

NAVISCAN / NAVIPAC WITH EDGETECH 6205

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1 Introduction

This document includes information on the configuration of **NaviPac/NaviScan** in a combined solution in support of acquisition of multi-beam and sidescan data from an EdgeTech 6205 swath bathymetry (multi-beam) and dual frequency sidescan sonar system. Information about settings in the EdgeTech soft- and hardware are not included, please consult EdgeTech (6205: Combined Bathymetry & Side Scan Sonar) for further information.

2 NaviScan Configuration

The **NaviScan/NaviPac** configuration to support acquisition of multi-beam and sidescan data from an EdgeTech 6205 system is slightly different from what we normally see.

Normally the attitude and navigation-based sensors are interfaced into **NaviPac** and distributed to **NaviScan**.

In this configuration, it is the other way around, the instruments coming from the EdgeTech system are interfaced with **NaviScan**, from which data is distributed to **NaviPac**.

The following sections describe the configuration in detail.

2.1 Configuring the instruments from EdgeTech

The sonar data flow between the EdgeTech hardware and software and third-party software (**NaviPac/NaviScan**) is depicted below in Figure 1 (taken from the EdgeTech 6205 Hardware User Manual). Data available for the third-party software is output from the Discover software, all time-tagged in accordance with the **Time** input into the sonar interface box:

- Range/angle data (raw multi-beam datagrams)
- Auxiliary data
 - Position data
 - Heading data
 - Motion data
- Dual-frequency sidescan data



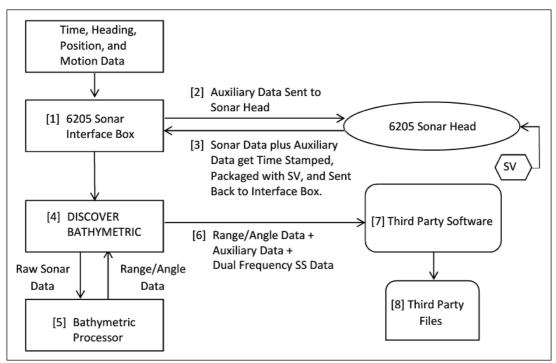


Figure 1 Dataflow in the EdgeTech 6205 system (from 6205 Hardware User Manual)

Five different instruments originating from the EdgeTech system must consequently be configured in **NaviScan**:

- Navigation
- Gyro
- Motion
- Multi-beam
- Sidescan

A few other instruments might be relevant to define in **NaviScan**. It all depends on the characteristics of the project in question. The most important ones are also described here:

- Bathymetry sensor (from NaviPac)
- Runline control (from NaviPac)



2.1.1 Navigation

📝 NaviScan.BIN - NaviScan Config		_		×
File Equipment View Options Tools	Help			
	1. 🛛 🖈			
🖃 🛱 NaviScan.bin	Sensor & help	EdgeTech4600 Position		
System Parameters	Name	EdgeTech4600 Position		
🗄 🖷 Geodesy	Disabled			
🖶 🕮 Runline Control	Port setup	TCP 1901 127.0.0.1		
i™ NaviPac	Latency	0 ms		
EdgeTech4600AttGyro	Mount offset X	-3.53 m		
	Mount offset Y	8.695 m		
Edgetech4600 RPH	Mount offset Z	-4.932 m		
🚊 🕮 Bathy				
EdgeTech4600 B				
- Navigation				
EdgeTech4600 Position				
iandar in the second s				
a 2 H2_Edgetech4600/6205				
🖉 🖾 🖬 H1_EdgeTech Sidescan Dual				
H2_EdgeTech Sidescan Dual		-		
_				
i For Help, press F1	1		NUM	1 .::

Figure 2 Configuring the EdgeTech4600 navigation instrument

To configure the navigation information arriving from the Discover software, the following settings must be applied:

- Driver: EdgeTech4600 Position
- **Port setup**: TCP 1901, IP address 127.0.0.1 (IP address of computer where Discover is executed)
- **Mount offsets**: related to the antenna offsets determined in the local coordinate system defined in **NaviPac/NaviScan**



