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M25 Case Study

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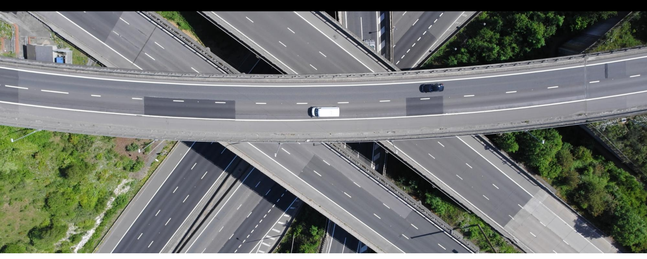

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Summary

Connect Plus, the company awarded the contract to operate and manage the M25 and its key arterial routes on behalf of Highways England, worked with partners Connect Plus Services (CPS), Osborne and Sensat to digitally map the road network. From this, a single source of data has been built which all M25 suppliers can access within one visualisation platform, creating a 'digital 3D M25'. The project covers 120 miles of highway, consists of over 23 billion data points and 85,000 high-resolution images, captured and delivered in Sensat in 30 days.

The project

To support Connect Plus in the creation of an accurate digital 3D representation of the M25 that will enable intelligent infrastructure, Sensat, working alongside partner Osborne, completed a photogrammetric survey of the entire M25 network, including all adjoining trunk and slip roads, using drone technology.

While we can see a physical asset in a digital format today to make more informed project decisions, using AI to tell us when it needs an intervention without the traditional regime of inspections is on the horizon. It will transform the way we plan, deliver and maintain our infrastructure, bringing tangible benefits to the economy and to the lives of people travelling, working and living on our transport corridors. Sensat visualisation platform sets Connect Plus and partners up for this future.

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> "We are thrilled that we're now in a position to create the first digital 3D model of the M25, giving us a new and innovative way to deliver safer, more reliable journeys for our customers whilst limiting disruption and reducing our road workers' exposure to live traffic."

Andy Dean
Chief Executive of Connect Plus

Challenges

Keeping workers safe
As part of Connect Plus' drive for elimination of risk, and following the principles of prevention, the introduction of a digital 3D M25 is enabling a reduction in the number of people required to go out and work on a busy motorway network. The digital 3D M25 allows for better design, planning and safer systems of work, allowing right first time construction with reduction of hazards for the workforce undertaking the task.

Siloed and impossible to access site data
A big obstacle in construction is that much of the data collected is silo-held in isolation by the business or division that collected it. The M25 team were looking for a way for data to be easily shared between multiple parties: owners; designers; suppliers. All M25 data and information is now available in one platform for visualisation and collaboration.

The solution

Aggregated in Sensat's visualisation platform, processed 3D point cloud and 2D orthomosaic data captured by Sensat, has been used to create the first digital twin of the M25. Today, a virtual 3D model has been shared with Connect Plus, Connect Plus Services and its framework contractors, acting as a key source of information of the entire motorway. Visualising data in this way will support the team in planning and decision-making processes across renewal and maintenance projects in 2020/21 and beyond.

A powerful tool for design, consultation, and more
The creation of a 'digital twin' of the M25 network will open the possibilities to harness emerging technology. The potential from organic growth of this approach is endless:

- Historic data pinned to every asset for optimum maintenance scheduling
- Real time monitoring to provide condition status for planning interventions and enhancements
- Scheme progress tracked and reported by overlaying drone survey

> Having worked with Sensat to collect and visualise this data Osborne has been able to increase the safety of its teams by putting fewer employees on the M25 carriageways at night when inspections and surveying take place. The data can now be shared by Connect Plus and Connect Plus Services, across the M25 Community and soon it will be possible for us all to access real time monitoring for condition status, tracking and reporting on planned interventions and enhancements during a scheme. Connect Plus is moving towards predictive maintenance of the M25 and ultimately to a point where an asset can tell us when an intervention is required without the need for inspection. This has the potential to be a step change in the whole asset management lifecycle, and will transform the planning, delivery and maintenance of infrastructure.

Jamie Harrison
Highways Director at Osborne

Conclusion

The M25 team have now received accurate high-resolution 2D and 3D data of the M25 to put to immediate use. By capturing the information once and sharing across teams, the projected benefits in terms of planned schemes in 2020/21 are:

- 26 less shifts for surveys which reduces cost, saves time, and keeps people safely off the network.
- No disruption through lane closures or narrow lane running.
- Carbon emissions are reduced by 95% on traditional surveys.
- Remote measurements / progress reporting using Sensat's visualisation platform, and 'live' data saving time.

This is the first important step on the M25 digital twin roadmap. When linked with emerging technologies for predictive maintenance of assets it has the potential to create a step-change in whole life asset management

Problem	Solution
M25 site data is siloed, difficult to access and share	Sensat's visualisation platform, is allowing multiple stakeholders across the M25 framework to easily visualise, interact with, and share 3D datasets anywhere, on any device.
It is impossible to validate designs in their real-world environment	Through Sensat's software, you can visually combine dynamic project information in their real-world environment, including CAD, BIM, and LiDAR

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