



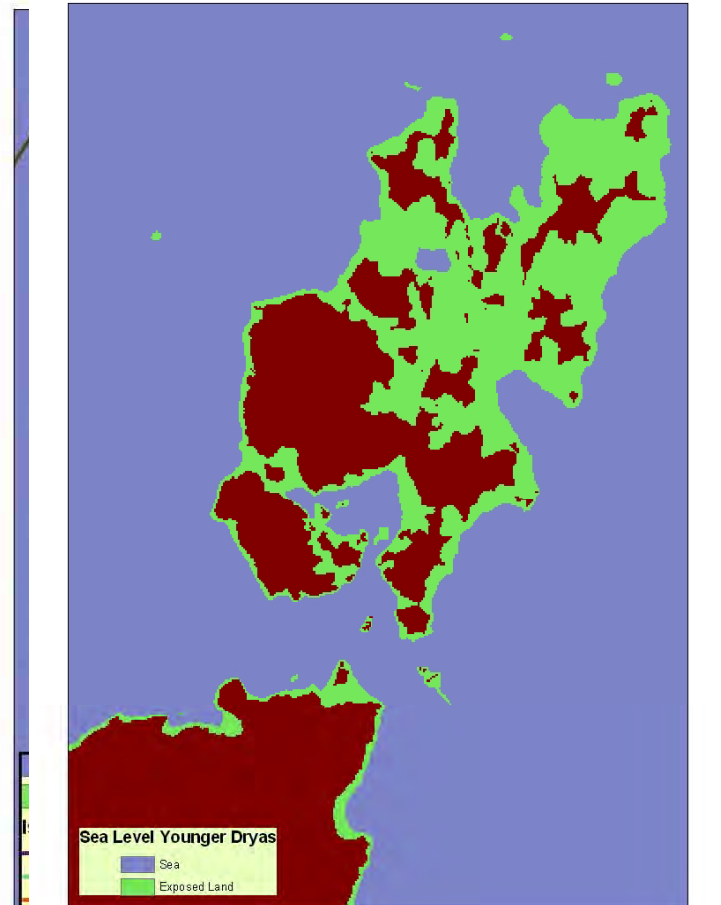
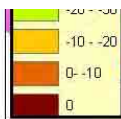
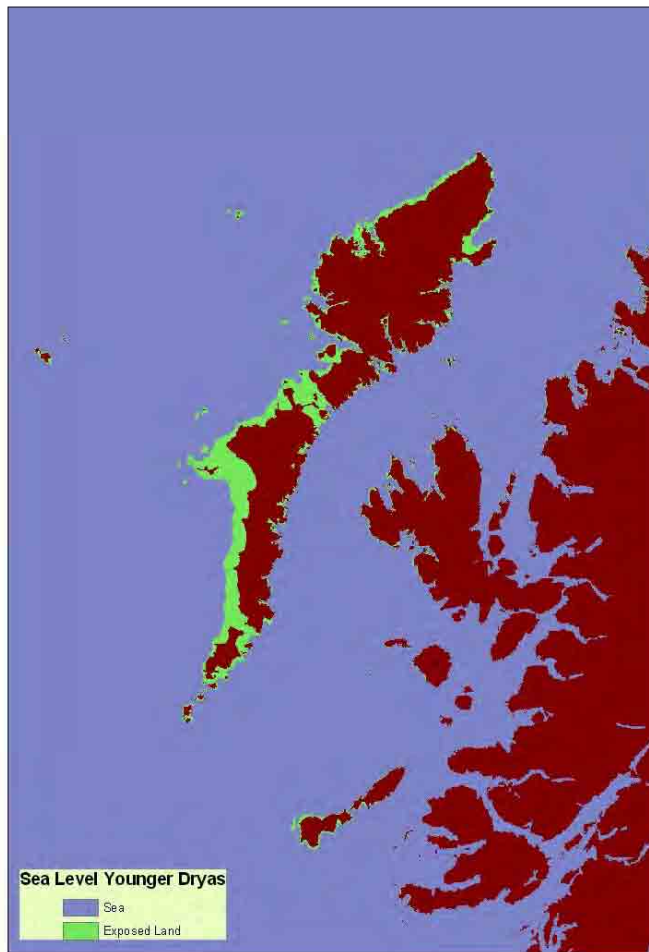
MASTS

Coastal Survey

- Focus on very high resolution survey in the intertidal to near-shore zone
- Evaluation of physical (sediment dynamics, coastal erosion) and biological (habitat) systems
- Monitoring of natural (environmental and climate) and anthropogenic change
- Wide Range of Timescales
- Holistic evaluation of the system

.....the *Transition Zone*

The Scottish Coast and Change





Mapping Technologies (coverage and accuracy)

Technique	Datum	Relative Measure (precision)	Absolute Measure (accuracy)
Satellite	Satellite	mm	cm-10s cm
Airborne (Lidar)	Satellite	cm	cm
Photography	Satellite or Ground	cm-m	m
RTK dGPS	Satellite or Ground	mm	mm-cm
TLS	Satellite or Ground	mm	mm-cm
Echosounder	Satellite, Ground or Marine	cm-m	cm-m
Sidescan	Satellite, Ground or Marine	cm	cm-m
Bathymetric Sidescan	Satellite, Ground or Marine	cm	cm
Multibeam	Satellite, Ground or Marine	cm	cm

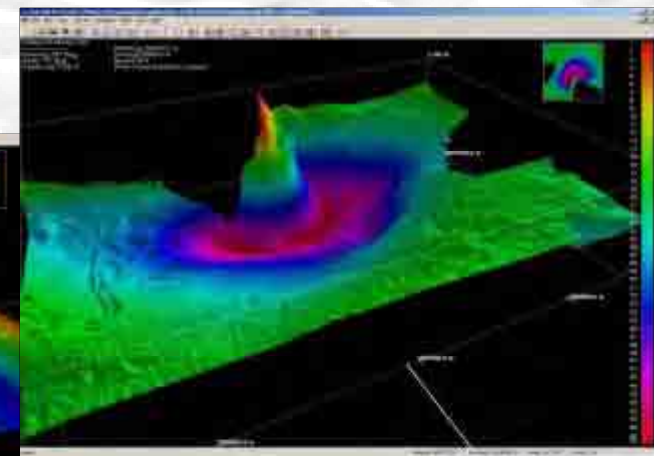
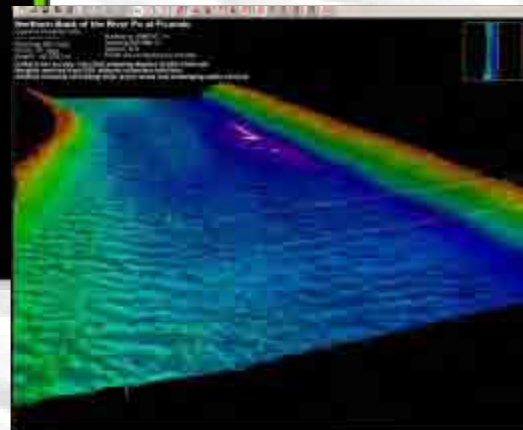
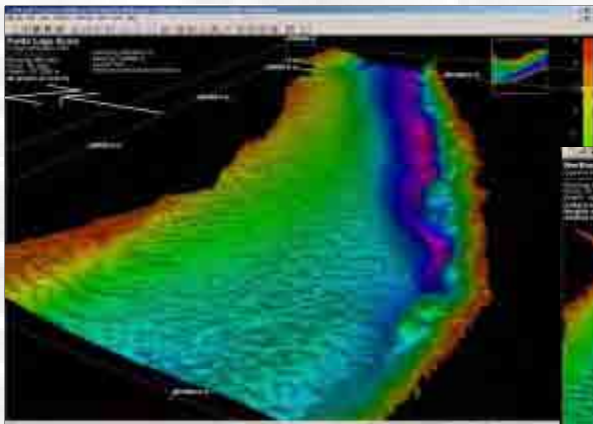
Measuring Change





