

Testimony of
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Chair, Committee to Review the Federal Aviation
Administration Research Plan
on Certification of New Technologies into the National
Airspace System

Aeronautics and Space Engineering Board
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Mister Chairman, ranking member, members of the committee, thank you for the opportunity to speak to you today on issues concerning civil aeronautics research and the FAA reauthorization. I am here today in my capacity as one of the co-chairs of the committee of the National Research Council which recently reviewed a FAA research plan for certification of new technologies. That report was requested in the FAA Modernization and Reform Act of 2012 and was released on Monday, June 8, 2015.¹

In response to the 2012 Act, the FAA Office of NextGen prepared a 10-page certification research plan² for the Next Generation Air Transportation System (NextGen). The report was completed in February 2014 and approved by FAA management for release to the NRC in April 2014. In response to the request to review the research plan, the National Research Council created a committee that gathered data from the FAA, Congress, industry, and other sources to assist in its review. The committee received briefings from the author of the Research Plan and was able to have a dialogue with relevant FAA officials to understand the management guidance that went into generating it.

Mr. Chairman, before commenting on the findings of our report I want to make clear that our committee had a very limited charge. We were asked to review and comment on this one research plan. The FAA has many other plans for research and for other aspects of the implementation of NextGen, we were not asked to and did not review those other plans. In addition you

¹ National Research Council, *Transformation in the Air—A Review of the FAA's Certification Research Plan*, Prepublication Draft, June 2015.

² FAA, *Research Plan: Methods and Procedures to Improve Confidence in and Timeliness of Certification of New Technologies Into the National Airspace System: Final*, Office of NextGen, Washington, D.C., February, 2014.

may be aware that the National Research Council also recently released a report “A Review of the Next Generation Air Transportation System: Implications and Importance of System Architecture.” That report was authored by another NRC committee and while our committee was aware of the general direction of that report’s findings while we were writing our review, the reports are independent.

Mr. Chairman, the transition of technologies into the National Airspace System and the generation of the associated procedures, regulations, and certification processes is a major challenge for the FAA. One of the problems is that improvements in avionics and other systems are occurring at a far more rapid pace than the procedures, regulations, and certification processes. Another issue is that avionics systems are becoming relatively cheaper whereas the certification costs are not. When the results of research are handed over for certification, a whole new process begins where the resulting new equipment must be designed, built, and then certified. Different functions of the FAA are required to be engaged in those processes—from airworthiness, to operational specification approval, to training, to certifying new air traffic procedures—and provide the interface with the industries producing hardware, software and the operators that use the system.

Certification of a new technology is not as important as the approval of the operational capability of that technology and its ultimate implementation in the National Airspace System. The many stakeholders play a major role in the introduction of new technology—from the airlines and other users buying, installing, training, and using the new capabilities, to the operators

of the National Airspace System having sufficient training, procedures, regulations, and policies to take advantage of the technology.

The users and supporters of the National Airspace System are a very broad mix—from airlines to the military to general aviation, the manufacturers of the air and ground equipment, and multiple labor and professional organizations—all with different and sometimes conflicting interests and expectations. The operation of the U.S. National Airspace System affects the lives of people around the world in terms of travel, commerce, and national security. This in turn presents the FAA with a complex and dynamic set of challenges. All of these users and stakeholders have a significant impact on the scope and type of research that the FAA must conduct.

Mr. Chairman, our committee found that the February 2014 certification research plan does not demonstrate how integration of aircraft, ground systems, and procedures will occur in the National Airspace System. In particular, it omitted any substantive discussion of the air segment. Although the FAA does provide a rationale for this omission, in the committee's view we do not believe that it is realistic to address one without the other because the air and ground segments are so closely integrated and will be even more integrated in NextGen. Successfully demonstrating how integration will occur will create confidence in implementation and, we believe, attract stakeholder and operator investment.

As I mentioned previously, the scope of our study was confined to the relatively narrow scope of reviewing a research plan for certification of new technologies. Our resulting major recommendation is that the FAA should

produce a new certification research plan—one that focuses on a number of important goals which I will now outline but which are discussed in more detail in our report.

Mr Chairman, our committee believes that all stakeholders will benefit substantially from the explanation of the end-to-end processes necessary to certify, approve, and implement advanced NextGen capabilities beyond the mid-term (that is, 5-7 years). It is in the best interests of the FAA that it describe and fully explain the steps that the FAA and aviation stakeholders are taking to expedite the realization of the NextGen capabilities. We believe there is value to the FAA producing a comprehensive research plan that explains the agency's research goals and plans for integrating and certifying technology into the National Airspace System. Future FAA research plans, when properly executed, can play a valuable role in guiding the FAA and stakeholders and explaining progress in certifying new technologies into the National Airspace System.

We also recommend that in its certification research plan FAA pay particular attention to several key issues including software assurance, cybersecurity, and verification and validation. Although we recognize that the FAA is aware of these issues, our committee believes that they are of such importance that they deserve constant attention and prioritization.

Finally, we recommend that a new FAA research plan on certification should benchmark the best practices of other organizations regarding certification that can contribute to the timely implementation of NextGen technologies. In our view a new FAA plan should outline how the agency

can best coordinate its research with other relevant organizations— particularly NASA, which conducts significant research of relevance on air traffic systems. We believe that these other organizations can provide valuable lessons to the FAA.

Thank you for the opportunity to speak to you about this National Research Council report and I look forward to addressing your questions.