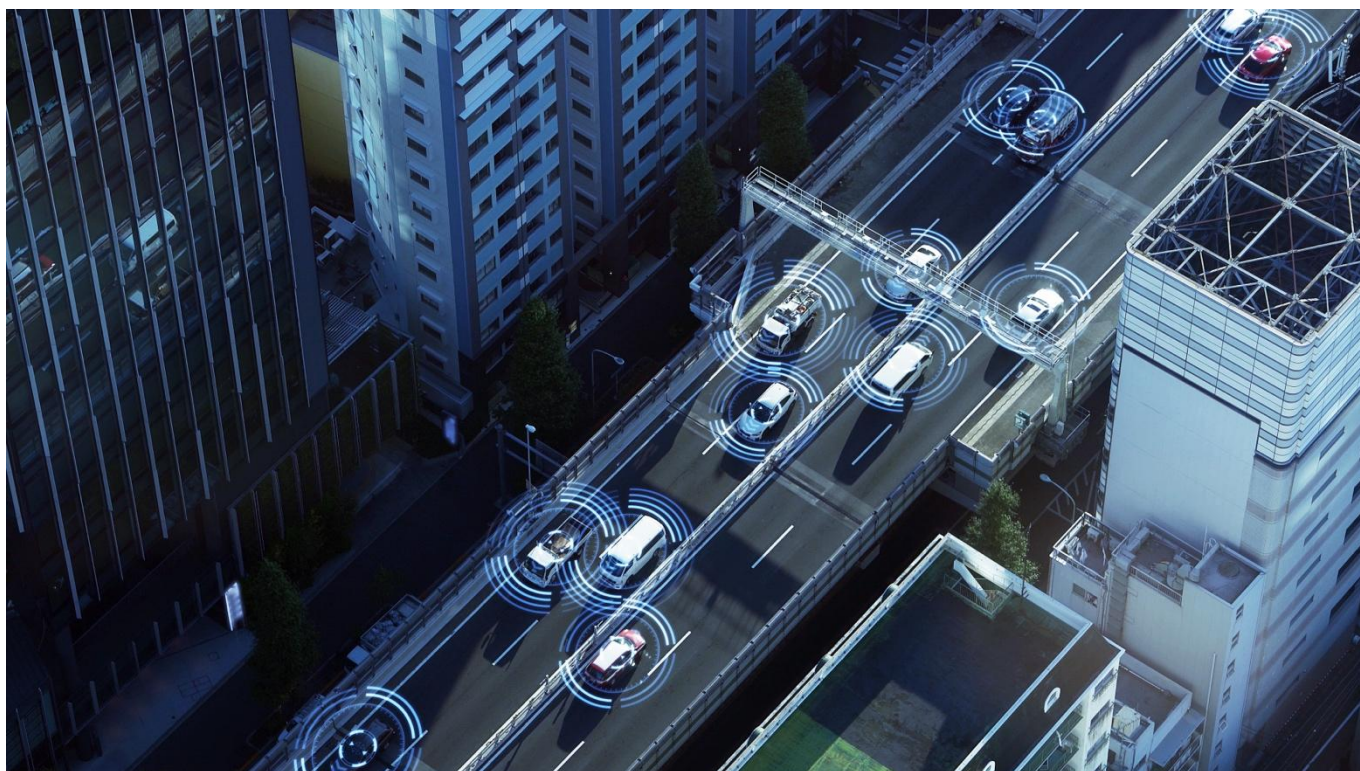


LMT monitoring report: progress and insights from the Commercialising Connected and Automated Mobility Programme



UK Research & Innovation
Our ref: 245-747-03

LMT monitoring report: progress and insights from the Commercialising Connected and Automated Mobility Programme

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List of acronyms and abbreviations

Acronym	Meaning
AD	Autonomous Drive
AV	Automated Vehicle
CAM	Connected and automated mobility
CAV	Connected and autonomous vehicles
CCAM	Commercialising connected and automated mobility (programme) (not to be confused with European Partnership on Connected, Cooperative and Automated Mobility)
CCAV	Centre for Connected and Autonomous Vehicles
CPC	Connected Places Catapult
DBT	Department for Business and Trade
DfT	Department for Transport
FOAK	First of a Kind (programme)
FTE	Full Time Equivalent
IMS	Impact Management System
IUK	Innovate UK
LMT	Land and Maritime Transport
MRL	Market Readiness Level (not to be confused with Manufacturing Readiness Level)
MSP	Monitoring Service Providers
NZP	Net Zero Propulsion
OEM	Original Equipment Manufacturer
PISA	Photonic Inertial Sensors for Automotive (project)
QRM	Quarterly Review Meeting
QMS	Quarterly Monitoring Scores (refers to the scores IUK MSPs report against projects, as part of the Quarterly Review Meeting – QRM)
SME	Small and Medium-Sized Enterprises
TDD	Transport Decarbonisation Demonstrator (programme)
TRL	Technology Readiness Level
TVH	Tees Valley Hydrogen
UKRI	UK Research & Innovation
ZEHD	Zero Emission Heavy Goods Vehicle and Infrastructure Demonstrator (programme)

Executive Summary

Steer-ED and Technopolis were commissioned to conduct monitoring on the Land and Maritime Transport (LMT) portfolio, which comprises seven grant-funding programmes covering a range of technologies, transport modes and objectives. This report focuses on the Commercialising Connected and Automated Mobility (CCAM) programme.

The CCAM programme sought to advance the deployment of connected and automated mobility technologies in the UK. It comprised: a Deployment strand (6 projects¹, £42m) to demonstrate Connected and Automated Mobility (CAM) vehicles; and a Supply Chain strand (13 projects, £18m) to develop technologies or capabilities that address gaps and barriers to scale-up². All projects began in 2023, with the last now finishing in March 2026.

This report is structured around the LMT portfolio logic model, which is divided into five themes: programme delivery; partnerships and collaboration; technology development, deployment and commercialisation; skills development; and wider framework conditions. Key findings in each of these areas are summarised below.

Programme delivery

At their latest quarterly assessment, a majority of CCAM projects were found to be on track with milestones and on course to deliver against objectives.

Most projects in the CCAM portfolio had timelines extensions (average of 6 months), reflecting a delayed start, as well as the safety-critical, regulatory-dependent nature of technology development. Two of the 19 projects were still ongoing as of February 2026.

At their latest quarterly assessment, 15 of the 19 projects were found to be on track with milestones (based on updated timelines), while three had slipped slightly (less than three months) and one had slipped by over three months. Most were on course to deliver against original objectives, except four that were at risk due to the loss of partners, supply chain and technical difficulties, and shorter vehicle deployment timelines.

Other than a delay to award announcements, beneficiaries were mostly positive about their experience of working with Innovate UK (IUK). There were, however, calls for more regular communication across projects, and between IUK and all partners.

Partnerships and collaboration

The programme enabled large numbers of new or strengthened partnerships, across sectors and disciplines, and with potential customers and users.

The CCAM programme enabled large numbers of new partnerships to be formed, as well as helping to further develop others, with consortium relationships rated highly. The funding has brought together organisations that would not have worked together otherwise. Projects have provided access to potential customers and suppliers, policy and regulatory bodies, and complementary skills. Ideas have been shared, trust built, and relationships strengthened. Routes to market and commercial opportunities have also become clearer, particularly where projects involved customers and users. Many partners also expect to continue working together beyond the project. Some are already pursuing further projects and funding in the area of automated mobility in both the UK and Europe.

¹ A seventh Deployment strand project (Hub2Hub) was terminated.

² A further £1.8m was also awarded for Mass Transit Feasibility Studies, but these are out of scope for the current study

Development, deployment and commercialisation

CCAM projects progressed 2.4 TRLs on average since application. Most are still some way from commercialisation, but there is already evidence of early product launches, customer interest, follow-on bids, and market testing.

CCAM projects have progressed on Technology Readiness Levels (TRL), with an increase of 2.4 levels on average, and a majority are now at TRL 5 or above. A total of 22 patents have been reported as a result of the programme so far, with further patenting expected.

Some beneficiaries are already close to commercialisation and/or have a clear pathway mapped out, and around 10% have already launched new products or services into the market. Collectively, beneficiaries also expect to increase employment by over 1,500 Full Time Equivalents in the next five years as a result of their project.

As projects near their end or close, dissemination activities have increased. Between August 2024 and August 2025, 15 CCAM projects have been picked up in news and social media (on average 55 times each), with projects that are more advanced and / or user-facing tending to gain more attention. Further dissemination efforts are also planned.

Skills

Beneficiaries report the creation of 50 new jobs through CCAM projects, plus positive contributions to skills amongst staff, including enhanced technical and regulatory understanding and improved sectoral / market knowledge.

A majority of CCAM beneficiaries (94%) surveyed in Wave 2 reported that their project had positively contributed to skills within their organisation. This included enhanced technical or regulatory understanding, improved sectoral / market knowledge, and the bringing in of new skills and expertise through recruitment (35% reported new jobs created as a result of their project, with 50 new jobs created overall). Participants have also learned lessons in terms of project management, partnership working, and operational agility, which will strengthen their skills and organisational capabilities going forwards. This growth is expected to support future projects and efforts to secure funding.

Wider framework conditions

Projects are expected to deliver wider benefits, supporting decarbonisation, as well as accessibility, safety, and service to underserved groups.

With the early-stage and safety critical nature of the technologies concerned, CCAM projects are laying the foundation for future impact. However, beneficiaries do expect to support the delivery of benefits to society and the economy in the longer-term, in terms of supporting decarbonisation, improving the safety of operators and users, creating greater efficiency and increasing transport options for under-served groups.

There is growing awareness, trust and acceptance of CCAM technologies in the industry, and the CCAM programme is thought to have supported this. CCAM projects have also themselves sought to influence the wider environment, through engagement with regulatory, policy and standards bodies. Challenges to deployment / commercialisation remain, however, including a lack of public acceptance and a lack of market demand (partly as a result), the need for a more coordinated approach to implementing system-wide change, difficulties in securing funding to support further development, and a need for secondary legislation that can enable and incentivise widespread uptake.

Next steps for the programme

The CCAM programme is coming to an end in 2026. Beneficiaries and wider stakeholders were positive about progress that had been made in the CAM sector, both through the CCAM programme and more widely (e.g. in terms of awareness and acceptance of the technology, the work underway to establish AV regulation, and the establishment of a strong ecosystem and supporting infrastructure). There is now a desire to shift the main focus from supporting innovation, to supporting the application and demonstration in real-world commercial pilots. As such, interviewees were positive about the new CAM Pathfinder³, which is investing £150m to support the development and commercial rollout of CAM solutions. Launched in 2025, it aims to support the growth of the UK's CAM supply chain and market, fostering innovation in areas like intelligent logistics and autonomous public transport, while preparing for self-driving commercial services in late 2020s.

Future evaluation

Many of the impacts of the CCAM programme will only become clear over time, as the remaining projects conclude, and as results are taken forward, for further development or into the market. Further evaluation, once all projects have closed, and perhaps one or two years after, will be important to capture these longer-term benefits.

³ <https://zenzic.io/cam-pathfinder/>

1 Introduction & methodology

Introducing the LMT portfolio

- 1.1 The LMT portfolio comprises seven grant-funding programmes spanning a range of technologies and transport modes (including rail, road and maritime). The programmes are: the Zero Emission Heavy Goods Vehicle and Infrastructure Demonstrator (ZEHID); the Maritime Decarbonisation programme; the Commercialising Connected and Automated Mobility (CCAM) programme; the Tees Valley Hydrogen (TVH) Transport Hub programme; the Rail First of a Kind (FOAK) programme; the Net Zero Propulsion programme (NZP); and the Transport Decarbonisation Demonstrator (TDD).
- 1.2 The programmes vary in objectives, size, complexity and duration. Projects range from single applicant six-month feasibility studies costing around £25k, to four-year multi-partner collaborative research and development (R&D) projects costing millions.

Purpose of this report

- 1.3 Steer-ED and Technopolis were commissioned by IUK, in partnership with the Department for Transport (DfT) to conduct a monitoring commission on behalf of the LMT portfolio and the constituent seven programmes.
- 1.4 This report is one of seven LMT programme reports, and focuses on the CCAM programme. It presents final findings synthesised from a range of evidence sources, described below.

Introducing the CCAM Programme

- 1.5 The CCAM programme sought to advance the deployment of connected and automated mobility (CAM) technologies in the UK. This was the only programme in the LMT portfolio where funding is provided by the Department for Business and Trade (DBT).
- 1.6 The programme comprised two parts: a Deployment strand (6 projects⁴, £42m in grant funding) aimed to demonstrate connected and automated passenger and goods vehicles; while a Supply Chain strand (13 projects, £18m) aimed to develop specific technologies or capabilities that address gaps and barriers to scale-up in the UK CAM supply chain. £1.5m was also awarded for Mass Transit Feasibility Studies under the programme, but these projects are out of scope for the current study.
- 1.7 All projects started between March and September 2023, and were expected to conclude before April 2025 – although most projects have since been extended, reflecting the safety-critical, regulatory-dependent nature of the technology development across the portfolio. The last project will now finish in March 2026.

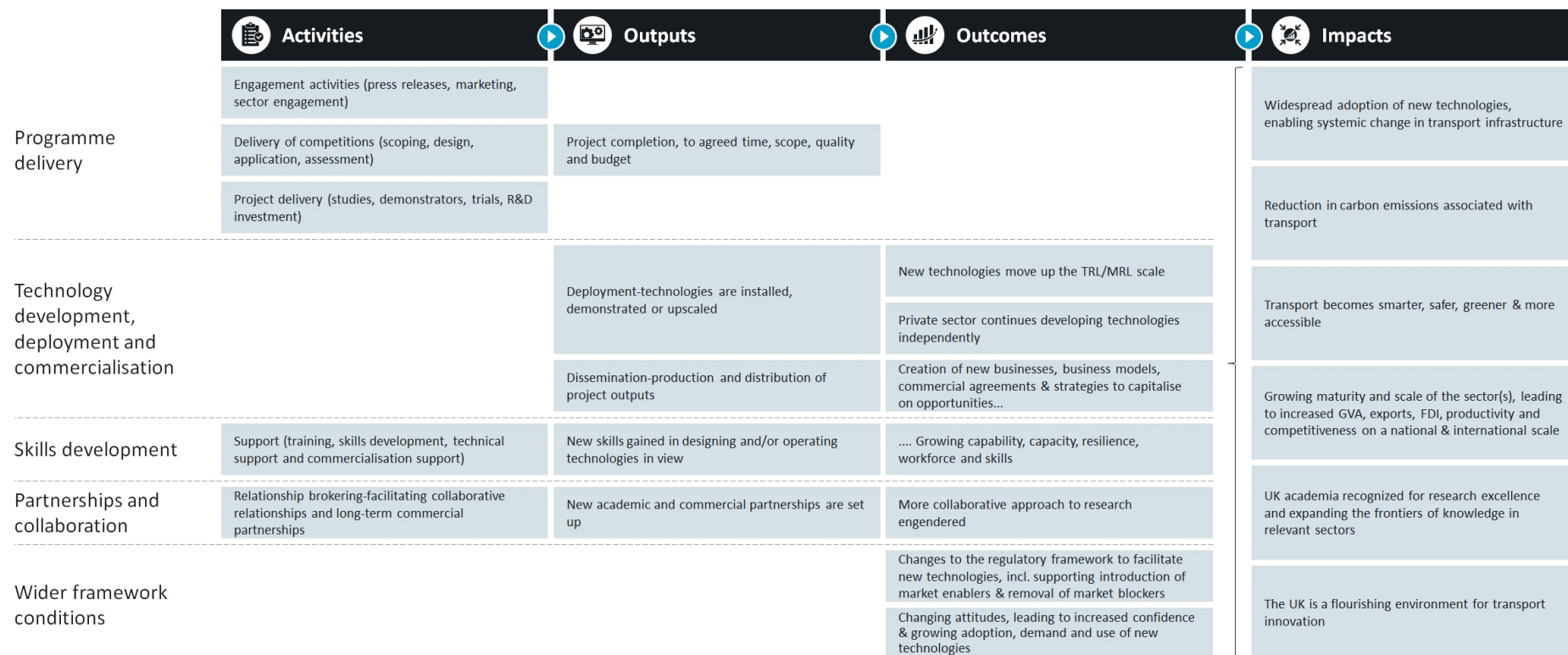
⁴ A seventh Deployment strand project (Hub2Hub) was terminated in January 2024 after delays to the build of a zero-emission hydrogen-electric autonomous HGV meant that trials would not be possible within the project timelines. Alternative options (e.g. use of alternative test vehicles and sourcing from overseas suppliers) were explored, but no feasible way forward was found.

Monitoring approach adopted

The LMT portfolio monitoring framework and logic model

- 1.8 This programme level report (and the wider LMT monitoring framework) is structured around the portfolio logic model, presented in Figure 1-1. This shows the causal relationships between activities conducted and how those are expected to lead to long-term programme impacts, via outputs and outcomes. The logic model is divided into five themes, reflecting five key underlying mechanisms: programme delivery; technology development, deployment and commercialisation; skills development; partnerships and collaboration; and wider framework conditions. Each of the chapters of this report is titled after one of these themes, providing a structured exploration of the causal mechanisms.

Figure 1-1: LMT portfolio high-level logic model

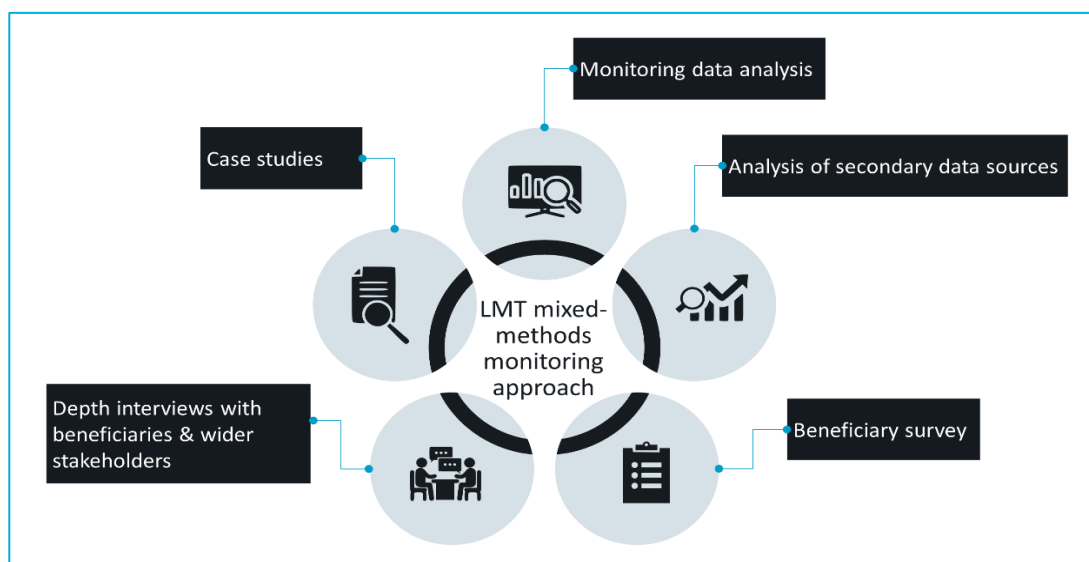


Source: Steer-ED and Technopolis, 2024

Sources of evidence utilised

- 1.9 Fieldwork was conducted over a three-year period and structured into three Waves of activity, referred to as Waves 1, 2 and 3, with the following timescales:
- **Wave 1:** Fieldwork took place between July and August 2024.
 - **Wave 2:** Fieldwork took place between July and September 2025.
 - **Wave 3:** Fieldwork took place between January and February 2026, focusing mainly on the extended CCAM projects.
- 1.10 This final CCAM programme report brings together evidence collected across all three Waves⁵, providing a consolidated account of findings to date. This final version builds on the Wave 2 CCAM programme report and incorporates newly available evidence from Wave 3 through updates to the text.
- 1.11 Figure 1-2 below sets out the five types of evidence collection utilised for this monitoring commission. These evidence strands were selected in order to provide a broad and deep understanding of the portfolio, triangulating across a range of qualitative and quantitative research methods, and gathering inputs from a range of different perspectives.

Figure 1-2: Sources of evidence utilised within the monitoring approach



Source: Steer-ED, 2024

- 1.12 A detailed description of the scope and coverage of methods deployed across the portfolio is given in Appendix A and briefly summarised below for the CCAM programme.
- 1.13 **Monitoring data analysis** – spanning three data sources: applicant information data, Quarterly Monitoring Scores (QMS)⁶ (latest scores available as of January 2026), and the Impact Management System (IMS) (data as of 3 February 2026).

⁵ Wave 1 research helped form the foundation for the subsequent Waves. While it provided important context, the findings presented in this report are mainly derived from Waves 2 and 3.

⁶ QMS scores are provided by MSPs as part of Quarterly Review Meetings (QRM) with each project.

