EAGLE6

computer for telescopes and astrophotography

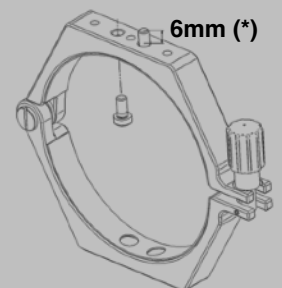VERSION 1.0

Update 11-02-2025

EAGLE is manufactured by PrimaLuceLab S.p.A. (Italy). For any matters relating to the use, service and warranty, please refer to the addresses given in the relevant documents.
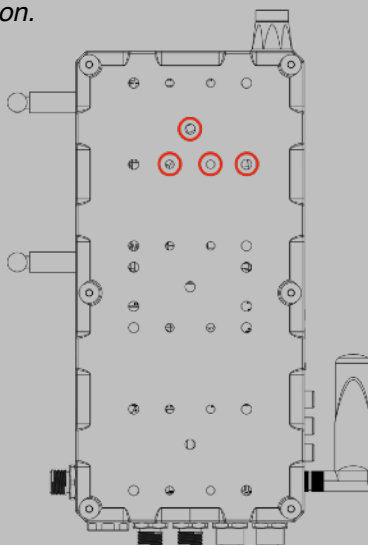
Things to know before using EAGLE

1: The EAGLE is specifically designed to control telescopes and astronomy accessories and is more than a standard Windows computer. Do not modify the EAGLE's and Windows system settings, as this could disable some of its features.

2: The EAGLE includes a computer running the Microsoft Windows operating system. If you experience issues installing, connecting, or using a third-party device (such as a mount, camera, or other accessory not manufactured by PrimaLuceLab), we recommend first verifying that the device works correctly with Windows 11. Since these issues may be related to drivers or software compatibility and not directly to of the EAGLE, please check the manufacturer's support resources for troubleshooting before contacting our technical support.

3: Before installing your devices driver and your astronomy software in the Windows operating system of the EAGLE, PLEASE CREATE A RECOVERY DRIVE by following the instructions you find at paragraph "First use: create a recovery drive with Windows 11 tool before installing your software" of this user manual.

4: For wireless connectivity, the EAGLE creates a WiFi network operating on the same frequency as typical modems or routers used for internet access. If you use the EAGLE at home (for example, during initial software installation), you may experience a lower signal or, in some cases, connection issues caused by radio interferences with other wireless networks. To resolve this, move the EAGLE to an area with fewer WiFi connections, or connect it directly to a monitor (via HDMI), keyboard (USB), and mouse (USB) to install your software.

5: Each EAGLE unit is assembled in our laboratories and rigorously tested by PrimaLuceLab technical experts. This ensures the proper functioning of all components, including the integrated computer, wireless connection stability and speed, and the power bridge.

6 - CAUTION: *when connecting the EAGLE to other mechanical PLUS elements, ensure that you do not use screws that are too long, as they may come into contact with the internal electronics of the EAGLE.* **THE THREADED PORTION OF THE SCREW (*) EXTENDING FROM THE ELEMENT (ring, bar or clamp) TO BE CONNECTED TO THE EAGLE** <u>**MUST NOT EXCEED 6mm**</u> **EXCEPT FOR** THREADED HOLES THAT CORRESPOND TO THE FAN POSITION, WHICH ARE INDICATED IN THE PICTURES BELOW. **FOR THESE SPECIFIC HOLES, THE THREADED PORTION OF THE SCREW EXTENDING FROM THE ELE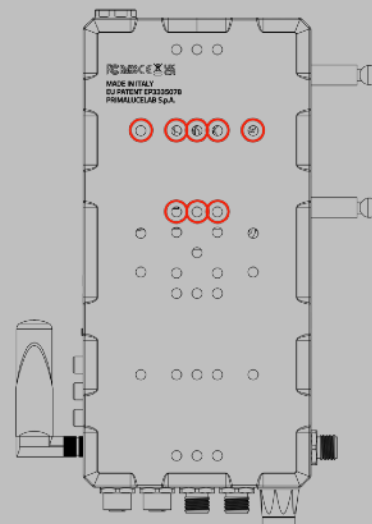MENT (*)** <u>MUST NOT EXCEED 4mm</u>. *If any of the screws touches the internal elements of EAGLE, this could lead to breakage or malfunction.*

6mm (*)

EAGLE6
(top view)

**EAGLE6
S / PRO / XTM**
(bottom view)

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WARNING

If improperly handled, EAGLE may be damaged, so please follow the instructions below:

• Do not disassemble

• Do not open, damage or subject to electric shock or excessive impact any part of EAGLE. Do not drop.

• Do not short the electronic elements

• Do not expose at temperatures above 50°C

• Do not burn or incinerate any component.

• Do not wet any electronic or electric component.

• Do not use outdoors in adverse weather conditions such as rain or snow.

• Do not bend, modify or force any part of EAGLE

• Never point the EYE sensor without cap towards the Sun. If you use your telescope to observe or photograph the Sun, please cover the EYE sensor with the proper cap provided in the box before pointing the Sun.

NOTICE In case you check any malfunction, please contact us immediately (+ 39-0434-1696106 or support@primalucelab.com). Do not try to disassemble, repair or modify yourself EAGLE, without our written approval, in order not to loose the manufacturer warrantee.

Components Identification

The numbers indicate the name of the specific component. Read the paragraphs below for detailed operation description.
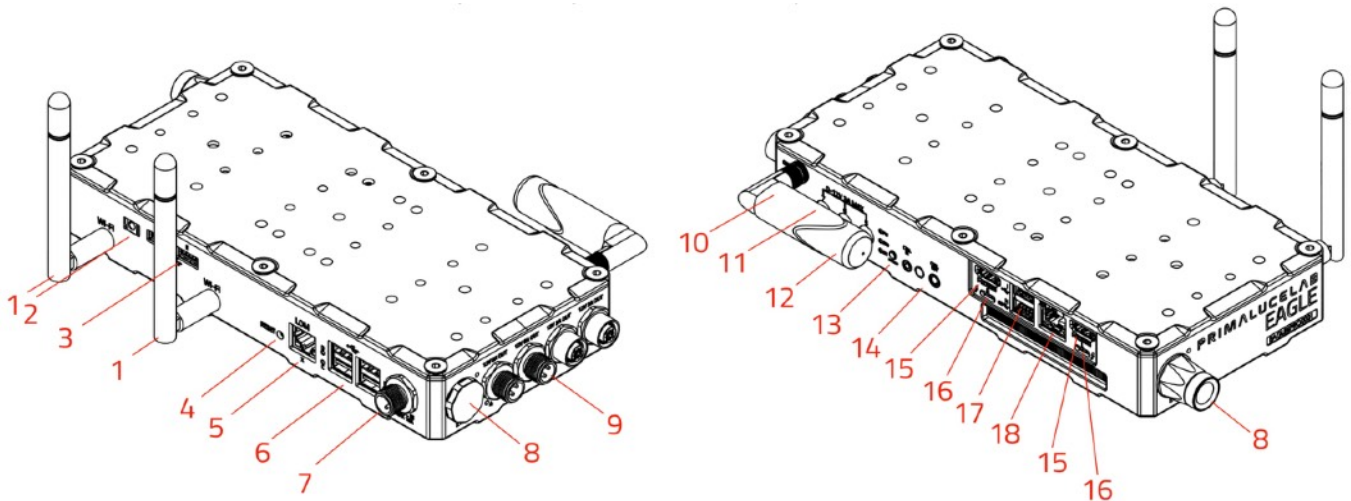
1) WiFi antenna

2) 3.5mm stereo headset jack

3) USB 3.2 ports

4) Reset button

5) LOM port

6) n.4 USB 2.0 ports (on/off switchable)

7) Power IN 12V

8) EYE sensor

9) n.4 12V power out ports

10) Status LED

11) n.3 power out ports with regulated voltage

12) GPS antenna

13) On/Off switch

14) CTRL-IN and CTRL-OUT ports

15) HDMI port for external display

16) USB-C ports

17) n.1 USB 3.2 port (blue) + n.1 USB 2.0 port (black)

18) Ethernet port

First use: how to choose the correct power source

EAGLE allows you to distribute power to many devices used in telescopes astrophotography (such as mount, camera, filter wheel, electronic focuser, dew heaters, etc.), thus eliminating the need for many different power supplies. Since the EAGLE allows you to have a single power source (battery or AC adapter), it's important to select the correct power source to properly power all the devices you want to use.

CAUTION

EAGLE must be powered with 12V regulated voltage. You can use a power supply with 12V output voltage or a field battery. If you use a battery, this MUST be provided with a proper voltage stabilization. In case of any malfunction, immediately unplug the power supply. **DO NOT CONNECT TO THE EAGLE A BATTERY WITHOUT 12V VOLTAGE REGULATOR** since it may damage the other instruments powered by EAGLE (like the cooled camera). Immediately disconnect power supplies or battery if there's any malfunction of the unit.

Which battery or power supply have I to use for my equipment?

The power supply or battery you need to use to power the EAGLE and all peripherals connected to it depends on the electric current needed to power all the instruments plus the EAGLE. Let's make an example by considering the EAGLE basic model, that needs for an average of 0,6 Ah:

- EAGLE: 1,2Ah maximum consumption (average consumption: 0,6Ah)
- Cooled camera: 4Ah maximum consumption (average consumption: 3Ah)
- Computerized mount: 2Ah maximum consumption (average consumption: 1Ah)
- Guide camera: 0 consumption (power from the USB port of EAGLE)

We'll have a total maximum power consumption: 7,2Ah. So, for this setup, you should use the 14A AC adapter. If you want to use a battery (WARNING: The battery must have a 12V voltage regulator with protection system) that can power the entire system for 8 hours (for example for the duration of an astronomical night), you will need a battery with a capacity of at least:

7,2Ah (consumption per hour) x 8 (hours duration) = 57,6 Ah

TIP

When many devices are powered through the EAGLE (and Ampere consumption exceeds 5Ah) we recommend the use of a power supply or battery with voltage regulator set to 12.8V volts instead of 12V. This is because, when you distribute power to many devices and you have an high power consumption, there's a normal and small voltage drop: by setting your source at 12.8V, you will have a voltage of 12.xV in the EAGLE's power out ports and this will be fine with all your 12V powered devices. The important thing is to have the voltage not lower than 12.0V. In order to create a large capacity field battery and have a voltage of 12.8V, you can connect to the battery a 220V inverter and then connect to this the standard 12.8V 14A AC adapter for EAGLE.

First use: switch on and activation of wireless network

The EAGLE is designed to be controlled from an external device (not included with the EAGLE) via WiFi. You can use any mobile device (tablet or smartphone) with any operating system (iOS or Android) or any computer (Windows or macOS). To enable remote control, you'll need to download the "**Microsoft Remote Desktop**" app onto the device (smartphone, tablet, or computer) you'll use to control your EAGLE. Depending on your system's app store, the application may also appear under the name "**RD Client Microsoft**." The Remote Desktop client is free and compatible with all major operating systems, including iOS, Android, Windows, and macOS. Alternatively, you can use the "**Parallels RDP Client**," which is also free and available for multiple operating systems.

To set up the hardware, begin by installing the two WiFi antennas (1) included in the package. Thread them onto the appropriate ports on the side of the EAGLE. Next, attach the GPS antenna (12) to the designated port on the opposite side, as shown in the diagram (image 1). **Please note: since the connectors for the WiFi and GPS antennas are identical, ensure you attach the antennas to the correct ports. The WiFi antennas should be connected to the side of the EAGLE with two antenna ports, while the GPS antenna must be connected to the side with the single antenna port.**
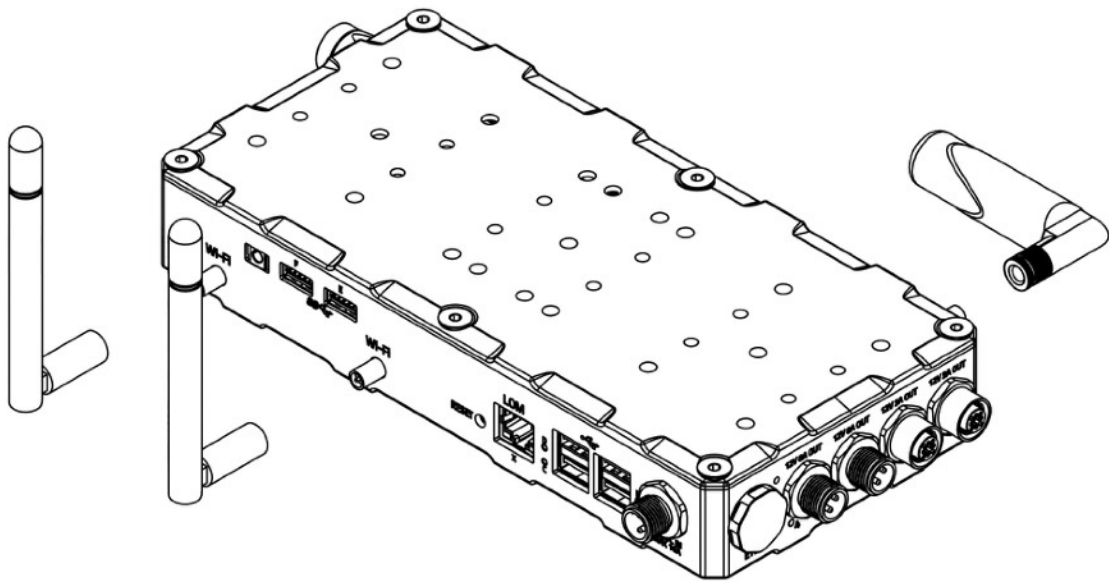
Image 1: thread the WiFI antennas (left) and GPS (right) to the proper ports
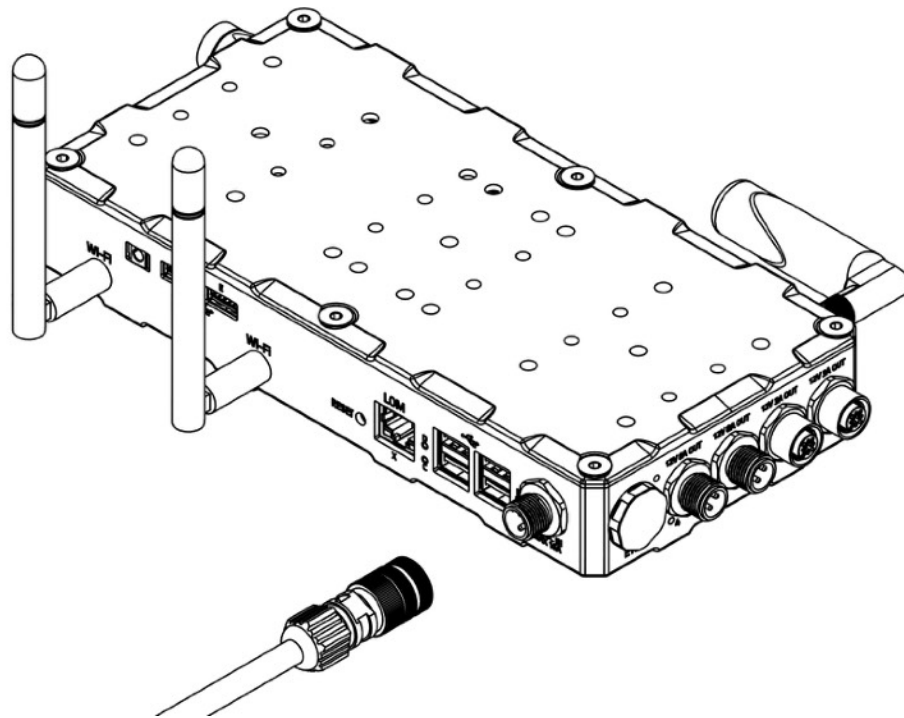
Image 2: Connect the power plug into the socket (7)

To power the EAGLE using a 12V battery with a cigarette lighter socket, use the 12V cable with a cigarette lighter adapter included in the EAGLE package. Connect the power cable (image 2) to the designated socket (7 - 12V power input). You will hear a beep, and the PW LED will light up. If you prefer to power the EAGLE from a 110/220V wall outlet, replace the power cable with the optional 12.8V power supply. Next, press the power button (13). The ON LED will illuminate, and the SSD LED will begin blinking, indicating that Windows is booting up.

Image 3: press the ON/OFF button (13) to switch EAGLE on
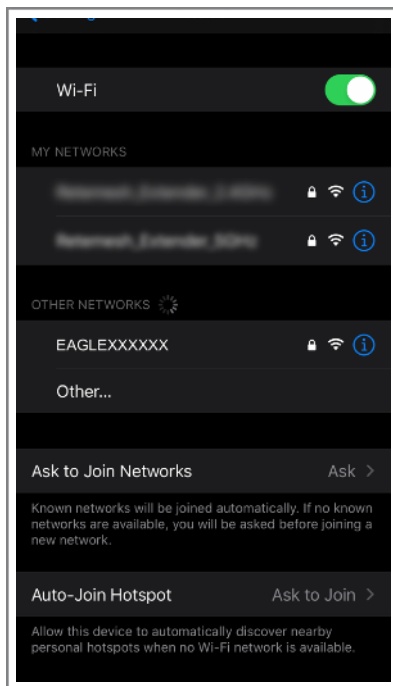
Image 4: select the WiFi net created by EAGLE

Now wait about one minute and you will hear a second beep sound. This indicates that the EAGLE's WiFI connection is ready. On the side of the EAGLE case you will see the STS LED light turn green, this means that Windows has booted correctly. Turn on your WiFi device you choose to control EAGLE. The network name is EAGLEXXXXXX (where the XXXXXX is the serial number of your EAGLE as written also is also on the EAGLE's case).

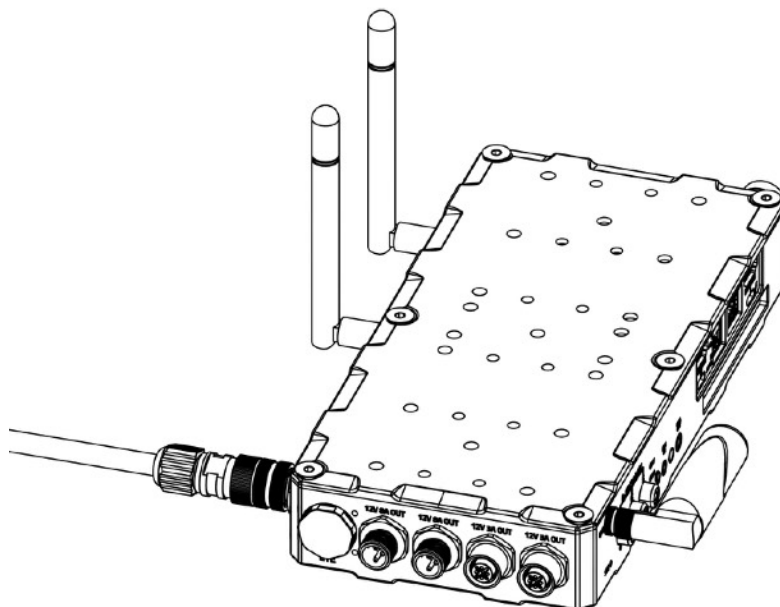Look at the list of WiFi networks shown on your device (identification mode of wireless networks depends on the control device you use, so if you do not know how to search for WiFi networks, please read the manual of your device) and select the network created by EAGLE (picture 4).

A window will appear where you will be asked to enter the password of your network (image 5). The password is ***primalucelab***. Using the keyboard (virtual or physical) of your device, enter the password paying attention to appropriate upper or lower case. Then press the CONNECT.

(Note: Each EAGLE has a different Windows login password known only to you; **the password is shown on the EAGLE quick guide that you find in the box**. This way it is safe to use your EAGLE at a star party where other EAGLE users might be present).
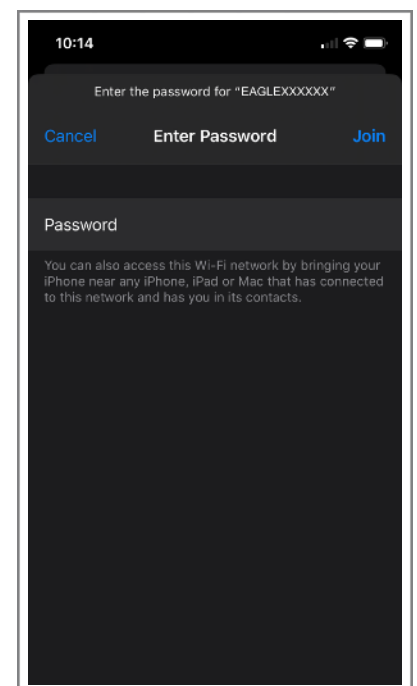
Image 5: insert network password

Image 6: connection to WiFi network.
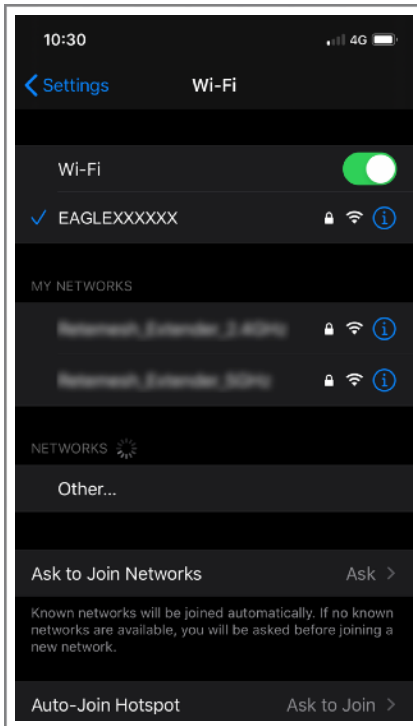
Then EAGLE WiFi network connection is confirmed (image 6). The network setting is complete and the next time you want to access the EAGLE you will no longer need to enter your password: your device will connect automatically when you select the network created by EAGLE.

NOTE

On Windows operating systems, when you select EAGLE's WiFi network, you may be requested to insert a "PIN from the router label". Please click on the "Connect using a security key instead" and then type the password "primalucelab".
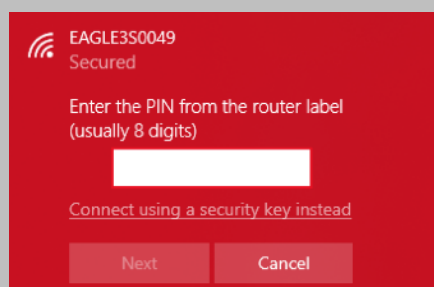
Image 7: Press the + button to add the parameters to access your EAGLE.

First use: Setting remote control with iPhone or iPad

This guide has been written by using an iPhone with iOS 18.2 and Windows App Mobile client 11.0.7 (and it has been tested also with iPad using iPadOS 18.2 and Windows App Mobile client 11.0.7). From the App Store of your iPhone/iPad, please search and install the "**Windows App Mobile**" app. If you do not know how to install the app from the App Store, please read the manual of your iPhone/iPad.

Start the "**Windows App Mobile**" app. You will see a screen like the one visible in the image 7. Click the + button (top-right), then select "**PC**".

In the window that opens, in "PC name" enter 192.168.137.1
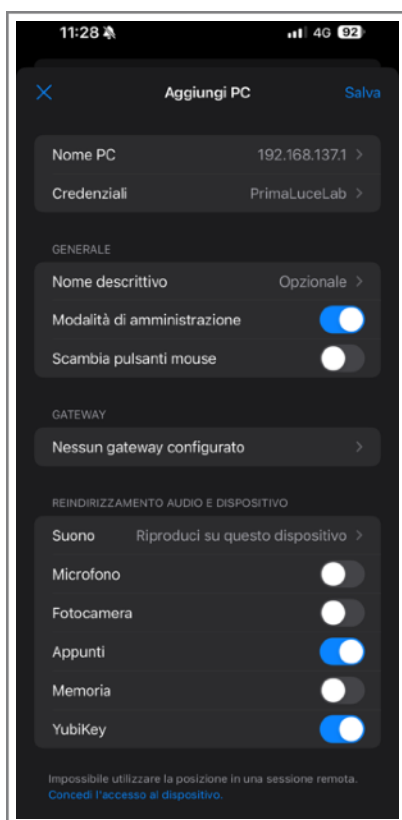
Image 9: Press "Save" to confirm access data.

Then select the "User Account" field and choose "Add user account". A window will open (picture 8) where you can enter your username and password to log on to Windows.
The values are:
- Username: ***PrimaLuceLab***
- Password: (that shown on the quick guide in the EAGLE box)
Then press the button "Save" to save the access data.

   WARNING: when entering your data check that your device does not automatically insert a space after the word "username" and "password".

Then (image 9), select the option "Admin Mode" and press the "Save" button to confirm and save the access data.
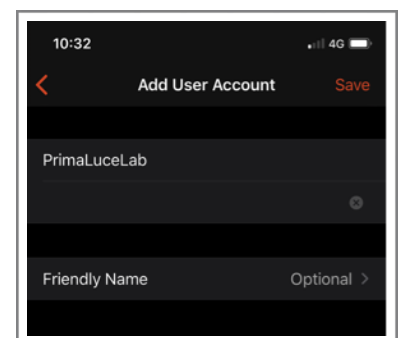
Image 8: Insert User name and Windows access password.

Image 10: Select the created link

Returning to the main page you will find a new connection (picture 10). Tap on it and wait a few seconds, you'll see on your device's desktop EAGLE (image 11).

Now can use the screen of your iPhone or iPad like mouse and keyboard of EAGLE. There are two modes of use, that can be selected by pressing the central-up button (between the magnifying glass and the keyboard) to see the options. By default, the app works in "mouse" mode to display the classic Windows pointer that you can move with your finger and click on the icons and buttons visible on the screen. Instead, if you want to use the touch mode (as you usually do with tablets or smartphones), click the central button at the top (image 12) and select the hand button (the icon next to the house).

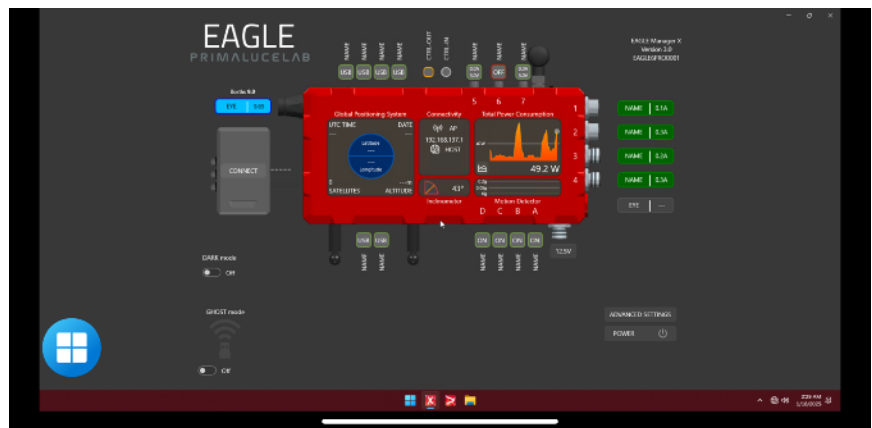To simulate a single mouse click (like pressing the left button of the mouse) just "tap" on the screen. To simulate the
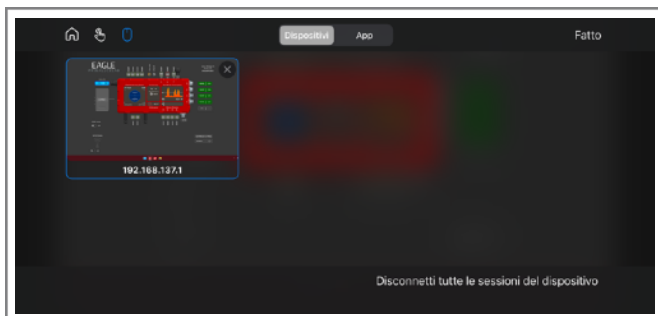
Image 12: By clicking the central-top button (between magnifier and keyboard), you will see the options.

Image 13: By clicking the hand button (the icon close to the house), control will turn in touch-screen mode

right mouse button, place a finger on the screen (and do not move it), and then "tap" with another finger to make options appear.

NOTE: You can also use another Remote Desktop client, the "Parallels Client" (you can download from the App Store). This client has to be set as the Microsoft one, the only difference is that this will ask also the Port number, please set it to 3389.

NOTE

After being connected to the EAGLE's WiFi, I start a Remote Desktop connection but I get an error "Unable to connect". How can I fix this?
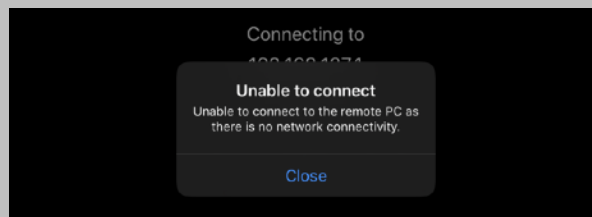
This error may happen if your iPhone or iPad doesn't have an internet connection, for example when (or if) it doesn't have a 4G connection. In this case, please proceed this way:

1) In the iPhone/iPad please go to Settings > Wifi, and select your EAGLEXXXXXX network. Once selected, tap on the "i" icon to the right.
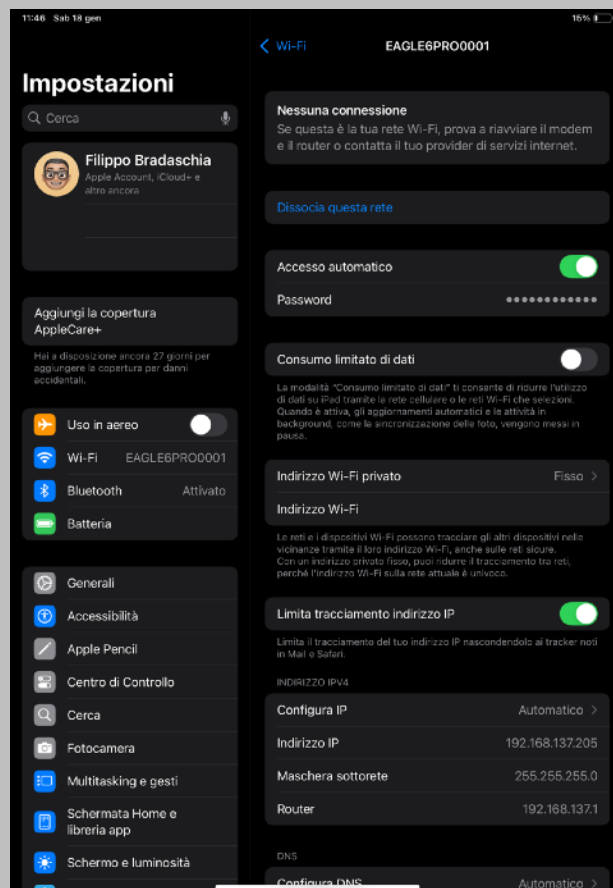
2) Next tap on "Configure DNS" and change the selection from "Automatic" to "Manual", and tap on "Add server". Here you type the IP address of your EAGLE (192.168.137.1) as the DNS server. Press the "**Save**" blue text on the top to confirm.

3) With the IPv4 address and DNS settings configured manually, the Remote Desktop should work correctly. Please launch again the Microsoft Remote Desktop app and start the connection.
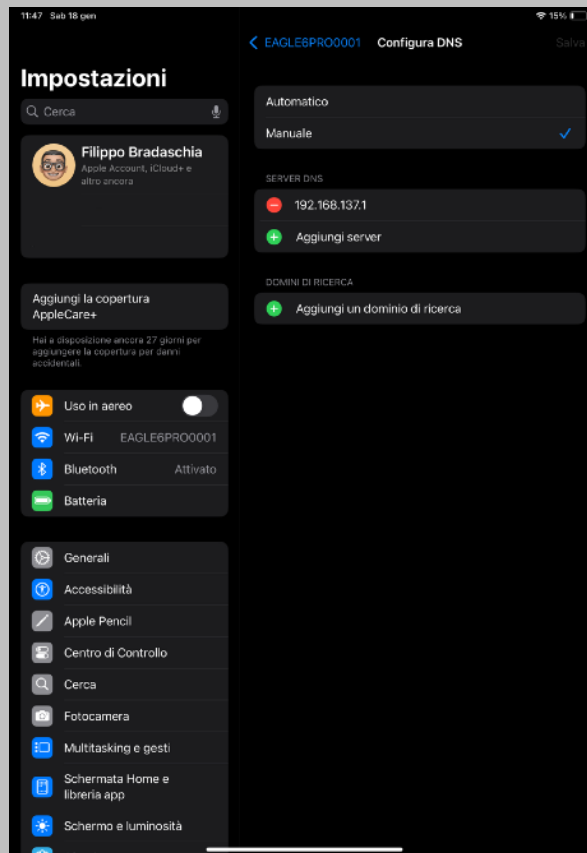
First use: Setting remote control from a Windows computer

This guide has been written by using a Windows 11 Home computer and there included Remote Desktop Connection app.

Thanks to the remote control app, you have the EAGLE with all your software on your device screen. Type "**Remote Desktop**" in the search field of your Windows computer and start the Remote Desktop Connection app. You will see a screen like the one visible in the image 14.

Image 14: type IP number 192.168.137.1

in the Computer area

In the window that opens, in "Computer" enter 192.168.137.1 Then type ***PrimaLuceLab*** as "User Name" (image 15).
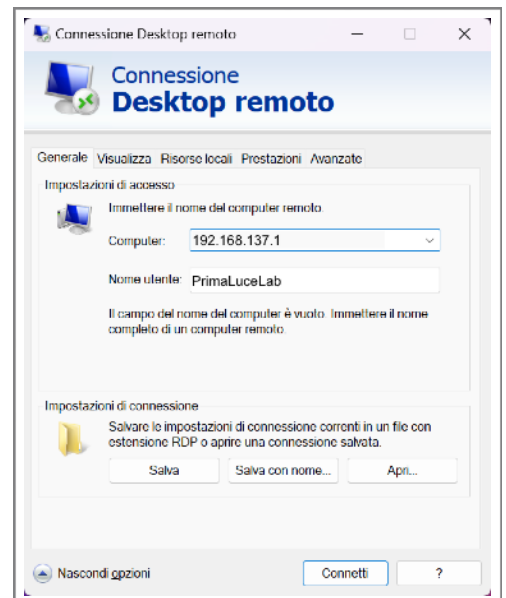
Image 15: Type PrimaLuceLab

as Name and press Connect.

Press "Connect" button and a new window will appear, type your password that shown in the flyer in the EAGLE box and select "Allow me to save credentials" (image 16).

WARNING: when entering your data check that your device does not automatically insert a space after the word "username" and "password".

If you get a new notification window stating that "Remote Desktop cannot verify the identity of the remote computer", please select the option "Don't ask me again for connections to this computer" and press "Yes" button.

