

Product Presentation

- Applicant Name:
Lam Ngo Sum (Neptune 22 Equipment & Technical Services Ltd.)
- Product Name: Norbit iWBMS
- Specification:

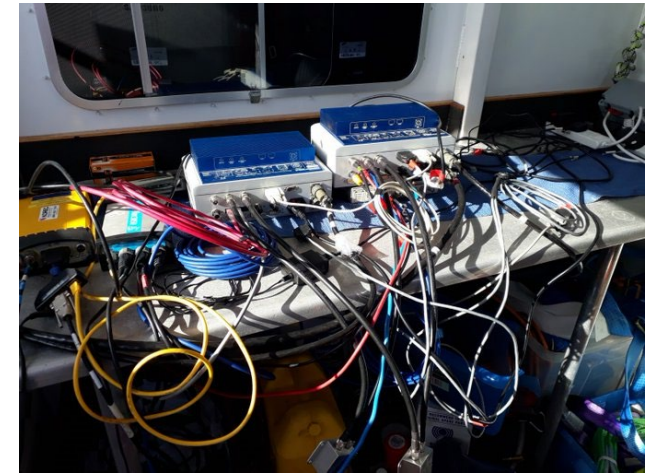
TECHNICAL SPECIFICATION	
SWATH COVERAGE	5-210° FLEXIBLE SECTOR (SHALLOW WATER IHO SPECIAL ORDER >155°)
RANGE RESOLUTION	<10mm ACOUSTIC w. 80kHz BANDWIDTH
NUMBER OF BEAMS	256-512 EA & ED
OPERATING FREQUENCY	NOMINAL FREQUENCY 400kHz (FREQUENCY AGILITY 200-700kHz)
DEPTH RANGE	0.2-275m (>300m WITH 0.9° X 0.9° OPTION)
PING RATE	UP TO 60Hz, ADAPTIVE
RESOLUTION (ACROSS X ALONG)	STANDARD: 0.9° X 1.9° @400kHz AND 0.5° X 1.0° @700kHz. NARROW OPTION: 0.9° X 0.9° @400kHz AND 0.5° X 0.5° @700kHz
POSITION	HOR: ±(8mm +1ppm X DISTANCE FROM RTK STATION) VER: ±(15mm +1ppm X DISTANCE FROM RTK STATION) (ASSUMES 1m GNSS SEPARATION)
HEADING ACCURACY	0.03° (RTK) WITH 2m ANTENNA SEPARATION
PITCH/ROLL ACCURACY	0.02° INDEPENDENT OF ANTENNA SEPARATION
HEAVE ACCURACY	2 cm OR 2% (TRUEHEAVE™), 5 cm OR 5% (REAL TIME)
WEIGHT	8.5kg (AIR) 3.5kg (WATER)
INTERFACE	ETHERNET
CABLE LENGTH	STD 8m, OPT: 2m, 25m AND 50m
POWER CONSUMPTION	60W (10-28VDC, 110-240VAC)
OPERATING TEMP.	-4°C to +40°C (TOPSIDE -20°C to +55°C)
STORAGE TEMP.	-20°C to +60°C
ENVIRONMENTAL	TOPSIDE: IP67: DUST TIGHT, PROTECTED AGAINST THE EFFECT OF IMMERSION UP TO 1m/WET-END (SONAR): 100m



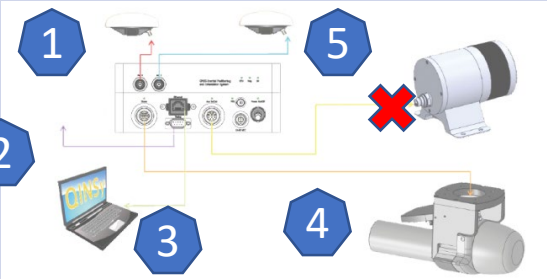
- Core Functions:
Multi Beam Echo Sounding Survey (**Point Cloud Under Water Survey**)
- Technology Used:
IMU, RTK GPS, Echo Sounding
- Construction Process involved:
Marine Construction
- Key Improvement in Construction Process:
 - All-in-one multi beam system
 - 210 degree swath angle (larger coverage)
 - Lighter weight
 - "Water column" function instead of side scan sonar system
 - DC power supported
 - In house lidar system supported
 - In house carbon fiber mounting supported
- Job Reference:
 - Contract No. CV2016/01, CEDD Maintenance Contract for Seawalls and Navigation Channels, Hong Kong, Multibeam Survey (2016-2021)
 - Foyle Ports Survey Vessel, Ireland, Multibeam Survey, 2020
 - Shipwreck Survey, Budapest, Multibeam Survey, 2019
- First Launch Date: 09/13