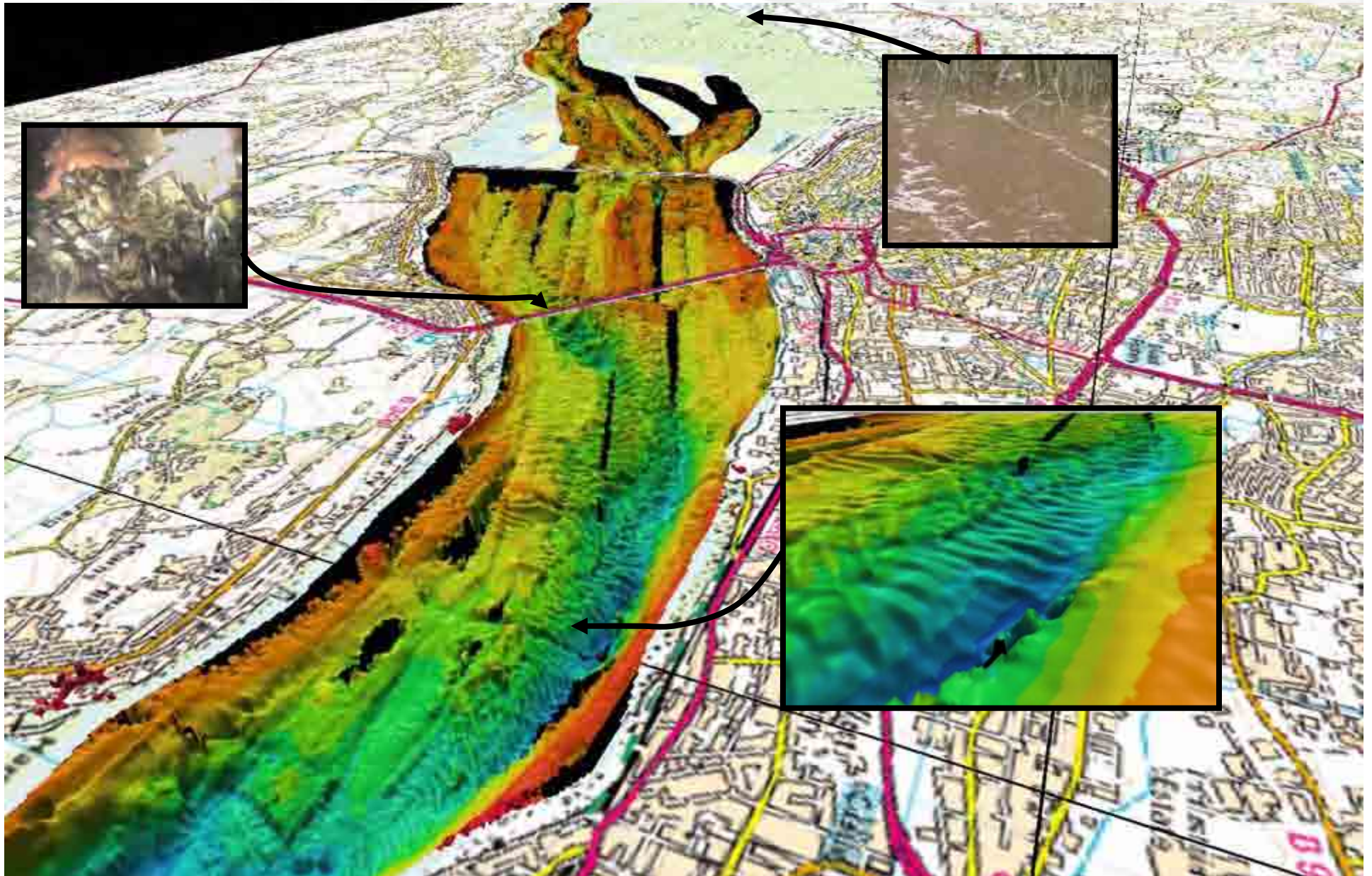
Swath Sonar - SEA SwathPlus

- Bathymetry plus Amplitude
- V-Wide coverage
- High frequency – very high resolution (cm)
- Rapid deployment
- Deployment on wide range of “vessels”

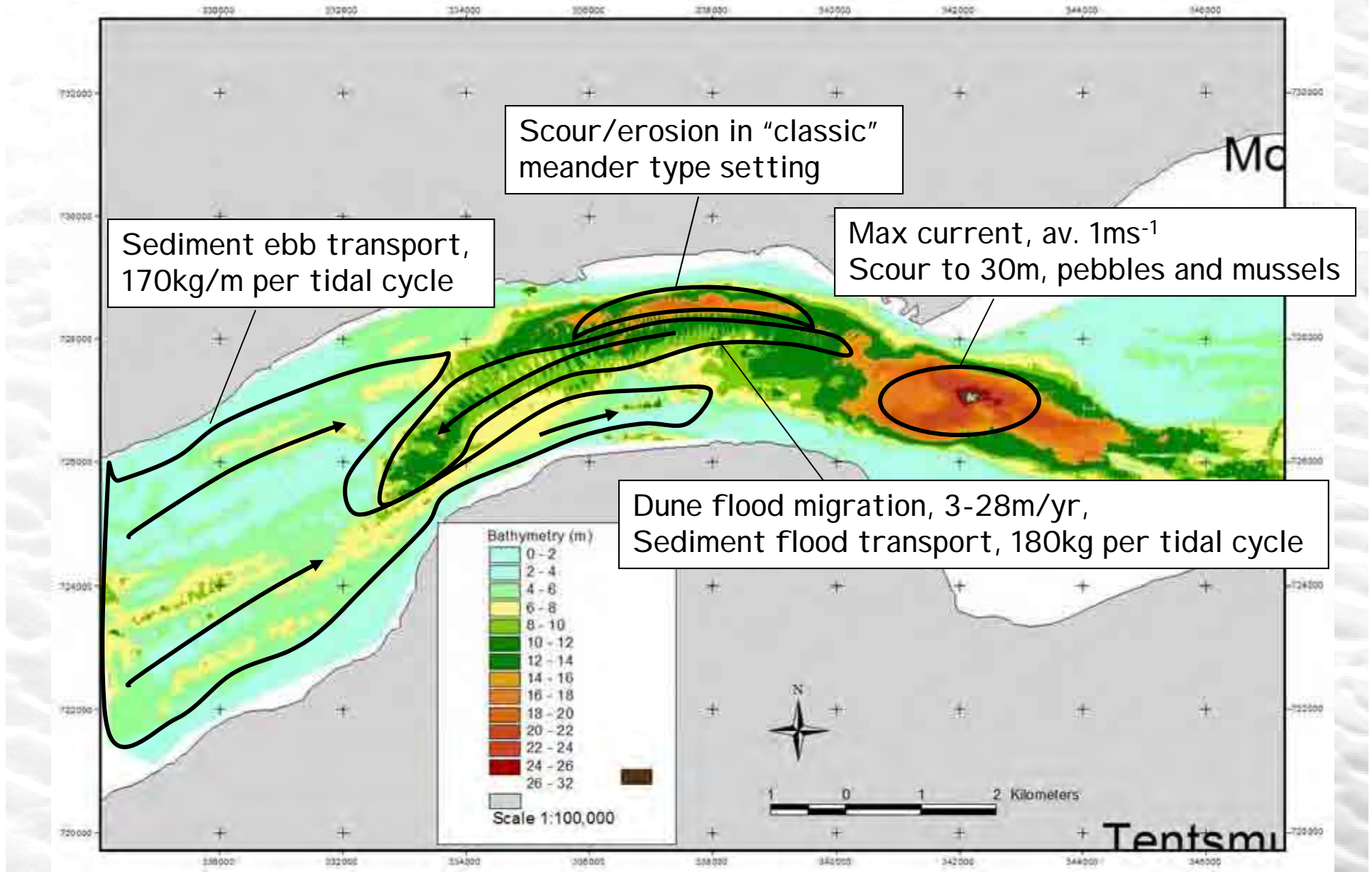




Evaluation of Protected Habitats – Tay and Eden Estuary Special Area of Conservation

