

# NaviSuite Kuda Core Getting started

Last update: 15/02/2023  
Version: 4.6

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# 1 Introduction

The document describes the typical setup and usage of the **NaviSuite Kuda Core** software. The typically required hardware is a computer on the USV and a remote computer onshore. The software facilitates the communication between the computers, allowing the computer acting as supervisor to take control of the USV.

## 2 Licencing

These licences can be purchased:

- NaviSuite Kuda Core
- NaviSuite Kuda Core + Processing
- NaviSuite Kuda Pro
- NaviSuite Kuda Pro + Processing

You will get a 9 digit licence key.

Licences with the name like **NaviSuite Kuda Aquisition And Processing** are purchased before 2022. We have changed the product name and once they run out, they cannot be prolonged easily.

Please contact Support and ask for a new licence.

This guide is based on the NaviSuite Kuda Core licence.

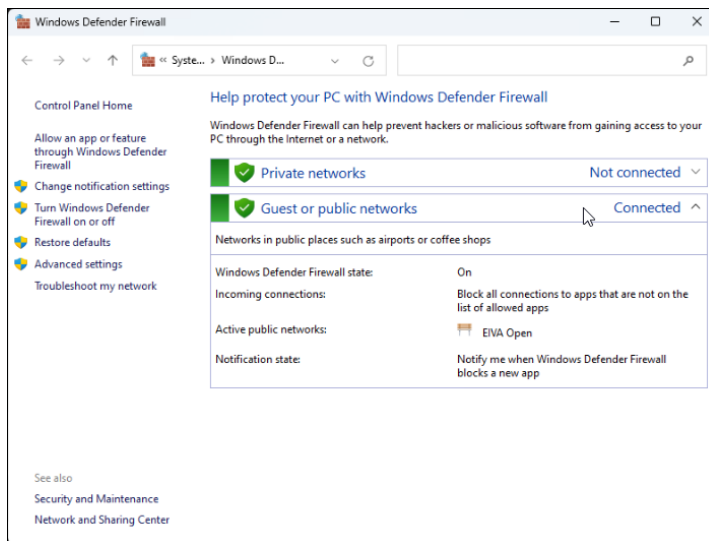
### 3 Preparation of the USV computer

Hardware used: Windows11 computer with Windows updates executed

Licence: NaviSuite Kuda Core

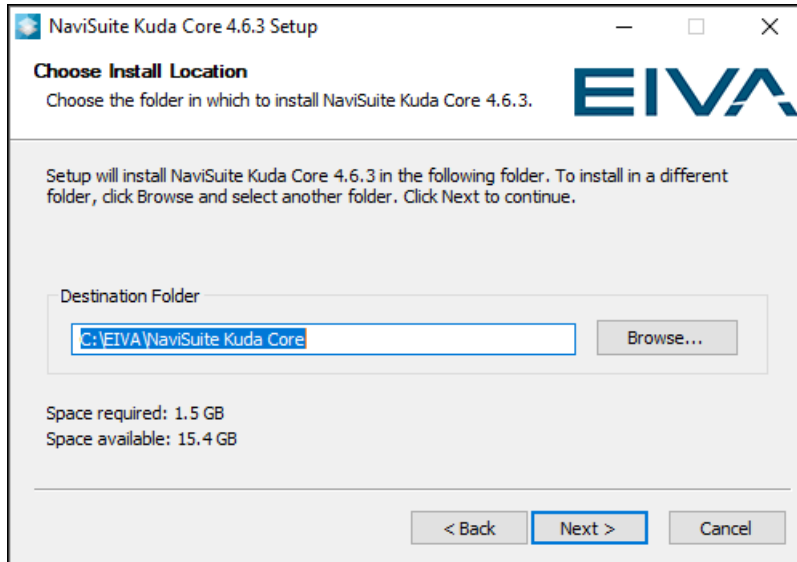
Software: KudaCore\_4.6.3 (installs: NaviScan\_9.7.2, Helmsman\_4.6.3, NaviSuiteConfig\_4.6.2.exe). Download the software here [EIVA download site](#).

Firewall settings: No special settings, use the default Windows settings. The KudaCore\_4.6.3 software will add some Firewall rules.

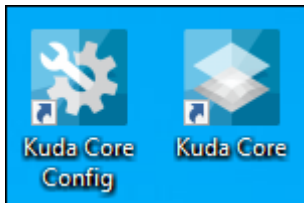


- Run the installer and use the default path





- Two desktop shortcuts are created, **Kuda Core Config** and **Kuda Core**.



- Open **Kuda Core Config**
- Enter the 9 digit licence key that you purchased from **EIVA**.

**Kuda Core Config**

You can enable a licence to the product with the 9-digit licence key provided when the product is purchased through [eiva.com/navisuite](https://eiva.com/navisuite) or [My EIVA](#).

**Why do I see this message?**

Please enter your 9-digit licence key:

207-708-080 Valid

PC code: 4 224 870 394

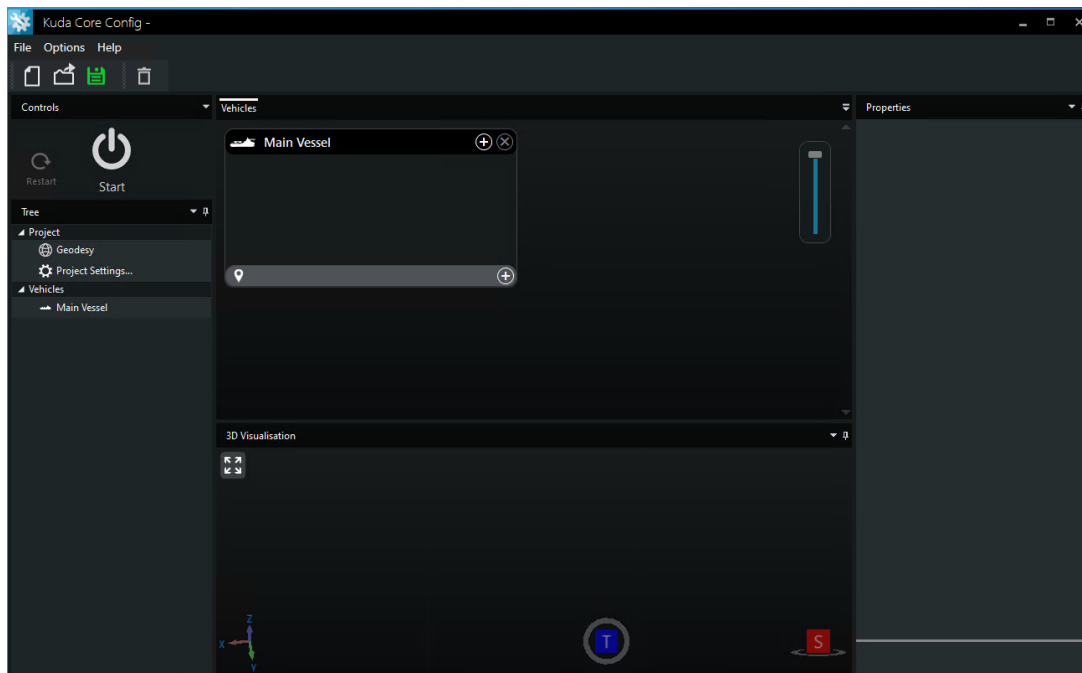
Select the products you want to activate on this computer:

Product	Start date (duration)
<input checked="" type="checkbox"/> NaviSuite Kuda Core	02/09/2022 (+30)

