Date

Thursday 19 July 2007

Title of session

Workshop 2 - Spatial – The Final Frontier?

Name of presenter/chair

Chair: Neil Ackroyd, Director of Data Collection and Management, Ordnance Survey

Presenters: Dr Sarah Smith-Voysey and Mark Tabor, Ordnance Survey

Rapporteurs

Colin Henderson, Ordnance Survey and Selena Patton, Defence Geographic Centre

Presentation title: The Future of Remote Sensing

Whether we realise it or not, remote sensing is part of our daily lives; for navigation, route planning, emergency service provision, insurance quotes for our homes and air travel. Examples of different types of remotely sensed data are Interferometric Synthetic Aperture Radar (IFSAR), topographic and bathymetric LiDAR data, digital photography and hyperspectral imagery. This presentation examines the current state of these technologies and introduces the future developments.

Over the last five years there has been an increase in spatial and temporal resolution of many sensors, and a shift from the use of passive sensors to active sensors for many applications. Laser and Radar data capture has a distinct advantage over traditional methods as they provide a higher level of accuracy. They are deployable in adverse weather conditions and so have the potential to capture greater amounts of data.

One of the advances for laser scanning will be waveform scanning. Traditional laser scanning is active and measures the range between a reflecting surface and the sensor. A waveform scanner will also record the vertical distribution of intercepted surfaces within a footprint. The dataset, therefore, comprises a series of signals, or waves, which provide information about the surfaces with which the laser has interacted. The biggest challenge in this area is in processing the multitude of waves and calibrating the sensors for the various user communities. Multispectral and hyperspectral laser scanning will be another area of growth. Since 2005 there have been indications that future generations of commercial laser scanners will operate multiple wavelengths. The wavelengths recorded by the scanners would cross more than one band in the electromagnetic spectrum. Both of these developments in laser scanning technology require a multi-disciplined

approach, merging the field of remote sensing with the fields of electronic engineering and biochemistry.

Synthetic Aperture Radar (SAR) and InSAR can currently be used to obtain multi-temporal data and are useful in applications such as earthquake analysis and DTM creation.

The key future development for laser and radar will be in multi-sensor data fusion. This is not a development of the technology itself, rather a development in the processes that will enable these data to be merged and analysed as if they were a single dataset.

Questions	Answers
It is well documented about creating DTMs from LiDAR data. Has there been any work on creating models using other wave-lengths below sea level?	We do not look at bathymetric LiDAR, the UK Hydrographic Office does. Our understanding is that it works very well in crystal clear waters, such as in Hawaii, but any sediments etc will ruin the quality of the data.
	I don't now the correct answer to this question. An educated guess would be that laser scanning would work well on snow except where the surface is mirror like such as ice. SAR is likely to have a better result, but I'm prepared to stand corrected.