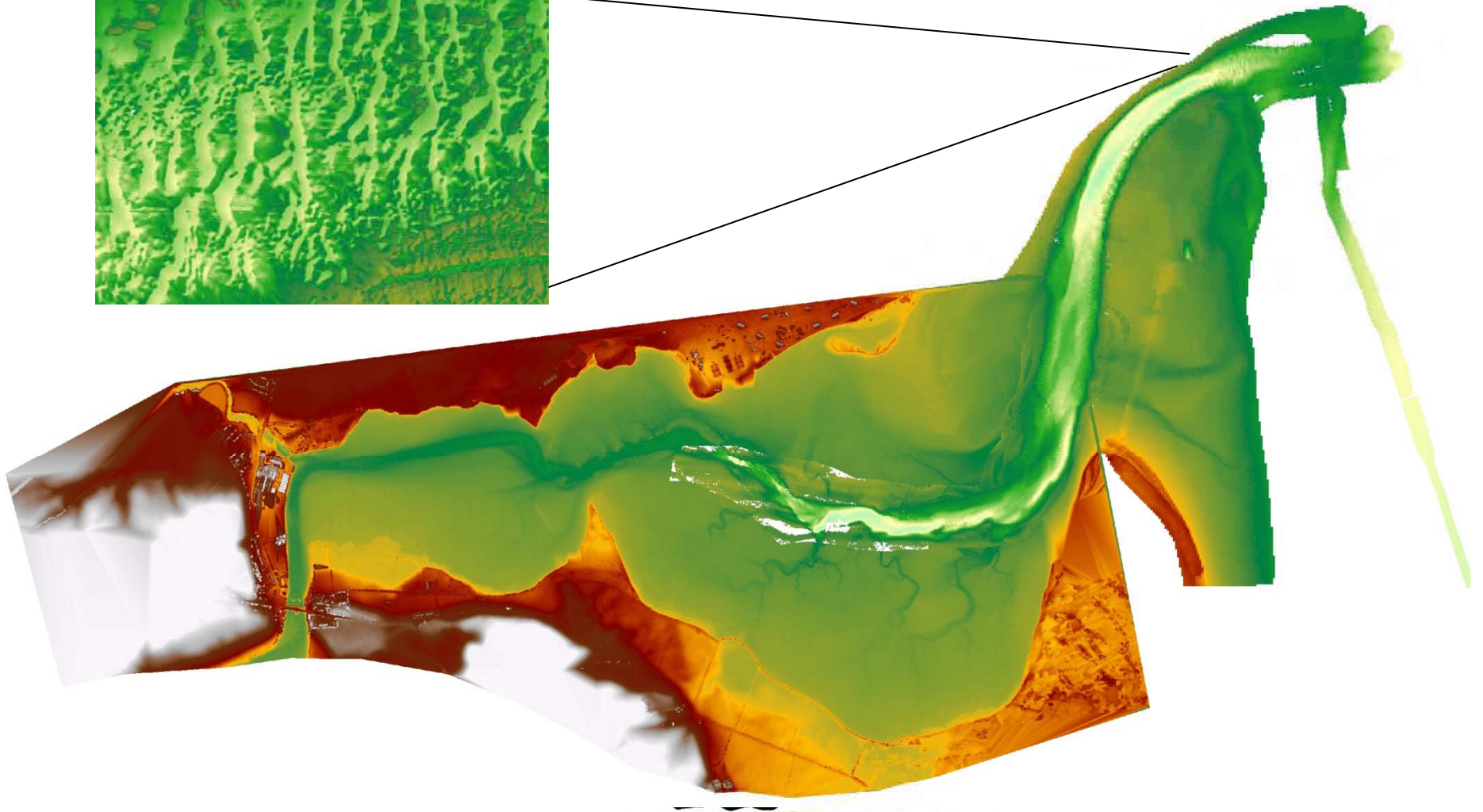


Quantitative Analysis of Sediment Movement in the Tay Estuary





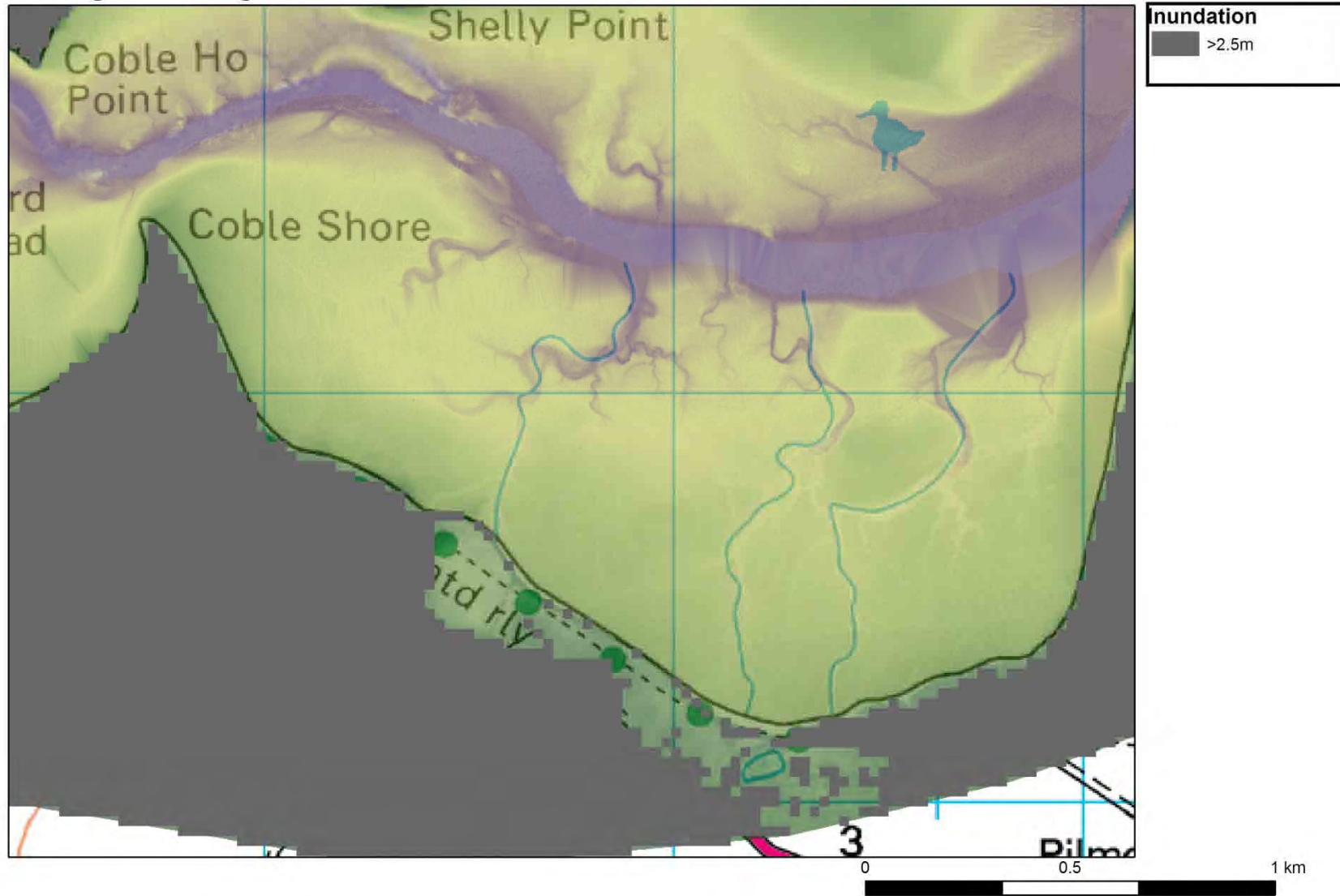
Changing Sands – high resolution bathymetry of the Eden Estuary





