

3D Laser Scanning in Transport Infrastructure

By

- Yash Mehrotra
- Geosystems & Survey Softwares (P) Ltd.
- (Distribution Partners of FARO Technologies in India)



Introduction to 3D Laser Scanning

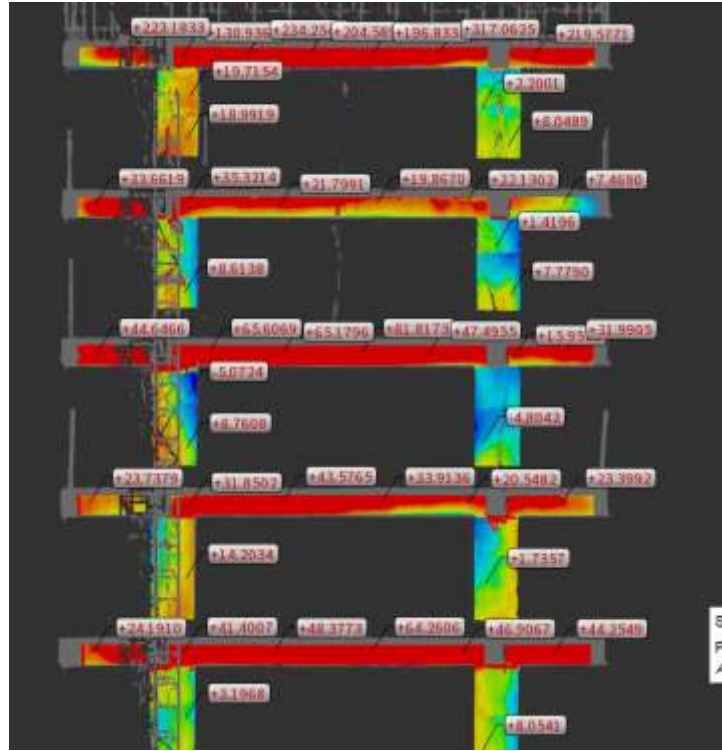
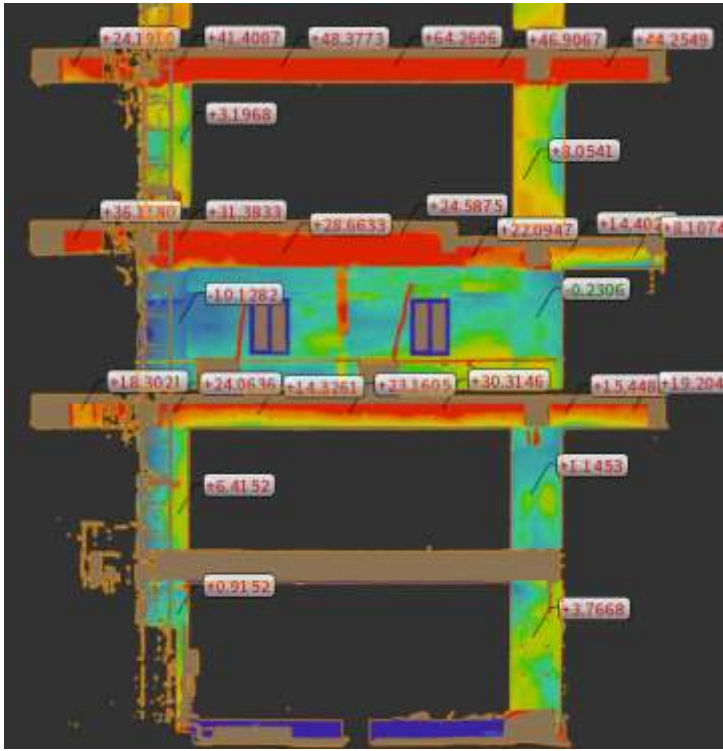


- 3D laser scanning uses either phase-based or LIDAR technology to accurately and efficiently capture 3-dimensional data in a wide variety of settings, regardless of size and surface features.
- 3D laser scanning creates clear and precise digital records of existing conditions. The scan produces millions of measurement points called “coordinates.” Together the points create the raw data in the form of “point clouds.” Each coordinate in a point cloud contains an x, y, and z value, which are also known as (Northing (y), Easting (x), and Elevation (z)).
- The intricate detail of these points means that a person can get an exact measurement from any one point to any other point in the point cloud.



