

NORBIT

- explore more -

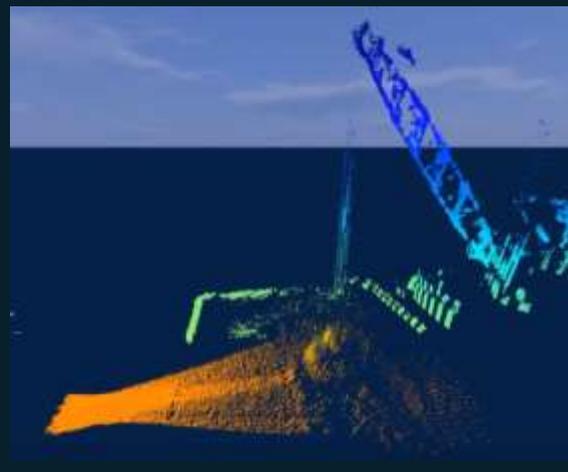
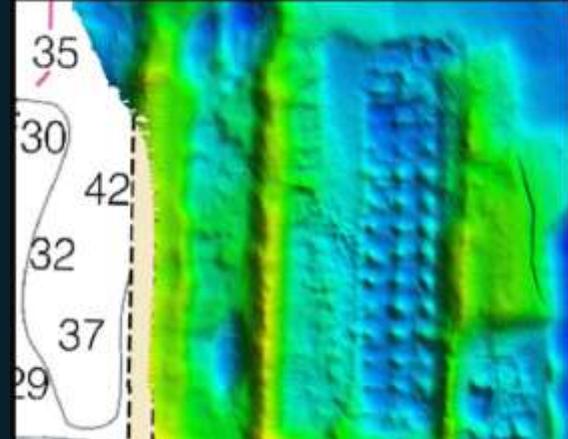
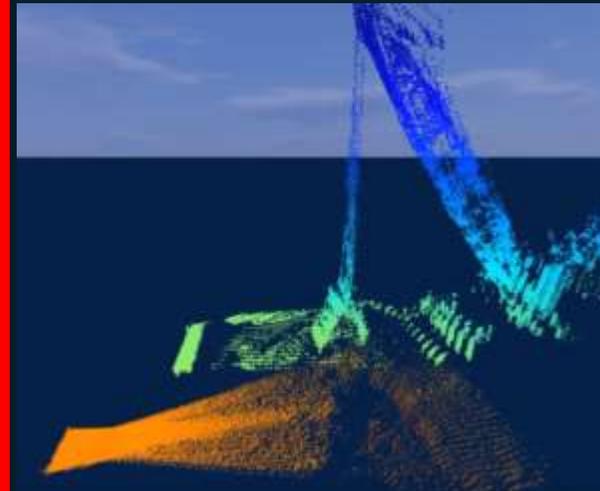
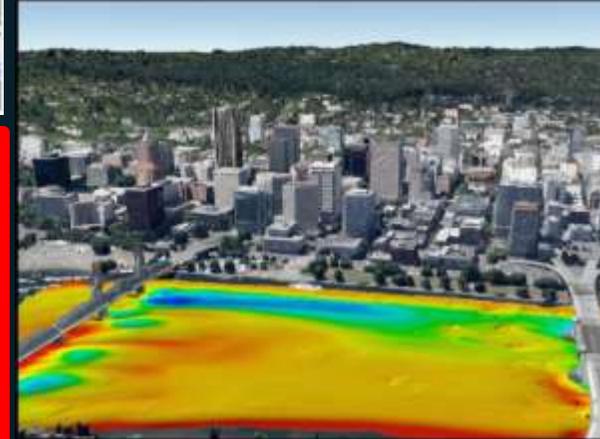
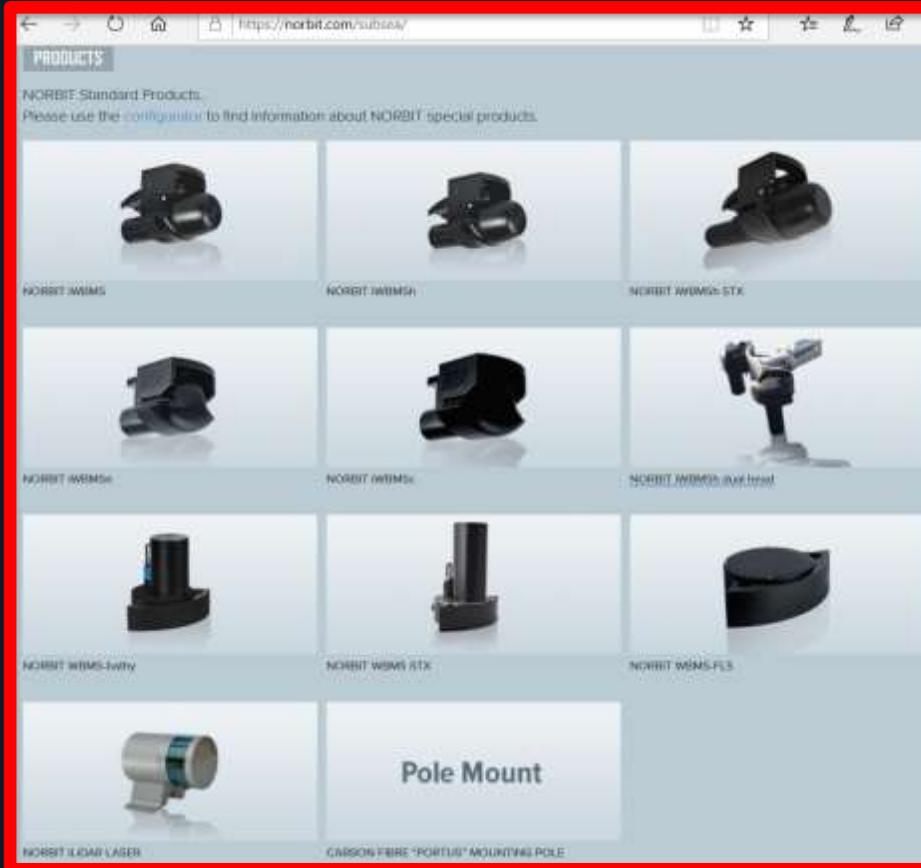
NORBIT STX, iSTX and STX360

