RELEASE NOTES

NAVISUITE UCA 4.5

Last update: 25/06/2021

Contents

1 Release notes NaviSuite Uca 4.5

The NaviSuite Uca software version 4.5 is a major release and consists of a series of features based on new user requirements, features inherited from the core software packages NaviModel and NaviPac Helmsman's Display as well as several improvements and bug fixes.

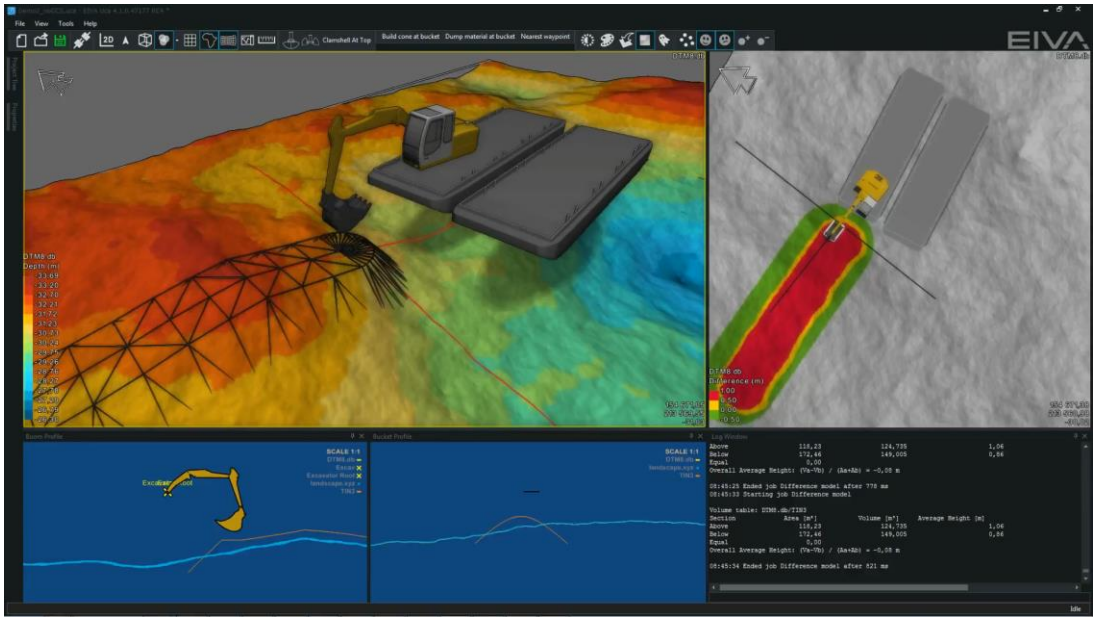

Figure 1 Example of an Uca setup for rock placement

1.1 Formatting convention

Items formatted in bold are properties, buttons, or other elements in the **NaviSuite Uca** software.

2 New features

2.1 Simplified method to change buckets

Many operations require the usage of different buckets. Changing buckets can be done via the **Setup Selector** option.

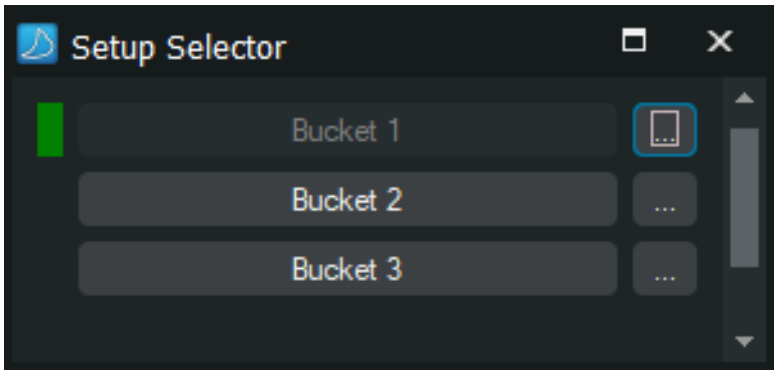

Figure 2 Setup Selector option for simplified switching between buckets

The **Setup Selector** allows you to define multiple buckets with different dimensions and saves them in the Uca project. The defined buckets can be used within Uca (display and excavation) and in NaviPac DataMon.

Additionally, the **Setup Selector** can handle more complex configurations that eventually involve changing the dredger dimensions.

