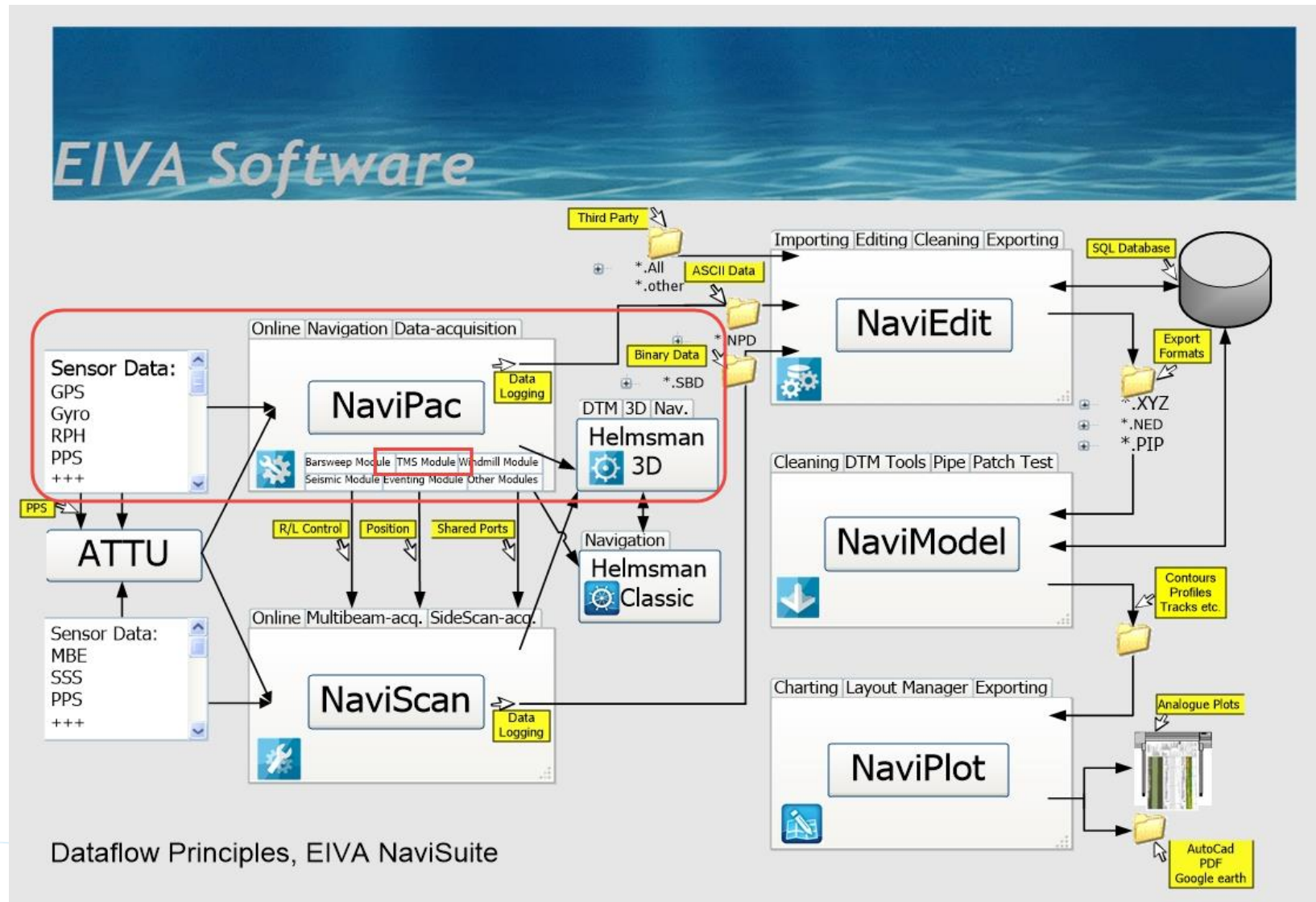




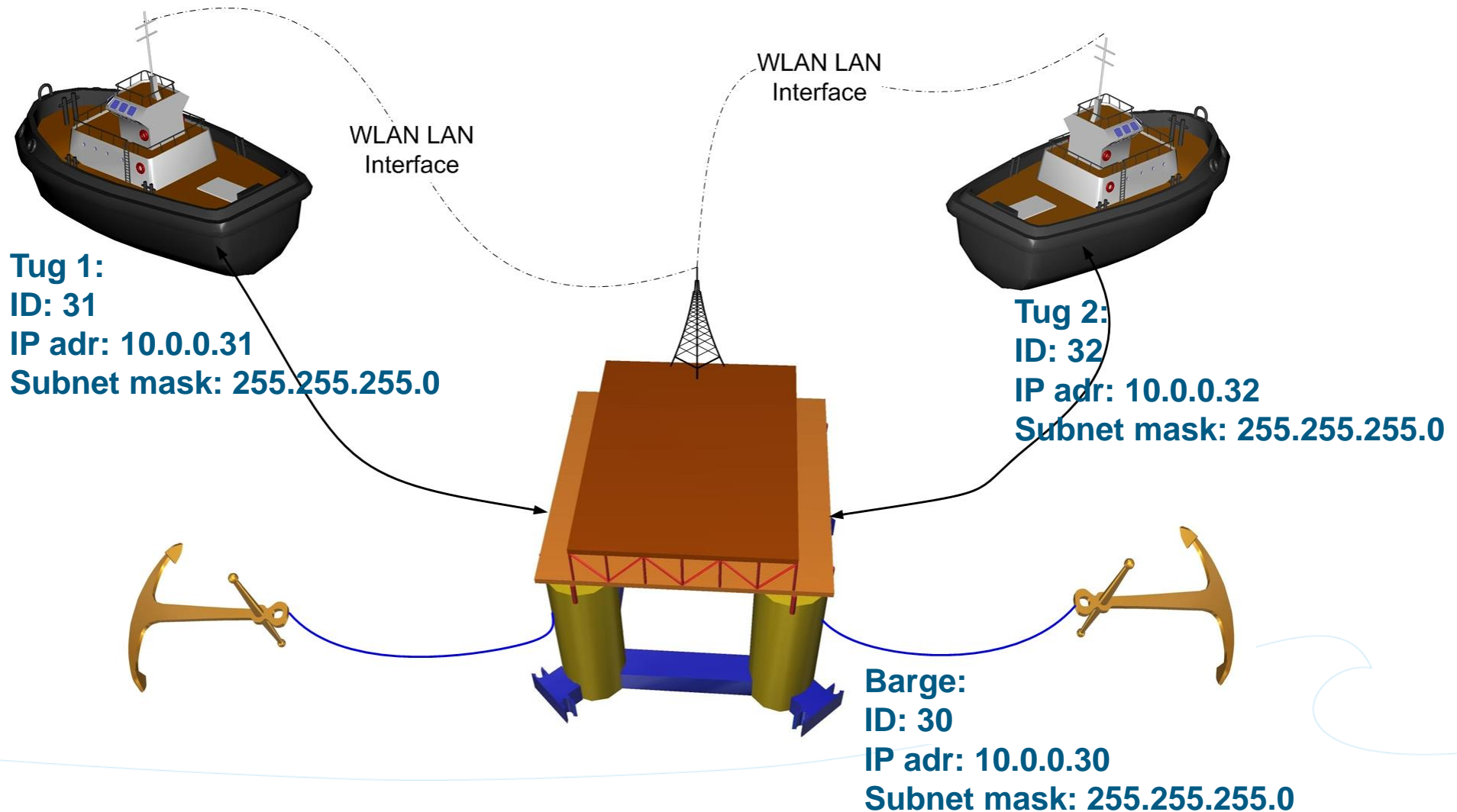
# **NaviPac 4 Tug Management Module**

With Wireless LAN

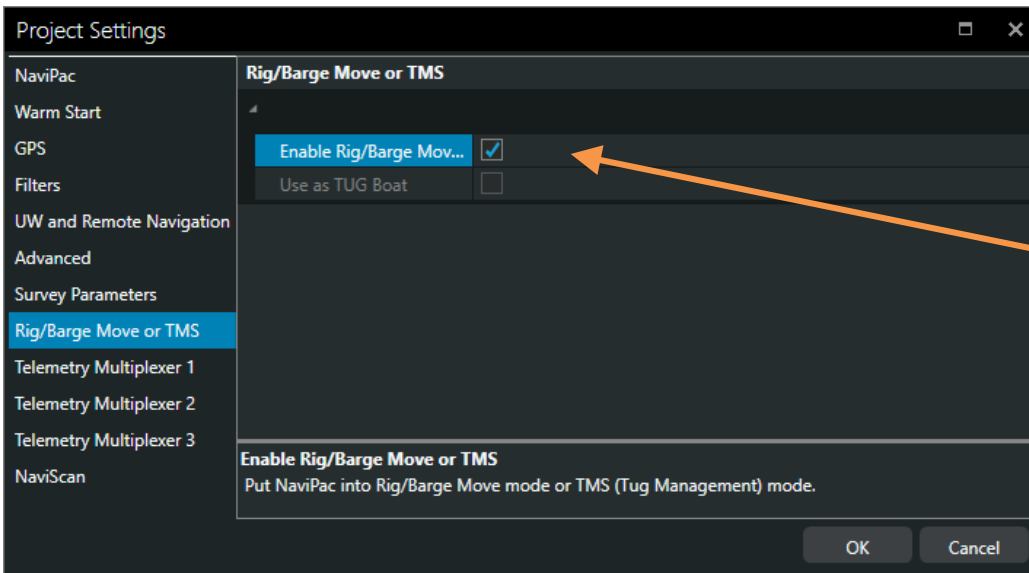
# Tug Management in EIVA NaviSuite



# The Situation

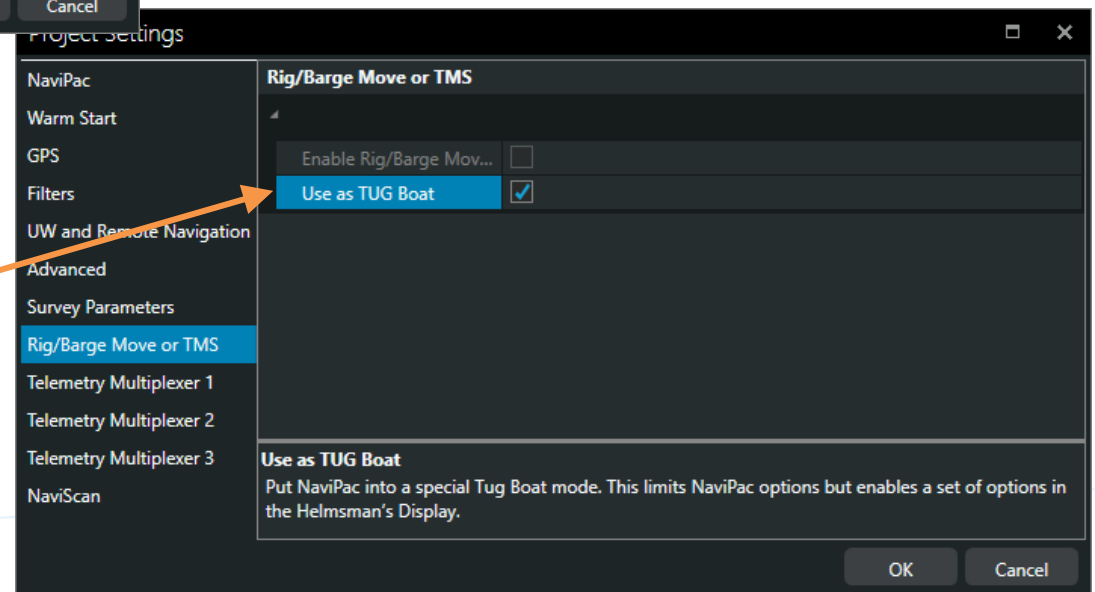


# NaviPac – Defining Mode



On the Barge, Rig/Barge mode must be enabled.

