

ACE Desktop: Dome, Telescope, Instruments (Region 1)

DOME	
Shutter	Shut
Dropout	Shut
Slit Azimuth	90.0 Home
Error	00:00
Status	Manual

TELESCOPE EAST	
Covers	Closed
R.A. Track	OFF
Dec. Track	OFF
Focus	18151
R.A. Limits	Home
Dec. Limits	Home

INSTRUMENTS	
Wheel 1	CaH
Selector	S CCD
Autoguider	OFF

On the left hand side of the [ACE Desktop](#) the real-time states of the dome, telescope and instruments is displayed. Listed below are the possible responses for each field:

DOME

Shutter: Opening, Open, Closing, Shut, Ajar

Dropout: Opening, Open, Closing, Shut, Ajar

Slit Azimuth: 0-359 (degrees) + **Home** if at home position.

Error: [Time to the next update \(and possible move\)](#)

Status: Manual, Auto, [Sleeping](#)

TELESCOPE ([EAST](#), indicates the side of the pier, WEST, [Wrapped](#), Unwrapped)

Covers: Opening, Open, Closing, Closed

R.A. Track: OFF, [Track Rate](#)

Dec. Track: OFF, [Track Rate](#)

Focus: Integers within the range of the focus travel, [ESTOP](#)

R.A. Limits or AZ Limits: Home, East, West, [AZ+](#), [AZ-](#), [ESTOP](#)

Dec. Limits or Alt Limits: Home, North, South, [Zenith](#), [Horizon](#), [ESTOP](#)

INSTRUMENTS

Wheel (number): [Current named filter.](#)

Selector: [Shows current Port in use](#)

Autoguider: The message shown here depends on the particulars of an **Autoguider** when it is engaged.

ACE Desktop: Data Entry and Catalogues

(Region 2)

The screenshot shows the ACE Desktop software interface. At the top is a blue title bar labeled "Telescope". Below it is a menu bar with options: Telescope, Instruments, Observations, Tool Kit, Network, View, Help. A toolbar with various icons is visible below the menu bar. The main window displays a table with the following columns: Name, R.A., Dec., Epoch, PM(ra), PM(dec), and Vmag. The table contains several rows of data, including "flat18", "focus1", "flat03", "flat23", "focus 0", "flat13", "rot11868841", "rot02502726", "rot07394765", "focus03", "rot10653195", and "flat737". A context menu is open over the table, listing options such as "Open Existing Database ...", "Open New Database ...", "Save Database ...", "Save Database As ...", "Database Cells Editable", "Database Cells Read-Only", "Set Database Font", "Filter Database", "Search Database", "Set Display Coordinate Precision", and "Display columns ...". Below the table, there are input fields for "R.A.", "Offset", "H.A.", and "D:\ACE Control System". The "Name" field is set to "ZENITH PARK". Below that, there are input fields for "H.A." (00 00 00.0) and "Dec." (+31 57 36.0).

The top window of this region of the ACE desktop displays loaded databases. These databases can be created by users to record the positions of targets/objects. These positions then selected and [the telescope is commanded to move through the TABs below.](#)

<Right Click> the mouse anywhere on the screen to bring up the control menu for managing

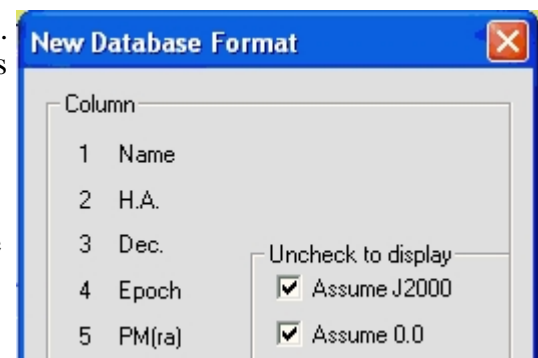
databases. (the menu is shown here)

Open Existing Database: Opens a *.cat file that contains a database of targets and positions. ACE software releases may include standard star catalogues such as the Bright Star Catalogue and the Guide Star Catalogue.

Open New Database: Creates a blank database for which new targets and positions can be defined.

Format the new database with some of the options shown here. The names of the first 6 columns are fixed. Two extra columns (7 and 8) are available for user defined names (and data). Check the assumptions desired with respect to the Epoch (**J2000**) and the **Proper Motions** (PM) in RA and Dec.

