

# Quick start guide

## M3 BATHY Multibeam Echo Sounder: Using QINSy - Lite





# *M3 BATHY Quick start guide: Using QINSy - Lite*

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#### **Support information**

If you require maintenance or repair, contact your local dealer. You can also contact us by phone at: +1 604 468 8144 or by email at: km.support.vancouver@km.kongsberg.com. If you need information about our other products, visit our web site. On the web site you will also find a list of our dealers and distributors.

#### Feedback

To assist us in making improvements to the product and to this manual, we welcome comments and constructive criticism. Please send all such – in writing by Email to: **alan.zhao@km.kongsberg.com** 

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# About this manual

## Purpose

The purpose of this document is to provide the necessary instructions and reference diagrams required to properly configure the M3 and QINSy software. Installation of all M3 hardware should be complete before reading this guide.

## Target audience

The reader is expected to have a background in multibeam echo-sounder bathymetry survey techniques and experience of using QINSy software.

# Licence information

The M3 Software is included with the M3 BATHY system. Updates are available free of charge and can be downloaded from: <u>http://www.km.kongsberg.com/mesotechsoftware.</u>

A QINSy <sup>®</sup> Lite license is supplied as part of the standard M3 BATHY system. Updates can be obtained directly from QPS.

# Software version

The software references and associated figures in this manual are using:

- M3 Software v1.62
- QINSy<sup>®</sup> Lite 8.10 (Build 2015.06.14.1)

# Registered trademarks

- M3 Sonar<sup>®</sup>
- QINSy<sup>®</sup>

# M3 BATHY

This is the quick start guide for the software configurations of the M3 BATHY shallow water bathymetric survey system.

This manual does not give a detailed description of every function in the M3 and QINSy software. Refer to the M3 user manual and QINSy user manual for detailed information.

#### Topics

- *System description* on page 5
- *System diagram* on page 5
- *Support information* on page 6

# System description

The M3 BATHY is a compact, lightweight multibeam echo-sounder system for shallow water survey. The M3 BATHY system software package includes the M3 software and the QINSy software.

The M3 software controls the M3 multibeam echo-sounder, acquires sounding data and exports the sounding data to the QINSy software.

The QINSy software receives the sounding from the M3 software through UDP with the **Kongsberg Mesotech M3** driver.



### System diagram

Figure 1. System Diagram

- All sensors including GPS, Gyro, Motion Reference Unit (MRU), and ZDA need to be connected to the QINSy software. It's optional to split the sensor data to the M3 software for M3 local recording.
- The M3 software sends sounding through EM .ALL format over UDP.
- If the QINSy software and M3 software are running on separate computers, split the ZDA string to the QINSy software and M3 software so that both computers' time can be synchronized with ZDA time.
- If the QINSy software and M3 software are running on the same computer, configure the ZDA string only to the QINSy software.

## Support information

If you require assistance with your M3 BATHY system, please contact:

Kongsberg Mesotech Ltd. Phone: +1 604 464 8144

Email: km.support.vancouver@km.kongsberg.com

If you require assistance with QINSy software, please visit QPS support website, <u>https://confluence.qps.nl/display/support/QPS+Support+Portal</u>

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# Getting started

#### Topics

- *Powering on the system* on page 7
- *Powering off the system* on page 8
- Starting up the M3 software on page 8
- Starting up the QINSy software on page 10

### Powering on the system

- 1. Starting up the Sonar Processor laptop:
  - **a.** Power on the laptop.
  - **b.** Log in to Windows.
- 2. Powering on the Surface Interface Unit:
  - **a.** Plug the AC to DC power brick into the breakout box connected to the Surface Interface Unit.
  - **b.** Confirm the power indicator light on the Surface Interface Unit's power supply is turned on.
  - **c.** It will take the Motion Reference Unit (MRU) up to 15 minutes before full accuracy is achieved.
- **Note!** If the vessel has high dynamics during start-up, the MRU may run into problems. At worst, the alignment must be redone by restarting the MRU. High dynamics during start-up means that the MRU has moved up to  $\pm 10$  degrees on all the orientation axes.
  - **d.** The GPS will also need up to 15 minutes to acquire all satellites and achieve full accuracy.

Note! If the Surface Interface Unit (SIU) is powered on before the processor laptop, the SIU will start sending GPS strings to Windows. There is a known issue with Windows where it may detect the GPS string as a serial mouse and the mouse cursor will jump around. To fix this, turn off the SIU or disconnect the GPS, restart Windows, then turn on the SIU or connect the GPS.

