



ANALYSIS OF THE NEED AND JUSTIFICATION OF ADDITIONAL RUNWAY CAPACITY AT ORD

*Joe DelBalzo
JDA Aviation Technology Solutions
4720 Montgomery Lane Suite 950
Bethesda, MD 20814
301-941-1460
cschultz@jdasolutions.aero*

3 June 2015

Contents

1.	Need for Runway 9C/27C and the Runway Extension of 9R/27L at O'Hare	3
a.	Observations and Conclusions	3
2.	The OMP Master Plan	4
3.	OMP Master Plan Demand	6
4.	ORD Delays	7
5.	Conclusion.....	8
	Exhibit 1. ORD EIS OMP Passenger Enplanement Forecast	9
	Exhibit 2. ORD EIS OMP Operations Forecast.....	9
	Exhibit 3. ORD EIS OMP Enplanement Forecast and 2014 FAA TAF ORD Enplanements	10
	Exhibit 4. ORD EIS OMP Operations Forecast and 2014 FAA TAF ORD Operations	10
	Exhibit 5. ORD Delays.....	11
	Exhibit 6. THE JDA TEAM.....	12

1. Need for Runway 9C/27C and the Runway Extension of 9R/27L at O'Hare

There has been much discussion among the public, the media and public officials about the desirability, need and justification for building the additional runway 9C/27C and the runway extension of 9R/27L which are part of the Chicago project known as the O'Hare Modernization Plan or "OMP".

Construction and operation of these additional runway components of the Master Plan will require significant financial resources and, once constructed, will again create additional areas of noise impact on various communities around O'Hare.

JDA Aviation consultants – led by former FAA air traffic control experts and Dr. Antonio Trani, a civil engineering professor who has served as a technical consultant on airport demand and capacity issues for the FAA and NASA – conducted a multi-part analysis which consisted of:

1. An examination of the original demand projections and assumptions that were used to design the components of the OMP Master Plan, including the runway and terminal components of the Master Plan.
2. An examination of the interdependent components of the OMP Master Plan – how runways and terminals and gates are needed to create a balanced airport to meet current and projected demand.
3. An examination of FAA's projected passenger and aircraft operations forecasts for O'Hare out to the year 2040 – 25 years from now.
4. An assessment of the principal causes of current reported aircraft operational delays at O'Hare and the airport components (e.g. runways and/or gates and terminal capacity) needed to address reduce those delays.

a. Observations and Conclusions

1. The currently FAA forecasted long term demand is far lower – and extends with a much slower growth rate for decades longer – than the forecast demand for passenger and aircraft operational growth used by Chicago and the FAA to justify the scope and timing of the OMP Master Plan.
2. Lost in much public and media discussion of the OMP is the fact the six parallel runway plan proposed by Chicago in its OMP Master Plan includes as necessary balancing components the construction of more than 2 million square feet of new terminals and associated gates, consisting of at least new Terminals 4 and 6 and a new Terminal 7 (the Western Terminal). Without the massive new terminal components (and associated gates) which are part of the OMP Master Plan,

there is no justification or demonstrable need for building the remaining proposed runway 9C/27C. In addition, each of the proposed terminals has major cost and/or logistical issues which – coupled with financial and technical opposition from American and United – raises significant doubt as to whether these new terminals (and gates) will be constructed.

3. Based on the new 2015-2040 FAA Terminal Area Forecast (as compared to the now obsolete forecasts used for the design of the OMP Master Plan) the end-of-year 2015 runway configuration – including the new 10C/28C and the soon to open 10R/28L – should provide sufficient runway capacity to meet FAA's projected demand for O'Hare until beyond 2035. In addition, to justify moving beyond the end-of-year 2015 runway configuration to add one more runway, Chicago would also have to build the new terminal and gate capacity prescribed in the OMP Master Plan to balance the throughput of the new runway capacity.
4. An analysis of various FAA airport performance reporting data bases suggests that a primary source of current operational delays experienced at O'Hare is due to the current unavailability of sufficient gate capacity. In the short term, O'Hare should focus on increasing gate and terminal capacity to match the performance capability of the end-of-year 2015 runway system. In the long term O'Hare should not build additional runways beyond the 2015 runway system until O'Hare constructs additional gate and terminal capacity to match the additional runway capacity, *i.e.*, the major terminal and gate components of the OMP Master Plan or similar terminal and gate capacity.

