Mapping the Underworld (MTU)

Multi-Sensor Device Creation, Assessment, Protocols

Mapping the Underworld

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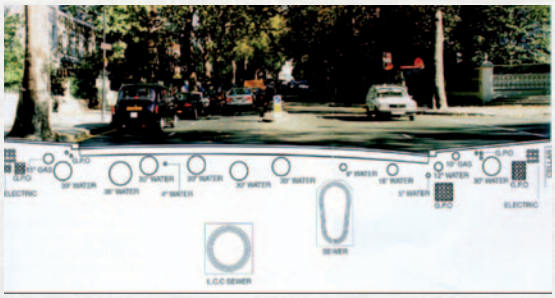
The second phase of Mapping the Underworld (MTU) is a four-year research project, starting in January 2009, which aims to create and proof-test a multi-sensor 'location device', and optimised operational protocols informed by utility record and soil data.

Update

Phase One of the MTU project included a feasibility study of location technologies that might be combined to detect all buried utilities.



Phase Two, the launch of which took place in February (see reverse for more information), is focussing initially on developing analytical frameworks, numerical modelling of simple buried utility scenarios and laboratory-based experimentation to predict the potential performance of the sensors in various ground conditions when detecting various buried utility types. The literature is being reviewed to identify the latest worldwide developments (in this we are fortunate to have the active support from 40 project partners who practice within the field of buried utility detection) and to identify the relevant design parameters for each sensor.

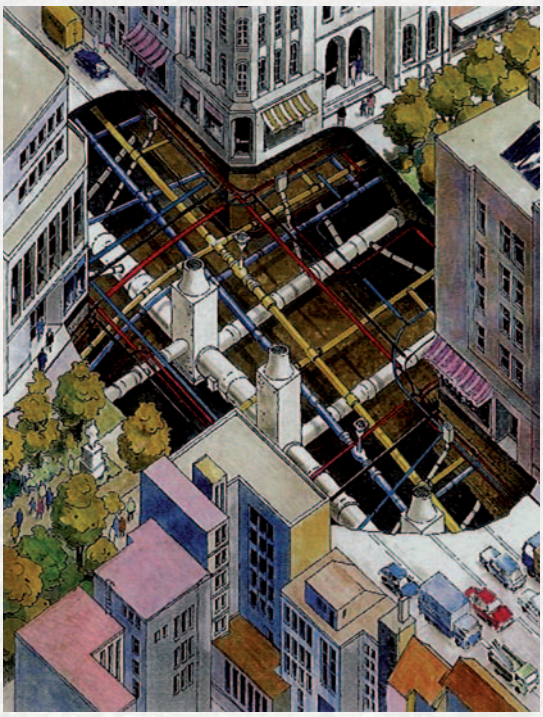
Once this initial work is complete, the focus will shift to combining the sensors in the multi-sensor device, and exploring how data fusion from the various sensors improves detection certainty, whilst optimising sensor performance on UK and European test sites. A programme of work is available on the MTU website (see over).

Research Areas

1. Development of the Multi-Sensor Array
2. Fusion of Sensor Data with Asset Records
3. Enhanced Ground Penetrating Radar
4. Acoustics for Pipe Location
5. Low Frequency Electromagnetic Field Technologies
6. Magnetic Field Technologies
7. Tuning of the Multi-Sensor Device to the Ground Conditions
8. Proving Trials and Specification of a National MTU Test Facility

Site Trials

Sites with known geotechnical and geophysical properties, or those that can be characterised by the research team, are being sought to provide locations where the device can be tested and optimised. The data from the four sensors will be fused with buried asset records to provide probability predictions of what utilities are buried at a given location. Ultimately the multi-sensor device will be trialled at a bespoke buried utility test site in Frankfurt.