4D solution for dredging applications

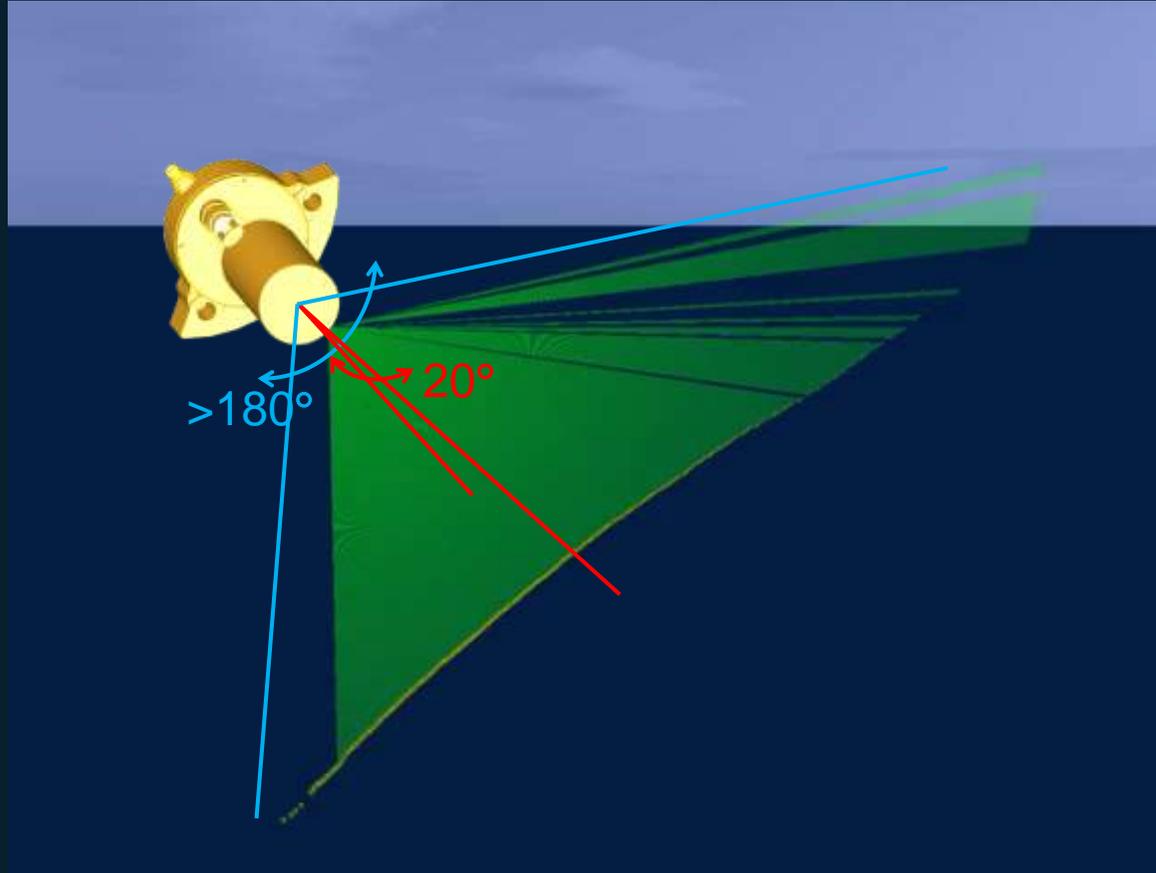


pawel@norbit.com

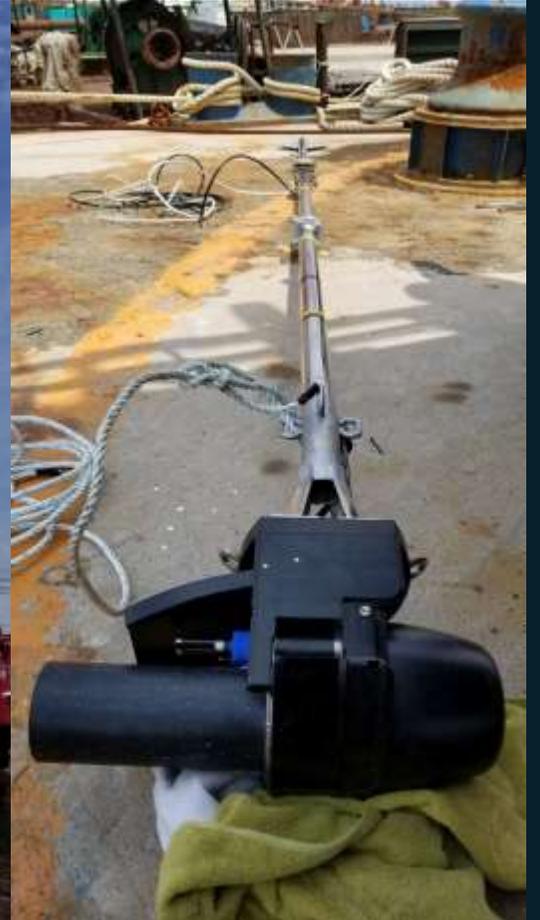
WEDA 10.2019

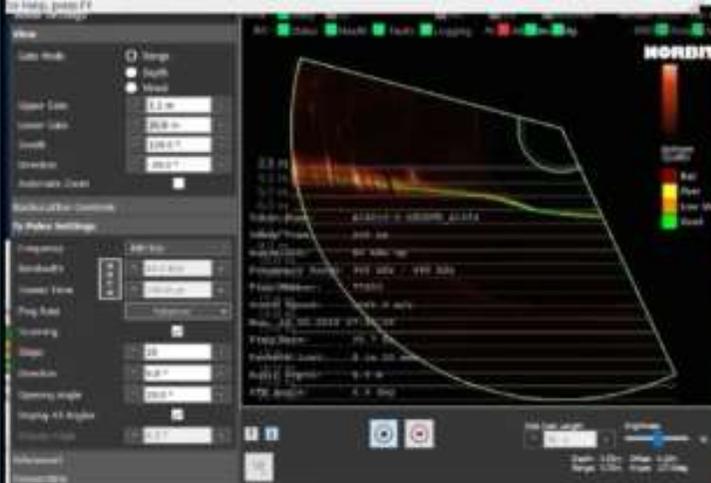
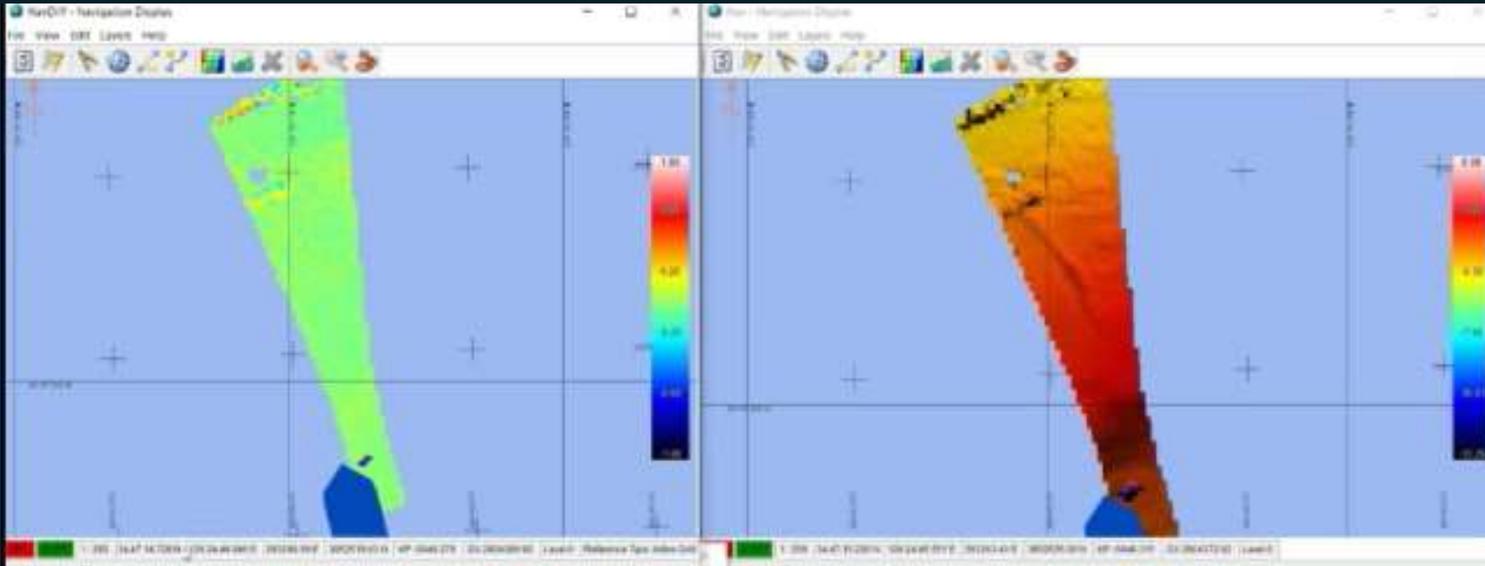


Sonar is not moving.
Scanning is done
electronically.



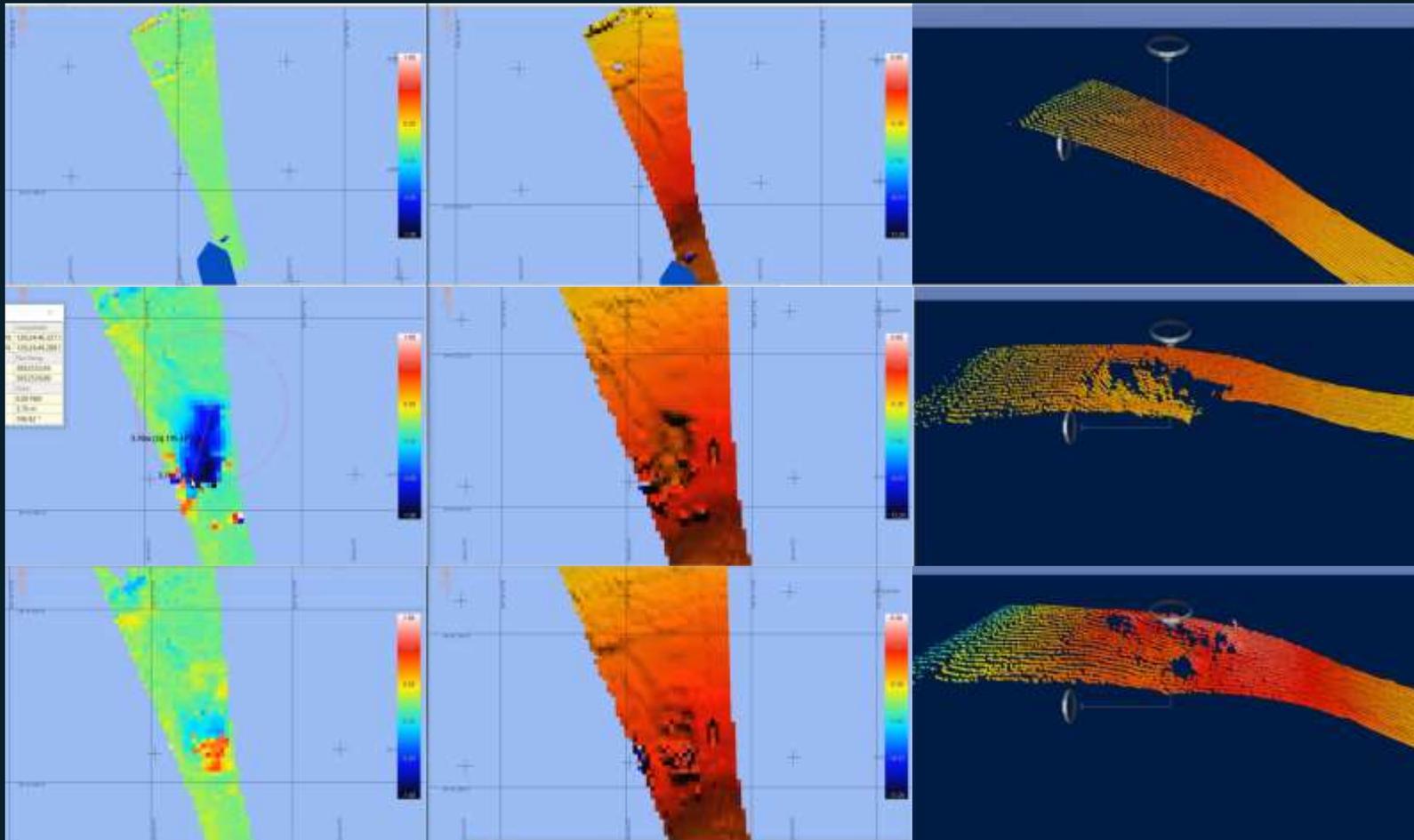
STX Scanning
pattern





This simple dredge scenario shows the bucket bite and release operation.

The top left is the differential grid. The top right is the real time grid.

