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9 Case Studies

The case studies in this chapter have been prepared to illustrate stakeholder engagement activities at airports that have experienced or hope to benefit from the implementation of new NextGen capabilities. For the most part, they describe engagement activities related to the implementation of PBN procedures, which is the NextGen initiative that has and will continue to impact the most airports. Airports of varying sizes have been included to demonstrate differing challenges and various approaches to overcoming those challenges. Although not NextGen-specific, FAA's briefings about Chicago O'Hare International Airport's modernization program are included because they illustrate a successful approach to community outreach about new flight procedures that will result from runway realignments. EUROCONTROL's *Specification for Collaborative Environmental Management* also describes stakeholder engagement guidelines that have been successful in support of activities in Europe that are analogous to NextGen.

These case studies highlight the following best practices for stakeholder engagement on NextGen implementation:

- Data collection, analysis, and relationship-building with interested stakeholders are recognized as important prerequisites to NextGen implementation.
- Airports and community representatives are notified as early as possible about proposed flight procedure and airspace changes.
- Stakeholder engagement fosters two-way dialogue through which each party is informed of the other's objectives, questions, and concerns.
- Collaborative and trusting relationships among all relevant stakeholders are created and sustained as essential to efficiently achieving optimally balanced results.
- Stakeholder engagement is promoted by senior management as part of an airport's culture.
- Individuals are empowered, enabled, and held accountable for learning about, communicating, and leading engagement activities concerning NextGen implementation.
- Airports contribute important information on local population centers, noise concerns, land use patterns, and abatement procedures that are factored into the flight procedure design process.
- Airports provide an important communications bridge between FAA, operators, and community stakeholders.
- Public outreach efforts are well-publicized, accessible, and clearly communicated.
- Face-to-face meetings are used effectively to establish two-way communication.
- The Internet, electronic media, and portable devices are incorporated as new and innovative ways of communicating and disseminating information.

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- General information is provided and common terminology is employed to establish a common ground for communication, but specific implementation schedules, maps showing areas of impact, and statistics that quantify the degree of change also are shared as required.
- In-house communications, marketing, and GIS staff can help keep the costs of developing engagement material down. Consultants may be required to collect data and conduct analyses.

Proactive Engagement at Dallas/ Fort Worth International Airport

Background

Dallas/Fort Worth International Airport (DFW) was established by a contract between the cities of Dallas and Fort Worth, Texas, in 1968. In 2014 DFW had 679,820 operations, making it the fourth busiest airport in the United States.

DFW benefits from a great deal of land that is owned by the airport (over 17,000 acres). Use of surrounding land also has been planned with airport compatibility in mind. This foresight was partially enabled in 1971 when the North Central Texas Council of Governments (NCTCOG) developed noise exposure maps of then-forecast 1985 operations. NCTCOG provided the noise contour map and a model land use ordinance to surrounding cities to aid in compatible land zoning around DFW. Many surrounding jurisdictions subsequently enacted ordinances to control land development within these areas. The noise contours and contours from the 1992 Final Environmental Impact Statement (FEIS) also were incorporated into land use planning for surrounding cities. With the advance of quieter jets, these conservative policy contours continue to serve the airport and surrounding communities well, providing stable elements of city master plans and zoning ordinances.

In the late 1980s DFW foresaw the need for two additional north/south runways and the need to expand the number of departures from a single departure heading to multiple, divergent headings to increase departure throughput and accommodate growing capacity needs while maintaining safe separation. An Environmental Impact Statement (EIS) was prepared under the National Environmental Policy Act (NEPA). The EIS evaluated the environmental effects of constructing and operating two additional runways as well as the necessary redesign of the Metroplex airspace, which included these divergent "fanned" departure headings. Concern about noise from operation of the new runways was the dominant issue during the EIS development, leading to lawsuits that went to the Supreme Court. FAA approved the FEIS in 1992, giving the airport the authority to build two new runways and redesign its airspace including expanding the number of departure headings available to air traffic control (ATC). One runway was constructed and the airspace redesign was implemented; however, the planned expansion in the number of headings was not implemented. A subsequent NEPA study in 1998 again included the additional approved departure headings. During the intervening years, the need for the expansion of optional headings had become more significant in order to alleviate departure throughput issues attributed to growth in air traffic and the conversion of turboprops to regional jets. (During this time, turboprops shifted from 30% of DFW's fleet to < 5%.)

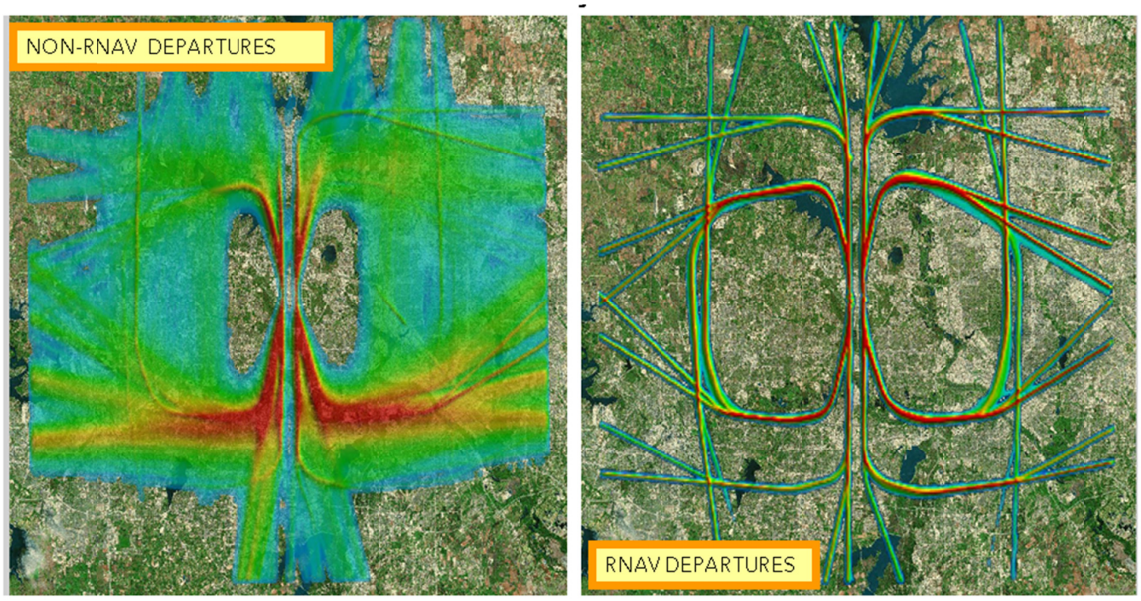
Implementation of the expanded departure procedures was not technically feasible for FAA until FAA's NextGen program. Area navigation (RNAV) technologies used in performance-based navigation (PBN) procedures have provided FAA the means to enable multiple departure headings within the existing airspace structure. A significant number of airlines equipped their aircraft to take advantage of the new performance-based capabilities. Local FAA air traffic management (ATM) designed RNAV procedures

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to provide two RNAV courses from each departure runway, explored lessons learned at other airports, and worked with multiple stakeholders during development and testing from the start. FAA and DFW staff worked collaboratively in the development of RNAV flight tracks (see Figure 9-1). The airlines, being important beneficiaries, were also active stakeholders in the development of the new procedures. To engage them, FAA conducted meetings that involved airline and airport representatives. American Airlines, a significant carrier at DFW, also offered the use of their simulators so that the new procedures could be flown virtually before they were implemented.

FAA and DFW worked together to develop a noise study of the proposed RNAV departure procedures; the study indicated that no significant impact would occur with RNAV and overall noise would be reduced. An independent environmental review of the implementation of these RNAV procedures was not required, however, because given the findings of the earlier NEPA studies a formal community engagement effort was not required.

Nevertheless, DFW and FAA's Airports District Office (ADO) concurred that it was important to engage local communities on the proposed change in advance. The ATO agreed and participated in a public outreach campaign that the airport initiated.



Source: DFW Airport

Figure 9-1. *Maps showing the difference between traditional flight tracks (left) and RNAV flight tracks (right).*

Stakeholder Engagement Methods Used

Aviation planners at DFW initiated a public outreach campaign to inform the surrounding municipalities of the upcoming implementation of RNAV procedures well in advance of implementation. The airport allowed each city to determine the audience for the joint airport/FAA presentations which varied from small meetings with city leaders and elected officials to briefings before local city councils. During these meetings, airport representatives explained the drivers behind the need for change, why these procedures were important to air service at DFW, and the careful consideration that was being given to where the new flight tracks would go. FAA representatives provided information on what RNAV is and why it is important on a national scale. To complement this general information, the airport also developed a grid point analysis showing noise impacts at day-night average sound levels (DNLs) of

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60 and 65 decibels (dB). Slide presentations were used to convey this information. The presentations were adapted to the specifics of each community and in most cases one meeting per community was sufficient.

The reaction to these briefings was largely positive. One municipality had their outside noise expert study the noise impacts further. Some concern was expressed about the portion of aircraft that were equipped with the avionics necessary to use the RNAV procedures, thus eliminating drift and the possibility of aircraft spreading noise impacts more broadly than the specified routes. Fortunately, it was determined that 85% of the aircraft would be RNAV capable and therefore the projected noise impacts being communicated were fairly accurate.

RNAV procedures were planned to be initiated in October 2004. The proposed date had been communicated during the public outreach campaign; however, the date had to be adjusted to November due to charting dates. Ironically, residents began complaining on the earlier, initially published, date. RNAV officially began in September 2005 with few complaints from east-side residents where the RNAV tracks were moved closer to residential areas. Some residents living just outside the boundaries of the previous noise mitigation areas (mitigated for impacts from the new east-side runway as required by the 1992 FEIS) were interested in whether they would be now eligible for noise mitigation measures (which they were not). The airport also received, recorded, and responded to noise complaints.

Supportive Map Data

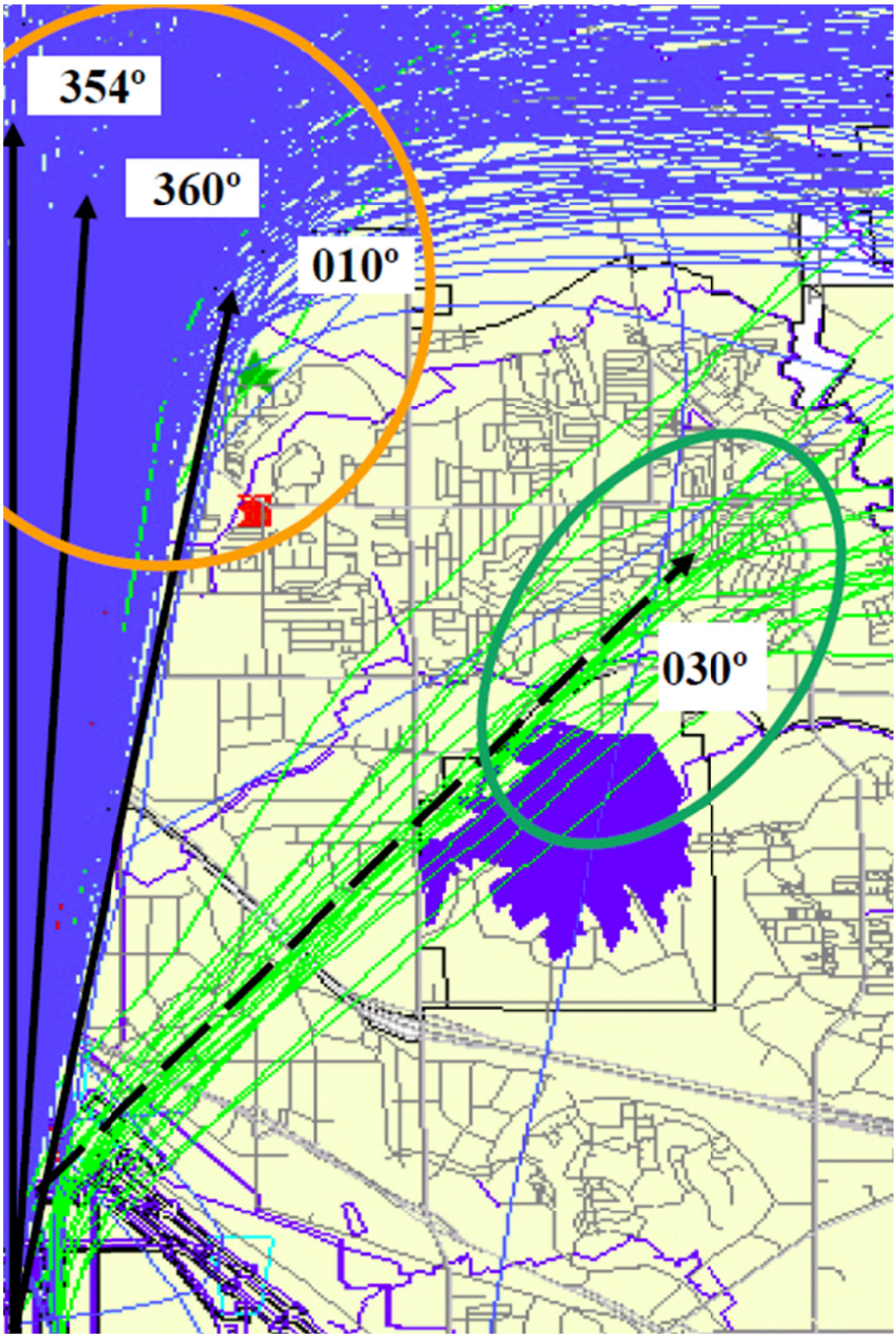
Mapping data were an important element of the information used to communicate the impact of the new procedures among FAA, airport, airline, and community stakeholders. Of the graphics used in one NextGen-related community outreach presentations, not counting logos and a few general photos of aircraft, 90% were maps. Flight tracks from DFW's Airport Noise and Operations Monitoring System (ANOMS) helped illustrate existing conditions. Recognizing the importance of showing both the "before" and "after" conditions, the airport created its own graphics to show proposed conditions. An example of these maps is shown in Figure 9-2. These comparisons helped illustrate that, even though the implementation of the RNAV procedures brought aircraft closer to city centers, the tighter flight tracks that resulted reduced the area of land impacted. Noise contours that had been developed by airport consultants were shared with communities upon request. Statistics showing fleet mix changes over time complemented this map information.