Use as TUG Boat on the Tugs.



# NaviPac – RIGSetup on the Barge I

### RIGSetup

XY View scale (1 cm = x m) 200 Drag cursor in order to re-centre the vessel.

Load Setup... Save Setup... Reset !!!

Number of Winch points: 8

To use Auto Calculate all Anchors:  
Define winch points clockwise !!!!!

Winch	X	Y	Z
Winch 1	10.00	59.00	0.00
Winch 2	26.00	57.00	0.00
Winch 3	26.00	-42.00	0.00
Winch 4	5.00	-42.00	0.00
Winch 5	-20...	-42.00	0.00
Winch 6	-41...	-42.00	0.00
Winch 7	-41...	57.00	0.00
Winch 8	-25...	59.00	0.00

Rig/Barge Layout

Outline/Shape file: Select... Edit...

C:\EIVA\NaviPac\Setup\Wiking.shp

Name: Svanen

Client: Company

Close Apply

Placement ☒ Show Anchors

Well: Aarhus

Easting: 581600

Northing: 6226000

Grid Heading: 10

Anchor Positions...

### Anchor Positions

Auto Calculate all Anchors...

Matched Winches and Anchors

Winch	Anchor	Easting	Northing	Range	Bearing	MLB	MLM	State
Winch 1	S1	582194.63	6226538.46	750.000	50.000	No	No	Racked
Winch 2	S2	582382.65	6225986.25	750.000	95.000	No	No	Racked
Winch 3	S3	582100.40	6225379.59	750.000	140.000	No	No	Racked
Winch 4	S4	581532.26	6225210.62	750.000	185.000	No	No	Racked
Winch 5	S5	580998.48	6225480.02	750.000	230.000	No	No	Racked
Winch 6	S6	580805.18	6226031.12	750.000	275.000	No	No	Racked
Winch 7	S7	581087.43	6226637.79	750.000	320.000	No	No	Racked
Winch 8	S8	581650.99	6226809.59	750.000	5.000	No	No	Racked

Selected Anchor

Anchor Name: S1 Anchor State: Racked

Anchor/Proposed Position

Easting: 582194.63 Northing: 6226538.46

Range/Grid Bearing from Winch Position

Range: 750.000 Bearing: 50.000

Update Anchor Restore Anchor to Original

Buoys

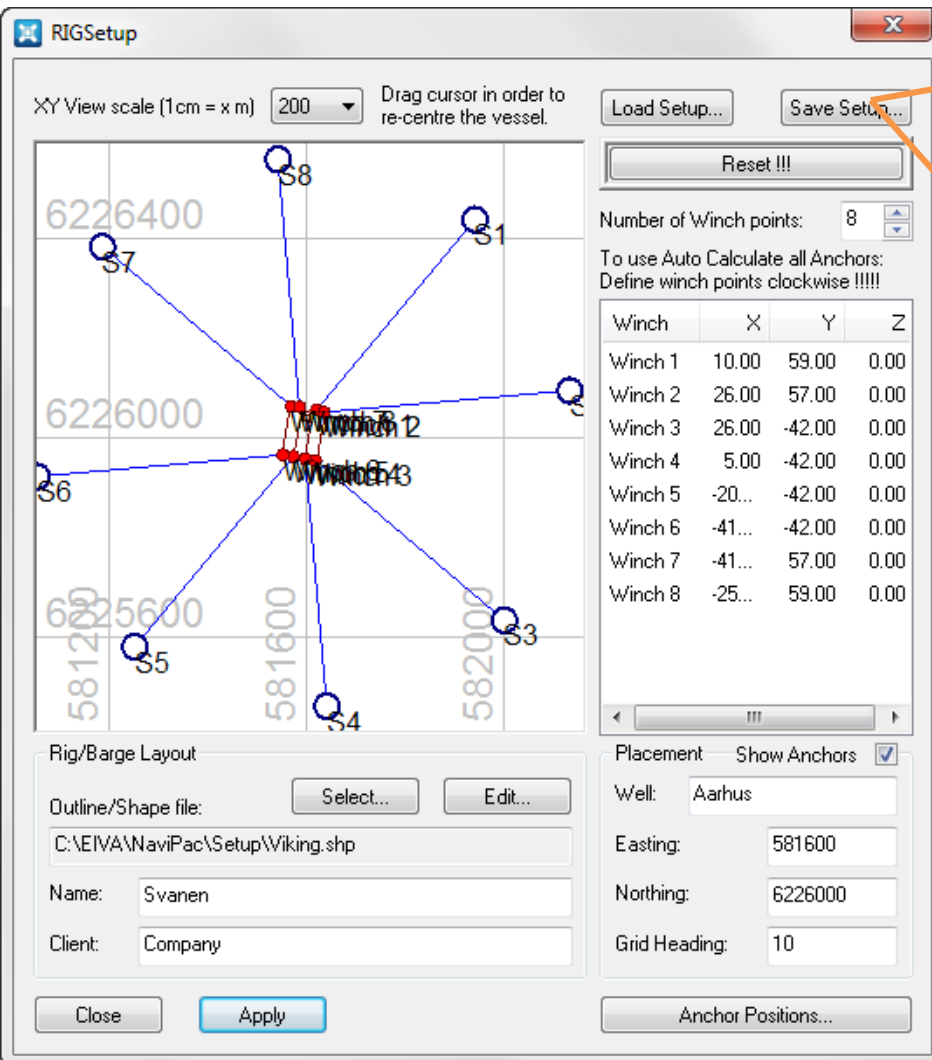
Mid Line Buoys

☐ Use Mid Line Markers

Marker Interdistance 0

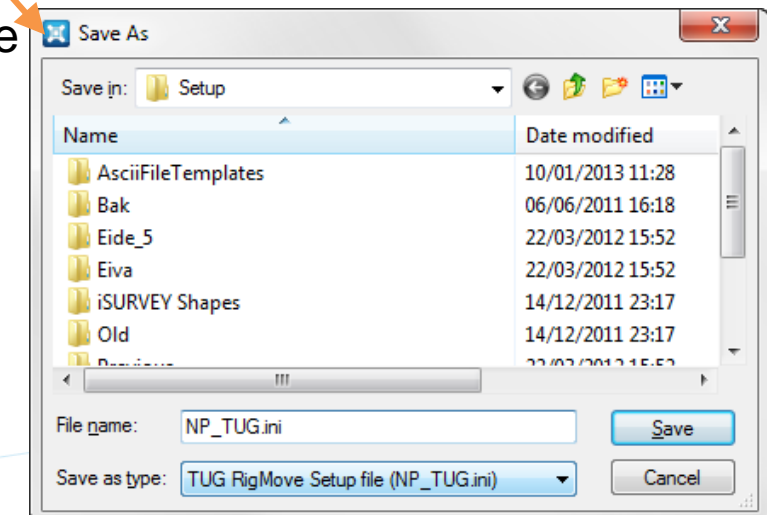
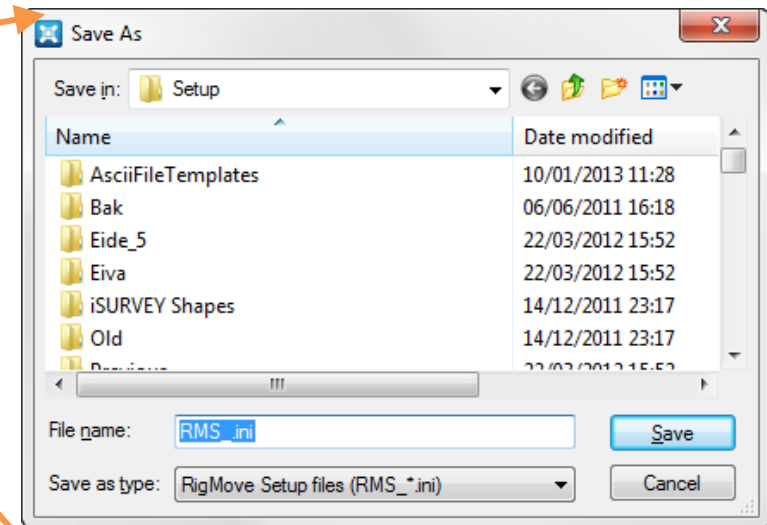
Cancel OK

# NaviPac – RIGSetup on the Barge II

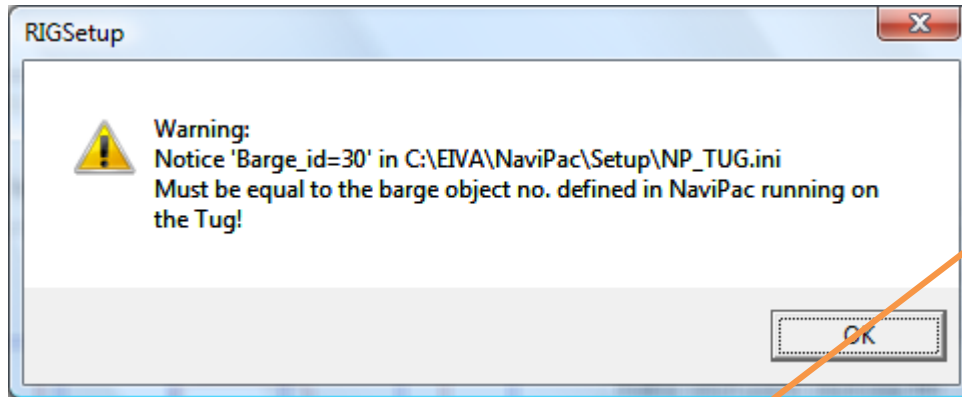


1 - Save as  
RigMove  
Setup file.

2 - Save as  
TUG Rigmove  
Setup file.



