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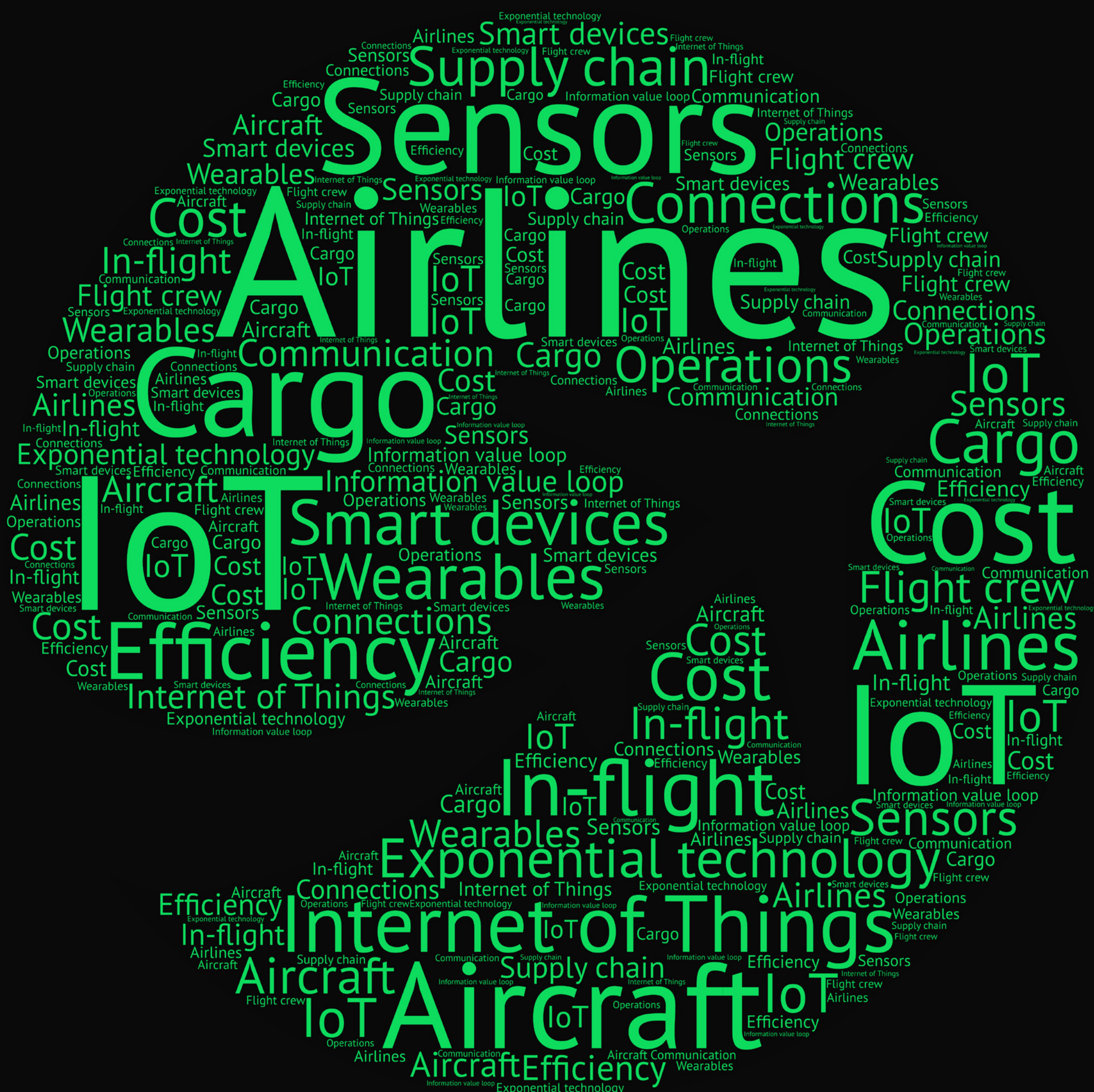


Traveling at the speed of knowledge

Exploring operation and profit benefits of deploying the Internet of Things

Part 1 of 2

Introduction

In the airline industry, the focus on costs rarely wavers and the pace is constantly demanding. However, the ability to network exponential technologies continues to offer a rich potential to improve productivity, derive additional utilization from assets, and lower costs. Airlines need more than another hard-won half a percentage point. They need a game-changer.

