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Solar IP CCTV System

Benefits Realisation Report Summary



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Solar IP CCTV System: Benefits Realisation Report Summary (10/10/19)

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The roundabout at junction 6 of the M42 is a key junction on the strategic road network (SRN) serving many high-profile traffic generating businesses and facilities including Birmingham airport, Birmingham International railway station, the National Exhibition Centre, the National Motorcycle Museum, Birmingham Business Park and Jaguar Land Rover.

It is also the interchange with the A45. This key junction experiences severe congestion and on occasion has “locked” with traffic at a standstill. Attempts to manage the situation were hampered by a lack of visibility on parts of the roundabout.

Installing a camera was an obvious solution, however the work involved in establishing power and network connectivity to new locations on the SRN can be prohibitive, with considerable lead times, costs and inter-agency co-ordination.



To overcome these challenges, Kier Highways proposed to design and build a Solar IP CCTV System (SICS) which could be quickly and easily deployed to locations without power or communication infrastructure.

A first-generation unit was installed which provided the required coverage, but the batteries housed in the unit were not powerful enough and required regular charging via a generator. A replacement second generation unit performed better and gave over 90% coverage capability during the testing period. This exceeded the original scope requirements.

Due to the success of the first camera three further units were installed at key points on the SRN where coverage was minimal. The units have performed to similar standards as the first unit; therefore the full scope of the project has been met.

Locations of unit deployment are:

- North East Quadrant of the M42 Junction 6
- M6 Junction 4 – to monitor HS2 works
- Stonebridge Island A45/A452
- M42 Junction 6 Motorcycle Museum

These SICS used different communication technologies: Global System for Mobile Communication (GSM), Satellite Communication and Microwave point to point links with the technologies compared for effectiveness.

In comparison to traditional wired cameras there was a total saving for all four SICS of 1,051kWh per year equating to 297.56 kg CO₂e for all four SICS units. **The cost per unit is approximately £80,000 and the traditional method is approximately £200,000 giving a cost saving of £120,000 per unit.**

The feedback received from the end users from Highways England and Feedback has been hugely positive with the recommendations from the project team for the project to move to **Business as Usual** for Highways England.

The project was successfully commended at **CIHT 2018 National Awards for 'The Ringway Innovation award'** and awarded winner at **2017 IFSEC as 'Project of the Year'**.

Summarised below are some of the key project successes:

1. **High quality 24/7** video streaming powered entirely by solar power 365 days of the year (unit 4)
2. **Reduced data costs** through point to point and use of compression encoders
3. **Reduced civil engineering works** by mitigating the need for costly groundworks for laying power and data cables as well as installing masts
4. **High encryption levels** achieved with data transfer which allows the units to sit on the Highways Network and to be shared with numerous stakeholders in a secure way – Highways England Cyber Security Team graded the solution as low risk.
5. **Each SICS saves** the following (calculated using approx. 30 Watts Power Draw per hour) $30 \text{ (Power)} \times 24 \text{ (Hours)} \times 365 \text{ (Days)} = 262,800 \text{ Watts} / 262.8 \text{ kWh}$ per year, contributing to an improved environment
6. **The cost per unit** is approximately £80,000 and the traditional method is approximately £200,000 meaning the benefit is £120,000

Andrew Butterfield - Highways England Head Of Service Delivery

"We had a specific problem at Junction 6 of the M42 where we couldn't see part of the roundabout with the existing cameras in place, there was no simple way to get a camera in to that place and connect to electricity and the technology it needed to connect to. With SICS we were able to drive in, lift the mast up and start getting video footage directly to mobile phones, into our control centres, we are even sharing that with stakeholder NEC and airport. We can now all share and understand much better the functioning of one particular roundabout. Once we get to a stage where that round about is operating at its premium capacity we can pick that camera up and move it somewhere else and we can do the same over and over again as many times as we want to without really expensive connections to electricity and to the technology it needs connecting too. It's a faster solution, a more efficient solution and even cheaper solution so it wins on every score."

Frank Bird – Highways England Emergency Planning Officer

"By way of feedback, those that have used the new locations via the RCC PC have been waxing lyrical about how useful it is to fill in some of the gaps in our knowledge when we are undertaking incident management. So, once we improve the reliability of the units it will be hugely beneficial to the operational side of the business"

Patricia Dray – Highways England Asset Manager

"This area is extremely vulnerable to lock up events and the ability to have full visibility of the junction will really help with management of the congestion, in partnership with our stakeholders in the area. We heavily rely on intervention by the NEC to resolve congestion at our junction, as it is them who invoke the recovery plan and divert their traffic to Stonebridge Island via the Eastway, which in turn relieves junction 6 to get traffic flowing again. Clearly, as a result, it is essential that the NEC has visibility of the operation of the junction – this solution allows this to happen"



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