### Powering off the system

- **1.** Powering off the Surface Interface Unit simply requires unplugging the power cord or switching off the breaker to the Surface Interface Unit's AC to DC power-supply brick.
- 2. Powering off the Sonar Processor Laptop:
  - a. Save your settings, and then close the QINsy and M3 Software.
  - b. Shut down Windows.

### Starting up the M3 software

- **1.** Start the M3 software:
  - **a.** Double click the M3 software icon on the Windows desktop.
- 2. Confirm that the M3 Sonar is connected to the system:
  - a. Select Setup menu > System Configuration > Devices > Sonar Setup.
  - **b.** Click the **Discover Sonar Heads** button.
  - **c.** Confirm that the Sonar Head appears in the **Online Sonar Heads** list. If not, check the Ethernet connection between the laptop and the M3 Sonar Head.

#	Name	Serial Num	IP Address	Port	Discover Sonar Heads
1	Discovered 1	1108-001	192.168.1.234	30	Use Discovered Head
iec	overv terminate	ad .			

- d. Select the Sonar Head listed under Online Sonar Heads and click on the button Use Discovered Head.
- 3. Confirm that the mounting offsets have been entered correctly:
  - **a.** Click on the **Deployment** tab > **Mounting Offsets** in the System Configuration window.

**b.** Confirm that the offsets are entered according to the *Configuring the sonar and sensors* section on page 16. Default configuration for M3 BATHY – Downlooking is shown in the figure below.



- c. Close the System Configuration window.
- 4. Confirm that the M3 Software data export and profiling settings are correct:
  - a. Select Setup menu > Preferences.
  - **b.** In the **Preferences** window, confirm the IP address and port settings are configured according to the *M3 Sonar data recording and exporting* section on page 19. The default values are shown in the figure below.

UDP Data Export	
Export to File	Water Column
Port for .ALL format:	20002
Port for PMB format:	20006
Remote IP Address:	127.0.0.1

- c. Close the Preferences window.
- **d.** Select **File** menu > **Exporting Format**, then confirm the format is set to "Profile Point (.all)".
- e. From the **Profile Settings** window (if not open, select **Display** menu > **Profiling Settings**), confirm either "Image and Profile" or "Profile Only" is selected.
- **f.** From the **Sonar Apps** menu, confirm that either "Profiling" or "Profiling Fast" is selected.
- 5. Connect the M3 Sonar and start exporting:
  - **a.** Select **Setup** menu > **Connect** to activate the M3 Sonar Head.
  - **b.** Confirm that the sonar image updates.
  - c. Click on the Export Data button located in the top-right menu of the sonar screen.

# Starting up the QINSy software

- 1. Insert the QINSy dongle into a computer USB port.
- 2. Start the QINSy software:
  - **a.** Double click the QINSy icon on the Windows desktop.
- **3.** Confirm that the correct database file is used:
  - a. Select Setup button from the QINSy Console, select the correct database file in the Active Template, then close the Template Manager.
- 4. Bring QINSy online for data acquisition:
  - **a.** Click the **Online** button from the QINSy console to bring QINSy online for data acquisition.
  - **b.** Check the **QINSy Time Synchronization** window to have **Valid Time Synchronization**.

me 08:37:05.016 08:37:06.001	Status						
08:37:05.016		^	Status	Last Error			
09:31:00:001	Valid Time Synchronization		Stat	tus	OK [Timetag only]		
08-37-06-016	Valid Time Sunchronization		Accu	uracy Sundhranization	1 [msec]	10, 27, 14 Windo	was Disabled
08:37:07.001	Windows System Time = 17/04/2015 - 15:37		Last	Tao Arrival	Quysy: 2015-04-17	38:37:14 Who	vs: Disabled
08:37:07.016	Valid Time Synchronization		Time	Tag Accuracy	Offset -1 [msec]		
08:37:08.005	Windows System Time = 17/04/2015 - 15:37				error a fundel		
08:37:08.016	Valid Time Synchronization						
08:37:09.005	Windows System Time = 17/04/2015 - 15:37						
08:37:09.016	Valid Time Synchronization		0.6	Accuracy	_		
08:37:10.005	Windows System Time = 17/04/2015 - 15:37	1	0.0	Accuracy			
08:37:10.016	Valid Time Synchronization		0.5	-			
08:37:11.005	Windows System Time = 17/04/2015 - 15:37		ິພິ ∩ 4		1		
08:37:11.016	Valid Time Synchronization		SE 0.1				
08:37:12.005	Windows System Time = 17/04/2015 - 15:37		<u>_</u> 0.3	1 /			
08:37:12.016	Valid Time Synchronization		E oo				
00:37:13.005	Windows System rime = 17/04/2015 - 15:37		. 0.2				
08-37-14.005	Windows System Time = 17/04/2015 - 15:32	_	0.1	1/			
08:37:14.016	Valid Time Synchronization			$\mathbf{V}$			
		-	0		08:35:00	08:36:00	08:37:0

c. Select Online button to start the QINSy controller.