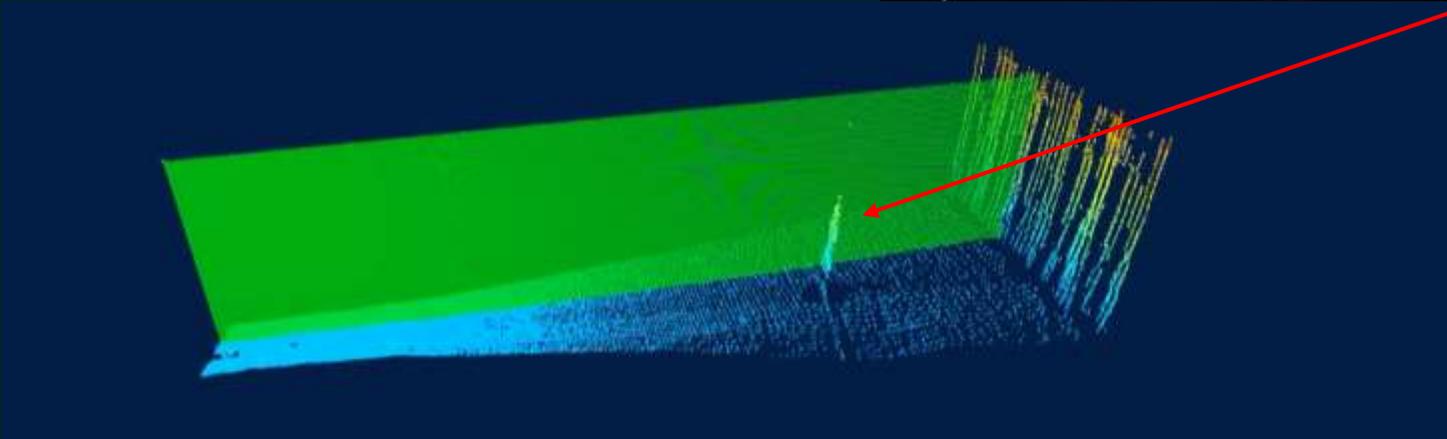
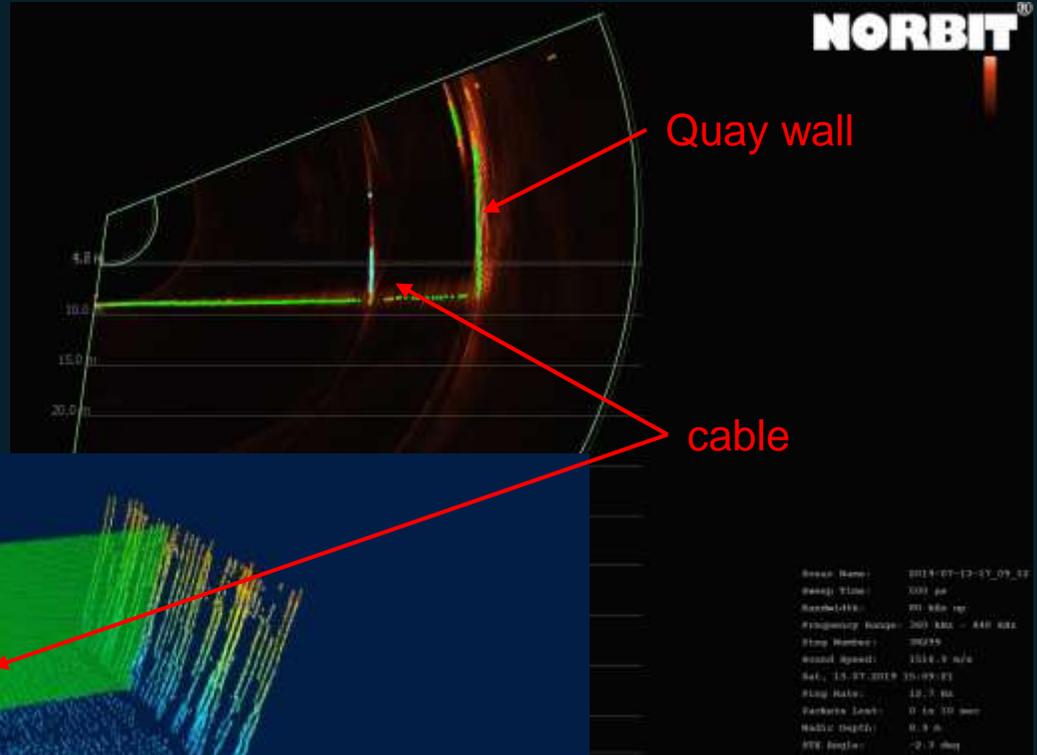


Before grab

After grab

After release

- The object (cable) deployed at the shoot area roughly 25 meters away from the sonar.
- The Multi-detect data can be separated from the bathymetry (different flags – colors - supplied with data)



NORBIT

- explore more -

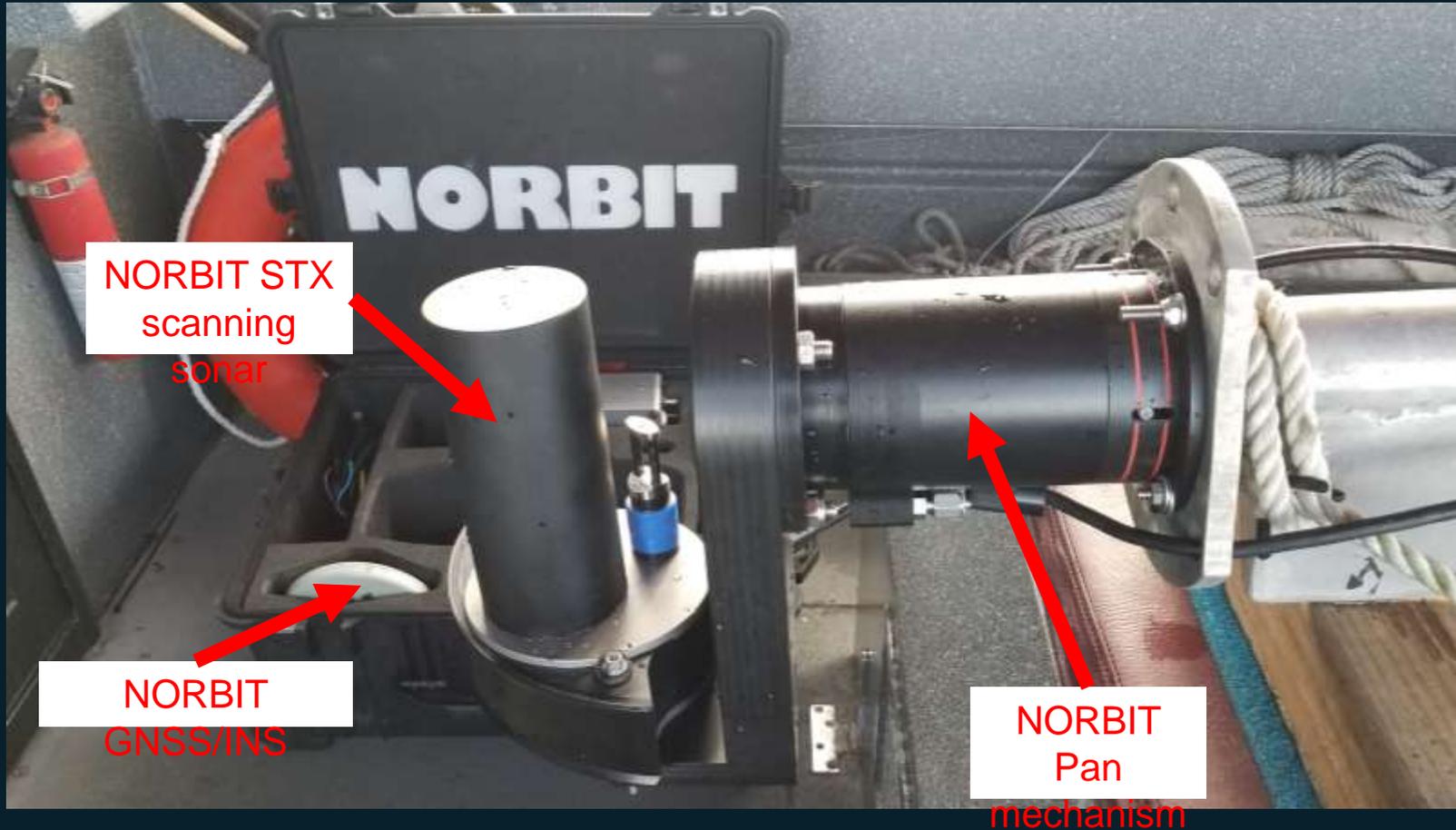
STX360 & Lidar – 4D sonar for dredging monitoring – More Coverage



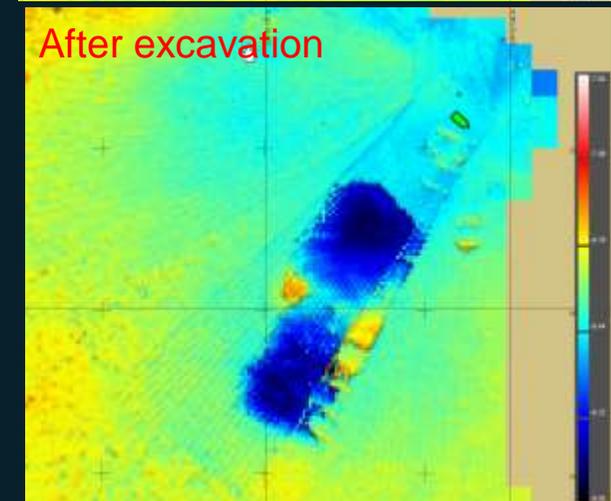
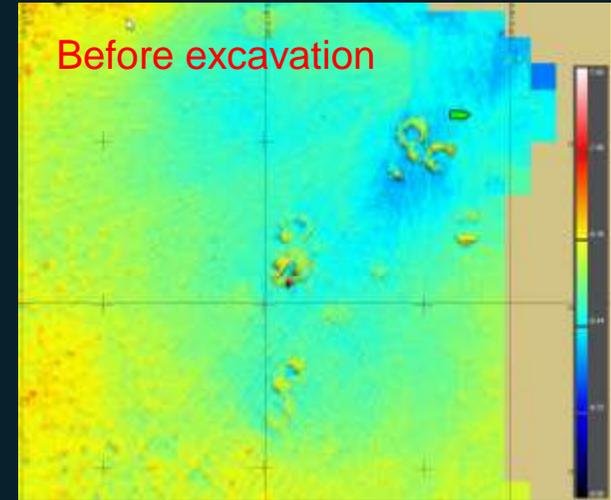
Dual head NORBIT **STX** with integrated **Lidar** and **GNSS/INS**