Save Database: Saves the currently loaded database under the same file name.



Save Database As: Saves the loaded database under a new file name.

Database Cells Editable: Allows the user to edit cells directly by clicking with the mouse and editing. In this mode the cells are green in color.

Database Cells Read-Only: Disables cells from being modified by mouse clicks on the screen. This prevents unintentional data entry.

Set Database Font: Change the font size, color and style for easier readability.

Filter Database:

Filter the database according to a range of positions (**Right Ascension and Declination**) and/or **Magnitudes**. Very useful for displaying subsets of large catalogues. Once a subset is created, it could be saved (as a newly named catalogue) if desired.

Search Database: Searches the **Name** column of a database for the inputted string. Currently ACE will only find exact matches.

Set Display Coordinate Precision:

Choose from the available formats for the coordinates.

Display Columns: Not currently implemented.

Database Path:

D:\ACE Control System\Current Release\shawap File location for the loaded database. Click in the field and move to the right to see the entire path if it does not fit in the window.

Sort within Columns:

Click the first cell of a column to sort the contents by ascending or descending order. This is nice shortcut. The newly sorted data can be saved and reloaded subsequently.

ACE Desktop: Data Entry | RA (tab)

R.A.	Offset	H.A.	D:\ACE Control System\Current Release\shawap		
Name	flat18		Replace	Delete	17 Items
	R.A. (Catalog)	Dec.	Epoch	PMra	PMdec
0	18 29 30.0	+52 07 00	2000.00	+0.000	+0.000
GO TO		STOP		flat18	
				rot10653195	
				std132552	

Use the RA tab to input equatorial coordinates (RA and Dec) into the appropriate fields (with Proper Motion corrections if necessary).

Name: Type a name for the current position and Add or

Replace a name in the database (press the Replace button). Load a name from the [Database above](#) by double clicking on the cell. Remove a loaded name from the Database above by pressing the Delete button. The Items field indicate how many entries are currently in the database.

The three buttons at the bottom are the last three acquired telescope positions. Press one of these buttons to return to that position.

[Click on this image to navigate to the other tabs.](#)

ACE Desktop: Data Entry | Offset (tab)

R.A.	Offset	H.A.	D:\ACE Control System\Current Release\shawap		
Name	Center CCD				
	R.A.	Dec.			
0	8.95	16.88	arc_seconds		

.The **Offset** tab allows a user to move a specified number of arcseconds (or arcseconds per sidereal second) from the current

button will reset all the fields.

position. The "0"

Click on the image to navigate to other tabs.

ACE Desktop: Data Entry | HA (tab)

R.A.	Offset	H.A.	D:\ACE Control System\Current Release\shawap
Name ZENITH PARK			
H.A.		Dec.	
0	00 00 00.0	+31 57 36.0	
GO TO		STOP	
ZENITH PARK			
(HA 05 10 00.0 DEC +15 00 00)			
(HA 04 10 00.0 DEC +15 00 00)			

Similar to the [RA tab](#), enter coordinates in Hour Angle (HA) and Declination. Note, each tab records the last three positions acquired from within it.

Click on this image to

navigate to the other tabs.

ACE Desktop: Clocks, Positions, and Pointing Models (Region 3)

SYSTEM CLOCKS & TELESCOPE POSITION			
JULIAN DATE	2453837.46613	JD	101 / 365
CIVIL DATE	16:11:15.0 MST	Tue Apr 11, 2006	
U.T. DATE	23:11:16.0 UTC	Tue Apr 11, 2006	
SIDEREAL	05:04:57.7		
System OK			
Positions			
	R.A.	Dec.	
Instrumental	05:05:00	+31:57:38.1	
Refracted	10:22:37.0	-10:32:01.5	
Apparent	10:22:37.3	-10:34:14.9	

The System Clocks & Telescope Position displays the relevant values of the current time and position of the telescope on the sky.

Julian Date: The number of days that have elapsed since the Julian cycle began on January 1st, 4713 B.C. The second pair of numbers on this line indicates the day number (based on the U.T. Date) out of the total 365 days in a year.

Civil Date: The local time and (Gregorian) date.

U.T.C. Date: The date and time calibrated and coordinated by atomic clocks but synchronized with astronomical U.T. (Greenwich Solar Mean Time).

