StarCat

IRTF Star Catalog Application

User's Guide v2302

Table of Contents

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.

Startcat can send slew request to the TCS using these catalogs lists, and query the TCS for its position for new search coordinate. These catalog lists can be viewed 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.

If you have questions or comments concerning STARCAT, you may contact the IRTF. The starcat home page is at
http://irtfweb.ifa.hawaii.edu/~tcs3/related/starcat/.

The current version of starcat is StarCat4

2. Setting up your user account

When STARCAT starts up, it read the file ~/.starcat-init in your home directory. Using a text edit, you can customized STARCAT using commands from Appendix A. 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.

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. Here an example of a .starcat-init file:

```
guider none
mainsort Ang.Offset
catalog.clear
catalog.set nomad
SkyMap.ShowSmokey on
```

3. Starting STARCAT

STARCAT is installed in all IRTF observing workstation. Type 'starcat' on your terminal start it. Many observing desktop may have a STARCAT icon for you to use.

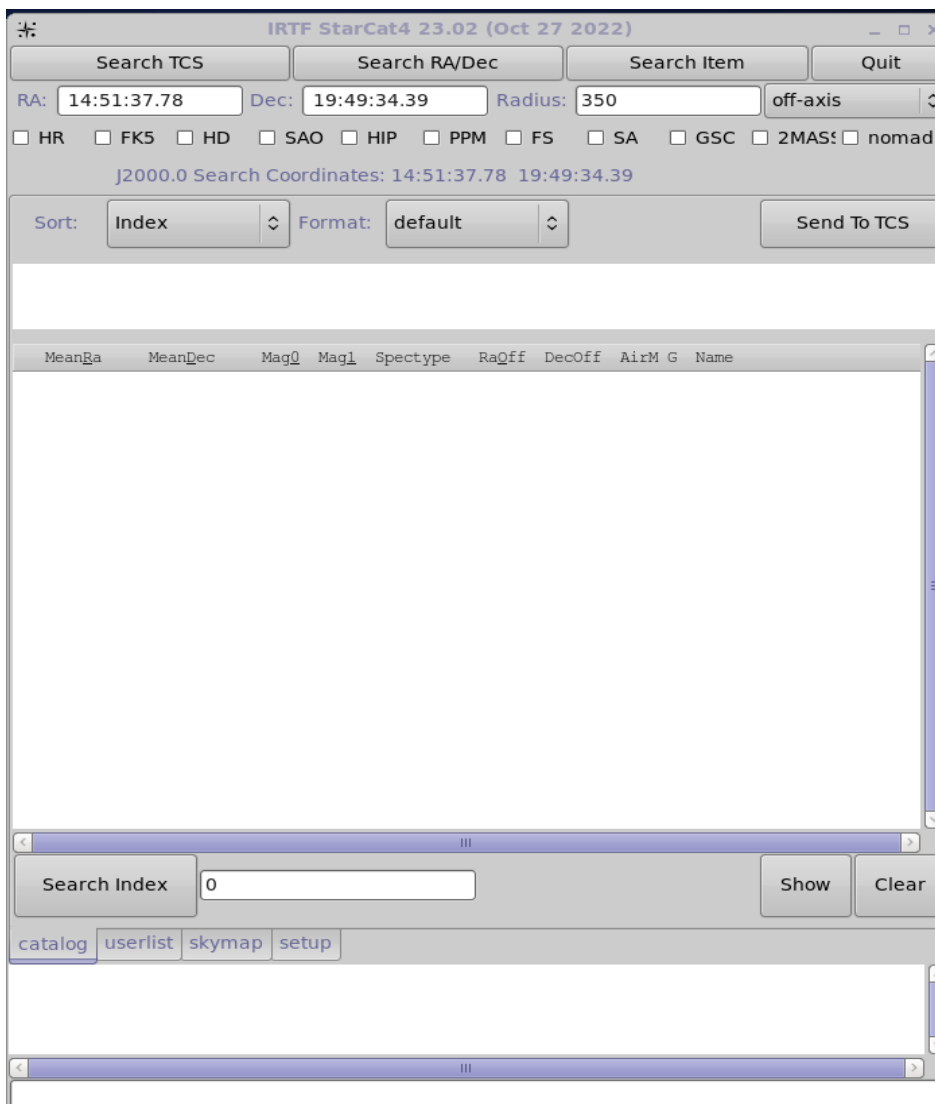When starcat stars this window should appear on your screen:

Figure 3.1 – The Base Window

4. Main Catalogs Search Options

These widgets allows you to search the Main Catalogs (HR, FK5, HD, ..) for data.

