell guider (90 arcseconds)

None – When set to none, the radius is set to the minimum suggest value of all the selected catalogs. The minimum values are:

Bsc5	27000 arcseconds
Fk5	23117 arcseconds
gsc	540 arcseconds
irtf	16200 arcseconds
sao	3346 arcseconds
ukirt	16200 arcseconds
hd, hd.sao	2500 arcseconds

5. Searching the Main Catalogs

Clicking on the **Catalog** tab will display the Main Catalog Panel.

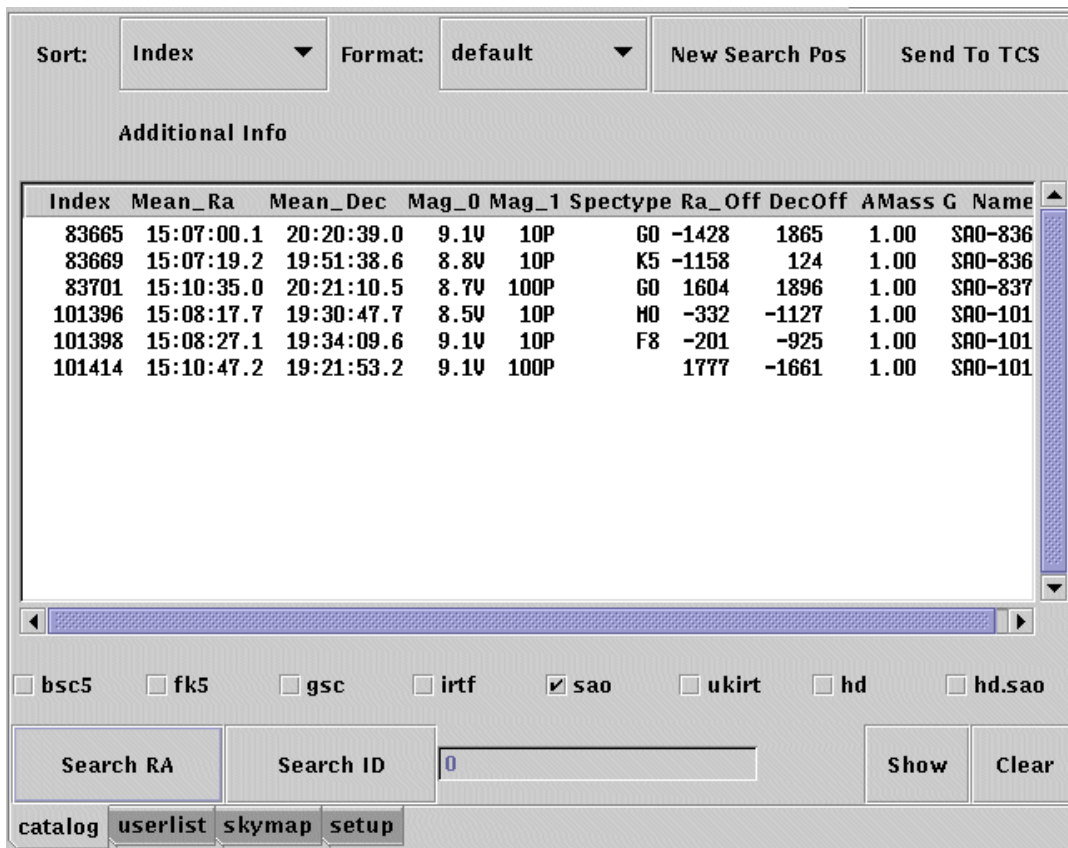


Figure 5.1 – The Catalog Panel

5.1 How to search the Main Catalogs based on a search coordinate:

1. Enter your search coordinates (see previous section [Entering Search Coordinates](#)).
2. Select the catalogs you wish to search. (ie: sao)
3. Select the **SearchRA** button.

5.2 How to search the Main Catalog based on a catalog ID or index:

1. Select the catalogs you wish to search. (ie: sao)
2. Enter the ID or index value in the text panel next to the search ID button.
3. Select the **SearchID** button

5.3 Other main catalog functions:

Sort menu – Specifies the sort field for the object list.

Format menu – Specifies the text format for the object list.

NewSearchPos button – Set the search coordinates using the highlighted object's coordinates.