Complementary Environmental Analyses

In 2008 DFW initiated an airport-wide sustainability program. An important objective of this program was to complement and support sustained aviation growth through the development of a NextGen Environmental Management System (EMS). Analysis of four criteria—air quality, climate, energy, and noise—helped DFW evaluate the environmental and energy related impacts of NextGen capabilities.

- With regard to air quality, emissions were anticipated to increase; however, DFW had already significantly reduced emissions through changes to its central utility plant and replacement of airport ground support vehicles.
- With regard to climate, analysis suggested that technology, alternative fuel, operational improvement, and policy solutions could help mitigate the expected increase of CO_2 emissions.
- With regard to energy, increased efficiencies were expected to result in a net decrease in energy consumption.

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Source: DFW Airport

Figure 9-2. *Map showing 30% authorized deviations (in green) from normal flight paths (in blue).*

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- With regard to noise, NextGen would provide aircraft noise-reduction improvements via the Continuous Lower Energy, Emissions, and Noise (CLEEN) program and operational procedures such as RNAV and those outlined in the North Texas Optimization of Airspace and Procedures in the Metroplex (OAPM) study.

During the development of the EMS, stakeholder outreach was required to be responsive to the needs of numerous stakeholders at various levels including:

- Federal
  - FAA (headquarters, region, district, and ATC offices)
  - EPA
  - U.S. Army Corps of Engineers (USACE)
  - U.S. Department of Justice (DOJ)
- State
  - Departments of transportation (DOTs), environmental agencies
- Regional/Local
  - Airlines
  - Environmental agencies
  - Community interest groups
  - Metropolitan planning organizations (MPOs)
  - Financial institutions
  - Contractors
- Airport Departments
  - Airport management
  - Communications
  - Environmental affairs
  - Real estate
  - Energy
  - GIS
  - Operations
  - Engineering
  - Planning

Successes

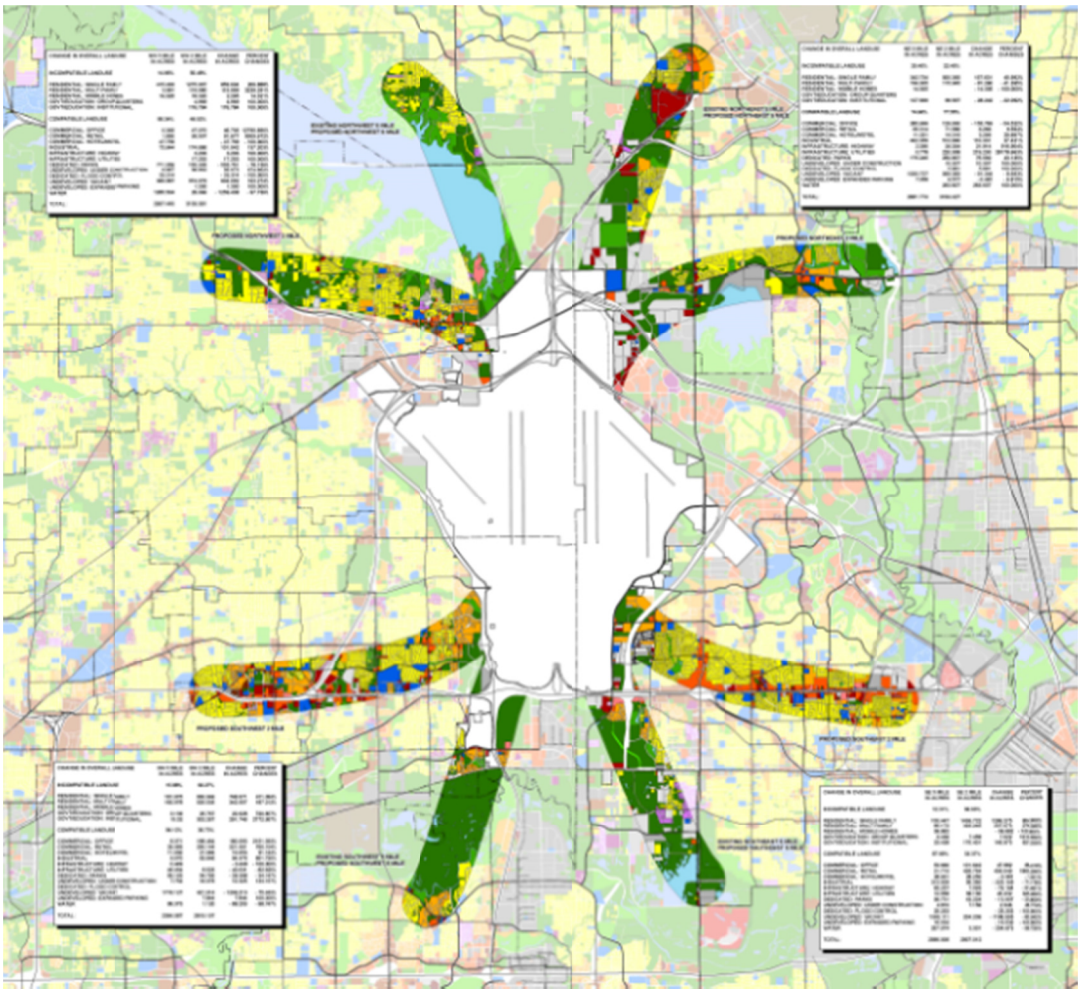
DFW's proactive approach toward stakeholder engagement was and continues to be a key factor in achieving the following results:

- Stakeholder engagement has become engrained in DFW's culture. It is "just something they do."
- DFW's community outreach program for RNAV was positive in that it met each community's unique needs, requirements, and desires. As a result, communities accepted the planned changes without resistance once they understood them. DFW educated, engaged, and gained advocacy for the final outcome—communities owned the outcome. Even though some residents received in-

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creased noise, because of early education and engagement, the community understood, continued to support, and advocated for implementation.

- DFW and its owner and host cities declared a "NextGen Day" in 2012, issuing their strong support for FAA's NextGen. The airport reported in a press release that the surrounding municipalities of Dallas, Fort Worth, Coppell, Euless, Grapevine, and Irving had issued proclamations supporting NextGen implementation.
- DFW conducts briefings individually with local communities to educate and inform them about the FAA NextGen program well in advance of any identified NextGen procedures. The goal of these briefings is to communicate with local communities about the basic principles of NextGen and overall environmental benefits, to learn of communities' specific needs and concerns, and to partner with all relevant stakeholders, including local communities, in future NextGen developments.
- DFW's approach has helped airport managers engage airlines to produce an optimal balance of results. In one such case an airline sought the ability to turn aircraft early in order to save fuel. Their plan was to fly down a nearby highway where compatible land use existed on either side. The airport conducted a GIS analysis of a proposed departure procedure change, calculating the underlying land use compatibility for the existing turn as well as the proposed early turns (see Figure 9-3).



Source: DFW Airport

Figure 9-3. *Land uses under proposed flight tracks.*

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The net results showed that the early turns would result in a greater adverse effect of noise and mitigation costs that would have far exceeded any fuel savings.

- Although committed to ongoing stakeholder engagement, the airport has kept the costs of engagement low by utilizing in-house GIS and communications personnel to help develop the materials that airport planners need. In-house personnel also respond to noise complaints. When necessary, the airport uses outside consultants to conduct noise analyses and other studies.
- FAA reported that "By [DFW] using these, the implementation of NextGen EMS Framework and collaboration will be compatible with on-going stakeholder environmental programs and initiatives. In turn the stakeholder community will be encouraged to collaborate and meet the aviation environmental and energy goals" (FAA 2013b).
- DFW's efforts will be leveraged to advise future NextGen EMS frameworks and collaborations through similar, detailed use of examples, case studies, and direct stakeholder involvement.

Metroplex Planning at Denver International Airport

Background

Beginning in 2010, several ATC offices within FAA, as well as the City and County of Denver, operator of Denver International Airport (DEN), and several key airlines initiated a "local" process to introduce new RNAV technologies and improve the efficiency of the airspace surrounding DEN. The process ultimately included a wider group of stakeholders and unfolded over a nearly 4-year period, yielding 17 new RNAV standard terminal arrival routes (STARs) and 16 new RNAV standard instrument departures (SIDs) for DEN, as well as several additional STARs and SIDs for Centennial Airport (APA) and Rocky Mountain Metropolitan Airport (BJC), both of which are also within the Denver airspace. Recognized by FAA's NextGen Office as an exemplary implementation of NextGen procedures, this airspace redesign effort became a prototype for others to follow.

Earlier efforts to redesign arrival and departure routes for DEN had stalled in part because of the complexities of resolving issues related to overlapping but segmented airspace responsibilities. By 2010, changes in personnel and FAA's broadening of the initial stakeholder group created a working group of approximately 50 people who could focus on a common solution. This group represented:

- Multiple levels of FAA (including the NextGen office in Washington, DC; an FAA design team leader; air route traffic control center (ARTCC), terminal radar approach control facility (TRACON), and air traffic control tower (ATCT) personnel; and environmental protection specialists from the Northwest Mountain Regional office;
- Three major air carriers that had the equipment needed to fly RNAV procedures;
- City and County of Denver personnel representing the airport's planning and noise abatement offices;
- Arapahoe County Public Airport Authority personnel representing the planning and noise offices of Centennial Airport; and
- Multiple consultant firms assisting the FAA design team, conducting the FAA environmental assessment (EA) process, and representing the airport's operational and environmental concerns.

The group also incorporated limited representation of local planning jurisdictions.

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Stakeholder Engagement Methods Used

In a series of working group meetings, initially held monthly and later every 2 to 3 months, members worked closely on the common goal of designing and implementing RNAV procedures as efficiently and effectively as possible, focusing first on departure routings, then on arrivals. FAA Terminal Area Route Generation, and Traffic Simulation (TARGETS) modelers worked side by side with airport consultants to develop flyable routes while minimizing noise impacts and noise-related penalties; airlines offered the use of their simulators for flight tests; FAA provided human-in-the-loop (HITL) training for controllers to work through transitions and airspace conflicts; and FAA's environmental consultant worked closely with airport personnel to conduct effective public outreach efforts.

Information exchange within the working group included formal technical presentations by FAA's design team leader, the airport's noise abatement manager, the airport's noise consultant, and others, each representing a different stakeholder viewpoint. One example of the detailed information presented and discussed is shown in Figures 9-4 and 9-5. These maps compare flight track densities from an 81-day sample of radar data for jet departures with the same set of data following an early iteration of the proposed RNAV SIDs. The groups of points to the northwest, west, and southwest of the airport are critical noise locations.

