

# HToolGUI

## A Horizon Interface for the IRTF.

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## 1. Introduction

HTOOLGUI is a application used to query JPL Horizon's data. HtoolGUI major features include:

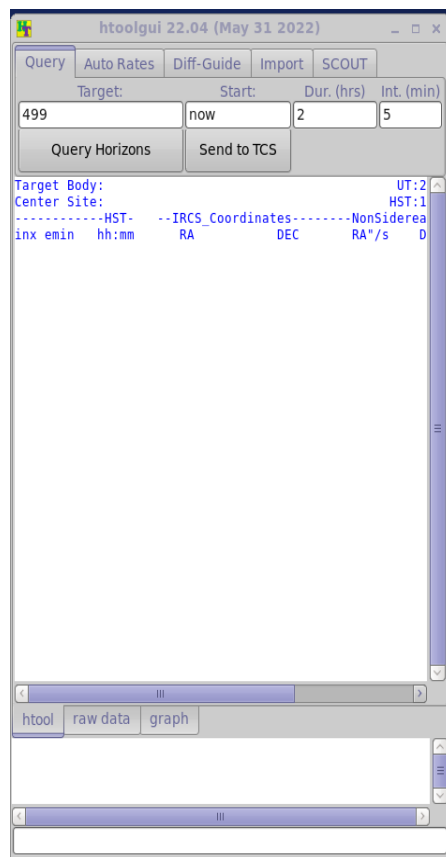
- Monitors the TCS, and stops AutoRates when no in tracking mode.
- Allow for NEXT and NS.RATE updates to the TCS.
- Allows rates update to smokey, and moris. Differential rate from the TCS can be applied.
- Queries Horizon directly or can import a captured text session output from Horizons.
- Can import JPL SCOUT data from the JPL Scout website.

HTool has a home page at <http://irtfweb.ifa.hawaii.edu/~tcs3/related/htool/>.

To start htoolgui, type "htoolgui" on your terminal. This GUI should appear:

```
Usage: t3remote [-d] [-h hostname]
-d Turn on the debug flag.
-h hostname Sets the tcs3 computer's hostname. Default is 't1'.
```

This GUI should appear:



## 2. Querying Horizon Data

In the 'query' tab, enter:

Target -Use the Horizon Target ID for your target.

Start – The start time. Enter 'now' for the current time or enter the UT date using the format “YYYY-MM-DD HH:MM”.

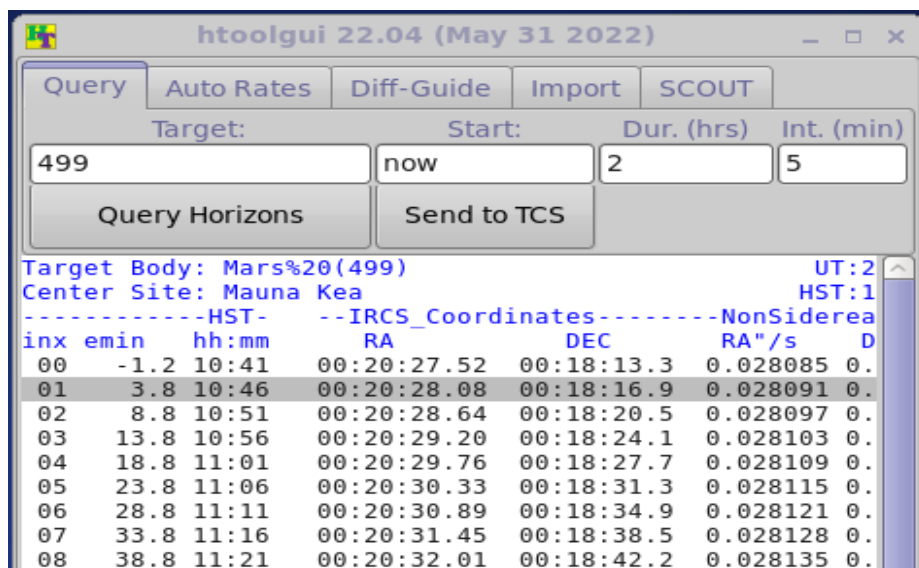
Duration: Enter the number of hours to query for. Hour is an integer.

Interval – Enter output interval in minutes. Minutes is an integer.

Click the “Query Horizon” button to start the query.

When the Query is completed you will see the formatted output in the center section.