SentToTCS button – Sends the highlighted object's coordinates to the TCS

Show button – prints the list to standard output.

Clear button – clears the object in the main catalog list.

6. User List

Clicking on the **Userlist** tab will display the userlist Panel.

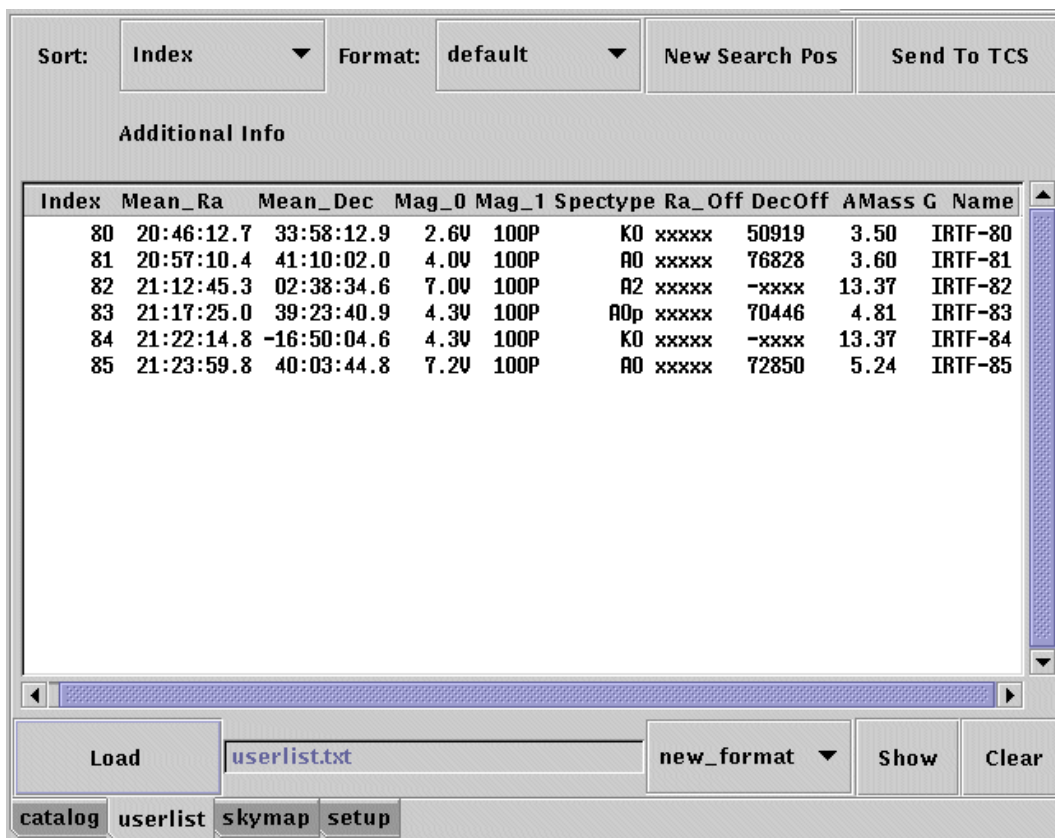


Figure 6.1 – The UserList Panel

6.1 How you load your object list:

1. Enter the name of your user list file (the example shows userlist.txt).
2. Select the format you are using on the menu next to the filename text entry.
3. Select the **Load** button.

6.2 Other User List functions:

Sort menu – Specifies the sort field for the object list.

Format menu – Specifies the text format for the object list.

NewSearchPos button – Set the search coordinates from the highlighted object's coordinates.

SentToTCS button – Sends the highlighted object's coordinates to the TCS

Show button – prints the list to standard output.

Clear button – clears the object in the main catalog list.

7. SkyMap Panel

Clicking on the **SkyMap** tab will present the skymap panel. The SkyMap displays a drawing of the main catalog stars centered on the search coordinates.

The **Data** box at the left of the coordinate system displays relevant data based on the mouse cursor position. When the mouse is moved, the offset RA and DEC of the mouse position is displayed in the **Mouse** field. If there is a star near the mouse position, information about that star is displayed in the remaining fields. Any empty fields will contain a single "-" (dash) character.