- 1.14 **Analysis of secondary data** – including: Meltwater, a media monitoring platform to assess the public dissemination of LMT projects in the period from 12 August 2024 to 12 August 2025; and Dimensions, a database that provides patent and publication data⁷.
- 1.15 **Beneficiary survey** - An online survey of beneficiaries was developed (a range of multiple choice and free text questions). This was distributed to project leads and partners (enabling multiple responses per project) across all programmes each Wave. The response rates across all research Waves combined is presented within Appendix A. The response rates for Wave 2 and Wave 3 for CCAM were as follows⁸:
- **Wave 2:** There was a 73% response rate.
 - **Wave 3:** There was a 76% response rate.
- 1.16 It is important to highlight that the survey respondents from the three Waves differed. As such, while the findings offer valuable insights, they present a cross-sectional comparison rather than a longitudinal comparison across Waves.
- 1.17 **Depth interviews** – comprised one-hour depth interviews conducted with programme beneficiaries and a selection of wider stakeholders (knowledgeable industry stakeholders from both commercial and academic institutions).
- These interviews were undertaken during August-September 2025 in Wave 2, and January-February 2026 for Wave 3.
 - The number of interviews varied by programme, in accordance with the number of stakeholders involved. A total of 45 interviews were conducted across Waves 2 and 3 for the CCAM programme (with a further breakdown provided in Appendix A).
- 1.18 **Case studies** – three case studies have been undertaken for this programme (a total of 21 across the portfolio). For CCAM, the case studies selected covered the EvolvAD, Harlander and DriveSafe AI projects. Findings from these are presented as vignettes across this report and, with separate full write-ups presented within the appendices. All case studies have been reviewed by the programme’s independent panel of subject-matter experts, selected for their expertise.

Methodological considerations

While the data collected over the multiple waves of the study represents a rich longitudinal evidence set for such an early-stage innovation programme, the following considerations should be taken into account when reading the findings:

- **Many technologies are still at the early stages of development**, meaning long-term impacts have not yet occurred. Many impacts are unlikely to emerge until several years after projects have completed. This is particularly the case for innovation funding, where numerous steps occur between initial project funding and measurable market outcomes. The findings gathered at this early stage (even if project have

⁷ Based on metadata (as of 01/09/2025 for Wave 2 and 10/02/2026 for Wave 3) from Digital Science’s Dimensions platform, available at <https://ukri.dimensions.ai/>. Access was granted under licence agreement with UKRI.

⁸ The number of responses varies across questions because some beneficiaries did not complete every item. Throughout the report, the base number of responses is shown for each question.

closed) should therefore be considered indicative of a longer-term trajectory rather than conclusive.

- **Dependency on self-reporting:** although multiple sources of evidence have been examined, including consultation with wider stakeholders and industry experts, there is nonetheless an emphasis on understanding impacts via discussion with – or reporting by – project beneficiaries. Beneficiaries may sometimes emphasise positive outcomes or focus less on challenges, thus resulting in findings which could overstate the true impact of the portfolio. Wherever possible, the views of wider stakeholders and industry experts have been considered alongside beneficiary viewpoints to mitigate this risk.
- **Heterogeneity of the portfolio:** The programmes within the portfolio vary significantly in terms of scale, technology, and commercial readiness. Applying a consistent methodology across the seven programmes is therefore challenging. To address this, Steer-ED and Technopolis sought to achieve a balance between providing consistent research tools across the portfolio, while also allowing for some tailoring to reflect the differences between programmes.
- **Survey fatigue among respondents:** Repeated surveys of beneficiaries can lead to fatigue, causing lower response rates or incomplete responses and reduced data quality. This risk has been managed via briefing sessions with beneficiaries and proactive management of communications to ensure stakeholders understand the purpose of the research and benefits of participating. Across the portfolio, the beneficiary survey achieved overall project response rates of 51% in Wave 1, 66% in Wave 2 and 58% in Wave 3 which is still considered good representation (programme specific breakdowns are outlined in Appendix A).

Structure of this report

1.19 The remainder of this report is structured as follows:

- **Section 2: Overview of CCAM delivery** outlines the current status of the programme and presents evidence on the progress made.
- **Section 3: Building and strengthening partnerships through programme delivery focuses** on how CCAM has fostered partnerships across industry, academia and government.
- **Section 4: Development, commercialisation and deployment of new technologies** explores the progress made by CCAM projects in developing new technologies and progressing on the pathway to commercialisation.
- **Section 5: Growing skills and organisational maturity through programme delivery** assesses the impact of the CCAM programme on enhancing skills and growing businesses and organisational capacity and capability.
- **Section 6: Impacts on wider framework conditions and long-term outcomes** discusses the potential impacts of CCAM on broader industry and regulation.
- **Section 7: Conclusions & next steps** concludes the report.

2 Overview of CCAM delivery

Key messages

- The CCAM programme ran two competitions in 2022: The Deployment strand, seeking projects to transition technologies and services from research to real-world solutions; The Supply Chain strand, looking to develop specific technologies or capabilities to address gaps and barriers to scale-up.
- The process of applying to the programme was found to be appropriate and straightforward, although there were some calls for better tailoring to different types of organisation and different sizes of grant.
- £41m was awarded across 19 projects (6 Deployment, 13 Supply Chain).
- All projects were due to conclude by April 2025, but most (16/19) have since agreed extensions, reflecting the safety-critical, regulatory-dependent nature of the technology development. As of February 2026, two project were ongoing.
- Extensions have successfully enabled projects to continue delivery. At their latest quarterly assessment, 15 projects were found to be on track with milestones and deliverables (in line with newly set timelines where applicable), while 3 had slipped slightly (<3 months) and one had slipped by over 3 months.
- At their last assessment, nearly all projects were also considered on course to deliver all planned objectives. There were just four that might fail to fully deliver; reasons varied, including withdrawal of key project partners, supply chain difficulties, delay with technological development of vehicle components, and vehicle deployment running for a shorter period than originally anticipated.
- Other than a (~6 month) delay to award announcements, beneficiaries generally spoke very positively about their experience of working with IUK, including the support they received with tackling challenges encountered during delivery. Monitoring Service Providers were found to be helpful and supportive, while quarterly review meetings were also considered useful for addressing challenges.
- There were calls for more regular communication across CCAM projects, to share learnings, avoid duplication and ensure complementarity, as well as more direct interaction between IUK and (non-lead) project partners.

Introduction

- 2.1 This chapter provides an overview of the CCAM portfolio, outlining the objectives, timelines and key features of the programme, drawing on analysis of monitoring data plus insights from the beneficiary survey. It goes on to characterise the delivery progress across projects and offer insights from project delivery drawn from beneficiary interviews.

Introducing the programme

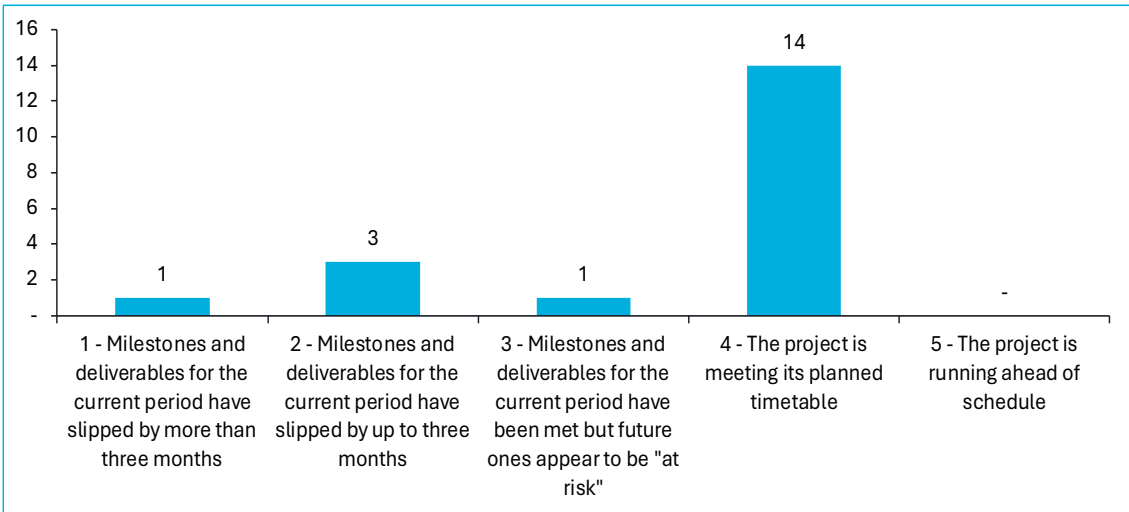
- 2.2 The CCAM programme sought to advance the deployment of CAM technologies in the UK. It comprised two parts:
- **The Deployment strand** - which aimed to transition CAM technologies and services from research to real-world solutions through phased activities like large-scale demonstrations, standardisation, and integration into urban and freight systems for passenger and goods.
 - **The Supply Chain strand** - which aimed to target early commercial self-driving vehicle opportunities and support the UK supply chain to grow and fill technology gaps necessary for their deployment. The programme required applicants to put forward projects which could strengthen the capabilities of the sovereign UK CAM supply chain, improve the safety and security of CAM, fill specific technology gaps, improve performance, reliability and scale-up opportunities in the UK and globally.
- 2.3 IUK worked closely with the Centre for Connected and Autonomous Vehicles (CCAV, a joint unit of DfT and DBT) to launch competitions for both strands in 2022. Successful applicants were announced in April (Deployment strand) and July 2023 (Supply Chain).
- 2.4 In total £60 million in grant funding was awarded across 95 partners delivering 19 CCAM projects. The 6 Deployment projects were awarded £42m in total, with 44 partners involved, while the 13 Supply Chain projects were awarded £18m in total with 51 partners.
- 2.5 Most CCAM projects (16 of 19) had their timelines extended (by between two months and a year, six months on average), reflecting the safety-critical, regulatory-dependent nature of technology development across the portfolio. As such, while all were originally expected to have concluded by April 2025, some are still ongoing. As of January 2026, 17 of the 19 projects had ended, while all are due to have concluded by March 2026.

Insights from project delivery

- 2.6 Quarterly Monitoring Score (QMS) data is provided by IUK MSPs as part of each project's Quarterly Review Meeting (QRM) to track project delivery progress. The latest available QMS data⁹ was used to investigate the extent to which milestones and deliverables for different CCAM projects have been achieved according to timeline.
- 2.7 Figure 2-1 shows that the majority of CCAM projects (15 of 19) were assessed as meeting their planned timetable (although this includes one that was at risk of future slippage). Just three projects were assessed with milestones and deliverables having slipped by up to three months, while one project was assessed with milestones and deliverables having slipped by more than three months. This is in the context of 16 out of 19 projects having already had their timelines extended, so the latest QMS assessment is based on the revised timelines and focused on progress during that quarter.

⁹ Obtained January 2026, although the dates of the latest reports on individual projects varies from March 2024 to January 2026 (as many projects have now closed).

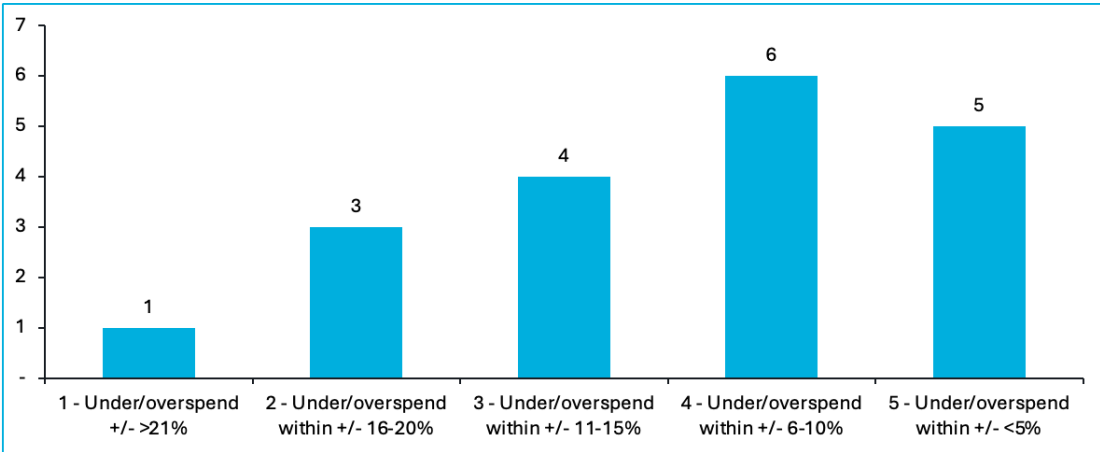
Figure 2-1: Current status of CCAM projects (n=19)



Source: QMS data (IUK), Steer-ED analysis (January 2026) (Answer options: Time Scoring Matrix, Scores 1-5)

2.8 QMS data also provides an assessment of how well CCAM projects were delivering against their budget (based on revised timelines). Figure 2-2 below shows that scores are spanning the entire range from one to five, with under half of projects (8/19) assessed as having over or under-spend of 10% or more. It is important to note however, that while some of the larger divergences from budget are definitely associated with resource issues or project delays, the notes alongside QMS data reveal that others are due to information not being filled out by all project partners on time, or provided in an unsuitable format.

Figure 2-2: CCAM project delivery against budget (n=19)

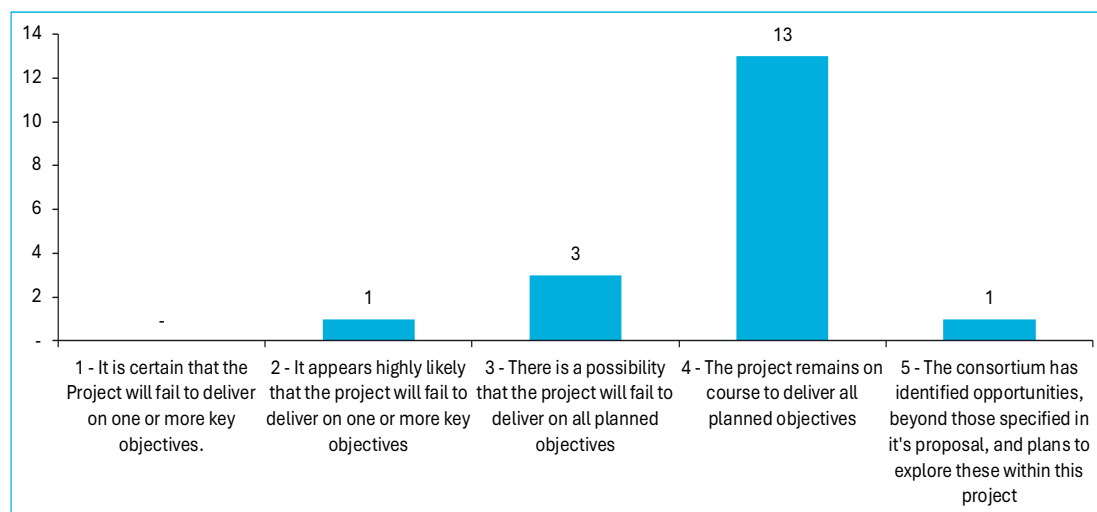


Source: QMS data (IUK), Steer-ED analysis (January 2026) Question: How well has the project been able to deliver against budget? (Answer options: Cost Scoring Matrix, Scores 1-5)

2.9 QMS data was also used to investigate the extent to which CCAM projects were successfully achieving their objectives at the time of their latest report. The portfolio is rated highly, with 13/18 projects assessed as remaining on course to deliver all planned objectives, and one having even identified opportunities beyond their original proposal. This demonstrates that project extensions supported participants in continuing their activities in alignment with overarching goals, ensuring sustained progress towards project objectives.

- Three projects (Harlander, PISA and TOAST) were given a score of 3, indicating a possibility that they would fail to deliver on all objectives.
- One project (CAVForth2) was given a score of 2, indicating that it appeared highly likely that the project would fail to deliver on one or more key objectives.
- Qualitative data reveals that the reasons in these four cases are varied, including withdrawal of key project partners, supply chain difficulties, delays with technological development of vehicle components and vehicle deployment running for a shorter period than originally anticipated.

Figure 2-3: CCAM project delivery against scope (n=18)



Source: QMS data (IUK), Steer-ED analysis (January 2026). Question: How well has the project delivered against its objectives? (Answer: Cost Scoring Matrix, Scores 1-5)

Insights from project delivery

- 2.10 This section goes on to report findings from beneficiaries regarding their experience applying for and delivering CCAM projects, collected via interviews.
- 2.11 CCAM beneficiaries generally reported that the application process was appropriate and relatively straightforward. Some had prior experience applying for IUK grants, and this familiarity aided in making the process easier to navigate (some even expressed that this application process was easier than for previous IUK grants). A small number found the resource requirements for developing an application to be onerous, and felt that there was some duplication in the information required in the application form and IUK portal. A few also mentioned that not all questions were suited for non-business organisations. One beneficiary also mentioned that some of the questions asked were too general for a technical project submission.
- 2.12 Some beneficiaries noted that the rigorousness of processes and requirements around supporting evidence did not scale with competition size – meaning that the requirements were the same whether submitting a bid for a small, simple project, or for a complex multi-million pound project. This led to applicants for some smaller projects feeling that the application process was not proportionate to the funding. Another beneficiary raised concerns around the weight placed on the pitch and felt that applications should be assessed using a joint scoring system between the pitch and original application.

- 2.13 Beneficiaries went on to report that IUK staff were highly supportive during project inception. Some projects encountered initial changes due to partners withdrawing or adaptations to the technical scope of the work. In these cases, IUK staff reportedly assisted in identifying suitable replacement consortium partners and demonstrated strong technical understanding in helping to refine and re-design the project. One beneficiary, however, mentioned that IUK was less flexible regarding changes to the financial reporting requirements, especially in relation to beneficiaries being able to adjust their rates during the reporting process.
- 2.14 Beneficiaries generally spoke very positively about the experience of working with IUK. Almost all interviewees brought up the role of Monitoring Service Providers (MSPs) – speaking positively about the help and support they provided and highlighting that they offered a valuable bridge between the project team and IUK. MSPs with strong technical understanding of projects were perceived as particularly valuable in helping to drive these projects forward. However, some were more personable and ‘hands on’ than others. One beneficiary also noted that, given the central role of the MSP, changing them during the project could be disruptive.

“We get good support. We have an excellent MSP who helps us and we have good contacts directly within the organisation. And I do have to say that the Innovate UK portal has improved dramatically in the last year.” – Wave 2 CCAM beneficiary interview

“I’ve worked with a couple of funding bodies in the past and Innovate UK is by far the easiest one to deal with. I tend to find that the Monitoring Service Providers are quite knowledgeable, and everybody is quite helpful.” – Wave 2 CCAM beneficiary interview

“When we had to do all the processes to get the project off the ground, Innovate UK have been great, they have been very helpful, easy to get hold of, supportive, provided all the guidance we needed.” – Wave 3 CCAM beneficiary interview

- 2.15 While CCAM beneficiaries generally spoke positively about their experience of working with IUK, there were a couple of opportunities for improvement identified by interviewees:
- **Delays in award announcements leading to project extensions:** CCAM beneficiaries noted delays of around six months in receiving award notifications, which had serious implications for projects – many having to be extended as a result.
 - **Lack of communication with project partners:** Whilst most project leads reported regular communication with IUK, wider project partners mentioned that they have not had any exposure to these meetings. Furthermore, some wider project partners reported feeling out of the loop and noted that they did not always receive regular updates on progress from project leads. It was suggested that having consortium wide meetings could help address these knowledge gaps.
- 2.16 Most beneficiaries felt that project monitoring expectations were reasonable, and reporting requirements were clear and easy to understand. Some had previous experience of delivering projects for IUK, meaning they were familiar with the expected deliverables and financial reporting requirements. Beneficiaries also felt that the

quarterly review meetings (QRMs) helped address challenges in a timely manner and provided them with regular opportunities to present progress and assess risks. However, a few noted that they had input to several different monitoring and evaluation exercises / requirements, which was felt to be burdensome. One beneficiary also mentioned that collating monitoring information across larger consortia could be more time consuming.

- 2.17 Beneficiaries felt that the financial management processes were straightforward, and that IUK had provided sufficient support with setting up the funding portal, budgets and forecasts at the project onset. Some beneficiaries also reported that the funding portal had been improved over time, making it easier to process claims and make claim adjustments. Some of the portal options had also been automated, which was considered helpful. One suggestion for further improvement was to receive email notifications, instead of having to log into the portal daily to see whether any claims had been approved. Some beneficiaries interviewed in Wave 3 also reported that financial reporting requirements had become more detailed recently, with claims being subject to increased levels of scrutiny.
- 2.18 A small number of beneficiaries mentioned that the Zenzic levy felt a little high, given the value that had been delivered for their project so far. One beneficiary, for example, noted that Zenzic had not proactively identified or suggested promotional or dissemination opportunities, whereas IUK was perceived as more effective in promoting projects to wider audiences at events such as Cenex Expo. However, others highlighted that they would rely heavily on Zenzic in future in terms of promotion and improving public perceptions. Others had already been receiving active support from Zenzic, with one specifically highlighting strong assistance in project management.
- 2.19 There were several key barriers to delivery that were mentioned across beneficiaries:
- **Project timelines** – many stated that the delayed announcement of successful applications, combined with already short timelines, reduced the feasibility of the technology complex project activities proposed. The extensions given across most projects reflected this challenge.
 - **Partners** – some beneficiaries highlighted the challenges for consortia that had lost partners or key staff during the course of their project, and the difficulties and knock-on effects of finding replacements with similar expertise and capabilities.
 - **Technology** – A small number of beneficiaries highlighted particular challenges with developing a specific technology, which caused delays or a need for project redesign.
- 2.20 Despite these challenges, most beneficiaries were positive about their progress and achievements. Key factors behind this success included:
- Collaborative working and ongoing technological and operational learning.
 - The ongoing support from IUK throughout project delivery.
 - Finding creative solutions to challenges (within the partnerships and with IUK).
 - Extended project timelines, enabling consortia the space to overcome difficulties.
- 2.21 Wave 3 fieldwork indicated that project extensions were crucial for beneficiaries, as they provided additional time to replace withdrawn project partners, identify new suppliers where necessary, and dedicate further time and resource to the technical development of their projects, while still allowing sufficient time for testing and deployment.
- 2.22 Beneficiaries had also drawn multiple lessons as a result of their participation in the CCAM programme. Better planning ahead of project activities was identified as a key

strategy to avoid project delays in future, including incorporating more realistic timelines for product testing and development and allowing sufficient time for identifying potential customers. Another important lesson was to do with more regular communication with other CCAM projects to share learnings, avoid duplication and ensure complementarity. A lot of important lessons were also drawn regarding partner choice and ways of working. Some leads mentioned that their projects would have benefitted from better stakeholder and supply management and clearer definition of project roles and responsibilities to ensure future projects ran more smoothly.