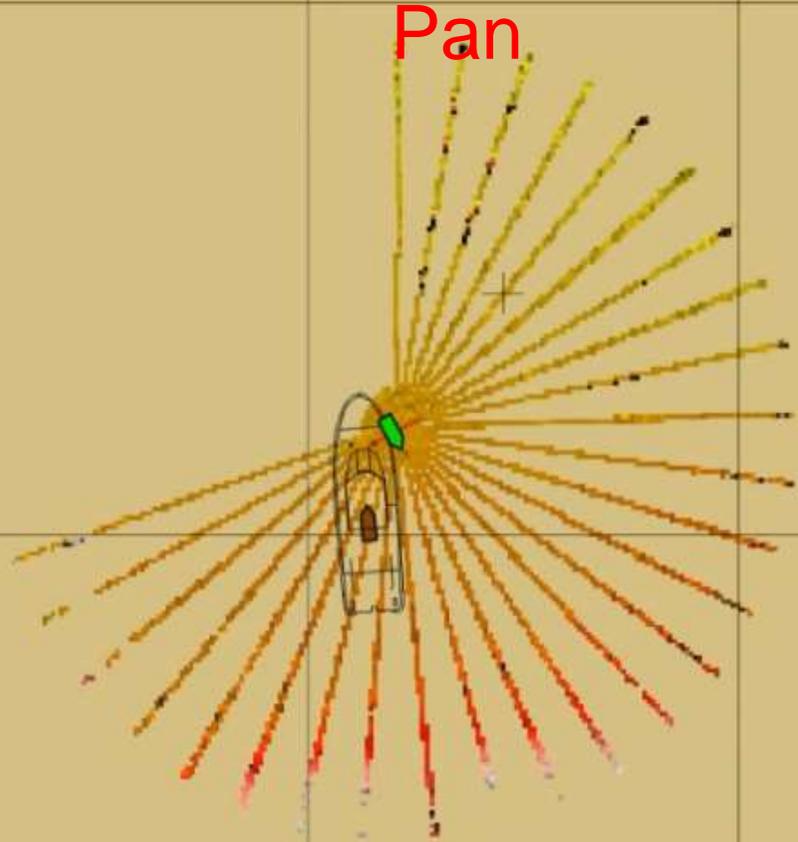
Dredge site



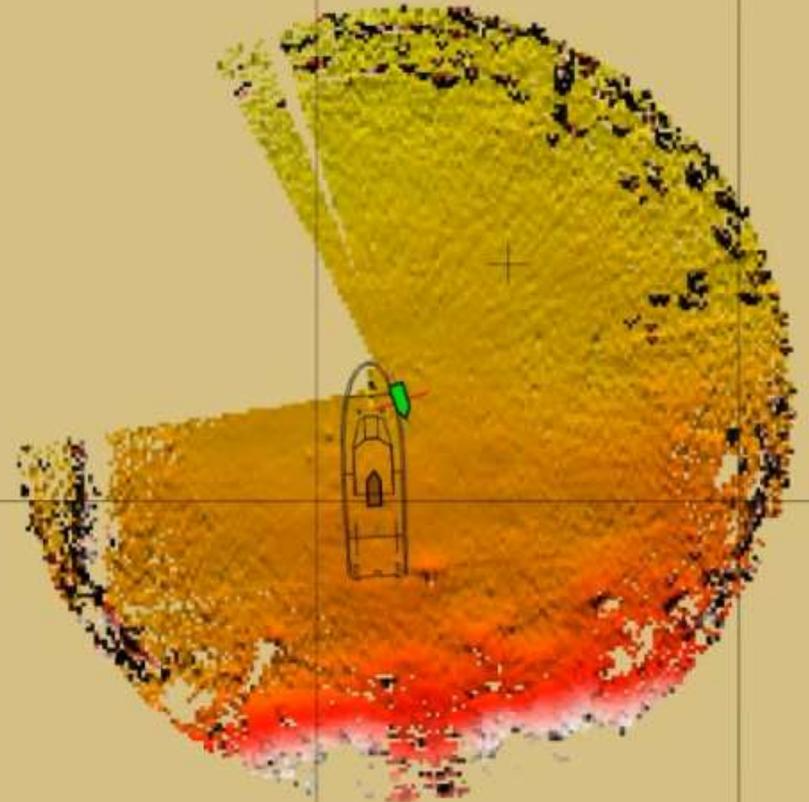
- Integrated pan mechanism monitors the position of the suction pipe or excavator's grabber and move STX while monitoring real-time with electronic scanning.
- Capable of 360 deg coverage due to tightly integrated pan mechanism.
- Monitor the dredging operation in the real time accurately measure the changes in the distribution of the material.
- Gives the instant information to the operators where to move the dredger and how much material has been removed.



Single swath sonar on
Pan



STX360



Advantages of using STX360 over a pan rotator with single swath sonar

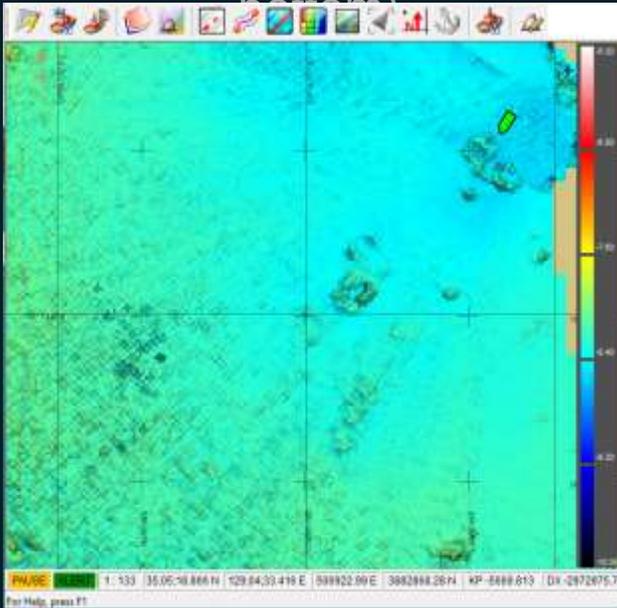
Pan rotator + single swath sonar

- Requires continuing scanning
- Wear and tear due to continuing scanning
- Possible ambiguity of sonar position while rotating
- Separate rotator and sonar controls

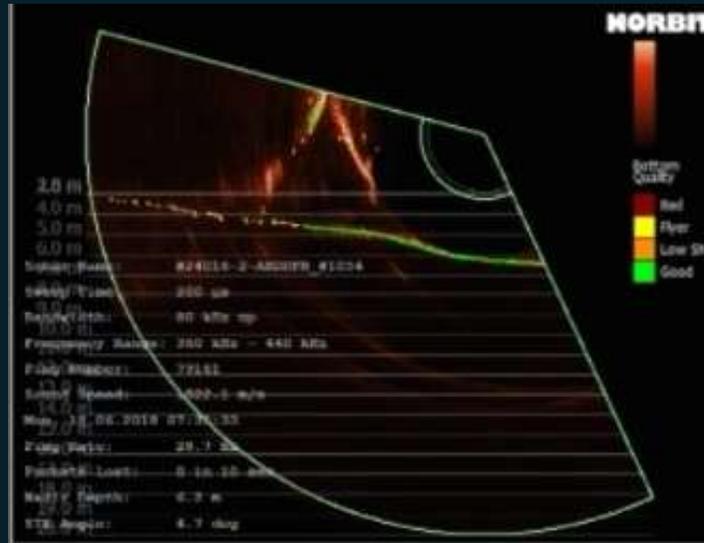
STX360

- STX scans electronically and only moves when needed (target is outside 20deg sector)
- The rotator is used at much lower rate and lasts for much longer
- STX does not scan when turning (no ambiguity)
- NORBIT provides integrated app to control both rotator and sonar in synchronized way

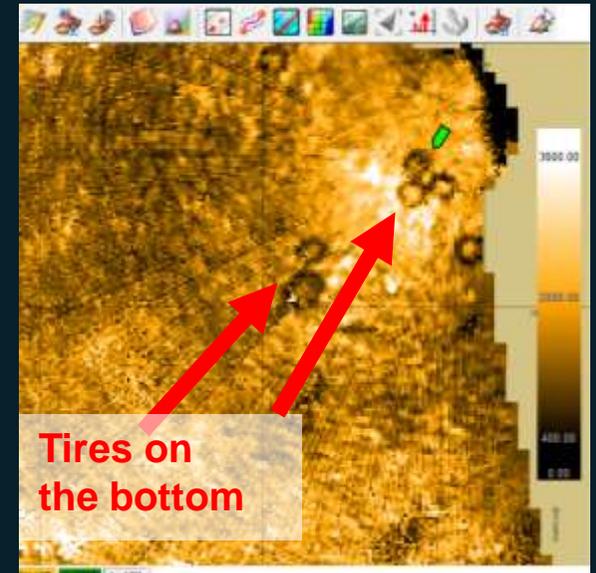
- NORBIT STX360 outputs:
 - ✓ Bathymetry - for accurate measurement
 - ✓ Water column – for visualization
 - ✓ Backscatter (intensity) - for safety (quick identification of boulders, or other objects on the bottom)