Search TCS	Search RA/Dec	Search Item	Quit

RA: 07:46:03.70   Dec: 19:49:34.39   Radius: 350   none

☐ HR   ☐ FK5   ☐ HD   ☐ SAO   ☐ HIP   ☐ PPM   ☐ FS   ☐ SA   ☐ GSC   ☐ 2MASS ☑ nomad

J2000.0 Search Coordinates: 07:46:03.70 19:49:34.39

First select the catalog you wish to search, and insure the Radius is correct. You have 3 options as indicated by the 3 search buttons:

Search TCS – Starcat will query the TCS, update the RA/DEC field with the TCS's position, and perform a search on this position.

Search RA/DEC – First enter the coordinates in the RA/DEC text fields. Press this button to search the entered RA/DEC position.

Search Item - if you have catalog data loaded in the Main or User catalog list. You can highlight an entry and use that position as your search position. After highlighting a catalog entry, click the **Search Item** button.

Below the list of star is **Search Index.**

Search Index [   ]

Enter the Numeric ID for the star to find a particular star, for example, to find SAO_45859 enter 45859. For SA stars, the enter 4 digit for each NNN-NNN part, ie SA-35-535 would be "00350535". GSC, 2MASS, and NOMAD are not supported.

4.1 About the Radius Parameter

Search will look for star at the FK5 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 (350 arcseconds).

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

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

HR	18000 arcseconds or 5 degs
FK5	36000 arcseconds or 10 degs
HD	2500 arcseconds, or 0.7 degs
SAO	3600 arcseconds, or 1 degs
HIP	7200 arcseconds, or 2 degs
PPM	7200 arcseconds, or 2 degs
FS	108000 arcseconds, or 30 degs
SA	36000 arcseconds, or 10 degs
GSC	540 arcseconds, or 0.15 degs

2MASS   900 arcseconds, or 0.25 degs
nomad   350 arcseconds (offaxis guider FOV).

5. Main Catalog Display options

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

This tab displays the search results from the main catalogs. When you select a star from the list, more detailed informtion about his object is displayed just about the list. Using you mouse you can highlight/copy information for input into other applications (ie, SIMBAD data searches).

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

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

Sent To TCS 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 User List Panel.
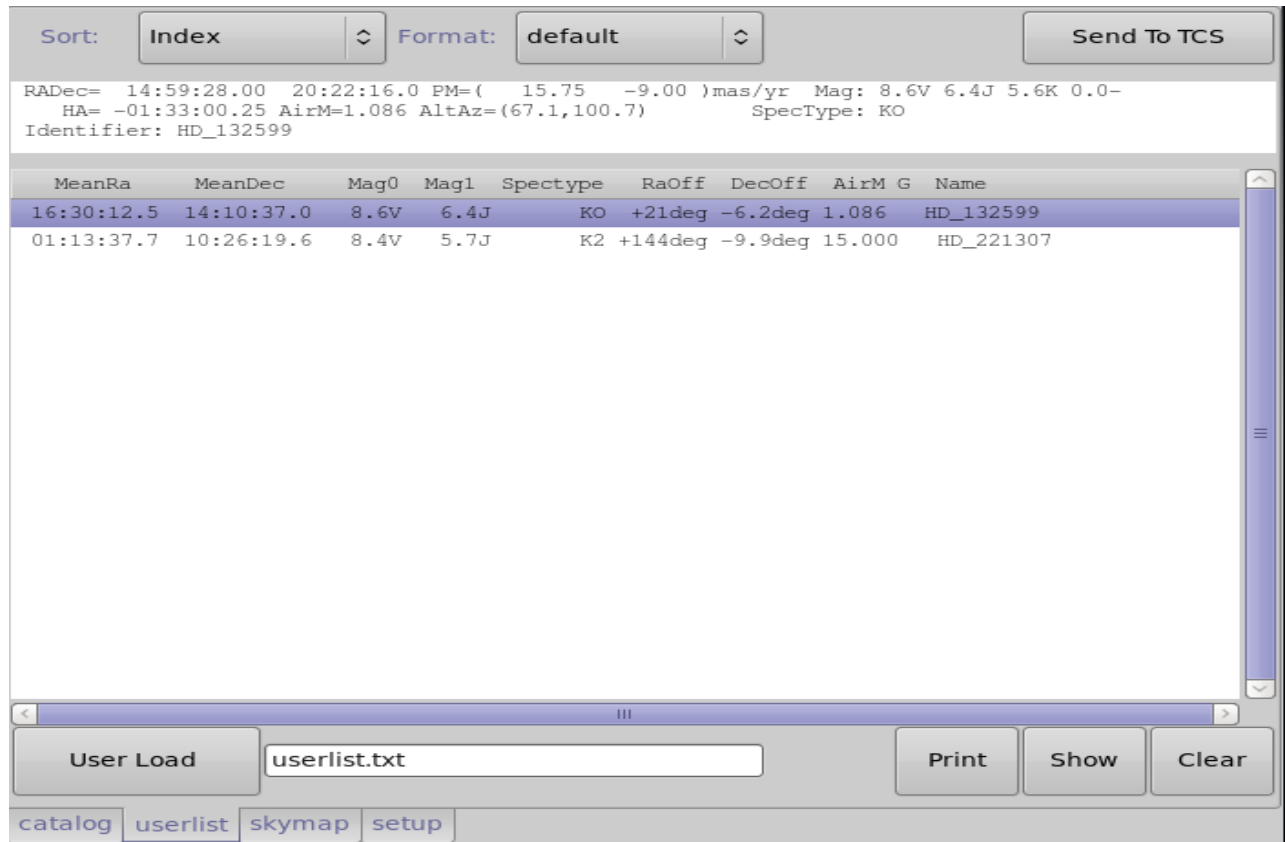
6.1 How to load your object list:

Enter the name of your user list file (the example shows userlist.txt).
Select the format you are using on the menu next to the filename text entry (new or old format).
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.
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

Skymap with ShowSmokey Off and ON

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 Star Data box on the left will display relevant data based on the mouse cursor position. When positioned on a star, details of the star is displayed.

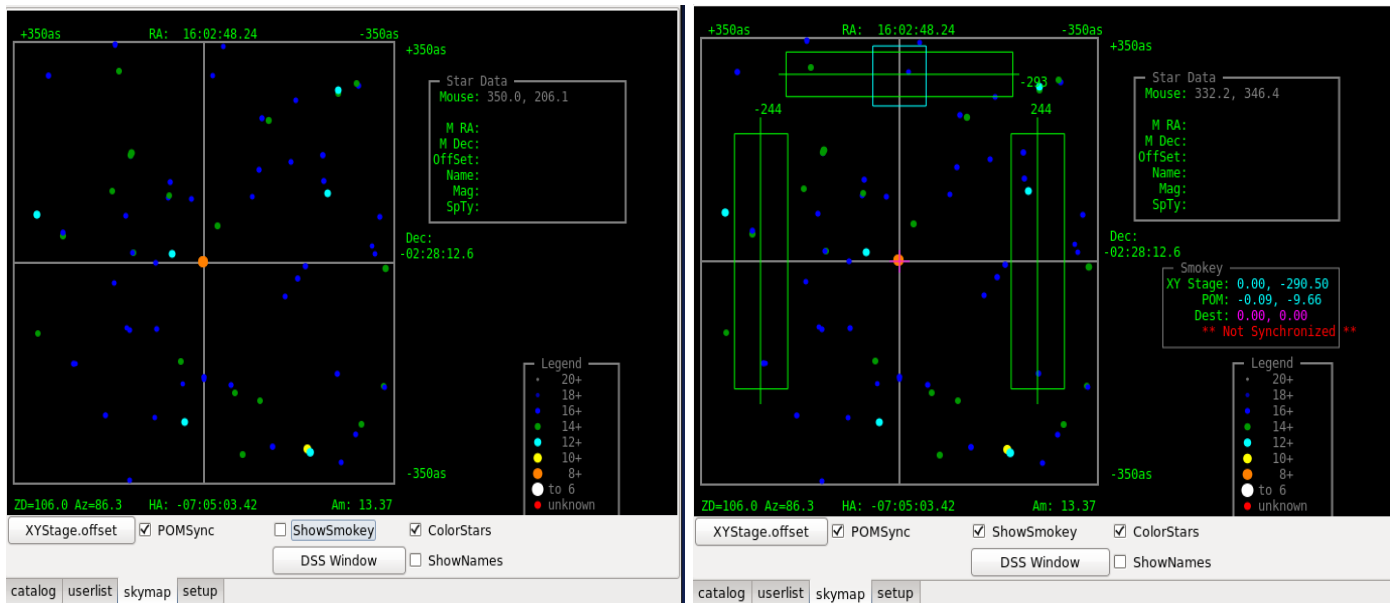The **Legend** box at the left of the coordinate system displays the current magnitude legend. This legend can be used to visually estimate the magnitude of stars shown in the skymap.

ColorsStars – this checkbox switches the legend from a grayscale to a colored scale.

ShowName – When checked, the names of the stars are display in the starmap.