2.2 Drivers

- Added support for direct communication with Liebherr dredgers via DataMon

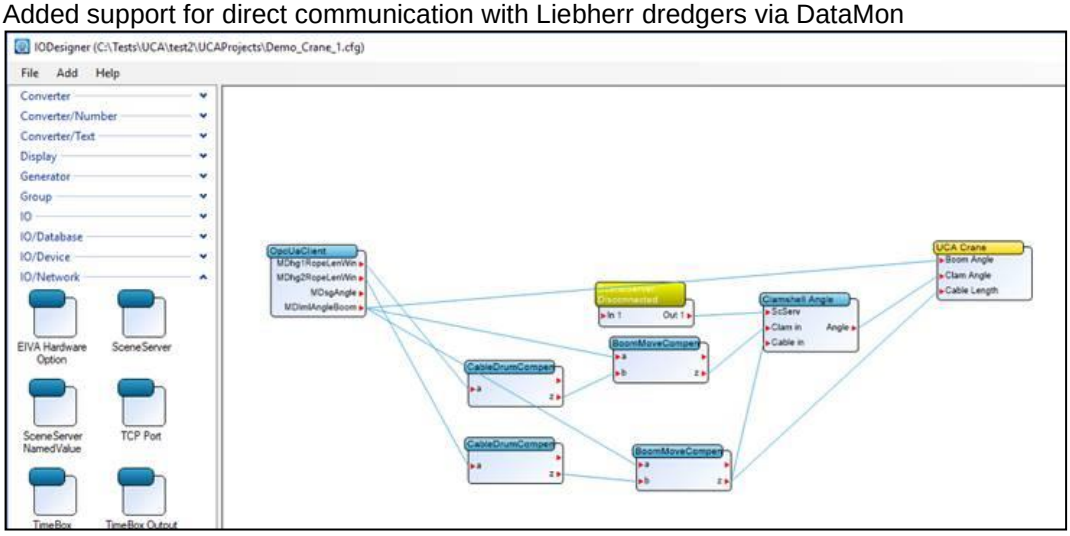

Figure 3 DataMon Liebherr sensor configuration

- Support for placing eTrac sensor on the upper pin of an Excavator dog bone configuration, to reduce wear and risk of damage.
- Support for SignalQuest inclinometers.
- Features for marking dumping of material. Can be done via mouse click or external device such as foot pedal.

2.3 Enhancements

- A **NaviPac** status indicator has been added in the Uca interface. This can be useful to indicate if the GPS signal has lost RTK.

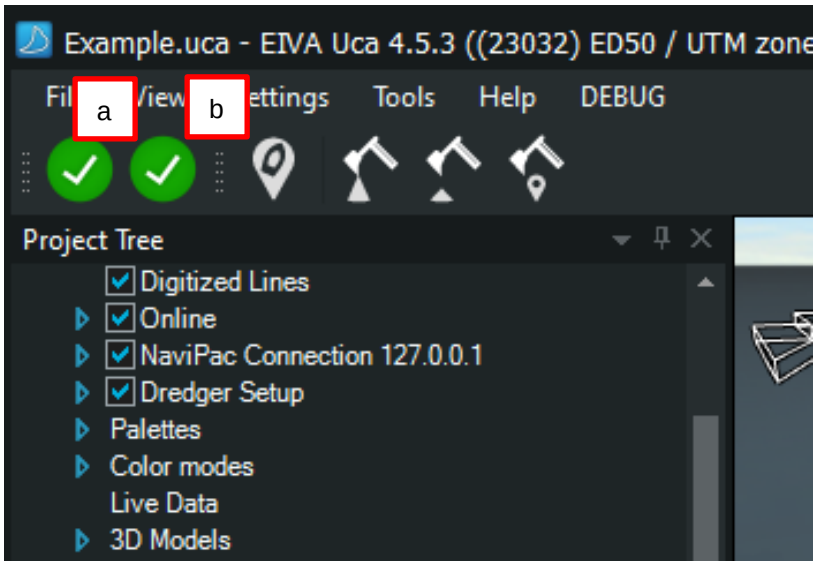

Figure 4 NaviPac status indicators.

'a' = Status for connection to NaviPac. **Are we connected to NaviPac?**
'b' = Internal NaviPac status. **Is everything ok in NaviPac?** If NaviPac is set to warn about loss of RTK, this one will change colour to show the current status, also in case RTK is lost.

- Computer aided single bucket calibration. From a user defined number of observations, measurements of bucket angle and -offset observations are made and from those the bucket calibration angle can be estimated and applied. Typically, 5 observations should be applied. For further information about the single bucket calibration process, please refer to the EIVA document: **UCA BUCKET C-O CALIBRATION**.