Conclusion

- 2.23 The CCAM programme has supported 6 Deployment and 13 Supply Chain projects.
- 2.24 The application process was found to be appropriate and straightforward by most beneficiaries, although there were some calls for better tailoring to different types of organisation and different sizes of grant (i.e. proportionality in requirements).
- 2.25 There were delays to the award announcement, shortening already tight project timelines, and further challenges have been faced during delivery (e.g. the loss of a partner on several projects). However, most project agreed extensions to their timelines (of two to 12 months), and this proved essential in enabling projects to achieve their objectives.
- 2.26 Most projects have achieved, or are on track to achieve milestones, deliverables and objectives (based on revised timelines). At their latest assessment, just four projects were at risk of not fully delivering, due to challenges with the loss of partners, supply chain difficulties, delay with technological development of vehicle components, or vehicle deployment running for a shorter period than originally anticipated.
- 2.27 Beneficiaries (both leads and those partners with exposure to IUK) generally spoke very positively about their experience of working with IUK, the support from Monitoring Service Providers, and the quarterly review meetings. However, there were suggestions made for more regular communication across CCAM projects, as well as more direct interaction between IUK and (non-lead) project partners, plus request for further simplification and streamlining across different monitoring and reporting requirements.

3 Building & strengthening partnerships through programme delivery

Key messages

- The CCAM programme has enabled the formation of large numbers of new partnerships within the project consortia, as well as helping to further develop others. It has brought together organisations that would not have been able to work together without the IUK funding.
- The project partnerships have provided direct access to potential customers and suppliers, as well as various complementary skills and expertise. Beyond formal partners, projects have also involved interactions with policy and regulatory bodies, bringing in wider knowledge and understanding.
- The consortium relationships were rated highly by most CCAM beneficiaries, with consultees reporting good collaborations and collective hard effort to overcome challenges and deliver against objectives. Good coordination and management of the consortia was seen as key, as well as regular and open lines of communication.
- Issues within the partnerships have mainly arisen where partners have gone into administration or are for some other reason no longer able to participate. However, a small number of beneficiaries also complained about partners not fully pulling their weight, or not keeping to timelines.
- Through the CCAM projects, ideas have been shared, trust has been built, and relationships have been strengthened. Routes to market and commercial opportunities have also become clearer where projects have involved potential customers and users.
- Many beneficiaries also mentioned that they expect to continue to work with their CCAM partners beyond the programme duration. Some have even started bidding together for other automated mobility funding, both in UK and Europe.

Introduction

- 3.1 A key objective of the LMT portfolio is to encourage a more collaborative approach to research through fostering new academic and commercial partnerships. As a result, CCAM applicants were required to deliver projects in partnership with at least one other organisation. Participating organisations could include businesses, charities, academic institutions, public sector organisations and research and technology organisations.

- 3.2 This chapter sets out the role that project delivery has played in building and strengthening partnerships between industry, academia and regulators. It explores the mechanisms through which new partnerships were formed, and the CCAM programme's contribution to strengthening these relationships. It goes on to describe beneficiaries' accounts of the types of partnerships formed and their anticipated (or realised) benefits.

Exploring the role of programmes in partnership development

- 3.3 Responses to the beneficiary survey indicated that the majority of CCAM beneficiaries (78% in the Wave 2 survey, 75% in Wave 3) had formed one or more new partnerships through the programme.
- 3.4 The latest IMS data suggests that just under one fifth (19%) of CCAM beneficiaries reported that they had received support from the IUK Business Connect service (formerly known as the Knowledge Transfer Network), which aims to form new connections between innovators and potential partners. However, in interviews, the Business Connect service did not emerge as a key driver of new partnership formation. Indeed, most beneficiaries mentioned finding CCAM project partners through their existing networks.
- 3.5 Although beneficiaries were often aware of their partner organisations and their expertise beforehand, the project was reported to have helped cement and formalise these partnerships, with these organisations working together towards a common goal. Some also highlighted that even though they were previously well aware of the business commonalities between their work and their partners', the partnership would not have happened without IUK funding because of the substantial investment, time and resource requirements involved.

"The project wouldn't have happened without the funding. There is no way the partners would have been brought together. It means our partner would never have had the opportunity to bring the vehicles to start testing and developing in the UK." - Wave 2 CCAM beneficiary interview

"For us to deliver this project, we needed partners. And the only way we could afford to bring those partners on board and in a way that was sufficiently low risk for us, was to use collaborative R&D. Without it, we would have produced a much smaller output." – Wave 3 CCAM beneficiary interview

Types of partnerships formed, and how they have been used

- 3.6 Beneficiaries described the types of partnerships formed or strengthened through working together on CCAM projects. These included:
- **Partnerships with potential customers:** relationships with organisations who may become future customers of the technology being developed. For the Demonstrators strand, their role on the project typically related to testing the technology in a real-

world environment, or helping to specify requirements for the product. This type of partnership gave the opportunity to better understand customer requirements and provide confidence in the technologies being developed.

- **Partnerships to provide technical support or additional capacity:** relationships with specialist consultants, testing facilities, or academics who could provide advice or technical support to specific areas of technology development. For example, some project leads partnered with organisation who could carry out safety assurance, route-hazard assessment or provide vehicle cybersecurity expertise. Several interviewees also mentioned working closely with the Connected Places Catapult (CPC), which is the UK's innovation accelerator for transport, the built environment, cities and local growth (e.g. the CPC data and digital team worked on one CCAM project to help develop a low-cost, high-definition road map using aerial imagery).
- **Partnerships with potential suppliers:** For the Supply Chain strand, relationships with organisations who could manufacture the technology itself or components of it, such as technology companies and established automotive players. Beneficiaries also discussed building relationships with potential subcontractors who could provide additional capacity or capability on future projects.
- **Partnerships with regulators:** Relationships with regulatory or semi-regulatory bodies or those with more in-depth knowledge around the regulatory environment, who could help ensure that the technologies being developed are compatible with current regulations. These were often not formal project partners, with beneficiaries pointing to IUK, DfT and CCAV, as well as Zenzic (which was established by government to coordinate the CAM ecosystem and facilitate supply chain growth).

- 3.7 In the Wave 2 survey of CCAM beneficiaries, 89% rated their consortium relationships as 'good' or 'very good'. The more recent Wave 3 survey results were even more positive, at 94%. Similarly, in interviews, most beneficiaries were positive about the quality of the partnerships and regularly highlighted that individual consortium members had worked hard to deliver project outputs and achieve the originally set objectives.
- 3.8 Some of the partners had experience of working together in the past, which helped strengthen their partnership, while others reported making active efforts to effectively engage and work with new organisations. Some beneficiaries also mentioned that their partners had worked on IUK projects before which then made the collaboration easier due to the common understanding of project requirements.
- 3.9 Project leads reported that adopting an interactive approach was particularly helpful, such as engaging in regular communication with partners and even coaching where necessary. Open communication, knowledge sharing and clear definition of roles were also mentioned as key factors for a positive working relationship amongst consortia.
- 3.10 Some challenges were also identified. For instance, beneficiaries noted that not all partners were equally willing to collaborate, and some struggled to keep to project timelines. Furthermore, a number of projects experienced delays as a key partner either went into administration or could no longer participate. In those instances, new partners had to be found last minute, while delivery pressures also meant that there was less time to establish collaborative ways of working with new consortium members.

"Although we are a large consortium we are all focussed on the project objectives and work very effectively as a unit." – Wave 2 CCAM beneficiary survey

“The quality of relationships between project partners was very good throughout the project. The consortium worked in a collaborative and transparent way, with clear roles, regular communication and a shared commitment to delivery.” – Wave 3 CCAM beneficiary survey

- 3.11 Many beneficiaries confirmed through interview that relationships had evolved and strengthened as a result of their CCAM project. They explained that the process of working together helped to give a more tangible reason to engage, provided opportunities to connect and share ideas over challenging technological problems, helped to formalise relationships, or gave a better understanding of one another’s organisations.

“This was really the first time where the project partners work together and we did have a tangible output which was the integration of our systems into a vehicle for the demonstration phase, and I think it is safe to say that we did achieve some very good targets and goals.” – Wave 2 CCAM beneficiary interview

“Generally, the project has been very well run. There have been challenges which have led to some tension, but all project partners have acted professionally to collaboratively resolve issues as they have arisen. Many of the challenges have been outside of the control of the project partners, but we have worked hard to positively influence a successful project outcome. – Wave 3 CCAM beneficiary survey

- 3.12 The Wave 2 survey also found that a majority of beneficiaries (76%) believed that their relationship with consortium partners had grown stronger over the previous year. They explained that working closely with their project partners enabled them to understand individual organisational capabilities in terms of skills and expertise, which led to building trust and strengthening the relationship.

“By participating in the Harlander project, Oxa have significantly strengthened its relationships with key Original Equipment Manufacturers (OEMs) and ecosystem partners, which will enable successful collaboration in the delivery of future projects and provides a clear path for expansion on a regional scale beyond this initial public transport service e.g. industrial deployments.” – Wave 2 CCAM beneficiary interview

Beneficiary perspectives on the benefits of partnerships

- 3.13 Beneficiaries were asked to further explain any benefits realised because of partnerships formed or strengthened through their project. The three main themes mentioned were:
- **Commercial opportunities** – partnerships with potential customers and/or collaborators meant that beneficiaries had a clearer route to market, and the ability to gather intelligence on customer requirements, such as that they could ensure the

technology being developed was well-suited to the needs of their potential customers. For instance, one CCAM programme beneficiary stated:

“We are benefitting commercially from the partnership and are actually working through contracts at the minute with a couple of organisations. Whilst conversations or relationships were a little tentative in the early stages, we are now very much working hand in hand with partners to commercialise” – Wave 2 CCAM beneficiary interview

- 3.14 **Promoting project findings** – Working jointly with universities and academia, has ensured that project findings are captured in academic papers, and helped to promote these findings more widely. Project findings have also been successfully captured and promoted in trade press and social media. One CCAM beneficiary mentioned:

“A university is one of our partners in a large consortium and they published three papers so far. We are just holding out until we have the vehicles running on the ground until we distribute the papers.” – Wave 2 CCAM beneficiary interview

- 3.15 **New skills/knowledge accessed via partners** - which provided valuable inputs to the project, making it more likely that the technology would be successful, would fit regulatory requirements, and would meet the needs of potential customers. Beneficiaries explained that a wider and stronger set of partnerships provided opportunities to test out ideas and also provided access to contacts who could help when challenges arose during project delivery. One CCAM project partner stated:

“We have observed an increase in the technical maturity of the lab demonstrations of the product because of how we work with different project partners.” – Wave 2 CCAM project partner

- 3.16 CCAM beneficiaries also mentioned some examples of how partnerships developed during the programme can be of potential use in future. For instance, many mentioned that they expect to continue to work with their partners beyond the programme duration. Some have even started bidding for new projects in the area of automated mobility, both in the UK and Europe. The programme was also felt to have successfully influenced access to the wider CAM ecosystem which might lead to future engagements between project partners and leading Original Equipment Manufacturers (OEMs), customers and supply chain companies that have not been directly involved in the projects. Some beneficiaries also mentioned increased interest in their technology internationally.

“Through the project we have got relationships with universities, and with people who do digital twinning and related technology. The whole ecosystem is bigger because of the project – including customers and supply chain. And the biggest thing we have done as a result is to develop new use-cases.” – Wave 2 CCAM beneficiary interview

“We remain in regular contact with most of our consortium partners and are jointly exploring new funding opportunities.” – Wave 3 CCAM beneficiary survey

Case study vignette showcasing partnership development and the benefits to the project/organisation

Building upon previous Nissan research, *evolvAD* (see full case in Appendix B) is a £3.8 million initiative funded via the CCAM programme that aimed to develop an automated vehicle (AV) capable of safely driving in residential, urban, and rural environments. The five project partners focus on high definition map generation and validation, alignment with multiple complex operational design domains and improving interactions in complex urban environments with vulnerable road users.

The project was supposed to run for 21 months, between July 2023 and March 2025, but was granted a 12-month extension until March 2026 to deliver an additional work package focused on commercialisation of the technology.

Nissan’s role is to lead the development of the connected and autonomous vehicles (CAV) trialled for the project: however, working with partners allowed it to expand the technology and build knowledge in the following areas:

- Applying advanced machine learning techniques to generate high-definition maps of aerial imagery (Connected Places Catapult)
- Using facial recognition technology and helping decipher pedestrian intentions e.g., what is the probability of a pedestrian crossing the road (Humanising Autonomy)
- Providing onboard cybersecurity and an advanced safety case for taking the driver out of the vehicle (SBD Automotive)
- Developing vehicle system validation processes utilising infrastructure on the Smart Mobility Living lab (TRL).

According to Nissan, one of the key project outcomes was building stronger rapport with its partners, universities and other experts from the wider CAM community. For instance, the team held conversations and shared experience with Zenzic and the Advanced Propulsion Centre UK – two organisations who worked together to launch a new future mobility accelerator. Nissan also worked closely with government and trade bodies, including with IUK, the Auto Council, the Society of Motor Manufacturers and Traders, DfT and DBT, leading to increased understanding of national regulatory practices and how to provide critical insights to policymakers. They also worked with Leeds University, Cranfield University and Nottingham University through the project, and will continue to preserve these relationships in future

The Nissan research team built a better understanding of the work and expertise of their project partners, which helped gain insight on which organisations they might want to include in future projects. This was considered particularly important as Nissan approaches its commercialisation stage. The project is also now attempting to identify local partnerships that can support commercialisation activities.

Conclusion

- 3.17 A key objective of the LMT portfolio is to encourage a more collaborative approach to research through fostering new academic and commercial partnerships.
- 3.18 The CCAM programme has enabled the formation of large numbers of new partnerships within the project consortia (78% of beneficiaries surveyed in Wave 2 were working with at least one new partner), as well as helping to further develop existing ones (76% of Wave 2 survey respondents reported a strengthening of relationships with partners over the past year). It has brought together organisations that would not have been able to work together otherwise. It has provided direct access to potential customers and suppliers, as well as various complementary skills, expertise and insight across different partner organisations and with other organisations outside of the formal consortia.
- 3.19 Partner relationships were rated highly by most CCAM beneficiaries, with consultees reporting good collaborations and collective hard effort to overcome challenges and to deliver against projects objectives. Good coordination and management of the consortia was seen as key to this, as well as regular and open lines of communication across the partners. Where issues have arisen, this has tended to relate to situations where organisations have no longer been able to participate, and have withdrawn mid-delivery.
- 3.20 Through the CCAM projects, ideas have been shared, trust has been built, and relationships have been strengthened. Routes to market and commercial opportunities have also been identified. Many beneficiaries also expect to continue working together beyond the programme, with some already collaborating on follow-up initiatives.

4 Development, commercialisation & deployment of new technologies

Key messages

- CCAM project activities have helped progress technology readiness levels. The great majority (89%) of beneficiaries report an increase in TRL from the time of application (an increase of 2.4 levels on average). However, less than a third report reaching TRL 7 or higher, and most are still some way from commercialisation.
- A total of 22 new patents have now been reported as a result of the CCAM programme (across 14 beneficiaries), with further patents expected in future.
- Between August 2024 and August 2025, 13 of the 19 projects were picked up in news and social media (on average 44 media items each), with projects that are more advanced and / or that are more user-facing tending to gather more attention. Project Harlander (a passenger shuttle service) is a standout case – it was featured in nearly 300 news items in 12 months.
- One-third of all CCAM beneficiaries expect their organisation to bring a new product, service or process to market within the next two years as a result of project involvement. Some are already close to commercialisation and/or have a clear pathway mapped out. Around 10% of those surveyed in Wave 2 had already launched new products or services into the market.
- Potential barriers to commercial development highlighted by participants included a lack of public acceptance of CAM technologies and a lack of market demand (partly as a result), difficulties in securing commercial funding, and a need for secondary legislation (relating to the Automated Vehicle Act) to provide regulatory clarity.

Introduction

- 4.1 This chapter explores the extent to which CCAM projects have been successful in developing and deploying technologies, and progressing towards commercialisation.

Reported TRL progression across projects, and mechanisms driving this

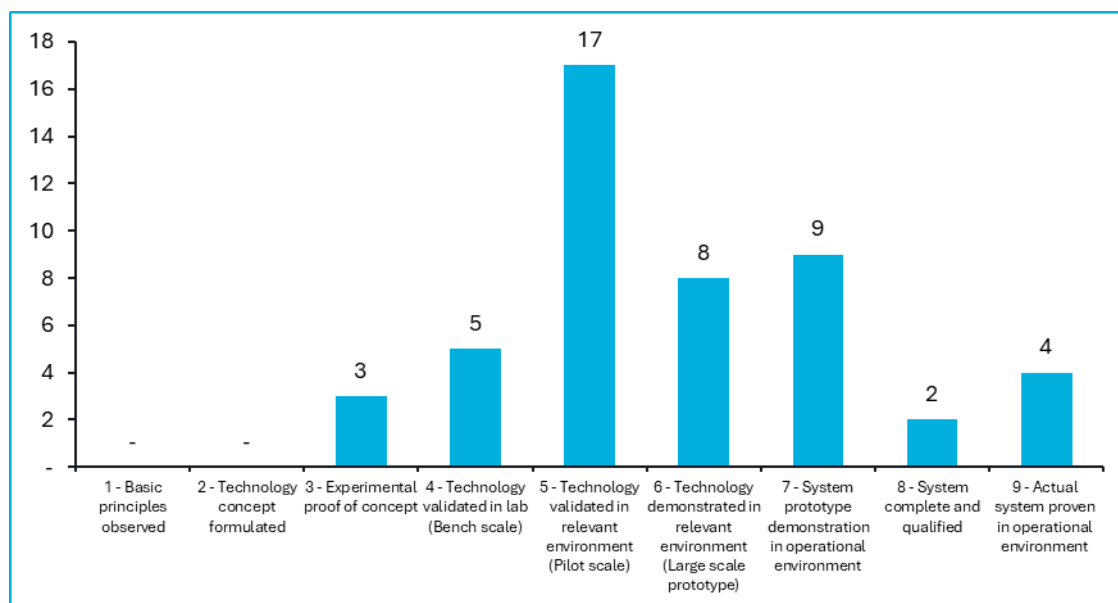
- 4.2 The Technology Readiness Level (TRL) scale provides a recognised approach for assessing the stage of technological development of an innovation. It runs from the early principles stage of a project (TRL1 = ‘basic principles observed’) through laboratory testing (TRL6 = ‘technology demonstrated in relevant environment’) to the technology being ready to deploy (TRL9 = ‘actual system proven in operational environment’). As such, although subjective, self-assessed TRLs provide a valuable indication of the status of projects, and the technological advancement that has been made via project delivery.
- 4.3 In interviews with beneficiaries, there was a clear rationale for how project activities were helping to progress the technology up the TRL scale – for example developing new software and hardware solutions, advancing cybersecurity, drafting risk assessments and use cases, and mainly conducting testing and deployment in virtual, controlled and real-world environments (especially for the Deployment Strand). Beneficiaries were able to express clearly how the project activities being undertaken were helping advance the technology in question. Beneficiaries interviewed in Wave 3 also emphasised the importance of the extension period in allowing them to continue technology development while still having sufficient time for testing and deployment, which was crucial for building customer and user confidence.

“We are working with other partners on the ground to do some physical testing of the OEM vehicle and create a virtual twin model in order to test it in the virtual world as well. With the virtual model, we can input a scenario and run thousands of simulation models regardless of the weather and setting conditions.” – Wave 2 CCAM beneficiary interview

“A lot of progress was made, we are now deploying parts of our advanced driver assistance systems, and that is a very rapidly growing area of the business for us. We are very much focused on the verification and validation and testing of these systems, so that we can support the technology providers and OEMs in understanding how safe their system is.” – Wave 3 CCAM beneficiary interview

- 4.4 In response to the Wave 2 survey conducted in 2025, beneficiaries were asked to report on the current TRL of their technology. As shown in Figure 4-1, all of the respondents reported progression to level 3 or higher on the TRL scale, with the great majority (83%) reporting being at level 5 or above. However, only four of the respondents reported having a system proven in an operational environment (TRL 9). This included Oxford RF Ltd (for the Sim4CAMSens project), IPG Automotive (SCALE), ANGOKA (Harlander) and Boldyn Networks (SAMS). Most technologies, however, are still some way from market.
- 4.5 Beneficiaries were also asked through the survey to indicate TRL levels at the time of application, but only three responses were given. In two of these cases, the TRL level had risen (4 to 6; and 6 to 8), while in the other it had remained the same (7).

