

## Why GAO Did This Study

The Federal Aviation Administration (FAA), partnering with other federal agencies and the aviation industry, is implementing the Next Generation Air Transportation System (NextGen), a new satellite-based air traffic management system that will replace the current radar-based system and is expected to enhance the safety and capacity of the air transport system by 2025. Concurrently, FAA continues to maintain and upgrade existing air traffic control (ATC) systems that will also be needed for NextGen. This involves acquiring and implementing new software and hardware.

GAO was asked to determine (1) how, if at all, costs and schedules of FAA ATC acquisitions programs, including those related to NextGen, have changed since they were first submitted to Congress, (2) the reasons for any such changes, and (3) the extent that selected ATC programs adhere to cost and schedule best practices. To do its work, GAO reviewed 30 programs and conducted cost and schedule analysis on four programs that had an approved baseline and were NextGen related. GAO reviewed acquisition documents and interviewed FAA officials.

## What GAO Recommends

To better estimate the cost and completion dates for major acquisitions, FAA should, among other things, require cost and schedule risk analysis, independent cost estimates and integrated master schedules. FAA did not comment on whether or not it agreed with the recommendations.

# AIR TRAFFIC CONTROL MODERNIZATION

## Management Challenges Associated with Program Costs and Schedules Could Hinder NextGen Implementation

### What GAO Found

In a review of 30 major ATC acquisition programs, all of which will contribute to the transition to NextGen, GAO found that costs for 11 of the 30 programs have increased from their initial estimates by a total of \$4.2 billion and 15 programs experienced delays. The 11 acquisitions that experienced cost increases account for over 60 percent of FAA's total acquisition costs (\$11 billion of \$17.7 billion) for the 30 programs. The 15 acquisitions that experienced schedule delays, of which 10 also had cost increases, ranged from 2 months to more than 14 years and averaged 48 months.

Cost increases and schedule delays occurred due to several factors, many of which have been longstanding challenges for FAA. Specifically, these have involved (1) additional or unanticipated system requirements; (2) insufficient stakeholder involvement (such as controllers' input) throughout system development; (3) underestimating the complexity of software development; and (4) unanticipated events including funding shortfalls or work stoppages. These challenges, if they persist, will impede the implementation of NextGen, especially in light of the interdependencies among many acquisition programs, where cost increases or delays in one program can affect the costs and schedules of other programs.

For the four programs GAO selected to analyze in depth, FAA is not consistently following the characteristics of high-quality cost estimates and scheduling best practices that GAO previously identified. Regarding cost estimates, GAO found that although all four of the programs generally provided well documented and comprehensive estimates, which are two of the four characteristics, no program fully met the two other characteristics. Specifically, each program estimate was not credible because each lacked an independent cost estimate, which provides a check against FAA's estimate and three programs lacked risk or uncertainty analysis. The estimates also lacked accuracy because they were not updated regularly or based on comparable programs. Regarding scheduling practices, most programs did not substantially or fully meet the majority of the 9 best practices GAO previously identified including developing a fully integrated master schedule of all program activities and performing a schedule risk analysis. For example, without a schedule risk analysis, FAA is unable to predict, with any degree of confidence, if the estimated completion dates are realistic. FAA is implementing new processes and organizational changes to better manage acquisitions. However, by not consistently following the characteristics of high-quality cost estimate and scheduling best practices, FAA cannot provide reasonable assurance to Congress and other stakeholders that NextGen and other ATC programs will avoid additional cost increases or schedule delays.