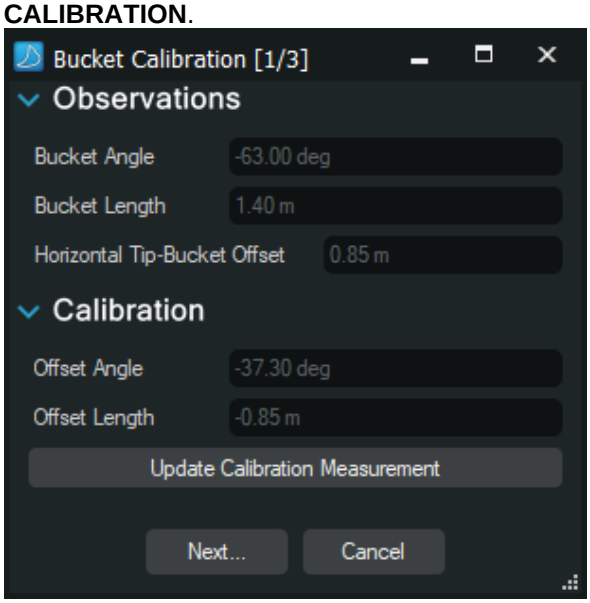

Figure 5 Bucket calibration wizard

- Ghost marking/shape added to ease return to previous position

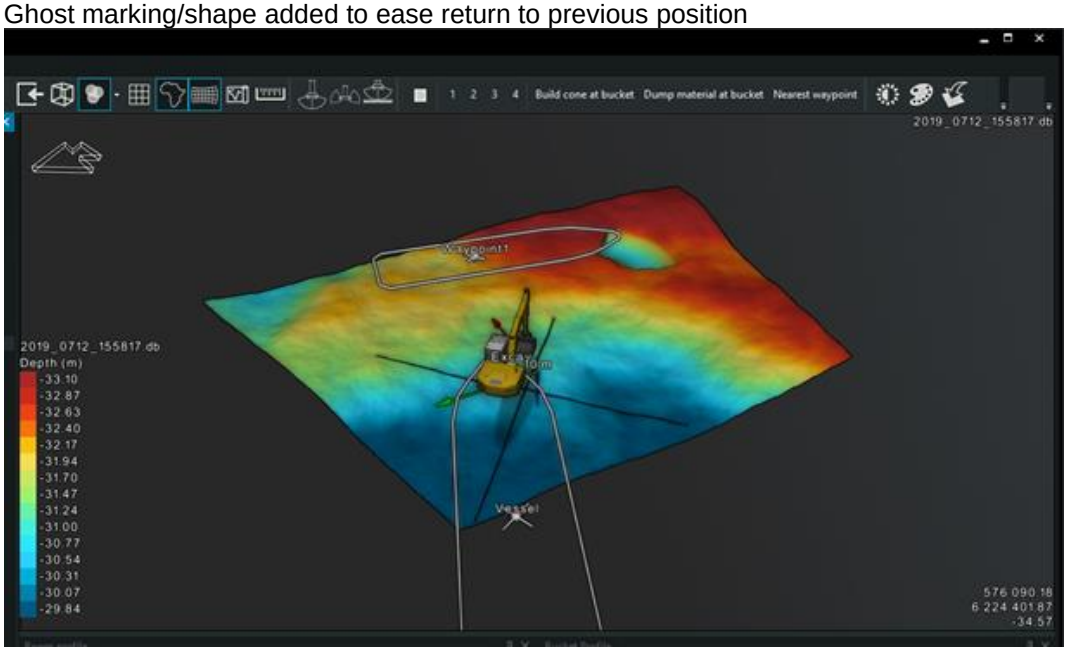

Figure 6 Map view ghost marking/shape

- Added Operations Radius to indicate how far the arm can reach before moving position. The colour can be defined by the user.

Figure 7 Depth based operational radius

- Improved volume report
- Added background maps from Eniro AB (Danish nautical maps, not certified for navigation)
- Added the **EIVA Licence Activator** to support the licences from the **My EIVA** self-service portal for NaviSuite software.
- Added the EIVA Eventing package and the Uca reference points (POI) can be used for assigning events in the Eventing Tablet (See chapter 3.5).

- The default backhoe excavator can now be displayed with visible threads

Figure 8 Backhoe excavator with threads shown

- Added functionality to move the bucket reference point can be moved (used for depth and position)

