

# Predictive Airport Analytics

Combining data science,  
analytics and weather to  
streamline airport operations



---

## Highlights

- Gain situational awareness at major hub airports
- Better understand fuel requirements
- Reduce taxi time and fuel waste
- Operate more efficiently to support efficient departures and arrivals
- Mitigate downstream propagation

## The cost of delays

Airport delays cost airlines millions of dollars every year. While these delays are often foreseeable they appear to be unavoidable. Because most airlines consolidate their operations into just a few hub airports, delays can propagate throughout the system. A two hour delay at 8:00 AM can equate to eight hours of propagated delays throughout the day.

Forced into airing on the side of safety, dispatchers and schedulers all too often add buffer time and overestimate fuel requirements. Operating on intuition and personal knowledge, airlines are making the best decisions they can using the most and best data that they can assemble at the time. In today's era of technology and data, this approach is no longer good enough.

## What if we used all the available data?

There is a huge amount of data available that could enhance decision-making. We know the number of flights, and their taxi times. We know the capacity of airports and their historic operational behavior. And, we have confidence in forecasting weather's impact on operations. The scale of this data has never been larger and more prolific. One of the biggest problems airlines face today is integrating big data into their operations for real-time decision making. There is a trend for airlines to integrate big data into their flight operations for better outcomes.

**“An airline operating 300 flight per day from the 3 NYC area airports could expect \$1.2 million in operational savings annually.”**

-Dr. Alex Huang

## Meeting the Competition

Competition is fierce. It's important to use the information at your fingertips to create actionable knowledge for your operations. That means harnessing data from multiple channels in multiple formats: historical weather observations (METAR), weather forecasts (government TAF, WSI TAF, and WSI Proprietary Weather Forecast Platform), historical flight data (ASDI, ASDE-X and EFD archive), real-time flight data (ASDI and ASDE-X) and historical airport operational data (FAA airport operations archive).

Data models and algorithms let airlines go far beyond best guesses. The technologies are validated against historical data. Airport Analytics will provide airlines insights on future airport operational conditions to help them proactively handle their operations based on the insights. And, as more airlines adopt these tools, delays related to weather and congestions can be minimized.

## Opportunities for airlines

During peak capacity times, it's important to manage and limit holding patterns and extended taxi-times. There are ways to know if your aircraft will run out of fuel. When weather strikes, airlines obtain insight on the expected behaviors of airports (for example, congestion and runway configuration) using airport analytics. Hence, airlines can plan accordingly to reduce delay and improve operational efficiency.

## A better way

The solution is to combine historical airport operational data, flight data and weather forecasts into a single system that you can use to see and understand congestion patterns at major airports, and take appropriate actions. In other words, you can forecast airport operations conditions as you would the weather!

## Features

### Congestion prediction

Forecast airport congestion 12-hours out

- View Predicted Airport Capacity and Future Flight Demand Capacity Imbalance
- Predict airport congestion level with fresh data updated every 15 minutes

### Runway configuration prediction

Foresee arrival and departure runaways

- Display current and future runway configurations
- View timing of runway configuration changes over a twelve hour period

### Taxi time prediction

Know how long it will take you to get from gate to runway

- Takes the guesswork out of fueling for taxi
- Uses individual flight records against airport congestions and conditions
- Takes into account terminal and runway positions

## The Weather Company Solution

WSI Airport Analytics delivers the above capabilities in an easy-to-use, powerful upgrade to WSI's Fusion Surface Movement Package. Offering the only solution to pair historical airport operational data with superior weather forecasting, it provides airlines with actionable operational predictions. WSI Surface Movement with Airport Analytics is the only solution to bring the power of big data to carriers' airport operations.

## About The Weather Company, an IBM Business

The Weather Company, an IBM Business, helps people make informed decisions and take action in the face of weather. The company offers the most accurate forecasts globally with personalized and actionable weather data and insights to millions of consumers, as well as thousands of marketers and businesses via Weather's API, its business solutions division, and its own digital products from The Weather Channel ([weather.com](http://weather.com)) and Weather Underground ([wunderground.com](http://wunderground.com)).

The company delivers around 25 billion forecasts daily. Its products include the world's most downloaded weather app, a network of 250,000 personal weather stations, a top-20 U.S. website, one of the world's largest IoT data platforms, and industry-leading business solutions.

Weather Means Business™. The world's biggest brands in aviation, energy, insurance, media, and government rely on The Weather Company for data, technology platforms and services to help improve decision-making and respond to weather's impact on business.



© 2017 Copyright The Weather Company,  
an IBM Business

The Weather Company, an IBM Business  
400 Minuteman Rd  
Andover, MA 01810

Produced in the United States of America  
July 2017

IBM, the IBM logo and [ibm.com](http://ibm.com) are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. The Weather Company®, The Weather Company® and device, are trademarks or registered trademarks of TWC Product and Technology, LLC, an IBM Company. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at “Copyright and trademark information” at [www.ibm.com/legal/copytrade.shtml](http://www.ibm.com/legal/copytrade.shtml).

This document is current as of the initial date of publication and may be changed by IBM at any time. Not all offerings are available in every country in which IBM operates.

The information in this document is provided “as is” without any warranty, express or implied, including without any warranties of merchantability, fitness for a particular purpose and any warranty or condition of non-infringement.

IBM products are warranted according to the terms and conditions of the agreements under which they are provided.

The performance data and client examples cited are presented for illustrative purposes only. Actual performance results may vary depending on the specific configurations and operating conditions. It is the user’s responsibility to evaluate and verify the operation of any other products or programs with IBM product and programs.

Statement of Good Security Practices: IT system security involves protecting systems and information through prevention, detection and response to improper access from within and outside your enterprise. Improper access can result in information being altered, destroyed, misappropriated or misused or can result in damage to or misuse of your systems, including for use in attacks on others. No IT system or product should be considered completely secure and no single product, service or security measure can be completely effective in preventing improper use or access. IBM systems, products and services are designed to be part of a lawful, comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products or services to be most effective. IBM does not warrant that any systems, product or services are immune from, or will make your enterprise immune from, the malicious or illegal conduct of any party.