

# AEROTRAIN - DULLES AIRPORT TRAIN SYSTEM

When Washington Dulles International Airport’s automated airport train system – AeroTrain – goes into service, airline passengers will have a convenient and comfortable train system to transport them between the Main Terminal and Midfield Concourses. It will handle more riders and move more efficiently than the current Mobile Lounges.

The Metropolitan Washington Airports Authority contracted with Sumitomo Corporation of America who, working with Mitsubishi Heavy Industries, designed, engineered, constructed, and delivered the rubber tire trains to Dulles. Once underway, they will also operate and maintain the system for five years.



The train system coming to Dulles is similar to other Mitsubishi systems currently operating in Hong Kong, Singapore, Tokyo, Yokohama, Hiroshima, Kobe, and other locations.

### Phase One

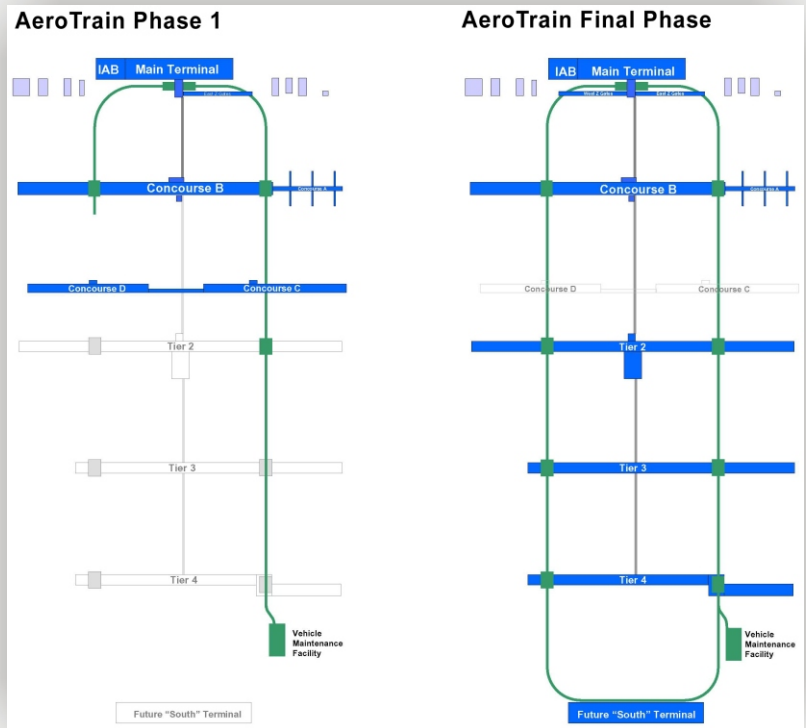
The AeroTrain system will replace most of the current Mobile Lounges that transport passengers between the Terminal and Midfield Concourses.

The first phase of the project includes a train station at the Main Terminal and tunnels that will connect the Terminal to the east and west ends of Concourse B. This phase also includes construction of a train station at the site of a future permanent Midfield Concourse that will be built when future demand requires. In the interim, this train station will be connected to the east end of the existing Concourse C/D.

The stations in the Concourses are located at convenient points to minimize walking distances to airline gates. The Main Terminal Train Station will be reached through two new spacious, subsurface security screening areas. Once beyond security, passengers may continue to the Z-Gates located at the Terminal, use the passenger walkway to Concourses A and B, or board AeroTrain to the Midfield Concourses.

### The Final Layout

The Master Plan for Washington Dulles International Airport envisions a future that consists of the existing Main Terminal (located at the north end of the airport) and a new “South” Terminal, with four permanent midfield concourses in between. The AeroTrain system will develop concurrently with each new facility until it finally joins into one continuous “loop.”



# TRAIN STATIONS

## Main Terminal Train Station

Construction of the new AeroTrain system at Washington Dulles International Airport began with the Main Terminal Station. The Terminal Station is approximately 60 feet below ground, directly adjacent to the Main Terminal on the airfield side of the Terminal, and spans its entire length (approximately 1,600 feet) from west to east.

