Optec Alt-Azimuth Derotation Server
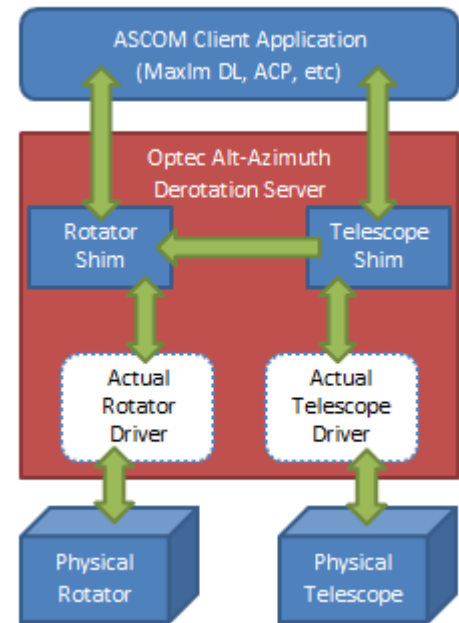*Quick Start Guide*

Introduction

While alt-azimuth mounted telescopes are wonderful for visual observing, they present a unique challenge for astrophotographers. In order to capture images longer than several hundred seconds the camera must be de-rotated during the exposure to compensate for the rotation of the image plane. This rotation rate is not constant over time but can be calculated based on the right-ascension and declination of the object, the longitude and latitude of the observer, and local sidereal time. With the use an alt-azimuth mount, an Optec camera field rotator, and the Optec Alt-Azimuth Derotation Server, anyone from the amateur level to the professional astrophotographer can easily capture high quality images using an alt-azimuth mounted telescope.

Derotation Server Model

The graphic to the right represents the structure of Optec Alt-Azimuth Derotation Server and how it interacts with the ASCOM client application and physical devices. The Optec Alt-Azimuth requires an ASCOM client application. The client app connects up to the rotator *shim* which in turn connects up to the actual rotator driver. We call it a *shim* because it does not actually control the physical rotator as a normal driver would. The rotator shim has two functions: it passes commands and data between the client app and the actual rotator driver, and it makes de-rotation move requests to the actual rotator driver. The telescope *shim* functions in a similar way as the rotator shim. The client app connects up to the telescope shim, which in turn connects to the actual telescope driver; any ASCOM telescope driver can be used. The most important part of the Optec Alt-Azimuth Derotation Server is the arrow that points from the telescope *shim* to the rotator *shim.* This arrow represents the passing of the current altitude and azimuth data from the telescope to the rotator shim. The rotator shim uses this data when performing the de-rotation rate calculations.

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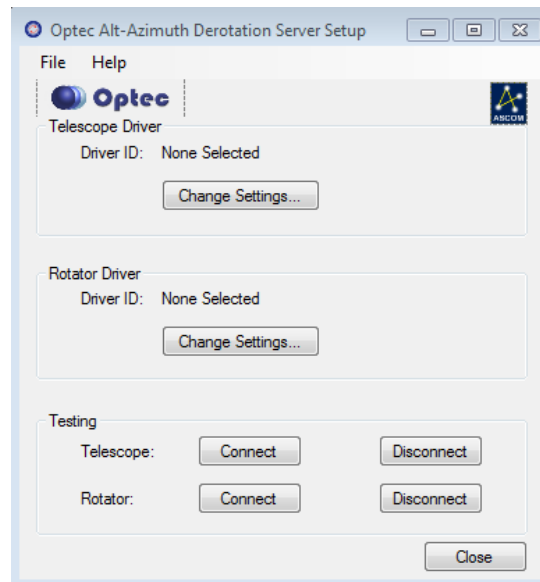www.optecinc.com

Configuring the Derotation Server Using the Setup Utility

Before you can setup the *Alt-Az Derotation Server* you must have an Optec ASCOM Rotator driver and ASCOM Telescope driver installed. The Derotation Server uses these drivers to communicate with your devices. Consult the device manufacturer if you have trouble finding or installing these drivers.