Figure 4-1: Reported current TRL of CCAM projects (n=48)



Source: LMT beneficiary survey (Wave 2), Steer-ED analysis (September 2025), Question: With reference to the TRL scale, what is the TRL of the technology now? (Answer options: Numeric (1-9), Unsure)

- 4.6 CCAM beneficiaries were also asked about TRL levels again in the Wave 3 survey conducted in January 2026. This time, 27 beneficiaries provided information on TRL levels both at the application stage and currently. A substantial majority (89%) reported an increase in TRL (of between 1 and 7 levels, 2.4 on average), while two respondents (7%) reported no change and just one reported a drop (from TRL 6 to 5).
- 4.7 The Dimensions data source currently shows no patents associated with any of the CCAM projects so far. However, the latest self-reported IMS data shows that 22 new patents had been created as a result of the CCAM programme (across 14 beneficiaries).
- 4.8 In the Wave 2 beneficiary survey, respondents were also asked how many patents were currently held in relation to their project and how many they expected to hold in three years' time. Although only 6% (3 respondents) reported holding a patent in the Wave 2 survey, this was anticipated to rise to 27% within the next three years, demonstrating that a subset of beneficiaries expected their technology to develop to a point where it is sufficiently advanced and commercially valuable.
- 4.9 These expectations are starting to materialise already; when surveyed again in January 2026 (Wave 3), a substantially larger proportion of beneficiaries (35%, or 9 respondents) reported now holding a new patent as a result of the programme.

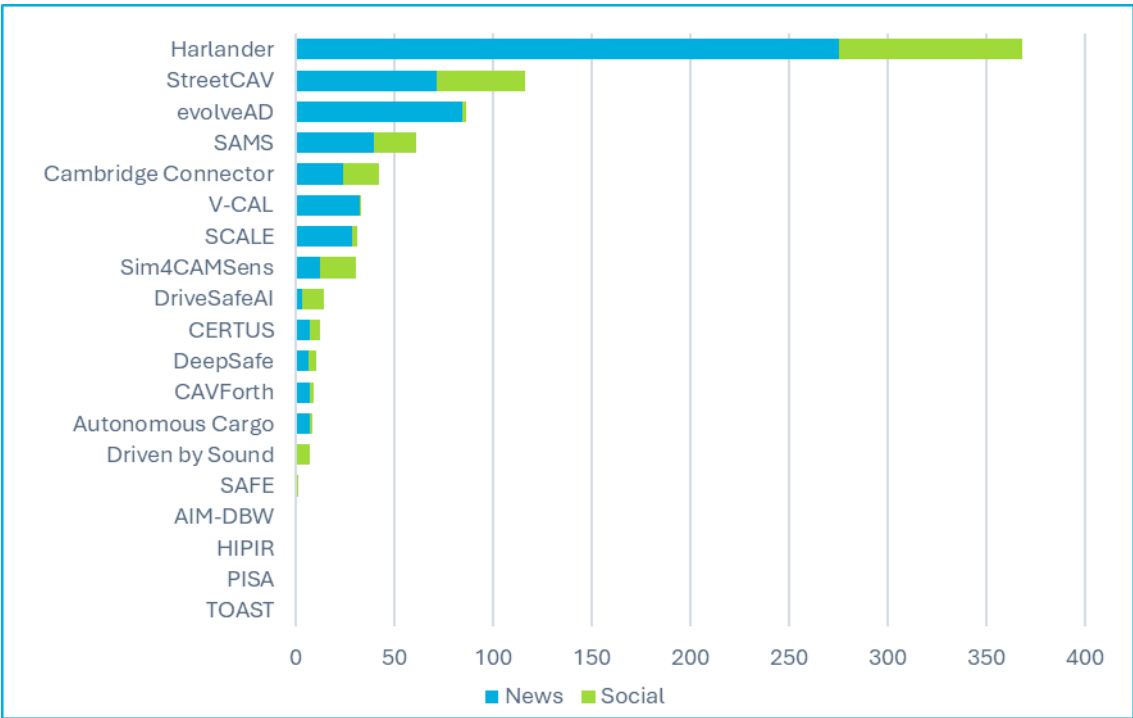
Intellectual property and information dissemination

- 4.10 Dissemination via production and distribution of project outputs is one of the expected outcomes from the CCAM programme. Over half (54%) of Wave 2 survey respondents indicated that their CCAM projects had already been featured in news reports and trade press, while 43% reported being featured in blogs and 25% in academic journals.
- 4.11 Wave 3 survey results show that dissemination activities continued during the project extension period, with an increased proportion of beneficiaries now reporting their

projects being featured in different outlets (66% reported news reports, 63% trade press, 47% blogs and 28% academic journals).

- 4.12 We further explored mentions of LMT projects in the media (news media, trade press, industry publications, social media, blogs, and other sources) using the Meltwater platform, with searches undertaken for each of the CCAM projects based on keywords, and covering the period between August 2024 and August 2025.
- 4.13 Figure 4-2 shows that media items were found for 15 of the 19 projects in the CCAM portfolio. This included 828 media items in total, so an average of 55 items per project (across these 15 projects). Most of the media items found were news items (72%), while social media posts accounted for 28%. It is important to note that interviews with beneficiaries suggested that a substantial amount of further social media activity was planned for when demonstrations had taken place, or at project close.
- 4.14 Perhaps unsurprisingly, the analysis suggests that CCAM projects that are more user-facing tended to gather more press than those that were focused on optimising systems or supply chain development. In particular, Project Harlander (a project developing an automated passenger shuttle service in Belfast, which is explored in more detail in case study B) stands out with 368 items. This is likely to reflect Harlander’s strong engagement with media outlets and clearly defined communications strategy.

Figure 4-2: Media coverage of CCAM projects



Source: Meltwater data, Technopolis analysis (data collected August 2024 to August 2025).

- 4.15 Many beneficiaries also highlighted building strong industry-academia collaborations, which will help disseminate findings via producing academic articles. The Dimensions data source records six academic articles resulting from CCAM projects so far (August 2025). It is important to note, however, that not all projects were finished at this point and that there is also often a lag between project completion and academic publication, due

to long periods of peer review and feedback. Therefore, more academic articles are expected in future.

- 4.16 More generally, project partners regularly highlighted during interviews that they are working closely together to disseminate any emerging findings by developing project-specific webpages, producing social media content or attending industry conferences.

“We work on our LinkedIn profile, and we have our own dedicated section on our website, trying to showcase our capabilities, and the project work that we have done. As part of the project deliverables, we also had to produce a white paper, and we are trying to do marketing online as well as trying to look at forums and conferences.” – Wave 2 CCAM beneficiary interview

“Our project launch became a novelty. People came to see it, universities, with a lot of visitors and media attention. We had national and regional media attending; we had reporters and influencers. We have a very good marketing department, who did a great job at promoting the event.” – Wave 3 CCAM beneficiary interview

Commercial progress made by organisations

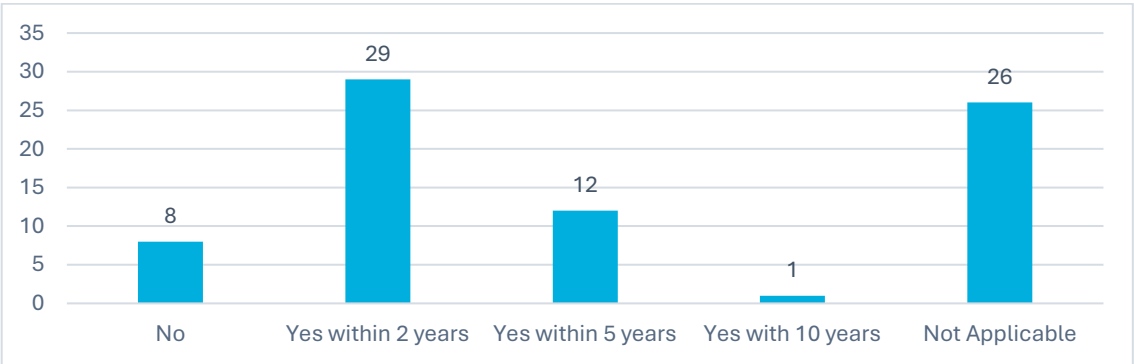
- 4.17 Beyond technological progress, a key objective of the CCAM programme is that the technologies being developed eventually become commercially viable products that not only achieve market success, but also address key transport challenges facing society.
- 4.18 While some CCAM beneficiaries are already close to commercialisation and/or have a clear pathway mapped out – and are therefore engaging proactively in business development activities, others at lower TRLs (the majority of projects) reported that they were still concerned with developing the technology itself, and had not yet turned their attention to commercialisation activities.
- 4.19 Amongst the former, interviewees described the types of project activities that had contributed to commercial progression, some of which reinforce findings from the previous chapter regarding benefits of partnerships. These included:
- Providing an opportunity to **demonstrate the project in a real-world environment** and via the CAM Testbed UK, offering reassurance to customers through a tangible product and helping to generate interest and spread the word about CAM technologies. Demonstrations also helped showcase specific product applications and develop practical product experience of different road environments for usability.
 - Providing feedback from **trialling technology in an operational context** through demonstrations, allowing refinements to the vehicle software and hardware design.
 - Helping to **identify potential new customers and develop relationships** with them, securing a pathway to a future customer base. For instance, some CCAM project leads partnered with potential customers and secured future contracts as a result.
 - **Engaging in promotional activities**, including commencing conversations with OEMs to promote the product, develop case studies to showcase project progress and share forecasts on how technology might impact costs in future.

“One of the partners within the project is the end customer. They have won two additional contracts because of this technology and now they are looking to roll it out in other areas of their organisation.” - Wave 2 CCAM beneficiary interview

“We are seeing a lot of commercial opportunities coming through and we are not that far away from being able to address those with essentially a commercial product, and one or two of these opportunities are in the UK, but there are quite a few overseas as well.” – Wave 3 CCAM beneficiary interview

- 4.20 The pathway to commercialisation, and progress made to date, was further interrogated via IMS data collection and the beneficiary survey, as well as through beneficiary interviews.
- 4.21 The latest IMS data indicates that 29 CCAM beneficiaries (37% of those responding) expected their project to result in new products, services, or processes being brought to market within two years (see Figure 4-3). Note that this question was answered by all partners (including e.g., local authorities, universities), who are unlikely to develop products as a result of the programme (hence the high ‘not applicable’ response).

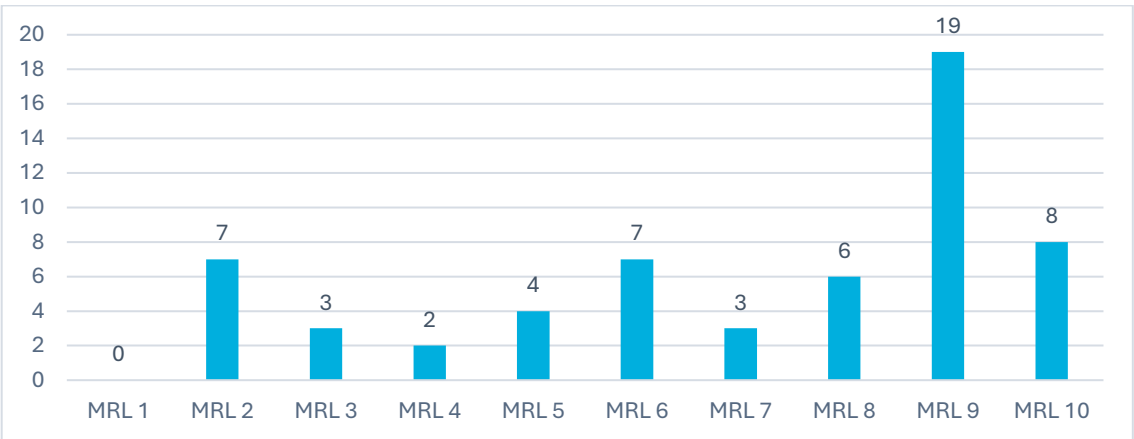
Figure 4-3: Project beneficiaries' views on whether the project will result in new products, services or processes (n=76)



Source: IMS data (IUK), Steer-ED analysis (February 2026), Question: As a result of this IUK support, does your business expect to launch any new or significantly improved products, services or processes?

- 4.22 IMS data also explored the Market Readiness Level (MRL) of CCAM projects. MRL is a scale that assesses the commercial viability and market acceptance potential of a new product, service, or technology, measuring how prepared it is for launch and adoption by customers, ranging from MRL1 (‘unsatisfied needs have been identified’) to MRL10 (‘business model is defined coherently’). By evaluating aspects like customer demand, competitive positioning, business viability, and market fit through a structured framework, MRL identifies the steps needed to achieve successful commercialisation.
- 4.23 As shown in Figure 4-4, IMS data, demonstrates that the current MRL that projects are operating at spans almost the entire range, from MRL2 to MRL 10. That being said, CCAM projects are typically at the higher MRL range, with over half (33 of 59 beneficiaries) reporting MRL 8 (‘value proposition defined’), MRL 9 (‘product/service defined’) or MRL 10 (‘business model is defined coherently’).

Figure 4-4: Reported current Market Readiness Level of CCAM projects (n=59)



Source: IMS data (IUK), Steer-ED analysis (February 2026). Question: In relation to this Innovate support, what is the Market Readiness Level (MRL) of the product or service to date?

- 4.24 Beneficiary survey respondents were also asked about progress in terms of getting products to market. In Wave 2 (August 2025), 10% of beneficiaries indicated that their projects had already resulted in a new product or services being launched, with a similar proportion (9%) reporting the same in Wave 3 (January 2026).
- 4.25 One of the survey respondents reported that they had developed a new product called the H360-S, a radar sensor that delivers 360-degree coverage without moving parts. The sensor eliminates mechanical components like motors, minimises the risk of failure and lowers maintenance requirements, making it a cost-effective solution for automotive systems.

“The H360-S is the world’s first solid-state 360 radar sensor for robotics and autonomy applications. The H360-S can replace multiple traditional sensors with one high-performance yet low cost device.” – Wave 2 CCAM beneficiary survey

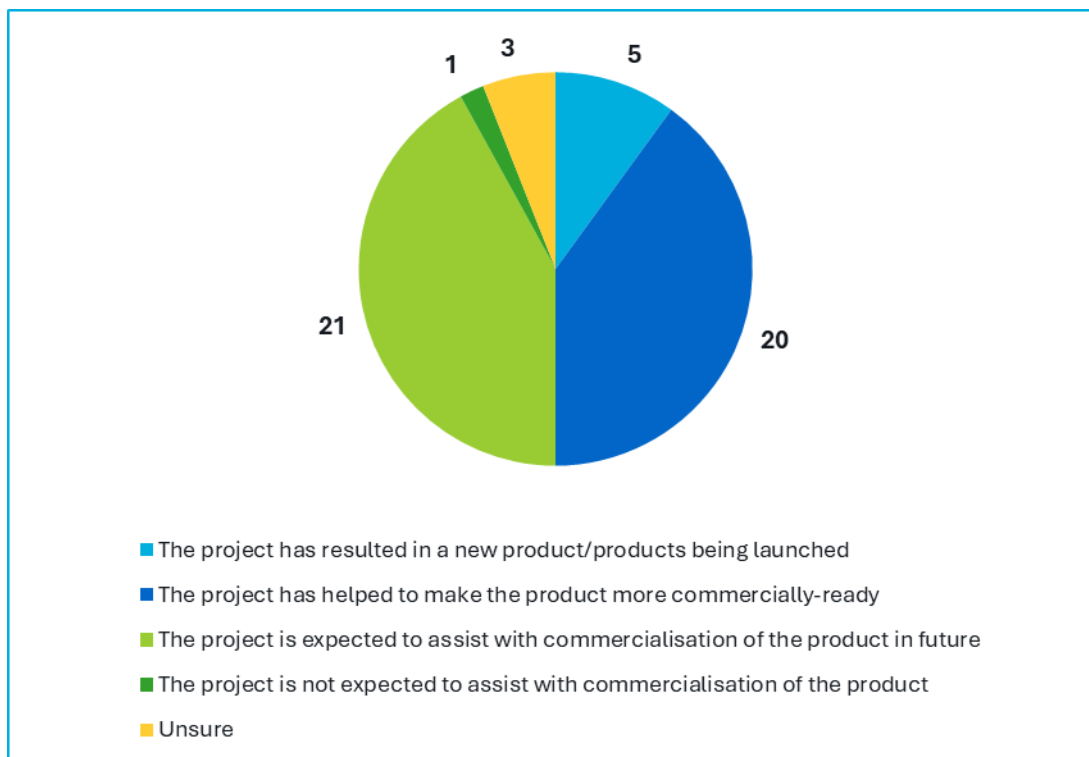
- 4.26 In addition, as shown in Figure 4-5, 40% of the beneficiaries surveyed in Wave 2 (August 2025) indicated that their project had helped to make products more commercially-ready and 42% expected the project to assist with commercialisation in future. 15% or eight respondents (through a separate question, not included in the graph) indicated in Wave 2 that they had already entered into commercial contracts with customers for products and services relating to their CCAM project. By the time of the Wave 3 survey (January 2026), this had risen to nine respondents that had already entered into commercial contracts.

“We helped our project partners to increase their product offering by developing their safety case. This is something they can now take to operate somewhere else, to build up test plans, and route hazard assessments.” - Wave 2 CCAM beneficiary interview

“Whilst we haven’t commercially launched any new products and services, what I would say is that we have added new features, new capabilities to our existing product. The

vehicles evolved a lot in terms of having new capabilities, including new overtake functions, and additional sensors using cameras.” – Wave 3 CCAM beneficiary interview

Figure 4-5: Current progress of CCAM projects in getting products to market (n=50)



Source: LMT beneficiary survey (Wave 2), Steer-ED analysis (September 2025), Question: Which of the following statements best represents current progress in terms of helping to get the product to market? (Answer options: The product project has resulted in a new product/products being launched, The project has helped to make the product more commercially-ready, The project is expected to assist with commercialisation of the product in future, The project is not expected to assist with commercialisation of the product. Unsure, Other (please specify))

Case study vignette showcasing a project which has made notable commercial progress, plus commentary on the barriers and enablers experienced

Project Harlander (see Appendix C for full case study) was a collaborative project led by Belfast Harbour, ANGOKA, British Telecommunications, eVersum, Oxa and HORIBA MIRA. It is funded through the CCAM Deployment strand.

Electric autonomous vehicles offer a route to provide clean, efficient, and affordable public transport that aligns with net zero targets, plus connectivity to other modes of transport. Harlander focused on deploying two autonomous electric passenger buses on public roads- between the Titanic Halt train station and key destinations across Belfast’s Titanic Quarter. These areas have a high demand for public transport and experience significant congestion due to limited access points.

The project has resulted in notable commercial progress for the partners involved:

- eVersum developed a new Level 2 autonomous vehicle platform with high passenger capacity and disabled access that could be used across the UK (fully integrated with the Oxa Driver and AV stack). The project team reported that there

were now potential buyers for the vehicle. They also added that the Autonomous Drive (AD) integration carried out in the vehicle provided valuable experience in getting to operational readiness and meeting regulatory requirements in the UK.

- HORIBA MIRA developed a safety assurance case for lvl4 autonomous vehicles which is now on the market. This demonstrates their capability to lead full end-to-end safety assurance programmes for future automated vehicle deployments.
- Oxa is building on the success of Harlander by pursuing other projects with partners in the consortium. The company has discovered new directions for its business and is focusing on near-term passenger transportation deployments in off-road environments such as airports and ports, where there is further potential to commercialise outputs from the Harlander project.

Overall, a key enabler in the success of the project is that the management team was able to keep the partners working together, especially when their internal strategic direction changed. This ensured that the project kept progressing towards objectives and stayed aligned with intended outcomes, despite technical challenges and the early withdrawal of a project partner that was supposed to provide the shuttle buses.

- 4.27 IMS data includes self-reported information on additional turnover generated as a result of the CCAM project, as well as the additional turnover that is expected to be generated in the next five years. According to the latest data (as of February 2026), beneficiaries responding had reported an additional £4.5m of turnover generated already as a result of their projects, with an additional £1.1bn expected in the next five years. IMS asks for additional details, but few provided further information on the sources (or potential sources) of this turnover.

Barriers and enablers to technological and commercial development

- 4.28 The potential barriers to commercial development were discussed with both CCAM beneficiaries and wider stakeholders, who collectively pointed to a wide range of hurdles that might prevent technologies from achieving commercial success. The key barriers mentioned by both groups included:
- **Regulatory clarity**, or a need for regulatory mechanisms to incentivise change – some CCAM stakeholders raised the need for government intervention to introduce more stringent policy guidelines, without which some of the CAM technologies being developed will not be commercially viable. For instance, stakeholders discussed a need for regulatory clarity (there is a need to define the secondary legislation related to the Automated Vehicles Act), which was perceived as a core limiting factor to the progression of CAM technologies.
 - **Investment readiness**. Funding was discussed as a challenge facing many of the technologies, and in particular the difficulties in finding commercial funders willing to invest in CAM technologies before they are entirely market ready. A lack of market demand was also mentioned as a key concern, with CCAM beneficiaries finding it difficult to promote a product for a market that is not yet ready for it commercially.
 - **Integration complexity**. Technological challenges arising from the cutting-edge nature of the work and the small size of many participating companies, were mentioned as potential commercialisation barriers.

