

CASE STUDY — INNOVATION IN HIGHWAYS MAINTENANCE

Uncrewed Aerial Systems for Highway Asset Survey and Emergency Response

Evidence submission — Local Highways Maintenance Transparency Report 2026/27 (Department for Transport)

Authority	Milton Keynes City Council (MKCC)
Programme	Adoption of uncrewed aerial systems (UAS) for highway asset survey, audit and emergency response, delivered through the MKCC Innovation Programme
Innovation	Drone-based aerial survey and incident response replacing or supplementing conventional access methods, with outputs feeding GIS and digital twin asset data
Delivered to date	DronePort:MK (September 2023 – March 2025) — DSIT Regulatory Pioneers' Fund project; highways asset audit tested as a priority use case; Operating Safety Case submitted to the Civil Aviation Authority for highways asset surveys
Current status	Drone deployment operational for highway emergency response and incident situational awareness; GIS proof-of-concept survey trials completed across multiple service areas
Partners	Smart City Consultancy, Cranfield University, Cranfield Airport, Satellite Applications Catapult, Civil Aviation Authority, Thales
Forward programme	Project OPERA (UK Space Agency / European Space Agency funded, Thales-led, supported by DfT and DSIT) — 12-month phase targeted to commence October 2026
Transparency link	Innovation and continuous improvement; operative safety; network availability and resilience; asset data quality and decarbonisation

1. Background and strategic context

Milton Keynes has a long-established position as an urban laboratory for new technology, working with public and private sector partners to develop technical, commercial and operational models that deliver better long-term outcomes. The council's Smart City vision anticipates connected autonomous vehicles, robotics and uncrewed aerial vehicles working together to deliver public services. Having already invested in ground-based autonomous service delivery, MKCC has extended that work into airborne services.

For the highway service specifically, the driver is straightforward. Conventional inspection of structures, high-level assets, embankments, verges and hard-to-reach drainage frequently requires working at height, access plant and traffic management — all of which carry cost, carbon, disruption and, most importantly, risk to operatives. Aerial survey removes much of that exposure while producing a richer and more repeatable data product than a written condition note.

The Department for Transport's 2026/27 transparency reporting requirements ask local highway authorities to evidence how they are adopting innovation and moving from reactive repair towards preventative, data-led asset management. MKCC's drone programme is a direct response to that expectation, and is unusual in that it addresses not only the technology but the regulatory and public-acceptance barriers that have prevented most authorities from adopting it at scale.

2. Delivered work: DronePort:MK

Between September 2023 and March 2025, MKCC led the DronePort:MK project, funded by the Department for Science, Innovation and Technology through the Regulatory Pioneers' Fund, working with Smart City Consultancy, Cranfield University and the Satellite Applications Catapult. The project was designed to test demand for drone-based services and to develop technical and regulatory solutions allowing safe, secure operation in a city environment.

Highways asset audit was one of two priority use cases selected and tested, alongside medical delivery. Key outcomes with direct relevance to the highway service were:

- Operating Safety Cases prepared and submitted to the Civil Aviation Authority for highways asset surveys — a substantive regulatory step that most authorities exploring drones have not reached.
- A Target Technical Architecture defining how a local authority can provide oversight and assurance of drone operations in a city centre environment, rather than relying entirely on third-party operators.
- Proof of concept work demonstrating the value of drone-captured data in developing a Digital Twin of the city, providing the asset data foundation for longer-term preventative management.
- A demand pipeline evidencing pull from local authority services for drone-based survey, audit and assessment, monitoring, emergency response, and maintenance and repair use cases.

The council's GIS team has since completed several proof-of-concept trials demonstrating the value of drone-captured survey data across multiple service areas, and drone deployment is now operational within MKCC for highway emergency response and incident situational awareness.

3. What changes on the network

Aspect	Conventional survey / response	Drone-enabled approach
Operative safety	Working at height, rope access or MEWP for structures; operatives exposed to live carriageway during inspection	Personnel remain at a safe standoff position; no working at height and reduced live-carriageway exposure
Traffic management	Lane or full closure frequently required to inspect structures, high-level assets and verges	Most survey work achievable with no closure, removing traffic management cost and disruption
Survey duration	Hours to days for a structure or large site, constrained by access and TM booking lead times	Overhead scan of a site or structure achievable in minutes, with far shorter mobilisation
Output	Point observations, photographs and written condition notes	Georeferenced imagery and photogrammetric models feeding GIS and digital twin, allowing change detection between surveys
Emergency response	Situational picture built from ground level, limited by access and darkness; extent of an incident often unclear until entry is possible	Rapid aerial situational awareness to size the incident, plan safe access and inform closure and diversion decisions
Carbon footprint	Multiple vehicle movements for access plant, TM and inspection teams	Substantially reduced vehicle movements and plant use, supporting net zero commitments

The identified benefits are operational time and cost efficiency, a reduced environmental footprint, and safe personnel access to challenging environments.

