RELEASE NOTES

NAVIPAC 4.5.5

Last update: 26/11/2021
Version: 4.5.5

Contents

1 Release notes NaviPac 4.5.5

NaviPac version 4.5 collects a series of new features, fixes and special developments made since the first release of NaviPac Pro 4.2.

This version is named 4.5 to keep number compatibility with NaviModel.

NaviPac 4.5 completes the transition from generation 3 to generation 4.

Where noted, reference the EIVA tickets for details.

1.1 Formatting conventions

Items formatted in **bold** are properties, buttons, or other elements in the NaviPac software. Numbers in [] refers to Fresh Desk support ticket.

2 NaviPac Patch 4.5.5

A small hotfix from November 2021 including driver and minor modifications to the kernel side of NaviPac.

- UDP drivers extended to support multicast – recommended for use of Sonardyne SPRINT-Nav (LNAV data input). Multicast uses address space from 224.x.x.x to 239.x.x.x
- Driver problem for Sonardyne LBL TP code fixed
- Bug in data handling from GECO GPS driver fixed
- Data output to external navigation system (eg NaviPac tug/barge) allow selection of POI [36843]
- Possible to send secondary vessel position in user defined data outputs [37476]
- Support of Kongsberg PSIMSSB M code transponder
- NaviPac config – better open/close of subprograms
- NaviPac config – added default path for 3D models [36528]
- NaviPac config – fixed an issue where multiple instruments could end up with the same unique setup id
- Improved alignment of icons in Input Monitor
- Improved header information H6 for prioritized navigation
- Read and display of VORF height files could possibly be wrong in config
- Telemetry multiplexer – improved help text
- Telemetry multiplexer watch-dog – support up to 3 instances
- Telemetry GPS status share – send updates more frequently

Beside that a series of improvements and bug fixes have been added to the HMD.

- Optimization of CAD file loader
- We can now select a runline from map view. Select the line on the map view and the Select column in the vehicle control changes to the runline name, if correct click the select button in the vehicle control, that relates to the corresponding vehicle:

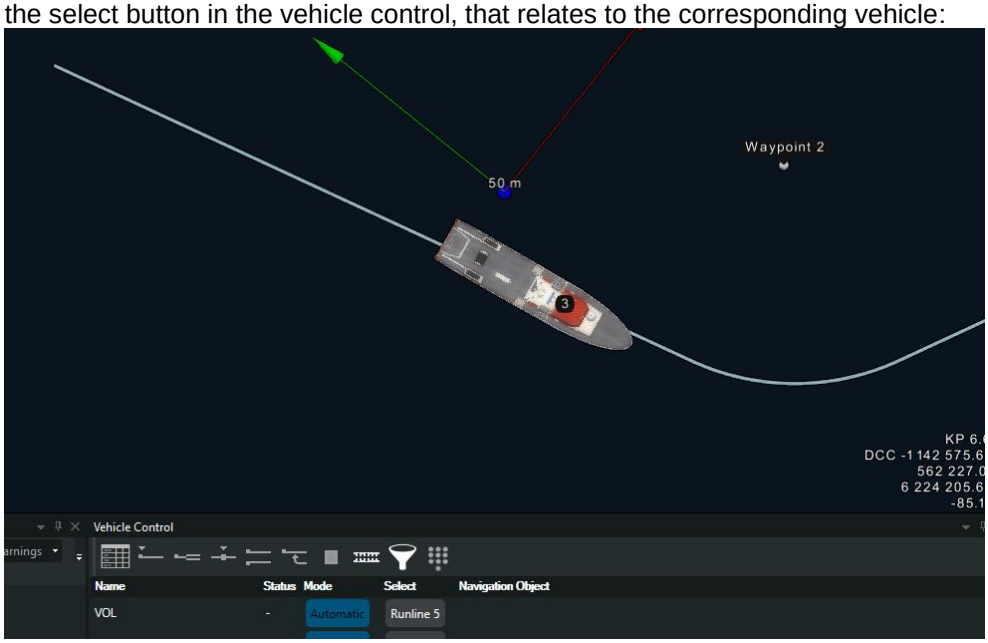


Figure 1 Runline selected at map

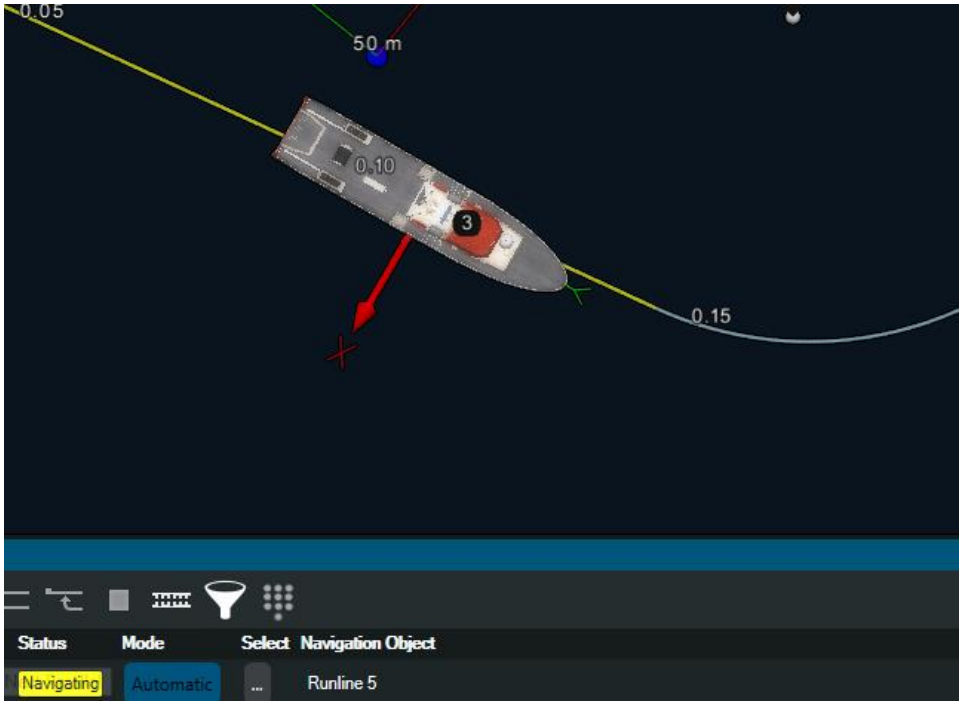


Figure 2 Runline activated

- Allow keyboard shortcuts to be used for the Vehicle Control
- Easier to see font colour in tree view
- Improve remote synchronization
- Prevents Remotes from making a track
- Improved master/remote sync of Vehicle Control [39891]
- Fix crashes
- Fix to Autozoom
- A new Easy rectangle Event type is available
- Now it is possible to block shift multiple events to pipe by meters/ussf from the event window
- Enter position... has been fixed to allow different number formats, and allow lon/lat.
- Range/Bearing view true bearing fix and clear indication between Grid and True bearings
- Improved ETA calculation and display for Range/Bearing views
- Online eventing – possible to add live data
- A fix to event collection, that can help the user edit the guids of an event collection, if an event collection already exists in the project with those same guids
- Eventing fix to date export
- Can export event table grid to CSV
- Events can now record live data
- Eventing Highlander mode reintroduced into Helmsman.
- Barge runlines – protect against inverting [41696]
- Position information in the lower right corner of the 3D view is now printing using a font setting that makes each numeric digit equally wide. This way, the overall appearance of the position information is jumping a lot less
- The “Follow object” algorithm has been improved to minimize jumping. This produces a calmer image

And especially related to RIGMove and tug management.

- Flexible tug view settings including change of tugboat
- Show runline DOL instead if Tug is navigating a runline
- Fix to intended position gyro
- A new view called the Runline view has been added
- Runline, Range bearing and tug view are more consistent with each other, and improvements made to the views
- Tugs remove runlines when requested to by Barge
- Fix to range bearing info
- Allow name change to intended position
- Improve move anchor/proposed position/intended position

3 NaviPac Patch 4.5.4

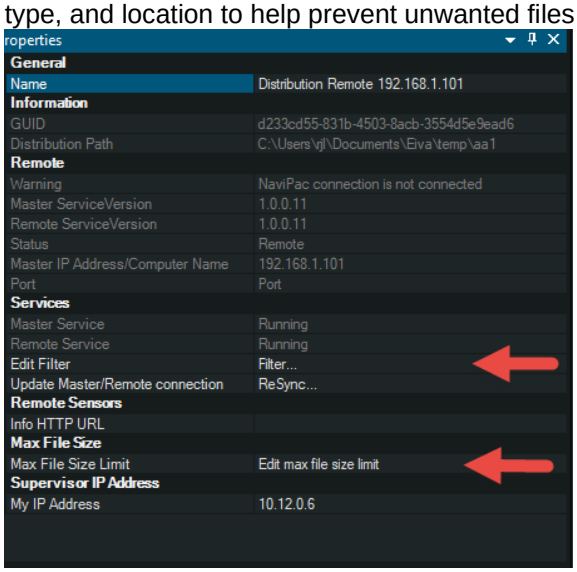
A small hotfix from June 2021 including driver and minor modifications to the kernel side of NaviPac.

- Sonardyne LNAV datainput – default telegram length adjusted
- Problem saving USBL Calibration data fixed [21827]
- Position fix calibration – save timestamp in ASCII data log
- Stopping RIGSetup when stopping NAVIPAC [J21827]
- Telemetry polling – better explanation in help text and bug fixed for no 2 and 3
- Critical bug fixed in template tracking – failed when having unused transponders
- Improved debug trace log
- Custom log setup – scroll-bar for long item names added
- Added manual on HMD safety zones
- Updated help file NaviPac Online
- Updated help text on NAVIPAC remoting

The Helmsman's Display have been undergoing a series of tests and improvements especially in relation to remote and remote supervision.

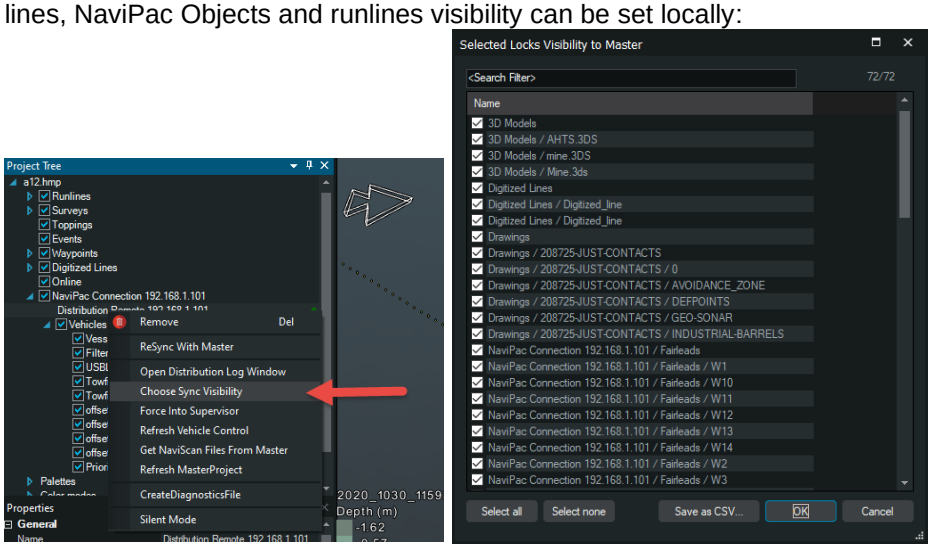
Remotes

- Remotes syncing has been improved and optimized
- Syncing 3d objects and 2d shapes has been improved
- Fixed AIS object shapes to properly reflect the AIS properties
- AIS objects can be allowed into exclusion zones without causing alarms, from the AIS node properties
- Exclusion zones and Inclusion Zones as well as all attributes are synced to remotes
- Remotes can add and create objects and will be marked with a blue sphere indicating it's a local file
- Remotes can delete all local files, so if a file is deleted off the master, and the autodelete function doesn't work, the remote will show it as a local file
- Remote service can limit files according to file size, and filter according to name and type, and location to help prevent unwanted files from being synced:



- A new visibility feature has been added to the remotes, found on the context menu of the distribution node. It allows the user to lock, or unlock an objects visibility from the master, so items like drawings can be dictated by the master, whilst certain

lines, NaviPac Objects and runlines visibility can be set locally:



- Auto-filtering on the master is longer done to drw1 files, and thus these will always be distributing unless user filters manually
- DTMs are no longer synced and are expected to be put on a common shared network drive, and marked external

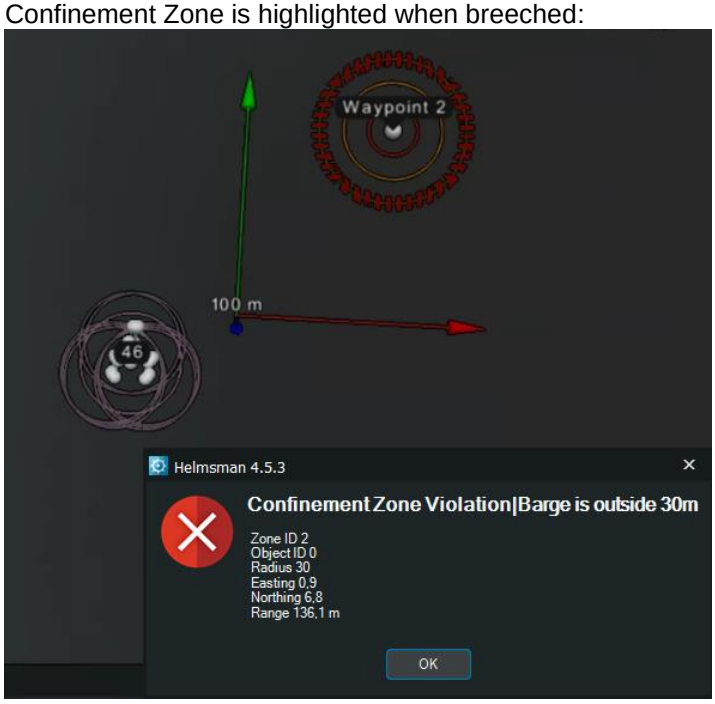
Supervisor:

- Supervision has been improved and optimized
- Supervisor can let user know if remote is not currently fully synced with master prior to starting supervision
- Uploading objects with 3d objects and 2D shapes has been improved

Operational

- If an object has both a 2D/3D model attached, the 2D shape will be shown in 2D and the 3D model will be shown in 3D
- NaviPac shape files close the polygons correctly now
- Geojson exports of runlines waypoints, lines and exclusion zones

- Confinement Zone is highlighted when breeched:



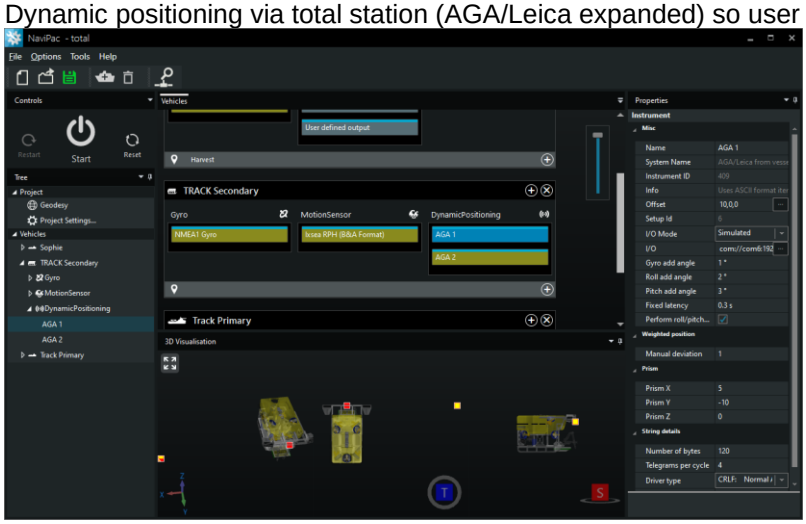
- RIGMove - Intended position Name gets name from NaviPac messages
- Initial loading of ACAD files have been optimized for speed
- Crash and bug fixes

4 NaviPac Patch 4.5.3

A small hotfix from April 2021 including driver and minor modifications to the kernel side of NaviPac. Note – Helmsman's Display is identical to version 4.5.2

- Template tracking [**38087**]
  Calculation of heading based on two or more USBL transponders failed in v 4.5.2

- Dynamic positioning via total station (AGA/Leica expanded) so user can define:



  - Prism offsets (to enable multiple prisms on target)
  - Data latency
  - Tracker mounting
  - Enable/disable roll/pitch compensation
- Teledyne DVL extended to support Schilling CDL format
- NMEA Win driver – direction and speed were swapped around
- Enabled selection of recording data units
- Bug in interpreting Topcon total stations for dynamic positioning
- Improved installation of *Crystal Reports* – used by EIVAStat
- Protecting against double starting NaviPac from the start button
- Updated manuals and help files

5 NaviPac Patch 4.5.2

This small hotfix patch from March 2021 includes a series of bug fixing.

