

ELEVATED

Taking air travel to the next level



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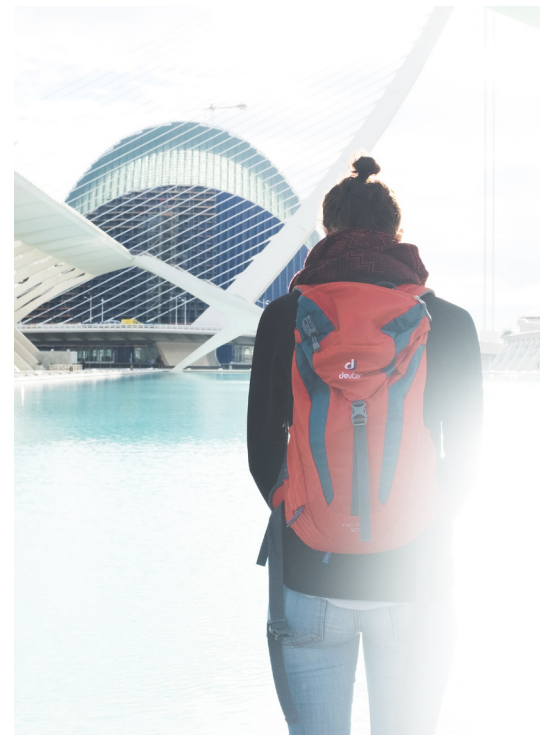
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What does it mean to originate?

California may have the answer.

Many industries, ours included, use the word “innovate.” Innovate and win. Innovate or be left behind. We’ve all heard and perhaps used similar phrases. Every business that survives will innovate. They iterate as times change, and it can be as simple as being perceptive enough to quickly follow another’s lead.

But to originate...well, that means changing the game in your favor. I see companies such as Uber, Airbnb, Facebook and even Tesla that were hungry enough to question why things couldn’t be reinvented and done a completely different way.

This is why we chose California for this year’s IBM Airline Summit. It’s the world’s fifth largest economy, just ahead of the United Kingdom. And it became such a powerhouse because people were willing to put their time and resources into origination. It’s the birthplace of blue jeans, lasers, and cable cars. Steve Jobs and Wozniak founded Apple in the state.




Aviation is tied to this place as well. The first transpacific flight to Australia took off from Oakland in 1928. When a pilot broke the sound barrier for the first time, he was flying over Victorville, California. During World War II, Southern California aircraft manufacturing plants employed 2 million people and built 300,000 planes. Today, California companies like SpaceX and Virgin Galactic are imagining the next era of flight. We’re so impressed by California’s contribution, we put a feature on its aviation history on page 9 of this issue.

As we continue throughout this event, I invite you to ask yourself not simply what needs to be done, but to ask where the opportunity exists to do something unprecedented in our industry. I hope this event and our visit to the Apple Campus will inspire you to ask not “When?” or “How?” but “Why not?”

Enjoy, and here’s to being original.



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HOW NEW TECHNOLOGY IS IMPACTING TRAVELERS

BY JESSICA WRIGHT

*The San Francisco-based travel blogger behind **Bon Traveler** explains how IBM solutions are transforming the travel experience.*

Just this last week as I was flying from Heathrow to San Francisco, I plugged in my iPhone into a socket under my seat and connected to Wi-Fi to thin out my email inbox. It dawned on me that this ability to be connected on a plane was a gift — something that was unimaginable only a decade ago. Who would have thought that we could connect like this, 35,000 feet in the air? Technology is ever so important for air travel in ways that go beyond that online connectivity in-flight.

As a frequent flyer, I clock in more hours on a plane than I care to. There's a harsh reality as part of taking redeye flights, changing time zones, and trucking luggage back and forth. It's often in these moments of convenience provided by technology or good process in air travel that makes the entire experience that much more pleasurable and enjoyable.