# NaviPac – Rigsetup for the Tugs



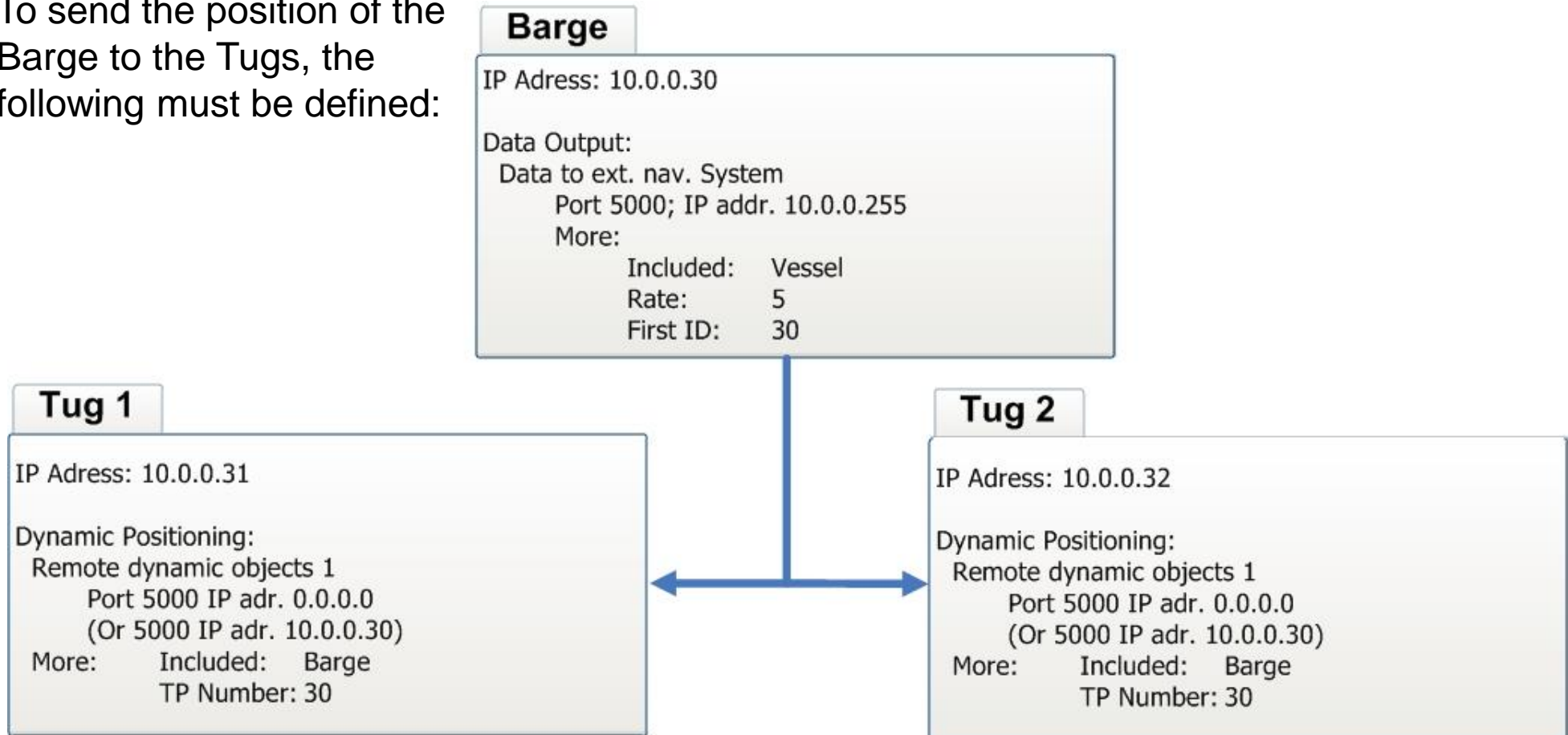
When saving the TUG Rigmove Setup file, the warning above is given.

The file NP\_TUG.ini, which is generated from the RIGSetup option in the Barge NaviPac (previous slide), must be copied onto the Setup folder in EIVAHOME of each of the Tugs (C:\EIVA\NaviPac\Setup).

```
[RigMove]
Barge_id=30
No winch points=8
WinchName01=W1
WinchOffset01=10.000, 60.000, 0.000
WinchName02=W2
WinchOffset02=27.000, 57.000, 0.000
WinchName03=W3
WinchOffset03=27.000, -42.000, 0.000
WinchName04=W4
WinchOffset04=5.000, -42.000, 0.000
WinchName05=W5
WinchOffset05=-20.000, -42.000, 0.000
WinchName06=W6
WinchOffset06=-42.000, -42.000, 0.000
WinchName07=W7
WinchOffset07=-42.000, 57.000, 0.000
WinchName08=W8
WinchOffset08=-25.000, 60.000, 0.000
```

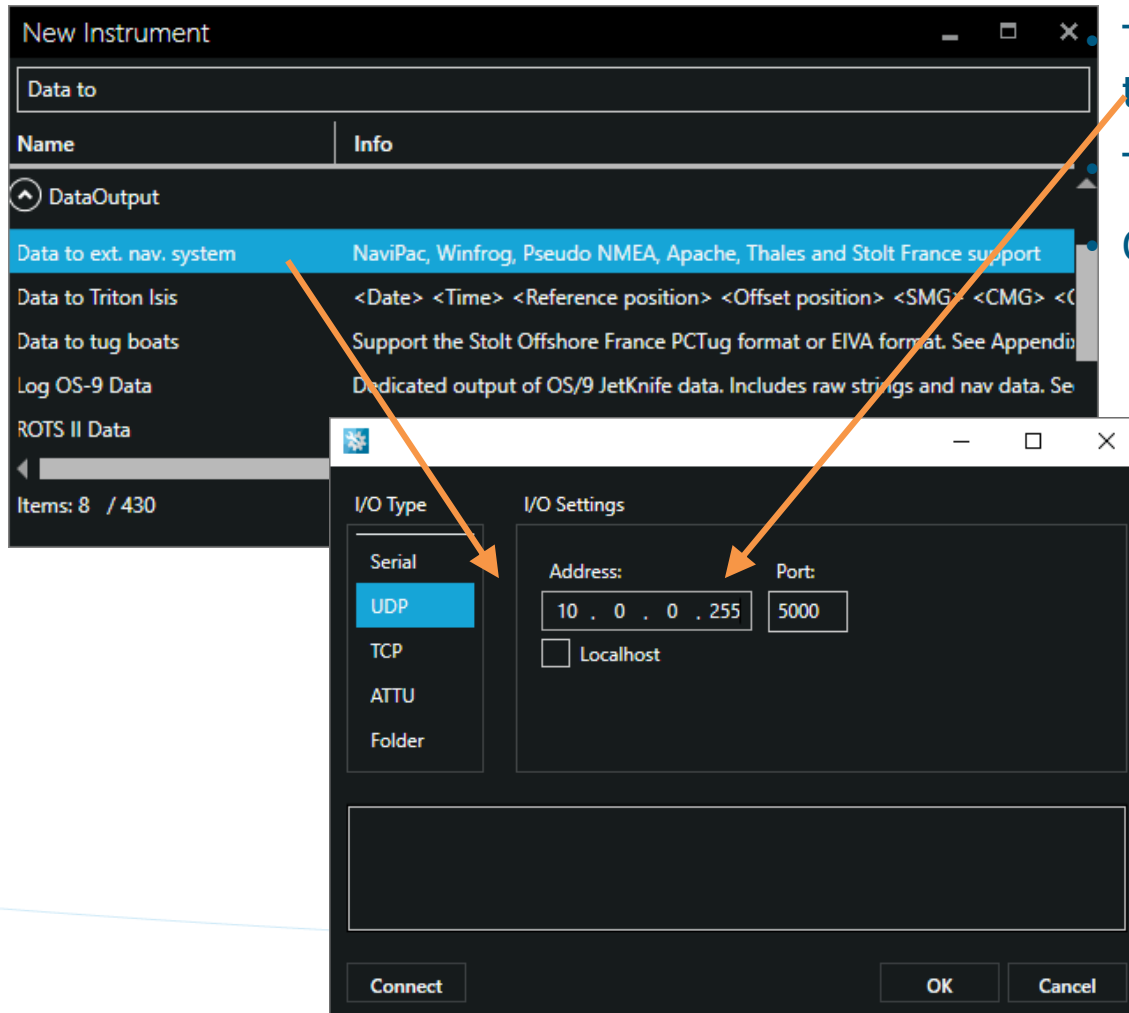
# NaviPac – Barge – Position Output

To send the position of the Barge to the Tugs, the following must be defined:



# NaviPac – Barge – Position Output

To send the Barge position to the Tugs, the following output must be selected:



**New Instrument**

Data to

Name	Info
DataOutput	
Data to ext. nav. system	NaviPac, Winfrog, Pseudo NMEA, Apache, Thales and Stolt France support
Data to Triton Isis	<Date> <Time> <Reference position> <Offset position> <SMG> <CMG> <C
Data to tug boats	Support the Stolt Offshore France PCTug format or EIVA format. See Appendi
Log OS-9 Data	Dedicated output of OS/9 JetKnife data. Includes raw strings and nav data. Se
ROTS II Data	

Items: 8 / 430

**I/O Type**

- Serial
- UDP**
- TCP
- ATTU
- Folder

**I/O Settings**

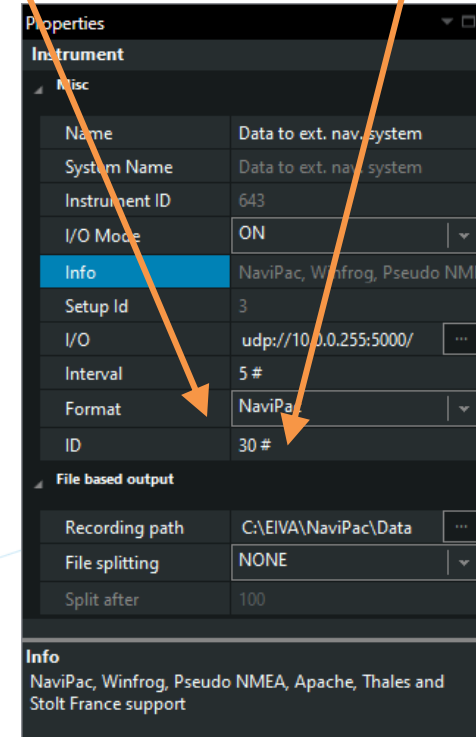
Address: 10 . 0 . 0 . 255 Port: 5000

☐ Localhost

Connect OK Cancel

The last part of the IP Address should be 255 to facilitate broadcasting to all Tugs.

The ID of the barge position must be set to 30. Choose format NaviPac.