Bathymetr

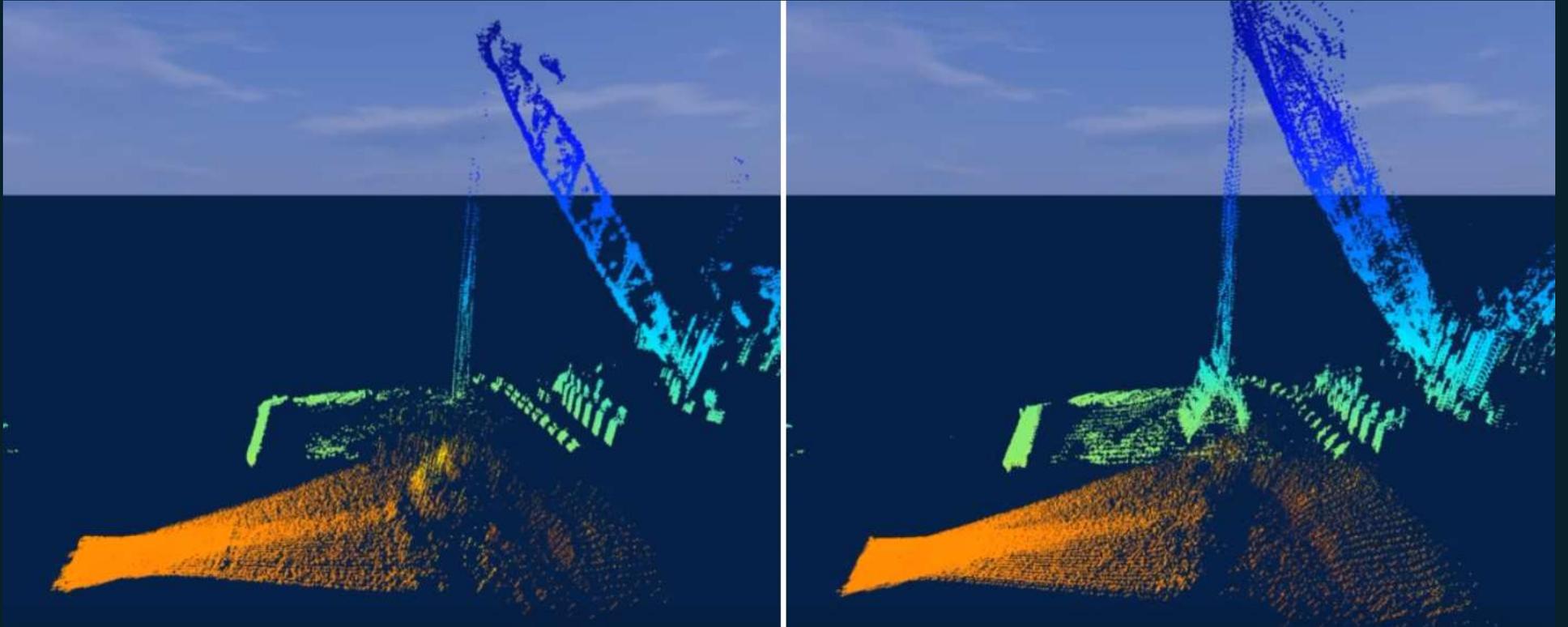


Water Column

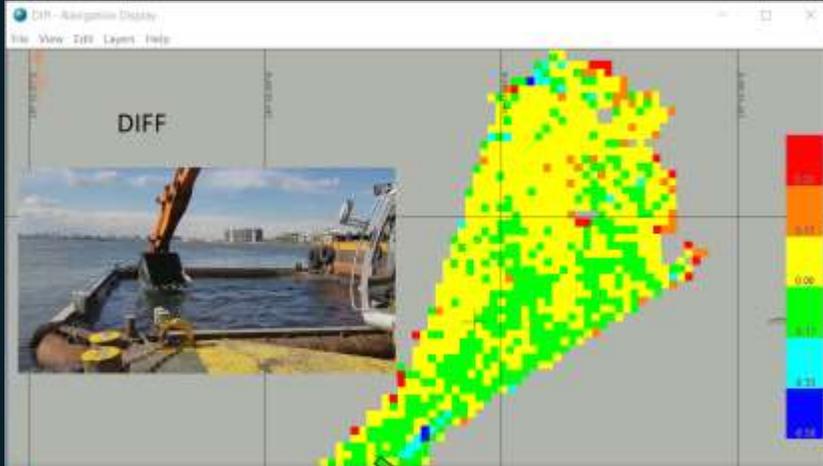


Tires on the bottom

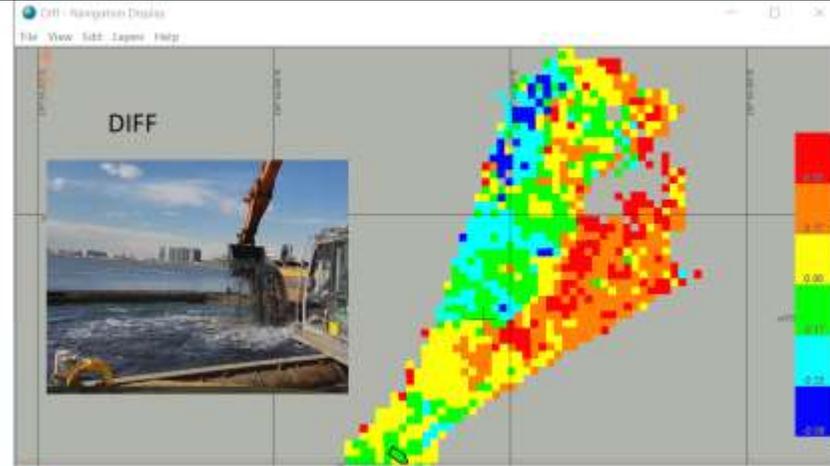
Backscatte



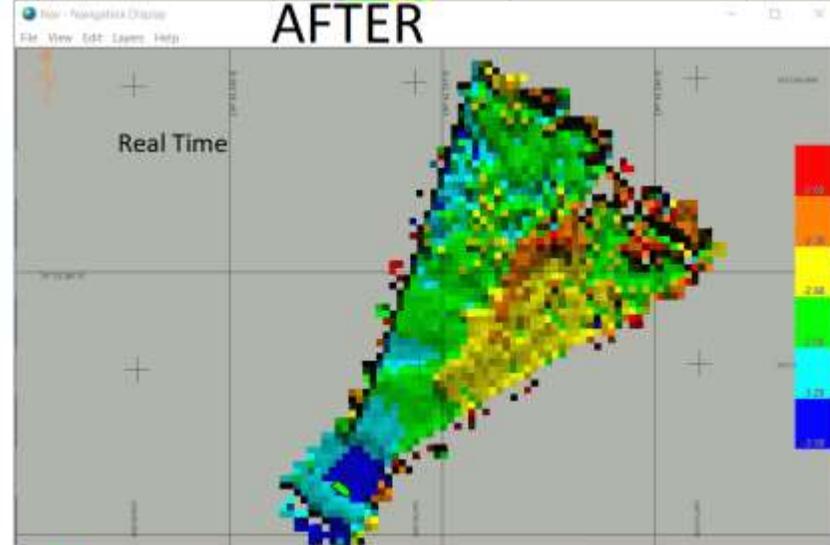
Two “frames” of STX+Lidar 3D coverage with grabber in and out of the water



BEFORE



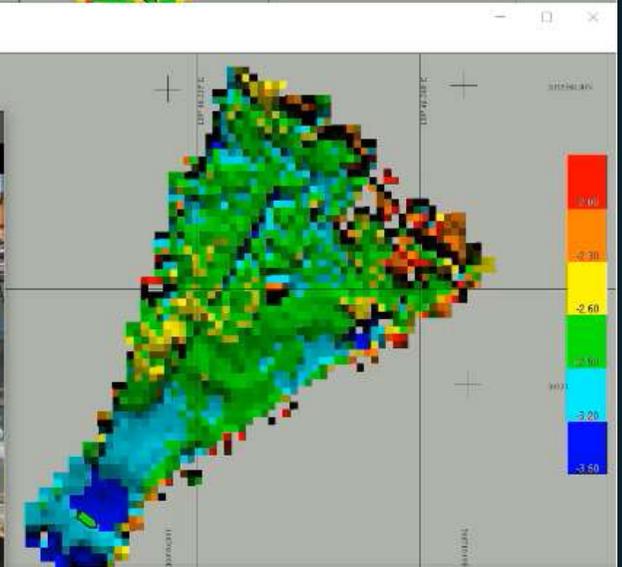
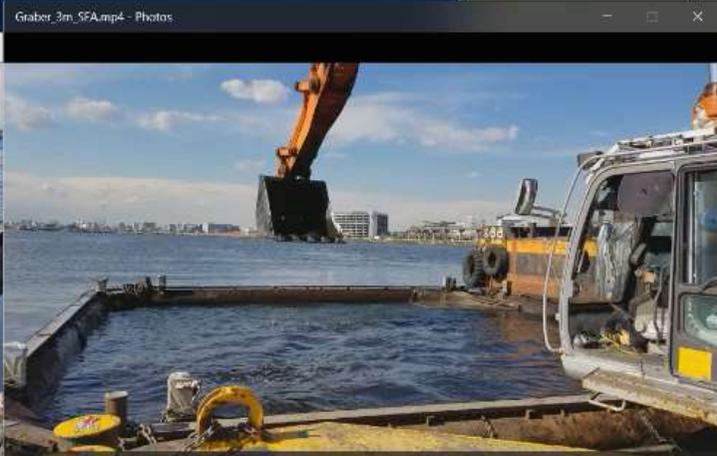
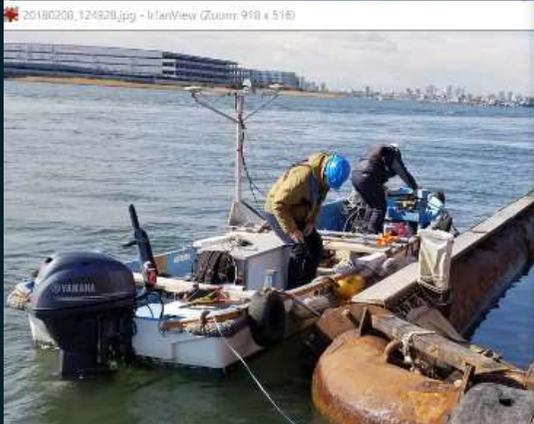
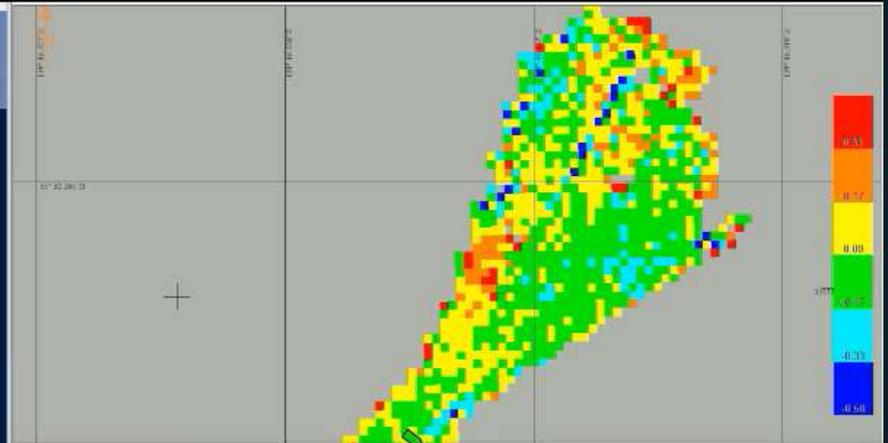
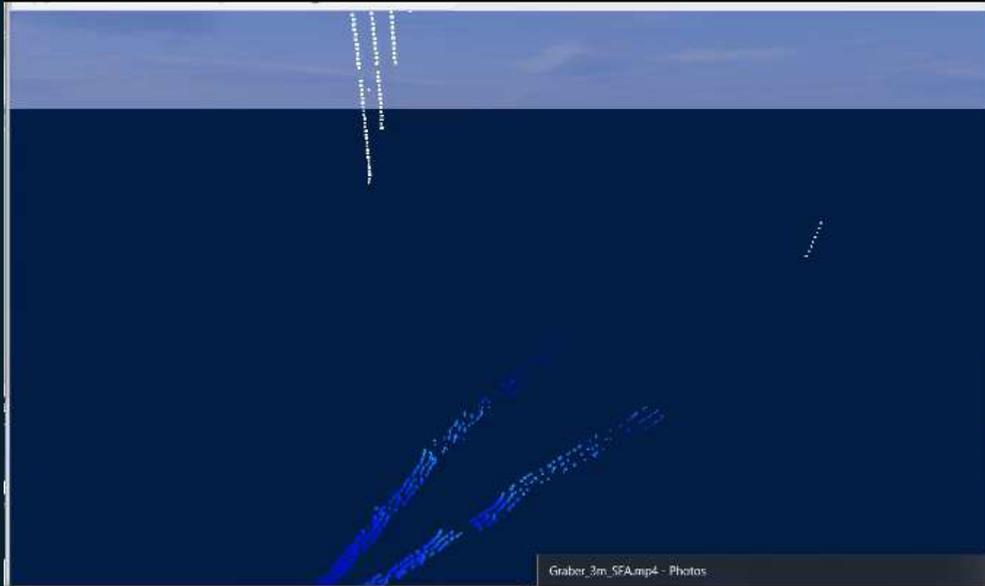
AFTER