Image 16: Type your Password and press OK

Image 17: EAGLE start screen

Now you will be connected to the EAGLE Manager (image 17). Now you are ready to use the software you prefer to control your telescope. The next time you will want to connect to the EAGLE, launch Remote Desktop Connection app and all the settings will be already set for connection (image 18).
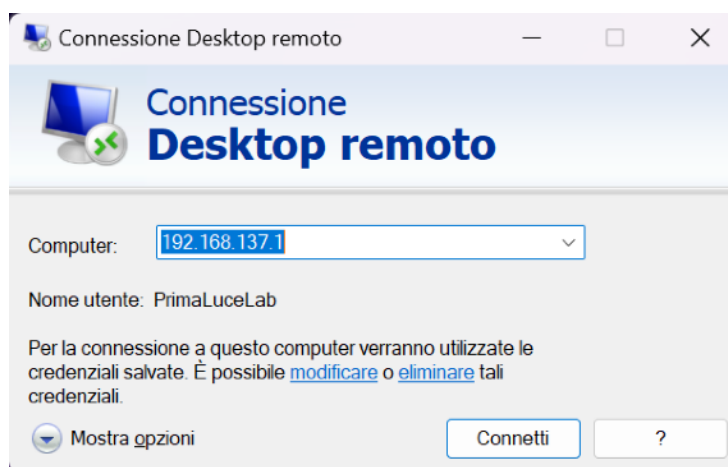
Image 18

NOTE: You can also use another Remote Desktop client, the "Parallels Client" (you can download from here https://www.parallels.com/products/ras/capabilities/rdp-client/). This client has to be set as the Microsoft one, the only difference is that this will ask also the Port number, please set it to 3389.

First use: Setting remote control from a Mac computer
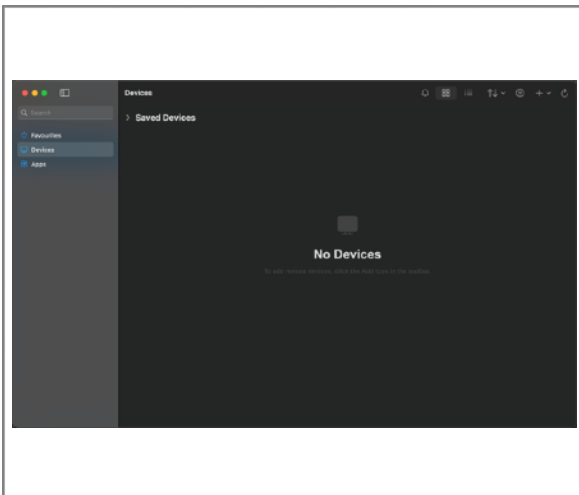
Image 19: Press the + button to add the parameters to access your EAGLE.

This guide has been written by using a macOS Sequoia 15.2 and Windows App Mobile client 11.0.9. From the Mac App Store of your computer, please search and install the "**Windows App Mobile**" app. If you do not know how to install the app from the Mac App Store, please read the manual of your computer.

Thanks to the remote control app, you can have your EAGLE with all your software right on your device's screen. Start the "**Windows App Mobile**" app. You will see a screen like the one visible in the image 19. Click the + button (top-right), then select "Add PC".

In the window that opens, in "PC name" enter 192.168.137.1
Then select the "User Account" field and choose "Add credentials". A window will open (picture 20) where you can enter your username and password to log on to Windows.
The values are:
- Username: ***PrimaLuceLab***
- Password: (that shown in the flyer in the EAGLE box)

Image 20: Insert User name and Windows access password.
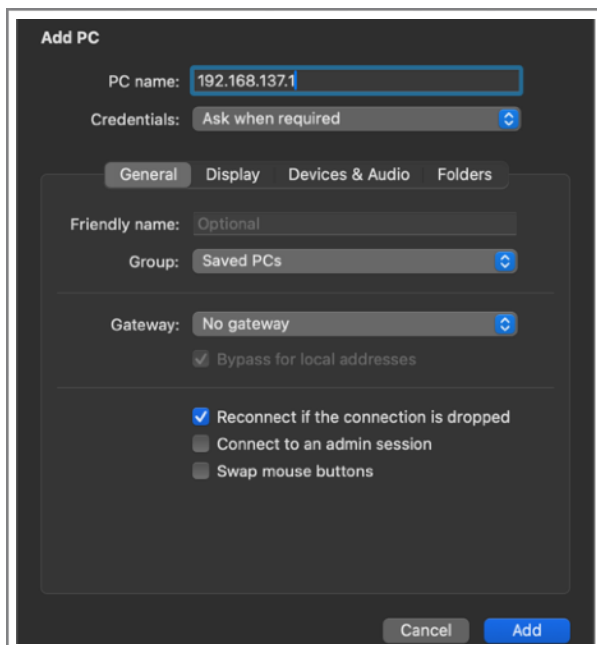
Image 21: Press "Add" to confirm access data.

Then press the button "Add" to save the access data.

WARNING: when entering your data check that your device does not automatically insert a space after the word "username" and "password".

Then (image 21), select the option "Reconnect if the connection is dropped" and press the "Add" button to confirm and save the access data.

Returning to the main page where you will find your new connection (picture 22).

Image 22: Select the created link

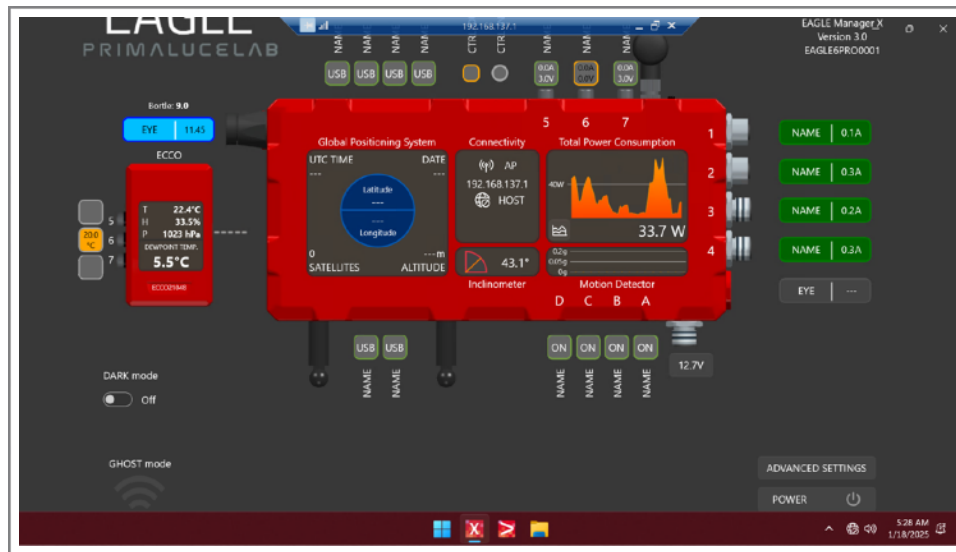Double click on the connection and you will be connected to the EAGLE Manager (image 23). Now you are ready to use the software you prefer to control your telescope.

Image 23: EAGLE start screen

NOTE: You can also use another Remote Desktop client, the "Parallels Client" (you can download from here https://www.parallels.com/products/ras/capabilities/rdp-client/). This client has to be set as the Microsoft one, the only difference is that this will ask also the Port number, please set it to 3389.

NOTE

After being connected to the EAGLE's WiFi, I start Remote Desktop connection but I get an error "Unable to connect". How can I fix this?
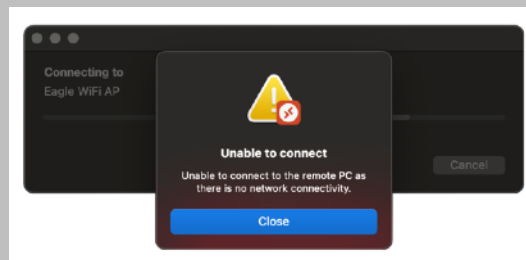
In this case, we have to configure Network settings on your Mac, let's do the following:

1) Go to your macOS System Preferences, select Wi-Fi and make sure your Mac is connected to the EAGLE's WiFi network. Then click on the Details button to the right of the EAGLE's WiFi connection.
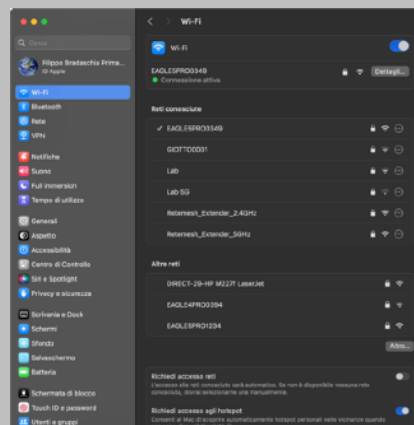
2) Next, click on the "DNS" tab. Under "Search Domains" click the "+" symbol, and in the popup window that opens, type ".local" and press keyboard ENTER to confirm.
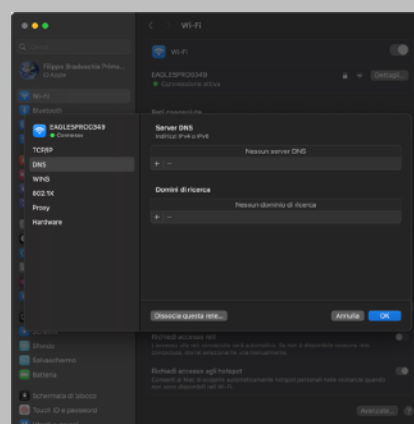
3) This will add a Search Domain as you can see in the image below.
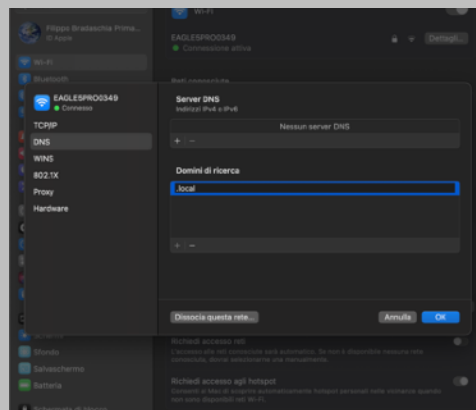
4) Click OK button to confirm. Check that now your Mac is connected to the EAGLE's WiFi and start the Remote Desktop connection.

First use: Setting remote control from an Android device

This guide has been written by using an Android smartphone 9.1 and Microsoft Remote Desktop client 10.0.7.1066. From the Google Play Store of your device, please search and install the "**Microsoft Remote Desktop**" app. If you do not know how to install the app from the Google Play Store, please read the manual of your computer.

Thanks to the remote control app, you have access to your EAGLE with all your software right on your device's screen. Start the "**Microsoft Remote Desktop**" app. You will see a screen like the one visible in the image 24. Click the + button (top-right), then select "Add PC".

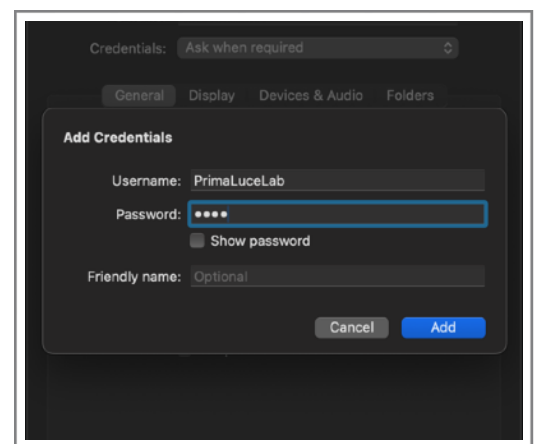*Image 24: Press the + button to add the parameters to access your EAGLE.*

In the window that opens, in "PC name" enter 192.168.137.1
Then select the "User name" field and choose "Add user account". A window will open (picture 25) where you can enter your username and password to log on to Windows.
The values are:
- Username: **PrimaLuceLab**
-Password: (that shown in the flyer in the EAGLE box)

Image 25: Insert User name and Windows access password.

Image 26: Press "Add" to confirm access data.

Then press the button "Save" to save the access data.

WARNING: when entering your data check that your device does not automatically insert a space after the word "username" and "password".

Then (image 26), select the option "Connect to an admin session" and press the "Add" button to confirm and save the access data.

Returning to the main page you will find a new connection (picture 27).
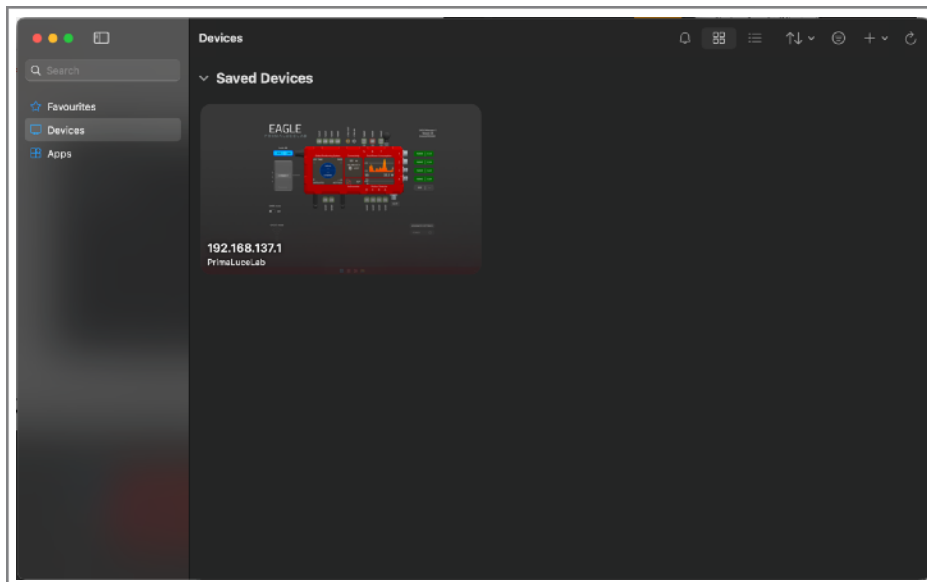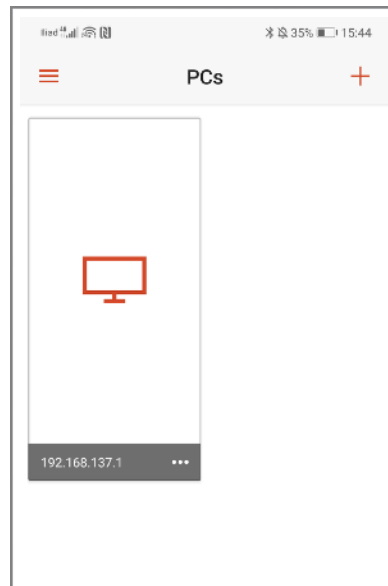

Image 27: Select the created link

Double click on the connection and you will be connected to the EAGLE Manager (image 28). Now you are ready to use the software you prefer to control your telescope.
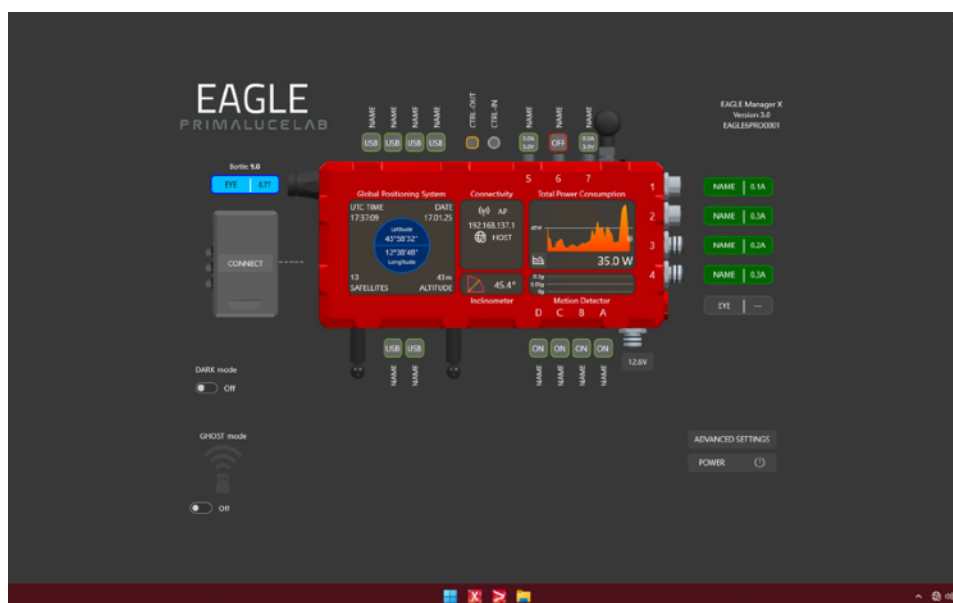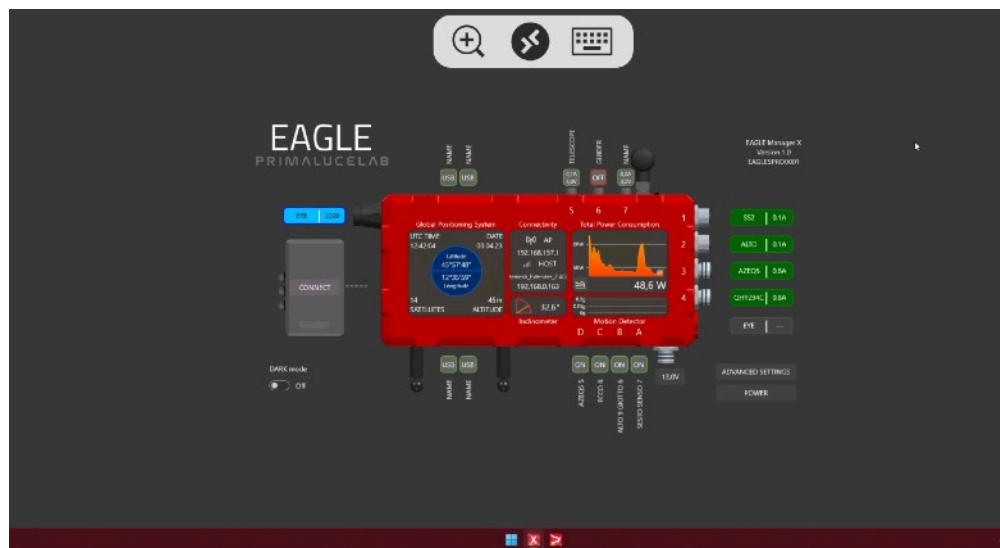

Image 28: EAGLE start screen

NOTE: You can also use another Remote Desktop client, the "Parallels Client" (you can download from Play Store). This client has to be set as the Microsoft one, the only difference is that this will ask also the Port number, please set it to 3389.

NOTE

After being connected to the EAGLE's WiFi, I start Remote Desktop connection but I get an error "Unable to connect". How can I fix this?

This error may happen if your Android device doesn't have an internet connection, for example when (or if) it doesn't have a 4G connection. In this case, please proceed this way:

1) In the Android device please select the Wifi settings of the EAGLEXXXXXX network you connected to.

Indirizzo IP	192.168.137.103
(invariati)	👁
☑ Mostra opzioni avanzate	
Proxy	Nessuno >
Impostazioni IP	Statico >
Indirizzo IP	
192.168.137.103	
Gateway	
192.168.137.1	
Lunghezza prefisso rete	
24	
DNS 1	
8.8.8.8	

2) Here we have to write a manual IP address for the network of your EAGLE. The IP address of your EAGLE's AP interface is 192.168.137.1. An address must be selected in the same network range, and it must be unique. This is done by changing the last "octet" of the network address. Your EAGLE ends in ".1" You can select any other address starting with ".2, up to ".254". Remember if you have multiple devices accessing your EAGLE, you should choose and assign a unique IP to each device. In this example, we have chosen ".103" - so the IP address we have configured is "192.168.137.103. Configure the netmask and router as shown in the example above. The router is the IP address of your EAGLE. Press the blue EAGLEXXXXXX text on top left to confirm.

Gateway

192.168.137.1

Lunghezza prefisso rete

24

DNS 1

192.168.137.1

3) Next configure DNS to the IP address of your EAGLE (192.168.137.1).

Certificate can't be verified.
Do you want to connect anyway?

You are connecting to:
192.168.137.1
Name in certificate from the remote PC:
EAGLE3S0049
It may not be safe to connect to this PC
because of the following reason:
• Not from a trusted certifying authority
• PC name mis-matched

☑ Never ask again for connections to this PC

⌄ More details

CANCEL   CONNECT

4) With the IPv4 address and DNS settings configured manually, the Remote Desktop should work correctly. Please launch again the Microsoft Remote Desktop app and start the connection. If the "Certificate can't be verified" window appears, please select "Never ask again for connections to this PC" and click CONNECT button to start.

First use: create a recovery drive with Windows 11 tool before installing your software

Before installing your devices driver and your astronomy software in the Windows operating system of the EAGLE, we suggest you to create a recovery drive. In fact, after production and testing of your EAGLE, we always record a "Windows Restore Point" that you can use if the software and driver you use create problems in Windows and you want to come back to factory settings. But, since main Windows Updates automatically delete recovery points, we recommend you also to make a backup copy of your Windows installation.

If you don't do a backup copy of your SSD drive and if in the future you will have problems with the Windows installation of your EAGLE or with your SSD drive, you will have to ship us back the entire unit (since every EAGLE is different because, for example, every EAGLE has its remote control codes) to fix it.

The backup tool integrated in Windows 11 creates a recovery drive to restore Windows 11 to factory settings (Windows will be already activated then) but you will loose your data and you will have to install your softwares again. If you want to save also your files, you can use other softwares solutions (like Acronis Cyber Protect or Macrium Reflect) that are not pre-installed in Windows 11 and that you have to buy separately.

NOTE: Before starting the backup of your SSD drive, please connect a USB 3.0 pen or an external USB 3.0 drive (with at least 16GB of dimensions) in one of the USB 3.0 ports of the EAGLE. Slower USB 2.0 pen or drive will also work but will need a longer time to perform the backup.
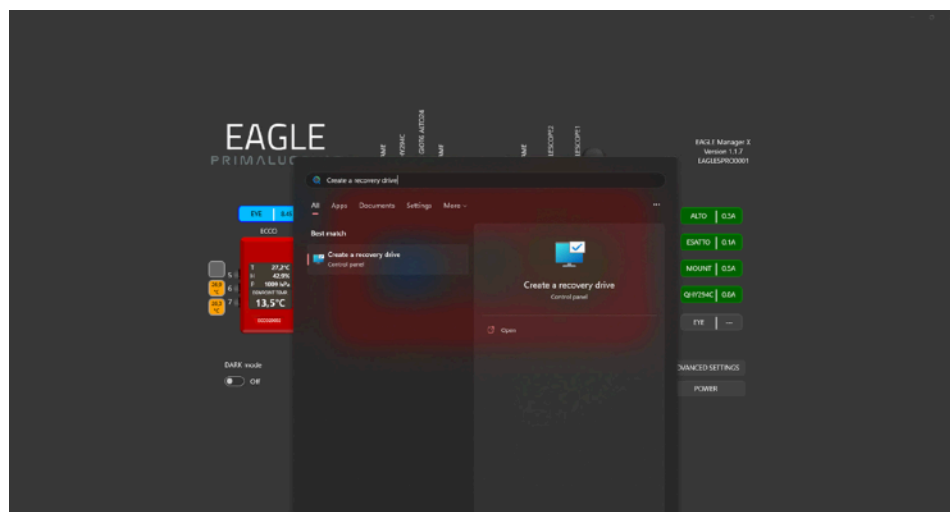
1) In order to create a recovery drive, in the search box on the Windows 11 taskbar, type **Create a re-
   covery drive** and then select it. You might be asked to enter an admin password or confirm your
   choice.

2) When the tool opens, make sure **Back up system files to the recovery drive** is selected and then
   click on **Next**.
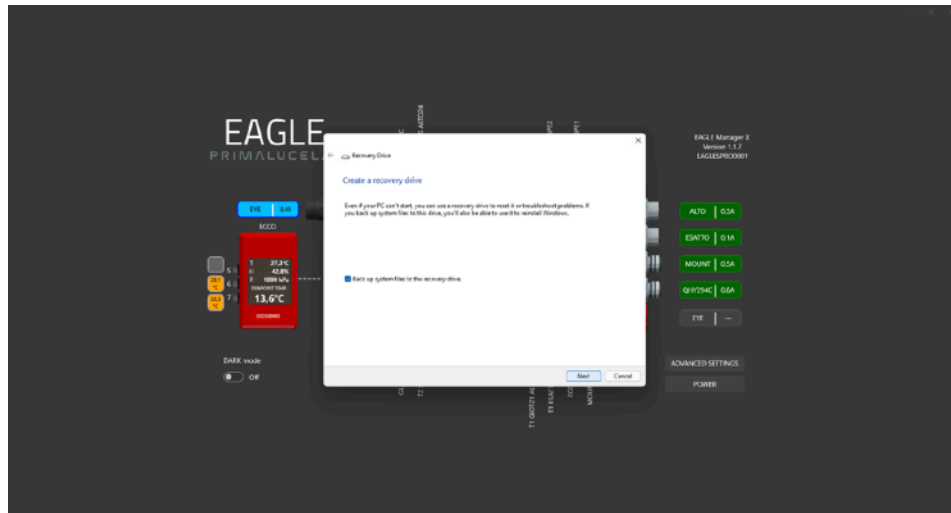
3) Select **Create**. Many files need to be copied to the recovery drive, so this might take a while.
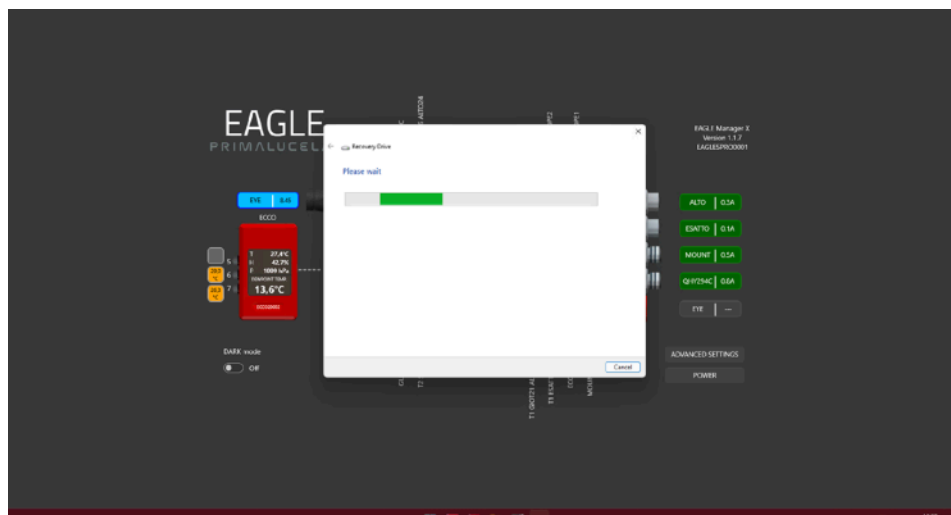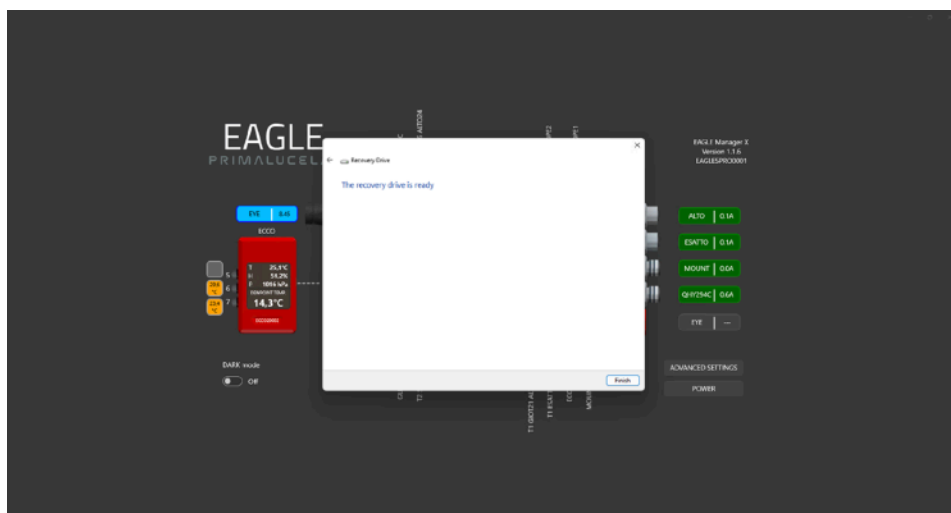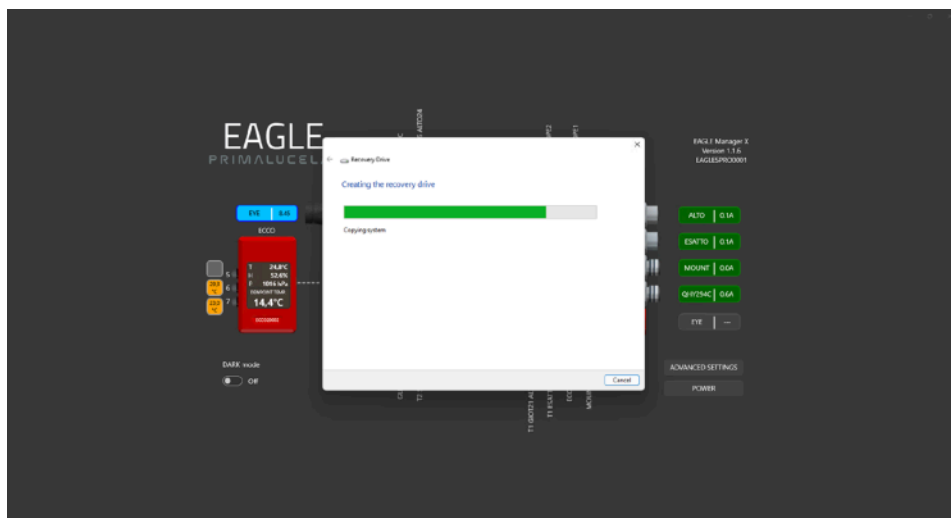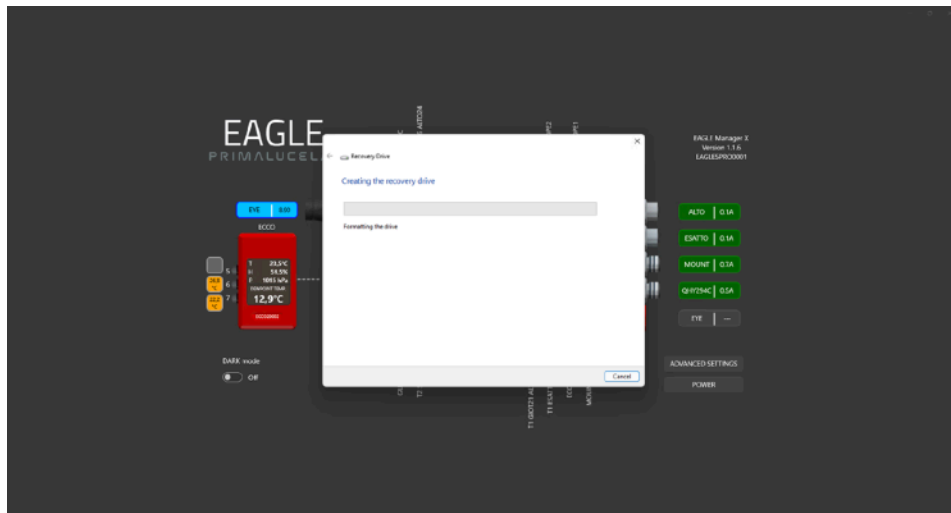
4) At the end of the process, you will see the message The recovery drive is ready, you can press **Finish** button.

How to use recovery drive to restore Windows 11:

Please note: this procedure has to be done by connecting the EAGLE to an external HDMI monitor and by plugging a USB mouse and keyboard. This is needed since, until you fully restore your EAGLE, you can't access to it with Remote Desktop.

1) Connect the recovery drive and turn on your EAGLE.
2) Press Windows logo + L on the keyboard to get to the sign-in screen, and then restart your PC by pressing the Shift key while you select the Power button > **Restart**.
3) Your EAGLE will restart in the Windows Recovery Environment (WinRE) environment.
4) On the Choose an option screen, select **Troubleshoot**
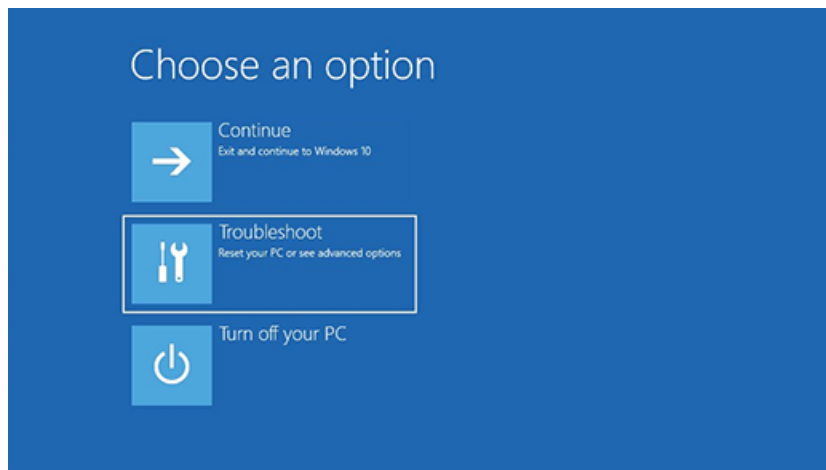
5) To reinstall Windows 11, select **Advanced Options** > **Recover from a drive**. This will remove your personal files, apps and drivers you installed, and changes you made to settings.
6) At the end of the process (it may take a lot of time), Windows will restart.
7) Disconnect USB drive from EAGLE
8) After Windows starts, it will request you to type username, please type **PrimaLuceLab**
9) As password type the 4 digit password that comes with your EAGLE
10) It will ask you for keyboard type and language
11) Download from www.primalucelab.com the latest EAGLE Manager X and install it in Windows
12) Enter in System and rename PC name with the serial code of your EAGLE (System -> Rename)
13) Reboot Windows
14) In the Windows search field, type **netplwiz**
15) Deselect the checkbox **"Users must enter a user name and password to use this computer"**. Based on Windows 11 version you have, the checkbox may be hidden. If you can't find the checkbox, please follow this guide to make it appear:
    1) Press Windows + R keys concurrently to bring up the Run dialog box.
    2) Type **regedit** in the Run box and click OK to open Registry Editor.
    3) Navigate to the following key from the left side of the Registry Editor window:

       HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\PasswordLess\Device

4) On the right pane of the Device, double-click on the DevicePasswordLessBuildVersion DWORD (32-bit) Value to change its default "Value data."

5) Now, change the Value data from 2 to 0 and then click on the OK button.

6) Run again the "netplwiz" command. You will see the checkbox "Users must enter a user name and password to use this computer" available in the "User Accounts" dialog. You can now dele-select it

16) Windows will as you to confirm your password to apply this new option. Type your EAGLE 4 digit password 2 times

17) Reboot Windows

18) It should automatically load EAGLE Manager X at startup

Your EAGLE is now restored.

First use: install your software

EAGLE6 uses a Windows 11 64 bit operating system. This way you are free to install the astronomy software you choose, as long as it is designed to work with 64 bit Windows 11. In order to install your software, you can proceed in 2 ways:

A) *Connect the EAGLE to an HDMI monitor and add a USB keyboard and mouse.* This way you will be able to use the EAGLE as a standard desktop computer (picture 29) and install your software.

