

# **T3Remote**

The Remote GUI for TCS3

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## 1. Introduction

T3Remote is a mini-gui for the tcs3. It is intended to be used by observers and the Telescope Operator. It is installed and runs on the IRTF workstation. Multiple copies can be running by various number of users.

To start t3remote, type “t3remote” on you console terminal. The GUI should appear.

Usage: t3remote [-d] [-h hostname]

- d Turn on the debug flag.
- h hostname Sets the tcs3 computer’s hostname
- m Use Medium size font for status. Hides the Main Tabs window.
- l Use Large size font for status. Hides the Main Tabs window.
- t Tabs only. The status display is hidden.

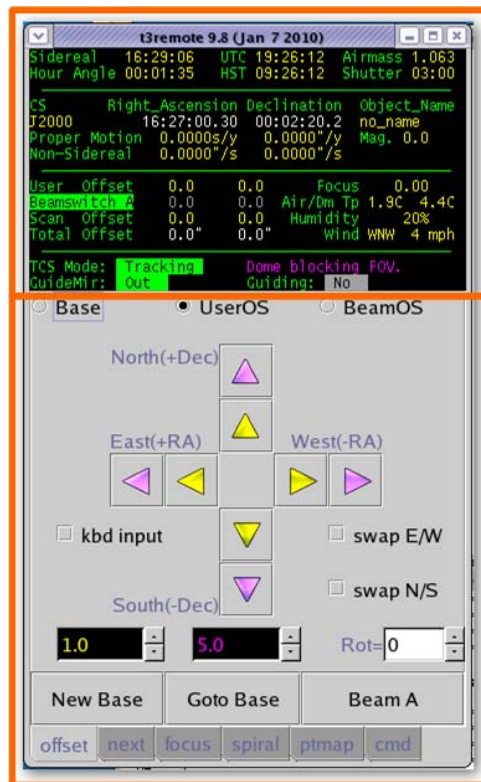
## 2. T3Remote

The GUI has 2 main sections:

Status Display

Main Tab provides various types of control widgets to the TCS3.

Here is a picture of the GUI:

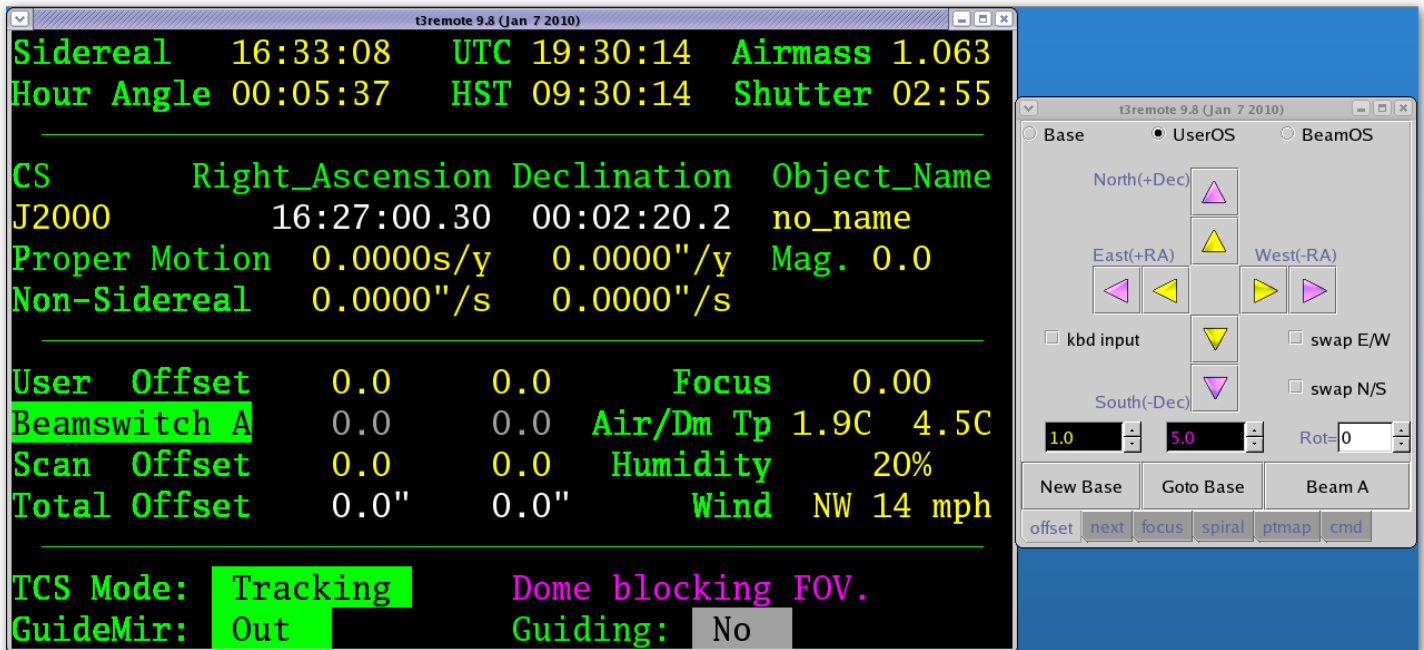


Status Display

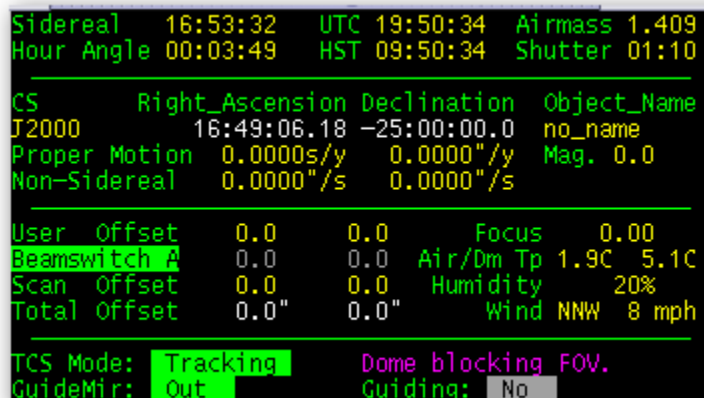
Main Tabs

You can use larger font for the status using the `-m` or `-l` command line option. Using `-m` or `-l` will only display the status. You can run another copy using the `-t`, to display the Main Tab (without status) . There is an example, 2 t3remote running: 1) large fonts, 2) with tabs only.

- > t3remote -l
- > t3remote -t



### 3. Display Status Area



The Display Status Area provides status from the TCS3. Data provided includes:

Sidereal – The Local Sidereal Time.

Hour Angle – The observed Hour Angle position.

UTC – Coordinated Universal Time

HST – The local time, Hawaii Standard Time.

Airmass – Air mass

Shutter – Time in HH:MM until the shutter will block the field of view.

CS – The Celestially Coordination frame of reference for the RA and Dec positions.

J2000 = The FK5 reference frame using the Equinox of J2000.0

B1950 = The FK4 reference frame using the Equinox of B1950.0

App = Topocentric Apparent.

Other the 'FK4' or 'FK5' is display with its Equinox values.

Right Ascension – Target Right Ascension (target is base position + offsets ).

Declination – Target Declination

Object Name – The object name field from the ptable (TCS3 position table).

Proper motion – display proper motion ra (s/yr) and dec (“/yr).

Non-Sidereal – The non-sidereal rate in “/s.

Mag. – The magnitude value from the position table.

User – User offset magnitude display; color coded yellow when applied, gray when disabled.

Beamswitch A or B – Indicates the beam position, and offset magnitude.

Scan – offset applied from the scan offset.

Total – display the total offset added to the base, resulting in the target RA Dec position.

Focus – display the actual focus position (actual is the position sensor value).

Temp. – The temperature in degree C.

TCS Mode – provide to operating mode of the TCS. They are:

Stop – telescope is parked: servo is off; brakes are on.

