Aerobridge Providing Multiple Access To Aircraft Vehicle  
Dynamite Obinna, Senior Aeronautics with Minor in Engineering Science  
Embry-Riddle Aeronautical University, Daytona Beach, Florida

The Problem
- Wish growing technology in making air travel faster, aircraft manufacturers have continually increased the carrying capacity of aircraft.
- Using a single jetway, it takes a remarkable amount of time to board a large number of passengers. This causes departure delays and forcing passengers to arrive at the gate at a much earlier time than necessary.
- Every year, airlines lose millions of dollars in delay-times.
- Prolonged delay-time means airlines fly fewer routes for a particular plane. Consequently, this leads to non-optimum utilization of airplanes, which in turn, reflects in extreme negative impact on the amount of revenue that airlines can generate.

Current Solutions and their Pitfalls
Airlines have explored various ways to reduce turn-times. One attempt is through selective loading by zones (Figure 2A). A further attempt to reduce the problem associated with the present practice is the use of multiple door for boarding and deplaning passengers (Figure 2B).

Why Bother?
TIME SAVED = MONEY SAVED!  
With a minimum of $30/minute in terminal parking fees, a reduction in total boarding time can result in significant benefits for the airline industry. By minimizing boarding time, airlines can improve their on-time performance and increase their aircraft/crew utilization thereby, increasing profitability.

The Solution
The Aerobridge Providing Multiple Access To Aircraft Vehicle (patent pending) is designed and engineered to mate with aircraft and extend its structures laterally to go over the aircraft wing, thereby, providing a common passageway over which passengers and cargo can enter and exit the aircraft via multiple access doors simultaneously. This invention reflects a deviation from current single telescoping units used to service mid-large sized airplanes and addresses the aforementioned problems associated with current practices (Figure 2B). Using this novel jetway, airlines will gain high efficiency in the aircraft turn-time process.

Simulation Results
- Base-turn-time
  - Accessing 2 doors: 7 mins saved
  - Accessing 2 doors + alternate boarding method: 17 mins
- Accessing 3 doors: 12.5 mins saved
  - Accessing 3 doors + alternate boarding method: 23 mins
- Accessing 4 doors: 17.7 mins saved
  - Accessing 4 doors + alternate boarding method: 29 mins
- Accessing 5 doors: 22.6 mins saved
  - Accessing 5 doors + alternate boarding method: 33 mins

Structural Test
The Aerobridge Providing Multiple Access To Aircraft Vehicle is designed to meet the structural and load standards set by the Federal Aviation Administration. The structural design was tested based on a combination that imposes the most adverse loading. Besides the dead loads and strain caused by movement, the structural design will support:
- Floor live load of 400 lb/ft²
- Roof live load of 250 lb/ft²
- Wind live load of 2.5 lb/ft²

Economic and Social Benefits
- Reduced delay-time for airlines
- Compatibility with conventional systems
- Cheaper system for providing multiple access to airplanes
- Better boarding experience system for the elderly and handicapped
- Smooth and enjoyable boarding process on regional and international flights

References

For further inquiries or updates about this project please contact: Dynamite Obinna  
Phone: 267.991.5998  
Linkedin: dynamite-obinna-44404780  
Website: www.dynamiteobinna.net  
Email: info@dynamiteobinna.net

Figure 2A: Selective Boarding Methods  
Figure 2B: Multiple Jetways used to service aircraft.  
Figure 3: Delay-time significantly decreases as the bridge is used to service more doors for passenger ingress and egress.  
Figure 4a: Stress Analysis using Steel as the frame material  
Figure 4b: Stress Analysis using Aluminium as the frame material.