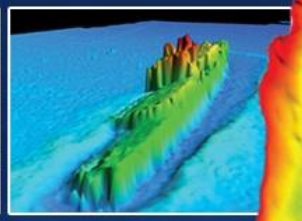
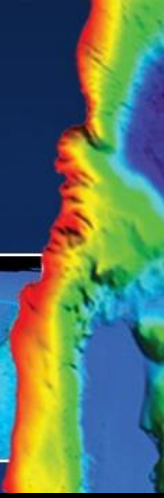
CIDCO

Centre interdisciplinaire de développement en cartographie des océans

Interdisciplinary Centre for the Development of Ocean mapping





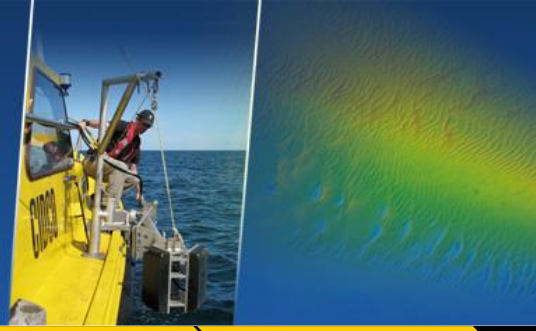
Deformation Analysis of Harbour and Dam Infrastructure using Marine GIS

U.S. Hydro 2015

Mathieu Rondeau[1], Camille Stoeffler[1], Davis Brodie[2] and Matt Holland[2]

[1] CIDCO ; [2] CARIS

Context



1) First diagnostic

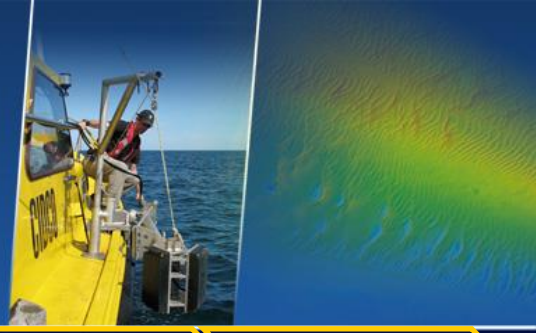
Coverage perf.	300m²/h
Resolution	mm
Accuracy	50cm->2m
Visibility sens.	yes
Current sens.	yes
Products	Sketch, videos

Complementarity

Coverage perf.	30 000m²/h
Resolution	10-15cm
Accuracy	cm
Visibility sens.	no
Current sens.	no
Products	3D points cloud