After installing the *Alt-Az Derotation Server* software you will notice a new icon on your desktop for *Optec Alt-Az Derotation Setup.* This is a simple utility that is provided to assist in the configuration of the software. The image below shows the main form for the setup utility. Follow the steps below to setup the software:

1. In the *Telescope Driver* box click *Change Settings*. This will bring up the driver Chooser which will allow you to change device drivers and access the driver's settings. Select the driver for your telescope mount.

2. In the *Rotator Driver* box click *Change Settings*. This will bring up the driver Chooser which will allow you to change device drivers and access the driver's settings. Select the driver for your specific rotator device.

3. At this point the Derotation Server software is setup and ready for use. To test the setup press the *Connect* buttons in the *Testing* box. The Alt-Az Derotation Server Status window will open and display the status information for each of the drivers as well as the current rotation rate of the star field.

4. Press the *Disconnect* buttons in the *Testing* box and close the setup utility.

5. The final step is to setup your observatory control program. The process will vary slightly depending on application but go to the setup form where you select a telescope. Select Optec Alt-Az Server as your telescope driver and press ok. Go to the setup form where you select a rotator and choose Optec Alt-Az Server again for your rotator. The Derotation Server will automatically begin working anytime the Telescope and Rotator are both connected.
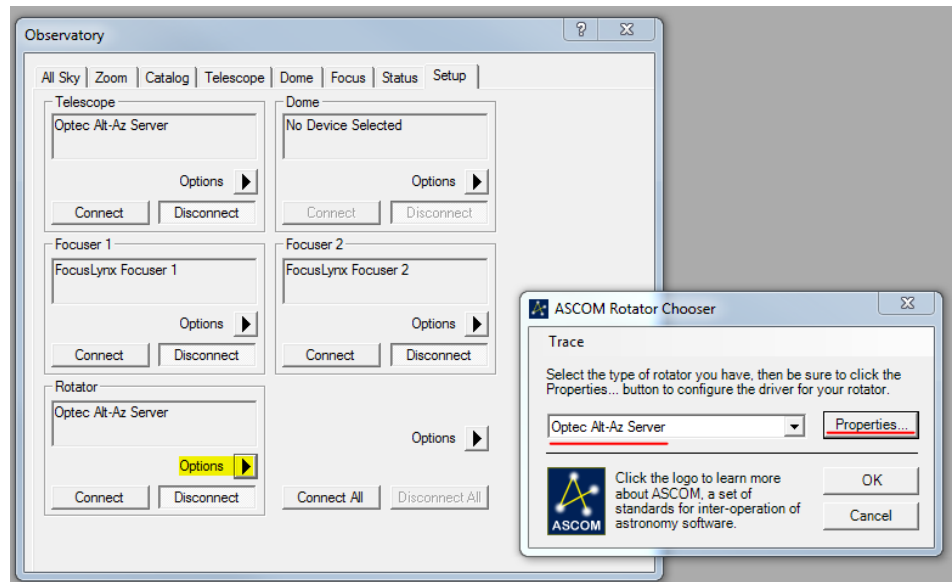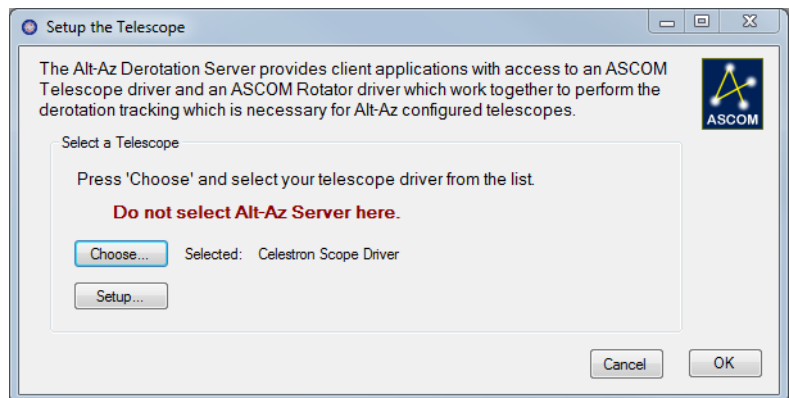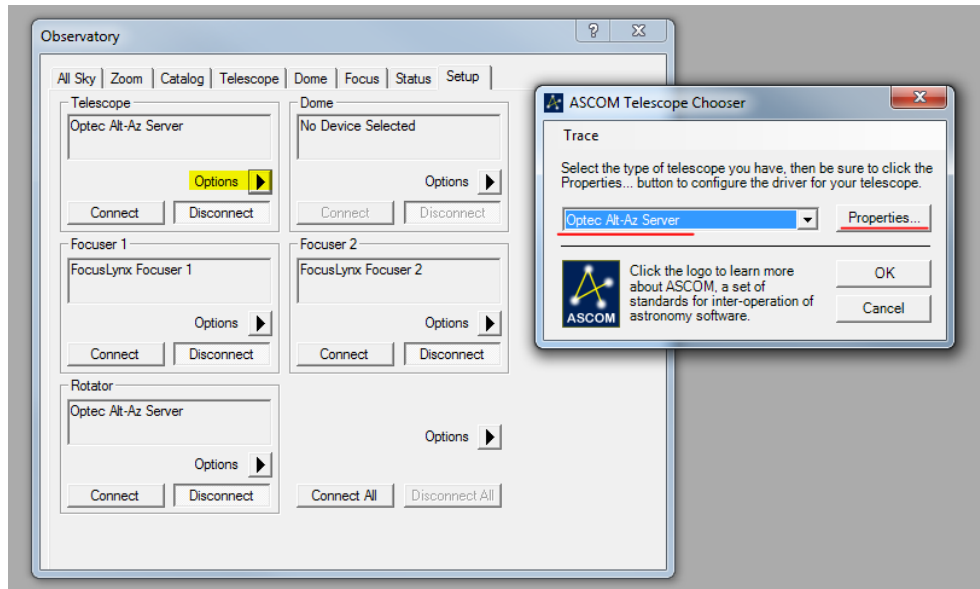
Configuring the Derotation Server using an ASCOM Client Application
– MaxIm DL5 Example

