

# REDUCING FLIGHT CANCELLATIONS BY IMPROVING NEXT GENERATION AIR TRANSPORTATION SYSTEM IMPLEMENTATION

Carol Foster

*In April 2010, the Federal Aviation Administration (FAA) began fining airlines for keeping passengers aboard a grounded plane during lengthy delays. Airlines responded by more frequently cancelling their flights to avoid the fines. In 2011, the FAA began switching air navigation from radar to global-positioning satellite (GPS) technology, known as the Next Generation Air Transportation System (NextGen), in order to better accommodate United States (U.S.) air traffic and reduce flight cancellations. However, significant flight cancellation reductions can only occur when NextGen is implemented throughout the U.S. aviation system. While NextGen was originally scheduled to be fully implemented by 2025, delays in individual airport plan development and in FAA approval of plans mean that the benefits of reduced cancellations may also be postponed. NextGen rollout can be improved by Congress and the FAA by mandating plan approval timelines, organizing a best practices forum for airports to use when creating individual NextGen plans, and denying federal funding opportunities to airports that do not develop individual plans in a timely manner. Close Congressional and FAA monitoring of these new measures will help to determine whether further policy changes beyond these recommendations will be needed in the future.*

## INTRODUCTION

Over the past 50 years, the number of air passengers on flights originating in the United States (U.S.) increased eightfold, from around 100 million in 1963 to over 800 million in 2013.<sup>1</sup> Air passengers and the airline industry depend on safe, reliable, and efficient air travel to get to their business or leisure destinations and to continue to stay in business, respectively. Department of Homeland Security (DHS) passenger and plane screenings and Federal Aviation Administration (FAA) rules regarding flight crew work-hour limits and on-board conditions during tarmac delays, including mandating that passengers have access to water and lavatories during on-board delays, have improved passenger safety and comfort.<sup>2</sup> Still, an increasing number of flight

---

1 Bureau of Transportation Statistics, "Total Passengers on U.S. Airlines and Foreign Airlines U.S. Flights," April 3, 2013, accessed September 19, 2013, [http://www.rita.dot.gov/bts/press\\_releases/bts016\\_13](http://www.rita.dot.gov/bts/press_releases/bts016_13).

2 United States Department of Transportation, "U.S. Department of Transportation Expands Airline Passenger Protections," April 20, 2011, accessed February 28, 2014, <http://www.dot.gov/briefing-room/us->

cancellations since 2010 jeopardize air travel efficiency and reliability.

This article will provide a brief history of the growing cancellation problem, followed by a discussion of past attempts to address the issue through the Next Generation Air Transportation System (NextGen). It will also provide a series of policy recommendations and proposals outlining potential solutions and an evaluation framework to assess subsequent NextGen implementation efforts.

### CAUSAL STORY OF GROWING FLIGHT CANCELLATIONS

In January 2008, bad weather left passengers aboard a Delta flight from Atlanta to West Palm Beach waiting on the tarmac for 10 hours. The crew would not give the passengers any food or water and refused to adjust temperatures on-board. Passengers were given conflicting information about the wait time and the anticipated takeoff time.<sup>3</sup> This incident was not an isolated one; during 2009, 868 flights originating in the U.S. sat on the tarmac with passengers on-board for more than three hours for domestic flights and for more than four hours for international flights.<sup>4</sup>

Frequent reports of lengthy delays and poor on-board conditions led the FAA to intervene in 2009, enacting a rule that restricted the time airlines could keep passengers waiting on a closed aircraft. The rule went into effect in April 2010 and limited tarmac delays to three hours for domestic flights and four hours for international flights.<sup>5</sup> The rule created a strong disincentive to delay flights; airlines that exceeded those limits must pay the FAA \$27,500 in fines per passenger.<sup>6</sup>

The FAA's tarmac rule was well-intentioned but inadvertently led to an increase in flight cancellations.<sup>7</sup> Just one year into the change, airlines were 24 percent more likely to cancel a flight before it left the gate and three times more likely to cancel a flight that was on the tarmac for between two hours and three hours.<sup>8</sup> The tarmac rule did cut on-board delays, reducing tarmac delays between two and three hours by 40 percent and nearly eliminating all tarmac delays over three hours, but the inadvertent increase in cancellations resulted in a rising number of stranded customers who were often unable to get rebooked for 17 hours.<sup>9</sup> Within a year of the tarmac rule's implementation, the national nature of the growing cancellation problem caught the attention of a concerned FAA and Congress.

