The Disruptive Potential of Autonomous Vehicles on Short-Haul Domestic Flights

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Autonomous vehicles (AVs), particularly robotaxis, have the potential to disrupt short-haul domestic flights under 250 miles, which could significantly impact regional airlines and smaller airports. Current estimates for robotaxi operating costs range from $0.20 to $1 per mile, with some projections as low as $0.40 per mile once scaled. These vehicles could offer door-to-door service, eliminating many hassles of air travel, such as airport parking, security screenings (e.g., TSA checks), wait times, boarding/deboarding delays, and ground transportation at the destination. For trips where AV travel time and cost approach parity with flying, factoring in the full door-to-door journey, travelers may prefer the convenience of AVs, especially if they can work, relax, or sleep en route. This hypothesis is supported by emerging evidence from AV technology advancements, though full autonomy (without human supervision) is not yet widely deployed or regulated for public use. While barriers such as traffic congestion, weather variability, regulatory approvals, and infrastructure needs may delay widespread adoption of AVs, Tesla has made significant progress in addressing several of these challenges. For infrastructure, Tesla's Supercharger network expanded rapidly in 2025, adding over 3,500 connectors in Q3 alone and opening to more non-Tesla EVs, providing robust charging support for long-distance AV travel. On weather variability, Tesla's Full Self-Driving (FSD) software has shown improvements, with version 14.2.2.1 demonstrating strong performance in rainy conditions, reportedly surpassing human drivers in stability and control. A notable case occurred during the December 2025 San Francisco power outage, where Waymo's robotaxis stalled at dark intersections and suspended service citywide due to reliance on predefined signals, while Tesla's FSD (in supervised mode) navigated some disabled traffic lights more effectively in tests, though it exhibited inconsistencies like proceeding through intersections unsafely in about 80% of cases and required human intervention for robotaxis. Regulatory approvals are advancing state-by-state, with permissive environments in Arizona (Phoenix, where Waymo operates fully driverless), Texas (Austin, requiring permits but enabling Tesla's planned robotaxi rollout), and California (San Francisco, updating rules with new AV citation authority starting in 2026), though federal standards are still evolving and full unsupervised autonomy remains limited. Traffic congestion persists as a broader challenge for all AVs. If AVs achieve full reliability and scale despite these hurdles, they could shift significant travel from short-haul flights, with studies estimating potential mode switches affecting up to 77 million aviation passengers annually or increasing overall vehicle miles traveled by 13-31%, potentially reducing short-haul flight demand by 10% or more and straining regional carriers and airports.

A Real-World Demonstration: David Moss's Cross-Country AV Journey

David Moss, a Tesla owner with a Model 3 equipped with the latest AI4 hardware and Full Self-Driving (FSD) Supervised software (version 14.2), has logged over 11,000 miles with zero reported interventions. This includes a coast-to-coast drive from the Tesla Diner in Los Angeles, California, to Myrtle Beach, South Carolina, a distance of approximately 2,700 miles, completed in about 2 days and 20 hours without any disengagements, even for parking or stops at Superchargers. Moss's vehicle operated under supervised autonomy, meaning he was present and attentive, but the system handled all driving tasks autonomously.

This achievement highlights the growing reliability of AV technology for long-distance travel. While FSD Supervised is not fully autonomous (it still requires a human driver ready to intervene), Moss's zero-

intervention streak demonstrates progress toward hands-off operation. Applied to air travel, it suggests that for journeys where AV time and cost are comparable to flying, including all pre- and post-flight logistics, passengers might opt for AVs to avoid airport inefficiencies. However, long-haul AV trips like Moss's currently exceed typical flight times for similar distances (e.g., a cross-country flight takes 5-6 hours versus 2+ days driving), so disruption is more likely for shorter routes where drive times are competitive.

Case Study: Rochester International Airport (ROC)

Using Frederick Douglass Greater Rochester International Airport (ROC) as an example, a small-hub airport with approximately 2.6 million total passengers (enplanements and deplanements combined) in 2024, short-haul trips of 250 miles or less could be vulnerable. ROC serves as a regional gateway in western New York, with non-stop flights to about 28 destinations, primarily hubs like Chicago (ORD/MDW), Detroit (DTW), New York (JFK/EWR), Philadelphia (PHL), and Washington, D.C. (IAD/DCA). For instance, a trip from Rochester, NY, to Cleveland, OH (approximately 265 miles driving, or 4-4.5 hours), has no direct flights from ROC to Cleveland Hopkins International (CLE). Passengers must connect through hubs like Detroit, Chicago, or New York, turning a short trip into a full-day ordeal with multiple legs, layovers, and added costs. In contrast, a robotaxi could provide a seamless 4-5 hour door-to-door ride at an estimated $106-132 (at $0.40-0.50 per mile), potentially cheaper and less stressful than flying (factoring in tickets, fees, and time lost). Other destinations from ROC potentially impacted (based on air distances under or near 250 miles) include:

- New York City area (JFK/EWR/LGA): ~250-264 air miles, served by Delta, American, and United.
- Philadelphia (PHL): ~257 air miles, served by American.
- Baltimore (BWI): ~278 air miles (slightly over), served by Southwest.
- Washington, D.C. (DCA/IAD): ~289-300 air miles (borderline), served by American and United.