2) Validation, details

Hybridised MBES/LiDAR capture solution 2010->2012

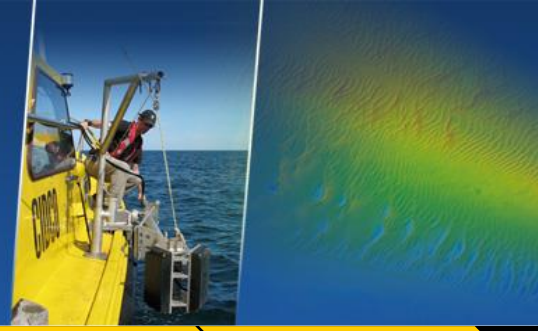


F.-J.- Saucier survey launch

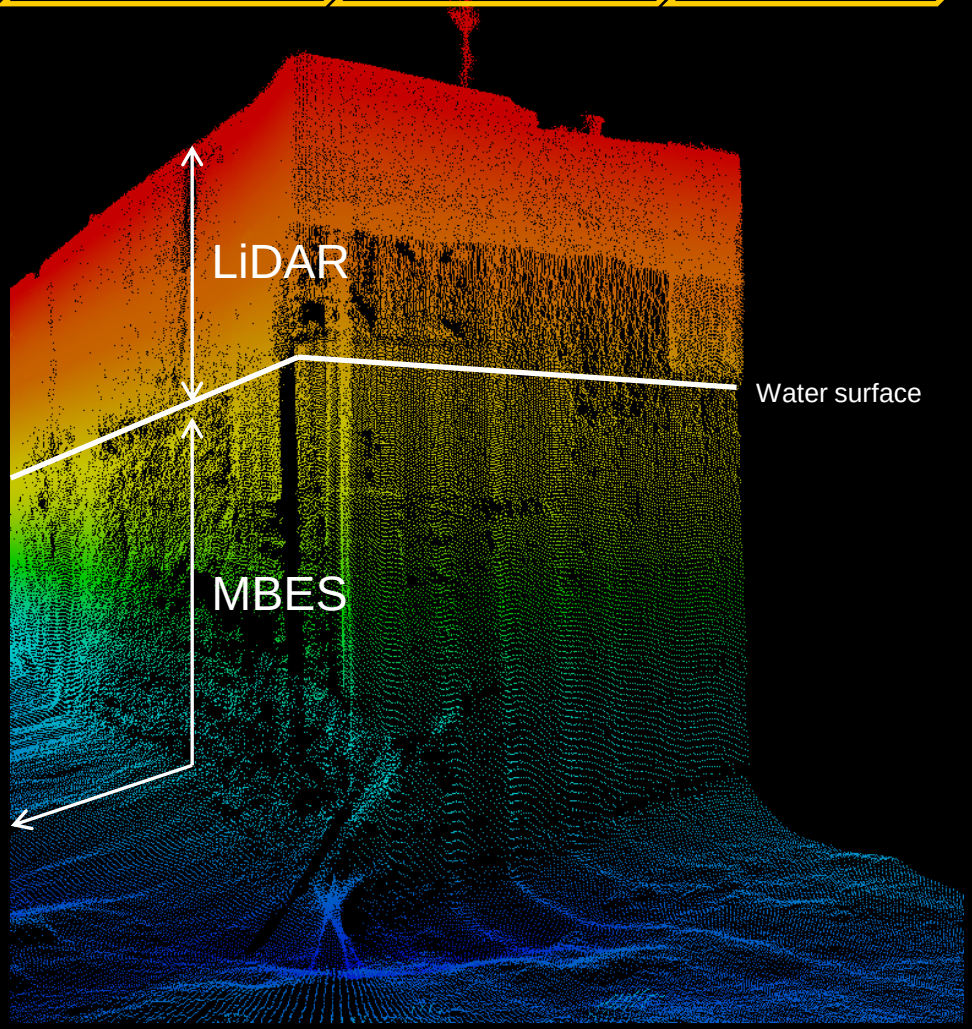
Teledyne Reson SeaBat 7125 SV2

Problem

2010->2012

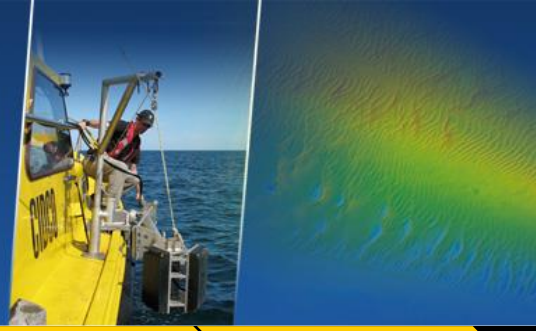


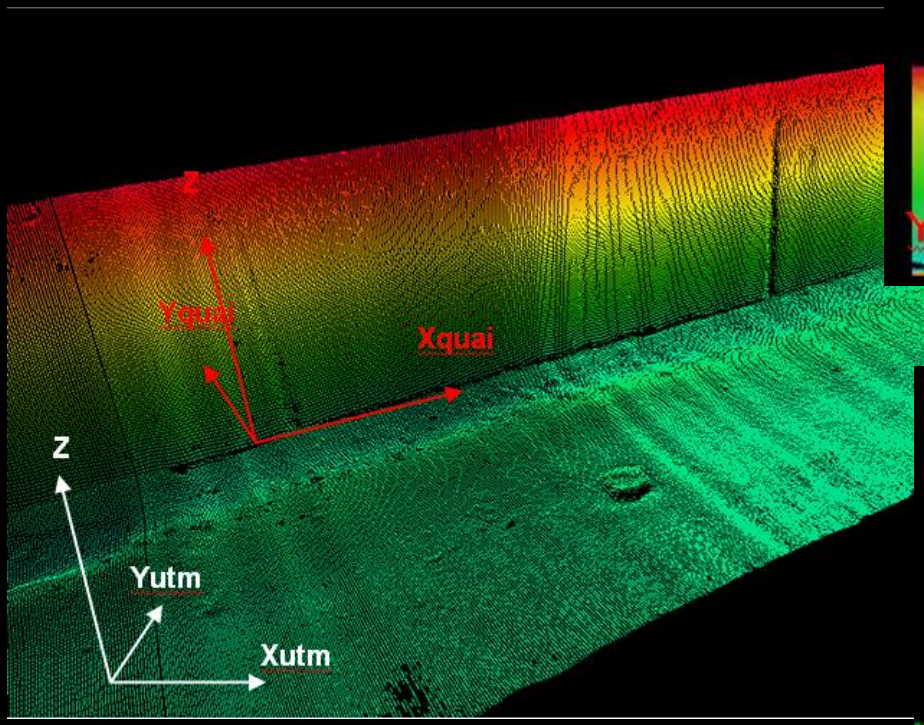
+	-
For the first time, port management bodies have a full view of the submerged part of their structures	3D points cloud is not easily usable by engineers
Precious information to better plan maintenance and repair	Vertical surface processing is not yet supported in CARIS
Recurring inspection -> evolutive diagnostic possible	



