Mobile Technologies for Rapid Land Cover Mapping

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SUMMARY

The integration of 'on the fly' mapping technologies into everyday surveying equipment is now reality. The latest mobile mapping solutions are compact, hard-wearing and include a space based augmented (SBAS) Global Positioning Systems (GPS), that delivers positional information to within 5 metres (ESA, 2005).

A 'proof of concept' exercise was carried out to assess the feasibility of using a mobile mapping unit with Windows CE based GIS software to perform a rapid small-scale land cover survey.

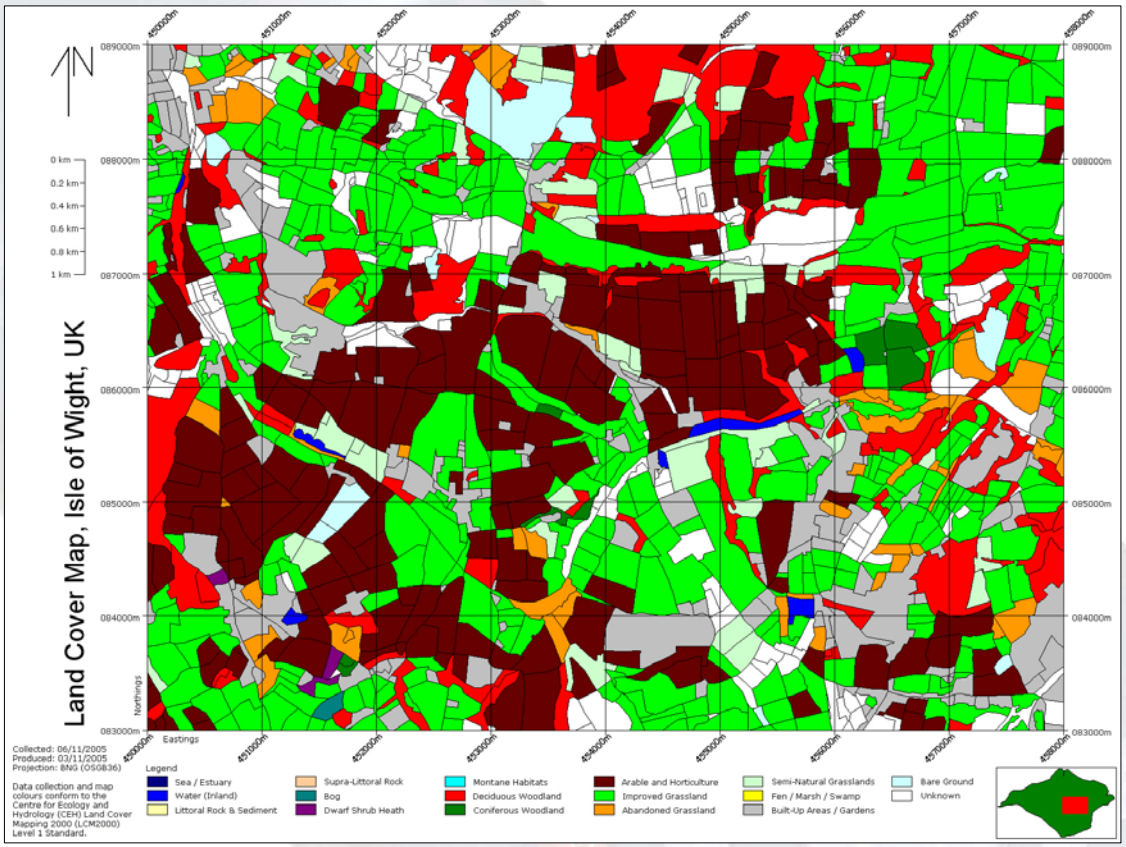
The study was carried out over a 48km² area near Newport, Isle of Wight during extreme weather conditions in November 2005.

ANALYSIS

This technique has the advantage of human interpretation, although the ground-based nature of the survey meant some areas were inaccessible and therefore unclassified.

The augmented GPS delivered sub-metre accuracies for the majority of the trial. Attributed data was successfully collected with automatic positional and timing data.

The Mobile Mapper uses a single touch of the screen to enter a point and another click to choose the appropriate class. Although mostly advantageous, it was found that rain water droplets or double-clicks added superfluous classifications to polygons.



RESULTS

The resulting land cover map of the survey is shown (centre). The data collected was downloaded to a PC and a thematic map was generated using a desktop GIS at 1:10000 scale.

It was calculated from the dataset that:

- An average of 25 polygons (1km²) were classified per hour per Mobile Mapper.
- Only 14% of the polygons were not classified.

The unit itself was subjected to torrential rain and occasional knocks and drops, however both hardware and software were unaffected. Additionally, despite the cold weather, there were no issues with battery life over the 6 hours of intensive use. There were also no GPS dropouts due to urban canyons or canopy cover.

CONCLUSION

The Mobile Mapping solution was efficient, reliable and adaptable to the project. The software combined with a touch-screen display made it easy for the users to enter points.

The advantage of recording the data digitally is the immediate turn-around of the raw data into a useable product.

The units were robust enough to allow data collection even in the most extreme weather conditions.

Mobile mapping systems have demonstrated the ability to deliver 'on-the fly' mapping.

METHODOLOGY

STEP 1

A 25cm centimetre GSD aerial photography was digitised into field boundaries.

STEP 2

The polygons were uploaded to the Mobile Mapping unit together with a schema reflecting the Centre for Ecology & Hydrology (CEH) Level 1 land classifications.

STEP 3

A single point was placed within each polygon to classify that particular area. The layer was saved regularly to ensure data was not lost.

STEP 4

The points layer was downloaded from the handheld unit and saved on a PC. This is the resulting data in its rawest form.

STEP 5

The dataset was checked for inconsistencies. Polygons without classifications or with too many classification points were highlighted and the data was cleaned.

STEP 6

The classifications were attributed to the polygons within a desktop GIS program. These polygons were then thematically mapped using the CEH standards.

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