**Properties**

**Instrument**

Misc

Name	Data to ext. nav. system
System Name	Data to ext. nav. system
Instrument ID	643
I/O Mode	ON

**Info**

Setup Id	3
I/O	udp://10.0.0.255:5000/
Interval	5 #
Format	NaviPac
ID	30 #

**File based output**

Recording path	C:\EIVA\NaviPac\Data
File splitting	NONE
Split after	100

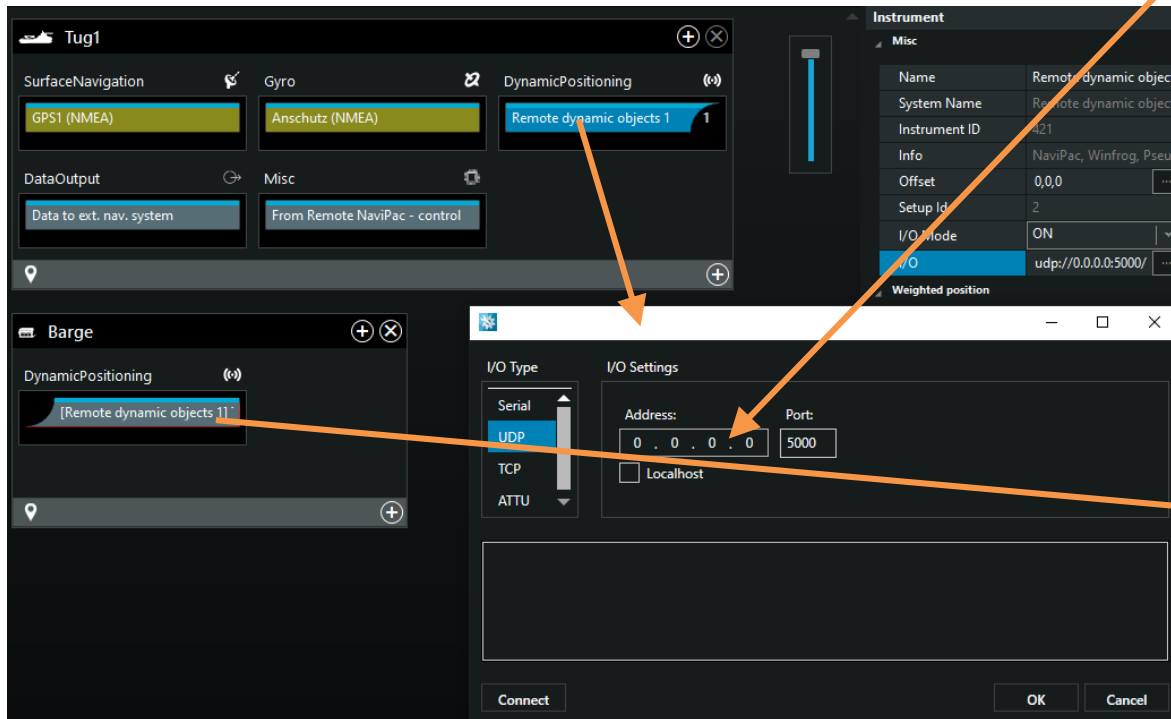
**Info**

NaviPac, Winfrog, Pseudo NMEA, Apache, Thales and Stolt France support

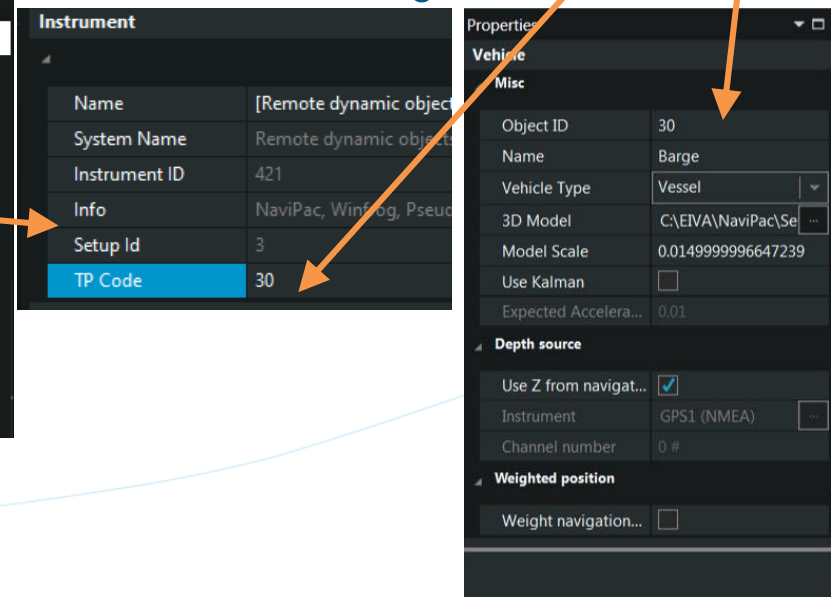
# NaviPac – Tug – Receive Barge Position

To receive the barge position on Tug 1, the following Dynamic positioning system must be defined:

- The IP address: 0.0.0.0 allows NP to read from all IPs.
- The TP number of the remote dynamic object position string associated with the Barge is 30.
- The ID of the Barge must also be 30



The screenshot shows the NaviPac software interface. The 'Tug1' window has 'DynamicPositioning' set to 'Remote dynamic objects 1'. The 'Barge' window has 'DynamicPositioning' set to 'Remote dynamic objects 11'. The 'I/O Settings' dialog is open, showing 'UDP' as the I/O Type, 'Address: 0.0.0.0', and 'Port: 5000'.



The screenshot shows the 'Instrument' and 'Properties' windows. The 'Instrument' window displays the following details:

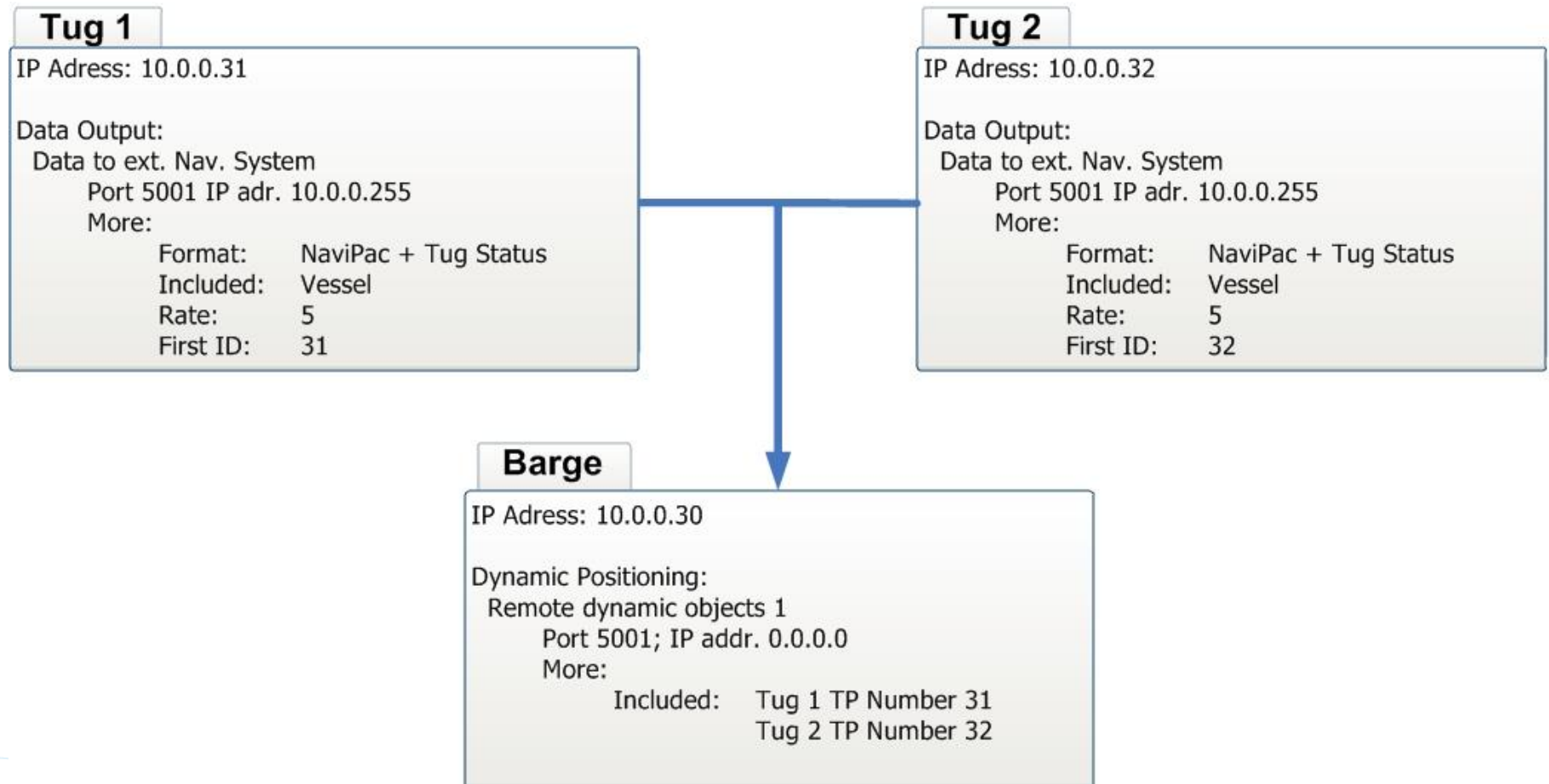
Property	Value
Name	[Remote dynamic object]
System Name	Remote dynamic object
Instrument ID	421
Info	NaviPac, Winflog, Pseud
Setup Id	3
TP Code	30

The 'Properties' window displays the following details:

Property	Value
Object ID	30
Name	Barge
Vehicle Type	Vessel
3D Model	C:\EIVA\NaviPac\Se...
Model Scale	0.014999996647239
Use Kalman	<input type="checkbox"/>
Expected Acceleration	0.01
Depth source	Use Z from navigat... <input checked="" type="checkbox"/>
Instrument	GPS1 (NMEA)
Channel number	0 #
Weight navigation...	<input type="checkbox"/>