---

department-transportation-expands-airline-passenger-protections.

3 Kathryn B. Creedy, "Delta Tops Tarmac Delay Report Card," *Aviation Today*, March 11, 2009, accessed September 20, 2013, [http://www.aviationtoday.com/regions/usa/Delta-Tops-Tarmac-Delay-Report-Card\\_30427.html#\\_Uko7-YY3vzN](http://www.aviationtoday.com/regions/usa/Delta-Tops-Tarmac-Delay-Report-Card_30427.html#_Uko7-YY3vzN).

4 Bureau of Transportation Statistics, "Tarmac Times," July 2013, accessed September 10, 2013, [http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/subject\\_areas/airline\\_information/taxi\\_out\\_and\\_other\\_tarmac\\_times/index.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/subject_areas/airline_information/taxi_out_and_other_tarmac_times/index.html).

5 United States Department of Transportation, "New DOT Consumer Rule Limits Airline Tarmac Delays, Provides Other Passenger Protections," December 21, 2009, accessed September 30, 2013, <http://www.dot.gov/briefing-room/new-dot-consumer-rule-limits-airline-tarmac-delays-provides-other-passenger>.

6 Brett Snyder, "Delay Rule Bumps Up Flight Cancellations," *CNN*, June 13, 2011, accessed September 20, 2013, <http://www.cnn.com/2011/TRAVEL/06/13/tarmac.delays.cancellations/index.html>.

7 United States Government Accountability Office, *Airline Passenger Protections* (Washington, DC: September 2011), accessed September 19, 2013, <http://www.gao.gov/new.items/d11733.pdf>.

8 *Ibid.*, 42.

9 Econometrica, Inc., *Independent Review and Analysis of the Impact of the Three-Hour Tarmac Delay Rule* (Bethesda, MD: January 9, 2014), accessed February 28, 2014, [http://www.dot.gov/sites/dot.gov/files/docs/Econometrica\\_Tarmac\\_Delay\\_Report\\_1\\_9\\_2014.pdf](http://www.dot.gov/sites/dot.gov/files/docs/Econometrica_Tarmac_Delay_Report_1_9_2014.pdf), 17.

## ADDRESSING INCREASED CANCELLATIONS: IMPLEMENTATION ATTEMPTS

Since April 2010, few policy remedies to address the rule's unintentional impact of rising cancellations have been considered or employed. In September 2011, the United States Government Accountability Office (U.S. GAO) report found considerable problems with cancellation increases following the tarmac rule. Policymakers were left with the following options: removing the tarmac fines and, therefore, running the risk of reverting back to increased instances of delays; expanding aviation infrastructure so that airports could handle increased traffic; imposing a fine for flight cancellations; or implementing a new air navigation system that could improve the flow of air traffic so that fewer delays, and thus fewer cancellations, would occur.<sup>10</sup> Ultimately, the FAA chose to address the increase in cancellations by moving from radar to more precise global-positioning satellite (GPS) air navigation.<sup>11</sup>

When planes and air traffic control towers both use GPS, planes can be more accurately tracked so that more planes can safely fly in limited air space. As a result, flight delays are fewer and shorter, planes use less jet fuel, and flight cancellations are reduced.<sup>12</sup> It is important to note that benefits can only occur when GPS navigation is used throughout the U.S.'s interconnected aviation system.

The FAA first explored the possibility of transitioning commercial aviation from radar navigation to more precise GPS navigation in the 1980s, but the commercial technology did not exist at that time. The FAA began testing GPS navigation, known as NextGen, in airplanes and air traffic control towers in Seattle, Houston and the Washington, D.C. area in 2004.<sup>13</sup> In 2011, the problem of rising cancellations pushed the FAA to move from NextGen testing to nationwide implementation. The FAA set 2025 as the deadline for complete national implementation.<sup>14</sup> Less than a year later, Congress formally supported this goal with implementation guidance and appropriations through the passage of S. 223/H.R. 658, the FAA Air Modernization and Safety Improvement Act.<sup>15</sup>

