



PRODUCT MANUAL

ASA Direct Drive Mount 85 (DDM85)

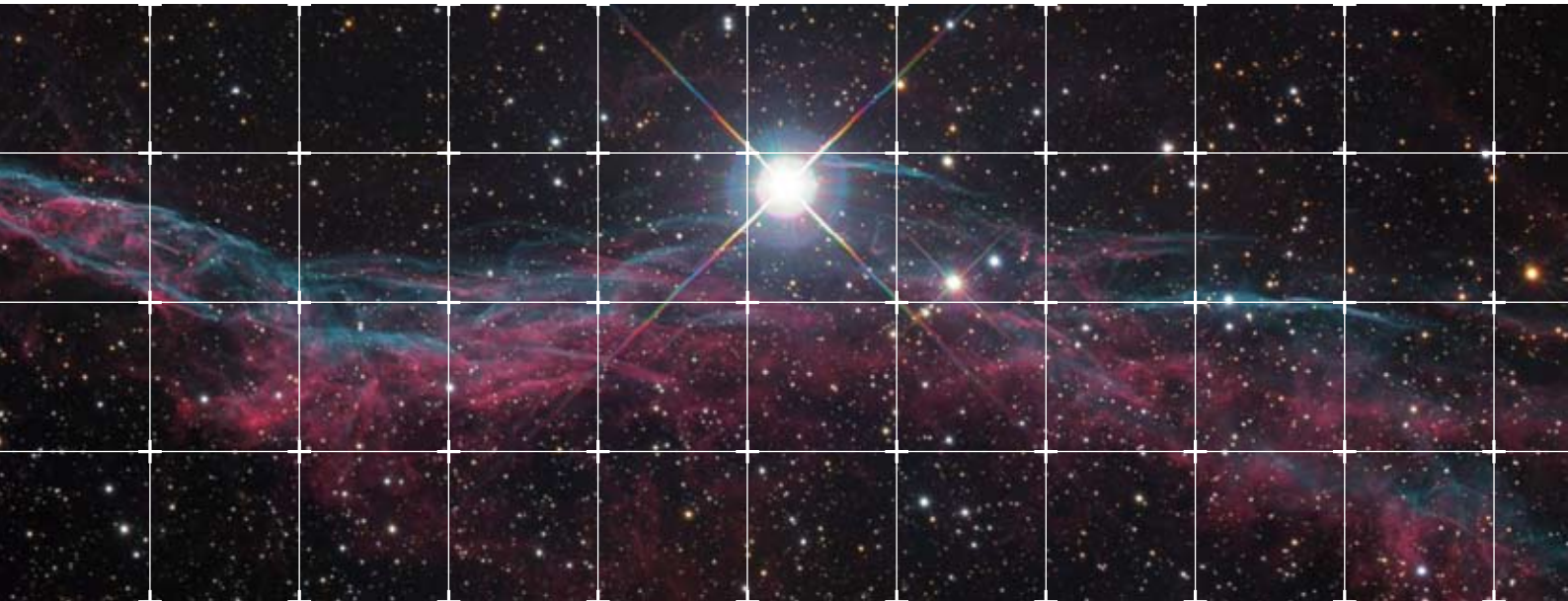


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CAUTION: Please read the product manual of your new mount carefully before using it!

PLEASE NOTE:

- In conjunction with a telescope, the mount needs to be balanced with counterweights before it is used!
- Before using the internal laser (optional) of your mount, make sure there are no people in front of the mount or standing in line with the laser (see ASA's laser safety spec sheet, available on <http://www.astrosysteme.at>).

1. Delivery contents





A



B



C



D



E



F



G



H



I

Included in the delivery of your mount are the following cables:

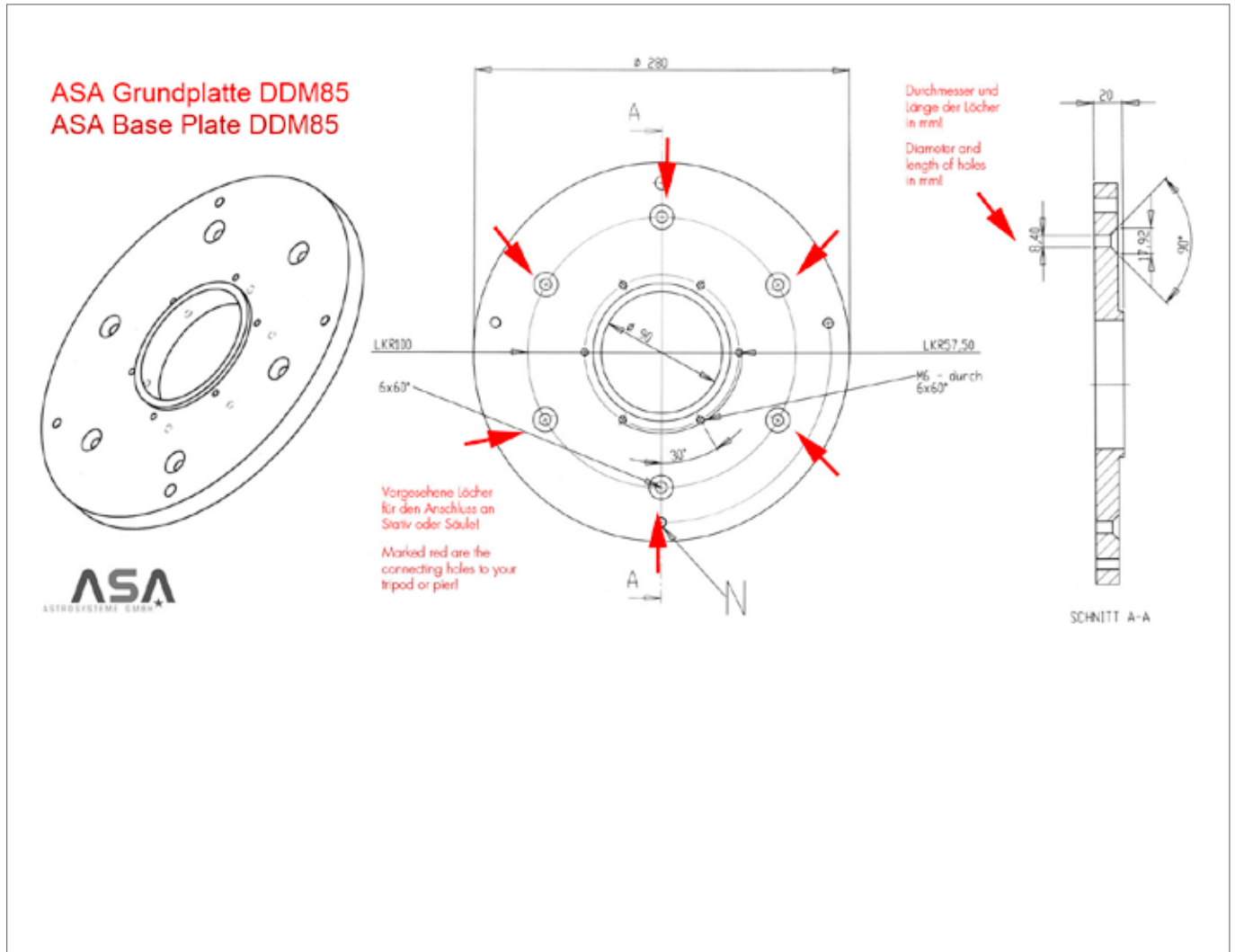
- A** AC power cord
 - Nr. 1: + 12V1 max.5A (Lüfter, Laser, OK3, etc.)
 - Nr. 2: - 12V1
 - Nr. 3: + 0 - 48V2 max.5A (chosen freely, galvanic isolation)
 - Nr. 4: - 0 - 48V2
 - Nr. 5: + 12V max.10A (mount controller)
 - Nr. 6: - 12V
- B** USB to serial converter
- C** Mount controller cable
- D** USB-cable

Optional cables available:

- E** Spiral cables to connect ASA's OK3 - ASA's electric focuser (used only if the OK3's controller is build into the mount (option to be ordered separately))
- F** Spiral cable for cooling fans build into the ASA Astrographs and other cooling fans
- G** AC power cable 1 x 12V1, 1 x 0 - 48V2 (i.e. to use for cameras, filter wheel etc.)
 - +12V1 brown (max. 2A)
 - 12V1 white (max. 2A)
 - + 0 - 48V2 yellow (max. 5A)
 - 0 - 48V2 green (max. 5A)
- H** Spiral cable for data transfer (8 x 0,2 or client specific)
- I** Cable for data transfer (8 x 0,2 or client specific)

Putting together your mount

(It is important, that the correct order is used!)