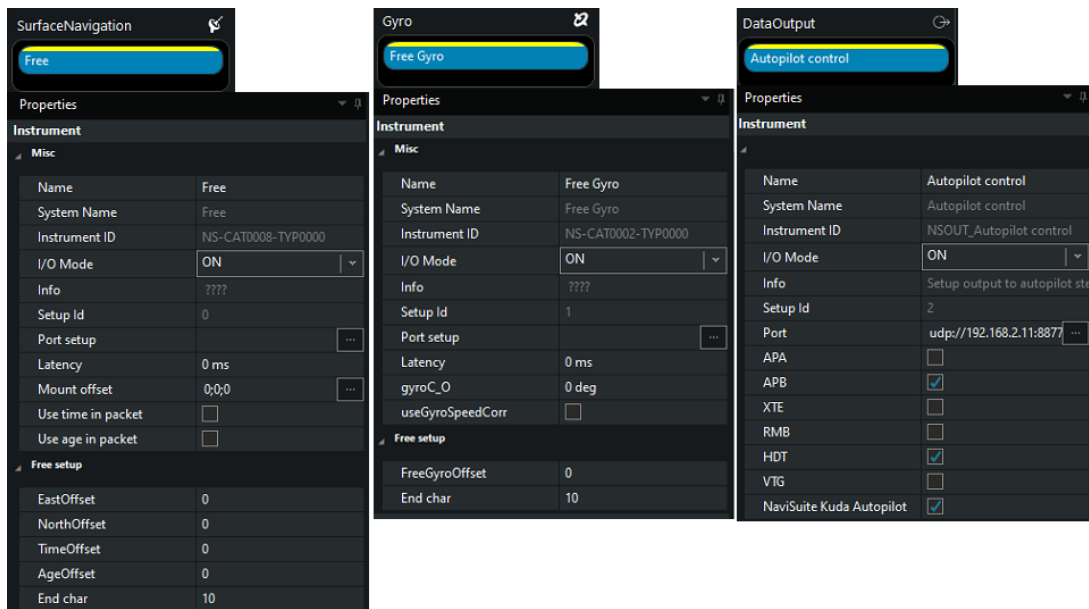
Alternatively, enable [licence server](#) or [add a licence file](#).

[See active licences on this computer](#) [Activate](#) [Demo](#)

- **NaviSuite Kuda Core** opens with an empty project.
- Click on the Main Vessel and use the plus (+) sign to add instruments.



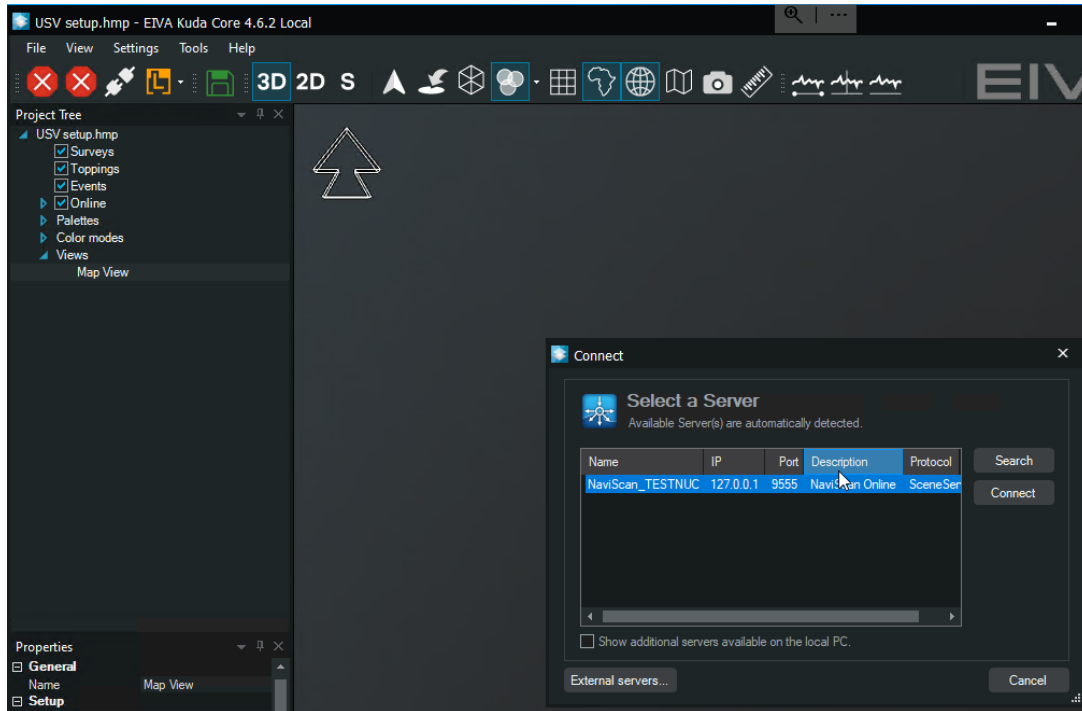
- For a simulated setup:
- Add the instruments **Free GPS** and **Free Gyro** (Do not set a **Port**. If you changed the port settings, you need to delete the instrument and add it again.)
- Add the **Autopilot control** (as **Port** set the ip address of the current computer).



- Save the project, eg USV Setup.nsp
- Start Kuda Core Config



- Now Kuda Core starts up
- Save the Kuda Core project and give it a project name.
- Connect to the local NaviScan that is running in the background.





- NaviSuite Kuda Core Config should always be running, therefore add Kuda Core Config to the Windows Startup.

See also <https://support.microsoft.com/en-us/windows/add-an-app-to-run-automatically-at-startup-in-windows-10-150da165-dcd9-7230-517b-cf3c295d89dd>

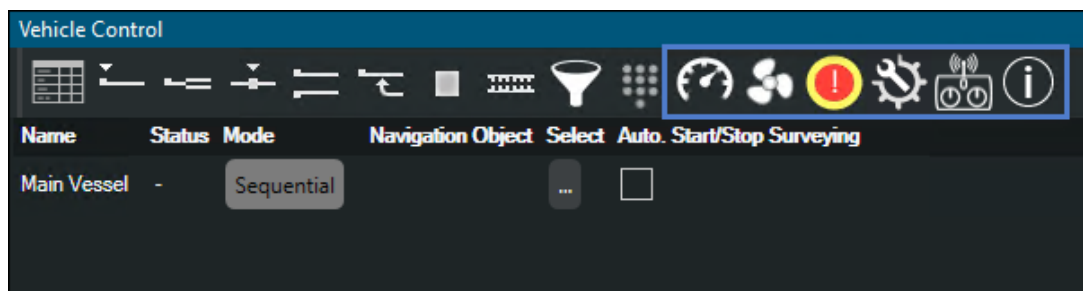
## Add an app to run automatically at startup in Windows 10