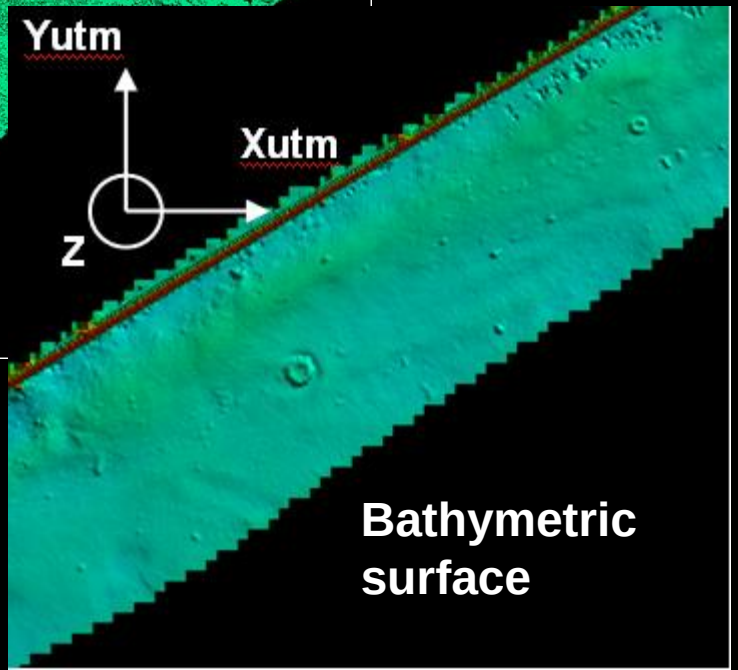
Objective

2010->2012



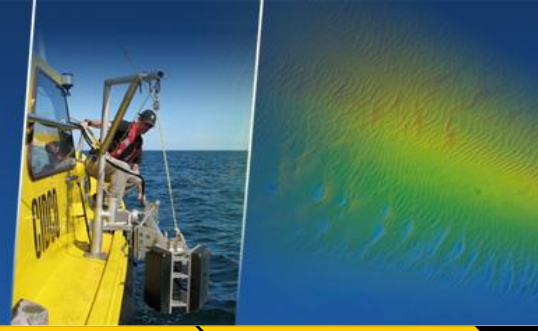


Quay wall surface

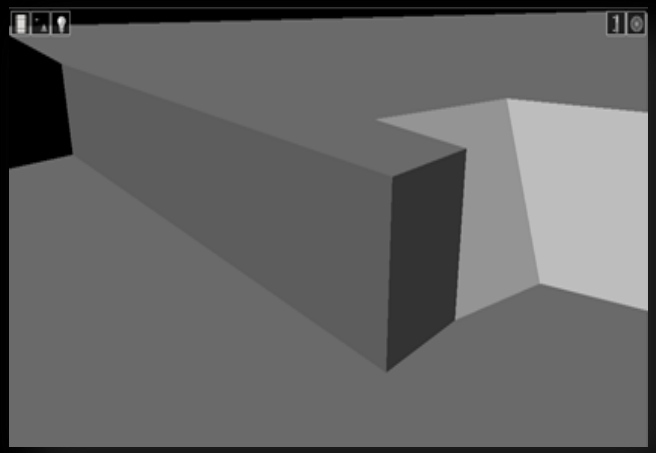


Bathymetric surface

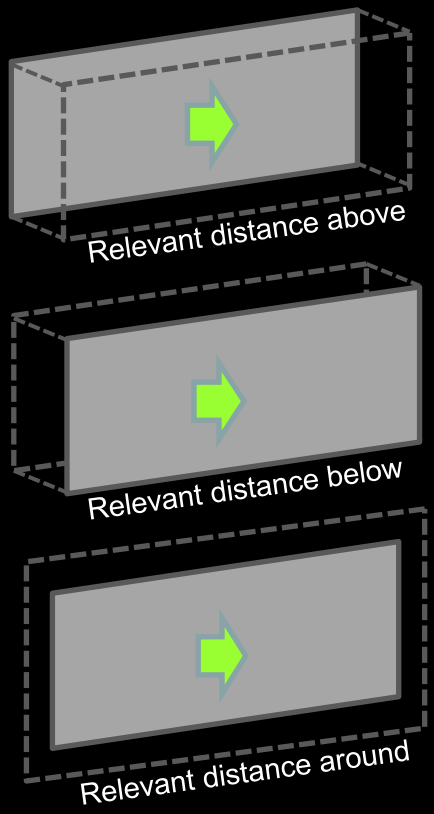
Engineering Analysis Module
2013->2014



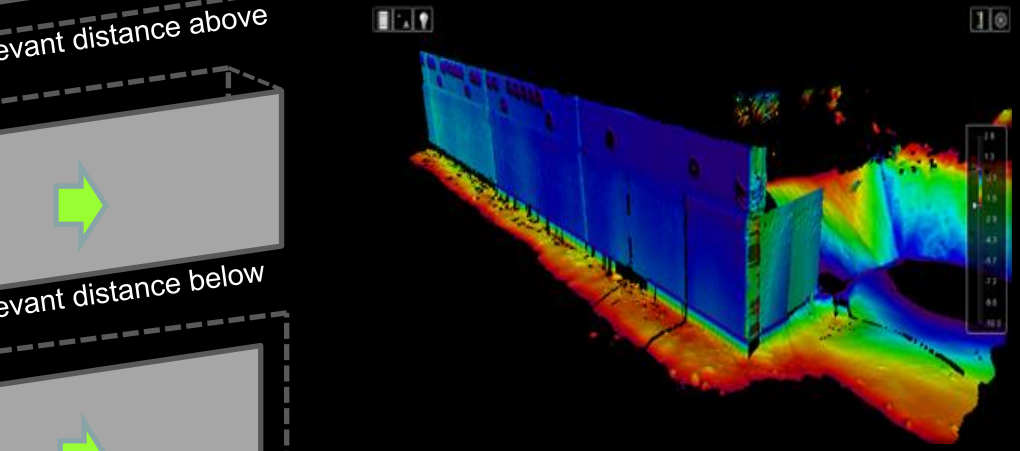
Create a 3D model (collection of inclined and horizontal planes)