The Derotation Server can be used with any ASCOM client application that allows control of an ASCOM rotator

and telescope mount. For this example I am using MaxIm DL 5 by Diffraction Limited. The first step is to install the Optec Alt-Azimuth Derotation Server. Download the most recent version of the setup project from the Optec website and run the setup.exe executable to begin the install process. The same version works for both 32 and 64 bit versions of
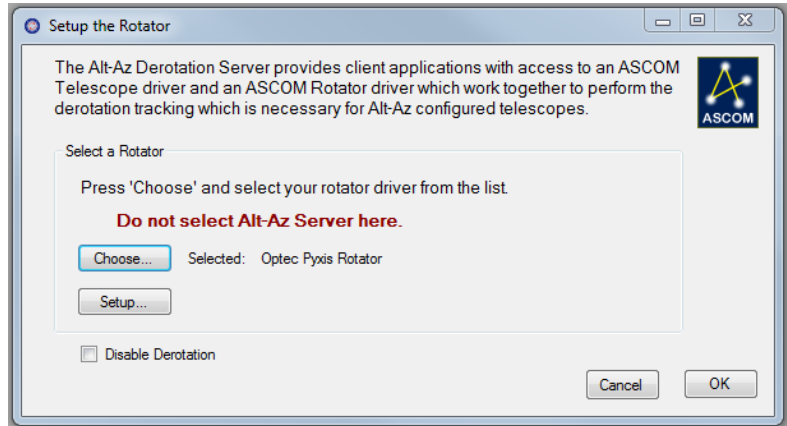