- Combined positioning [36744]
  The final position calculations of eg USBL based input had a weakness in the offset calculation when using large offsets and lars roll/pitch values
  Related to consistencies in **Euler** vs **Tait–Bryan** angle handling. This is also included in upcoming NaviEdit release
- M-type transponders
  Fixed gyro/heading issue with (HiPAP) M-type transponders (internally being increased with 300, e.g. 43+300=343)
- Uninstall
  Protect against removal of user files [36548]
- Configuration
  - Warning added when removing POI [36529]
  - Select the POI after adding it [36257]
  - List all transponders on USBL system (right click on master) [20503]

    - User defined output: wrong handling of double click on arrow [36447]
    - Allow use of underscore in names [36360]
    - Improved use of vehicle number [36353]
- Helmsman's Display
    - Support for System 34 geodetic setup
    - Exclusion zones enabled on live data (eg range/bearing connections)
    - Improved NaviScan reconnection
    - Video overlay not shown on top of pinned views
    - Allow export of events
    - Improved handling of Alarm list – only keep most recent item of each alarm
- Interfaces
    - Port towards Sonardyne SPRINT-Nav improved to include reconnection in case of lost link
    - Bug in online change of transponder codes fixed
    - I/O Monitor – faster update of status parameters [36444]
    - Distance shooting – linked events: Extended to use separate event numbers
    - Potential bug in Phins gyro fixed [37414]
    - Extended Leica Autotrac 1 to also support 789 protocol
- Telemetry watchdog is also stopped by Stop NaviPac
- Online event setting: Removed buttons that only apply in configuration mode
- Event log files – allow longer vehicle names
- Updated documentation

6 NaviPac Patch 4.5.1

This small hotfix patch includes some bug fixing.

- ITRF
  The user interface for selecting ITRF in the NaviPac configuration tool were shown blank despite selections made in the project – which could result in setting it faulty the second time
- Helmsman's Display
    - Fixed crash in Remote helmsman due to anchor handling tool
    - Fixed remote objects visibility not persisting after loading a saved project
    - Adding data items in the tug view means to show/unshow (untick and tick) items
    - Removed the remotes ability to sync range bearing, dashboards, dataviews, and anchor handling views
    - When using Manage safety zone, and selecting an object, the settings don't persist when reopening the project
    - Other minor crash reports fixed
- More reasonable warning given when missing admin rights
- Sensor data
    - Kongsberg PSIMSSB – ignoring special case for M nodes (workaround)

- Phins interfacing – did not always remember status after restart
- Possible dual event trigger added
- Added FAE LS1501 laser acquisition driver
- Signing of ATTUMon

7 New features

7.1 Rig Move and Tug Management

A huge part of NaviPac 4.5 consists of the Rig move / anchor handling tool. We have implemented all components from version 3 – and made sure that the new way of behaviour fits with the previous version so the move over should be easy – you will recognise the terms and settings.

Enabling the setup is done via the NaviPac Project Settings:

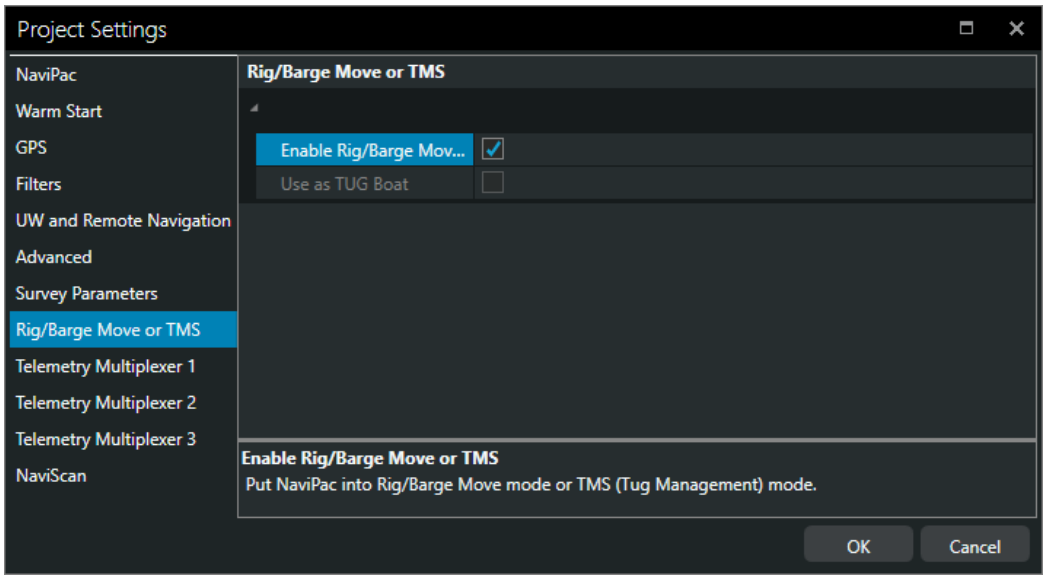


Figure 3 Enabling use of Rig move

You can configure the barge and up to 16 anchors, as you could in version 3.

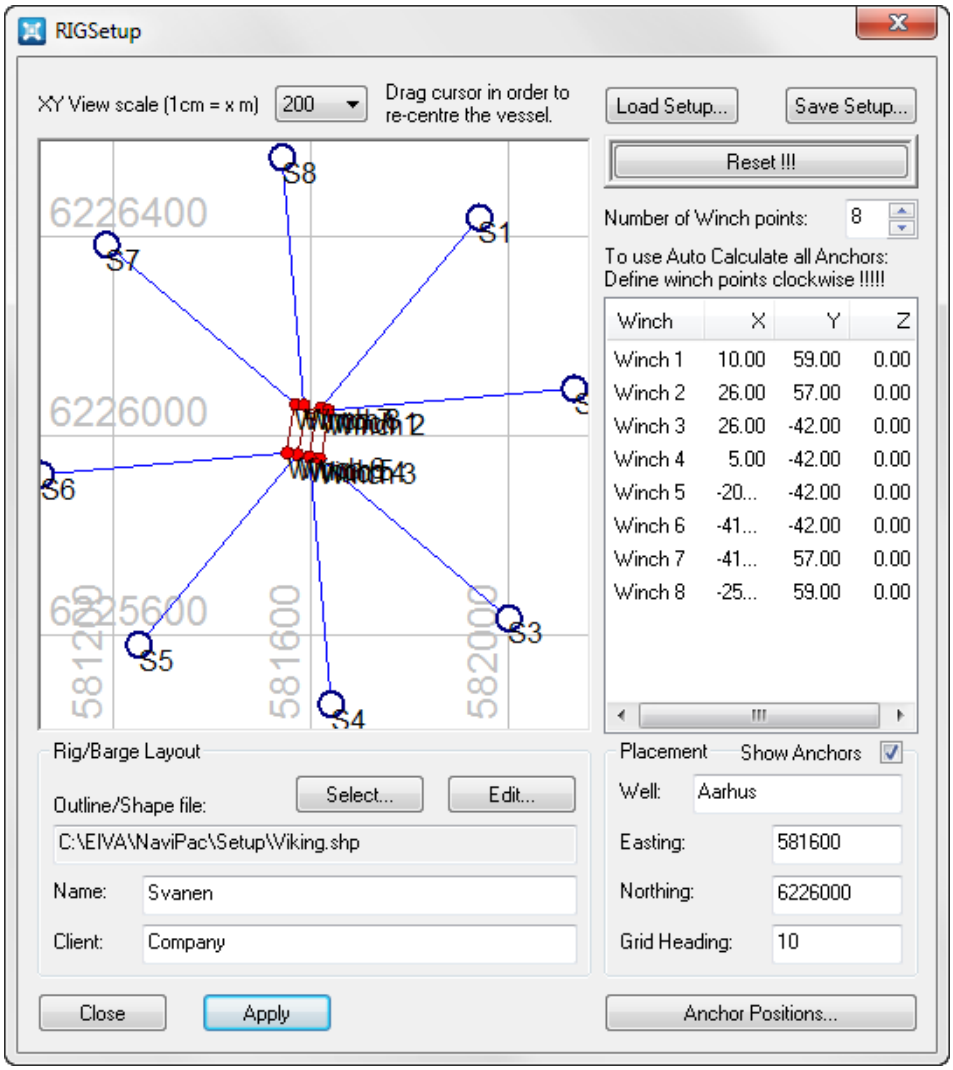


Figure 4 Configuring barge and fairleads

The interfacing between barge and tugs can take place using telemetry or IP based media (WLAN or mesh network), and NaviPac sends a combination of data to external navigation system, data and commands to tugs boats and remote NaviPac control:

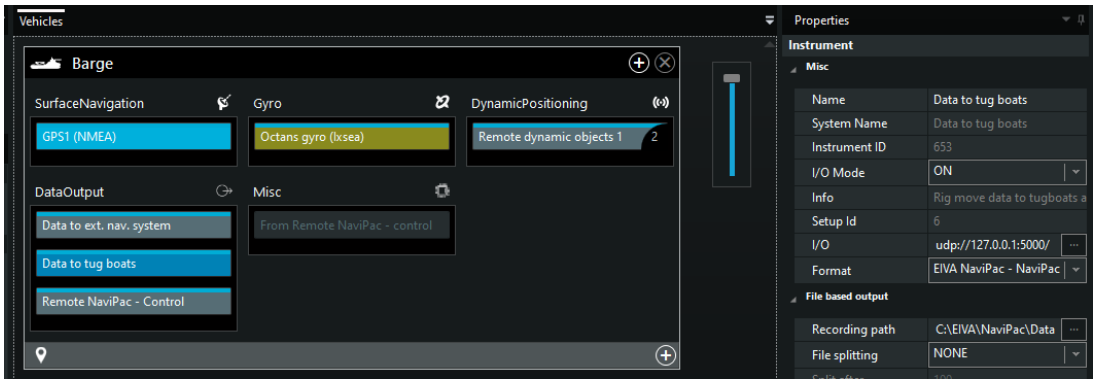


Figure 5 Configuring barge outputs

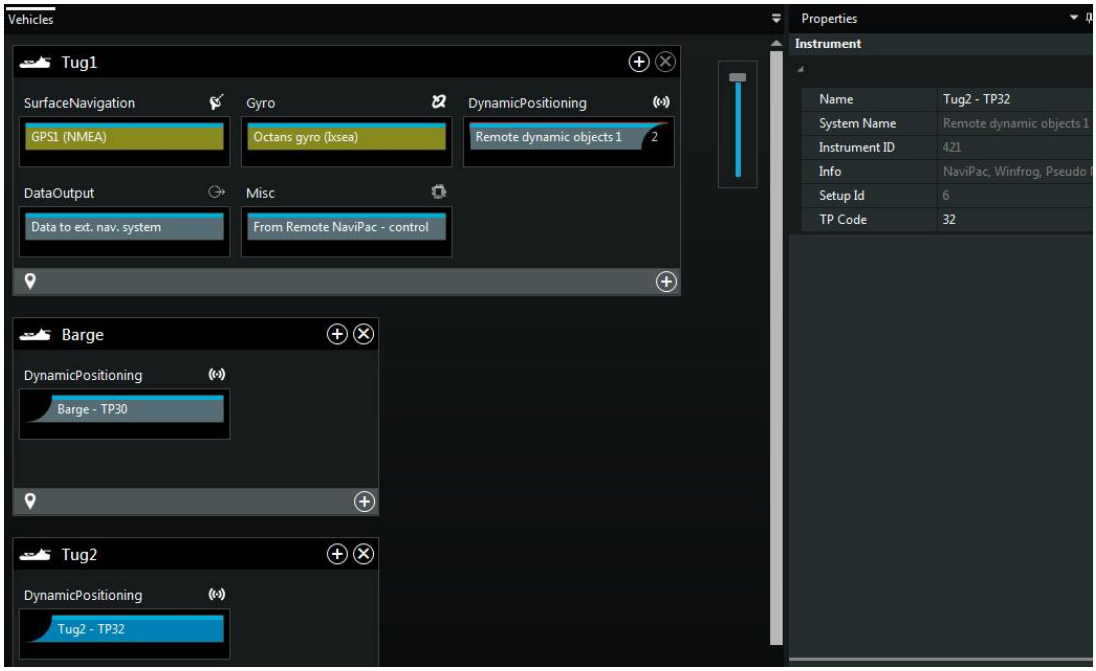


Figure 6 Tug1 receiving barge and other tugs from the barge

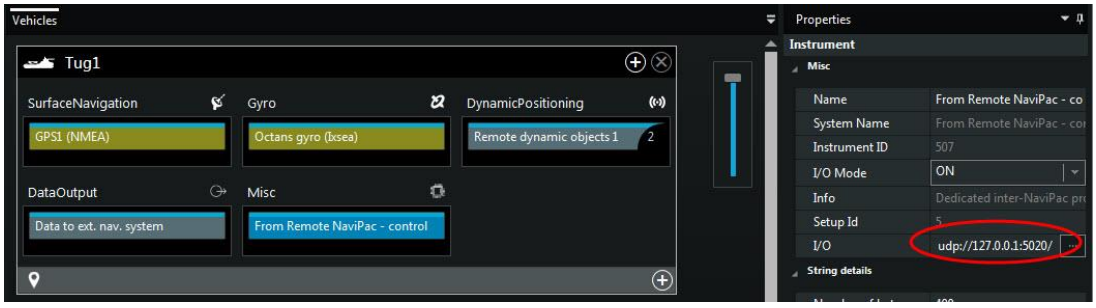


Figure 7 Tug receiving commands

You can use up to 3 telemetry radio modems – individually configured and thus enabling the use of a huge number of tugboats (15-20) or other external receivers.

