Twentieth-century airplanes generated a lot of data – about the engine systems, fuel use, crew activity, and even weather systems they encountered. But airlines and airports had little to no capability to do much of anything with it, and most of the information could not even be transmitted in real time.

Today, through thousands of sensors and sophisticated digitized systems, the newest generation of jets collects exponentially more, with each flight generating more than 30 times the amount of data the previous generation of wide-bodied jets produced. While currently only about one-tenth of the global fleet is made up of these technologically advanced aircraft, in a decade more than half of it will be. By 2026, annual data generation should reach 98 billion gigabytes, according to a 2016 estimate by Oliver Wyman. The newest generation aircraft by then will be spewing out between five and eight terabytes per flight, up to 80 times what older planes today generate.

Yet, airlines and airports still have only limited capacity to process this trove of information and use advanced analytics and artificial intelligence to help inform operations and maintenance – and almost never in real time. Discussing the connectivity of a plane usually revolves around whether passengers can get WiFi signals that let them do their work or stream their favorite entertainment. While this is no small amenity – with 85 percent of passengers saying they would connect to free Internet if available – the potential of connectivity could extend so much farther.

OPTIMIZING OPERATIONS

With the data provided by the newest aircraft, fuel consumption, crew deployment, and flight operations could be optimized to account for varying conditions; maintenance could anticipate when parts need replacing; air congestion could be reduced; flight routes could be altered well in advance of takeoff to avoid storms; systems could back up pilots by handling routine cockpit tasks; and passengers could be kept informed about schedules and options from the minute they leave their home for the airport. It would make the planes easier to fly and maintain and more efficient. It also may reduce crew fatigue with more precise scheduling to help fill in the gaps from anticipated pilot shortages. Ultimately, the data could help with the next iteration of aircraft and systems by providing information about how their design and manufacture could be improved.
The new connectivity and advanced analytics also mean savings for airlines; Oliver Wyman’s estimate is between two percent and 2.5 percent of total global operating costs, which translates to something between $5 billion and $6 billion annually. And while it may take several years, even a decade, to realize all of these possibilities, aviation is on the cusp of a data science revolution that will transform almost every aspect of the industry and provide its managers better control. The question industry players must ask themselves is whether they will be leaders or followers.

Where artificial intelligence and advanced analytics can play the biggest role is dealing with the unpredictables the industry faces daily. With hundreds of planes, thousands of flights, and millions of employees and passengers, there is now too much data and too many variables – from big events like hurricanes and snowstorms to smaller disruptions like air traffic control delays, mechanical failures, or even lines of thunderstorms that can wreak havoc on airline operations for days. Humans cannot sort through all the data fast enough to fix problems or even prioritize potential threats; computers and analytics are necessary. While much of this activity today is mostly reactive, the next step will be for aviation to proactively avoid some of the delays, congestion, and inefficiencies that annoy passengers and keep the global industry at single-digit profit margins.

BUILDING THE FUTURE

Starting to make this future a reality are aircraft and engine manufacturers like Boeing, Airbus, General Electric, Bombardier, and Safran, as well as parts makers and systems designers like Honeywell, which are starting to create a business out of the collection and analysis of the data being generated by aircraft. Then, there are also the data analytics experts like Google and Microsoft, which also are making a play for some of that pot of potential revenue.

Airlines, however, won’t be willing to hand over large chunks of their operations and potentially profits to their suppliers. A couple of pioneers have begun to digitize what have been incredibly manual processes involving plane maintenance data and schedules. By doing this, they’re hoping to avoid situations that can wreak havoc on flight schedules where the plane shows up at 7 pm for repairs, but the necessary parts arrive at 7 am the next morning or vice versa.

Maintenance represents a $9.1 billion expenditure for the four largest US airlines, for instance, so anything that can contain growth of such a substantial cost center – or even reduce it – would fall straight to the bottom lines of carriers. Using predictive maintenance – a protocol that allows airlines to anticipate when parts will fail in order to make their replacement more efficient – becomes a possibility when planes are fully connected to airlines and maintenance shops, and data being generated by the planes can be stored in a single database and analyzed.

OBSTACLES TO PROGRESS

Airlines encounter obstacles when attempting to realize many of these potential efficiencies. They include legacy information technology not flexible enough to accommodate more sophisticated analytics and artificial intelligence systems, and a dearth of mathematicians and engineers in their ranks to operate and understand the more advanced software and its output.

The transformation is also expensive, and currently, many airlines will first choose to spend any discretionary dollars on improving the customer experience. While predictive maintenance and other behind-the-scenes efficiencies would smooth out operations and result in fewer delays and inconveniences, the visible customer amenities that help keep customers happy and occupied, such as better WiFi connectivity, may influence passenger decisions more, and strong WiFi connections can save airlines the cost of installing seatback television screens. For instance, JetBlue and Amazon have a partnership that allows Amazon Prime members to stream Amazon videos on Jet Blue flights with a WiFi connection Amazon sponsors.

