London Heathrow Airport

AGL Control - "By-pass System"

Design, Supply, Install & Commission

Engineering Solutions

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London Heathrow Airport Engineering Solution

By-pass AGL Control System

Project Key Facts

Client Name | Heathrow Airport
Location | London Heathrow Airport, United Kingdom

Dates | Jan 2026

Project Overview

At Heathrow Airport—one of the world's busiest and most operationally constrained aviation environments—ATG Airports Ltd, in partnership with Heathrow Airport Limited, has delivered what is believed to be a world-first: a fully stand-alone, cyber-secure contingency Airfield Ground Lighting (AGL) system integrated and commissioned within a live runway environment.

The project, known as the By-pass AGL system, represents a major step forward in airfield operational resilience and critical infrastructure protection. It was engineered to provide a fully independent contingency lighting control capability while maintaining seamless interoperability with Heathrow's existing AGL platform, and enabling a future transition towards ATG's next generation AGL architecture. Importantly, the system was designed and delivered to meet stringent international aviation safety and regulatory requirements throughout.

A defining feature of this programme was the operating environment. All installation, integration, and testing activities were carried out within a live international airport runway system, under extremely constrained overnight access windows typically limited to four to six hours per shift. These restrictions were governed by Heathrow's operational requirements and NOTAM-controlled runway closures, demanding exceptional planning precision, coordination, and execution discipline.

The project originated in 2016, with ATG formally appointed to deliver in 2021. A dedicated delivery team of 12 engineers, were responsible for delivering the full scope from design through to commissioning. Despite the complexity and operational constraints, the team achieved zero disruption to live runway operations and maintained zero safety incidents throughout the entire delivery lifecycle—an essential requirement in such a high-risk airside environment.

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A further challenge emerged during delivery when cybersecurity requirements were introduced as a late-stage enhancement. This required the team to adapt the system architecture to incorporate robust cyber protections without impacting programme timelines or operational integrity. The solution was successfully implemented through secure system architecture design, network segregation, and alignment with established industrial cybersecurity principles, including an IEC 62443-aligned approach. These measures ensured the protection of safety-critical lighting control systems against evolving cyber threats while maintaining full operational functionality.
The installation, integration, and testing phases required close coordination across multiple stakeholders, including airport operations teams, regulatory bodies, and engineering specialists. Despite the short access windows and complexity of live environment constraints, the system was fully integrated and validated without interruption to airport operations.

A major milestone was achieved during February 2026 with the completion of a full pan-airfield Site Acceptance Test (SAT). This validated system performance across the operational airfield and confirmed readiness for live contingency use. The successful delivery of the By-pass AGL system establishes a new benchmark for resilient, cyber-secure airfield infrastructure. It demonstrates that fully independent contingency systems can be deployed at scale within live airport environments, and that even highly complex, multi-layered integrations—including late-stage cybersecurity enhancements—can be achieved without compromising operational continuity or safety.

Beyond Heathrow, the project sets an important precedent for global aviation infrastructure. It shows that critical airfield systems can evolve to meet modern resilience and cyber-security demands while remaining fully compatible with continuous airport operations.

Ultimately, this project reflects a combination of technical innovation, disciplined execution, and adaptive engineering—delivering a genuinely industry-leading solution for the future of safe, secure, and resilient airfield operations.

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