Implementing NextGen at airports is much more difficult than equipping planes and air traffic control towers with GPS technology. Each individual airport must create new flight patterns and remove physical obstructions that may interfere with those new GPS-oriented patterns.<sup>16</sup> Once an airport creates an individualized plan, the FAA must review the plan to ensure it meets aviation safety standards. There are 5,170 public airports in the U.S., with over 500 offering major commercial airline service.<sup>17</sup> Since

---

10 United States Government Accountability Office, *Airline Passenger Protections*, 12-36.

11 Federal Aviation Administration, *NextGen Implementation Plan* (Washington, DC: June 2013), accessed October 7, 2013, [http://www.faa.gov/nextgen/implementation/media/NextGen\\_Implementation\\_Plan\\_2013.pdf](http://www.faa.gov/nextgen/implementation/media/NextGen_Implementation_Plan_2013.pdf), 10.

12 *Ibid.*, 19-20.

13 *Ibid.*, 4-10.

14 *Ibid.*, 10.

15 "FAA Air Transportation Modernization and Safety Improvement Act," (PL 112-95, February 14, 2012).

16 Puget Sound Regional Council, *Preparing Busy General Aviation Airports for Next Generation Technologies* (Seattle, Washington: May 2013), accessed November 9, 2013, <http://www.psrc.org/assets/7340/NextGen.pdf>.

17 "Airports Q&A," Airlines for America, accessed October 10, 2013, <http://www.airlines.org/Pages/Airports-QA.aspx>.

2011, the FAA has approved few individualized NextGen implementation plans; only 35 major airports and 9 smaller airports have been able to implement FAA-approved plans.<sup>18</sup>

Individual airports, especially smaller airports, may not have the resources or the experience necessary to create acceptable NextGen plans. Because of this, the FAA has received few plans to review. However, for airports that do develop a plan, the FAA is slow to approve the plan or provide feedback for plan improvements. While the full implementation of NextGen by 2025 was originally expected to cost the FAA and airports \$40 billion, delays throughout the implementation process are expected to drive up costs and push back national implementation.<sup>19</sup>

### POLICY RECOMMENDATIONS FOR IMPROVING NEXTGEN ROLLOUT

Evaluations of NextGen offer valuable insight for putting NextGen back on track for a timelier and more cost-effective implementation process. Airport officials at the front lines of implementation across the country are finding that the FAA is not adequately assisting airports develop tailored NextGen flight patterns.<sup>20</sup> Once airports create their plans, the FAA is taking longer than anticipated to approve the plans, thus further delaying full NextGen implementation.

In order to more quickly mitigate the tarmac rule's inadvertent impact of increased cancellations, the NextGen rollout needs to occur more quickly. Viable policy solutions to accelerate NextGen implementation must be developed within the context of the limited availability of federal funding. Rather than mandate a shorter implementation timeline, the recommendations detailed below attempt to address the roots of NextGen implementation delays. Policy recommendations include that the FAA respond to submitted NextGen plans within 90 days, that the FAA creates a NextGen best practices forum so that airports from across the country can get better assistance when developing NextGen plans, and that airports become ineligible for federal aviation grants if they do not submit implementation plans to the FAA two years after the launch of the best practices forum.

#### *Recommendation I: Mandatory 90-Day NextGen Plan Review by the FAA*

Airports, especially smaller airports, complain that the FAA's approval of individual NextGen implementation plans is taking too long. Without an approved plan, airports cannot begin to implement and benefit from NextGen. Once an airport submits its plan, there is currently no deadline by which the FAA must respond with an approval or feedback for plan improvement. The FAA has taken over a year to provide feedback on some plans.<sup>21</sup> To remedy this problem, Congress should pass legislation

---

18 Federal Aviation Administration, *NextGen for Airports* (Washington, DC: June 2013), accessed December 9, 2013, <http://www.faa.gov/nextgen/media/nextgenForAirports.pdf>.

19 Susan Carey, "The FAA's \$40 Billion Adventure," *The Wall Street Journal*, August 9, 2013, accessed November 9, 2013, <http://online.wsj.com/news/articles/SB10001424127887323971204578625952559851308>.

20 Puget Sound Regional Council, *Preparing Busy General Aviation Airports for Next Generation Technologies*.

21 United States Government Accountability Office, *NextGen Air Transportation System: FAA Has Made*

mandating that the FAA respond to airports within 90 days of when an airport submits its NextGen implementation plan.