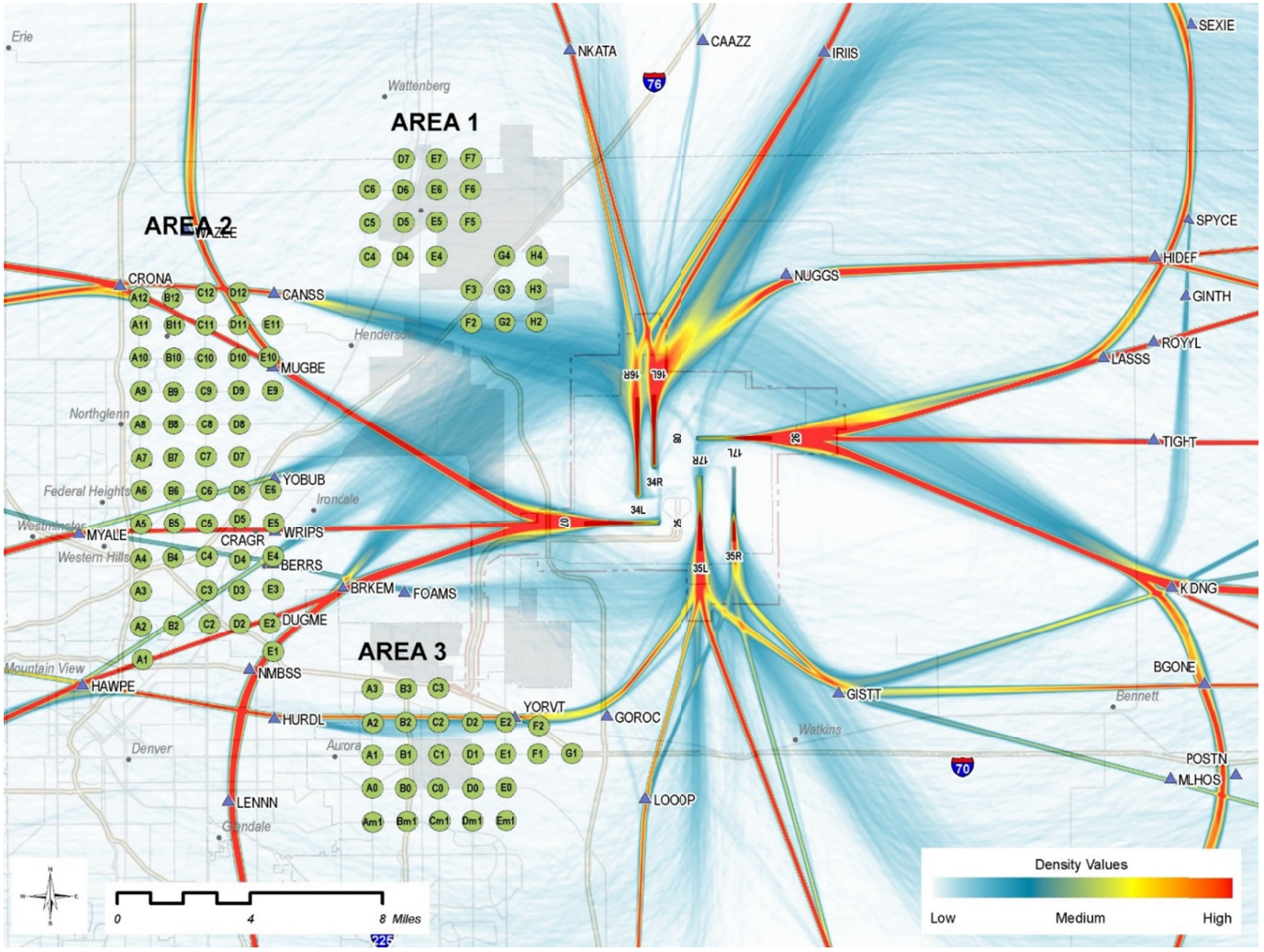
Waypoints, speeds and altitudes, and other information associated with each proposed procedure in and out of each arrival and departure gate were presented graphically and discussed one by one with airlines, air traffic controllers, and consultants who provided feedback on issues such as fly-ability, handoff procedures between ATC facilities, noise impacts, and suggestions for changes to alleviate problems.

As the overall design became more stable, FAA's environmental consultant initiated development of the public outreach effort. Before this point, only a few representatives of the general public had been included in the working group process. Public outreach involved the following methods:

- Four scoping meetings were conducted to explain the proposed redesign effort, describe the proposed public outreach effort, and receive comments on the proposed EA process.
  - One scoping meeting was held for federal, state, and local agencies which included the U.S. Fish and Wildlife Service, the U.S. National Park Service, the U.S. Forest Service; EPA; the State Historic Preservation Office; Adams, Arapahoe, and Douglas Counties; the Cities of Aurora and Denver; and others.
  - Three scoping meetings—one near DEN, one near APA, and one near BJC (all within and affected by elements of the Denver airspace redesign) were held in an open house format for the general public and included a presentation, staffed poster stations, and handouts.
- Individual meetings were held with the National Park Service, the Colorado State Parks Commission, the Centennial Airport Noise Round Table, and DEN planning and noise office personnel.
- A second round of public meetings used the same open house format and same meeting locations as the scoping meetings. The purpose for this later round of meetings was to describe the findings reported in the Draft EA and receive public comments on the draft before publishing the Final EA.

Information describing the successes of the airspace redesign at Denver also extended beyond FAA's working group and EA process. Presentations and technical talks were conducted at various conferences, including one given by Denver's Mayor Michael Hancock at the NextGen Institute's 2013 Annual Meeting; a June 2014 presentation by the DEN noise abatement manager to the NextGen Advisory Committee titled "Denver PBN Implementation," and an October 2010 presentation to a meeting of the American Association of Airport Executives (AAAE) on "The Role of NextGen at Airports."

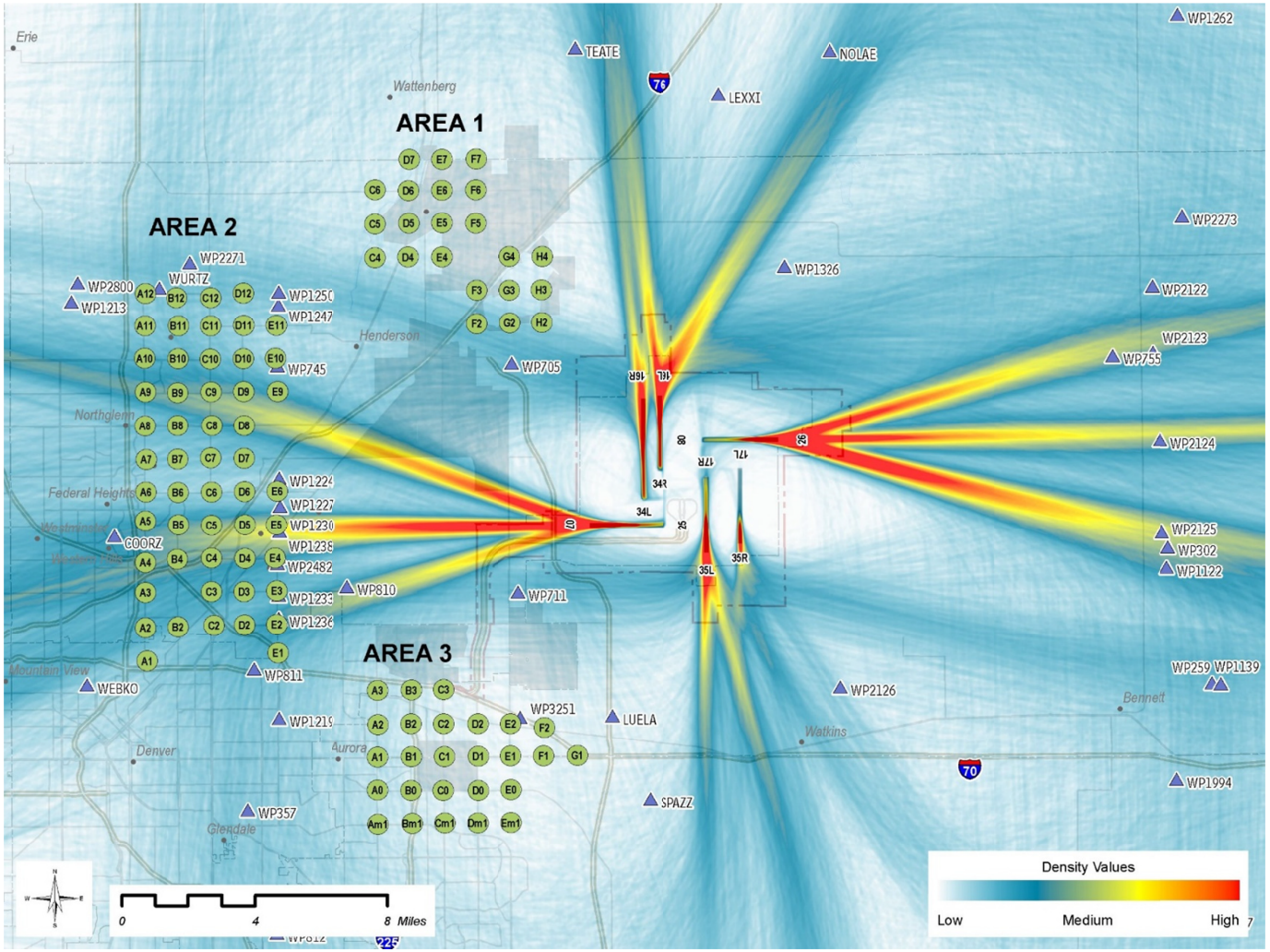
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Source: DEN Airport

Figure 9-4. *Departure flight tracks prior to implementation of RNAV SIDs.*

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Source: DEN Airport

Figure 9-5. *Departure flight tracks after implementation of RNAV SIDs.*

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Continuing to lead by example, DEN has been selected to serve as the demonstration airport for testing another NextGen initiative, the application of simultaneous required navigation performance (RNP) procedures on widely spaced parallels, a technology that is currently available only during visual flight rules (VFR) weather. The Denver airspace also is currently undergoing a further review as part of FAA's national OAPM program.

Successes and Lessons Learned

Denver's success can be largely attributed to three factors:

- The collaborative efforts of the working group and its multiple stakeholders. In the words of FAA's design team leader, "It's the people." They put their agendas aside to solve a problem.
- DEN is an airport at which the manager of the noise abatement office is knowledgeable about and fully engrossed in local airspace issues, airport development plans, RNAV technologies (including through the manager's seat on the RTCA NextGen Advisory Committee), and land use development proposals, and who brings to the working group and EA process the added sensitivity this knowledge conveys about impacts on the surrounding communities.
- The Inter-Governmental Agreement (IGA) between the City and County of Denver and Adams County, the jurisdiction whose land was annexed to build the new airport. The IGA stipulates extremely constraining noise limits at the 101 points identified in Figures 9-4 and 9-5, an exceedance at any one of which carries an extremely expensive penalty ($500,000 per annual occurrence). This financial incentive for success is significant.

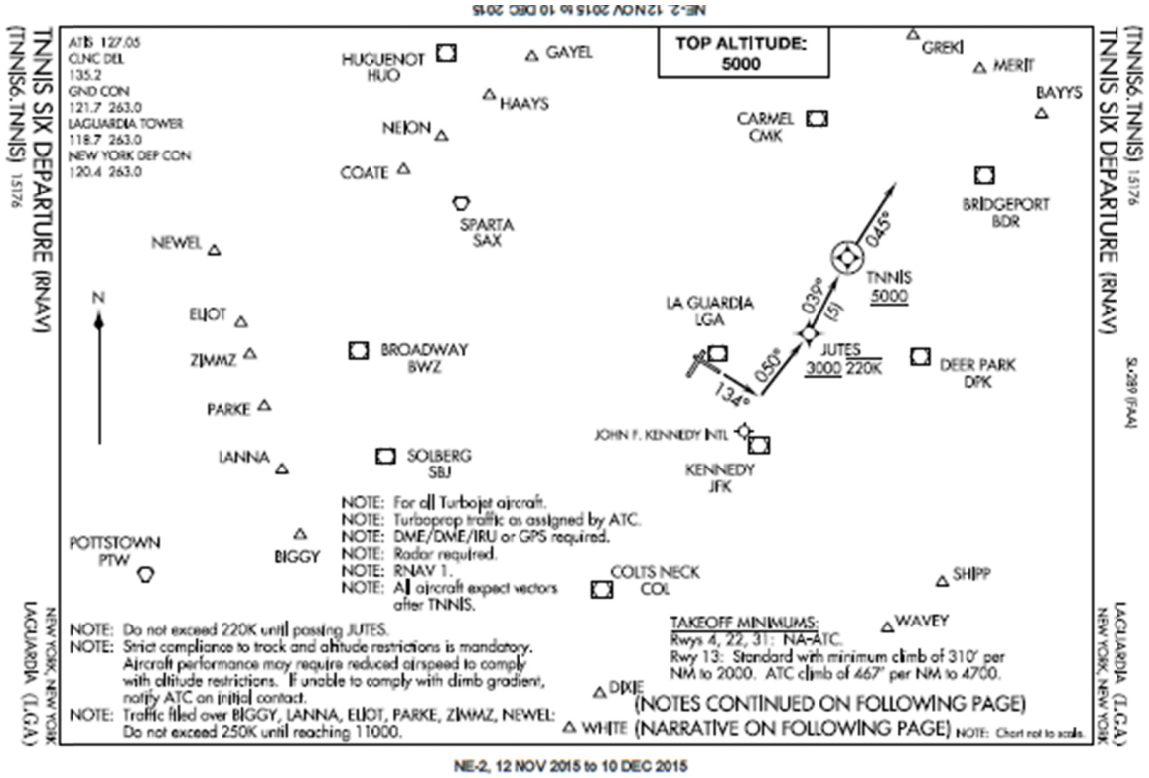
Implementation of the TNNIS Departure at LaGuardia Airport

Background

The TNNIS ("Tennis") departure, referred to on current FAA-published charts as the "TNNIS SIX DEPARTURE (RNAV)" and shown in a horizontal orientation in Figure 9-6, was developed initially as an infrequently used RNAV procedure for RNAV-equipped aircraft taking off from Runway 13 at LaGuardia Airport (LGA). The procedure was designed as an overlay to the previously used standard departure from Runway 13, referred to informally as the "Flushing Climb," which had been established in the 1960s to avoid conflict with traffic on an instrument landing system (ILS) approach to Runway 13 at John F. Kennedy International Airport (JFK). Both the original procedure and the new overlay involved a straight-out departure on runway heading, followed by an 86° left turn to the northeast. The older Flushing Climb procedures had been developed and assigned to aircraft by FAA ATC personnel to eliminate conflict with JFK arrivals assigned the 13L ILS. Later, both the TNNIS and Flushing procedures were used to minimize noise and disruption during the U.S. Open tennis tournament, which takes place annually at the U.S. Tennis Association's facility at Flushing Meadows in Queens, New York.