NORBIT

- explore more -

NORBIT STX & Lidar – 4D sonar for dredging monitoring

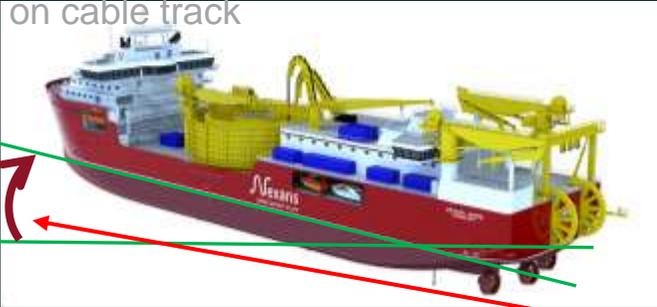


NORBIT

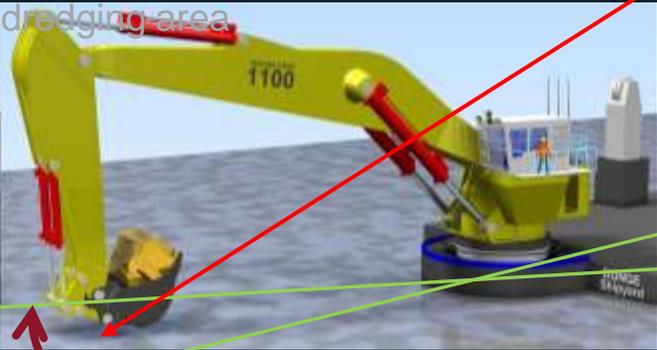
- explore more -

STX360 for dredging, cable laying , rock dumping solution

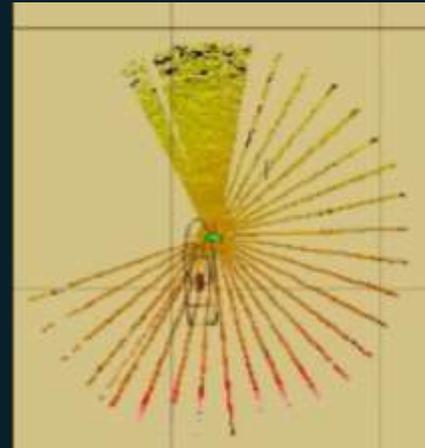
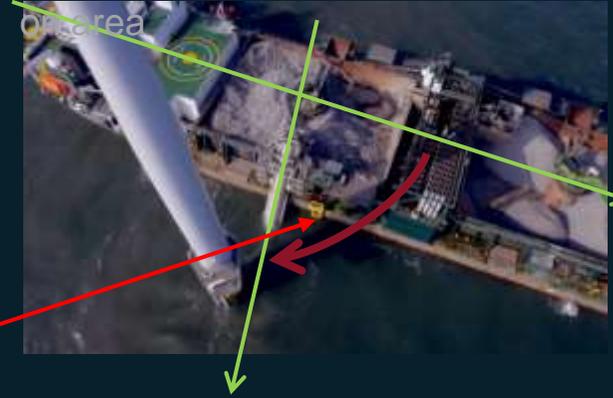
Coarse rotation synced to vessel heading offset to keep STX scanning on cable track



Coarse rotation synced to arm direction to keep STX scanning in dredging area

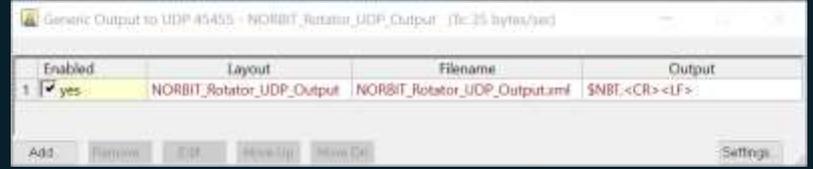
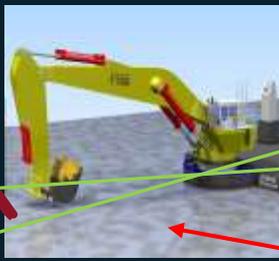


Coarse rotation synced to rock depositing arm direction to keep STX scanning on a rea



STX360 in manual mode

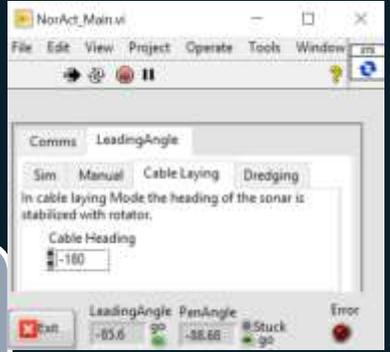
Rot+STX – Operation process



Qinsy output "Leading Angle" to NORBIT App: NorAct

Qinsy applies the new rotation to the STX frame
Continues data acquisition

NorAct detects if there is a need to rotate



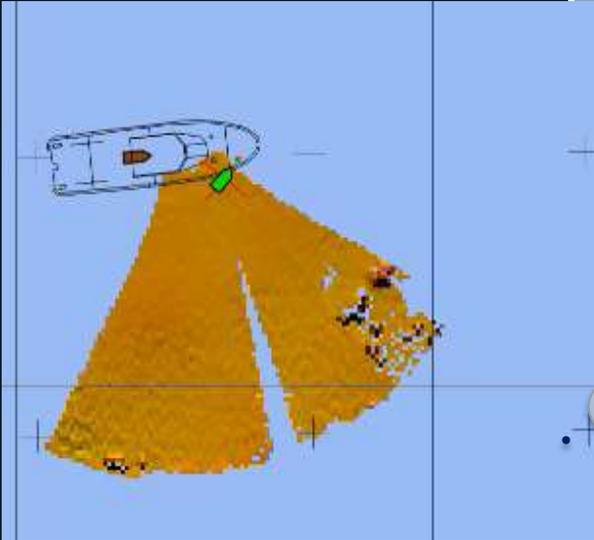
Rotator stops moving, NorAct:

1. Apply breaks
2. Reads the position accurately
3. Sends to Qinsy
4. Starts STX

NorAct

1. Stops STX
2. Moves rotator

STX never scans when rotator moves!



STX is accurate when scanning
STX scans fast and makes up for lost time during movement

- It is **not possible** with **single swath sonar**, **only STX**

Moving takes time

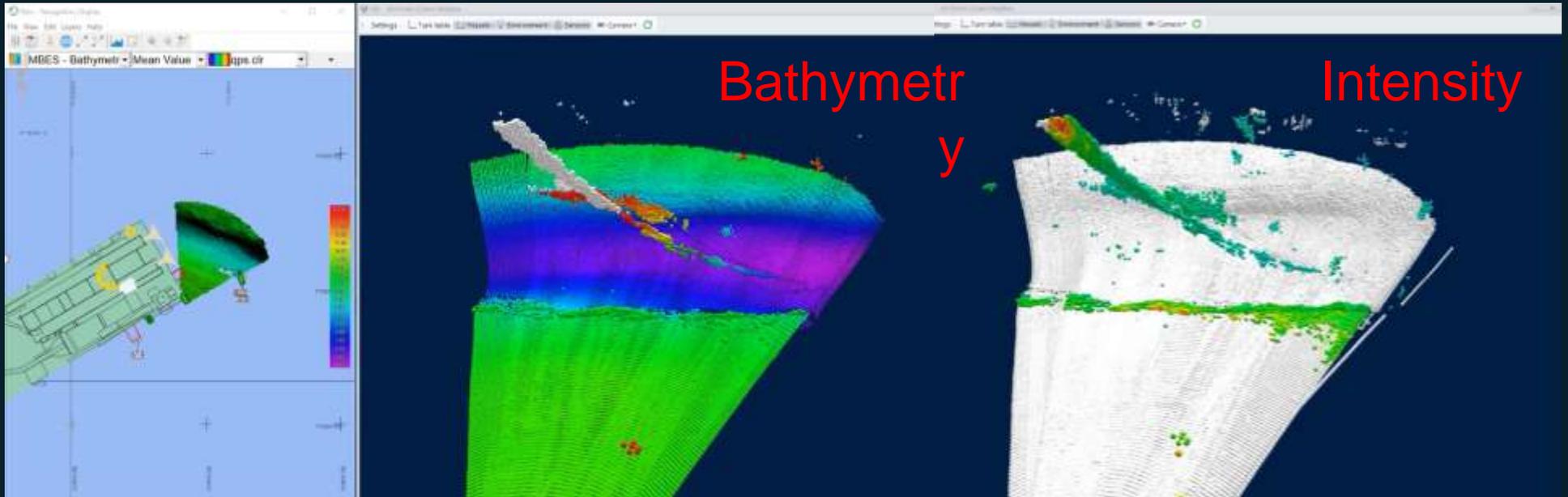
When moving we do not know accurately the position