DSS Window – Pressing the DSS Window button will instruct stacat to download a DSS image and display in it a dialog window. This DSS FOV is fixed at 12 arcmin, it is intended to display the star within the smokey offaxis guiding area to help the TO select an offaxis guide star. *Note: It may take from 5 to 10 seconds for the DSS window to appear or update, as the image are queried from the DSS server.*

Note: Controlling the XYStage should only be done by the Telescope Operator.

If **ShowSmokey** is enabled, the **Smokey** box (center-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 cyan box show the current located of the smokey's mirror/POM. Clicking on the mouse will move the Magenta "+". This "+" show the destination for the POM with the **XYState.offset** button is pressed.
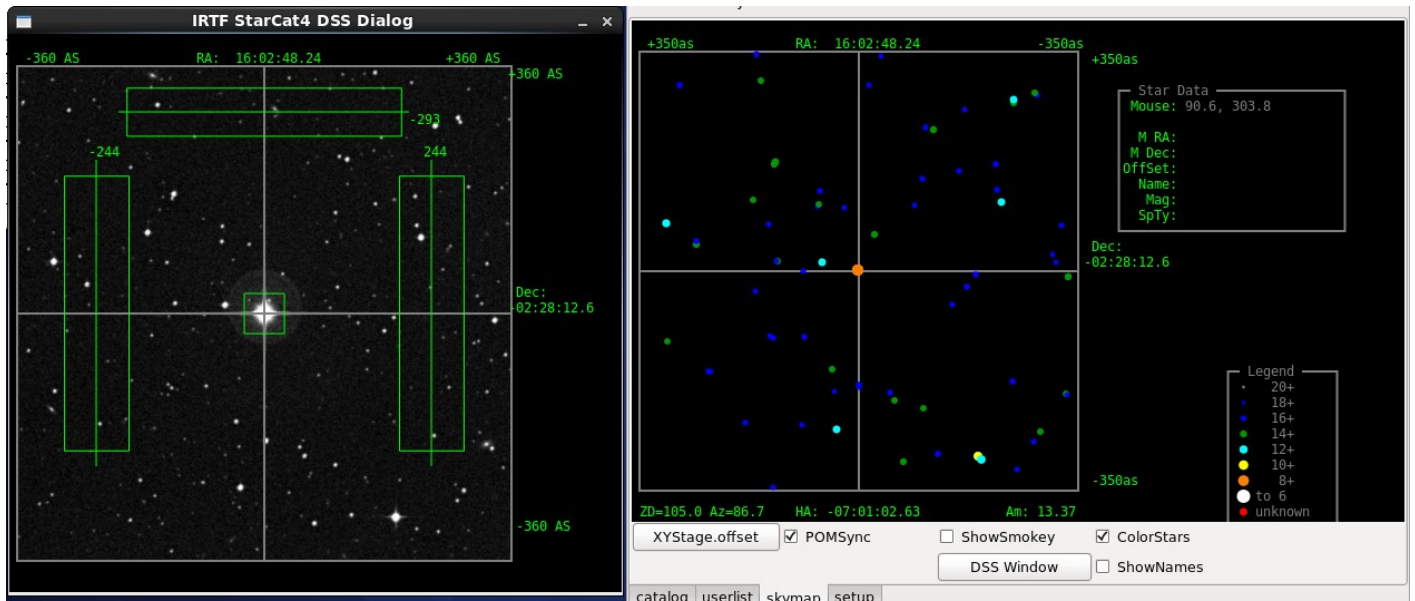
XYStage.offset – Move the x-y stage to the destination RA and DEC.

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

ShowSmokey – Toggle advanced Smokey controls.

Here is a screen shot of the SkyMap and DSS window.

