

Visual Simulation of Washington Dulles International Airport

[Click here to see the video of the completed visual simulation.](#)

The objective of the ModSim Group Project is to simulate the Washington Dulles International Airport (IAD) system with respect to the requirements stated below.

1. Generate the arrivals of vehicles (passenger cars, buses, trucks, etc.) with a random number of passengers as seated in each vehicle entering at the beginning of Dulles Access Road on the map shown in Figure 2 below. Make each vehicle to move on the road and arrive at the passenger drop-off area (Figure 6) on the upper floor of the main terminal building. Visualize each passenger getting off the vehicle, entering the terminal building, and walking through the hallways (Figure 6). Decompose each vehicle to show its inside view with seated passengers. After the passengers get off, make the vehicle move to the exit point of the airport by using the appropriate road.
2. Visualize the passengers being picked up at the passenger pick-up area (Figure 6) by different vehicles. Show the inside view of each vehicle and the boarding of passengers into each vehicle. Make each vehicle move to the exit point of the airport by using the appropriate road. Terminate the vehicle and all passengers in it upon exit from the model.
3. Simulate the airport operation with only 8 aircrafts. Make 2 aircrafts arrive / depart on concourse A, 2 for concourse B, 2 for C, and 2 for D. Hence, represent 8 gates as follows: Gate A1, A2, B1, B2, C1, C2, D1, and D2.
4. Generate the arrivals of 8 aircrafts according to a schedule you will determine. Create a random number of passengers as seated in each aircraft arriving. (Keep the number of passengers in an aircraft small so that your model runs with acceptable performance.) When the aircraft arrives at a gate, make the passengers get off, walk through the hallways of the concourse (Figures 4 and 5) and wait for the shuttle bus to go to the main terminal. Visualize the entering of passengers into the shuttle bus. After the passengers get off the shuttle bus and enter into the main terminal building, make them walk through the hallways of the main terminal (Figure 6) and wait for a vehicle to be picked up and driven on the road to leave the airport.
5. A low quality image of the IAD runways is provided in Figure 1. Find a better image of the runways, preferably an EPS image. Show the landing of each of the 8 aircrafts at a runway. Visualize the movement of the aircraft on the runway to the gate.
6. After the arriving aircraft deplanes its passengers, it will allow the waiting passengers to board on the aircraft after waiting for a period of time. All passenger movements for boarding and deplaning must be visualized. The aircraft must taxi on the runway and take off. Once the aircraft enters the airport exit point, the aircraft and its passengers must be terminated.
7. All passenger movements and interactions, if any, in the hallways of concourse A, B, C, and D, and the main terminal (Figure 6) must be visualized.

8. Each shuttle bus between the main terminal and a concourse building must be visualized with passengers shown inside the shuttle bus.
9. Select appropriate values for all random variables. Calibrate the values you have chosen so that a reasonable visualization can be obtained and the system is in steady state.
10. Run your simulation for a long time to make sure that you do not have bugs that show up later in the simulation.
11. Use your creativity to build a model with as high fidelity as possible. The more detail the better. You will be graded based on the level of detail and validity of your visual simulation.
12. Document your model. The Documentation window should be used for overall model documentation, and must be used to provide a list of capabilities you have included in your model representation. This list will be used for grading purposes.