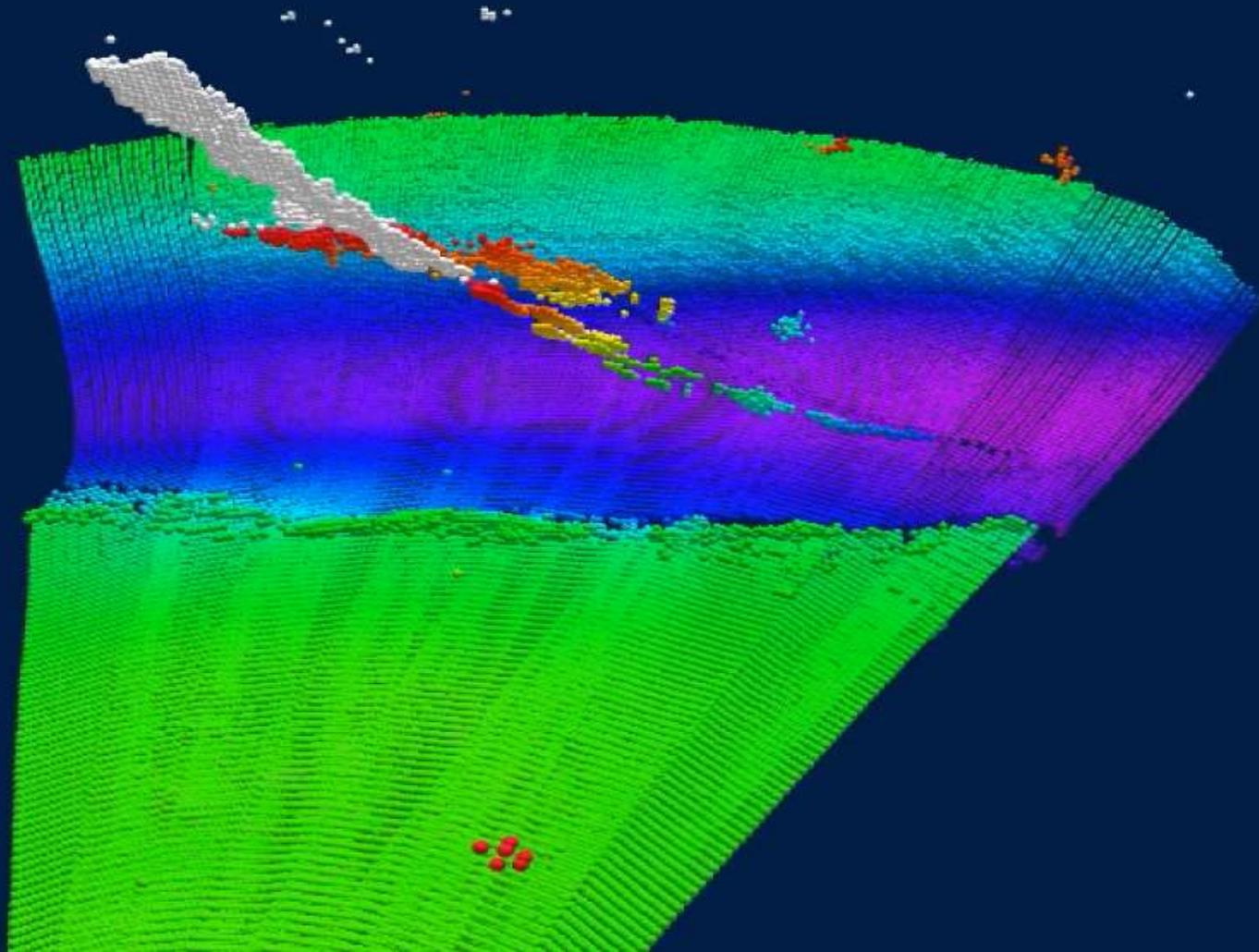
NORBIT
- explore more -

NORBIT STX360
for cable laying

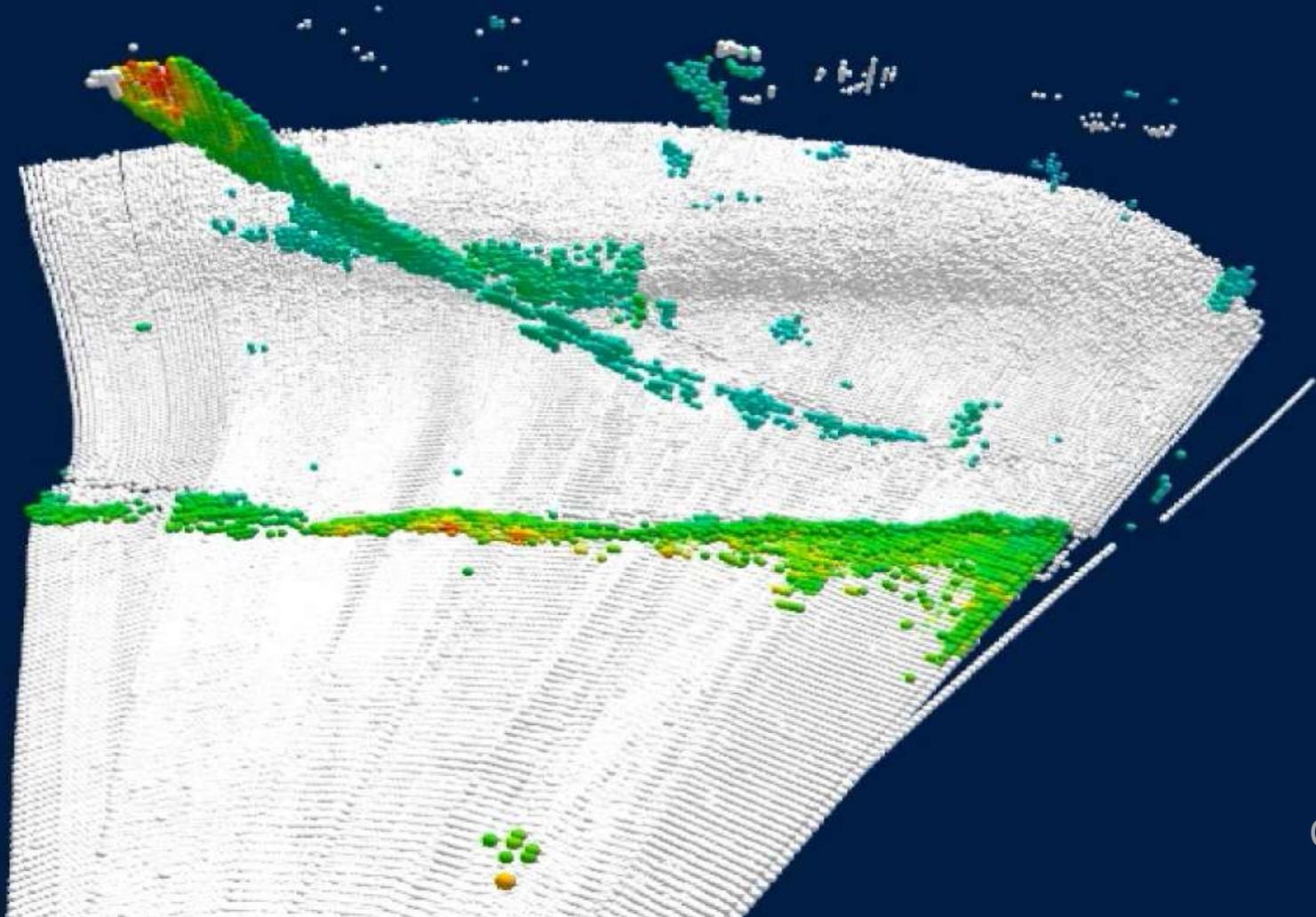


- Multi-detect points do not contribute to bathymetry DTM
- Used for catenary modeling





Click to play

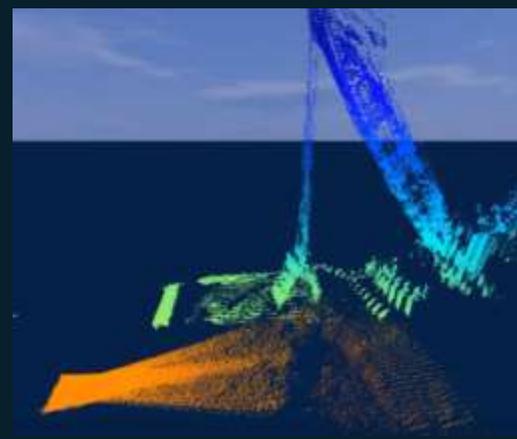
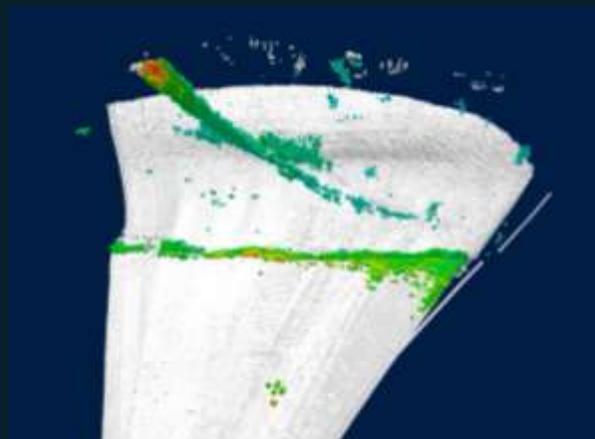
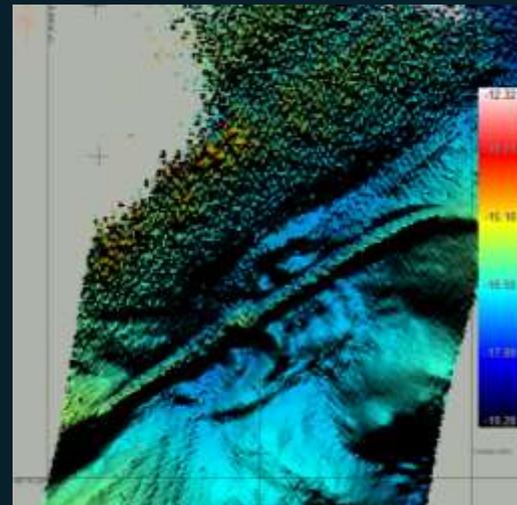
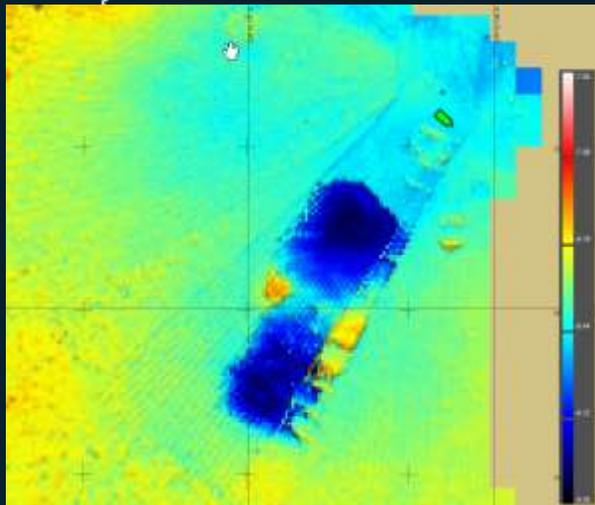


Click to play

NORBIT

- explore more -

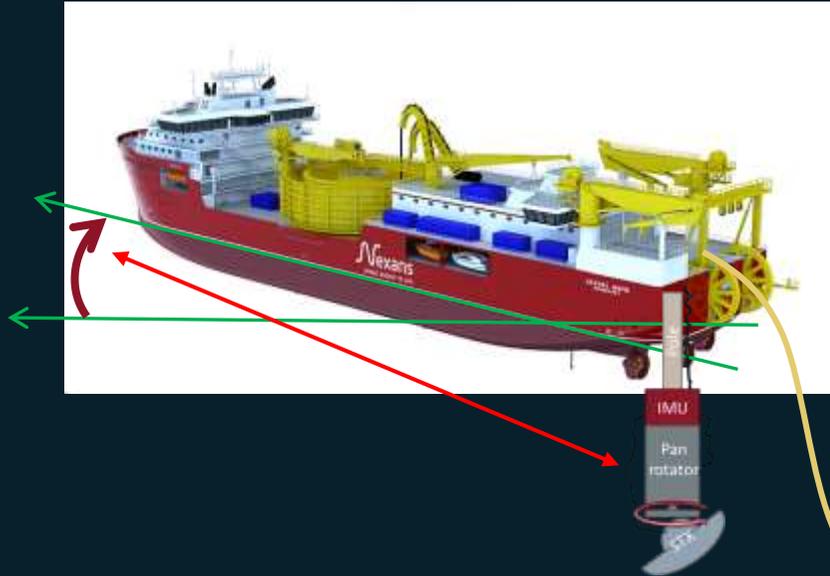
Thank you. Questions?