2. The OMP Master Plan

Balancing OMP's New Runway Capacity with Major New Terminals and Associated Gate Facilities.

It is axiomatic in planning major new airport development that all the major component parts of the airport – runways, terminals, gates, and surface transportation facilities – be designed in balance. Increasing the runway capacity of the airport, while failing to make corresponding adjustments to the capacity of the terminals and gates, simply moves congestion and delay from one airport component (e.g., runways) to the next critical component (e.g., terminals and gates).

This need to balance the capacity of the major components of the airport was recognized by the Transportation Research Board of the National Academy of Sciences in their report "Evaluating Airport Capacity" (ACRP Report No. 79):

At most airports, the capacity of the airfield system determines the ultimate capacity of the airport. However, prudent planning requires that airfield capacity be balanced with the capacities of other airport components, such as the terminal complex, ground access roadways, and the cargo complex. This balancing is

usually accomplished in the facility requirements portion of an airport master plan.

p. 92 (emphasis added)

Chicago and the FAA recognized this need to balance the runway and terminal components of an expanded O'Hare in designing the components of what is popularly known as the "OMP". Chicago balanced these runway, terminal, and gate components in the OMP Master Plan.

Contrary to popular misconception, the FAA and Chicago emphasized that the OMP Master Plan involves far more than six parallel and two crosswind runways.

"To meet the needs of airlines, passengers, air cargo operators, and other Airport users, the capacity of terminal and support facilities should be in balance with the capacity of the airfield. Thus, this component of purpose and need simply reflects the FAA's recognition that any undertaking to enhance the airside capacity at an already congested location also needs additional non-airfield capacity, including terminals, gates, and associated infrastructure."

September 2005 FAA Record of Decision, p. 15 (emphasis added)

See also July 2005 FAA Final Environmental Impact Statement ("FEIS"):

"The estimated terminal area necessary to accommodate the projected demand ranges from about 6.9 to 7.4 million square feet. This is a net increase of approximately 2.5 million square feet, or 53 percent, over the existing terminal area."

FAA FEIS, p. 2-33 (emphasis added).

In its Master Plan, Chicago noted that in addition to the need for more than 2 million square feet of new terminal space, the new terminals needed to provide an increase in gates from an existing 189 gates to 265 gates. Chicago OMP Master Plan, p. IV-25.

These massive new terminals and gate facilities needed to accommodate the capacity provided by the OMP runways were identified in Chicago's Master Plan as Terminal 4 (to be used by American Airlines), a new Terminal 6 (to be used by so-called "spoke" airlines – i.e. all other airlines but United and American), an extension to Concourse K, and a major new Terminal 7 (Western Terminal) (to be used by United Airlines).

Thus the balanced components of the OMP Master Plan airport – which Chicago and the FAA have variously called the "OMP" and by another name ("Alternative C" in the FAA's EIS) – included the eight runway configuration as well as major new terminals and major new gate increases on both the East and West sides of the airport. The specific terminal and runway features of the OMP Master Plan airport ("Alternative C" in FAA parlance) is shown on Exhibit A attached to this report.

3. OMP Master Plan Demand

The Demand On Which the OMP Master Plan Airport Was Designed Has Not Materialized -- Raising the Question As to Whether the Additional Runway(s) and Major Terminal Expansion Are Necessary.

The major components of an airport (e.g. runways, terminals, and gates) are sized and designed based on projected growth in passenger demand coupled with an assessment of how many aircraft operations will be necessary to carry that passenger demand to and from the airport.

Airport planners use an estimate of passengers who actually board an airplane at the airport (these are called “enplanements”). The number of future annual enplanements is then converted into estimates of annual aircraft operations as well as estimates of operations in peak periods of travel.