MP – Move Position mode (non-observing positional moves).

MV – Move Velocity mode (non-observing velocity moves).

Track – Track the sky position specified by the tracking table.

slew – Slewing to a tracking position.

To the right of TCS Mode, relevant status is displayed for current TCS Mode.

During tracking, you may see:

Dome is ready

Dome moving..sec (where sec is estimated seconds in current move)

Dome blocking FOV (Field of view)

During Slew, the estimated time to the end of the slew is displayed.

GuideMir: Display the location of the off/on axis guider mirror.

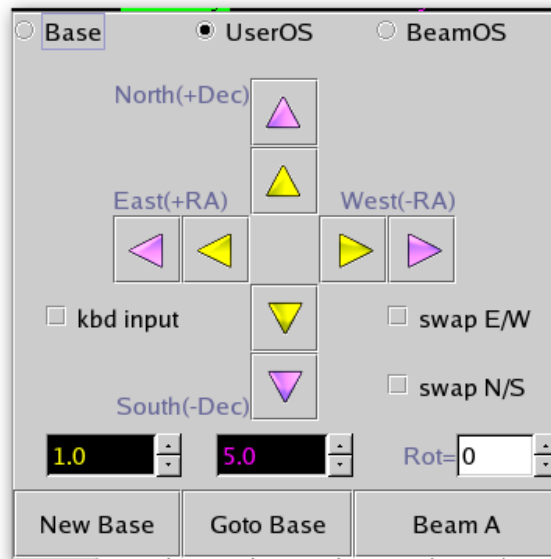
Out – means the mirror in out of the optical path (green text).

In – means the mirror is blocking the optical path to the instrument (Red)

Unkn – means the position is not known by the TCS.

Guiding – Indicates if guiding is active (YES) or not (NO). Guiding YES, occurs when peaking up the pointing map using the guider or manually. YES is display when the TCS receives 5 guiding updates within the last 60 seconds.

## 4. Offset Tab



The Offset Tab allows the users to increment the base coordinates and/or offsets.

First select the coordinate to change from the top radio buttons:

**Base** – Base RA and Dec position

**UserOS** – User offsets.

**BeamOS** – Beam offsets.

Use the **spinbuttons** (yellow and magenta input fields) near the bottom to set the magnitude of the offset. Units are in arc seconds, and the color indicate the which buttons they are for.

The **Rot=** input specifies a rotation for the offset request. The units are in degrees.

Click on the **Arrow Buttons** to move or change the OS values.

The **swap E/W** or **swap N/S** allows you to change the direction of the buttons.

The **kbd input**, when checked, allow the keyboard arrow key to function like the Yellow buttons.

The **NewBase** button will make the current position the new base (zeroing any active offsets).

The **Goto Base** button will zero the user offset (using “user.set 0 0 “).

The Beam Switch button’s label will read **Beam A** or **Beam B** to indicated the current beam position. Press this button to toggle the beam position.

## 5. Next Tab

The screenshot shows a web-based control interface for a telescope. It features several input fields and buttons. At the top left, there is a dropdown menu for 'CS' set to 'fk5' and a 'Clear' button. Below this are two rows of input fields: 'RA' with '07:28:07.28' and '-43.44 mAS/yr', and 'Dec' with '15:31:38.4' and '-89.36 mAS/yr'. A 'Name' field contains 'SAO\_96922'. The 'Mag' field has '8.5' and a small up/down arrow. To its right are two 'n-sidereal rate "/s' fields, both containing '0.0000'. Below these are two large buttons: 'Send Next Obj' and 'Show AirMass'. At the bottom, a tab bar contains 'offset', 'next' (which is highlighted), 'focus', 'spiral', 'ptmap', and 'cmd'.

The Next Tab also you to send the next or slew destination to the TCS.

After entering the sky coordinates, and press the **Sent Next Obj** button to sent you slew request to the TCS.

**CS** – The Celestial Coordinate System Reference Frame:

Fk4 – The RA and DEC is in the FK4 Reference Frame. Its standard Equinox of B1950.0 is assumed.