- **d.** From the Controller window, select **Settings->Computation Setup**.
- e. Click on GPS under the boat name, set Height status to Unreliable if not using RTK, then click OK to close the computation setup window

i i i i i i i i i i i i i i i i i i i	- C L GPS	System Parameters	e computation	
New Computation		Height status	Unrelia	able 💌
	🗹 🥂 M3	Preferred position SD	System (	Driver 💌
Copy Computation		Position a priori SD	0.	.50
		Preferred height aiding SD	Database	Setup 👻
EX I		Height aiding a priori SD	Auto	matic
		Dynamic a priori SD	Disa	abled
		System Thresholds		
		System Thresholds	Minimum	Maximum
		System Thresholds Parameter Age	Minimum	Maximum 5.00 [s]
		System Thresholds Parameter Age Solution Mode	Minimum 0	Maximum 5.00 [s] 0
		System Thresholds Parameter Age Solution Mode 3D Position RMS	Minimum	Maximum 5.00 [s] 0 1.73 1.00
		System Thresholds Parameter Age Solution Mode 3D Position RMS Position SD Height SD	Minimum 0	Maximum 5.00 [s] 0 1.73 1.00 1.00

f. From the Controller window, select Settings -> Session Setup.

Planning	
Storage	_ Format: *.grd - Sounding Grid ▼
	Filename: Plymouth grid.grd
Database	
-	
XTF	
	New Clear Layers Import
Sounding Grid	Systems-
sta.	System Layer
	M3 - Bathymetry Survey Data ▼
DTM File	M3 - Intensity (Beam Average) Disabled
۵ 🗐	
÷	
Control	
Fixing	

Select **Sounding Grid** from the left panel under **Storage**, select **\*.grd-Sounding** 

g. Create a new .grd file name.

📑 r iyinouai yiru.yru	File	Plymouth grid.grd
	Unit type	Survey Units
🛄 Survey Data	Base cell size	0.500000
	Origin	Generate automatically
	Grid Easting at origin	0.00
	Grid Northing at origin	0.00
	Maximum grid size	2097120 x 2097120 cells

h. Name the Survey Data layer to an easy remembered name, such as M3 Survey Data. Select Bathymetric data, Standard Grid: Mean, Count and 95% Confidence Level, then click OK.

Create New Sounding Grid				
🛐 new grid.grd	M3 Survey Data			
M3 Survey Data	Bathymetric data			
Reference	Standard Grid: Mean, Count and 95% Confidence Level 💌			
	Value			
	Hit Count			
	95% Confidence Level			
Add layer Remove layer	OK Cancel			

**i.** Select named layer such as **M3 Survey Data** for Bathymetry, and select **Disabled** for Intensity.

Element of the second sec				
	File			
Storage	Format:	*.grd - Soundi	ing Grid	-
	Filename:	Plymouth gri	id.grd	
<b>F</b>				
Severating Grid		New	Clear Layers Imp	oort
Sounding Glid	Systems			
	Systems System		Layer	
	Systems System M3 - Bathymetry	,	Layer M3 Survey Data	•
DTM File	Systems System M3 - Bathymetry M3 - Intensity (Be	, eam Average)	Layer M3 Survey Data Disabled	- -
DTM File	Systems System M3 - Bathymetry M3 - Intensity (Be	, eam Average)	Layer M3 Survey Data Disabled	•

j. Select **DTM File** from the left panel. Configure DTM storage file as **Format:** \*.qpd – QINSy Processing.

🞲 Session Setup - Storage -	DTM File		×
Planning	_ File		
Storage	Format:	*.qpd - QINSy Processing	-
	Mode:	Use Database storage name	-
	Filename:	0001 - Noname - 0001.qpd	
Database	Flagged FP:	All footprints are stored, flagged footprints are inactive (Recommended)	-
<mark> </mark> XTF	- Custome		
Sounding Grid	Systems	Use System	
DTM File			
	,		
Control			
Fixing			
	OK	Cancel	

**k.** From the Controller window, select menu **Options -> Displays** and click **Manage Sets** to add displays.

Display Manager	
Tasks <sup>™</sup> <u>Manage Sets</u> <sup>™</sup> Add Display <sup>™</sup> Change Options	Active Display Set

I. click New Set button in the Manage Display Sets window to create a display set

anne	Description		Template Db	Created By	Remarks
B_vessel_XPlore	r Created 17/04	/2015 11:01:57 AM	M3_vessel_Plymouth.db	Alan	<no displays=""></no>
<u>14</u> 07 000					

m. From the Active Display Set, select just created display set, and then click Add Display.