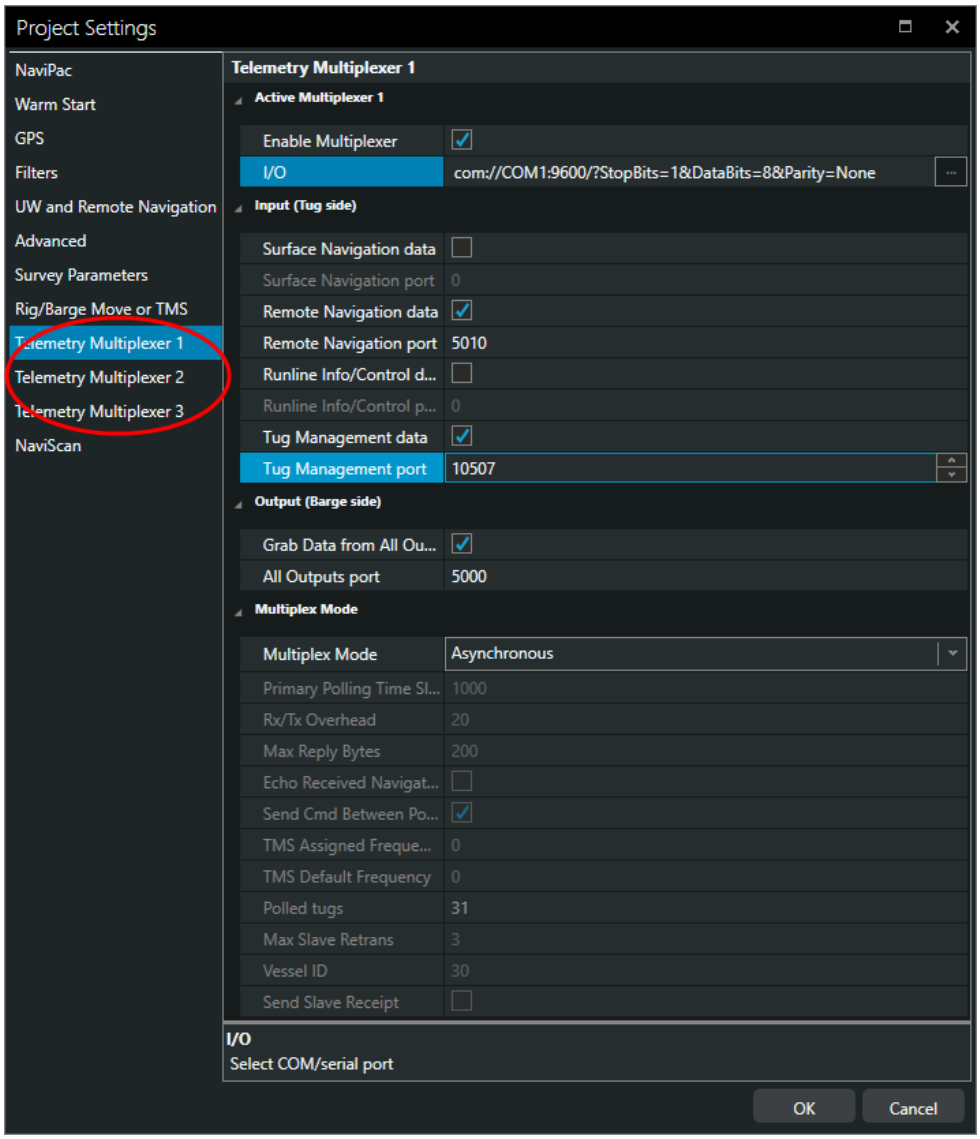


Figure 8 Multiplexer setup

The rig move operation will be controlled by the RigMon module (as in NaviPac 3), but all operations are performed from the Helmsman's Display.

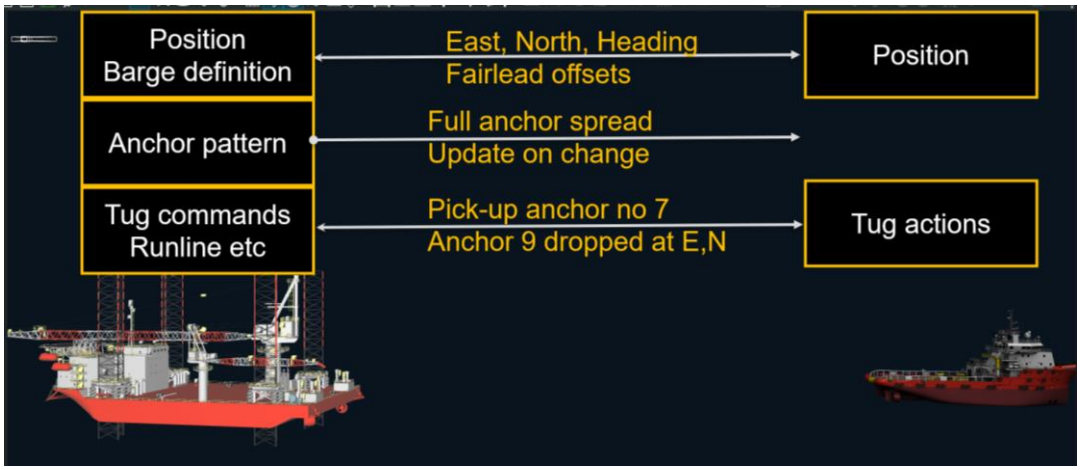


Figure 9 Barge/tug information exchange

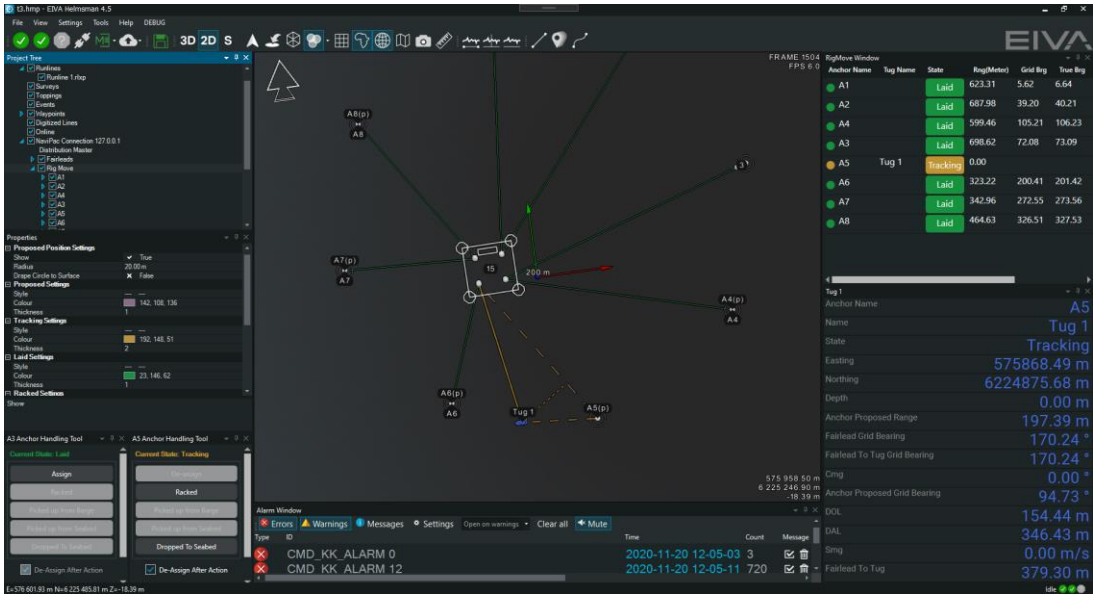


Figure 10 NaviPac Helmsman's Display with tracking tugboat

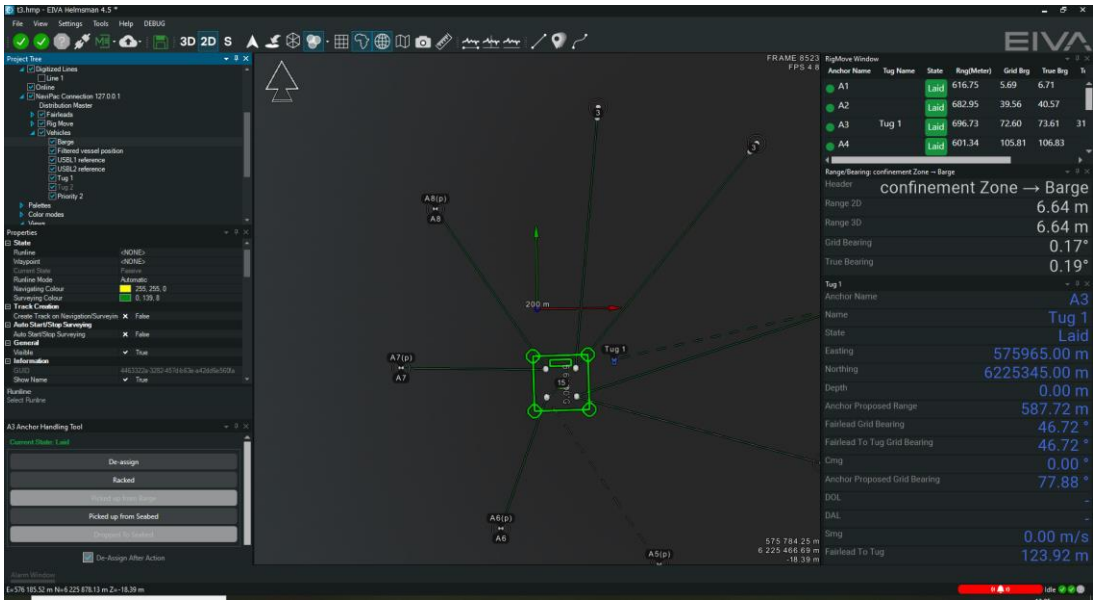


Figure 11 NaviPac Helmsman's Display with assigned tugboat

NaviPac 4.5 do also include a simple barge anchor drop/pickup position tool via eventing

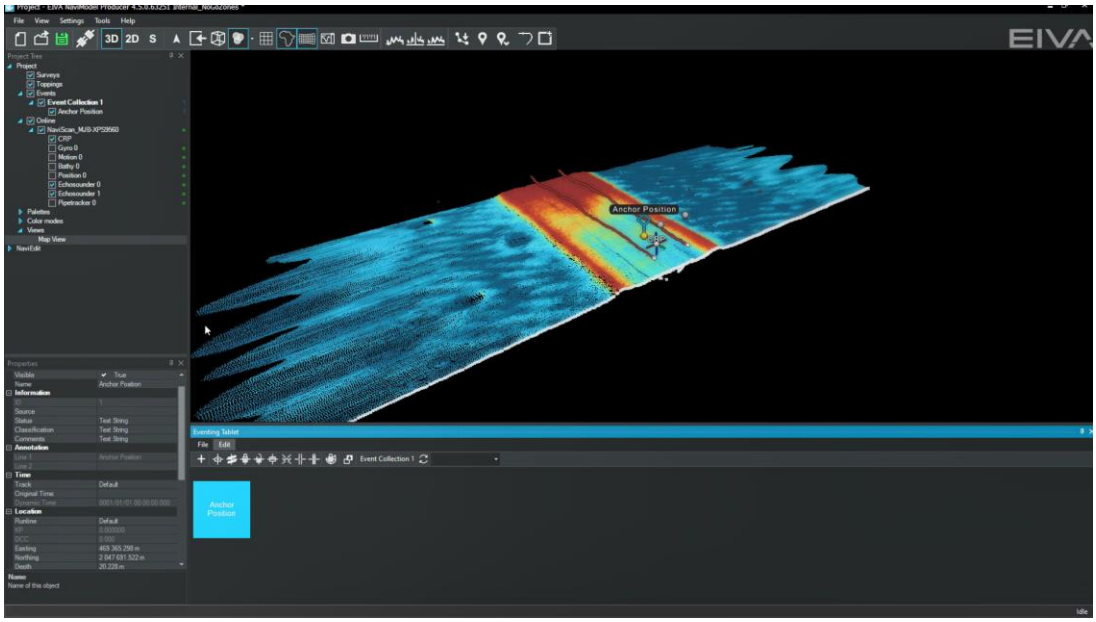


Figure 12 Lightweight anchor drop/pick up from barge

7.2 Remote Supervision

We see more and more companies wanting to control the survey operation from a control centre at land, both for unmanned service vehicle operations as well as more advanced vessel surveys where they have limited expertise onboard.

NaviPac have been well prepared for this, as our internal NaviPac module communication is based on networked TCP/IP (and have been for a long time), and with the introduction of NaviPac 4 the final step was taken by simplifying file and folder structure used by the software.

It has been possible to run onshore monitoring since the first modern version of NaviPac 3 – and in version 4.5 we introduce the final step – taking control from shore via Remote Supervision.

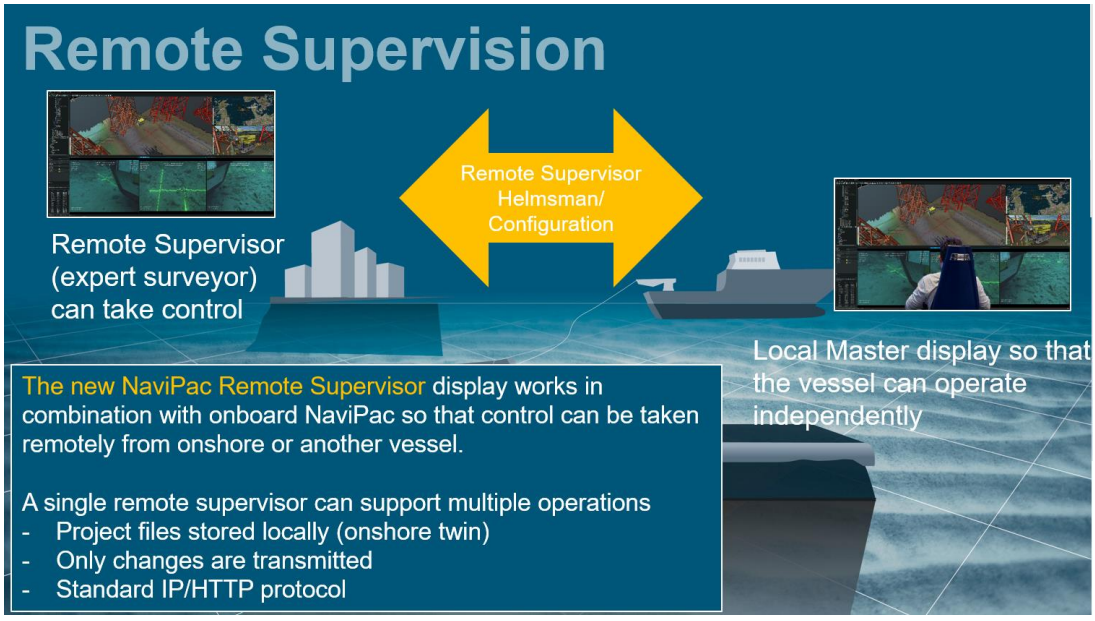


Figure 13 Remote supervision flow

7.2.1 Remote Survey Supervision

The first level of the remote supervision is done from the Helmsman's Display, where the standard software can connect a NaviPac system running on your internal IP range network.