Fk5 – The RA and DEC is in the FK5 Reference Frame. Its standard Equinox of J2000 is assumed.

Apparent – The RA and DEC is in geocentric apparent reference frame.

Note: For ICRS coordinates, used CS of fk5.

**RA** – Right Ascension in hours. Note the following formats are equivalent:

18:02:23.05

18 02 23.05

18.03973611

**Dec** – Declination in +/- degrees. Note the following formats are equivalent:

19:48:58.0

19 48 58.0

19.816111

**PM** – proper motion. RA proper motion in mAS/yr. Epoch for proper motion correct is implied by the CS value.

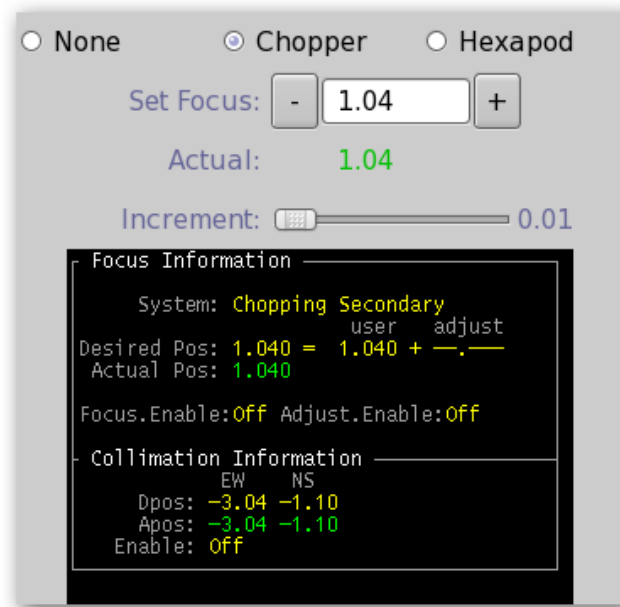
**Name** – a name for the object.

**Mag** – a visual magnitude (optional)

**Non-sidereal rate** “/s – RA and Dec non-sidereal rates in arcseconds/second.

Press the **Show AirMass** button to display the HA, and Airmass for the entered RA, Dec position.

## 6. Focus Tab



The Focus Tab allows the observer to change the telescope focus.

The top radio buttons identifies which focus hardware you wish to command:

**None:** disable focus communications.

**Chopper:** Commands the chopping secondary focus via the tcs3 (This is the default IRTF secondary).

**Hexapod:** Commands the hexapod secondary focus via the hexe daemon. (NOTE: this hasn't be tested or used for many years).

You can decrement or increment the desired focus position by pressing the “-“ and “+” buttons. The incremented amount is control by the slider below labeled “**Increment**”. You can also enter the desired focus value in the **text entry widget** (then hit RETURN).

The **Actual Position** shows the focus position sensor value. When Focus.Enable is ON, the software control loop will drive the focus to the Desired Position. Red means the focus is out-of-position, Green mean it is in-position.

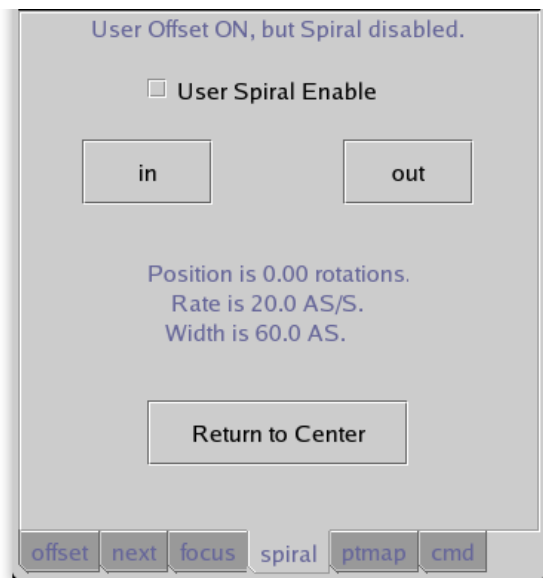
**Status or feedback information** is presented in the black display area.

