Aurrigo makes breakthrough in driverless pods technology

A Coventry-based company has created 10 new jobs over the past year to meet rising demand across the world for the driverless pods it has developed with support from the Centre for Connected and Autonomous Vehicles (CCAV) and Innovate UK.

A division of the RDM Group dedicated to autonomous vehicles, Aurrigo now has annual sales of £4.2 million. It has customers in Australia, Canada, Finland, Singapore, and the US, and has recently supplied one of its 'Pod Zeros' to China. It predicts a further £6 million of orders before the end of 2020.

Aurrigo recently collaborated with researchers from the University of Warwick to demonstrate a major breakthrough in CAV technology, a successful demonstration of pods 'swarming' like birds and insects. This innovation is a key element of a CCAV-funded project called SWARM (Self-organising Wide area Autonomous vehicle Real-time Marshalling). It means that pods can follow each other without supervision, helping each other to drive and navigate through pedestrian areas around people.

Aurrigo is a key part of the UK's growing CAV eco system and has contributed to 2 other CCAV funded projects.

T-CABS (Trumpington to Cambridge Autonomous Bus Service)

This project is a 30-month project in Cambridge which will create the UK's first autonomous bus service.

Through T-CABS, Aurrigo has received a £2.54 million grant to build and trial a fleet of 6 self-driving shuttles with 10-15 seats to operate an out-of-hours service on a section of an existing guided busway. Public services start by the end of 2020.

INTACT (INnovative Testing of Autonomous Control Techniques)

A 24-month collaboration between Aurrigo and Warwick University researchers, the INTACT project has a total budget of £1.085 million.

The objective is to develop a 3D simulator, to enable design, testing and evaluation of a low-cost autonomous control system.

5StarS: developing a security framework for autonomous and connected vehicles

New autonomous and wireless connectivity in vehicles will provide many commercial opportunities for innovation. However, this automotive world will also prove attractive to smart criminals. Those using connected and autonomous vehicles (CAVs) need to know that they, their vehicles and personal data will be kept safe from cyber attack.

The government has responded by investing more than £800,000 in a £1.5 million collaborative project to develop an automotive cyber security assurance framework. It adopts an integrated set of standards for manufacturing innovation and assessment, with a rating system to build trust among consumers and insurers.

The 2 year 5StarS (Automotive Cybersecurity Through Assurance) project has had support from the Centre for Connected and Autonomous Vehicles and Innovate UK. The 5StarS consortium came together in 2017 to address the issues around growing vehicle connectivity. It was clear that existing standards and regulations or even those in development did not offer consumers a way of making informed buying decisions based on vehicles' cybersecurity resilience. Nor could insurers evaluate threats when pricing premiums.

To provide vehicle manufacturers with practical guidance and support, the 5StarS partners have devised a roadmap covering 3 specific areas – innovation, assessment and assurance rating. The project identified regulations, standards and best practice that should guide innovation and product development so that manufacturers can measure their vehicles' resilience. They include ISO/SAE DIS 21434 (road vehicles – cybersecurity engineering) which is still under development. That, in turn, opens the way to independent assessment procedures and ultimately a risk-based system with a visible rating for insurers and consumers. The rating system will apply only to new vehicles.

If fully adopted by the automotive industry it will operate in much the same way as the existing Euro NCAP type ratings for vehicle safety, building trust in connected autonomous vehicles (CAVs) and advanced driver assistance systems (ADAS). The newest vehicles on sale are already equipped with keyless entry, cameras to aid parking and lane positioning, GPS positioning for satellite navigation systems, DAB radio, wifi and Bluetooth communications.

Demonstrating that appropriate security measures are in place can potentially create an entirely new revenue stream for the industry. Although the 5StarS project was funded by the government and the consortium partners are UK-based, the framework is designed to align to current and emerging international standards and best practice so that it can be applied

internationally. This will assist vehicle manufacturers aiming to sell vehicles globally.

The next step is to run trials with vehicle manufacturers to validate the assurance framework against their vehicles and build upon the international interest received in the project to foster wider adoption.

MuCCA: government-backed collision avoidance system achieves world first

A UK government-backed consortium has achieved a ‘world first’ by demonstrating a collision-avoidance system in which 2 vehicles co-operate by radio link to steer around a stationary car without human assistance.

The successful live demo at Bruntingthorpe Proving Ground in Leicestershire is a significant milestone in developing a driver aid to avoid multi-vehicle collisions, particularly motorway pile-ups.