Sidereal Time: The Right Ascension that is currently crossing the local meridian.

The message field will display messages indicating the telescope is [approaching one of its limits](#).
([Warning Deltas](#))

Positions:

Instrumental: The encoder position (expressed in RA and Dec) that will point the telescope to an intended position on the sky. [See ACEFlex Pointing Diagnostics for definitions](#).

H.A.: Hour Angle. Number of hours in RA that the telescope is East or West of the meridian (00:00:00).

Sec(Z) : Equals $1/\cos(\text{Zenith Distance})$ where $Z = 90 - \text{Altitude}$. This value approximates the number of "atmospheres" the telescope is looking through. At the zenith, the altitude is 90 so $1/\cos(90 - \text{Altitude}) = 1/\cos(0) = 1$ atmosphere.

AZ : [Azimuth](#) (degrees)

ALT: Altitude in the sky (degrees).

Magnify: Press this button to display the time and telescope position in large digits on the monitor.

ACE Flex pointing corrections: See [ACEFlex Pointing model](#). A new Grid Point can be added here by pressing the button. Be certain to center the intended position (target) first so that ACE can precisely determine the correctional vector (difference between the ideal position, not including the apparent and refracted terms, and the current encoder reading).

Traffic Light Color Scheme in ACE

ACE communicates in various ways with the user through explicit messages, information dialogues, and in some instances low-level command responses. In addition, the overall color scheme throughout the program gives the user one more way to assess the current state of the observatory.

Fields throughout the program are colored in various shades of Red, **Yellow**, and Green. The general meaning of these colors is:

RED:

This color (or pink) signifies either the final or resting state of a device. A closed shutter and "homed" ([Autodome](#) off) dome would have pink fields for example. Another example is the number of sets for a sequence of exposures (using a detector). In the [Observations | Sequence](#) (tab) the "Set" field is pink because it will be the last exposure in the set whereas the Exposure field is GREEN (see below) since this is a reoccurring value that used repeatedly.

YELLOW:

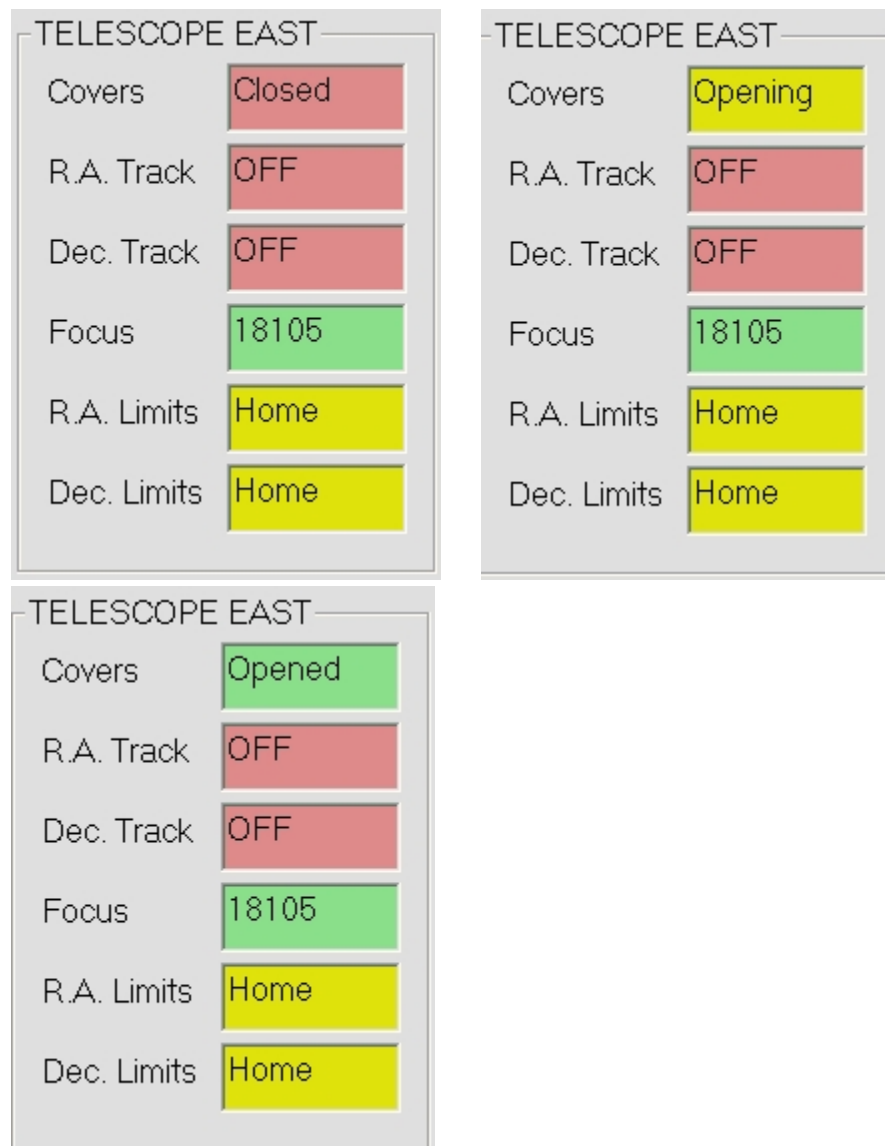
Yellow fields generally indicate that a device is moving or adjusting itself in some way. While the shutter is "opening" the field will be **yellow**. **Yellow** fields also alert the user to special conditions of a