Define contributing soundings

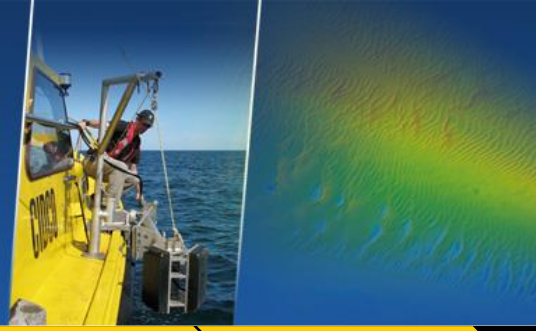


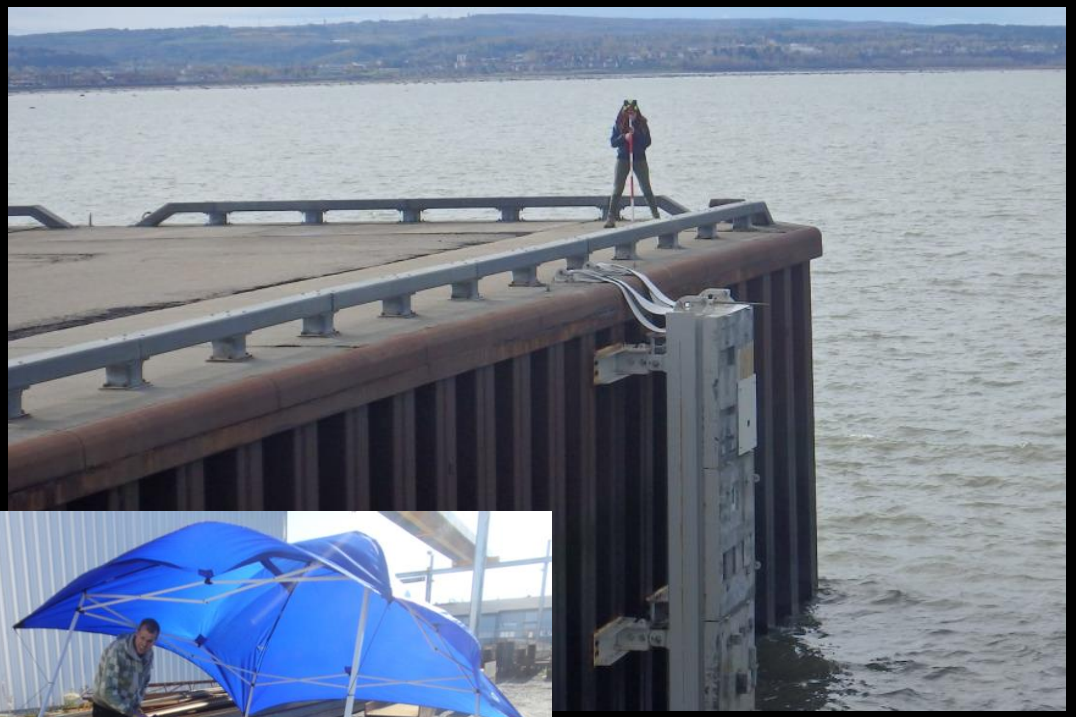
Grid contributing soundings on each plane of the 3D model



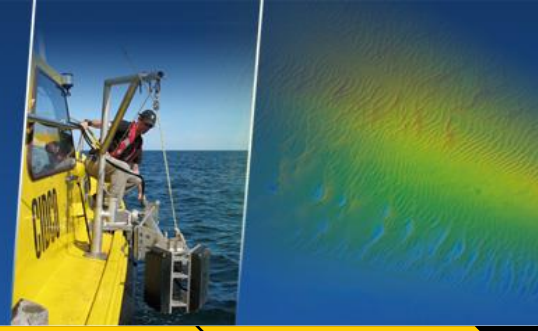
Datasets courtesy of Montreal Port Authority

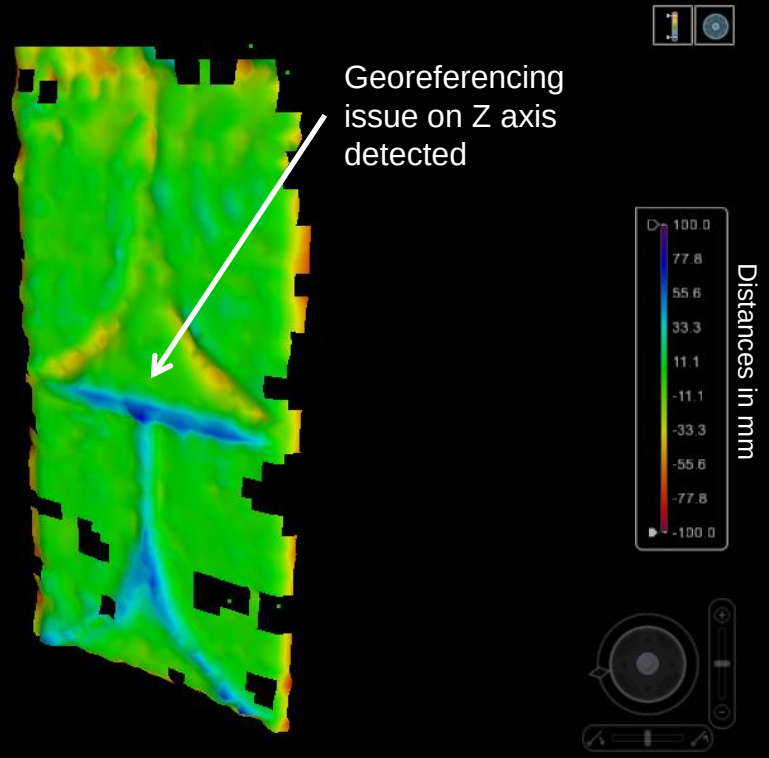
Case Study: CIDCO Test Bench
Installation - 2014



