



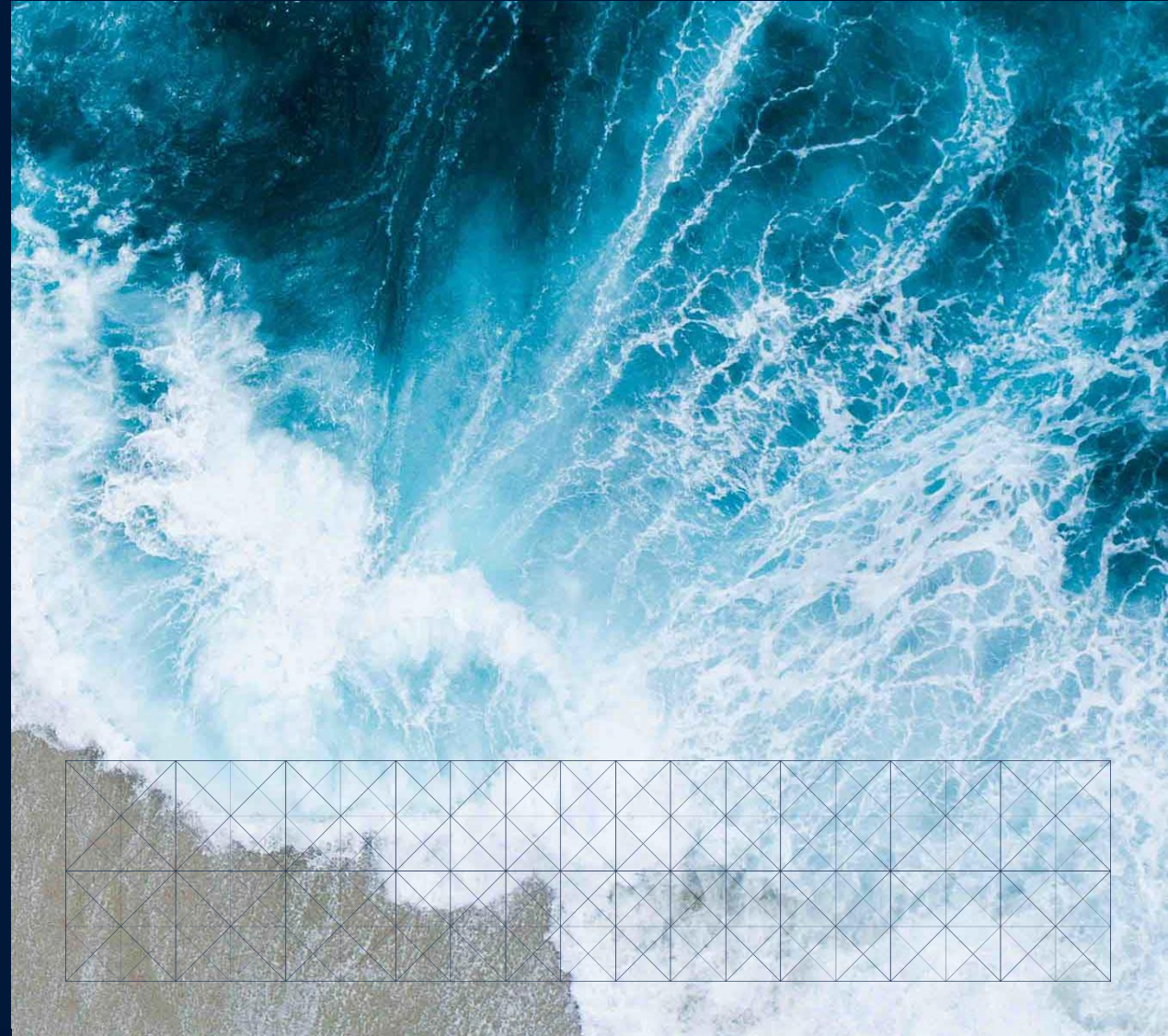
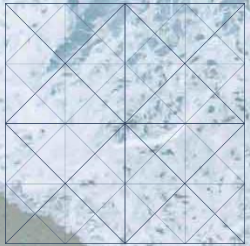
KONGSBERG