Windows 10

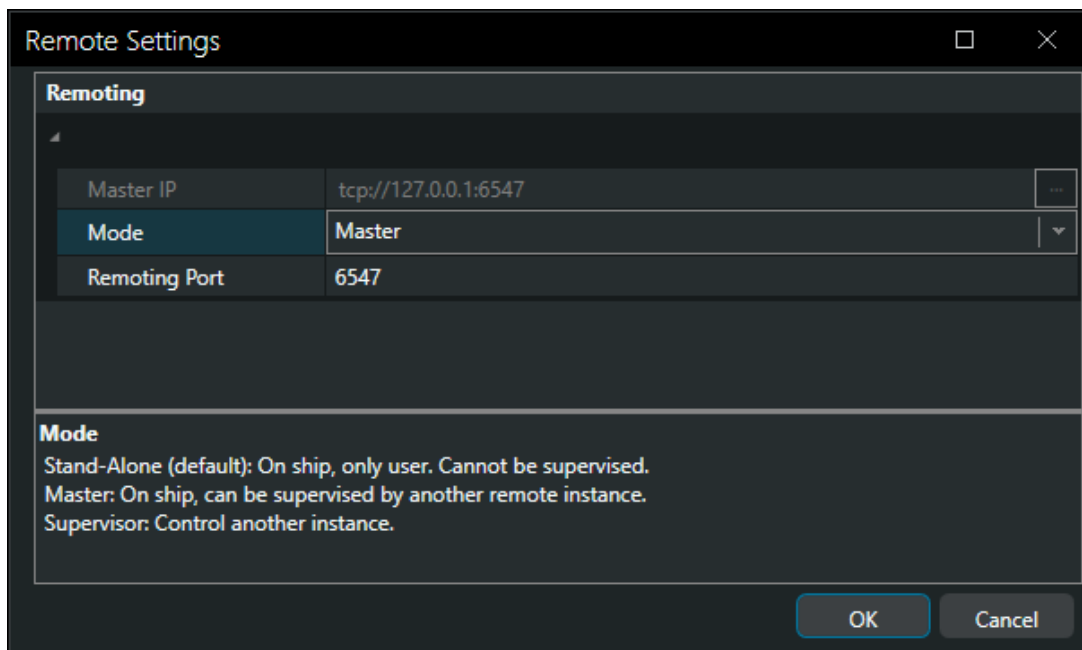
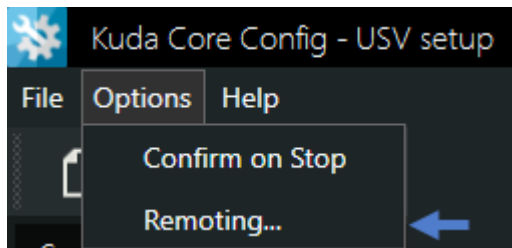
1. Select the **Start**  button and scroll to find the app you want to run at startup.
2. Right-click the app, select **More**, and then select **Open file location**. This opens the location where the shortcut to the app is saved. If there isn't an option for **Open file location**, it means the app can't run at startup.
3. With the file location open, press the **Windows logo key**  + **R**, type **shell:startup**, then select **OK**. This opens the **Startup** folder.
4. Copy and paste the shortcut to the app from the file location to the **Startup** folder.

Or find C:\Users\[username]\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup

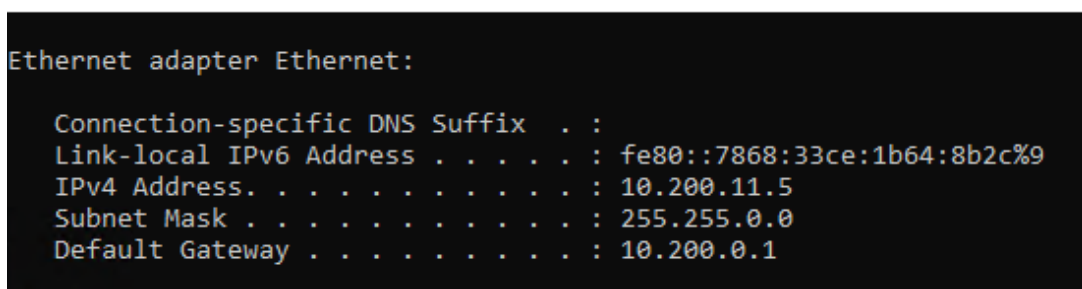
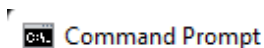
- Browse to the **View** tab in the menu bar, and add the **Vehicle Control**. Here the six different Autopilot controls are now visible.



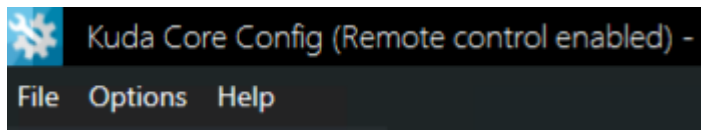
- Enable Remoting in **Kuda Core Config**



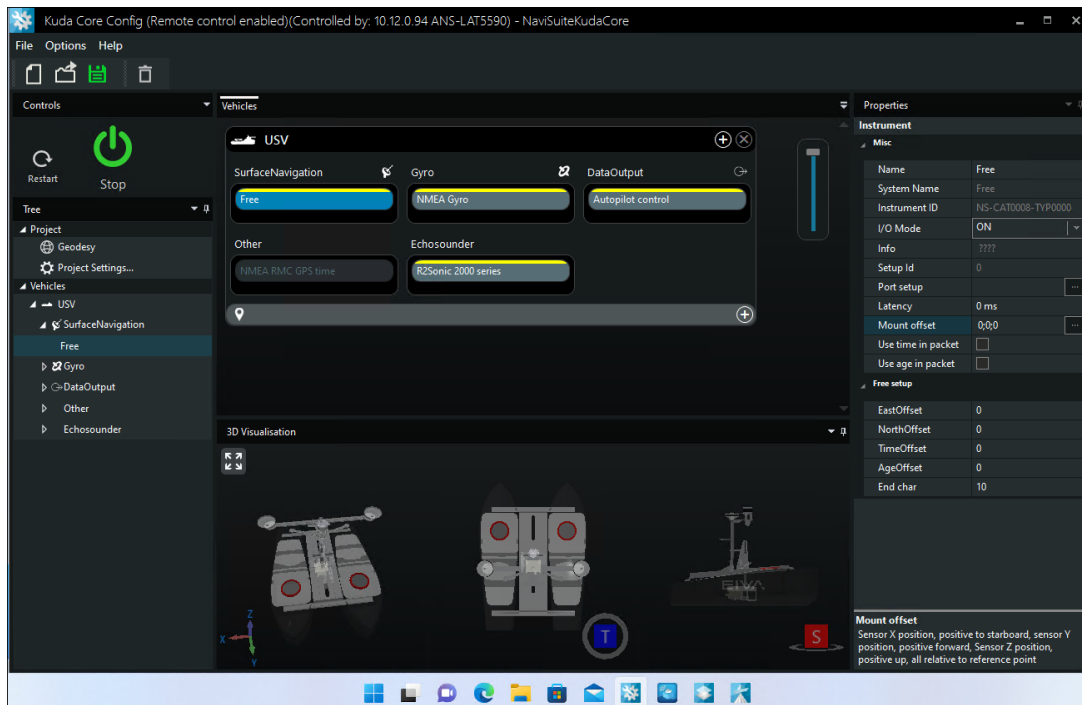
- Write down the USV IP address because you will need it on the onshore computer. In this example the ip address is 10.200.11.5. The default port is 6547. Any port can here be used.



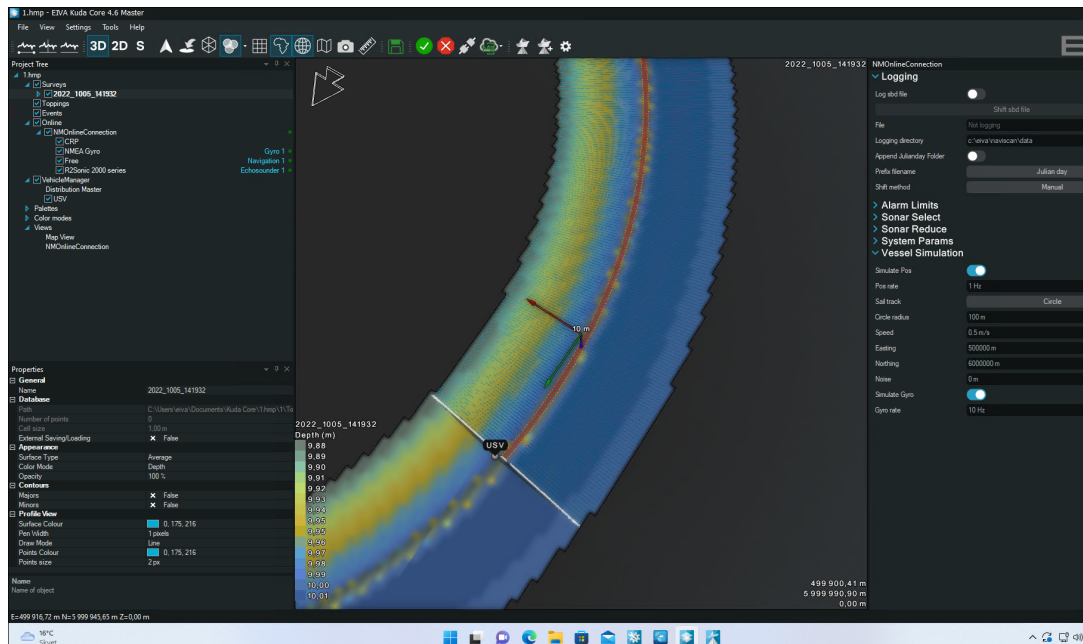
- In the project title you can now see that the Remote control is enabled.