Natural Change vs. Managed Change

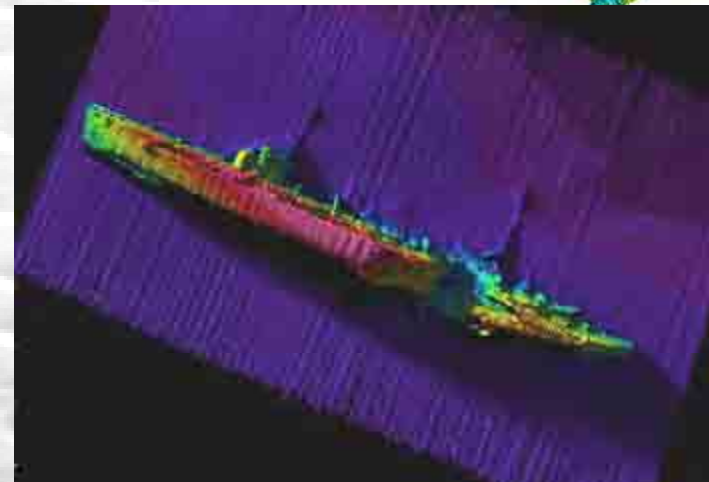
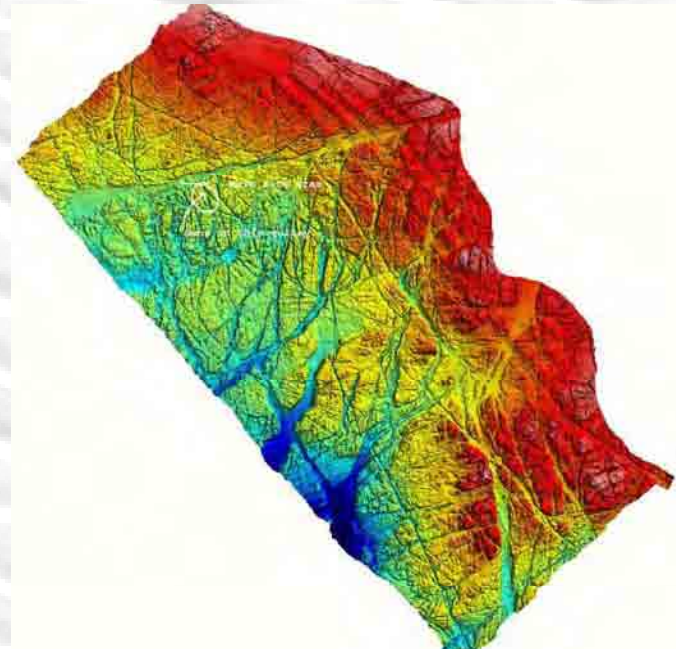
Managed Realignment - Cobble Shore





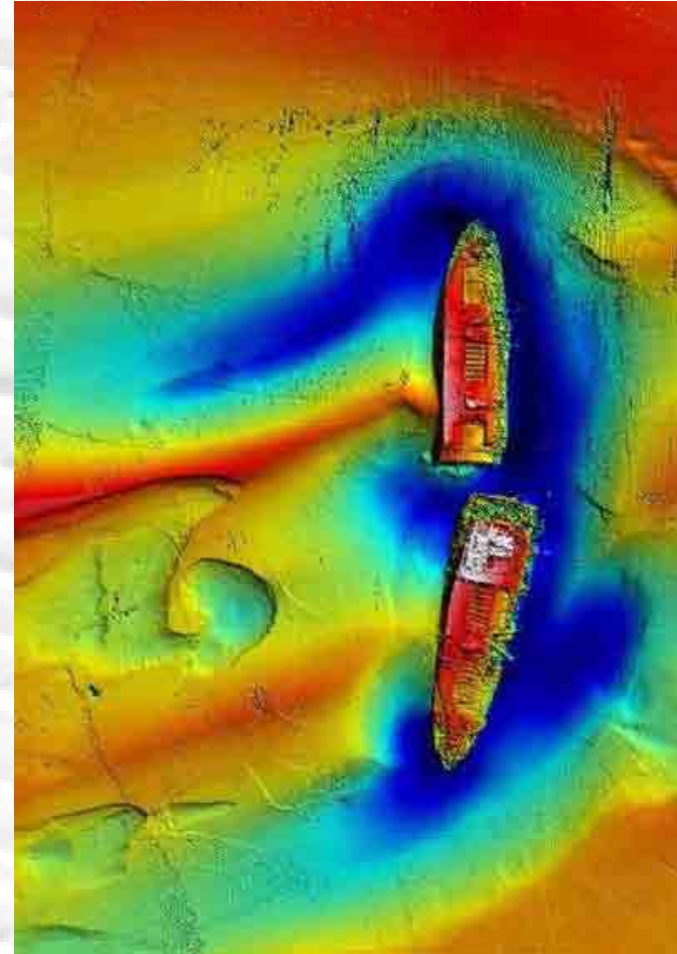
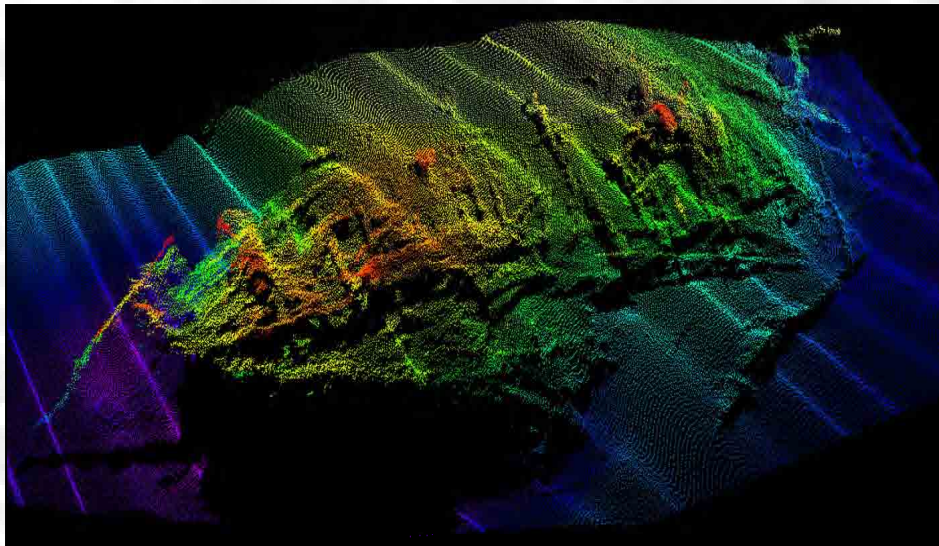
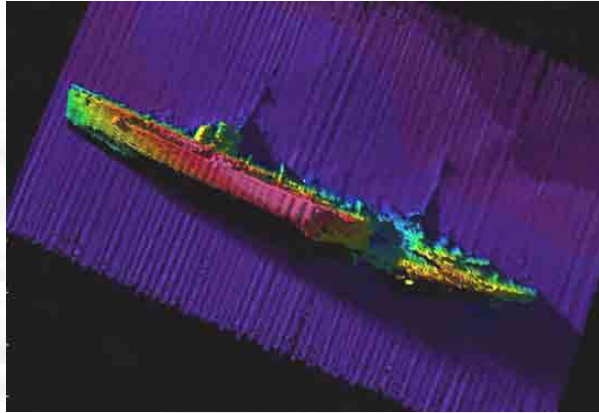
Multibeam Sonar - Reson 8125