EM SERIES MBES

Shallow water Survey and Inspection

Kongsberg Discovery



EM SERIES Multibeam Echosounders



KONGSBERG

EM® 3002



EM® 2040C (MKII)



EM® 2040P (MKII)



EM® 2042-07



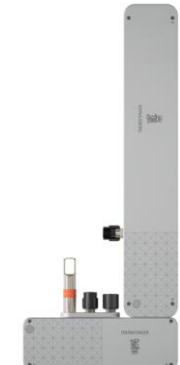
EM® 2040-07 (MKII)



EM® 2040-04 (MKII)



EM® 2042-04



EOL 2020 (min 10 years)

Current

New SEP 2023



Sealand Mapping

Hydrographic survey Kenya





Paul M. Nzau (MISK)

- MA Planning (UoN)
- Msc Hydrography (UoP, UK)
- Btech Land Surveying (TUK)

Others

- Certificate, Introduction to Hydrography, Skilltrade Academy, Netherlands
- Diploma, SIS & EM3002 operator course, Kongsberg Maritime Training Centre, Horten Strandpromenaden, Norway
- Full member, Institution of Surveyors of Kenya
- IOC (Ocean Expert) Directory
<https://www.oceanexpert.net/expert/NZAU>
- Member The UKI Hydrographic Society, South West Branch
- Student member Royal Institution of Chartered Surveyors (RICS)



Sealand Mapping Ltd

Contents:

- I. Registration
- II. Team
- III. Equipment & Vessel
- IV. Hydrographic surveying projects
- V. Local Challenges



Registration

- Sealand Mapping Ltd is fully owned by Kenyan nationals and was registered in 2012
- Hydrographic surveys, Land Surveying and Urban planning

Team



Paul Nzau

(Director & Hydrographer)

- Msc Hydrography Univ. of Plymouth, UK
- MA Urban Planning Univ. of Nairobi
- Bachelor of Technology Land Surveying (TUK)



Martin Sila

(Chief Surveyor)

- Bachelor of Science Geospatial Engineering Univ. of Nairobi



Brounce Kivunzya

(Project surveyor hydrography)

- Bachelor of Science Geomatic Engineering, JKUAT.