Samples of flight tracks flown by aircraft assigned to the Flushing and TNNIS departure procedures, as well as a sample of tracks assigned to the even older Whitestone Climb, were obtained from FAA by *The New York Times* and illustrated in an August 25, 2013, article regarding the noise complaints that had arisen from the implementation of the TNNIS departure (Buckley 2013). The graphic used in the *Times* article is shown in Figure 9-7.

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Source: http://flightaware.com/resources/airport/LGA/DP/TNNIS+SIX+(RNAV)/pdf

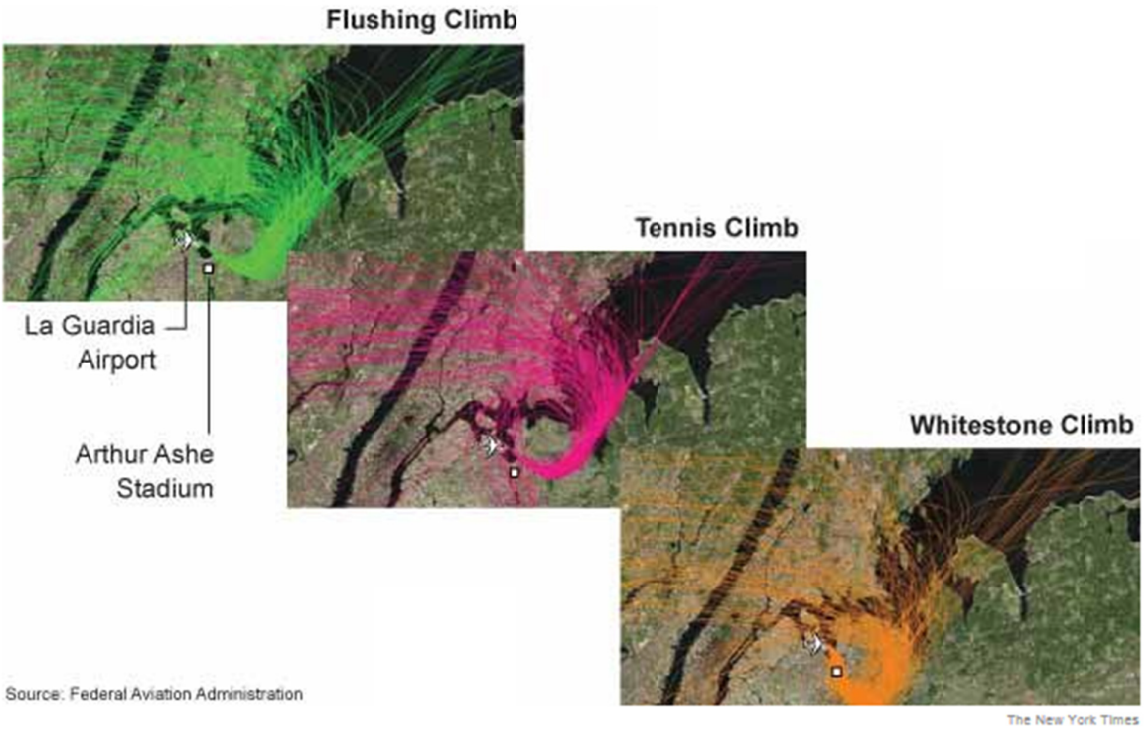
Figure 9-6. *TNNIS Six RNAV departure procedure.*

As shown in both the first and second panels of Figure 9-7, the Flushing and Tennis climbs each achieve the goal of bypassing Arthur Ashe Stadium (the tournament's main facility, shown as a small white square in each panel) to the north, thereby resulting in less interruption of the tennis matches. The second panel also shows the very narrow dispersion of RNAV-equipped aircraft heading off to the northeast (toward the "s" in Tennis) on the TNNIS departure, compared to the widely varying pattern of tracks following the Flushing Climb (or following the Tennis Climb without RNAV equipage).

When FAA designed the initial versions of the Tennis overlay, the Flushing Climb and TNNIS departure procedures were only being used when winds were generally from the southeast and only during the 2-week period in late August and early September when the U.S. Open tennis matches were being played. The relatively infrequent use of these procedures and the fact that the TNNIS departure was an overlay to an existing flight corridor led FAA at the time to believe that its effect on the noise environment beyond the tennis stadium would be minimal. Consequently, FAA perceived little need to engage the general public before implementation.

As air traffic with RNAV-equipped instrumentation increased in the New York metropolitan area, particularly at JFK, the New York TRACON identified a need to decouple (ensure separation of) departures on LGA's Runway 13 from landings on JFK's Runway 22L. Anticipating the need to alter activity on the TNNIS departure and reduce potential conflicts between LGA and JFK traffic, in April 2011, FAA's Air Traffic Eastern Service Center conducted an internal environmental review of potential noise problems from increased use of the procedure. The service center's analysis identified two population centroids where the noise increase would be significant but concluded that the nearby land uses were largely compatible and that overall there would be little or no environmental impact. As a result of this review, FAA issued a Categorical Exclusion allowing the TRACON to initiate a 180-day test whose purpose was

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Source: (Buckley 2013)

Figure 9-7. *Comparison of radar traces for aircraft following the Flushing, "Tennis," and Whitestone Climb procedures.*

to evaluate different runway configurations and weather conditions when conflicts between JFK and LGA traffic could be minimized. The test was initiated on February 13, 2012, and ended on August 13. During this time, more than 2,600 delays at JFK were determined to have been avoided. Immediately following the test, the de-coupling measures were implemented permanently. At no time before or during FAA's testing of increased use of the TNNIS departure was it considered necessary to provide public notice of the test, nor did FAA determine that public involvement was appropriate. It is unclear whether FAA notified the Port Authority of New York and New Jersey (PANYNJ), the operator of LGA, that the test was to take place. Therefore, it was only as use of the Tennis departures increased during the summer of 2012 that the public became aware of the changes taking place.

Stakeholder Engagement Methods Used

Residents of Bayside and Flushing, NY, who received large increases in overflights during the test period, were incensed over the resulting noise levels, and borough leaders were critical of FAA's lack of prior public notification that a test would be undertaken. An article in the *Queens Courier* on September 14, 2012, cited Queens Borough President Helen Marshall as saying to an FAA representative who had briefed the borough about the test after the fact, "This is the borough board … This is where you start. You don't end up here. I don't think you're in touch. I don't understand why you didn't let us know about this a long time ago." Councilmember Daniel Dromm added, "You're telling us now that this has already been happening—for what purpose?" The FAA representative responded with an acknowledgment that, despite no requirement to do so, a better job "probably should have" been done in notifying people (Chan 2012). The August 2013 article in The *New York Times* stated, "For many officials, activists, and New Yorkers, the FAA's move was yet another example of what they see as the agency's overriding community anguish in pursuit of its own ends" (Buckley 2013).

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Several New York congressional delegates demanded follow-up meetings and FAA's New York regional administrator met with members of the public on at least one occasion, but few other outreach efforts were conducted.

Eventual political pressures that evolved from the TNNIS departure led New York Governor Andrew Cuomo to direct PANYNJ to conduct its first-ever pair of 14 CFR Part 150 Airport Noise Compatibility Planning Studies at LGA and JFK. The studies were initiated in October 2014, included regular participation by a large stakeholder roundtable committee, and involved a significant public outreach effort. The planning studies are expected to be completed in August 2017.

Successes and Lessons Learned

The FAA air traffic environmental specialist who conducted the agency's environmental review suggested in a phone conversation regarding the LGA case study that perhaps, "for any large change to a procedure in a highly populated area, FAA at least ought to provide public notice." In another conversation a member of FAA TRACON involved with the original design of the TNNIS departure, indicated that FAA "probably should have done something" to alert the public, but because the original procedure was not used very often, FAA did not think noise would be an issue, adding that "maybe fear" of a community-initiated delay may also have factored in not announcing the test in advance. The presence of two population centroids predicted to have significant noise impact during the environmental review process should not have been ignored and may well have been predictive of the public reaction that followed.

Ultimately, the LGA case study illustrates what may have been a lost opportunity to collaborate over potential noise issues resulting from implementation of a NextGen initiative. Airports live with and are usually far more connected to the sensitivities of their constituent neighborhoods than is FAA's ATO. Had they taken place, preliminary discussions with PANYNJ and the community might well have permitted PANYNJ noise office personnel to alert FAA or take steps themselves to contain the development of public concerns into a potential problem. FAA's unannounced increased use of the TNNIS departure illustrates the importance of the need to remove organizational siloes and take advantage of collective knowledge about local noise concerns and problems before important air traffic changes are formally implemented.

PBN Implementation at Seattle-Tacoma International Airport

Background

In early 2010 one of the largest air carriers based at Seattle-Tacoma International Airport (SEA), having equipped many of its aircraft with RNP capability and trained its pilots to fly RNP procedures with authorization required (AR) into small airports with difficult weather and terrain constraints, began to lobby for the implementation of PBN procedures at SEA. Called "Greener Skies," the carrier's program promoted NextGen publicly as a technology that could significantly reduce flight miles and save fuel for its aircraft entering the Seattle airspace to land. The reduced fuel use would result in fewer hydrocarbons released into the atmosphere and have a beneficial effect on the air quality of the region. The new procedures also were promoted as beneficial for noise by keeping aircraft in narrow corridors concentrated on downwind legs over Puget Sound to the west, with RNP turns to final over Elliott Bay to the north and Commencement Bay to the south.

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Following early meetings with the Port of Seattle as the owner and operator of SEA, and with FAA senior management and elected officials of several surrounding jurisdictions to gauge public support, the carrier requested that FAA take over the procedure design and environmental analyses required for implementation. Only arrival procedures on the west side of the airport were to be revamped, maximizing flights over water while avoiding changes to the east where population densities and the likelihood of controversy were much higher. Toward the end of 2010, FAA accepted responsibility for the task and initiated a two-phased study. Phase I was to design the new RNAV/RNP procedures and carry out an EA on the flight procedure changes. Phase II was to be a research study using SEA as a demonstration airport to investigate the safety, policy changes, and ATC technology improvements needed to implement RNAV/RNP procedures on closely spaced parallels throughout the national airspace system (NAS).

Figure 9-8 depicts a sample of the then-current radar traffic and Figure 9-9 depicts the proposed changes that were eventually developed through FAA's design review process. The 90,000 square-mile study area for the EA is shown by the dashed rectangle in each. The radar sample shows the current dispersion of arrivals (in red) and departures (in green) in a north flow runway configuration where all operations are on Runways 36L, 36C, and 36R, which appear just south of the words "King County." In addition to an expected narrowing of the flight corridors west of the airport, similar to the narrow bands of radar flight paths entering the study area from the northwest and south, the proposed RNAV procedures with their RNAV/RNP final approach segments in orange (Figure 9-9) would bring arrivals over several new communities in the Seattle area, but closer to the airport, which would allow many arrivals to follow curved RNP approaches over water until joining short final approaches to land. The complete set of new procedures included two new STARs and 21 new RNP and RNP-to-ILS procedures to SEA's six runway ends.

The new designs also included optimized profile descents (OPDs), allowing aircraft to begin flight-idle descents from altitudes as high as 38,000 feet and minimize interim level-off segments all the way to the landing runway. Fewer level flight segments requiring higher engine thrusts combined with shorter flight legs, especially for aircraft arriving from the south, would result in important fuel savings with minimal increases in noise close to SEA.