Responding within 90 days does not mean that the FAA must approve unacceptable; safety must continue to be at the center of the NextGen plan approval process. Within 90 days, the FAA must either approve plans that are clearly acceptable or return substandard plans along with FAA feedback. Resubmitted plans should be reviewed within 90 days as well.

In order to ensure that the FAA adheres to the 90-day timeline, submitted NextGen plans should be clearly assigned to individual employees or teams of employees within the FAA. Adherence to the timeframe should carry weight in FAA annual employee evaluations. Public Congressional hearings scrutinizing FAA compliance could put additional pressure on the FAA to follow the 90-day timeline. If the timeline is mandated by Congressional legislation, Congress could threaten the FAA with funding cuts for noncompliance.

**Strengths:** The 90-day mandate ensures that airports will get timely feedback but provides for enough time that the FAA should have the necessary administrative capacity to meet the deadline. The consequences for the FAA and its employees if they do not follow the 90-day timeframe are clear and strong enough to provide incentive to comply. This change in FAA review procedures could be quickly implemented following Congressional passage.

**Weaknesses:** This change in policy mandates faster feedback but not necessarily quality feedback. FAA bureaucrats looking to comply with the 90-day mandate may feel pressure to review a greater quantity of plans more quickly rather than provide helpful feedback that airports could use to revise their NextGen implementation plans. Periodic airport surveys of the helpfulness of FAA feedback could help to ensure quality FAA reviews.

*Recommendation II: Provide More NextGen Implementation Guidance for Airports Through FAA-Managed Best Practices Forum*

In order to accommodate additional NextGen air traffic, airports may need to change takeoff and landing patterns, remap taxi patterns, and remove physical barriers. Airports, especially small ones, may not have the capacity or the expertise to develop acceptable individualized NextGen implementation plans, and the FAA has not been helpful in providing guidance. A best practices forum is a policy tool designed to provide airports with the information they need to develop an acceptable implementation plan; such a policy requires minimal FAA involvement.<sup>22</sup>

A best practices forum for NextGen implementation would give airports nationwide the opportunity to learn from each other in order to develop better individualized implementation plans more quickly. While each airport will have its own unique set of planning challenges to address, a best practices forum will allow airport representatives to get feedback from other airports and discover how other

---

*Some Progress in Midterm Implementation, but Ongoing Challenges Limit Expected Benefits* (Washington, DC: April 2013), accessed November 11, 2013, <http://www.gao.gov/assets/660/653626.pdf>, 31-47.

<sup>22</sup> Eugene Bardach, *A Practical Guide for Policy Analysis*, 4th ed. (Washington, DC: CQ Press, 2012), 145-6.

airports addressed similar obstacles in their plans. The 44 airports that are already implementing their FAA-approved NextGen plans will likely want to participate in the forum so that nationwide implementation, and its associated benefits, can occur more quickly.

In order to ensure that NextGen planning remains secure, the FAA would need to develop a protected website for the forum and verify all requests for forum accounts. The FAA should establish some initial best practices on the website, perhaps some drafted with the help of the 44 airports with approved plans and U.S. airlines that have experience with NextGen navigation. The site should allow airports to post their own NextGen questions and advice for other airports to see and should include a national airport directory so that airports can contact each other more directly.

**Strengths:** While airports in one region may compete for business, most airports are in unique locations. Airports will likely want to help each other in order to advance national NextGen implementation. Providing information digitally is an administratively simple and cost-effective way for the FAA to help airports develop adequate NextGen plans more quickly.

**Weaknesses:** If airports that have successfully implemented NextGen do not participate in the forum, the forum may become a less helpful resource. Additionally, if the forum is not a secure site, the digital forum could lead to a breach in U.S. aviation security. The FAA could encourage airports to participate by developing grants for which only forum participants are eligible.

*Recommendation III: Deny Federal Aviation Grants to Airports That Fail to Develop an Initial Implementation Plan Two Years After Best Practices Forum Launch*

While slow FAA review of submitted NextGen plans is a major reason behind the sluggish nationwide NextGen rollout, airports failing to develop individualized NextGen plans equally delay national NextGen implementation. If airports do not submit an initial NextGen implementation plan to the FAA two years after the launch of the best practices forum, those airports should be ineligible for federal funding through the FAA's Airport Improvement Plan (AIP) grant program. The FAA selects which airports receive AIP grants. The FAA could create a new rule that prevents them from selecting airports that did not develop and submit an initial implementation plan within two years of the forum's launch. Only when an airport submitted a plan would the airport's AIP grant eligibility be restored.