Applications of 3D laser Scanning

- Architecture, Building Information Modeling
- Heritage
- Civil/Survey
- Digital Factory, Facility Management
- Engineering/Construction



Evolution of 3D Laser Scanning – Construction Monitoring

Use in Transport Infrastructure (Progress Monitoring)



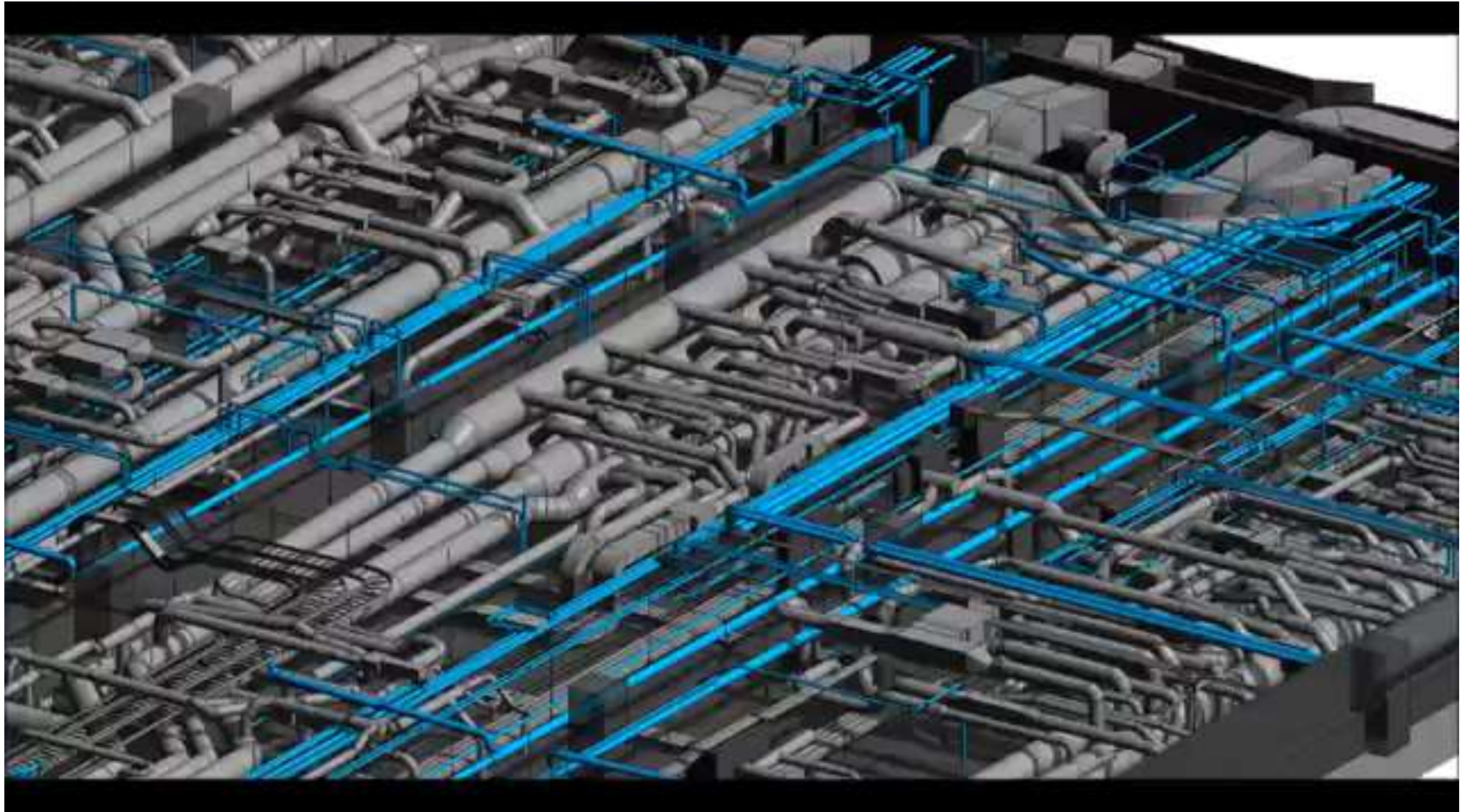
Infrastructure projects like New Terminal construction, Railway stations, Bus stations, Major bridges, highways require continuous assessment & monitoring to ensure timely completion & accurate completion of work according to SOPs



3D Laser Scanners can document the As-Built conditions of each site at regular intervals to verify the project is going as per timeline, design (Beams, columns, wall verticality, floor flatness at each level) by means of video walkthroughs or Virtual Reality to assess the site in an immersive environment



An airport Terminal scanning project at a regular interval of 6 months can help organizations in cutting re-work costs (which is on average 30% of the construction costs) & timely execution of the projects



Railway Stations Modernization

- The 3D laser scanning of structures such as old & new highways, bridges, buildings, sites either done in the past or if carried out today, can be used as a reference data on which future scans of the structures can be superimposed to verify how much these structures are deforming over time due to stress & load at each point and prevent any disaster by carrying over suitable maintenance at the right location
- The existing infrastructures like railway stations, airports can undergo modernization & up-gradation after capturing the existing As Built scenario in 3D & using the data to re-design the entire infrastructure



Road & Highways Design

- Traditional survey instruments like Total Stations are regularly used by consultants for individual projects like Center Line marking or Edge marking. 3D Scanning solution can capture the complete As-Built environment & raw data can be used by the consultant for multiple projects at multiple times without re-visiting the site for different projects, saving crucial time, money & enhancing productivity
- Private consultants are using our One Man Setup called Scan & Go to survey existing road/highways for DPR purposes by providing much accurate data in a highly cost effective manner than mobile mapping solution & using the same FARO Scanner in Terrestrial mode for Alignment in Green belt projects for Bharat Mala