2. Mounting the Base Plate

Connecting your base plate (part of the delivery content) to an equatorial pier or tripod is achieved through six drill holes. It is also possible to custom drill holes to your mount or to order a custom made drill pattern at ASA (optional). Pay attention

that your base plate is pointing towards north in line with our drawing. In case you would like to use your mount in conjunction with a G11 tripod, ASA can offer pre-fabricated ASA adapters. Adapters for other tripods can be custom made at ASA.



3. Mounting the RA-axis on the Base Plate

Place the RA-axis onto the base plate and make sure that the brass pin connector located at the azimuth adjustment screw is fitted properly in the intended hole on the south side of the base plate. Screw the RA-axis to the base plate using the mounting screws (3 x).

Hint: Fix all screws by hand first and then use an Allen wrench key to fasten the screws.



5. Mounting the DEC-axis on the RA-axis

Place the DEC-axis onto the RA-axis. Make sure the contact plug on the RA-axis is pointing downwards (see image). Then screw the DEC-axis onto the RA-axis by using the fastening screws with cone set (4 x). Since the center of gravity lies higher if there is no counterweight shaft fastened to the mount, pay extra attention that the DEC-axis does not swing downwards!



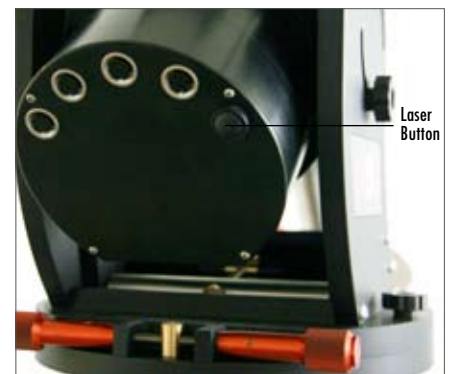
4. Adjusting the Polar Height (this adjustment must be done before mounting your telescope and weights!)

Before using your telescope, you need to adjust the polar height on your telescope to match your location: Open the locating screws for polar height located at the side of the mount. Then open the two socket screws located in the inside of the polar height cradle. (**CAUTION:** The RA-axis will then become loose and could tip over!). Then turn the red azimuth adjustment screw until the cross bar is roughly in the middle. Orientation can be achieved through the nonius to the left and right side of the polar height cradle. Adjust the mount to your latitude according to the 10 degree scale. By slightly moving the RA-axis, try finding a position in which the socket screws will correspond to an opposite hole/socket. Then fix tightly. Now you can fine tune a more exact position using the red adjustment screw for polar height. After using the fine tuning feature, the control screws for polar height needs to be tighten again. You can achieve a very rapid adjustment by using a build-in laser (optional). To do this, the DEC-axis and RA-axis need to be mounted together first (see next chapter).



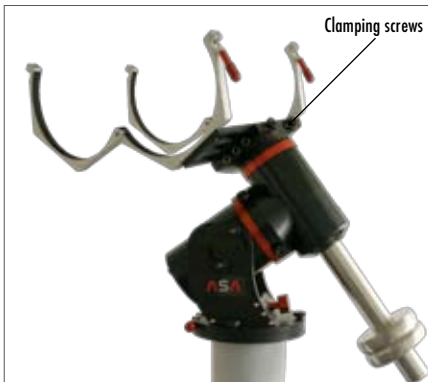
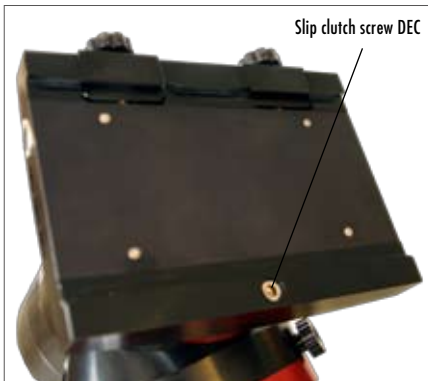
6. Counterweight Shaft and Counterweights

Now you can screw the counterweight shaft into the DEC-axis and add your counter weight onto the shaft. Before you screw the shaft into the thread, it is advised to spray the thread with silicon spray. To complete the process, attach and fasten the safety screw and plate to the lower end of the counter weight shaft.



7. Achieving a rough Polar Alignment by using your mounts internal laser

With the help of a laser along the polar axis, your mount can be easily aligned to the celestial pole. To achieve this, make sure the mount is fitted with the counterweight shaft and counterweights prior to the alignment process. Start by loosening the four locating screws for polar height and the three Azimuth fastening screws. Then press the laser knob at the backside of the RA-axis and move the mount with help of the Azimuth adjustment and polar height adjustment screws until the active laser has reached the vicinity of the polar star. **ALWAYS USE THE LASER WITH EXTREME CAUTION!** Make sure, that no person is looking into the laser! Direct contact between the eye and the laser can cause permanent damage to the eye!



8. Slipping Clutch

Before mounting the telescope, the mount can be CAREFULLY fixed against slippage by use of special bolts on both axis. This is especially important for heavy optics.

IMPORTANT: The safety bolts must be disengaged prior to operating the mount!

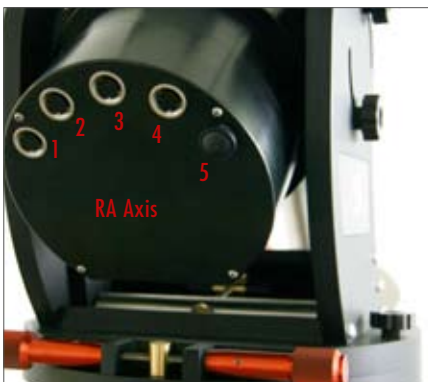
9. Mounting your telescope

Slide the dove tail with the mounted telescope rings onto the mounting rail and fasten the rail with the clamping screws located to the side. Now place the telescope inside the telescope rings.

IMPORTANT: After mounting the telescope, don't forget to disengage the safety bolts, in case you engaged them prior to mounting the telescope. Make sure the telescope is already balanced properly, because disengaging the safety bolts can cause an unbalanced telescope to drift off, possibly causing damage to the tube.

10. Balancing your telescope

You can balance your system by moving your telescope back and forth in between the rings and by moving your counterweights along the counterweight shaft. A good configuration will show no unbalance in a horizontal position along the DEC- or the RA-axis (see image).



11. Connecting cables to your mount

Connect the delivered cables to the mount. Each cable comes with a different plug, so they will only fit into the required socket.

- Socket 1 = USB (cable D)
- Socket 2 = COM (cable C)
- Socket 3 = Data (cable I)
- Socket 4 = Power supply (cable A)
- Knob 5 = Laser

12. Connection Ports on the frontal DEC-axis

- 1 to 3 = USB connections
- 4 = Connection for the ASA OK3 - ASA's electric focuser (cable E); (cable optional)

13. Connection Port on the rear DEC-axis

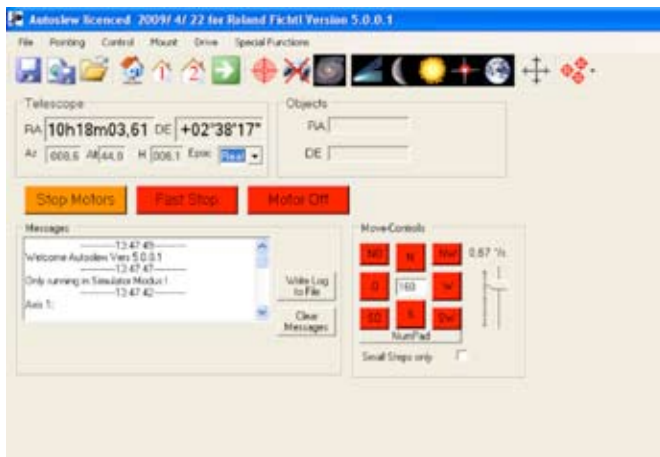
- 1 = 4-pole connector 1 x 12V1, 1 x 0 - 48V2, galvanic separation (cable G)
- 2 = Socket for data connection series 8 x 0,2 or client specific (cable H)
- 3 = Socket 1 x 12V1 (cable F)

AUTOSLEW - Software for the ASA mount

You can download ASA's software and manuals in the download area on ASA's website (<http://www.astrosysteme.at>).