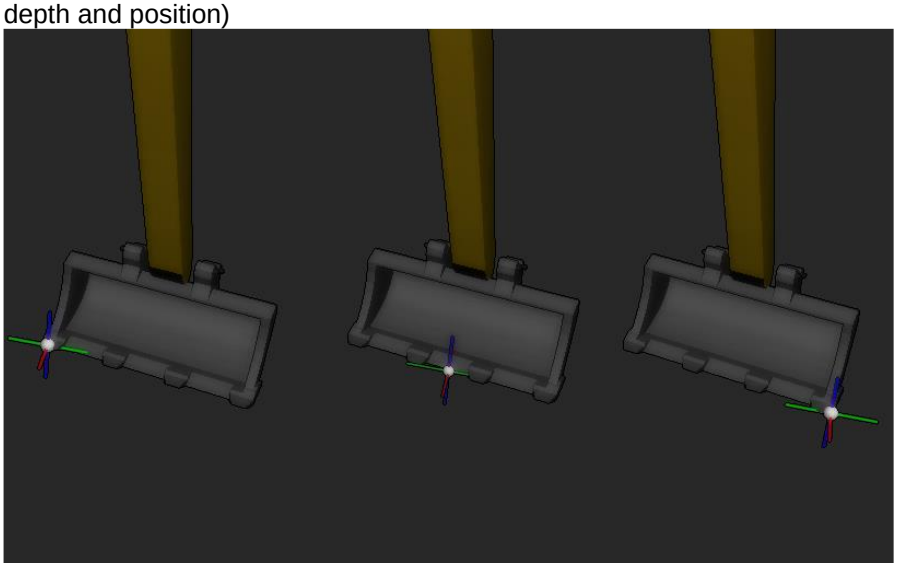

Figure 9 Buckets with different bucket reference points

- Added automatic start of relevant background programs, eg NaviPac and DataMon.

- Added **Locked mode** option.
  In this context a password can be defined for a project. Doing so will allow a super user to configure Uca and then **lock it** so essential settings cannot be changed while in operation. Selecting buckets, creating ghosts, creating events, etc will still be available.

2.4 Bug fixes

- Fixed issues with default excavator template
- Fixed crash during application load, happening if external programs did not respond in time
- Fixed problem with spaces in filenames for UCA files
- 3D model representation of dredger arm synchronisation improved to avoid the 3D model lagging behind the real world and the excavation in the terrain.
- Additional minor fixes
- Faster program start-up

3 Additional features from other EIVA software packages

NaviSuite Uca version 4.5 is partially based on the code base of NaviModel and NaviPac Helmsman's Display and will as such inherit a series of improvements from versions 4.4 and 4.5 of these products.

In this context we would like to mention a couple of features that are relevant for Uca. More details can be found in the release notes for the specific software packages on the EIVA download site.

3.1 MESH import/export

In NaviModel we have implemented support for additional mesh files such as .obj and .fbx to load detailed 3D models.
Mesh exports can be generated from catenaries, DTMs and point clouds.

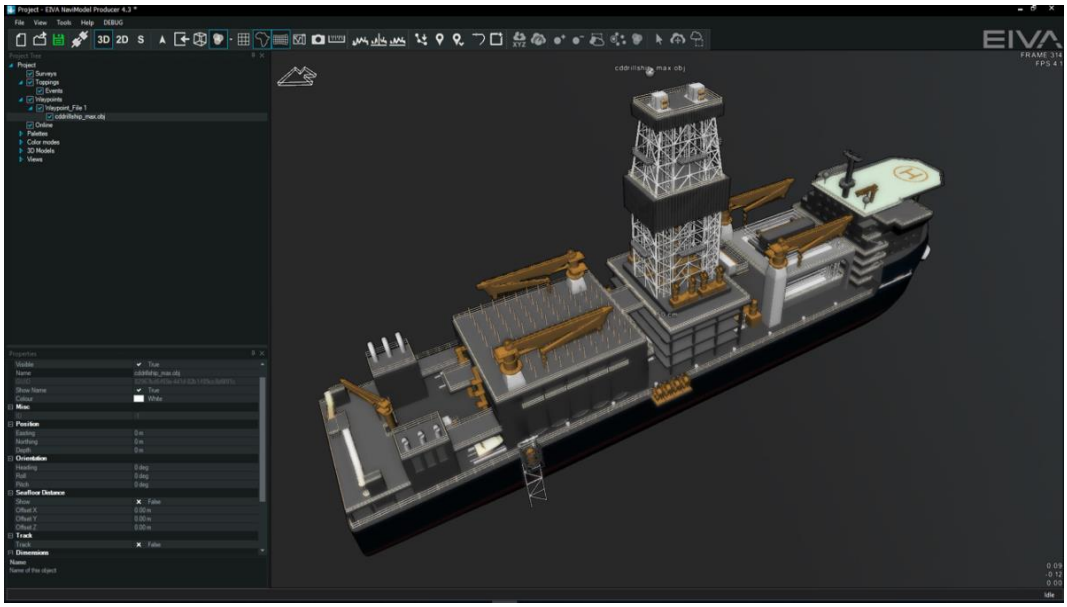

Figure 10 Mesh 3D models in NaviModel and NaviSuite Uca

3.2 AutoCAD reader

NaviModel includes an upgraded CAD reader and supports DWG as well as DXF file formats.
The files are loaded in an efficient LevelOfDetail model, supporting both 2D and 3D drawings. You may choose to enable/disable layers from the Project Tree.