Windows. Once the installation is finished, open your observatory control program (ASCOM Client App). Go to the setup screen that allows you to select a telescope mount. In the ASCOM Telescope Chooser select *"Optec Alt-Az Server",* and then press the *Properties* button. This will bring up a special Setup window that allows you to choose the actual telescope driver that the alt-az server will use to communicate with your telescope mount. Click the *Choose* button to select the driver and then click the *Setup* button to configure the actual telescope driver as needed. For this example I have selected the *"Celestron Scope Driver".* When you are finished click OK to close the Alt-Az server setup and then click *OK* to close the ASCOM telescope chooser. For this example we have now configured MaxIm to connect

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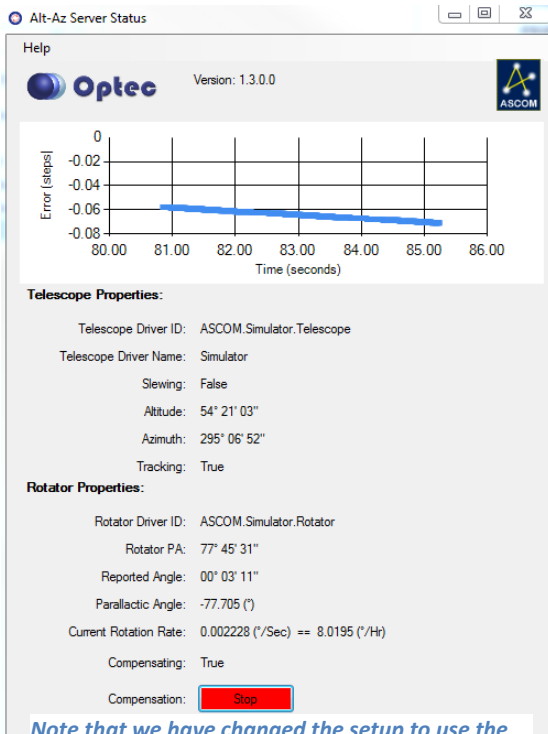www.optecinc.com

up to the *Optec Alt-Az Server* which will in turn connect up to the Celestron Scope Driver to control the Celestron mount.

Note that some telescope drivers do not calculate the instantaneous altitude and azimuth directly. In these cases, the POTH hub must also be used. For example, when using the **ServoCAT** ASCOM driver, you would choose the POTH hub in the Alt-Az Derotation Server telescope selection, and then in the POTH setup dialog you would choose the ServoCAT driver.

The next step is to set up the rotator driver. Open the setup window that allows you to select an ASCOM rotator driver. In the *ASCOM Rotator Chooser* window, select *Optec Alt-Az Server* again, then press the *Properties* button. This will bring up a window that allows you to choose the actual rotator driver needed to control your rotator. Click the Choose button, select your rotator driver, and press OK. For this example we have now configured MaxIm to connect up to the Optec Alt-Az server which will in turn connect up to the Optec Pyxis Rotator driver to control the Pyxis.

At this point, the observatory control program is properly configured to use the Derotation Server. Press the *Connect* buttons to connect up to the rotator and the telescope. This will start up the Optec Alt-Az Derotation Server. The server will automatically de-rotate the rotator any time the following conditions are met: The rotator must not be otherwise moving and the rotator and the telescope must be connected. When the Derotation Server is running the Alt-Az Server Status Window is available for viewing. If you do not see it immediately upon connection, it is likely minimized.

Note that we have changed the setup to use the Simulators for this image.

The Alt-Az Server Status window can be used to monitor the progress of derotation. The windows displays the drivers currently selected, the current Altitude and Azimuth of the telescope, Position Angle of the rotator and current derotation rate.

The Server will automatically adjust the amount that the rotator moves to keep up with the derotation rate. It will also automatically move the rotator to compensate for the change in angle relative to the North Celestial Pole as the telescope slews. This is reported out through the driver and on the display as the Reported Angle. Client programs connected to the Alt-Az

Server Rotator driver will receive the Reported Angle rather than the Rotator angle.

The Alt-Az Server Status Window should not be closed manually. The window will automatically close when both the rotator and the telescope are disconnected.

If you have any questions or problems configuring the Optec Alt-Az Derotation Server please contact Optec technical support by email at support@optecinc.com or by telephone 616-897-9351.