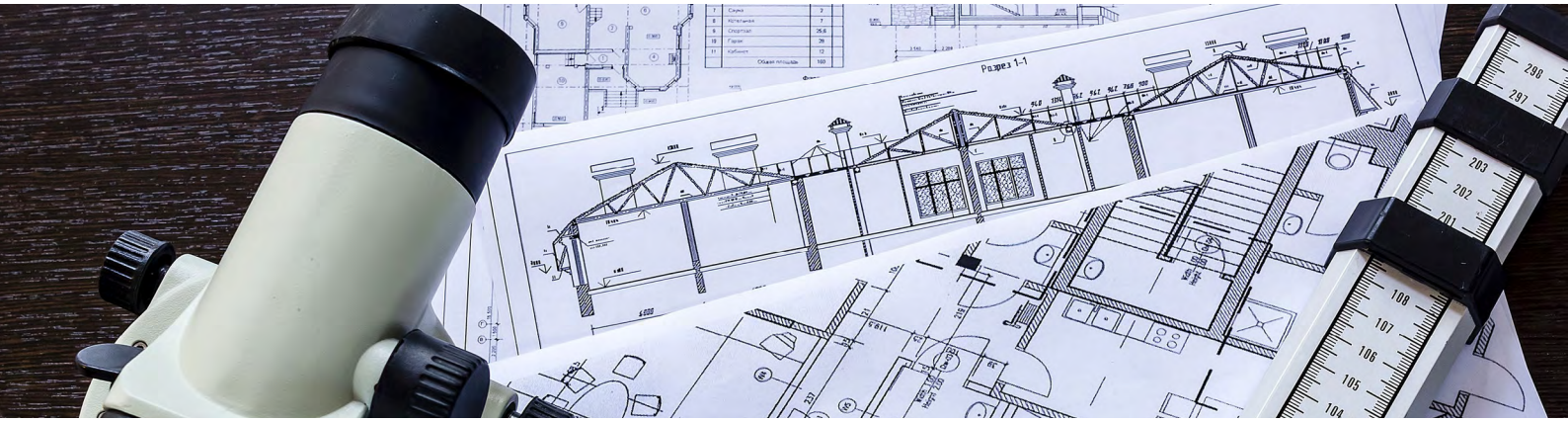
Ten10 x Ordnance Survey Case Study

Ordnance Survey (OS) is the national mapping agency for Great Britain and a global leader in geospatial precision.

For over two centuries, OS has provided the foundational data used for everything from emergency service routing and flood risk modeling to the planning of 5G networks and electric vehicle infrastructure. They maintain the National Geographic Database, a repository containing over half a billion individual geographical features.

The Height Program was a strategic initiative designed to overhaul OS's legacy Height System of Systems. By migrating from aging on-premise infrastructure to the Customer Data & Service Platform (CDSP), the program eliminated critical security vulnerabilities, consolidated the application estate, and established a future-proof foundation for operational efficiency and ongoing innovation.



The Challenges

To achieve the goals of the Heights Programme, Ten10 and OS had to navigate a complex landscape of technical debt and operational constraints such as:

- A major hurdle to achieving "seamless delivery" was the limited existing documentation from the current platform. The lack of clarity and understanding comprised the goal of modernising the systems, as The Height Team, consisting of Ten10 and OS had to reverse-engineer legacy processes to ensure that the high-precision Building Height Attributes (BHA) remained accurate and consistent during the transition.

- The OS team had to ensure the legacy system was fully operational for existing customers while simultaneously building the future-proof environment. This required a meticulous migration strategy to ensure that daily operations and release planning were never compromised during the transformation.

- The existing reliance on manual validation was the primary barrier to scalability. To provide foundational intelligence, the data volume (covering 48 million buildings and structures) required a move toward Data Automation by Ten10. The challenge lay in replacing human-intensive checks with automated workflows that maintained the "high-precision" standard OS is known for.

- The expensive and complex on-premise hardware constraints limited innovation and drove up operational overheads. Transitioning to a cloud-native architecture was essential to replace this rigid cost model with a scalable, efficient platform.

- One of the greatest risks was the interdependency of the application landscape. Because the Heights systems were a "System of Systems," any single failure in migration sequencing could trigger a domino effect across the wider OS estate. De-risking this landscape required Ten10 to apply rigorous data automation and testing to manage the complex "web" of dependencies without disrupting the delivery of Height data.

The Solution

In partnership with Ten10, Ordnance Survey successfully transitioned the Height infrastructure to the cloud-native Customer Data & Service Platform (CDSP) by:

- **Modern Data Pipelines:** The team replaced legacy processes with modern raster/vector pipelines using Azure Databricks (Scala, Spark) and the Hadoop ecosystem.
- **Automated Validation:** The Heights team, a combined effort from OS and Ten10 implemented a fully automated validation process integrated into CI/CD pipelines, replacing manual checks with high-speed, high-precision data engineering.
- **Strategic Migration:** The team Migrated high-value products like BHA and Change Caches while enhancing system visibility through advanced observability tools.
- **Robust Testing:** Conducted rigorous DR (Disaster Recovery) testing and managed the complex web of dependencies to ensure zero disruption during the transition.

"Ten10 were able to provide skilled test engineers who were able to quickly integrate with the existing data team, and get up to speed with our tech stack."

"They not only worked within the existing approach, but devised and implemented new ways of testing to handle the unique aspects of the system. These developments were also shared with the wider testing team, and have enriched the overall testing capability in the team."

David Walshe – Ordnance Survey Refining Test Lead

The Results

Ten10's focus on automation and cloud engineering transformed the speed and scalability of OS operations:

- **Risk Mitigation:** The Heights team successfully moved the BHA risk profile from around 1000+ vulnerabilities and an Amber status to 0 and Green following the decommissioning of legacy infrastructure.
- **Elimination of Redundancy:** Ten10 streamlined production by ensuring NGD Buildings and BHA are produced via a single, revised Area Heighter module on the CDSP.
- **Performance Benchmarking:** Ten10 established a framework to measure "Product Creation Time" by comparing the April 2024 (legacy) runs against the October 2024 (CDSP) publication, resulting in a six-week testing reduction for the end-to-end processing time.
- **Resource Reallocation:** Initiated a re-calculation of annual support and resource costs to confirm a significant reduction in FTE effort for the BHA module, reduced from 8 weeks to 1-2 hours required to maintain the system
- **Data Quality Assurance:** Data quality, The Heights team managed the end-to-end solution from planning to automation and integration into CI/CD (a fully automated validation process that increased the quality of the deliverables).

Key Outcomes

Significant Cost Savings: With the collaborative efforts of the Height team, OS has achieved annual savings of £85k in support costs by centralising BHA so far, and future releases are expected to increase these significantly.

Elimination of Redundancy:

Streamlined production via a single, revised Area Heighter module.

Resource Efficiency:

OS have reduced the FTE (Full-Time Equivalent) effort required to maintain the system, allowing for resource reallocation.

Robust Testing:

Conducted rigorous disaster recovery testing and managed the complex web of dependencies to ensure zero disruption during the transition.

The Future

The new infrastructure provides the foundational intelligence required for the UK's Digital Twin ambitions and advanced flood risk modeling. By moving to the CDSP, Ordnance Survey has established a future-proof foundation that enables:

Innovative Product Creation:

Seamlessly delivering high-precision intelligence for 48 million buildings and structures.

Scalable Geospatial Capabilities:

Leveraging integrated processing and storage for the next generation of 3D data products.

Continued Decommissioning:

A structured pathway to further de-risk the estate and retire remaining legacy dependencies.