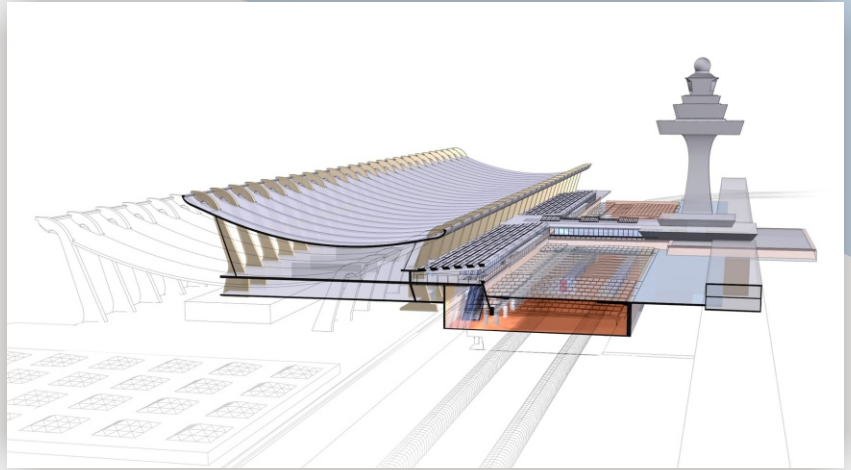
When completed, the Terminal Station will have four distinct levels: Departures (49,600 square feet), Arrivals (49,600 square feet), Security Mezzanine (121,700 square feet), and the Train Platform (54,500 square feet). Twenty 20 elevators and 32 escalators will move passengers to each level.

The Security Mezzanine will provide critical floor space for a new, expanded passenger security screening function that will provide for more efficient passenger screening and alleviate congestion on the Main Terminal Ticketing Level. Passengers who do not need to check luggage will be able to go directly to the Security Mezzanine from the parking facilities.

The Train Platform was built in a side-center-side arrangement. This arrangement allows departing passengers to enter the train from the center platform after arriving passengers, bound for baggage claim, exit the train onto the side platforms and proceed up to the ground floor of the Terminal.

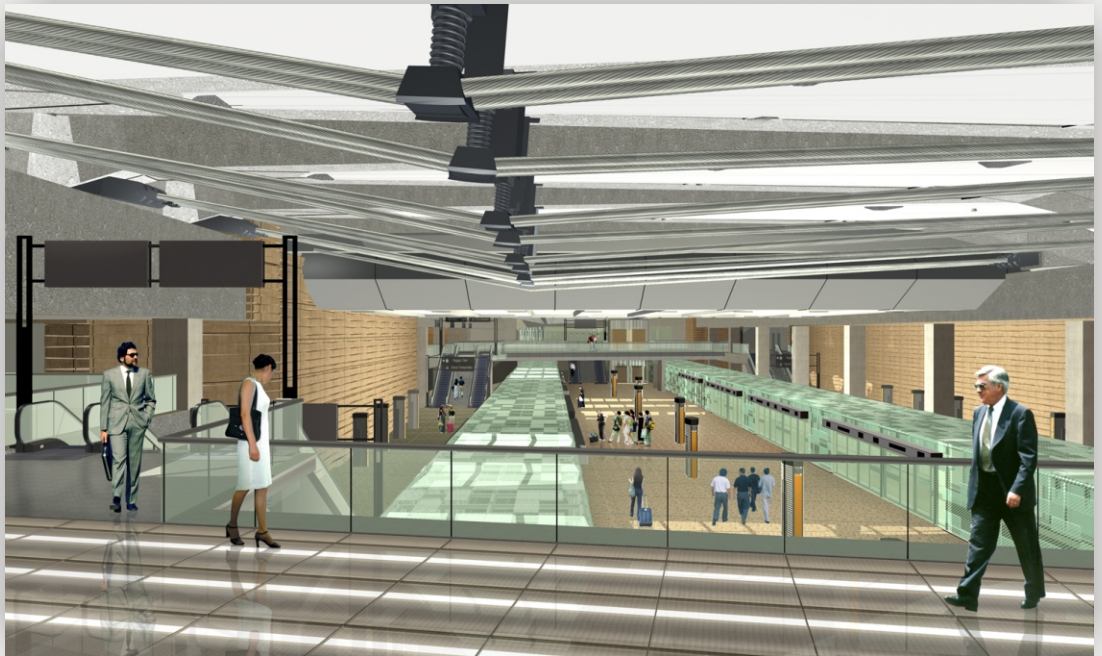
In order to bring light into the Terminal Station, an extensive system of skylights at roof level will maximize the natural light filtering down to the station platforms.

