

Robots make their mark



Bertel Kirkeby explores how robotic pre-marking is helping speed work on a £600 million motorway upgrade in the Midlands

With work commenced in 2015 and due for completion in 2020, the Highways England scheme on the M6 aims to cut congestion, boost capacity and, ultimately, improve journey times for travellers between Coventry and Birmingham.^{1,2} The work involves upgrading a 22 km (13.6 mile) stretch between junctions 2 and 4 (see map) to a Smart Motorway.

As part of this work, project lead Balfour Beatty contracted the WJ Group, which specialises in temporary and permanent road markings, to perform setting out for surface works.³ The initial work, once the carriageway surface is laid, entails the application of temporary white line road markings as a guide to permanent markings. For an 8 km stretch of the newly-surfaced carriageway, these temporary pre-markings were applied using the TinyPreMarker robot from TinyMobileRobots of Arhus, Denmark.

Thanks to its built-in GNSS technology and control tablet, the 18kg robot delivered some spectacular results. Among the benefits cited by the crew and engineers were increased productivity, greater road marking accuracy, a reduced margin for human error and increased safety on the



The 8km stretch of the M6 being upgraded to Smart Motorway lies either side of Corley Services



TINYPREMARKER AT-A-GLANCE

Maximum marking speed: 4 km/h / 2.5 miles/h * More than 8 hours operation * Withstands rain, wind and rough terrain * Remote control reach up to 500 m / 600 yds. * User-friendly tablet solution * Replaceable aerosol can of any size * Robot uses RTK GPS * Weight excl. battery: 18 kg / 40 lbs * Battery weight: 4 kg / 8 lbs: Generates curves, circle arches, straight lines and parking lots * Marks with points or dashes * Status indicator is visible from long distance * Many user-controlled parameters.
More at: <https://tinymobilerobots.com>



From days to hours

During similar construction projects on the M1, M4 and M60, the pre-marking robot has proven its efficiency by completing in two hours what would otherwise take an engineer approximately a day and a half. Customers of WJ, including Colas, Balfour Beatty and Galliford Try have all experienced how the TinyPreMarker improves project execution and productivity in large-scale road construction projects.

This increase in productivity is of great significance for those who are typically working to very strict deadlines between different stages of a construction project and where shifting weather conditions can pose big problems. Applying pre-markings quickly and accurately before progressing to permanent markings and the provision of traffic engineering facilities is therefore of great importance.

The robot isn't only fast, it's also accurate. For example, it marked out 3km of outside lane edge along the M1 for Costain & Galliford Try JV. When engineers went to check the accuracy of marking with a

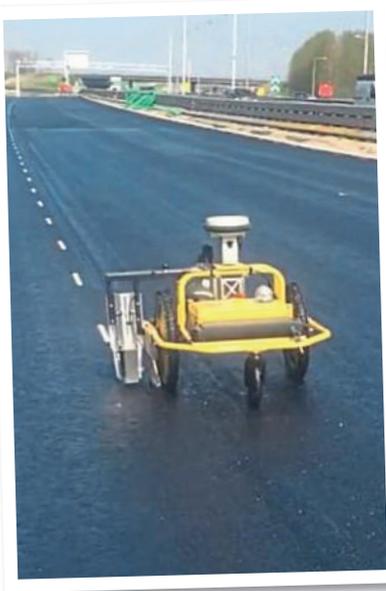
Geomax Zenith GPS/GNSS system, they found that the robot had achieved a 5mm average tolerance over this distance ... well within the 25mm tolerance to which engineers normally work.

Balfour Beatty and WJ engineers, site agents and road operatives were all involved in pre-marking the 8 km stretch of the M6 either side of Corley Services. Using the robot, markings were applied at one metre centres and the job completed in about three hours. For site agent Maciej Kozlowski, the TinyPreMarker was an eye-opener: "My engineers were absolutely astonished with the robot, setting that out would have taken both of them a week."