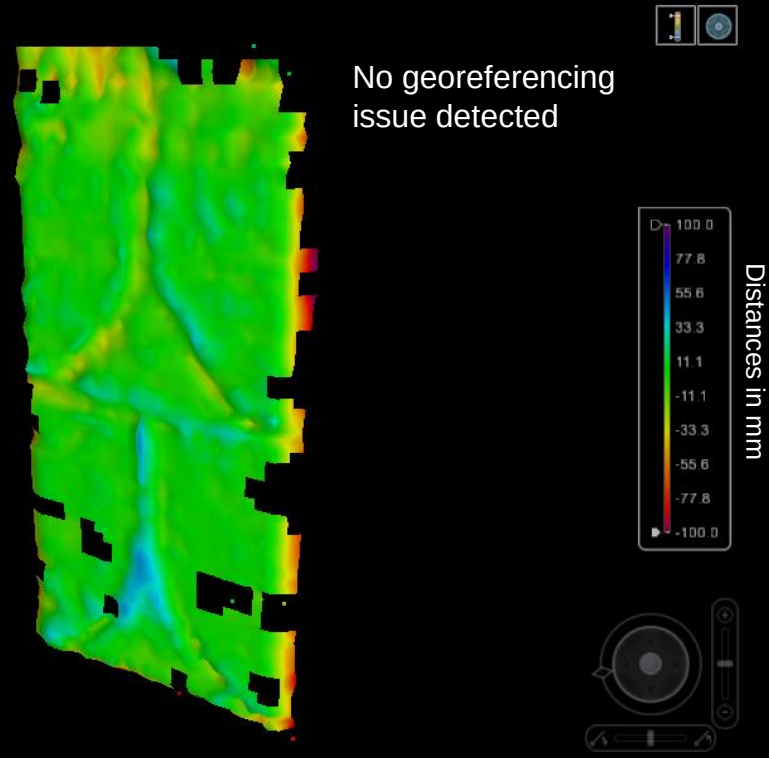


Case Study: CIDCO Test Bench
Accuracy evaluation



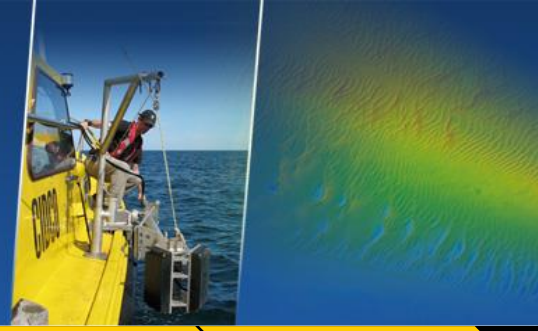


Ref VDTM – MBES line1 VDTM

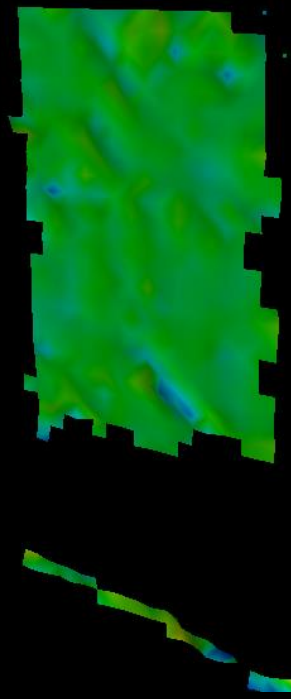


Ref VDTM – MBES line2 VDTM

Case Study: CIDCO Test Bench
Precision evaluation

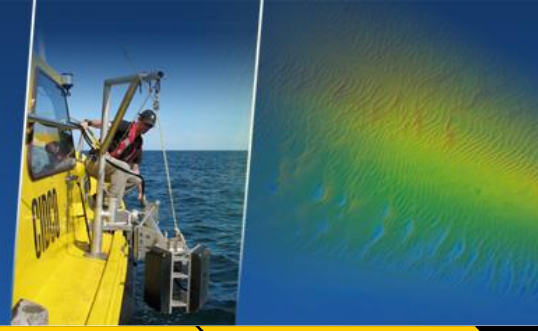


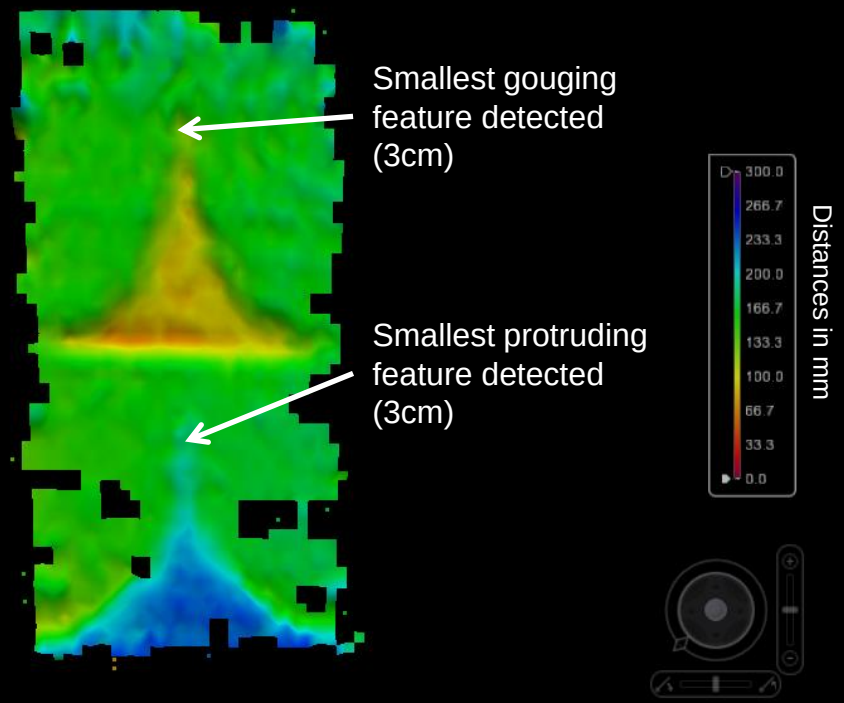