Equipment and Vessel

❖ Half cabin cruiser vessel

MBES

Kongsberg EM3002 MBES

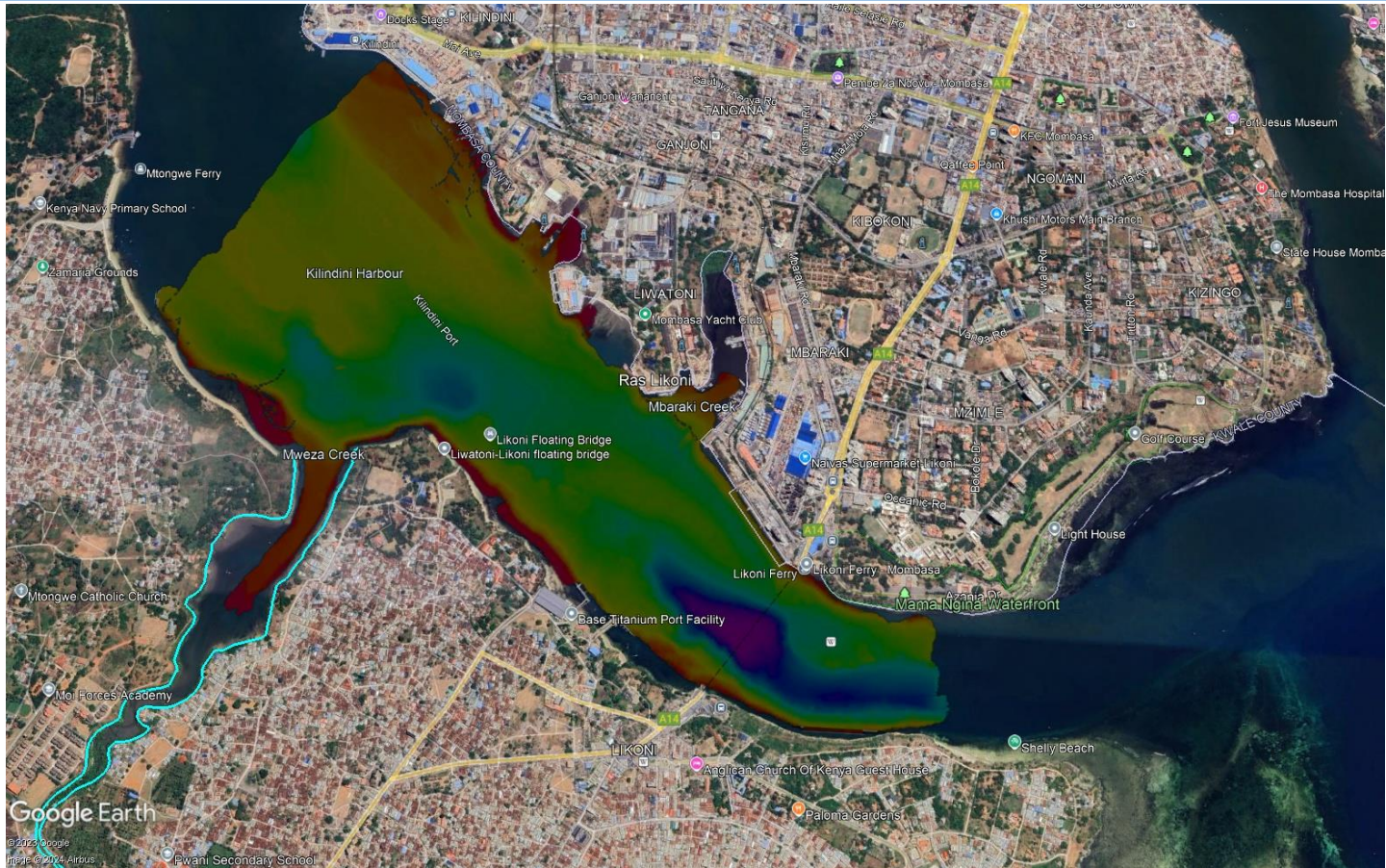
- EM3002 Transducer
- Seapath 130 positioning system
- Kongsberg MRU-H motion sensor
- Valeport Swift SVP
- Valeport MiniSvS for beam steering
- USM over-the-side mount



Major Projects & Clients

