

## SPE YP Lecture

Thursday 26 November 2009

NOVOTEL The Hague Centre, Hofweg 5-7

17.30-18.00 Welcome drinks - 18.00 Start lecture

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### 3D Laser scanning & 3D Subsurface radar scanning at petrochemical site By Ir. Erik Claassen, and Dr. Vsevolod Kovalenko (Fugro)

#### Abstract

For an adaptation of an installation at a major refinery in the region Botlek, an engineering office needed accurate and reliable data of the actual situation. Due to the importance of HSE on this part of the asset and because of the high complexity of the installations, Fugro-Inpark used lasergrammetry survey equipment to survey the existing situation.



Having the visible infrastructure and piping fully measured and ready for modelling, the client decided to get a similar view of the underground. The site conditions include significant area, paved surface, and more importantly: the high density of the underground piping! Some of these pipes are known to be filled under pressure with dangerous substances. This situation does not lend itself for test trenching very well, so an alternative solution was sought for.

The solution was the scanning of the terrain with Ground Penetrating Radar (GPR). This 30 years old variety of the radar technology allows detection of subsurface objects in a manner resembling the shallow seismic. The technology in use was in fact a very modern array of 8 GPRs, which scanned the subsurface of the site at a high resolution. This volume and density of the data coupled with the extensive use of specially designed software allowed for 3D imaging of the subsurface. The ultimate result has been given in a 3D CAD drawing draped upon the digital terrain model readily provided by the laser scanner.

In this presentation, the background of the project will be explained together with the techniques of 3D laser- and ground penetrating radar- scanning. Examples of point clouds will be visualised, together with different options to process the critical information needed for this project.

#### About the Presenters

**Ir. Erik Claassen** did his internship at CSIRO, Canberra Australia, in 2002. He graduated in 2003 from TU Delft on the research at the registration of airborne (FLI-MAP) and terrestrial laser data. After this, he joined Fugro-Inpark B.V. in Breda as project engineer specialised in 3D (terrestrial) laser scanning. Since 2009 he is responsible for all operational matters of Fugro-Inpark region Breda.

**Dr. Vsevolod Kovalenko** graduated from Kharkov State University in 1995 with the Specialist degree in applied mathematics. After the graduation he went on to work in several research institutions (Ukraine and Delft) on development for (ground penetrating) radar and fully polarimetric GPR for landmine detection. After completion of a postdoctoral project on high resolution full polarimetric Doppler surveillance radar he joined Fugro. In Fugro-Inpark he is responsible for projects involving the mapping of underground infrastructure by various means including, of course, the GPR.