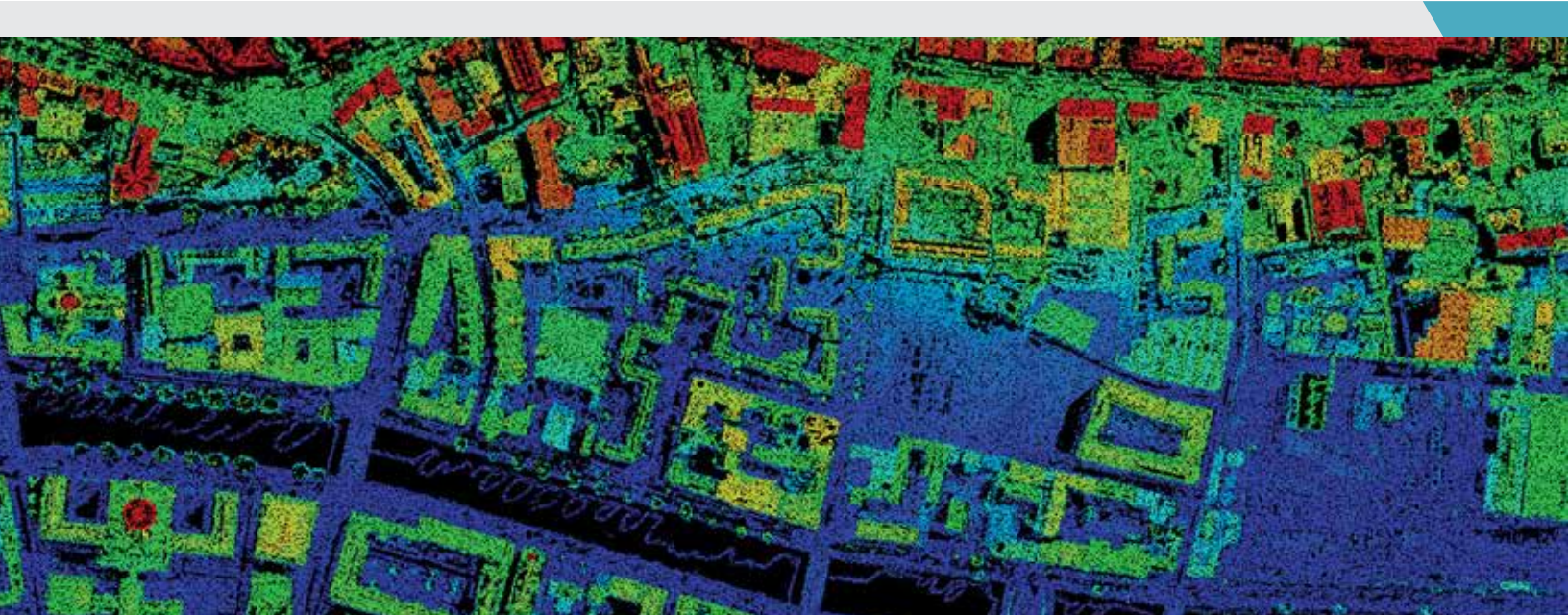


From the Sensor to the Internet: Ordnance Survey Ireland's Complete Solution

Ordnance Survey Ireland



SCOPE

To maintain and develop Ireland's underlying physical infrastructure to create and maintain mapping and related geographic databases

CUSTOMER

Ordnance Survey Ireland

PROJECT SUMMARY

Development of modern mapping operations 1960's – present day

BENEFITS

- Development of GPS network infrastructure
- Provision of imagery at 25-centimeter resolution for national map updates
- Flood mapping, height data for orthorectification, peat quantities, and infrastructure-design projects
- Map updates, photo control for air-triangulation, ground truthing
- End-to-end mapping solution using:
 - ERDAS APOLLO
 - Leica System 1200 GPS & TPS
 - Leica RTK Network Geodetic GNSS Receivers and Antennae
 - Leica GNSS Spider Software
 - IMAGINE Photogrammetry
 - ADS40 large format digital camera
 - ALS50 airborne laser scanner
 - DSW 700 Digital Scanning Workstations



Ordnance Survey Ireland (OSi) is the national mapping agency of the Republic of Ireland. The country's entire infrastructure is based on the data OSi provides, including property registration and valuation. Within Ireland, some organizations that rely on OSi include local government offices, transportation departments, utility companies, private engineering and architecture firms, and those with agricultural interests. OSi evolved from the Ordnance Survey Office, which was established in 1824. It currently employs 320 staff at its head office in Dublin and in six regional offices.

OSi's fundamental mandate is to maintain and develop Ireland's underlying physical infrastructure, including maintaining a national grid and geodetic and height frameworks, and to create and maintain mapping and related geographic databases for the entire country. It offers mapping services and a comprehensive range of urban, rural, tourist, and leisure maps at a variety of different scales, both in digital and in print, to a customer base spanning all sectors of society.