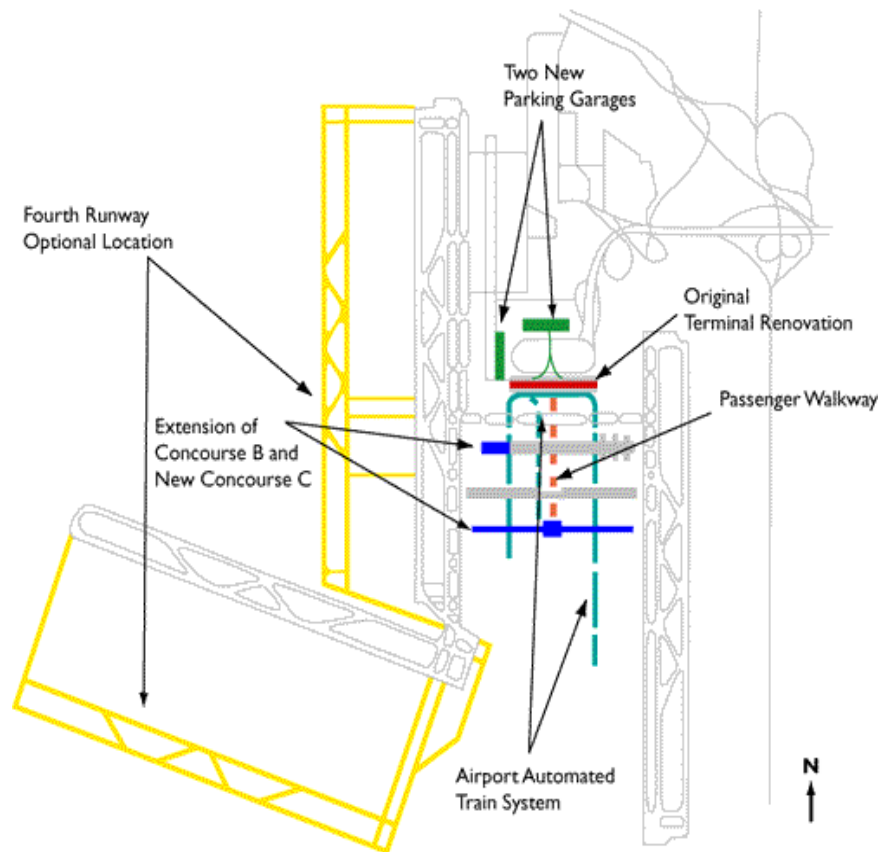


Figure 1. Top-Level View of IAD with Runways