The **Legend** box at the left of the coordinate system displays the current magnitude legend. This legend can be used to visually estimate the magnitude of stars shown in the skymap. The scale may be changed using the new **MinMag** command, specifying the desired minimum magnitude. For example,

MinMag 20

would set the minimum magnitude to +20. In this case, the legend would display *20+*, *18-20*, *16-18*, *14-16*, *12-14*, and *10-12*, respectively.

If **ShowSmokey** is enabled, the **Smokey** box at the lower right will display information relevant to the x-y stage and the POM. The **XYstage** and **POM** fields display the positions of x-y stage and POM, respectively. The magenta cross initially centered in the skymap acts as a positioning guide. The value in the **dest** field represents the RA and DEC of the guide, and clicking the **XYStage.offset** button will move the XYStage to that position. If **POMSync** is enabled, the POM will synchronize itself with the XYStage when moved. Finally, the cyan box represents the current position of the x-y stage.

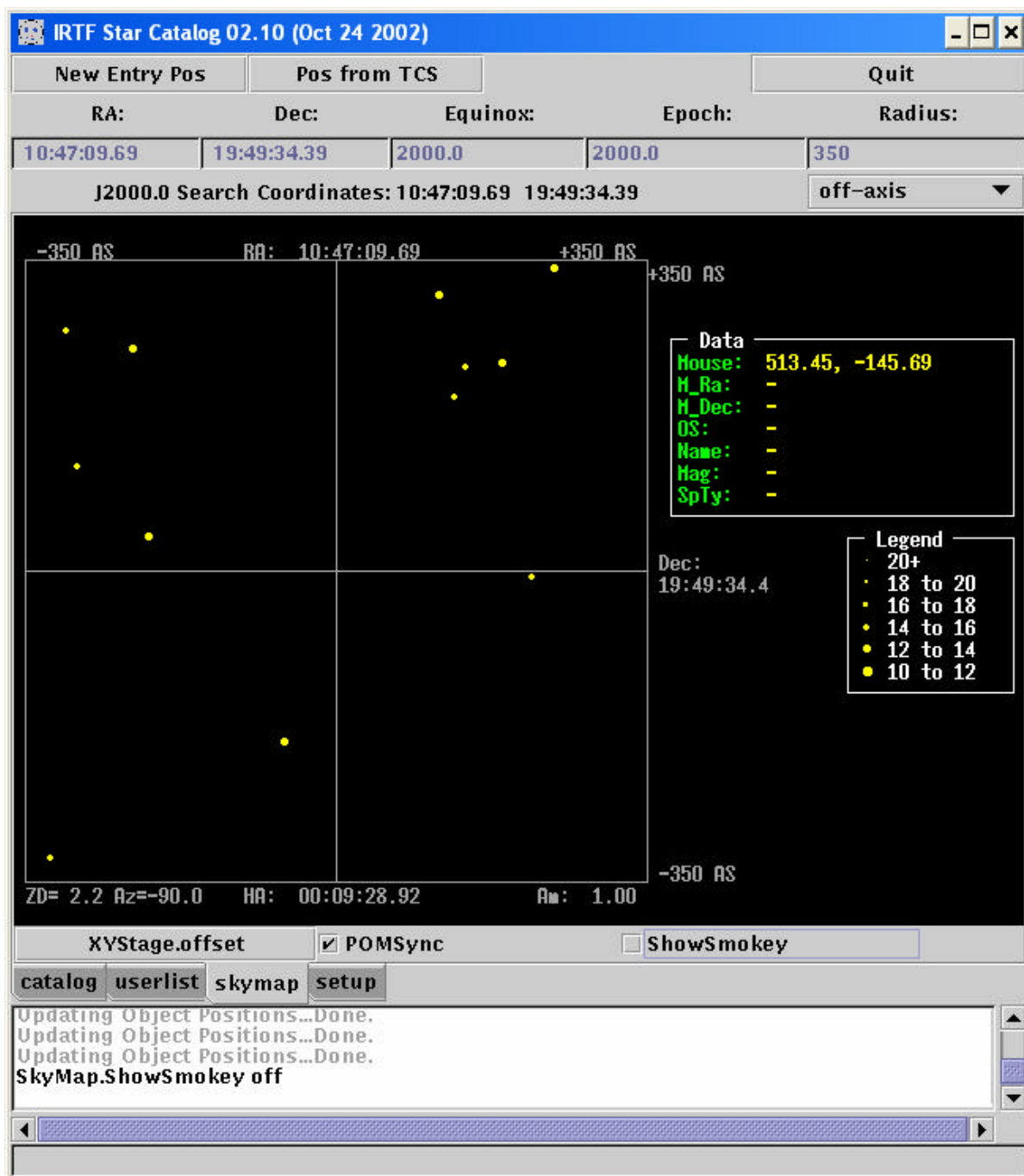


Figure 7.1 – The SkyMap Panel

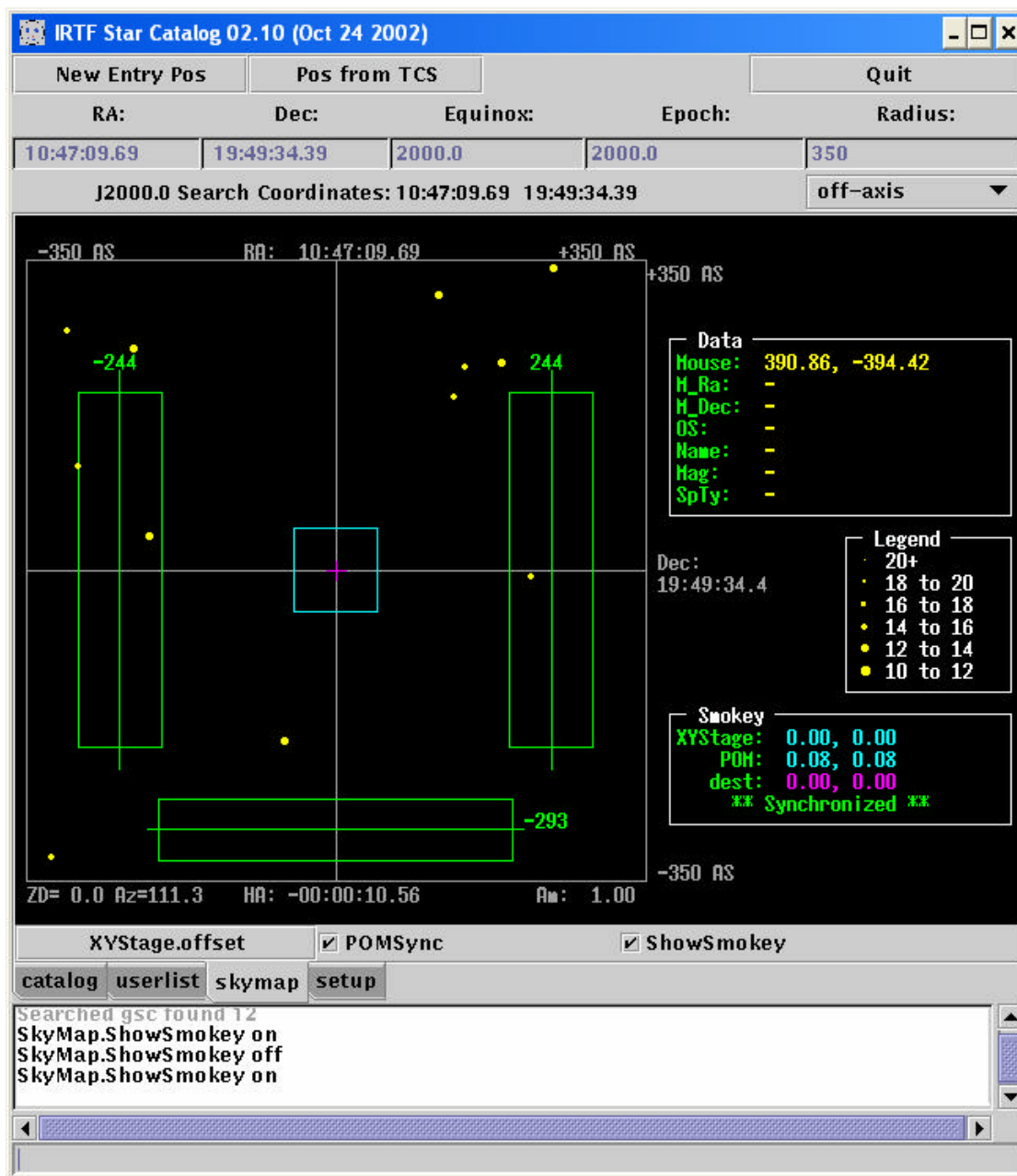


Figure 7.2: The SkyMap panel with ShowSmokey enabled.