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.

```
┌─ Time Information ──────────────────────────────────────────────────────────────┐
│            UTC        Local        GMST        LAST
│         22:37:48    12:37:48    19:20:42    19:20:42
│         2017/08/01  2017/08/01
├─ Search Position ──────────────────────────────────────────────────────────────┤
│             RA         DEC        Eqx       Epoch      Radius
│  User   16:02:48.24 -02:28:12.63  2000.0    2000.0      350
│  Mean   16:02:48.24 -02:28:12.63  HA=-07:00:02.4     Alt=-14.8 Az=86.7
├─ Setup Information ─────────────────────────────────────────────────────────────┤
│  Elevation    4168.0              TimerSelect  real          SkyMap.ShowSmokey off
│  rHumidity    0.10                VirTime UTC  1998/11/17    SkyMap.ShowNames   off
│  Lapse        0.00650                          21:07:20      SkyMap.ColorStars  on
│  Latitude     19:49:34.39
│  Longitude    -155:28:19.20       UpdatePeriod 60
│  Pressure     650.0               tcsHostname  t1
│  TempK        273.0
│  WaveLength   0.55
│
├─ Catalog Information ───────────────────────────────────────────────────────────┤
│  Idx Name       Radius  RA_path
│   0  HR          18000  /starcatalogs4/hr.catalog.ra
│   1  FK5         36000  /starcatalogs4/fk5.catalog.ra
│   2  HD           2500  /starcatalogs4/hd.catalog.ra
│   3  SAO          3600  /starcatalogs4/sao.catalog.ra
│   4  HIP          7200  /starcatalogs4/hip.catalog.ra
│   5  PPM          7200  /starcatalogs4/PPM.catalog.ra
│   6  FS         108000  /starcatalogs4/fs.catalog.ra
│   7  SA          36000  /starcatalogs4/sa.catalog.ra
│   8  GSC           540  /starcatalogs4/gsc.catalog.ra
│   9  2MASS         900  /starcatalogs4/2mass.catalog.ra
│  NOMAD.Mag.limit=18.0 NOMAD.root=/starcatalogs4/nomad
│
└─────────────────────────────────────────────────────────────────────────────────┘

IRTF StarCat4 Version 17.08. Compiled on Aug  1 2017. Gtk+ 2.24.23
Window: 694x504  Font: 7.0x14.0  Text: 99x36

 catalog | userlist | skymap | setup
```

9. Userlist v3

9.1 The Userlist v3 text format

The user list version 3 is the only suppoted userlist format as of the 2023A semester. Previous userlist formats known as new(v2), and old (v1) are not supported.

The userlist is a text file. Each line describes an object. The column data is sparated by white spaces (any combination of spaces and tabs). Lines beginning with '#' are comment lines.

Column	Name	Description
1	Index	Numeric index of catalog
2	Name	Name as a string , max 30 chars (no blanks)
3	Right Ascension	hh:mm:ss.ss in ICRS coordinates.
4	Declination	dd:mm:ss.ss in ICRS coordinates.
5	RA Proper Motion	s.ss in milli-arcseconds/year. Use 0.0 if not known
6	Dec Proper Motion	s.ss in milli-arcseconds/year. Use 0.0 if not known
7	Spectra Type	7 chars max. Use 'n/a' if not known
8,9	Mag[0] value & type	m.m c. Use '0.0 -' if not known.
10,11	Mag[1] value & type	
12,13	Mag[2] value & type	
14,15	Mag[3] value & type	

Here is an example:

```
#
#Index _____Name_____    __ICRS_RA__ _ICRS_DEC__   RA_PM  Dec_PM   __ST___  Magn_0  Magn_1  Mang_2  Mang_3
#    30 chars max,no spaces   hh:mm:ss.ss +dd:mm:ss.s   mas/y   mas/y  (7chars) xx.x V  xx.x C  xx.x C  xx.x C
1     HD_132599               14:59:28.00  20:22:16.0   15.75   -9.00     K0     8.6 V   6.4 J   5.6 K
2     HD_221307               23:31:01.82 -00:35:45.6   13.05   -5.80     K2     8.4 V   5.7 J   4.7 K
```

9.2 The Userlist FAQ

How do I convert the 'new' format to this v3?
- Only convert object with epoch=2000 (FK5). Object with epoch of 1950 (FK4) should be updated with IRCS coordinates, or removed.
- Column 5, Epoch, can be removed. The v3 format use ICRS coordinates, so the epoch field is not needed.
- Proper motion values should be conveted to mas/yr.
  - To conver RA seconds /year to mas/yr: multiply by 15000. IE: 0.00105 * 15000 = 15.75
  - To convert Dec arcseconds/year to mas/yr: multiply by 1000. IE: -0.009 * 1000 = -9.00

Here is an example line of the new format (top), and the v3 format

New format:
```
#Index Name_____  ____RA_____ ____DEC____  _Epoch_ RaPM    DecPM   __ST__ Magn_0  Magn_1  Mang_2   Mang_3
1      HD_132599     14:59:28.00 20:22:16.0   2000.0  0.00105 -0.009  K0      8.6 V   6.4 J   5.6 K
```

V3 Fomat:

```
#Index _____Name_____  __ICRS_RA__  _ICRS_DEC__  RA_PM  Dec_PM  __ST___  Magn_0  Magn_1  Mang_2  Mang_3
#       30 chars max,no spaces  hh:mm:ss.ss +dd:mm:ss.s  mas/y   mas/y  (7chars) xx.x V  xx.x C  xx.x C  xx.x C
1       HD_132599             14:59:28.00  20:22:16.0   15.75   -9.00     K0     8.6 V   6.4 J   5.6 K
```

What if I still have my 'new' format when I started observing?