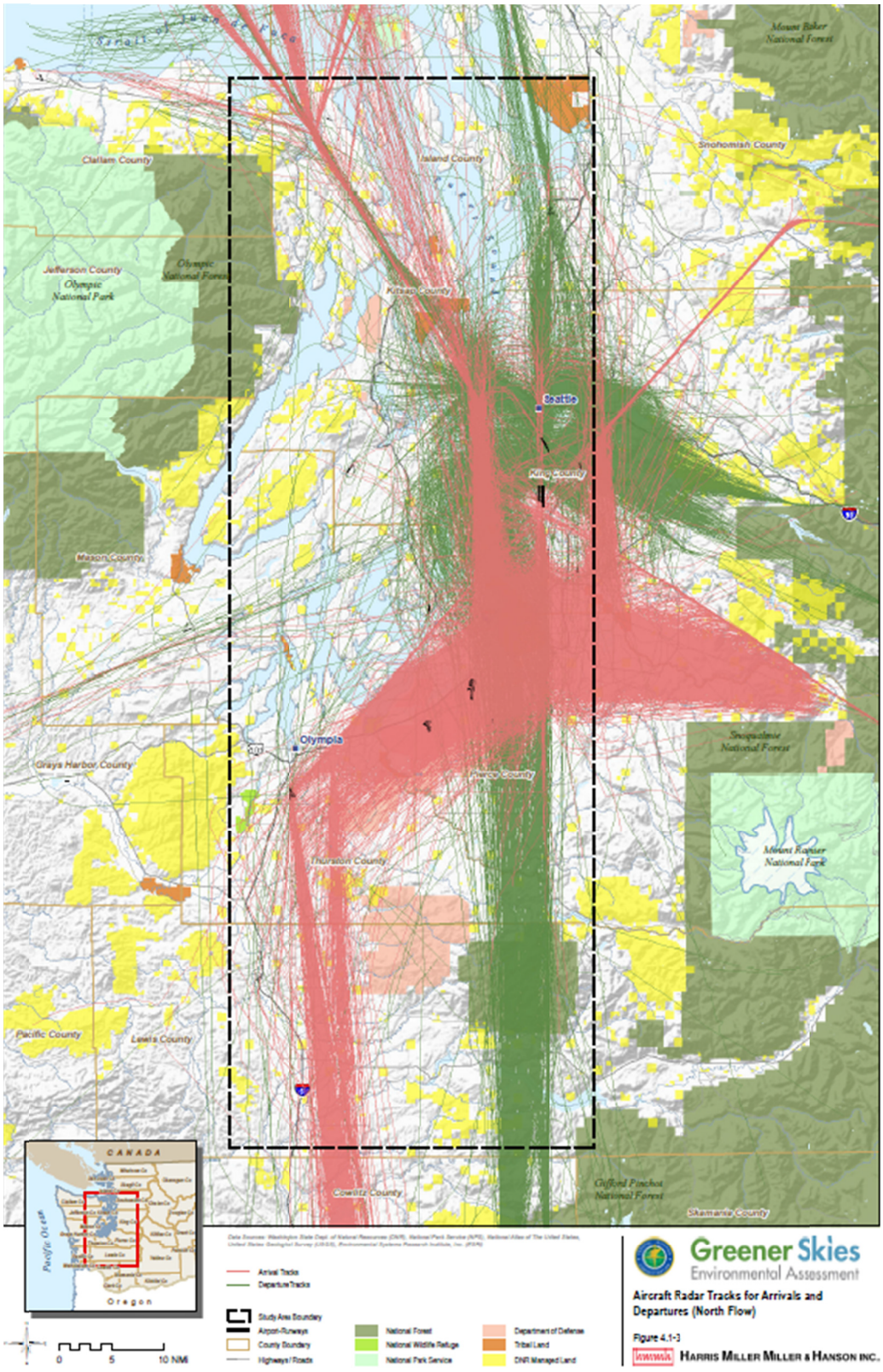
Phase II of the Greener Skies initiative affected none of these Phase I operations, though it could, at some point in the future, open the possibility of having two aircraft fly simultaneous RNP approaches to closely spaced parallels in poor weather. Those potential benefits were insufficiently defined to be assessed as part of the Phase I EA.

Stakeholder Engagement Methods Used

Under pressures to get the new procedures in place as soon as possible, FAA began procedure design in the spring of 2011, and the EA and the Phase II research project (referred to as I2) got underway in November of that year. *The Seattle Times* ran several stories on the NextGen projects but the first formal outreach efforts took place in January 2012. These efforts consisted of two scoping meetings, one to the north and one to the south of SEA, in which FAA and its environmental consultant team introduced the project and the EA process to the public through workshops for the purpose of obtaining public input on the project.

Because of prior controversies over noise, including litigation over SEA's third runway, publicity for the meetings was closely controlled by FAA and kept narrow in scope. A single legal notice ran for 2 days in print in *The Seattle Times* and in the *Highline Times* (to reach southern readers), and for 14 days online in *The Seattle Times* nwsource® classifieds. Other resources such as mailing lists, local neighborhood newsletters, or other local knowledge available from the SEA Noise Office were left untapped, resulting in relatively few attendees at either meeting. A third agency meeting was held at FAA's

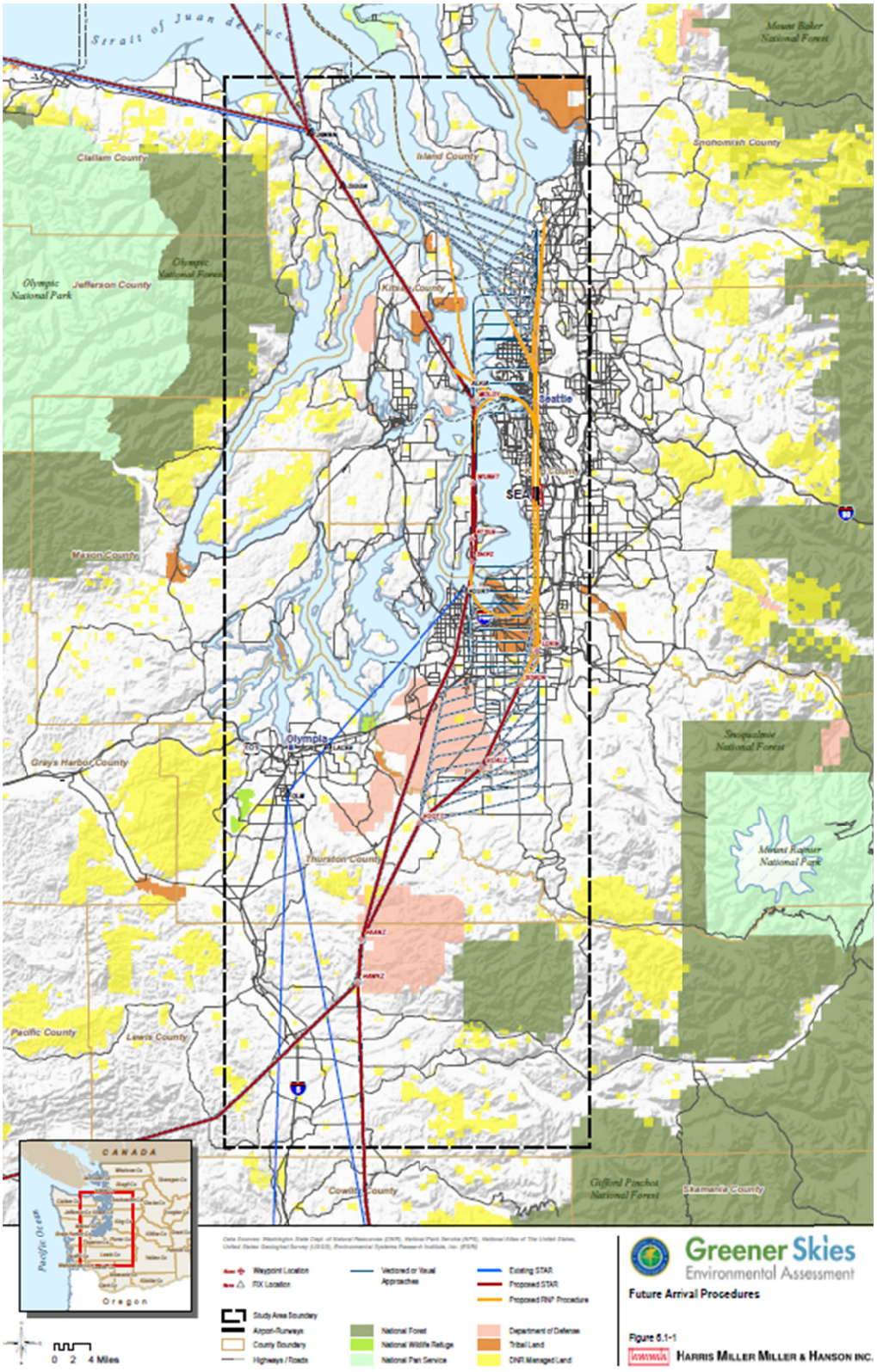
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Source: SEA Airport

Figure 9-8. *SEA radar tracks of arrivals and departures (north flow).*

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Source: SEA Airport

Figure 9-9. *SEA future arrival procedures.*

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regional office for the purpose of briefing federal, state, local, and tribal representatives on the upcoming project and to obtain official comments on the study. The content and format of all three meetings was identical: introductory boards set up at stations attended by FAA and/or consultant representatives outlining the EA process, presenting examples of current radar data, and describing the expected timeline and future outreach opportunities. A slide presentation covered much of the same material, and FAA presented a high-quality video using animation to illustrate the intended benefits of PBN procedures specific to SEA. Printed tri-fold handouts were available explaining the project background, elements of the EA process, and opportunities for public feedback.

A second round of meetings consisting of two public workshops and another agency meeting followed the release of the draft EA for the purpose of reporting findings and encouraging comments on the document. Meeting venues and notices were the same as those used during the scoping process. A court reporter was onsite at the two public meetings to record formal statements that the public wished to make. Attendance was generally higher at the second round of public workshops, both to the north and to the south. Public participation at the meeting to the north was more vocal and disruptive than it had been for the scoping meetings, in large part because a group of residents in a neighborhood north of SEA had organized themselves around issues of changes in flight procedures, insufficient public outreach, a poorly selected meeting location, and lack of translators. However, neither the meetings nor any resultant comments received on the Draft EA delayed the project beyond the deadline for the release of FAA's Finding of No Significant Impact (FONSI) and Record of Decision (ROD).

Additional outreach methods used included the following:

- A project website that described the project, included copies of the slide presentations used in the scoping and public meetings, presented graphics, and included the Draft EA and later the Final EA. An interactive window on the site allowed visitors to submit comments on the documents.
- Hard copies of the Draft EA and Final EA documents were left on file at three area libraries and at the FAA regional office.

Successes and Lessons Learned

The Greener Skies EA process was successful from the perspective that the EA was completed on time and found no significant impacts from the proposed RNAV/RNP procedures, leading FAA to issue its FONSI/ROD on schedule and allowing the new procedures to be published and implemented on schedule in April 2013.

Public reaction to the project, however, was critical of the outreach effort and of the public workshops in particular. Some of the difficulties of the outreach effort stemmed from these factors:

- FAA placed strict constraints on the level of public outreach, on the use of known newsletter address lists, and on any contact with airport staff. SEA's noise office had years of experience addressing the public's concerns over numerous noise problems, was well aware of noise-sensitive neighborhoods and their community leaders, had mailing lists for its own public meetings, and could have provided advice on convenient and appropriate venues. None of this experience was accessible for the EA. Although NEPA requires lead federal agencies to maintain an arms-length relationship with a project sponsor, it is unusual to have so little interaction on a topic that has no direct bearing on the subject of the EA (the RNAV/RNP procedures).
- Announcements of the public outreach meetings were made through small legal announcements in *The Seattle Times* and *Highline Times*, the project website (which was not publicized widely), and word of mouth. Attendance consisted of no more than a handful of people until the final public meeting, by which time community activists had got word of the meeting and recruited their

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neighbors to come. Even then, about 50 people showed up, though they were disruptive and demanded a subsequent meeting to address noise issues in their own neighborhood.

- FAA agreed to the extra meeting, at which they made their own presentations but were careful to specify that such meetings were outside the purview of the EA. According to an FAA spokesperson involved with both the EA workshops and the subsequent community meeting, neighbors viewed the subsequent presentations even more poorly than they did those associated with the EA, emphasizing the benefit that could have been realized by permitting communications with the airport.
- Some of the results presented in the EA might have been presented differently. For example, increases and decreases in DNL exposure levels as small as one-tenth or two-tenths of a decibel (dB) might better have been reported simply as "insignificant" rather than drawing attention to them as increases or decreases. Although the public presentation characterized the changes as insignificant, many of the concerned neighbors who attended the second workshop north of SEA lived in areas where *any increase at all* was of concern to the residents.
- Following the conclusion of the EA, the proposed procedures were implemented only partially with initial publication of the two new STARs, greatly reducing the expected benefits of the RNP procedures as evaluated in the environmental review process. New RNP procedures have since been added to each of the six runway ends and are now used regularly, largely without community reaction.