쪩 Display Manager	×
Tasks	Active Display Set  (None> (None> M3_vessel_XPlorer Qlose Help

- **Observation Physics Display** is recommended to add to monitor all the sensor input. Any RED entry in the **Observation** display means the data is not receiving properly.

- Raw Multibeam Display is recommended to add to monitor the multibeam data.

- **Navigation Display** is used to show vessel position and multibeam coverage on the navigation chart.

- **5.** Collect Bathymetry data using QINSy:
  - a. From the Controller console, click the Record button to start the recording.



**b.** Click the **Stop** button to stop the recording.

M3_vesse	el_Plymouth.db - Controller
<u>F</u> ile <u>V</u> iew	<u>S</u> ettings Sess <u>i</u> on <u>O</u> ptions <u>R</u> eset <u>H</u> elp
📑 💀	🎡   🌒 🖳 M3_vessel_XPI 🛛   🧠 🔂   🧏
	📲 🔘 📉 🥸
Status: Fix numbe Steered n	Online - RECORDING - Splitted when DTM file exceeds 100.0 MB r. <b>120</b> - Every 10.00 seconds ode: GPS - GPS Antenna on Champion Barge

# Appendix A: Supplemental Procedures

#### Topics

- M3 software setup procedures on page 16
- 6. Enter the UDP port in **Port for .ALL format.** This is the UDP port set in the thirdparty software to receive the .ALL data from the M3. Set the **Remote IP Address**; this is the IP address of the computer running the third-party software. If the third-party software is running on the same computer as the M3, enter **127.0.0.1**.
- 7. Close the **Preferences** window.
- 8. Click the **Export Data** button in the top-right menu to enable UDP .ALL data export.
- 9. Select Setup menu > Connect to activate the M3 Sonar Head.
- **10.** The M3 data-acquisition screen should be similar to the screen below:



• QINSy software setup procedures on page 20

### M3 software setup procedures

#### Configuring the sonar and sensors

- **1.** Run the M3 software.
- 2. Set up the sonar:
  - a. Click Setup menu > System Configuration.
  - **b.** Select the **Devices** > **Sonar Setup** tab.
  - c. Click Discover Sonar Heads.
  - d. Click Use Discovered Head to accept.

Onli	ne Sonar Heads:				
#	Name	Serial Num	IP Address	Port	Discover Sonar Heads
1	Discovered 1	1108-001	192.168.1.234	30	Use Discovered Head
Disc	overy terminated	d.			

e. Set the Trigger mode to synchronize the M3 with another acoustic device. Set the trigger mode to **Master** to send out a sync pulse so that the other acoustic device can be triggered by the M3 sync pulse. Set the Trigger mode to **Slave** to be triggered by the sync pulse from the other device. For M3 BATHY system, the default is set to **Master**.

Device Properties:			
Head Name	Discovered1		Get Default
Serial Number	1108-001		
IP Address	192.168.1.234		
IP Port	30		
IP Subnet Mask	255.255.255.0		
IP Default Gateway	0.0.0.0		
Trigger Mode	Master - Immediate Start	*	
Time Sync Mode	Master - Immediate Start		
	Slave - External Pulse Triggered		

- **3.** Set up the mounting offset:
  - a. Click Setup menu > System Configuration.

- **b.** Select the **Deployment** > **Mounting Offsets** tab.
- c. If the M3 is installed as connector towards bow, select **Downward** from the **Orientation**. If the M3 is installed as connector towards stern, select **Downward Inverted** from the **Orientation**. If the M3 is installed as sideways looking to scan vertical structures, enter the **Roll** angle.

Serial Number:	1108-001	
Name:	Discovered 1	
IP Address:	192.168.1.234	Z
Mounting:		
Parameter	Value	¥ 🟊 2
X Offset [m]	0.000	
Y Offset [m]	0.000	
Z Offset [m]	0.000	
Orientation	Downward	
Pitch Angle [de	g] -90.0	
Roll Angle [deg	] 0.0	
Yaw Angle [deg	] 0.0	

Figure 2. Downward Mounting



Figure 3. Downward-Inverted Mounting



Figure 4. Downward Mounting with 45-degree roll and two poles

Note! The M3 BATHY default mounting configuration is **Downward**.