Technology has changed the way I see flying. In fact, it's made it better and a much more comfortable experience. The first thing that comes to mind when I think about technology and airlines is the tangible — in-flight connectivity and entertainment. Ever been on a

flight and there is no movies or Wi-Fi? It's a game changer, and for me, has led to airline loyalty where I will stick to certain airlines knowing that the experience on board is that much better. One company that has made an incredible impact on air travel is IBM and it's in ways that you may not even know.

Technology in air travel goes beyond what we see. For instance, did you know that before a flight, Alitalia (Italy's largest airline) uses a tool from The Weather Company, an IBM company, to calculate weather data so that the flight avoids turbulence? Using the technology from The Weather Company has led to more comfortable journeys, less stress in-flight, all because Alitalia used this vital data.

One of my favorite examples of technology in air travel that has impacted me is IBM's work with Delta. There was a need for cutting down the amount of lost luggage, so working with IBM, Delta used RFID tagging to help create more consistency in how the baggage is processed. RFID is a system that uses small radio frequency identification devices to help create a tag and locate based on data transmission.

What does this all mean for you? You get to track where your checked bags are at any moment via the Fly Delta app. It's the little details like this that have the biggest impact. These steps to transparency in the airline industry are crucial for creating a better air travel experience.

To me, the most stressful part of the entire process of flying is check-in. I'll do anything to speed up the process and eliminate stress. Things like paying for priority check-in and having TSA Pre have helped make it more enjoyable. Before a flight, I always download the app for the airline as well. I've found the data to be more accurate, to have more control over the check-in process, and I like to have a mobile boarding pass. One example

of IBM's work in this space is with Japan Airlines, where they used big data to create an app for the Apple Watch. As a passenger you could check flight status and gate information, as well as have your boarding pass, all in one place. These types of details are crucial to streamlining the process of flying.

As I think about how technology is involved with air travel, I start to see more and more examples. As I write this now, I am checking applications like SeatGuru to choose a seat that will best suit my needs, I have a mobile boarding pass, and I will be using Priority Pass to check if I have a partnering lounge at my departing airport. These small details add up, in ways that can be quantified — for me, it's a much more enjoyable air travel experience.



Jessica Wright is a full-time travel blogger based in San Francisco. As a photographer and writer, she shares her travels on Bon Traveler, a site dedicated to inspiring others to travel well and often. Bon Traveler is a home to curated guides, hotel insights, and the best in cultural adventure travel.

Aviation milestones in California

The Golden State's history of flight

Victorville

U.S. Air Force Captain Charles "Chuck" Yeager pilots a plane faster than sound for the first time in 1947.

Santa Monica

The first airplane to fly around the world, a Douglas World Cruiser, is built in 1924.

Pasadena

C.P. Rodgers lands the first transcontinental flight in 1911.

Los Angeles

Georgia Broadwick becomes the first woman to parachute from an airplane in 1913.



Hawthorne

Hawthorne-based SpaceX launches the first privately developed liquid fuel rocket to orbit the Earth in 2008.

Oakland

Lester J. Maitland and Albert Hegenberger make the first flight from the United States mainland to Hawaii.

Long Beach

In 1920, Amelia Earhart takes her first ride in an airplane and gets hooked on flying.

San Francisco

The Martin M-130 China Clipper opens the first regularly scheduled air mail service across the Pacific.

THE TRANSPORT SYSTEMS OF SCIENCE FICTION WILL BE HERE SOONER THAN YOU THINK

BY VIVEK WADHWA

A Silicon Valley-based author and academic imagines a future for transportation that's nearer than we think.

Picture the commute of the future: You live in Palo Alto, Calif., but work 350 miles away in Los Angeles. After your morning latte, you click on a smartphone app to summon your digital chauffeur. An autonomous car shows up at your front door three minutes later to drive you to a Hyperloop station in downtown Mountain View, where a pod then transports you through a vacuum tube at 760 mph. When you reach the Pasadena station, another self-driving car awaits to take you to your office. You reach your destination in less than an hour.