During the 1960s and 1970s, OSi carried out a major triangulation of Ireland using WILD Heerbrugg (now known as Leica Geosystems) surveying and geographical measurement technology. In many ways, OSi were the pioneers in digital photogrammetry, and were the first wide-scale adopters of this technology. By 1999, OSi was the largest civilian digital photogrammetric production facility in the world.

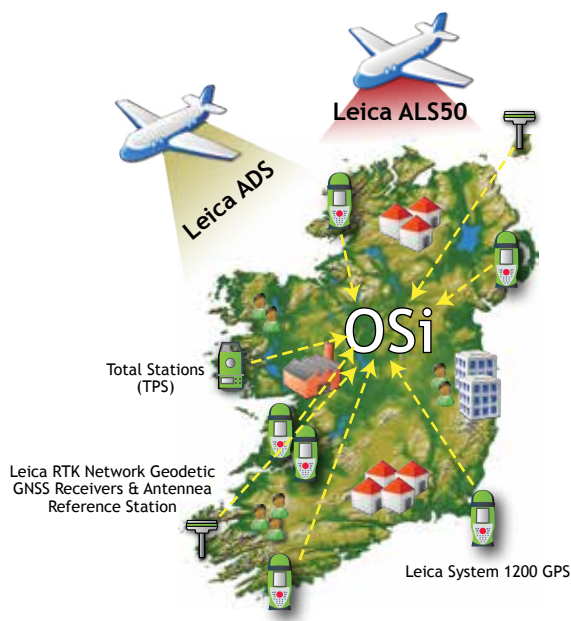
OSi has continued to stay ahead of customer requirements, leading the transformation of mapping from paper to up-to-date digital data. In addition, OSi has also driven requirements for organizations like the Open Geospatial Consortium (OGC®) and the International Organization for Standardization (ISO), as well as the Infrastructure for Spatial Information in Europe (INSPIRE) initiative. In fact, OSi provides the key dataset for

INSPIRE and are the official advisors to the government for all INSPIRE matters.

Colin Bray, Chief Technology Officer, Ordnance Survey Ireland, comments: "OSi saw WILD technology as an industry leader, which combined with high-quality local support, was fundamental to the successful development of modern mapping operations. Local support evolved, and in 1988, Survey Instrument Services Ltd (SIS) was appointed as our key contact for WILD, who were able to provide the level of support and service that was needed to meet our advanced level of technical requirements."

Technology has developed at a rapid pace, with advancements in photogrammetric and airborne solutions, and the introduction of GNSS, surveying, and enterprise systems for managing and delivering massive amounts of data. Since this time, OSi has relied on Leica Geosystems and its sister company, Hexagon Geospatial, to complete its workflow from the sensor to the internet.

This end-to-end mapping solution includes 35 Leica System 1200 GPS and 5 TPS, 17 Leica RTK Network Geodetic GNSS receivers and antennae, as well as software applications including Leica GNSS Spider Software running the RTK Network. For airborne mapping activities, OSi has 45 licenses of IMAGINE Photogrammetry (a suite of photogrammetric production tools from Hexagon Geospatial), as well as one Leica ADS40 large format digital camera, one Leica ALS50 airborne laser scanner, and two DSW 700 Digital Scanning Workstations. In addition, OSi has also implemented ERDAS APOLLO to manage and deliver their massive amounts of geospatial information.



Leica Geosystems GPS, TPS, RTK Network Geodetic GNSS receivers and antennae, an ADS40 digital camera, and an ALS50 airborne laser scanner are used to capture data throughout the country.

the necessary one-second data for all airborne operations, with two OSi aircraft operating the ADS40 and ALS50 camera and LiDAR. The network also provides the reference solution for OSi's many field requirements such as map updates, photo control for air-triangulation, ground truthing of all its LiDAR projects, and quality checking national mapping.

Bray comments, "Primarily the field survey equipment is used for national map updates. In the field, our surveyors use a ruggedized tablet PC with an application specifically designed for OSi. This allows the addition of features to an existing map that has been extracted directly from our database. These tablet PC's are connected to System 1200 GPS/TPS via cable/Bluetooth to facilitate ground measurements from our Active GPS Network."

Continues Bray, "The Active GPS Network infrastructure is made available to the commercial survey community through third-party providers, including Leica SmartNet Network RTK. SmartNet offers full GNSS (GPS and GLONASS) coverage for all of Ireland. For end users, this means a completely traceable and repeatable network RTK system, using the latest GNSS technology, which is referenced directly to the OSi national infrastructure."

