



THE RIPPLE EFFECT

Stories of purpose and lasting impact

Modernizing an airline without disrupting the journey

To fuel bold ambitions, a US airline needed to overhaul its legacy Passenger Service System. Deloitte helped set that transformation in motion—without downtime.

OTHERS HAD **TRIED TO HELP. TIME WAS RUNNING OUT.**

THE SITUATION

Years ago, on what was supposed to be the third mission to land on the Moon, an oxygen tank exploded on the Apollo 13 Command Module, leaving the crew more than 200,000 miles from home with a dwindling supply of air. The engineers at Mission Control knew that the complexity of the situation made bold, simple solutions impossible; still, the clock was ticking.

So, one step at a time. First, the crew transferred to a different module...that would never sustain them long enough. But it bought time to work with Mission Control on methodically addressing the cascade of problems that remained.

You know how that story ends; the one below isn't over just yet. It's a modern IT version of the Apollo 13 tale with the same moral: So long as smart, dedicated people can communicate and collaborate, even the thorniest challenges can be worked through—carefully, creatively, and step by step.

This version concerns a major US airline and its thorny legacy Passenger Service System (PSS), which has historically managed everything related to a passenger's journey—from booking flights, to checking in, to checking bags.

Like at other major US airlines, this PSS is a 60+ year-old mainframe system built on highly specialized code that requires deep expertise to work with. (In fact, the number of people still expert in these systems is highly limited.) The codebase is a black box with decades of business rules buried deep inside, exception stacked on exception, the dependencies invisible; even small changes to the PSS require manual investigation and reverse-engineering—but move too fast without understanding what connects to what, and critical systems could fail.

With a foundation like this, how can you innovate?

Not easily, and airline leaders knew it.

They did have a clear vision for something better. And they had tried to bring the system into this century and onto the cloud for faster transformation, better customer experiences, and lower operating costs. Several times they'd tried. But sustaining momentum proved difficult.

Why? Because the roadmap was still evolving, the organization worked across silos, alignment was hard to maintain, and the business case was still developing. A waterfall approach wasn't well-suited to a system held together by decades of patches and workarounds. So delays piled up, costs climbed, timelines stretched, and progress kept stalling. After earlier efforts proved difficult to sustain, teams grew skeptical. Worse: Everyone treated transformation like a project with an end date, not an ongoing practice.

And that was just back-of-house. Passengers felt the pain continuously. Even on the best days they got limited personalization, slower feature releases, and inconsistent experiences. And when weather delays or cancellations hit, the legacy system couldn't keep pace, slowing rebooking to a crawl.

Stakes were high for everyone concerned: Modernize too slowly, and competitors gained ground. Move too quickly without understanding all those hidden, gotcha dependencies, and the operations that did work could break. The leaders had the vision. What they needed was an effective way forward, ideally with the help of a strategic modernization adviser.

This time, they called Deloitte.



THE SOLVE

And why Deloitte? Likely in part because of Deloitte's [IndustryAdvantage™ positioning](#), a wraparound value proposition with deep travel-sector experience, co-innovation opportunities with a who's who of [Deloitte technology alliances](#), and [modern engineering methods](#) designed to help clients accelerate complex transformation.

And to be sure, that airline industry lens mattered. Leaders needed an adviser who could navigate their particular business and technology strategy challenges, *and* work with legacy technologies, *and* bring those technologies up to date with next-gen application modernization tools (like [Deloitte Ascend™ Mainframe Modernization](#)), *and* fundamentally change how the organization worked in the future.

So Deloitte put together a multidisciplinary team tailored for the airline's needs. The overall team covered workstreams for Program Management and Governance; Strategy, Value Case Development, and Executive Communications; Architecture and Data Strategy; Development, Software Development Life Cycle, and Development Pods; and Agile Coaching—deployed onshore, offshore, on-premises, and at remote locations. Their overall goal: Help the airline transform its operations from fragile, fragmented, and constrained processes to a robust, personalized, and omnichannel e-commerce-like experience for both passengers and employees.

So far, so good. But how do you, as the saying goes, build the plane while flying it? How do you modernize a system where downtime is not an option?