Support from the Puget Sound Regional Council

In some parts of the country, councils of government, MPOs, or other non-government organizations (NGOs) have helped airports within their region overcome specific challenges. The NCTCOG, for example, has helped establish zoning overlays near airports and provides guidance on airport land use compatibility planning (see the DFW case study in this chapter). In Georgia, the Savannah Area Geographic Information Services has helped Savannah/Hilton Head International Airport (SAV) comply with FAA AGIS data collection requirements. The Puget Sound Regional Council (PSRC), however, has been a leader in helping airports in northwestern Washington State prepare for NextGen.

PSRC is a MPO that provides regional transportation planning, growth management, and economic development support to counties, municipalities, ports, tribes, and transit agencies in the central Puget Sound area. The organization works closely with state government, and, in the case of aviation, with FAA's Northwest Mountain (ANM) Regional Office (RO) and the Seattle ADO. PSRC supports land use compatibility planning, zoning overlays, and other types of activities relevant to airports in the region.

In 2012 FAA Seattle ADO provided PSRC with a grant to complete a study that resulted in a regional plan to help general aviation airports realize the benefits of NextGen. As a part of this study, airports that could benefit from NextGen capabilities were identified. The degree to which these airports were prepared to implement NextGen capabilities and any design or operational deficiencies that could stand in the way were identified. Capital Improvement Plans (CIPs) were then developed to support any necessary improvements. Finally, the study identified an approach and strategies that airports could use to evaluate NextGen-related options as part of their normal planning and development process. The study resulted in an extensive report that provided general information about NextGen and its various initiatives from an airport's perspective and also provided specific findings and action items for general aviation airports in the region.

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In 2014 additional funding was provided by FAA to support Phase II of PSRC's study. The objectives of this phase are to build upon the Phase I results to complete a NextGen airspace study for the PSRC. Airspace, flight procedures, aircraft operations, and obstructions to navigable airspace are being modeled at a regional level. A regional airspace map will be prepared, compatible land use recommendations will be made, and costs for mitigating obstructions will be estimated. This study and related deliverables include material that will communicate the benefits of NextGen and provide findings on how airports can facilitate the implementation of NextGen capabilities. The material to be produced includes three-dimensional (3-D) animations, slide presentations, reports, a brochure, and an innovative iPad application. The iPad application is intended to provide a more interactive means of communicating the benefits of NextGen to FAA, general aviation, and public stakeholders and informing them what they can do to help.

Twenty-five (25) airports were included in the Phase I study and will directly benefit from the products being developed in Phase II. Among them are King County International Airport/Boeing Field (BFI) and Snohomish County Airport/Paine Field (PAE). The experiences of these two airports in preparing for NextGen are described in the next two case studies.

Preparations at King County International Airport/Boeing Field

Background

King County International Airport/Boeing Field (BFI) is a non-hub, primary airport with one 3,710 ft. runway and approximately 400 based aircraft. What makes BFI unique is its significant testing of Boeing commercial and military aircraft, comingled airspace with Seattle-Tacoma International Airport (SEA), and significant cargo operations conducted by United Parcel Service and DHL (Deutsche Post DHL Group—a global logistics company). Increased production of Boeing 737 and military tanker aircraft are prompting the development of new hangar facilities at the airport that will coincide with planned increases in aircraft testing operations.

Although the airport enjoys several RNAV, STAR, and traditional ILS procedures, it has yet to fully benefit from NextGen PBN. One approach uses RNP procedures, but it requires authorization from the control tower, which is seldom provided because of operational restrictions. The limited use of this approach is also apparent in FAA procedure use statistics.

As a part of the airport's current master plan update, the FAA Regional Office (RO) has encouraged the airport to include the development of an electronic Airport Layout Plan (eALP). These data will be submitted to FAA via FAA's web-based AGIS, which is considered an enabler of NextGen, providing safety-critical mapping data that are used in new procedure development. These data will also provide benefit to the airport.

Stakeholder Engagement Methods Used

BFI understands how important stakeholder engagement can be when pursuing these objectives. The airport has found that its engagement methods have been particularly successful with FAA and with regional agencies (i.e., PSRC). New staff at the FAA RO and ADO, including a former peer from a nearby airport, have been particularly proactive in creating and welcoming two-way dialogue with the region's airports.

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BFI finds it helpful to discuss conceptual plans with these FAA staff members, as well as with PSRC and other nearby airports. Further details about the procedures, funding requirements, and environmental impacts are then discussed with FAA. These communications occur via monthly meetings. Before each meeting, an airport staff member will poll airport and FAA participants to set the agenda, which can cover upcoming capital improvement projects, grant activity, reporting requirements, the current master plan update, and other topics. NextGen procedure development may come up once or twice a year. Other stakeholders, including tenants, may join these meetings on an as-needed basis. The airport also conducts quarterly meetings with large commercial and general aviation tenants. Collectively, these meetings have been very helpful in keeping all parties informed and in fostering discussion of the best path forward for all parties involved. In addition to meeting materials, the airport has found press releases, technical reports, website content, and documents that address Frequently Asked Questions (FAQs) to be successful tools for stakeholder engagement.

The airport has enjoyed the use of an on-staff community outreach specialist, but airport marketing and business development needs are increasingly becoming a priority. Its surrounding communities are very proactive, however, and the airport makes a point of keeping them informed with timely information about aircraft run-ups, airshows, and new aircraft test programs that may have an impact on local residents. Because of the significant presence and impact of Boeing's aircraft testing operations, BFI has required Boeing to have a communication plan. Stakeholder engagement guidance and tools provided by PSRC and others may help the airport keep up with its responsibility.

Successes and Lessons Learned

BFI has realized limited NextGen capabilities to date, but the airport has significant hopes for the future and a history of proactive community engagement that can help facilitate implementation. By reconfiguring the airspace and enabling tighter flight procedure routes, NextGen may decouple the currently comingled airspace between SEA and BFI, which currently constrains BFI's operations to favor the more active commercial hub airport. Specifically, NextGen collaborative air traffic management (CATM), global navigation satellite system landing system, PBN, and separation management initiatives are expected to provide direct benefits to BFI. The capabilities these initiatives offer should improve safety, capacity, operational efficiency, and customer service.

NextGen has the potential to provide a lot of value to BFI. Although the cost of equipping general aviation aircraft will present some constraints, doing so also offers the opportunity to improve capacity, operational efficiency, and safety in a dense airspace with significant commercial activity and many restricted areas. BFI believes that the PSRC's Phase I study has better prepared it to benefit from NextGen and illustrates how helpful regional councils can be.

Unique Challenges at Snohomish County Airport/Paine Field

Background

Snohomish County Airport/Paine Field (PAE) is a reliever airport with 9,010 ft. and 3,004 ft. parallel runways. The airport has approximately 560 based general aviation aircraft. As with BFI Airport, the airport faces unique operations challenges. PAE is adjacent to Boeing's Everett factory where 747, 767, 777, and 787 aircraft are assembled. To support this operation, PAE provides airfield service for the Boeing facility to receive parts (including the fuselage section of the 787), for delivering new aircraft,

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and for receiving aircraft due for heavy maintenance. PAE is also host to two flight museums that actively operate vintage aircraft. These unique operations, along with the active fleet of general aviation aircraft, place unique challenges on the airport and the surrounding communities, which NextGen may help alleviate.

Atlas Air operates the Boeing Dreamlifter, which imports 787 fuselage sections into PAE. Given flight and supply chain logistics, these aircraft often arrive in the middle of the night. They are also heavily loaded and fly slow, low, and dirty (i.e., with flaps and landing gear extended) over surrounding communities. These communities include Everett and Mukiteo, which have grown in population and size over the years to encroach upon the airport. As a result, the Boeing Dreamlifter flights and other operations at PAE now lead to an average of three to four noise complaints a day.

To reduce the noise impact of the Dreamlifter, Atlas Air approached the airport to propose implementing four PBN procedures, one from each of the four cardinal directions. Together, the airport and Atlas Air became proponents for the new procedures and approached FAA. The PBN implementation process outlined in FAA Order JO 7100.41 was followed and a core working group (CWG) was established that included FAA, Atlas Air, airport, and Boeing representatives. Meetings have been held every couple of months and have proceeded well. Recently, the process passed the baseline analysis review (BAR) stage. The airport hopes that, once in place, the procedures will significantly alleviate the noise impact of the Dreamlifter.

Stakeholder Engagement Methods Used

PAE takes several measures into account in addressing community concerns about noise around the airport. The airport conducts public noise meetings; regularly sends representatives to community council meetings that, on average, are attended by 40–50 residents and community representatives; and occasionally meets with the mayors of adjacent municipalities. The airport also operates three noise monitors and has developed noise abatement procedures that it proactively reminds pilots to follow.

Successes and Lessons Learned

Although the airport employs some RNAV procedures, thus far the impact of NextGen has been minimal, and additional NextGen capabilities will likely be implemented incrementally. The airport has played a proactive role in promoting new procedures that will alleviate some of the unique challenges their operators face. The new procedures proposed for the Dreamlifter operations will benefit Boeing and also will reduce late-night noise events in adjacent communities. Boeing would eventually like to have ground-based augmentation system (GBAS) equipment installed at the airport. Like BFI, PAE has also found the PSRC Phase I study to be helpful in preparing for NextGen and looks forward to the analysis and tools Phase II will bring.

Improved Air Service at Beverly Regional Airport

Background

Beverly Regional Airport (BVY) in Massachusetts (formerly Beverly Municipal Airport) was established in 1928 as the home of a flying club founded by early aviation enthusiasts. These early aviators recognized the importance of stakeholder engagement. To achieve their goals, the club convinced city elected officials about the benefits of air transportation and the positive effects it could have on their

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community. This early stakeholder engagement set a precedent of active involvement of local elected officials, residents, and businesses that continues to the present day.

In the 1940s the U.S. Navy acquired the airport and invested in airfield infrastructure to support pilot training. In August 1941 the airport boasted the longest paved runway in New England. In 1946 the Navy returned the airport to the city and fixed base operators (FBOs) moved in to provide training, maintenance, and aircraft sales. Eventually, airfield take-offs and landings peaked at approximately 220,000 operations per year.

With the nationwide decline of general aviation, economic pressures on private flying, and competition for corporate jets from nearby Boston's Logan International Airport (BOS) and Bedford's Hanscom Field (BED), Beverly saw a decline to approximately 67,000 operations per year. One FBO remains: North Atlantic Air provides fuel, parking, maintenance, and training services for private and corporate aircraft operators. An ATCT operates at the airport, although this was threatened by a wave of contract tower closures proposed in 2013.

The airport manager, commissioners, and tenants recognize the value the airport offers to the surrounding community and have actively advocated its use for aviation, as well as compatible non-aviation uses. Since the Navy left, improvements to the airport's infrastructure have been made using federal grant monies augmented with local and state funds. Such improvements have included rebuilding the airport's two runways, building a new apron that can support corporate aircraft, and providing for additional overnight parking. Private tenants have built hangars, and several corporations have offices on the airport's 415 acre property, which spans three municipalities. In total the annual economic impact of the airport is approximately $22M.

In 2011 a wide area augmentation system (WAAS) was installed, providing horizontal and vertical guidance to the airport's longest runway, Runway 34. This installation paved the way for a series of RNAV procedures that now serve Runways 16, 27, and 34, as well as two STAR procedures. A localizer performance with vertical guidance (LPV) approach to Runway 16 also was established, offering the highest precision possible with a WAAS-improved global positioning system (GPS) signal. This improvement enabled a reduction in low-visibility minima from 480 ft. to 250 ft., which gave corporate aircraft greater flexibility when landing in adverse weather conditions and enabled access into BVY when landing at other airports was not feasible.

These NextGen-enabled procedures have resulted in an increase in corporate jet traffic serving a variety of small and large companies, as well as increasingly popular fractional jet ownership programs that make private jet travel more accessible to corporations and individuals. One corporate jet operator has moved its operations to the airport. The FBO enjoys increased fuel sales, which make up a significant portion of its revenue. Two new hangars have been built to accommodate new jets based at BVY. The increased airport business has had a positive impact on commerce in the surrounding community. The NextGen equipment installation and new GPS-based procedures have made the airport more of a destination, which has had a positive effect on the airport, its tenants, and the surrounding communities.