In the OMP Master Plan and in the FAA’s EIS, Chicago and the FAA based the design of the OMP Master Plan Airport (Alternative C) from a base year of 2001 and a design year of 2018. From a base year (2001) demand of 29.4 million enplanements in 2001 carried in 911,000 flight operations Chicago projected passenger traffic at O’Hare to dramatically rise to 52.9 million enplanements in 2018 carried on 1.148 million operations. (See Exhibits 1 and 2)

Chicago designed the eight runway OMP system coupled with the massive new terminal and gate expansion of the OMP Master Plan airport (Alternative C) to meet these projected year 2018 demand figures (52.9 enplanements and 1.148 million operations). Moreover, Chicago projected the operations growth at the airport to be very rapid, projecting operations to exceed 1 million operations by 2007. Unfortunately, forecasts of aviation demand – particularly for future periods extending beyond 15 years – are known to suffer from significant uncertainty and inaccuracy. Indeed this inaccuracy has been especially significant in the case of the forecasts on which the runways and terminals of the OMP Master Plan Airport (Alternative C) was designed.

Based on the recently released 2015-2040 FAA Terminal Area Forecast (TAF) for O’Hare the projected demand for enplanements and operations is far lower than projected by Chicago and the FAA in the design and approval of the OMP airport (Alternative C). FAA now projects passenger demand will not reach levels (if ever) on which OMP was designed until the year 2035 – when the Master Plan projected this demand would be reached by 2018. FAA projects flight operations at the airport will not reach the levels which the OMP Master Plan predicted by 2018 until 2042. (See Exhibits 3 and 4)

Given the historical track record of high levels of inaccuracy and overstatement in FAA Terminal Area Forecasts, it may be prudent to view even the most recent 2015 FAA forecasts with some skepticism. But accepting the forecasts as accurate for the sake of discussion and analysis, it is clear that there is no likely need to build any additional runways at O'Hare – at the very least for many years into the future – and no need to build the massive terminal/gate expansion on which the eight runway OMP system is predicated.

Dr. Antonio Trani, a professor of civil engineering at Virginia Tech who has consulted extensively for FAA on airport design and operational matters, conservatively estimates that the existing O'Hare end-of-year 2015 runway configuration (with the new 10C/28C and the new 10R/28L will provide enough runway capacity into the distant future without the need to build the new runway 9C/27C at least until beyond 2034. The extension of runway 9R/27L might be considered but only if the airport shuts down (by choice) two existing long runways 32R and 32L, existing runways that could serve future large capacity operations at the airport. In a companion paper, JDA recommends that existing runways 32R and 32L be maintained.

With the 5 parallel runways and 2 cross-wind runways (14/22s) of the Fall 2015 O'Hare runway configuration Dr. Trani estimates that ORD has the runway capacity to handle 1.1 million operations per year (annual service volume) – with one caveat. As discussed below, information from FAA airport performance databases indicate that a significant percentage of the delays currently experienced by passengers at O'Hare are caused by the unavailability of sufficient gates to efficiently process flight operations.

4. ORD Delays

ORD Performance Data Suggest Current Gate Shortages Are Affecting Current O'Hare Delays

While there may not be a need to build additional runways or major terminal facilities in the foreseeable future, Chicago, the FAA and the airlines should examine the need for additional gates at O'Hare to address current traffic demand. Airlines, Chicago and the FAA could also implement demand management strategies to reduce delays at the airport if no additional gates are constructed.

An examination of FAA's ASPM database shows relatively large gate departure delays as compared to relatively modest airborne delays (See Exhibit 5). Dr. Trani has conducted a preliminary "first-order" analysis of gate needs at O'Hare to accommodate current operational conditions. He suggests that ORD current delay performance would benefit if O'Hare added 15-20 more gates. A comparative analysis was performed using Atlanta as a benchmark airport. The only airport with similar number of flight operations to O'Hare.

5. Conclusion

The media has reported that the major airlines are opposed to further terminal and runway expansion at O'Hare until there is concrete evidence of a proven rise in passenger and operational demand to justify such expansion. The JDA analysis set forth above shows that the reported airline opposition to such further expansion is justified.

