

Leica Geosystems **TruStory**

Leica Zeno GIS for efficient management of irrigation networks



Water is becoming a scarce resource and it is of growing importance to efficiently use it in agriculture, particularly in arid climates, where recent droughts have brought an urgency to develop techniques for monitoring water irrigation and crop productivity. Increasing irrigation potential in the command areas requires considerable efforts, both in terms of time and money.

Advances in remote sensing and GIS have offered water resource researchers and managers a new and fresh way for obtaining accurate spatial data on actual water use, water demand, allocation and distribution of water, and crop yield.

For these tasks, the Zeno 10 GNSS/GIS handheld device with Zeno Office software provides the ideal solution. It is easy to use, customisable and upgradable, allowing enhanced performance and increased profitability in the field of asset collection & management. By simplifying data integration from field to office, rich geospatial data of assets is easily captured and managed with one simple workflow.

El Concorde Construction is an organisation specialising in the design, engineering, management and construction of projects. The company has been contracted to define an integrated meticulous strategic plan for developing and managing water resources throughout Iraq in order



■ Company

EL CONCORDE CONSTRUCTION LTD.
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■ Challenge

Emphasis is on the irrigation distribution network with collecting, documenting accurate positions and GIS attribute information of all water assets.

■ Objectives

- Update the database of irrigation and drainage channels including all facilities, bridges and pumping stations
- Historical review and study of the feasibility of future irrigation projects
- Establishment of strategic plan for developing and managing water resources throughout Iraq

■ Location

Developed areas in Iraq



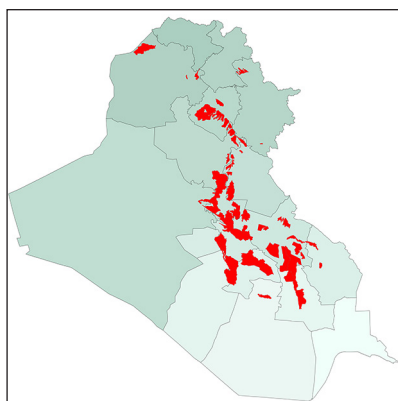
■ Deliverable

GIS based asset inventory representing all required geo locations and related attribute data of irrigation network canals and structures (e.g. pump stations, damages, bridges, offtakes, regulators).



to ensure sustainable management and development of the country's water and land resources. Long-term project phases are seen for the future in 2015, 2020, 2025, and 2035.

This project, which has been developed for several areas, in particular for the locations along the Tigris and Euphrates Rivers and their main water courses, for a total area of 12,000 square kilometres.



Project planning and requirements

All the survey features for the irrigation system and also their locations, need to be incorporated into an improved database to facilitate planning. Every asset needs to be surveyed, feature by feature. Due to the nature of the data and the required accuracy, as well as the

difficulty to access certain locations, it was decided that a physical survey would prove more cost effective than a vehicle-based one.

Collecting data with Zeno10 GNSS/GIS

For such a large survey area, with high volumes of data and with work taking place regardless of weather, the right choice of right survey equipment was essential. El Concorde selected the Zeno 10 handheld GNSS/GIS using Zeno Field software due to its compatibility with the existing Esri based GIS, its excel-

Key tasks

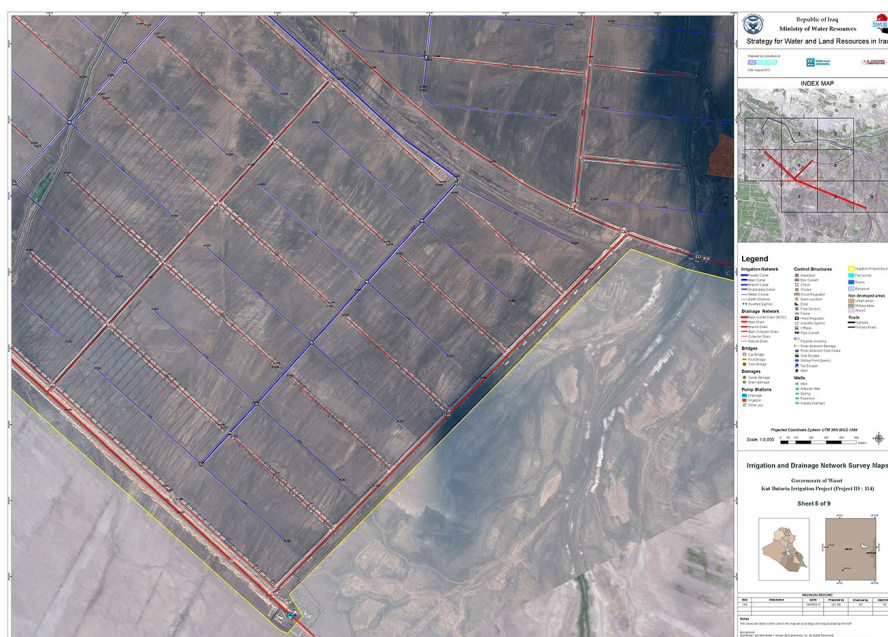
- Capture the irrigation network features, structures and fill attribute table
- Transfer data from Leica Zeno Field to ArcMap (ArcGIS with Zeno Office)
- Process data information that has been surveyed
- Generate maps containing all data

Hardware and software

- Zeno 10 and Zeno Field
- Zeno Office and Esri ArcMap software

Benefits

- Perfect for maintaining the Geographic Information System (GIS) when working in the field
- Provides a one-click automated workflow between the field and office
- Durable and able to work in harsh environments
- Integrated digital camera automatically links photos to feature location
- High performance sub-metre accuracy
- Quick and easy access to data which has been measured on-site, simply plugin and the field data is downloaded
- EasyIn workflow updates data of the irrigation network digitised by Esri ArcGIS



lent mobility and screen performance. In addition, the Zeno GIS solution offers reliable technical support and this is essential when adopting new equipment into a business or

The data of the irrigation network that was captured with the Zeno 10 can easily be imported with just one click using the EasyIn workflow from Zeno Office. The latest data is

Zeno Field using the equally simple 'EasyOut' wizard. Once the surveyors go out, they take the up-dated data set into the field.

Mohammed Al-Eswid, Project and Geomatics Engineer at El Concorde Construction states "The Zeno GIS handheld could be easily carried to survey sites and easily collected information by taking pictures, entering the data and following-up with wide screen, easily handle with Esri ArcGIS for downloaded data, and the best thing is that you don't need to go back to the office for days".

Efficient Workflow

A single spatial database for each project was designed and Zeno Office software was used to create and manage a database containing all mandatory attribute fields requested as well as other information such as site photographs. Contain drop down lists to improve data quality and speed of collection. The entire projects were surveyed by a specialist team of surveyors who collected 40,000 features.

project. A key element of ensuring rich asset detail was captured at the point of survey, making sure all data could be captured in a single visit.

The integrated camera on the Zeno 10, which helped to document features with images was invaluable for internal quality processes and assessments, and enabled the staff in the office to easily understand documentation, making it easier for them to work together and ensure the right data was captured at the time. This way, revisits were eliminated, thus minimising costs and delivering datasets without delay.

A simple workflow chain

The Zeno GIS solution ensures efficient workflows by reducing trips from the field to the office and with its ability to monitor data captured in the field, ensuring a direct integration in the office.

transferred directly to Esri ArcMap. This automated process is very easy to maintain and manage and ArcMap generates the final map that contains QC and processed data.

For further map updates that require new survey operations for the irrigation network, El Concorde Construction export features from ArcMap to