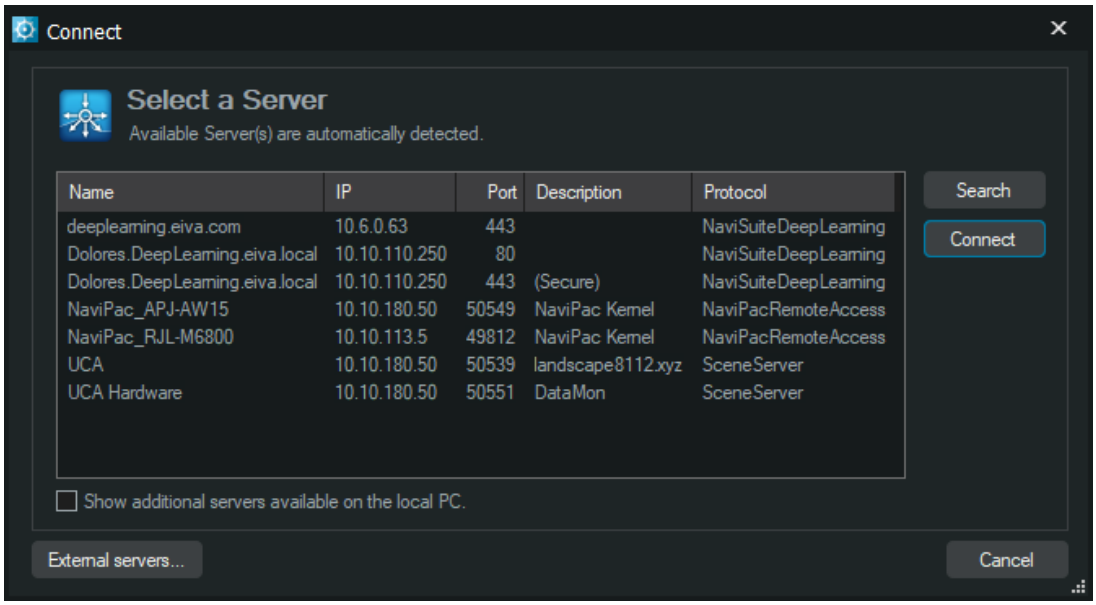


Figure 14 NaviPac - auto connection service

As soon as you connect to the server, the Helmsman's Display (HMD) will start as any ordinary remote, that is, download all necessary files via a file synchronisation service (project, runlines, waypoints etc) based on HTTPS and receive the live data on the ordinary TCP/IP connection (port 4884). You can hereafter switch to become the supervisor:

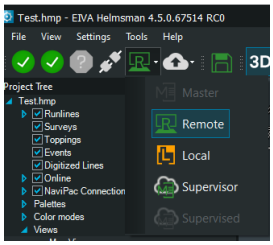


Figure 15 Helmsman's Mode

The HMD modes are:

1. Master
   The main computer on board the vessel
2. Remote
   Any remote connection
3. Local
   Not connected to NaviPac – previously known as Line Planner
4. Supervisor
   The onshore (or remote) station taking control
5. Supervised
   The onboard Master downgraded to Supervised

You will now operate the HMD as on the ordinary master; creating runlines, display lines etc – and when complete upload it back to the onboard system:

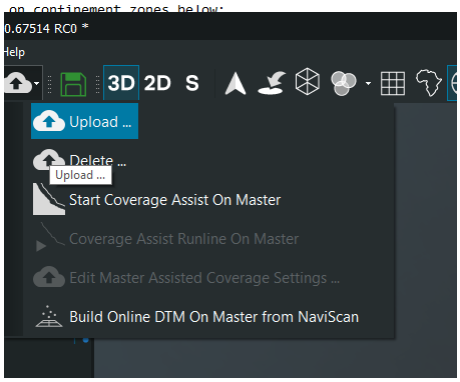


Figure 16 Upload to master

The HMD will now list all files changed since you took control and allows you to select what to upload:

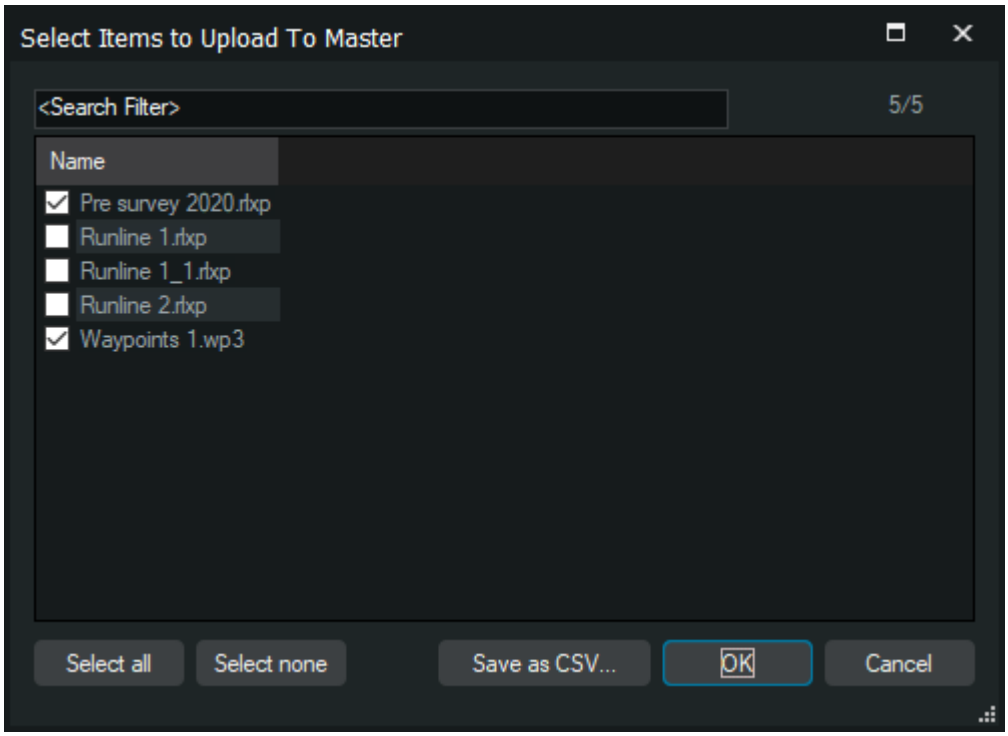


Figure 17 Upload selection

The file and project will then be uploaded to the barge and available to use right away.

7.2.1.1 MBE Survey specific (USV)

If you are using the setup on an unmanned vessel or want to take control over a setup using MBE data for dynamic route planning (our Coverage Assist tool), then we have two special functions enabled:

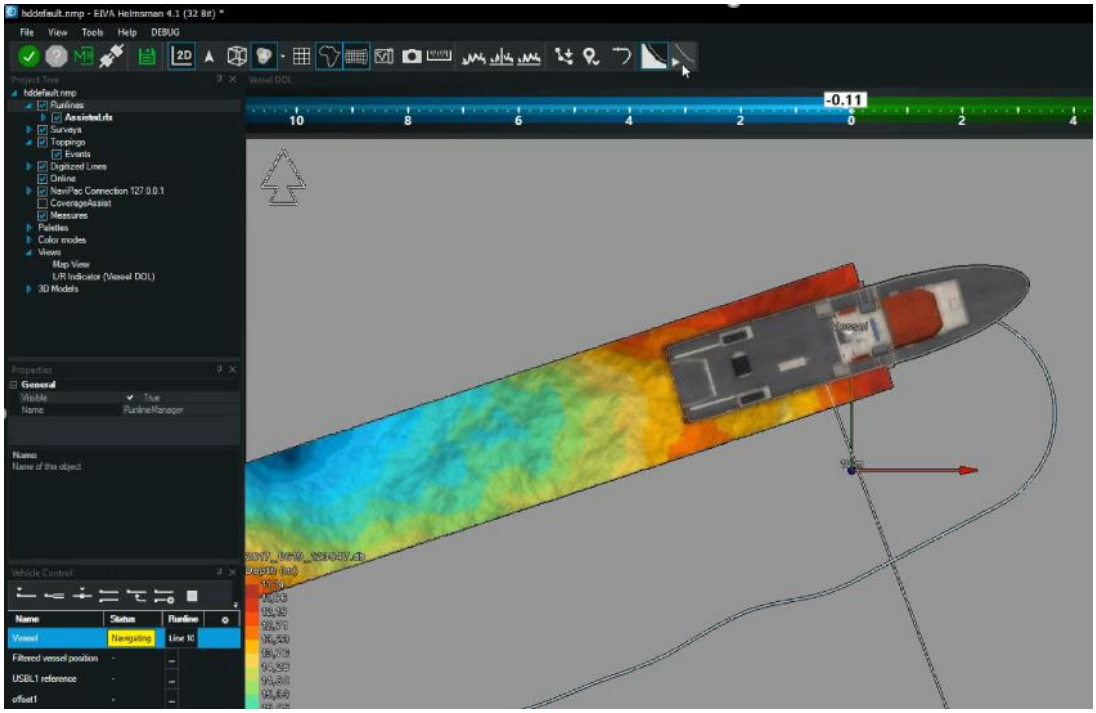
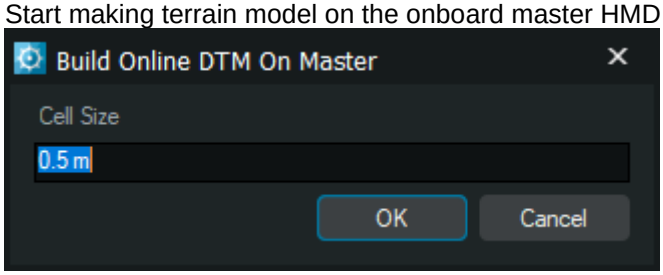


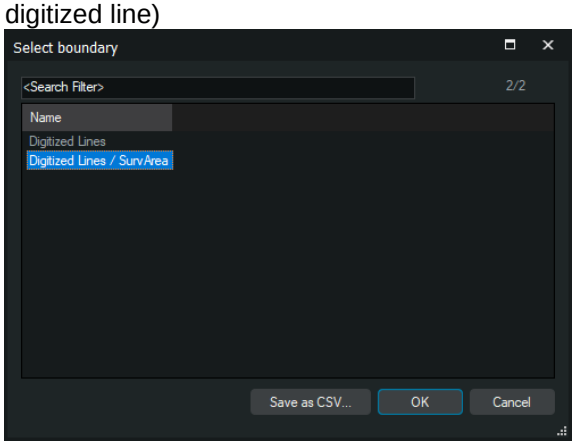
Figure 18 Coverage Assist

- Build Online DTM
  Start making terrain model on the onboard master HMD with selected cell size:



- Start Coverage assist
  Initiate the automatic runline handling inside the selected boundary (defined as

digitized line)



7.2.2 Remote Configuration Supervision

It is furthermore also possible to take remote control of the entire configuration process, valid for both USV operations and supervised survey operations with onshore expert control.

The onboard solution must be set up to allow supervision via the **Options > Remoting** tool and change mode from **Stand-alone** to **Master**.

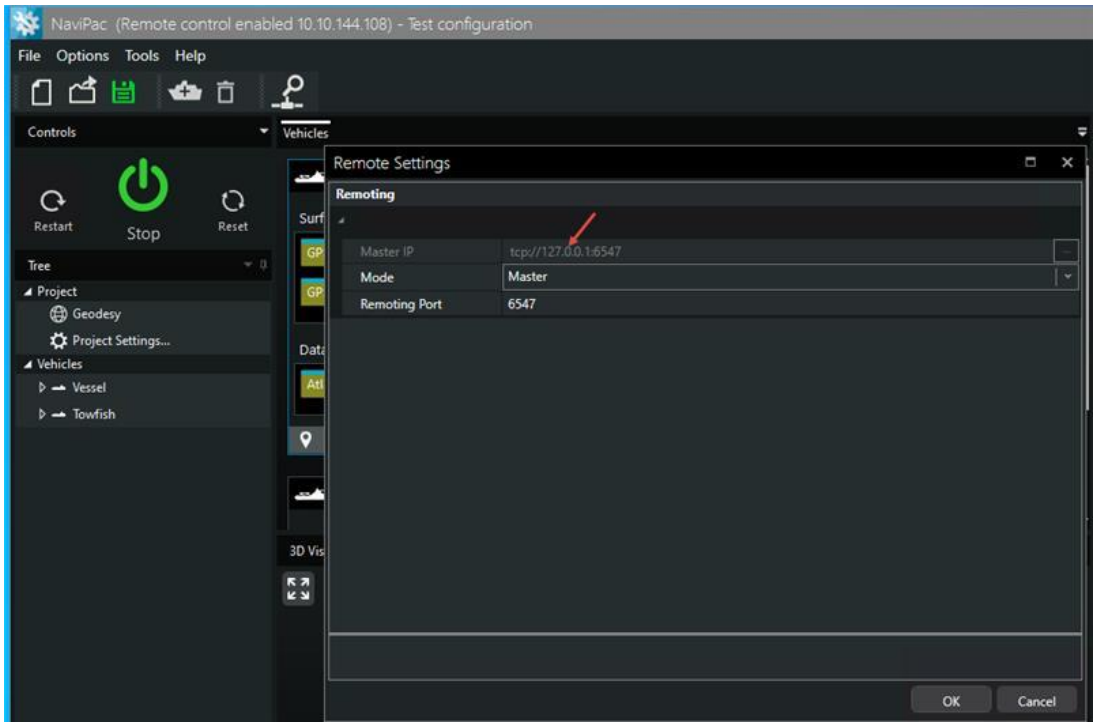


Figure 19 Enabling remote control

At the remote end you just use a standard NaviPac installation and start NaviPac and go into **Options > Remoting** tool and select mode to be Supervisor and identify the IP address of the vessel system.

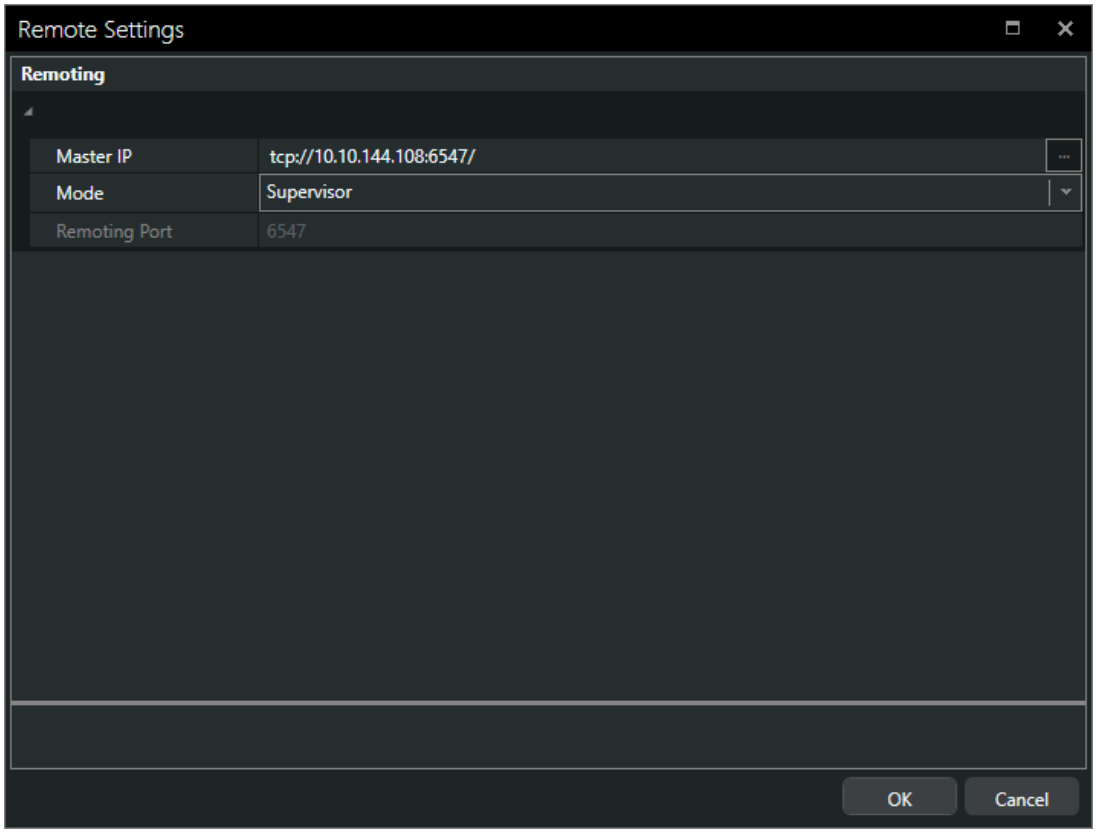


Figure 20 Taking remote control

NaviPac will first of all download the entire project file and load it into the tool, so you can monitor and change any settings.

