

**Statement of
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Senate Committee on Finance**

Introduction

Thank you for the opportunity to speak with you about the aviation trust fund re-authorization and the role of the trust fund, and the taxes that feed into it, in creating a fair, efficient, and modern air transportation system. As a Professor of Transportation Engineering at the University of California, Berkeley, Chair of the Transportation Research Board Committee of Aviation and Airspace Capacity and Delay, co-Director for the National Center of Excellence in Aviation Operations Research, and an active researcher in the field for some 20 years, I have had the opportunity to analyze and study many different facets of the US Aviation System. Based on my experience and research, I would like to share my own perspective on the invaluable opportunity Congress has to change the trust fund so that it promotes the kind of air transport system that the United States needs and deserves.

In my view such a system must (1) evolve in response to the ever-changing needs and growing demands of its direct users and their customers; (2) identify those needs through a process that stresses accountability to users and allows user representatives to simultaneously and forcefully advise on the enhancements to be undertaken and how they will be paid for; and (3) when necessary allocate services in a manner that gives priority to those who have paid for the existing system. In the next few minutes, I will elaborate upon these points and their implications for how the trust fund should be financed and managed.

1. Evolving Usage

With its strong domestic market and long-standing technological leadership, the US has always led the world in finding new ways to both supply and use civil air transportation. This week's All-Star Game took place in San Francisco, to which the Giants could move in the late 1950s because improved air transport had made the west coast readily accessible to the rest of the nation. When I was a graduate student, the US was innovating economic deregulation of commercial air transportation, a policy that has now been adopted in most of the economically developed and developing world. Incumbent airlines adapted to deregulation by creating hub-and-spoke networks that exploited the economies of consolidating traffic between many origin-and-destination markets onto a relatively small number of flight segments. Deregulation also engendered a whole new class of air carrier in the US—the so-called low-cost carrier or LCC—which are now sprouting up around the globe.

While deregulation made airline travel affordable to the masses, it made commercial air travel less palatable to high-end business users. This led to strong growth in the market for business jets, deliveries of which were more than three times greater in 2006 than in the early 1990s. These jets allow those with means to fly non-stop between thousands of US airports—as compared to the 500 or so that receive some form of scheduled airline service—and to do so on their own schedule and without the hassles and indignities of TSA screening. A wide range of methods for providing on-demand air transportation, from in-house airlines, to fractional ownership, to web-enabled chartering, have allowed a diverse set of customers to participate in this market, while growing income inequality has increased the number of Americans able to pay for this luxury.

Innovation in on-demand air transport continues. A new generation of 2-6 seat, very light jets (VLJs) is entering the market. These single-pilot aircraft will make it economic to provide short-haul on-demand air transport to smaller travel parties. While it is expected that many VLJs will support service methods already in place for traditional business jets, they will also enable fundamentally new service concepts. For example, Day Jet is pioneering the use of VLJs as shared taxis providing next-day service to individual customers. Customer service requests will be combined and assigned to aircraft using a sophisticated real-time routing and scheduling algorithm.

As yet another example with which I am personally familiar, a company called MVP air is poised to enter the intercollegiate athletic travel market. Using 30-seat jet aircraft, MVP plans to transport college teams on routes which are not well served by commercial air carriers. Given the ex-urban locations of many large Universities, such routes are not hard to find. Consider, for example, a Big Sky game in which Montana visits Northern Arizona. A charter would take just 3-4 hours campus-to-campus, while, according to Travelocity, the best commercial airline option would require, each way, 2 stops, 10 hours, 200 miles of airport access travel, and a round-trip fare of over \$600. Driving this 1000-mile trip would take only 5 hours more!

The economics of on-demand air travel rests primarily on individuals' and companies' willingness to pay more for air transport per se in exchange for time savings, reduced nights away from home, meal expenses, and ground access costs. Some of these tradeoffs are easily quantifiable but others are not. For the Big Sky, we calculated that a dedicated athletic charter would reduce travel cost if collegiate athletes' time was valued at more than \$3.70 per hour, about half the new minimum wage. While the athletes would no doubt agree that their time is worth much more than this, we will see what the colleges think. This typifies the kind of decision that will determine the ultimate market potential for on-demand air transport.

2. Accommodating Growth and Change in Demand

While we acclaim the private-sector innovators that develop the aircraft and service concepts described above, the efforts made by infrastructure and air traffic service

providers to accommodate these changes are often taken for granted. Airports have adapted to hub-and-spoke operations by providing airfields that can handle multiple streams of aircraft even in adverse weather, and terminal designs that make passenger connections quick and easy. As on-demand service providers have joined traditional airlines on higher altitude jet routes, minimum vertical separations have been reduced, sectors redesigned, and controller decision-support tools introduced to make more room. Innovative traffic flow management mechanisms developed in partnership by FAA and users allow the system to respond to adverse weather in a completely safe and reasonably efficient way, while making full use of available capacity when the weather is good.

Faced with the possible proliferation of on-demand, small jet services, however, many in the aviation community propose a transformation, rather than a mere adaptation, of the current system. The transformed system, whose current name is NextGen, is envisioned to increase en route and terminal capacity by as much as three-fold over the next 20 years. Recognizing uncertainty about just how far the on-demand phenomenon will go, the NextGen proponents seek a system in which this is determined by the market, without regard to infrastructure limitations. The broad outlines of how such a transformed system would operate are becoming clear, and the details are the subject of an active, multi-agency research and development program overseen by the Joint Program and Development Office (JPDO).