XYStage.offset – Move the x-y stage to the destination RA and DEC.

POMSync – Toggle whether the POM should sync with the XYStage when moved.

ShowSmokey – Toggle advanced Smokey controls.

8. Setup Panel

Clicking on the **setup** tap will present the setup panel. This panel simply displays the value of some starcat parameters and variables.

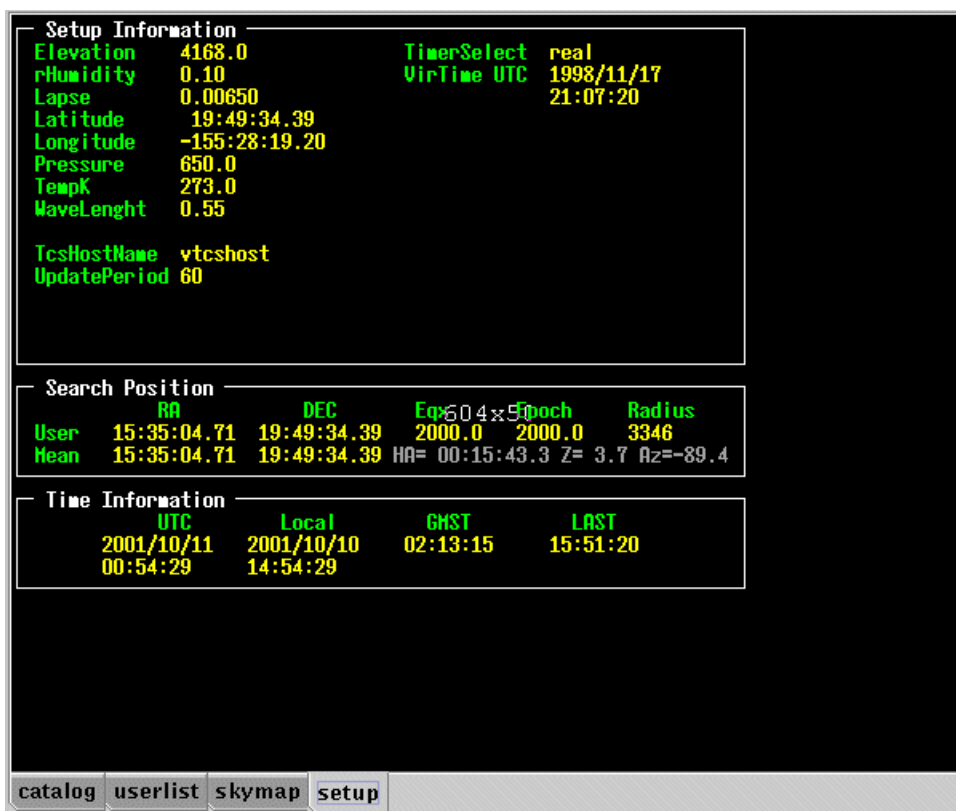


Figure 8.1 – setup panel

9. User List Text Format - The User List supports 2 text formats.

9.1 Old_Format is the text format using by previous xstarcat and starcat version 1. Each line describes an object. The column data is separated a white space (any combination of spaces and tabs).

Column	Name	Description
1	Name	Name of object (no blanks allowed)
2	Right Ascension	hh:mm:ss.ss
3	Declination	dd:mm:ss.ss
4	RA Proper Motion	s.ssss in seconds of time/year.
5	Dec Proper Motion	a.aaaa in second of arc/year
6	Magnitude	m.mmm
7	Epoch	eeee.e . Equinox of 2000.0 is assumed.

Lines beginning with '#' are comment lines.