- **Public acceptance** was also mentioned as one of the key blockers of CAM technologies. However, beneficiaries stated that they are working to conduct demonstrations and test how consumers are responding to the service, once safety and accessibility issues are resolved.

“I think the cost will be difficult for the public to conceptualise and accept if we don’t make the benefits of the technology clear. It is important to think about how we lay the groundwork for accepting the technology and tackling the cost barriers via subsidies and grants.” - Wave 2 CCAM wider stakeholder

“The big question is how the public will accept the technology. We have seen a split in passenger reaction. Some think it is fantastic and want it rolled out, others are much more hesitant. There is a very slow shift in the acceptance of autonomous vehicles. Once that changes, the commercial aspect will become more viable.” – Wave 2 CCAM beneficiary interview

“We have obvious technical challenges of any new product that you need to continue to develop and identify. You overcome these challenges by prioritising them, and the project helped us accelerate that.” – Wave 3 CCAM beneficiary interview

4.29 Whilst beneficiaries and wider stakeholders were more readily able to identify barriers than enablers to commercialisation, the following factors emerged:

- **Projects which are already at an advanced stage** – projects which entered the programme at a relatively high TRL are considered lowest risk, and most likely to achieve technological and commercial success. For instance, some beneficiaries mentioned having the CAM system architecture ready, and only having to run the trials to test it.
- **Projects in which a potential customer is involved within the project partnership** – projects which were able to demonstrate involvement of a potential customer within the partnership demonstrated a clearer pathway towards commercialisation. In some cases, beneficiaries anticipated that the project partner would be the first customer of the product (if the demonstration is successful), thus providing initial revenue for the company while also offering an opportunity to market to others.
- **Having access to testing infrastructure** – projects who used the CAM Testbed UK mentioned gaining more experience in building safety cases, which was considered a competitive advantage in commercialising their technology.
- **Working closely with customers** – projects which have run successful deployments had the opportunity to spend time with customers and conduct in-depth conversations about potential risks and mitigation strategies.

Conclusion

4.30 CCAM projects have made progress through technology readiness levels, via the development, testing and deployment in virtual, controlled and real environments that

has been enabled in the programme. A majority of projects report being at TRL 5 or above in the Wave 2 survey (August 2025), but most are still some way from commercialisation.

- 4.31 Over half of CCAM beneficiaries reported that their projects have been featured in news reports and trade press, while smaller numbers have seen dissemination activity through other channels. Between August 2024 and August 2025, 15 of the projects have been picked up in news and social media (on average 55 times each). Project Harlander (passenger shuttle service in Belfast) is a standout case, being featured in nearly 300 news items in the period. Further media activity was expected as CCAM projects came to a close, as well as an increase in other dissemination activities.
- 4.32 The latest IMS data (as of February 2026) showed that 22 new patents had been reported as a result of the CCAM programme (across 14 beneficiaries), and a quarter of Wave 2 survey beneficiaries expected to patent within three years. The data also indicates that around one-third of all CCAM beneficiaries then expect their organisation to bring a new product, service or process to market within the next two years as a consequence of project involvement. Some are already close to commercialisation and/or have a clear pathway mapped out, with project activities having enabled the trialling or demonstration of technologies in operational or real-world environments, as well as engagement with potential customers. Around 10% of those surveyed in Wave 2 had already launched new products or services into the market.
- 4.33 Potential barriers to commercial development include a lack of public acceptance of CAM technologies and a lack of market demand (partly as a result), technical challenges, difficulties in securing commercial funding to support next steps, and a need for secondary legislation to provide the necessary regulatory framework and clarity for the market.

5 Growing skills & organisational maturity through programme delivery

Key messages

- A majority of CCAM beneficiaries (94%) reported in the Wave 2 and Wave 3 surveys that their project had positively contributed to skills within their organisation. This included through the enhancement of technical or regulatory understanding, improved sectoral / market knowledge, and the bringing in of new skills and expertise to teams through additional recruitment (35% of beneficiaries reported in the Wave 2 survey that new jobs had been created as a result of their project).
- Over half (56%) of CCAM beneficiaries expect new jobs to be created within the organisation within five years as a consequence of their CCAM project. Over 1,500 additional jobs are anticipated in total across the projects.
- Participants have also learned lessons in terms of project management, partnership working, and operational agility, which will strengthen their skills set and organisational capabilities going forwards.
- This growth in skills and organisational maturity is expected to support future projects and collaborations as well as efforts to secure funding.

Introduction

- 5.1 Delivery of CCAM projects is expected to stimulate growth in the capability, capacity, resilience, workforce and skills of beneficiary organisations, ultimately leading to growth in the maturity and scale of the CAM sector, with corresponding economic benefits. This chapter sets out the mechanisms by which activities have impacted organisational skills and maturity, and the role of the programmes in creating and safeguarding jobs.

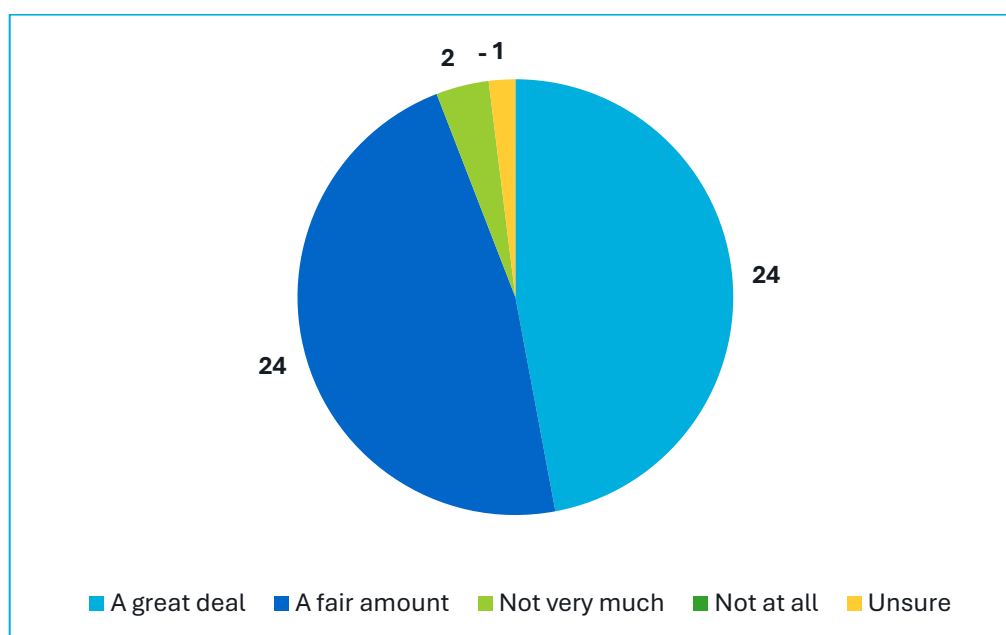
How projects have contributed to skills development amongst partner organisations

- 5.2 The majority of beneficiaries (94%) reported via the Wave 2 survey that their CCAM project had positively contributed ('a great deal', or 'a fair amount') to the skills within their organisation (Figure 5-1). Only two (4%) said 'not very much'. Very similar responses were provided to the Wave 3 survey (94% and 3% respectively).

“The project has had a strong positive impact on skill development within our organisation. It has led to the creation of new knowledge in cutting-edge technologies, the development of a bespoke test platform, and the establishment of innovative processes. These advancements have significantly enhanced our technical capabilities and research expertise.” – Wave 2 CCAM beneficiary survey

“Engineers, service teams and technicians have learnt how to manage the technology to make it work reliably.” – Wave 3 CCAM beneficiary survey

Figure 5-1: Self-reported impact of the CCAM project on organisational skill (n=51)



Source: LMT Beneficiary Survey, Steer-ED analysis (September 2025), Question: To what extent has the project had a positive impact on skill levels within your organisation? This could include for example commercial, technical, or regulatory knowledge/skills. (Answer options: A great deal, A fair amount, Not very much, Not at all, Unsure)

5.3 Through the interviews and survey, beneficiaries identified a range of mechanisms by which CCAM projects have contributed to organisational skill development:

- **Enhancing technical understanding** – The most direct effect, and most commonly cited, many organisations reported that through their experience of the project, they had increased their knowledge of CAM technologies, and increased their understanding of the associated challenges and solutions. They also had access to new pieces of equipment or testing facilities such as the CAM Testbed, which also helped to progress their skills.

“The project funded the evolution and testing of the software. We had a hardware platform already, but the project allowed us to embed the software in some vehicles, test it and improve it.” – Wave 2 CCAM beneficiary interview

- **Enabling the organisation to hire new staff** (discussed in further detail as follows) – It was commonly mentioned that projects had enabled expansion of the organisation, and that new hires had brought additional skills to the team.

“We are an SME, employ 100 people and run from one location. However, the project has moved us from a small SME operator to something larger. Our brand exposure also increased significantly because of it.” – Wave 2 CCAM beneficiary interview

“We have taken on more engineers, and we have developed their skills. We have taken on graduates who have been able to work with our senior engineers and are getting increasingly confident and competent.” – Wave 3 CCAM beneficiary interview

- **Enhancing regulatory understanding** – Beneficiaries explained that their project had helped their understanding of the regulatory environment and the regulatory requirements that they would need to work within for their CAM technology to be successful.

“I think there is a much greater understanding of what will be expected of organisations like ours in the future and how the legislation will apply to us. We are a lot wiser to those things. Beyond the immediate project team, it has also given us an opportunity to educate people in senior director roles, on what is likely to come towards them in future.” – Wave 2 CCAM beneficiary interview

“We have developed autonomous vehicle expertise in-house, as well as being able to share this more widely with colleagues who are likely to be affected by the new AV legislation and the APS Act.” – Wave 3 CCAM beneficiary survey

- **Enhancing sector context and location understanding** – Though less commonly cited, for some CCAM beneficiaries the project gave an opportunity to work in a sector or geography which they were less familiar with (for example taking CAM technology for urban driving and developing it for rural roads). The projects helped beneficiaries to get a better understanding of different sectors and local environments, as well as an improved understanding of customer requirements.

“Taking CAM technology and applying it to rural roads in the UK is of strategic importance as we need to consider new criteria, such as how to navigate mini roundabouts, speed humps, and Pelican crossings.” – Wave 2 CCAM beneficiary interview

- **Strengthening project management skills** – a small number of beneficiaries reported that the act of managing the project, including managing risk, stakeholders and budgets was in itself a learning experience, which helped to expand the organisation’s capabilities.

How projects have contributed to growth in organisational maturity amongst partner organisations

5.4 Through interviews, CCAM beneficiaries identified a series of lessons learnt through project delivery. These include:

- Project management – Beneficiaries explained that working on the CCAM programme helped them develop a better understanding of the pressures that other project partners are under. Some highlighted that this understanding is helpful when planning ahead, and as they schedule time for partner delivery project outputs.
- Partnerships working – Beyond project management, beneficiaries mentioned that learning how to work with partners in a collaborative manner was an important learning, as opposed to hiring contractors to implement aspects of the work.

“There is a lesson learnt in terms of having good partner interaction so that if we do identify a problem, we can reach out to the partner and request support and then overcome the issue quicker, and finish within the original timescale.” – Wave 2 CCAM beneficiary interview

- Building agile working practices – Many CCAM beneficiaries interviewed highlighted the need to operate and project manage with agility, as there were components of their work that could not have been planned for or predicted in advance. For instance, some project partners went into administration, requiring teams to mobilise at pace and find appropriate replacements with similar expertise. The importance of agile working practices was highlighted also with regards to the successful delivery of the projects during the project extension periods. For instance, some beneficiaries had to identify new suppliers, adapt their internal processes and practices and re-design their products to successfully complete their projects.

“We thought we had done due diligence when it came to vehicle selection, network selection, before the programme started. But once the project starts, things change, and you need to adapt.” – Wave 2 CCAM beneficiary interview

“The knowledge gained from the project has enabled us to enhance and change some of our internal processes, which in turn changed our service that we provide to our customer. At the end of every project we do, we do a lessons learnt exercise, and we use this to improve our processes for both applying for and delivering future R&D projects.” – Wave 3 CCAM beneficiary interview

5.5 The potential implications of newly developed skills and knowledge gained were also explored with beneficiaries. While these discussions were somewhat speculative, the following were noted:

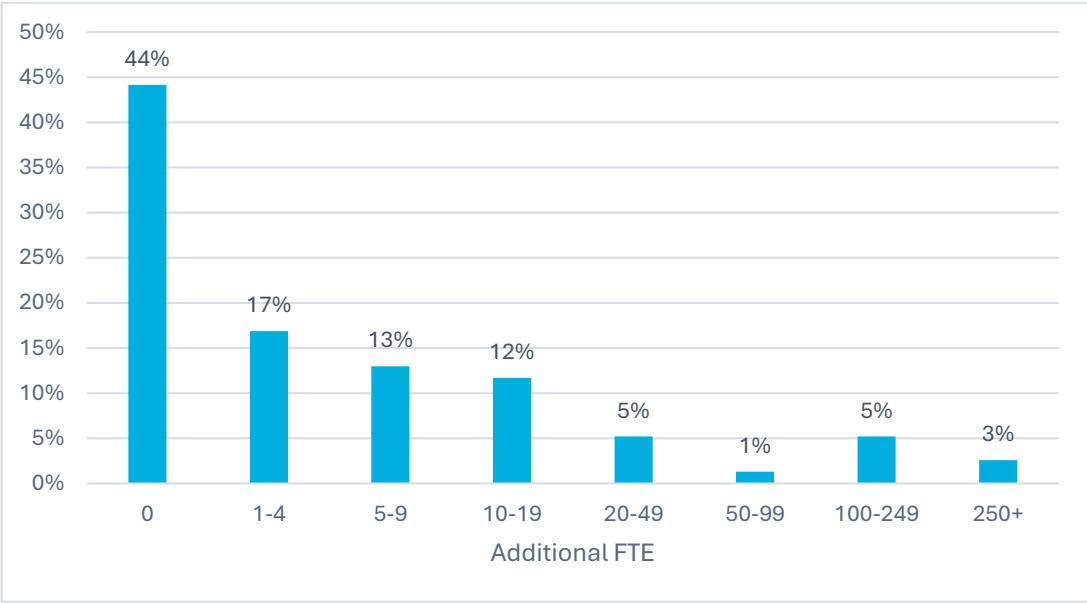
- The CAM technologies themselves have been improved as a result of additional technical contributions and enhanced vehicle deployment, making it more likely that they will be successfully commercialised. This was particularly relevant in the areas of risk assessment, building user cases and strengthening product safety.
- Beneficiaries feel better placed to make future applications for IUK and other government funding, having learnt the processes and expectations of the IUK grant funding approach and established partnerships with organisations they want to continue collaborating with.
- Valuable partnerships have been formed (as discussed in Chapter 2), which will provide input to future projects. The potential of academics for disseminating key findings from the projects was noted in particular.
- Having worked directly with OEMs, partners now have a better understanding of market needs, and are therefore better able to pitch the technology to the market
- Beneficiaries reported that their organisations are now better-placed to develop other technologies, services or products, building on skills they have learnt.
- Securing better understanding of government regulation, has enabled organisations to participate in wider policy conversations with both central and local government, and feel better prepared to understand and respond to policy consultations on the topic.
- A small number of beneficiaries mentioned that participating in the CCAM programme and achieving technological progress as a result, will feed into securing future private investment in their businesses.

“We will see changes in the coming years because via the project we identified our needs in terms of engineering resource and the skillset required.” – Wave 2 CCAM beneficiary interview

The role of programmes in creating and safeguarding jobs

- 5.6 Figure 5-2 provides a view of anticipated future job creation (in five years’ time), collected via Wave 2 IMS data (noting again that this is completed by all types of partner).
- 5.7 Responses have been excluded where the number of jobs created in five years’ time was the same as the current employment figure (suggesting the respondent had not understood that the question related to additional jobs). Also, where the ‘additional employment’ reported appeared to be ‘total employment’ (e.g. where current employment was reported as 681 and additional employment was reported as 1,000, the difference (391) has been used instead as the estimate of additional employment).
- 5.8 The latest IMS data shows that over half (56%) of CCAM beneficiaries expect new jobs to be created within their organisation in five years’ time as a consequence of the project. The expected numbers vary substantially, from one to 319 additional FTEs per organisation. In total, 1,538 additional jobs are anticipated, equating to 20 additional FTEs per beneficiary (on average, based on those responding).

Figure 5-2: Expected number of FTE employees in five years' time, as a result of this support, CCAM (n=77)



Source: IMS data (IUK), Steer-ED analysis (February 2026), Question: As a result of this Innovate UK support, how many more or less Full Time Equivalent (FTE) employees do you expect to have in your business in five years' time?. Note that two responses were removed, where the question appears to have been answered erroneously (respondents provided additional FTE numbers in the thousands and that were exactly the same as the figures given for the pre-existing number of FTEs). In addition, four responses were amended where the reported additional employment appears to be total future employment (the figure was amended to the difference between predicted and current employment).

- 5.9 In the Wave 2 beneficiary survey, respondents were also asked if CCAM projects have resulted in the creation of new jobs and or supported existing jobs. 35% of beneficiaries stated that new jobs had been created as a result of their project (between one and 10 in each case, with 50 new jobs reported overall), while a higher proportion (66%) stated that existing jobs had been supported (between 1 and 250 in each case).

Conclusion

- 5.10 CCAM project delivery is expected to grow the capability, capacity, resilience, workforce and skills of beneficiary organisations, ultimately supporting a larger and more mature CAM sector.
- 5.11 A majority of CCAM beneficiaries (94%) reported in both Waves 2 and 3 surveys that their project had positively contributed to skill development within their organisation. This included through the enhancement of technical or regulatory understanding, improved sectoral / market knowledge, and the bringing in of new skills and expertise to teams through additional recruitment (with 35% of beneficiaries reporting in Wave 2 that new jobs had been created as a result of their project).
- 5.12 Participants have also learned lessons in terms of project management, partnership working, and operational agility, which will strengthen their skills set and organisational capabilities going forwards. This growth in skills and organisational maturity is expected to support future projects and collaborations as well as efforts to secure funding.

6 Impacts on wider framework conditions & long-term outcomes

Key messages

- Beneficiaries reported an ongoing improvement within the automotive industry and amongst the public, in the levels of awareness, trust and acceptance of CAM technologies. The CCAM programme, and particularly the demonstrators, are felt to have contributed to this, with considerable emphasis placed on dissemination and customer / public engagement as part of delivery. CCAM projects have also sought to influence the wider regulatory environment, through direct engagement with regulatory, policy and standards bodies, and via participation in consultations.
- The majority of CCAM beneficiaries, when interviewed, had either just completed their project or were still delivering, and so it was too early to have demonstrated wider impact. However, they all spoke about the potential for their technology to deliver benefits to society and the economy in the longer-term, in terms of supporting decarbonisation and net zero targets, improving the safety of operators and users, creating greater efficiency in services and increasing transport options for under-served groups.

Introduction

- 6.1 This chapter discusses the role that projects have played in affecting trust in, and adoption of, new technologies, plus contributions to the regulatory environment. It then goes on to discuss evidence about potential longer-term outcomes that may be delivered by the portfolio.

The role of projects in driving adoption of new technologies

- 6.2 Via interviews, beneficiaries discussed the extent to which they had observed changes in the acceptance and willingness to use the CAM technologies they are developing. Many felt that the automotive industry as a whole is gradually shifting towards a greater acceptance of CAM technologies over time, and consistent marketing efforts have helped improve public awareness and trust of automated vehicles.

- 6.3 Some went further to suggest that their project itself had contributed to growing customer trust. The key mechanism described, particularly for the CCAM Deployment strand, was that by providing real-life demonstrations of the CAM technologies in use, this helped potential customers to experience the technology and increase their understanding of (and therefore willingness to adopt) it. That is why some beneficiaries dedicated substantial time and effort to attending conferences, and showcasing their product, as well as launching press releases and engaging with the public or local residents to invite them to trial some of the vehicles.

“We really wanted the end customer to be involved in these projects very closely so they can actually see what the technology is doing. So we work closely with them and have in-depth conversations, and we get good feedback as a lot of people are more willing to take this on as a result.” – Wave 2 CCAM beneficiary interview

“Absolutely, there is more acceptance of AVs. Some of the work that has been funded by CCAV has helped that because it has created greater exposure, but also if we look at other territories around the world, what’s happening in North America, China, Japan, North Korea, people are getting greater levels of exposure to these technologies, which means they are becoming more accepted.” – Wave 3 CCAM beneficiary interview

The role of projects in shaping the regulatory environment

- 6.4 Beyond demonstrating the technologies in question, another potential role of CCAM projects was to influence the regulatory framework itself – particularly in identifying areas where regulations are not fit for purpose or where additional regulatory intervention may be required to facilitate technological progression.
- 6.5 Beneficiary survey respondents were asked to explain how their projects had impacted the regulatory environment. Key mechanisms highlighted include:
- **Via direct contact with regulatory bodies** such as the Driver and Vehicle Standards Agency and British Standards Institution. Beneficiaries explained for example that they had worked with these agencies to ensure regulations for AVs are fit for purpose, provided input to DfT for their engagement with the United Nations on automated logistics and worked with the All-Party Parliamentary Group on automation.
 - **Via participation in consultations.** Beneficiaries mentioned responding to calls for safety related updates to codes of practice and contributed to consultations to guide legislation on AVs.
 - **Via feeding information, either directly or indirectly, to regulatory bodies.** Some beneficiaries stated that they had shared lessons learnt from projects to inform legislation on the development and deployment of autonomous vehicles and fed into legislation such as the UK Automated Vehicle (AV) Act.
 - **Via engagement with standard bodies.** One beneficiary mentioned engagement with standard bodies and test centres to understand how future models interact with upcoming standards, and to contribute to standards for maintenance and compliance of self driving systems.