Stakeholder Engagement Methods Used

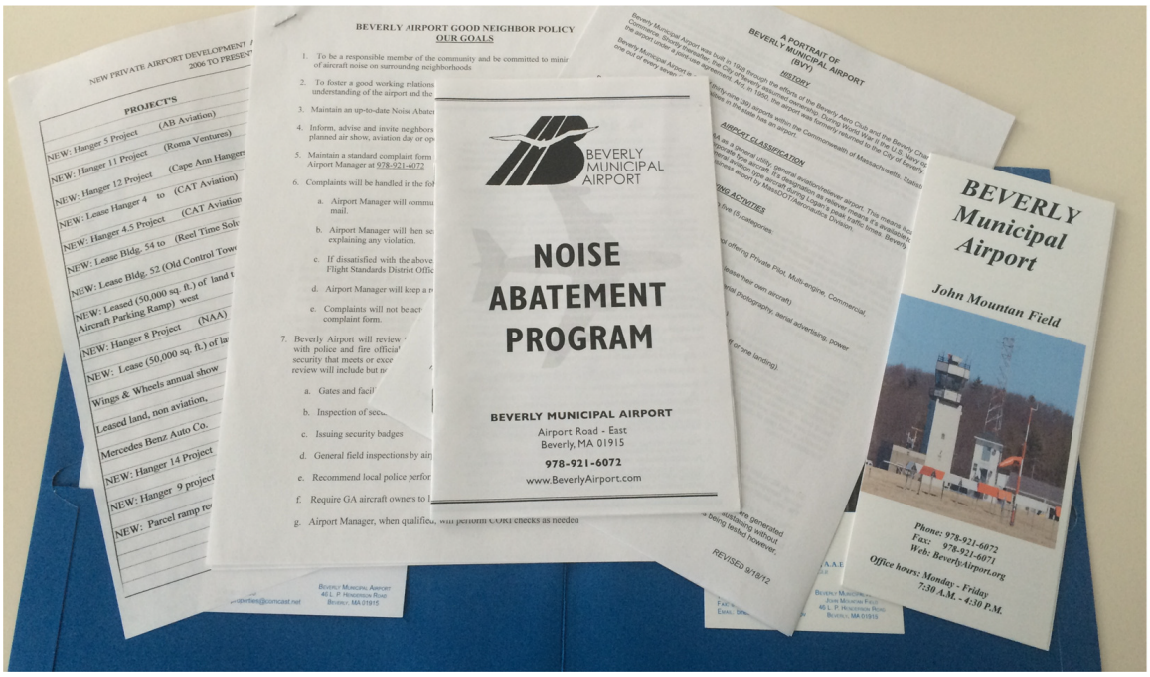
A large part of the airport's success can be attributed to the proactive approach its manager, staff, and commissioners have taken with regard to stakeholder outreach and engagement. Following are some of the methods and tools the airport has found effective.

- A presentation that outlines the history, current status, future plans, and economic impact of the airport is frequently used to brief local elected officials, agencies, businesses, and other interested parties.

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- A package of printed engagement materials that provide information on the airport's history, capital improvement program, noise abatement program, land acquisitions and sales, policies, economic impact, and points of contact is readily available to interested parties (Figure 9-10).
- An actively maintained website that offers access to copies of the materials as well as other resources for residents and the surrounding community (Figure 9-11). Commission meeting minutes, airport newsletters, rules, regulations, policies, studies, and the long-term master plan are all available for public download. Points of contact in companies doing business at the airport are provided along with resources for pilots and other visitors.
- Brochures that provide airport facts and information on the noise abatement program are made available at prominent locations throughout the surrounding community.
- A list of voluntarily provided e-mail addresses and (where e-mail is not available) street addresses that are maintained and used to inform abutters of airport capital improvement projects, construction activities, and other relevant events.
- A "good neighbor" policy that prohibits touch-and-go operations during weekends and encourages pilot training in designated low-impact areas.
- The involvement of two members from adjacent municipalities that serve on the airport commission even though the airport is owned and operated by the City of Beverly.

The successes BVY has experienced as a result of NextGen-enabled procedures were to be highlighted in brochure based on the New England General Aviation Regional Study.



Source: BVY Airport (Beverly [MA] Regional Airport)

Figure 9-10. *Printed engagement materials used by Beverly Regional Airport.*

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Source: BVY Airport (http://www.beverlyairport.com/)

Figure 9-11. *Beverly Regional Airport website.*

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Despite the proactive measures taken to inform, educate, and engage its stakeholders, the airport has faced some challenges, as follows.

- Partial cutting to resolve a tree hazard on private land abutting the airport was challenged in court by the landowner. Even after the airport had offered alternatives, the lawsuit was elevated to the Massachusetts Commonwealth's Supreme Court and a jury awarded significant damages to the resident.
- Many residents do not yet understand that the new RNAV procedures allow aircraft to approach at a steeper angle so that they clear homes and other obstacles at a higher and therefore safer altitude.

Successes and Lessons Learned

NextGen improvements, continued federal investment in airfield infrastructure, and a proactive stakeholder engagement program have allowed Beverly Regional Airport to serve a growing number of corporate aviation customers and business tenants. The result has been a productive use of a community asset that provides a significant economic benefit to the surrounding region with minimal noise or environmental impact.

Modernization at Chicago O'Hare International Airport

Background

The O'Hare Modernization Program (OMP) is the City of Chicago's multi-year plan to modernize Chicago O'Hare International Airport (ORD), converting it from a triangular runway configuration to a primarily east-west traffic flow and making it more efficient and safer in the process. The OMP was initially proposed by the city more than 10 years ago and was modified and evaluated along with various alternatives, culminating in the FEIS published in July 2005. FAA approved the preferred alternative in its September 2005 ROD (FAA 2005).

Subsequent delays in the OMP construction schedule, caused largely by a lawsuit filed against the city by United and American Airlines regarding the timing and funding of OMP projects still to be constructed, led the city to issue a letter to FAA in November 2013, in which the city identified construction schedule modifications that had not been anticipated or evaluated in the EIS. Though the final airfield configuration was unaffected by the new interim conditions, FAA considered the modifications to be substantive and deserving of their own environmental review. As a result, in November 2014, FAA initiated a re-evaluation of the OMP EIS to disclose the environmental impacts of the interim conditions generated by airfield construction schedule modifications (FAA 2015b).

OMP runway projects already completed at the time the re-evaluation was initiated included the new Runway 9L/27R on the north airfield and an extension to Runway 10L/28R on the south airfield, both of which opened in 2008, and the new Runway 10C/28C, which opened in 2013. Given the re-evaluation, the opening of new Runways 10R/28L and 9C/27C and the extension of Runway 9R/27L, all of which had initially been planned for completion in 2013, would not occur as anticipated in the 2005 FEIS. Runway 10R/28L was now anticipated to open on October 15, 2015, Runway 9C/27C was planned for opening in November 2020, and the extension of Runway 9R/27L was planned for opening in November 2021.

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Given the construction schedule modifications and staggered openings of the three as-yet uncompleted runway projects, FAA elected to prepare the re-evaluation to disclose new or changed conditions or impacts that had not been evaluated in the initial EIS. Two new interim conditions were to be examined:

- The airfield as it would operate after the October 15, 2015 opening of Runway 10R/27L, and
- The airfield as it would operate after the November 2020 opening of Runway 9C/27C until completion of the extension of 9R/27L.

On completion of construction of extended Runway 9R/27L, all runway components of the build out approved in FAA's ROD on the initial FEIS would be complete. The condition of the airfield with all components completed had already been fully evaluated in the original EIS, so it was not to be reassessed.

As operator of Chicago O'Hare International Airport, the City of Chicago had a limited, though critically important role in the development of FAA's environmental document. The city served as the contracting authority and administrator for FAA's independent third-party contractor (TPC) on the re-evaluation. Also, the city's Noise Office provided key data including a year's sample of current radar data from the ORD noise management system, and for consistency with prior analysis methods the city's planning consultant conducted simulation modeling for the two yet-to-be built runway configurations using procedures that had been applied successfully in the original EIS. Outputs from each of these data sources were used by FAA's TPC to generate modeled flight paths, runway utilizations, taxi and airspace delays, and other key information supporting the noise and air quality analyses of the re-evaluation.

The two interim configurations assessed in the re-evaluation are shown in Figures 9-12 and 9-13. As the city continues ORD's conversion to the new, primarily east-west traffic flow, previously operational southeast-northwest Runways 14L/32R and 14R/32L have been or are scheduled to be decommissioned. The reduced flexibility in the orientation of runways (and presumed inability to use the closed runways in a nighttime noise mitigation program), combined with the recent openings of the new east-west runways, have been viewed by many residents surrounding ORD as a detriment to their noise environment. This public perception has caused a major increase in the number of noise complaints received by the city. The heightened awareness of the changes and resulting increased community annoyance has led FAA to undertake an unusually comprehensive public outreach program in conjunction with the re-evaluation. The summary of outreach efforts in the next section of this case study largely draws from Chapter 4 of the re-evaluation report.

Stakeholder Engagement Methods Used

Public Information

To facilitate public access to complex technical information used in the noise and air quality analyses reported in the Draft Re-Evaluation, early release of certain material related to the study was provided through an FAA website (http://www.faa.gov/airports/airport_development/omp/eis_re-eval/). On June 2, 2015, FAA released a re-evaluation overview. Public workshop dates, times, and locations and Total Airspace and Airport Modeler (TAAM) simulation studies were published by FAA on July 10, 2015.

Availability of the Re-Evaluation

FAA published notice of the availability of the Draft Re-Evaluation document on its website on July 27, 2015. FAA also delivered hard copies of the document to 73 public libraries in Chicago and suburbs

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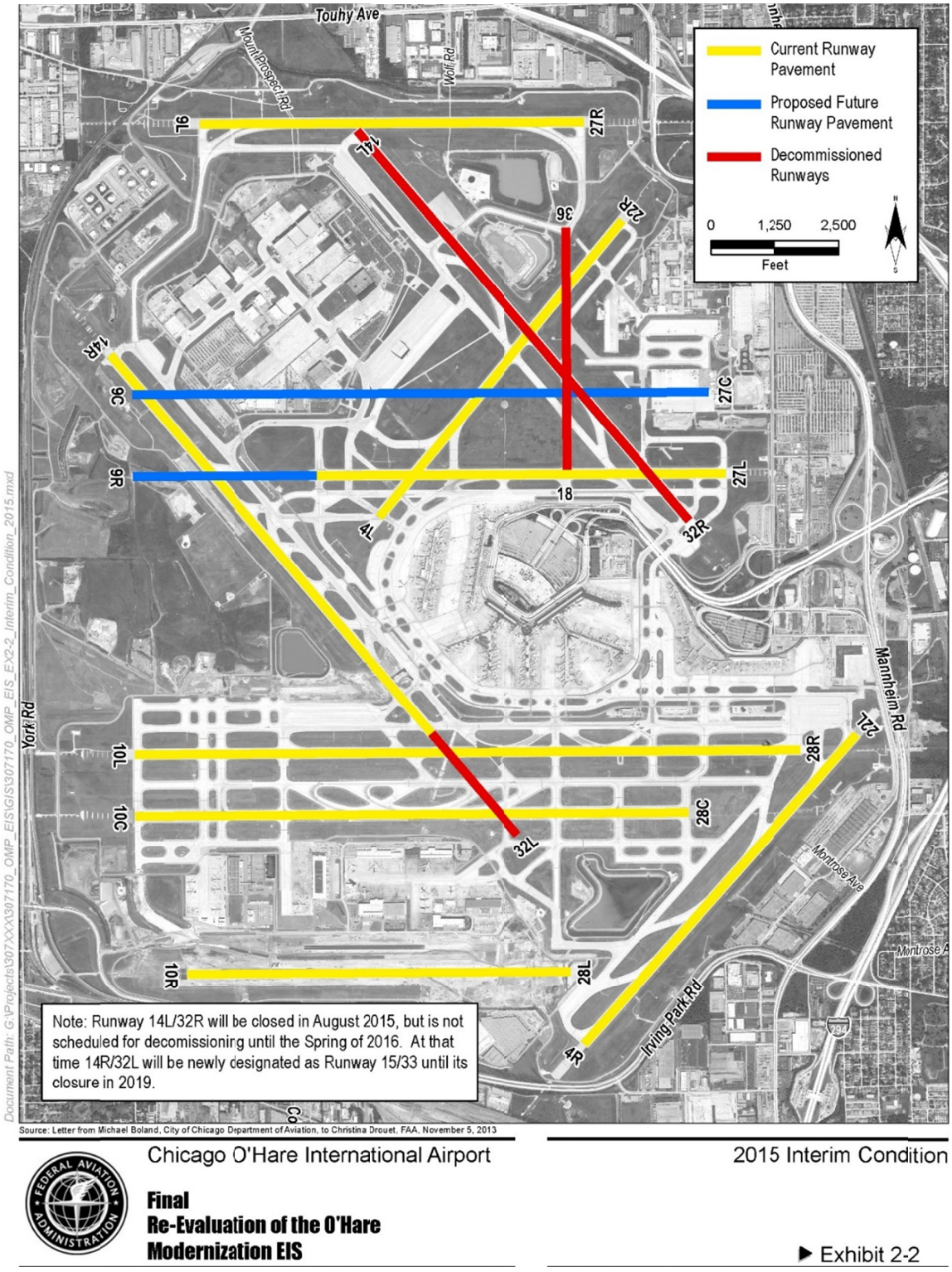


Figure 9-12. *Map of Chicago O'Hare International Airport showing 2015 interim condition.*