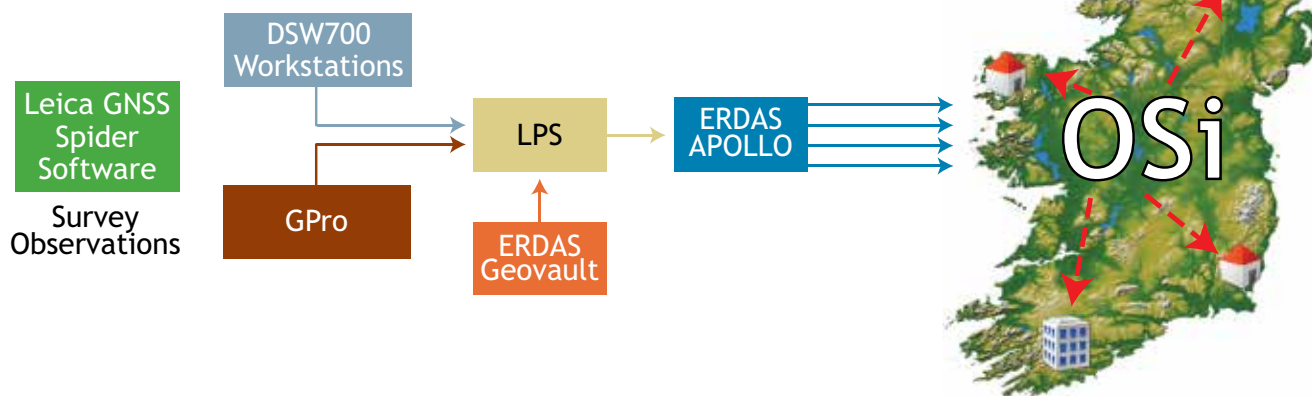
GPS NETWORK INFRASTRUCTURE

In 1995, OSi established a passive GPS network known as IRENET 95. A year later in 1996, densification took place, and in 2001, the network became active through ten stations, with a beta real-time GRS network in the Dublin area. In 2003, a national beta real-time network was established using the CRNET/Geo++ application software suite, which was upgraded to the Leica Spider system in 2005.

The Active GPS network infrastructure was established to provide a reference solution and RTK-correction service for all internal production. The primary use for this infrastructure is to provide

PHOTOGRAMMETRY AND AIRBORNE APPLICATIONS

OSi introduced photogrammetry to its production operation in the mid 1960s with the imagery being supplied by the Irish Air Corps. OSi has been capturing its own aerial photography since the 1970s, and in the early 1990s, was the first organization in Ireland to introduce digital photogrammetry with the purchase of a digital scanner.



OSi relies on Leica Geosystem hardware and Intergraph software products to manage and deliver data to agencies across Ireland (and throughout the world).

Since the introduction of the ADS40 large format digital camera in 2005, OSi has been able to provide imagery at 25-centimeter resolution for national map updates and orthorectified imagery of urban areas with a 25-centimeter resolution. It has also allowed the DSW700 film scanners to engage in systematic scanning of the organization's film archive into a data management software. The software then provided automated and accessible long-term storage and management of digital imagery files. The ALS50 airborne laser scanner is engaged mainly in commercial activities, including flood mapping, height data for orthorectification, peat quantities, and infrastructure design projects.

The photogrammetry and remote sensing department primarily uses IMAGINE Photogrammetry with the air-triangulation application, ORIMA. The PRO600 products are used to extract data for map updates.

DATA MANAGEMENT AND DELIVERY

With ERDAS APOLLO, OSi has implemented OGC compliance in their data storage model with a Service Oriented Architecture (SOA) to support the management and distribution of information within the organization. Having an image-serving capability was paramount for OSi, which is one of the reasons it selected ERDAS APOLLO. ERDAS APOLLO offers on-the-fly geoprocessing through a powerful implementation of the OGC Web Processing Service (WPS) specification. The workflow is designed so that end users can execute robust and complex geoprocesses. An end user can run an entire model, such as change detection, site analysis, or elevation change, within a single Web Processing Service (WPS). With this functionality and more, ERDAS APOLLO met all of OSi's requirements.

CONCLUSION

Bray states, "For the past 30 years, OSi operated on the basis that we were a technology organization. We have remained at the leading edge of technology in all aspects of operations. OSi introduced digital mapping into its workflow in the late 1970s, and since then, we have endeavored to introduce the most advantageous technologies to OSi as they became available at a practical level. A vision was created then to move away from plastic and paper materials into a complete digital environment. Over the years, as developments have taken place, OSi has consistently evaluated these developments and implemented new technologies where further efficiencies and new products were evident."

"We see the development of a good relationship being vital to the success of any operation. The support of world-leading organizations' proven technologies and the availability of a reliable local partner, such as SIS, is essential. Such relationships have contributed greatly to OSi's success in the mapping industry."



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