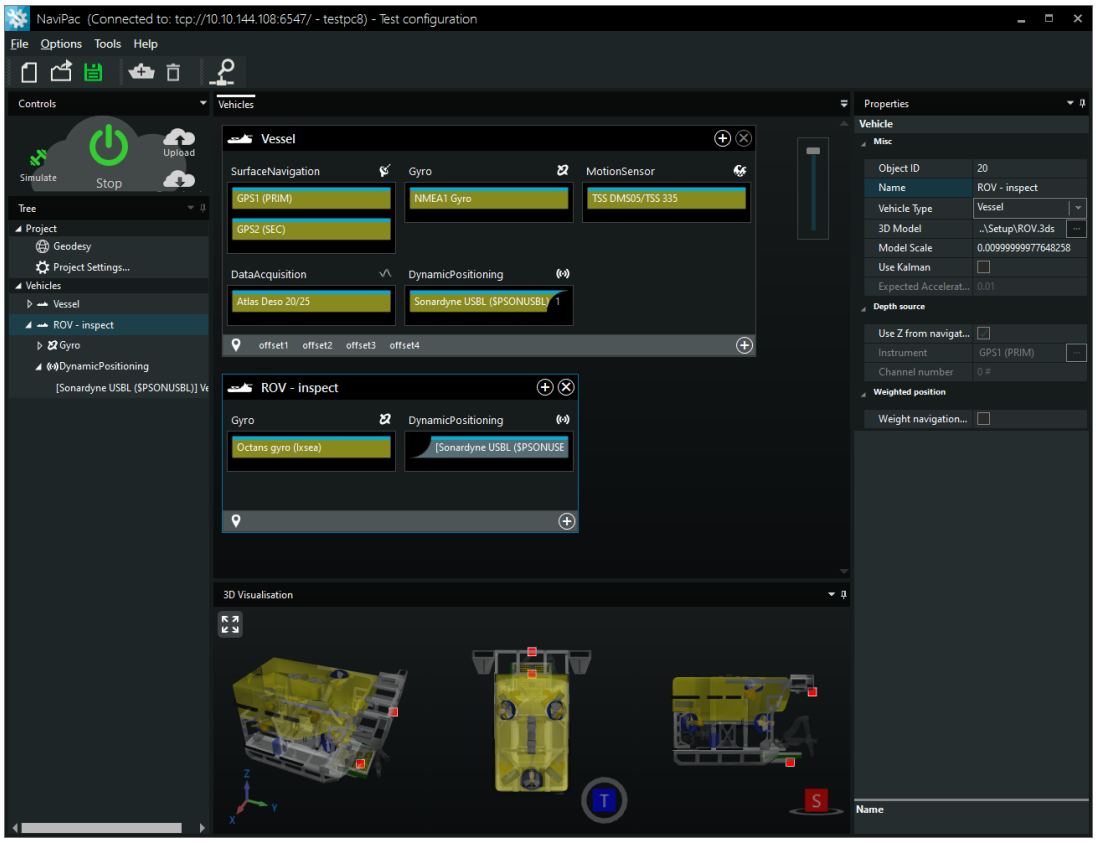


Figure 21 Configuration program in control

The upper left part of the configuration program includes a series of special control tools for the remote operation:

- Start/Stop
  Start and stop navigation onboard the vessel
- Upload
  Upload your configuration to the vessel
- Download
  Download new copy from the vessel
- Simulate
  Run the entire setup on your local pc – all in simulated mode

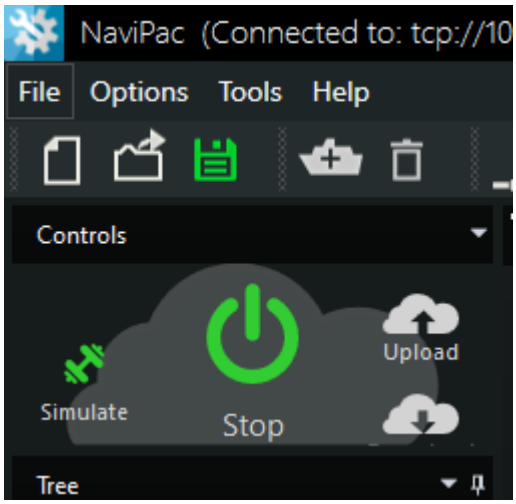


Figure 22 Remote control tools

7.3 Time & distance eventing

NaviPac 4.5 has all the time and distance event settings that NaviPac 3.10 had. The entire setup is now handled as part of Project settings in the setup phase:

- Event format and data storage
- Time based events
- Distance shooting
- Events triggered by external events
- Event trigger output (eg to NaviSuite Seismic Trigger)

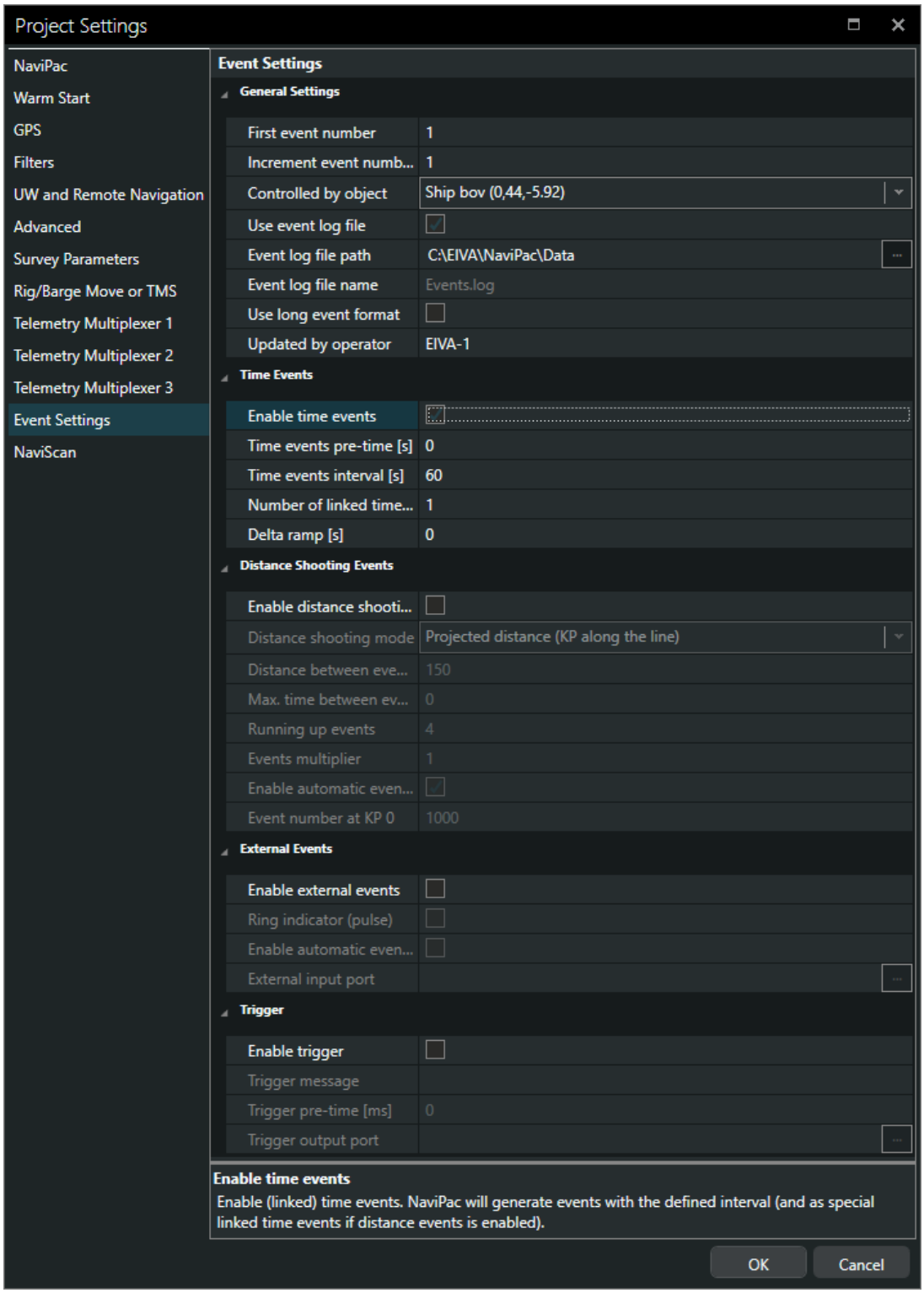


Figure 23 Eventing setup

The distance shooting algorithms have been updated so they can be used when performing NaviPac cycles with high frequency updates – previously only working at 1 Hz.

7.4 2D seismic

NaviPac 4.5 includes the 2D seismic operations – including:

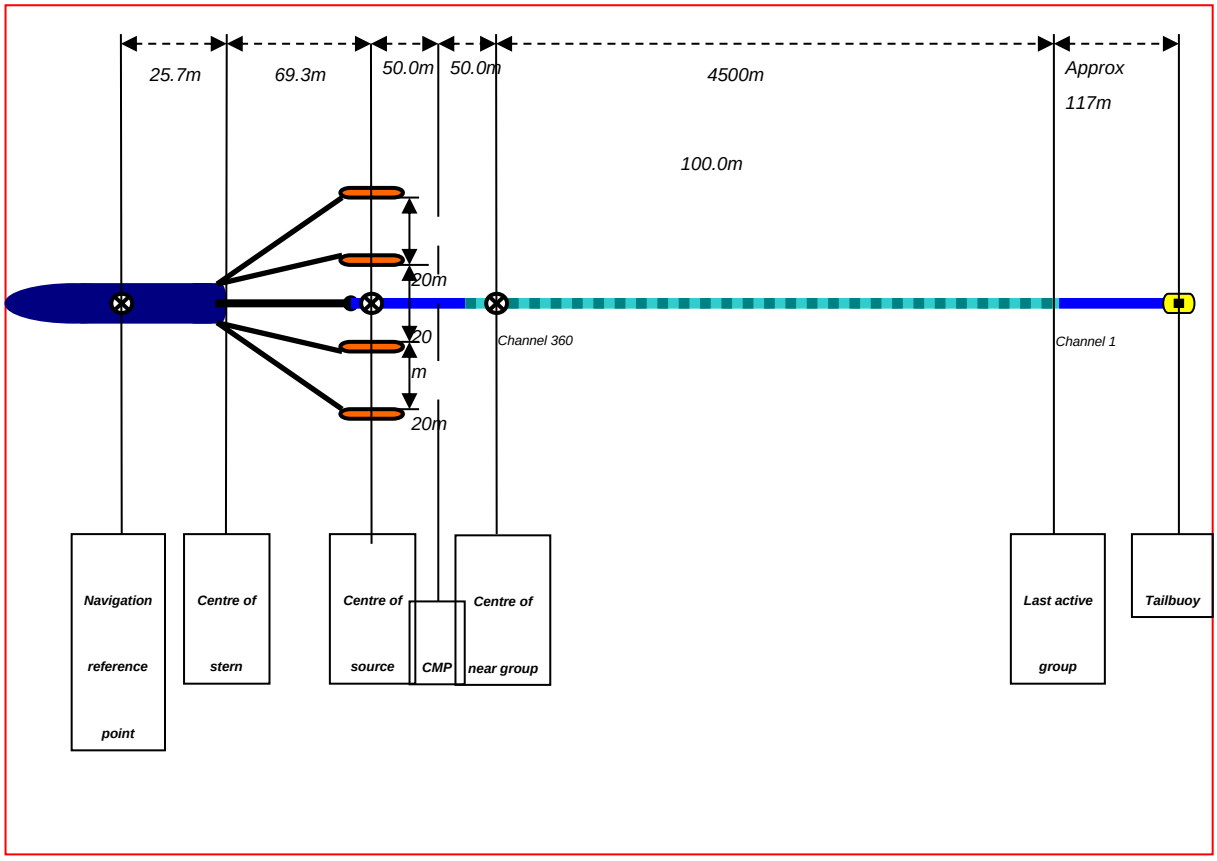


Figure 24 Streamer positioning

NaviPac 4.5 supports up to two streamers (version 3 was limited to 1), and all setup is done in the main instrument page:

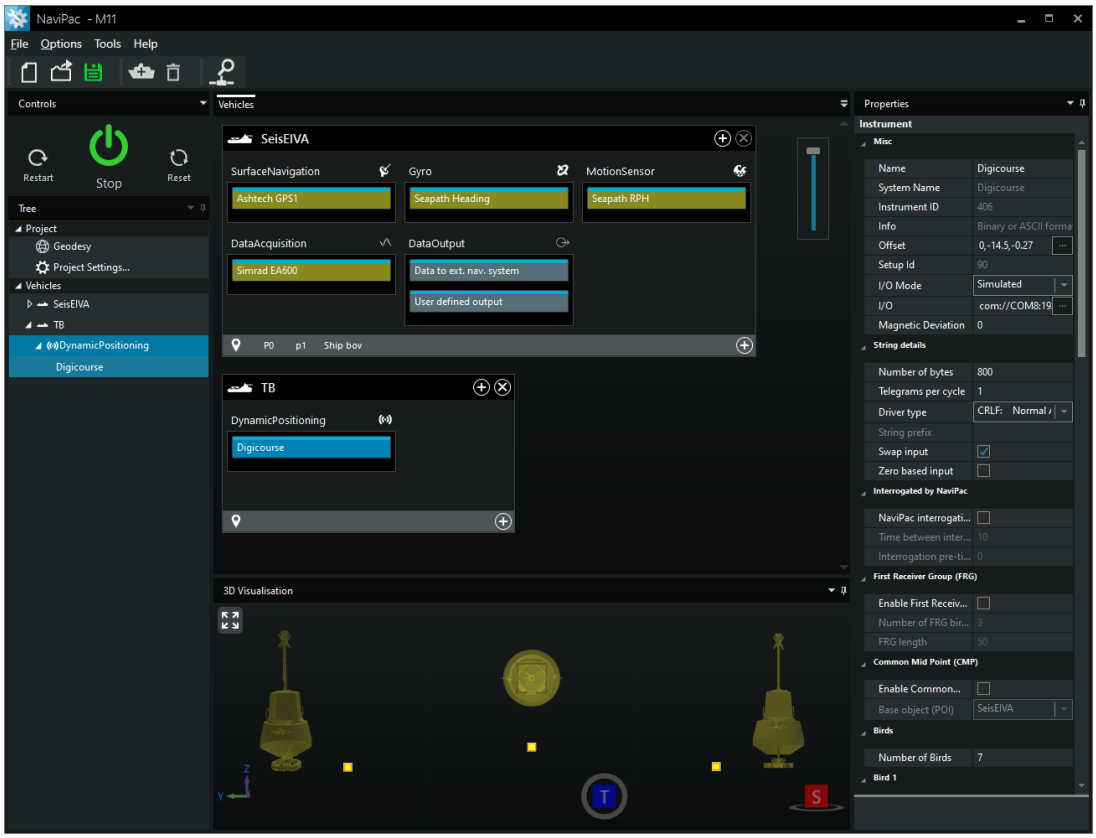


Figure 25 Defining streamer positioning

The streamer position is shown at the Helmsman's Display and the tail position can be used like any other vehicle object.

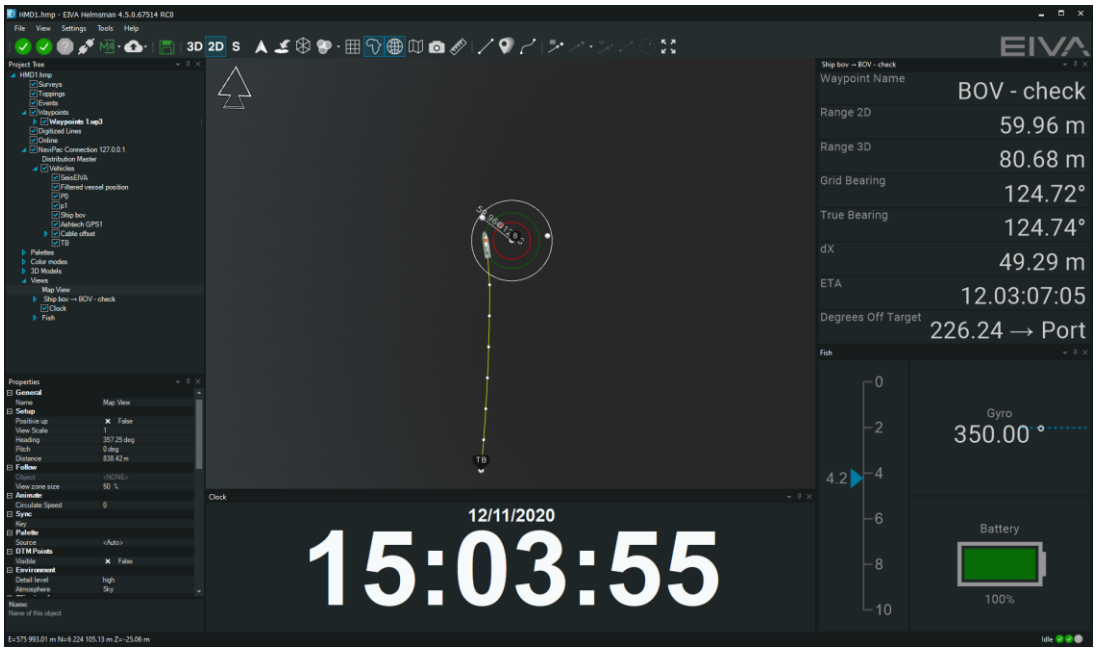


Figure 26 2D streamer display

As a new feature in version 4.5 you can also show the cable depth information both graphically in Map View and numerical in the Data Views – as well as in the sideview mode (S).