The Internet of Things (IoT)—networks of sensor-equipped, intelligent, exponential technologies that can gather data, interpret it, and take action—may be that game-changer. By 2020, 20.8 billion objects will likely be connected to the IoT, and more than half of major new business processes and systems will use IoT in some way. By 2022, consumers and businesses will save an estimated trillion dollars a year in maintenance, service, and consumables.[1]

Airlines can claim a share of those savings. Imagine toolboxes, ground equipment, and lifejackets that monitor and report their own status. Drones that check for lightning damage. Engine borescopes that an engineer can control from another city. Or data from employee wearables that leads to lower insurance rates. By streamlining repetitive processes and making people more efficient, IoT can help transform cost-saving from an incremental struggle to a wide-open frontier.

This is already starting to happen.

2/3 **of surveyed airline leaders believe IoT offers clear benefits right now.[2]**

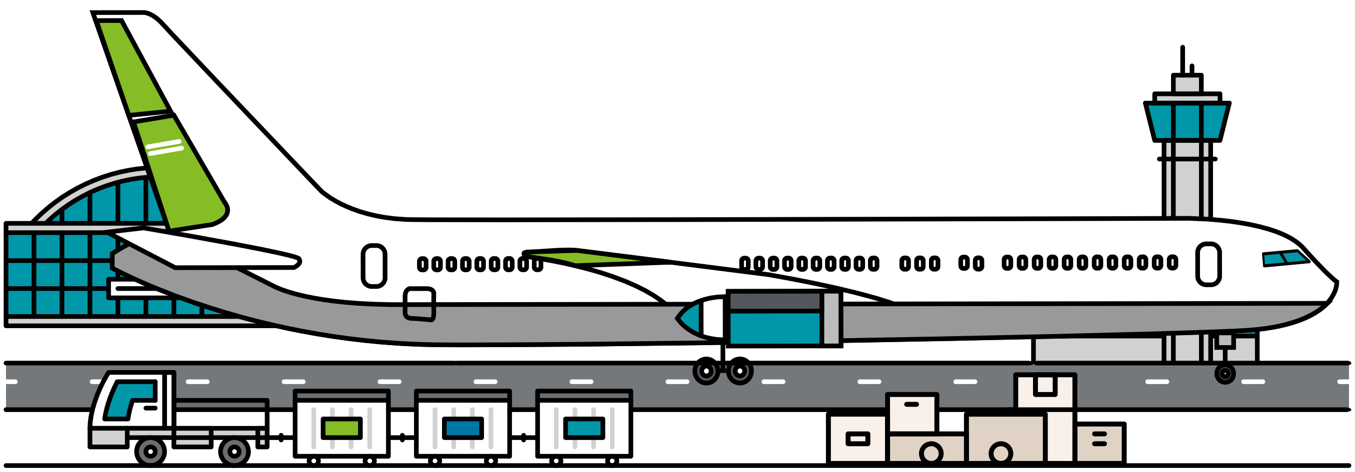
86% **expect identifiable benefits within three years.**

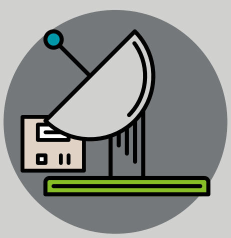
37% **have begun to explore and implement IoT improvements as a way to confront rising costs.**

What these first movers are finding is that an investment in smart devices is only part of the puzzle. They must also plan carefully for the architecture that links data, decision, and action into a self-driving loop.

What IoT could look like

Airlines are already rolling out concepts such as predictive maintenance, asset tracking, and smart workforces. By integrating the networking strength of IoT with exponential technologies like robotics and 3D printing, they are on a path to realizing scenarios like this one:





The in-air detection and notification: In mid-flight, an aircraft part recognizes it is not functioning properly. The aircraft sends a message to the ground about the malfunctioning part for repair upon arrival.

The on-demand supply chain: The part used in the repair will need to be replaced upon landing, so before arrival, a 3D printer at the arrival airport receives a signal to print the part.