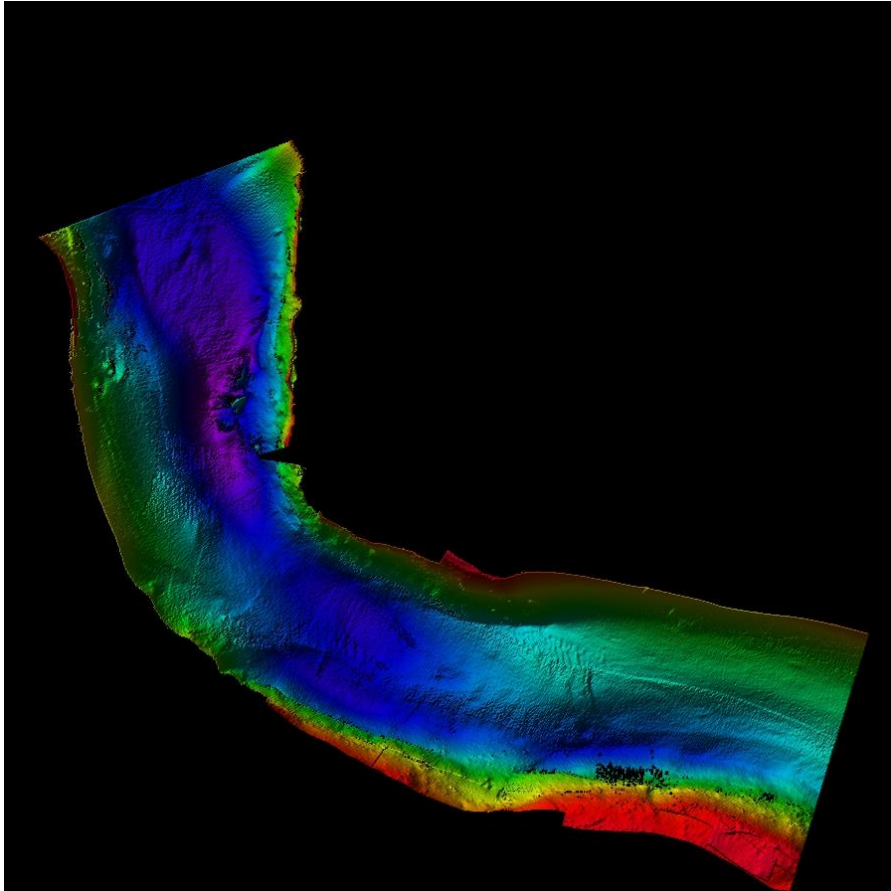
- Mombasa Port Area
Development project phase II
Dongo Kundu by pass 2019- 2024
*client Fujita/ Mitsubishi
consortium contractors (Japan)*
- KPA container terminal no. 23
client Toyo construction (Japan)
- Mtwapa bridge – ongoing Client
CCCC, China
- Mombasa gate bridge *Client
Katahira, Japan through Ramani*