2.1.2 Gyro

📝 NaviScan - NaviScan Config			_		\times
File Equipment View Options Tools	Help				
	1. 🛛 🖈				
🖃 🛱 NaviScan.bin	Sensor & help		EdgeTech4600AttGyr	0	
System Parameters	Name		EdgeTech4600AttGyr	o	
🖶 💭 Geodesy	Disabled				
🖶 🕮 Runline Control	Port setup		TCP 1901 127.0.0.1		
Gyro	Latency		0 ms		
EdgeTech4600AttGyro	gyroC_O		2.897 °		
🖕 💭 Motion	useGyroSpeedCorr				
Edgetech4600 RPH	GPS Data		HDT		
Bathy		~	HDT		
🔤 💼 Navigation			VEL		
di EdgeTech4600 Position			Mix HDT and VEL d	lata	
Echosounder				1010	
🖻 🖷 Sidescan					
H1_EdgeTech Sidescan Dual					
🛄 📩 H2_EdgeTech Sidescan Dual	Select the source for or GPS_VEL message		heading data from eith from both.	er GPS_	HDT
For Help, press F1 NU					

Figure 3 Configuring the EdgeTech4600 gyro instrument

To configure the gyro information arriving from the Discover software, the following settings must be applied:

- Driver: EdgeTech4600AttGyro
- **Port setup**: TCP/IP 1901 (port) and IP address 127.0.0.1 (IP address of computer where Discover is executed)



2.1.3 Motion

🔰 NaviScan.BIN - NaviScan Config		_		×
File Equipment View Options Tools	Help			
	1 🛛 🖈			
	Sensor & help	Edgetech4600 RPH		
System Parameters	Name	Edgetech4600 RPH		
🖶 💼 Geodesy	Disabled			
🖮 🛱 Runline Control	Port setup	TCP 1901 127.0.0.1		
	Latency	0 ms		
EdgeTech4600AttGyro	Mount offset X	-3.71 m		
Building Motion	Mount offset Y	0 m		
Edgetech4600 RPH	Mount offset 7	-3.804 m		
🖶 🖷 Bathy	Heading mount	0.0		
🖬 EdgeTech4600 B	roll_C_O	-0.65 °		
🖶 🛱 Navigation		1,128 °		
EdgeTech4600 Position	pitch_C_O			
Echosounder	heave_C_O	0 m		
협 1 H1_Edgetech4600/6205 협 2 H2_Edgetech4600/6205				
Sidescan				
	Data: Binary data			
H2_EdgeTech Sidescan Dual	Help:			
For Help, press F1	J		NUM	A

Figure 4 Configuring the EdgeTech4600 motion instrument

The motion information arriving from the Discover software requires the following settings to be applied:

- Driver: EdgeTech4600 RPH
- **Port setup**: TCP/IP 1901 (port) and IP address 127.0.0.1 (IP address of computer where Discover is executed)



2.1.4 Multi-beam

NaviScan.BIN - NaviScan Config File Equipment View Options Tools	Help	-		×
	L+ 🖄 🗡			
	Sensor & help	Edgetech4600/6205		
System Parameters	Name	H1_Edgetech4600/6205		
i∰ Ceodesy ⊟Ca Runline Control	Disabled			
NaviPac	Port setup	TCP 1901 127.0.0.1		
	Latency	0 ms		
EdgeTech4600AttGyro	Mount offset X	-3.71 m		
	Mount offset Y	0.209 m		
Edgetech4600 RPH	Mount offset Z	-4.14 m		
Bathy	Roll mount	0.42 °		
🔤 🖆 EdgeTech4600 B	Pitch mount	-1.23 °		
🖾 Havigation 🖞 EdgeTech4600 Position	Heading mount	-0.9 °		
Echosounder	Binning filter			
1 H1_Edgetech4600/6205	Method	Filter not used		
2 H2_Edgetech4600/6205	Scan Filters			
ia Sidescan	Quality threshold	0		
ធំ H1_EdgeTech Sidescan Dual ធំ H2_EdgeTech Sidescan Dual	Ind range start	0 m		
	Ind range end	20000 m		
	Incl angle start	-180 °		
	Incl angle end	180 °		
	Section exclude 🛛 🗄			
	Beam exclude 🛛 🗄			
	Data: Help: TCP port 1901 an Discover is run typ. same	nd IP address of the compute as naviscan 127.0.0.1	ter on wh	ich
For Help, press F1	,		NUM	

Figure 5 Configuring the EdgeTech4600 multi-beam instrument (head on port side)

Filter not used
 Vertical limit [m] vs across bins [m]
 Range limit [m] vs angle bins [°]
 Angle limit [°] vs range bins [m]