That is the type of scenario that Hyperloop Transportation Technologies (HTT) chief executive Dirk Ahlborn laid out for me as we were preparing to speak together on a panel at the Knowledge Summit in Dubai on Dec. 5. He was not talking about something that would happen in the next century; he expects the first of these systems to be operational in the United Arab Emirates by 2020. The Abu Dhabi government has just announced that it has been working with his company to connect Abu Dhabi and Al Ain, two UAE cities separated by 105 miles, using the Hyperloop system.

A proposal for this mode of transportation came from Elon Musk in August 2013 in a paper titled "Hyperloop Alpha." Musk envisaged a mass transit system in which trains travel as fast as 760 mph in pressurized capsule pods. These would ride on an air cushion in steel tubes and be driven by linear induction motors and air compressors. He claimed that the system would be safer, faster and cheaper than trains, cars, boats and supersonic planes, for distances of up to at least 900 miles, and said it would be resistant to earthquakes and generate more energy through its solar panels than it would use.

Straight out of science fiction it may be, but two start-ups took up Musk's challenge to develop the technology: HTT and Hyperloop One. These companies have raised more than \$100 million each and say they will have operational systems in three to four years and that they have governments backing them. Hyperloop One demonstrated elements of the technology in the Las Vegas desert in May 2016. The sheiks I spoke with in Dubai were most excited about HTT's system.



Even if the Hyperloop technology doesn't pan out, the digital chauffeurs surely are coming. Self-driving cars such as the Tesla that I drive can already take control of the wheel on highways and are able to monitor traffic around them better than humans can — because their sensors enable them to see in 360 degrees and communicate with each other to negotiate rights of way.

By 2020, self-driving cars will have progressed so far that they can drive safely at speeds as fast as 200 mph in their own partitioned lanes on highways. In these circumstances, the commute to Los Angeles from San Francisco would take only an hour and a half — without the need to catch a connection to a supersonic pod. From Abu Dhabi to Al Ain or Dubai could take the car 30 to 40 minutes, door to door. In other words, Elon Musk's self-driving cars and HTT's

short-haul Hyperloops may be competing with each other. I'm one of those who would prefer the convenience of having their car come with them so that they can keep extra stuff in the back and be working uninterrupted on the commute. In any case, for longer journeys, say from New York or San Francisco to Miami, catching a Hyperloop will make more sense than riding in the self-driving car.

The point, though, is that we are on the verge of a revolution in transportation. For decades — actually, centuries — we have been dependent on locomotives and, more recently, airplanes to take us long distances. The technologies have hardly advanced. The entire industry is about to be disrupted. Many of us will choose to take the shared cars and Hyperloops; others will own their own cars. But we will take fewer rides in trains and planes.

That is why new rail-based transportation systems, such as the one that California has long been debating, are not sensible investments to make. By the time they are complete, our modes of mass transportation will have changed. The California project aims to move 20 to 24 million passengers a year from downtown L.A. to downtown San Francisco, through California's Central Valley, in 2 hours 40 minutes. It is projected to cost an estimated \$64 billion when completed by about 2030. By then, we will be debating whether human beings should be allowed to drive cars, and public rail systems will be facing bankruptcy because of cheaper and better alternatives.

The wise investment to make will be in accelerating adoption of self-driving cars and in reserving lanes for them, and in building energy-efficient long-distance transportation systems that do not consume even more time, money and arable land than we have lost already. For distances in the hundreds or thousands of miles, we'd do well to explore Hyperloops and other environmentally sensitive modes of mass transportation. They may be far more cost-effective than laying new railways.



Vivek Wadhwa is a Distinguished Fellow at Carnegie Mellon University's College of Engineering. He is a globally syndicated columnist for The Washington Post and author of *The Driver in the Driverless Car: How Our Technology Choices Will Create the Future*; *The Immigrant Exodus: Why America Is Losing the Global Race to Capture Entrepreneurial Talent*, which was named by The Economist as a Book of the Year of 2012; and of *Innovating Women: The Changing Face of Technology*, which documents the struggles and triumphs of women. Wadhwa has held appointments at Duke University, Stanford Law School, Harvard Law School, Emory University, and Singularity University.