- 6.6 Whilst in-depth interviews with beneficiaries showed that regulation was considered a barrier for CAM technologies and future commercialisation, the interviewees struggled to identify further specific examples of policy gaps or additional regulation needed, even though they were aware of wider team members feeding into consultation activity and / or conversations with the British Standards Institution. This could be related to the fact that many of the beneficiaries interviewed had stronger technical expertise and led on technological and operational delivery, as opposed to wider organisational strategy and policy.

Case study vignette showcasing how a project has helped to contribute to changes in the regulatory environment

EvolvAD (Appendix B) aims to develop an AV capable of safely driving in residential, urban, and rural environments. Up to September 2025, the project has safely completed 2,000 autonomous test miles. According to the project team, no regulatory challenges had emerged as the trial ran with a safety driver present as per the current regulatory guidelines. However, the additional work package running until March 2026 aims to develop a business case demonstrating that the UK could be the entry point for Nissan's efforts of launching an AD mobility service in Europe. The document will consider potential factors for expansion, including variations in the built-up infrastructure, policymaking and regulatory framework.

In August 2025, the team is conducting consultations with local authorities in the UK to inform the document and create a methodology for replicating these efforts to different geographies in the future, based on the local regulatory framework. The final draft will contain criteria for assessing the potential for launching CAVs in different geographies and explore what social value can be delivered and then maximised as part of the commercialisation efforts, and what regulatory framework should be adopted nationally and locally to allow the operation of CAM technologies.

As part of this, Nissan is working closely with partners and local authorities to develop a 360-degree understanding of the regulatory needs across the country and provide critical insights to policymakers and urban planners to ensure a successful introduction of an AD mobility service around 2030.

Long-term outcomes

- 6.7 In the beneficiary survey (Wave 2), respondents were asked their view on whether the technology being developed in their project had contributed to a range of societal impacts or whether it may contribute to these once fully commercialised. The societal impact most reported to as having already been achieved in the Wave 2 survey was 'developing solutions which can be exported globally', with 64% of beneficiaries reporting that this had already been achieved either 'a fair amount' or 'a great deal'. After this, the next most commonly impact was 'making transport safer' (37%). In the longer term, beneficiaries anticipated much higher levels of societal impact, with 96% expecting to produce a solution which can be exported globally, 95% expecting to produce a technology which would make transport safer, and 90% making transport more reliable.
- 6.8 The majority of CCAM beneficiaries, when interviewed, had either just completed their project or were still busy with project delivery, and so it was too early to demonstrate wider impact. However, they were able to speak coherently about the potential for their

technology to deliver societal benefits in the future. Most were positive that their projects and the enhancement of CAM technologies as a whole will deliver a series of long-term benefits for the economy and society. They mentioned the following future benefits:

- **Decarbonisation:** Many of the autonomous vehicles developed and trialled as part of CCAM projects were fully electric and using very low power. Therefore, participants expected that the wider launch of these technologies will support national decarbonisation efforts and the UK's journey towards net zero. For instance, one CCAM beneficiary mentioned: "Benefits also include decarbonisation because obviously we want people to stop driving petrol and diesel cars around and using what will be electric buses, which have lower carbon impact."
- **Safety benefits:** One of the most commonly cited long-term programme benefits among CCAM beneficiaries was improving customer safety when using vehicles. Deployment efforts focused not only on developing and improving the safety modules for autonomous vehicles, but also showcasing them to users to reduce reluctance of adopting CAM technologies. It is also expected that the technology could reduce incidents in the long-term by improving failure responses / mitigation strategy if something goes wrong on the road. One CCAM beneficiary stated that the technology is increasing user safety, by making sensory decisions which help reduce human error.
- **Operational benefits:** Some CCAM beneficiaries mentioned that the long-term aim of their project was to reach a level of readiness to remove the safety driver from the vehicle. This in turn can lead to less safety drivers operating automated vehicles, substantially reducing the costs of different transport services.

"What we do now is employ people who park, clean and refuel the vehicles. If technology can help automate that, it makes internal operations less risky." – Wave 2 CCAM beneficiary interview

- **Economic benefits:** CAM technologies were also expected to make driving more efficient and cost effective, by reducing human error, and saving costs for organisations using automated vehicles. In addition, the growing interest in CAM technologies stimulates job creation in the area, which was directly enhanced by the CCAM funding for individual projects as discussed in Chapter 5. The sector is only expected to grow in the future and lead to more jobs being created.
- **Societal benefits:** CCAM beneficiaries also mentioned they anticipate a range of wider societal benefits to be realised as a result of their participation in the programme. For instance, some projects expected to see improved transport access in rural areas and hard-to-reach localities, whilst others believed automated mobility can help improve accessibility for disabled people.

6.9 Key barriers to achieving long-term outcomes reported by both beneficiaries and wider stakeholders were as follows:

- **A need for aligned action** – CCAM beneficiaries explained that to implement system-wide change, a coordinated approach across multiple stakeholders will be necessary. For instance, multiple beneficiaries mentioned in the in-depth interviews that there is some duplication of effort across the different CCAM projects which could be avoided via closer cross-programme collaboration. One beneficiary

specifically suggested that such collaboration could be particularly beneficial now before many of the technologies are commercialised, as key organisations in the area are not yet competing with each other and are more likely to share valuable knowledge.

- **A lack of incentive structures** – meaning that whilst some beneficiaries considered CAM technologies commercially viable, they felt that more stringent legislation needs to be in place for the technologies to achieve widespread take-up.
- **A lack of regulatory clarity** - which is needed in order to permit the technology to be deployed effectively (this was particularly related to removing the safety driver from the vehicle).
- **A lack of investment** to continue CAM technology development beyond the stage reached through the innovation grant.
- **Issues around public acceptance** and trust in new CAM technologies.

Case study vignette showcasing the long-term impacts of one of the technologies being developed

Nissan's team felt that it is too early to report on impacts achieved as a result of the EvolvAD project (see full case study in Appendix B), which aims to develop an AV capable of safely driving in residential, urban, and rural environments. However, it is anticipated that multiple longer-term impacts will be realised both for Nissan and for the wider economy, society and the environment.

The team felt that the research project was successful in driving Nissan's knowledge and understanding of how AD technology performs across challenging driving environments. The technology has made driving safer by reducing human error, and cleaner by improving efficiency. It is anticipated that this technology can enable access to mobility to many more people who may not have it today due to location, age or disability. Bringing mobility to underserved locations is in turn expected to improve equity and access to opportunities. From the point of view of local and central government, the technology can help decarbonise and reduce congestion, as well as stimulate the local economy and provide services to underserved communities.

From an Original Equipment Manufacturer (OEM) point of view, a potential long-term benefit could be pivoting into mobility services as a new business model. This could bring a new revenue stream for Nissan but also transform the entire supply chain and introduce new employment opportunities in the CAM sector. If Nissan's commercialisation plan in the UK is successful and the technology is introduced in selected local geographies, it can also be anticipated for the UK to become a smart cities specialist on a global level, attracting investment, skills and expertise for future AD technology development. To help enable that, greater CAM ecosystem building activities are required.

Conclusion

- 6.10 Beneficiaries reported that an ongoing improvement within the automotive industry, as well as amongst the wider public, in the levels of awareness, trust and acceptance of CAM technologies. The CCAM programme, and particularly the demonstrator projects, are felt to have contributed to this, with considerable emphasis placed on dissemination and customer / public engagement as part of delivery. CCAM projects have also sought to

influence the wider regulatory environment, through direct engagement with regulatory policy and standards bodies, and through the participation in consultations.

- 6.11 The majority of CCAM beneficiaries, when interviewed, had either just completed their project or were still delivering, and so it was too early to have demonstrated wider impact. However, they all spoke about the potential for their technology to deliver benefits to society and the economy in the longer-term, in terms of supporting decarbonisation and net zero targets, improving the safety of operators and users, creating greater efficiency in services and increasing transport options for under-served groups.

7 Conclusions & Next Steps

Summary of monitoring findings

- 7.1 This report is structured around the LMT portfolio logic model, which is divided into five themes: programme delivery; partnerships and collaboration; technology development, deployment and commercialisation; skills development; and wider framework conditions. The key findings in each of these areas are set out below.

Programme delivery

- 7.2 The CCAM programme awarded £42m to 19 projects (6 Deployment and 13 Supply Chain). All were originally due to end by April 2025, however most (16 of 19) agreed extensions (of six months on average), and two were still ongoing as of January 2026.
- 7.3 At their latest quarterly assessment, 15 projects were found to be on track with milestones (based on the updated timelines), while 3 had slipped slightly (<3 months) and one had slipped by over 3 months. Nearly all were on course to deliver against original objectives, except four that were at risk due to the loss of partners, supply chain and technical difficulties, and shorter vehicle deployment timeline.
- 7.4 Other than the initial delay to award announcements, beneficiaries were mostly positive about their experience of working with IUK, both in terms of the application process and then project delivery. There were calls for more regular communication across CCAM projects, to share learnings, avoid duplication and ensure complementarity, as well as more direct interaction between IUK and (non-lead) partners. There were also calls for further efforts to simplify and streamline requests for information and evidence, which can distract from project delivery.

Partnerships and collaboration

- 7.5 The CCAM programme has enabled large numbers of new partnerships, as well as helping to further develop those that already existed. It has brought together organisations that would not have worked together without the IUK funding. These partnerships have provided direct access to potential customers and suppliers, policy and regulatory bodies, and complementary skills.
- 7.6 Consortium relationships were rated highly by most CCAM beneficiaries, who reported good collaboration and collective efforts to overcome challenges and deliver against objectives. Good project management and partnership communication was seen as key. Issues within the partnerships have been limited, and mainly related to partners that have had to leave the project during delivery.
- 7.7 Through the CCAM projects, ideas have been shared, trust has been built, and relationships strengthened. Routes to market and commercial opportunities have also become clearer, particularly where projects involved potential customers and users.

Many partners also expect to continue working together (with some already bidding for further projects and funding).

Development, deployment and commercialisation

- 7.8 CCAM projects have progressed on technology readiness levels (TRLs), through development, testing and deployment in different environments. The great majority (83%) reported sitting at TRL 5 or above at the time of the Wave 2 survey (August 2025), while by the time of the Wave 3 survey (January 2026), 29% were sitting at TRL 7 or higher. However, most are still some way from commercialisation.
- 7.9 As projects progressed, dissemination activities increased. Between August 2024 and August 2025, 15 of the CCAM projects were picked up in news and social media (on average 55 times each), with projects that were more advanced and / or user-facing tending to gain more attention. Projects reported that further dissemination efforts (including publications and conferences) were planned for the end of demonstrations and / or around the time of project close.
- 7.10 IMS data shows that 22 new patents have been reported as a result of the CCAM projects.
- 7.11 Around one-third of beneficiaries expect their organisation to bring a new product, service or process to market within the next two years. Some are already close to commercialisation and/or have a clear pathway mapped out. Around 10% have already launched new products or services into the market relating to their CCAM project.
- 7.12 Potential barriers to commercial development include a lack of public acceptance of CAM technologies and a lack of market demand (partly as a result), difficulties in securing funding to support further development, and a need for secondary legislation to the AV Act.

Skills

- 7.13 A majority of CCAM beneficiaries (94%) reported through survey that their project had positively contributed to skills within their organisation. This included enhanced technical or regulatory understanding, improved sectoral / market knowledge, and the bringing in of new skills and expertise through recruitment (35% reported to the Wave 2 survey that new jobs had been created as a result of their project).
- 7.14 Participants have also learned lessons in terms of project management, partnership working, and operational agility, which will strengthen their skills and organisational capabilities going forwards. This growth is expected to support future projects and efforts to secure funding.

Wider outcomes and impacts

- 7.15 Beneficiaries have seen growing awareness, trust and acceptance of CAM technologies in the automotive industry and amongst the public, and the CCAM programme is thought to have supported this. CCAM projects have also sought to influence the wider regulatory environment, through direct engagement with regulatory, policy and standards bodies.
- 7.16 The majority of CCAM beneficiaries, when interviewed, had either just completed their project or were still delivering, and so it was too early to have demonstrated wider impact. However, they all spoke about the potential for their technology to deliver benefits to society and the economy in the longer-term, in terms of supporting decarbonisation and

net zero targets, improving the safety of operators and users, creating greater efficiency in services and increasing transport options for under-served groups.

Next steps for the programme

- 7.17 Although the CCAM programme is coming to an end, several recommendations were made by beneficiaries that could be taken forward in other future initiatives. For instance:
- Ensuring quick turn around on competitions and grant awards, allowing sufficient time for projects to be fully implemented.
 - Increasing communication between IUK (and lead contractors) and the wider consortia, as well as information / knowledge sharing across projects.
 - De-duplicating information requirements between application form and portal.
- 7.18 Beneficiaries and wider stakeholders were positive about progress that had been made in recent years in the CAM sector (through the CCAM programme, but also in terms of wider awareness and acceptance of technology, the work that is underway to establish AV regulation, and the establishment of a strong ecosystem and supporting infrastructure).
- 7.19 According to stakeholders, a tipping point is now being reached, where you can look at moving from enabling technology via innovation and trials (the technology is now largely there), to applying that innovation in the real world, deploying in commercial pilots.
- 7.20 Stakeholders expect early deployment to be mainly off-highway (construction, marine, airside, defence, etc.), but also flagged that public awareness and acceptance of CAM technologies and solutions had shifted to the point where wider on-road deployment (of e.g. advanced driver assistance) also now seemed feasible in the coming years.
- 7.21 There were calls for a step-up in terms of supporting the demonstration of business cases at scale (more vehicles, multiple sites), with a real focus on commercialisation, and where these can also support wider ecosystem development around regulation, insurance and acceptance.
- 7.22 Interviewees were positive about the new CAM Pathfinder programme, which is investing £150m to support the development and commercial rollout of CAM solutions, focusing on targeted, high-value market segments in early commercialisation of these technologies.

Recommendations for future evaluation

- 7.23 Many of the impacts of the CCAM programme will only become clear over time, as the remaining projects conclude, and as the results are taken forward, for further development or into the market. Further monitoring and evaluation, once all projects have closed, and one or two years after, will therefore be important to capture these longer-term benefits.
- 7.24 Economic impact analysis over the longer term is also needed to capture further information on job creation and safeguarding, SME growth, inward investment, licensing and exports. At present, there are some positive forecasts for future growth, but little has yet been realised. Capturing these indicators over the longer term, together with supply chain development and follow-on finance raised, will be critical to assess the programme's contribution to growth and the wider industrial strategy.

Appendices

A Sources of evidence utilised

Monitoring data analysis

- A.1 Three forms of programme monitoring data are captured by IUK and were provided to Steer-ED for analysis, as described below.

Applicant information data

- A.2 Basic ‘demographic’ data covering organisations awarded funding. The data includes the beneficiary’s name, project name, project description, competition programme, the total amount of funding, which was initially bid for, the grant funding amount provided, project start and end date.

Quarterly Monitoring Scores (QMS) monitoring reports

- A.3 Quarterly assessments undertaken by external MSPs; typically, industry professionals who are knowledgeable about the technology in question and are contracted to provide an independent assessment of project progress on a quarterly basis. Their assessment covers the project’s scope, time, cost, exploitation, risk, and project management. Officers score each of these project aspects as well as providing commentary as to the reasoning behind their scores.
- A.4 For Wave 3, QMS data was only provided for five programmes; CCAM, FOAK (2025 specifically), TVH, Maritime and ZEHID.

IUK’s impact management system (IMS)

- A.5 IMS is a data collection system which, at the time of writing, is being rolled out across all IUK programmes. It captures data upon project commencement, during project delivery, and following project completion, and is provided in the form of short-answer multiple choice, quantitative, or character-limited free-text responses. It covers subjects including patents, technology progression and partnerships (amongst others).
- A.6 For Wave 3, IMS data was provided for only three programmes: FOAK (2025 specifically); CCAM; and Maritime. These programmes had additional data available in Wave 3 and this information was therefore included within this Monitoring Report.

Analysis of secondary data sources

- A.7 Three sources of secondary data were explored for inclusion within this document:

Crunchbase

- A.8 To further explore whether businesses participating in LMT programmes are attracting external investment, and whether LMT participation aligns with investment-raising events,

Technopolis have made use of Crunchbase – a platform that provides information on businesses and funding events.

- A.9 Of the ~430 unique organisations participating in LMT projects (at the time of undertaking Wave 2 analysis), Technopolis were able to identify 215 (50%) in Crunchbase (the remainder were mainly public orgs and universities). Of these, 88 have one or more instances of securing external funding (251 deals in total, 2010- July 2025). Crunchbase provides details on the type of funding, the date and the financial amount.
- A.10 Findings evidenced that investment/ funding activity was relatively low pre-project participation, and increased gradually, peaking during IUK LMT project period — with the highest number of investment/funding rounds in 2023 (63). This suggests a clear increase in funding and investment round announcements following the start of IUK LMT project participation.
- A.11 Table A-1 shows the different types of funding / investment round that are captured.

Table A-1: Funding / investment round

Investment Type	Number	Investment Type	Number
Grant	131*	Non-equity assistance	4
Seed	28	Post-IPO debt	5
Pre-seed	7	Private equity	3
Series-A	16	Series-B	6
Equity crowdfunding	5	Corporate Round	2
Convertible Note	2	Series-C	2
Debt Financing	7	Undisclosed / Unknown	28
		Grand Total	251*

Source: Technopolis Crunchbase data, 2025. *Note: 13 LMT grants are included, which have then been removed from the subsequent analysis.

- A.12 For the 88 companies with funding data, Technopolis have tracked deals (both volume and value) over time at the company level. Technopolis have analysed the total number and value of deals for each company since the start of their LMT project, and then also compared this with the number and value of deals achieved in an equivalent period prior to the project start date (i.e. if the LMT project started two years ago, Technopolis has compared the two years, pre- and post- this start date).
- A.13 At the overall portfolio level, this reveals:
- LMT participants have achieved 110 deals since their project started. This is 43% higher than the 77 deals they achieved in the same length of time before project start.
 - LMT participants have achieved deals worth \$4.7bn since their project started. This is more than five times higher than the \$0.8bn achieved in the same length of time before project start.
 - On average (per company, amongst these 88), organisations have secured 1.3 deals worth \$52.9m since project start, and 1.0 deals worth \$9.7m in the same period before.
- A.14 An additional, updated analysis was also undertaken in Wave 3 for the Maritime and FOAK programmes, covering the period 2018 to the end of 2025. This update also included the additional 26 FOAK projects awarded in 2025.

Meltwater analysis

- A.15 To assess the public dissemination of LMT projects, a structured search of media output was conducted using Meltwater, a media monitoring and analytics platform. The data collection for each project covered the one year period from 12 August 2024 to 12 August 2025, capturing online news and print, as well as social media activity on platforms, blogs, and forums. An additional, updated analysis was also undertaken in Wave 3 for the Maritime and FOAK programmes, covering the period from 30 January 2025 to 29 January 2026. This updated analysis also includes 26 FOAK projects awarded in 2025.
- A.16 For accuracy, search queries were tailored for each project by combining project titles or acronyms with lead organisation names, and articles were manually screened to remove irrelevant results. The search process also involved an iterative refinement of keywords to ensure that retrieved content was directly attributable to the projects.
- A.17 Meltwater's metrics enabled assessment of both the quantity and quality of media coverage. Estimated views gauged the average exposure of articles, reach measured the potential audience size, and engagement captured interactions across platforms including Facebook and Twitter. These data points were collected for each project and aggregated at the programme level, providing a comprehensive overview of LMT projects' media performance.

Dimensions

- A.18 Dimensions is a comprehensive research database that provides patent and publication data. The LMT projects were identified within the Dimensions dataset. However, only FOAK of the seven programmes were associated with patents and only FOAK and CCAM were associated with publications within the dataset.
- A.19 As not all the programmes were associated with patents and publications from the dataset, there is some discrepancy to self-reported information from project beneficiaries which will be further explored with the Dimensions team. Dimension data has therefore only been included for programmes where patents and publications have been linked.
- A.20 It should be highlighted that for Wave 3 specifically¹⁰ a dimensions search was undertaken only for FOAK 2025 and Maritime.

Beneficiary survey

- A.21 An online survey of beneficiaries was developed and distributed to all project beneficiaries during each of the research Waves across the full portfolio, amounting to 582 recipients. Both project leads and partners were invited to complete the survey, meaning that multiple responses could be captured from each project. The survey included a range of multiple choice and free text questions and allowed for the gathering of valuable additional data beyond the core data collected by IUK via IMS, QMS monitoring reports and applicant information data.
- A.22 Unique surveys were created for each programme and whether a beneficiary had responded in the previous Wave. The number of questions therefore varied slightly

¹⁰ This data was based on metadata [as of 01/09/2025 for Wave 2 and 10/02/2026 for Wave 3] from Digital Science's Dimensions platform, available at <https://ukri.dimensions.ai/>. Access was granted under licence agreement with UKRI.

between programmes and whether a beneficiary had responded in the previous Wave. However, the core survey questions remained consistent between programmes and whether a beneficiary had responded in the previous Wave.