No precision issue detected



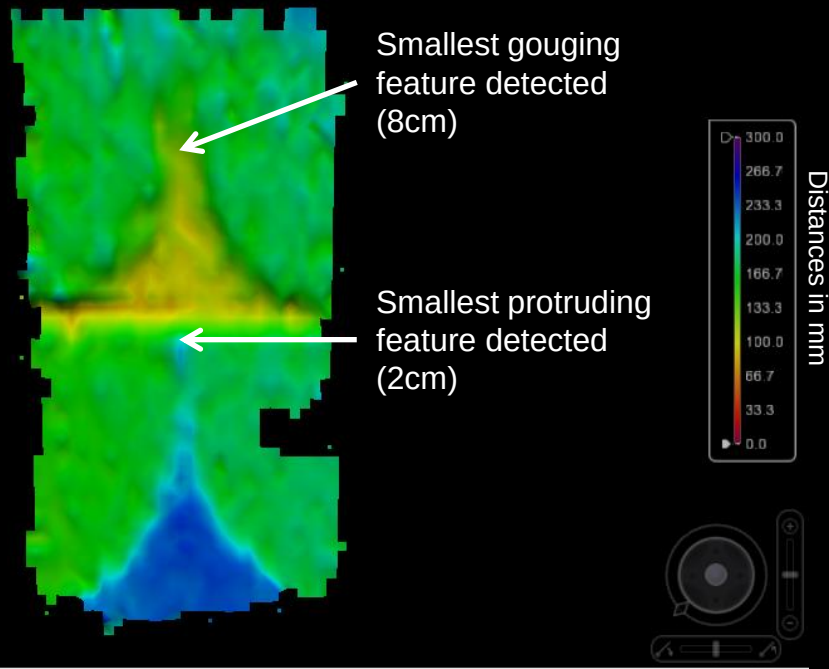
MBES line1 VDTM – MBES line2 VDTM

Case Study: CIDCO Test Bench
Resolution evaluation



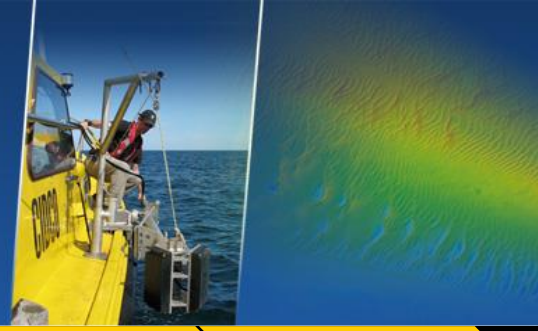


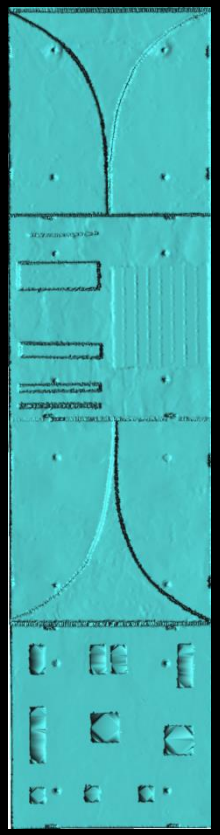
Survey line speed = 1 knot
Distance from test bench = 2m
Swath angle = 90°
Steering angle = 40°