- 4. Save the deployment configuration:
  - a. Click the Master Reference tab.
  - **b.** Click the **Save As** button.
  - c. Enter a new configuration name and click OK. (e.g. Downlooking Mode)
  - d. The configuration file is saved under the M3 software installation folder: ... $KMLM3_Vxxxx$ binSettings.

#### Setting the sound speed

- **5.** Measure the sound velocity at the Sonar Head or calculate the harmonic mean from the sound velocity profile.
- 6. Run the M3 Software.
- 7. Click **Setup** menu > **Preferences**.
- 8. Enter the Variable: Sound Velocity.
- 9. Click Close.

#### M3 Sonar data recording and exporting

- 10. Display Profiling Settings by selecting Profiling Settings from the Display menu.
- 11. Select Profiling or Profiling Fast application mode from the Sonar Apps menu.
   Profiling Fast mode provides a much higher ping rate but is not recommend to be used for a short range of less than 5 meters.
- **12.** Choose **Image and Profile** or **Profile Only** to enable profile points on the sonar image window.

P	ofiling Sett	ings		
	Display Moo	de Image <u>and Profile</u>	◎ <u>P</u> rofile Only	

- 13. Select File menu > Exporting Format > Profile Point (.all).
- **14.** Select **Setup** menu > **Preferences** to configure the UDP port and IP address.

**Note!** Changing values in the Master Reference or Mounting Offsets tabs changes the values for the current configuration. If you want to create a new configuration, first click **Save As** or **New**, then modify the parameters.

Preferences				×				
4 Preferences				Þ				
Units: <u>Meters</u> <u>Eeet</u>	Variables: <u>S</u> ound Veloci Magnetic <u>V</u> a	ity: riation:	1600	m/s Degree				
Cursor Options:	р ⊚ X / Y		Geograph	nic				
Time System Local Time      UTC	Overlay Text Text1 Text2							
File Saving:	File Saving: Prompt User for Filename Name: + yyyy,MMM,dd,hh-mm-ss							
Use C:\KML\M: Images: C:\/ Recordings: C:\/	Use C:KMLW3_V0161           Images:         C:V04.W3_V0161\mapes           Recordings:         C:V04.W3_V0161\Recordings           Browse         Browse							
Exports: C: V	ML/M3_V0161/R	ecordings		Browse				
GeoTiff Auto Save: Distance  3.0 m Cropped Width: 75 % Port for JALL format: 20002 Port for JALL format: 20006 Remote IP Address: 127.0.0.1								
			d	lose				

- **15.** Enter the UDP port in **Port for .ALL format.** This is the UDP port set in the thirdparty software to receive the .ALL data from the M3. Set the **Remote IP Address**; this is the IP address of the computer running the third-party software. If the third-party software is running on the same computer as the M3, enter **127.0.0.1**.
- **16.** Close the **Preferences** window.
- 17. Click the **Export Data** button in the top-right menu to enable UDP .ALL data export.
- **18.** Select **Setup** menu > **Connect** to activate the M3 Sonar Head.
- **19.** The M3 data-acquisition screen should be similar to the screen below:



### QINSy software setup procedures

The following configuration steps are required to interface QINSy for data acquisition. This document uses QINSy software version 8.10 (Build 2015.06.14.1).

#### Creating a project

- 1. Run QINSy software, select menu File -> Manage Projects to create a new project.
  - a. Click New button to create a new project.

Projects								
Select an existing project from the list below or create a new project								
Project	Locatic	Creation date	Last change date	$\Delta$	Survey type	Description		
PortMoody	C:\User	2015-May-19 13:32:43	2015-Sep-21 11:06:43					
Plymouth	C:\User	2015-Apr-13 14:35:48	2015-Nov-19 09:33:04					
Open		New Mana	age 👻 Edit p	oroje	ect information	View columns	; [-	Close

**b.** Provide a project name, select the file folder, add description, and click **OK** to create the project.

New Project	×
Project Name:	
Project Folder:	
C:\Users\alanz\	
Common Files Folder:	
Survey Type:	
Description:	
	*
	-
OK Cancel Help	

c. If prompt No template found, make a new one?, click Yes.

Console	×
1	No template found, make a new one?
	Yes <u>N</u> o
Don 🗌	't ask me again

d. Provide a new template database name and click OK.

New Template Database	×
Enter new template database name:	ОК
	Cancel
	Help

- 2. Configure Geodetic parameters.
  - a. From the **Datum Parameters** page, click **Add** button to add a datum, such as **WGS84**, and then click **Next**.