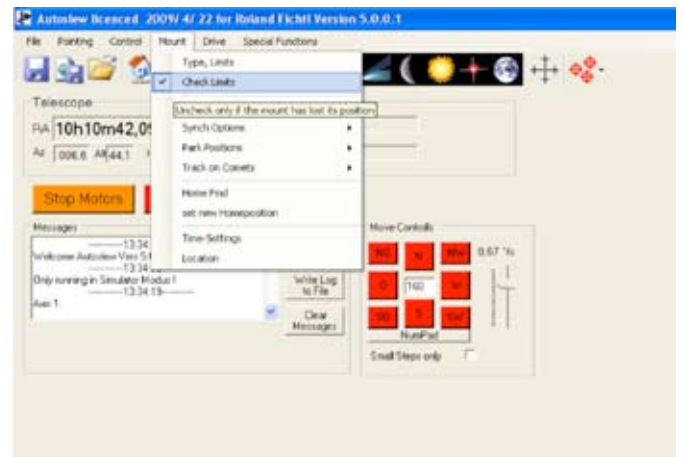
IMPORTANT: Make sure to carefully follow the instructions of your installation guide.

Activate the software with your serial key before running the software for the first time. You will be prompted to enter the key when you run your software for the first time. The key is located at the bottom of your final invoice. Connect your power supply cord from your mount with your power supply unit (12 V < 12 Amp / not supplied with the mount). **CAUTION:** Wrongly connecting your power supply unit could cause permanent damage to your mount. Connect both controller cables of your mount with the USB to serial converter (B) connecting your mount with your PC / Laptop. (Connect with the USB of your mount to your PC. It is advised, to use a USB Hub with external power supply in between).



14. Starting Autoslew

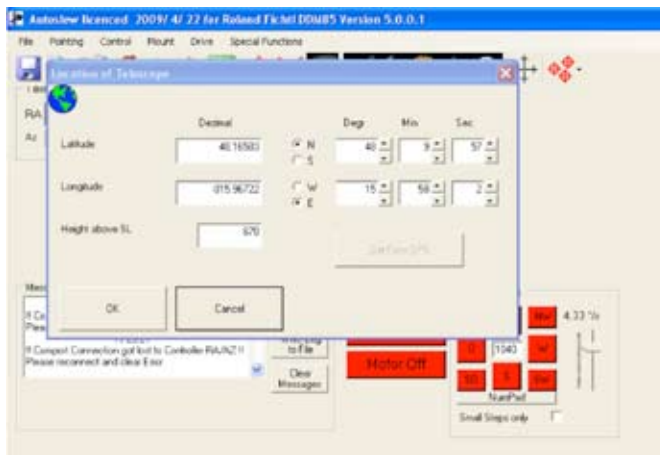
The motors of your mount are now active and the mount is stiff, since the motors have built a magnetic field. As soon as you move the telescope by hand, the motors will switch off and must be reactivated in Autoslew (click the red button "Clear Servo error"). Since no parameters have been adjusted yet, it is possible and normal that your mount will make loud noises, vibrate or that it will deactivate itself. Therefore, it is recommended that you turn off the motors first by clicking "Motors Off" in Autoslew. Then follow the instructions below.



15. Mount Limits

In Autoslew, click on "Mount" in the top menu and then deactivate "Check limits". This will allow your mount to run freely, since prior to mount calibration (sync on a star and doing rough polar adjustments), limits will not be handled right by the software.

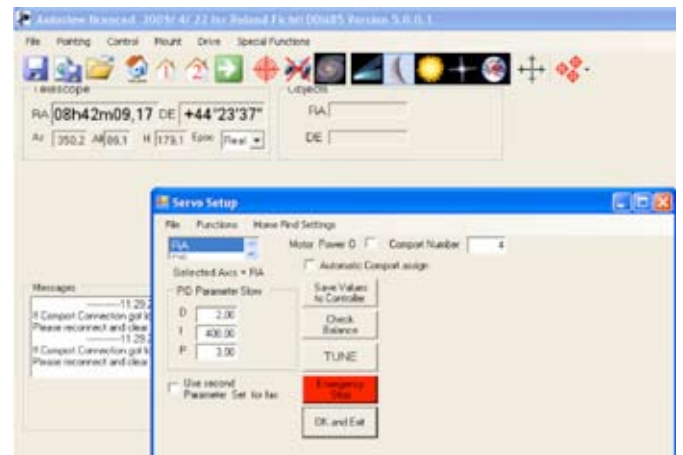
CAUTION: Be aware, that as long as your mount is not synchronized or the option "check limits" is deactivated, your telescope can run into your pier or tripod!



16. Adjusting your Location and Time

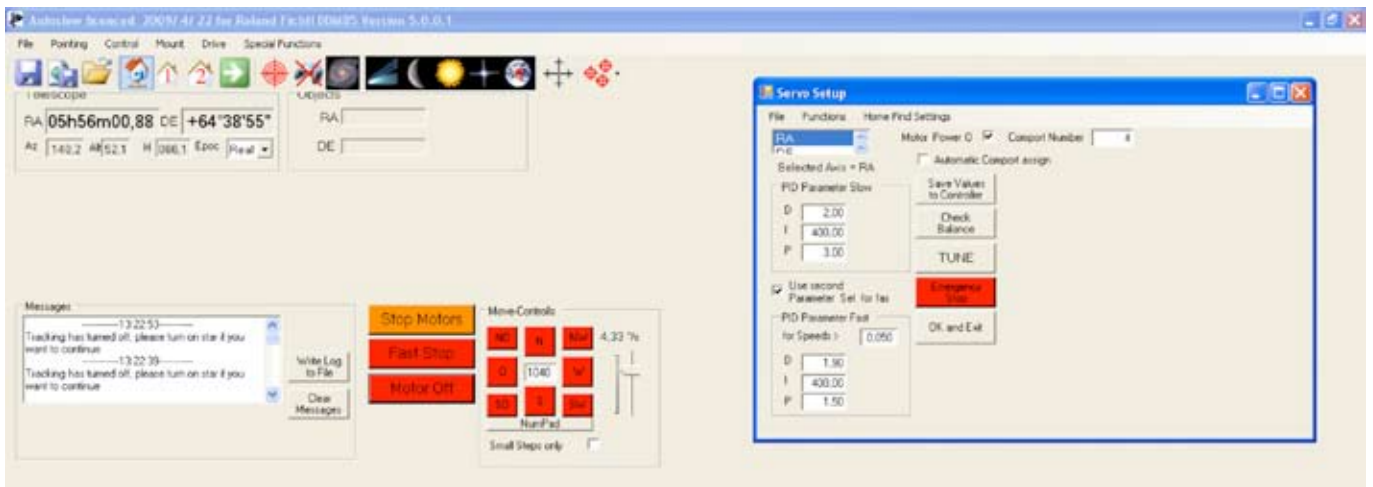
In Autoslew, go to "Mount / Location" to set up your geographical location. Your time is synchronized automatically with your operating system.

TIP: Update your operating systems time either automatically or choose to update manually from time to time! To simplify the process and to increase precision, you can use an external GPS receiver in conjunction with Autoslew. We recommend you use "Navilock" (www.navilock.de) which comes with an USB connection. Go to "Mount/Time Settings" to connect your GPS with Autoslew.



