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EMBRACING OUR SMART WORLD WHERE THE CONTINENTS CONNECT:
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Control in LASER Scanning of Coastal Erosion at Happisburgh, North Norfolk, UK

- *Derek SPALTON and David FROGGATT*

Aim

- *Findings*
- *Case study selection*
- *Data Collection*
- *Issues Arising*
- *Control and Accuracy*
- *Solution*
- *Further Work and Developments*

Findings

- *Old school techniques with target scans proved reliable, providing redundancy/repeatability of the survey control.*
- *Target scans beyond 150m require secondary confirmation*
- *Surface reflectivity around targets can be problematic*
- *Control surveys required additional bracing*
- *GPS control around the cliff face and the adoption of dial up has restricted application*
- *Pre-survey planning required*

Case study selection

- *The Happisburgh site was selected as it was heavily surveyed 2000-2006 and is known to have one of the highest rates of erosion due to the underlying Till geology*.

Happisburgh erosion (Tyndall Centre, 2012) (©Mike Page)

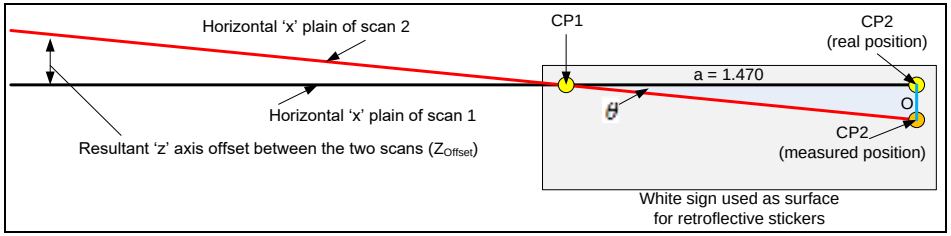
Data Collection

- *A series of stations was formed along the cliff top and beach*
- *Additional temporary tie points were formed on signs etc…*
- *The data was collected in bulk over two consecutive days*

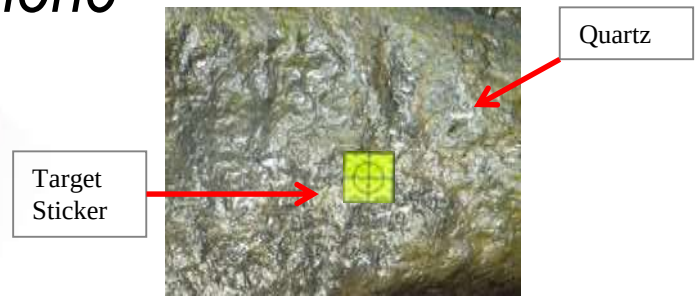
Final survey around approximately 800m in length

Issues Arising

- *Axial control of the survey*



- *False readings and none location of targets*



Control and Accuracy

- *Once the data had been edited the accuracy was confirmed*

Measurement between	Distance (m)
STN_E_MF - TS8 - TS7	109.672
STN_C_DF - TS8 - TS7	109.672
STN_D_MW - TS8 - TS7	109.679
Difference between Min & Max	0.007
STN_E_MF - TS8 - TS9	50.588
STN_C_DF - TS8 - TS9	50.684
STN_D_MW - TS8 - TS9	50.674
Difference between Min & Max	0.096
STN_E_MF - TS9 - TS7	73.348
STN_C_DF - TS9 - TS7	73.198
STN_D_MW - TS9 - TS7	73.202
Difference between Min & Max	0.150

Distance between target stations

	Constraint Error - X	Constraint Error - Y	Constraint Error - Z
D3_TS7_DF_STN_C	-0.013	0.009	-0.017
D3_TS7_MF_STN_E	0.040	-0.012	-0.021
D3_TS7_MW_STN_D	-0.011	0.001	-0.013
D3_TS8_DF_STN_C	-0.011	0.005	-0.076
D3_TS8_MF_STN_E	0.031	0.020	-0.071
D3_TS8_MW_STN_D	-0.020	0.018	-0.084
D3_TS9_DF_STN_C	0.031	0.010	-0.049
D3_TS9_MF_STN_E	-0.064	0.014	-0.049
D3_TS9_MW_STN_D	0.028	-0.001	-0.042

Constraint errors

Solution

- *Restriction to false readings*
- *Establishing additional survey stations*
- *Restricting line of sight distances to less than 200m*
- *Reducing density whilst increasing overlap*

Further Work and Developments

- *Further surveys are to be carried out in the next year with UAV photogrammetry*
- *A stronger line of stations has been established behind the "erosion line"*
- *The adoption of larger height "extending" targets is being trialled*
- *Trials with auto registration software is underway*

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Any Questions?