STX – cable laying use case

Pan mechanism is used for coarse positioning

STX is used for real time measurement



Allows for:

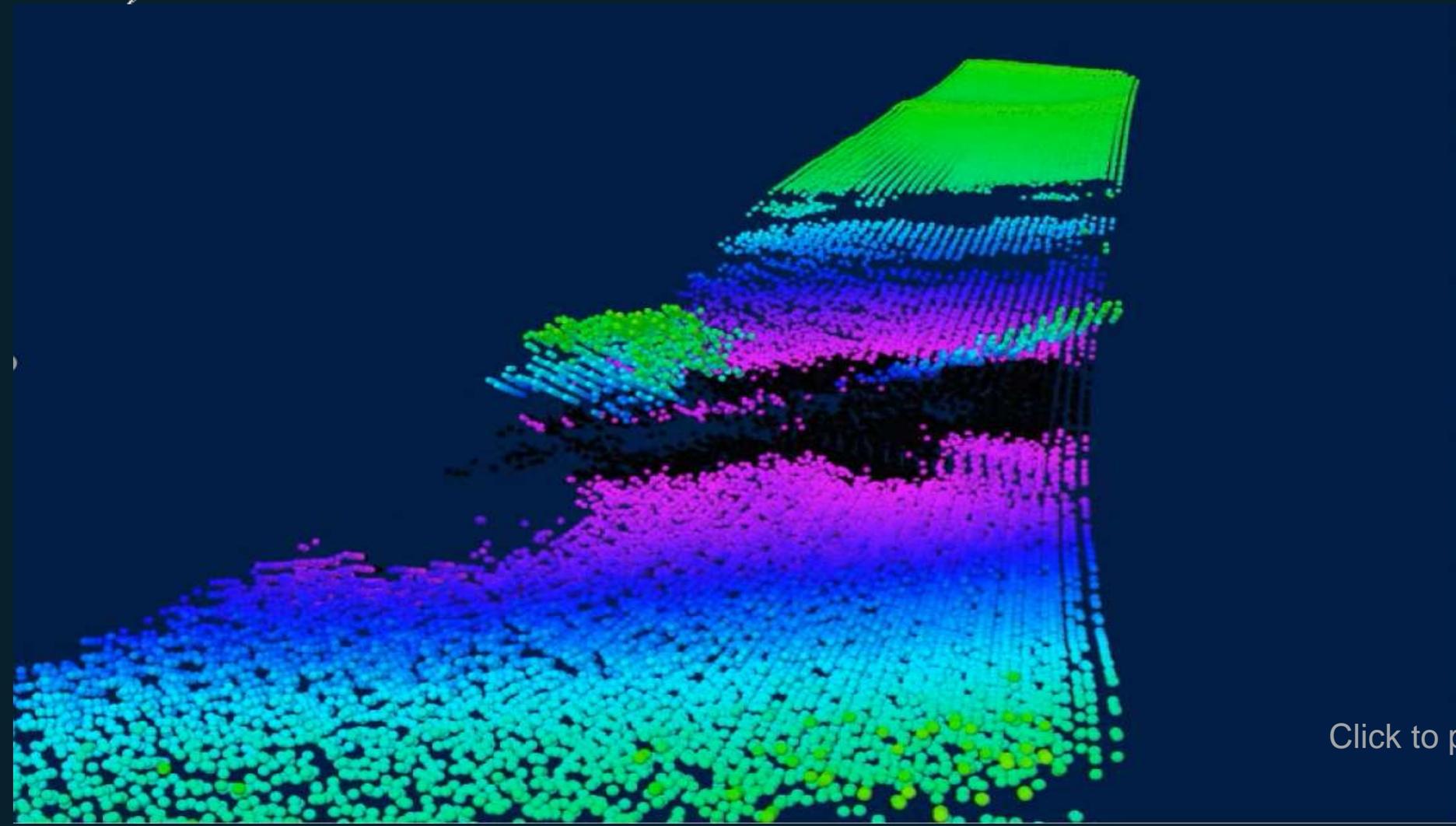
- Heading stabilization
- 360 deg mapping
- Ensuring product location
- Touch down point monitoring
- Catenary modeling

- Pan mechanism rotation is synced to vessel heading to keep STX scanning on cable track
- The rotator is activated only if the heading exceeds certain threshold
- While rotation the STX does NOT scan to avoid ambiguities with pan mechanism position
- Qinsy is used to send the heading to the rotator
- There is a logic which will determine when the rotator needs to move

NORBIT

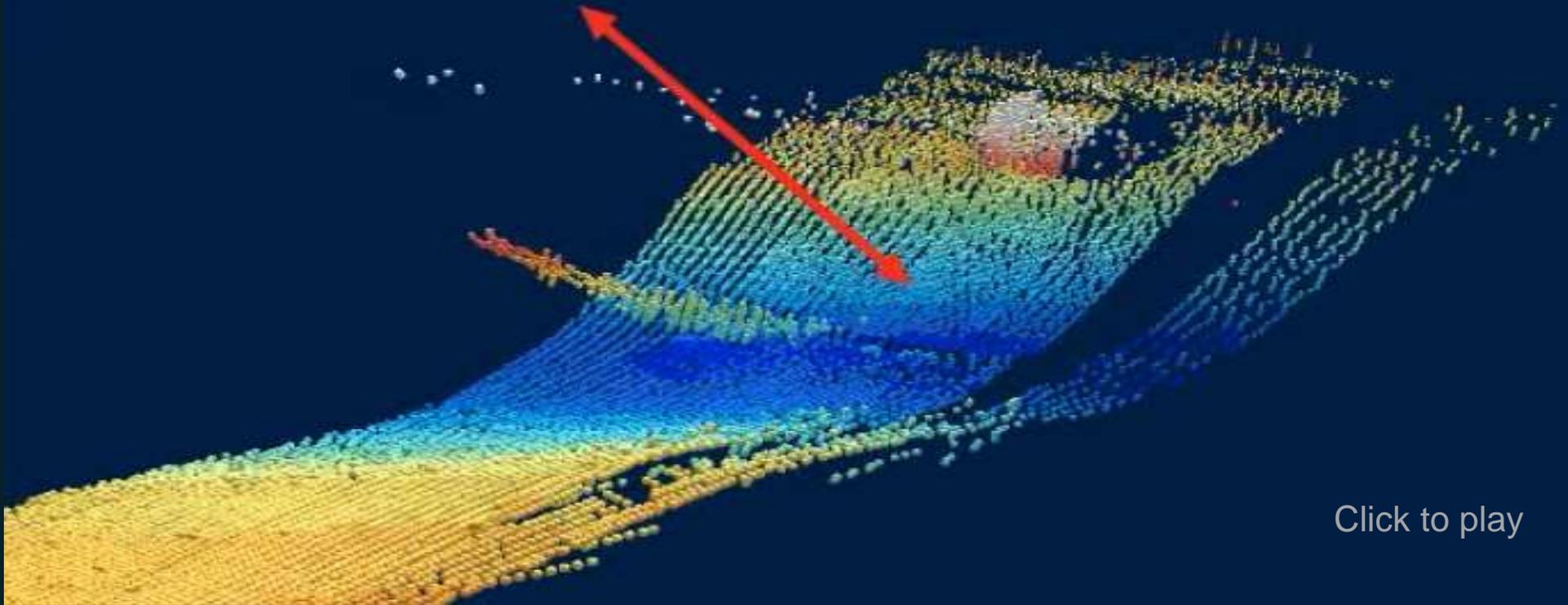
- explore more -

Cable laying, STX360, point cloud display



Click to play

Touch down



Click to play

NORBIT

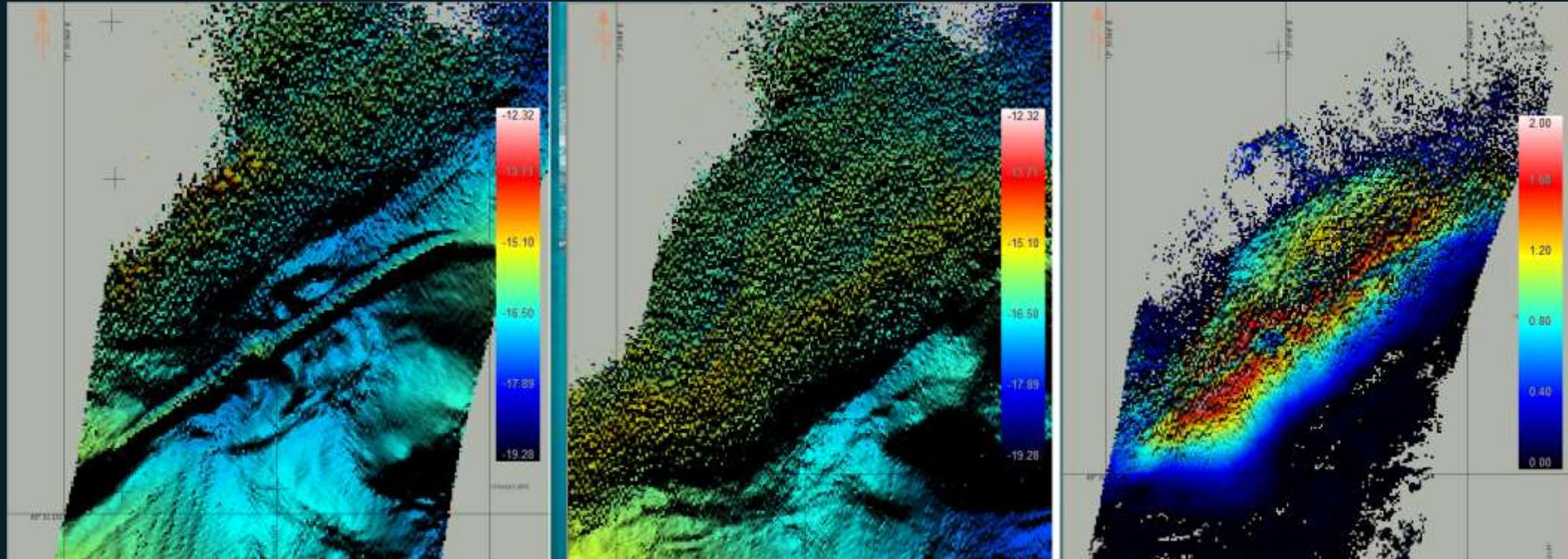
- explore more -

Cable laying, STX360, intensity display



Click to play

1. Create Reference surface  2. Perform Real-Time operation  3. Watch the Difference in real time





NORBIT

- explore more -

STX 360 GNSS/INS

- Real time navigation
- RTK support
- PPK, PPRTX for postprocessing
- Compact and lightweight
- Titanium and plastic construction