NaviScan - NaviScan Config			×
File Equipment View Options Tools	Help		
⊡ BvviScan.bin System Parameters	Sensor & help Name	Edgetech4600/6205 H2_Edgetech4600/6205	
⊕…© Geodesy ⊟…© Runline Control	Disabled		
NaviPac	Port setup	TCP 1901 127.0.0.1	
	Latency	0 ms	
EdgeTech4600AttGyro	Mount offset X	-3.71 m	
🖻 🛱 Motion	Mount offset Y	0.209 m	
Edgetech4600 RPH	Mount offset Z	-4.14 m	
🖮 🕮 Bathy EdgeTech4600 B	Roll mount	0.42 °	
□ Lugereen 1000 D	Pitch mount	-0.1 °	
🔤 📅 EdgeTech4600 Position	Heading mount	-1.59 °	
Echosounder	Binning filter		
	Method	Filter not used	
Sidescan	Scan Filters		
📓 🖾 Sidescan 🛗 H1_EdgeTech Sidescan Dual	Quality threshold	0	
📅 H2_EdgeTech Sidescan Dual	Ind range start	0 m	
	Incl range end	20000 m	
	Incl angle start	-180 °	
	Inclangle end	180 °	
	Section exclude	_	
	Beam exclude ±		
For Help, press F1		NUN	1

Figure 6 Configuring the EdgeTech4600 multi-beam instrument (head on starboard side)

To configure the multi-beam information arriving from the Discover software the following settings must be applied:

- Driver: Edgetech4600/6205.
- **Port setup for both heads**: TCP/IP 1901 (port) and IP address 127.0.0.1 (IP address of computer where Discover is executed).
- Offsets for both heads: related to the acoustic center determined in the local coordinate system defined in NaviPac/NaviScan. Note that the two individual acoustic centers converge at a single point (EdgeTech 6205 Hardware User Manual). The offsets are consequently identical for the two heads.



• **Mount angles**: result of a dual head patch test calibration, that will result in different (though similar) pitch, roll and heading values for the two heads.

🗾 NaviScan.BIN - NaviScan Config		– 🗆 X
File Equipment View Options Tools	Help	
	1. 🛛 🖈	
	Sensor & help	EdgeTech Sidescan Dual
System Parameters	Name	H1_EdgeTech Sidescan Dual
🔒 🗠 🖨 Geodesy	Disabled	
🖮 🖻 Runline Control	Port setup	TCP 1901 127.0.0.1
Gyro	Latency	0 ms
EdgeTech4600AttGyro	Mount offset X	-3.71 m
	Mount offset Y	0.209 m
🔤 Edgetech4600 RPH	Mount offset Z	-4.14 m
🖶 🛱 Bathy	Roll mount	0 °
EdgeTech4600 B	Pitch mount	0 °
🖶 📼 Navigation	Heading mount	0 °
 □・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・		
협 H1_EdgeTech Sidescan Dual 협 H2_EdgeTech Sidescan Dual	Data: EdgeTech Sidesc Help: TCP port 1901 ar Discover is run typ. same	nd IP address of the computer on which
For Help, press F1		NUM:

Figure 7 Configuring the EdgeTech4600 sidescan instrument

To configure the sidescan information arriving from the Discover software the following settings must be applied:

- Driver: EdgeTech Sidescan Dual.
- **Port setup**: TCP/IP 1901 (port) and IP address 127.0.0.1 (IP address of computer where Discover is executed).
- **Offset**(s): related to the acoustic centre determined in the local coordinate system defined in NaviPac/NaviScan.
- Mount angles (Roll, Pitch, and Heading mount): not relevant.



2.2 Configuring additional instruments

2.2.1 Bathy

🔀 NaviScan.BIN - NaviScan Config		_		×		
File Equipment View Options Too						
▯▯▯ױױ	┋[] 🛛 🖈	•				
🖃 👼 NaviScan.bin	Sensor & help	EdgeTech4600 B				
System Parameters	Name	EdgeTech4600 B				
🗄 💼 Geodesy	Disabled					
in the control and the contro	Port setup	TCP 7030 127.0.0.1				
Motion	Latency	0 ms				
Bathy	Mount offset X	0 m				
EdgeTech4600 B	Mount offset Y	0 m				
🦾 ((NaviPacHeaveCor))	Mount offset Z	0 m				
Navigation	depthC_O	0 m				
ia∰ Echosounder ia∰ Sidescan	useBarometer					
	useCTD					
	densityWater	1 kg/dm3				
	gravity	9.82 m/s2				
	presureSurface	1 atm				
		-				
For Help, press F1]			NU .:		