The final result will look like this:



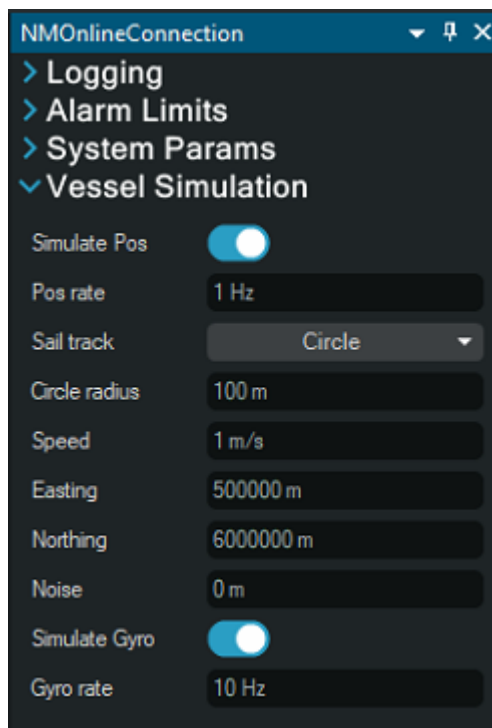
Check the **Online node** in the **Project tree**. Green dots represent an active working connection. If the dots are red, remove the **Online node** and connect once more.



The toolbar is shown



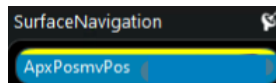
1. Log SBD file
2. Shift SBD file
3. Settings eg for changing simulation speed



Your USV computer is now ready to be used.  
Switch to the onshore pc.

### 3.1 Example: USV Kuda Core Config

Example Kuda Core Config from the EIVA USV Reav16 (includes Applanix POSMV):



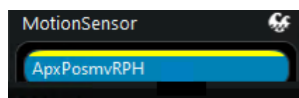
Name	ApxPosmvPos
System Name	ApxPosmvPos
Instrument ID	NS-CAT0008-TYP000A
I/O Mode	ON
Info	\$GRP-binary-\$#
Setup Id	0
Port setup	udp://10.0.0.44:5602/
Latency	0 ms
Mount offset	0;0;0
PosFromRPH	<input checked="" type="checkbox"/>
PosFromRPH2	<input type="checkbox"/>
Use datumshift	<input type="checkbox"/>
Use ITRF	<input type="checkbox"/>
GPS green status	No status alarm

Instrument ApxPosmvPos



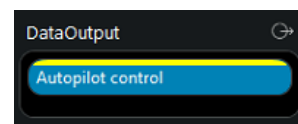
Name	ApxPosmvGyro
System Name	ApxPosmvGyro
Instrument ID	NS-CAT0002-TYP0015
I/O Mode	ON
Info	Binary..
Setup Id	1
Port setup	udp://10.0.0.44:5602/
Latency	0 ms
gyroC_O	0 deg
useGyroSpeedCorr	<input type="checkbox"/>
Use rph2	<input type="checkbox"/>

Instrument ApxPosmvGyro



Name	ApxPosmvRPH
System Name	ApxPosmvRPH
Instrument ID	NS-CAT0003-TYP0013
I/O Mode	ON
Info	Binary..
Setup Id	2
Port setup	udp://10.0.0.44:5602/
Latency	0 ms
Mount offset	0;0;0
Heading mount	0 deg
roll_C_O	0 deg
pitch_C_O	0 deg
heave_C_O	0 m
Use rph2	<input type="checkbox"/>

Instrument ApxPosmvRPH



Name	Autopilot control
System Name	Autopilot control
Instrument ID	NSOUT_Autopilot control
I/O Mode	ON
Info	Setup output to autopilot st
Setup Id	2
Port	udp://192.168.2.11:8877
APA	<input type="checkbox"/>
APB	<input checked="" type="checkbox"/>
XTE	<input type="checkbox"/>
RMB	<input type="checkbox"/>
HDT	<input checked="" type="checkbox"/>
VTG	<input type="checkbox"/>
NaviSuite Kuda Autopilot	<input checked="" type="checkbox"/>

Instrument: Autopilot control

Other

Pos mv GPS time

Instrument

Name	Pos mv GPS time
System Name	ApxPosmv GPS time
Instrument ID	NS-CAT0000-TYP0006
I/O Mode	ON
Info	Binary data...
Setup Id	3
Port setup	udp://10.0.0.44:5602/
Latency	0 ms

Instrument: Pos mv GPS time

Bathy

GpsHeightPosmv

Instrument

Name	Pos mv GPS time
System Name	ApxPosmv GPS time
Instrument ID	NS-CAT0000-TYP0006
I/O Mode	ON
Info	Binary data...
Setup Id	3
Port setup	udp://10.0.0.44:5602/
Latency	0 ms

GPSHeightPosmv

Other

NMEA ZDA GPS time

Info

\$xxZDA,hhmmss.hh,dd,rr

Setup Id

1

Port setup

com://COM18:38400

Latency

0 ms

PPS usage

Not used

Not used

RI

DCD

DSR

CTS

NMEA ZDA GPS time



Echosounder

R2Sonic 2000 series

**Instrument**

**Misc**

Name	R2Sonic 2000 series
System Name	R2Sonic 2000 series
Instrument ID	NS-CAT0009-TYP0020
I/O Mode	ON
Info	R2Sonic 2000 BTH0 UDP port 4000. N
Setup Id	5
Port setup	udp://10.0.0.86:4000/
Latency	0 ms
Mount offset	0;0;0
Roll mount	0,488 deg
Pitch mount	-0,153 deg
Heading mount	0,308 deg
Secondary IP	udp://0.0.0.0:0/
Exclude sections	0
Exclude beamGrps	0

**Scan Filters**

quality threshold	8
incl range begin	2 m
incl range end	22 m
incl angle begin	0 deg
incl angle end	0 deg

Instrument: Echosounder

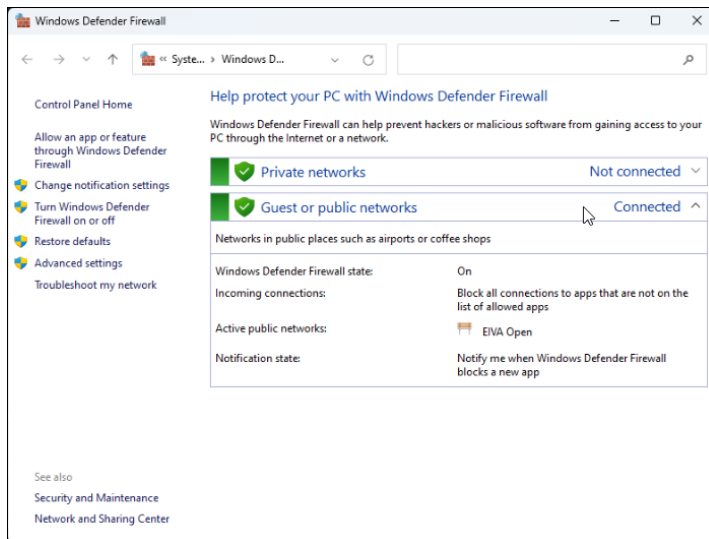
## 4 Preparation of the Supervisor computer onshore

Hardware: Windows11 computer with Windows updates.