Like this: Deloitte designed a *multi-phased incremental transformation*. This meant there'd be Strategy, Mobilization, and Execution phases... but the phases wouldn't be strictly sequential, and important work would happen in the spaces between.

An important pivot happened early in the Strategy phase, when one Deloitte sub-team provided the equivalent of an MRI view of the entire

legacy system by first ingesting the mainframe codebase, then using Deloitte's AI-augmented Ascend platform to accelerate code mining, logic translation, and dependency mapping. This “MRI” had great resolution and showed highly entangled areas that were poor candidates for early modernization. It was also fast, in one case taking a day to extract the clear, accurate business insights from the legacy system that airline stakeholders had been struggling for weeks to unearth.

This model had at least three benefits: It kept the flywheel turning (with separate but related work running in parallel), it helped break down old organizational silos (with information and course corrections flowing between workstreams), and it built new employee skills for both tackling such a complex transformation and for working together in a more agile fashion in the future.

More highlights: During the Mobilization phase, teams put newly defined strategies and models into practice through pilot programs and employee activations. (One example of such a pilot program: a GenAI-powered mainframe emulator that can one day help 55,000+ frontline airline employees—including customer service agents and operations teams—work with the legacy system using natural language instead of specialized coded commands.) These efforts served as a bridge between the old and new systems, reduced the burden on employees, and improved speed and accuracy of customer interactions.

Deloitte then started incrementally decomposing the mainframe into [cloud-native microservices](#), modernizing components in carefully sequenced waves to manage risk and maintain service continuity. Beyond the technology work, Deloitte helped the airline capture the hearts and minds of business stakeholders and align enterprise partners around a shared vision through an executive-ready narrative and broad business case that encompassed more than just IT.

BUILT OVER **DECADES.** MOVING TO THE **FUTURE.** WHILE **PASSENGERS KEEP FLYING.**

THE IMPACT

As on Apollo 13, there aren't any singular, bold moves to point to, but the results of this engagement are still eye-opening rapid and effective, with Deloitte helping airline leaders lay the foundation for one of the most complex modernization journeys in the business.

That foundation reflects the hard, essential work of bringing clarity to a legacy environment built over decades—aligning strategy, architecture, data, delivery, governance, and agile ways of working to help leaders understand what they had, focus on what mattered most, and move forward with confidence.

And that foundation is already creating value. Airline leaders estimate more than \$300 million in annual cost savings, including more than \$20 million in direct platform operating cost reduction. They also see meaningful upside through faster feature releases, more personalized customer experiences, and a model that can unlock both cost savings and new revenue potential. Across the enterprise, a pilot for a GenAI-powered mainframe emulator used by more than 55,000 desk agents has shown it can help improve productivity and reduce training time by about 30%.

Just as important, the work has helped shift how the organization moves. Business and technology teams gained stronger alignment around priority workstreams. Delivery became more disciplined. Decision-making became faster. And the airline is now better positioned to keep building toward a more scalable, personalized, and customer-centric experience for passengers and employees alike.

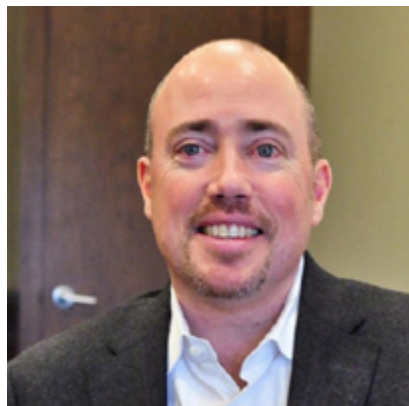
Full PSS modernization will require sustained, multi-year investment across technology, operating model, data, architecture, and ways of working. But this effort made the challenge more manageable. Rather than trying to solve everything at once, the airline and Deloitte teams found a way to see inside the mainframe, understand it, and modernize it piece by piece without bringing the airline to a standstill. The result is a clear path forward, with progress already underway.



YOU DON'T UNTANGLE LEGACY. YOU SOLVE
PAST IT.

LET'S CONNECT.

Do these challenges sound familiar?



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