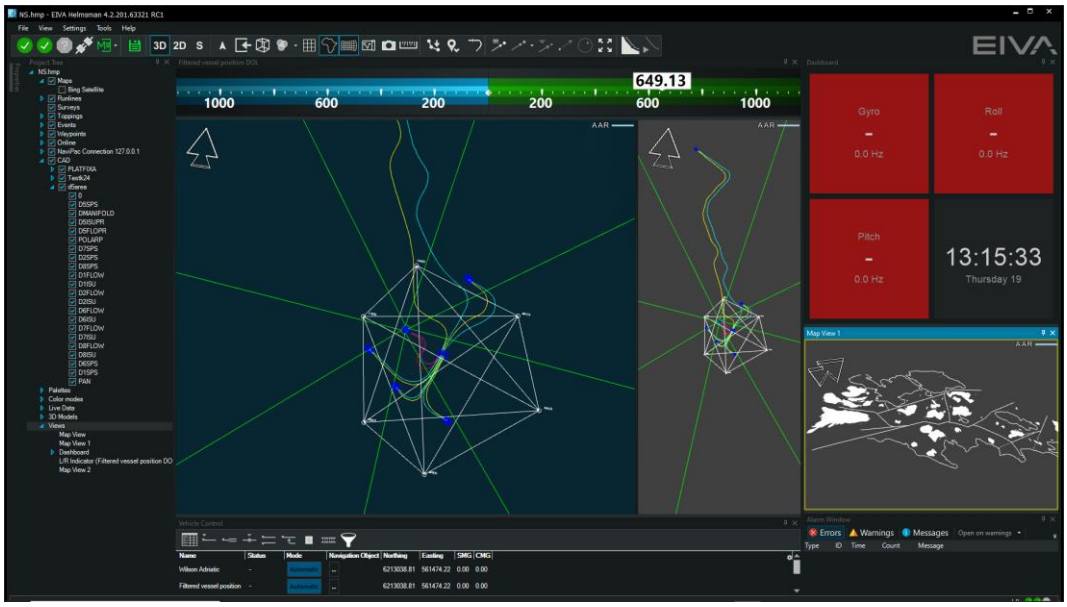

Figure 11 AutoCAD DWG import with selectable layers

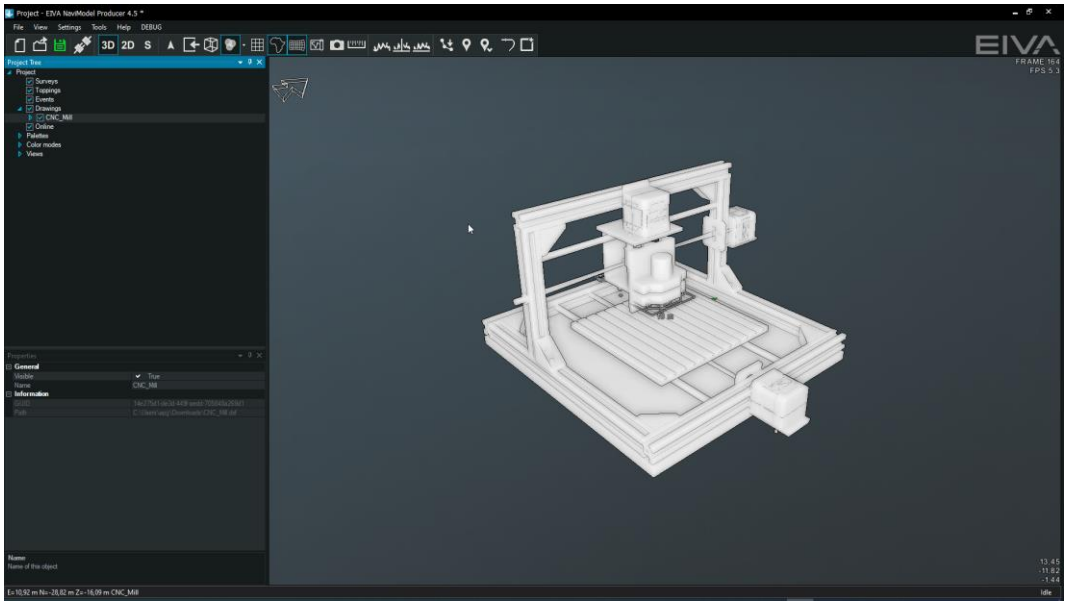

Figure 12 Example for a 3D AutoCAD

3.3 New web services

NaviPac has been supporting the web-based services for tiled maps (TMS) like Bing for a while. This has been expanded to support the more interactive WMS solution.

Uca initially asks the server about layers and parameters and then enables the user to control the settings.