The connected, autonomous tarmac: The printed part must be delivered to the arrival gate. An autonomous vehicle picks it up and makes the delivery.

The connected employee: The mechanic uses heads-up display eyeglasses to view reference documents from the cloud. Using a borescope connected to a wireless tablet, the mechanic streams live video to a remote engineer allowing the repair and inspection to benefit from the engineer's authority without the need for travel. Instead of the aircraft being taken out of service to await an engineer's arrival, the aircraft leaves on time for its next segment.

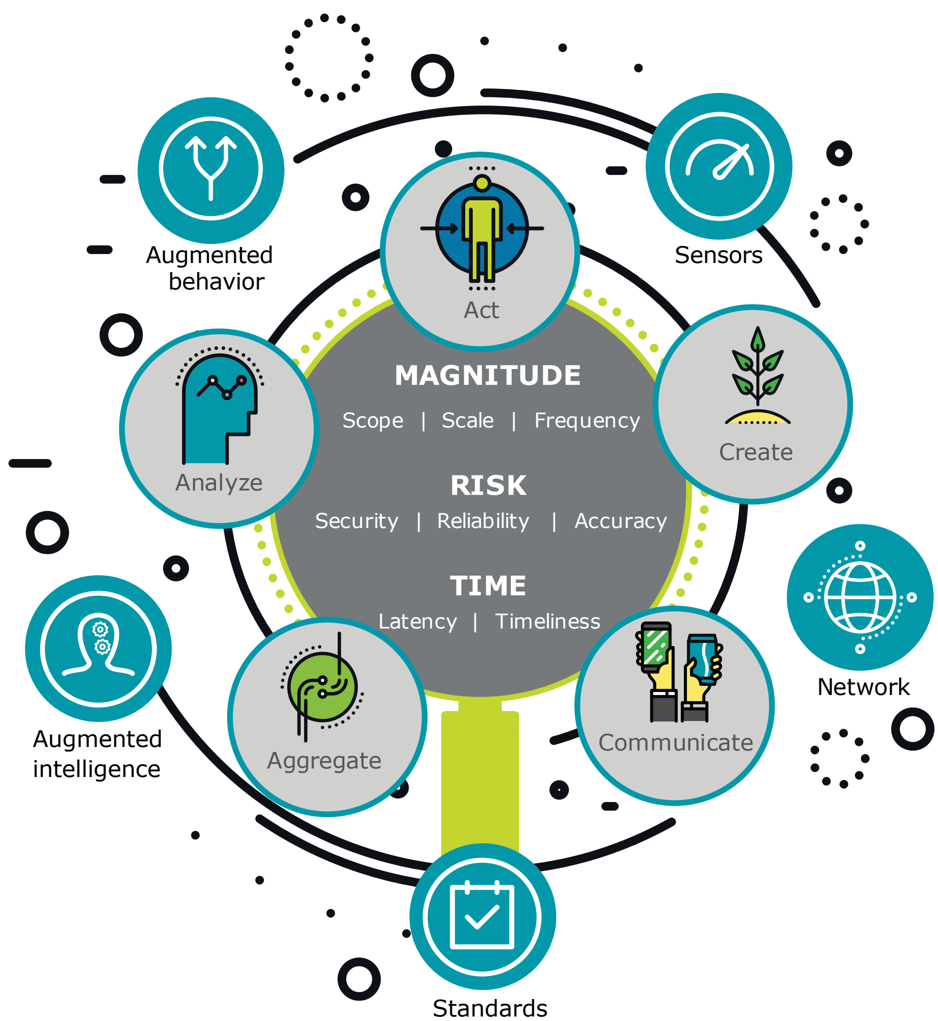
This scenario addressed the core function of keeping an aircraft in safe operation while increasing the utilization of the aircraft and the crew. A similar journey along the information value loop might save fuel, fine-tune baggage handling, or speed back-office functions.

Iterate, improve, dare

IoT networks don't arrive pre-assembled with a huge, common go-live date. They grow over time. Establish a "digital flight test program" that iterates and improves, but also keeps building. Think big, but start small, then scale fast. Every implementation can yield lessons to improve upon the one that follows.