Projects

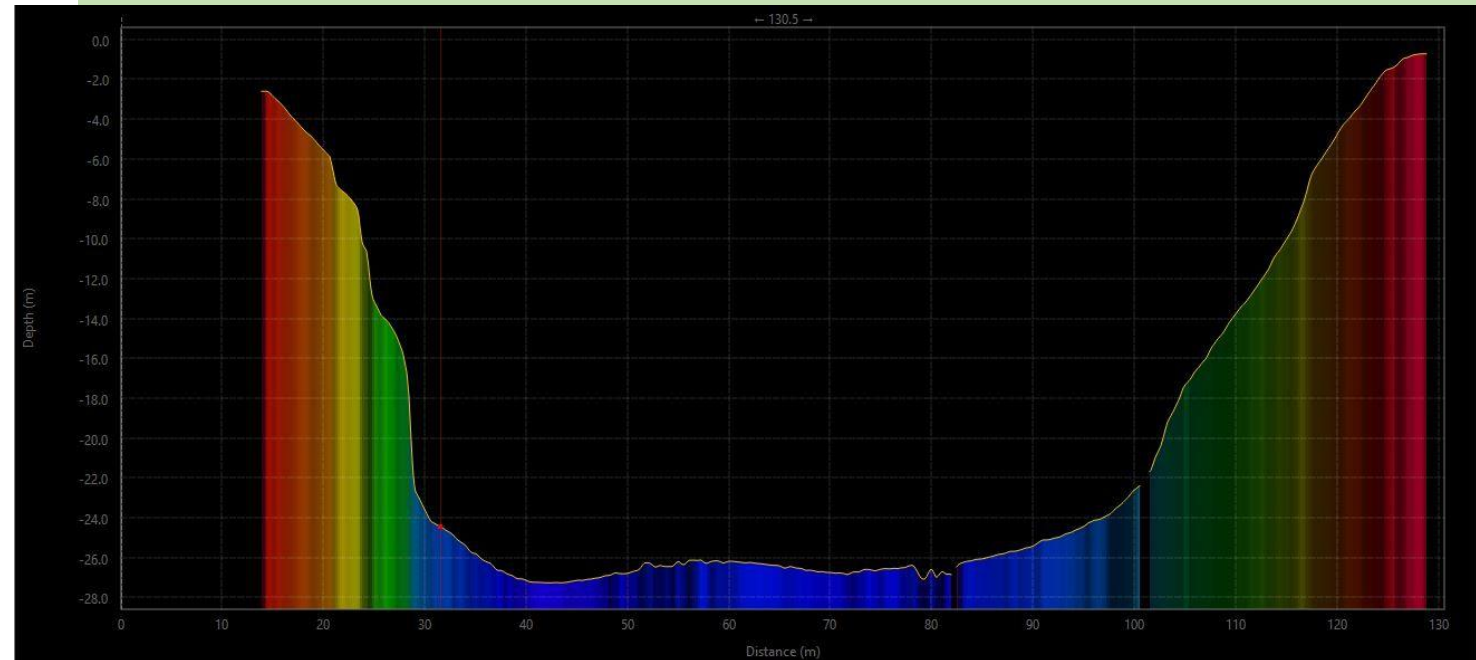


Mombasa Gate bridge

Projects

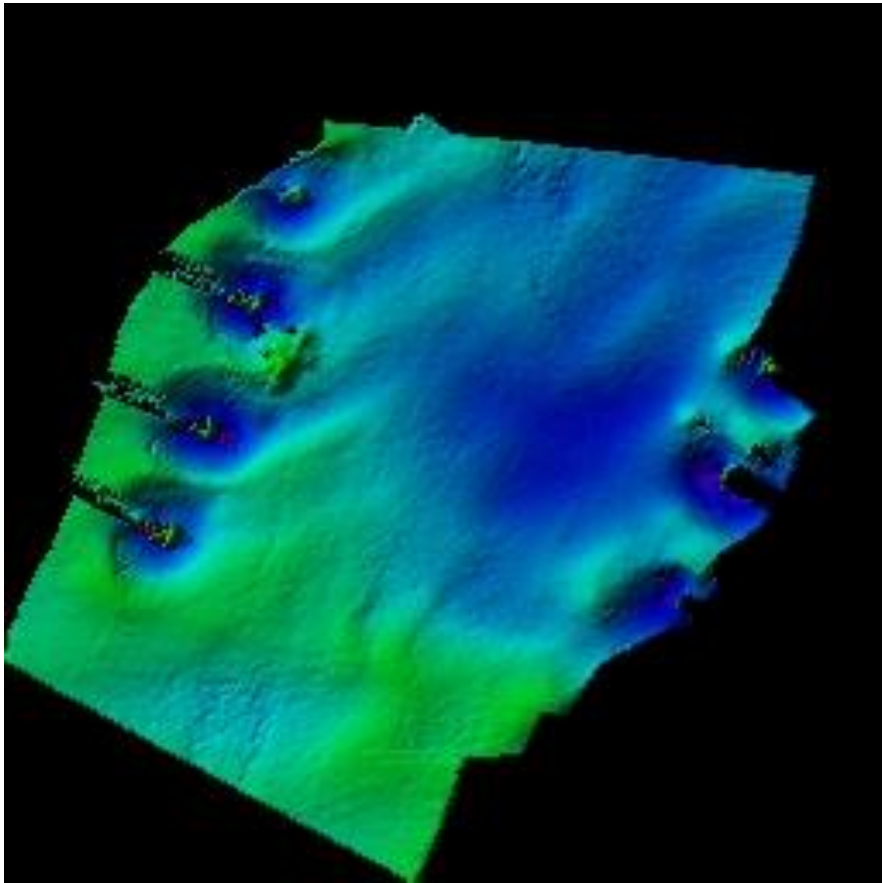


Mtwapa bridge