For example:



The blue text provides the header information. The Target body is the object queried. The headers for the data columns are provide.

'inx' in the index of each ephemeris line.

'emin' provide the elapse minutes for each ephemeris line.

The RA, and DEC provide the IRCS coordinates for the object.

The nonsidereal rate are shown.

The HA, EL, and Az values are shown (scroll to the left or expand the window).

A highlighted line indicated the next nearest ephemeris data point.

### 3. Sending a slew target to the the TCS.

Once you have valid data in HToolGUI you can press the 'Sent to TCS' button. This will sent update next object buffer in the TCS so you can slew to the object. The next ha, dec, and rate are interpolated using the nearest ephemeris points.

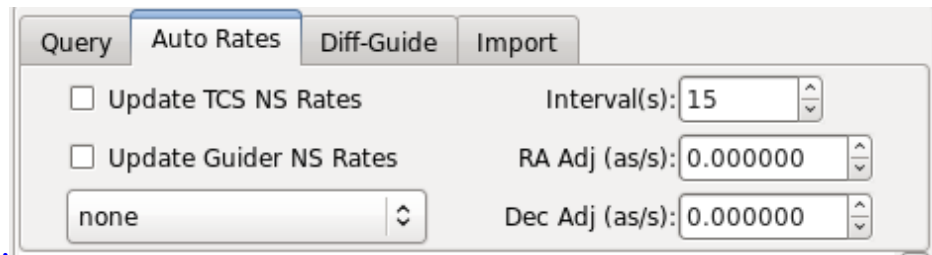
### 4. Auto Rates

[This tab is used when guiding on a star, and observing the target](#)

The **Auto Rates** tab allows you to continuously update the non-sidereal rates to the TCS and/or Guider.

For the TCS, the non-sidereal tracking rate will be update.

For the guiders, the NS Rates that moves the guidebox across the image is updated.



To start AutoRates:

- Set the desired interval. (This can be changed while AutoRate is ON).
- Click the 'Update TCS NS Rates' to send rates to the TCS.
- Click the 'Update Guider NS Rates' to send Rates to the guider.
- The combobox below selects the guider: None, Smokey, or Moris.

When TCS stop tracking:

- Autorate will be turned off.
- The RA, and DEC adjustment will be zeroed.

Using RA, and DEC Adj widgets:

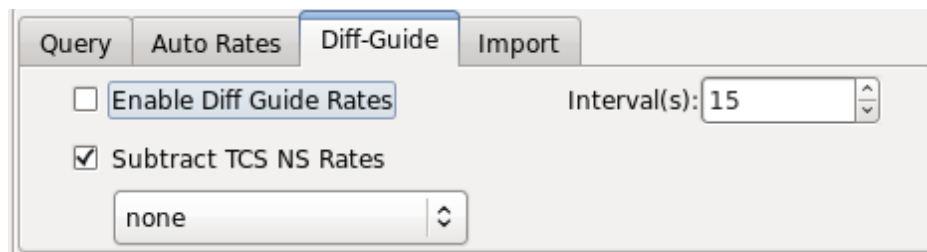
The RA and Dec Adj widget allows you to add a value to the calculated non-sidereal rate values being send to the TCS. This allows the Telescope Operator to adjust the rates in event of poor or incorrect ephemises information. The guiders or the TCS (details graph2) can provide you with rate information. But when using autorate, the TCS ns.rate are constantly being overwritten. Using the RA/Dec Adj widgets, an improved rate can be provide to the TCS. However, RA/Dec Adj should not be used when the non-sidereal rate are know to be correct, or when trying to correct pointing error in the TCS. For pointing error, the TO should correct the pointing rates.

## 5. Diff-Guide Tab

The Diff-Guide tab should only be used when guiding on the Target object. This tab is intended to help the TO do differential guiding, ie: observing one solar system object, while guiding on another.

In this mode of operation, 2 HtoolGUI will be used:

1. HToolGUI with the observed Target using “Auto Rate” to provide TCS with data.
2. HToolGUI with the guider Target using “Diff-Guide” to provide NS-Rate for the guider.



After getting the TCS tracking on the Observed target with HtoolGUI #1.  
Use the HtoolGUI #2 to update the guider's NS Rates:

1. Select the correct guider from the combo box: smokey, moris, or none. The 'none' choice is provided as the calculated ns.rate can be printed in the feedback area for you information.
2. Select the update Interval in seconds.
3. Select the 'Subtract TCS NS Rate' to instruct Htool to subtract the TCS NS.Rate from the target data before sending the rate to the guider.
4. Select "Enable Diff Guide Rate" to have HToolGUI send NS.Rate to the specified guider.