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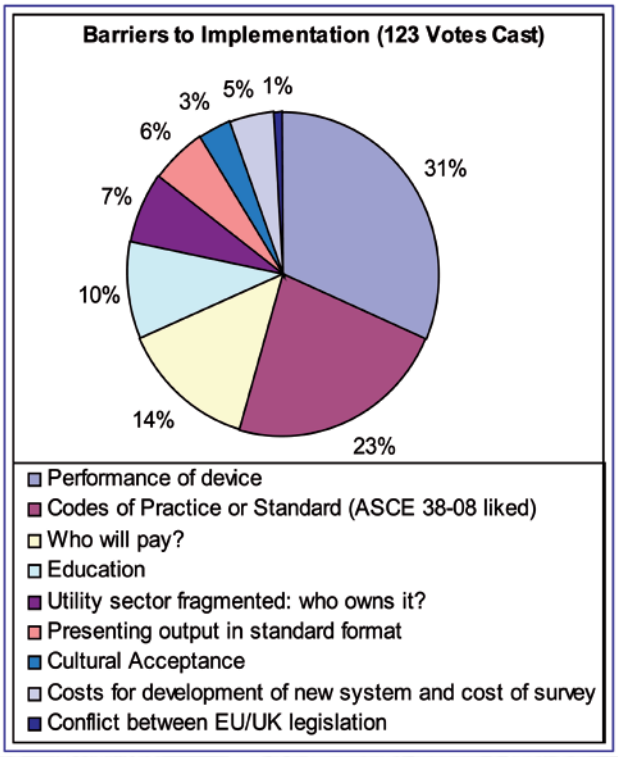
Project Launch

The Mapping the Underworld Project Launch was held on 26 February 2009 at the British Geological Survey's Keyworth offices. Attended by 80 delegates, the launch proved to be highly successful in combining formal presentations with breakout workshop sessions to capture delegate thinking and plenary discussion.

The morning session involved formal presentations by the MTU team summarising the outcomes of the MTU feasibility study, the context for the new project and the aims and objectives of MTU Phase Two. Two of our project partners were invited to present the problems of buried asset location in the USA and the steps being taken there to improve practice. The BGS gave a presentation on recent initiatives to provide 3D geological information of the UK in a user-friendly interface.

The afternoon session followed an informal structure in which project partners and other delegates were given the opportunity to discuss the project's challenges in four working groups. Three questions were posed: How should the MTU team engage with stakeholders? What are the barriers to the implementation of a multi-sensor device? What would be on your wish list for the future? Perhaps inevitably, the discussions within the groups covered a far wider remit.

The thoughts of the working groups were clustered into similar issues and the delegates voted on what they considered the most pressing issues.



Outcomes of Voting

A number of trends were highlighted in the voting. It is clear that the majority of delegates would like to be informed of advances in the MTU project via the project website and an upgrading of the site is duly being undertaken.

Standards (both on wish lists and as a barrier to implementation) were identified as being important and received a large proportion of the votes cast, while the American ASCE 38-08 'standard' proved to be of much interest. The need for well trained staff to operate the multi-sensor device was also highlighted as being a key issue. The MTU project aims to create a specification for a national test facility, which if constructed could be used to train operators to use the multi-sensor device as well as other geophysical apparatus and allow benchmarking.

Collaboration with the British Geological Survey (BGS)

Liaison between the research team and the BGS seeks to identify how best to utilise the datasets held by the BGS to integrate prior knowledge of the geophysical properties at any UK site into the MTU process. Understanding the relationship between geotechnical and geophysical properties of a site will provide relevant information prior to deploying the sensors to seek the utility service 'targets', thereby optimising the survey protocols and subsequent data analysis. A comprehensive laboratory study relating a soil's geotechnical properties with geophysical properties and detailed interrogation of the performance of the sensors in various ground conditions.

Future MTU Events

Three annual events are scheduled to take place during MTU Phase Two. These aim to provide delegates with updates on the project, information on new developments within the field of buried infrastructure and a voice within the project.

The first of the annual events is scheduled for 25 February 2010 and is to be held in association with the ORFEUS project (**www.orfeus-project.eu**). Details of all MTU events will be hosted on the MTU website.

Contact Us

For further information please see the website at: **www.mappingtheunderworld.ac.uk** or contact **Rosie Phenix-Walker**, our Project Coordinator (**r.phenixwalker@bham.ac.uk** or **0121 414 3544**)