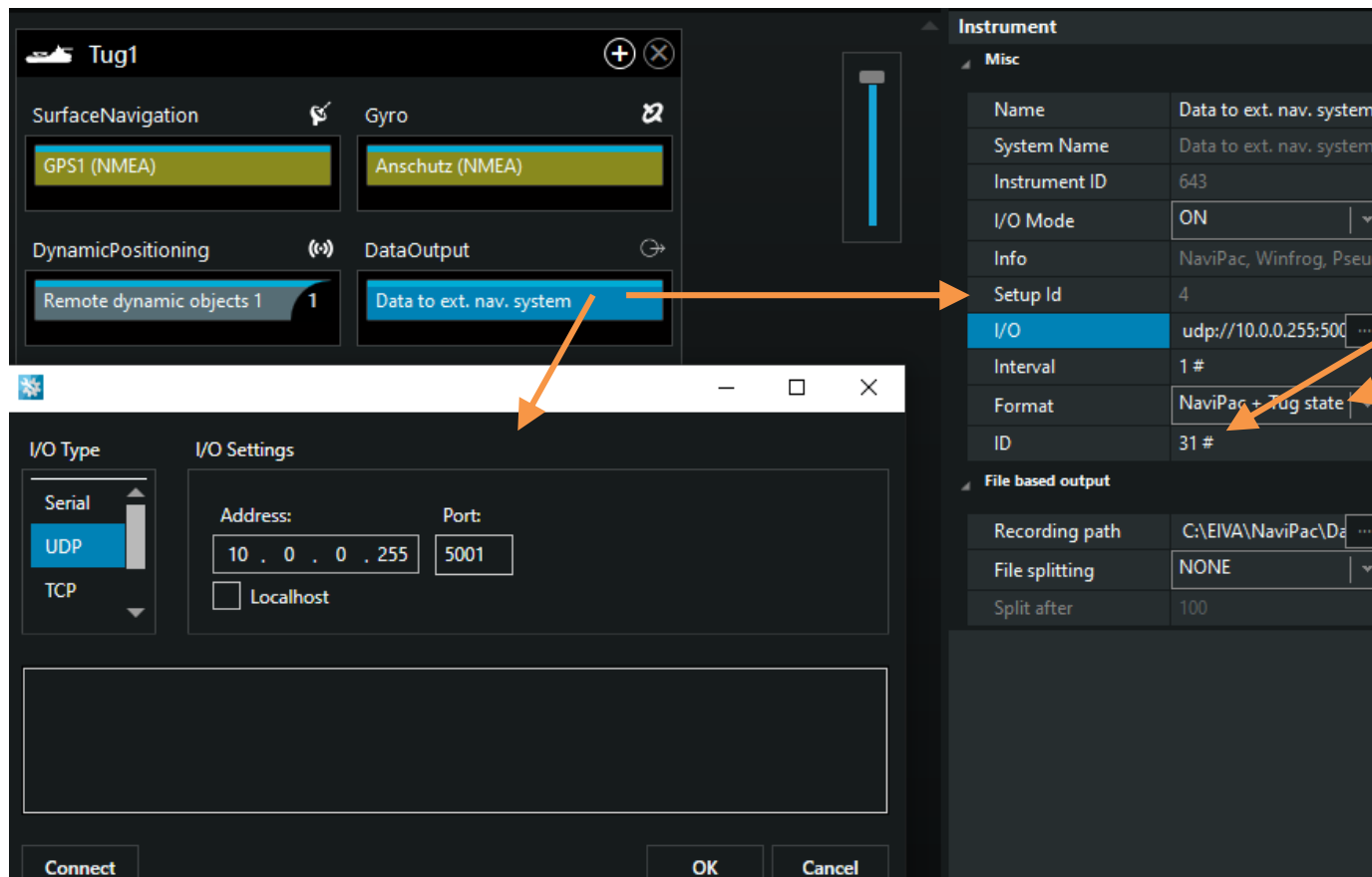
# NaviPac – Tug – Position Output

To send the position from the Tugs to the Barge, the following must be defined:



# NaviPac – Tug1 – Position Output

To send the position from the Tug 1, the following output must be defined:



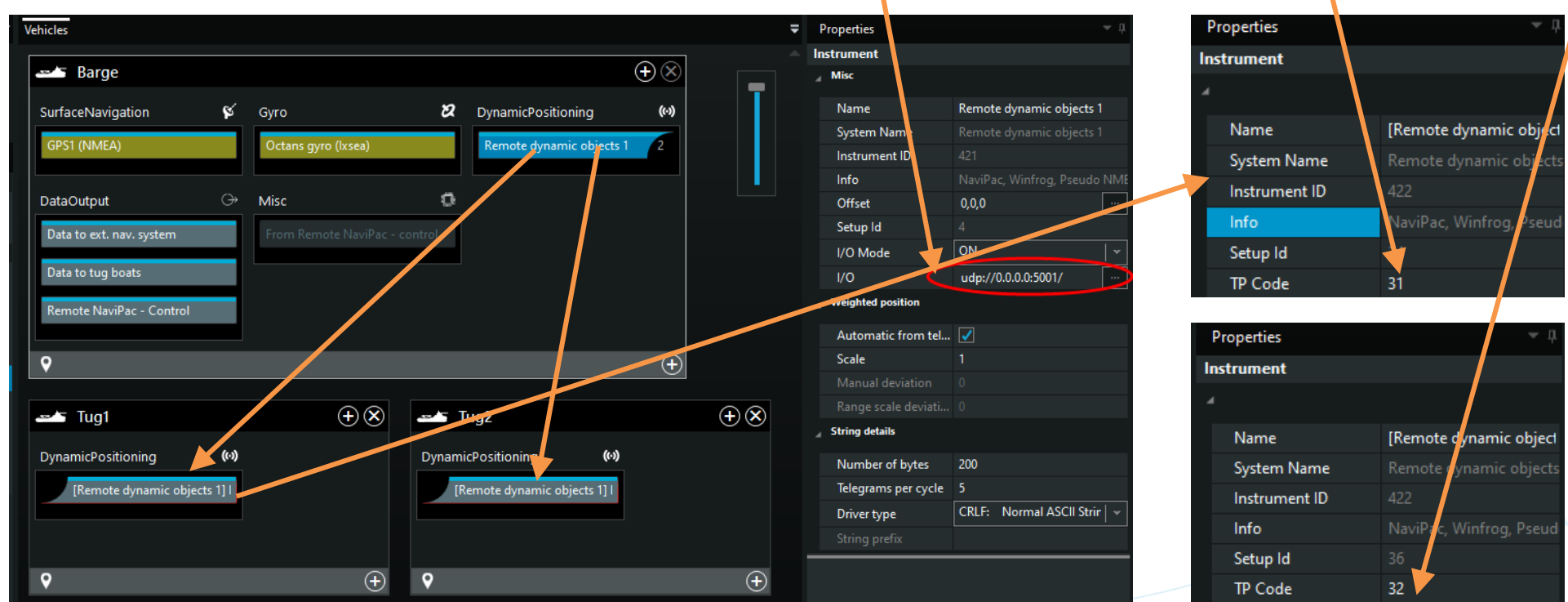
The screenshot shows the NaviPac software interface for configuring Tug1. The 'DataOutput' section is set to 'Data to ext. nav. system'. The 'I/O Settings' dialog is open, showing 'UDP' as the I/O Type, '10.0.0.255' as the Address, and '5001' as the Port. The 'Instrument' panel shows 'I/O' mode set to 'udp://10.0.0.255:5001' and 'Format' set to 'NaviPac + Tug state'.

- The reference point (CRP) on the tug should be the stern. This is usually the anchor handling point on a tug.
- The ID must be defined as 31 (Tug 1).
- Format is NaviPac + Tug state.

# NaviPac – Barge – Receive Tug Position

To receive the tug positions on the barge, the following Dynamic positioning system must be defined:

- The IP address: 0.0.0.0 allows NP to read from all IPs.
- The TP number of Tug1 is 31.
- The TP number of Tug2 must consequently be 32.
- ID of the tug objects is 31 and 32, respectively.

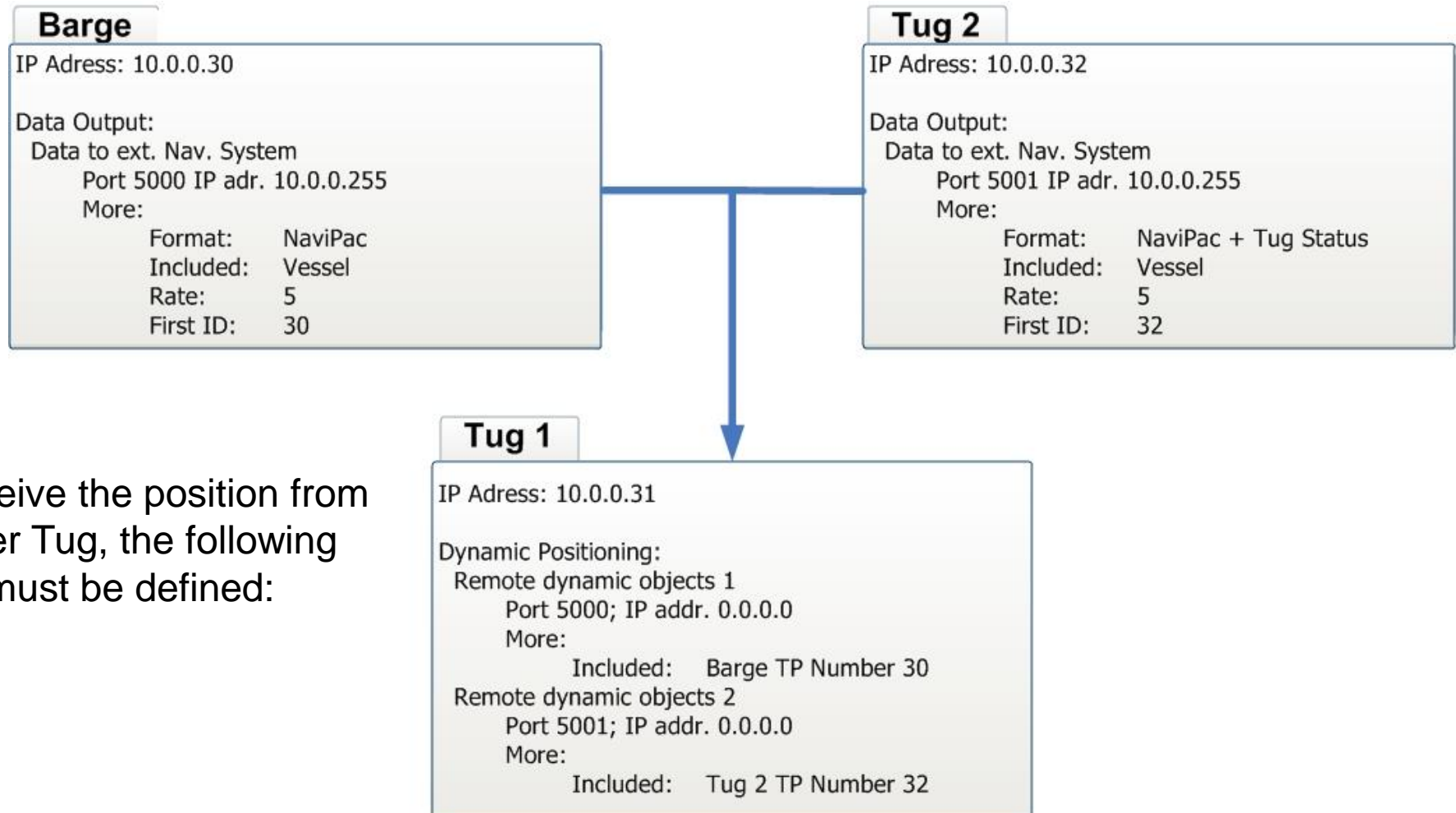


The screenshot shows the NaviPac software interface. The 'Vehicles' panel on the left contains three sections: 'Barge', 'Tug1', and 'Tug2'. The 'Barge' section has 'SurfaceNavigation' (GPS1 (NMEA)), 'Gyro' (Octans gyro (Ixsea)), and 'DynamicPositioning' (Remote dynamic objects 1). The 'Tug1' and 'Tug2' sections both have 'DynamicPositioning' (Remote dynamic objects 1). The 'Properties' panel on the right shows the 'Instrument' properties for 'Remote dynamic objects 1'. The 'I/O' field is set to 'udp://0.0.0.0:5001/'. The 'Info' panel shows the 'TP Code' as 31. The 'Properties' panel on the right shows the 'Instrument' properties for 'Remote dynamic objects 2'. The 'TP Code' is set to 32.