Figure 8 Configuring the bathy instrument

A bathymetry instrument is only relevant when an RTK solution (or another solution that supplies adequately accurate height information) is available for the navigation. At present, **NaviScan** cannot use the navigation information arriving from the Discover to extract the vertical component. Instead this information must be defined as an output in **NaviPac**. In **NaviScan** the following settings must be applied:

- **Driver**: Bathy
- **Port setup**: TCP 7030, IP address 127.0.0.1 (IP address of computer where **NaviPac** is executed)
- **Mount Offsets**: **NaviPac** will calculate the value associated with the CRP position, by default. Therefor values of 0,0,0 are used in **NaviScan**.



2.2.2 Runline Control

📝 NaviScan.BIN - NaviScan Config — 🗆 🗙					
File Equipment View Options Tools	Help				
☐ d ≝ H+ H+ E					
🖃 🗝 NaviScan.bin	Sensor & help	NaviPac			
System Parameters	Name	NaviPac			
🗄 💼 Geodesy	Disabled				
En Runline Control	Port setup	UDP 6010 127	.0.0.1		
⊕ Gyro	Latency	0 ms			
Motion	NaviPac geodesy				
Bathy Navigation Echosounder Sidescan	Data: \$S, <filename>< characters><cr><lf> Help:</lf></cr></filename>	:cr> <lf> \$E,<ur< td=""><td>nused</td><td></td><td></td></ur<></lf>	nused		
For Help, press F1	1			NUM	

Figure 9 Configuring the runline control instrument

A runline control instrument is used to convey relevant information from **NaviPac** to **NaviScan**. This includes:

- A trigger to start and stop logging. Using this functionality makes it possible to synchronize logging in **NaviPac** and **NaviScan**.
- Runline information.
- Geodesy information.

In NaviScan the following settings must be applied:

- Driver: NaviPac
- **Port setup**: UDP/IP 6010 (port) and IP address 127.0.0.1 (IP address of computer where **NaviPac** is executed). Note that the port number could be any port available.



2.3 The output to NaviPac

To facilitate the distribution of the EdgeTech auxiliary data from **NaviScan** to **NaviPac**, the following must be configured:

In **NaviScan Config**, activate the Global Parameters dialogue (Options – Global Parameters), go to the **Instruments** tab and define the settings under the **EdgeTech4600** headline:

Specify Global Parameters		×			
Real-time Export Instruments	Height Calculations NaviScan				
Edgetech4600 🗉		^			
maximumSwath	0 m				
maximumDepth	0 m				
minimumDepth	0 m				
Navipac Repeater 📃					
Navipac IP	127.0.0.1				
Pos UDP Port	2320				
Rph UDP Port	2321				
Send position and motion data to Navipac					
Note: Restart of NaviScan Online is required for changes to be fully applied.					

Figure 10 Configuring the EdgeTech4600 Repeater

The settings are:

• Use the NaviPac Repeater

Enable this option to facilitate the distribution to NaviPac

NaviPac IP

Specify the IP address of the NaviPac computer here.

- Pos UDP Port Specify the position output port here (2320 is default, but any available number could be used)
 Rph UDP Port
 - Specify the motion and gyro output port here (By default Port 2321 is set, but any available number could be used)



3 NaviPac Configuration

In **NaviPac**, the **NaviScan** configuration is reflected. Only the instruments relevant for the EdgeTech 6205 based **NaviPac/NaviScan** relationship are described here:

- Navigation
- Gyro
- Motion
- Bathy output
- Runline Control

3.1 Configuring the Navigation instrument

💸 NaviPac - EdgeTech 💶 🗖 🗙							
File Options Tools Help							
1 🖆 🛗 🖕 ĉ 🚊	م						
Controls 🗸	Vehicles	Ŧ	Properties				
			Instrument				
	Main Vessel		⊿ Misc				
Restart Ct Reset	SurfaceNavigation 💕		Name	Edgetech 4600 (NaviScan)			
^{Restart} Stop ^{Reset}			System Name				
Tree 👻 🗸	Edgetech 4600 (NaviScan)		Instrument ID				
▲ Project			Info				
Geodesy	Gyro 🛛 🗶		Offset	-3,53;8,695;4,932			
🛱 Project Settings	Edgetech 4600 (NaviScan)		Setup Id				
▲ Vehicles			I/O Mode	ON			
🖌 🛥 Main Vessel	Matian Canada		I/O	attu://127.0.0.1:2320/ ···			
🖌 💕 SurfaceNavigation	MotionSensor 😽		Apply datum shift				
Edgetech 4600 (NaviScan)	Edgetech 4600 (NaviScan)		Fixed latency	0 s			
🖌 🗶 Gyro			Apply ITRF shift				
Edgetech 4600 (NaviScan)	DataOutput 🕞		String details				
MotionSensor	EIVA runline control		Number of bytes	100			
Edgetech 4600 (NaviScan)			Telegrams per cycle				
⊿ ⊕DataOutput	Heave correction and GPS height		Driver type	CRLF: Normal ASCII String with 'c 👻			
EIVA runline control							
Heave correction and GPS height	Q						
			Info Binary Edgetech format - se	end via NaviScan on ATTU format			
3D Visualisation							

Figure 11 EdgeTech 4600 navigation in NaviPac

The following settings are of significance for the navigation sensor:

• Driver: EdgeTech 4600 (NaviScan)



• I/O

Format is ATTU (data is time tagged in the EdgeTech system. **NaviScan** is taking this time tagging into account and supplying **NaviPac** with similar information via the ATTU format. Timing in **NaviPac** and **NaviScan** are consequently identical for all instruments arriving via the distribution from **NaviScan**), port (2320) is as defined as part of the EdgeTech 4600 repeater settings in **NaviScan**.

Offsets

Similar to the ones defined in NaviScan.

3.2 Gyro

🐝 NaviPac - EdgeTech			_ = ×
File Options Tools Help			
🖞 🖆 🏥 🖕 Č	<u>e</u>		
Controls 🗸	Vehicles 🗧 🗧	Properties	
	A	Instrument	
	Main Vessel	A Misc	
Restart Ct Reset	SurfaceNavigation 🛛 🕰	Name	Edgetech 4600 (NaviScan)
Kestant Stop Reset	Edgetech 4600 (NaviScan)	System Name	
Tree 🝷 🖡	Eugetech 4000 (Naviscan)	Instrument ID	
▲ Project		Info	
🔀 Geodesy	Gyro 🗶	Offset	0;0;0
🛱 Project Settings	Edgetech 4600 (NaviScan)	Setup Id	
✓ Vehicles		I/O Mode	ON *
🖌 🛶 Main Vessel	MotionSensor 😽	I/O	attu://127.0.0.1:2321/ ···
SurfaceNavigation	Motionsensor	Gyro C-O	2,897 °
🖌 💋 Gyro	Edgetech 4600 (NaviScan)	Minimum time slice	0 s
Edgetech 4600 (NaviScan)		Latency	0 s
👂 🕵 MotionSensor	DataOutput 🕞	✓ String details	
▷ ⊕ DataOutput	EIVA runline control	Number of bytes	100
		Telegrams per cycle	50
	Heave correction and GPS height	Driver type	CRLF: Normal ASCII String with 'c 👻
	Ŷ		
		Info Binary Edgetech format - se	end via NaviScan on ATTU format
3D Visualisation			

Figure 12 EdgeTech 4600 gyro in NaviPac

The following settings are of significance for the gyro instrument:

- Driver: EdgeTech 4600 (NaviScan)
- I/O

Format is ATTU (see above under 'Navigation instrument' for details), port (2321) is as defined as part of the EdgeTech 4600 repeater settings in **NaviScan**.



• Gyro C-O Similar to the value used in NaviScan

3.3 Motion

🐝 NaviPac - EdgeTech						. 🗆	×
File Options Tools Help							
🖞 🖆 🛗 🤹 Ö	<u></u>						
Controls	▼ Vehicles	Ŧ		Properties			
			h	nstrument			
	Main Vessel			Misc			<u>^</u>
0 V 0	SurfaceNavigation 💅 📕			Name	Edgetech 4600 (NaviScan		
Restart Stop Reset				System Name	Edgetech 4600 (NaviScan		
Tree	≠ µ Edgetech 4600 (NaviScan)			Instrument ID			
▲ Project				Info			Na
Geodesy	Gyro 🗶			Offset	-3,71;0;-3,804		
🛱 Project Settings	Edgetech 4600 (NaviScan)			Setup Id			
▲ Vehicles				I/O Mode	ON		~
🖌 🛥 Main Vessel	MotionSensor &			I/O	attu://127.0.0.1:2321/	Γ	
SurfaceNavigation	MotionSensor 🍪			Roll C-O	-0,65 °		
🕨 🛿 Gyro	Edgetech 4600 (NaviScan)			Pitch C-O	1,128 °		
🖌 🕵 MotionSensor				Heave C-O	0 m		
Edgetech 4600 (NaviScan)	DataOutput 🕞			Minimum time slice	0 s		
▷ ⊕DataOutput				Latency	0 s		
	EIVA runline control			String details			
	Heave correction and GPS height			Number of bytes	100		
				Telegrams per cycle	50		
	Q			Driver type	CRLF: Normal ASCII Str	ng witl	-
				ifo iinary Edgetech format - se	end via NaviScan on ATTU f	ormat	
3D Visualisation							