- **For Wave 1:** The survey was open for a period of approximately three weeks from 15 July 2024 to 3 August 2024 (for six programmes) and for approximately four weeks between 16 September 2024 to 11 October 2024 for the TDD programme. Overall, the survey was issued to 464 recipients across the portfolio (236 responded).
- **For Wave 2:** The survey was open for a period of approximately six weeks from July to September 2025, issued to 220 recipients across the portfolio (145 responded).
- **For Wave 3:** The survey was open for approximately four weeks between January and February 2026, issued to 347 recipients across the portfolio (201 responded).

A.23 Table A-2 shows the beneficiary survey response rates and number of responses from unique organisations within each of the seven programmes.

Table A-2: Beneficiary survey response rates and overall number of responses (all Waves)

Programme	Number of responses	Number of beneficiaries sent the survey	Response rate
ZEHID	85	125	68%
CCAM	146	179	82%
Hydrogen	26	29	90%
FOAK	74	102	73%
Maritime	196	481	41%
Net Zero propulsion	28	76	37%
TDD	27	39	69%
Total	582	1,031	56%

Source: Steer-ED survey response analysis, 2026

A.24 Across the LMT portfolio, the beneficiary survey achieved the following project response rates per Wave:

- Wave 1 = 51%, which is still considered good representation.
- Wave 2 = 66%, which is still considered good representation.
- Wave 3 = 58%, which is still considered good representation.

Depth interviews with beneficiaries and wider stakeholders

A.25 The qualitative research component comprised one-hour depth interviews conducted with programme beneficiaries and a selection of wider stakeholders. The interviews were held using MS Teams and were guided by a topic guide.

Beneficiary interviews

A.26 As Table A-3 shows, a total of 183 interviews were undertaken with project beneficiaries (project leads, and in some cases project partners) during the three-year LMT research period, split per Wave as follows:

- Wave 1 – 70 interviews.
- Wave 2 – 61 interviews.

- Wave 3 – 52 interviews.

A.27 The number of interviews undertaken varied by programme, in accordance with the number of stakeholders involved in the programme. The ZEHID and CCAM programmes were a key focus for beneficiary interviews due to the substantial number of beneficiaries participating in these initiatives.

Wider stakeholder interviews

A.28 Interviews with wider stakeholders took the same format and were conducted with a selection of knowledgeable industry stakeholders (from both commercial and academic institutions), based on recommendation by IUK and programme sponsors. These interviews were conducted over the three-year research period under the LMT portfolio. As Table A-3 shows, a total of 118 interviews with wider stakeholders were completed across all three research Waves combined.

- Wave 1 – 53 interviews.
- Wave 2 – 50 interviews.
- Wave 3 – 15 interviews.

A.29 Priority was given to programmes with the largest funding allocation, and therefore ZEHID and CCAM were a key focus for wider stakeholder interviews.

Summary

Table A-3: Beneficiary and wider stakeholder interviews (all Waves)

Programme	Number of Beneficiary Interviews	Number of Wider Stakeholder Interviews
ZEHID	24	27
CCAM	52	18
Hydrogen	11	16
FOAK	29	16
Maritime	38	22
Net Zero Propulsion	18	9
TDD	11	10
Total	183	118

Source: Steer-ED interview analysis, 2025

Interview notes and analysis

A.30 All interviews were recorded and transcribed using the automatic transcription facility on Microsoft Teams. A note-taker also attended each interview and took detailed notes of the conversation between the interviewer and the interviewee.

A.31 Following the interview, the notes taken by the note-taker and any notes taken by the interviewer were either manually coded or analysed using qualitative analysis software, Atlas.ti. Both forms of analysis were guided by a coding frame aligned with the study's research questions and topic guide to ensure consistency. Coding was conducted by the programme leads and project team support to ensure consistency and reduce bias, with openness to emerging themes.

- A.32 Learnings from these interviews, supported by quotations, have been provided throughout this report.

Case studies

- A.33 A total of 21 case studies have been developed for the monitoring commission (two, three or four case studies for each programme). These are presented as vignettes within the report and as separate full write-ups within remaining parts of the appendices. The case studies were developed through interviews with project leads and supporting desk research. All case studies have been reviewed by the programme's independent panel of subject-matter experts, selected for their expertise in relation to the programme or technology in question. This provides a valuable external perspective on the importance and potential long-term impact of the technology in question.

B Case study: The EvolvAD project

Introduction	
Value	Project cost is £4.2m, Offer Grant is £2.2m
Duration	33 months
Start date	07/01/2023
End date	03/31/2026
Context & Objectives	
Project summary	Building upon previous Nissan research, evolvAD¹¹ is a £4.2 million initiative funded (£2.2m) via the CCAM programme, which aims to develop an automated vehicle AV capable of safely driving in residential, urban, and rural environments. The five project partners focus on high definition map generation and validation, alignment with multiple complex operational design domains and improving interactions in complex urban environments with vulnerable road users. The project was supposed to run for 21 months, between July 2023 and March 2025, but was granted a 12-month extension until March 2026 to deliver a few additional work packages to conduct a final demonstration during the Cenex Expo week, as well as to begin the study towards the commercialisation of the technology. As a lead partner, Nissan's role is to lead the development of the connected and autonomous vehicles (CAV) trialled for the project. Other project partners include: • Connected Places Catapult: Applying advanced machine learning techniques to generate high-definition maps of aerial imagery. • Humanising Autonomy: UK supplier with advanced vulnerable road users (pedestrians, cyclists and motorcyclists). • SBD Automotive: Providing onboard cybersecurity and advanced safety case for taking the driver out of the vehicle. • TRL: Developing vehicle system validation processes utilising infrastructure on the Smart Mobility Living lab testbed. As of September 2025, the project has resulted in successfully running 2,000 autonomous test miles¹² and 45 people working on project delivery.
Context	evolvAD is the third consecutive autonomous driving project completed by the Nissan research team since 2017. The first project, HumanDrive, ran from 2017 to 2020, and aimed to develop an AV capable of safely driving on highways and motorways. The project culminated in sending a Nissan LEAF on a self-navigated

¹¹ <https://www.evolvad.co.uk>

¹² <https://www.evolvad.co.uk/outcome>

	drive for 230 miles, with the system making decisions about how to navigate roads and obstacles encountered on a journey, directing the car to change lanes, merge with traffic and stop and start, when necessary, at roundabouts and traffic signals. Between 2020 and 2023, Nissan also ran their ServCity project which aimed to help cities harness the latest autonomous vehicle technologies and successfully incorporate them into a complex urban environment. ServCity tested vehicle technologies on board a Nissan LEAF in the lab, before public road testing in London at TRL's Smart Mobility Living Lab. For the first time the research team accessed direct communication from the infrastructure (e.g., CCTV) to inform their work. After successfully completing testing in both highway / motorway and complex urban environment, Nissan applied for the CCAM programme in 2023, and secured funding for evolvAD – a project aiming to take the technology further and lead testing in residential and rural roads. Residential and rural roads present their own unique set of challenges for autonomous driving (AD) technology. For example, in residential areas, drivers often face narrow roads, single lanes with parked vehicles on either side and slow driving speeds. Rural roads can include similar conditions but with higher driving speeds and winding roads with little to no road markings. Testing AD in these environments is of strategic importance for the UK. The technology was previously tested in the US and Japan – countries with very different driving culture and road infrastructure – leaving knowledge and technological gaps to be further explored by Nissan's UK team. For instance, the team considered pedestrian and cycling behaviour and patterns, and built on their ServCity findings, by focusing on how to navigate mini roundabouts, speed humps, and Pelican crossings in residential and rural areas in the UK.
Objectives	1. Nissan is conducting 'Autonomous mobility service' research globally in Japan (Nissan Research Centre), the UK (Nissan Technical Centre Europe), and the US (Nissan Advanced Technology Centre, Silicon Valley). This includes the latest 'Easy Ride' Serena AD vehicle testing in Yokohoma, Japan, where the company is aiming to launch autonomous mobility services. 2. evolvAD contributes to Nissan's ongoing global development of autonomous mobility efforts, sharing insights and data to understand how the technology can be tailored to perform safely across different driving conditions worldwide. The project has four key objectives: 3. Bring together a UK Government-funded consortium of experts to further enhance autonomous drive capability and technically support supply chain readiness 4. Nissan will contribute to the project aim by further establishing autonomous drive (AD) technology capability in the UK in collaboration with consortium partners 5. Enable 100% electric Nissan LEAFs equipped with cutting-edge AD technology to be put through their paces on urban residential and rural roads 6. evolvAD builds on successful Nissan-backed AD research projects, HumanDrive and ServCity, and contributes to the advancement of AD

	technologies at Nissan as the brand accelerates towards its Nissan Ambition 2030 long-term vision for empowering mobility ¹³ .
Project Activities	
	Since July 2023, the five evolVAD partners – Nissan, Connected Places Catapult, Humanising Autonomy, SBD Automotive and TRL – have worked to technically support UK supply chain readiness for future mass deployment of AD technologies in the UK. The focus area of process activities is trialling advanced AD technology in built-up residential and rural areas. During evolVAD, Connected and Autonomous Vehicles (CAVs), were tested by Nissan in various simulators and on private test-tracks before being introduced onto urban residential and rural roads. For higher speed routes on winding roads with no markings in rural areas, Nissan has introduced a chassis control system for the AD vehicle to enhance the braking and steering performance, allowing the system to behave with a level of competence comparable to an Advanced Driver. In the urban environment, using infrastructure such as CCTV on residential streets, the evolVAD CAVs received information to improve situational awareness, creating a unique case study on how vehicle to infrastructure (V2I) can be used to enhance the performance of CAVs, as well as developing all-new V2I technologies. Project partners also led on a series of evolVAD activities. SBD Automotive focused on ensuring the safety and security of the AD technology. First, a safety case study was developed for taking the test driver out of the vehicle. Whilst the safety driver remained in the vehicle during the evolVAD trials, the research is important for future technological applications. The team also explored the cybersecurity threats the technology can be vulnerable to, especially if used as a mobility service. TRL's activities focused on supporting the Smart Mobility Living Lab and worked to design test specification standards for suppliers delivering AD components and testing systems in the UK. Connected Places Catapult developed a low-cost, high-definition map using aerial images that, whilst not utilised by evolVAD (as was ready upon trial completion), may be used in future projects. Humanising Autonomy's role in the project was to use facial recognition technology and help decipher pedestrian intentions (e.g., what is the probability of a pedestrian crossing the road). However, the organisation went into administration at the end of March, just as the project was close to completion. In addition to the core activities mentioned above, Nissan secured a project extension until March 2026. This comprises the delivery of an additional package of work focused on efforts to commercialise the technology in the UK. Nissan is already planning to launch AD mobility services in Yokohama, Japan, in 2027. The additional evolVAD work package aims to build a business case demonstrating that the UK could be the entry point for expansion of these efforts in Europe. The document will consider potential factors for expansion, including variations in the built-up infrastructure, policymaking and regulatory framework. In

	August 2025, the team is conducting consultations with local authorities in the UK to inform the document and create a methodology for replicating these efforts to different geographies in the future. The final draft will contain criteria for assessing the potential for launching CAVs in different geographies and explore what social value can be delivered and then maximised as part of the commercialisation efforts. Key project success factors included being able to draw learnings from the safety cases developed for the HumanDrive and ServCity projects. The team could utilise six years of previous project experience and adapt pre-existing safety cases to residential and rural areas instead of building those from scratch, saving valuable time and resource. A key project challenge that remains is securing public acceptance for commercialising AD technology in the UK and globally. Whilst a media event, led by Nissan in March 2025, showcased that the public is mostly positive towards the prospect of launching autonomous vehicles, the research team still needs to identify and secure the support of a local council to pursue next steps for commercialisation in the UK. The project extension aims to take these challenges into consideration and explore topics such as how to prevent acts of vandalism or ensure autonomous vehicles successfully interact with the whole local transport ecosystem, including public transport. Another challenge for commercialisation is the cost associated with launching the technology more widely. That is why Nissan is aiming at launching a mobility service for public use, as opposed to a vehicle equipped with AD technology that can be purchased for personal ownership. A challenge for the whole CAM ecosystem is the lack of wider coordinated activities and knowledge exchange. Whilst some activities were organised by the CCAM programme leads, more nation-wide efforts are required to stimulate CAM technology acceptance with trials across the UK. As a lead organisation, the team at Nissan reported having positive experience with applying for the CCAM programme and delivering the programme of work after being successful. Having applied for similar programmes in the past, the team felt well prepared for the application process, which was in line with their expectations. One suggestion was made around shortening some of the timelines. This included being able to apply soon after the programme is announced instead of waiting for months and being able to find out the application outcome sooner. Another suggestion was tailoring the criteria depending on whether the application covers a new / existing project or based on project size / length, as currently the requirements and amount of preparation needed are the same for all projects.
Outcomes & Impacts	
Outcomes	Overall, 12,000 autonomous miles were driven with 0 accidents across all three projects (HumanDrive, ServCity and evolvAD). evolvAD alone includes £4.2 million in investment, 2,000 autonomous test miles ran and 45 people working on project delivery.

	According to Nissan, one of the key project outcomes was building stronger rapport with project partners, universities and other experts from the wider CAM community. For instance, the team held conversations and shared experience with Zenzic and the Advanced Propulsion Centre UK – two organisations who worked together to launch a new future mobility accelerator. Nissan also worked closely with government and trade bodies, including with IUK, Auto Council, the Society of Motor Manufacturers and Traders, DfT and DBT. The Nissan research team built better understanding of the work and expertise of their project partners, which helped them gain wider insight on which organisations they might potentially want to include in future projects. This was considered particularly important takeaway as Nissan approaches their planned commercialisation stage, and the choice of project partners is more important than ever. They also worked with Leeds University, Cranfield University and Nottingham University and will continue to preserve the relationships built as a result of evolvAD in future. The project extension will look into building on these relationships further and attempt to identify local partnerships that can support the commercialisation activity. Another valuable outcome was building a stronger understanding of how to tailor the AD technology for the UK market. The project findings helped tailor the AD technology developed in Japan for European and UK road infrastructure and driving style. A new supplier was also chosen based on these findings, which was considered an important legacy for next generation projects led in the UK. Finally, an important outcome was engaging in activities to promote the programme progress. In 2025, evolvAD demonstrations were completed for both the media and UK government. This included an event in London with government ministers, automotive groups and potential host councils which took place in February 2025, as well as an event in the Nissan Technical Centre Europe in March 2025 with media and influencers. The technology was presented at the Cenex Expo – a conference bringing together the UK innovation community working on net zero and connected automated mobility research.¹⁴The event took place at the beginning of September 2025 in Millbrook, where 20 guests were invited by Cenex to Nissan Cranfield to experience the technology first-hand. It is also expected that the project’s technological learnings and data collected will be an important outcome for the wider research community and will be used to support the development and launch of CAM technologies in future.
Impacts	Nissan’s team felt that it is too early to report on impacts achieved as a result of the project. However, it is anticipated for multiple long-term impacts to be realised in future both for Nissan and for the wider economy, society and the environment. The team felt that the research project was successful in driving Nissan’s knowledge and understanding of how AD technology performs across challenging

¹⁴ <https://cenex-expo.com/>

	driving environments. The technology has made driving safer by reducing human error, and cleaner by improving efficiency. It is anticipated that this technology can enable access to mobility to many more people who may not have it today due to location, age or disability. Bringing mobility to underserved locations is in turn expected to improve equity and access to opportunities. From the point of view of local and central government, the technology can help decarbonise and reduce congestion, as well as stimulate the local economy and provide services to underserved communities. However, challenges remain in the future around how these potential impacts can be measured, including data availability and building impact assessment methodologies. From Original Equipment Manufacturer (OEM) point of view, a potential long-term benefit could be pivoting into mobility services as a new business model. This could bring a new revenue stream for Nissan but also transform the entire supply chain and introduce new employment opportunities in the CAM sector. If Nissan's commercialisation plan in the UK is successful and the technology is introduced in selected local geographies, it can also be anticipated for the UK to become a smart cities specialist on a global level, attracting investment, skills and expertise for future AD technology development. To help enable that, greater CAM ecosystem-building activities are required in the UK, to support sharing of learnings and data, and could be promoted via future IUK programmes and the Catapult Network activities.
Additionality	Globally, Nissan has a dedicated AD team in both Japan and the US, leading AD trials before the evolAD project was launched in the UK. The team located at the headquarters in Yokohama are a step ahead in their commercialisation journey, actively working to launch an AD mobility service in 2027. They work closely with the UK team, by sharing emerging learnings and offering secondment / upskilling opportunities for one of the UK engineers. However, despite this ongoing support, the UK team felt that Nissan could have decided against launching AD trials in Europe, without the dedicated CCAM funding secured for evolAD, as well as the funding secured for previous projects, such as HumanDrive and ServCity. In fact, the first Nissan AD engineering team in the UK was set up because of the funding provided for the HumanDrive project. Securing funding for evolAD prevented this team from being disbanded and further contributed to its expansion to five AD engineers, one test engineer, one technician, and one test technician working on the project.
Successes and lessons learnt	
Key lessons	As a lead delivery organisation of evolAD, Nissan learnt important lessons regarding the adoption and application of project management processes. One of the project partners, Humanising Autonomy, went into administration in March 2025 just as their key project outputs were due to be submitted. As a result, that component of the research could not be delivered. It was suggested that in future deliverables are scheduled to be submitted in stages throughout the project lifetime instead of at the end to avoid delays. Another delivery challenge mentioned was around the high staff turnover, which led to skill loss across the team. For instance, project Monitoring Service Providers

	were particularly hard to retain. The team responsible for co-leading and project managing evolvAD at the Connected Places Catapult also experienced staff turnover. However, the consortium showed agility in these challenging situations and still managed to deliver the project on time and meet wider project objectives. Finally, Nissan’s research team in the UK was responsible for submitting multiple financial forecast predictions to the headquarters in Japan. The lead team in Japan further showed very strong interest in the development of the core AD technology. Overall, these reporting processes and ongoing conversations highlighted that a lot of research is still required to identify best customer practices for the UK market, and social value requirements, including accessibility criteria, and how to accommodate wider inclusion needs. The aim for Nissan UK is to use these research efforts and become a global role model on how to maximise social value via AD technology.
Next Steps	Following the successful delivery of evolvAD and previous projects, Nissan are now shifting towards studying the readiness of the UK to introduce AD systems. The intention is to continue working in this space beyond project completion in March 2026 and effectively start making the necessary adjustments to take the technology to the selected geography for commercialisation with an appropriate service design to suit the local area. The team is working to identify gaps, address operational design domains (ODDs) or adjustments needed to take this work forward, compiling the necessary data to select a suitable city for launching a mobility service in the UK around 2030. Working with partners, the team in Cranfield will continue their research to develop a 360-degree understanding of infrastructure and regulatory needs across the country and provide critical insights to policymakers and urban planners to ensure a successful introduction of AD mobility service around 2030.

