

Reimagining Systemic Instabilities in Aircraft Turnaround

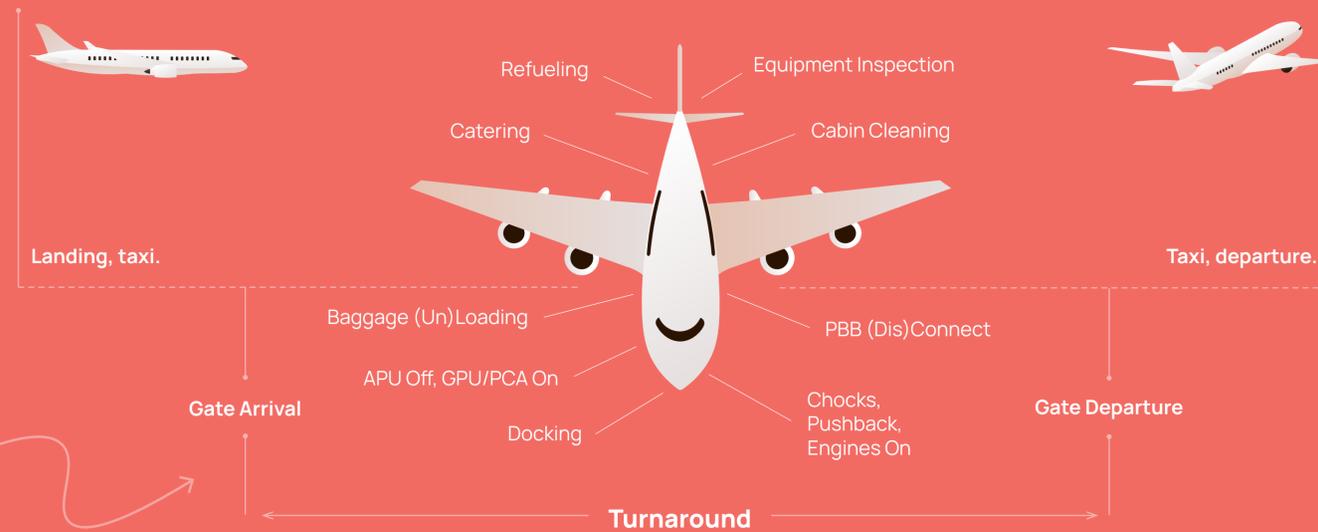
A Strategic Design Framework for OEM Relevance in Future Turnaround Systems

01 Context

Aircraft turnaround delays cost the aviation industry over \$33 billion annually (FAA, 2019) and contribute to an estimated 172 million kg of avoidable CO₂ emissions each year through inefficient APU use (Assaia, 2024). With up to 50% of all flight delays originating during turnaround operations (Assaia, 2023), even a one-minute improvement per flight could generate significant economic and environmental impact.

02 Research Question

What are the critical factors causing systemic instabilities in aircraft turnarounds, and how can aircraft manufacturers mitigate these through a new systemic design approach?



03 Key Systemic Instabilities

Expert interviews and literature review surfaced four recurring frictions embedded in aircraft turnaround systems:

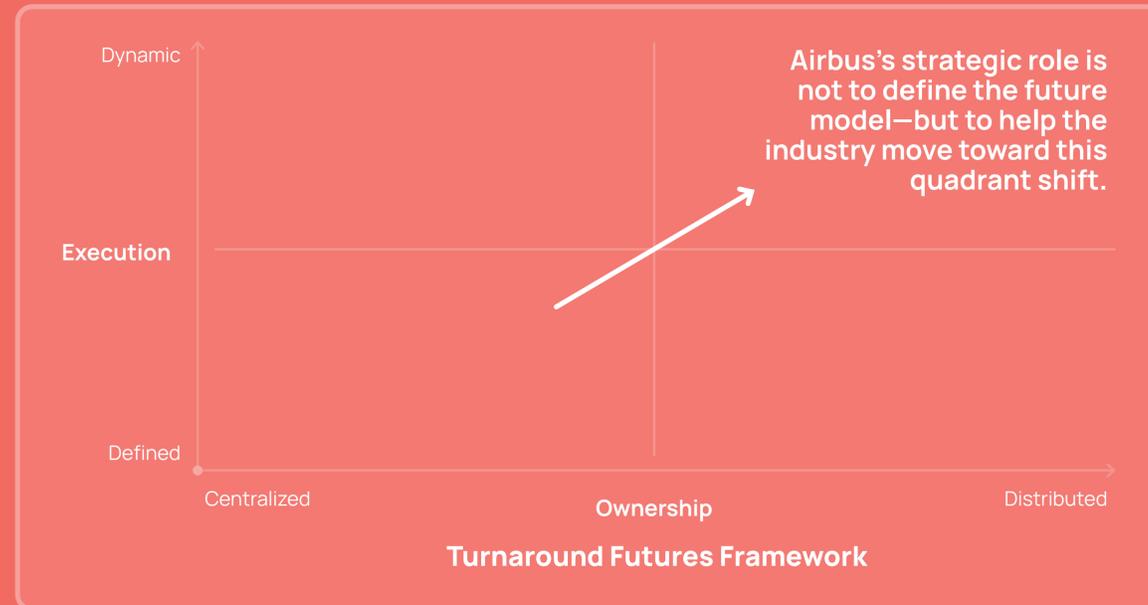
- Sequencing Bottlenecks from misaligned task timing
- Communication Breakdowns across disconnected actors and outdated systems
- Interface Mismatches between aircraft and ground support equipment tooling
- Accountability Voids where no actor fully owns performance outcomes



These frictions limit the effectiveness of even the most advanced operational tools—and expose deeper structural misalignments across the ecosystem.

07 Recommendation

The final recommendations outline how Airbus—as an aircraft OEM—can drive systemic change by aligning turnaround timelines through shared coordination logic and enabling readiness through open, modular standards.

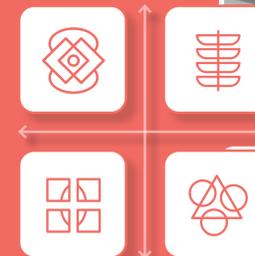


06 The Turnaround Futures Framework

As stakeholders responded to the archetypes, recurring themes of ownership and execution responsibility emerged. These became the axes of the Turnaround Futures Framework.

- Execution**
Who actually drives and adapts the turnaround actions on the ground?
- Ownership**
Who holds accountability when performance fails?

Plotting the archetypes onto this matrix revealed that most current systems sit in the bottom-left (centralized, defined). Strategic opportunities lie in enabling a shift towards a more dynamic and distributed turnaround model.



04 Speculative Design

3 speculative concepts were created to provoke discussion and challenge assumptions; reimagining a frictionless turnaround future.

05 Archetype Development

These speculative concepts challenged the status quo and through co-design sessions with industry stakeholders, they were critiqued, validated, and reframed into four systemic archetypes, each offering a different path toward a more adaptive and resilient turnaround model.

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June 27, 2025
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