EVERYONE WINS

Of course, an enhanced customer experience is the biggest anticipated payback from the connected plane, according to a global survey that shows close to 50 percent of airline respondents putting that first among advantages. Connectivity will allow for the integration of loyalty programs into crew-issued tablets and other hand-held devices and enable two-way crew communications with the airline operations center. Flight operations will benefit from the shift from legacy data link systems to modern broadband; the integration of live flight routes and performance systems; the enabling of real-time graphical weather maps; and the facilitation of turbulence mapping, to name a few.

Even for airports, there is great potential for revenue generation. First, with the right data, airports could begin to establish brand recognition and a closer relationship to passengers, working with airlines to help their customers get to airports and gates more efficiently and hassle-free. They also could inform passengers about how to spend their waiting time more productively, letting them know about shopping and dining opportunities and places suited for families or work.

Connectivity is one of those rare win-wins for the industry, making flying more efficient, safer, and ultimately more pleasant. Now the investments need to be made.
MRO SURVEY FINDINGS 2017
This edition of Oliver Wyman’s annual MRO Survey examines dramatic workforce challenges, supporting technologies, and implications for the industry.

2016-2017 AIRLINE ECONOMIC ANALYSIS
In its eighth year, this report covers a range of aviation industry-specific economic and performance data as well as global capacity growth by region.

PERSPECTIVES ON MANUFACTURING INDUSTRIES
A collection of viewpoints on industrial companies’ challenges and trends, as well as their opportunities and potential courses of action.

BEYOND PRICE AND LOYALTY PROGRAMS
In the highly competitive airline industry, improving the customer experience is driving investment, differentiating brands, and generating a healthy tension between airlines and aircraft OEMs.

SURPRISE: ROBOTS AREN’T REPLACING HUMANS IN KEY AREAS OF MANUFACTURING
The real key to developing a competitive edge in an age of evermore automation is striking the right balance between people and robots.

2017-2027 FLEET AND MARKET FORECAST
A 10-year outlook for the commercial airline transport fleet and the associated maintenance, repair, and overhaul (MRO) market.

MOBILITY 2040: STAYING AHEAD OF DISRUPTION
Our new research study of emerging trends and the future of passenger transport.

NOW ARRIVING
Oliver Wyman’s PlaneStats.com publishes an in-depth data chart each day. Subscribe to daily email delivery at www.planestats.com/arrival_subscribe

RECENT PUBLICATIONS FROM OLIVER WYMAN
For these publications and other inquiries, please visit www.oliverwyman.com.
ABOUT OLIVER WYMAN

Oliver Wyman is a global leader in management consulting. With offices in 50+ cities across nearly 30 countries, Oliver Wyman combines deep industry knowledge with specialized expertise in strategy, operations, risk management, and organization transformation. The firm has more than 4,500 professionals around the world who help clients optimize their business, improve their operations and risk profile, and accelerate their organizational performance to seize the most attractive opportunities. Oliver Wyman is a wholly owned subsidiary of Marsh & McLennan Companies [NYSE: MMC]. For more information, visit www.oliverwyman.com. Follow Oliver Wyman on Twitter @OliverWyman.

ABOUT OUR AVIATION, AEROSPACE & DEFENSE PRACTICE

Oliver Wyman's global Aviation, Aerospace & Defense practice helps passenger and cargo carriers, OEM and parts manufacturers, aerospace and defense companies, airports, MROs, and other service providers develop growth strategies, improve operations, and maximize organizational effectiveness. Our deep industry expertise and our specialized capabilities make us a leader in serving the needs of the industry. Also, Oliver Wyman offers a powerful suite of industry data and analytical tools to drive key business insights at www.planestats.com as well as a team of highly experienced technical specialists from our CAVOK business who support certification, safety and operational performance initiatives.

PRACTICE LEADERSHIP

ROGER LEHMAN
Partner and Global Transportation Practice Leader
roger.lehman@oliverwyman.com

GILLES ROUCOLLE
Partner and Transportation Practice Leader for Europe
gilles.roucolle@oliverwyman.com

AMERICAS

TIM HOYLAND
Partner
tim.hoyland@oliverwyman.com

PATRICK LORTIE
Partner
patrick.lortie@oliverwyman.com

GEOFF MURRAY
Partner
goeff.murray@oliverwyman.com

DAVE MARCONTELL
Vice President & CAVOK GM
DMarcontell@cavokgroup.com

CHRIS SPAFFORD
Partner
christopher.spafford@oliverwyman.com

BRUCE SPEAR
Partner
bruce.spear@oliverwyman.com

VIK KRISHNAN
Partner
Vikram.Krishnan@oliverwyman.com

JEAN-PIERRE CRESCI
Partner
jeanpierre.cresci@oliverwyman.com

OLIVER FAINSILBER
Partner
olivier.fainsilber@oliverwyman.com

SÉBASTIEN MAIRE
Partner
sebastien.maire@oliverwyman.com

BJOERN MAUL
Partner
Bjoern.Maul@oliverwyman.com

VIK KRISHNAN
Partner
Vikram.Krishnan@oliverwyman.com

EMEA

JÉRÔME BOUCHARD
Partner
jerome.bouchard@oliverwyman.com

ERIC CIAMPI
Partner
eric.ciampi@oliverwyman.com

JÉRÔME WEILL
Partner
jerome.weill@oliverwyman.com

Copyright © 2017 Oliver Wyman