17. Adjusting your Motor Parameters and Balance

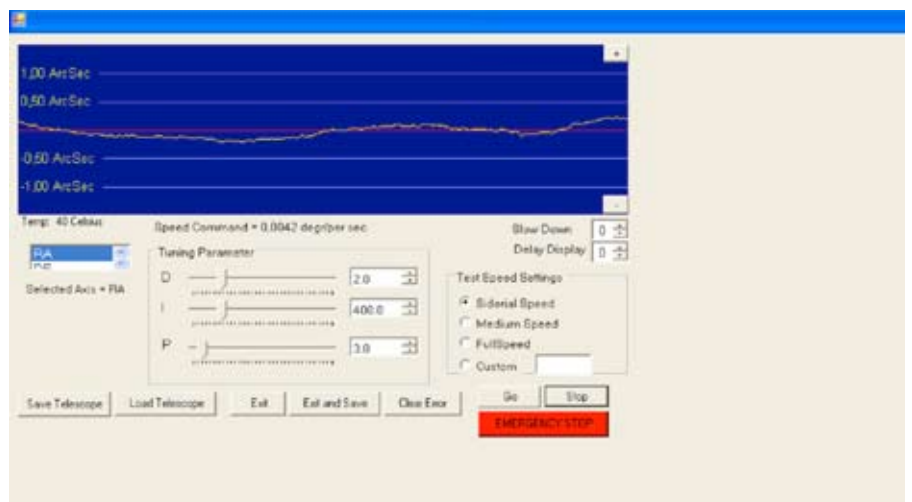
By choosing "Drive/Servo/Settings" you can access the menu to adjust your mounts configuration.



Adjusting the Motor Parameters

In Autoslew you will find a drop down menu in which you can choose between RA- and DEC-axis. In case you turned off motors before using Autoslew, you can now turn on motors individually by checking "Motors Power 0". Then click on the "tune" option, this will bring you to the adjustment page for motor parameters.

In order to understand better the adjustment process of the motor parameters, you can take your time and view a thorough video tutorial available through our website (currently only in German) at http://www.astrosysteme.at/de/montierung_videotutorial.html



Before you proceed with adjusting parameters, move the telescope into a position where it is pointing towards north and the counterweight pole is pointing down towards the meridian.

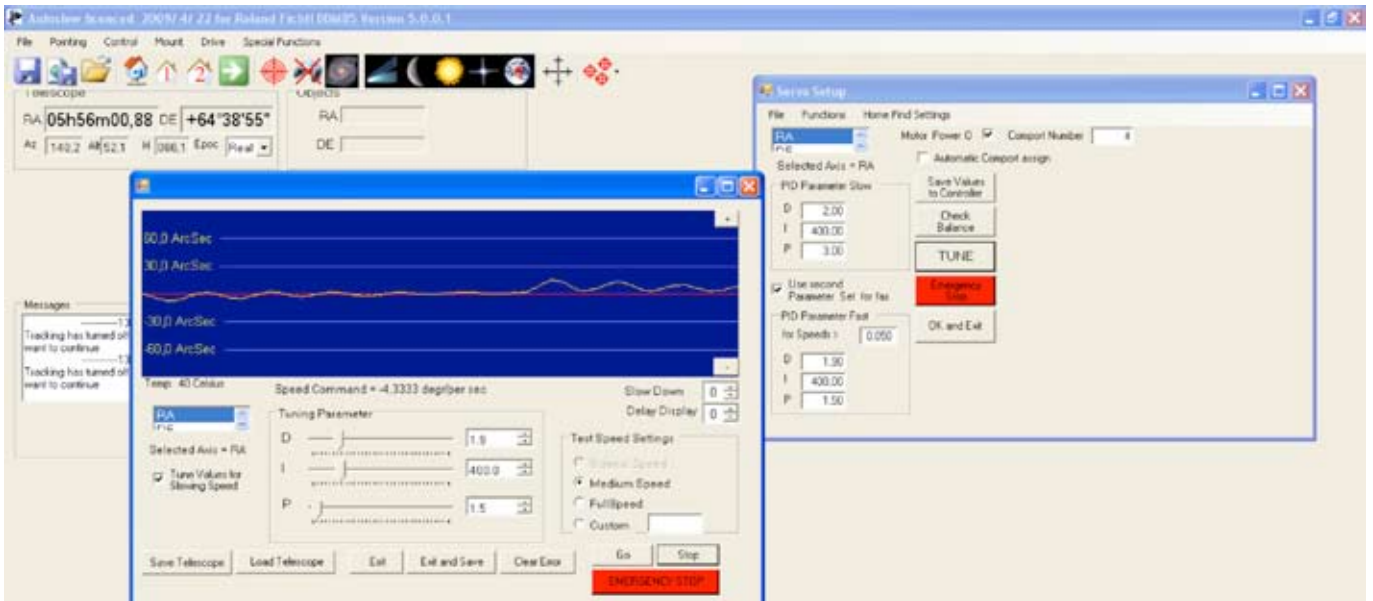
IMPORTANT: The mount should be properly balanced at this point of time - a more exact fine tuning process can be done at a later stage (see instructions below)!

Because every telescope and image train has its own unique total weight, you will need a specific set of parameters for each set-up so your mount can reach optimal performance. Adjusting these parameters will only need to be done once for each telescope setup. It is therefore important to set up your image train prior to the adjustment process, especially if it adds considerable weight and counter weights to your system! Start by choosing RA-axis in the dropdown menu, then click on "Siderial speed" to adjust the parameters for the tracking speed first. Start the tuning process by pressing "Go". Observe the curve displayed in the main blue window. Through movement of the levers you can change the parameters. It is best to start with lower values and then gradually move the lever to the right side, thus increasing values. Through the use of +/- buttons in the blue window, you can zoom into the graphically displayed curve.

After completing the process, choose DEC-axis in the drop down menu and repeat the process. The goal is to set the values as high as possible, without the mount producing noise or vibrations.

TIP: When the process of adjusting the parameters is complete, slightly tip the telescope with your fingers (wind burst simulation). If the parameters are adjusted correctly, the mount will not vibrate or create excess noise.

Once parameters are adjusted correctly, click "Exit and Save". To complete the process, choose "Save Values to Controller". This will store the values directly onto to your mounts controllers.

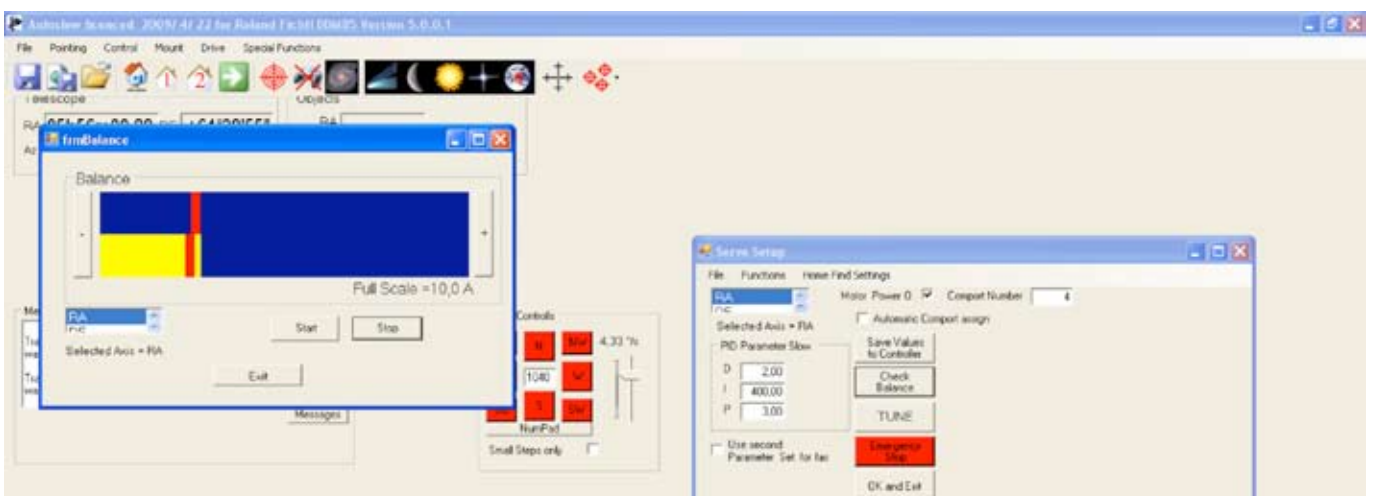


After you have optimized motor parameters for tracking, it is possible to do the same for fast tracking speeds ("Tune Values for Slewing Speed"). In principle, the tuning process is similar to the one explained above, although for the fast speed tuning it is enough to make sure there are no loud noises or vibrations coming from the mount. Once your adjustments are completed, you can save your configuration by clicking on "Exit and Save". Then "Save Values to Controller". Note: Lite telescopes will generally need lower values (lever moved to the left side) than heavier telescopes.