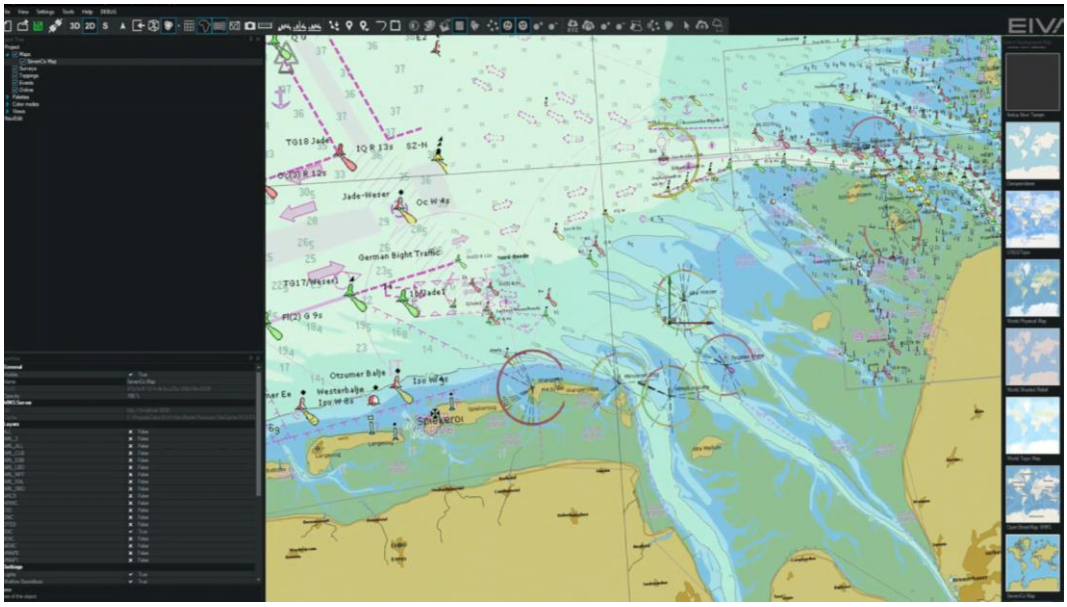

Figure 13 Example of the SevenCs map server

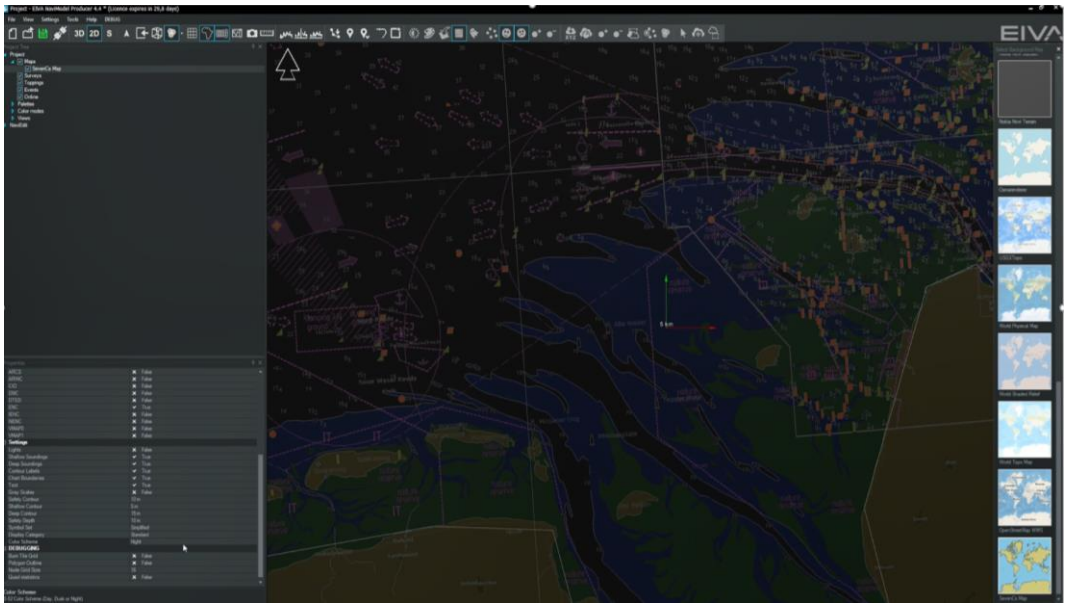

Figure 14 Example of the SevenCs map switched to night vision

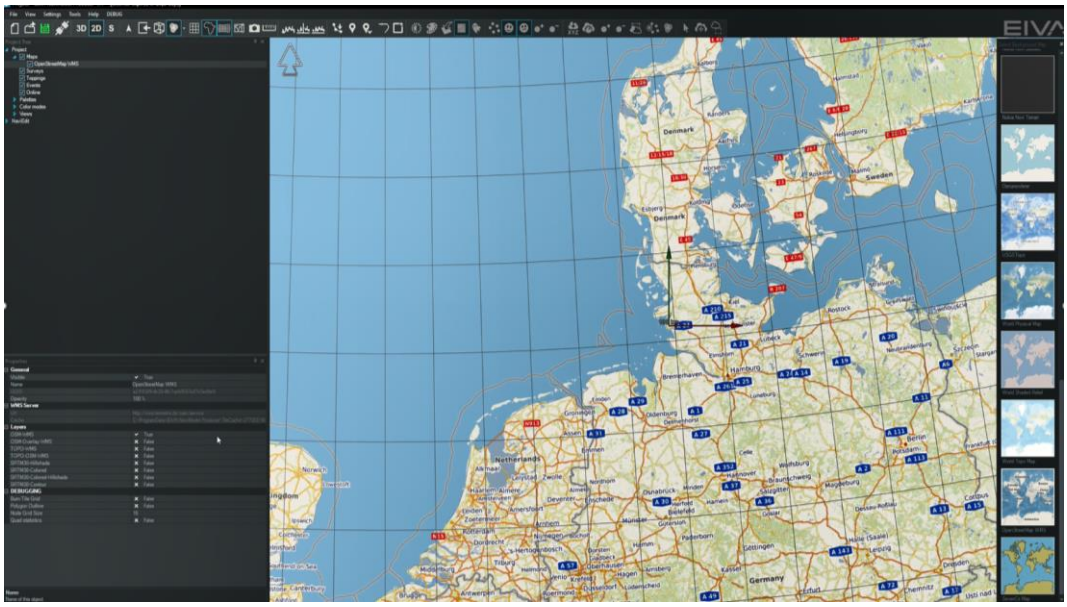

Figure 15 Example of a background map from Open Street Map WMS

Background maps can be added from the installed map selector tool, if you have other public links let us know so we can include them.

3.4 US Survey Feet

NaviPac 4.5 re-introduces the data unit selection, so you can work in eg US Survey Feet as known from NaviPac series 3. This has also been adapted by Uca.