The new format can still be read into starcat, but you have to enter this command on the command widget. Type:

```
userload.v2 userlist.txt
```

You shoud use the 'Print' button to display your list in the v3 format to stdout (terminal window). This way you will have a copy in the new format going forward. Starcat only prints FK5 objects. The userload.v2 command will be removed in future version of starcat.

Appendix A – Dictionary of Commands

This section describes the command set for STARCAT. Command can be type into the command widget (located on the bottom of the main GUI).

For the syntax, the following conventions are used:

`Normal Courier` fonts must be typed as showed.

`Italic Courier` fonts represent choices or values to be determined by the user.

These are further explained under the Range. Some examples:

`{off|on}` – represent a list of choice. You must select one.

`[value]` – the *`[]`* represent an optional parameter.

azel – Issues a LOAD RA,DEC command using observed Az El values.

Syntax	`azel` *`Az El`*
Range	*`Az – Azimuth, in degrees (N=0, E=90, S=180, w=270).`*
	`El – Elevation in degrees (0 to 90).`
Example	`AzEl 180 85.5`

Catalog.clear – Untoggles any catalog selection.

Syntax	`Catalog.Clear`
Example	`Catalog.Clear`

Catalog.set – Sets the toggle for a catalog by name.

Syntax	`Catalog.set` *`catalog_name`*
Range	*`catalog_name – can be {bsc5, fk5, gsc, irtf, sao, ukirt, hd.sao }.`*
Example	`Catalog.set fk5`

CatFile.Inx.Path

CatFile.Name

CatFile.Ra.Path

CatFile.Radius – A set of properties are associated with each catalog: Name, Default Radius, and file paths to its RA and Index sorted files. These 4 commands allow you to set these properties.

Syntax	`catfile.name` *`index name`*
	`Catfile.radius` *`index radius`*
	`Catfile.inx.path` *`index inx_file_path`*
	`Catfile.ra.path` *`index ra_file_path`*
Range	index – 0-7 (8 main catalog are supported)
	Name – name of catalog (any string).
	Radius - in arcseconds (1 to 200000)
	Inx_file_path – full pathname of index sorted catalog.
	Ra_file_path – full path name of RA sorted catalog

Example   `Catfile.name 0 bsc5`

            `Catfile.radius 0 27000`

            `Catfile.inx.path 0 /starcatalogs2/bsc5.catalog.inx`

            `Catfile.ra.path 0 /starcatalogs2/bsc5.catalog.ra`

Catalog.show – Print the catfile variable to stdout.

   Syntax   `Catalog.show`

Example   `Catalog.show`

DSS – The DSS command invokes the download and display of the Digital Sky Survey image, and update the DSS window.

   Syntax   `DSS`

Example   `DSS`

Echo – Prints the parameter string to the text feedback window.

   Syntax   `Echo` *string*

   Range   *string – Any message.*

Example   `Echo Hello, can you see this message?`

Elevation – Specifies the elevation in meters above sea level of the telescope. Used to calculate airmass and observed parameters.

Syntax   `Elevation` *meters*

   Range   Meters – the elevation in meters.

Example   `elevation 4168`

Guider – Tells starcat what guider is used. The guider affects the default search radius.

   Syntax   `Guider {off-axis | tip-tilt | cshell | none}`

   Range   off-axis – The default range is 250.

            Tip-tilt – The default range is 160.

            cshell – The default range is 90.

            none – The default radius is based on the catalog selection for searching.

Example   `guider off-axis`

HaDec – Issues a LOAD RA,DEC command using observed Ha Dec values.

   Syntax   `HaDec` *Ha Dec*

   Range   *HA – Hour Angle (units of time)*

            Dec – Declination in degrees.

Example   `HaDec -1:00 19:50`

Lapse – Given in Kelvin per minute. Used to calculate airmass and observed parameters.

Syntax   `Lapse` *rate*

     RangeRate – rate in Kelvin/minute.

Example   `lapse 0.0065`

Latitude – Specifies the latitude of the telescope. Used to calculate airmass and observed parameters.

   Syntax   `Latitude deg:min:sec {N | S}`

   Range   Deg:Min:Sec – must be 90 degrees or less north or south of the equator.

 Example   `latitude 19:49:34.39 N`

Load – Specifies the parameters for the search position.

   Syntax   `Load ra dec [eqx] [epoch] [pm_ra] [pm_dec]`

   Range   `ra – Right Ascension (Time format)`

               `Dec – Declination (degrees)`

               `Eqx – equinox. Default is 2000`
                   Epoch – Epoch. Default is equinox value.