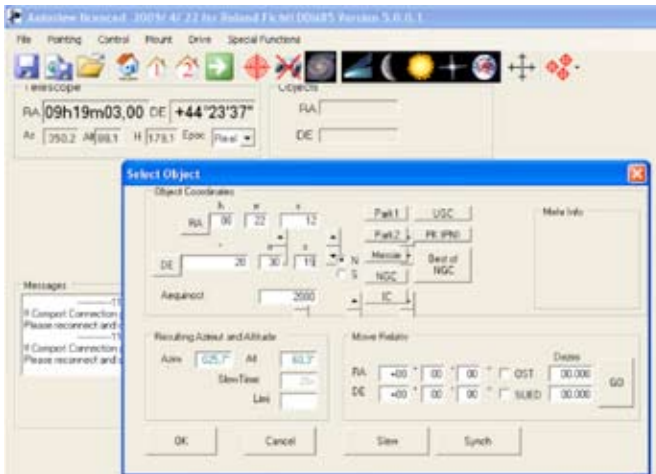
Adjusting and fine-tuning your Telescopes Balance in Autoslew

If you have followed instructions carefully, your telescope will be roughly balanced at this point in time. Through a special feature within Autoslew you can fine tune the balance of your telescopes to further maximize the performance of your mount.



You can start by bringing your telescope into a horizontal position (see image). In Autoslew, open the Servo Settings menu if not already opened, click on "Drive" located in the top text menu. Then click on "Servos", followed by "Settings". You are now in the Servo Setup window. Choose "RA" in the drop down menu and then click on the "Check Balance" button located in the center of the window. Click on "Start" - you can now see the remaining imbalance on the RA-axis displayed by large

yellow and smaller red bars. To adjust the balance on the RA-axis, slightly move the counterweights along the counterweight shaft back and forth until both the top and bottom red bars are perpendicular to each other. Then click on "stop". Then choose the "DE" axis from the dropdown list and click on "Start". To adjust the balance on the DEC-axis, slightly move the telescope within the telescope rings back and forth until both the top and bottom red bars are perpendicular to each other.

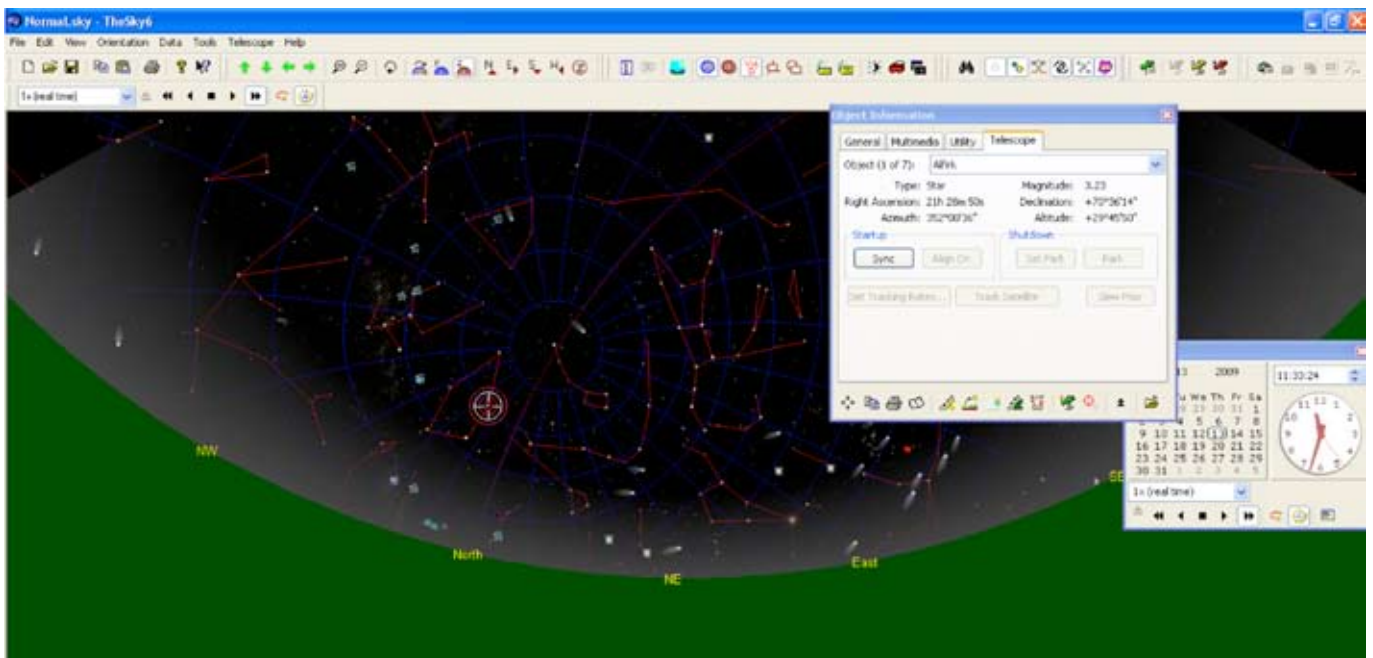


18. Finding Objects with Autoslew or Planetary Simulation Software

In Autoslew, click on the star symbol (located in between the graphical representation of sun and earth) called "Turn on tracking with sidereal Speed". To find objects, you can either use Autoslew or work with planetary simulation software i.e. "The Sky" or "Starry Night". With the help of the arrow keys called "move controls" in Autoslew, point your telescope to a bright star and center it. To synchronize with Autoslew, click on the "Select Objects" symbol (galaxy symbol). Enter the coordinates of the star and click on the "Synch" button.

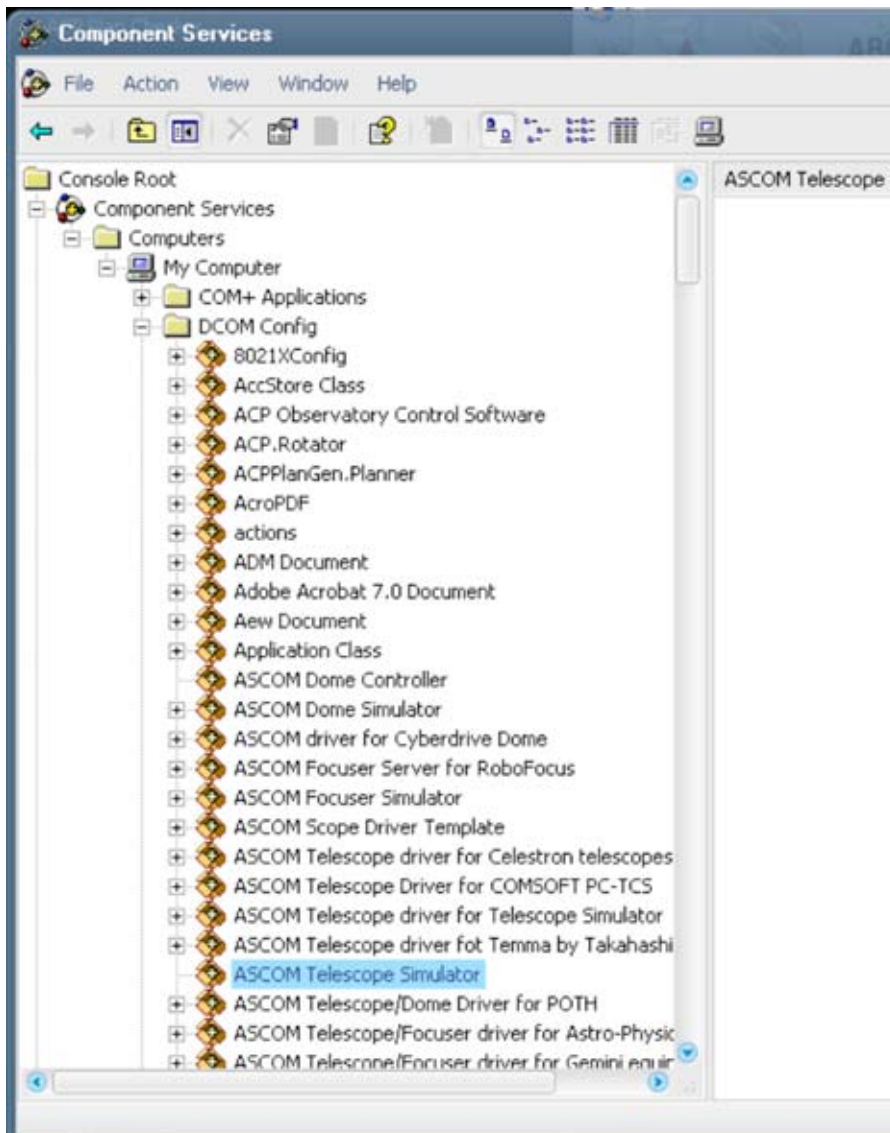
A pop-up will appear in Autoslew, asking you to choose whether your telescope is in east or west position. Your telescope is in east position, if the counterweight shaft is pointing towards east. Vis-a-versa, your telescope is in west position, if the shaft is pointing towards west.