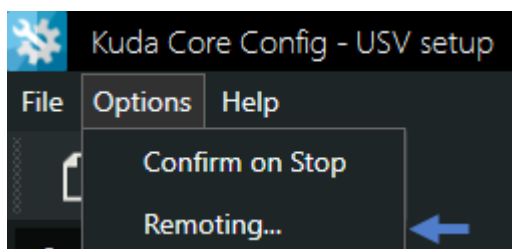
Licence: No licence needed.

Software: The same version as installed on the USV computer.

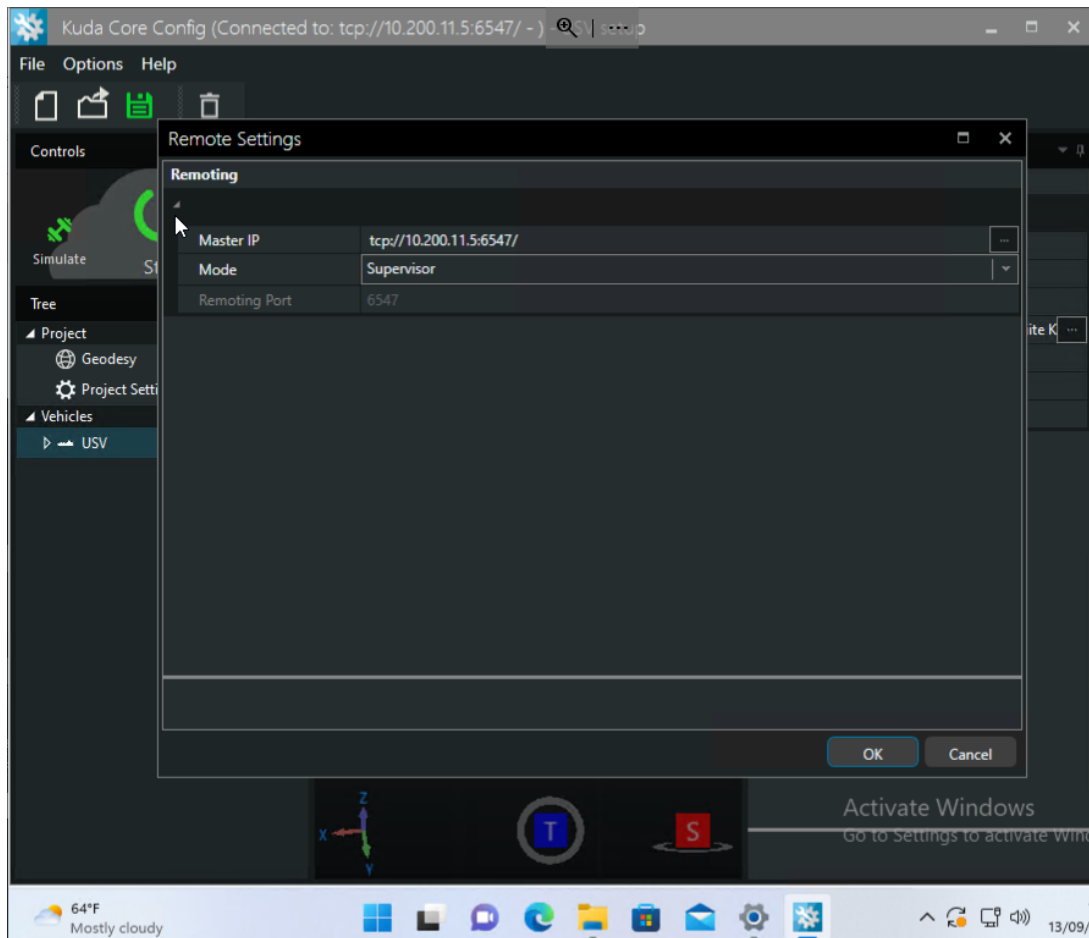
Firewall settings: Default Windows settings

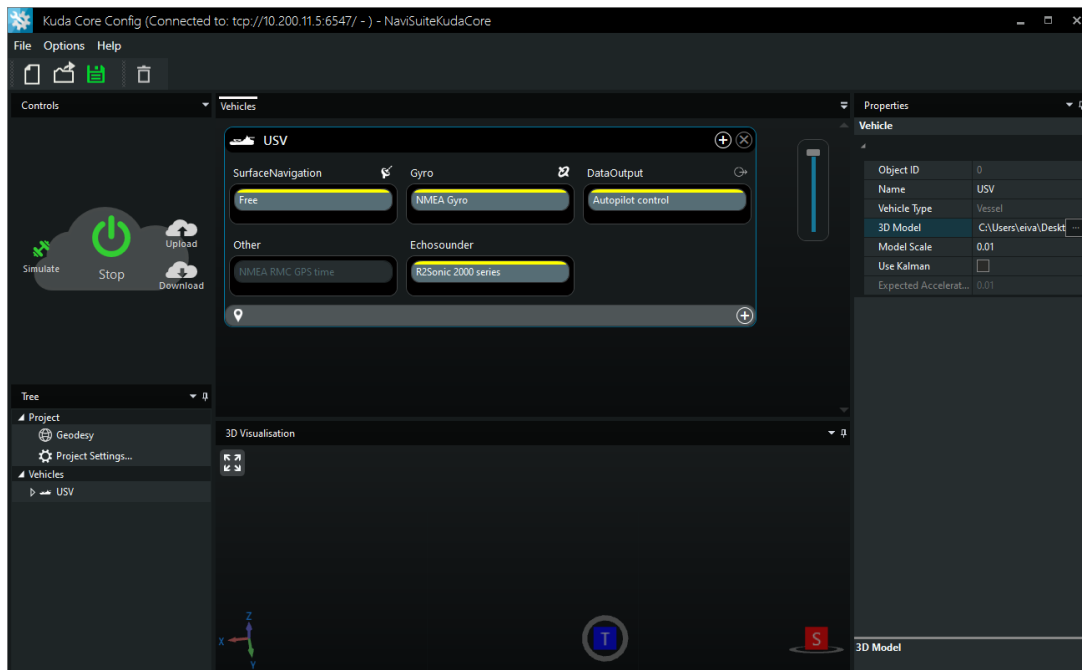


- Install **NaviSuite Kuda Core** to the default path.
- Open **Kuda Core Config**
- Enable **Remoting**

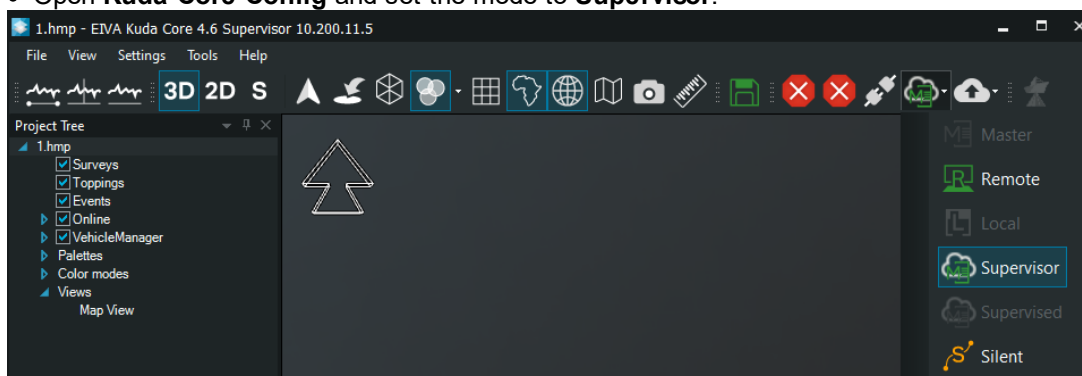


- Use the ip address and port from the USV computer.
- Set to Supervisor.





