Presented at the FIG e-Working Week 2021,
21-25 June 2021 in Virtually in the Netherlands

SMART SURVEYORS FOR LAND AND WATER MANAGEMENT
CHALLENGES IN A NEW REALITY

FIG NL THE NETHERLANDS

e WORKING WEEK 2021
20-25 JUNE

Capra Alessandro

10971

Underwater Photogrammetry for Change Detection

Tuesday, 22 June 15:00–16:30

ORGANISED BY FIG GIN Geo-Informatie Nederland kadaster ITC UNIVERSITY OF TWENTE.

PLATINUM SPONSORS Trimble. esri THE SCIENCE OF WHERE

UNDERWATER 3D MEASUREMENTS

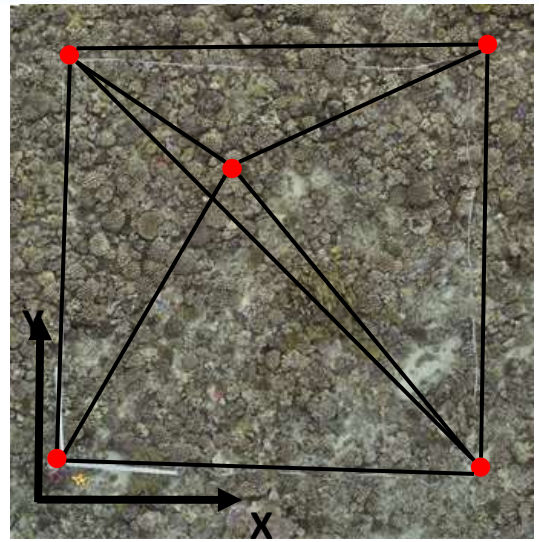
- Resolution
- Accuracy
- Repeatability
- Spatial scale

Ecomar - Belize

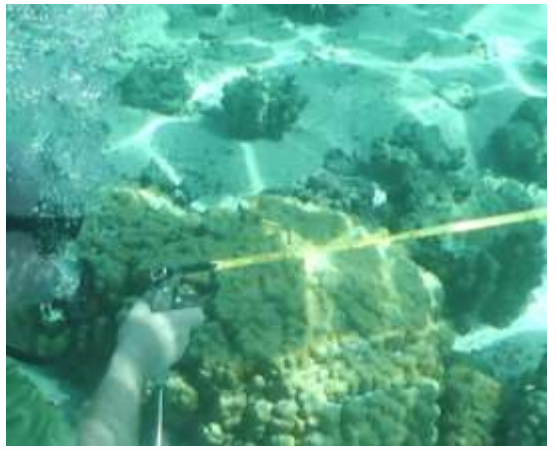
PHOTOGRAMMETRY – GROUND REFERENCE NETWORK

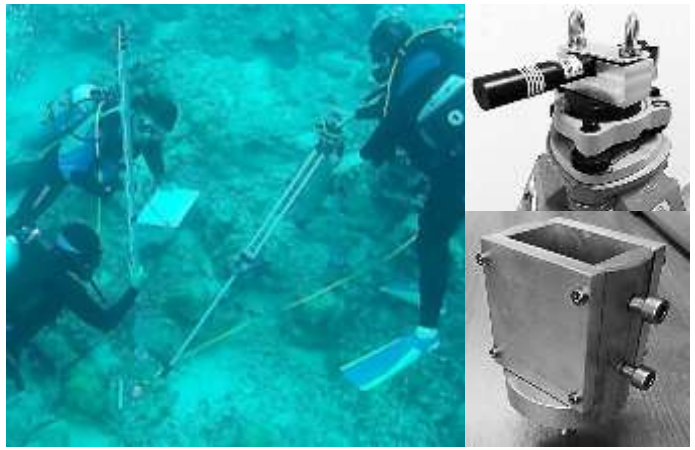
UNDERWATER PHOTOGRAMMETRY – THE NETWORK

- Stable points materialization
- Distances measurements
- Height differences measurements (levelling)
- Least squares network adjustment