The prospects of success for JPDO and NextGen depend on the criteria for success that one adopts. If the criterion is that established roadmaps are followed on time and on budget leading to the desired end-state system, the odds against success are extremely high. Experiences with ambitious, large-scale, aviation infrastructure modernization programs in the US and Europe, as well with infrastructure megaprojects in many other sectors, make this conclusion inescapable. Project advocates face strong, often irresistible, pressures to overestimate the benefits, underestimate the costs, and downplay the risks of such projects as they sell them to decision makers. A data base of such projects assembled by Danish planner Bent Flyvberg yields overwhelming evidence of the universality of this phenomenon.

A special feature of NextGen that increases its risk relative to most megaprojects is its dependence on aircraft equipage. Planned NextGen improvements in both the mid-term and far-term will require, as a condition for access in some cases and benefit realization in others, aircraft to have digital communications, augmented satellite navigation, synthetic vision, satellite-based surveillance capabilities, and cockpit traffic displays. An analysis by MITRE suggests that the percentage of aircraft with the required traffic displays could range from 15-90% 10 years from now and 30-90% in 2025, the targeted year for full NextGen implementation. On the one hand, equipage requirements force a lengthy process of standard setting and rulemaking necessary to assure that only properly equipped aircraft can access restricted airspace or perform special procedures; on the other they further cloud benefits assessments, since benefits often grow more than proportionally to the number of capable aircraft.

If, however, we moderate our expectations and think of NextGen as a means of developing and delivering targeted improvements in specific regions that users desire and are willing to pay for, then much good can come from it. The key to capturing that value is accountability, and the only way to have true accountability is for users—all users—pay for NextGen deployments and in a manner that links what they pay to what they get, while continually providing input on both sides of this equation. In this regard, I strongly support the proposal for an advisory board composed of representatives from full spectrum of users that, quoting FAA, “would make recommendations on fee-setting, major capital projects and the FAA’s strategic plan” and whose recommendations could be overruled only through with approval of the Secretary of Transportation (or perhaps even Congress). I can think of nothing that would be more effective in unlocking and unveiling the potential benefits of system modernization in an effective, cost efficient, manner than to have a single entity, whose members answer directly to those writing the checks for NextGen, simultaneously pass judgment on how big those checks will be and what services will be provided in return.

The approach of targeted improvements overseen by an advisory board can also mitigate the equipage risk. Given its structure, the advisory board will surely take into consideration equipage requirements and costs in assessing any given improvement proposal. Given its wide fee-setting authority, it may even choose to structure fees in a manner that gives credit to aircraft that have the necessary avionics.

For such an arrangement to be effective, it must represent all types of users, and representatives must accept as a guiding principle the link between what they contribute and the services they receive. This does not entail any specific tax structure but does suggest that it be primarily linked to the flight activity rather than the size and nature of the payload that the flights carry. Nor does it, in my view, necessitate a major reallocation of costs *for the current system* from one class of user to another. While it would be much fairer and somewhat more efficient to shift more of the current system cost burden to non-commercial high performance aircraft operators, the key issue is not how the baseline system is funded but how its transformation is. If capacities of certain parts of the system are to be tripled so that more affluent individuals can fly them in small private planes then the operators of those aircraft must agree to make a commensurate contribution to the tab. If they are unwilling, then priority of access must be given to the airline customers who paid for the existing capacity, a point I will further elaborate below.

For this arrangement to be effective, it must clearly distinguish between funds for maintaining and operating today’s system and those for enhancing it. Using FAA’s terminology the board’s greatest authority will be over the F&E account, to which the fees it authorizes will be paid and from which the enhancements it approves will be financed. Inevitably, however, the realization of benefits from these investments will depend on how effectively FAA manages its ongoing costs of operation, and it will thus be incumbent on the board to monitor these as well. This monitoring function could itself be beneficial. In Europe, the establishment of a Eurocontrol Performance Review Commission, external to various national air traffic service providers and with no

managerial authority, appears to have engendered a marked downturn in unit costs in just a few years. Moreover, such monitoring will regularly document inequities in the cost burden born by different user classes.

3. Allocating Scarce Capacity

This brings me to my final point, which is that when users are unwilling to pay for expanding capacity in congested parts of the system, it is highly desirable to allocate scarce capacity in some systematic manner that favors those who paid for it. Fortunately, those who paid by far the most happen to be customers of large jet commercial airlines who can also use the capacity most productively. This is true both because of the trust fund and the fact that airport landing fees are proportional to aircraft weight. One can favor such users in a variety of ways, from grandfather rights, to administrative rules, to congestion pricing on a per flight basis, to auctions of landing and take-off slots. Economists who claim privileged expertise on how to allocate resources view some of these alternatives with horror and others with glee, but in this context their similarities are more important than their differences. Each will tend to favor large jet operators and the silent, trust-fund contributor majority of air travelers who patronize them over a far smaller group of the elite who have heretofore paid very little. I reiterate that this favoritism is only justified when small jet operators are unwilling to pay their fair share of what is necessary to enhance the system to accommodate everyone.

Summary

In summary, the growth of convenient, and relatively expensive, on-demand air travel in small jets represents the flip side of airline deregulation that also brought us historically low fares and a more austere commercial airline product. The on-demand market may continue to grow and capture market share from commercial airlines, but the infrastructure to support this growth should be provided when and where users, including small jet operators, are willing to contribute to its cost in a substantial way. An organization akin to FAA's recommended Advisory Board is ideally suited to implement this principle. When this Board determines additional capacity ought not be provided, priority access should be given to those classes of users who have historically contributed the most to the existing system. Congress should act to create and empower the advisory board, restructure the trust fund in a manner that clearly distinguishes between funds for maintaining the existing system and transforming it into NextGen, and, finally, give FAA the necessary authority to allocate capacity when required.

This concludes my testimony. Thanks again for the opportunity to give it. I look forward to your questions.