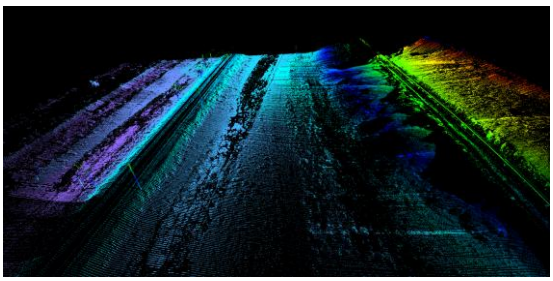
Dynascan

Dynamic Systems | CASE STUDY



Client: Royal Haskoning

Project: Survey of Baku New Port Site

Laser System: Dynascan

MDL'S Dynascan was used to provide a fast, accurate means of collecting huge amounts of data for a waterfront development survey!

In Azerbaijan's capital city, Baku, the old port is due to be demolished and replaced by modern waterfront developments. In its place, the New Baku International Sea Trade Port Complex is being built 65km to the South.

An offshore survey of the approaches to the port commenced in 2009. There was also a requirement for a survey of the land in the port basin area, together with railways, roads, powerlines, built up areas, wetlands and other man-made features. This information was required to facilitate the planning, logistics and construction work for the New Port project. The data needed to join up with the hydrographic data, providing a seamless DTM of the basin area.

Airbourne survey techniques were ruled out as being too expensive and traditional land survey techniques as too slow. Mobile mapping was considered to be the best potential solution, providing a fast, accurate means of collecting huge amounts of data.

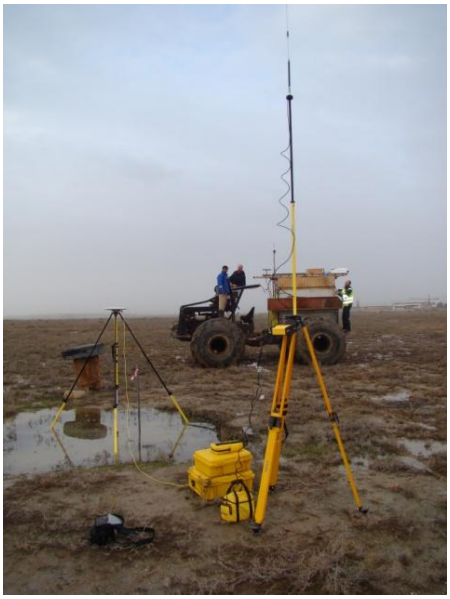
The terrain to be surveyed was varied and challenging. It included wide open mud flats, extremely rough and pitted waste ground which had been excavated for sand, small villages, main highways, railway embankments, disused industrial facilities and marshy transition zone areas.

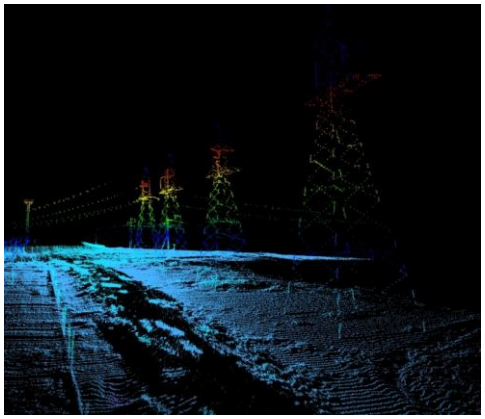
The only vehicle able to traverse the whole landscape was a huge buggy, originally designed for working in the Louisiana swamps, and now mainly employed as a mobile drilling platform and workhorse around the Caspian sea.

Given the challenges that this project involved, MDL's Dynascan was selected as being the most appropriate mobile mapping system available. There were a number of key features which made the Dynascan particularly attractive for the New Port survey: the unique ruggedized construction of the system, designed for the rough terrain of mines and quarries; the ease with which the system could be adapted to a new mobile platform; and the range of the laser which made it useful in those areas where pipelines, walls or extreme terrain reduced accessibility for the buggy.

Dynascan

Dynamic Systems | CASE STUDY





Fitting the Dynascan on a new vehicle is a simple process. However, the buggy had previously been working as a water transporter and had to be completely customised to carry not just the Dynascan, but also two personnel sitting on the side of the vehicle and operating the data collection software.

Originally, the aim was to collect data on the buggy, and process the point cloud in the field at the same time. However, once the survey started, it was clear that this would be impossible as the buggy had no suspension other than large low pressure tyres. In addition the rough terrain meant that a significant portion of the operators' attention was focused on controlling the vehicle. Monitoring the progress of the survey, watching the QC indicators and shouting instructions to the driver were the other essential duties and as a result processing and data-cleaning had to be done back in the office.

The Dynascan is used in conjunction with Quinsy, an online data collection package which takes in information from the Dynascan sensors and produces real time QC information and filtering. A plan view of the survey area, overlaid with dxf topographical layers as well as the areas already scanned, gives excellent awareness of the areas that have been covered and the areas that still require surveying. The open areas could be planned with pre-defined survey lines which the buggy could drive up and down sequentially. In more complex areas where the path was determined by obstacles such as pipelines and buildings, the navigation screen could be used to 'paint in' more and more coverage, until no 'gaps' remained in the survey.

An RTK base station at the centre of the project area provided GPS corrections, picked up by the Dynascan's radio antenna. System checks were done twice a day, when the buggy was driven past areas that had been densely surveyed by conventional means. Each night, the scanned data would be compared with the surveyed data for a confidence check on the absolute position of the survey and the quality of the scanning laser pitch, roll and heading sensors in the Dynascan.

This project involved challenges such as torrential rains, unregulated 'dirty' power from the buggy engine and noise and fumes foreman on-board generator. In addition, during the early stages of the project the landscape transformed from dry and sun-baked into a quagmire. Even the all-terrain buggy regularly became stuck in the marshy areas and as a result much time was spent extracting the vehicle from the thick mud.

Throughout the project the Dynascan continued operating and collecting data. A vast amount of data was produced, cleaned and adjusted. The finalised point clouds produced matched up perfectly with the data collected from the survey boats and offered great value to the project contractors.