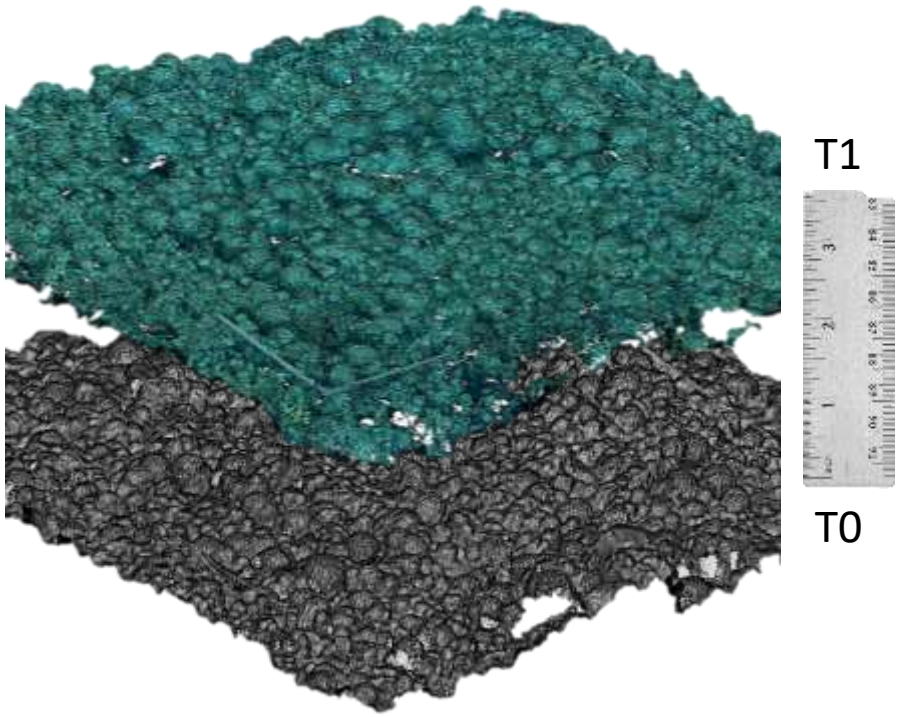


COORDINATES IN A LOCAL REFERENCE SYSTEM, FEW MM OF ACCURACY





3D Results at Different Epochs - Monitoring

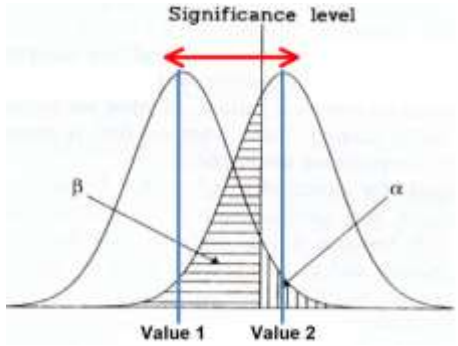


T1

T0

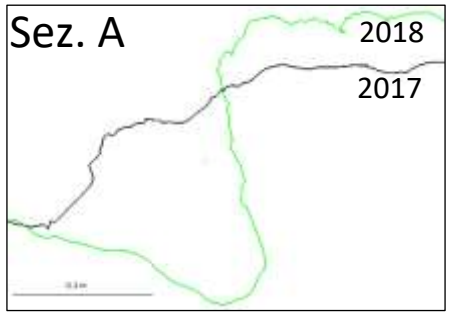
Same reference system (accurate co-registration)