Here is an example:

```

#name      RA          DEC          paRA  pmDec  Mag  epoch
IRTF-1    00:02:45.93  35:48:55.86  0.00  0.00  7.30 2000
IRTF-2    00:15:57.26  04:15:03.75  0.00  0.00  7.00 2000
IRTF-5    00:32:49.08  28:16:49.08  0.00  0.00  6.40 2000
IRTF-6    00:33:39.52  20:26:02.36  0.00  0.00  7.60 2000
IRTF-7    01:09:43.94  35:37:13.93  0.00  0.01  2.40 2000
    
```

9.2 New Format is the newer starcat2 format. Each line describes an object. The column data is separated a white space (any combination of spaces and tabs).

Column	Name	Description
1	Index	Numeric index of catalog
2	Name	Name as a string 11 chars (no blanks)
3	Right Ascension	hh:mm:ss.ss
4	Declination	dd:mm:ss.ss
5	Epoch/Equinox	1950.0 assumes FK4. Otherwise FK5. Default to 2000.0
6	RA Proper Motion	s.ssss in seconds of time/year. Defaults to 0.
7	Dec Proper Motion	a.aaaa in second of arc/year. Defaults to 0
8	Spectra Type	7 chars max. Defaults to 'n/a'
9,10	Mag[0] value & type	m.mmm c. Default to '0' and '-' if not given.
10,11	Mag[1] value & type	
12,13	Mag[2] value & type	
14,15	Mag[3] value & type	

Lines beginning with '#' are comment lines.

Here is an example:

```
#
#Index Name_____ _RA_____ _DEC_____ _Epoch_ RaPM DecPM __ST__ Magn_0 Magn_1 Mang_2 Mang_3
#
 1 IRTF-1      00:02:45.93 35:48:55.86 2000.0 0.00 -0.00 A0      7.30 V 99.90 P 0.00 x 0.00 x
 2 IRTF-2      00:15:57.26 04:15:03.75 2000.0 0.00 -0.02 A0      7.00 V 99.90 P 0.00 x 0.00 x
 3 IRTF-3      00:30:02.36 -03:57:26.35 2000.0 0.00 -0.01 K5      6.00 V 99.90 P 0.00 x 0.00 x
 4 IRTF-4      00:31:18.42 -43:36:24.78 2000.0 -0.00 -0.02 A2      7.50 V 99.90 P 0.00 x 0.00 x
```

10. Catalog List Format

In the Catalog and User List windows, you can specify the format of the data display. The following lists a sample of each format option.

10.1 Example of Default Format

```
Index Mean_Ra Mean_Dec Mag_0 Mag_1 Spectype Ra_Off DecOff AMass G Name
83560 14:52:07.4 20:17:24.9 6.9V 100P A0 -2975 1670 1.00 SAO-83560
83569 14:53:31.4 19:53:17.3 7.0V 100P K0 -1790 223 1.00 SAO-83569
83583 14:55:49.4 20:31:46.8 8.4V 10P G0 157 2532 1.00 SAO-83583
83592 14:56:56.0 20:33:37.1 8.9V 10P K0 1097 2643 1.00 SAO-83592
```

10.2 Example of OBS Format

```
Index Mean_Ra Mean_Dec Hour_Angle Alt Azim AirMs G AngOff Off_Ra Off_Dec
83560 14:52:07.4 20:17:24.9 00:05:31.8 89 -70.40 1.00 3408 -2975 1670
83569 14:53:31.4 19:53:17.3 00:04:07.8 89 -86.61 1.00 1804 -1790 223
83583 14:55:49.4 20:31:46.8 00:01:49.9 89 -31.62 1.00 2537 157 2532
```

83592 14:56:56.0 20:33:37.1 00:00:43.3 89 -13.08 1.00 2860 1097 2643

10.3 Example of MAG Format

Index	Mean_ra	Mean_Dec	Epoch	Mag_0	Mag_1	Mag_2	Mag_3	Spectype	Name
83560	14:52:07.4	20:17:24.9	2000	6.90V	100P	0.00-	0.00-	A0	SAO-83560
83569	14:53:31.4	19:53:17.3	2000	7.00V	100P	0.00-	0.00-	K0	SAO-83569
83583	14:55:49.4	20:31:46.8	2000	8.40V	9.50P	0.00-	0.00-	G0	SAO-83583
83592	14:56:56.0	20:33:37.1	2000	8.90V	10.00P	0.00-	0.00-	K0	SAO-83592