There is no need to construct runway 9C/27C. The demand is simply not there to demonstrate the need for the runway for the foreseeable future. In addition, even if future demand materializes to support added runway construction, such runway construction should be deferred until it can be balanced with appropriate construction of additional terminal and gate capacity. Otherwise added traffic supported by new runway capacity will simply increase delays to an overtaxed terminal and gate supply.

Exhibit 1. ORD EIS OMP Passenger Enplanement Forecast

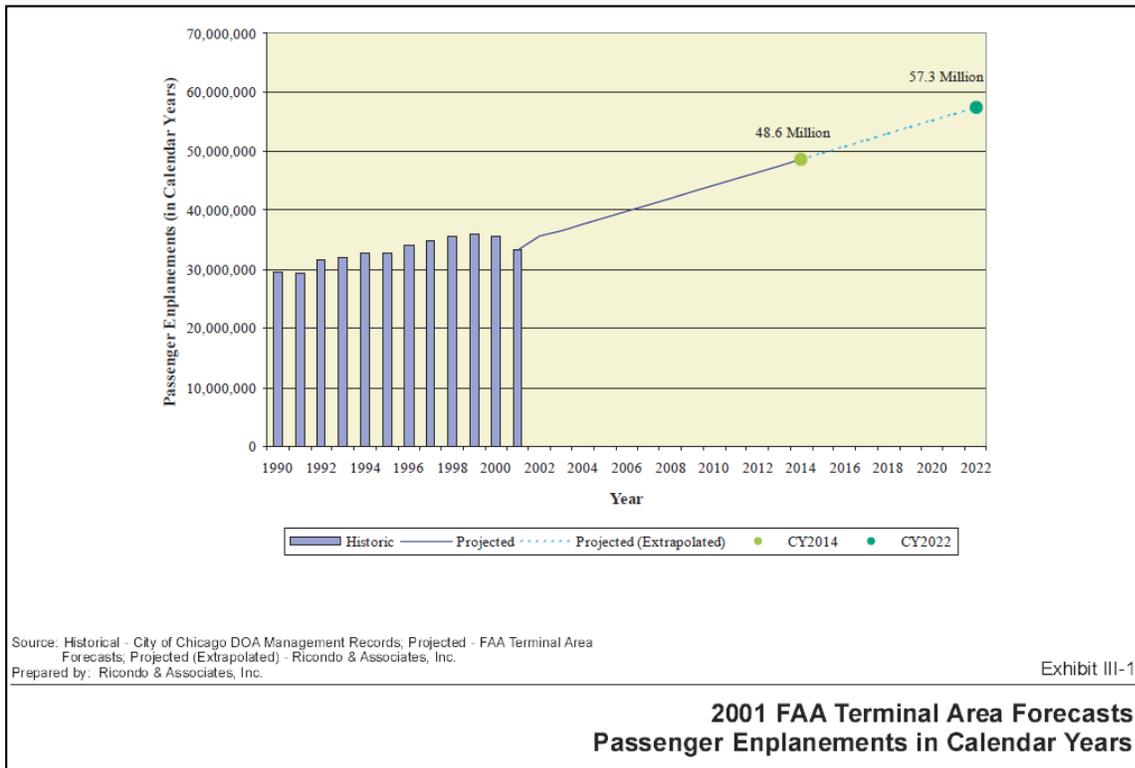


Exhibit 2. ORD EIS OMP Operations Forecast

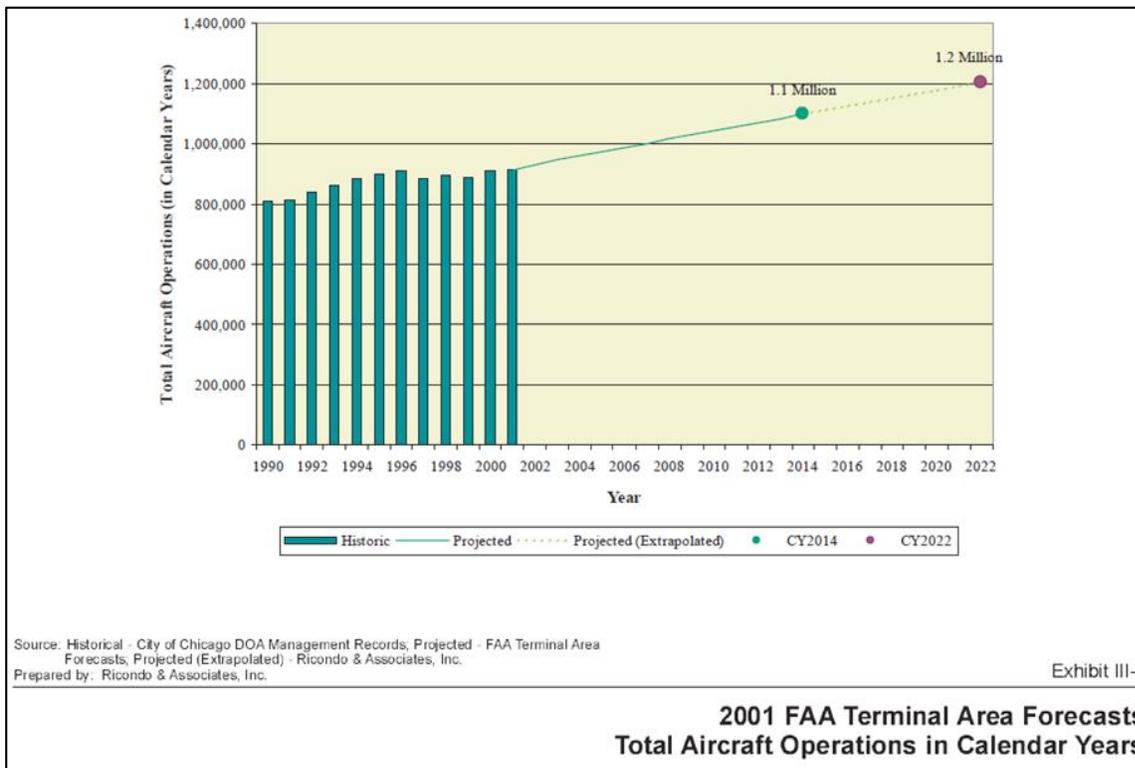


Exhibit 3. ORD EIS OMP Enplanement Forecast and 2014 FAA TAF ORD Enplanements