Smaller airports, those likely to have less experience implementing NextGen technology and likely to delay submitting a plan, are more dependent on federal funds than larger airports. If a smaller airport's construction project is selected for an AIP grant by the FAA, federal funds will cover 90 to 95 percent of the project's costs.<sup>23</sup> With a significant funding source on the line, airports may take more seriously the best practices forum as a resource to develop their plans.

---

<sup>23</sup> "Airport Improvement Program (AIP) Overview," Federal Aviation Administration, last modified September 10, 2013, <http://www.faa.gov/airports/aip/overview/>.

**Strengths:** The threat of losing eligibility for federal funds creates a strong incentive for airports to develop their individual plans and participate in the best practices forum. This measure is a low-cost policy tool for effectively speeding up NextGen implementation.

**Weaknesses:** In order to qualify for federal grants, airports could hastily submit substandard plans that ultimately create more work for the FAA. The FAA can help airports develop comprehensive NextGen plans initially by providing airports with a checklist of required plan elements; only airports that address all of the FAA-required elements in their NextGen plan will be eligible for federal grants. Developing quality plans, even with FAA guidance, could be especially difficult for regional airports that have smaller budgets and fewer personnel than major airports. Additionally, once this new FAA rule goes into effect, airports that lose AIP grant eligibility and the members of Congress who represent them are likely to strongly push for a repeal of the measure.<sup>24</sup>

When implemented together, these three policy recommendations have the potential to keep NextGen implementation on its original timeline and budget so that flight cancellations can more quickly be reduced nationwide. In order to determine whether these policies are effective in improving the national rollout of NextGen and reducing flight cancellations or if additional measures are needed to improve NextGen implementation, the U.S. House and Senate transportation committees and the FAA must establish an evaluation strategy.

#### EVALUATING NEXTGEN IMPLEMENTATION IMPROVEMENT MEASURES

Feedback from the FAA and individual airports will help to provide a ground-level view of the new policies' implementation.<sup>25</sup> Evaluations conducted by the U.S. GAO and think-tanks will help to provide the FAA and Congressional committees with valuable third-party insight. A mix of quantitative and qualitative assessments of airport plan development, FAA plan reviews, and flight cancellations before and after the policy changes will be helpful to the House and Senate transportation committees and the FAA in determining whether the three recommendations helped to sufficiently improve NextGen implementation. In order to best monitor the impact of the three NextGen policy changes on the speed of NextGen's rollout and on flight cancellation trends, Congress should review NextGen evaluations by the FAA, the U.S. GAO, and think-tanks. Congress and the FAA should request surveys of U.S. airports, and House and Senate transportation committees should hold public hearings on NextGen progress and flight cancellation trends before and after the policy changes.

**FAA, U.S. GAO, and Think-Tank Evaluations:** Since the FAA will be in charge of implementing the new NextGen policy changes, House and Senate transportation committees should request reports from the FAA regarding the number of airport plans the FAA processed, the number of plans the FAA approved, plan turnaround times, and

---

<sup>24</sup> John W. Kingdon, *Agendas, Alternatives, and Public Policies*, 2nd ed. (New York: Addison-Wesley Educational Publishers Inc., 1995), 45-67.

<sup>25</sup> Marcia Meyers and Susan Vorsanger, "Street-Level Bureaucrats and the Implementation of Public Policy," in *The SAGE Handbook of Public Administration*, ed. Guy Peters and Jon Pierre (London: SAGE Publications Ltd., 2003), 245-254.

flight cancellation trends before and after the policy changes. Since the FAA is biased towards showing NextGen success, Congress should also request an independent U.S. GAO report and consult think-tank reports on NextGen implementation before and after the three new policies. Currently, think-tank evaluations of NextGen implementation are nearly nonexistent; however, as NextGen implementation progresses, more think-tank assessments are likely to develop. Congressional committees and the FAA should consult these third-party assessments in the future.

**Airport Surveys:** NextGen implementation has been slow thus far because airports are not getting help creating implementation plans and the FAA is not quickly reviewing submitted plans. Surveying airports on the ease of implementation plan creation, approval, and execution before and after the changes in FAA procedures and the launch of the best practices forum will provide valuable insight for Congress and the FAA. Surveys requested by the FAA and Congress should ideally be conducted by the impartial U.S. GAO.