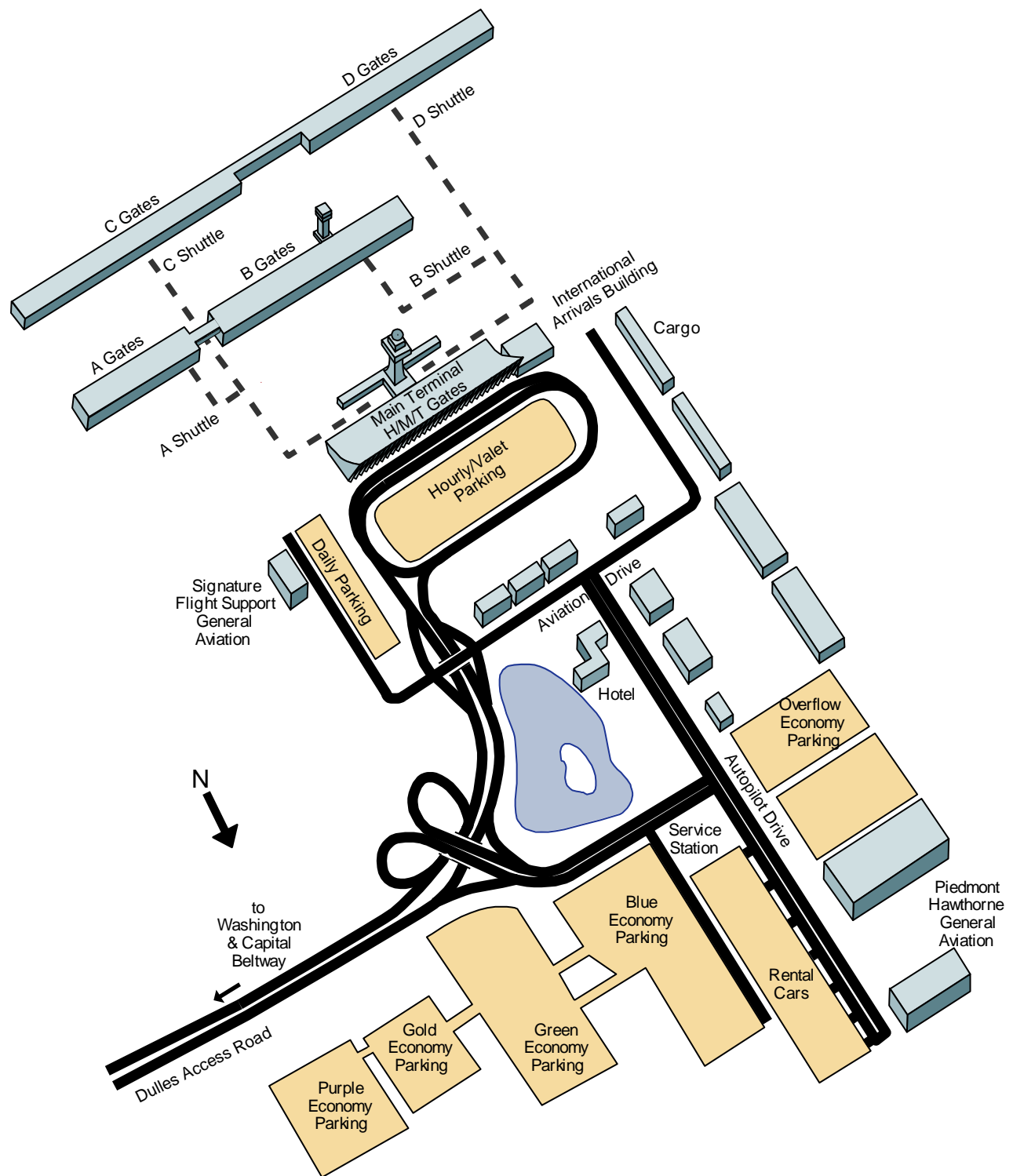
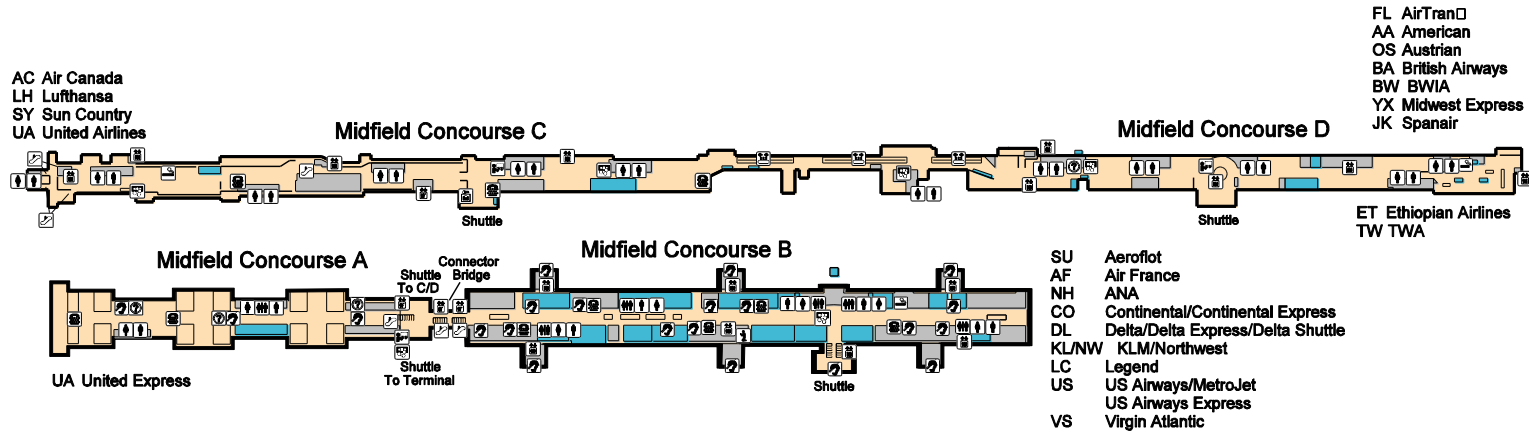