               `Rapm – RA proper motion. Default is 0.`

               `Decpm – Dec proper motion. Default is 0.`

 Example   `Load 20:34:23.4 19:49:34.39`

Longitude – Specifies the longitude of the telescope. Used to calculate airmass and observed parameters.

   Syntax   `Longitude deg:min:sec {E | W}`
                RangeDeg:Min:Sec – must be 180 degrees or less east or west of Greenwich.

 Example   `longitude 155:28:19.20 w`

LTOffset – Specifies the universal time to local time offset in minutes. Used to calculate airmass and observed parameters.

   Syntax   `LTOffset value`
                RangeValue – offset in minutes (-720 to 720).

 Example   `ltoffset –600`

MainClear – Clears the Main catalog list from the main catalog display area.

   Syntax   `MainClear`

MainFormat – Specifies the data format for the main catalog.

   Syntax   `MainFormat { Default | Obs | Mag }`

   Range   Default – The default data format

               Obs – Data format highlighting observed position information.

               Mag – Data format highlighting magnitude information.

 Example   `MainFormat Obs`

MainSearchID – Searches the selected MainCatalogs for matching index or catalog ID. Matching records are loaded into the Main Catalog List.

               Syntax`MainSearchID ID`

               RangeID – Numeric ID value to search for.

               ExampleMainSearchID 100334

MainSearchRA – Searches the selected MainCatalogs using the search parameter (mean J2000 ra, dec, and radius). Matching records are loaded into the Main Catalog List.

       Syntax `MainSearchRA`

       Example MainSearchRA

MainSentToTCS – Issues a C.SLEW command to the TCS using the coordinates from the selected entry in the Main Catalog.

  Syntax   `MainSentToTCS`

Example   `MainSentToTCS`

MainShow – Prints the main catalog to stdout (the terminal window).

  Syntax   `MainShow`

Example   `MainShow`

MainSort – Indicated the sort field for the MainCatalog.

  Syntax   `MainSort` *{ Index | RA | Dec | Mag | Ang.Offset | RA.Offset | Dec.Offset | Airmass | Name | HA | Alt | Azi }*

Example   `MainSort RA`

NewEntryPos – Does a new catalog search using the coordinates in RA,DEC entry field, ie "Search RA/Dec" button.

  Syntax   `NewEntryPos`

Example   `NewEntryPos`

NewItemPos – Does a new catalog search using the coordinates of the highlighted object in the catalog, ie "Search Item" button.

  Syntax   `NewItemPos`

Example   `NewItemPos`

Nomag.mag.limit – Set the faint magnitude limit for the nomad catalog searches.

  Syntax   `NOMAD.Mag.Limit mag`

  Range   `mag – the faint magnitude limit. Range is 0 to 29.`

Example   `NOMAD.Mag.Limit 18.5`

Nomag.mag.root – Tell starcat where the NOMAD catalog files are.

  Syntax   `NOMAD.Mag.Root dir`

  Range   `dir – the directory with the NOMAD files are located.`

Example   `NOMAD.Mag.Root /starcatalog3/nomad`

OutTab – Select the (output) tab for the display window.

  Syntax   `OutTab` { *catalog* | *userlist* | *skymap* | *setup* }

  Range   *{catalog | userlist | skymap | setup }*

Example   `OutTab catalog`

POM.getOffset – Retrieves the POM offset by querying smokey.

Syntax   P*OM.getoffset*}

Example   POM.getOffset

POM.Sync – Toggle whether the POM should synchronize its position with that of the x-y stage. The synchronization occurs only after using **XYStage.offset**.

Syntax   POM.Sync {*on* | *off*}

Range   *{on|off}*

Example   POM.Sync on

PosFromTCS – Loads a new search position by querying the TCS for its position..

Syntax   PosFromTCS

Example   PosFromTCS

Pressure – Specifies the atmospheric pressure at the telescope. Used to calculate airmass and observed parameters

Syntax   Pressure *value*
               RangeValue – pressure in mBars (200 to 2000).

Example   pressure 650

Quit – Exits the STARCAT program.

Syntax   Quit

Radius – Sets the search box size. The number given is the "radius" of the box.

Syntax   Radius *value*
               Range   Value – radius in arcseconds.

Example   radius 400

RHumidity – Specifies the relative humidity at the telescope. Used to calculate airmass and observed parameters.

Syntax   RHumidity *value*
               Range   Value – relative humidity (0.0 to 1.0).

Example   rhumidity 0.10

SkyMap.ColorStars – If ON uses color for display skymap stars, else a gray scale is used.

