

# How the IoT Fuels Airlines Industry's Flight into the Future

## Abstract

Airlines are the least profitable node in the aviation value chain, well behind global distribution systems, travel agencies, MRO firms, and ground handlers. Historically, airline companies have been early adopters of technology and they are now striving to modernize their legacy processes and systems. Digital technologies have been at the forefront of the transformational shift to customer-centric service delivery, and simplified and efficient operations. Going forward, the intersection of digital technologies and the Internet of Things (IoT) will open up bigger and more profound transformation opportunities for airlines.

KLM Royal Dutch Airlines uses a robot to guide travelers through airport terminals.<sup>1</sup> Air New Zealand's digital bracelet or app allows people to track their young wards who are flying alone.<sup>2</sup>

Virgin Atlantic leverages Heathrow's beacon network to provide a connected and personalized airport experience for its Upper Class passengers.<sup>3</sup> The service automatically triggers customers' mobile boarding passes for presentation as they approach their private security channel.

The Emirates Group offers a beacon-based solution that not only alerts airline staff to luggage mishaps, but also notifies customers when their bags reach the baggage claim section.<sup>4</sup>

## IoT is the Next Big Thing for Airlines

Digital technologies have allowed airlines to deliver unique customer experiences, simplify underlying processes, and improve workforce productivity. The logical next step is to leverage the IoT to explore a whole new dimension to digital transformation. The combination of the IoT and other technologies, such as robotics and artificial intelligence (AI), will result in numerous opportunities for service delivery improvement.

Going forward, a smart, holistically-connected IoT ecosystem that brings together all entities and assets in the aviation value chain is likely to be the new normal.

## Five Key Areas for IoT Strategy Formulation

To make the most of the IoT, airlines need to formulate their strategies around five key areas:

- 1. Hyper-Personalization:** Airlines should hyper-personalize the entire travel experience by using the data generated at each point of interaction, whether it is the home, the airport, or the aircraft.
- 2. Track and Trace:** The IoT can enable a range of track-and-trace applications in a smart and hyper-connected aviation ecosystem. Today, permission-based tracking allows contextual, location-based information such as waiting time, gate change, and flight delays to be delivered to passengers. In a completely sensorized environment, the benefits of tracking can be extended to come up with a wide range of services and process improvements.
- 3. Proactive Alerts and Actions:** The sensorization of customer-facing infrastructure and processes is enabling proactive delivery of information and services. The emphasis now is on prediction and prevention rather than post facto resolution.
- 4. Higher Operational Efficiency:** Most modern day aircraft engines are already embedded with an array of sensors that generate terabytes of data per flight. At present, that data is downloaded after the flight for post-flight analysis. With IoT applications, flight data can be analyzed during the flight, creating truly transformative possibilities. IoT applications can also help airlines maximize fleet utilization and reduce operational costs by identifying potential problems early on.

GE's Flight Efficiency Services has partnered with AirAsia to optimize climb profiles, estimate fuel needs, and minimize the use of auxiliary power units.<sup>5</sup>

**5. Product or Service Monitoring:** With everything from physical infrastructure to aircraft to personnel connected through an IoT ecosystem, airlines can also explore opportunities to drive improvements in ancillary products and services. They can leverage sensor data—from location to emotion—to upsell ancillary offerings such as lounge access, and fast lane access, among others.

## Addressing IoT Adoption Challenges to Ensure Smooth Take-off

Some of the key challenges to be addressed before embarking on a large-scale IoT implementation include:

- **Stakeholder Diversity:** The aviation industry involves several stakeholders with diverse interests, and in many cases, their own ecosystems of technologies and systems. At the same time, many of these stakeholders are dependent on each other. So, as airlines evolve in their adoption of the IoT, it becomes necessary for them to look beyond their 'localized' enterprises, and consider working with other stakeholders guided by a common IoT vision.
- **Geographical Spread:** Most airlines operate on a global scale across multiple geographies, each with its own cultural context and level of technological maturity. A successful IoT strategy will therefore have to account for these regional variations.
- **Security and Privacy Considerations:** Airlines operate in one of the most secure environments in the world. Therefore, security and privacy have to be accorded top priority for any IoT initiative in the aviation sector. Privacy also becomes a critical issue with the deployment of advanced technologies such as facial recognition, as a result of which the volume of private, customer data being transacted increases manifold.
- **Complex Legacy Systems:** The technology ecosystem of most airlines continues to host complex legacy systems and architecture. In comparison, many IoT technologies are at a nascent stage, with communication and security protocols still evolving. Given this disparity, during the initial phases of their IoT initiatives, airlines should focus on mature technologies, like beacons, and simpler components that are more easily integrated.

## Conclusion

For airlines, the ideal IoT adoption strategy would be to employ a 'start, learn, prove, and improve' methodology that allows them to experiment with new technologies in a progressive manner. The first step is to explore opportunities that fit into a 'sense and make sense' model. These are initiatives that are essentially simple to realize but deliver value that delivers great business value. The next step should be to enhance the self and situational awareness of different components. The final step in the IoT deployment process would be to extend these capabilities across a connected and collaborative IoT network, that includes all nodes within the aviation ecosystem, along with a robust set of machine-learning and AI algorithms that keep evolving in terms of maturity, confidence levels and self-learning capabilities. With this approach, airlines will be ready to take off in the direction of true cognition, where the enterprise is self-learning, intelligent, and self-thinking. Companies with a vision of evolving into such a cognitive enterprise will regard the Internet of Things as a powerful enabler.

Even as airlines gear up for the IoT revolution, the transition toward a cognitive era in business has already begun. The IoT capabilities that airlines build today will play a key role in helping them evolve into cognitive organizations tomorrow.

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