- Bathymetry (plus Amplitude)
- Medium coverage
- High frequency – very high resolution (cm)
- Good on vertical structures
- Rapid deployment





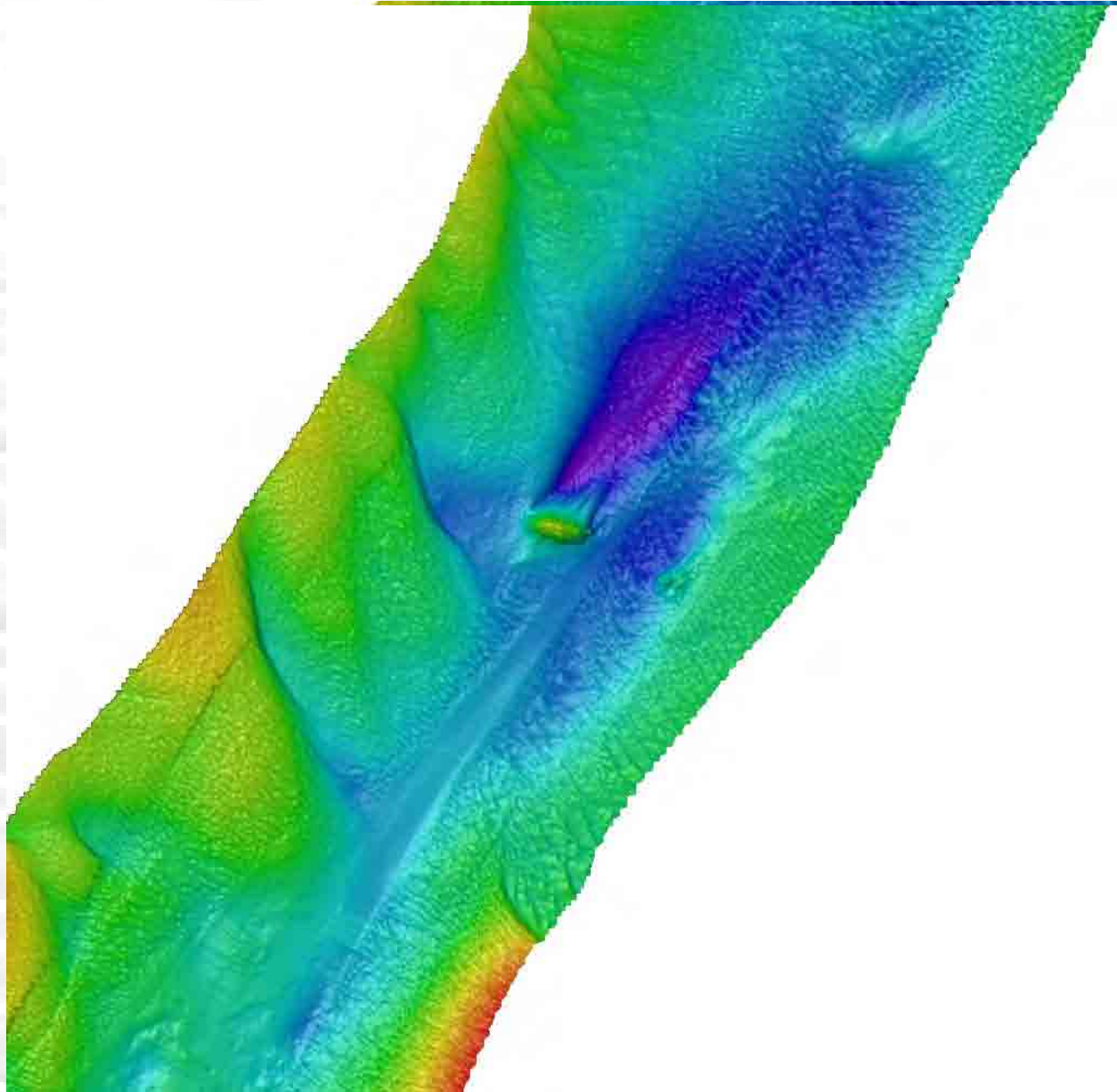
Quantitative Analysis of Seabed Features