To add additional visual interest and directional clues to passengers, two of the elevators in the Terminal Station have been designed as sculptural elements. They serve as glass-enclosed vertical tubes with their appearance mirrored by two similar horizontal forms – the dual glass-enclosed train tubes at the platform level. Along with natural and artificial light, the extensive use of glass forms and stainless steel throughout the Terminal Station will brighten the space.



*Underground Train Station located adjacent to the Main Terminal*

The primary challenge facing the Metropolitan Washington Airports Authority while the AeroTrain system is under construction, is maintaining the uninterrupted flow of passengers (and Mobile Lounges) between the Terminal and airline gates in the Midfield Concourses. In order to achieve this goal, work is being carefully phased.



*Main Terminal AeroTrain Platform*

# TRAIN STATIONS



*Concourse B Train Station*

integrated into the expansion of Concourse B, the designers were able to create a facility that allows natural light to filter down into the Station.

The trains will move into the Stations within glass enclosures equipped with sliding doors that close automatically.

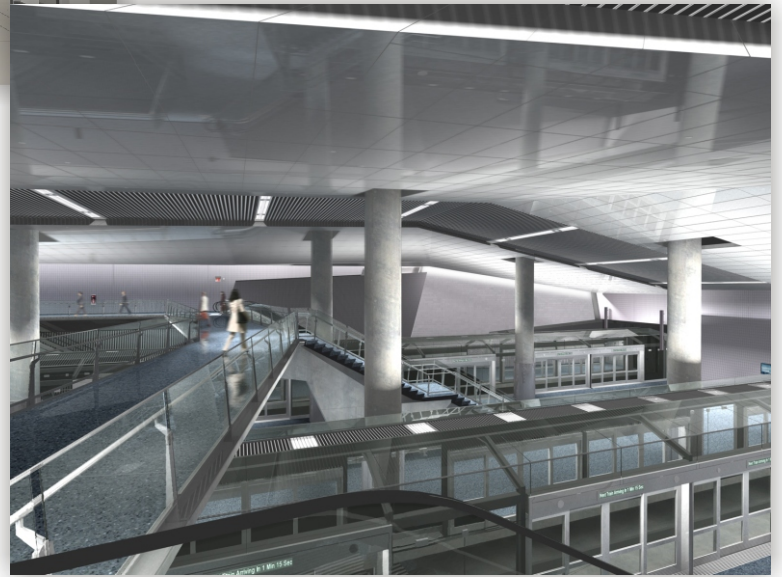
## Concourse Train Stations

The Concourse East and West Train Stations will serve the A and B Gates. The East Station is being constructed under the existing portion of Concourse B. Initially, due to site constraints, the Concourse B East Station will operate in a center platform configuration. Passengers will arrive at and leave the Station from a single platform. It will eventually be expanded into a side/center/side configuration.

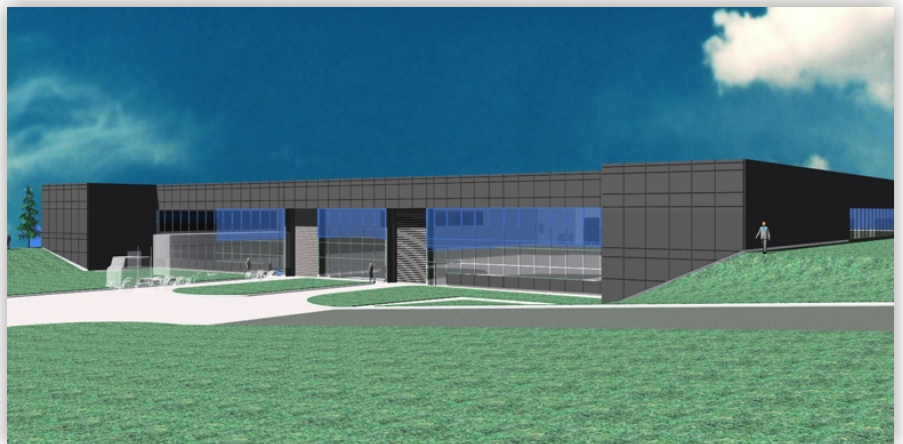
Concourse B's West Station is being constructed concurrent with the addition of 15 new aircraft gates. Passengers arriving at the Concourse B West Station will exit onto side platforms, while other passengers are departing the Station via the center platform.

The Concourse C East Station is being built under the location for a future permanent midfield concourse. It, too, will have a side/center/side configuration. In the near term, the AeroTrain Station will serve existing Concourse C passengers via a temporary pedestrian connector tunnel. In the long term, this Station will serve the eastern half of a future 44-gate, domestic and international Midfield Concourse.