Datum Parameters		x
	Predefined Coordinate System	
	Survey Unit Meters	Edit <u>U</u> nit
	Datums           1 WGS84	<u>A</u> dd <u>E</u> dit
	Mean Water Level Model	
	Undefined or Horizontal Datum	for height aiding
	No Height Level Correction Applied       Height offset:	Meters
	< Back Next >	Cancel Help

Projection Grid Parameters

Projection Type: Universal Transverse Mercator (North Hemisphere)

**b.** Select a **Project Type** based on the survey requirement, such as UTM and zones.

Option:	Not Applicable	
Latitude of grid origin	1:	0;00;00.000 N
Longitude of grid or	gin:	▼ 123;00;00.00000 W
Grid Easting at grid	origin:	500000.000
Grid Northing at grid	origin:	0.000
Scale factor at longi	ude of origin:	0.999600000
UTM zone number:		▼ 10 (123 W

- c. Click **Finish** to complete the Geodetic setup.
- 3. Setup vessel object.
  - a. Enter a vessel name, give a description to the **Object Reference Point**, such as **M3 Transducer**, and then click **Next**.
  - **b.** Leave the rest of the pages as default, and click **Finish** at the last page to complete the vessel object setup.

Object Definition			X
	General Object Definition Type: Name:	Vessel Champion Barge	•
9	Object Reference Point <u>D</u> escription: <u>H</u> eight above draft referen	M3 Transducer cce: 0.000	m
	Object Squat Model Squat Method:	Not Defined	•
< <u>B</u> ac	k <u>N</u> ext >	Finish Cancel Hel	p

- 4. Add Position Navigation System
  - a. From the New System window, give a name such as GPS.
  - b. Select type Position Navigation System.
  - c. Select driver NMEA Position and Heading (GGA/HDT)

d. For M3 BATHY system, set the Speed to 115200, and Port to COM12.

#### e. Click Next.

System [GPS]	0.0		
System			
Name:	GPS		
Туре:	L Position Navigation Sys	stem	-
I/O Parameters			
D <u>r</u> iver:	NMEA Position and Headin	ng (\$GGA/\$HDT	ī/\$ROT) ▼
Port number:	COM12 -	Byte frame:	10 bits (0.087 ms)
Baud rate:	115200 -	Data bits:	8 -
Stop bits:	1 •	Parity:	None 👻
Maximum update	e rate: 0.000 s	Latency:	0.000 s
Notes			
I/O Parameters	are only used in online mode a	nd have no effect i	in replay mode
Latency is only a	applicable for non-UTC drivers		
This driver also	supports other system types		More info
		Deleh	Second Utels
< <u>D</u> a	interest >		Help

**f.** In **Position System Parameters** page, select previously defined vessel as **Object** and click the 🔁 button to add a new node.

Location		
Object:	Champion Barge	-
Antenna:	M3 Receive Array	- <b>-</b>
Receiver number:	0	Receiver number is used as slot number in case of multiple outputs.
Receiver Positions		
Horizontal <u>d</u> atum: - Receiver Heights	WGS84	•
Vertical datum:	WGS84	•
Height level:	No Level Correction	n v
Height offset:	m 000.0	n
Position Parameters		
A-priori <u>S</u> D:	0.500 m	For example: GPS 5.00 m, DGPS 0.50 m, RTK 0.05 m.

**g.** Enter the offset from the M3 BATHY GPS primary antenna to the reference point and then click **OK**. For M3 BATHY system, if using M3 transducer as the reference point, the offsets for the GPS is X = 0, Y = -0.266m, the Z = 2.646 for two pole sections, 3.802 for three pole sections.

t Variable Node		X
Node		
<u>N</u> ame:	GPS	
Location		
<u>O</u> bject:	M3 Bathy Vessel	
Offset from Object Refere	nce Point	
X (Stbd = Positive):	0.000	m
Y (Bow = Positive):	-0.266	m
Z (Up = Positive):	2.646	m
Offset Parameters		
A-priori <u>S</u> D:	0.005	m
OK	Cancel	Help

- h. Click Finish to complete the Position Navigation System setup.
- 5. Add Gyro Compass

a. Select Gyro Compass and click OK if prompt to Add Related System

Add Related	System		X
The Driver systems. S cancel to e	added can als elect the syste xit.	o decode the f em to add or pr	ollowing ess
Gyro Compa Miscellaneo	ass us System		
	ок	Cancel	

- **b.** For M3 BATHY system, the heading and position are both coming from the same source. Use the same driver and port settings as GPS for Gyro Compass and then click **Next**.
- c. Select the vessel name as Location and click Finish to complete the Gyro Compass setup.
- **6.** Add M3 Multibeam sonar
  - **a.** Right-click on **System**, select **New System**. (can also add other sensors through this popup menu)



- b. Select type Multibeam Echosounder.
- c. Select driver Kongsberg Mesotech M3.