- Download the configuration from the USV.
- Open **Kuda Core Config** and set the mode to **Supervisor**.



Now the supervisor can create runlines and upload them to the USV.  
Also open the Vehicle Control to load the runline and start surveying.

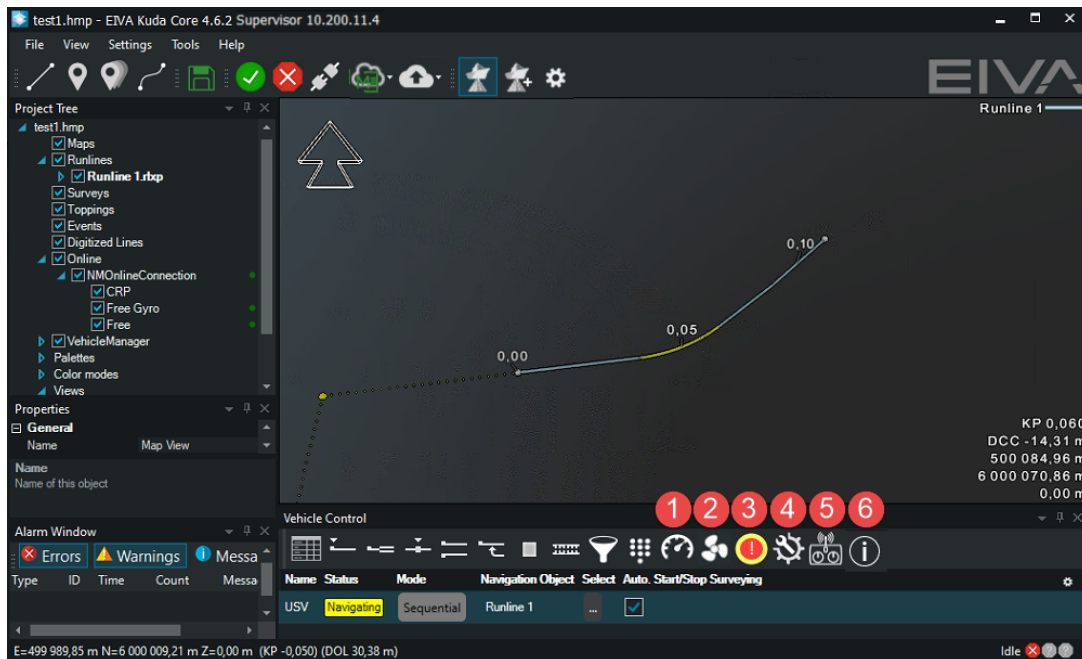
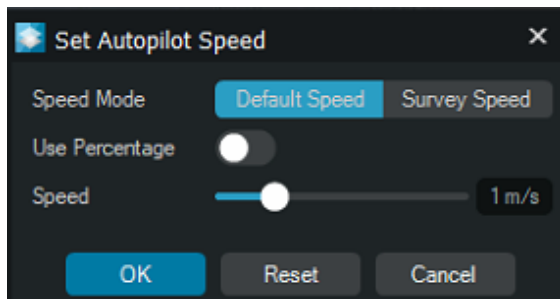
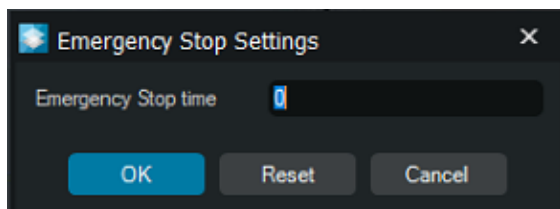


Figure: Kuda Core with Vehicle Control and special options  
New screenshot should be in supervisor mode.

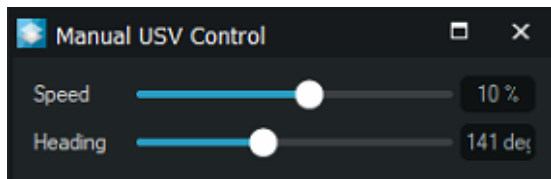
## 1. Set Autopilot speed



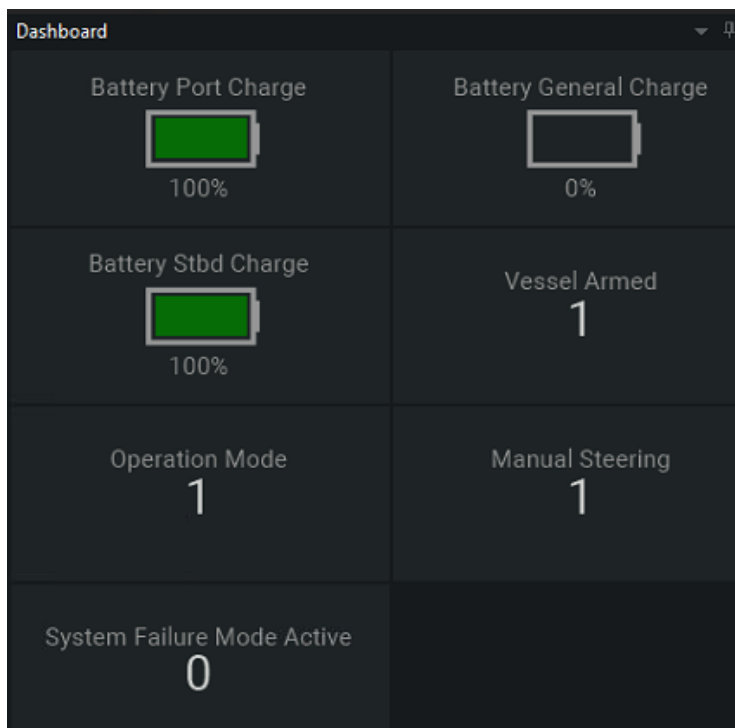
2. Start thruster
3. Emergency Stop
4. Set Auto Emergency Stop Time



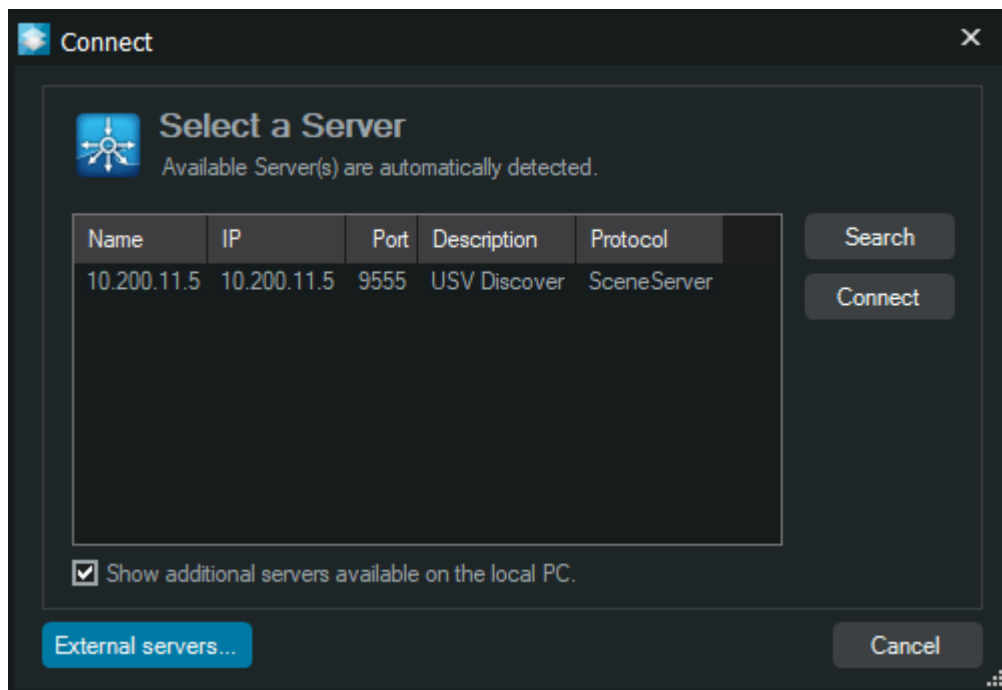
## 5. Manual USV Control



## 6. Battery dashboard



You can only start supervisor from being in a remote state. i.e connect to the master, and then go supervisor.