Autoslew is now synchronized and can be slewed (green arrow button) to any position by entering coordinates manually or by choosing object from the list.



If you are using Autoslew in conjunction with planetary simulation software: In the "The sky", choose "Telescope / Setup / Telescope API" and connect to Autoslew by choosing "Telescope / Link / Establish".

With TheSky you will also have to change your Windows DCOM settings prior to controlling your Ascom telescope with TheSky. See next chapter!



Since the driver is an EXE, and since TheSky uses the old Microsoft Distributed COM (DCOM), any outgoing connection from TheSky (including via TeleAPI.DLL which resides within TheSky's process) is subject to cross-process DCOM Permissions. The ASCOM Platform Installer adds all this extra baggage to the registry for EXE drivers that come with the Platform... but you will have to do this yourself:

For Windows XP, Vista:

1. Start menu, Run... enter dcomcnfg
2. In the Component Services window (see attached image) expand Component Services (click on the icon not the [+] box), then Computers, then My Computer, then DCOM Config.

3. At this point you will probably see many popup windows asking if you want to add AppID entries. Look for one of your drivers and answer Yes. Answer No for the rest.

4. Once you have passed all those popups, look for the Ascom entries in the left area. Right click all of them after each other and select Properties, General tab and change the Authentication Level to "None". Click OK. Now try to connect to your driver directly from TheSky by selecting "Telescope API" in the settings window and then select Astrooptik Server Telescope

Establishing a Connecting between TheSky and Autoslew

This section describes how to connect TheSky with Autoslew if both programs are running on the same computer. There is also a link on the Ascom homepage where you can find more information:

<http://www.ascom-standards.org/FAQs/TheSky.htm>

and a place where you can download your new TeleApi.dll:

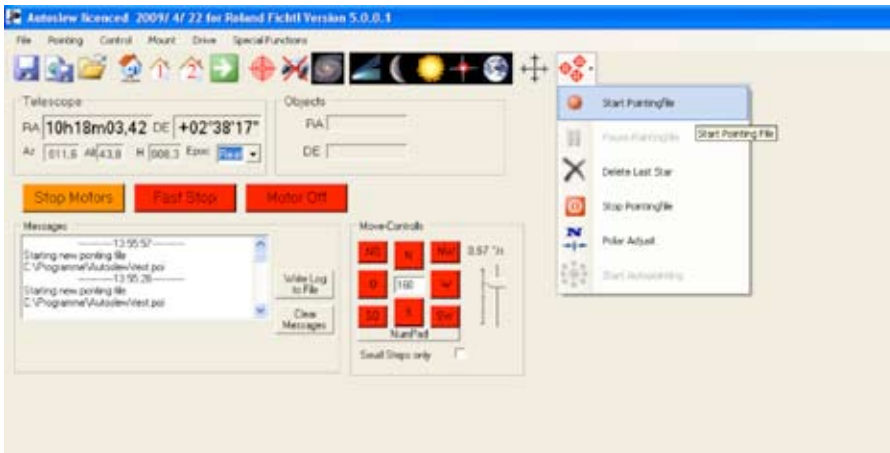
<http://www.ascom-standards.org/Downloads/Plugins.htm>

TheSky does not offer a direct way to select "Ascom Telescope" in a drop-down menu so, you have to use a modified telescope API as connection between TheSky and the Ascom telescope driver. You should therefore replace the original TheSky TeleAPI.dll with a new file with the same name.

To do this, download the TeleApi from the above link and copy it to: c:/program files/common files/system.

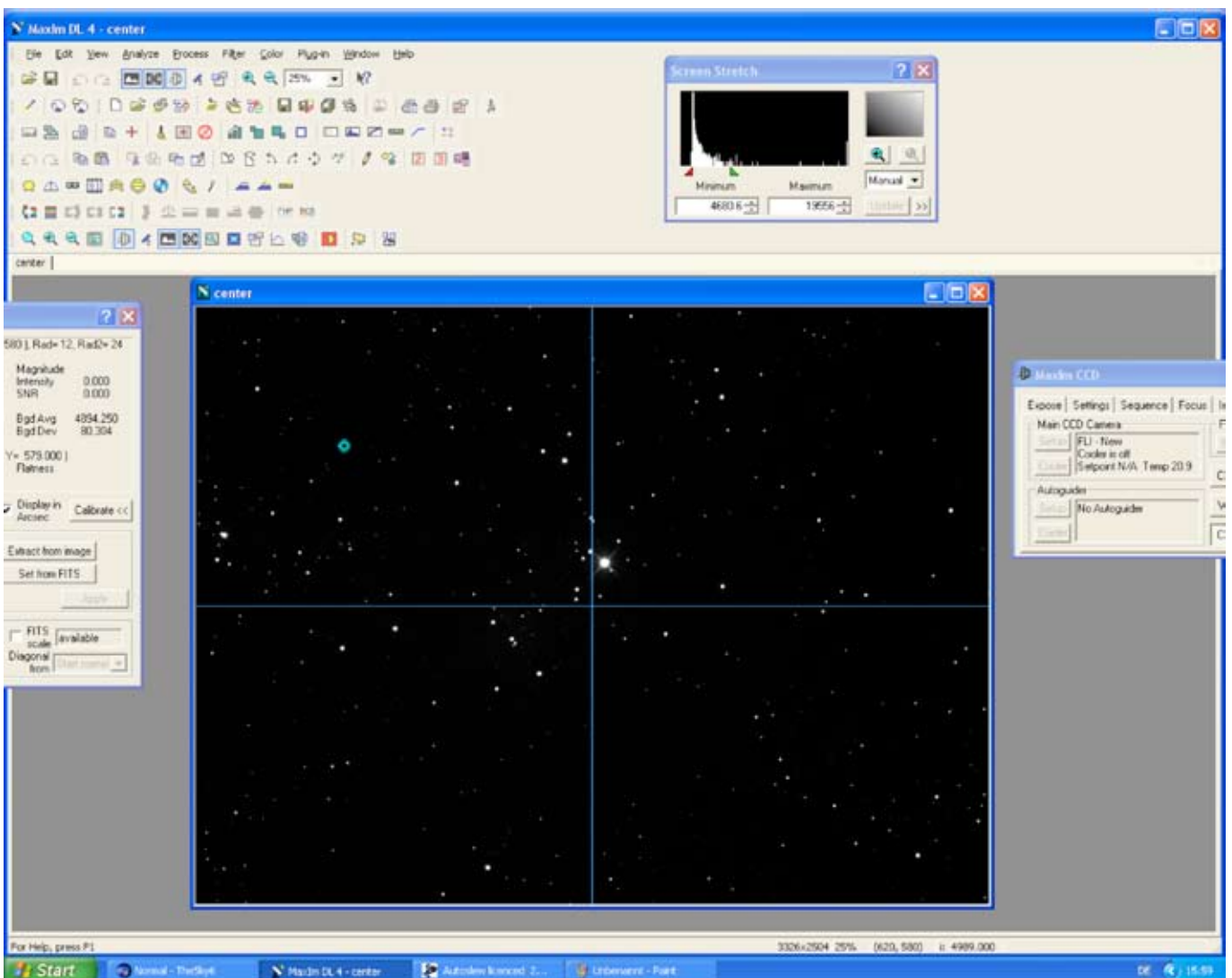
Establishing a connection between Starry Night and Autoslew