WHAT TODAY'S AIRLINES CAN LEARN FROM THE 'GOLDEN AGE' OF FLYING

Several times a month, a few dozen people dressed to impress board a Boeing 747 in Los Angeles, where they're met with a smile and the cocktail of their choosing. They then sit back in a plush Sleeperette seat, and spend the evening socializing with fellow passengers, enjoying an open bar, and eating a five-course meal that includes a Chateaubriand carved from a trolley. It would be the perfect flight, if only it were on a real plane.

Passengers on this “flight,” known as the Pan Am Experience, never get off the ground. Instead, they sit in a Boeing 747 replica parked in a Southern California aviation-themed motion picture studio called Air Hollywood. Their time on board is designed to recreate the experience of a flight with the now-defunct Pan Am airline during the late 1960s and early '70s.



Tickets, which cost \$300, typically sell out within a few minutes after they're made available. “We’ve had people walk on to our airplane and start crying because it reminded them of the old days and the good time they had,” Talaat Captan, CEO & Founder of Air Hollywood, told IBM. In an age of shrinking legroom, diminishing onboard service, and increasing hidden charges it’s no wonder that nostalgia for the so-called “golden age” of air travel is so strong, said IBM Travel and Transportation Industry VP Rob Ranieri. “I think the way we used to fly was more of a luxury event. In the old days, you’d pay a single price for a full service flight. You were really taken care of,” Ranieri said.

To a certain extent, Ranieri said, there’s no going back to the golden age. Deregulation and the growth of low-cost carriers has fundamentally changed industry dynamics. Airlines, he said, have economized in an effort to get passengers from A to B at the cheapest possible cost. That means more seats on board, less legroom, a smaller flight crew, and fewer built-in amenities.



Security protocols have also irrevocably changed. Even if there were extra room on board for communal bars and lounges today, Ranieri said, post-9/11 safety concerns would keep passengers in their seats rather than roaming freely about the cabin. For practical reasons, flights simply can’t be as social as they were in the '70s.

The golden age, of course, wasn’t all roses. Flights were so expensive that most people could only fly a handful of times a year. Planes were louder. There were fewer routes. And cabins were full of cigarette smoke. But today’s common passenger complaints are valid, Ranieri said, and they can’t be ignored. If airlines want to stay in business, they must figure out how to improve the customer experience within the regulatory and economic constraints of the day. “Passengers want the best value for their money, but on the other hand they want to enjoy traveling,” Ranieri said.

Finding that balance is tricky, said IBM Global Travel & Transportation Industries Executive Partner Heidi Fillmore, but it’s possible. With the right technological tools, she said, airlines can make passengers feel as personally cared for as they did in the '70s while keeping costs down. At the gate, Fillmore said, agents with better access to customer data can be empowered to make smart decisions that earn customer loyalty. Currently, she said, most ticket agents are only able to access limited information on passengers, including their seat and meal preference, and the number of trips they’ve taken with the airline previously. “But when you start to layer in all the other elements beyond what’s just sitting in your

loyalty database — things like, ‘We lost your bag last time,’ or, ‘Your flight was delayed last time, or the last three times’ — this is now a point where you have the opportunity to do something about that,” Fillmore said. “It’s about having a richer set of information at your fingertips so you have the opportunity to provide some better service or perks.”

“With the right technological tools, airlines can make passengers feel as personally cared for as they did in the '70s”

On board, flight attendants armed with a similarly robust set of data could be more efficient and more attentive. Having access to each passenger’s preferences on an iPad, for instance, can help a single flight attendant provide more personal service to more people. American Airlines became the first airline to equip all its flight attendants with tablets in 2012. “Equipping crew members with digital devices gives them access to information that allows them to address passengers in a relevant way,” Raymond Kollau, founder of airlinetrends.com, told Fortune. “It’s also a way to increase in-flight revenues, as the transaction process is quicker.” In the event of a flight cancellation, Fillmore said, airlines could use AI to quickly find a passenger’s next best travel option. Airlines could also use AI on their websites to provide personalized recommendations based on both structured and unstructured data for passengers booking flights and accommodations.