These routes, often operated by regional affiliates of major airlines (e.g., Delta Connection, American Eagle), could see reduced demand if AVs offer competitive alternatives. Airlines most affected might include regional carriers like Endeavor Air (Delta) or PSA Airlines (American), which rely on short-haul feeder flights. A cascading effect could occur: Fewer short-haul passengers mean reduced connectivity to hubs, potentially leading to route cuts, higher fares on remaining flights, and overall airport traffic decline. This could exacerbate "airport leakage," where travelers drive or use AVs to larger hubs like Buffalo (BUF, 70 miles away) or Syracuse (SYR, 80 miles) for better options. However, BUF and SYR will face the same challenges as ROC thereby limiting availability to destinations within BUF and SYR 250 mile vulnerability cone. Downstream implications include job losses in aviation support roles, reduced economic activity in airport-adjacent areas, and pressure on smaller airports to consolidate or repurpose facilities. However, not all short-haul flights will vanish; AVs may struggle with group travel, inclement weather, or high-density urban routes, preserving some air demand.

Conclusion: Preparing Airports for AV Disruption and Mitigating Financial Impacts

In principle, AVs could indeed challenge short-haul flights by offering superior convenience for sub-250-mile trips; however, their near-term inevitability may be overstated. Full autonomy faces hurdles like

federal regulations (e.g., NHTSA approvals), safety validations, and infrastructure scaling, potentially delaying mass adoption until the 2030s. However, the U.S. government's recent push to dominate the AI, Advanced Air Mobility (AAM), and broader technology space may provide the impetus for scaling at an accelerated pace. For instance, the White House's *"America's AI Action Plan"* (July 2025) emphasizes accelerating AI innovation and removing regulatory barriers, while the Department of Transportation's *"Advanced Air Mobility National Strategy"* (December 2025) outlines a bold 10-year vision for integrating autonomy in aviation, potentially spilling over to ground-based AVs through shared tech advancements. Additionally, NHTSA's 2025 initiatives, including the proposed AV Framework and voluntary programs like AV STEP, aim to modernize safety standards and expedite deployments, countering some delays.

Demonstrations like Moss's are promising but represent edge cases under supervision.

To prepare, airports like ROC should proactively adapt. The following table provides a structured approach to mitigate revenue losses from parking (as fewer drive personal vehicles), concessions (due to lower passenger throughput), airline services (fewer flights), and ground transport fees (e.g., rentals, taxis):

Revenue Stream	**Potential Impact**	**Mitigation Strategies**
Parking	High decline, as robotaxis enable drop-offs without on-site storage.	**1.** Convert lots to AV charging hubs or short-term pickup zones, charging fees for access. **2.** Partner with AV fleets (e.g., Tesla, Waymo) for dedicated integration, earning commissions per ride. **3.** Repurpose space for non-aviation uses like logistics centers or e-commerce fulfillment.
Concessions (e.g., retail, dining)	Reduced foot traffic from fewer short-haul passengers.	**1.** Focus on longer-haul travelers by enhancing premium lounges and experiential retail. **2.** Open facilities to non-passengers (e.g., public dining/events) to boost local revenue. **3.** Integrate AV arrival points with quick-grab concessions for hybrid travelers.
Airline Services	Loss of short-haul routes, reducing gate fees and enplanements.	**1.** Shift emphasis to medium/long-haul and cargo operations, lobbying for incentives to attract carriers. **2.** Invest in regional air mobility (e.g., eVTOL aircraft) for ultra-short hops that AVs can't match. **3.** Collaborate with airlines on bundled AV-air packages for seamless multi-modal travel.
Rental Cars/Taxis	Sharp drop, as robotaxis replace traditional ground transport.	**1.** Negotiate revenue-sharing with AV operators for on-airport pickups/drop-offs. **2.** Develop multi-modal hubs integrating AVs, buses, and rentals to capture fees from all modes. **3.** Diversify into AV maintenance or fleet management services.

Overall, airports can pivot by viewing AVs as complements rather than threats, e.g., using them to feed longer flights from farther afield, reducing leakage to larger hubs. Funding these adaptations could come from federal grants (e.g., FAA programs) or public-private partnerships. By acting early, airports can minimize financial hits and position themselves as integrated transport nodes in an AV-dominated future.