

## "HIGH-DEFINITION SURVEYING (HDS) : THE BEGINNING OF A NEW AREA IN REALITY CAPTURING"

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### **ABSTRACT:**

**Terrestrial Laser Scanning** as a technology has gone through an impressive development phase. Although, scanners have been available for more than ten years, their beneficial applicability as productive and competitive tools has just started to emerge in the last three years. This is on one hand to be attributed to the huge improvements in the data capturing rates, the photorealistic representation of reality and in a significant increase in accuracy by utilizing different base technologies as i.e. "Time of Flight" or "Phase Based" approaches, on the other hand, and maybe even more significant, the break-through in handling, managing and visualizing large **Clouds of Points (CoP)**. These advancements have opened up totally new perspectives. Especially, the huge improvements in the software tools to handle, visualize and mine these huge CoP's in an effective and efficient way to extract features and information have reached a stage, where several industries and users have utilized this technology as their primary tool and workflow. These developments have created a new area in Surveying, the area of "**High-Definition Surveying**" (**HDS**). In applying these new tools and workflows the physical reality can be captured in an efficient, accurate and reliable way with huge benefits for engineers and scientists. CoP's are seen and treated in the meantime as a new data content and their seamless integration into CAD, GIS, LIS and ERP applications have been successfully demonstrated and are the subject of many current developments.

The new capability to handle large Cop's is driving the demand for integrating data from different sensors into one and the same data model. This data fusion, where data from terrestrial systems as i.e. Laser Scanners, Total Stations and GPS – Sensors are combined with data from airborne LIDAR systems and even with results from photogrammetry and remote sensing applications, are opening up new dimensions of data extraction, data interpretation and information gathering.

This keynote will briefly present the status of Terrestrial Laser Scanning, its potential and limitations and introduce the concepts and ideas behind "High-Definition Surveying". A more detailed look into the developments and the capabilities of a state of the art **Cloud of Point Engine (cpE)**, which allows to manage, visualize and process CoP's with several billion points, will lead into an outlook of the feasibility and the current state of combining data from different sensors and systems into one seamless, high-definition model of our physical reality. All these latest developments, tools, workflows and methodologies have truly changed and will continue to change the way reality can be captured and subsequently be utilized for the benefit of a greater engineering and scientific community.