**d.** Set the **Port Number** to match the M3 software .ALL UDP exporting port number, such as 20002. Click **Next**.

Edit System [M3]	x
System	
<u>N</u> ame:	МЗ
Туре:	Multibeam Echosounder 🗸
Socket Settings	
D <u>r</u> iver:	Kongsberg Mesotech M3 🔹
Port n <u>u</u> mber:	20002
Notes	
I/O Parameters a	re only used in online mode and have no effect in replay mode
< <u>B</u> ac	k Next > Finish Cancel Help

e. Enter Roll, Pitch, and Heading offsets according to the M3 mounting.

Model, Transducer Location	n and Mounting Angles	
Description	Value	
Object	Champion Barge	-
Transducer Setup	Assume Common Acoustic Center	-
Transducer Node	M3 Transducer	-
Roll offset	0.000°	
Pitch offset	0.000°	
Heading offset	0.000°	

Figure 5. Downward Mounting

Itibeam Echosounder Parar	neters	×
Model, Transducer Location	n and Mounting Angles	
Description	Value	
Object	Champion Barge	-
Transducer Setup	Assume Common Acoustic Center	<b>•</b>
Transducer Node	M3 Transducer	<b>•</b>
Roll offset	0.000°	
Pitch offset	0.000°	
Heading offset	180.000°	

Figure 6. Downward-Inverted Mounting

Model, Transducer Location	n and Mounting Angles	
Description	Value	
Object	Champion Barge	-
Transducer Setup	Assume Common Acoustic Center	-
Transducer Node	M3 Transducer	-
Roll offset	45.000°	
Pitch offset	0.000°	
Heading offset	0.000°	

Figure 7. Downward Mounting with 45 degree roll

f. Leave the rest pages as default, and click **Finish** in the last page.

#### 7. Add Pitch Roll Heave Sensor

- **a.** Right-click on **System**, select **New System**. (can also add other sensors through this popup menu)
- b. Select driver TSS DMS R-P-H
- c. Select port settings, choose Port COM10 and 115200 baud rate and then click Next.
- **d.** Click the 🖶 button to add a new node.

•
•
•
m

e. For M3 BATHY system, if using M3 transducer as reference point, the X offset is 0, the Y offset is 0, the Z offset for the Kongsberg Seatex MRU is +0.116m.

t Variable Node	
<u>N</u> ame:	MRU node
Location	
<u>O</u> bject:	M3 Bathy Vessel
Offset from Object Refe	rence Point
X (Stbd = Positive):	0.000 m
Y (Bow = Positive):	0.000 m
Z (Up = Positive):	0.116 m
Offset Parameters	
A-priori <u>S</u> D:	0.005 m
ОК	Cancel <u>H</u> elp

f. Leave the rest pages as default, and click **Finish** in the last page.

- 8. Add Time Synchronization System:
  - a. Right-click Auxiliary Systems to add Time Synchronization System.

📢 M3QSG.db - Database Setup Program						
<u>File Edit View Options H</u> elp						
🛛 🚱 🍃 🎾 🍗 💼 🖓 🖓 🇠 🏹						
Survey General Geodetic Datums Heights Heights UTC to GPS Correction Object Champion Barge Auxiliary Systems Fixed Node						
For Help, press F1						

**b.** Select a time source, if not sure what time source to use, select **Third party synchronized Windows system time**.

Edit System [Time]	×
System	
<u>N</u> ame:	Time
Туре:	Time Synchronization System
I/O Parameters	
D <u>r</u> iver:	# Third party synchronized Windows system time

c. Leave the rest pages as default, and click **Finish** in the last page.