C Case study: Project Harlander

Introduction	
Value	Project cost is £10,196,420, Offer grant is £5,487,017
Duration	32 months
Start date	March 2023
End date	October 2025
Context & Objectives	
Project summary	The Harlander project has been awarded funding through the Commercialising Connected and Automated Mobility: Deployment programme, which sought to support new automated transport service projects. The Harlander project aims to establish Northern Ireland's first self-driving passenger service on mixed-use public roads in a 2,000-acre Belfast Harbour Estate. The project seeks to solve the transportation challenges in the Belfast Harbour area by delivering four electric shuttle buses (called Harlander) integrated with Level 4 autonomy software that would trial last-mile connectivity between Titanic Halt train station and key destinations across Belfast's Titanic Quarter. The project is part of Belfast Harbour's strategic plans and investment, underscoring its commitment to enhancing local infrastructure utilising cutting-edge technology. The Harlander project is led by Belfast Harbour, working with ANGOKA (providers of cybersecurity infrastructure), British Telecommunications (providers of 5G mobile network and security expertise), eVersum (providers of the shuttle buses), Oxa (providers of the self-driving software stack-Oxa Driver), and HORIBA MIRA (providers of the driving safety assurance and validation for real world autonomy). Despite initial delays to the start of the project, due to a partner leaving the consortium and the rescoping of the project, the eight-seater Harlander buses have been launched to the public in Belfast Harbour after the successful completion of a 3-month closed door testing. The vehicle provides low-carbon transport from public transport hubs to destinations across the Titanic Quarter and Queen's Island with a safety operator on board and is currently carrying passengers for free. The successful delivery of the Harlander project has led to the development of new products and services such as an electric autonomous passenger shuttle (eVersum) and a new safety assurance test for level 4 autonomous vehicles (HORIBA MIRA) which are available for purchase. Other partners such as Oxa have now discovered new use cases for their technology, formed new partnerships and are exploring different routes to commercialise the outputs from the project. For

	Belfast Harbour, the success of the project has established them as a hub for innovation and a testbed for autonomous vehicles. They are now in talks with councils, governments and the private sector regarding deploying new AVs and are seeking other funding opportunities to expand the routes in the public realm. In future, the Harlander shuttle buses are expected to contribute to the reduction of transport-related carbon emissions within the wider Belfast Harbour Estate.
Context	The Belfast Harbour Estate is a 2000-acre area on Belfast's waterfront that serves as Northern Ireland's primary maritime gateway and economic hub. It hosts about 760 businesses and handles significant trade and passenger traffic. Belfast Harbour is currently facing rising demand for public transport in its wider estate, particularly the Queen's Island and Titanic Quarter area and suffers from significant congestion due to limited access points. The Harlander project, supported through the Commercialising Connected and Automated Mobility: Deployment programme is addressing this problem. It seeks to deploy four autonomous electric shuttle buses that would trial last-mile connectivity between the Titanic Halt train station and key destinations across Belfast's Titanic Quarter such as the Innovation District, the Northern Ireland Science Park and Belfast Metropolitan College and the Titanic Belfast exhibition. Electric autonomous vehicles offer a route to provide clean, efficient, and affordable public transport that aligns with net zero targets and connectivity to other modes of transport. This makes them suitable for Belfast Harbour. The project is expected to benefit commuters travelling to Catalyst as well as students attending Belfast MET, together with visitors to the estate, providing intra-port connectivity. The Harlander project is part of Belfast Harbour's broader "Smart Port" strategy, which aims to integrate cutting edge technology to improve infrastructure and sustainability. The Harlander project is led by Belfast Harbour who are the project lead, overseeing the deployment of the shuttle buses. Other partners in the project are: ANGOKA (a software company based in Belfast) responsible for the cyber security of the remote operation of the vehicles in the Harlander project, and for system-wide Vehicle-SOC, preventing unauthorised access and ensuring passenger safety. British Telecommunications (a British multinational telecommunications holding company headquartered in London) provides advanced connectivity powered by its extensive 5G mobile network, along with their security expertise and innovative solutions. eVersum (a high-tech original equipment manufacturing company headquartered in Austria, specializing in the design, development, and production of electric commercial vehicles and platforms, primarily focused on passenger transport solutions) provides the eShuttle buses. The eShuttle is a mid-sized complete low-floor accessible shuttle bus that is low noise and designed utilising the latest zero-emission technology. The eShuttle is also designed for inner-city and last-mile transport. Oxa (an autonomous vehicle software company headquartered in Oxfordshire, England) provides the self-driving software stack called Oxa Driver which powers the eShuttle buses. Oxa Driver enables safe and efficient self-driving. The system is

	highly modular and customizable and can be retrofitted as a complete solution or integrated into co-developed autonomy solutions in full or at a component level. HORIBA MIRA (an automotive engineering and development company headquartered in Warwickshire, UK) provides safety assurance and conducts validation activities, helping to establish confidence in the shuttles' performance. The Harlander project is a vital component in the Belfast's sustainable transport plan as current visitor numbers of over 3.6 million people a year are predicted to rise to more than 5.6 million by 2035 as a result of a major investment program. The project is therefore helping to support Belfast Harbour's delivery of its Strategic Transport Masterplan for Queen's Island and is an initial step towards wider implementation of autonomous vehicles in the UK.
Objectives	The main aim of the project is to solve the transportation challenges in the Belfast Harbour Estate area with the deployment of four autonomous passenger shuttles running between local transportation links, through Belfast's Innovation District and major tourist attractions including the Titanic Belfast. The project also aims to deliver the most advanced autonomous service in the UK, inspire and inform sustainable future travel solutions and bring cutting-edge technology to the market through the deployment of the four shuttle buses. Alongside this, the project aims to investigate public acceptance of autonomous shuttles within existing public transportation and help people understand how autonomous transport options can complement public transport in the Belfast Harbour Estate area. In the long term, it is expected that the project will expand the use of autonomous vehicles in public transportation, with fleets of vehicles remotely monitored from control centres.
Project Activities	
	The project is structured into seven main work strands. The first work strand involves the vehicle delivery, certification and integration. During the delivery of this work strand, the project team ran into some technological challenges. The initial scope of the project was to deliver a level four unattended passenger service with four autonomous shuttles in Belfast Harbour Estate. A level four autonomous vehicle can drive itself without human intervention in specific conditions and environments. Early in the project, it became clear that the technology itself was still immature and not yet capable of supporting high automation. The project had to be rescoped to reflect the maturity level of the technology (by having a safety operator onboard rather than the shuttles buses being fully unmanned) and the number of autonomous shuttles buses to be delivered was reduced from four to two. Another key challenge during this stage, was the early withdrawal of the project partner REE from the consortium, who were supposed to provide the shuttles buses, but decided the project was not sufficiently aligned with their current strategic direction. This led to project delays, as the project lead had to find new autonomous vehicle and software stack providers, resulting in a three-month schedule slip. However, the project lead (Belfast Harbour) in collaboration with

	Innovate UK were able to identify and secure new partners Oxa and eVersum to deliver the two shuttle buses that would work with a safety operator onboard. The second and third work strands focus on safety and infrastructure respectively and involve conducting safety assurance tests and setting up the infrastructure needed such as bus stops and signage. The fourth work strand focuses on cyber security installations and trials on the shuttle buses. The fifth work strand focuses on managed services and involved installing the platforms and ingesting data from vehicle and security logs from the Vehicle Systems Management System (VSMS) into the Vehicle Operations Control System (VOCS) to enable better monitoring, control and decision making in the eShuttles, while the sixth work strand involves route mapping and setting up the internet connection for vehicle data upload. The seventh work strand of the project involves exploitation activities such as events and press engagements. All the infrastructure and operator related work strands have been completed and were followed by a closed testing of the shuttles buses to allow Harlander's systems to map the route. The project is now close to complete, and Belfast Harbour have taken delivery of an eight-seater driverless electric shuttle buses with a safety operator on board. The second shuttle bus is on track to be launched into the public service in the coming months.
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Outcomes & Impacts	
Outcomes	In July 2025, Northern Ireland's first self-driving bus service was launched heralding the start of a 3-month pilot in Belfast's Titanic Quarter. The driverless electric shuttle bus will run every 20 minutes along a one-mile route between Titanic Halt Train Station and Catalyst, serving both commuters and tourists for free. The pilot will run for eight weeks ending in late September 2025 and mark the start of a multi-year initiative aiming to have Level 4 services operating in the Belfast Harbour Estate by 2029. Participating in the Harlander project had positive effects for all the partners involved. Overall, the activities embarked on as part of the project led to the development of numerous outputs including new IPs and products that have potential for commercialisation in the future. Specifically, the project enabled HORIBA MIRA, to develop a detailed sample safety assurance case which demonstrated their capability to lead full end-to-end safety assurance programmes for future automated vehicle deployments. As a result, they have now developed a new level 4 testing for autonomous vehicles that is now on the market. As a result of the Harlander project, OXA and eVersum have increased their technical capabilities. For OXA, the integration of their self-driving software with the eVersum eShuttles has progressed their capabilities in offering a safe, secure and efficient way of deploying new shuttle fleets at scale. This successful integration has now been added to Oxa's portfolio to showcase their use case on passenger vehicles. Similarly, because of the project eVersum has now developed a new Level 2 autonomous vehicle platform with high capacity of passengers and disabled access that could be used in the UK fully integrated with the Oxa Driver

	and AV stack. The project team reports that there are now potential buyers for eVersum's new vehicle. For Belfast Harbour, the project has greatly increased their knowledge of autonomous vehicles which will be helpful with planning for the future in Belfast Harbour and Northern Ireland. In addition, the project team comments that by launching the UK's first fully autonomous passenger shuttle on public roads, Belfast Harbour has established itself as a key testbed for connected and automated mobility technologies. As a trust port that reinvests in innovation, it is now positioned to serve as a forward-thinking hub bridging the needs of port logistics with urban mobility and advanced technology trials. Belfast Harbour says that they are already having conversations with UK and overseas stakeholders, service providers and non-traditional operators regarding the deployment of autonomous vehicles. In addition, other government departments are now interacting with them to learn about challenges, benefits and changes required to deploy autonomous vehicles in public roads.
Impacts	The impacts of the Highlander project is yet to emerge. However, the project has the potential to show that the UK is competing with passengers with countries such as the US, China and Singapore in the global race towards the deployment of autonomous vehicles on public roads. Potentially, the project will benefit the Northern Ireland region and Belfast economically. The Harlander project plays a key role in Belfast Harbour's wider "Advance Regional Prosperity" strategy, which includes major investment in port infrastructure and estate regeneration. By strengthening Belfast's position as a Smart Port and innovation hub, the Harlander project will potentially help attract further investment in future and support the city's ambition to lead in next-generation mobility. In addition, some of the outputs of the projects have the potential for commercialisation in the future. For Oxa, the project is expected to assist with commercialisation of the product in future. They are actively building on the success of Harlander by pursuing other projects with, eVersum, focusing on near-term passenger transportation deployments in off-road environments e.g. airport and ports. This integration and collaboration is critical to their strategy of expanding into different operational domains. They report that there is a possibility to continue beyond the trial period to fully commercialise the outputs of the project. In terms of the environment, the project will potentially enable the reduction of transport-related carbon emissions within the wider Belfast Harbour Estate. The shuttle buses are electric, producing no tail pipe emissions, and directly contributing to the reduction of transport-related carbon emissions. Also, the shuttle buses are designed for last mile connectivity- from the Titanic Quarter railway station to key destination and will significantly contribute to cutting the reliance on private vehicles, easing traffic flow and lowering congestion related emissions. Furthermore, the project is a key part of Belfast Harbour's wider Environmental, Social and Governance and Smart Port strategy, supporting its goal of becoming a net-zero regional port. Insights and data gathered from the initiative

	will guide future sustainable transport planning, including the development of digital twin models and smart infrastructure solutions.
Additionality	The funding provided under Commercialising Connected and Automated Mobility: Deployment programme was essential to the initiating of the project. Belfast Harbour state that the project would not have happened without the funding as it helped to derisk the investment for the consortium. Consultations with project partners highlighted that the programme enabled the building of a large consortium from the different parts of the autonomous vehicle supply chain to develop a component-themed project. They also comment that the Innovate UK team had the expertise to enable the understanding of the project and provided guidance and advice.
Successes and lessons learnt	
Key lessons	Project Harlander provides important lessons into the technical, operational and collaborative aspects of the deployment of autonomous vehicles in the real world and identify success factors for similar future projects. First, a commercial agreement should be in place for partners who rely on close collaboration to achieve specific project milestones within a consortium. Not having an agreement for the partners involved in the vehicle and technology stack made collaboration difficult initially. But this was eventually resolved by the project lead. Second, the project highlighted the need to evaluate the maturity of both technology and the suppliers involved in the deployment of autonomous vehicles. The project team discovered that not all technology solutions are deployment-ready and assumptions about capabilities can lead to delays. Also, it is important to address any critical interdependence between partners in advance, ensuring that if one company changes its strategy, the other is not left unsupported. Third, to succeed, the deployment of autonomous vehicle projects requires the establishment of clear responsibilities and clarification of partner roles, expertise and contributions. One of the key successes of the project was finding new partners for the delivery of the shuttle buses. Belfast Harbour working with the CCAV and Innovate UK team were able to find new partners and took proactive steps to bring the new partners on board, finalise legal agreements and ensured their alignment and support for the project's direction. Also, the early recognition that neither a vehicle nor an autonomy stack was in place allowed Belfast Harbour to quickly realign its efforts, prioritising the development and integration of both from the outset. Also, finding new partners for the delivery of the shuttle buses. Another success was working with stakeholders to design the interior of the shuttle buses to be accessible. The Harlander shuttle bus is mid-sized with low-floor accessible shuttle bus. The low-floor design particularly beneficial for passengers with mobility impairments or those using wheelchairs. The shuttle bus also has interior elements such as handrails and accessible stop buttons - key features that support passengers with limited mobility or visual impairments. Another key enabler was having a strong project management team on the side of Belfast Harbour that was able to keep the partners working together especially

	when their internal strategic direction changed. This ensured that the project kept progressing to meet its objectives and stayed aligned with its intended outcomes. Also, the size of the consortium required a concerted effort to establish a strong, collaborative working relationship among all partners and navigating the diverse expectations and operational styles of each organisation was a challenge. These issues were successfully addressed through open communication, shared problem-solving, and a mutual commitment to the project's success.
Next Steps	The Harlander project is close to complete and the partners in the consortium have embarked on various activities related to the further development of the technologies produced in the Harlander project. Belfast Harbour is looking to see if they can extend the project through to 2026 and they are seeking other funding opportunities to expand the routes in the public realm. They are also looking at opportunities in the port side for Belfast's industrial autonomy.

D Case study: DriveSafe AI Project

Introduction	
Value	Project cost is £2,791,758
Duration	22 months
Start date	9/1/2023
End date	6/30/2025
Context & Objectives	
Project summary	In 2023, Wayve and Warwick Manufacturing Group (WMG), University of Warwick received funding from the Commercialising Connected and Automated Mobility competition (CCAM) under the Supply Chain theme to embark on the DriveSafe AI project. The DriveSafeAI project was a collaborative research partnership that aimed to develop a safety assurance framework for Artificial Intelligence (AI) systems in assisted and automated vehicles (AVs). The project was led by Wayve a leading developer of Embodied AI technology for automated driving and the WMG, a multi-disciplinary department at the University of Warwick renowned for tackling industrial, environmental and societal challenges through collaborative research with companies. WMG is globally recognised, undertaking a programme of research and engineering across the verification and validation spectrum and members of its research and engineering team sit on global standards committees. The project is now complete and progressed as expected. The project team launched a microsite through which Wayve and WMG will share their research on AI safety assurance in assisted and automated driving technology. In the long term, the outputs developed as part of the project is expected to potentially generate the evidence to underpin industry-wide standards and international regulations for the safe deployment of AI in automated vehicles, build confidence in the AV ecosystem and pave the way for the commercial deployment of AV technology globally.
Context	AI is important in enabling self-driving cars understand their environment, make decisions and drive safely. Despite the potential benefits of self-driving cars safety remains a big challenge and is related to the development of trust and acceptance in the technology. While safety is an important issue in the deployment of AVs, ensuring it is challenging due to the absence of a universal safety standard and the numerous versions of AI software. The complex and rapidly evolving nature of automated vehicle technology has led to various approaches to standardisation by different organisations.

	Demonstrating the safety of AI in AVs is crucial to the successful deployment of self-driving vehicles and realising the accompanying benefits. There needs to be safety validation based on well-defined standards within which self-driving vehicles would operate. This will confirm that algorithms developed and used in AVs are able to meet specified safety standard and function as intended. The industry expert interviewed highlighted that algorithms developed for AVs must be able to perform and adhere to safety standards hence the need for validation. So far, there has been little guidance regarding the specification, design, and verification of functionally safe AI systems, or how to apply AI technology for functions that are safety related. The DriveSafeAI project aimed to address the need for independent safety validation required by policy makers to build confidence in the safe use of AI in AVs. The project was led by UK AI company Wayve and WMG, University of Warwick. Wayve is a leading developer of Embodied AI technology for automated driving. The company develops advanced AI software and foundation models for autonomy that enable vehicles to perceive, understand, and navigate any environment, enhancing the usability and safety of autonomous driving systems. Wayve contributed its expertise in building AI systems and developing end-to-end machine learning for self-driving to the project. WMG is an internationally renowned research organisation. The organisation contributed its expertise in safety assurance and safety processes to the DriveSafe AI project.
Objectives	The DriveSafe AI project had four objectives: • To build safe assurance methods for the development of AI systems • To add datasets on Safety Pool for testing and training • To develop a methodology for simulation tools • To develop a rationale for AI safety architecture
Project Activities	The DriveSafeAI project had four work packages: Work package one: The development of evidence for a generalisable AI safety framework for self-driving, aligned with internationally recognized ODD-based safety assurance methods. This included evidence of the completeness of data for scenario training and testing. Work package two: This involved testing various approaches to scenario generation and publishing selected scenarios on Safety Pool™. The aim was to support industry efforts to build a shared scenario library for training and testing. Work package three: The development of evidence to inform simulation validation guidelines by comparing model performance in real-world and simulated environments. Work package four: The development of a design rationale for a redundant safety architecture in AI-based systems and share safety recommendations for the industry. In terms of challenges, the WMG identified no challenges. However, they commented that the accelerated development of AI required the project team to develop a safety assurance approach that is agonistic and applicable to all technologies. A key success factors in the project has been the collaboration between Wayve and WMG. Both teams have been able to work collaboratively on the research,

	deliver panel discussions at events and highlight the need for domain specific standards regulations to the AV ecosystem. In terms of their experience with LMT, Wayve and WMG had different responses. The experience of LMT has been positive for WMG as they were familiar with the application process and the requirements were clear. However, for Wayve, the bidding for the project required enormous resources and was challenging to navigate.
Outcomes & Impacts	
Outcomes	The DriveSafeAI project was recently completed (September 2025), therefore it is too early to report on the outcomes achieved. So far, the project has produced a taxonomy of the dataset that will be made into a standard and shared with the public in future. As part of the project, WMG and Wayve launched the DriveSafeAI microsite. The microsite is a dedicated platform through which Wayve and WMG can share insights, research, and tools focused on AI safety assurance in assisted and automated driving technology with industry professionals, researchers and policymakers. The resources provided will potentially help regulators build confidence in the use of AI in assisted and automated vehicles. Wayve and WMG have presented the concept and framework used in the DriveSafeAI project at various events and conferences such as the ADAS and Autonomous Vehicle Technology Expo which held in Stuttgart in 2024 and the MOVE mobility conference in which was held in London in 2024. At both events, the project team discussed the importance of safe AI for self-driving technology, highlighting the DriveSafeAI project as a prime example of how industry and academia can work together to develop safety methods and tools that inform future regulation. The DriveSafeAI has led to the creation of new roles within the WMG and Wayve team, thereby building skills and capacities in AI. For example, WMG has funded three positions within its research team including research fellows and postdocs that work on the DriveSafeAI project. Similarly, Wayve has created a new data set team of comprising of 5 people working full time on the machine learning engineering and simulation aspects of the DriveSafeAI project. The project has led to new collaborations. For example, Wayve was involved in the development of the BSI behavioural competency, helping to shape early drafts and created an independent advisory committee. As a result of the project, WMG is also engaging with groups, networks and policy makers working on regulation in the AV sector as an independent expert.
Impacts	A potential impact of the DriveSafeAI project is the development of an AI safety framework that will potentially build regulator and stakeholder confidence in the use of AI in AVs. This AI safety framework will drive innovation while ensuring the highest safety standards. Thereby creating a safety approach to AI while enabling scalability and innovation. The outputs from the project will potentially generate the evidence to underpin industry-wide standards and international regulations for the safety of AI, thereby contributing to building confidence in the AV ecosystem and public trust in self-driving vehicles. Furthermore, if successful, the DriveSafeAI project will potentially contribute to establishing the UK's leadership in AI safety by impacting global standards and regulation. Both partners intend to leverage their roles in standards and regulation development to translate DriveSafeAI's evidence-based outputs to shape and

	inform national standards (BSI), international standards (ISO), and regulations such as the United Nations Economic Commission for Europe (UNECE). This will contribute to demonstrating UK leadership at a global level. Members of WMG's research and engineering team sit on global standards committees and have contributed to standards. In terms of potential economic impact, by addressing AI safety, the project could help unlock the economic benefits that self-driving vehicles could bring to the UK. For instance, addressing AI safety in AVs will contribute to accelerating Wayve's path to commercialisation through the deployment of their software stack with an OEM. The expert interviewed for the case study also pointed out that the development of safety standards had the potential to advance the uptake of AVs and could lead to commercialisation in the area of developing testing algorithms and safety assessment for car manufacturers. The expert further noted that, competition could affect commercialisation as there are numerous players developing AVs.
Additionality	CCAM enabled the collaboration between industry and academia required to solve the challenge of AI in safety-critical applications like automated driving. Wayve notes that the funding enabled them to work on AI safety and collaborate with an independent academic partner with expertise in verifying and validating the safety of self-driving technologies. The funding provided by CCAM enabled WMG to provide an independent assessment to the project, which is crucial for ensuring AI systems in AVs are reliable and trustworthy. WMG provided expertise in AI safety, test scenario identification and use of simulation and real-world testing for evidence generation that Wayve did not have in-house. Wayve further added that it would have been challenging to carry out a project on AI Safety without an independent partner. <i>"WMG provided an independent view of how AI safety in AVs should be conducted and crucial expertise on AI safety that we did not have inhouse"</i> The funding also enabled WMG to embark on a new line of research in the area of AI safety and contributed to establishing University of Warwick as a hub for AI safety. The funding provided by CCAM led to the creation of jobs with the WMG team and attracted new collaborations. For example, the WMG team is working on new proposals at the European level. Also, the DriveSafeAI project has established University of Warwick as a hub for AI safety. Additionally, CCAM provided a platform for Wayve to continue moving forward with their work on AI safety and build their leadership in the AI and AV sector.
Successes and lessons learnt	
Key lessons	The success achieved so far in the DriveSafe AI project is driven by the strong expertise of the teams involved. A representative from Wayve stated that the expertise of WMG has been instrumental to the project's progression, highlighting that WMG provided an independent view of how AI safety in AVs should be conducted. The expert partner interviewed pointed out that the successful acceptance of the safety assurance frameworks AI systems in AVs and standards would require co-creation with manufacturers and policy makers. Therefore, the DriveSafe AI project is fundamental first step to addressing issues of safety in AVs and a catalyst for the deployment of AVs.
Next Steps	In terms of next steps, insights and findings from the research will be disseminated widely and published on the DriveSafe AI microsite.

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