Data courtesy of Uni St Andrews
ADU and EH



Quantitative Analysis of Sediment Movement – the Goodwin Sands



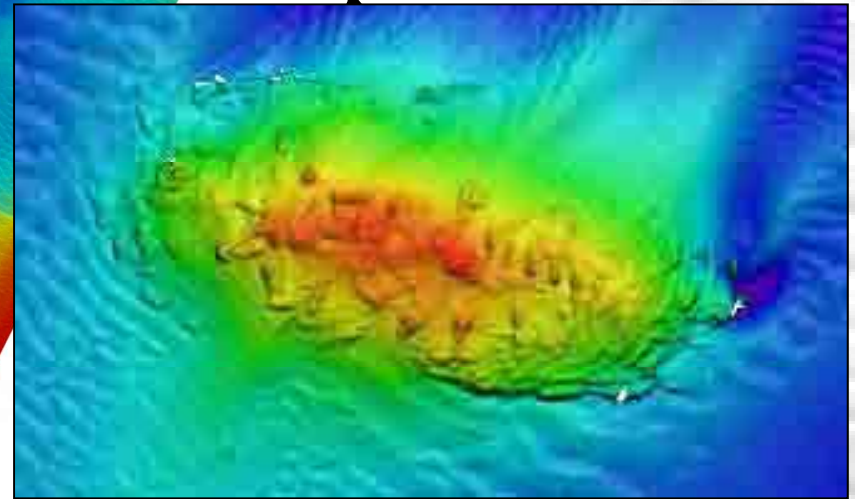
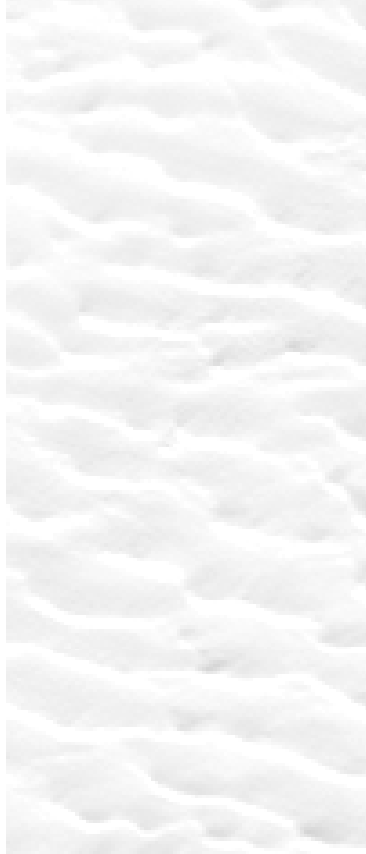
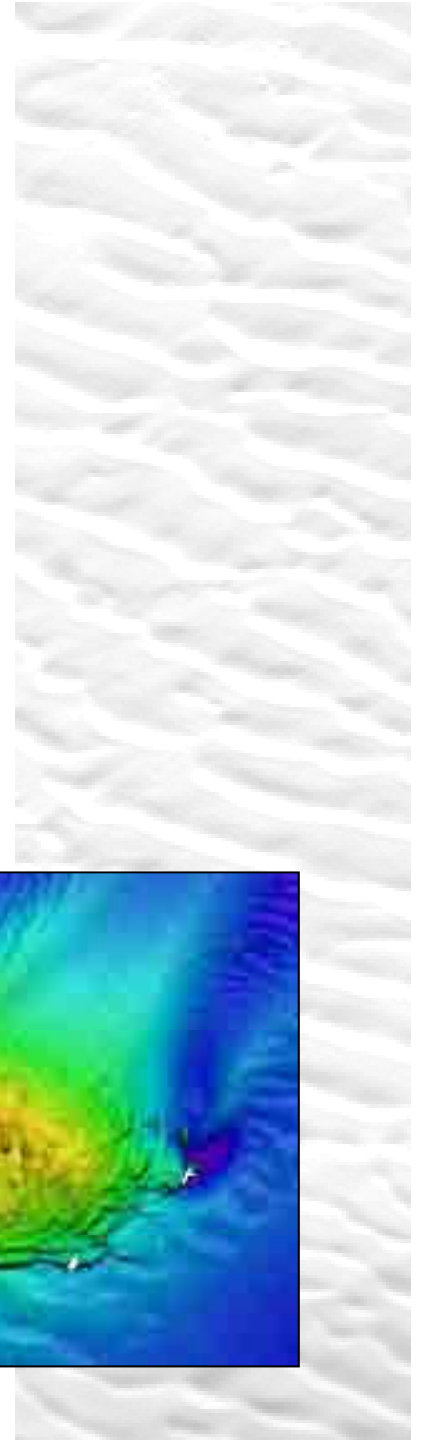
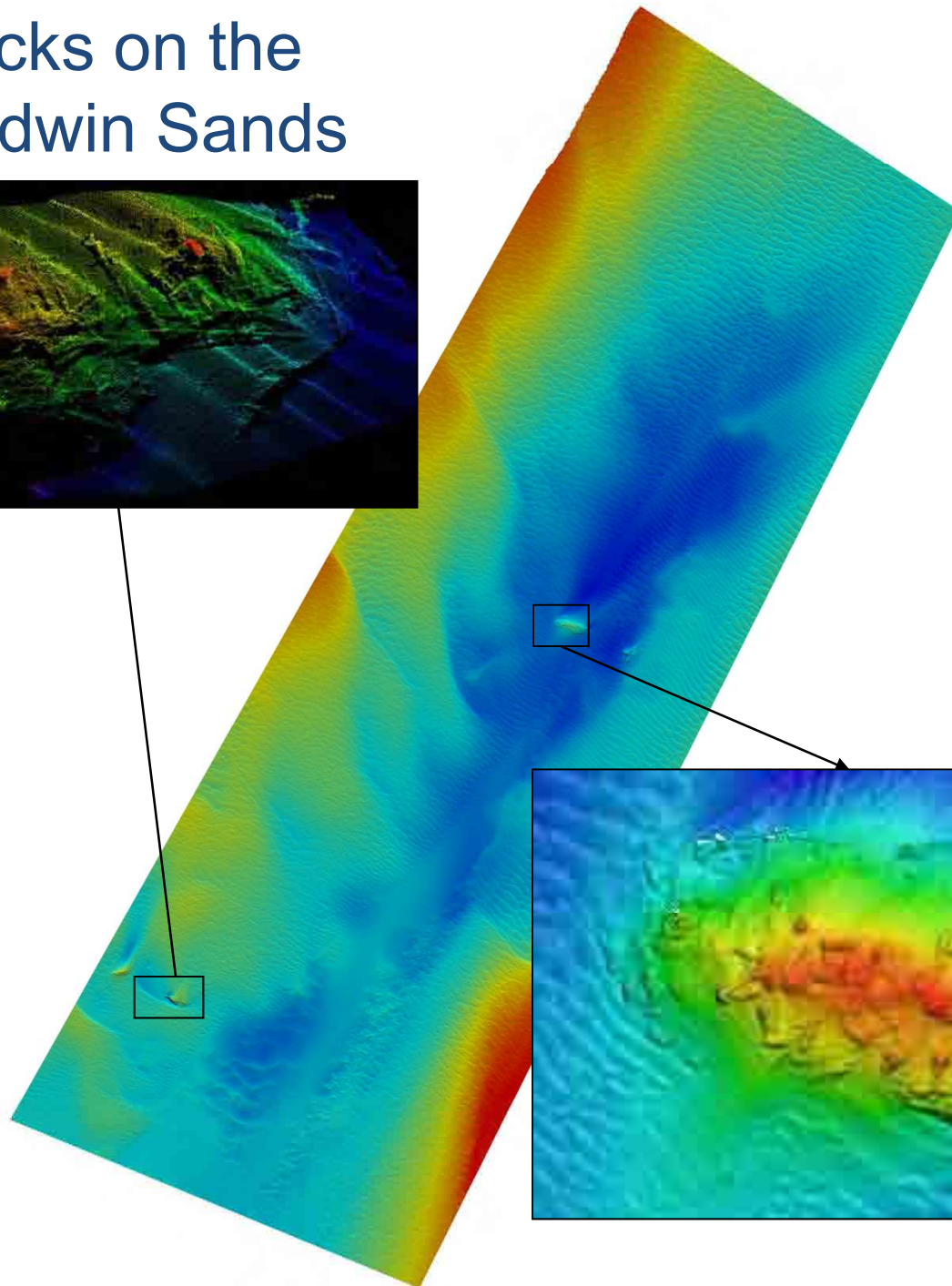
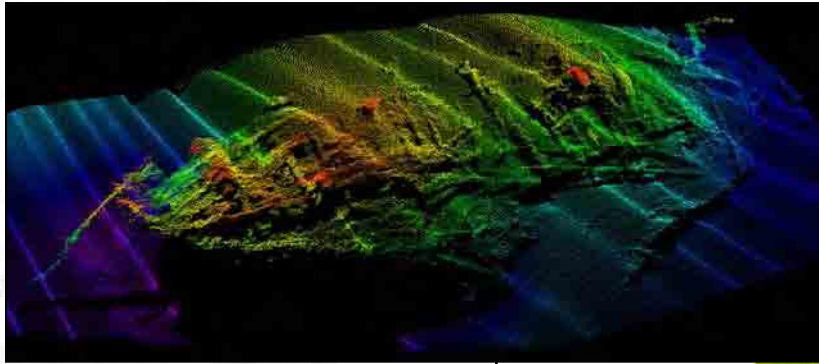
2002