Vehicle	DynamicPositioning
Barge	Remote dynamic objects 1
Tug1	Remote dynamic objects 1
Tug2	Remote dynamic objects 1

Instrument	TP Code
Remote dynamic objects 1	31
Remote dynamic objects 2	32

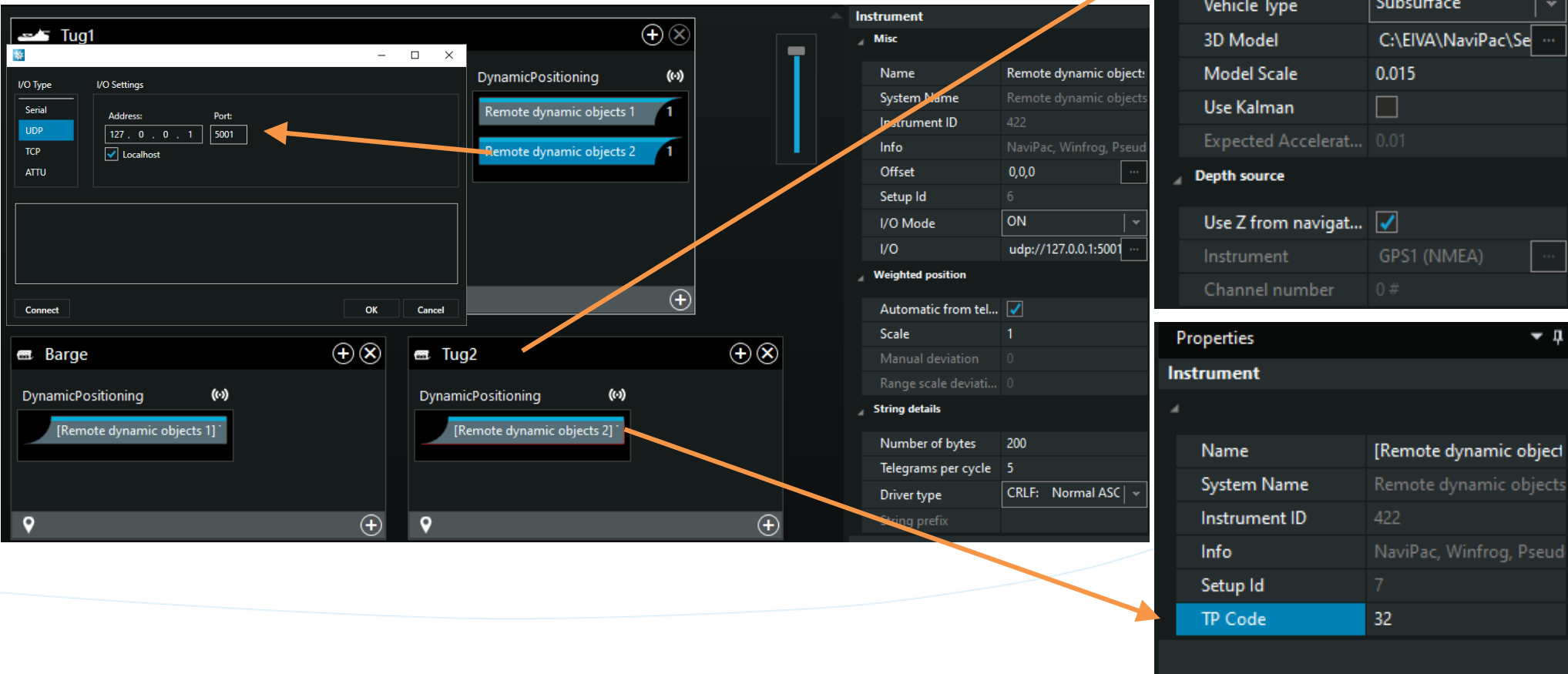
# NaviPac – Tug1 – Receive Tug2 Position



To receive the position from another Tug, the following input must be defined:

# NaviPac – Tug1 – Receive Tug2 Position

To receive the position from another Tug, the following input must be defined on Tug1:



The screenshot shows the NaviPac software interface with several windows open. The main window is titled 'Tug1' and has tabs for 'I/O Type', 'I/O Settings', 'DynamicPositioning', and 'Instrument'. The 'I/O Settings' tab is active, showing 'UDP' selected under 'I/O Type' and '127.0.0.1' as the 'Address' with '5001' as the 'Port'. The 'DynamicPositioning' tab shows 'Remote dynamic objects 1' and 'Remote dynamic objects 2' both set to '1'. The 'Instrument' tab shows 'Remote dynamic objects' as the 'Name' and '422' as the 'Instrument ID'. An arrow points from the 'Remote dynamic objects 2' field in the 'DynamicPositioning' tab to the 'Vehicle' properties window. Another arrow points from the 'Remote dynamic objects 2' field in the 'DynamicPositioning' tab to the 'Instrument' properties window.

**Vehicle Properties:**

Vehicle	
Misc	
Object ID	32
Name	Tug2
Vehicle Type	Subsurface
3D Model	C:\EIVA\NaviPac\Se...
Model Scale	0.015
Use Kalman	<input type="checkbox"/>
Expected Accelerat...	0.01
Depth source	
Use Z from navigat...	<input checked="" type="checkbox"/>
Instrument	GPS1 (NMEA)
Channel number	0 #

**Instrument Properties:**

Instrument	
String details	
Number of bytes	200
Telegrams per cycle	5
Driver type	CRLF: Normal ASC
String prefix	

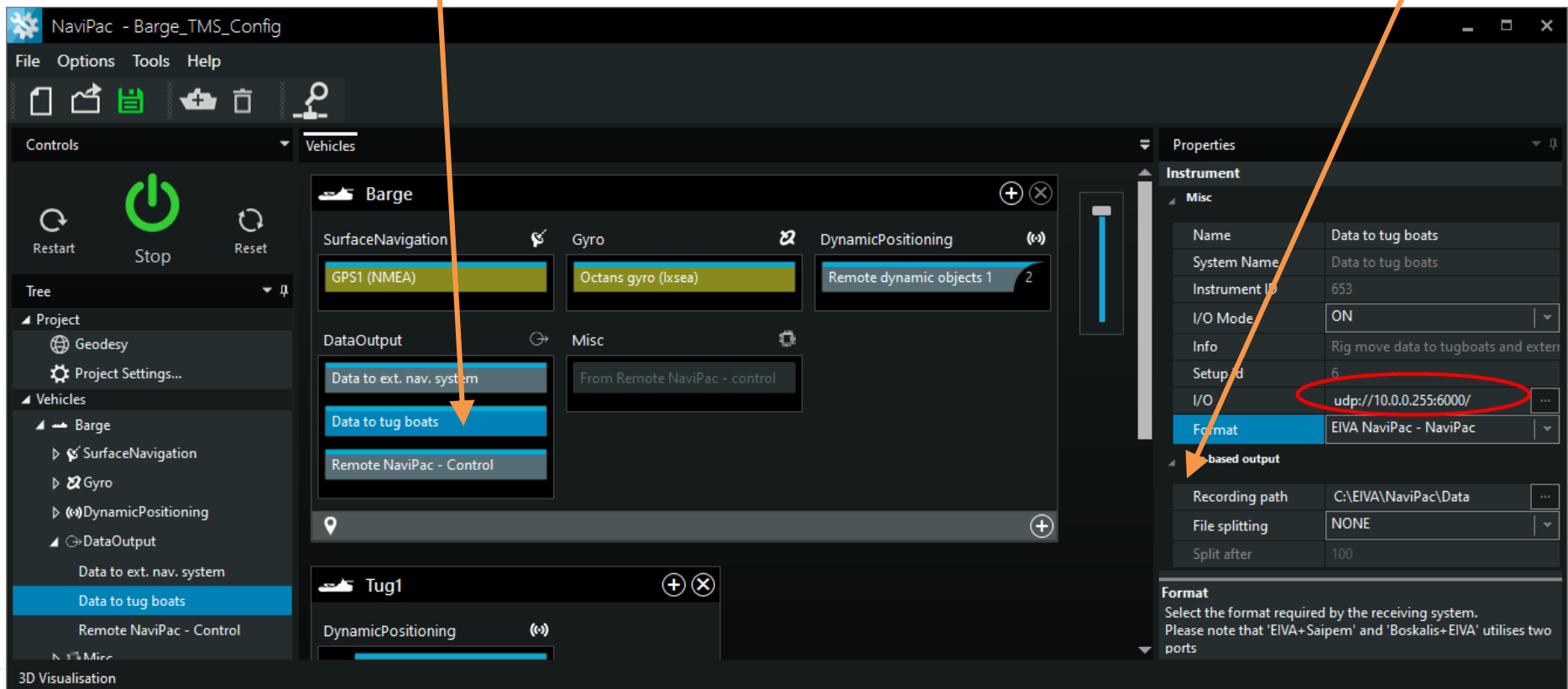
**Properties - Instrument:**

Properties	
Instrument	
Name	[Remote dynamic object]
System Name	Remote dynamic objects
Instrument ID	422
Info	NaviPac, Winfrog, Pseud
Setup Id	7
TP Code	32

# NaviPac – Barge – Output Anchor Pattern

To send the Anchor pattern to the Tugs, a 'Data to tug boats' output must be defined on the Barge:

NaviPac format must be chosen.



The screenshot shows the NaviPac - Barge\_TMS\_Config application window. The interface is divided into several sections:

- Controls:** Includes buttons for Restart, Stop, and Reset.
- Tree:** A sidebar menu with categories like Project, Geodesy, Project Settings..., Vehicles, and DataOutput. The 'Data to tug boats' option under 'DataOutput' is selected.
- Vehicles:** A central panel showing configuration for the 'Barge' vehicle. It includes sections for SurfaceNavigation (GPS1 (NMEA)), Gyro (Octans gyro (lxsea)), DynamicPositioning (Remote dynamic objects 1, 2), DataOutput (Data to ext. nav. system, Data to tug boats, Remote NaviPac - Control), and Misc (From Remote NaviPac - control).
- Properties:** A panel on the right showing the configuration for the selected 'Data to tug boats' output. It includes fields for Name, System Name, Instrument ID, I/O Mode, Info, Setup ID, I/O, Format, Recording path, File splitting, and Split after. The 'Format' is set to 'EIVA NaviPac - NaviPac'.