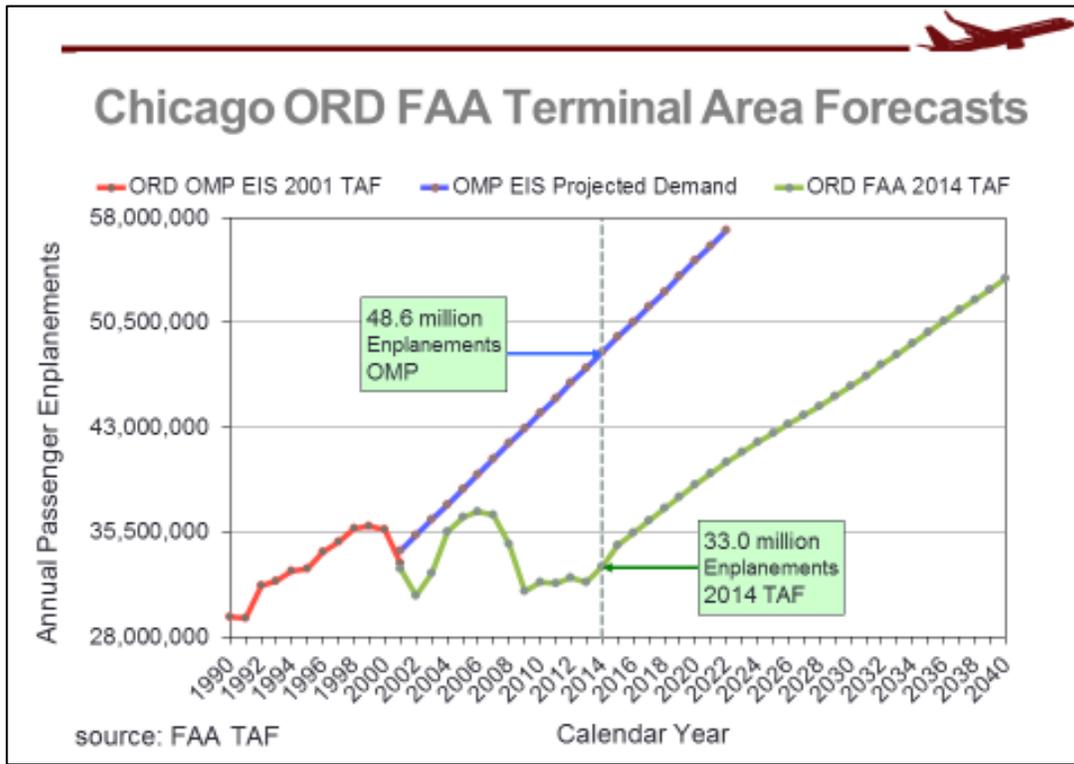


Exhibit 4. ORD EIS OMP Operations Forecast and 2014 FAA TAF ORD Operations

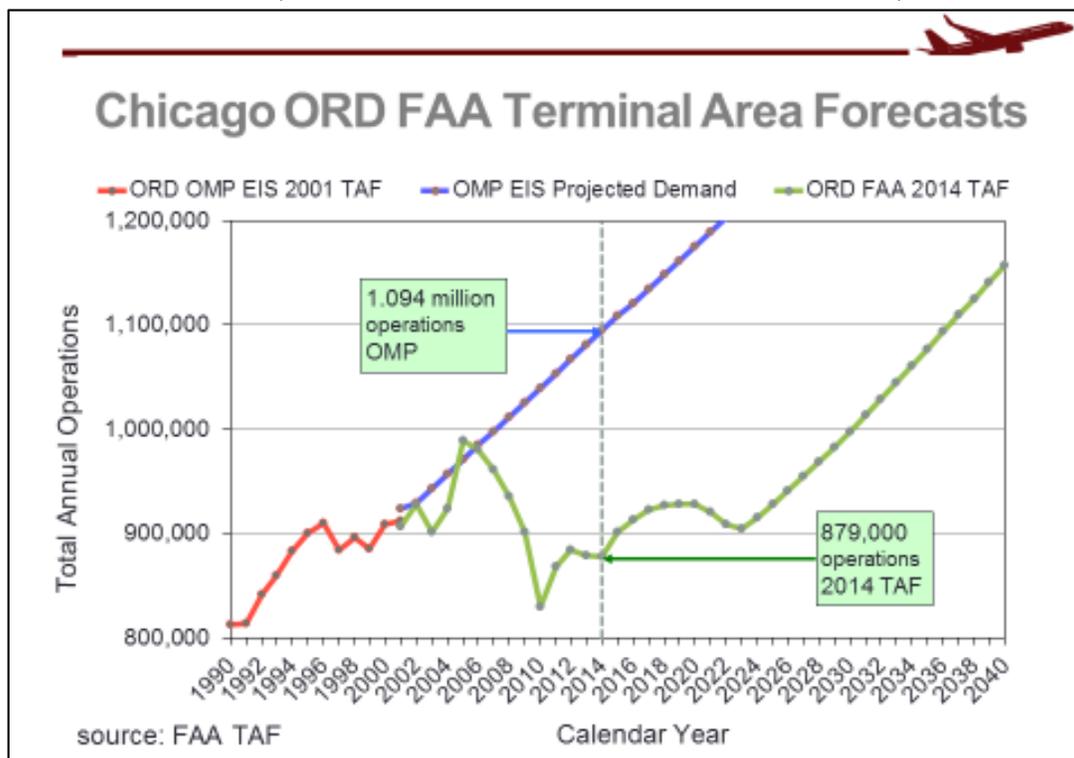


Exhibit 5. ORD Delays

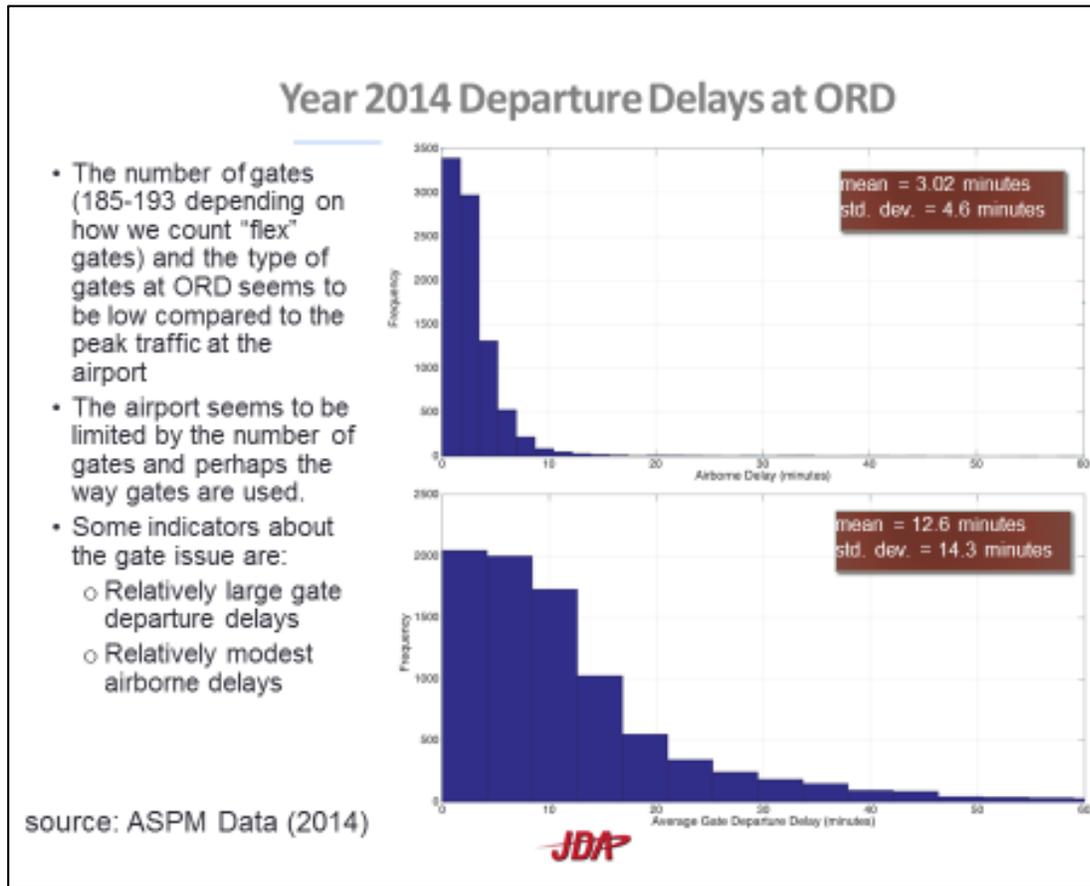


Exhibit 6: THE JDA TEAM

Author:

Joe Del Balzo, JDA Founder and President, served as the highest-ranking career professional (Acting Administrator) in the Federal Aviation Administration (FAA). Both in his long career with FAA (where he also served as FAA's Executive Director of System Operations, Executive Director for System Development, Director of the Eastern Region and Director of the FAA Technical Center) and in his subsequent private role as an aviation consultant, he has earned wide respect for his expertise in a wide range of aviation issues.