B) *Connect your device* (that you use to remotely control the EAGLE, for example a smartphone, a tablet or a computer) *to the EAGLE with WiFi and start your Remote Desktop client* to see EAGLE's desktop and install your software.
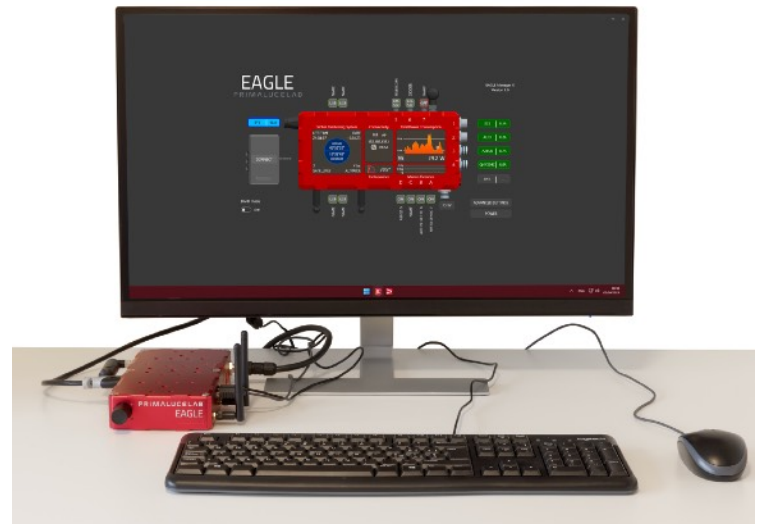
Image 29: EAGLE connected to HDMI monitor

Please note:

1) *EAGLE does not have an integrated CD or DVD reader.* If you have to install software that comes on CD or DVD, you may connect the external CD or DVD reader to the USB port of EAGLE. Then insert the CD or DVD of your software and follow the on-screen instructions to complete the installation.
2) *If you have software to install from a USB thumb drive*: connect the USB stick to the USB port of the EAGLE and follow the onscreen instructions to complete the installation.

For a better management of your software and to get quick access to frequently used applications, you can add your software to Windows "START" menu. In order to do this, select your software, make a right mouse click, then select the option "Pin to Start". The icon of your software will appear in the start menu that appears when you press the button on the screen bottom (picture 30).
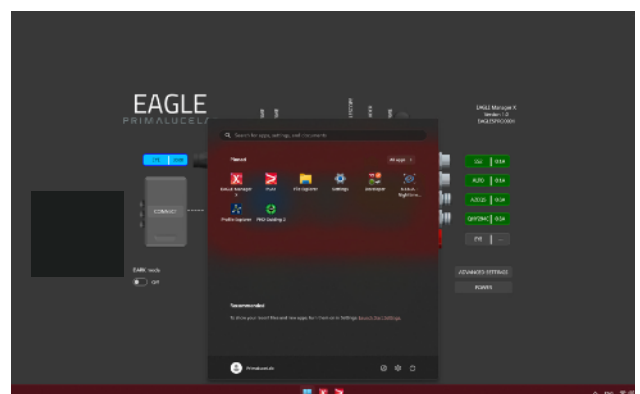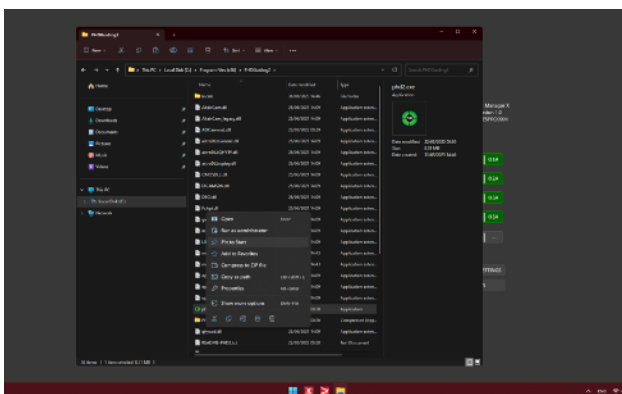
Image 30: In Start you find your software's icon

First use: set your local time

By default, the Windows operating system is configured to UTC-8 with the "Set time automatically" option enabled. To adjust this, right-click the clock in the bottom-right corner of the screen and select "Adjust date and time". In the settings window, you can select your correct time zone by clicking "Time zone" and choosing the appropriate option from the dropdown menu. If you prefer to manually set the time, toggle off "Set time automatically" and click "Change" under "Set the date and time manually" to input your local time and date. Once updated, your EAGLE will operate with the correct local time.

First use: install your USB devices

The EAGLE computer integrates a Windows operating system, which means that using a USB device with it follows the standard process of device installation in Windows. To ensure proper functionality, it is essential to install the necessary system drivers for the device, verify the connection, and check that the device is properly recognized by the operating system. Below, we provide a general guide on how to install a USB device on the EAGLE. Remember to check the driver installation procedure by referring to the manual of the device you want to install on the EAGLE.

1. Driver Installation: Before connecting the USB device to the EAGLE, confirm whether a system driver is required for it to operate. Many USB devices, including those from PrimaLuceLab, require a dedicated driver to communicate with Windows.
- If a driver is needed, download it from the manufacturer's website.
- Follow the manufacturer's provided instructions to complete the driver installation before plugging in the device.

2. Connecting the Device: Use the appropriate USB cable to connect the device to one of the EAGLE's USB ports. Ensure the connection is secure, especially with USB-C connectors, which should click into place.

3. Device Manager Verification: After connecting the device, open Windows Device Manager to verify that the device is recognized. Check under relevant sections, such as Ports (COM & LPT) or Other Devices. Here you should see the new device listed (SESTO SENSO 2, ESATTO, GIOTTO and ALTO are listed as "Silicon Labs CP210x") and you will see the COM port number associated to it. This is the number you have to use if you connect to astronomy softwares like PLAY or with ASCOM drivers. If you connect a USB camera, usually it may appear as "Astroimaging equipment", "Imagine Device" or similar.

What should I do if the USB device doesn't appear

If the device appears in Device Manager but it shows a with a yellow triangle, Windows is unable to automatically recognize the device because of a driver issue. Please install again the system driver as described previously and then reboot Windows. After reboot, reconnect the device and verify that it appears in Device Manager without any warning.

If the device does not appear in Device Manager, please follow these steps:
- if you're connecting a device with USB-C port, please check the USB-C connection by making sure that the USB-C cable is properly inserted into the device. In fact the USB-C plug must "click" into the USB-C port to ensure a proper connection.
- If the device still doesn't appear in the Device Manager when you connect it to EAGLE's USB port, try using another USB cable.
- If the device still doesn't appear in the Device Manager, connect the device to another USB port on the EAGLE. For example, if you initially used a USB 2.0 port, try one of the USB 3.0 ports.
- If the device still doesn't appear in Device Manager, connect it to another computer, this will help determine if the issue is with the device, the USB cable, or with the EAGLE's USB port.

First use: turn off EAGLE

To turn off the EAGLE, you can press the PO-WER button in the EAGLE Manager X interface. A notification window will appear asking for confirmation. Press the Confirm button to initiate the shutdown procedure (Image 31). This process will:

1) Disconnect you from the Remote Desktop app. You may see a notification stating, "The connection to the remote PC was lost," which is normal. This occurs because shutting down the EAGLE causes your external device to lose its connection to it. At this point, you can safely close the Remote Desktop app.
2) Blink the SSD LED light briefly during the Windows shutdown process. Once the PW LED turns off, it is safe to disconnect the power cable from the EAGLE's power IN port.
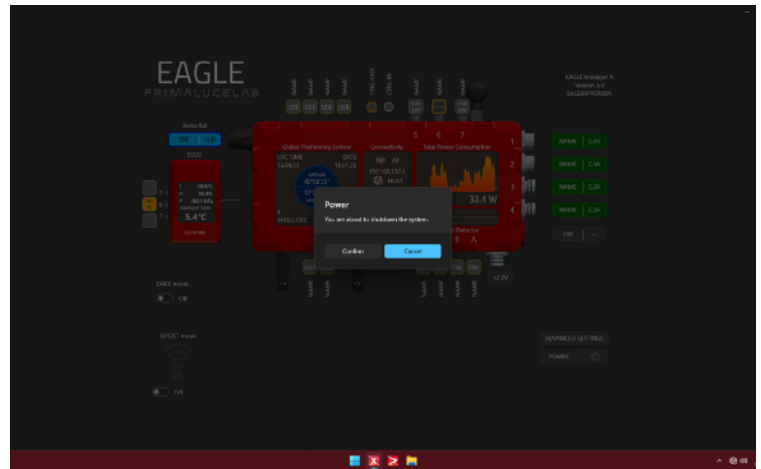
Image 31: Select "POWER" button to start the shutdown procedure
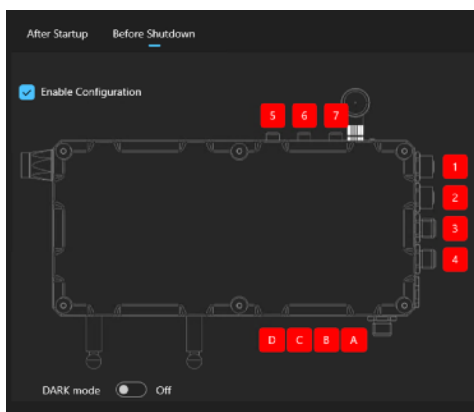
Image 32

We recommend using the POWER button in the EAGLE Manager X interface instead of the standard Windows shutdown method. This is because the POWER button can trigger advanced automations. For instance, you can go to ADVANCED SETTINGS, select Before shutdown, and enable the configuration (Image 32). This allows you to customize the shutdown process by clicking on individual ports and setting them to red to turn them off. When you press the POWER button in the EAGLE Manager X interface, the EAGLE will automatically turn off the selected ports during shutdown.

Additionally, in the same ADVAN-CED SETTINGS window, you can configure the behavior of the PO-WER button (Image 33).
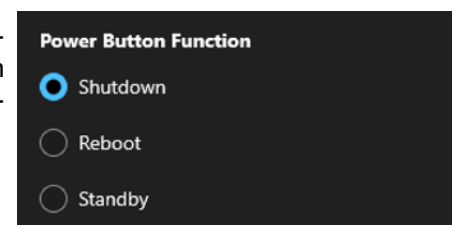
Image 33

Alternatively, you can shut down only the Windows operating system by pressing the On/Off switch on the side of the EA-GLE's chassis (Image 34) or by clicking the Windows icon and selecting the Power button from the Windows interface. However, note that this method shuts down only Windows and does not affect the power or USB ports of the EAGLE. For instance, if you shut down Windows using these methods, the power output ports on the EAGLE will remain in the ON state.

> **NOTE: Do not disconnect the power supply until the shutdown procedure is fully completed as described above.**
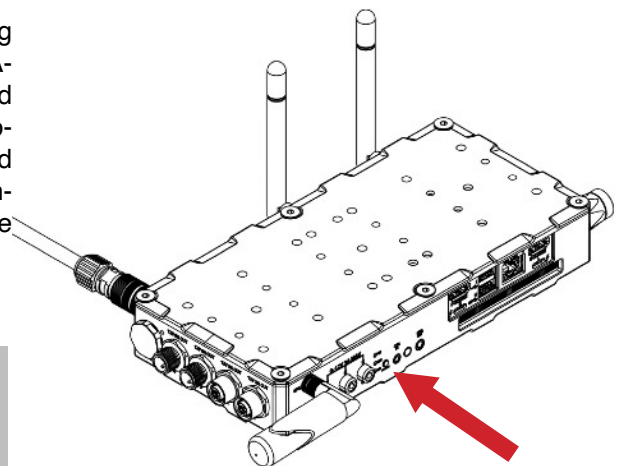
Image 34: push the On/Off switch position.

First use: installing EAGLE on the telescope

EAGLE has been designed entirely with SolidEdge three-dimensional design software to offer the best modularity with the PLUS elements (rings, dovetail plates or clamps) and/or any brand telescopes. EAGLE may be positioned between support and guide rings, connected to a Vixen or Losmandy style dovetail bar through the appropriate optional clamp or, in case of telescopes with long dovetail bars, it can be screwed on the PLUS Vixen or Losmandy dovetail bar and fixed over PLUS support rings. Let's explore the various possible configurations, depending on the telescope EAGLE has to be installed on, using both other PLUS elements and different instruments.

*6 - CAUTION: when connecting the EAGLE to other mechanical PLUS elements, ensure that you do not use screws that are too long, as they may come into contact with the internal electronics of the EAGLE. **THE THREADED PORTION OF THE SCREW (*) EXTENDING FROM THE ELEMENT (ring, bar or clamp) TO BE CONNECTED TO THE EAGLE MUST NOT EXCEED 6mm EXCEPT FOR THREADED HOLES THAT CORRESPOND TO THE FAN POSITION, WHICH ARE INDICATED IN THE PICTURES BELOW. FOR THESE SPECIFIC HOLES, THE THREADED PORTION OF THE SCREW EXTENDING FROM THE ELEMENT (*) MUST NOT EXCEED 4mm.** If any of the screws touches the internal elements of EAGLE, this could lead to breakage or malfunction.*

6mm (*)
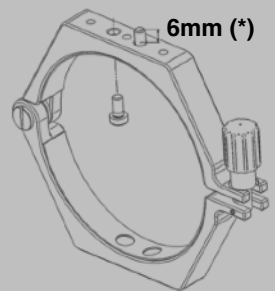
EAGLE6
(top view)

EAGLE6 S / PRO / XTM
(bottom view)

Connecting to telescopes with PLUS support rings and support rings spaced up to 12cm.
When using compact refractor telescopes, the distance of the support rings is set by the PLUS Vixen or Losmandy style dovetail clamp installed with the telescope. In this case , the EAGLE can be installed directly above the support ring, as if it were a dovetail bar (image 35). Thanks to the M5 threaded holes present in the upper part of the EAGLE, you can install in parallel the PLUS guide rings and a guide scope (note: the guide scope must not exceed 8 kg in weight to avoid flexure).

b

a
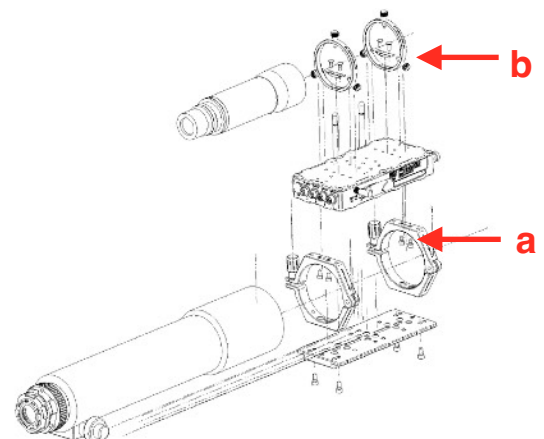
Image 35: installation of EAGLE between imaging and guide telescope

In order to use the EAGLE with this configuration, insert 2 M6 screws (**a**) in each PLUS ring (2 screws for each ring) and so fix the EAGLE. If you want to use a guide scope in parallel, you can install the PLUS guide rings. In order to do this, screw 2 M5 screws for each guide ring in the upper part of EAGLE (**b**).

Connecting to telescopes provided with PLUS support rings and support rings spaced more than 12cm.
If you want to use EAGLE with telescopes equipped with rings PLUS spaced more than 12cm, you can place EA-GLE over to the support ring for supporting a compact guide scope in parallel. But to do so you first need to add a PLUS Vixen or Losmandy style dovetail bar above PLUS support rings and then connect EAGLE (image 36).
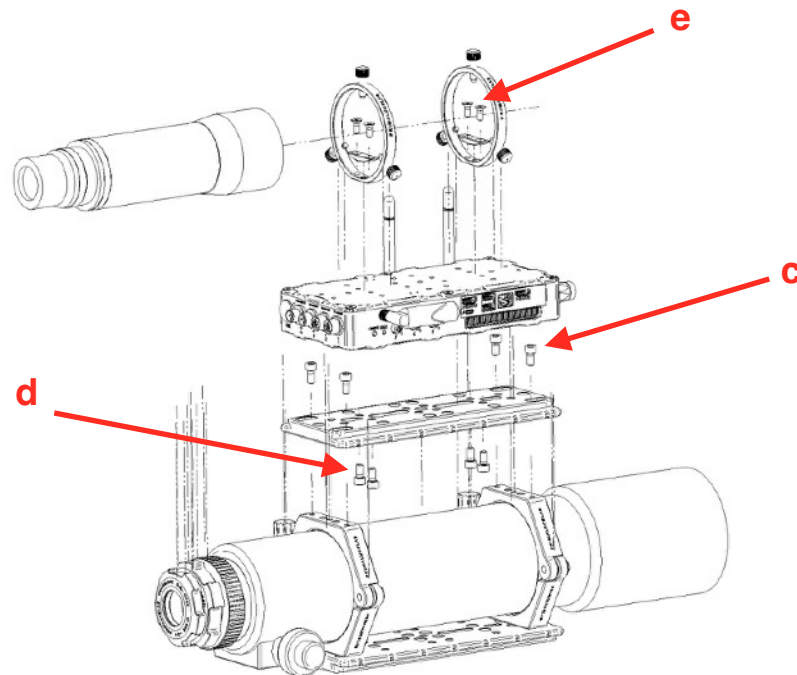
Image 36: installing the EAGLE when the main telescope support rings are spaced more than 12cm

In order to use the EAGLE with this configuration, use a PLUS Vixen or Losmandy style dovetail bar (with the same length as the one used under the support rings) and fix it with two M6 screws (**c**) for each ring. The dovetail bar above the telescope must be fixed in inverted position with respect to the one placed below the optical tube. Then use 4 M6 screws (**d**) to fix the EAGLE to the dovetail bar. Finally if you want to use a guide scope in parallel , you can install the PLUS guide rings. In order to do this, screw 2 M5 screws for each guide ring in the upper part of EAGLE (**e**).

Connecting to telescopes not equipped with PLUS rings

If your telescope is not equipped with PLUS support rings, just add the optional "PLUS Vixen + Losmandy style dovetail clamp" that can be screwed directly to the EAGLE and allow you to connect it to any Vixen or Losmandy style dovetail bar also from different brand. Take the "PLUS Vixen + Losmandy dovetail clamp" and, using 3 M6 screws (f), install it in the bottom plate of EAGLE, as shown in image 37.
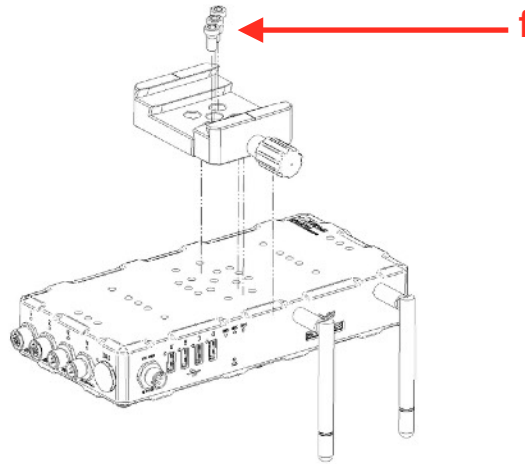
Image 37: installation of "Vixen+Losmandy PLUS dovetail clamp" on EAGLE

This way you can connect the EAGLE to any telescope equipped with Vixen or Losmandy style dovetail bar, as shown in image 38.
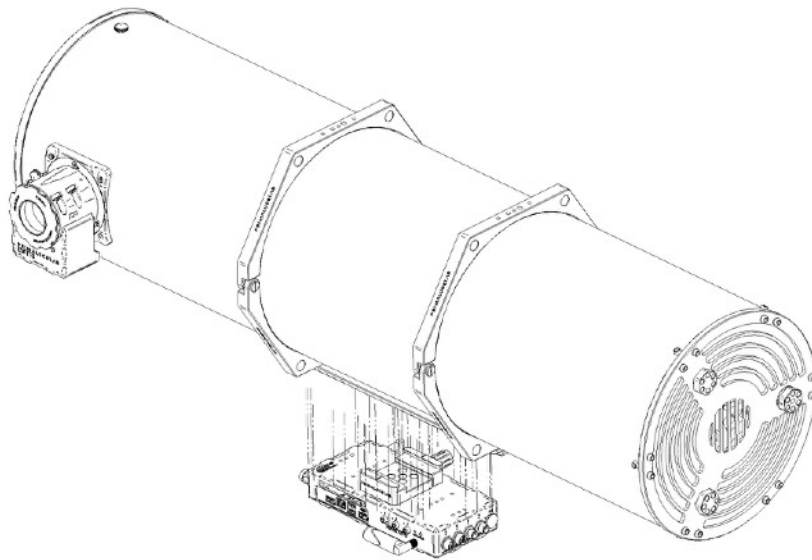
Image 38: EAGLE with "PLUS Vixen + Losmandy dovetail clamp" can be installed on any Vixen or Losmandy style dovetail bar

First use: powering other instruments connected to the EAGLE

EAGLE incorporates a power bridge to which you can connect up to 4 instruments such as mount, camera, filter wheel and electronic focuser. Through a special internal board, EAGLE **distributes** 12V power to 4 ports that connect the various devices using special optional cables. All ports are indexed and threaded to prevent the cable from unwanted disconnections or reversed polarity.

> **CAUTION**: *EAGLE distribute power only at 12V. If the instrument you want to use requires a different voltage, do* **NOT** *connect it to the power ports of EAGLE.*

> **CAUTION***: the power output from the OUT port of EAGLE depend on power supply or battery connected to the IN power port of the EAGLE.* **Since several instruments for astronomy strictly require a fixed 12V power, you have to check that your power source provides a stable 12V voltage.** *So if you want power EAGLE with a battery, make sure that this is equipped with a specific 12V voltage regulator.* **DO NOT CONNECT TO THE EAGLE A BATTERY WITHOUT 12V VOLTAGE REGULATOR** *since it may damage the other instruments powered by EAGLE (like the cooled camera or the mount).*
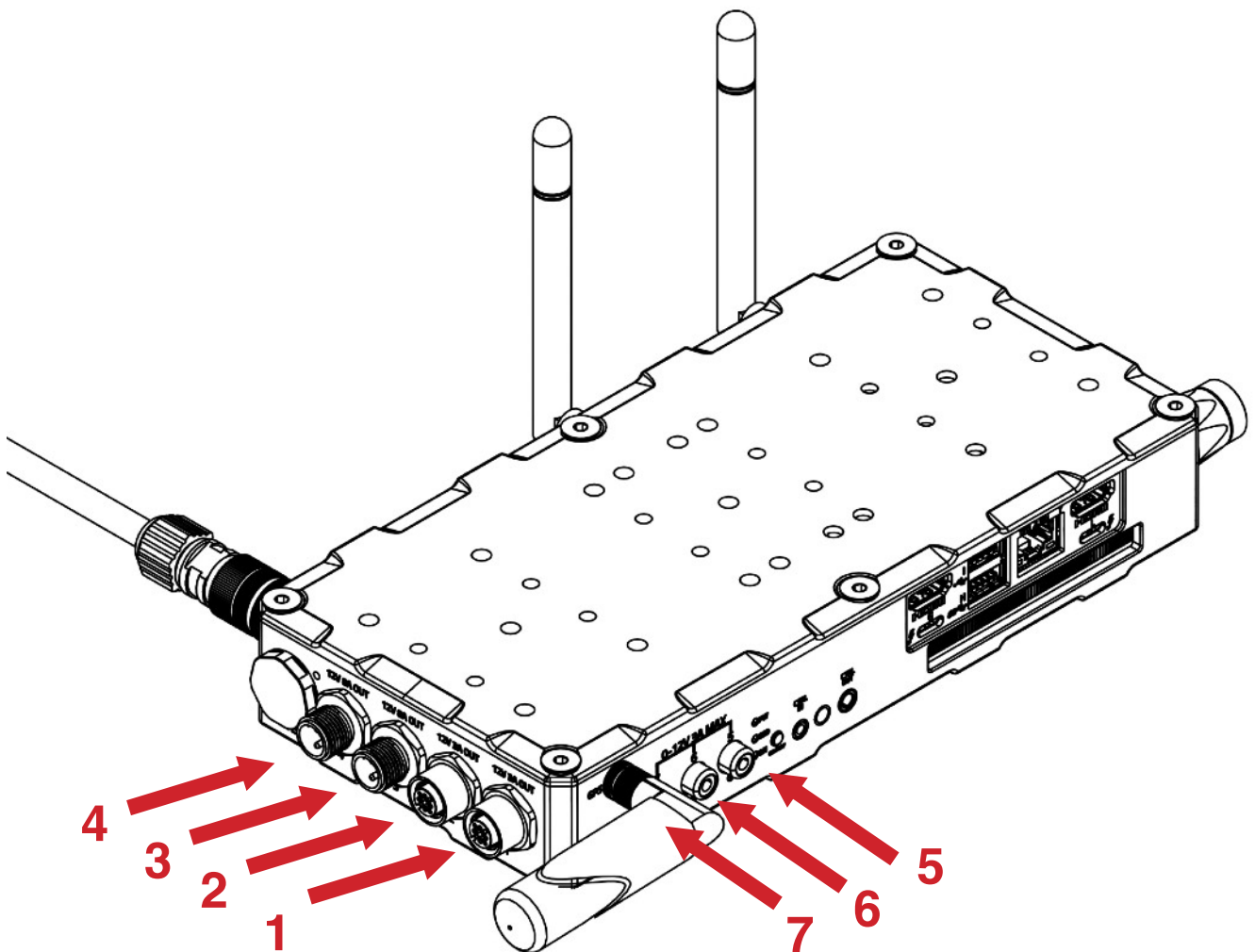
WHAT IF I CONNECT A DEVICE THAT HAS A HIGHER POWER CONSUMPTION THAN THE ONE ALLOWED ONE FROM THE POWER OUT PORTS OF THE EAGLE : the power board has a dedicated chip that protects the electronics. If your device requires more current than the one distributed by EAGLE, this chip disconnects power (this is a protection system to avoid power surges that could damage the connected instrument).

In this case, please remove the cable connected to the power OUT port of the EAGLE. Power out port will be automatically re-activated when the problem is fixed.

EAGLE has 7 12V power out ports including:
- **1, 2, 3 and 4** power out ports have 12V voltage. Ports 1 and 2 distribute up to 3A each while ports 3 and 4 distribute up to 8A and are therefore indicated for connecting high-power consumption devices (such as cooled cameras). In order to avoid confusing the connection ports, ports 1 and 2 (3A) have a different connector than the others. This makes it impossible to connect devices to the wrong ports.
- **5, 6 and 7** power out ports have adjustable voltage from 3 to 12V. They are therefore perfect for connecting dew heaters (without the need for external controllers).

To properly power all the instruments connected to the EAGLE :

1) **FIRST** connect the optional EAGLE-compatible power cables to OUT power ports of the Eagle and then to the power socket of your instrument

2) **AFTER** connect the power supply or stabilised battery to the IN power port of the EAGLE

You can turn on the EAGLE, activate the power OUT ports and use the telescope. When you want to close the telescope and disconnect power cables, please follow this procedure :

1) **FIRST** turn off the EAGLE by pressing the power on/off button (**7**) and wait until the SSD and ON LEDs are off

2) **THEN** unplug the power cord from the "12V power input" (**1**) of the EAGLE

3) **FINALLY** disconnect the power cables from the " 4 12V power OUT" ports (**10**) of the EAGLE

First use: EAGLE Manager X to check connectivity and sensors

When you remotely (with wireless or wired connection) connect to the EAGLE, you will see the EAGLE Manager X control interface (Image 39). Thanks to EAGLE Manager X, you can:

• Enable/Disable every 12V power out port
• Check power consumption
• Name power and USB ports
• Check for GPS data
• Check for EYE sky quality
• Set the power out voltage of the 3 x 0-12V power out ports:
• Check for Inclinometer
• Show Motion Detector data
• Activate DARK mode
• Activate GHOST mode
• Connect or disconnect devices connected to the A-B-C-D USB 2.0 ports
• Set wireless or wired connectivity
• Set your automatic power routines
• Automatically connect to the optional ECCO controller
• Save EAGLE sensors data in log files for later processing
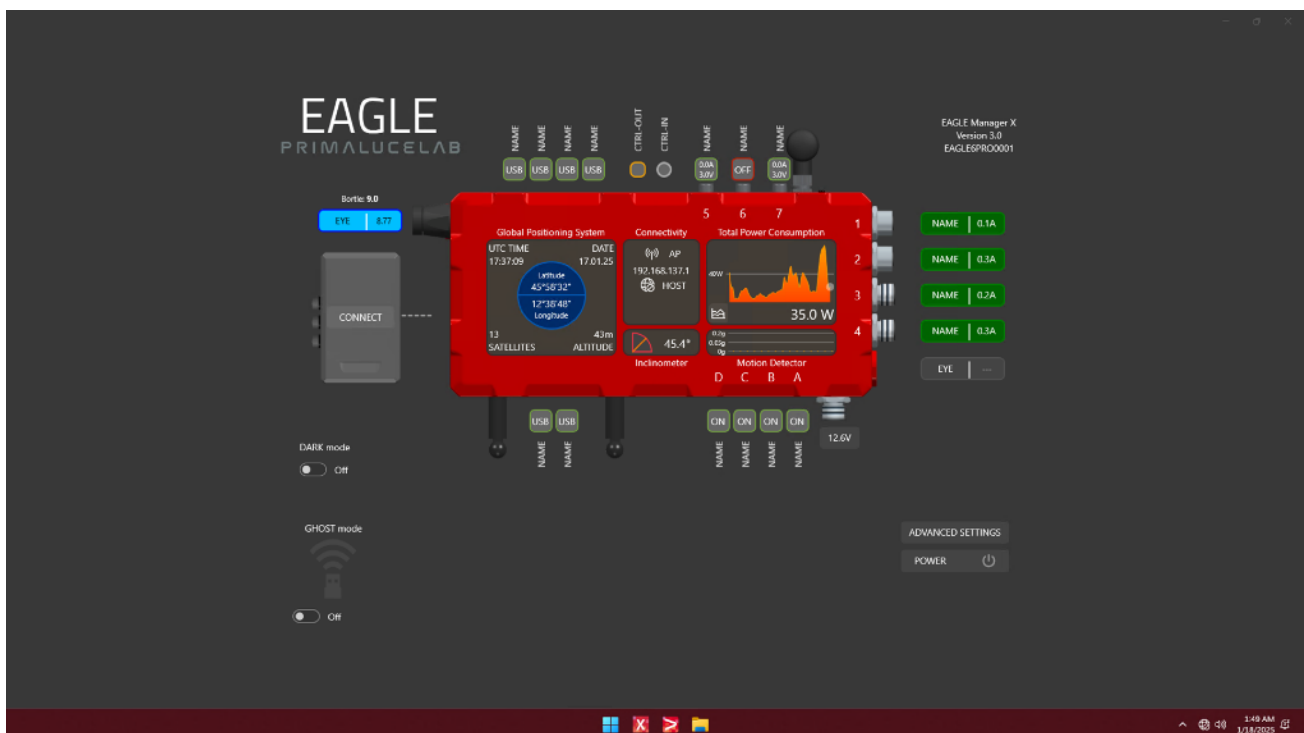
Image 39: EAGLE Manager X interface

In the EAGLE Manager X interface (Image 40), you can select your current power source by clicking on the EAGLE's Power IN port. You can choose between AC power units and battery. If you select battery, please enter the battery capacity in Wh and its charge status (Image 41). If you prefer to input the battery capacity in Ah, go to ADVANCED SETTINGS and change the "Battery Format" option from Wh to Ah. After making the change, click the Confirm button.
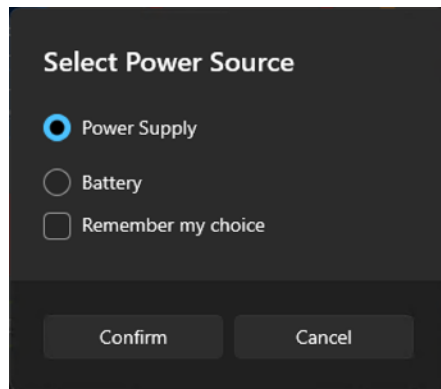
Image 40
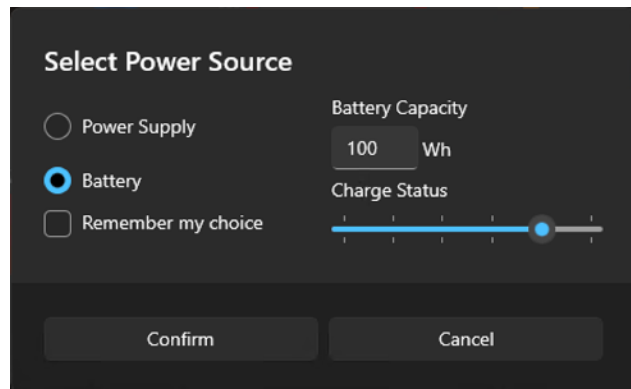
Image 41
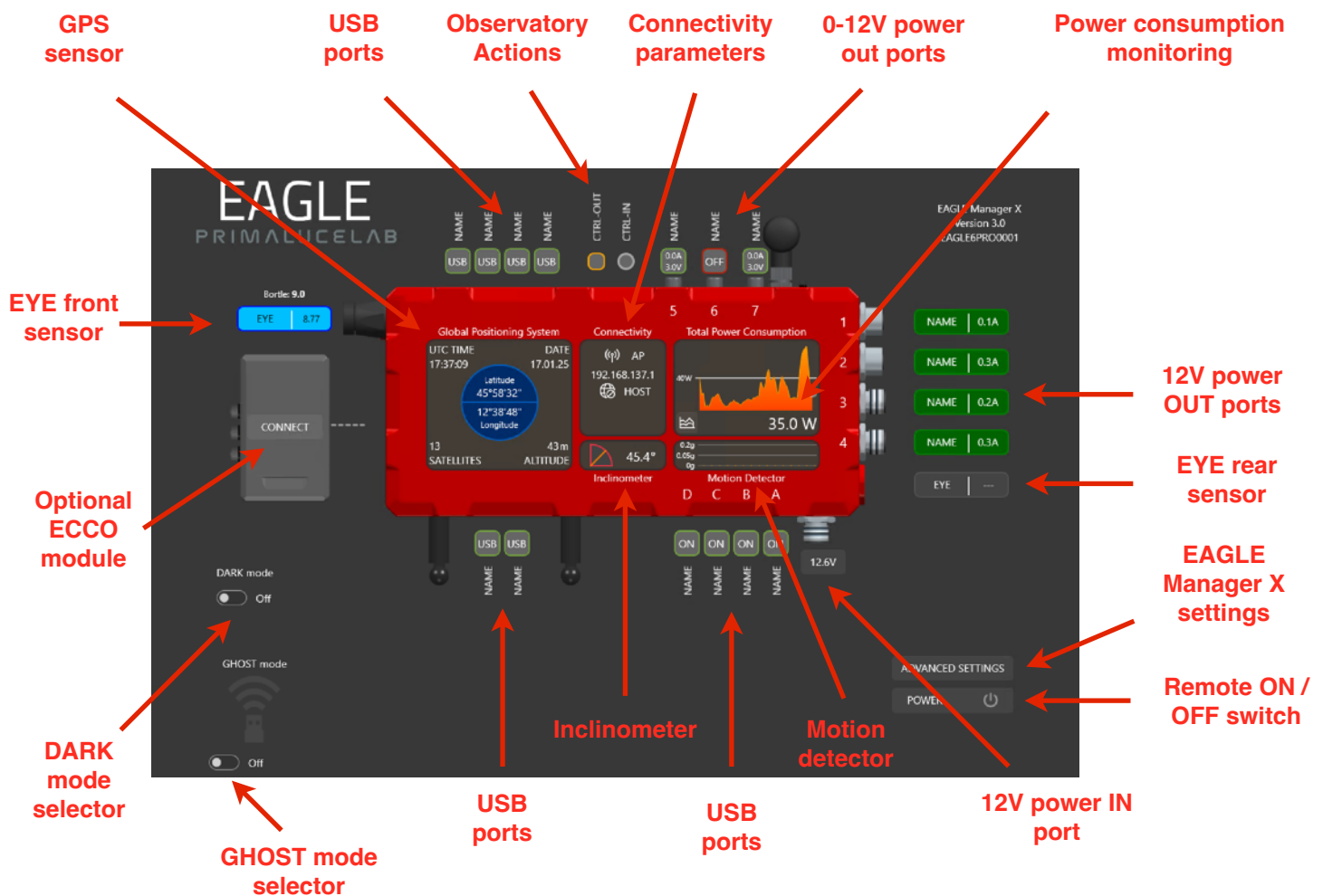
Image 42: EAGLE Manager X interface