4. Addressing the barriers, not just the technology

The principal finding from DronePort:MK was that the technology is not the constraint. Services only become commercially viable when operating Beyond Visual Line of Sight (BVLOS), and securing BVLOS approval remains difficult — a barrier that particularly disadvantages smaller operators and risks limiting the market to a handful of large players. MKCC identified that operating within the established Cranfield Airport flight zone, managed by its air traffic control team, offers a materially lower barrier to entry and appears essential for services to mobilise and operate at scale.

Two further enablers were identified: designing low-risk flight paths, such as drone corridors, into future city planning; and establishing a cost-effective airspace situational awareness and monitoring capability through the Smart City Control Centre, in place of traditional uncrewed traffic management or radar-based systems. Together these allow the council to exercise genuine oversight and assurance of operations above the city at proportionate cost.

5. Forward programme: Project OPERA

Building on DronePort:MK, MKCC is engaged in Project OPERA, led by Thales and funded through the UK Space Agency and European Space Agency, with the support of the Department for Transport and the Department for Science, Innovation and Technology. The consortium includes Cranfield University, Cranfield Airport, the Civil Aviation Authority and Smart City Consultancy. A 12-month phase is targeted to commence in October 2026.

OPERA is principally a techno-operational project developing resilient positioning, navigation and timing technologies that assure safe operation should conventional systems fail or be interfered with — addressing operational risk, national resilience and critical national infrastructure concerns within an integrated airspace management model. It uses the airspace structures around Cranfield Airport as a regulatory sandbox under the UK Airspace Modernisation Strategy, with a footprint encompassing transport hubs, medical facilities and large-scale construction projects, ultimately extending across the city.

MKCC's role is to lead stakeholder and user engagement: developing and validating use cases with local authority service teams, assessing societal and economic impacts including public concerns around safety, noise, privacy and environmental effect, and delivering education and outreach. A further deliverable is a local authority licensing and operations report, setting out how an authority can provide oversight and assurance of drone services operating above its area. This is explicitly intended as a reusable framework and toolkit for adoption by other local authorities across the UK.

MKCC is also exploring a shared "drone-in-a-box" network — permanently sited, remotely launched aircraft that could be tasked by any council service. For the highway service this would allow near-immediate aerial survey or incident response without mobilising a pilot to site.

6. How this evidences the transparency report requirements

- Innovation and continuous improvement — sustained, externally funded innovation activity progressing from proof of concept through regulatory submission to operational deployment, rather than a single isolated trial.
- Operative safety — aerial survey removes the need for working at height and reduces operative exposure to live carriageway during inspection of structures and high-level assets.
- Network availability — most drone survey work is achievable without lane or full closure, avoiding both the cost of traffic management and the disruption to road users that conventional inspection requires.
- Asset data quality and preventative management — georeferenced, repeatable survey outputs feed GIS and digital twin development, supporting condition trend analysis and planned intervention in place of reactive repair.
- Emergency response and resilience — operational use of drones for incident situational awareness supports faster, better-informed decisions on closure, diversion and safe access.
- Decarbonisation — reduced vehicle movements, access plant and traffic management contribute to the council's net zero commitments.
- Sector leadership and transferability — the local authority licensing and oversight framework is designed as a reusable toolkit for other authorities, and the regulatory learning is directly shareable with the sector.

7. Next steps

Subject to contract, the OPERA first phase commences in October 2026, with MKCC delivering use case definition, societal and economic impact analysis, outreach, and the local authority licensing and operations report over the following twelve months. For the highway service, the priorities are to extend operational drone use from emergency response into routine structures and asset survey under the Operating Safety Case arrangements, to establish the drone-in-a-box operating model, and to integrate survey outputs into the council's asset management and digital twin data. Progress and outcomes will be reported through the MKCC Innovation Programme and are available to DfT as supporting evidence.

Prepared by MKCC Highways Service — August 2026. Source: MKCC Innovation Programme briefing note, "Achieving city-wide drone adoption — progress and outlook", June 2026. Commercial and contractual detail relating to consortium partners is excluded. Supporting evidence (project outputs, Operating Safety Case submissions, survey data and deployment records) is held by the Innovation Programme and Highways Service and available to DfT on request.