**Congressional Hearings:** Beyond evaluations and surveys, Congress should monitor the success of NextGen implementation before and after the policy changes, whether those changes are brought about by legislation or an FAA rule, through public hearings. Hearings should include witnesses from the FAA, airports, and airlines. While hearings are less in-depth than reports, public hearings will allow House and Senate transportation committee members to ask for clarification on NextGen implementation progress and flight cancellation trends.

Since Congress and the FAA depend on the feedback of other organizations in order to determine the effectiveness of the three policy changes, Congress and FAA needs to keep two things in mind when processing reports, airport surveys, and witness testimony. First, NextGen decision-makers should be sure to acknowledge all evaluation biases. Even with quantitative reports, statistics can be presented in ways that serve the interests of the report's author or sponsor. Bias is nearly unavoidable for most actors but must be acknowledged in order for policymakers to make informed NextGen decisions going forward.<sup>26</sup>

Secondly, policymakers should remember not to confuse policy output success with policy outcome success.<sup>27</sup> Even if airports report in surveys that the forum makes them feel more included as stakeholders in the NextGen process or if the FAA reports that it is able to follow the 90-day review mandate strictly, these policy outputs need to lead to the policy outcome of reduced flight cancellations. If those policy outputs do not ultimately lead to significant flight cancellation reductions, additional NextGen implementation tweaking will be necessary.

## CONCLUSION

The FAA's April 2010 tarmac rule was a necessary measure to protect passengers from excessive on-board delays; however, the rule inadvertently increased flight cancellations. While GPS flight-navigation technology was not originally developed

<sup>26</sup> Mark Bovens, Paul 't Hart, and Sanneke Kuipers, "The Politics of Policy Evaluation," in *The Oxford Handbook of Public Policy*, ed. Robert E. Goodin, Michael Moran, and Martin Rein (Oxford: Oxford University Press, 2009), 319-35.

<sup>27</sup> Eugene Bardach, *A Practical Guide for Policy Analysis*, 32-3.



## REDUCING FLIGHT CANCELLATIONS

and tested as a remedy for the inadvertent impacts of the tarmac rule, the FAA approved the start of nationwide NextGen implementation in 2011 in part to address the recent rise in flight cancellations.

Problems with NextGen implementation mean that the program is currently not on track to deliver its intended benefits of significantly reduced flight cancellations by 2025. Congress and the FAA have the power to promote better and quicker implementation by mandating speedier FAA review of NextGen plans, creating a NextGen best practices forum for airports, and requiring airports to submit individual implementation plans within two years of the forum's opening in order to be eligible for federal grants.

In order to determine whether these reforms actually improve the NextGen implementation process and reduce flight cancellations, Congress and the FAA must closely monitor cancellation statistics and examine trends in NextGen implementation plan development and approvals. Nationwide NextGen progress can best be assessed through FAA, U.S. GAO, and think-tank reports, airport surveys, and public Congressional hearings. While think-tank evaluations of NextGen have been limited, as implementation continues, perhaps more evaluations will surface to provide valuable third-party insight. As long as report biases, strengths, and weaknesses are acknowledged by policymakers, considering a more diverse set of program evaluations will contribute to more informed efforts to reduce flight cancellations in the future.