In "Starry Night" choose Telescope (located in the vertical menu on the left side of your screen - near the left bottom corner) then choose "configure". Starry Night will now start the ASCOM Telescope Chooser. Select "Astrooptik Server Telescope". Then choose "Connect" in the telescope menu. If your software was installed correctly, a link will be established. If you choose to synchronize your planetary software and telescope to a star, Autoslew will again ask you weather your mount is pointing east or west.



19. Creating a pointing file

After you completed synchronizing Autoslew, you will proceed to polar align your mount. Initially, you will need to create a "pointing file" within Autoslew with between four to six stars. In Autoslew click the button with 3 red stars on it and choose "Start Pointing File" in the drop down menu. Name the file i.e. "name polaralignment".



As a next step, you need to slew your telescope to the first star. Select a bright star with the Sky or any planetarium software you are using and perform a slew to your first star. You can either use a crosshair eyepiece or use a CCD or Web-cam with some imaging software such as "MaximDL" or freeware such as PHD Guiding. Center the star with help of Autoslew's arrow keys "Move-Controls" or with your Joystick/Gamepad.



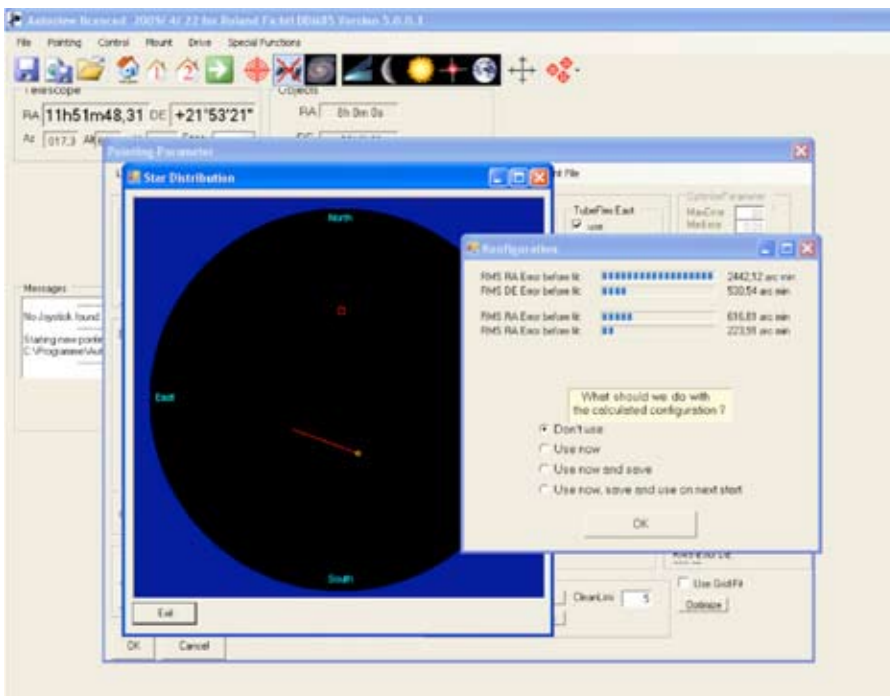
Autoslew will now show a green check symbol on a red button. By clicking on the button, confirm that the star is centered. Autoslew will now prompt you to move to the next star. Repeat steps until you have all stars confirmed.

20. Completing and using your pointing file

The process of centering and confirmation is the same for each star. Try using stars in large distance to each other, but each pointing file should contain star locations either east or west of the meridian (not both in one file). After centering and confirming 4 to 6 stars you can complete your pointing file by clicking on the button "Stop Pointingfile".



Then open your pointing file and then optimize it by use of the Option "Calculate Configuration".



Choose "Use now" and end by clicking OK.

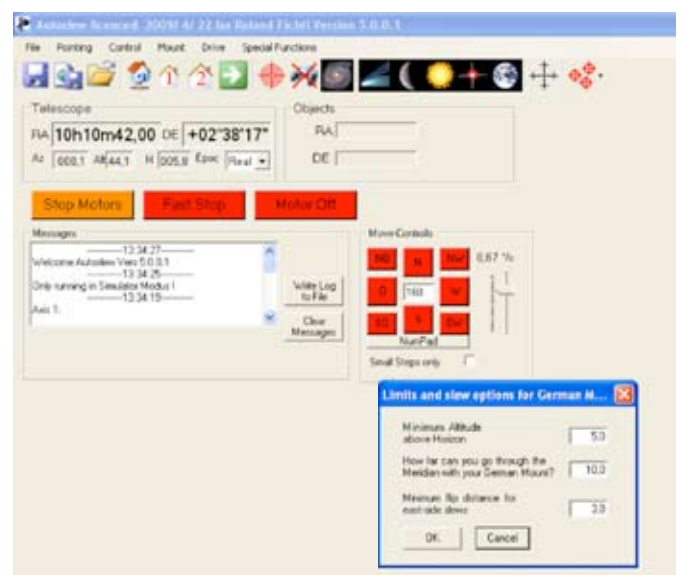


21. Fine-tuning Polar Alignment

Choose "Polar adjust", Autoslew will then display a list of Azimuth and polar height tracking errors and will prompt you to point and center a star south near the meridian in between a height of 10 to 40 degrees. After centering the star, click on "Move Star Now". Your mount will now move away from the star in correspondence to the error distance.

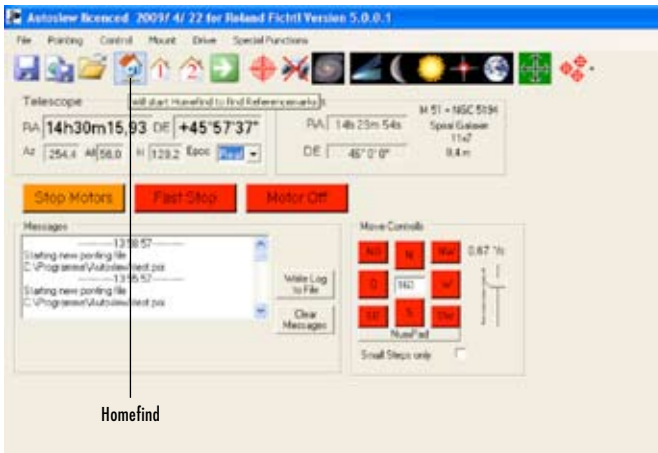


Continue by loosening both the azimuth fastening screws and the fastening screws for adjusting polar angle/height. Now turn the azimuth and polar height adjustment screws until the star is centered again in your image (consult chapter 7 of this manual to find out how to use the screw adjustments). Then fasten the adjustment screws with help of an Allen wrench key. You have now fine tuned your polar alignment! Autoslew will inform you about the precision of your tuning process next time you configure your pointing file(s) for optimizing tracking precision. (See Chapter 19).



22. Set limits

After completing the polar adjustment you can click on "Type Limits" to limit the movement of the mount so the telescope does not hit the pier, tripod or other obstacles.