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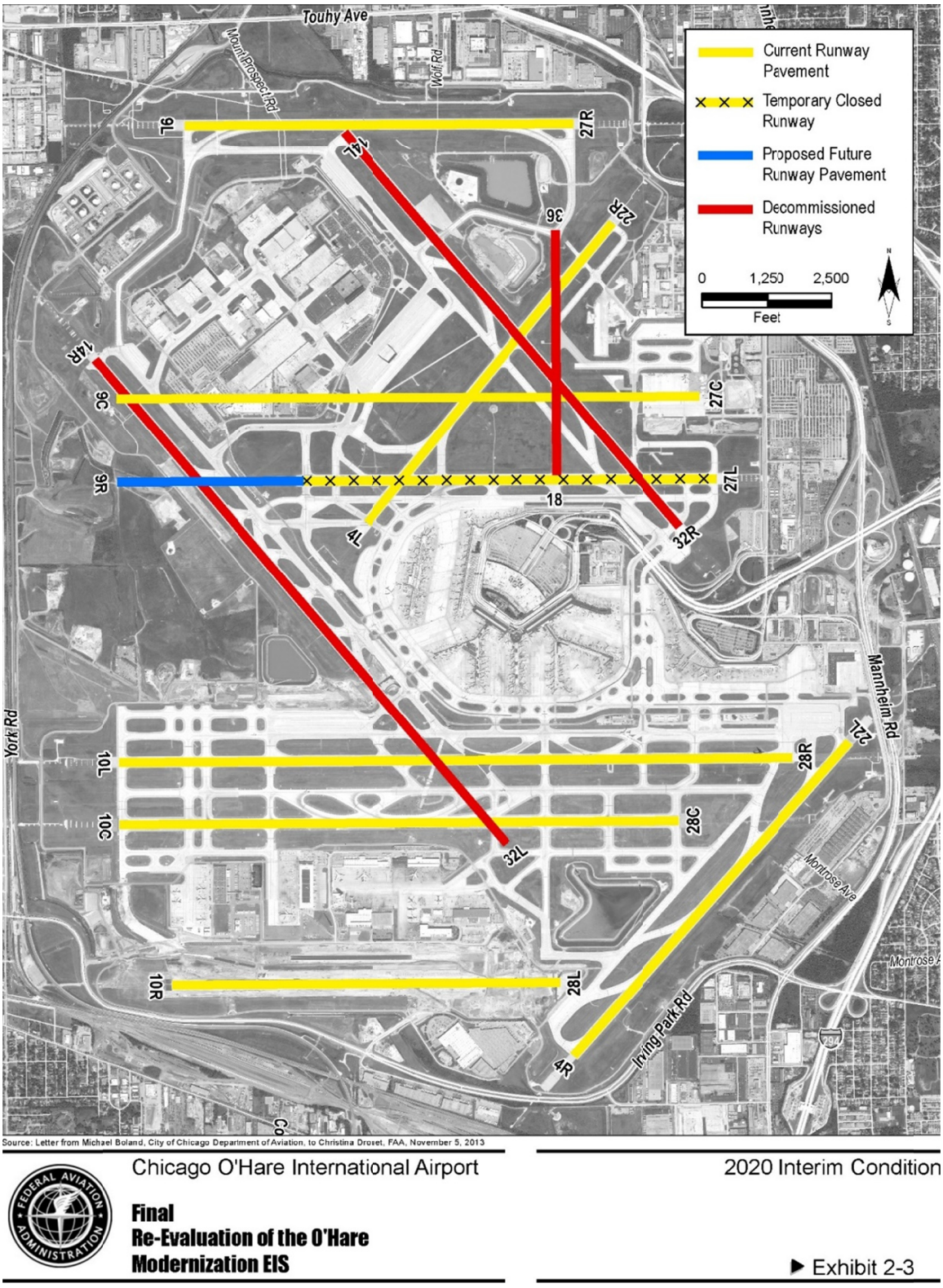


Figure 9-13. *Map of Chicago O'Hare International Airport showing 2020 interim condition.*

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surrounding ORD. Notice of the availability of the Draft Re-Evaluation also was published in the *Federal Register*, *Chicago Tribune*, *Chicago Sun Times*, and *Daily Herald* on July 27, 2015.

Public Workshops

To provide the public with opportunities to comment on the Draft Re-Evaluation, FAA hosted four 8-hour public workshops in neighborhoods surrounding ORD. Facilities were selected based on having capacities of approximately 1,000 people, free parking, ADA compliance, and public transportation accessibility. Public workshop dates, times, and locations were published as public notices in the *Federal Register*, *Chicago Tribune*, *Chicago Sun Times*, and *Daily Herald* on July 13, 2015.

FAA efforts to publicize and present the findings of the re-evaluation at the public workshops included the following.

- More than 70 exhibit boards on display. These boards included summary information presented graphically, in tabular form, and as text illustrating various aspects of the Draft Re-Evaluation. Copies of the boards were included in Appendix H, Attachment H-4 of the Final Re-Evaluation report, and can be found online at ftp://public-ftp.agl.faa.gov/2015%20re-eval/final%20re-eval/appendix_h.pdf.
- Several thousand copies of printed handouts for attendees at each workshop that (1) summarized major findings of the re-evaluation, (2) presented background technical information on how noise is described at ORD, and (3) showed a map and addresses of the 73 libraries where hard copies of the Draft Re-Evaluation document could be reviewed. Electronic copies of the handouts are available for viewing online at the same URL.
- More than 60 individuals representing FAA and contractor staff were available onsite to answer questions from the public and provide assistance to attendees. Among the staff available were many of the technical experts that were directly involved with the analysis for and development of the Draft Re-Evaluation.
- An audio-visual presentation approximately 8 minutes in length described the Draft Re-Evaluation in a voice-over of several key exhibit boards and reviewed the public workshop process. This recording played continuously for public viewing in a separate exhibit hall.
- Brief segments of TAAM animations of the 2015 and 2020 interim conditions were displayed on two large TV monitors in a continuous loop for the duration of the public workshops.
- Representatives from the O'Hare Noise Compatibility Commission (ONCC) were available to answer questions about the O'Hare Residential and School Sound Insulation Programs.
- Security was provided at each workshop using members of local police departments at each workshop location.

The workshops also allowed for the filing of comments on the Draft Re-Evaluation via blank comment forms, court reporters, or other forms of submittals. Spanish-language translators were available throughout the entire 8 hours of each workshop.

In total approximately 2,230 people attended the public workshops over the 4 days. Approximately 2,940 written comment submittals were handed in at the public workshops, and approximately 790 people provided verbal comments to court reporters. Approximately 430 additional submittals were sent directly to FAA via mail, e-mail, or FAX. From these submittals, FAA identified a total of 13,650 individual comments, which were addressed in the Final Re-Evaluation report (FAA 2015b).

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Successes and Lessons Learned

- FAA guidance on EIS re-evaluations does not require public outreach; however, FAA was sensitive to the increased public awareness and concern over the changes at O'Hare and acted to provide a huge public outreach effort.
- FAA management and staff fully embraced their direct involvement in the workshops. Nearly 20 FAA personnel attended all 8 hours of all four events. That included the FAA regional administrator, the acting deputy administrator, the regional division executive manager, the ADO manager and assistant manager, and many other senior staff. Every FAA staff member in attendance participated actively in responding to individual attendees' questions.
- Preparations for the public workshops were extensive, not just in the preparation and review of all outreach materials, but also in visiting the workshop locations in advance; drafting the room layouts; rehearsing for the workshops and practicing responding to challenging questions; and numerous other behind-the-scenes details.
- Most public comments received pertained to concerns about increased noise and operations and reflected negative and even suspicious attitudes on the part of the commenters, but many comments also acknowledged the degree and quality of the outreach effort.
- Responses to 13,000 comments were processed from the close of the 30-day comment period on August 26, 2015, until the delivery of the Final Re-Evaluation report on October 14, 2015 (FAA 2015b). Spreadsheets were used to document every commenter's name, address, comment number, comment category, and other information. Comments expressing similar questions or concerns were categorized and expansive responses addressed subtle differences between commenters. The unique approach used to respond to public comments is being applied on another FAA project that involves numerous comments on a NextGen Metroplex study.

Exemplary Collaboration at European Airports

Background

The European Organisation for the Safety of Air Navigation (EUROCONTROL), together with core stakeholders and other advisory groups, created the voluntary *Specification for Collaborative Environmental Management (CEM)* (EUROCONTROL 2014). The objectives of the CEM guidebook are to guide the efforts of core stakeholders in increasing ATM capacity and flight efficiency and thereby to support sustainable airport development in general. The guidebook identifies airport operators, aircraft operators, and air navigation service providers (ANSPs) as the core stakeholders, though other entities could be considered core stakeholders depending on the local situation. EUROCONTROL also sees the specification as a practical way to help meet the requirements of the Single European Sky ATM Research (SESAR) program and other pieces of environmental legislation. Although technically it does not fall under NextGen, this effort bears many similarities and relevant details that are applicable to U.S airports and their stakeholders.

In 2008 the concepts and protocols of CEM, though not yet formalized, were documented, and implementation began. EUROCONTROL published a 32-page guidance document that centered on the concept of environmental partnerships for airports (EUROCONTROL 2008). That document defines CEM and explains the protocols to facilitate formation and implementation of a partnership among stakeholders to address environmental challenges at airports. The document also presents a CEM case study involving such a partnership at Manchester Airport (UK). In 2009 David McMillan,

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then director general of EUROCONTROL, wrote an article about the fast and continuing implementation of continuous descent arrivals (CDAs) that minimize level flight and therefore reduce noise and emissions (McMillan 2009). In the article McMillan points out that successful implementation of CDA requires cooperative effort among the core stakeholders and points to CEM as a practical path to CDA implementation, further noting that CEM can be applied to address many different environmental issues caused by airport operations. At that time the Single European Sky ATM Master Plan was also promoting CDA and CEM, calling for both to be in common use by 2013, the year the first drafts of the CEM formal specification were created and circulated.

EUROCONTROL worked closely with Airports Council International (ACI-Europe) and interested industry parties over several years to draft the specification to help operators and ANSPs operate and develop airports sustainably. At the 9th ACI Airport Exchange in Paris on November 4, 2014, EUROCONTROL introduced the final draft of the specification. Soon thereafter, ACI-Europe approved the CEM specification as ACI Recommended Practice 3/14. The introduction to the recommended practice document states the following:

> The way in which this Recommended Practice helps produce joint solutions is by promoting a better understanding of the business interdependencies between airports, airlines and ANSPs as well as their common environmental impact. The underlying working arrangements represent a natural step forward for environmental management at airports … CEM addresses real-world needs building on real-world practices … By offering a general rubric for airport partners to address them [noise, local air quality, and greenhouse gas emissions] in a collaborative manner, the CEM Protocol helps them to identify trade-offs between the objectives and to make informed decisions (ACI-Europe 2014).

Stakeholder Engagement Methods Used

The underlying principle of the CEM specification is that the collaboration that must take place to solve environmental problems sustainably can be achieved only when all core stakeholders understand the interdependencies of their actions and decisions. The recommended stakeholder engagement method is to establish collaborative working arrangements among stakeholders. The working arrangements ensure that all stakeholders' ideas and concerns in relation to the environmental impacts of a proposed operational change are considered. An example of how this principle is applied at Vienna International Airport (VIE) is described below. Austria's largest airport, VIE is a hub airport with approximately 250,000 aircraft operations annually. The airport is located in the plains of the Dunărea River, east of the terminus of the Alps in eastern Austria. Collaborative working arrangements at VIE incorporate the following elements:

- The Mediation Forum, a series of meetings held throughout the year, brings together representatives of ATC, Austrian Airlines, VIE, mayors of the surrounding communities, elected officials from multiple political parties, and representatives of associations of NGOs. Topics discussed generally concern improvement of the environmental situation around the airport and future development of the airport and its surroundings.
- The Dialogue Forum (an outgrowth of the Mediation Forum) is similar to the Mediation Forum and involves the same stakeholders, but focuses more on the concerns of the surrounding communities, NGOs, and political representatives.
- Working groups are smaller groups that are established as a part of the Dialogue Forum process. Each working group includes personnel appropriate to specific topics relevant to environmental management around airports.
- ATC Operations (ATC-Ops) also holds regular meetings so that representatives of ATC-Ops, the airlines, VIE, and the Ministry of Transport can discuss proposed airspace changes. Additional ATC-Ops meetings also are held specifically with airlines as customers of the airport.

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Successes and Lessons Learned

The CEM process has helped VIE achieve the following successes:

- A high degree of acceptance of current and planned airport operations among surrounding communities, NGOs, and local authorities has been achieved because of the CEM process.
- Targeted, practical mitigation solutions have been possible because of the focused consideration of stakeholder concerns that occurs in the working groups.
- Every complaint or question from participants in the Dialogue Forum at VIE is referred to the appropriate working group, which enables a quick thoughtful response.
- VIE has been successful in avoiding negative environmental impacts on populated areas by proactively engaging local land use planning authorities in its collaborative process.
- VIE now has established contracts with local land use authorities so that it avoids residential development in agreed noise corridors.

Other European airports have achieved results similar to VIE using the CEM process (EUROCONTROL 2014).

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