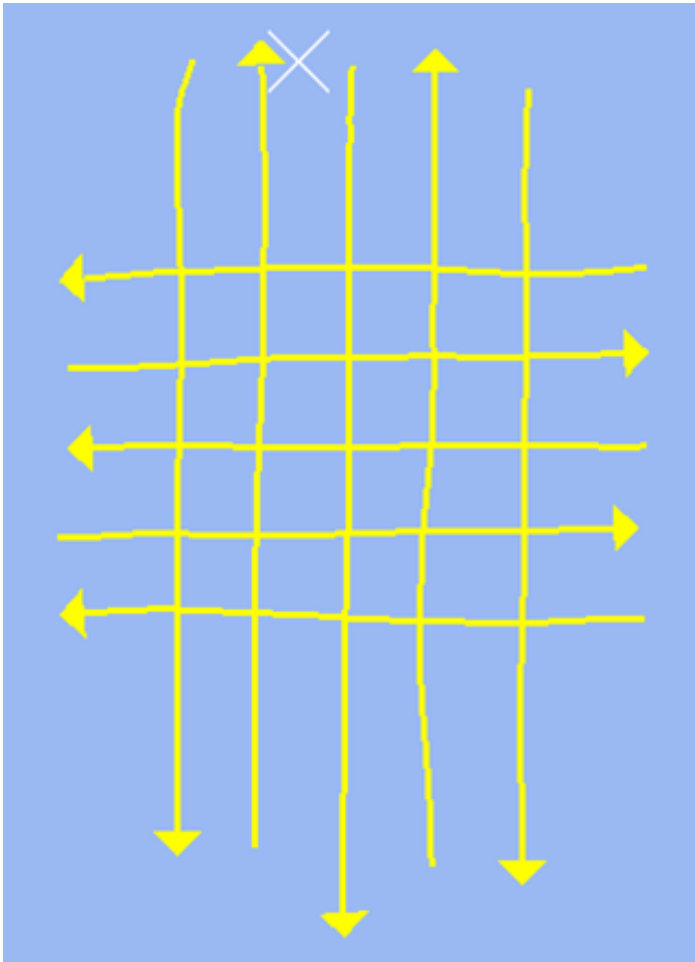


Projects

Dongo Kundu Bypass

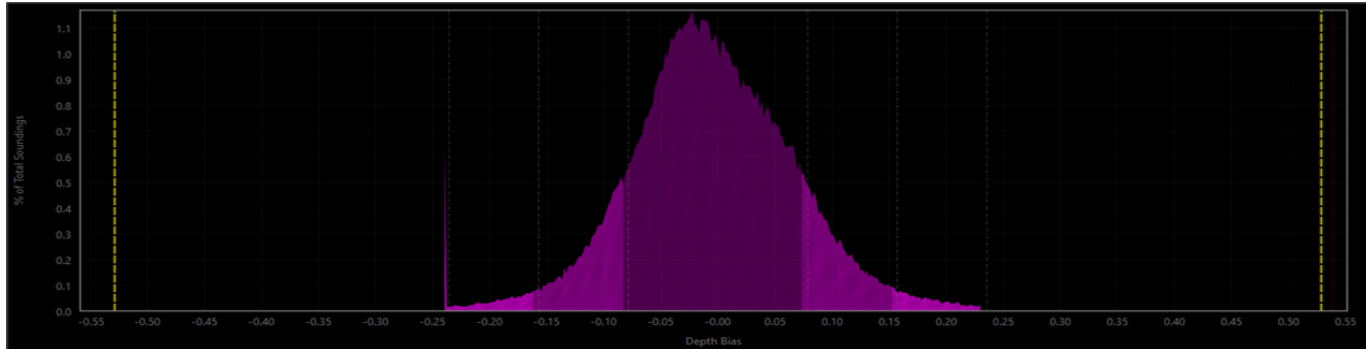


Estimating Uncertainty (Dongo Kundu bypass)