The interior finishes for the Stations include metallic tile walls, inclined stainless steel panel ceilings, with wood and stainless steel accents. Both direct and indirect lighting will illuminate the facilities. Because the design for the Concourse B West Station has been fully



*Tier 2/Concourse C Train Station*



*A Vehicle Maintenance Facility has been constructed at the end of the east tunnel section to provide service for the trains and systems.*

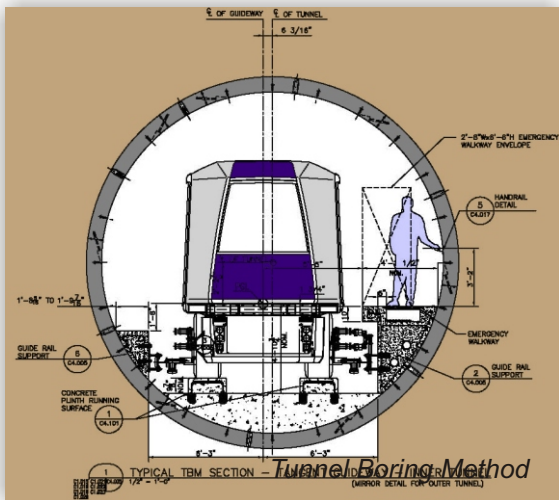
## TUNNELS

The total AeroTrain system tunnel length is approximately 19,958 track feet (3.78 miles). Three tunneling methods were used to excavate these tunnels.

The first method, called "cut and cover," was used to excavate approximately 7,700 track feet with a process that involves excavating a large trench down from the surface. This method was used close to existing facilities and where above ground access was available without disrupting airport activity.

The New Austrian Tunneling Method (NATM), a more traditional system of mining, was used in areas where the tunnels curve (3,650 track feet). NATM uses a combination of means to grind the rock face in layers. Shotcrete is immediately applied to the exposed tunnel walls to provide support.

Finally, the Tunnel Boring Method (TBM) was used to bore approximately 4,300 track feet, for the straight tunnel runs. The 23' diameter machine, known as a mole, bored through solid rock, approximately 55' below grade. Precast concrete wall lining segments were mechanically put into place by the mole as it continued to move forward.



The AeroTrain system is part of the D2 Dulles Development Program. Since 2001, the Metropolitan Washington Airports Authority has invested more than \$3 billion in improvements at Dulles Airport. Several other major projects are also a part of the D2 program including: two new Daily Parking Garages, renovation of the original portion of the Main Terminal, a passenger walkway connecting the Main Terminal with Concourses A/B, expansion of Concourse B, construction of a new Airport Traffic Control Tower, the construction of a new north/south runway, and the expansion of the International Arrivals Building.

## AEROTRAIN FACTS

### General Information:

- Number of Cars: 29
- Waiting Time: 1.9 minutes
- Maximum Speed: 42 mph
- Distance Between Stations: 2,150 feet
- Travel Time Between Stations: 72 seconds

### Dimensions:

Phase 1

Total Track Feet: 19,958 (3.78 miles)

Main Terminal Station: 440 feet long x 120 feet wide x 39 feet high (public area)

Concourse Stations: 180 feet long x 120 feet wide x 30 feet high (typical public area)

Tunnels: 16 feet x 18 feet

### Contractors:

#### Train and Systems:

Design/Build: Sumitomo Corporation of America

#### Main Terminal Train Station:

Design: Skidmore, Owings and Merrill

Construction: Turner Construction Company

#### Concourse A-B Train Stations:

Design: Hellmuth, Obata & Kassabaum

Construction: Atkinson/Clark/Shea (East Station)

#### Concourse C East Train Station:

Design: Kohn Pederson Fox Associates, P.C.

Construction: Facchina Construction Company, Inc.

#### Tunnels and Vehicle Maintenance Facility

Design: HNTB Corporation

Construction: Turner Construction Company (VMF)

Atkinson/Clark/Shea (East Tunnels)

Clark/Shea (West Tunnels)

### Estimated Completion:

Main Terminal Station and Train to Concourses A, B and C: 2009

### Estimated Program Costs:

Trains and System: \$215 million

Tunnels, Station Shells & Maintenance Facility: \$519 million

Main Terminal Train Station and Security Mezzanine: \$395 million

Concourse Stations (3):  
A/B East, B West, C (Tier 2) East \$285 million