If IoT initiatives grow in isolation from one another, an airline risks ending up with what technology executive Jean-Louis Gassée called the "basket of remotes" problem[3]–a host of "connected" devices and systems that don't share the protocols necessary to connect to one another. Other areas of potential risk associated with IoT include regulatory compliance, physical safety, data security and cyber risk, and the ability to handle a larger, more complex volume of data.

IoT information value loop



A new kind of loop

But how should all of these technologies be connected to avoid having an unusable "basket of remotes?"

One answer is the information value loop—an architecture that describes exactly how these familiar technologies should be combined in order to do something new and create new value.[4] For a piece of information to create value, it should move through all five stages.

- Sensors create information about a physical event or state.
- The originating object communicates the information to others over a network.
- The network aggregates different pieces of information from different sources and times.
- The network applies standards to analyze phenomena for patterns, relationships, or anomalies.
- The resulting analysis is a basis on which augmented intelligence can decide to act—to start, keep, or change a physical state.

With that last step, the information value loop has gone from physical to informational and back to physical, and it's ready to start around again. Now, information is a source of value. And harnessing that information can help airlines become safer, more efficient, and reduce costs.[5]

How to make IoT a reality

With a "flight test" mindset driving continuous IoT innovation, the actual work of creating value can be divided into manageable steps.

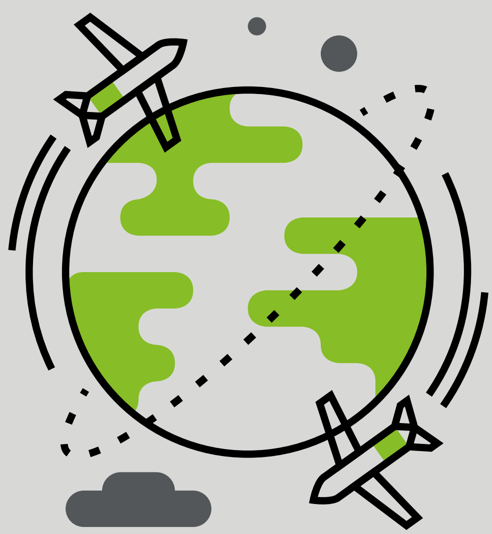
1 **Ideation and strategy.** What is the art of the possible? Use your business strategy to identify improvement targets, but use ideation workshops and ecosystem contacts to reach beyond the mundane to the truly innovative.

2 **Pilot and roadmap.** Ideas don't get off the drawing board without a plan for governance, structure, risks, and an analysis of capabilities. But don't let planning slow you down; this is the iterative "learn fast" part of the process.

3 **Capture, store, and process.** The information flow of the IoT relies on a data architecture that is robust enough to handle it. Breaking down silos and building the capacity to secure the necessary data, process and store it both on the edge and in the cloud, and analyze it are all complementary parts of the IoT evolution.

4 **Scale and deploy.** After your proof of concepts have proven value and delivered the insights needed, privacy rules, global capabilities and a keen eye towards security are critical for a successful scaling from a targeted concept to a global rollout.

5 **Operate.** Now that it's here, how can you make it really hum? Measure not only the way the solution performs, but also the way it contributes to business metrics. Then improve it, and measure again.



Dare to imagine

When technology works at its own unfettered pace, change can be exponential. Combine this with the airline industry–where organizations are already comfortable with reliance on technology, eager to shave minutes, and pressed to save dollars–you create fertile ground for innovation that can drive down costs and increase efficiency. The first movers are already benefiting from IoT. Their cost savings are already beginning to register. The pace of that movement is only going to throttle up from here. So go ahead, think big, start small, and scale fast.

Questions to consider

Where in your airline can deploying IoT drive cost saving over the next 18 months?

Do you have a data management strategy for IoT?

How can you accelerate adoption of IoT across the airline?

How can IoT help increase revenue, differentiate your product, and enhance customer experience? Part two of this series will explore how IoT creates tremendous opportunity for airlines.

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Acknowledgements

The authors would like to thank Scott Mickle, Manager (Deloitte Services LP) and Lauren Teegarden, Senior Consultant, (Deloitte Consulting LLP) for their contributions to the paper.

Endnotes

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