- connect or disconnect every power out port of EAGLE

Leaving power connected to your devices (for example, mount, camera, filter wheel, etc.) allows you to activate them remotely when you turn on the entire system. Each port shows the current consumption that can also be monitored over time.
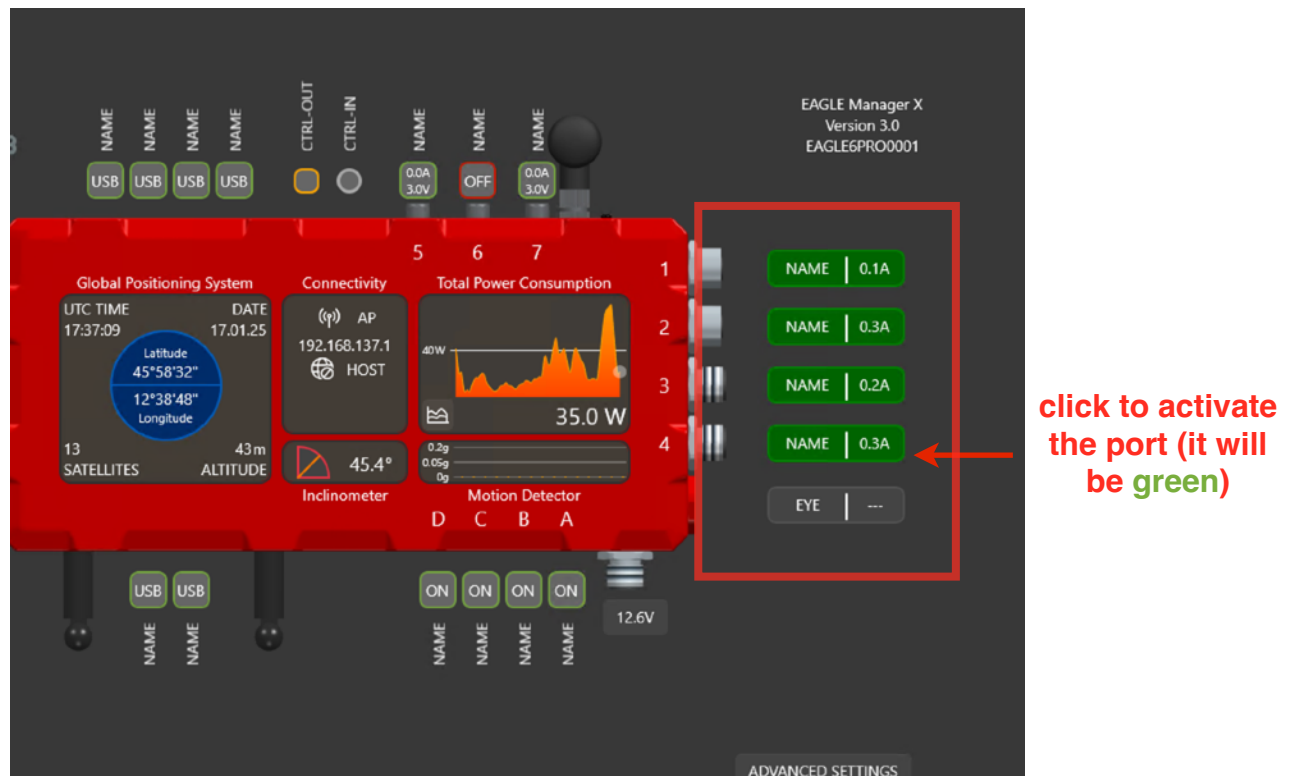
Image 43: click on one of the 4 power OUT ports to activate it

Click with the left mouse button (or a single tap on the screen of tablet or smartphone used for remote control) on one of the 12V power out ports to activate it, the port will become green and it will power the connected device. Click with the right mouse button (or a 2 finger tap on the screen of tablet or smartphone used for remote control) on one of the 12V power out ports to see advanced options of the selected power out port (image 44).
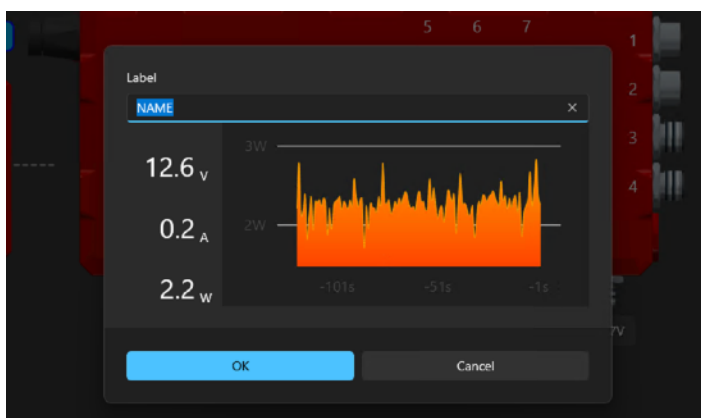
Image 44: advanced options window of one of the 12V power out ports

Here you can insert the name of the port in the field "Label", check for power consumption of the connected device and check for power consumption in time. Click OK button to confirm and exit from the window.

- set power out voltage of the 3 power out ports with adjustable voltage

For example, you can increase or decrease the heat generated by dew heaters connected to EAGLE without the need for external controller. Each port shows the current consumption that can also be monitored over time.
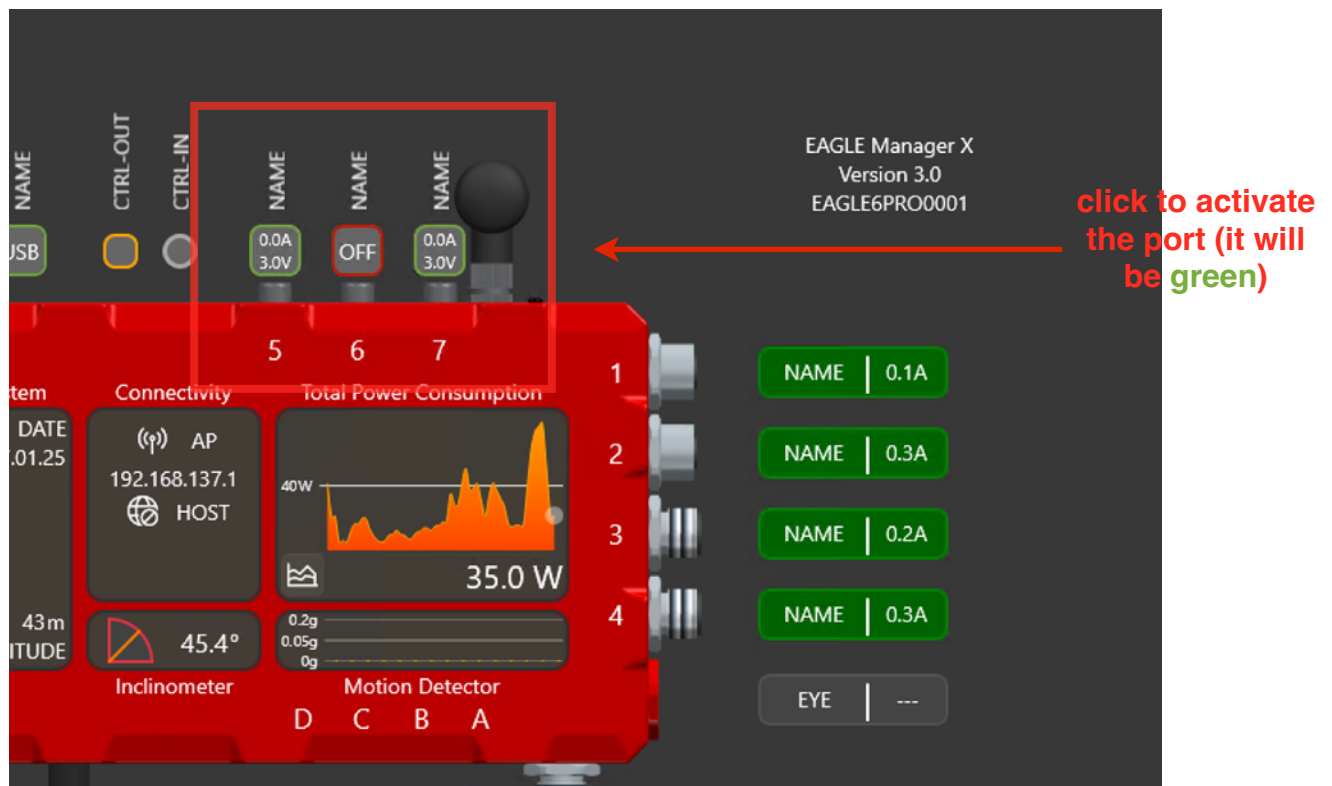
Image 45: click on one of the 3 power out ports to activate it

Click with the left mouse button (or a single tap on the screen of tablet or smartphone used for remote control) on one of the power out ports to activate it, the port will become green and it will power the connected device. Click with the right mouse button (or a 2 finger tap on the screen of tablet or smartphone used for remote control) on one of the power out ports to see advanced options of the selected power out port (image 46).

Image 46: advanced options window of one of the 3-12V power out ports

Here you can insert the name of the port in the field "Label", visualize power consumption of the connected device and the power consumption in time. You can also set the voltage of the power out port in the field "Voltage" (Voltage can be set from 3V to 12V and the new value will be applied when you will press the OK button).

If you want EAGLE Manager X to remember the port status the next time you will turn the EAGLE, you can select the "Remember my choice" option. Then please click OK button to confirm and exit from the window.

- connect or disconnect devices attached to the 4 USB 2.0 ports

This feature is convenient in case of temporary crash of autoguider or planetary camera (or other devices), which can then be reactivated without the need to go to the telescope and disconnect/reconnect the cable.
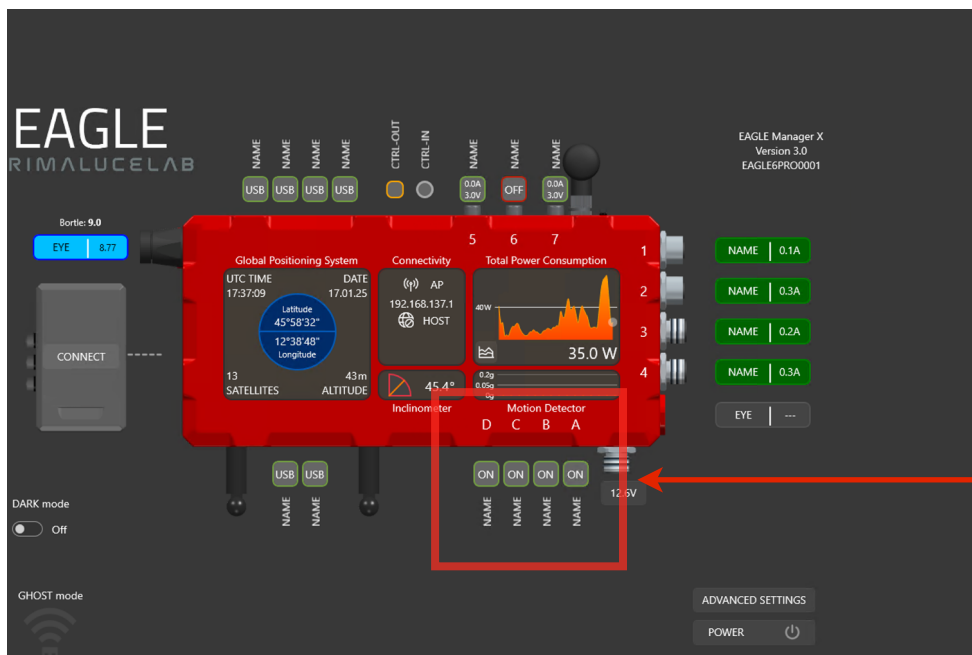
Click with the left mouse button (or a single tap on the screen of tablet or smartphone used for remote control) on one of the power out ports to activate it, the port will become green and it will connect the device. Double click on the NAME label to change its name.

click to activate the port (it will be green)

Image 47: click on one of the 4 USB 2.0 to activate it
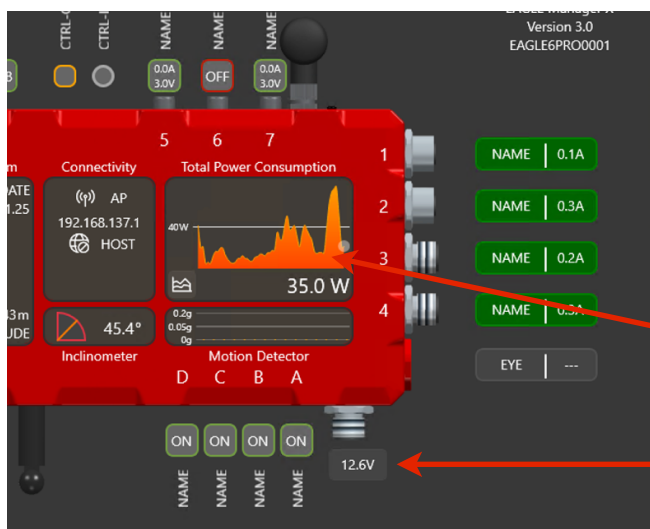
- check for power in voltage and power consumption

if you power your EAGLE with a battery, a dedicated menu allows you to set the Ampere capacity of your battery and charge percentage when EAGLE is powered on, enabling you to monitor its expected lifetime.

power consumption

power IN voltage

Image 48: power IN voltage and battery lifetime

- Set wireless or wired connectivity

You can access the EAGLE in two modes: Access Point (AP) mode for field use (allowing your smartphone, tablet, or external computer to connect directly to the EAGLE without requiring a WiFi router) or HOST mode for integration with an existing network, such as your home WiFi.
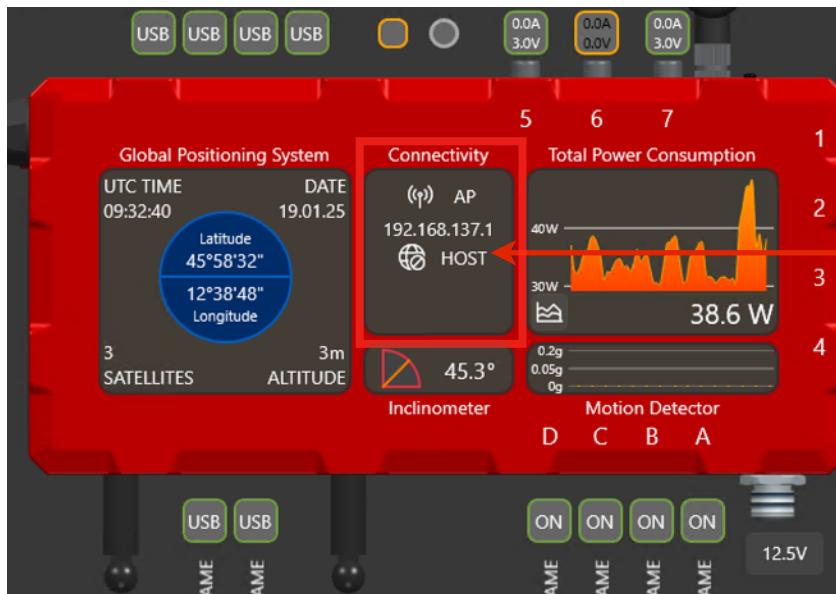
Image 49: WiFi connection settings

By default, the EAGLE activates Access Point (AP) mode, enabling you to connect to the EAGLE's wireless network and use Remote Desktop to access it at the IP address 192.168.137.1.

It shows IP addresses to connect to

Alternatively, you can connect the EAGLE to an external network (wireless or wired) to control it from any device connected to the same network. This is particularly useful if you need the EAGLE to access the Internet, for example, for remote control over long distances. To connect the EAGLE to your network router, use a standard Ethernet cable from your router to the LAN port labeled Y (avoid using the LOM port), or connect it to a wireless network. To connect EAGLE to a wireless network, from the Windows interface on the EAGLE click the network icon in the tray area (lower-right corner of the screen), and then click the > symbol next to the wireless icon (do not click directly on the WiFi icon, as this will disable the EAGLE's WiFi. If you're using Remote Desktop, this action will disconnect your session, requiring an external HDMI monitor to restore it). Select the desired wireless network, click the Connect button, enter your network password, and Windows will confirm the connection (refer to Image 50).
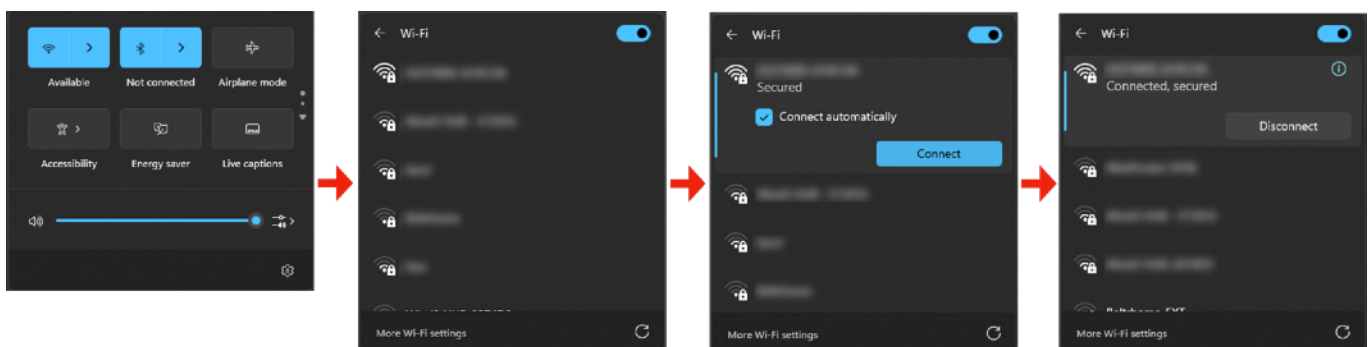
Image 50: steps to connect EAGLE to an external wireless network

Once connected, the Connectivity section will display a new IP address under HOST. This IP address is assigned to the EAGLE by the network you just connected to and will also appear if you use an Ethernet cable to connect the EAGLE to your router. To remotely control the EAGLE from a device connected to the same network (either wired or wirelessly), enter this new IP address in the options of your Remote Desktop app, replacing the default 192.168.137.1 address, which is valid only when connecting directly to the EAGLE's WiFi network.

- Check for Inclinometer

The Inclinometer sensor built into the EAGLE measures the elevation of your telescope with respect to the horizon level, with a resolution of 0.1 degrees (and a measured average error lower than 1 degree). Inclination data is shown in real time in the EAGLE Manager X interface. In order to provide the correct measurement, you just have to set what is the side of the EAGLE facing the sky. This is done by selecting the EYE sensor pointing the sky. So if you install the EAGLE on your telescope and you have it with the 12V power out ports pointing the sky, you could see Inclinometer with negative values. In this case, please select the other EYE sensor (the one to the right in EAGLE Manager X interface, close to 12V power out ports) and Inclinometer values will be positive.
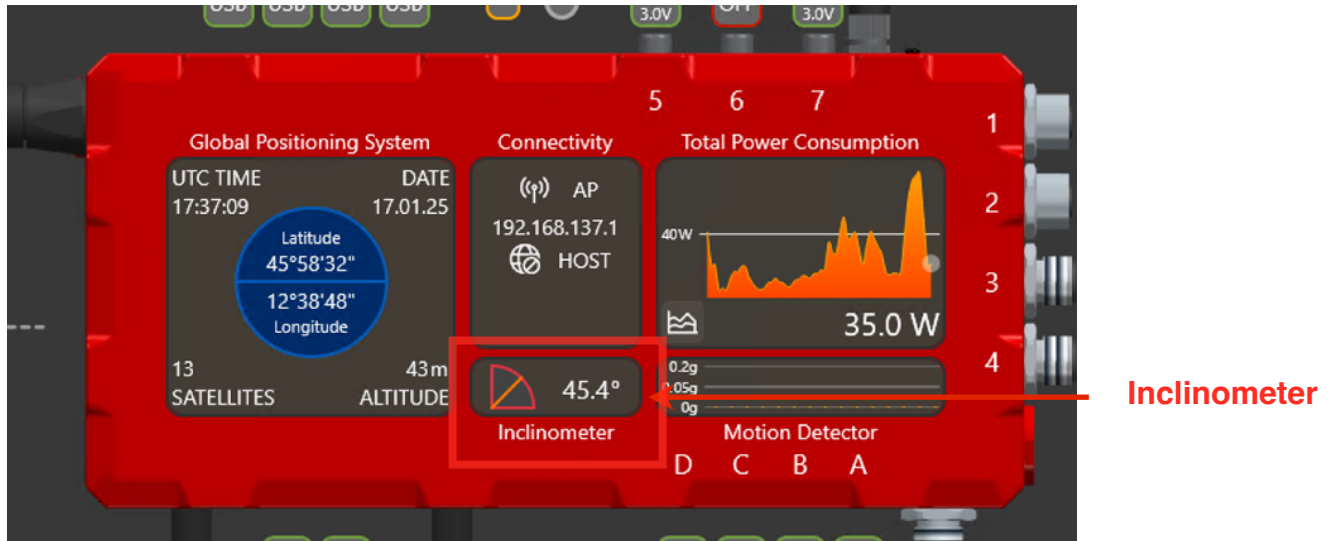
Image 51: Inclinometer

- Show Motion Detector data

Motion Detector shows in the EAGLE Manager X the unwanted motions without without confusing them with mount tracking or goto movements. This way PLAY (or third party software that support Motion Detector) can automatically repeat the last acquisition if EAGLE detects an unexpected motion. If you tap on the EAGLE chassis, you will see data (shown with logarithmic scale to have a better view of small motions) on the graph (that updates every second). You can also set the Motion Sensor sensitivity under ADVANCED SETTINGS, you will find the "threshold" value (default is 50 mg). It's important to set it to a level that shows no events on Motion detector graph when your telescope is tracking or making a goto (because it will be a little bit different for every telescope, because of different stability and mass) and it shows an event only when you touch the EAGLE or disconnect a cable.
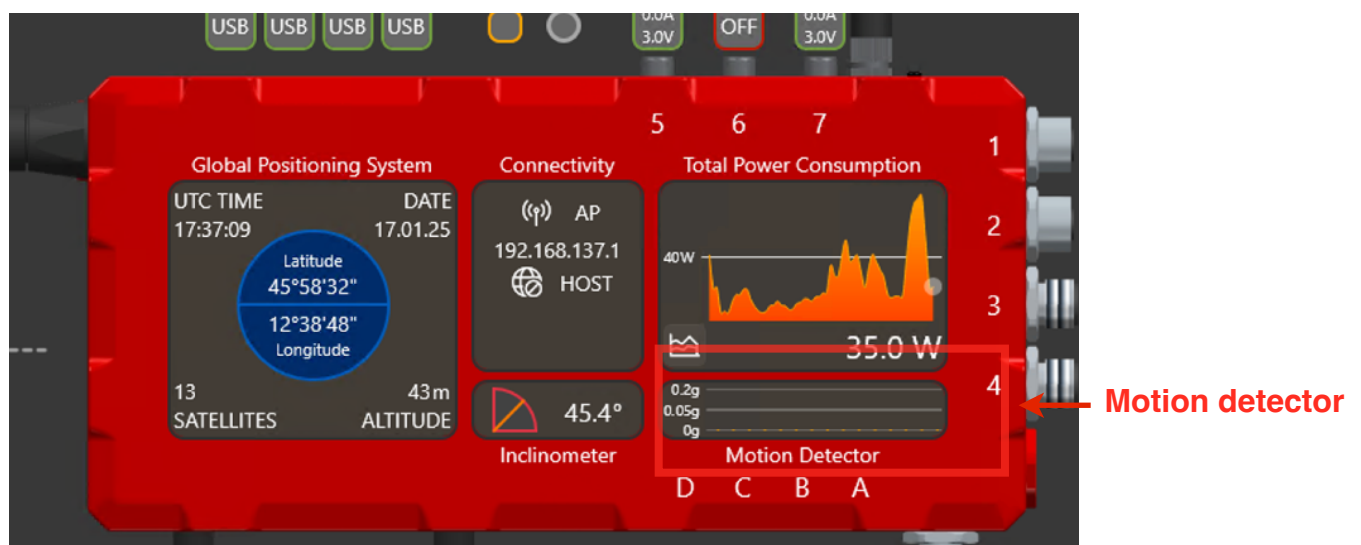
Image 52: Motion detector

- *remotely turn on/off the entire telescope*

The EAGLE is equipped with a standard ON/OFF button to power the unit on or off, but the entire system can also be shut down remotely. Once the EAGLE is powered on, users can activate connected devices remotely and operate the telescope. After completing the imaging session, users should first turn off the connected devices (camera, mount, etc.) and then shut down the EAGLE.
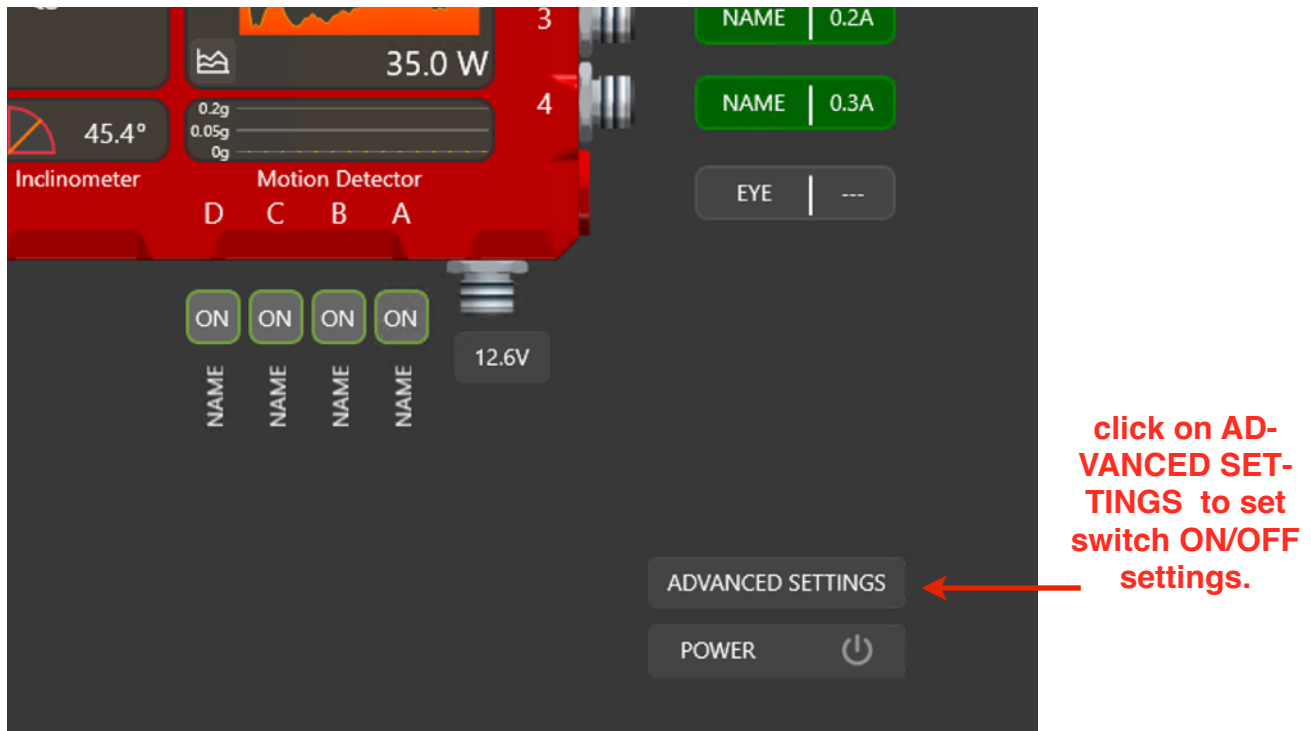
Image 53: ADVANCED SETTINGS button in EAGLE Manager

To configure the behavior of the POWER button, press the ADVANCED SETTINGS button. In the window that opens, you can set your preferred ON/OFF action for the POWER button in EAGLE Manager X. To turn off the EAGLE by pressing the POWER button, select Shutdown. Alternatively, you can choose Reboot or Standby. Click OK to save your selection.

Once configured, you can now turn off the EAGLE by simply pressing the POWER button.
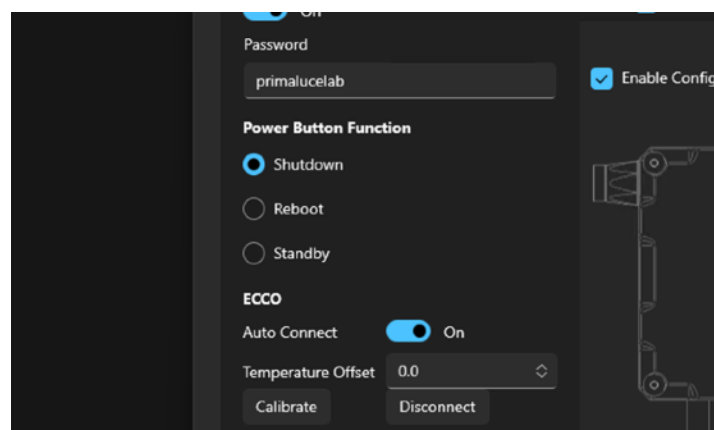
Image 54: ADVANCED SETTINGS window

- change the password of the WiFi network created by EAGLE

By default, EAGLE generates a WiFi network with EAGLExxxxx name (where xxxx is the serial number of your EAGLE) as reported also in the front part of the EAGLE. Default password is ***primalucelab*** but you can change it for your safety.

This way, if you're using the telescope together with other EAGLE users, only you will be able to access to your EAGLE AP WiFi network.

In order to do this, please click the ADVANCED SETTINGS button. Here you can see the Access Point status (default is ON) and you can modify the "password" field with the password you prefer and click OK to confirm (image 55). NOTE: The password has to be 8 characters long, it may contain both letters and numbers, without spaces.
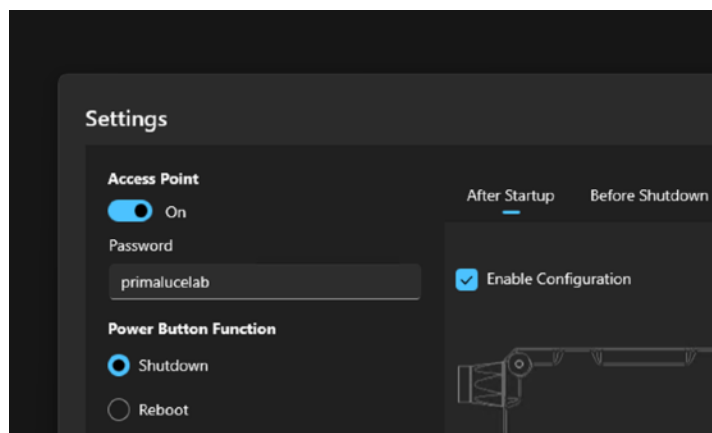
Image 55: ADVANCED SETTINGS window

NOTE!