Figure 2. Second-Level View of the Dulles International Airport



Symbol Legend

- ATM/Cash Machine
- Baggage Claim
- Baggage Lockers
- Business Service Center/ Foreign Exchange
- Chapel/Meditation Room
- Concessions
- Elevators
- Escalators
- Ground Transportation
- Hotel/Motel Information
- Information
- Moving Walkways
- Restrooms - Companion Care
- Restrooms - Men
- Restrooms - Women
- Security Checkpoints
- Smoking Lounge
- TDD Telephones
- Ticketing
- Visual Paging

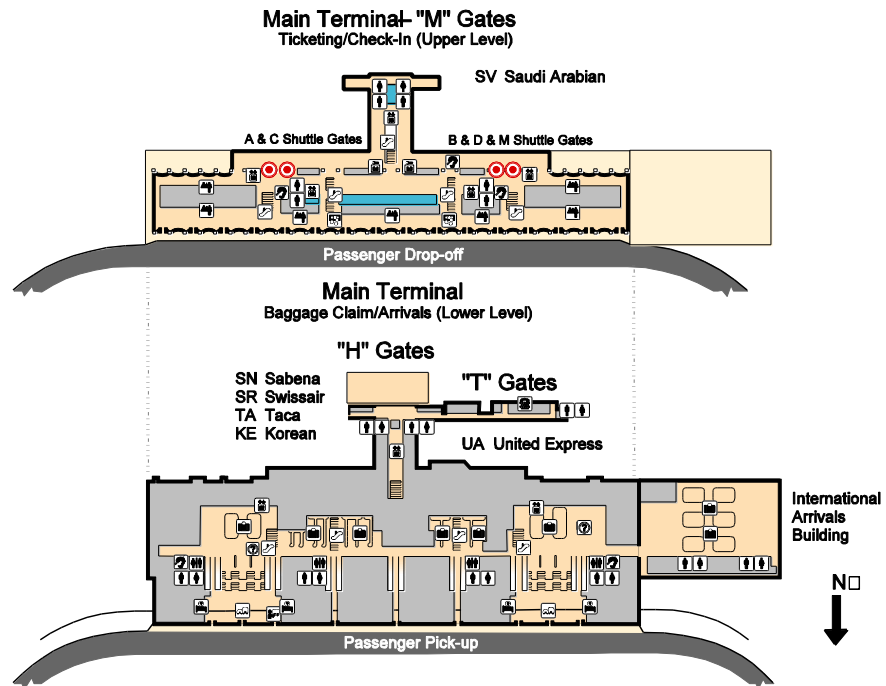


Figure 3. Terminal and Gates Layout with Legend

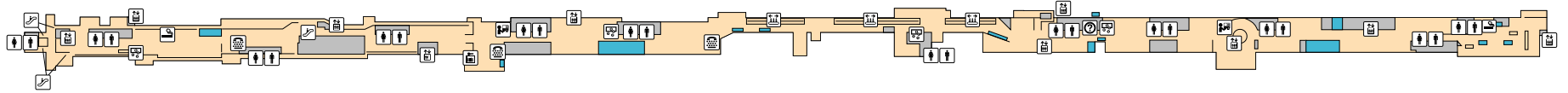


Figure 4. Concourse C and D Decomposition Layout

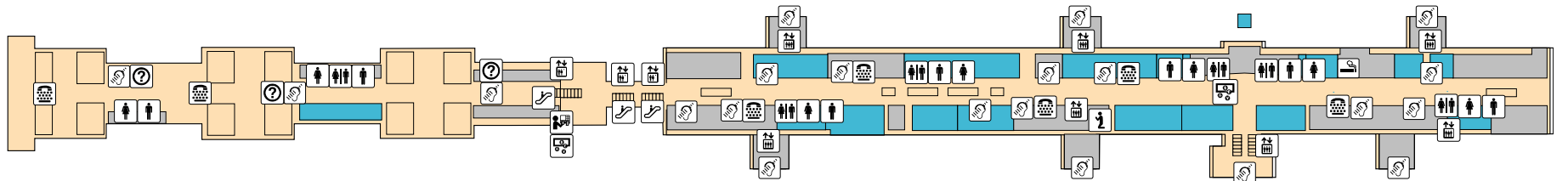


Figure 5. Concourse A and B Decomposition Layout

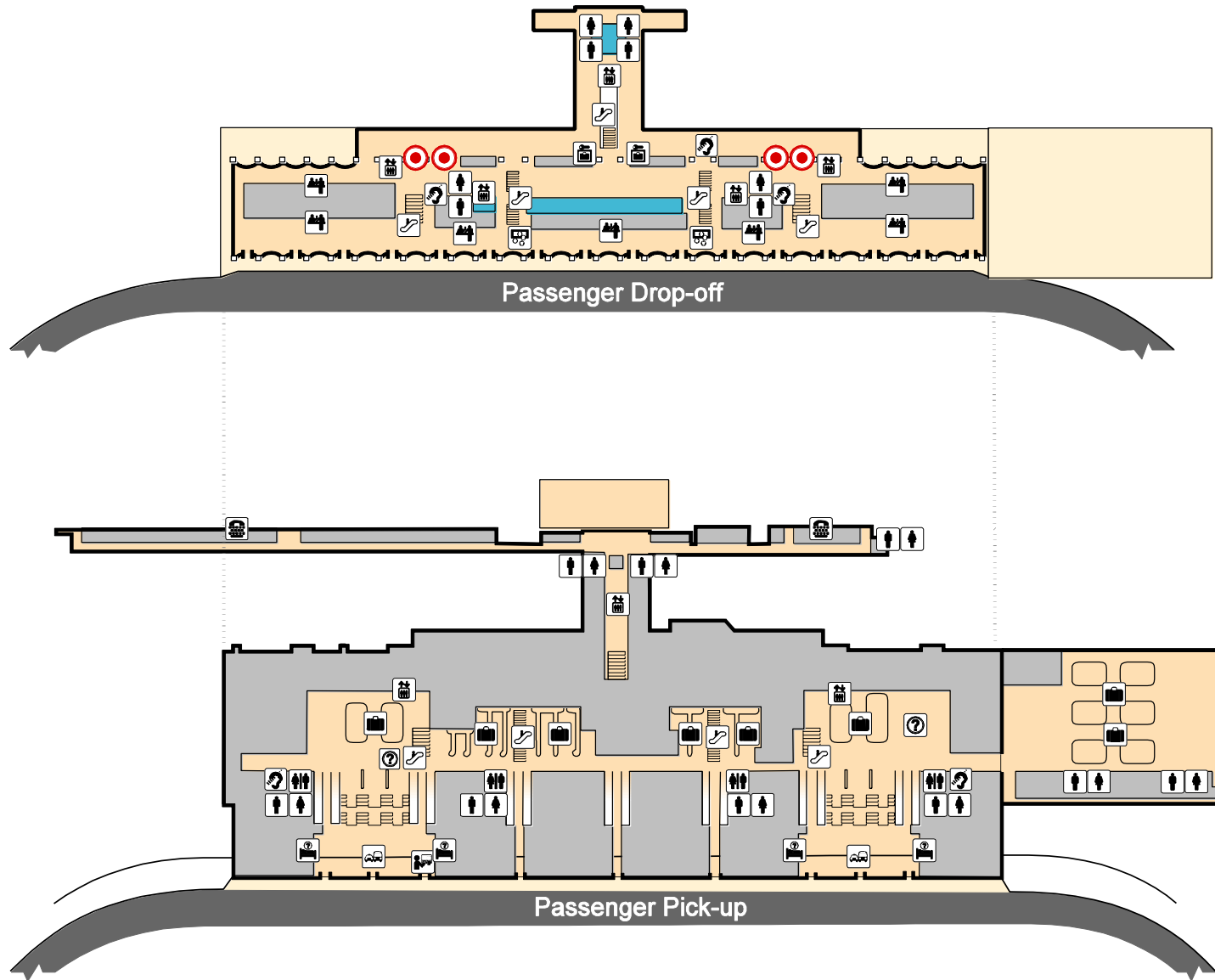


Figure 6. Main Terminal Decomposition