Syntax   SkyMap.ColorStars *{ off | on }*

Range   off – Use gray scale.

          On – Use color scale.

Example   SkyMap.ColorStars on

SkyMap.showNames – Indicate if the star name are displayed on the map.

Syntax   SkyMap.showNames *{ off | on }*

Range   off – Do not display names.

          On – Display the names.

Example   SkyMap.showNames on

SkyMap.showSmokey – Indicate if the skmap show the guide area for smokey.

   Syntax   `SkyMap.showSmokey` *{ off | on }*

   Range   `off – Do not display the guider guide area.`

           `On – Show the guide are as green boxes.`

 Example   `SkyMap.showSmokey on`

TCS – Sends a command to the TCS.

   Syntax   `TCS` *command*

         Range   Command – the TCS command to be sent.

 Example   `tcs 0:00:00 0:00:0 0.0000 0.000 2000.0 C.SLEW`

TCSHostname – Identifies the host used to handle communications to the TCS.

   Syntax   `TCSHostname` *host*

   Range   Enter a valid hostname

 Example   `tcshostname vtcshost`

TempK – Specifies the temperature at the telescope in Kelvin. Used to calculate airmass and observed parameters.

   Syntax   `TempK` *value*

         Range   Value – temperature in Kelvin (100 to 350).

 Example   `tempk 273.0`

UpdatePeriod– Indicate the period when the catalog observed positions are updated (using the UpdatePosition command).

   Syntax   `UpdatePeriod` *sec*

   Range   `sec – Update period in seconds.`

UpdatePosition – The command updates all positional information. (Automatically executed by starcat every UpdatePeriod).

   Syntax   `UpdatePosition`

 Example   `UpdatePosition`

UpdateTime – Updates the time information. This command is automatically execute every second by the starcat application.

   Syntax   `UpdateTime`

 Example   `UpdateTime`

UserClear – Clears the user's catalog list from the user catalog display area.

   Syntax   `UserClear`

UserFormat – Specifies the data format for the user list.

   Syntax   `UserFormat` *{ Default | Obs | Mag }*

   Range   Default – The default data format

            Obs – Data format highlighting observed position information.

            Mag – Data format highlighting magnitude information.

 Example   `UserFormat Obs`

UserLoad – Loads the user's catalog file into the user catalog display area. On the supportted userlist v3 format is supported.

    Range   Filename – the user's catalog list file.

    Syntax   `UserLoad filename`

    Range   Filename – The userlist catalog's filename.

    Example   `UserLoad Userlist.txt`

        Older formatted can still be loading using these commands:
        `UserLoad.v2 filename` – loads the "New" or v2 format, depreciated in 2023A.
        `UserLoad.v1 filename` – loads the "Old" or v1 format, depreciated in 2023A

UserPrint – Prints the user catalog in the v3 format to stdout (the terminal window).

    Syntax   `UserPrint`

    Example   `UserPrint`

UserSentToTCS – Issues a C.SLEW command to the TCS using the coordinates from the selected entry in the UserCatalog.

    Syntax   `UserSentToTCS`

    Example   `UserSentToTCS`

UserShow – Prints the user catalog to stdout (the terminal window) as displayed in the user list area

    Syntax   `UserShow`

    Example   `UserShow`

UserSort – Indicated the sort field for the UserCatalog.

    Syntax   `UserSort { Index | RA | Dec | Mag | Ang.Offset | RA.Offset | Dec.Offset | Airmass | Name | HA | Alt | Azi }`

    Example   `UserSort RA`

Wavelength – Specifies the observed wavelength in microns. Used to calculate airmass and observed parameters.

    Prompt   'Wavelength' text box on the Setup Options Page.
                RangeValue – wavelength in microns (0.1 to 50.0).

    Syntax   `Wavelength value`

    Example   `wavelength 0.550`

XYStage.GetOffset – Retrieves the XY Stage position from smokey.

    Syntax   `XYStage.GetOffset`

    Example   `XYStage.GetOffset`

XYStage.Offset – Move the x-y stage to the specified RA, DEC position.

    Syntax   `XYStage.Offset ra dec`

    Range

    Example   `XYStage.Offset 64.0 32.25`

Appendix B – Depreciated UserList Formats

As of the 2023A (Feb 2023) the format known are 'old' and 'new' are no longer supported. Observers should used the v3 userlist format. The old format is documented here for historical purposes.

9.1 New_Format – Starcat2 to Starcat4 v2109.

This is the text file format for importing user's list. 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 , max 30 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.
11,12	Mag[1] value & type	
13,14	Mag[2] value & type	
15,16	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
```

9.2 Old_Format

This older 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
```