2005

2006

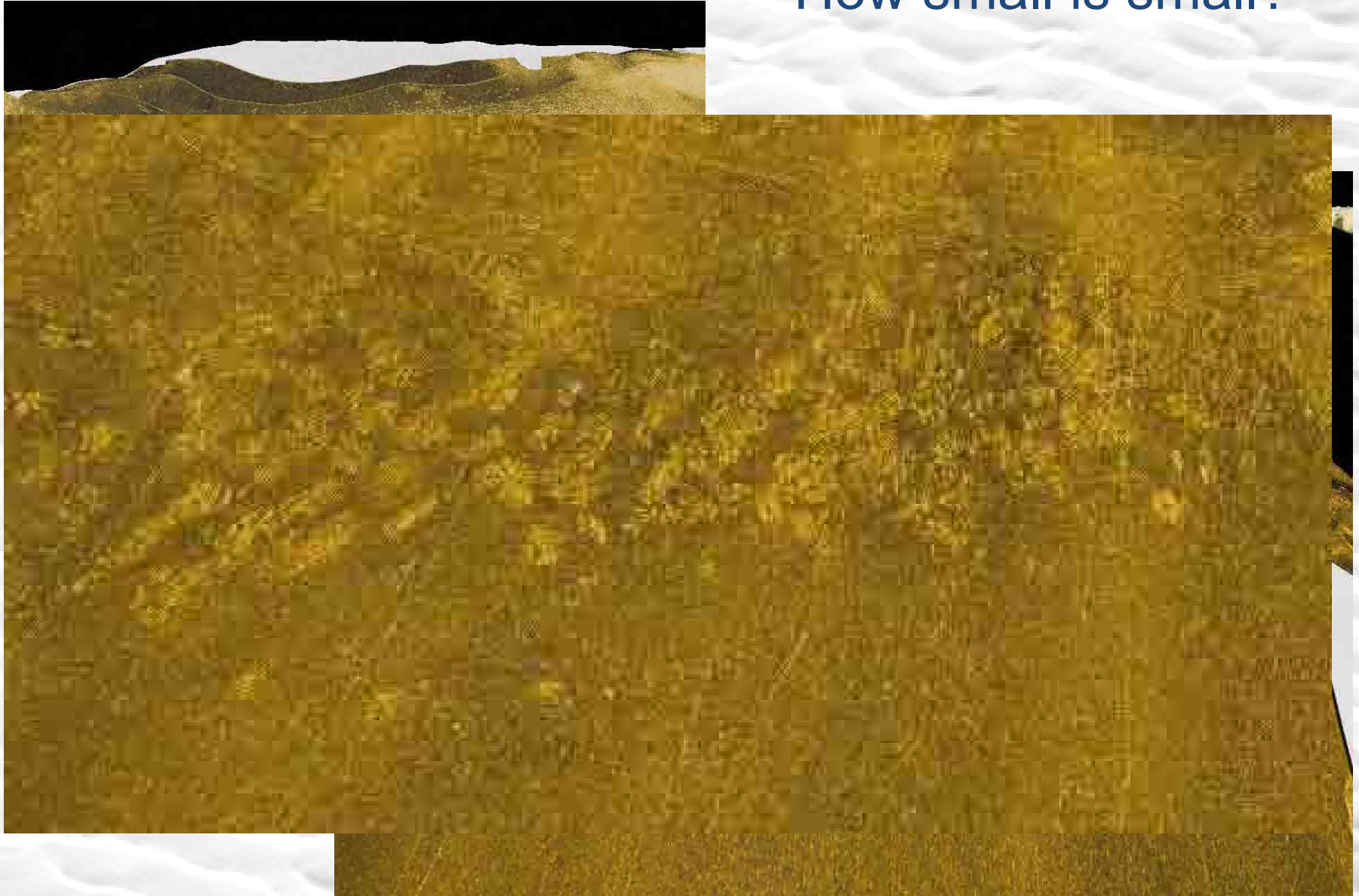


Wrecks on the Goodwin Sands





How small is small?

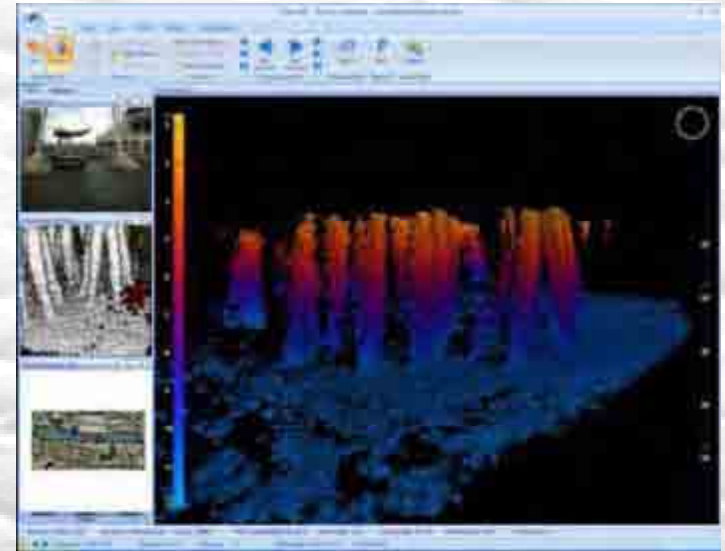




The Next Generation for Mapping and Monitoring?

Coda Echoscope

- V-high Resolution
- Timelapse
- Continuous Monitoring
- Echoscope **Underwater Inspection System**, linked to topside video
- Realtime data feed





Integrated Mapping

Mapping in the transition zone – new platforms

- Shallow draft boat
- Autonomous boats – WiFi networks
- Autonomous Underwater Vehicles