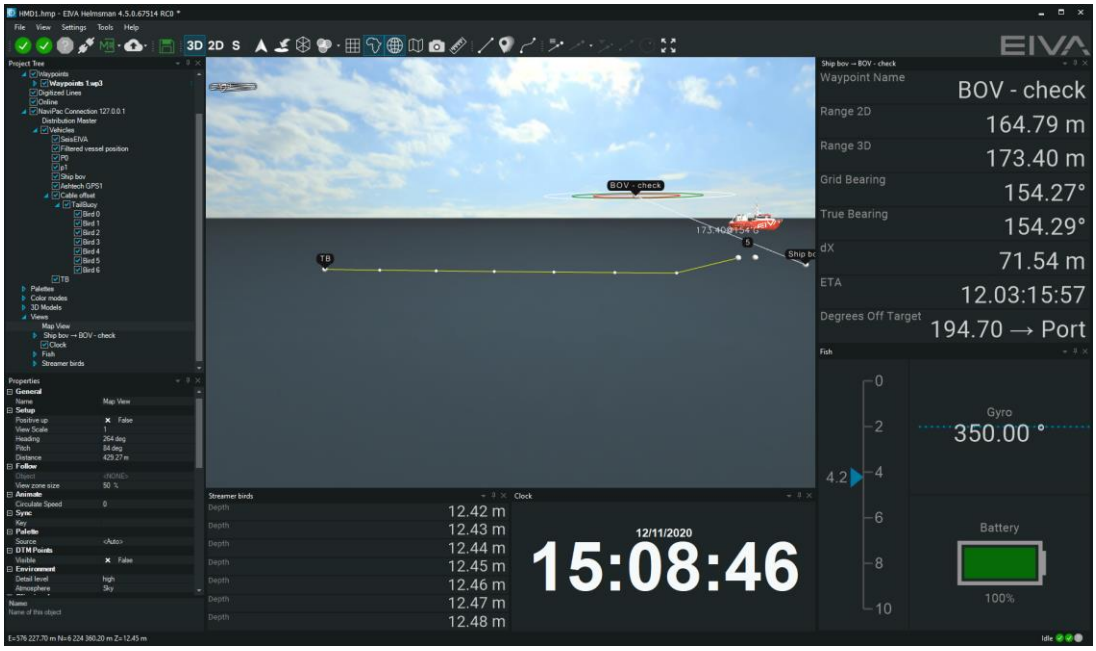


Figure 27 Streamer depth information

7.5 Real time data cleaning

NaviPac version 4.5 extends the real time data cleaning tools – so all EC-3D features known from NaviModel can be used during online acquisition and recording.

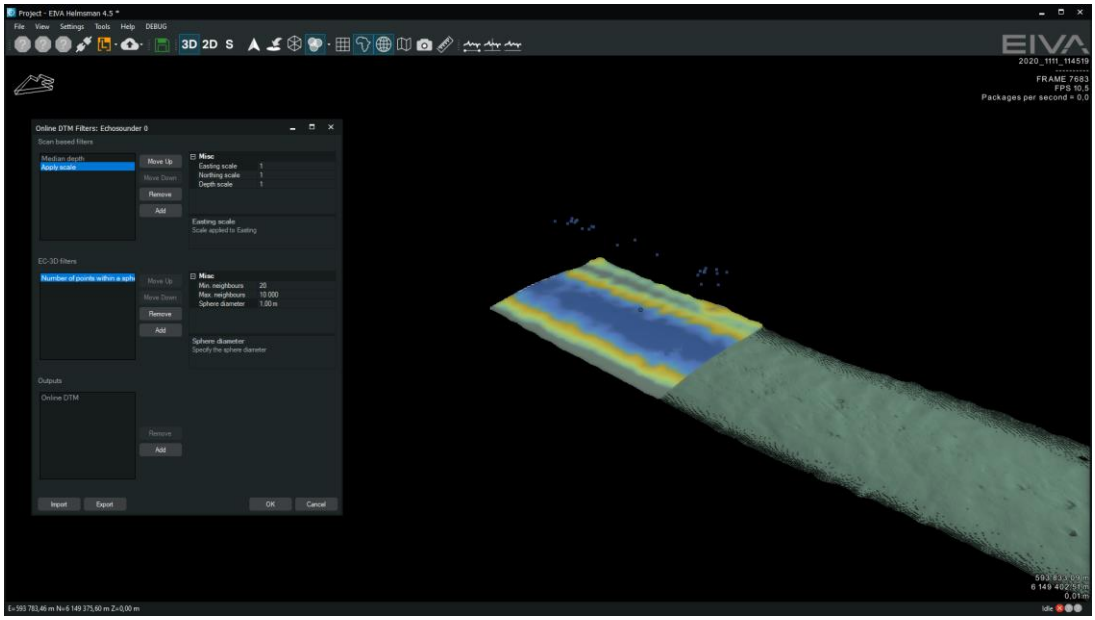


Figure 28 Real time EC-3D

You can enable one or more tools using the combination tools, and the result will be applied to the DTM generated in the HMD.

The system saves status information identifying all points flagged as noise. After import of the raw SBD files in NaviEdit, you can choose to use the online cleaned or simply keep using the raw data. If you choose to use the online cleaned, you can afterwards do further cleaning or undo some of the cleaning.

7.6 Helmsman's Display

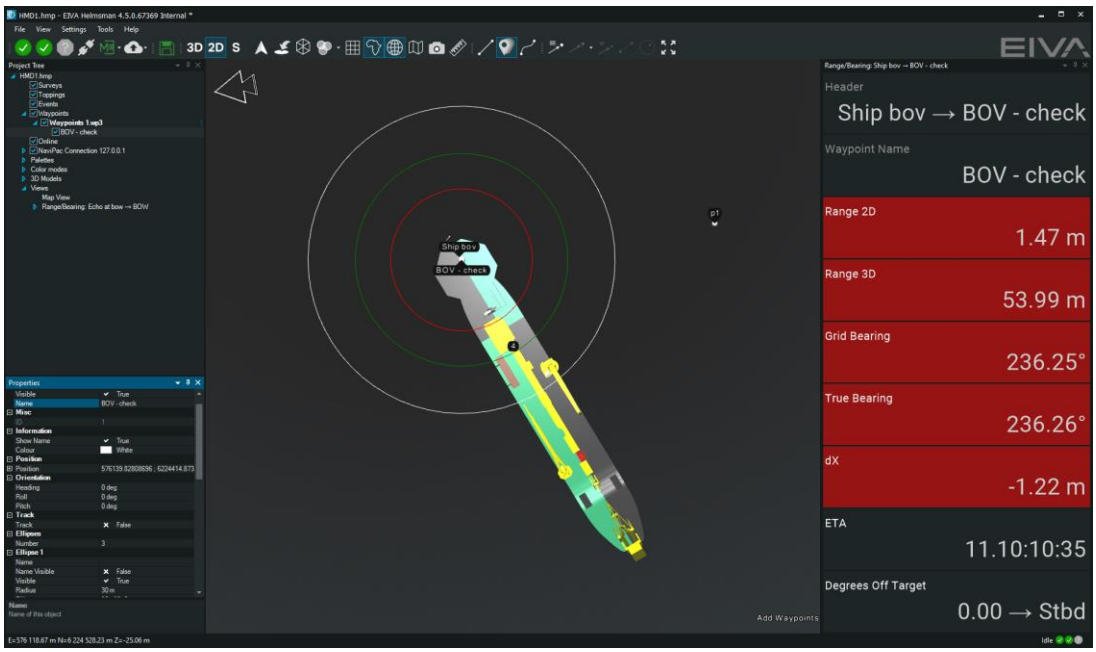


Figure 29 Multiple circle/ellipse display of waypoints

7.6.1 Dashboard data views

In NaviPac 4.5 we introduce a new data display type – dashboard and widgets, replacing the old Data View types. A widget is a value, a text or a graphical display unit, and you can combine them in one view or have multiple or free-floating views.

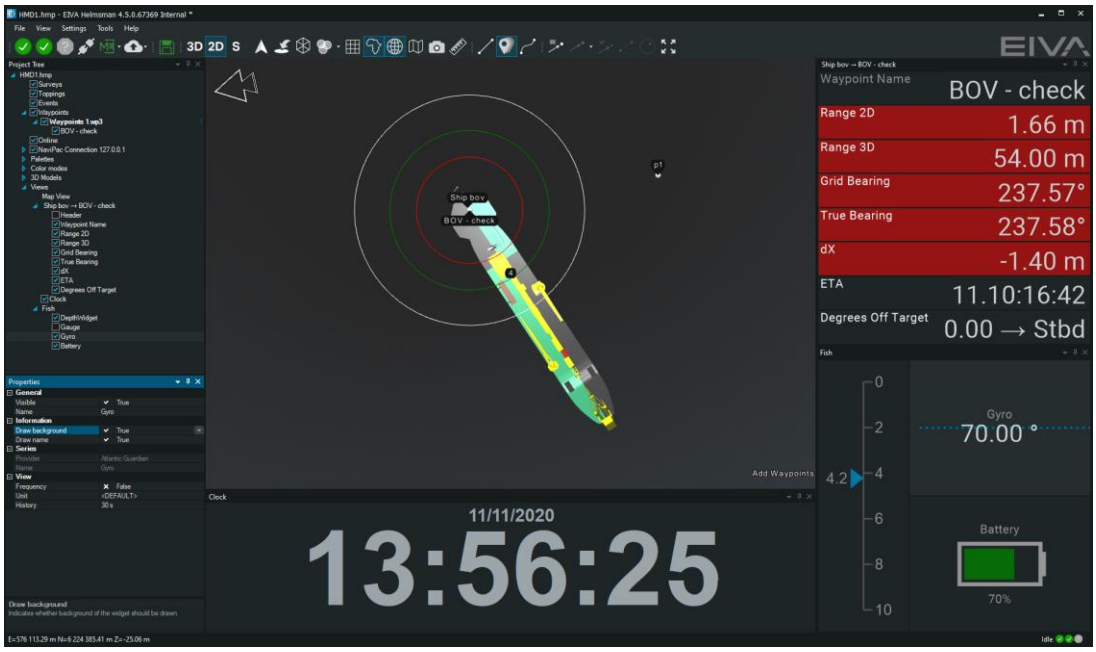


Figure 30 Helmsman's Display layout combining different widget types

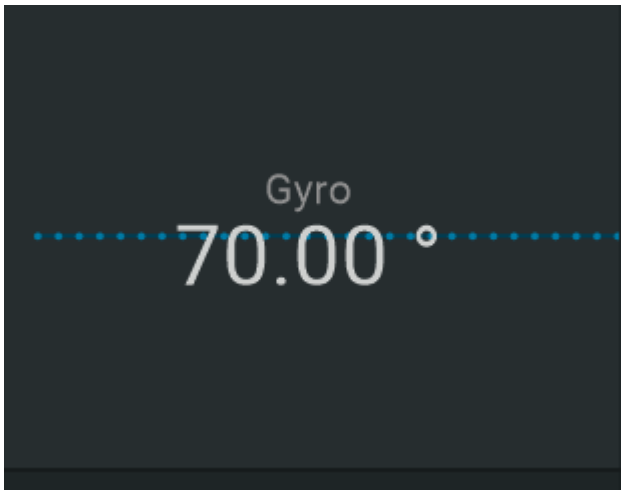


Figure 31 Use for live and time series data display

Figure 32 Widget dashboard for ROV pilot display

7.6.2 Video overlay

You can – as before – interface IP cameras into HMD and use it for display and recording. The overlay is done by combining any live data (from NaviPac, NaviScan or external inputs) into text or graphical widgets – including logo images.

The widgets are defined as free floating images on top of the video image (as well as other views) and can be made transparent to minimize the image's distortion.

Figure 33 Video overlay - shown outside image

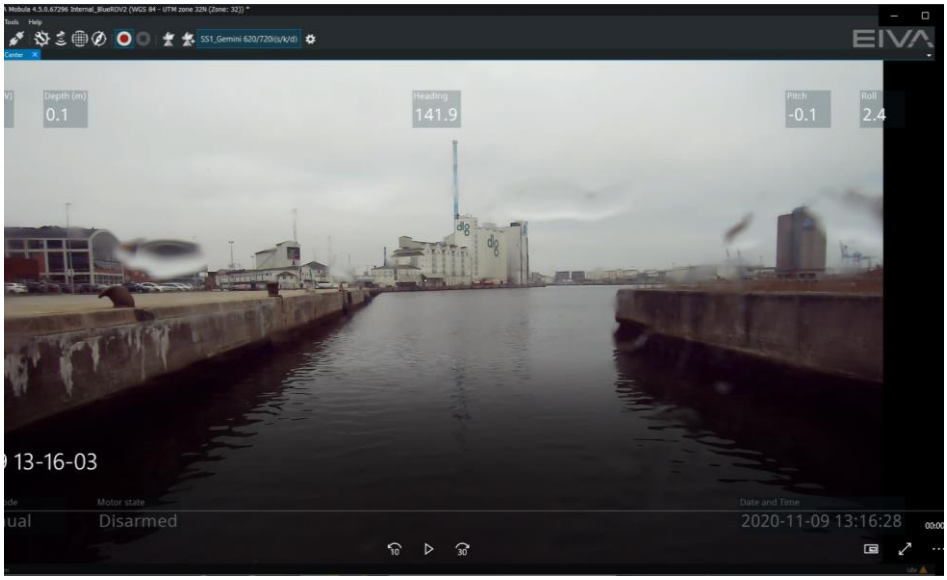


Figure 34 Overlay inside view as semi-transparent

We do not save the overlays as part of the video frames – but treated instead like subtitles. This means that the overlays can be viewed (and changed) in NaviModel and viewed in a standard VLC player.

7.6.3 Exclusion zones

NaviPac 4.5 re-introduces and extends the no-go zone alarming you know from NaviPac 3.10.

Lines, and waypoints can have no-go zones, which can be enabled via right-clicking the object and selecting **Attributes > Exclusion zone**.