Add the USV IP address, to the external server list.  
Eg 10.200.11.5:9555; SceneServer; USV Discover

```

ExternalServers.txt - Notepad
File Edit Format View Help
#### Additional domains/addresses for discovering local network servers:
#### <ip or domain>
ais.eiva.com

#### Manual connection information for connecting directly to external servers/services:
#### <ip or domain> :<port>; <protocol>; <optional description>
10.200.11.5:9555; SceneServer; USV Discover
  
```

## 5 AutoPilot

See 1.1\_NaviSuite Kuda - Autopilot manual.pdf




## 6 Firewall

FireWall settings set by KudaCore:

Inbound Rules						
Name	G...	Profile	Enabled	Action	Override	Progr
✓ EIVA Remote Service Open TCP		All	Yes	Allow	No	C:\EIV
✓ EIVA Remote Service Open UDP		All	Yes	Allow	No	C:\EIV
✓ EivaMaster Open TCP		All	Yes	Allow	No	C:\EIV
✓ EivaMaster Open UDP		All	Yes	Allow	No	C:\EIV
✓ Kuda Core Open TCP		All	Yes	Allow	No	C:\EIV
✓ Kuda Core Open UDP		All	Yes	Allow	No	C:\EIV
✓ NaviScan Config Open TCP		All	Yes	Allow	No	C:\EIV
✓ NaviScan Config Open UDP		All	Yes	Allow	No	C:\EIV
✓ NaviScan Open TCP		All	Yes	Allow	No	C:\EIV
✓ NaviScan Open UDP		All	Yes	Allow	No	C:\EIV
✓ NaviSuite Master Remote Services		All	Yes	Allow	No	Any
✓ NaviSuiteConfig Open TCP		All	Yes	Allow	No	C:\EIV

For 4G router connection these ports needs to manually be opened.

									
System   Network   Services   Firewall   QoS   VPN   Tools   Application   Status									
Port Mapping									
Enable	Proto	Source	Service Port	Internal Address	Internal Port	Log	External Interface(Optional)	External Address(Optional)	Description
Yes	TCP & UDP	80.160.68.90	9555	192.168.2.6	9555	No	Cellular 1		cellular1 usv
Yes	TCP	80.160.68.90	6547	192.168.2.6	6547	No	Cellular 1		Kuda config supervision
Yes	TCP	80.160.68.90	2000	192.168.2.6	2000	No	Cellular 1		NS
Yes	TCP	80.160.68.90	31231	192.168.2.6	31231	No	Cellular 1		HMD services (EivaMaster.exe)
Yes	UDP	80.160.68.90	5999	192.168.2.6	5999	No	Cellular 1		NaviScan center depth
Yes	UDP	80.160.68.90	2300	192.168.2.6	2300	No	Cellular 1		NaviScan DTM (reduced MBE)
Yes	TCP & UDP	80.160.68.90	2301	192.168.2.6	2301	No	Cellular 1		NaviScan NED exporter
Yes	TCP & UDP	80.160.68.90	2302	192.168.2.6	2302	No	Cellular 1		NS SS DTM
Yes	TCP & UDP	80.160.68.90	2304	192.168.2.6	2304	No	Cellular 1		NS NM scan writer
Yes	TCP	80.160.68.90	2305	192.168.2.6	2305	No	Cellular 1		NS HMD
Yes	TCP	80.160.68.90	2100	192.168.2.6	2100	No	Cellular 1		Real-time DTM (from NS to ?)
Yes	TCP & UDP	80.160.68.90	9777	192.168.2.6	9777	No	Cellular 1		NS dynamic port 1
Yes	TCP & UDP	80.160.68.90	9778	192.168.2.6	9778	No	Cellular 1		NS dynamic port 2
Yes	TCP & UDP	80.160.68.90	554	192.168.2.248	554	No	Cellular 1		IP-cam
<input checked="" type="checkbox"/>	TCP	0.0.0.0/0	8080		8080	<input type="checkbox"/>			
Apply   Cancel									