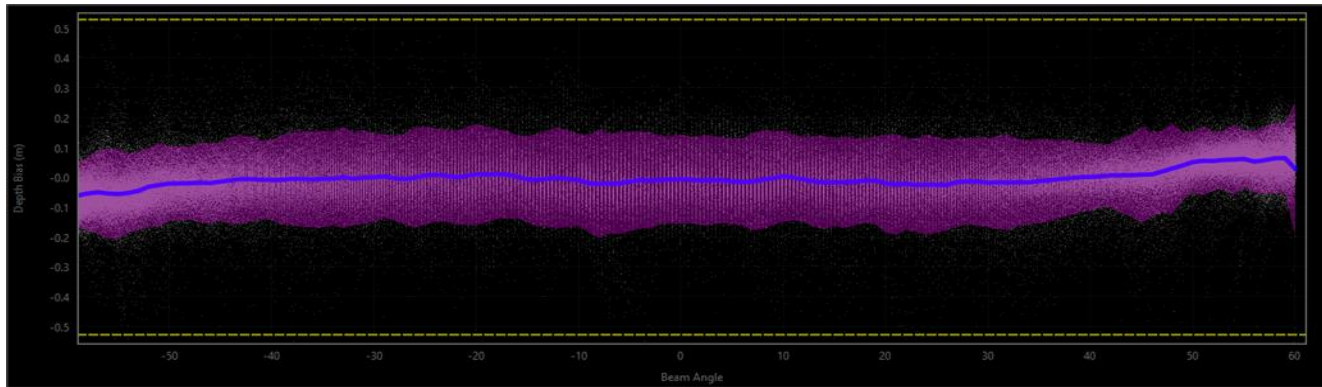


Running run lines and model of reference surface

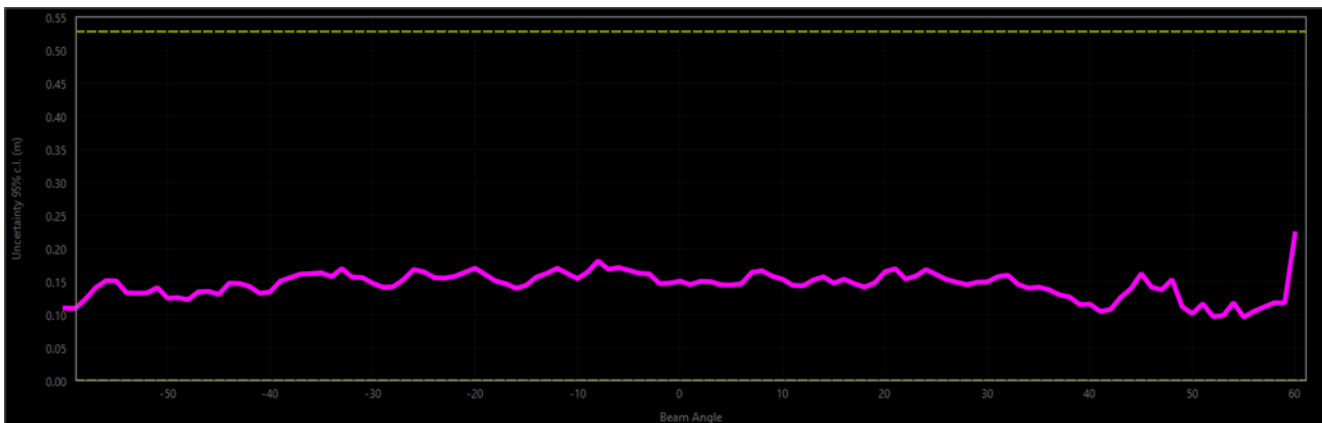
Estimating Uncertainty



- Histogram of the standard deviations



- Scatter graph of points along the Reference line



- Uncertainty plot

Estimating Uncertainty

Surface Statistics Information

Name: Uncertainty_surface_difference

Median: 0.00

Mean: -0.00

Std Dev: 0.10

Height Range: [-9.021, 9.292]

Total 2D Surface Area: 1172550.00

Positive (above 0.0) 2D Surface Area: 118916.00

Negative (below 0.0) 2D Surface Area: 1053633.75

Total Volume: -3029.17

Positive (above 0.0) Volume: 6916.53

Negative (below 0.0) Volume: 9945.70

Qimera cross-check tool

Reference Surface: Reference_surface_Base_Depth.sd

Sonar File: 0090 - RefCl - 0001.db

Number of Points of Comparison: 000000245895

Grid Cell Size: 0.500

Data Mean: -13.271128

Reference Mean: -13.267205

Mean: -0.003923

Median: -0.007606

Std. Deviation: 0.078577

Data Z - Range: -13.99 -12.17

Ref. Z - Range: -14.83 -12.27

Diff Z - Range: -0.67 1.44

Mean + 2*stddev: 0.161076

Median + 2*stddev: 0.164759

Ord 1 Error Limit: 0.528911

Ord 1 P-Statistic: 0.000313

Ord 1 - # Rejected: 77

Order 1 Survey ACCEPTED: 1

Challenges

- Lack of institutional capacity to teach practical hydrographic survey in our universities
- Lack of a local VORF
- Lack of CORS network makes transfer of controls expensive
- Recommend hydrographers and Surveyors publish their data and deposit it with the NSDI and KPA
- Create a hydrographic surveyors chapter at the Institution of Surveyors of Kenya (ISK)



Thank you!

