

# Data Capture Systems Tailored to the Customer



Over the last five years we have seen a clear move by technology manufacturers away from a 'horizontal' approach providing sensors and data capture systems for as many different customers as possible, towards a more 'vertical' approach creating systems with a particular sector's specialized needs in mind. For example, a Trimble system for water companies enables them to proactively monitor their water networks, trace leaks and pinpoint their exact locations using sensitive acoustic sensors, management software and mobile applications blended together.

Customization is deemed vital for a product to be successfully integrated into an application. But if customization is so crucial to the successful take-up of a system, why not create a system that is

not just application specific but customer specific?

During the past year, KOREC's in-house software development team has been approached many times over by customers with very specific requests like "We want to move from pen and paper to digital data collection but want to retain our existing workflow because it works well – off-the-peg data capture software won't allow us to do this." Or "We want software that automatically calculates a value we need out in the field for immediate decision making rather than our current systems that require us to process information back in the office."

Of course, a customized system must deliver a tangible return on investment (ROI) for it to be worth both the effort and investment required to develop it, but here's where things get interesting. Often our customers may work in very different industries but their needs are exactly the same. A Bluetooth link developed for use between K-Mobile data capture software running on a Trimble handheld and an external sensor improves productivity for both the pipeline walker using an electro-magnetic underground utility tracing device and for the environmentalist working on an ocean trawler with Bluetooth enabled fish measurement calipers. Similarly, a gully cleansing company and a forestry service have come to us with similar needs. Both wished to collect data and generate reports that would enable them to move away from inspection policies based on 'every six months' to an intelligent one driven by the principal of when a task should be done and not when it was last done. The gully company now targets specific drains based on silt levels and the forestry service inspects its picnic furniture and view point benches at high usage times rather than the middle of winter. In both cases, the same technology was used but for very different applications and this is what keeps customization costs down and within budget.

Our guiding principal with these customizations is that a little bit of effort to get it right, especially in the field, pays huge dividends in terms of ROI.

## Case Study 1: Digitizing Complex Manhole Cards Using Customized Templates to Improve Data Quality and Cut Office Processing Time by Two Thirds

RPS Group Plc is a multinational energy resources and environmental consultancy that advises clients on the built and natural environment. Operating out of the company's geomatics department in Staffordshire is the Survey Manager for England and Wales, Chris Alcock, who has lately run several manhole and asset survey programmes on behalf of both the private and public sectors as part of their work as topographical and underground utility surveyors.

In the past, these surveys have been carried out by recording the position of the manhole cover to within 10mm accuracy using a GNSS or total station and by entering up to thirty different types of manhole and chamber information onto paper printed cards (figure 1). This information would then be manually transcribed back at the office and transferred into a word document for delivery to the client as part of a report. Although the complexity and length of the card ensured all the required information was collected, the process was particularly time consuming in bad weather and required each hand-written note to be deciphered and manually recorded back at the office. Depending on the client's specified format, there was often a need to duplicate information to produce a word document or excel file as

required.

The ideal project for updating the process presented itself in a job that would involve the recording of over 1000 data ducts, each requiring a position, photography and around 20 input fields. Delivery of the captured data was to be as both a Word document and ArcGIS data. KOREC's in-house developed data capture software, K-Mobile, which is designed to run on a range of GNSS handhelds and smartphones seemed ideal for this project. The ability to customize this software would be key to the project's success.

## Template Development

Development was completed quickly with three systems of K-Mobile running on Trimble's rugged TDC100 handheld data logger (figure 2) which were purchased and prepared for the project. The end result was a customized digital data capture system that provided all the information they were used to collecting with pen and paper.

After a one hour training period, the RPS field workers were immediately productive on site and the project was successfully completed. At the end of each day, the TDC100's were synced with the RPS office and collected data was downloaded then turned into reports at the touch of a button, QA checked and forwarded to the client in their specified format, all without the need for the surveyors to return to the office.

"I'd say the time spent on site has changed little, except of course when the weather is bad and a rugged, digital system becomes invaluable!" explains Chris. "However, there are extensive time and cost savings to be gained in the office. In the past it would take us around one day to digitize 40 manhole cards with all the information we collected. We can now cut this time by 70% and that means a cost saving for the client, faster delivery of data and a confidence in its quality that pen and paper methods can't guarantee."

"The customization of K-Mobile has been key to the success of these projects and we see our initial development work with KOREC as just the beginning," continues Chris. "Our future plans include building-in automatic calculations in the field for invert levels, an automatic link to the GNSS recorded positions and the introduction of a portal which will enable our clients to view and access data more freely."

## Case Study 2: Upgrading from an In-house Bespoke System to a Fully Client Customized System for Tree Surveys and Inspections

The Environmental Dimension Partnership (EDP) is an independent environmental planning and design consultancy that operates throughout the UK from its offices in the Cotswolds, Shrewsbury and Cardiff. As well as offering a full range of environmental project services, including landscape, archaeology, heritage and ecological consultancy, EDP also has a dedicated arboricultural team that provides practical and commercially-aware advice on trees to developer and land-manager clients.

Technical lead for EDP's Arboricultural Services and a Director of the company is Gerard Dore. As part of his work managing development projects, Gerard was aware that EDP would be even better equipped to provide its clients with timely, accurate tree survey data if it addressed the shortfalls in its current data capture workflow.

Whilst the company had moved from pen and paper data collection some time ago, the data capture software lacked some flexibility for attribute collection, did not easily allow for the wireless transfer of data directly from site and there was no function to automatically geotag and link photos. The K-Mobile software came with built-in functionality that would be suitable for environmental applications and would rectify many of the problems with the old system. It also had the ability to customize the solution into a tailor-made system, exactly replicating their tree survey workflows, and could also seamlessly integrate with EDP's corporate QGIS.

When carrying out British Standard tree inspections (BS5837:2012), many tree attributes are recorded such as stem diameter and height, however, it is also a requirement to measure the tree canopy in four directions, north, south, east and west. The old system, whilst recording two canopy dimensions, did not have the ability to replicate these measurements graphically meaning that only a reasonable, rather than accurate, interpretation of the canopy was possible. KOREC's K-Mobile team therefore built in a function which enabled the measurement of all four cardinal points and the creation of an accurate ellipsis of the tree canopy.

The system was also enhanced to display accurate root protection areas (RPA) around the trees and automatically generate a graphic of this information on the survey tablet. Because the number of 'stems' a tree is made up of has a bearing on the RPA calculation, the software included an equation that automatically calculated this value, regardless of the number of stems. The RPA is then used to define an accurate figure as a construction buffer to protect the tree. The functionality to have this feature display on the survey tablet in the field provides an invaluable QA check.

## From Development to Field Use

Following the successful initial developments of the system, EDP purchased ten K-Mobile licenses and the software will run on GPS enabled tablets and smartphones. The tablets will provide the 0.2m accuracy required for the surveys and additionally will have the option to tie data in with aerial imagery and topographical surveys, snapping to known data points (Figures 3 and 4).

The new technology allows survey teams to collect and transmit data with confidence wirelessly and securely from the field allowing more rapid processing. This wireless link also means that if a template must be changed this can be done remotely, updating all surveyors at the same time so everyone is using the same version. EDP are now working towards streamlining all the data entry fields through picklists and creating an ergonomic system that's exactly suited to their requirements.

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