BIBLIOGRAPHY

- Airlines for America. "Airports Q&A." Accessed October 10, 2013. <http://www.airlines.org/Pages/Airports-QA.aspx>.
- Bardach, Eugene. *A Practical Guide for Policy Analysis*. 4th ed. Washington, DC: CQ Press, 2012.
- Bovens, Mark, Paul 't Hart, and Sanneke Kuipers. "The Politics of Policy Evaluation." In *The Oxford Handbook of Public Policy*, edited by Robert E. Goodin, Michael Moran, and Martin Rein, 319-35. Oxford: Oxford University Press, 2009.
- Bureau of Transportation Statistics. "Tarmac Times." July 2013. Accessed September 10, 2013. [http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/subject\\_areas/airline\\_information/taxi\\_out\\_and\\_other\\_tarmac\\_times/index.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/subject_areas/airline_information/taxi_out_and_other_tarmac_times/index.html).
- Bureau of Transportation Statistics. "Total Passengers on U.S. Airlines and Foreign Airlines U.S. Flights." April 3, 2013. Accessed September 19, 2013. [http://www.rita.dot.gov/bts/press\\_releases/bts016\\_13](http://www.rita.dot.gov/bts/press_releases/bts016_13).
- Carey, Susan. "The FAA's \$40 Billion Adventure." *The Wall Street Journal*, August 9, 2013. Accessed November 9, 2013. <http://online.wsj.com/news/articles/SB10001424127887323971204578625952559851308>.
- Creedy, Kathryn B. "Delta Tops Tarmac Delay Report Card." *Aviation Today*, March 11, 2009. Accessed September 20, 2013. [http://www.aviationtoday.com/regions/usa/Delta-Tops-Tarmac-Delay-Report-Card\\_30427.html#.Uko7-YY3vzN](http://www.aviationtoday.com/regions/usa/Delta-Tops-Tarmac-Delay-Report-Card_30427.html#.Uko7-YY3vzN).
- Econometrica, Inc. *Independent Review and Analysis of the Impact of the Three-Hour Tarmac Delay Rule*. Bethesda, MD: January 9, 2014. Accessed February 28, 2014. [http://www.dot.gov/sites/dot.gov/files/docs/Econometrica\\_Tarmac\\_Delay\\_Report\\_1\\_9\\_2014.pdf](http://www.dot.gov/sites/dot.gov/files/docs/Econometrica_Tarmac_Delay_Report_1_9_2014.pdf).
- "FAA Air Transportation Modernization and Safety Improvement Act." PL 112-95, February 14, 2012.
- Federal Aviation Administration. "Airport Improvement Program (AIP) Overview." Last modified September 10, 2013. <http://www.faa.gov/airports/aip/overview/>.
- Federal Aviation Administration. *NextGen for Airports*. Washington, DC: June 2013. Accessed December 9, 2013. <http://www.faa.gov/nextgen/media/nextgenForAirports.pdf>.

## REDUCING FLIGHT CANCELLATIONS

- Federal Aviation Administration. *NextGen Implementation Plan*. Washington, DC: June 2013. Accessed October 7, 2013. [http://www.faa.gov/nextgen/implementation/media/NextGen\\_Implementation\\_Plan\\_2013.pdf](http://www.faa.gov/nextgen/implementation/media/NextGen_Implementation_Plan_2013.pdf), 10.
- Kingdon, John W. *Agendas, Alternatives, and Public Policies*. 2nd ed. New York: Addison-Wesley Educational Publishers Inc., 1995.
- Meyers, Marcia, and Susan Vorsanger. "Street-Level Bureaucrats and the Implementation of Public Policy." In *The SAGE Handbook of Public Administration*, edited by Guy Peters and Jon Pierre, 245-254. London: SAGE Publications Ltd., 2003.
- Puget Sound Regional Council. *Preparing Busy General Aviation Airports for Next Generation Technologies*. Seattle, Washington: May 2013. Accessed November 9, 2013. <http://www.psrc.org/assets/7340/NextGen.pdf>.
- Snyder, Brett. "Delay Rule Bumps Up Flight Cancellations." *CNN*, June 13, 2011. Accessed September 20, 2013. <http://www.cnn.com/2011/TRAVEL/06/13/tarmac.delays.cancellations/index.html>.
- United States Department of Transportation. "New DOT Consumer Rule Limits Airline Tarmac Delays, Provides Other Passenger Protections." December 21, 2009. Accessed September 30, 2013. <http://www.dot.gov/briefing-room/new-dot-consumer-rule-limits-airline-tarmac-delays-provides-other-passenger>.
- United States Department of Transportation. "U.S. Department of Transportation Expands Airline Passenger Protections." April 20, 2011. Accessed February 28, 2014. <http://www.dot.gov/briefing-room/us-department-transportation-expands-airline-passenger-protections>.
- United States Government Accountability Office. *Airline Passenger Protections*. Washington, DC: September 2011. Accessed September 19, 2013. <http://www.gao.gov/new.items/d11733.pdf>.
- United States Government Accountability Office, *NextGen Air Transportation System: FAA Has Made Some Progress in Midterm Implementation, but Ongoing Challenges Limit Expected Benefits*. Washington, DC: April 2013. Accessed November 11, 2013. <http://www.gao.gov/assets/660/653626.pdf>.