It was the climax of a 32-month project called MuCCA (Multi-Car Collision Avoidance), led by Applus IDIADA and involving 5 other automotive industry, technology and research partners. This £4.6 million project was jointly funded by the Centre for Connected and Autonomous Vehicles (CCAV) and delivered through Innovate UK.

There were 1,870 road deaths in the UK to June 2019 and human error is a factor in 95% of accidents.

Acting autonomously, vehicles equipped with MuCCA technology figure out between them what to do when confronted with an obstacle or a likely collision. If an accident is unavoidable, the MuCCA system will intervene to minimise injuries and damage. In normal traffic, the technology could help to reduce the bunching and congestion on motorways which is costly to the UK economy.

MuCCA incorporates 3 key elements:

- sensing of the immediate environment around the vehicle
- automatic steering as well as automatic braking
- live vehicle-to-vehicle radio messaging, communicating 50 times a second

The autonomous vehicles cooperate in real-time – something humans cannot do – and can manoeuvre to give another car the space to avoid an obstacle. With sophisticated machine learning algorithms developed at Cranfield University, MuCCA can even predict how non-autonomous vehicles with human drivers are likely to react. The next stage of development will focus on refining the control systems and extending simulation testing to more tricky scenarios and

higher speeds.

CAVForth: creating Europe's first full-sized autonomous bus

Fusion Processing is an SME based in Bristol's Future Space. In its 8 years, its automotive products have gained over 1 million miles on the clock and it's now leading a consortium developing Europe's first full-sized autonomous bus.

A full programme of trials of Fusion's CAVstar autonomous drive system installed on Alexander Dennis single-deckers will be taking place during 2020 and 2021. They will feature on a 30-mile route between Fife, across the Forth Road Bridge, to the Edinburgh Park Train and Tram interchange. A successful public demonstration was staged late last year.

CAVForth expects to be carrying passengers by this time next year, running at up to 50mph and more fuel-efficiently than manually driven buses. With services every 20 minutes between 6am and 9pm, there could be 10,000 passenger journeys per week. Five 42-seat buses are being fitted with Fusion Processing's CAVstar® control and sensing system, integrated with each vehicle's steering, throttle and braking systems. CAVstar® draws on information from radar, LIDAR, optical cameras and ultrasonic sensors, along with satellite navigation, to detect and avoid objects in all weathers, day and night.

The buses will operate at AV Level 4 autonomy, meaning that the vehicles will operate autonomously along the routes and, whilst there will be regular driver controls, the driver will not be expected to use them, other than in an emergency. As a further level of safety, the vehicles will have additional backup braking and steering systems which, in the highly unlikely event of a failure, the backup systems can be utilised by the CAVstar system without the 'safety driver' needing to intervene.

It follows a live trial of the CAVstar system commissioned by Stagecoach early last year. A bus specially adapted by Fusion Processing navigated its way autonomously around the group's Manchester depot, visiting a fuelling station and the bus wash before finding its parking spot.

DIO awarded RoSPA Gold for the fourth consecutive year

News story

The Defence Infrastructure Organisation (DIO) has been awarded the Royal Society for the Prevention of Accidents (RoSPA) Gold Achievement Award for the fourth consecutive year.

DIO was recognised for its commitment to accident and ill-health prevention and the award is a tremendous achievement for an organisation as large and complex as DIO.

The RoSPA scheme is open to business and organisations of all types from across the UK and overseas. Judges consider entrants' occupational health and safety management systems, including practices such as leadership, performance management and workforce involvement.

The award recognises the quality and effectiveness of DIO's safety management systems, including arrangements for safe systems of work and demonstrates our commitment to the "Safety First" value. As with previous years, DIO will use feedback from the judges to further develop and improve our Safety Management System. This will help to improve health and safety for everyone who lives, works or uses the defence estate.

David Brewer, DIO's Chief Operating Officer said:

> DIO's fourth consecutive ROSPA Gold Award is a fantastic result which acknowledges our commitment to continually improving our Safety Management Systems. Safety is at the heart of DIO and we will continue to work closely with our customers and suppliers on keeping our people safe. Lastly special thanks to the health and safety team for putting forward a well evidenced submission during these different and sometimes difficult times.

Clare Read, Head of Regional Health and Safety Team said:

> We are extremely proud of achieving gold for the fourth consecutive year, particularly as the award submission was put together under the challenging Covid-19 lockdown period. We had to maintain Covid-19 technical advice and guidance to the organisation alongside our normal work. The circumstances under which the award was put together with the award criteria to demonstrate improvements over each year makes each successive entry more challenging than the previous one, and more satisfying to achieve.

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