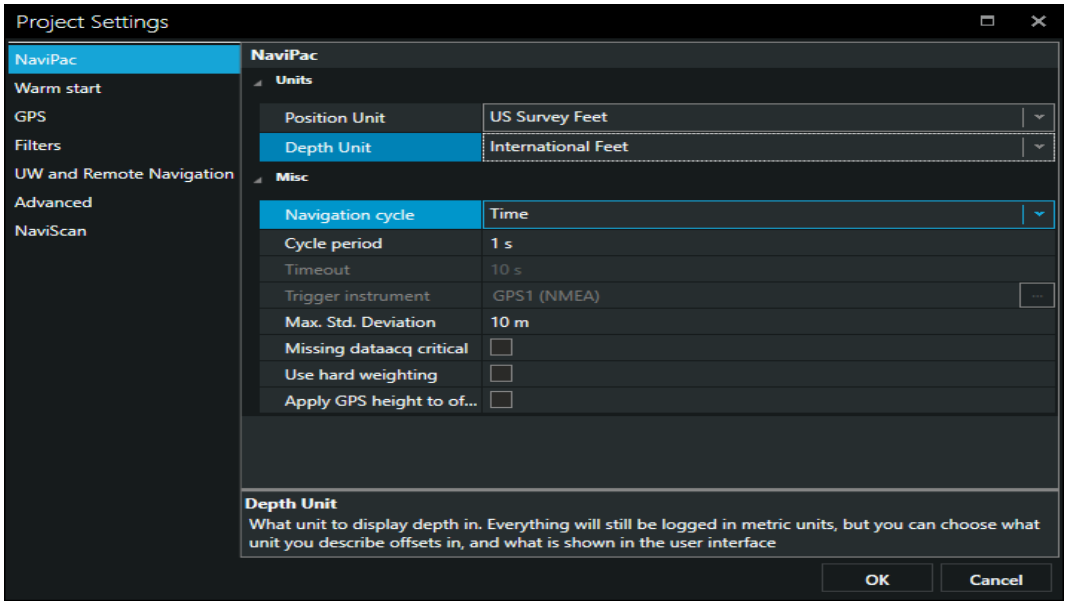

Figure 16 Data unit selection in NaviPac

3.5 Event Tablet

The Event Tablet from NaviPac Helmsman's Display is included in the Uca software now. The Event Tablet can be added from the Uca menu bar under Views. The user can

customise the size and colour of the event icons freely and position it where needed, eg move it to a second monitor.

If you are working on a project with an existing set of event definitions, then it is possible to auto-generate the Event Tablet.