Innovative Features

- Core Technology:
 - Multi Beam Echo Sounding Survey (**Point Cloud Under Water Survey**)
- Patent (if applicable):
 - Norbit Subsea AS
- Comparison with current practice and popular models:



Typical System with over 15 cables (The photo is only part of the system)

Feature	iWBMS	Typical System
All-in-one Combining RTK GPS, Motion Sensor, Gyro, IMU, Surface Velocity Probe	<ol style="list-style-type: none"> 1. Ready to go 2. Well aligned with IMU or motion sensor 3. Lesser Cable, 5 cables only (not with the Lidar system), tidy working space and easier setup by all are default setting, including data string, baud rate, etc.  <ol style="list-style-type: none"> 4. Higher accuracy comparing with motion sensor and gyro 5. Lesser components system is more suitable for small vessel or USV 6. Appox. HK\$1,060,000 for ready to go 	<ol style="list-style-type: none"> 1. Buy all different components before working 2. Hard work for align the IMU or motion sensor working properly with multi beam transducer 3. Each components connected by from 1 to 5 cables, mesh cable working space and setup data string one by one for components communication during installation 4. Lesser accuracy by using gyro and motion sensor 5. Larger space needed for installation, difficult for small vessel or USV 6. In general, approx. HK\$1,800,000 for all components with similar spec.

Innovative Features

Feature (Comparison Cont.)

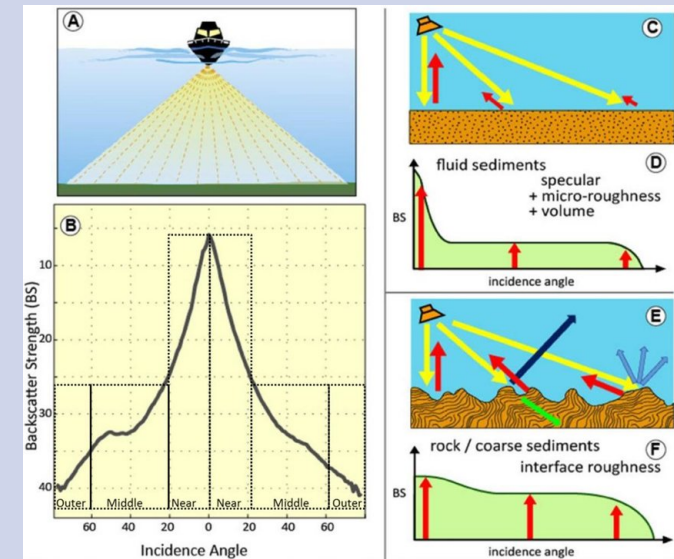
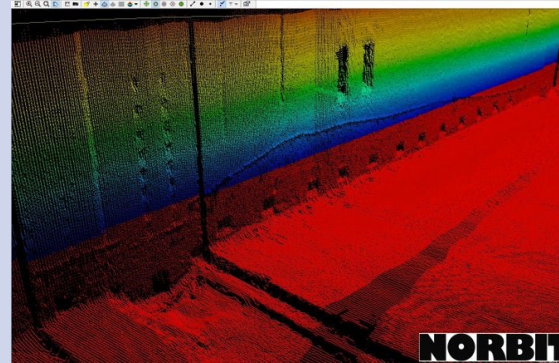
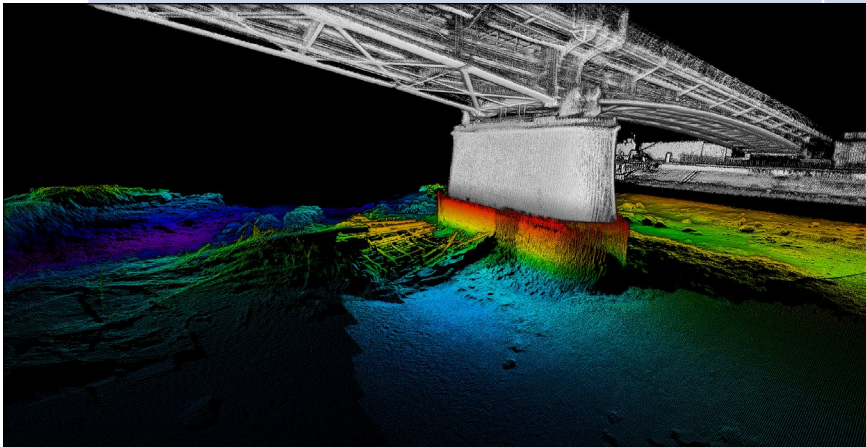
iWBMS