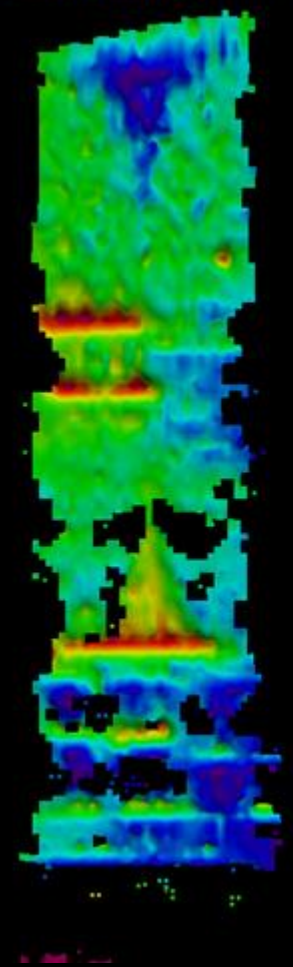


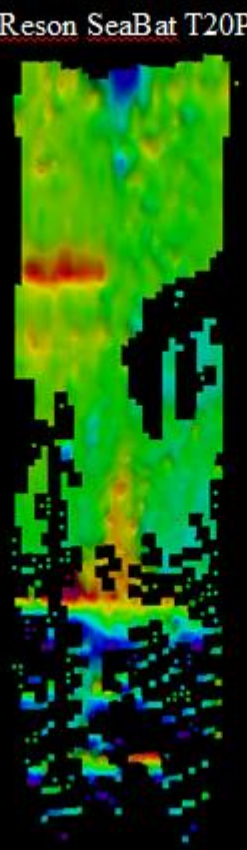
Survey line speed = 1 knot
Distance from test bench = 5m
Swath angle = 90°
Steering angle = 40°

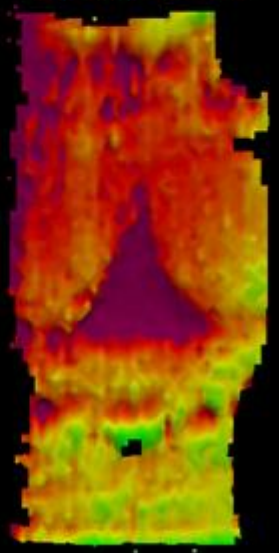
Case Study: CIDCO Test Bench
MBES comparison

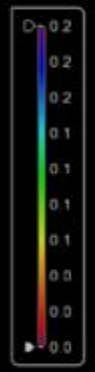












Case Study: CIDCO Test Bench
Head tilt / Beam steering