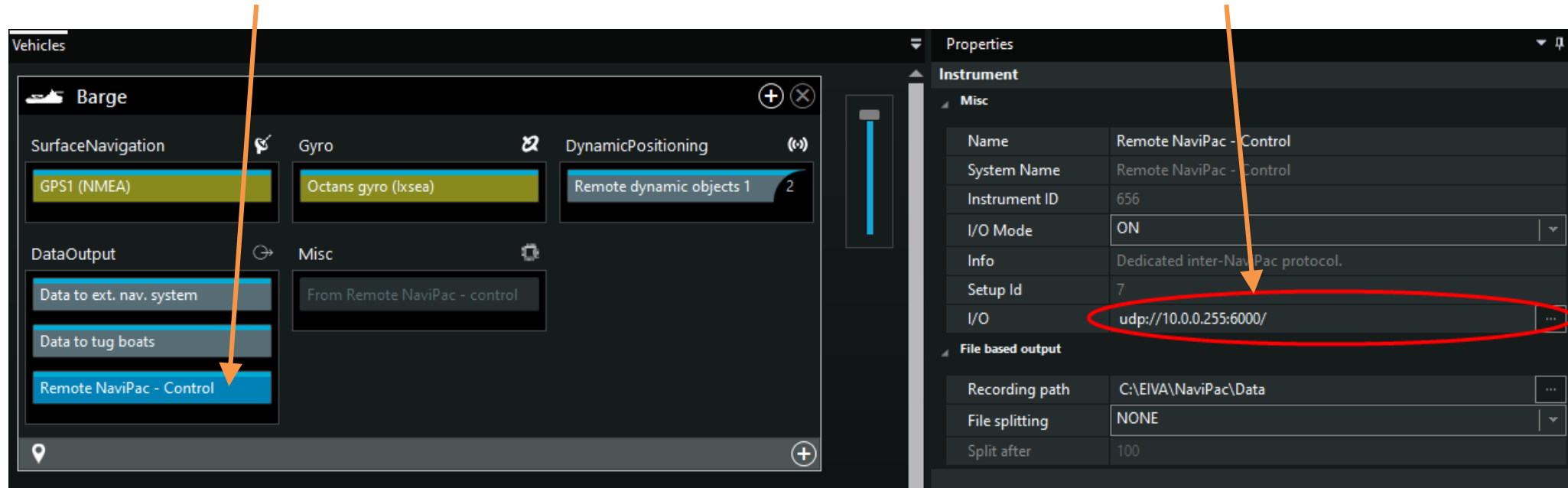
Two orange arrows highlight key configuration points:

- An arrow points from the 'Data to tug boats' option in the 'DataOutput' section of the 'Barge' vehicle configuration to the 'Data to tug boats' option in the 'Tree' sidebar.
- An arrow points from the 'Format' dropdown in the 'Properties' panel to the text 'NaviPac format must be chosen.'

# NaviPac – Barge – Send Runlines

To send Runlines to the Tugs, a 'Remote NaviPac – Control' output must be defined as shown here:

Note: same port as for 'Data to tug boats'.



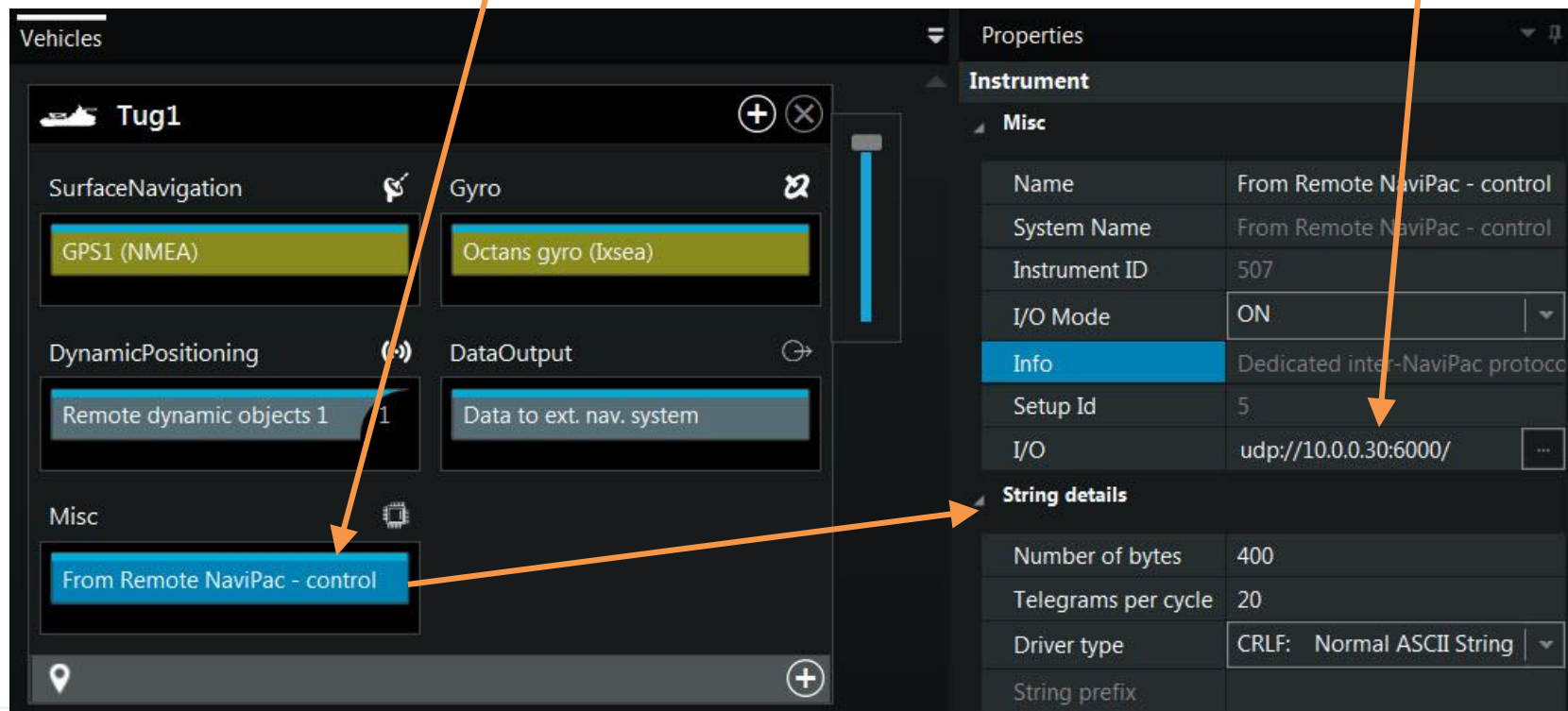
The screenshot displays the EIVA software interface for configuring a Barge vehicle. The 'Vehicles' panel on the left shows the 'Barge' configuration. Under 'DataOutput', the 'Remote NaviPac - Control' option is selected. The 'Properties' panel on the right shows the 'Instrument' settings, with the 'I/O' field set to 'udp://10.0.0.255:6000/'.

Instrument	
Misc	
Name	Remote NaviPac - Control
System Name	Remote NaviPac - Control
Instrument ID	656
I/O Mode	ON
Info	Dedicated inter-NaviPac protocol.
Setup Id	7
I/O	udp://10.0.0.255:6000/
File based output	
Recording path	C:\EIVA\NaviPac\Data
File splitting	NONE
Split after	100

# NaviPac – Tug – Receive Anchor Pattern I

To receive the anchor pattern on a tug,  
a 'From Remote NaviPac – control'  
Misc input must be defined:

The IP address: 10.0.0.30  
is the IP address of the  
Barge computer.



**Vehicles**

**Tug1**

SurfaceNavigation: GPS1 (NMEA)

Gyro: Octans gyro (Ixsea)

DynamicPositioning: Remote dynamic objects 1

DataOutput: Data to ext. nav. system

Misc: From Remote NaviPac - control

**Properties**

**Instrument**

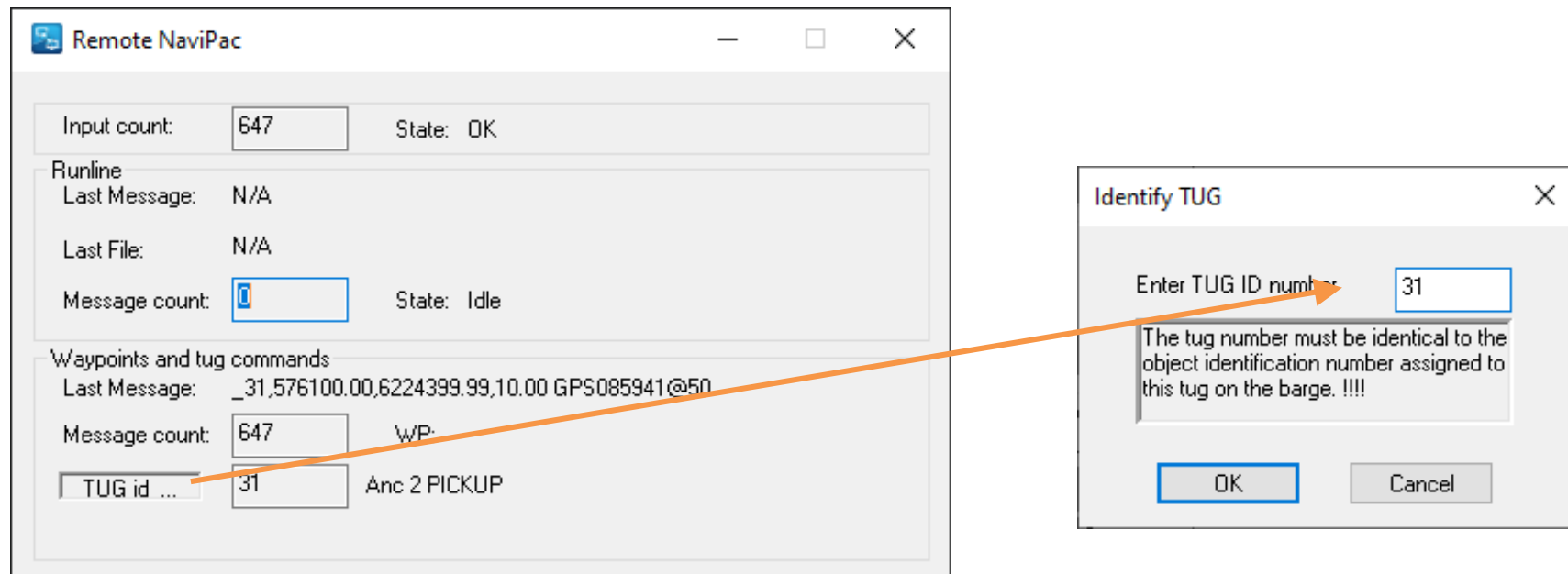
**Misc**

Name	From Remote NaviPac - control
System Name	From Remote NaviPac - control
Instrument ID	507
I/O Mode	ON
Info	Dedicated inter-NaviPac protocol
Setup Id	5
I/O	udp://10.0.0.30:6000/

**String details**

Number of bytes	400
Telegrams per cycle	20
Driver type	CRLF: Normal ASCII String
String prefix	

# NaviPac – Tug – Receive Anchor Pattern II



To receive the anchor pattern on the Tug, the Remote NaviPac window will be opened automatically when entering online mode. Click on the 'TUG id' text-box and the window to the right will open. Now insert the ID (31 for Tug 1 etc). NaviPac will remember this setting.

## NaviPac – Messages from Tug to Barge

The operator on the tug can activate some anchor-related commands towards the barge. The activation takes place from the Helmsman's Display of the Tug:

- PICKED UP - The anchor has been picked up from barge (state becomes 'Tracking').
- DROPPED - The anchor has been dropped on the seabed (state becomes 'Laid').
- DE-ASSIGN - The assignment is rejected from the Tug
- FIX - Various events performed on the tug (will be shown on HD of the Barge).