Known 3D models' errors

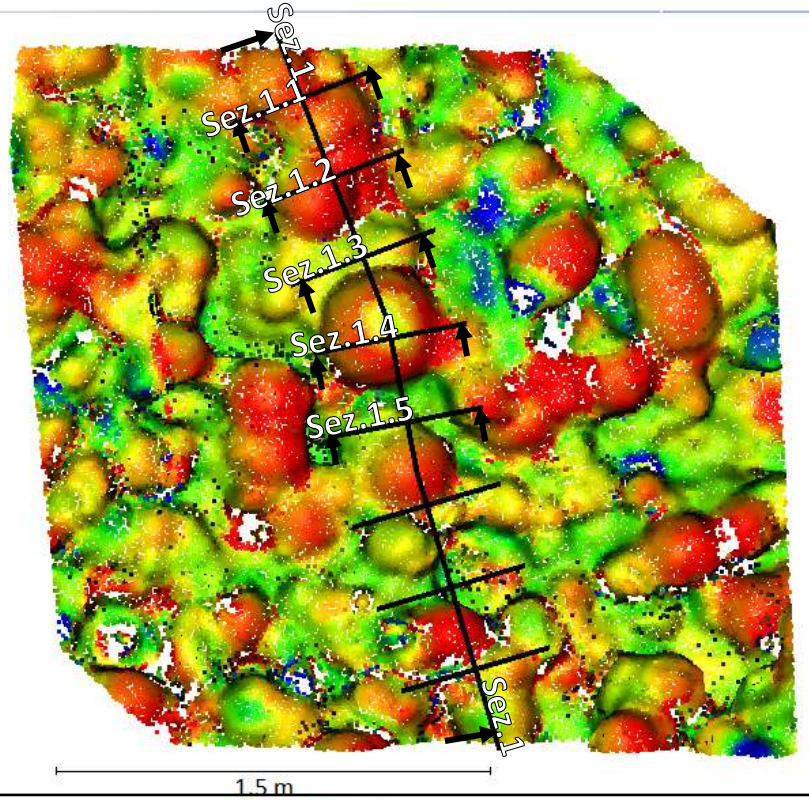


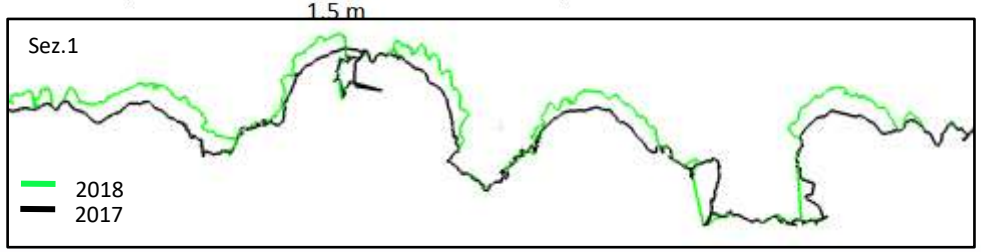
Are the Detected Changes Significant?

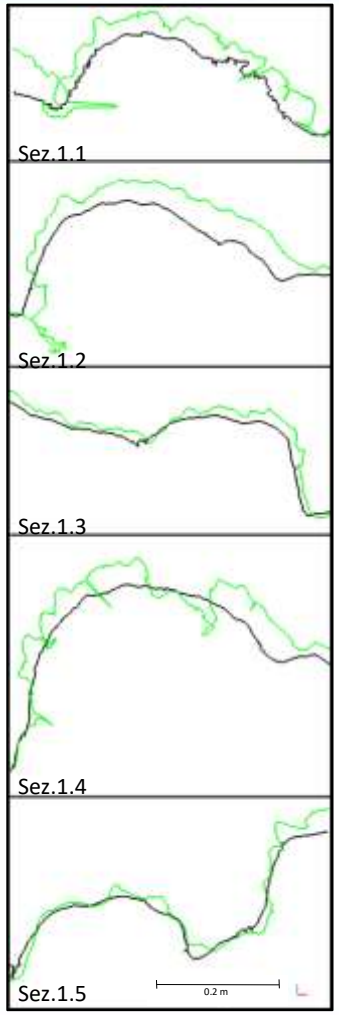
SMART SURVEYORS FOR LAND AND WATER MANAGEMENT
CHALLENGES IN A NEW REALITY



Subsequent photogrammetric models for multitemporal monitoring
-
high resolution
high accuracy
(mm | cm)