1) **after changing the password, you will need to access the WiFi network created by EAGLE again from your control device.**

2) **do not lose your password otherwise you will no longer be able to access EAGLE remotely.**

- Check for GPS data

In the left part of the EAGLE Manager X interface you can see data automatically captured by the GPS sensor (image 56):
• UTC Time
• Date
• Latitude
• Longitude
• Number of satellites
• Altitude
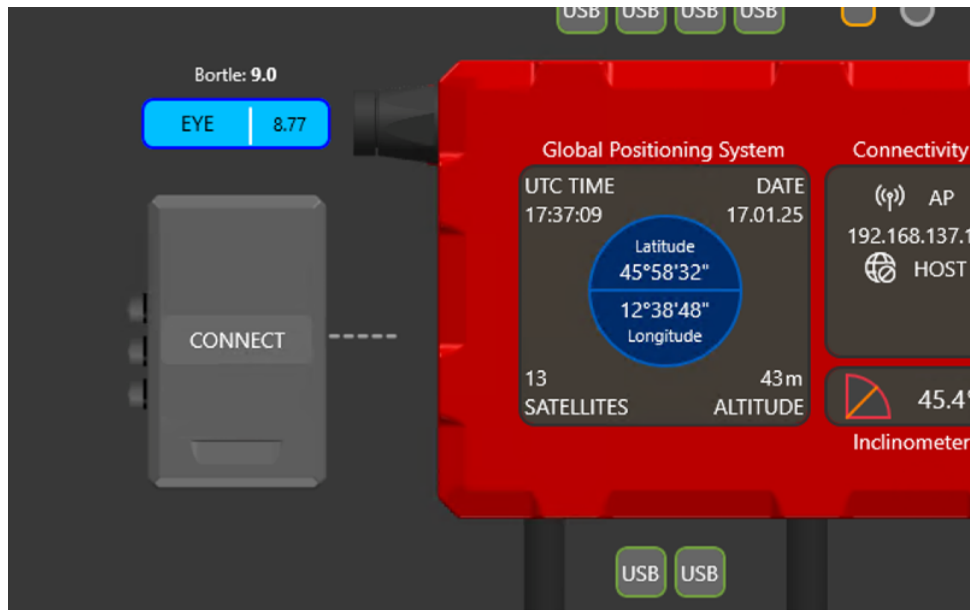
Image 56: GPS data shown in EAGLE Manager X interface

Under ADVANCED SETTINGS (image 57) you can modify how the GPS data is visualised. You can set:
• GPS format in DDD.DDDD° or DD°MM'SS''
• DATE formate in DD/MM/YY or MM/DD/YY
• ALTITUDE format in m (meters) or ft (feet)

Here you can also modify the "Set GPS time" option. If it's set to ENABLE, EAGLE Manager X will automatically write UTC time to Widows. This way the software you use for astrophotography will control the telescope with greatest precision. You just have to select your correct Time Zone in "Date & time" Windows options. In order to do this, please make mouse right-click click on the date and time (bottom-right part of Windows), select "Adjust date and time" and set the "Time zone" value in the new window.
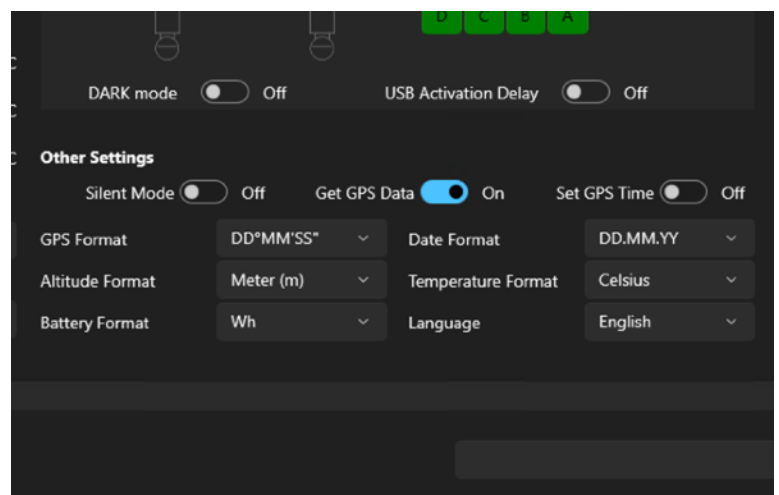
Image 57: EAGLE Manager X options
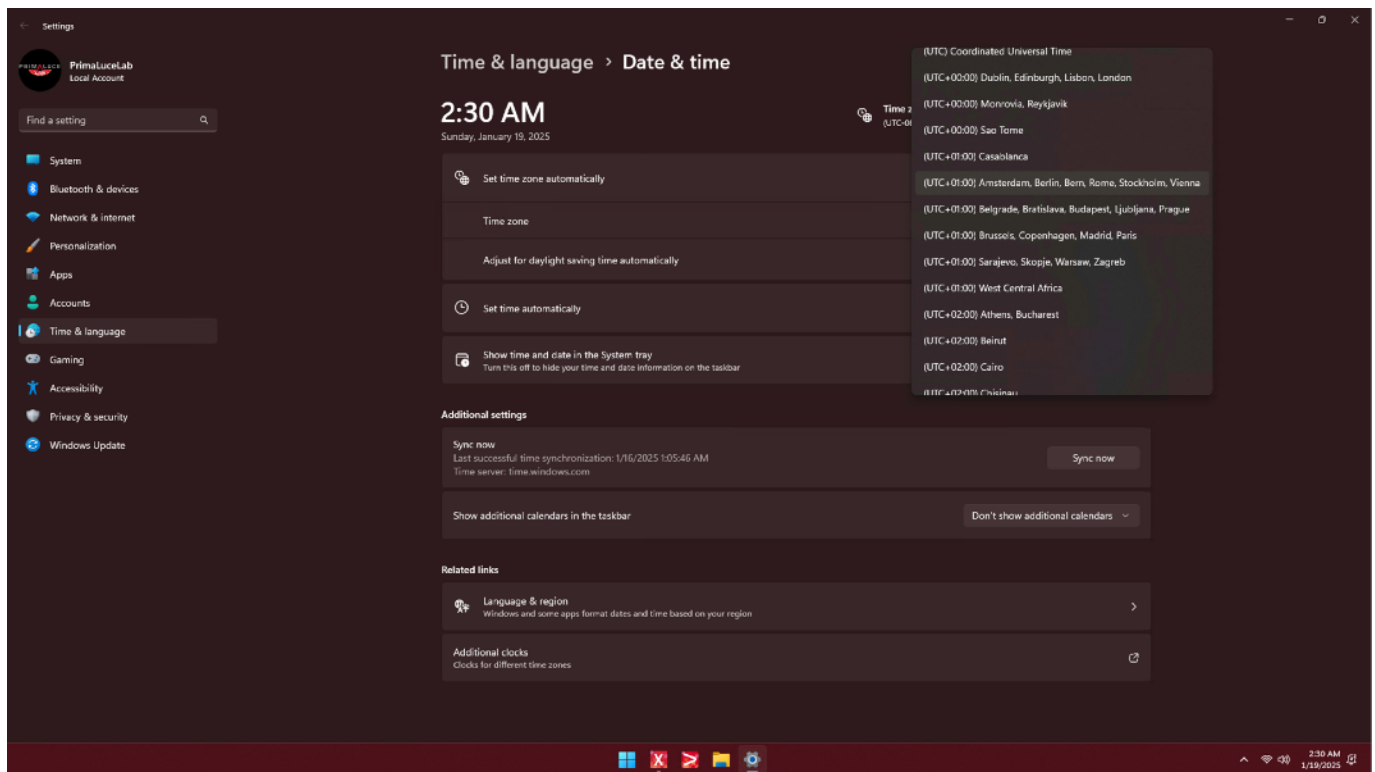
Image 58: Windows "Date and time" options

This way, every time you will turn on the EAGLE and GPS sensor will detect EAGLE's position and time, Windows time will be automatically updated. If you want to manually set your time, in the same Windows window you can manually set time, in this case please set as DISABLE the "Set GPS time" option in ADVANCED SETTINGS of the EAGLE Manager X.

- EYE sensor data

EAGLE include the EYE sensor to automatically measure the sky brightness for you (in magnitude per square arc second - mag/arcsec^2) with a 5 degree field of view, only where your telescope is pointed. The EYE value is shown in real time in the EAGLE Manager X interface where you can easily monitor sky quality measurements. EAGLE has two EYE sensors, one on each end of the EAGLE. Based on how you orient your EAGLE on your telescope, you can simply unthread and move the lens to the other sensor that is pointing to the sky, select the proper position of the lens in the EAGLE Manager X interface, and you are ready to read the sky brightness in any installation. EAGLE EYE has a narrow field of view, so it measures darkness of the night sky only in the part of the sky where your telescope is really pointed at. This way the EAGLE EYE won't be influenced, for example, by clouds that may be present in other parts of the sky. For the same reason, the proximity of your telescope or other accessories (like dew shield) won't interfere with the measurements.
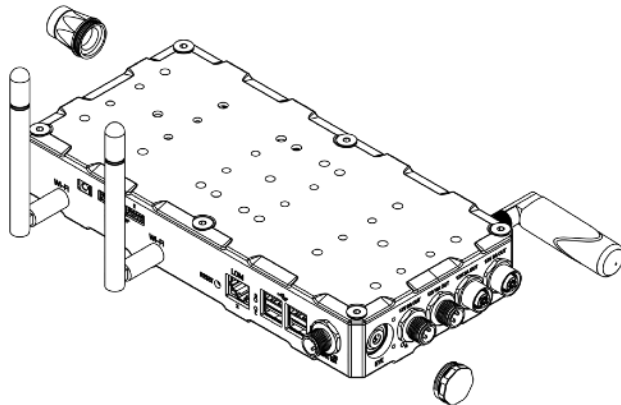
Image 59: If you install your EAGLE with the front part (the one with EAGLE name) facing the sky, please thread the EYE lens in front and close the back EYE sensor with the black cap.
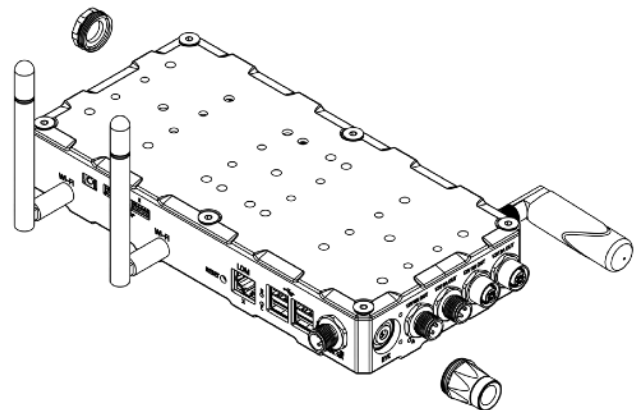
Image 60: If you install your EAGLE with the back part (the one with the power ports) facing the sky, please thread the EYE lens in the back sensor and close the front EYE sensor with the black cap.

In the EAGLE Manager X interface you can select the front EYE sensor (the one to the left) or the back EYE sensor (the one to the right) based on how you installed the EAGLE on your telescope (image 61). The active EYE sensor will become blue.
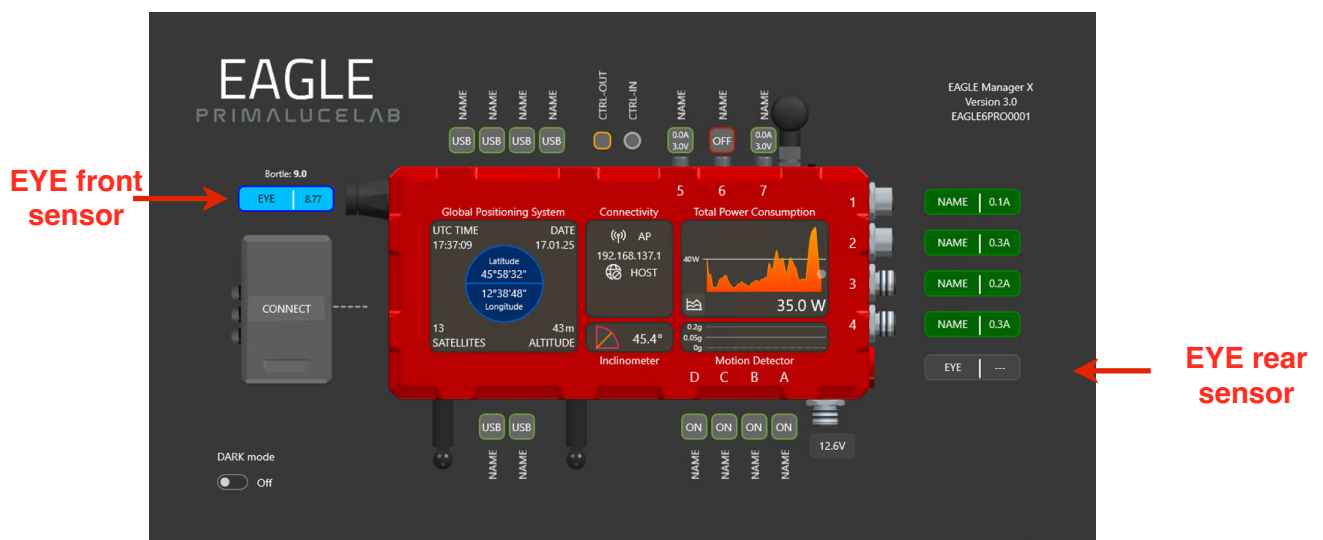
Image 61: The EYE sensors in EAGLE Manager X interface

The EYE sensor measures the darkness of the night sky in mag/arcsec^2 values this means than typical readings of the night sky will range from 18 (corresponding to a polluted night sky) to 22 (corresponding to a very dark sky with no light pollution) usually. The EAGLE EYE sensor is sensitive only to visible light since, behind the lens, there is a UV/IR cut filter and every EYE sensor is calibrated in PrimaLuceLab laboratory in order to consider temperature variations (thanks to a temperature sensor integrated in every EAGLE case) and by using a special light meter.

Based on the sky darkness, the reading time of the EYE value will change. Under light polluted sky, the EYE value will be displayed in a few seconds. Under very dark night skies, it will take up to a few minutes. In order to have a precise reading, avoid any light to one pointed against the EYE lens and activate EAGLE's DARK mode.

The small amount of internal heat generated by the EAGLE's processor reduces the possibility of dew formation on the small lens. During storage please remember to close the EYE lens with the provided cap and never point the EYE sensor at the Sun. If you're imaging the Sun, please keep the provided cap on the EYE lens.

- DARK mode

DARK mode feature that allows you to instantly turn off all the LED lights on the EAGLE. Not only this will prevent any influence on your telescope but it is also a great feature for your astronomy friends that may be close to you while enjoying the night sky together. Thanks to the new DARK mode, the EAGLE is now a welcome guest at star parties where standard computers may be prohibited because of uncontrolled light emissions from LEDs and screens (the EAGLE doesn't need for a screen to operate). In order to activate DARK mode, please select ON in the bottom-left switcher of the EAGLE Manager X interface. All the LED lights of the EAGLE will turn off and the EAGLE Manager X interface will become darker.
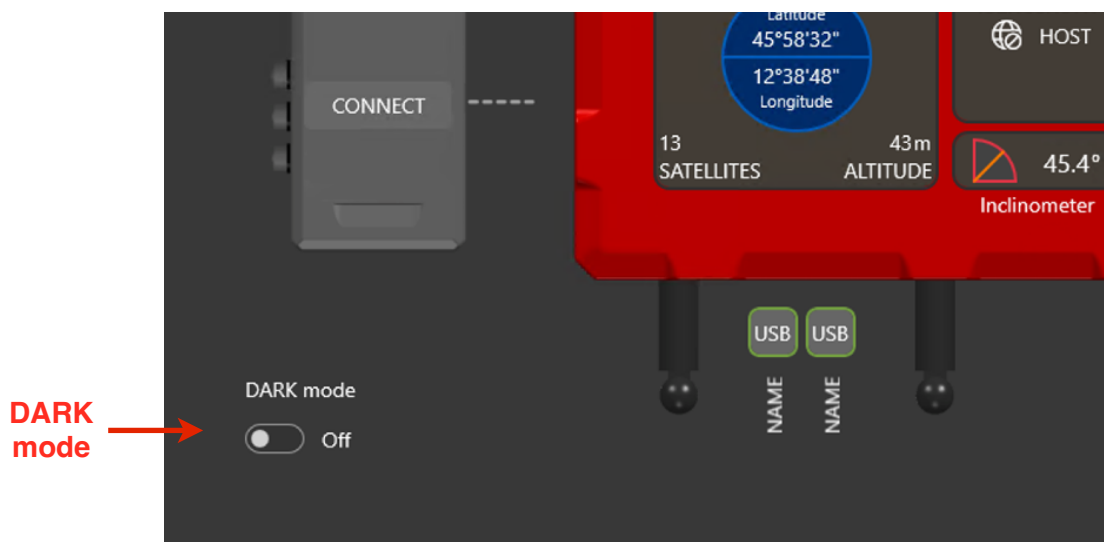
Image 62: DARK mode switcher in EAGLE Manager X

- GHOST mode

Thanks to GHOST mode, the EAGLE is able to control PLL devices (SESTO SENSO 2, ESATTO, ARCO, GIOTTO and ALTO) by using its WiFi connection instead of a standard USB cable, without forcing you to use special drivers or software. When you activate GHOST mode, EAGLE Manager X wirelessly connects to your PLL devices and creates a new COM device, as you would have with a standard USB cable (that now you can remove) so you can keep using your astrophotography programs and ASCOM platform as you always have.

NOTE: in order to use GHOST mode, you are required to:

➡Connect all your PLL Devices to your EAGLE with USB cables (you will remove USB cables later). WiFi of your PLL devices has to be turned on.

➡Set your EAGLE Wifi card at 2.4GHz and check that your WiFi card drivers are updated. In order to do this, follow this procedure:

- Go to Windows "Control Panel" and then select "Device Manager"

- Expand the "Network adapters" item.

- Right click on the WiFi card driver "Intel(R) WiFi 6E AX210 160MHz" and select "Properties"

- Select the "Advanced" Tab.

- Set "802.11a/b/g Wireless Mode" to "2.4GHz 802.11b/g"

- Set "802.11n/ac/ax Wireless Mode" to "Disabled"

- Set the "Preferred Band" to "Prefer 2.4GHz band"

- Set "Ultra High Band (6GHz)" to Disabled

- Select the "Driver" Tab.

- Check the driver version to be greater or equal to 23.30.0

- If not, download and install the updated driver from the following links:

  - https://www.intel.com/content/www/us/en/download/19351/windows-10-and-windows-11-wi-fi-drivers-for-intel-wireless-adapters.html

- Press OK.

- Reboot Windows.
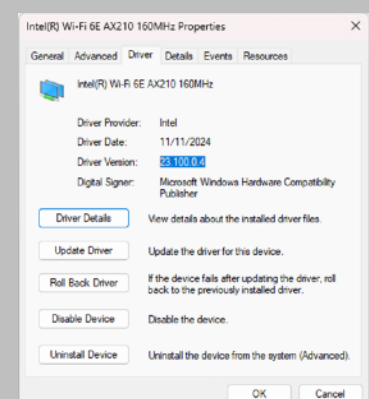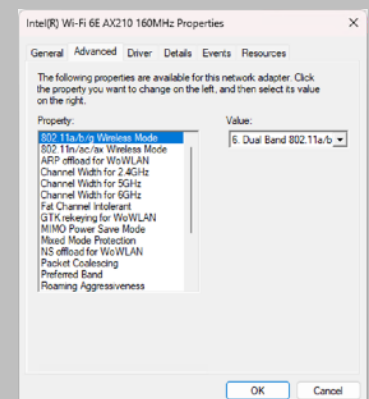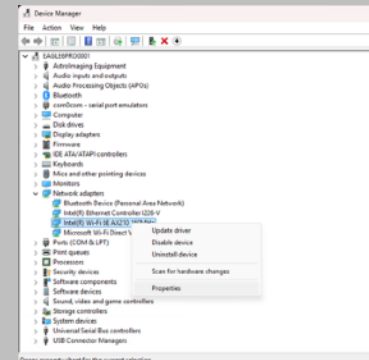
Now click on the activation button below GHOST mode icon and you will see a new window that will remind you to check your wifi card settings and driver version. Don't disconnect your devices USB cables now, you will disconnect them later. Click on OK button to proceed.
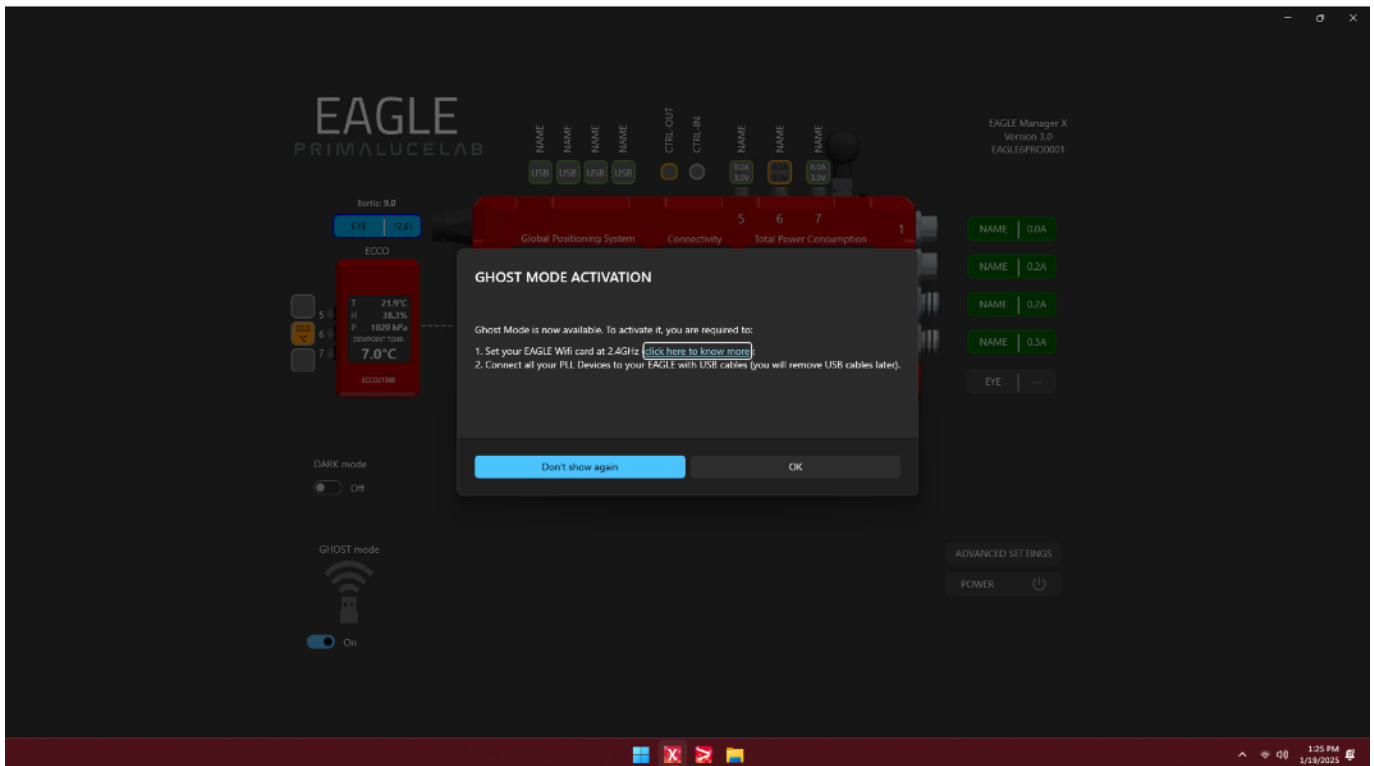
If you have one or more PLL devices (SESTO SENSO 2, ESATTO, ALTO, GIOTTO) connected to the EAGLE with USB cable, you will find new buttons to the right of the GHOST mode icon.
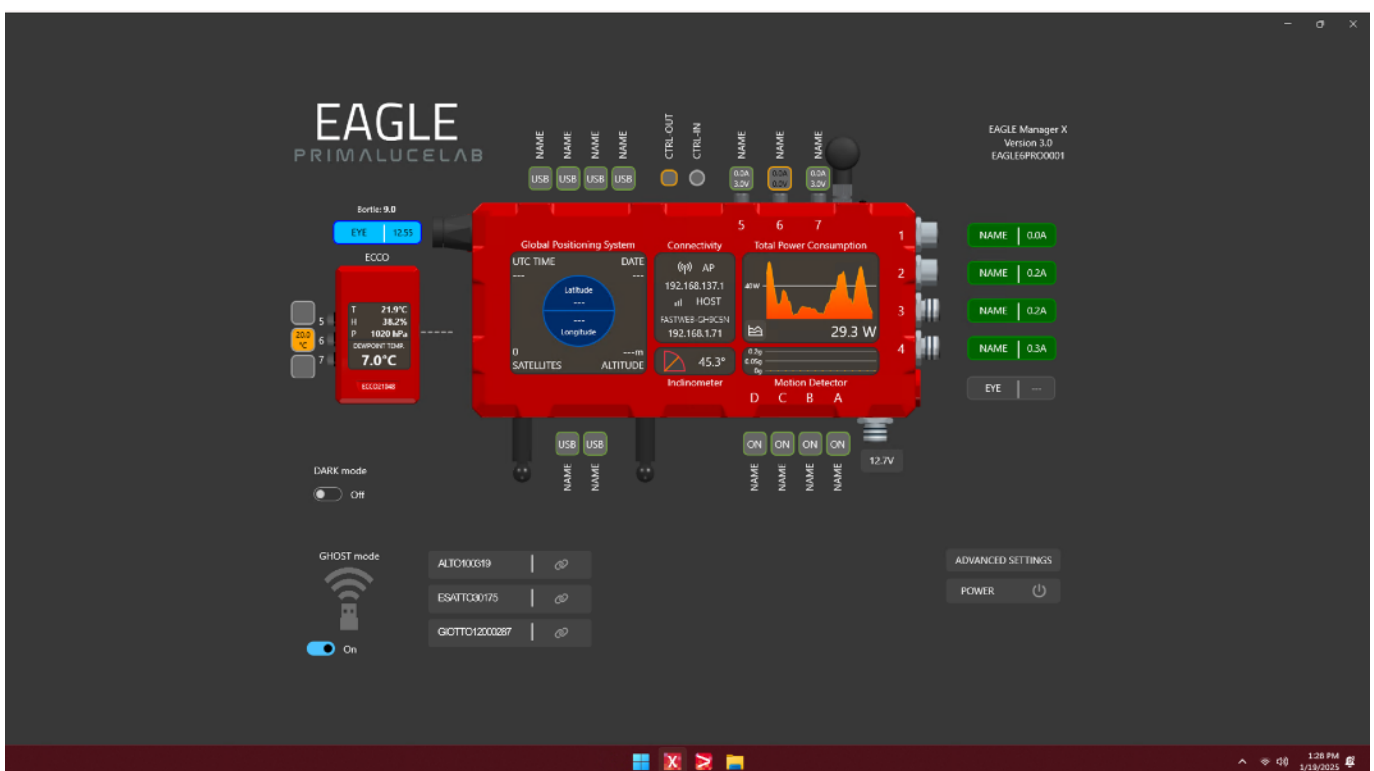
Make a mouse left-click on any of them to view the confirmation window, you can now press the "Apply" button to activate GHOST mode for the selected device.
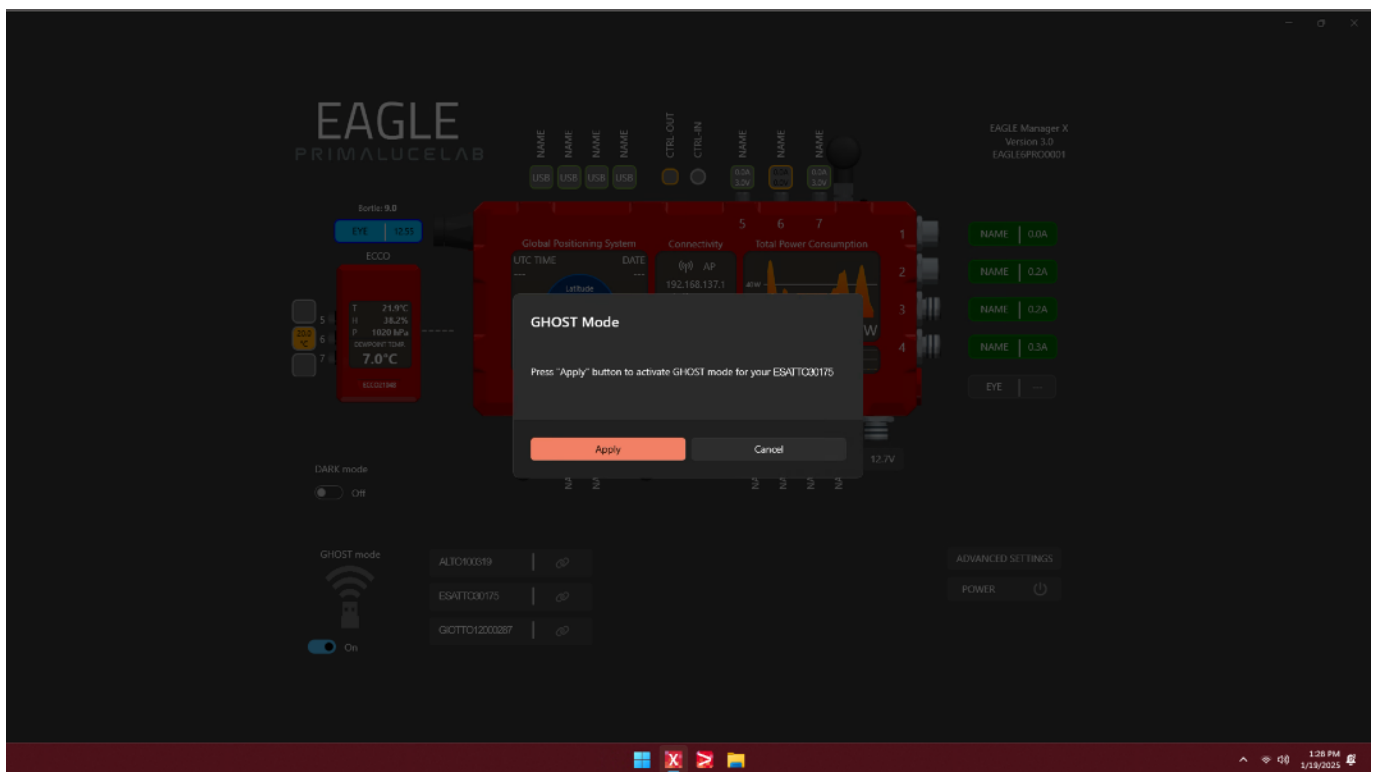
As soon as the GHOST mode is activated, you will see the confirmation. You can now disconnect the USB cable and press OK button to proceed.
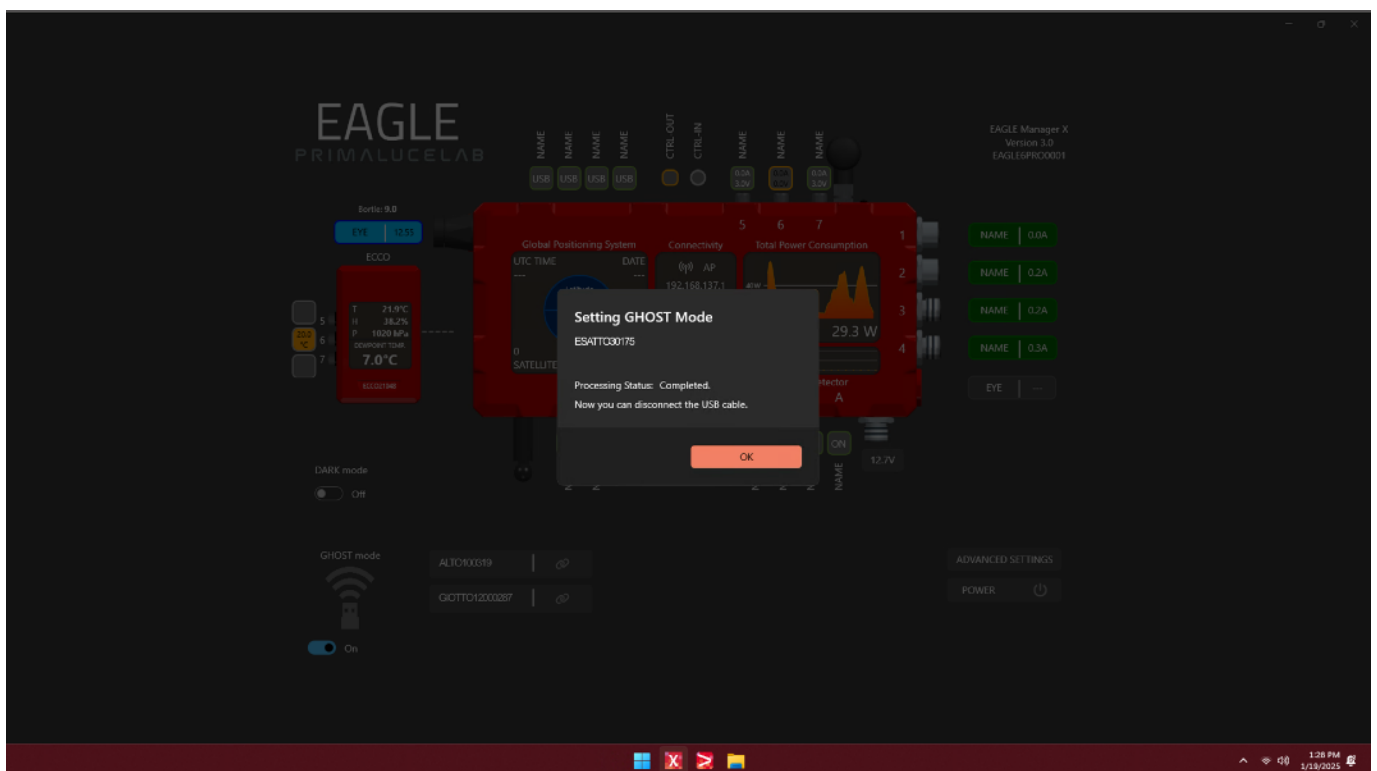
WHAT IF I RECEIVE A NOTIFICATION ERROR SUGGESTING TO REBOOT THE DEVICE INSTEAD OF A GHOST MODE CONNECTION CONFIRMATION?

If you encounter this issue, you need to reset your device settings. To do so, please follow these steps:

1. Disconnect the USB cable and power cables from your device.

2. Press and hold the RESET button on your device.

3. Turn on the power to your device while keeping the RESET button pressed.

4. Continue holding the RESET button for at least 20 seconds. The device's power LED should start blinking.

5. Release the RESET button.

6. Restart your EAGLE computer

Now your device should now be able to connect in GHOST mode.