Typical System

210 Degree Swath Angle

1. 210 degree swath angle can be used for reclamation survey especially survey the seawall. Due to the draft and shallow water, the 210 degree swath angle can cover everywhere; although the feature is more shallow than the transducer (the photo showing all the area under water are surveyed with norbit 210 degree transducer)

1. Typically the multibeam with 160 degree or narrower angle cannot survey the feature higher than the transducer.



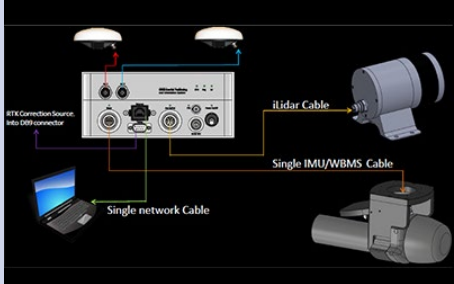
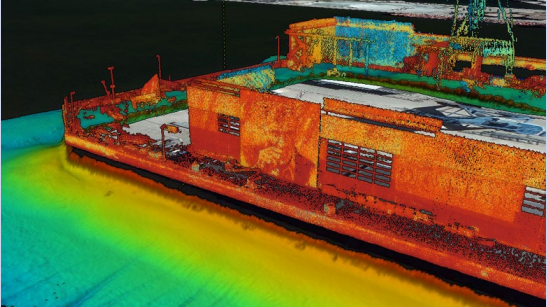
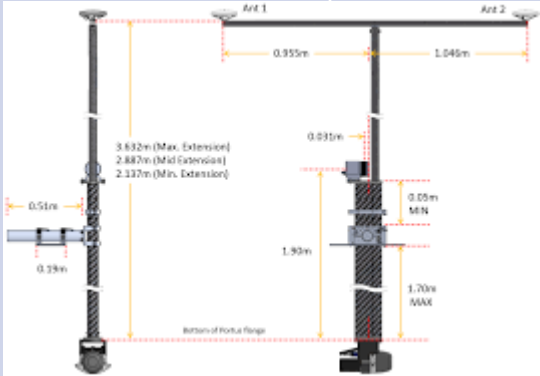