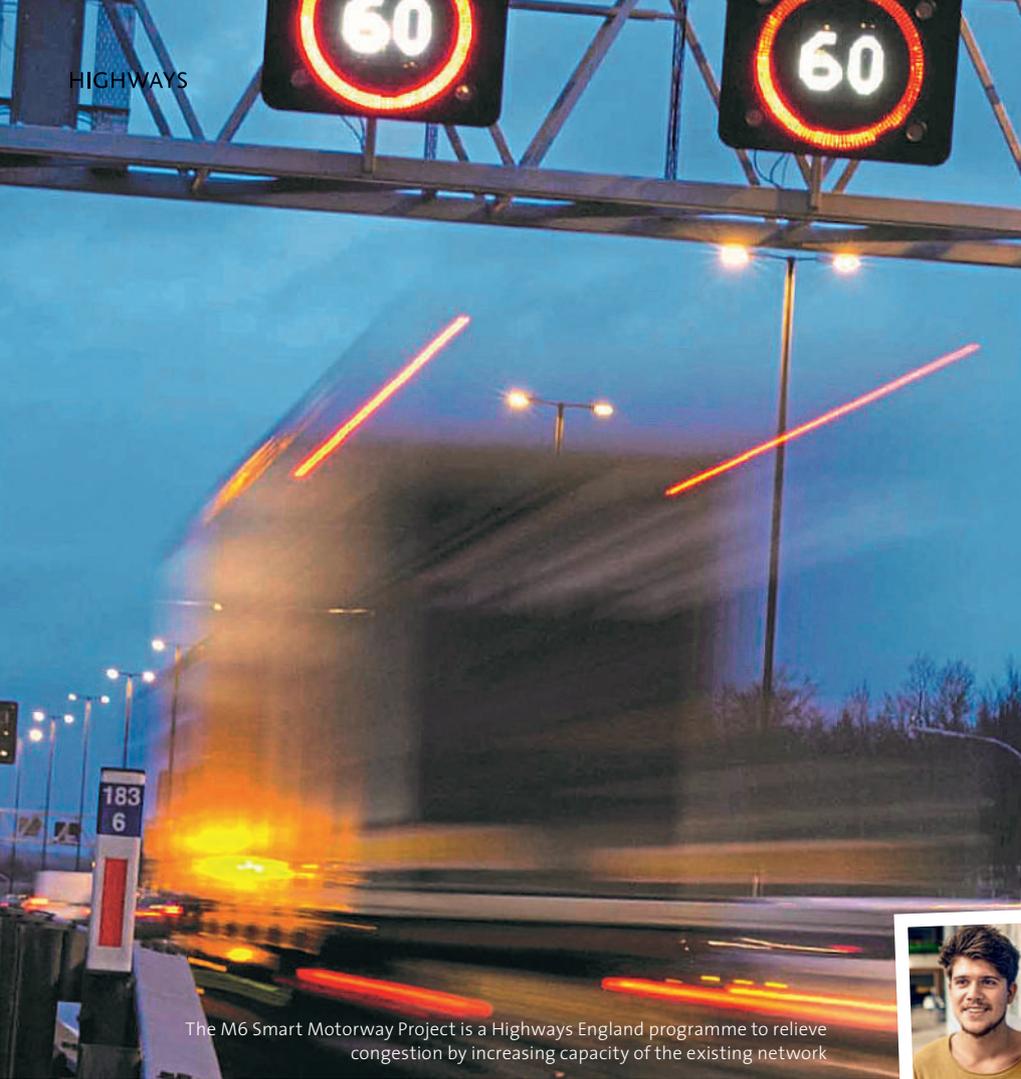
Added value

As a service-provider to road construction companies such as Balfour Beatty, WJ Group, sees the pre-marking robot delivering added value in a variety of different situations "It really is quite something to witness the robot carrying out the task at hand. The efficiency of the whole operation is absolutely incredible and to see this innovation come

job. The operators were able to control and supervise the pre-marking works from a safe distance, minimising the people/plant interface and causing less disruption to traffic.



Using the robot, pre-markings can be applied in a matter of hours that would otherwise take days



The M6 Smart Motorway Project is a Highways England programme to relieve congestion by increasing capacity of the existing network

to life and perform is brilliant”, says David Bayley, quantity surveyor for WJ North.

The time-savings, combined with high accuracy and precision, are an essential part of why the robotic pre-marker makes such a big difference for WJ and its customers says the Andy Stubbs, managing director, WJ South: “When you really think about it, the amount of work that the robot can get through in a couple of hours is absolutely incredible. The time this will save us out on the network is huge and enables us to carry out permanent marking and/or stud installation much quicker.”

References

1. <https://highwaysengland.co.uk/projects/m6-junction-2-to-junction-4-smart-motorway/>
2. <https://www.balfourbeatty.com/news/balfour-beatty-joint-venture-selected-to-deliver-a-smart-motorways-package-worth-over-600m-for-highways-england/?dismiss=cookiepolicy>
3. <https://www.wj.uk/>



Bertel Kirkeby is Marketing Manager at TinyMobileRobots (<https://tinymobilerobots.com>) in Arhus, Denmark.



The new Geospatial Insights Special Interest Group (SIG) is part of KTN’s growing portfolio of community-building groups that have a shared interest in a particular area of scientific research or technology.

In explaining the rationale for the new SIG, Andy Bennett, KTN’s Knowledge Transfer Manager for Space & Geospatial, who is leading the new group, said: “We live in a world increasingly powered by data; turning data into information helps us make decisions across all sectors of the economy ... This SIG is all about connecting the data holders and data processors with the people that can benefit from the insight geospatial data can provide.”

Over the next two years the KTN will be running a series of workshops to raise awareness of the insights geospatial data can bring to key sectors such as infrastructure, finance, agri-food, transport and health. As a first move, the SIG is collaborating with Geovation to conduct a Geospatial Investment Readiness and Pitchfest Programme. This will support companies looking to secure investment, culminating with the opportunity to pitch direct to a number of pre-selected investors.

More information can be found at <https://ktn-uk.co.uk/interests/geospatial>

PROMOTING CROSS-SECTOR INNOVATION

The Knowledge Transfer Network used the occasion of this year’s GEO Business Show to launch a Special Interest Group to accelerate innovation across the geospatial community and help grow the UK economy