When the TCS stops tracking, the Update Guider Rates will be turned off.

## 6. Importing Data into HToolGUI

The import tab allow you to specify a filename to allow importing of Horizon's data into htoolgui. This option can be used if you pre-generate and saved your Horizon data. Or if the Query interface is not working, you may still be about to obtain data using you web browser, and import the data into HTool.

See this page for additional details: [http://irtfweb.ifa.hawaii.edu/~tcs3/htool/import\\_data.html](http://irtfweb.ifa.hawaii.edu/~tcs3/htool/import_data.html)

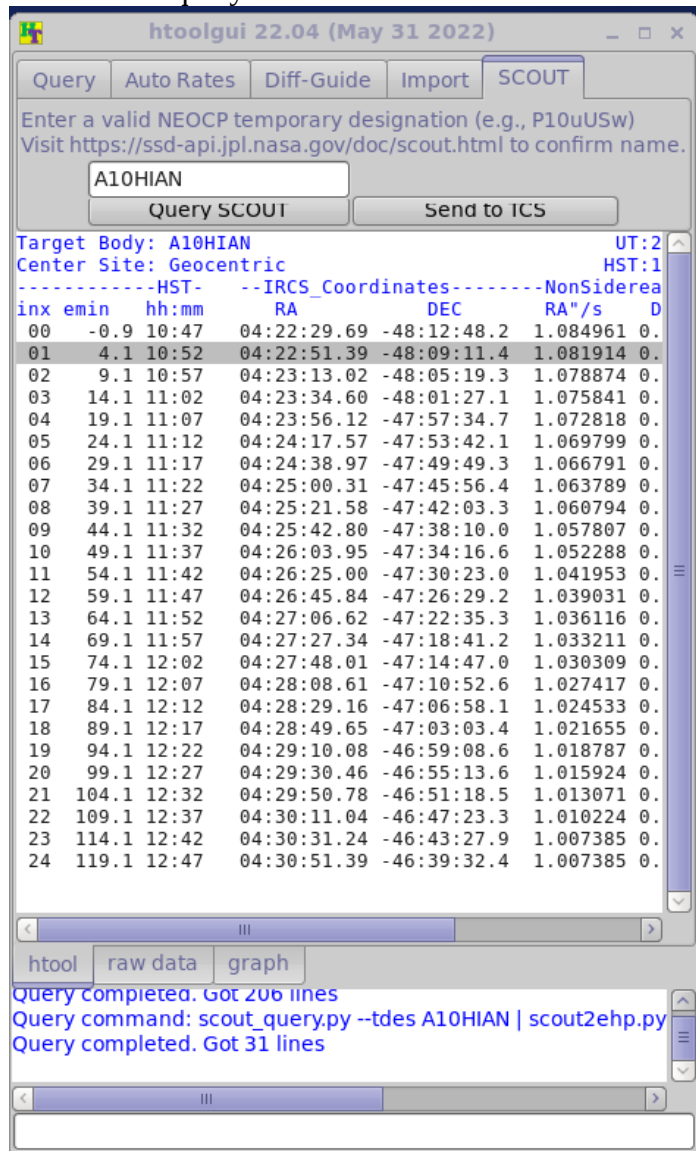
## 7. Querying data from JPL SCOUT

The JPL Scout site (<https://cneos.jpl.nasa.gov/scout/intro.html>) provides estimated ephemeris for unconfirmed NEO. Scout gives objects a temporary designation, and the information is potentially unreliable. But estimate ephemeris is provided, and can be used by htoolgui to observe these objects.

You need to provide htool the object designation from the scout web site. Note that these names are not permanent, so you should confirm the name via the web site when you use the SCOUT feature in htool. All other parameter are fixed (start and end time, interval).

To Query Data from JPL Scout:

1. Select the “SCOUT” tab, and enter a valid object name. Click the “**query scout:**” button.  
 A Scout query take longer that JPL Horizons, about 30-60 seconds for a query.. There is an example of an sucessful query:



After obtaining valid data, using Htool the same as after a successfully JPL query.  
 The **Sent to TCS** button should work as expect, as does the button on the **AutoRate**, and **Diff-Guide** tabs.