device or parameter that ACE feels may be relevant. For example when a telescope is at the "Home" encoder position, the R.A. Limits ([Region 1](#)) will highlighted as **Yellow**. However, once the telescope is tracking the R.A. Limit will be displayed as "OK" with a Green highlight. Encoder and Offset positions of devices are also generally displayed in **yellow** fields.

Green:

Green fields are always a good thing! They indicate the status of a device or action is "OK", valid, or successful.

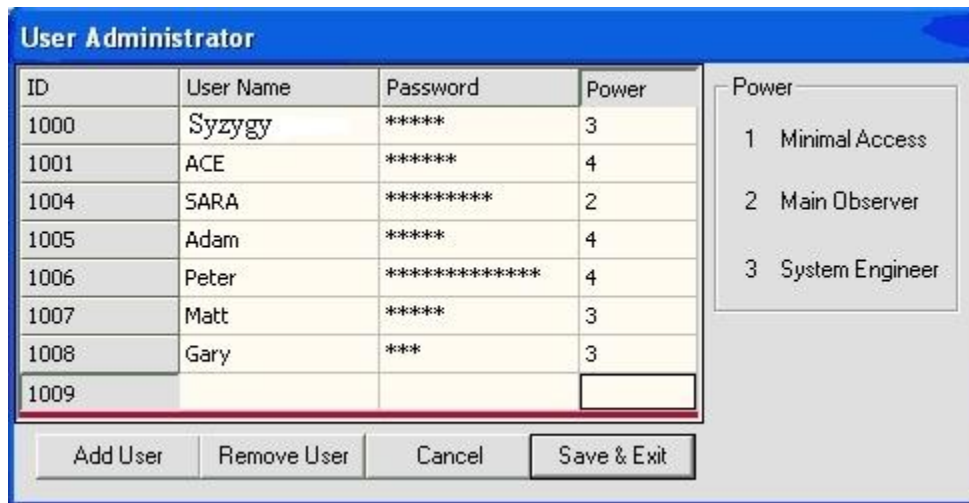
[Mirror Covers](#) example shown below demonstrates a sequence of actions that goes from red to **yellow** to green.



Privilege Levels

Privilege Level: 4

ACE uses privilege (or power) levels to permit a user access to various program features. In this manual a **Privilege Level**: will accompany topic headings. This will help determine whether a particular feature is visible or adjustable for a given level of privilege. For example, privilege levels themselves can only be adjusted by an "Administrator" with a privilege level of "4" (full access).