Your device is now connected to the EAGLE by using the WiFi connection instead of the USB cable. In fact you will see the button with a green border that confirms that the device is connected. In the button you can find the number of COM port that EAGLE Manager X associates to the wireless connection: when you want to connect and control your device with a control software (like PLAY or another software through ASCOM platform), you will have to use this COM port number **instead of** the COM port previously created by Windows when you used the USB cable (this COM port number is no more available now). Below the COM port number, you can also find the IP number associated to this device, this will be used in order to let you control the device with the Virtual Handpad, please refer to the next paragraph to know more.
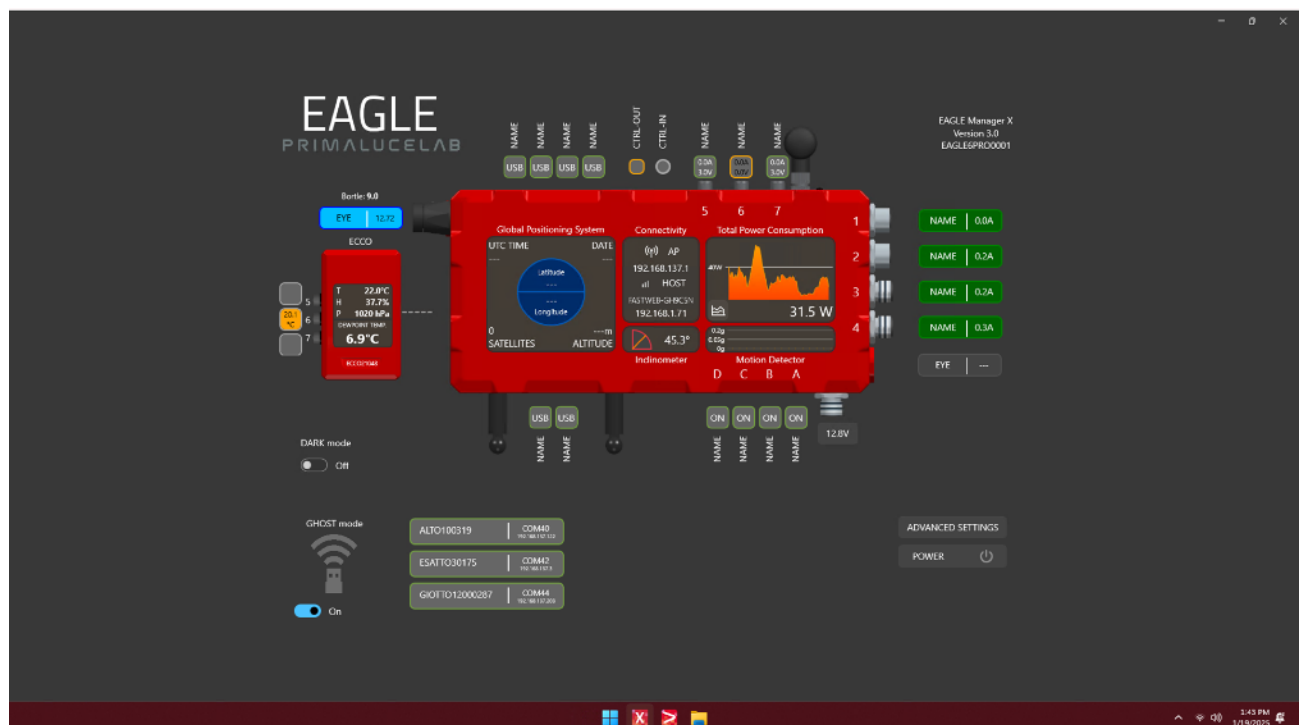
If you want to disconnect your GHOST mode activated device (in the same way you can do with the A, B, C and D USB ports of the EAGLE) you can make a mouse left-click and the button border will become red.
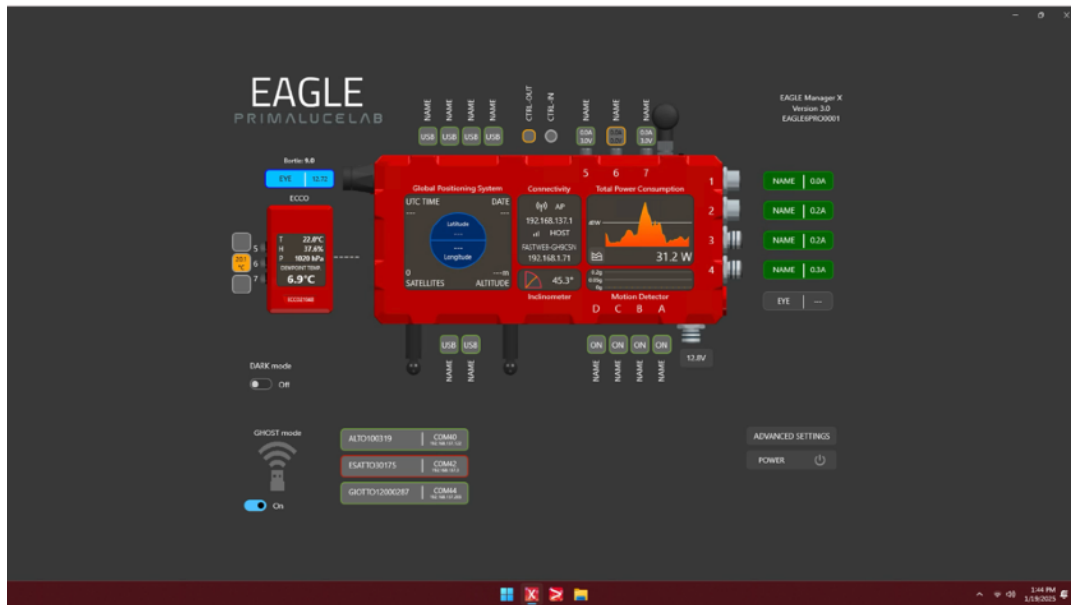
If you want to completely deactivate GHOST mode from the device and come back to the standard USB connection (this also restore the device WiFi connectivity to let you directly connect with the Virtual HandPad) you can make a mouse right-click to view the confirmation window.
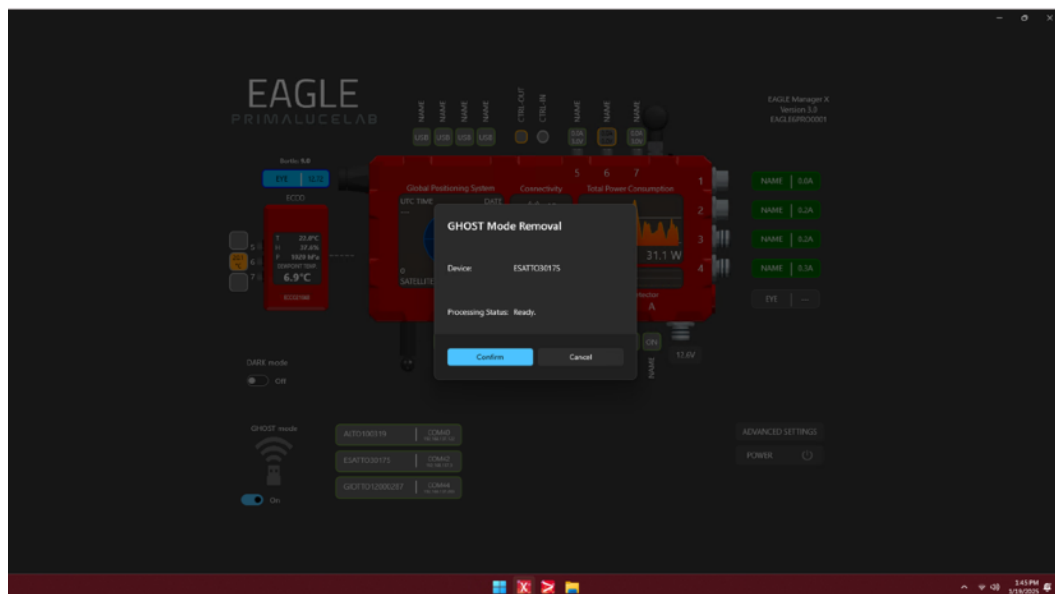
Click on "Proceed" button to confirm removal of GHOST mode, this way you can connect again the USB cable to the device and come back to the standard connectivity status.

NOTE: If your USB device, when connected to an EAGLE's USB port, is not be recognized in the Device Manager (it does not appear in the list), this may be caused by a driver conflict with the com0com component used for GHOST mode. To resolve this issue, you can uninstall the com0com software from the list of installed programs in the Control Panel. Once uninstalled, the driver conflict will be resolved, and the device should appear in the Device Manager.Please note that uninstalling com0com will disable GHOST mode.

Notes to the use of GHOST mode:

- GHOST mode has been tested with EAGLE computers with Windows OS at least Windows 10 1809.
- When you activate GHOST mode, the standard WiFi connection of selected device is no more accessible, and this means that you can't access the Virtual HandPad by connecting to its WiFi network as you do by default. In order to use the Virtual HandPad, you have to:
    - Connect your smartphone or tablet to the EAGLE WiFi connection
    - Open browser and type the IP number associated to the device, as shown in the related button (with green border) under the COM port number.
    - This will allow you to see the Virtual HandPad
    - If you have more PLL devices connected to the EAGLE with GHOST mode and you want to control all of them also with the Virtual HandPad, you can keep your smartphone or tablet connected to the EAGLE's WiFi network and just change the IP number as shown in the EAGLE Manager X interface.
- Especially for the first connection setup, you might notice a certain delay in the appearance of the GHOST mode buttons. This is normal and due to the authentication time of the device connected to the EAGLE wireless network.
- When you replace the standard USB connection with the GHOST mode wireless connectivity, **please remember also to change the COM port number registered in the software you use to control PLL device** through the PLL ASCOM drivers or in PLAY. This is very important since, by removing the USB cable, also the "old" COM port number that Windows associates to your PLL device is not available anymore.
- When you shutdown or reboot your EAGLE, you don't need to activate GHOST mode again since, at EAGLE Manager X launch after Windows startup, it will automatically activate again with the same settings.
- If, following a Windows update, some of the devices connected in GHOST mode do not appear in the list of the connected devices, restart the EAGLE Manager X by turning off the ports that power the PLL GHOST mode connected devices.
- GHOST mode works only if you set the EAGLE's WiFi network at 2.4 GHz since, even if EAGLE WiFi network can be dual channel (2.4, 5 and 6 GHz), WiFi controller in all the devices (SESTO SENSO, ESATTO, GIOTTO and ALTO) is 2.4 GHz only. This means that, even if a lower frequency may provide a longer range, by setting the EAGLE's WiFi at 2.4 GHz you may experience a slower refresh rate in Remote Desktop and this is normal. You may also experience some RFIs (radio frequency interferences) since they're usually more probable at lower frequencies. If you experience lower WiFi performances after you activate GHOST mode, you may consider coming back to standard USB cable and reset your EAGLE's WiFi to 5 and 6 GHz.
- If, after configuring GHOST mode, the device does not appear in the list of available devices, please follow this procedure:
    1. Double click on the EAGLE Manager X installer then click on the "Next" button
    2. Click on the "Repair" button;
    3. Click "Repair"
    4. In the "Do you want to allow this app to make changes" window, choose "YES"
    5. Press "Next", then "Agree".
    6. Whether you install the add-ons or not is irrelevant for the GHOST mode setup. Press "Next"
    7. Keep the default installation path and press "Install"
    8. Then press "Next" and wait until installation is completed.
    9. Press "Finish" and reboot Windows.
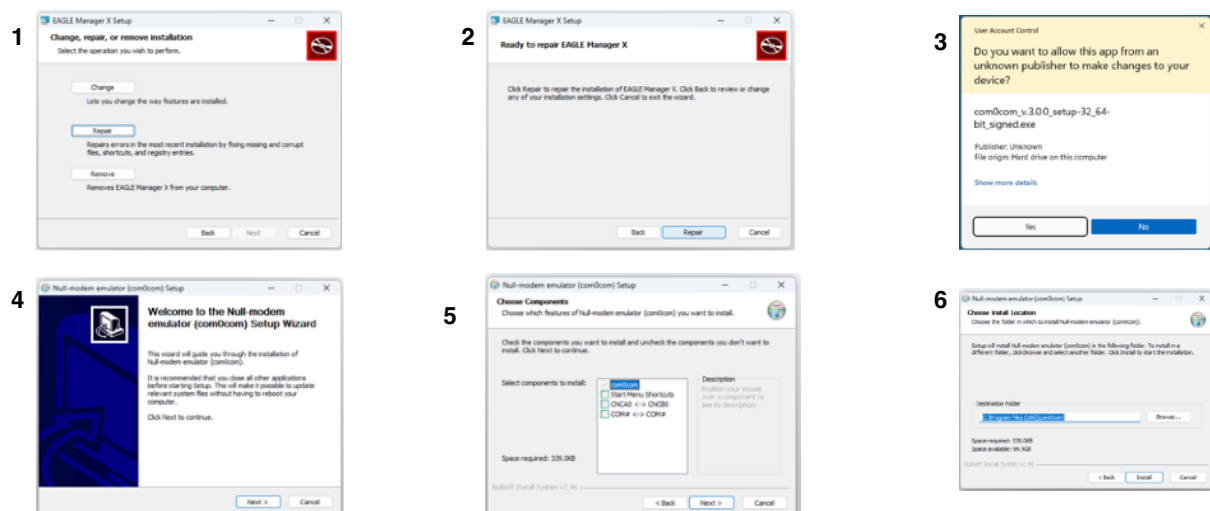
- Use Observatory Actions: the CTRL-IN port

The CTRL IN port provides a variety of remote control options, that you can choose and personalize in the EAGLE Manager X interface, by choosing if you want to power on, off or power cycle the EAGLE itself (without physically pressing the ON button), to manage the 12V power out ports or dew-heater ports remotely (for example in order to pre-heat your telescope optics before starting the session), to toggle the USB 2.0 ports or activate/deactivate the DARK mode. To activate these actions, simply connect an external device with a dry contact (e.g., a smart relay switch) to the CTRL IN port using a stereo jack cable and activate the relay switch through your smartphone.
In order to personalise the Action that the EAGLE accomplish when you send a command to the CTRL-IN port, you can make a mouse right-click on the CTRL-IN port of the EAGLE Manager X interface and this will pop up a new window (Image 63). Here you can select these options:

Mode:
- EAGLE ON: remotely turn the EA-
  GLE on
- EAGLE OFF: remotely turn the
  EAGLE on
- EAGLE ON/OFF: remotely turn the
  EAGLE on or off (based on the pre-
  vious status)
- E. MAN. PW BUTTON: execute the
  Action set (in Advanced Settings)
  for the POWER button

Polarity:
- NA
- NC
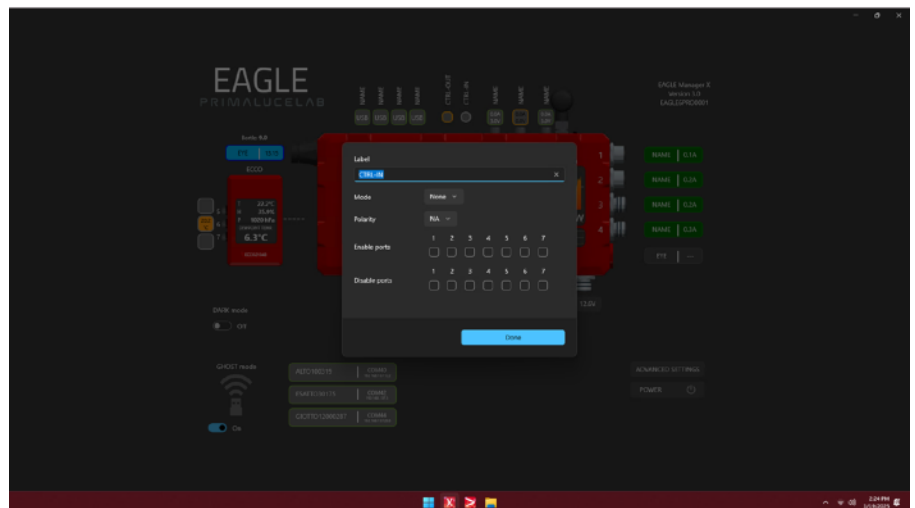
Image 63

Enable ports: here you can select if you want to use CTRL-IN Action to enable a specific EAGLE's port.

Disable ports: here you can select if you want to use CTRL-IN Action to disable a specific EAGLE's port

When you complete personalisation of the Action related to CTRL-IN port, you can click on **Done** button in order to save its settings.

> **NOTE: To use the Action related to the CTRL-IN port, you must connect your external device, which triggers the Action, to the EAGLE using a cable plugged into the CTRL-IN port.**
>
> The CTRL-IN port must be connected using a standard 2.5mm (1/10 inch) audio jack, either stereo or mono (TRS or TS). The two contacts (tip and ring for a stereo connector, or tip and sleeve for a mono connector) must be potential-free (do not connect any jack that provides power); otherwise, the EAGLE electronics may be damaged.
>
> Please connect the jack to CTRL IN port before powering on the EAGLE6. If you connect the cable with the EAGLE powered on, this will automatically start the Action.
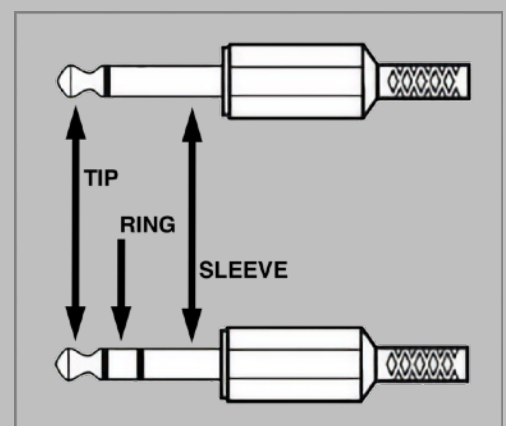
- Use Observatory Actions: the CTRL-OUT port

The CTRL OUT port adds even more functionality by allowing you to turn on/off external devices like mounts, domes, or other observatory equipment that support external switch control. Simply use a compatible cable (not included with EAGLE6 since it depends on the mount or dome you connect to it) to connect EAGLE's CTRL-OUT port to the external switch port of your device, then set the way the CTRL OUT port will send the command to your device in the EAGLE Manager X.

In order to personalise the Action that the EAGLE accomplish when you send a command to the CTRL-OUT port, you can make a mouse right-click on the CTRL-OUT port of the EAGLE Manager X interface and this will pop up a new window (Image 64). Here you can select these options:

- Mode:
        - Switch
        - Pulse
- Polarity:
        - NA
        - NC
- N. of pulses: the number of pulses the CTRL-OUT port has to create every time you press the CTRL-OUT button on the EAGLE Manager X interface
- Pulse Tim ms: length in milliseconds of each pulse

When you complete personalisation of the Action related to CTRL-OUT port, you can click on **Done** button in order to save its settings.
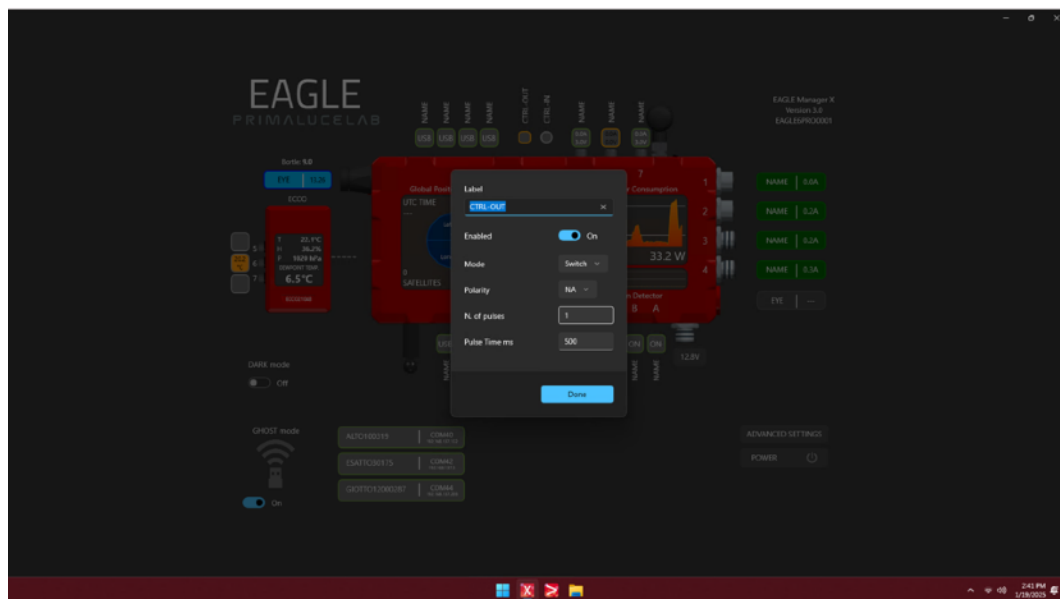
Image 64

NOTE: in order to use the Action related to CTRL-OUT port, you will need to connect your external device to the EAGLE by using a cable to be plugged to the CTRL-OUT port. The CTRL-OUT port must be connected using a standard stereo (TRS) 3.5mm (1/8inch) audio jack. Please note, do NOT:

- mono audio jack

- apply a voltage exceeding 48 VDC

- apply a current higher than 300 mA

as this could damage the electronics of the EAGLE. Please connect the jack to CTRL OUT port before powering on the EAGLE6 to avoid unintentional activations and short circuits.

- Use Lights-out Management (LOM)

Lights-out Management (LOM) feature allows you to remotely power on the EAGLE, check the status of systems like power output ports or sensors, and ensure everything is ready for observation independently of the operating system, even when the computer integrated in the EAGLE is powered off. Lights-out Management can be accessed by using a computer connected to the same network of the EAGLE, by plugging a standard Ethernet cable to the EAGLE dedicated LOM port and the network router.

In order to use LOM, first of all you need to make sure that the IP address of the LOM is compatible with the ones created by the network you want to connect it to. Enter in EAGLE Manager X ADVANCED SETTINGS and, on the right, you will find the options for IP number associated to LOM (Image 65). By default the EAGLE creates an IP number 192.168.0.222 for the LOM feature but, if your network IP numbers belong to a different class (for example 192.168.1.xxx), you can manually set a new IP number in the IP field and press the "Close" button to apply the new settings. You will hear the EAGLE emitting a "beep" sound to confirm the internal LOM IP address is updated.
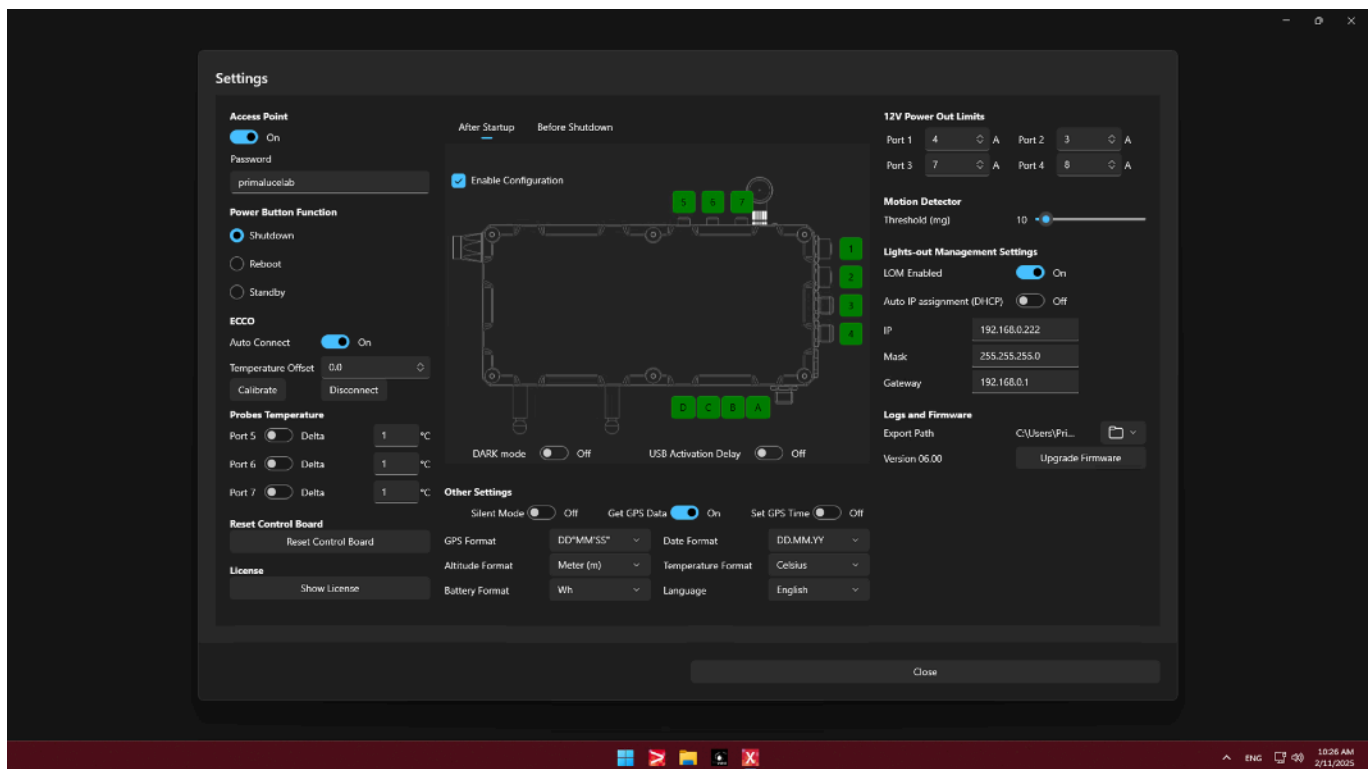
Image 65

NOTE: LOM can be accessed from:

• **a Windows computer by using Chrome, Firefox or Edge browsers**

• **a macOS computer by using Chrome or Firefox browsers**

In order to access LOM, you can use a computer connected to the same network (it has to have an IP number with same class of the one associated to LOM). Then you can open the browser and type, in the url bar, the IP number of your LOM. For example, if you selected 192.168.1.222 in the ADVANCED SETTINGS, you will type the same IP number in Chrome url bar. Press ENTER to confirm and you will see a login page (Image 66).
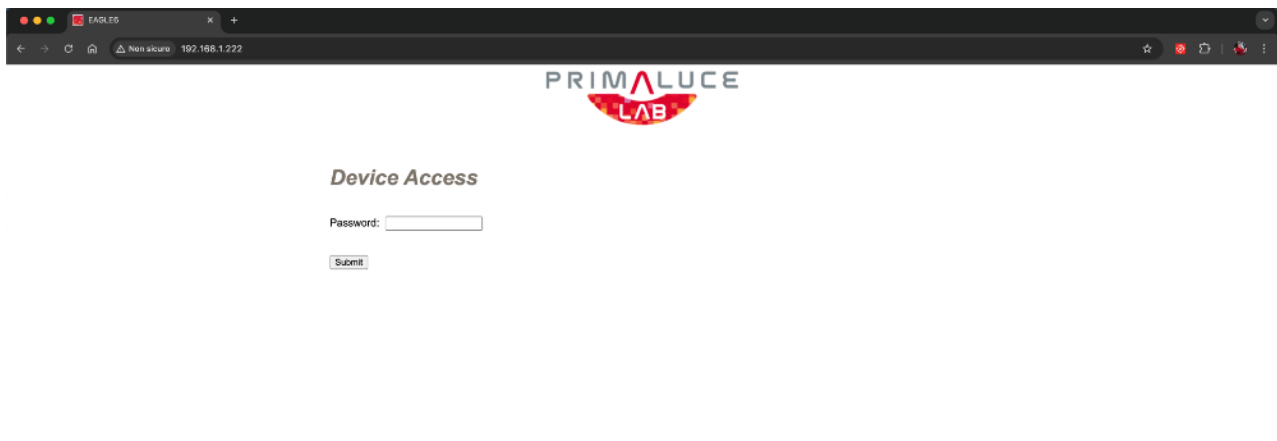
Image 66

Type the EAGLE's 4-digit password (the same you use to connect to Remote Desktop) and press the Submit button to enter in the Lights-our Management page (Image 67). Here you can:

- Check computer status and turn it ON or OFF remotely
- Check data from sensors: GPS and Inclinometer
- Monitor power IN
- Control power OUT ports (1-2-3-4-5-6-7)
- Toggle USB 2.0 (A-B-C-D) ports
- Toggle DARK mode
- Check for CTRL-IN and CTRL-OUT ports
- Check DIAGNOSTICS from sensors
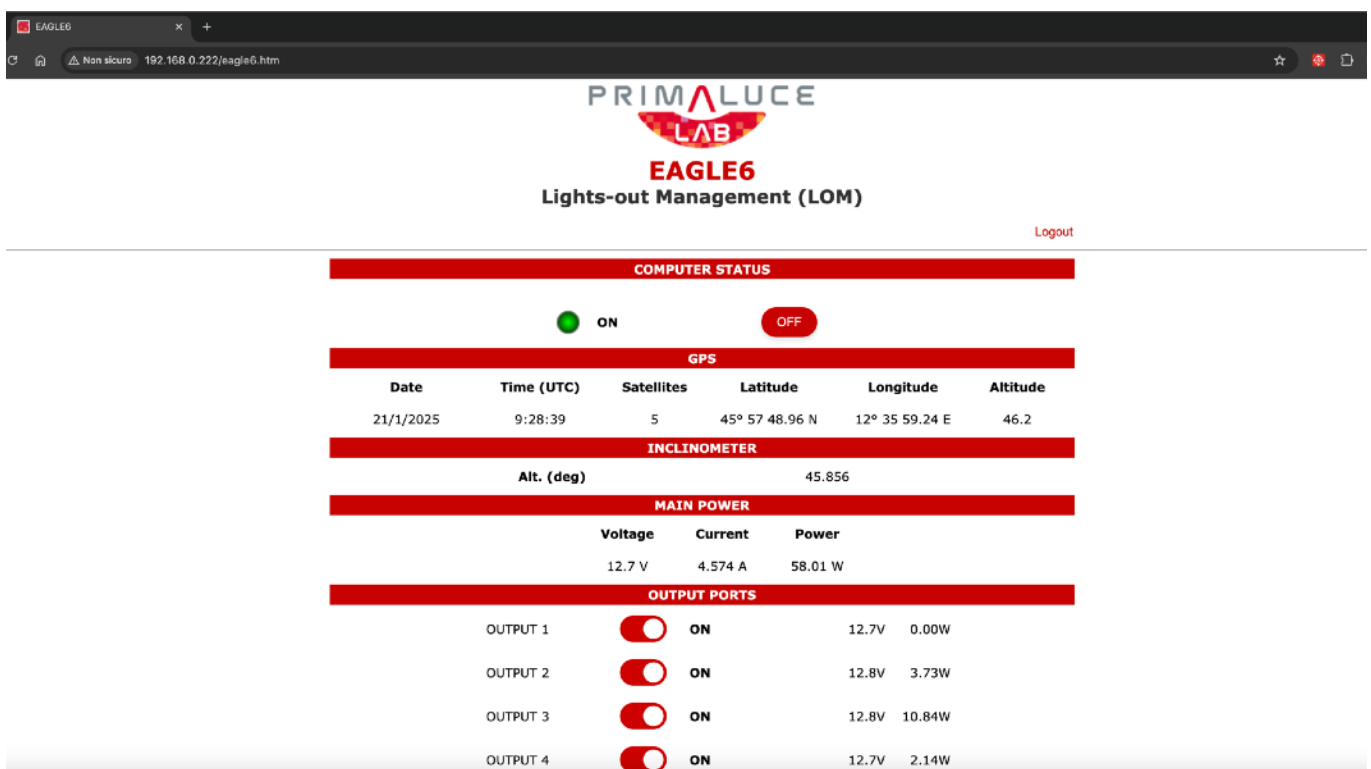
Image 67

First use: EAGLE Manager X to simplify devices connectivity

The EAGLE computer is able to control many devices and this is very important in modern days since your astrophotography telescope may be composed by more electronic accessories: imaging camera, auto guider, motorised focuser, rotator, motorised filter wheel, flat field generator, telescope cover motor, dome, etc. Most of these (usually all except cameras) are "serial devices" that communicate with computers by sending data with a "serial" standard (like the RS-232). But modern Windows computers (and the EAGLE too) have not serial ports (like COM1, COM2), so the serial device has to be connected to computer's USB port and communicate through a "virtual" COM port by using a driver that creates a COM port (e.g., COM3, COM4). Since definition of COM port number is requested in most astrophotography softwares (that needs to know what COM port is associated to every device), this is a very important factor. But the EAGLE Manager X allows you to easily keep track of all devices connectivity, let's see how.

First of all, when you connect a serial device (like a ESATTO focuser) to the USB port of your EAGLE, Windows automatically load a piece of software called "driver" to understand how to communicate with the serial device through the USB port. This driver creates a virtual COM port (e.g., COM3, COM4) on your computer and acts just like a traditional COM port, but it's using the USB connection instead. You can easily check this by going to Control Panel, then selecting Device Manager and expand the "Ports (COM & LPT)" devices. In the screenshot below, we connected an ESATTO focuser to the USB port A of the EAGLE and Windows automatically loaded the "Silicon Labs CP210x USB to UART Bridge" driver by creating a COM8 port.
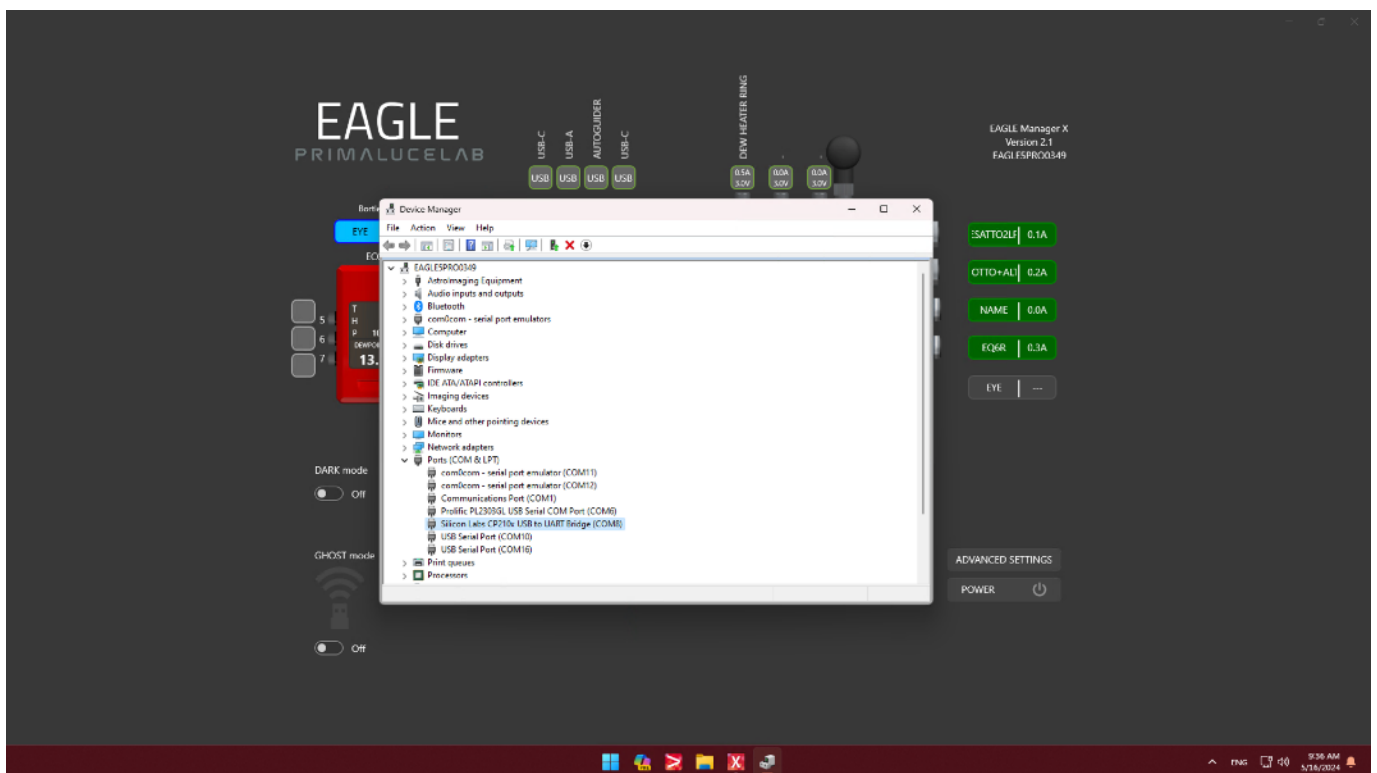
This means that Windows automatically assigned COM8 to our ESATTO focuser. We can easily note this by typing the device name and COM port number in the USB port "A" of the EAGLE Manager X interface. This way it will be easy to remember the COM port number associated to our devices without the need to coming back to Control Panel -> Device Manager every time. In the screenshot below you can see that we have the