Light in weight

1. Light Weight for small boat and USV

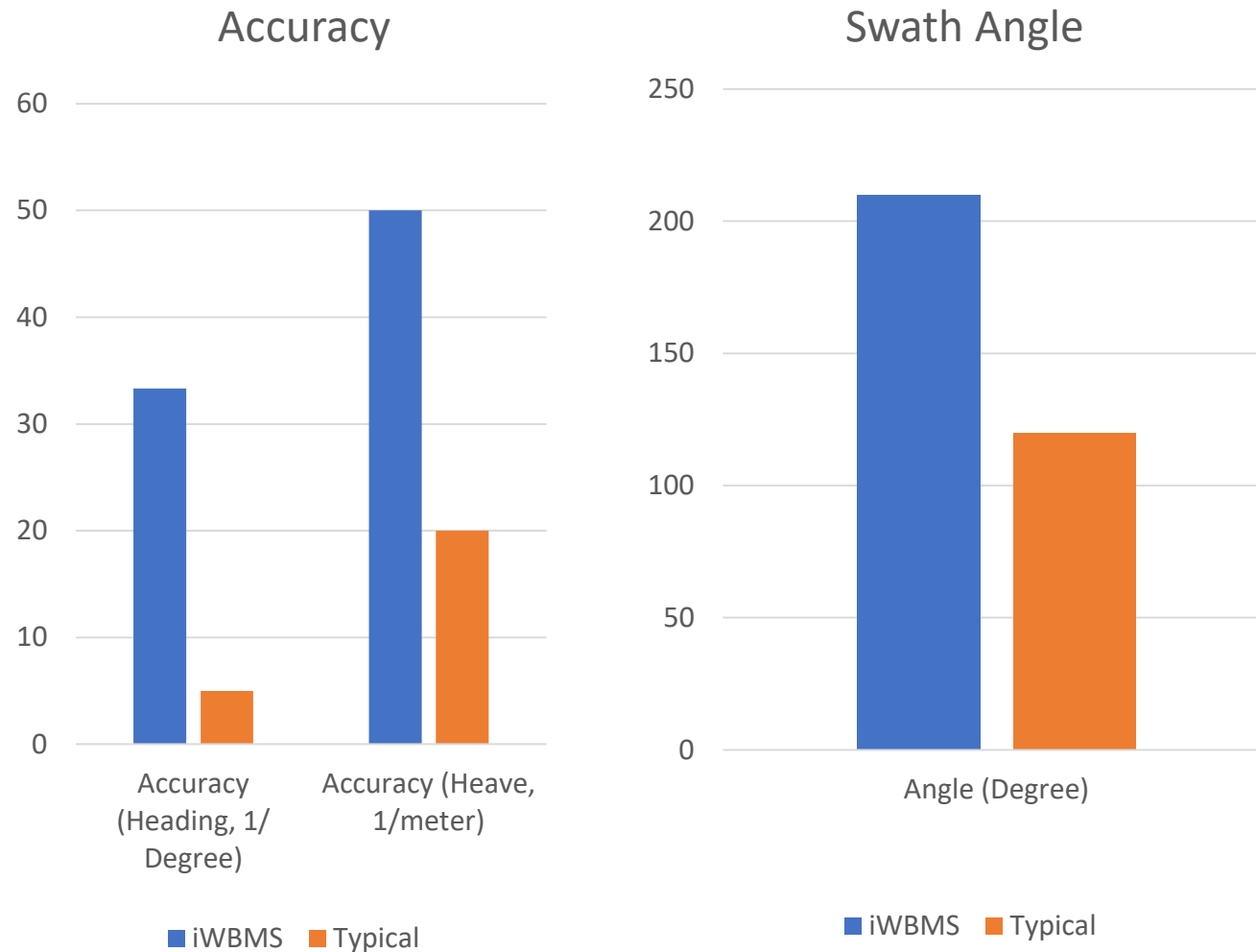
1. No sample this moment



Innovative Features

Feature (Comparison Cont.)	iWBMS	Typical System
<p data-bbox="180 486 586 521">Inhouse Add-on Accessories</p>   <p data-bbox="912 486 1172 521">1. Lidar System</p> <p data-bbox="912 901 1319 935">2. Carbon Fiber Mounting</p>  	<p data-bbox="1643 486 2331 644">1. Nil 2. Usually made by user or subsidiary factory and normally made by steel because of heavy transducer</p> 	

Benefits – Quality



- Higher Accuracy
 - Compare with the model used at the previous contract of CEDD Maintenance Contract for Seawalls and Navigation Channels (2013-2016)
 - Teledyne Odom MB1 (Obsoleted) with motion sensor - Teledyne TSS DMS05
- More Accessories
 - iLidar for **onshore point cloud survey**
 - Carbon fiber mount for different vessels
- Available installing on Unmanned Survey Vessel

Videos Demonstration

iWBMS and iLidar Point Cloud Survey Case Video

https://www.youtube.com/watch?v=nOA_4HI2sbA&t=8s

iWBMS and Otter Unmanned Survey Vessel Video

<https://youtu.be/ZFDHA50Y2is>