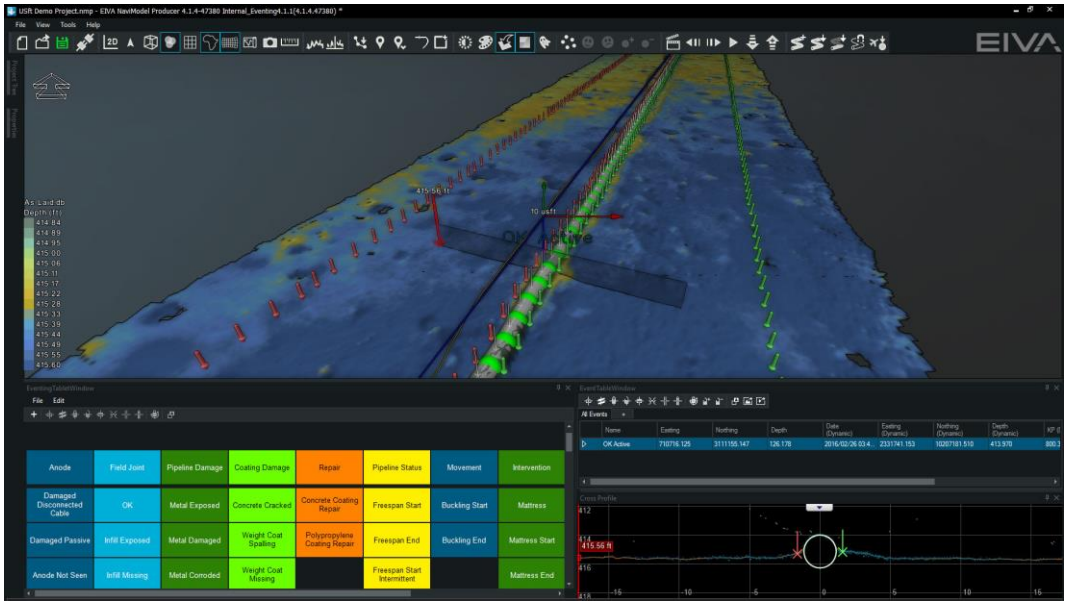

Figure 17 Possible use of the Event Tablet

4 Known limitations

4.1 3D drawings

NaviSuite Uca uses a 3DS format for graphical presentation. Realistic drawings are the key to getting good visualisation. To ensure this, all moving points must be connected to the correct rotation point in the drawing.

Please note that the update of the DTM is not based on the 3D drawing, but a vector hierarchy. Consequently, incorrect drawings do not result in incorrect DTMs, as Uca maintains a DTM where material has either been removed or added.

4.2 Using NaviSuite Uca without a barge position

The primary object in the configuration of the excavator system can be used for two different setups:

4.2.1 Excavator and barge

This is the standard option – and, in this case, the barge is positioned as the primary object and the excavator as a dynamic object (ie the excavator has a remote position).

4.2.2 Excavator only

You can also position the excavator as the primary object (based on a standard GPS input) or as a dynamic object (only relevant for setups including the Trimble GCS900).

Please note, however, that you need to have a primary object – otherwise you'll get a series of alarms in the system. We suggest (and that is how the demo database is set up) that you route the GPS position back into the system (output NMEA GGA message on UDP/127.0.0.1 and interface it as the primary GPS).

4.3 Trimble GCS900 interfacing

When connecting NaviSuite Uca with Trimble GCS900, you need to use the data stream twice. The position data is used to position the excavator in all three dimensions, and DataMon also uses the angular information to position the bucket. To share the data stream, we recommend (as illustrated in Figure 3 Example of a DataMon setup for Trimble GCS900) that you interface the input in DataMon and route it to the main setup. A sample configuration of this is available within the installed Uca software.

Please note that the Trimble Earth Works isn't an open format, and as such not integrated with the UCA Trimble interface

4.4 Object mapping

In NaviPac you may select the object number for the excavator freely. However, we recommend that you use object number 20, as used in the default configuration of the excavator, therefore reducing the number of necessary configuration changes.

4.5 Geodesy

NaviSuite Uca supports most geodetic solutions in the world – including the EPSG Geodetic Parameter Dataset – as it is based on the NaviPac geodetic kernel.

By working in grid coordinates, the software provides a powerful tool no matter where you operate in the world. However, some of the tools in the display (for example, the overlay of maps) may require geodetic transformation to work.

NaviSuite Uca currently only supports geodetic transformation for the following projections:

- Universal Transverse Mercator (UTM)
- General Transverse Mercator (TM)
- Lambert conformal conic (LCC)

4.6 Available templates

NaviSuite Uca includes a default template for backhoe dredger – more will be added later.

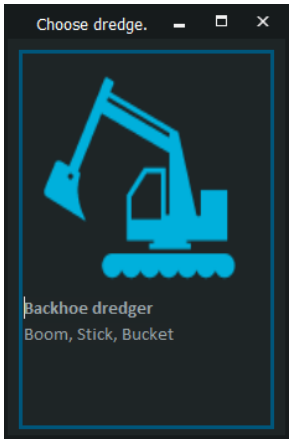

Figure 18 Backhoe dredger template

4.7 Backwards compatibility

The structure of NaviSuite Uca installation and projects has been changed and we recommend uninstalling older versions before use. Please also note that older edition project files are not directly compatible and will require the recreation of the setup.

4.8 Suction dredger support

In NaviSuite Uca 4.5 does not support these hardware and project types, suction dredger setup, wire crane setup, clamshell- and rotation clamshell setup. They will be added later.