• ESATTO connected to USB port "A" of the EAGLE and assigned to COM8
• SkyWatcher computerised mount connected to USB port "C" of the EAGLE and assigned to COM6
• ECCO connected to USB port "D" of the EAGLE and assigned to COM10
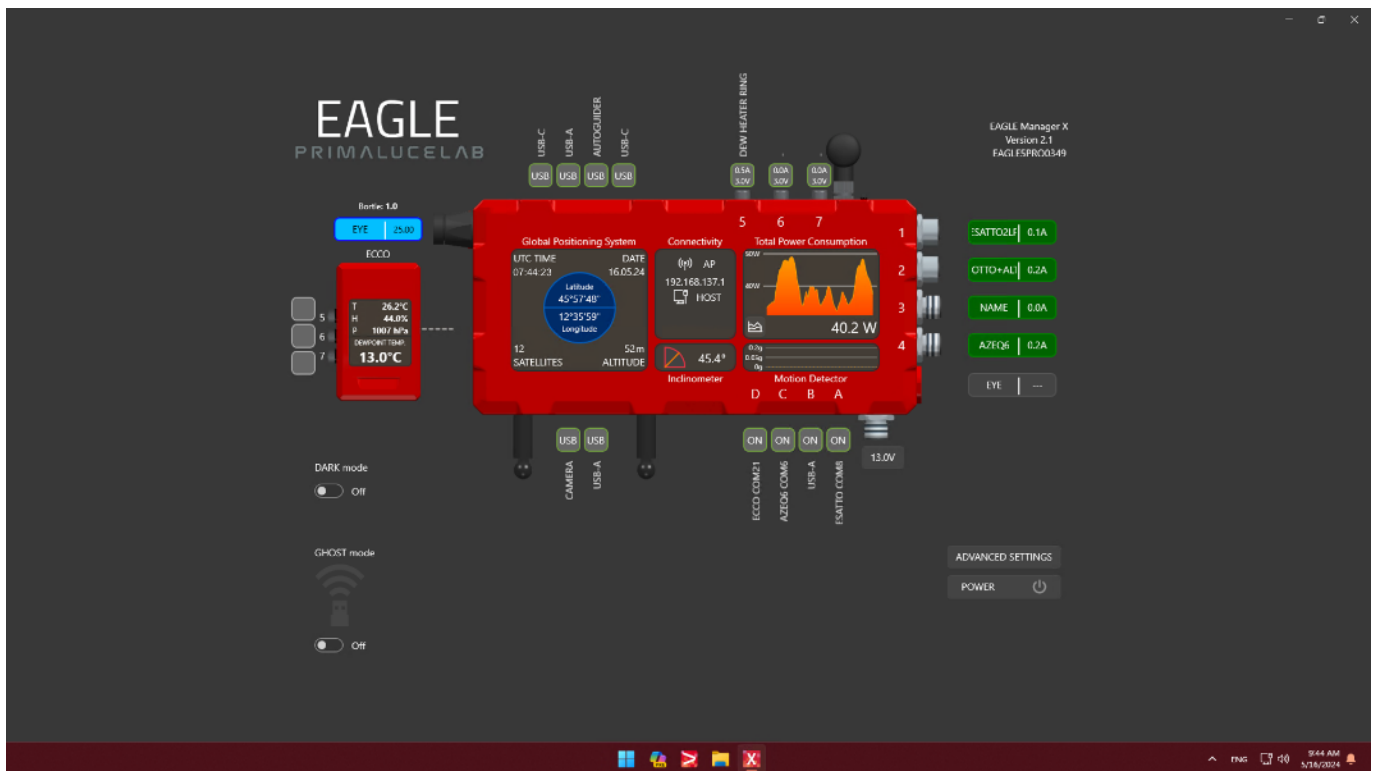
Another way to use EAGLE Manager X interface to simplify devices connectivity is to use GHOST mode. The GHOST mode allows you to replace the USB cable with a wireless connection without the need of special drivers or softwares, the EAGLE creates a "virtual" USB cable that assigns, as before, a COM port number and this allows you to use the astronomy software you prefer in the same way you do when you use a standard USB cable, but without the USB cable itself! When you activates GHOST mode for one of the PrimaLuceLab devices, EAGLE Manager X confirms the connection and it also shows the new COM port number assigned to your device when you connect to it through the GHOST mode. In this example, since we connected ESATTO focuser with GHOST mode and we removed the USB cable previously connected to USB port "A", EAGLE Manager X shows that ESATTO is now associated to COM40.
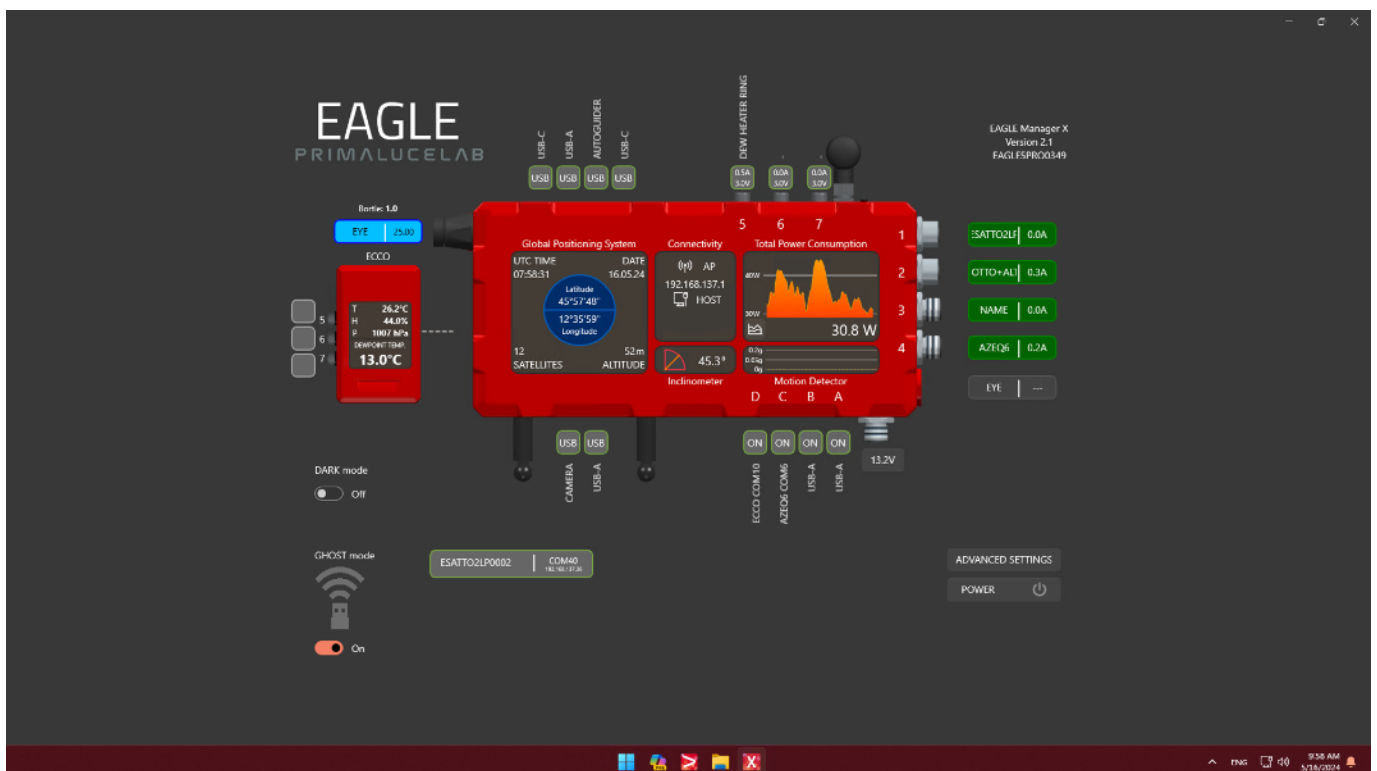
Now, all the serial devices and any software on your EAGLE computer can exchange data through these virtual COM port, just as if they were physical serial ports. Since we also connected GIOTTO flat field generator and ALTO telescope cover motor to the EAGLE through GHOST mode, the EAGLE Manager X shows now that:

- ESATTO is associated to COM40 through GHOST mode
- GIOTTO is associated to COM46 through GHOST mode
- ALTO is associated to COM44 through GHOST mode
- SkyWatcher computerised mount connected to USB port "C" of the EAGLE and assigned to COM6
- ECCO connected to USB port "D" of the EAGLE and assigned to COM10
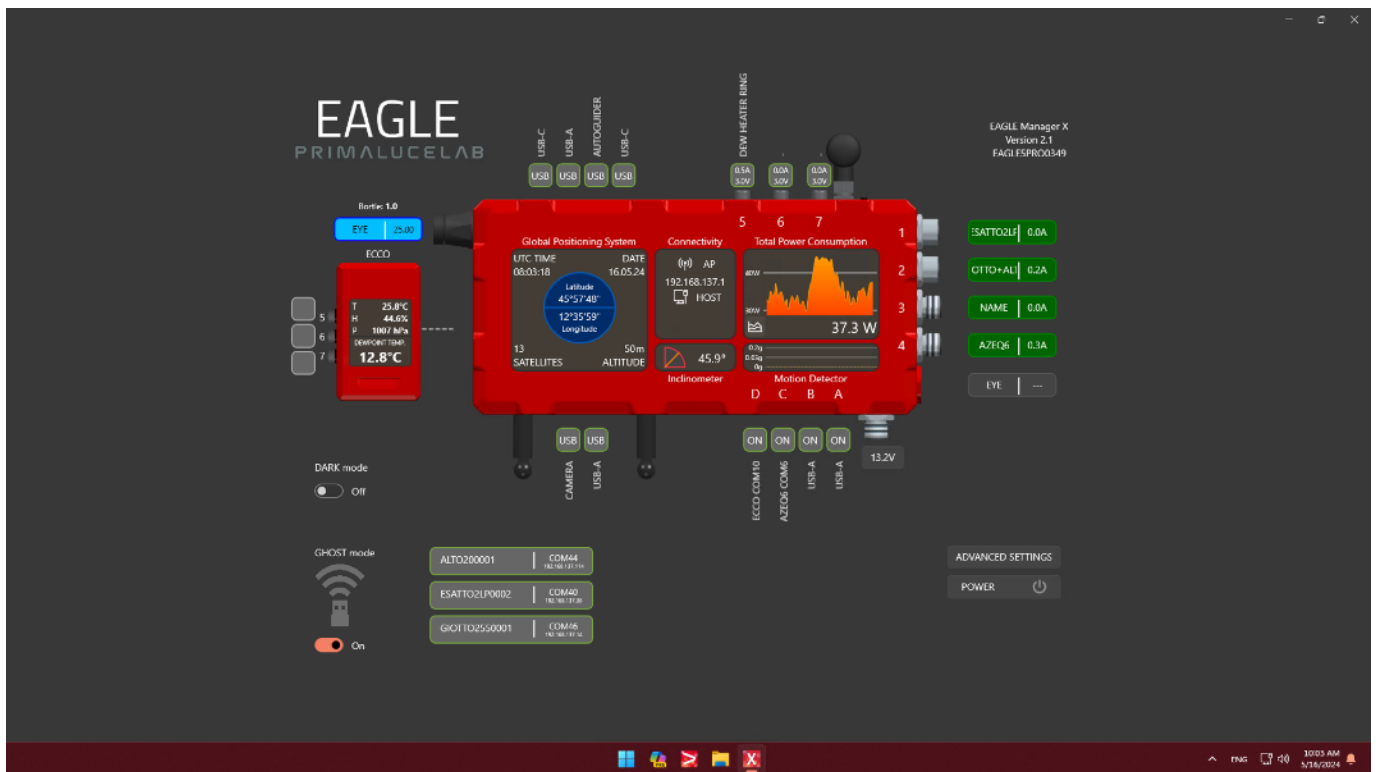
By knowing which COM port is associated to which device, you can now connect all your devices in an easier and quicker way. For example, if you connect your devices to PLAY and use the "Add to CONNECT ALL" feature, every time you launch PLAY you can just press the CONNECT ALL button in order to quickly connect to all your devices as you can see in the screenshot below.
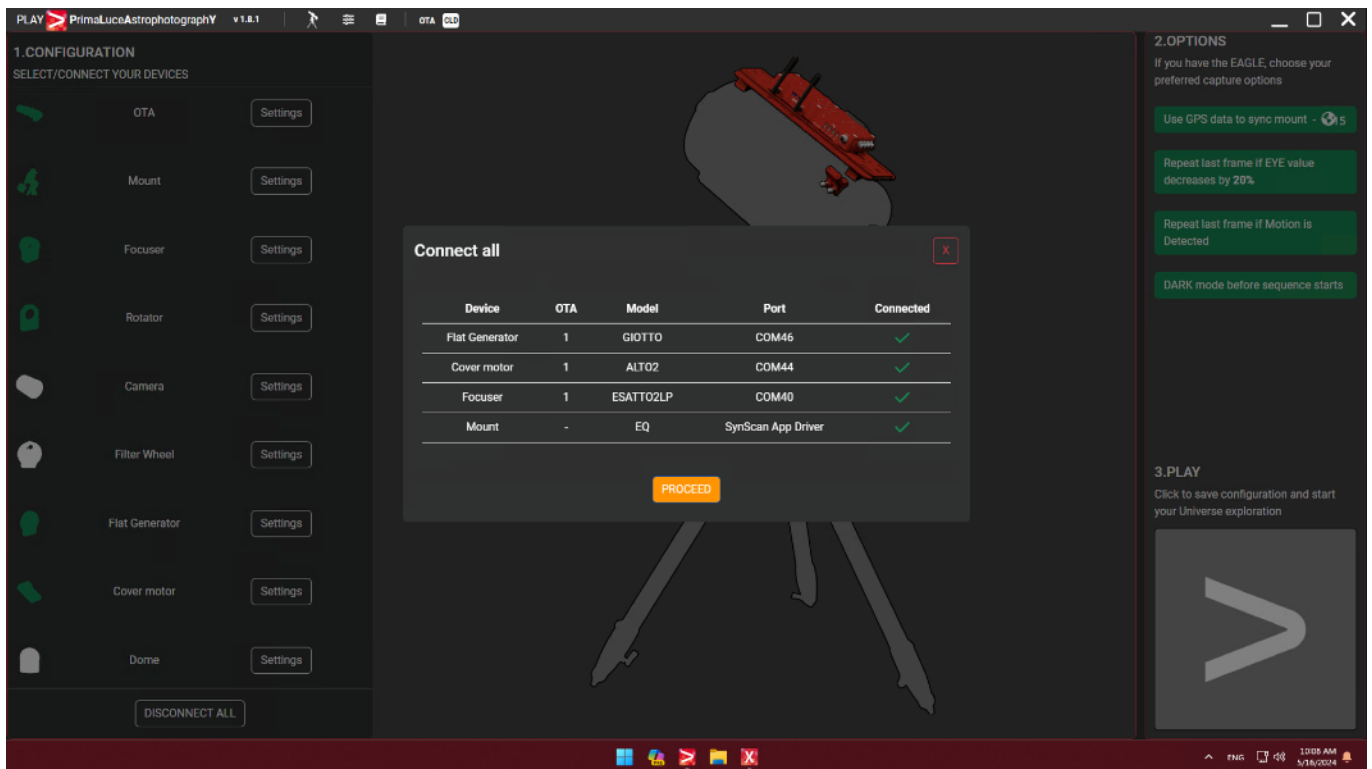
The same thing is valid also if you use third party softwares to control your serial devices through the ASCOM platform. You just have to make sure you select the correct COM port number in the ASCOM driver of the device you want to control. For example, in the screenshot below you can see we're using NINA astrophotography software to control ESATTO focuser with the "PLL ASCOM focuser driver" where we selected COM40. Just note that you can't control a device by using 2 softwares at the same time: in our example, you can control ESATTO with PLAY or with NINA and it means that, if you want to switch to NINA, you have to disconnect ESATTO from PLAY before connecting to NINA (and viceversa).
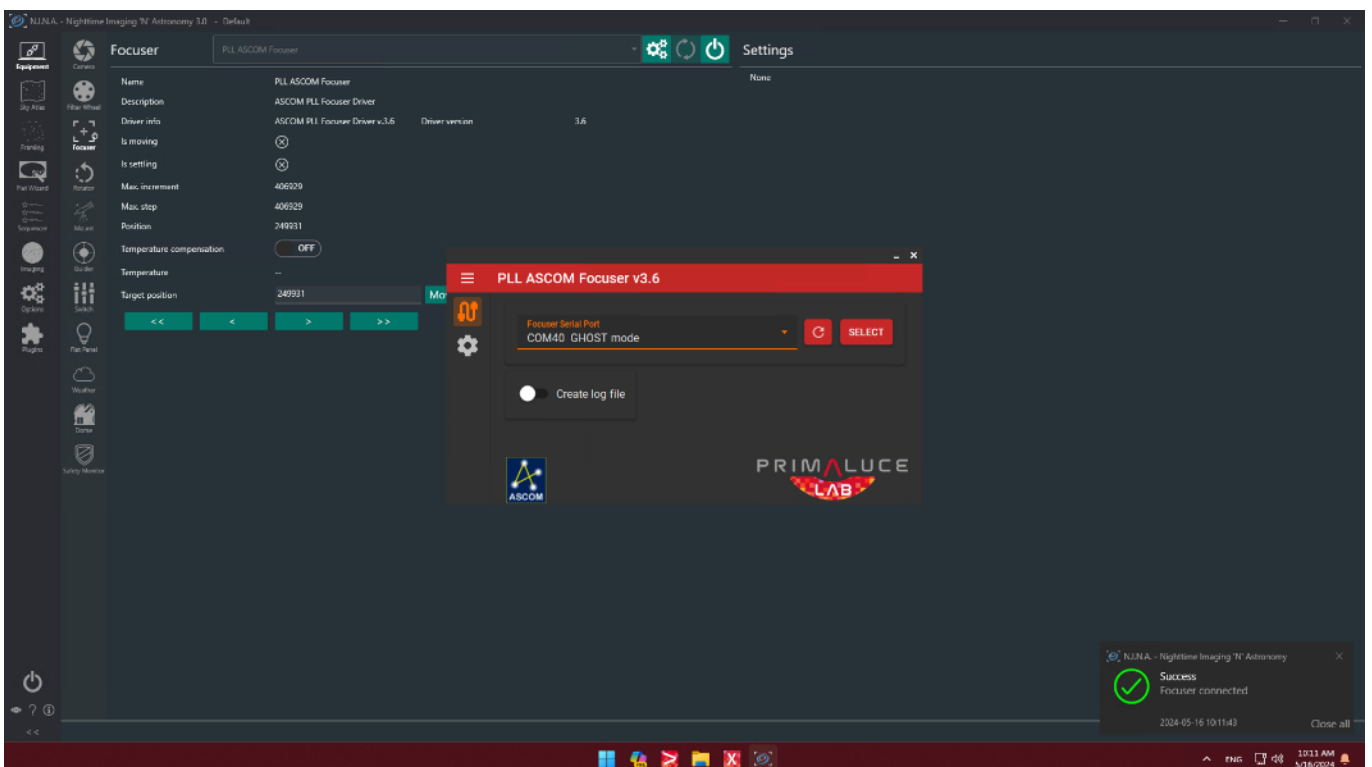
Advanced use: EAGLE ASCOM drivers

The EAGLE includes ASCOM drivers in order to allow third party softwares to connect to EAGLE's ports and sensors:

- **PLL Observing Conditions ASCOM driver**: this allows third party softwares to access to the EAGLE EYE sensor data, for example to save the sky darkness data in your astrophotography image (image 44). If you have also the optional ECCO2 environmental computerised controller, you can also see air temperature, humidity and pressure.
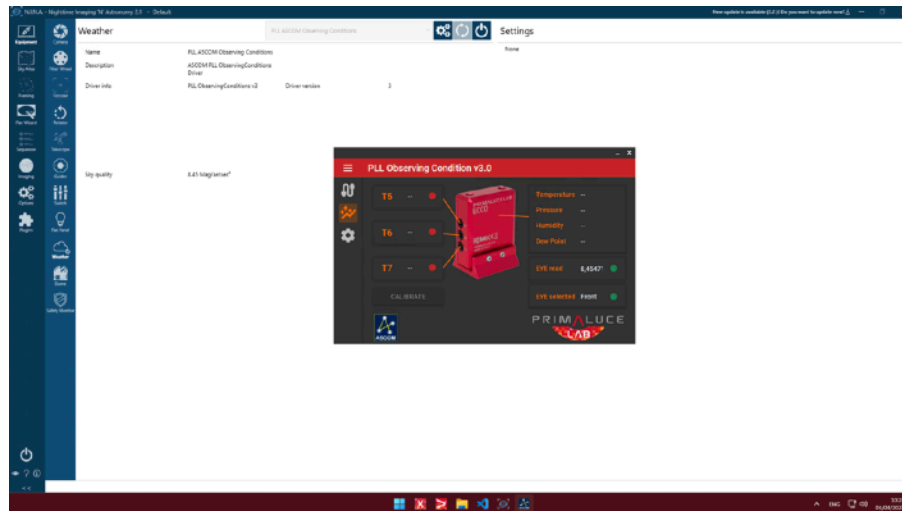
Image 44: NINA connected to PLL Observing Conditions 3.0 ASCOM driver

- **EAGLE Switch ASCOM driver**: this allows third party softwares (that supports power switches control) to take control of the EAGLE's power and USB 2.0 ports A, B, C and D in order to automate ports management (Image 45).
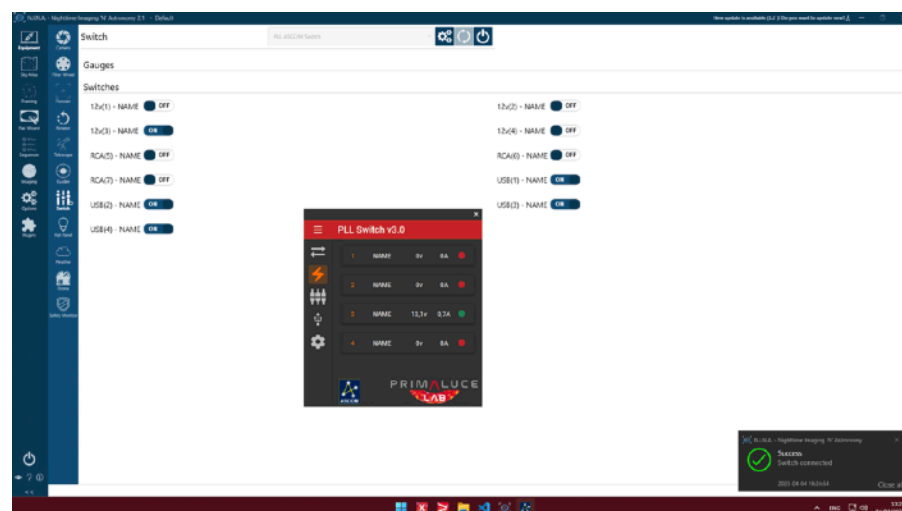
Image 45: EAGLE Switch 3.0 ASCOM driver

EAGLE's ASCOM drivers are already installed in your system. Updates can be found at https://www.primalucelab.com/astronomy/downloads. EAGLE's ASCOM drivers require at least ASCOM platform 6.6 that is already installed on your system.

Advanced use: program connection and power to devices

In the ADVANCED SETTINGS window, you can determine how EAGLE Manager sets USB and power ports (only A-B-C-D ones, the other USB ports will always be active) when EAGLE is turned on or off. This way you can, for example, schedule to turn on or turn off your devices when you turn on or off EAGLE. The "Configuration after startup" allows you to set the status of ports when EAGLE turns on, the "Configuration before shutdown" field allows you to set the status of the ports when EAGLE turns off (Image 46).
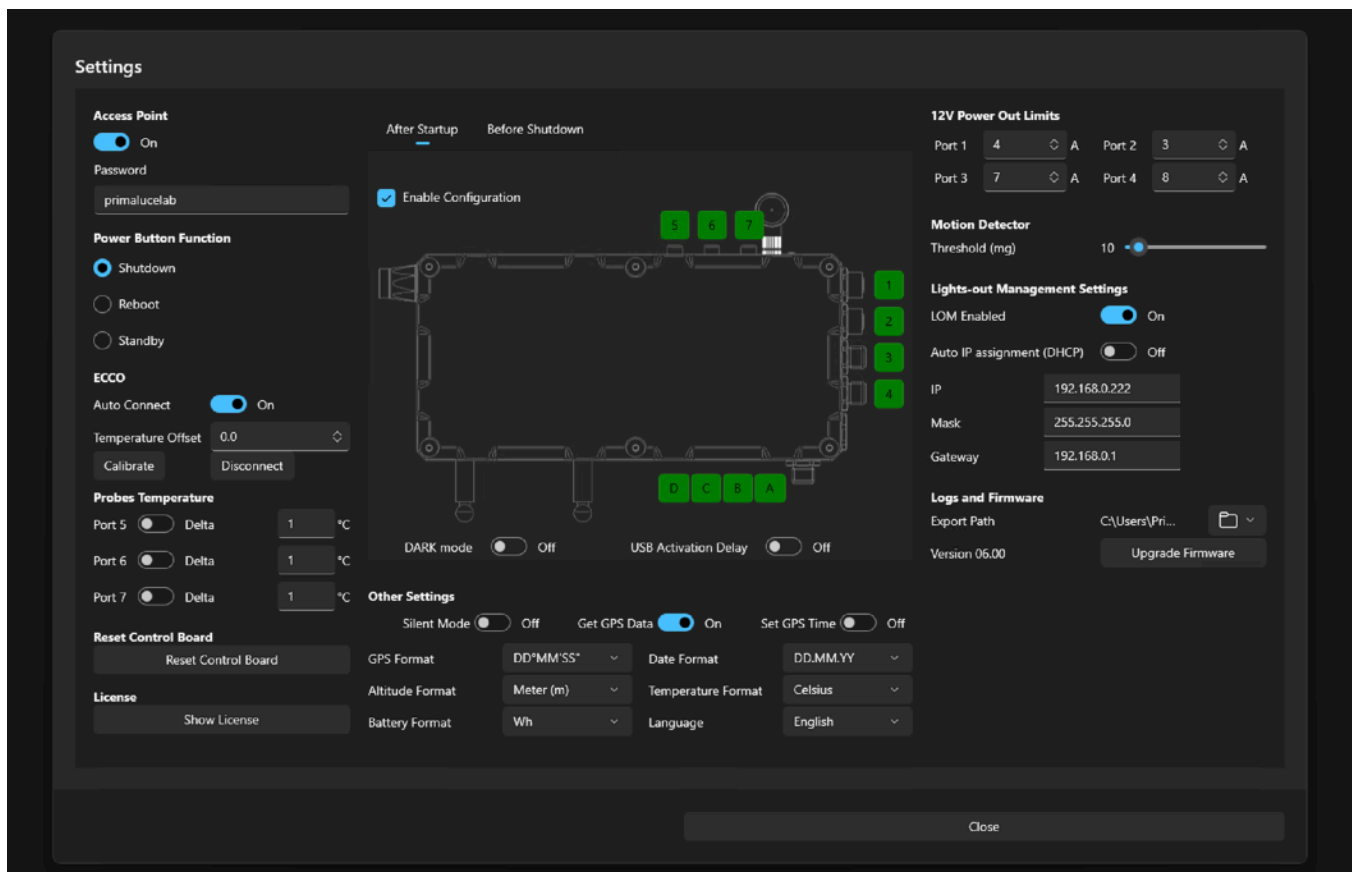
Image 46: ADVANCED SETTINGS window

To enable this feature, click on the "After startup" or "Before shutdown" you want to set. Then click on the ports to set if you want them ON (green) or OFF (red) and select "Enable Configuration". Click the OK button to confirm and the current configuration of EAGLE ports will be saved and applied each time you turn on/off the EAGLE.

Advanced use: Three ways to remotely turn your EAGLE on

The EAGLE6 introduces new ways to remotely turn it on, enhancing flexibility and convenience for remote observatory operation. Whether your telescope is located nearby or in a remote observatory, you now have three different methods to power on your EAGLE. In this paragraph we'll describe how to activate each method and what you need for each way.

1) Remotely turn your EAGLE on by using Lights-out Management (LOM)

Lights-out Management (LOM) includes a "Power" button, which lets you turn on your EAGLE from any device connected to the same network.

What you need:
• A device (PC, tablet, or smartphone) on the same network as the EAGLE
• A router with a connected to your device and the EAGLE

How to set it up:
1. Connect the EAGLE to your network: Ensure the EAGLE is connected via Ethernet to the same network as the device you will use for LOM access.
2. Access the LOM Interface: Open a web browser on your device. Enter the LOM's IP address (you can manually specify it in Advanced Settings of EAGLE Manager X).
3. Turn On the EAGLE: In the LOM dashboard, locate the "Power" button and click it. The EAGLE will immediately boot up.

2) Remotely turn your EAGLE on by using BIOS Auto Power-On

This method utilises the "After Power Failure" option in the BIOS. When enabled, the EAGLE automatically turns on as soon as the EAGLE's options power unit receives power. This method requires the use of a smart plug to be used together with EAGLE and the EAGLE's optional power unit. More, if you activate this feature also without connecting a smart plug, this is useful in case of a power outage: in case of a power outage the EAGLE will automatically as soon as power is restored.

What you need:
• A smart plug or power distribution unit (PDU) that allows remote power control
• A device (PC, tablet, or smartphone) with remote access to the smart plug
• The optional EAGLE's power unit

How to set it up:
1. Enter BIOS Settings: connect EAGLE to an HDMI monitor and USB keyboard (this allows you to use it as a standard computer). Power on your EAGLE and press F2 button during boot to enter the BIOS.
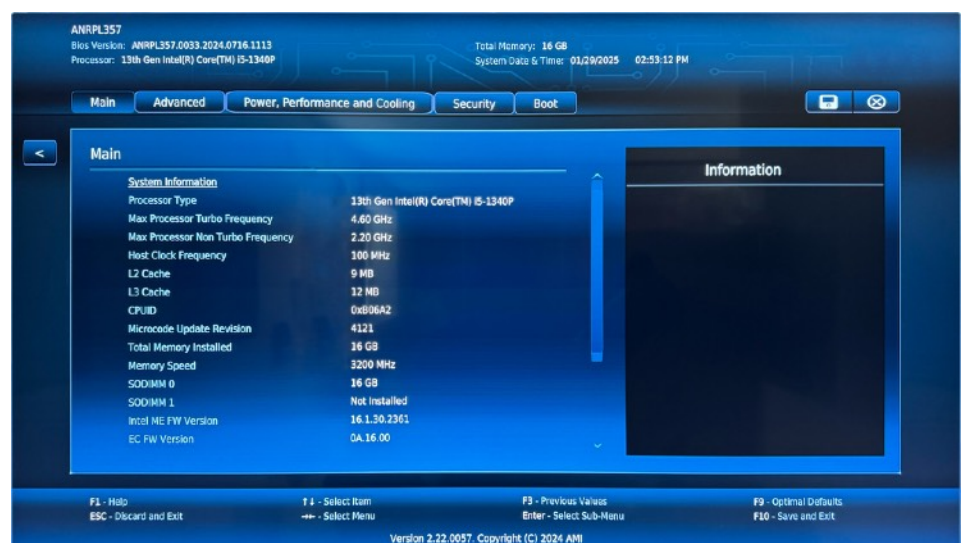
2. Enable Auto Power-On:
    1. if you have the EAGLE6 S/PRO/XTM, navigate to "Power, Performance and Cooling", then select "Secondary Power Settings". Locate the option "After Power Failure". Set it to "Power On".
    2. if you have the EAGLE6 with Celeron processor, navigate to "Advanced", select "Chipset Configuration", then "Restore on AC/Power loss" and set it to "Power On".
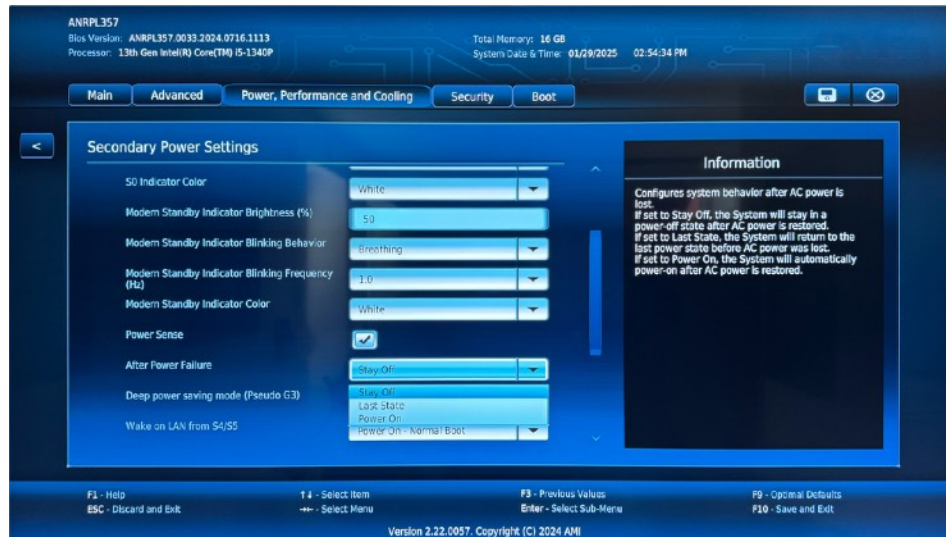
3. Save and Exit: Press F10 to save the settings and exit the BIOS.
4. Use a Smart Plug or PDU: Plug your EAGLE's optional power unit into a remotely controlled power switch (e.g., a Wi-Fi smart plug or a network PDU). Please refer to your smart plug user manual in order to check how to connect it to the Internet and let you remotely control by using your mobile device or computer.
5. When you will remotely activate your smart plug, the EAGLE will automatically boot up.

3) Remotely turn your EAGLE on by using Observatory Action with Smart Relay Switch

With the Observatory Action feature in EAGLE Manager X, you can use the CTRL IN port to remotely turn on your EAGLE via a smart relay switch. This allows you to power the EAGLE on from anywhere in the world, even through the Internet.

What you need:
• A smart relay switch (e.g., Shelly) connected to the EAGLE's CTRL IN port with 2.5mm jack cable
• A device (PC, smartphone, or tablet) to control the smart relay

How to set it up:
1. Connect the Smart Relay Switch to the EAGLE: Use a cable to connect the output terminals of the relay switch to the CTRL IN port of the EAGLE.
2. Configure EAGLE Manager X: Open EAGLE Manager X and go to CTRL IN settings. Set the CTRL IN function to "Power On".
3. Control the Smart Relay Switch: Access the relay switch's cloud control app on your smartphone or PC. Toggle the relay to "on" to trigger the EAGLE power-on command.

The EAGLE6 provides multiple ways to remotely turn it on, making it a flexible and adaptable solution for different observatory setups.

- If your telescope is near your control room (for example telescope is in your home backyard or in a school with an observatory within the school area), the LOM "Power On" button is the easiest to use option since it doesn't require any other hardware.
- If you have a remote observatory far from your location, the Observatory Action and the BIOS Auto Power-On with a smart relay are the most effective way to ensure full control over long distances. In order to provide the maximum reliability and if you don't need to use the CTRL IN port for another Action, you may also consider to use both the systems and have the highest level of power control of your EAGLE, telescope, and observatory.

Q & A

Q: Where to save my pictures or videos?
A: You can save captured images or videos directly on the hard disk of EAGLE. You can also connect a USB stick to one of the USB ports of the EAGLE, and then set the capture software you use to save images directly into the USB stick. This way, if you have an external computer that yo use to process images for astrophotography, you can easily move your images.

Q: Can I use EAGLE as a normal desktop computer?
A: Sure. EAGLE has an HDMI monitor port to connect an external display. Then connect a USB mouse and a USB keyboard to 2 USB ports of the EAGLE. Connect the power supply (or battery) to the power port of the EAGLE and press the on/off button to make using the EAGLE as it was a normal desktop computer.

Q: Can I change the operating system of EAGLE?
A: The remote control settings of your EAGLE are implemented in the operating system. So if you format the EAGLE's SSD drive, you will lose the functions of the wireless remote control. Since the version of the operating system does not imply real changes in the functionality of the telescopes (that indeed depend on the astronomy software installed), we advise you not to make changes in the EAGLE pre-installed operating system.