Figure 13 EdgeTech 4600 motion in NaviPac

The following settings are of significance for the motion sensor instrument:

- Driver: EdgeTech 4600 (NaviScan)
- I/O
 - Format is ATTU (see above under 'Navigation instrument' for details), port (2321) is as defined as part of the EdgeTech 4600 repeater settings in **NaviScan**
- Offsets
 Similar to the ones given in NaviScan
- C-O values for roll and pitch Similar to the values used in NaviScan



3.4 Bathy output

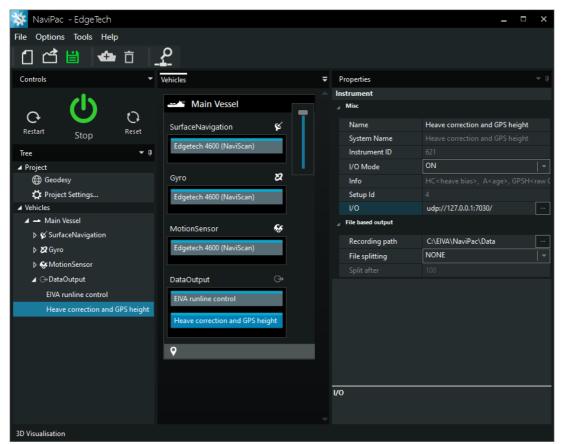


Figure 14 Bathymetry sensor in NaviPac

The following settings are of significance for the navigation sensor (remember that this instrument is only relevant in case of a surface-based system with a significant (accurate (RTK based)) height component):

- Driver: Heave correction and GPS height
- I/O

Protocol is UDP/IP, IP address is local (**NaviPac** and **NaviScan** are executed on the same computer), port is similar to the one given in **NaviScan**

No offsets, since NaviPac per definition is calculating the values to the CRP position



3.5 Runline Control

🐝 NaviPac - EdgeTech			_ = ×
File Options Tools Help			
1 🖆 🛗 🕁 🗇	م		
	- à -		
Controls 🗸	Vehicles 🗧	Properties	
		Instrument	
e 🕛 e	Main Vessel	A Misc	
	SurfaceNavigation 🛛 🖌	Name	EIVA runline control
Restart Stop Reset	Edgetech 4600 (NaviScan)	System Name	
Tree 🗸 🗸	Edgetech 4000 (Naviscan)	Instrument ID	
⊿ Project		I/O Mode	ON *
🖨 Geodesy	Gyro 🗶	Info	
🛱 Project Settings	Edgetech 4600 (NaviScan)	Setup Id	
▲ Vehicles		I/O	udp://127.0.0.1:6010/
🖌 🛥 Main Vessel	MotionSensor	File based output	
SurfaceNavigation		Recording path	C:\EIVA\NaviPac\Data ···
▶ 💋 Gyro	Edgetech 4600 (NaviScan)	File splitting	NONE
MotionSensor			
⊿ ⊕DataOutput	DataOutput 🕞		
EIVA runline control	EIVA runline control		
Heave correction and GPS height			
	Heave correction and GPS height		
	Ŷ		
		Info \$ <s e="">, <long file="" name<="" td=""><td>e><cr><lf></lf></cr></td></long></s>	e> <cr><lf></lf></cr>
3D Visualisation			

Figure 15 EIVA runline control instrument

The following settings are of significance for the Runline Control instrument:

• **Driver**: EIVA runline control I/O: Protocol is UDP/IP, IP address is local (**NaviPac** and **NaviScan** are executed on the same computer), port is similar to the one given in **NaviScan**.

4 Version descriptions

Version	Date	Author	Description
0.9	18-11-2015	LDA	Initial document
4.5	16-04-2021	ANS	Updated to NaviPac 4.5