SWATHplus – Examples: Modelling

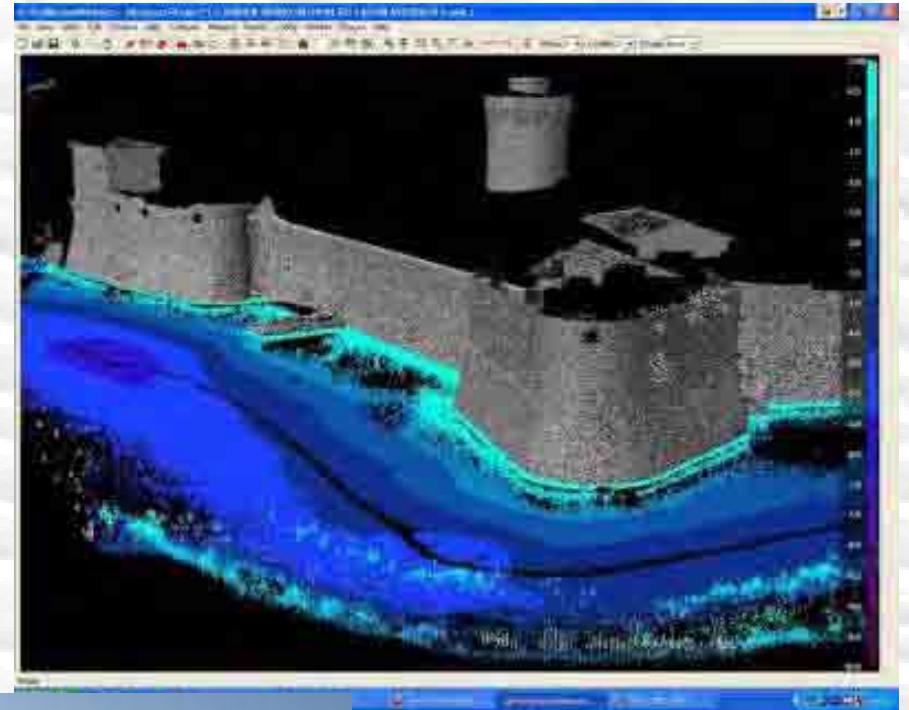
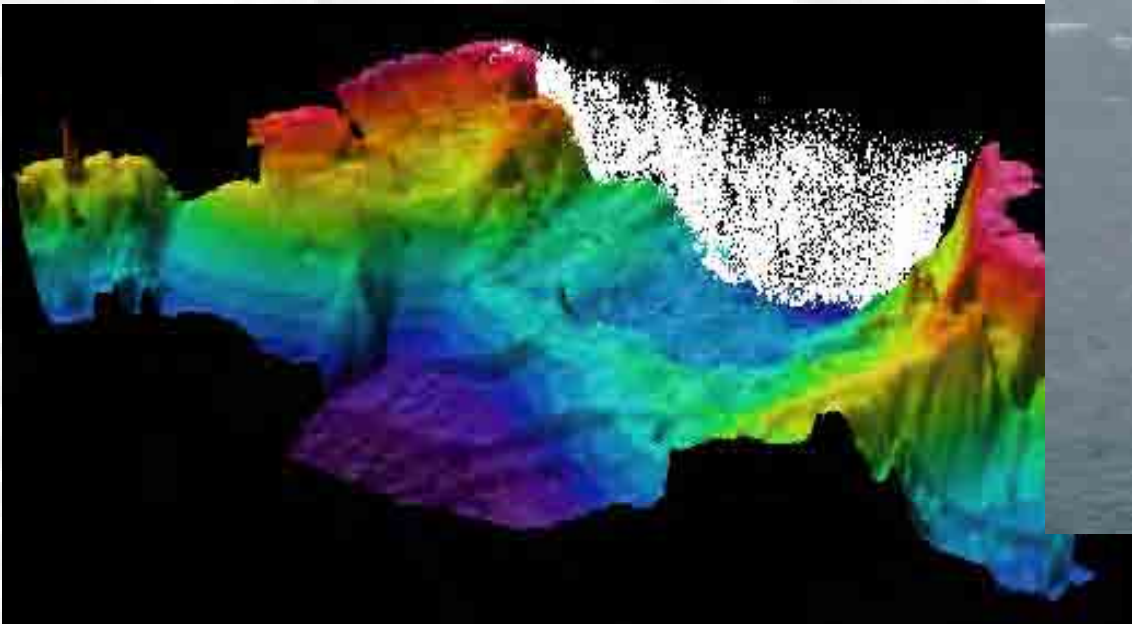
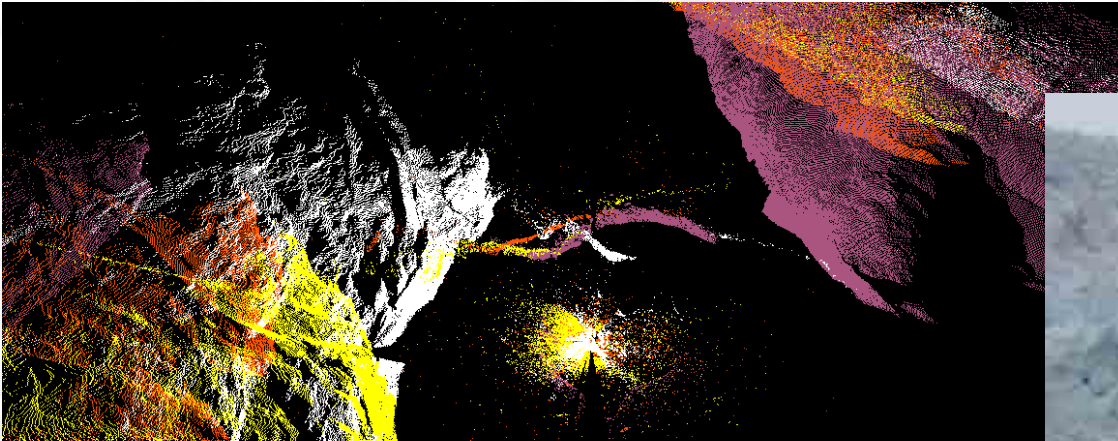


Image of Livorno Castle Italy, courtesy of Codevintec. Depth data from SWATHplus, Castle data from Laser scan.



Laser Scanning - Multibeam

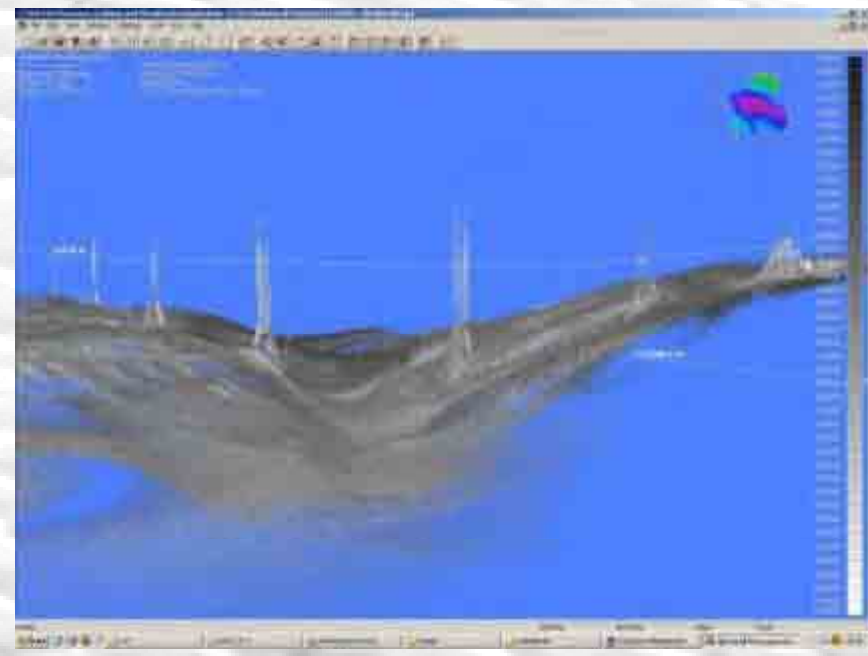
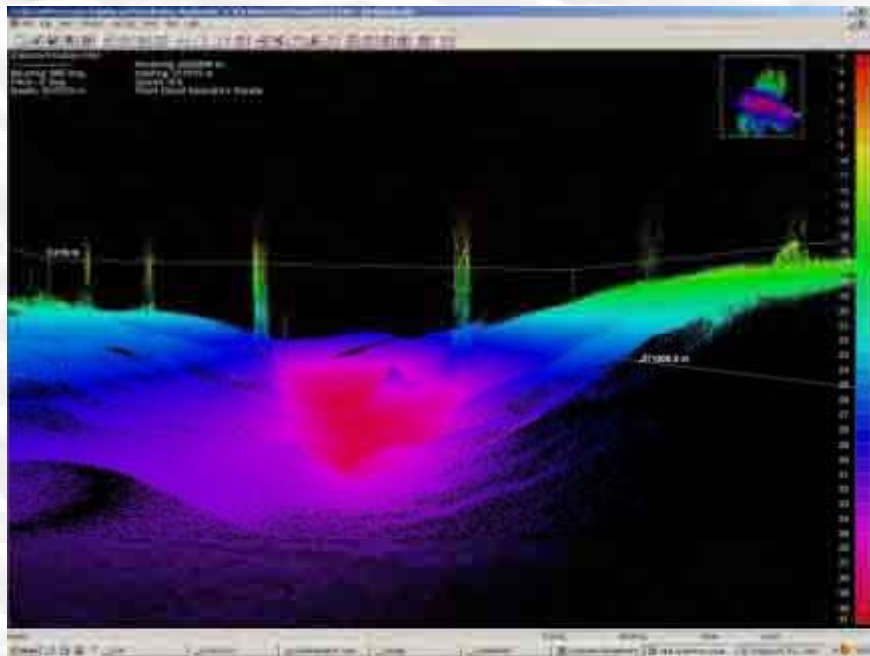




SWATHplus – Examples: Bridges



Solomons Bay
Maryland



Images from USGS



Future – Combined Approach

Seafloor Mapping Lab – California State Uni, Laser Scanning plus Bathymetry