**d.** The finished Database Setup should be similar to screenshot below.

M3QSG.db - Database Setup Program					
Eile Edit View Options Help					
🛛 🔇 🍪 Þ 🎾 🍗 🎰 🖓	ا 🕄 🐼 🔊 🖉 🎯				
Eneral	Object: Champion Barge				
🖶 😽 Geodetic	Object reference number:	1			
Datums	Object type:	Vessel			
Heights	Description of reference point:	M3 Transducer			
UTC to GPS Correction	Height above draft reference:	0.000 m			
🖶 🛃 Object	Squat model:	Not Defined			
Champion Barge	SD draft:	0.050 m			
System	SD squat:	0.050 m			
⊕ Ø GPS [Gyro Compass]	SD load:	0.050 m			
	SD tide:	0.100 m			
MRU	Time latency navigation:	0.002 s			
in the Wariable Node	Time correction to GMT (UTC):	0.000 h			
GPS	Time correction to master vessel's time:	0.000 s			
O Motion					
B Link					
Auxiliary Systems					
Evend Node					
For Help, press F1					

#### Importing ENC chart to QINSy



- 1. Click Administra... button in QINSy Console to open ENC Administrator to import ENC chart to the system for navigation.
  - a. Choose one of the chart types to import, such as S57, and then click Next.
  - **b.** Browse to the folder contains the chart files, then click **Next**
  - c. Click Start Import process to import chart, then click Next to see the importing result.
  - d. Click **Finish** to complete importing chart.
  - e. From the Line Editor, click Add Line to define survey lines:
    - Click Add Point, Insert Point, and Offset to add lines by entering coordinates.
    - Click **Cursor** to draw survey lines.
    - Click **Offsets** to add parallel lines.

#### Planning survey lines

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- 1. Click button in QINSy Console to open Processing Manager to plan survey lines.
- 2. Right-click Line and CAD/GIS Files, select New to create a new survey line file.

🖱   🙈	🧟 🦻	Ŧ				Processi	ng		
	Home	View	Plots	Profiles	s Project	Edit			
Previous	Next	Bookmarks	Zoom	Pan	☑ Zoom to Fit ♣ Zoom in ♣ Zoom out	ENC	Raster	Line and CAD / GIS	Soun
	View History View			N			Ld	yers	
Project Ex	plorer							1	φ ×
▼ ♥ Pro. > ∅ S	ject Survey File	s	Pre	set ≶ D	efault			•	×
🔰 🔶 S	> 📁 Sounding Grids Drag a column he			n header here to	eader here to group by that column				
🔰 🖉 🛙	ine and C/				Information				
🔰 💋 🖡	aster File	👶 Import	t		mormauon				
01	īde Data	📫 New			hame	•	File types		
		🔪 Print							
Clicity the	Line	hutton to o	raata a <del>-</del>		aulina Clia	lr on the	about to	atom the	line

**3.** Click the button to create a new survey line. Click on the chart to start the line, click again to finish the line.



**4.** Click the lines.



button to add parallel lines and click the lines button to add cross

Cross

5. Click

button to edit or remove survey lines.

### Performing patch-test

Once the hardware tests are complete, perform a calibration test to measure the Latency, Pitch, Roll and Yaw. Set up the patch-test survey lines before leaving the dock to save time by using the nautical chart to choose appropriate areas for each test.

1. Record Latency calibration data:			
<ul> <li>a. Select one survey line with a feature like a wreck, rock outcrop, or slope.</li> <li>b. Run the survey line in the same direction at one speed.</li> <li>c. Run the same survey line in the same direction at twice the speed of the first run.</li> </ul>	a y		
2. Record Roll calibration data:			
<ul><li>a. Select one survey line on a flat sea floor with a depth of 30 or deepest available area.</li><li>b. Run the survey line at the same speed in opposite direction</li></ul>	)m ns.		
Record Pitch calibration data:			
<ul><li>a. Select one line on sloped seafloor.</li><li>b. Run the line at the same speed in the opposite direction.</li></ul>			
4. Record Yaw calibration data:			
<ul> <li>a. Select two lines offset by half the swath width. The overla of the two runs should cover an object such as a wreck, rock; outcrop, pipeline, or trench line.</li> <li>b. Run both lines in same directions and at the same survey speed</li> </ul>	р		
	<ol> <li>Record Latency calibration data:         <ol> <li>Select one survey line with a feature like a wreck, rock outcrop, or slope.</li> <li>Run the survey line in the same direction at one speed.</li> <li>Run the same survey line in the same direction at twice the speed of the first run.</li> </ol> </li> <li>Record Roll calibration data:         <ol> <li>Select one survey line on a flat sea floor with a depth of 30 or deepest available area.</li> <li>Run the survey line at the same speed in opposite direction</li> </ol> </li> <li>Record Pitch calibration data:         <ol> <li>Select one line on sloped seafloor.</li> <li>Run the line at the same speed in the opposite direction.</li> </ol> </li> <li>Record Yaw calibration data:         <ol> <li>Select two lines offset by half the swath width. The overla of the two runs should cover an object such as a wreck, rock; outcrop, pipeline, or trench line.</li> <li>Run both lines in same directions and at the same survey speed.</li> </ol></li></ol>		

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