The commands are sent on top of the existing 'Data to external navigation system' output, so no additional setup is required on the tug boat.

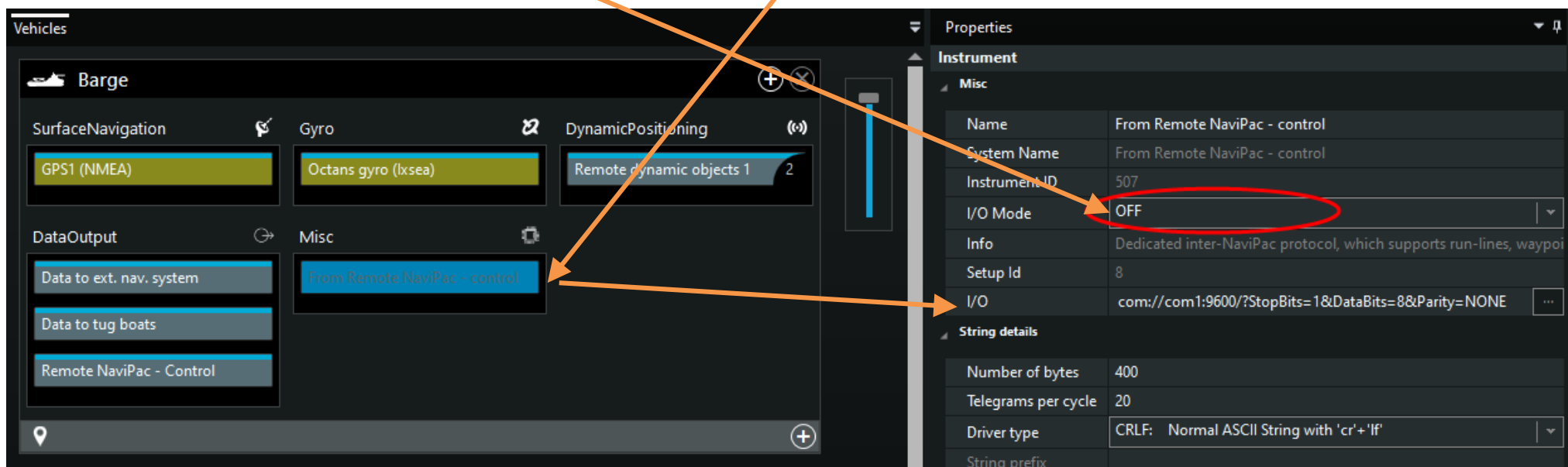
The data output (on the Tugs) must be selected to 'NaviPac + Tug state' or 'Expanded NaviPac'.



# NaviPac – Barge - Messages from the Tugs I

A 'Misc' instrument, 'From Remote NaviPac – control', must be defined on the Barge, in order to enable the Barge NaviPac to be capable of using the in-coming tug commands.

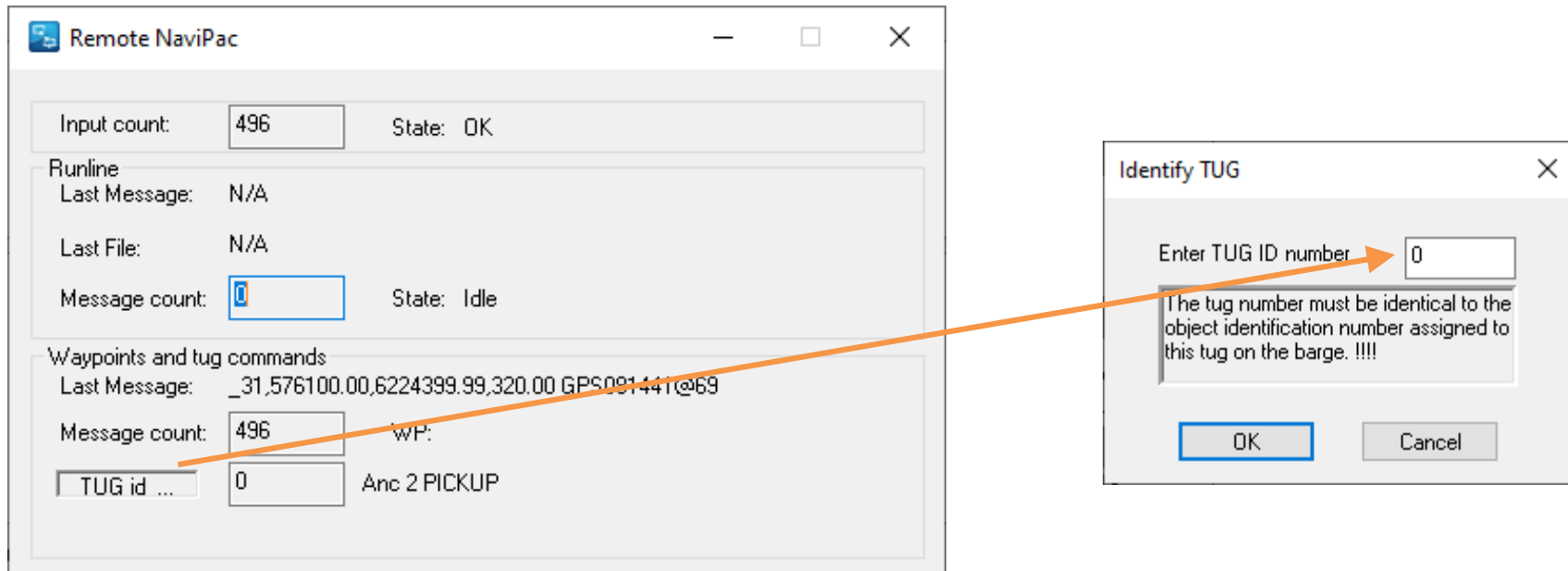
As the data is overlaid the general navigation data (from the Tug) the driver must be specified to I/O mode 'Off'.



The screenshot displays the EIVA software interface for configuring a Barge. The left panel shows the 'Vehicles' section with a 'Barge' icon. Under 'SurfaceNavigation', 'GPS1 (NMEA)' is selected. Under 'Gyro', 'Octans gyro (Ixsea)' is selected. Under 'DynamicPositioning', 'Remote dynamic objects 1' and '2' are listed. Under 'DataOutput', 'Data to ext. nav. system', 'Data to tug boats', and 'Remote NaviPac - Control' are listed. Under 'Misc', 'From Remote NaviPac - control' is selected. The right panel shows the 'Properties' section for the selected instrument. The 'Instrument' tab is active, showing the 'Misc' section. The 'Name' is 'From Remote NaviPac - control', the 'System Name' is 'From Remote NaviPac - control', the 'Instrument ID' is '507', and the 'I/O Mode' is 'OFF' (highlighted with a red circle). The 'Info' field states: 'Dedicated inter-NaviPac protocol, which supports run-lines, waypoi'. The 'Setup Id' is '8', and the 'I/O' field shows the serial port configuration: 'com://com1:9600/?StopBits=1&DataBits=8&Parity=NONE'. The 'String details' section shows 'Number of bytes' as '400', 'Telegrams per cycle' as '20', 'Driver type' as 'CRLF: Normal ASCII String with 'cr'+'lf'', and 'String prefix' as an empty field.

Instrument	
Name	From Remote NaviPac - control
System Name	From Remote NaviPac - control
Instrument ID	507
I/O Mode	OFF
Info	Dedicated inter-NaviPac protocol, which supports run-lines, waypoi
Setup Id	8
I/O	com://com1:9600/?StopBits=1&DataBits=8&Parity=NONE
String details	
Number of bytes	400
Telegrams per cycle	20
Driver type	CRLF: Normal ASCII String with 'cr'+'lf'
String prefix	

## NaviPac – Messages from the Tugs II



When in online mode, click on the 'TUG id' text-box and the window to the right will open. Now insert the ID (0 - telling that this is the barge). NaviPac will remember this setting. The window should never be closed, as it acts as interface between the NaviPac kernel (interpreter) and the TMS kernel (RigMon).

# NaviPac 4 TMS - Schematic Overview

## NaviPac Barge

**NaviPac Project Settings:**  
Enable Rig/Barge Move or TMS  
Configure Multiplex Telemetry (for Telemetry Solution only)

**Rig Setup:**  
Configure Rigsetup  
Save as: a) RigMove Setup  
b) Tug RigMove Setup (NP\_TUG.ini)

**Output Barge Position:**  
Data Output: Data to ext. Nav. System

**Receive Tug Position:**  
Dynamic Positioning: Remote Dynamic Object1

**Receive Messages from Tugs:**  
Special Input: Remote NaviPac – Control  
Online Mode: Define Barge ID to 0

**Output Anchor Pattern:**  
Data Output: Data to TUG boats

**Output Runlines & Waypoints:**  
Data Output: Remote NaviPac - Control

**Send other TMS Controls:**  
Online Mode: TMS Master Generic View  
(for Telemetry Solution only)

## NaviPac Tug

**NaviPac Project Settings:**  
Use as Tug Boat  
Configure Multiplex Telemetry (for Telemetry Solution only)

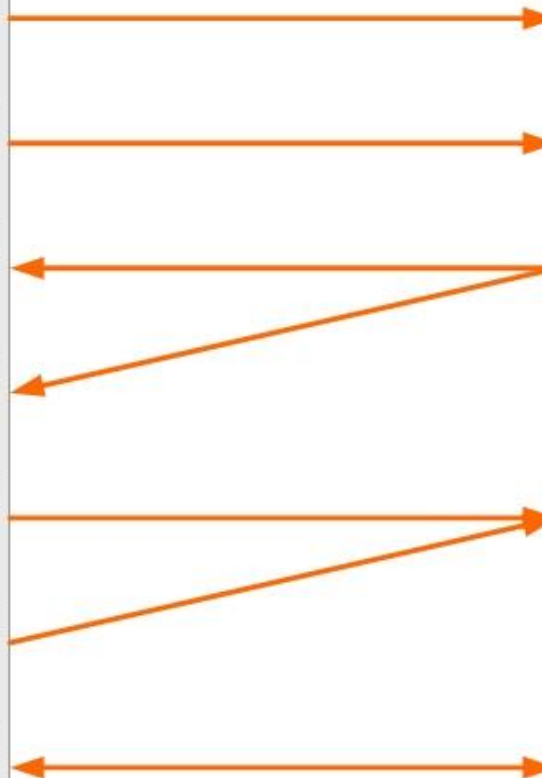
**Rig Setup:**  
Copy Tug RigMove Setup (NP\_TUG.ini) to EIVAHOME/Setup folder

**Receive Barge Position:**  
Dynamic Positioning: Remote Dynamic Object1

**Output Tug Position:**  
Data Output: Data to ext. Nav. System

**Receive Anchor Patterns & Runlines:**  
Special Input: Remote NaviPac – Control  
Online Mode: Define Tug ID

**Receive other TMS Controls:**  
Online Mode: TMS Slave Generic View  
(for Telemetry Solution only)





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