Q: What devices can I use to control EAGLE remotely?
A: You can use any smartphone, tablet (running iOS or Android) or computer (with Windows or MacOS) installing the application "Windows Mobile App", "Microsoft Remote Desktop" or "Parallels RD client". For ease of use we recommend devices with a screen size of at least 8 inches.

Q: Can I command EAGLE from my Apple computer?
A: Sure. Access to the OS X App Store and search for "Windows Mobile App" or "Parallels RD client" app. Install it and follow the instructions in this manual to set the remote control.

Q: Can I control multiple devices simultaneously EAGLE?
A: No, when you access to EAGLE with a new device, the connection to the previous devices is stopped and EAGLE will only appear in the new device.

Q: Sometimes I see a temporary connection drop and then it starts again, is this normal?
A: Using the EAGLE, sometimes you can have a drop out and then connection is automatically resumed. This is caused by a temporary loss of connection by the Remote Desktop Client also if the WiFi connection is unstable. This is normal, the Client you use should automatically reconnect to the EAGLE.

Q: Why does my SSD show up as smaller than advertised?
A: Your drive shows up smaller than advertised because storage drive capacity is calculated and reported slightly differently than other capacities in computing. The drive capacity is reported on the assumption that 1GB is 1,000,000,000 bytes. For example, a 480GB SSD is, in other words, actually 480,000,000,000 bytes. Windows OS uses binary bytes, so 1,024 bytes per Kilobyte, 1,024 KB per Megabyte, and so on. This means that when you

have a 480,000,000,000 bytes storage drive into a Windows computer, that computer converts the number of bytes into gigabytes by dividing by 1024 all the way up through the scale, not by dividing by 1,000. So:

480,000,000,000 Bytes / 1,024 = 468,750,000 actual Kilobytes

468,750,000 KB / 1,024 = 457,764 actual Megabytes

457,764 MB / 1,024 = 447 actual Gigabytes

This is why a 480GB SSD will be correctly reported by a Windows computer as 447GB.

Q: How can I set my EAGLE to automatically restart in case of power outage?

A: Please refer to the paragraph "Remotely turn your EAGLE on by using BIOS Auto Power-On" in the chapter "Advanced use: Three ways to remotely turn your EAGLE on". You just have to set the BIOS with the "Power On" option after a power failure.

Add EAGLE's ports control in external software

EAGLE Manager X has a web server that allows third party software, installed on the EAGLE, to take control of the EAGLE's ports and sensors. This paragraph describes the commands that allows you to control the EAGLE ports status and reads sensors data independently from EAGLE Manager software X. Web server replies to port 1380 and all replies are in json format. In order to correctly use this, please remember to update to the latest EAGLE Manager X in your EAGLE. When the EAGLE's ports and sensors are controlled by third party softwares, the EAGLE Manager X is always visible and the port and sensors status is always updated, also during capture.

PLEASE NOTE

1) This paragraph describes commands needed to software programmers to develop third party softwares. If you don't know what these commands are and/or if you are not a software programmer, please don't use these commands. The use of these commands is by your own risk and PrimaLuceLab has no responsibility on any application of these commands and integration on third party softwares. If you have problems related to the use of the EAGLE with third party softwares, please refer to the third party software support.

2) **EAGLE6 webserver is different from previous EAGLE versions**

REPLIES:

PORT INDEXES

12V power out port number 1: 1
12V power out port number 2: 2
12V power out port number 3: 3
12V power out port number 4: 4
3-12V power out port number 5: 5
3-12V power out port number 6: 6
3-12V power out port number 7: 7
USB 2.0 A port: 1
USB 2.0 B port: 2
USB 2.0 C port: 3
USB 2.0 D port: 4

http://localhost:1380/getinfo
replies with the EAGLE serial number, EAGLE Manager X version and firmware version

http://localhost:1380/getsupply
replies with the voltage of the EAGLE power supply. Example: {"result":"OK","supply":12.2}

http://localhost:1380/getpwrout?idx=1
replies with the voltage set in the 12V out ports (the ones to connect cameras, mounts, accessories, etc) with indexes from 1 to 4, their currents, voltages and "label" value. Example: {"result":"OK","voltage":12,"current":1.2,"power":12, "label":"camera"}

http://localhost:1380/getpwrhub?idx=1
replies with activation status of the USB 2.0 ports with indexes from 1 to 4 and "label" value. Example: {"result":"OK","status":1,"label":"mount"}

http://localhost:1380/getregout?idx=5
replies with the voltage set in the RCA ports (the ones for dew heaters) with indexes from 5 to 7, their currents, voltages and "label" value.
Example: {"result":"OK","voltage":8.4,"current":1.23,"power":10,"label":"dew heater"}

http://localhost:1380/setpwrout?idx=1&state=1
Turn on or off the 12V power out ports with indexes from 1 to 4. Reply: {"result":"OK"}

http://localhost:1380/setpwrout?idx=2&label=Camera
Set label of the power port 2 to "Camera". Reply: {"result":"OK"}

http://localhost:1380/setregout?idx=5&volt=9.2
Set the voltage in RCA ports voltage with indexes from 5 to 7. To turn off, set the voltage to 9.2. Reply:
{"result":"OK"}

http://localhost:1380/setregout?idx=5&label=Heater
Set label of the power port 5 to "Heater". Reply: {"result":"OK"}

http://localhost:1380/setpwrhub?idx=1&state=1
Turn on or off USB 2.0 ports with indexes from 1 to 4. Reply: {"result":"OK"}

http://localhost:1380/setpwrhub?idx=3&label=Mount
Set label of USB 2.0 C port to "Mount". Reply: {"result":"OK"}

http://localhost:1380/getecco
Asks for actual state of the ECCO module.
Reply 1: {"result":"OK", "ecco":"Not connected"}
Reply 2: {"result":"OK", "ecco":"Connected", "temp":"25.1", "hum":"45", "dew":"26.2", "temp5":"25.3",
"temp6":"25.4", "temp7":"25.5"}

http://localhost:1380/setdarkmode?active=1
Turn on DARK mode

http://localhost:1380/setdarkmode?active=0
Turn off DARK mode

http://localhost:1380/getdarkmode
Replies {"result":"OK","darkModeActive":0/1}

http://localhost:1380/geteye?idx=0
Front EYE sensor

http://localhost:1380/geteye?idx=1
Rear EYE sensor (the one close to 12V power ports)
replies {"result":"OK","value":123.456}

http://localhost:1380/getgps
Replies values (result,latitude,longitude,altitude,date,time,numsat)

http://localhost:1380/connectecco
Connect to ECCO

http://localhost:1380/getinclination
Replies with value of Inclinometer sensor

http://localhost:1380/getmotion
Replies with timestamp (unix timestamp) and motion values (in g) also if below threshold
Reply example: {"result":"OK","motions":[{"timestamp":1680600366,"value":0.035},{"timestamp":1680600439,"value":0.055},{"timestamp":1680601440,"value":0.032},{"timestamp":1680601901,"value":0.035}]}

http://localhost:1380/getall
Replies with all the data coming from all the EAGLE's ports and sensors

Note on EAGLE Manager X integration:

The EAGLE Manager X is not to be modified and it must be automatically started at Windows startup (as it is default in the EAGLE), also when the EAGLE's ports are controlled through third party software. In order to do this, a proper command allows to lock the EAGLE Manager X interface in the moment you connect the EAGLE to third party software. Command example:

/lockInterface?t=######

the parameter t=###### (###### is a number) set the time in seconds to freeze the EAGLE Manager X interface. For example:

- When a user start the control of the EAGLE ports from third party software, you have to send the command */lockInterface?t=36000* (to lock it for example for 10 hours)

- When the user disconnects the EAGLE control at the end of the capture (before disconnecting from third party software), you have to send the command
/lockInterface?t=0

This way, when the EAGLE's ports are controlled through third party software, the EAGLE Manager X will always be updated and the EAGLE's port status can't be changed by clicking on the EAGLE Manager X interface.

Troubleshooting

Q: After I turn it on, I can't find the EAGLEXXXXXX WiFi network
A: When the EAGLE is set in AP mode and you turn it on by pressing the ON button, after around 30 seconds (it depends on the EAGLE model you have) you should hear a beep sound which reports that the EAGLE's WiFi connection in AP mode is ready for connection. If you can't hear the beep sound, first of all please try to select the EAGLE's WiFi network by using different devices. If you find it in all of them except one, this may be related to an incompatibility of that the devices WiFi card with the EAGLE's wifi network. If you can't find the EAGLE's WiFi network in any of your devices, with the EAGLE powered on, please connect it to an external monitor with an HDMI cable (it may be a computer or a TV screen) and check what you see in the screen:

A) if you see Windows updating, please wait it to complete the update, after the update is completed you should see Windows booting and EAGLE Manager X interface automatically starting, the EAGLE's WiFi should appear and you should be able to connect to it.

B) if you see the password request (this may appear when you want to change the 4 digit password provided with the EAGLE), the EAGLE will create the WiFi network only after you will type the password. In order to fix this, please connect a USB mouse and keyboard to the EAGLE and click on Windows search field. Here type "netplwiz" then press ENTER in the keyboard. This will open a new window and you have to deselect the first option "Users must enter a name and password to use this computer.". Then press Apply and, if prompted, re-enter your password to confirm the changes. Then reboot and Windows should start without asking you the password. The EAGLE's WiFi should appear and you should be able to connect to it.

C) If you see Windows with the EAGLE Manager X, but you can't still find the EAGLE's WiFi network, please check that WiFi is ON. In order to do this, click on Windows START button and select the Settings icon. In the window that opens, please select "Network & Internet", then select WiFi and check that in the first option WiFi is ON. If it's off, please turn it on, then reboot your EAGLE and check if now you are able to find the EAGLE's WiFi network.

D) If you see Windows with the EAGLE Manager X and with the EAGLE WiFi is ON, please update WiFi card driver. In Windows, please select START button, select Control Panel and then Device Manager. Here you will find the list of devices connected to the EAGLE. Select "Network adapters", select the WiFi card (for example Intel WiFi 6 AX201), make a right mouse click and select "Update software driver". EAGLE has to be connected to the Internet, for example with an ethernet cab le to your router. In the window that opens, click on "Search automatically for updated software driver". Now restart Windows and check if WiFi works.

E) If you checked all the previous points and you still can't find the WiFi network, please check for the WiFi antennas of the EAGLE. If there is an hardware issue related to the antennas, you can change the antennas and with another model and test. EAGLE uses standard WiFi antennas with *sma* connector and male central pin.

F) If you checked all the points A, B, C, D, E and you still can't find the WiFi network, you may have an hardware issue, please write us to support@prima-lucelab.com.

Q: I'm able to find and connect to EAGLEXXXXXX WiFi network, but WiFi disconnects

A: WiFi connection stability depends on many factors, one of them is the quality of the antenna built in in the device you use to remotely control the EAGLE. Another factor is radio frequency interference that you may have especially in an indoor situation (typically when you install all your software and drivers in your EAGLE for the first time). Generally speaking, sometimes Remote Desktop connection to the EAGLE may drop out and then connection automatically restarts, this is normal and may be related to small levels of radio interferences. But this is related only to the Remote Desktop client and the WiFi connection to the EAGLE has to be constant. Instead, if you experience disconnections to the EAGLEXXXXXX network (and not related to the Remote Desktop client) this may be related to different factors, we analyse here:

A) <u>Limited WiFi range</u>: the EAGLE's WiFi connection has been designed to allow you to connect to the EAGLE also from many meters of distance but the maximum range depends on many factors like the presence of walls (different materials) or windows, the quality of the antenna in the device you use to remotely control the EAGLE and radio interference. If you experience WiFi disconnections, please move closer to the EAGLE and test again. If WiFi connection becomes stable, you can install a WiFi extender in between the position of your EAGLE powered telescope and the device you use to control it. If you still experience WiFi disconnections when you're close to the EAGLE, please move to point B.

B) <u>Reduce radio interferences</u>: radio interferences may be caused by other electrical devices you may have close to your EAGLE (for example WiFi routers), please move the EAGLE to a place away from possible interferences (for example, in the backyard where you use your telescope) and check if WiFi connection becomes stable. If you still experience WiFi disconnections, please move to point C. Another potential source of radio interference could be USB cables, especially when connected to the USB ports on the EAGLE that are located near the WiFi antennas. In this case, we recommend replacing the USB cables with higher-quality ones, preferably double or triple shielded.

C) <u>Update WiFi card driver:</u> in Windows, please select START button, select Control Panel and then Device Manager. Here you will find the list of devices connected to the EAGLE. Select "Network adapters", select the WiFi card (for example Intel WiFi 6 AX201), make a right mouse click and select "Update software driver". EAGLE has to be connected to the Internet, for example with an ethernet cab le to your router. In the window that opens, click on "Search automatically for updated software driver". Now restart Windows and check if WiFi connection is now stable. If you still experience WiFi disconnections, please move to point D.

D) <u>Change WiFi settings in order to reduce radio interferences and improve compatibility with the device you use to control the EAGLE</u>: in your EAGLE, please go to Control Panel -> System -> Device manager and select the WiFi card, you can do right mouse-click and select Properties. Here you will find some WiFi settings you can modify: for example you can choose if you want to operate 2.4 GHz, 5 Ghz or Dual Channel. You can choose the preferred bandwidth, and you can also modify the Wireless mode, based on the WiFi standards that are supported from the device you use to control the EAGLE. You can modify settings and find the ones that allows you to have a more stable WiFI connection. There is no a particular rule here because every setup is different since it may be impacted by different types of radio interferences. If you still experience WiFi disconnections, please move to point E.

E) <u>If you checked all the points A, B, C, D, and you still have WiFi disconnections (not related to Remote Desktop client disconnections),</u> you may have an hardware issue. In this case please write us to support@primalucelab.com and we'll support you to fix the problem.

Q: GPS reports no coordinates, date or time

A: GPS fix is automatically done when you power the EAGLE and this could take also 2-3 minutes from the power on since the EAGLE's GPS make a cold start, that means that the GPS device dumps all the information, attempts to locate satellites and then calculates a GPS lock. This takes the longest because there is no known information. If, after a few minutes, you still have 0 satellites shown on the EAGLE Manager X, you could have a radio interference caused by one or more devices used in your telescope. Especially USB 3 ports, when activated, may produces a radio frequency that may interfere with GPS signal. Please disconnect USB 3 devices from the EAGLE and check if the GPS is now able (within 2-3 minutes) to make the fix. If yes, the radio interference is coming from the USB 3 connector or cable so, in order to minimize this effect please follow these suggestions:

A) <u>Use high quality double shielded USB 3 cable</u> instead of the standard ones provided with your device
B) <u>Add ferrite beads to the USB 3 cable</u> and connect both ends of the USB 3 cable.
C) <u>Use an external GPS antenna</u> instead of the one provided with the EAGLE. The GPS connector is standard SMA male so you can replace it with a GPS antenna provided with a long cable (to have the antenna separated from the EAGLE) and connect it, for example, on the telescope tripod.

Q: I connected a USB device to one of the USB ports of the EAGLE and it doesn't work
A: Since the EAGLE5 includes also a Windows 11 64bit computer, it can control USB devices by properly installing the correct Windows 11 64bit drivers and softwares. Every USB devices has a different installation procedure, based on the manufacturer requirements so we suggest you to follow the user manual of the device you want to install in the EAGLE. But, for your advantage, you can quickly make this checks:

1) After you connect the device to one of the USB ports of the EAGLE (if you connect to one of the USB 2.0 ports, please verify that the status of the port is ON in the Eagle Manager), go to Windows Device Manager. Here you will see the list of the hardware devices of the EAGLE and connected to it.

2) If you still have to install the device driver in the EAGLE, you device won't be automatically recognized and it will be marked with a yellow sign (this means that the device can't be used until the driver is properly loaded).

3) Install in the EAGLE the device driver by following the manufacturer instructions.

4) Now you can click on the name of the unrecognized device with the right mouse button and select "Update Driver Software".
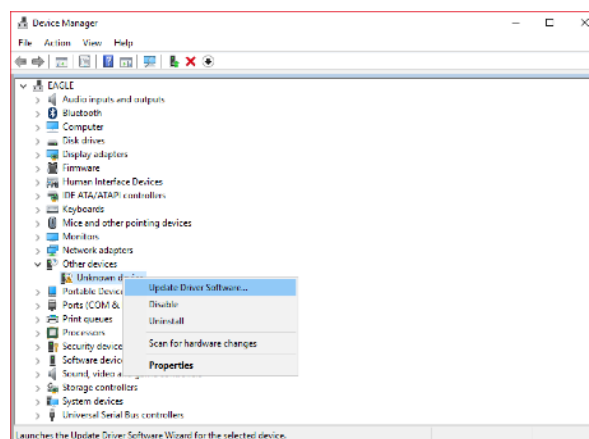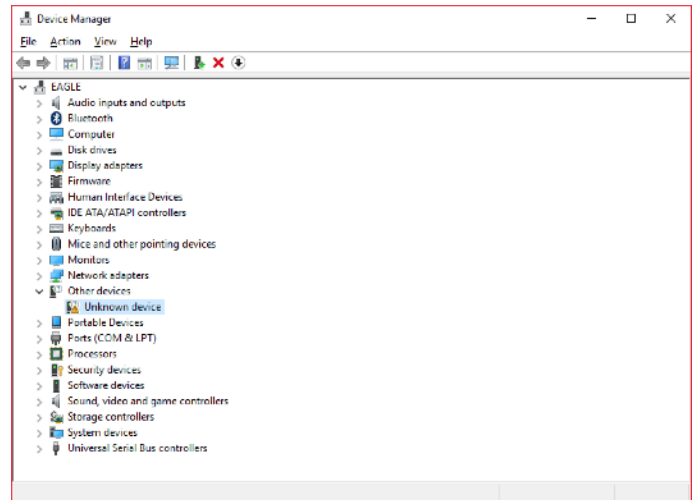
5) This will open a new window, please select "Browse my computer for driver software". In the window that opens select the folder where you previously installed the device driver, then click Next button.
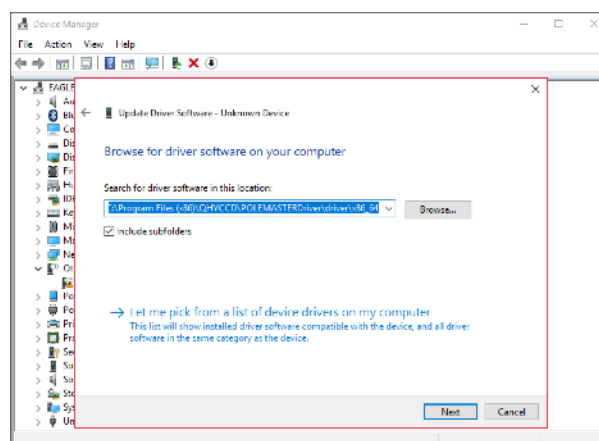
6) When the installation is complete, device will appear in the Device Manager list . You will be able to install its software for Windows 10 11 bits and use it.
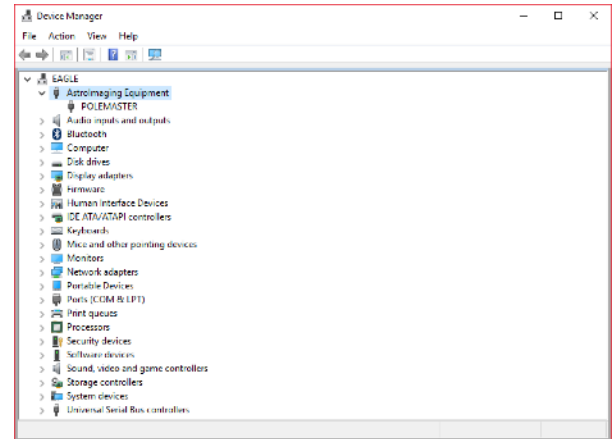
Q: What have I to do if the EAGLE suddenly shuts down during use

A: A sudden shut down of the EAGLE (with or without the power off of the other devices powered through the EAGLE) may be related to the power unit you use to power the EAGLE (and all the other devices powered through it), power cables or software settings. In order to fix this problem, please proceed this way:

A) Change the power unit: please change the power unit or the battery you use to power the EAGLE with a new unit. For example, you can try to change the AC adapter with a battery with enough capacity and connect to it by using the 12V cigarette cable supplied within the EAGLE's box. If this fix the problem, you may have an hardware issue on the power unit you're using or you may have a field battery with not enough capacity. In this case, please change your power unit or battery. If you still have sudden shutdowns, please move to point B.

B) Disconnect all the power out cables and test: a sudden power shutdown may be related to a short-circuit of a power out cable (from the EAGLE to an external device powered through the EAGLE) if the power consumption is high. Please disconnect all the power out cables and keep connected only the power cables that connects your power unit or battery to the EAGLE. If this fix the problem, you have a problem on one of the power-out cables, so test all of them with a multimeter tester and, when you find the not working cable, change or fix it (if you want to fix it and you have no experience on electrical parts, you may need the help of an expert). If you still have sudden shutdowns, please move to point C.

C) Check for software settings: inside Windows operating system there are settings related to power management. Please click on the START button, then select Control Panel and then Power Options. Here please check that the "High performance" option is selected, then press "Change plan settings" to the right of the "High performance" option. In the new window that opens, please check that the "Turn off display" and "Put the computer to sleep" are both set to "Never". Then click on "Change advanced power settings". In the new window that opens, please check that these settings are set this way:
   a) Turn off hard disk after: 0 (zero - this means Never)
   b) Wireless Adapter Settings - Power Saving Mode - Settings: Maximum Performance
   c) Sleep after: 0 (zero - this means Never)
   d) USB settings - USB selective suspend settings: Disabled

D) A Windows Update not installing correctly may suddenly force a OS reboot: Microsoft developed a troubleshooter program specifically to fix problems related to Windows Update process. Please select START button, then select Control Panel and click on Troubleshooting. Here click on 'Fix problems with Windows Update' and follow the on screen instruction to proceed.

E) If you checked all the points A, B, C, and you still have power problems, you may have an hardware issue. In this case please write us to support@primalucelab.com and we'll support you to fix the problem.

Q: When I connect to power, the EAGLE beeps and the "act" LED is on, but I have no activity on the PW or SSD LEDs

A: if you can hear the "beep" sound when you connect power to the EAGLE and the "act" LED is on, it means that EAGLE's internal power board receives power from your power unit. But if you press the power ON button and the EAGLE doesn't boot, before proceed, please connect the EAGLE to an HDMI monitor and check if you see any signal. If there is no activity on the monitor, please check the PW LED status:

CAUTION

All these steps require knowledge on computers and may require to change internal components, so if you can't do this or feel uncomfortable, please contact us writing an email to support@primalucelab.com

1) <u>If the PW LED is off</u>, you may have a problem related to the power ON button or a related to the motherboard power management. Please open the EAGLE case (there are 6 screws to remove on top of the EAGLE) and you will find, close to one of the corners, the internal power on button. By using a screw driver (or another tool) please press the internal power on button (the white button in the picture - **caution: do not touch other internal parts!**).

If the EAGLE now starts, you have an issue on the Power ON button, please write us to support@primalucelab.com and we'll support you to fix the problem.

If the EAGLE doesn't start, you may have a bad power source, try connecting the EAGLE to a different power unit. If with a different power unit

Internal power button

the EAGLE starts, you have an issue on the previous power unit. If it still doesn't start, unplug your EAGLE from the power unit and wait for more than 10 seconds. Then press the power button of your EAGLE a couple of times. Do this with no power source connected, then connect your EAGLE to the power unit again and try to turn it on. If it still doesn't start, please disconnect the EAGLE power unit and open the EAGLE's chassis. Here please check that the SSD drive is seated securely to the motherboard header. If it's correctly connected, you may have a defective SSD drive: in this case you can try to install a new SSD drive (note: in this case you would also have to install on the new drive the backup copy of the EAGLE's original SSD drive), connect EAGLE's power unit and check if it boots. If the EAGLE still doesn't boot, you may have an hardware issue on the EAGLE's motherboard, so please please write us to support@primalucelab.com and we'll support you to fix the problem.

SSD drive

2) <u>If the PWR LED is blinking in a pattern of three</u>, it means that the motherboard is not able to detect the memory module, or that the memory module is defective or that the memory module is the wrong voltage and/or incompatible. In this case remove disconnect the power unit from the EAGLE, then remove and reinstall the memory modules to make sure they are fully seated in the sockets. Connect the power unit again and check for the PWR
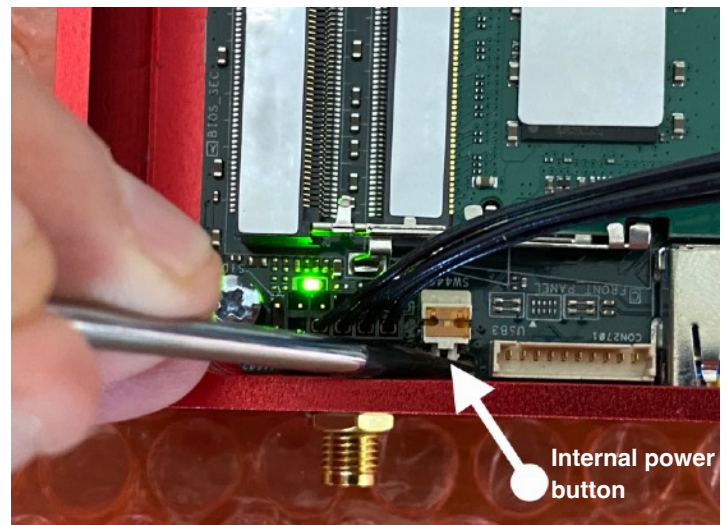
LED. If it's still blinking in a pattern of three, please check that the RAM modules have the correct voltage (in case you previously changed the ones installed as standard in the EAGLE): SODIMM DDR4 1,2V. If PWR LED is still blinking in a pattern of three, this may indicate defective memory. To isolate a specific module as defective, boot the system with just one installed at a time. You can also try testing suspected defective memory in a different computer. Then change the defective RAM module with another one with compatible specifications.

3) If the PWR LED is blinking in a different pattern, 2 red blinks indicated that the computer is in sleep mode (in this case this LED behaviour is normal for sleep mode, please press the power button to wake your EAGLE) while 16 on/off blinks indicates that the computer is overheating (in this case please check that chassis ventilation holes aren't blocked and unit has sufficient airflow).

Q: I have a problem with Windows operating system, can I restore the factory settings?
A: Before shipment, we record a "Windows recovery point" in the EAGLE units so you can immediately return back to the factory settings in a very easy way. Restoring won't affect your personal files but most likely will automatically solve your problem with Windows. In order to make a system restore please:
1) go to "Control panel"
2) select "Recovery"
3) select "Open System Restore" then press Next
4) choose the restore point (you will find the "EAGLE new" restore point")
5) press "Next" and then "Finish"

NOTE: if you perform a Windows Update, Windows will automatically delete this Recovery Point because it won't be compatible anymore with the previous Windows version. If you apply a Windows Update and the "EAGLE new" recovery point is deleted, we suggest you to make a new Recovery Point and always have one available. Please proceed this way:
1) go to "Control panel"
2) click on "System"
3) select the tab "System protection" then press the button "Create"
4) in the window that opens, please type the name of the restore point you want to create
5) press "Create" to create the restore point

If you haven't a Restore Point always available and if you don't create a SSD backup (by following the guide in one of the previous paragraphs in this user manual) , if you will have a problem with the Windows operating system you will have to ship the EAGLE to our laboratory in order to reset the EAGLE to factory conditions (in this case all the files, softwares and documents included in your EAGLE's SSD drive will be deleted).

Q: After connecting power and pressing the ON button, STS LED doesn't turn green
A: STS LED light states Windows status after Windows boot. If after pressing the ON button of EAGLE and waiting about 1 minute, the STS LED light does not turn green, it means that EAGLE failed to start Windows. Please connect the EAGLE to an external HDMI monitor and press the ON button, the look at what you can see on the monitor.

Q: When I connect an USB Device to EAGLE's USB port, it does not appear in the Device Manager at all
A: This may be caused by a driver conflict with the com0com component used for GHOST mode. To resolve this issue, you can uninstall the com0com software from the list of installed programs in the Control Panel. Once uninstalled, the driver conflict will be resolved, and the device should appear in the Device Manager. Please note that uninstalling com0com will disable GHOST mode.

Q: Windows reports wrong date or time
A: If, despite syncing the time, enabling daylight saving settings, and turning on location services, the time reverts to an incorrect value upon exiting the settings, this may be due to the GPS time synchronization feature in EAGLE Manager X, which can override manual time adjustments. To resolve this issue, select ADVANCED SETTINGS in EAGLE Manager X and disable the "Set GPS time" option. Once this option is turned off, you will be able to manually set the system time in Windows, and it will retain your selected time.

**Q: EAGLE Manager X shows the "Unable to connect to EAGLE" error.**
A: This issue may be related to a driver conflict that appears after you install a new device that uses the same driver that the EAGLE uses to control its power and USB ports. This could prevent you to control all the EAGLE ports and sensors, and to see power consumption data.
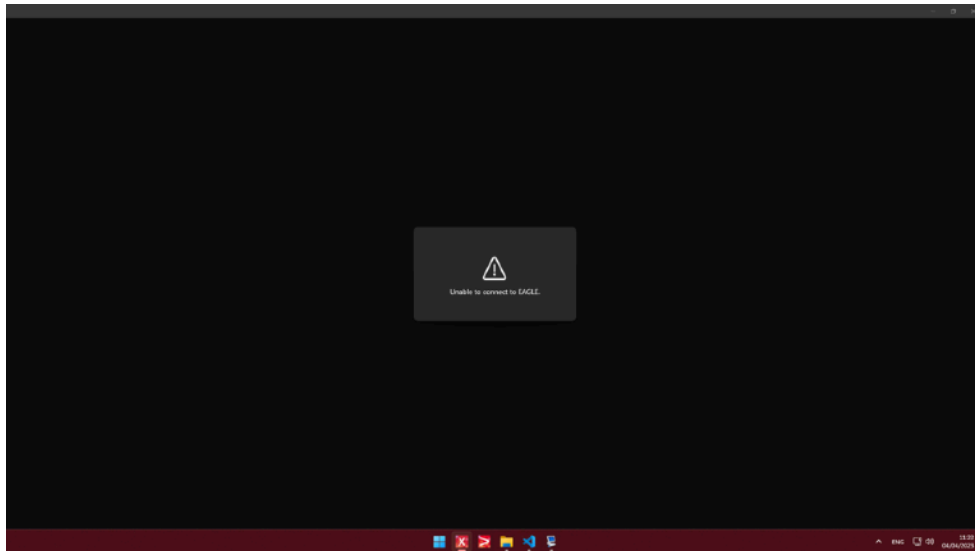
In order to fix this problem, please follow this guide:

• disconnect all your USB devices from the EAGLE
• download the "CDM Uninstaller" software from here https://ftdichip.com/utilities/ This software allows to remove FTDI drivers from Windows. Install the software in the EAGLE.
• launch the application with Administrator privileges and follow the guide https://youtu.be/KDQoj_SXmKg
• reboot your EAGLE
• download the new driver from https://ftdichip.com/drivers/vcp-drivers/, you have to select the one for "Windows (Universal)" and "X64 (64-Bit)"
• install this new driver in the EAGLE and then reboot.

After you reboot it (please do not connect other devices to the EAGLE now), the EAGLE Manager X should work.
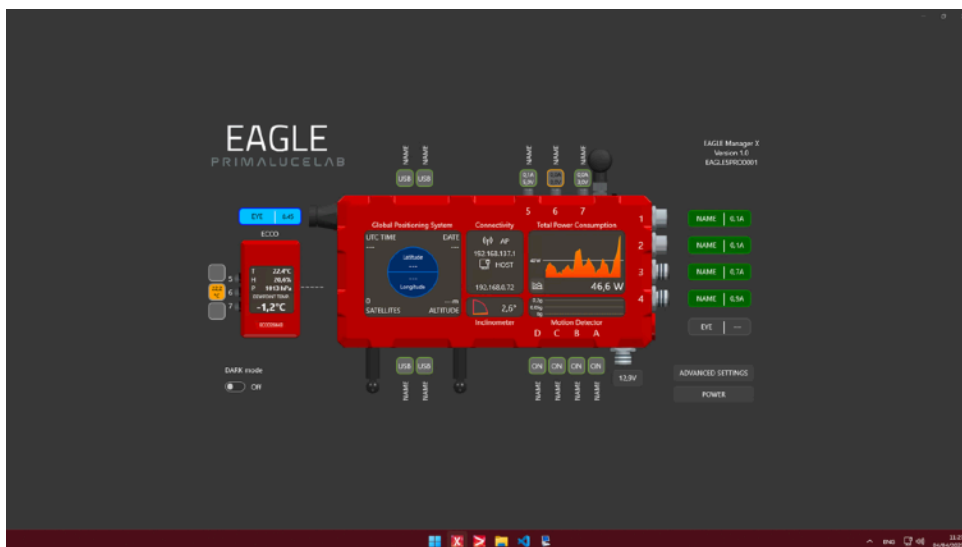
INFORMATION TO USERS

According to art. 26 of Decreto Legislativo 14 marzo 2014, n. 49 "Attuazione della Direttiva 2012/19/UE sui rifiuti di apparecchiature elettriche ed elettroniche", the symbol of the barrel placed on the equipment or its packaging indicates that the product at the end of its useful life must be collected separately from other waste.

The user will therefore have to give the end-of-life equipment to the appropriate separate collection centers for electronic and electrotechnical waste or to return it to the reseller upon the purchase of a new type of equivalent equipment, one by one.

Properly differentiated collection for the subsequent start of dismantled equipment for recycling, treatment and environmentally compatible disposal helps to avoid possible adverse effects on the environment and health and favors the reuse and / or recycling of the materials contained in the equipment.

The abusive disposal of the product by the user implies the application of the administrative sanctions as per D.Lgs. 152/2006.

Compliance with the RAEE legislation (D.Lgs. 49/2014)
PrimaLuceLab is registered to AEE Register with number IT17030000009790
PrimaLuceLab adheres to Sistema Collettivo ERP Italia for the compliance to RAEE legislation.

WARRANTY

1) The PrimaLuceLab product warranty is effective from the date of purchase and is valid only if it is with the invoice (or receipt) of purchase.

2) The warranty covers the product against defects in workmanship and includes the cost of the replaced material and labor.

3) The warranty does not cover any damage caused to the product or defects or failures that occur due to improper installation , improper use and/or deterioration due to normal wear.

4) THE GUARANTEE DOES NOT APPLY IN THE FOLLOWING CASES:
   - Repair by anyone not authorised by PrimaLuceLab .
   - Invasive interventions or tampering with internal and/or external parts.
   - Missing of the invoice (or receipt) of purchase.

TERMS OF SERVICE
Technical assistance is performed exclusively by PrimaLuceLab or its authorised resellers. All returns must be received with our permission (to be asked writing an email to support@primaluce-lab.com) . YOU HAVE TO add to the shipping the invoice (or receipt) of purchase and the detailed description of the defect. For products without the invoice (or receipt) of purchase, repair and shipping costs are always paid by the customer.

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Platform