The allure of the golden age of travel encapsulated in the Pan Am Experience will likely not lose its appeal any time soon. But airlines in 2018 can't parrot the past, and luckily they don't need to in order to provide an excellent experience for passengers. The golden age gleamed, in part, because it strove to provide the same elevated experience for all passengers.

Today, with cutting edge technology, airlines can instead provide a unique experience for each passenger, one that considers their unique tastes and desires.

"The reality is not everyone wants a meal and drinks and everything that came with the old way of flying," Ranieri said. "The way to do this cost-effectively is to cater more personally to each individual."



TURBULENCE: PREDICTING THE UNPREDICTABLE

We've all seen the recent reactions to passenger discomfort on the most globally recognized airlines. In today's world of viral social media, instant news reports, and temperamental public opinions, airlines have to be ever more cautious of how they act and present themselves to this hyperconnected environment. Turbulence is one of the variables that can set passengers off – it's a catalyst for motion sickness and in-flight phobias – but without warning can become dangerous for crew and passengers. On top of this, turbulence costs airlines millions of dollars in damages, engineering inspections, and passenger delays.

Some airlines claim there's nothing they can do to better prepare. At The Weather Company, an IBM Business, we have been working with airlines for over 30 years, providing solutions to help them avoid turbulence, route around severe weather and find the smoothest and safest journey for their crew and passengers – avoiding social media tirades before they start.

The Impact of a Headline

News stories have emerged in recent months with passenger-reported bouts of severe in-flight turbulence. Headlines decrying lacerations, broken bones, and other serious injuries upon landing were reported over seven times across major EMEA publications, such as the BBC and CNN International, in May and June alone.

These events of severe turbulence do not represent the majority of everyday travel issues for air carriers. To claim that turbulence is “impossible to predict” is a common misconception, even among industry professionals. Let's examine the reasons why.



Turbulence Prediction Is Possible

Clear-air turbulence, under which circumstances the air produces turbulent conditions without cloud cover, is usually reported as the culprit. Without a clear reason to expect unusual jolts, airlines are left slightly blind and often cannot give the proper amount of warning to passengers. With people moving about the cabin and not wearing buckled seat belts, clear-air turbulence can be the recipe for disaster.

At least, it is for airlines that do not employ effective aviation solutions from The Weather Company, the most accurate forecaster according to ForecastWatch. Our customers benefit from up to a 25% decrease in passenger and crew injuries due to turbulence and gains of up to \$3.98 million in safety-related costs over a 5-year period.

The image below shows a replay of what turbulence looked like for one of the recent cases, courtesy of WSI Fusion. Our solutions accurately identify the presence of turbulence, granting pilots and operations the foresight to adjust their flight plan to avoid disruption and keep passengers and crew safe.

Our turbulence data offers the most complete view of global turbulence threats using a combination of

162 forecast models, machine-learning algorithms, and 140+ meteorologists creating flight-planning guidance alerts, providing near-real-time weather reports for thousands of flights per day.

Accounting for Social Perceptions

Bottom line: Turbulence is difficult to detect and forecast because it is transient and largely invisible. However, detection is not impossible, and today's social rules dictate how quickly and virulently stories of in-flight injury take off.

Ensure that you are offering your crews the best way to predict turbulent conditions and notify passengers that they need to prepare. In any turbulent situation, even as little as 1 minute of warning is enough to alert passengers to take their seats and put on their seat belts. And, for those airlines affected by the most recent reports, those 60 seconds could have meant the difference between business as usual and recovery from a large-scale reputational disaster.

At The Weather Company, we want to make sure you're equipped and informed with the best knowledge to make more confident decisions in the air, on the ground, and everywhere in between.



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