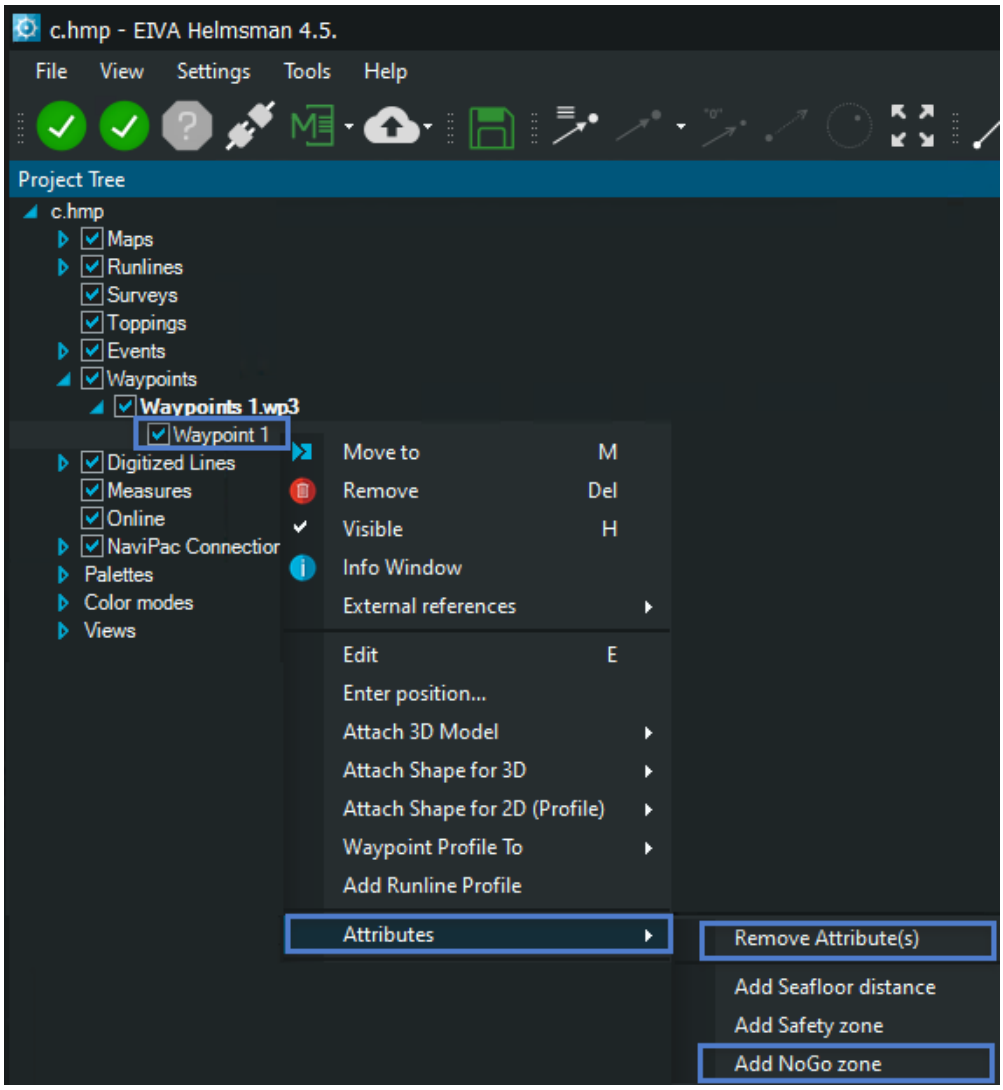


Figure 35 NaviPac Helmsman's Display showing No-Go zone related options

Enabling this introduces some attributes of the waypoint/lines.

Figure 36 Waypoint Properties view showing Exclusion zones

As default all vehicles will be prohibited from entering the zones – but you can overrule this manually via **Manage Exclusion zone** of the waypoint (by right clicking).

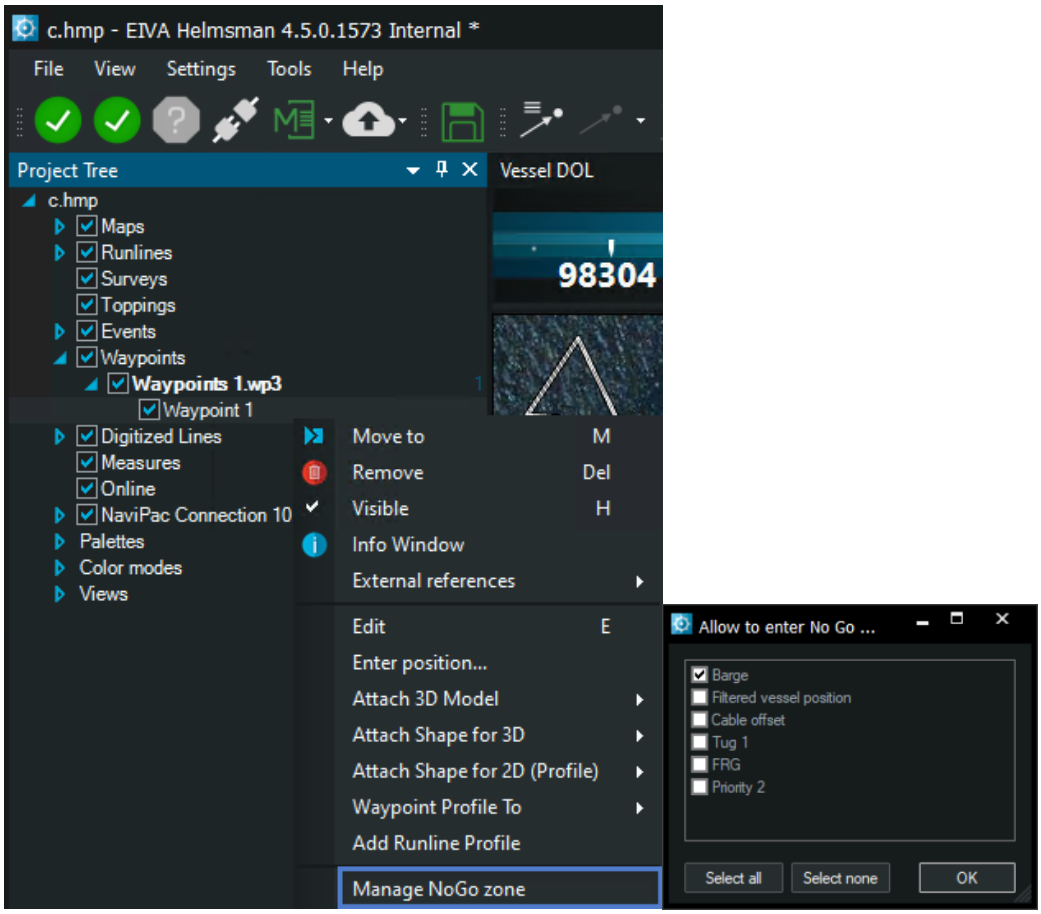


Figure 37 Manage an exclusion zone

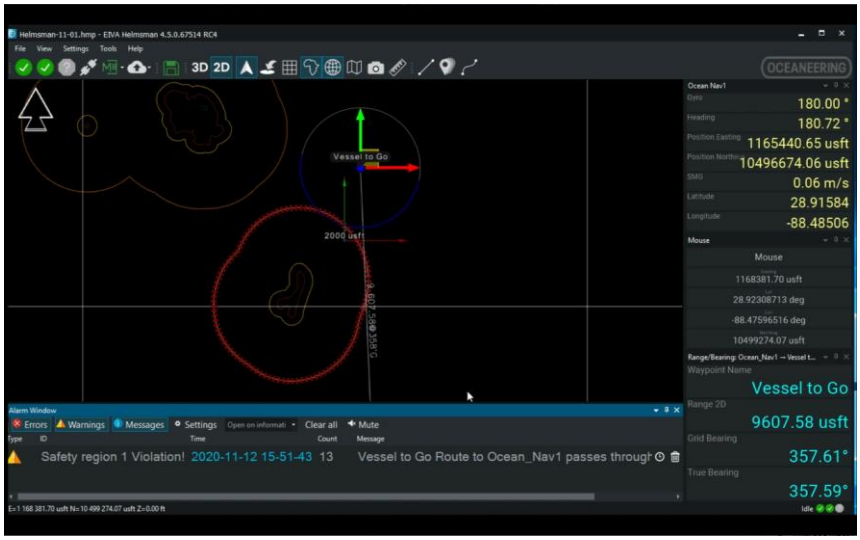


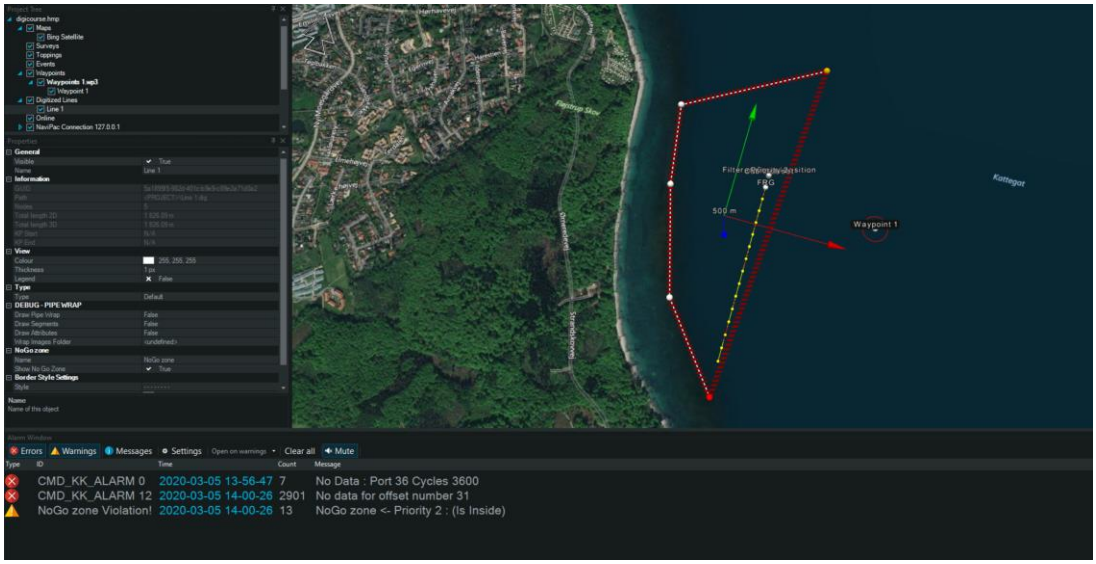
Figure 38 Waypoint tracking – potentially entering zone

7.6.3.1 Planning

It is prohibited for a vessel not listed on a no-go zone whitelist to navigate a runline that passes through that no-go zone. An alarm will sound.

It is prohibited for a vessel not listed on a no-go zone whitelist to navigate a waypoint that passes through that no-go zone. An alarm will sound. Navigation to a waypoint is continuously monitored and if the route passes through a no-go zone, the alarm will sound.

In both cases the Exclusion zone will be shown.



7.6.3.2 Alarms

Alarms are shown as warnings in the Alarm window. The alarm window can have sounds set to go off when an alarm is triggered. An alarms snooze time can also be set in the Alarm Window settings. Alarms can be removed and snoozed.

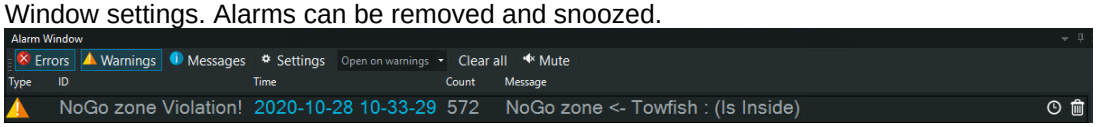


Figure 39 Exclusion zone alarms

For this reason, a popup message box can be made to pop up if entering a no-go zone.

7.6.4 Confinement zones

We have also (as a spin off from the no-go zones) introduced monitoring for staying within a zone – called Confinement zones. This feature is enabled at waypoints, where a selected vehicle (dynamic or offsets) can be selected, and then alarms can be generated for each waypoint's radius.

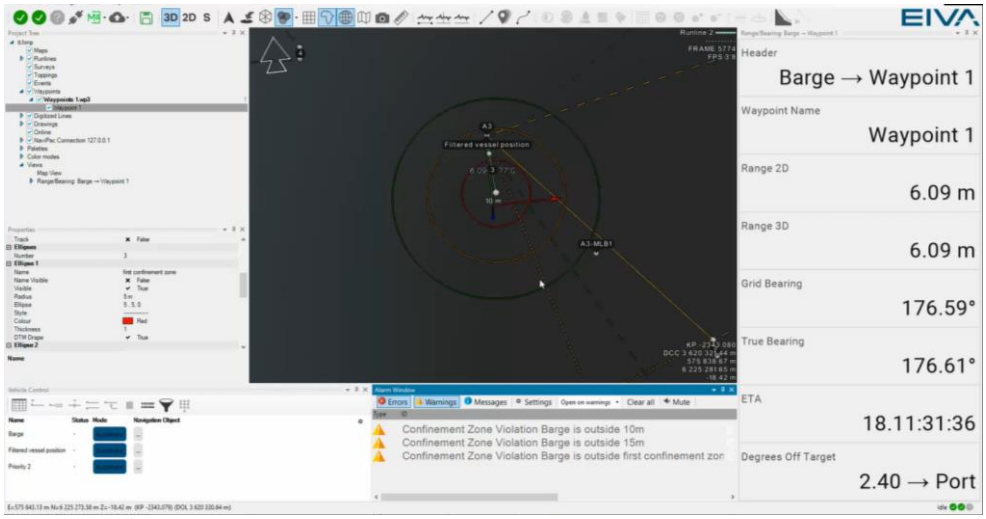


Figure 40 Alarm on Confinement zone

7.6.5 Barge runlines

NaviPac 4.5 includes the advanced creation of barge runlines, that is the route a lay barge should follow to hit the cable or pipe route.

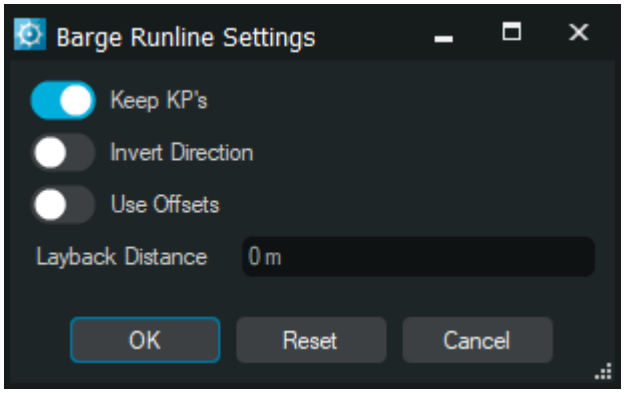


Figure 41 Creating barge line

The barge line can be based on fixed layback or dynamically positioned by selected a vehicle (Offset).

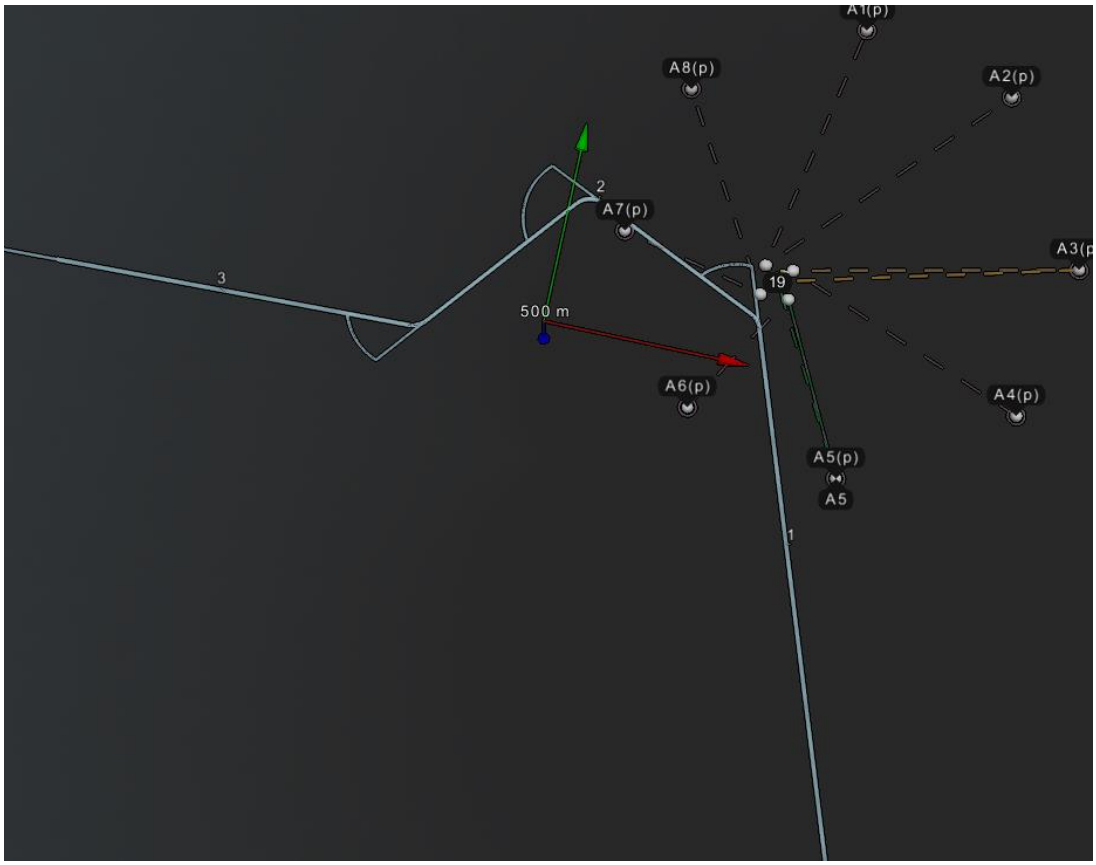


Figure 42 Original and barge line (barge is the funny shape)

7.6.6 Recording monitor

The new Log Monitor keeps an eye on changing files. This window tells you if a specific file type is being logged or not, simply by looking at the last write time for a specific extension in a specific folder. This extends not only to EIVA file types, but also to monitoring any other file types currently being logged.