The **Desired Pos** is where the focus mechanism is commanded to. The position is determined by the **User Dpos** (entered by the user) plus the **Adjustment** value. The adjustment value is a temperature and telescope position adjustment applied in real-time. This adjustment values is used when **Adjust.Enable** is ON. Information on how temperature and position affect focus is in the TCS3 Operators Guide.

Collimation information is also displayed here. The desired position (Dpos) and Actual position (Apos) is display. Apos is GREEN when collimation in ‘in position’, otherwise Red is used. The Collimation Enable is shows if the collimation software loop is active (ON) or not (OFF).



## 7. (User) Spiral Tab



The Spiral Tab allows the observer to spiral the telescope. The spiral RA and Dec offset are placed in the User Offset. To spiral, check the **User Spiral Enable**. Note that User Spiral disables user's offset.

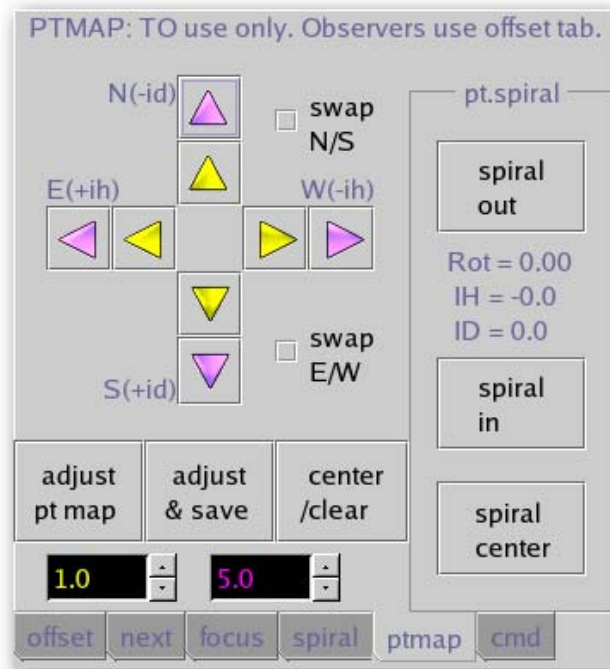
Press the **out** button to spiral outwards, use the **in** button to spiral inwards.

The **Position** tells you your location on the spiral in terms of rotations. The RA and Dec offset values can be seen on the **Users** (on the status display).

The **Rate** and **Width** is displayed for your reference. The TO can adjust these values using the User.Spiral.Rate and User.Spiral.Wid commands.

The **Return to Center** button sets the rotation to 0 (center of the spiral).

## 8. PtMap Tab



The PtMap Tab is the Point Map Table. These controls should be used by the Telescope Operator only (not the Observer).

The **arrow keys** allow you to peak up the IH and ID corrections values. Use the **yellow and magenta spin buttons** to set the displacement, units are in arcseconds. The **swap N/S or E/W** check buttons allow you to reverse the HA or Dec directions.

**Adjust pt map** – issues pt.madj command to add corrections values to MAdj (Map Adjustment) registers.

**Adjust & Save** – issue pt.save: does a pt.madj AND saves MAdj values in the ic/pt.save.txt files for recall at restart.

**Center/Clear** – Issues Pt.clear to zeros the MAdj, Spiral, and Rates registers.

The pointing map spiral can be controlled using the widget in the pt.spiral frame.

**Spiral out** – spirals outwards.

**Spiral in** - spirals inwards.

**Spiral center** – issues Sp.center sets the rotation to 0.

The spiral Rotation, IH, ID vales are displayed inside the pr.spiral frame.

## 9. CMD Tab

The CMD Tab allows t3remote command to be typed in using the keyboard. These are not TCS3 command (command defined the tcs3 command dictionary). In normal operations, neither the TO or Observer should use this tab.