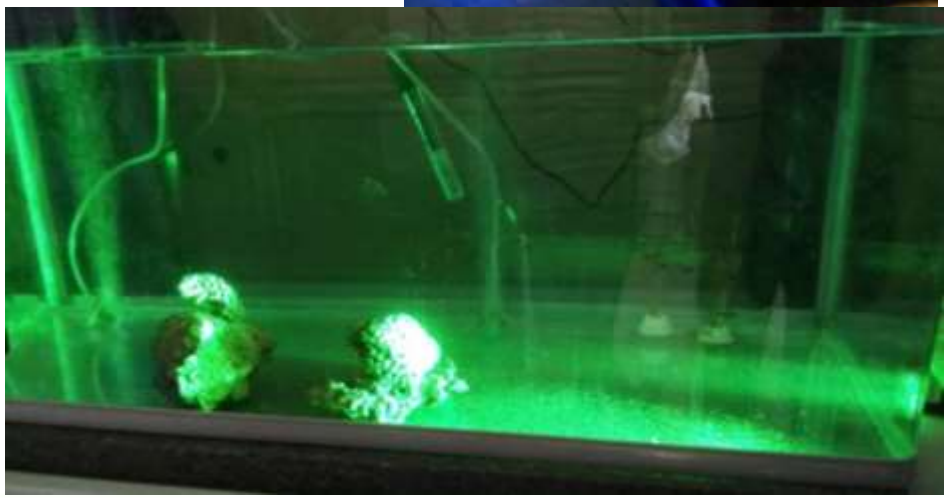


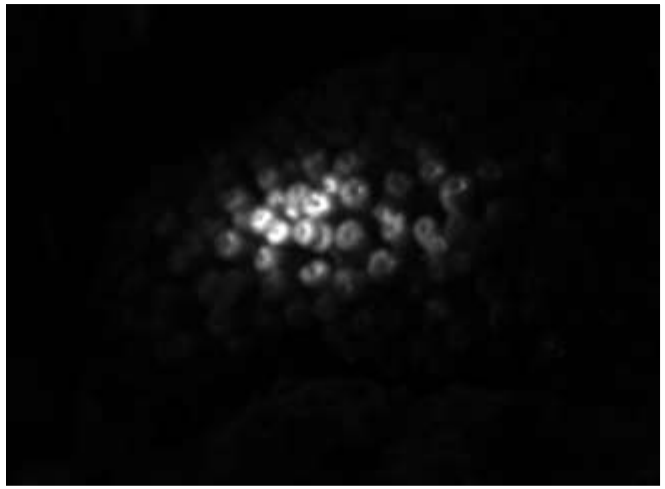


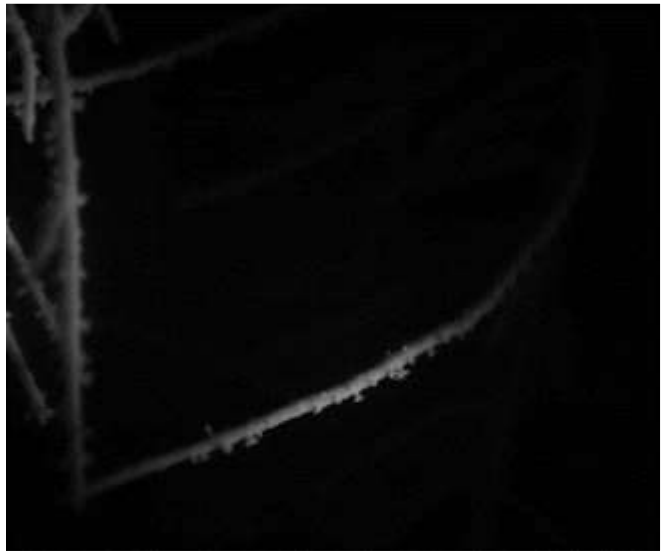
GEOMETRY AND BIOMETRY

Systems for the monitoring and 3D reconstruction of marine bioconstructors organisms

TESTING FLUORESCENCE







CONCLUSIONS

- High resolution 3D survey and monitoring
- Biometry
- Knowledge ⟷ Modelling ⟷ Mitigation actions

↕

From local data acquisition to global interpretation - Climate change

(Global Reef Monitoring network - https://gcrmn.net/)