This "Users" dialogue screen is under the [Setup](#) menu. Example users and privilege (power) levels are shown in the chart. Most users would be assigned "Main Observer" (level 2). A user of level "3" can adjust many features found under the [Setup](#) menu. For example a user with a privilege level of "2" would not see the "Users" or "Horizon Map" features under the Setup menu as it

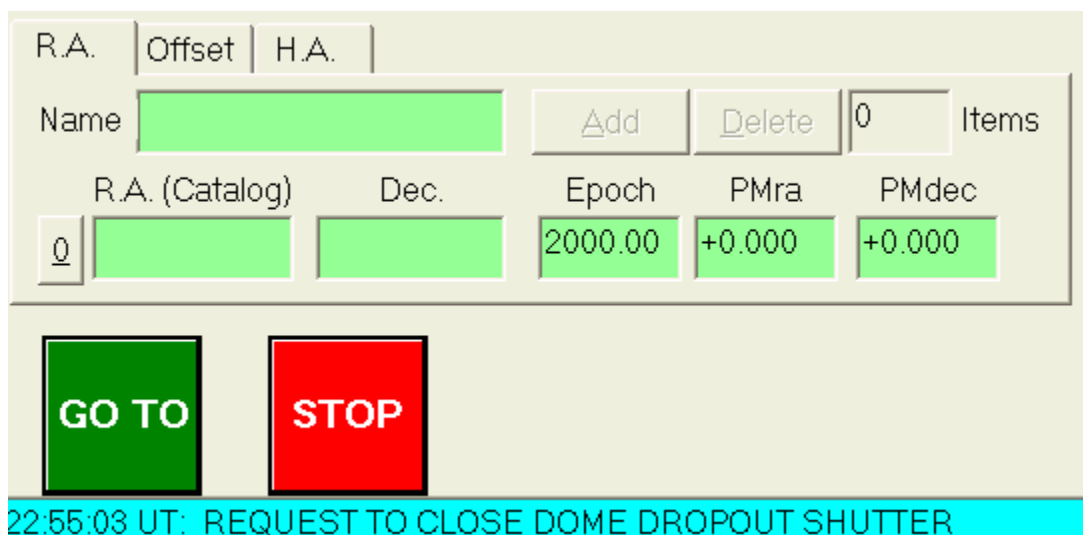
requires at least a privilege level of 3 to be visible.

ACE currently also uses a more general [System Password](#) that is supplied with the purchase of the software to permit changing values and parameters that ACE determined when installed in a specific observatory.

Shortcuts in ACE

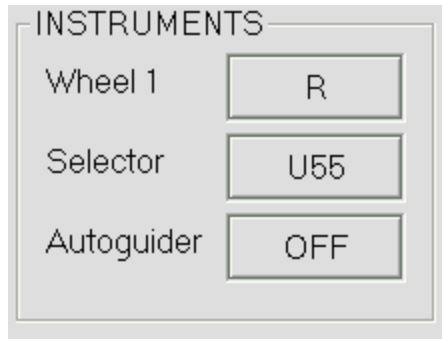
ACE contains many features that offer fast ways of performing an operation for a proficient user. The list below indicates a few of the less obvious examples in the program.

Zero Fields:

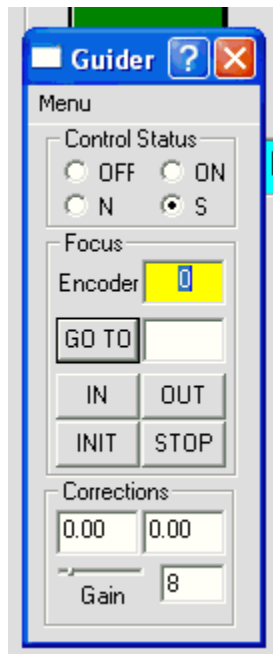


Press the "0" (just left of the "R.A. Catalogue in this image) to zero all the entry fields for a new target.

Instruments (Auxiliary):



Press the Wheel or Selector buttons to bring up (forward) the [Auxiliary \(Installed\) Equipment](#) tabbed dialogue in which options for the filter wheel or port selector can be managed. The Autoguider button will bring up (forward) the autoguider control panel:



The autoguider can only be used if the telescope [Tracking](#) has been enabled. In this particular implementation of the guider, N/S indicates which direction is "up" on the screen. The Focus section controls the focuser stage in and out (perpendicular to the focal plane). The Corrections are expressed in pixels, often with a maximum move (generally 2 pixels). The Gain is a multiplicative factor that determines the amount of a calculated adjustment is actually made. A value of "10" means that the full (100%) of a correction was issued to the mount. Thus, numbers larger than 10 are more aggressive and numbers much smaller than 10 are quite passive. It is generally best to make small corrections often rather than making aggressive (large) corrections infrequently as the danger of over-correcting and systematic "oscillations" can result.