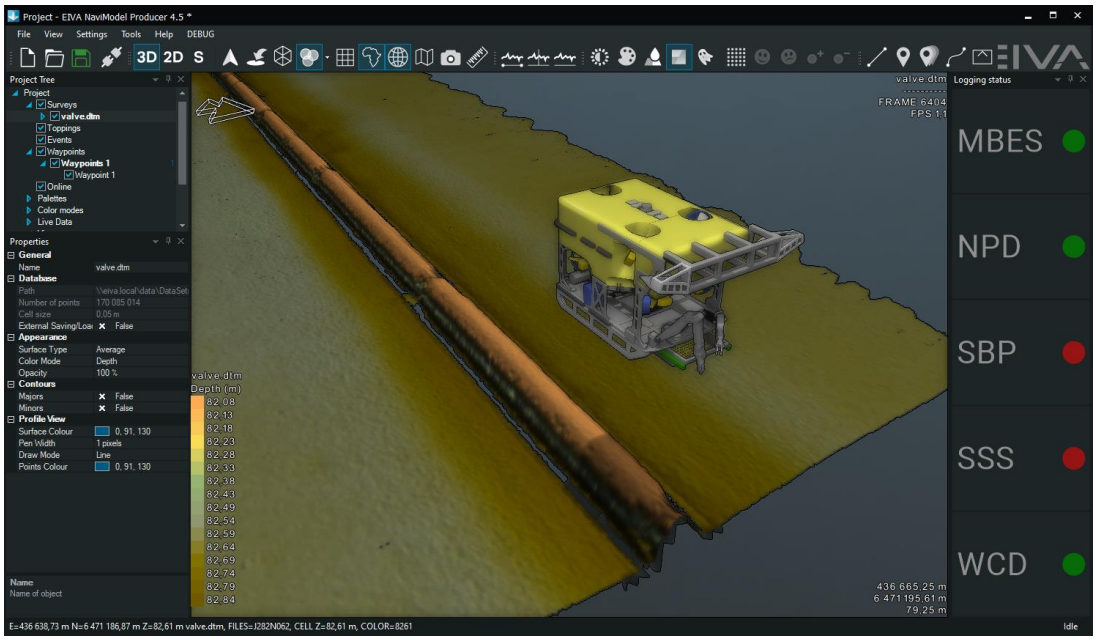


Figure 43 Monitoring file status

7.6.7 Sonar data display

The Helmsman's Display acts as the data display frontend for NaviScan – and often this results in a huge amount of data are send across from NaviScan. You can control this from NaviPac, as you can reduce the number of points per swath:

- Along
  Take every n'th swath
- Across
  Take every n'th beam
- Across with boundary
  Take a number of beams – select where data changes (efficient on flat seabed or wall)
- A combination of across and along

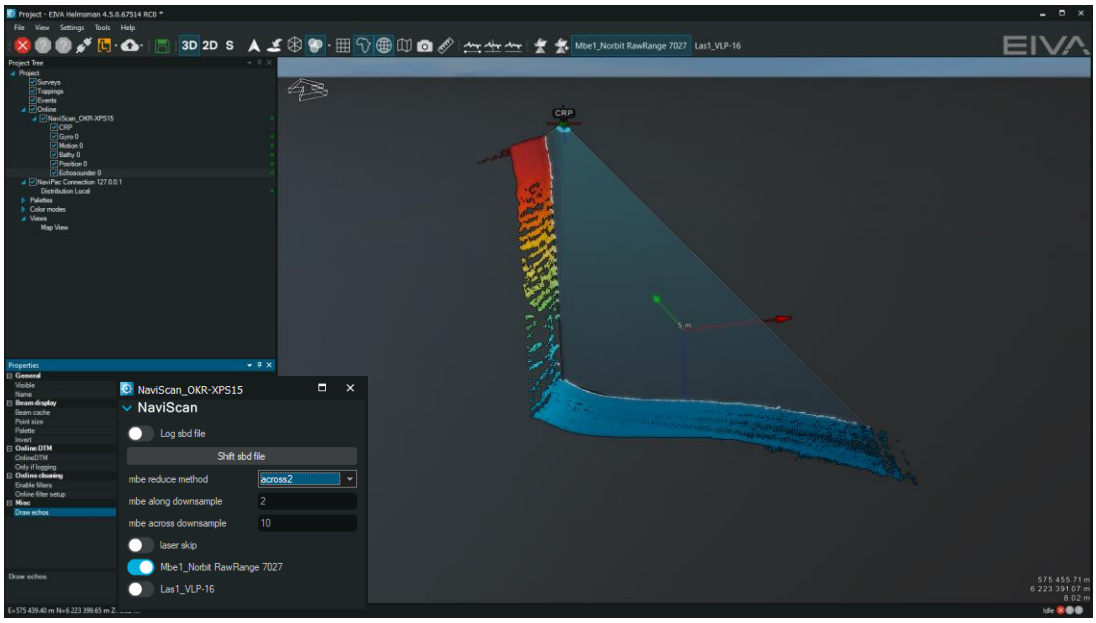


Figure 44 Sonar data control

The data reduction is applicable for:

- MBE sonar data
- Laser data
- Forward looking sonar
- Sidescan data

You can choose different methods for each sonar.
This tool is especially useful for the remote supervision over low bandwidth network.

You can also direct Start/Stop logging of NaviScan from the Helmsman's Display.

7.6.8 Position to KP calculator

NaviPac 4.5 includes an extended version of the KP to position calculator, which enables you (for an active runline) to convert position between line coordinates and world coordinates, map preview and waypoint creation.

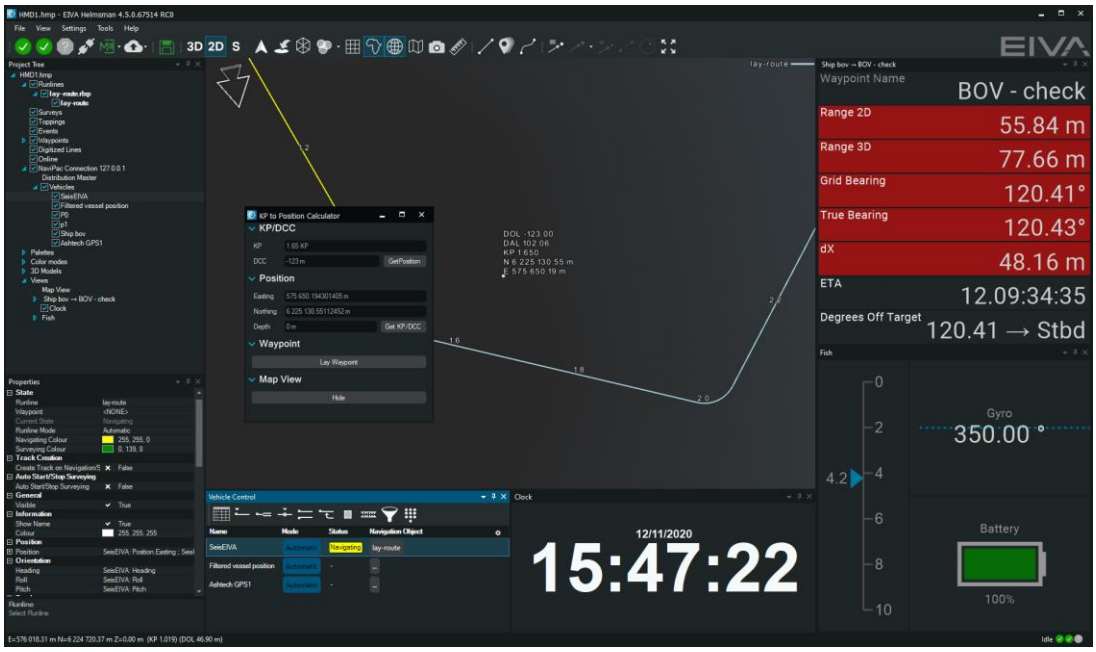


Figure 45 KP/DCC to world coordinates

7.7 IT

The structure of NaviPac 4.5 have changed, so the user no longer needs to make modifications to UAC (user account control) when running NaviPac – that will make the usage much safer as seen from an IT security perspective.

Installation still requires admin rights, including both the setup of NaviPac and the Wibu-key dongle security system, but the operator will not be prompted at each start-up.

8 Minor improvements

A series of minor improvements, bug and crash fixes etc have been accomplished.

8.1.1 New simulator

The built-in simulator has been extended, so you can simulate each vehicle independently.

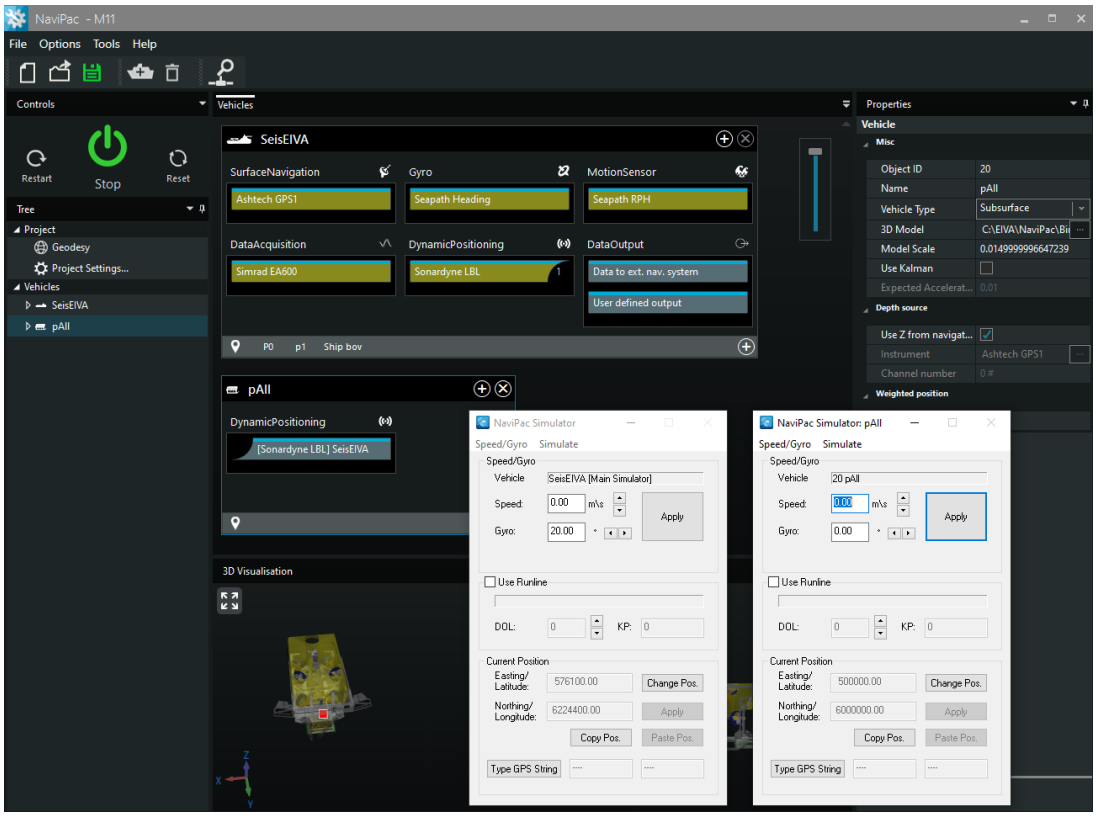


Figure 46 Multiple simulators

As default NaviPac uses a single simulator for all vehicles – but you can force each individual vehicle to have its own simulator via the Simulate menu and edit the INI file as shown (requires a restart to take effect):

[Object20]
Simulate=1
Easting=500000.000
Northing=6000000.000

8.1.2 Drivers

A few new drivers have been added to NaviPac:

- Enhanced driver for Forssea NAVCAM
- Enhanced Sonardyne SPRINT-Nav driver
- Control and zoom of Forward-looking sonar display

9 Known limitations

9.1 Compatibility

The new version of NaviPac uses a new data structure for the configuration, so the old combination of Gensetup.DB and NAVIPAC.INI are no longer supported.

9.2 Classic Helmsman's Display

Direct access to the classic Helmsman's Display (generation 3) is no longer supported.

9.3 Admin rights

The user of NaviPac do still need to have administrator rights, as we need to have full control pc clock and the availability to give certain processes higher priority. It must furthermore be the same user account that installs the software.

9.4 Charts

NaviPac 4 does not support third-party charts from for example, 7Cs and C-Map. Instead, you may use an extensive library of free background maps from the internet – like Bing or USGS Topographic maps or the WMS solution from SevenCs.

9.5 Geodesy

NaviPac 4 supports the same amount of predefined and EPSG-based geodetic solutions as version 3 – they are now just much easier to configure.

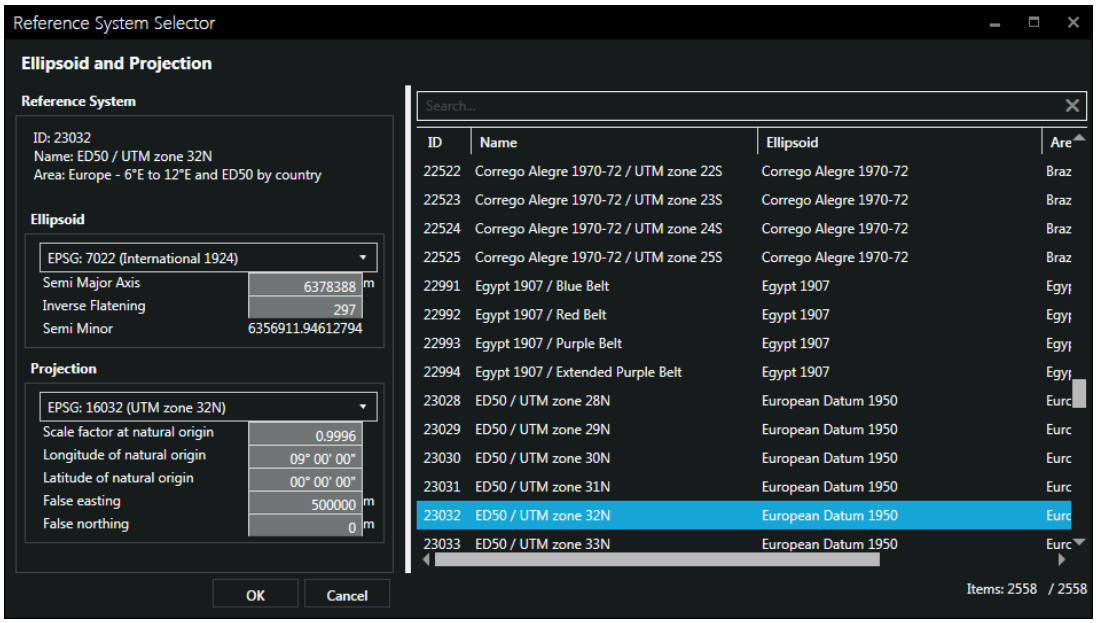


Figure 47 NaviPac 4 geodetic settings

There is a limitation in the Helmsman's Display: if you are using web-based charts, then they are most often defined in WGS84, while we are currently only supporting methods based on the Transverse Mercator system.

9.6 Master Helmsman's Display

When operating with multiple Helmsman's Displays the one running on the main NaviPac computer must be the master.

9.7 $PSIMSSR

NaviPac supports Kongsberg raw USBL telegram $PSIMSSR, but the data is assumed to be roll/pitch compensated, which isn't always the case. Therefore, we recommend that you instead use the standard $PSIMSSB telegram.