Homefind

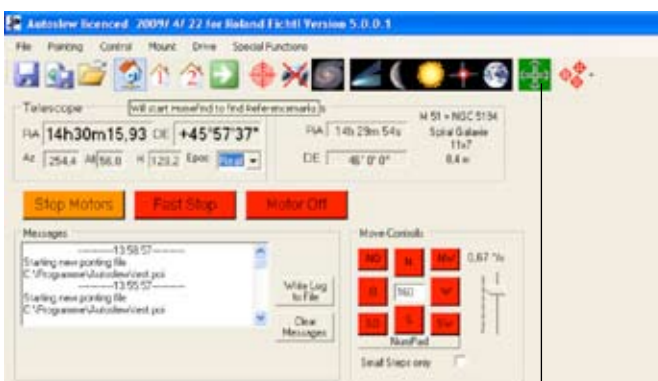
23. Home position

1. Point your telescope towards the zenith
2. Make sure, the counter weight shaft is pointing towards East (applies also to the southern hemisphere)
3. Click on the "Homefind to find reference mark" – Button
4. Motor will now search for the mounts internal reference mark.
5. When the reference mark is found, Autoslew will report: "RA calibrated OK", "Dec calibrated OK"
6. Slew to a star and center it
7. Synchronize your planetarium software (i.ex. The Sky)
8. In the Autoslew Menu Bar, click on "Mount" then on "Set new Home Position"
9. Autoslew will prompt you to ask whether you have synced and centered a star. Click OK!
10. At the end, make sure to save your parameters by clicking on "File" then "Save Parameters"

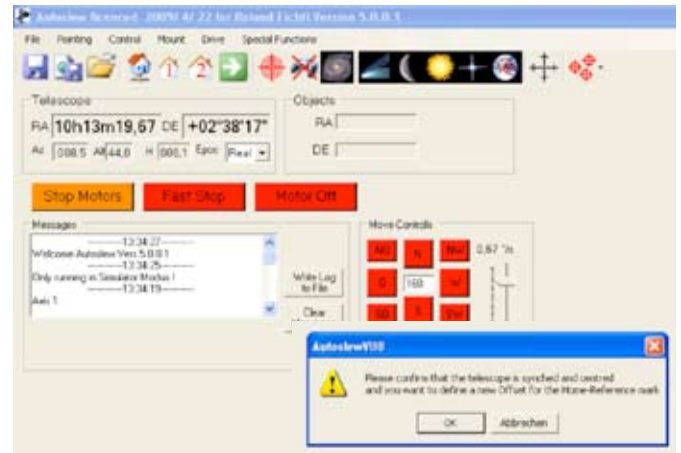
TIP: Choose a park position near the reference point, so you can speed up the process next time you start up your mount! (See also chapter 26).

When you start your mount next time, do the following to activate home position:

1. Turn off your mounts motors
2. Bring your mount into the home find position (telescope pointing to the Zenith).
3. Activate your mounts motors
4. Click on the home find button
5. The mount will now attempt to find its internal reference marks by moving into both directions
6. On a successful calibration, Autoslew will report back "AZ Calibration OK" "RA Calibration OK".
7. In your Planetarium Software connect your telescope. After connecting your telescope, you should see your mounts position in the planetarium main window (no need to synchronize again).



High Accuracy Tracking



24. Using a Pointing file for Tracking

When using Pointing Files in combination with data coming from the Renishaw Encoder on your mount, you will in principle achieve a tracking accuracy which will make auto-guiding unnecessary.

Create a Pointing file using at least 10 stars to optimize your mounts tracking accuracy. Choose stars spread out evenly over the visible sky. After creating your Pointing file according to the previously described method, you can use the file by choosing "Use now", "Save", "Use on the next start" in Autoslew. Then, click on the button "High Accuracy Tracking" and start your imaging process.

IMPORTANT: If you want to configure a new Pointing File, you will have to delete your old one by choosing "Pointing / Clear old Configuration".

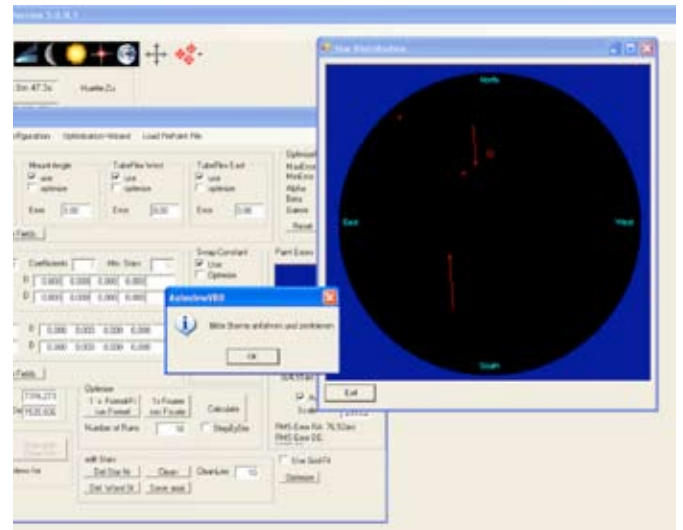
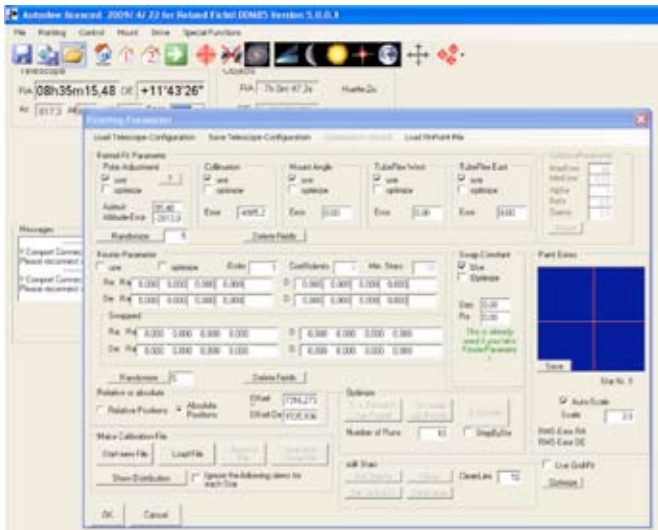
The next version of Autoslew will contain Autopointing. Autoslew will then be able to astrometrically create pointing files automatically according to your pre-defined preferences. The autopointing feature will require Maxim DL and PinPoint software in conjunction with a GSC catalog.

Use of Autoguiders

In case you still would like to use an autoguiding system to control your mounts tracking, you first need to activate "High Accuracy Tracking" and then connect your mount through the telescope Menu within your imaging software (i.ex. Maxim DL). There is a big increase in accuracy, if you don't guide through the camera relays but if you use the pulseguiding method that is a Ascom method supported by many programs like MaximDL. To set your autoguider to pulseguiding in MaximDL, go to the guide tab and select <options> and then <guider settings>. Set your guider output to "Telescope". Instead of pulling the relays a certain time now, MaximDL sends a pulseguide command to Autoslew in which it defines the time in milliseconds the telescope should move in a certain direction. The Autoslew correction speed currently is pre-set by 10 " / second. So if Autoslew gets a pulseguiding command of 20ms in a certain direction it moves the telescope by 0.2 arc seconds in this direction.

This explains why the pulseguiding method is far superior compared to guiding through the relays.

If you set the calibration time in MaximDL take into account that the telescope will move 10 arc seconds per second, so setting the calibration time to 10 seconds (default of MaximDL) will move the telescope 1.5 arc minutes.



25. Extending your Pointing File

You can further optimize your mounts tracking accuracy by adding extra stars to your Pointing File. Let's say you collected 10 stars on your first night and would like to continue the following night, start by pointing your telescope out of home position to the next star.

IMPORTANT: You should never synchronize in between. Instead, center the star as before, then open the file created during the previous night by choosing "Pointing / Advanced Pointing Control" click "Append File" and continue.



26. Park position

You can define the parking position of your mount by choosing "Mount / Park Positions / Change". When you restart your system, go to your home position. Then you can start pointing to objects.

TIP: Choose a park position near the reference point of your mount, so you can start faster next time! But on the other hand always have enough distance to your reference marks so you know in which direction to perform the homefind.

Support:

In case you encounter a problem that you cannot solve on your own, ASA's technical staff can assist you through remotely accessing your Autoslew software. Should you encounter a problem, send us an email describing the nature of your problem (support@astro-systeme.at). We will then get in touch to arrange a remote session with you.