Contributing:

Dr. Antonio A. Trani, is a JDA associated consultant and Professor with the Department of Civil and Environmental Engineering at Virginia Tech University and is Co-Director of the National Center of Excellence for Aviation Operations Research (NEXTOR). He has been the Principal or Co-Principal Investigator on 68 research projects sponsored by the National Science Foundation, Federal Aviation Administration, National Aeronautics and Space Administration, National Consortium for Aviation Mobility, Federal Highway Administration, and the Center for Naval Analyses. Dr. Trani has provided noise, capacity and safety consulting services to the Norman Manley International Airport, Punta Cana International, National Institute for Aerospace (NIA), Xcelar, Quanta Technologies, Los Angeles World Airport, Charles Rivers Associates, Boeing Phantom Works, Civil Aviation Administration of China (CAAC), British Airports Authority (BAA), SEATAC Airport Authority, Louisville International Airport, Delta Airport Consultants, Celanese, and the MITRE Corporation.

Dr. Sanford Fidell, is a JDA associated consultant and owner and President of Fidell Associates which provides consulting and research services and litigation assistance in environmental acoustics, transportation noise, and effects of noise on individuals and communities. He is the U.S. Representative to International Standards Organization (ISO) Technical Advisory Group on Community Response Questionnaire Standardization and to ISO Working Group 45 on Community Response to Noise. Dr. Fidell is member of the Acoustical Society of America and the Technical Committee on Noise. He was on the Design Review Group for the FAA's Integrated Noise Model software. Dr. Fidell has provided consulting services to community, airport and government agencies involved in aircraft noise controversies and assessments and disclosures of aircraft noise impacts and has consulted on land use planning related to aircraft noise regulation. He is active in international standardization efforts for prediction of aircraft, rail and road noise impacts.

Dr. David Dubbink, is a JDA associated consultant and an Environmental Planning and Noise Management Specialist. He holds a PHD from UCLA in Urban Planning and Environmental Management. He is the designer and developer of ISIS (the Interactive Sound Information System). Dr. Dubbink is a member of the Acoustical Society of

America, Institute of Noise Control Engineering, International Association for Impact Assessment and the Transportation Research Board, Committee A1F04, Transportation Related Noise and Vibration. He has provided training and consulting services on noise management to over 80 organizations worldwide.

Rob Voss Senior Air Traffic Operations Subject Matter Expert (SME), is a JDA associated consultant and former career FAA Air Traffic Control Specialist, Operations Supervisor, Quality Assurance and Training Specialist, Plans and Procedures Specialist, Air Traffic Manager, Integration and Efficiency Specialist and finished his FAA career as a System Operations Senior Advisor. Rob spent more than 26 years with the FAA including assignments at Chicago Midway (MDW), San Francisco (SFO), Santa Rosa (STS), Scottsdale (SDL), San Carlos (SQL) and the Midwest Tactical Operations office. While working for several years outside of the FAA, Rob was an Air Traffic Consultant to the Deputy Airport Director (Noise Abatement) at SFO, where he provided analysis, advice and education involving aircraft noise and air traffic procedures and was the Project Manager for a FAR Part 150 noise exposure map update. He has also served as a contractor and Air Traffic Analyst at NASA-Ames Future Flight Central research and simulation facility.

Craig Burzych is an Air Traffic Operations Specialist, a JDA associated consultant and former career FAA Air Traffic Control Specialist. He spent 24 years working at the O'Hare Control Tower and 4 years working in the Chicago Midway Tower. He was detailed annually to lead the FAA Air Traffic Control support for the annual EAA Oshkosh "fly In" the single largest aviation show and exhibit held in the U.S. Chuck served as President of the National Air Traffic Control Association (NATCA) (Chicago ORD) 9 years and also was a NATCA Aviation Safety Inspector and a member of the FAA Runway Safety Action team for the Great lakes Region.

Cynthia Schultz PE, AAE is JDA's Vice President of Airports where she manages the airport line of business including, airport Safety Management System services, airport sustainability, airport strategic planning, airport security, facilitating new technology/products for airports, training for airports and airlines, airline negotiation and development of support services. Before joining JDA Cynthia was the Airport Director of Great Falls International Airport where she directed and led all airport operations, maintenance, administration, finances, security and support services including project management of engineering, architectural and construction, negotiation and administration of leases and concessions, safety, certification, design, construction and funding issues.