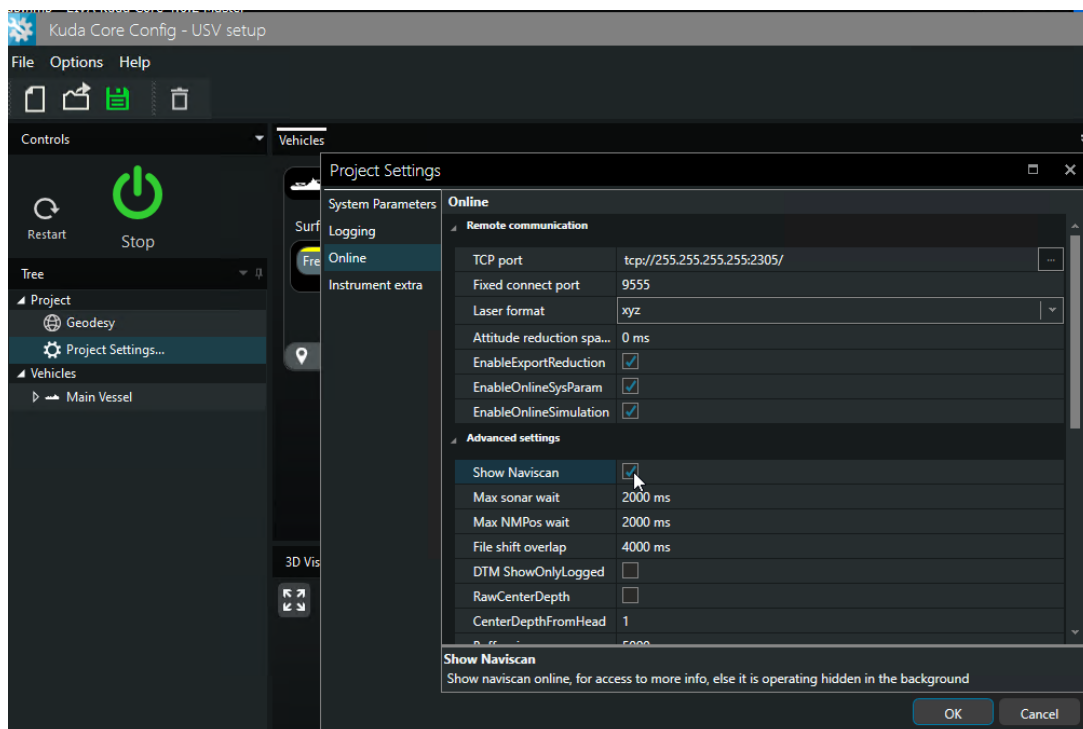
## 7 Trouble shooting

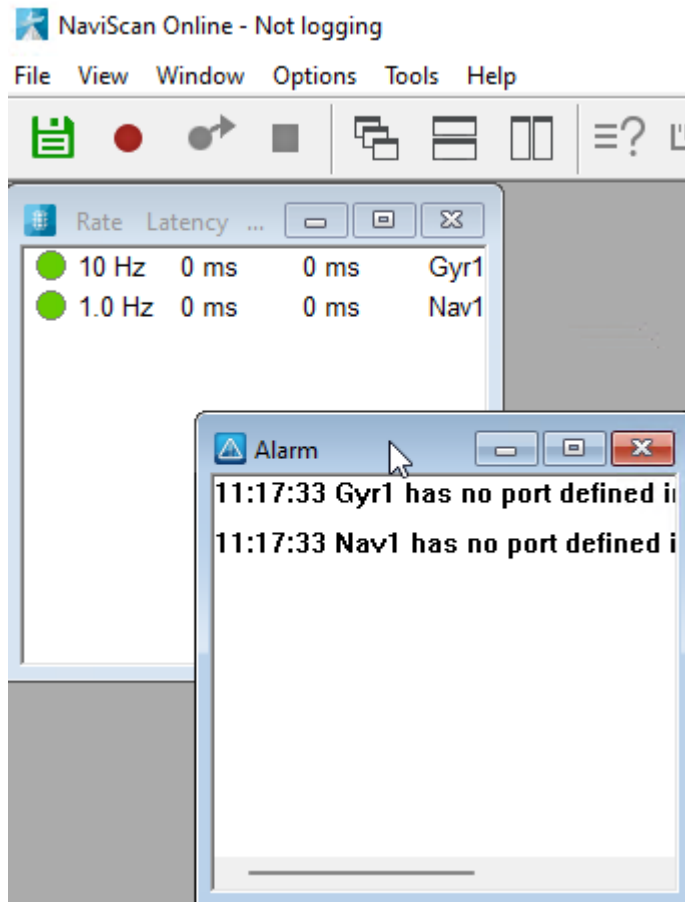
**Q.** Where are crash logs stored?

**A.** Crash logs are stored to the folder C:\ProgramData\EIVA\Kuda Core\Diagnostics

**Q.** NaviScan is by default running as a hidden process. Can I change that?

**A.** Yes. Enabling the tickbox **Show Naviscan** will start NaviScan as normal process, not as hidden process. This way the user can see the



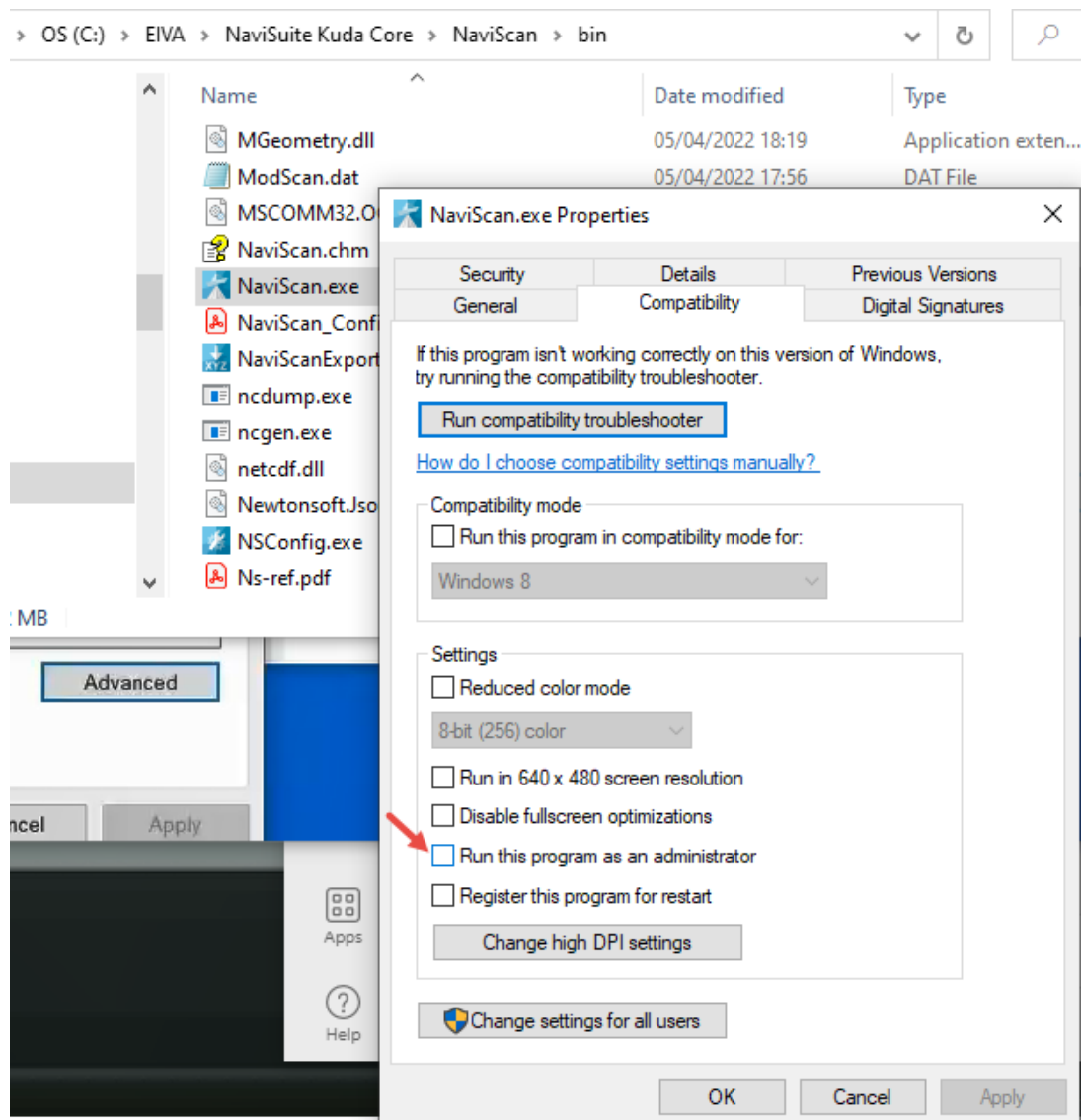


**Q.** What can I do when NaviScan shows this alarms?

**A.** User has no administrator rights on the computer. Try to set the option **Run as administrator** for NaviScan.

Should not be needed in the next Kuda software version.





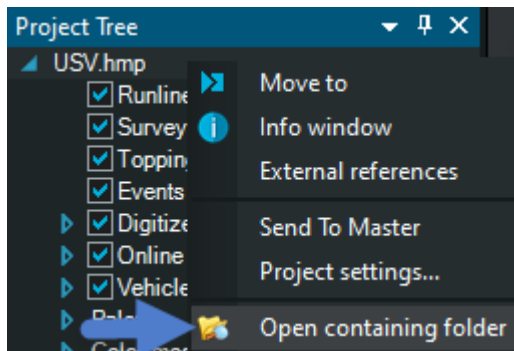
**Q.** The supervisor freezes temporarily when uploading waypoints or runlines.

**A.** Try to delete obsolete data from the USV and Supervisor pc.

On the USV, remove the files from the project via the Project tree.

Save the project.

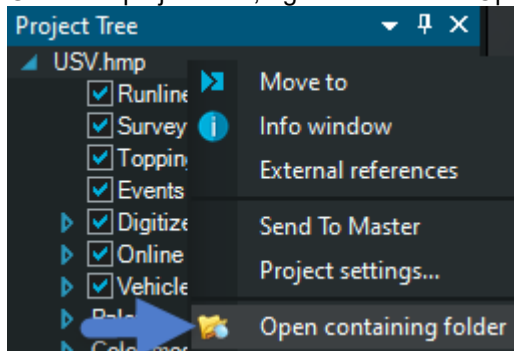
Go to the project tree, right mouse-click Open containing folder.



Delete the files there.

Switch to the supervisor pc.

Go to the project tree, right mouse-click Open containing folder.



Delete the files there.

**Q.** Which Services should be running?

**A.** These Services should be running:

