Assignment 4

Date Due: September 27, 2025 Instructor: Trani

Problem 1

Before solving this problem, familiarize yourself with the FAA AC 150/5220-22B and review the course notes.

A regional airport in Oregon is evaluating the need for a runway arrestor system (EMAS). The airport has a 670-foot grassy area at one runway end (see Figure 1). The critical aircraft is the Boeing 717-200 (MTOW = 110,000 lbs.) also shown in Figure 1. The Boeing 717-200 is a derivative of the Douglas DC-9 and has similar size and weight. The airport has approach procedures with runway visibility minima of 3/4 of a nautical mile (RVR). The airport is located at 587 feet above mean sea level conditions.

a) Find the RDC code for the runway design to accommodate the Boeing 717-200. State all three parameters of RDC.

b) Find the size of the EMAS required to bring the runway end into compliance (i.e., legal RSA). State the recommended design exit speed used in your design.

c) State the dimensions of the RSA, ROFA, and RPZ for the Boeing 717-200.

d) Draw to scale in the CAD software of your choice the three surfaces above.

e) If the maximum height of a railroad car is 23 feet, find if the OFZ surface is violated by the passing train car. Show your calculations.

f) Find if the old administrative building penetrates the inner transitional OFZ surface. Show your calculations.

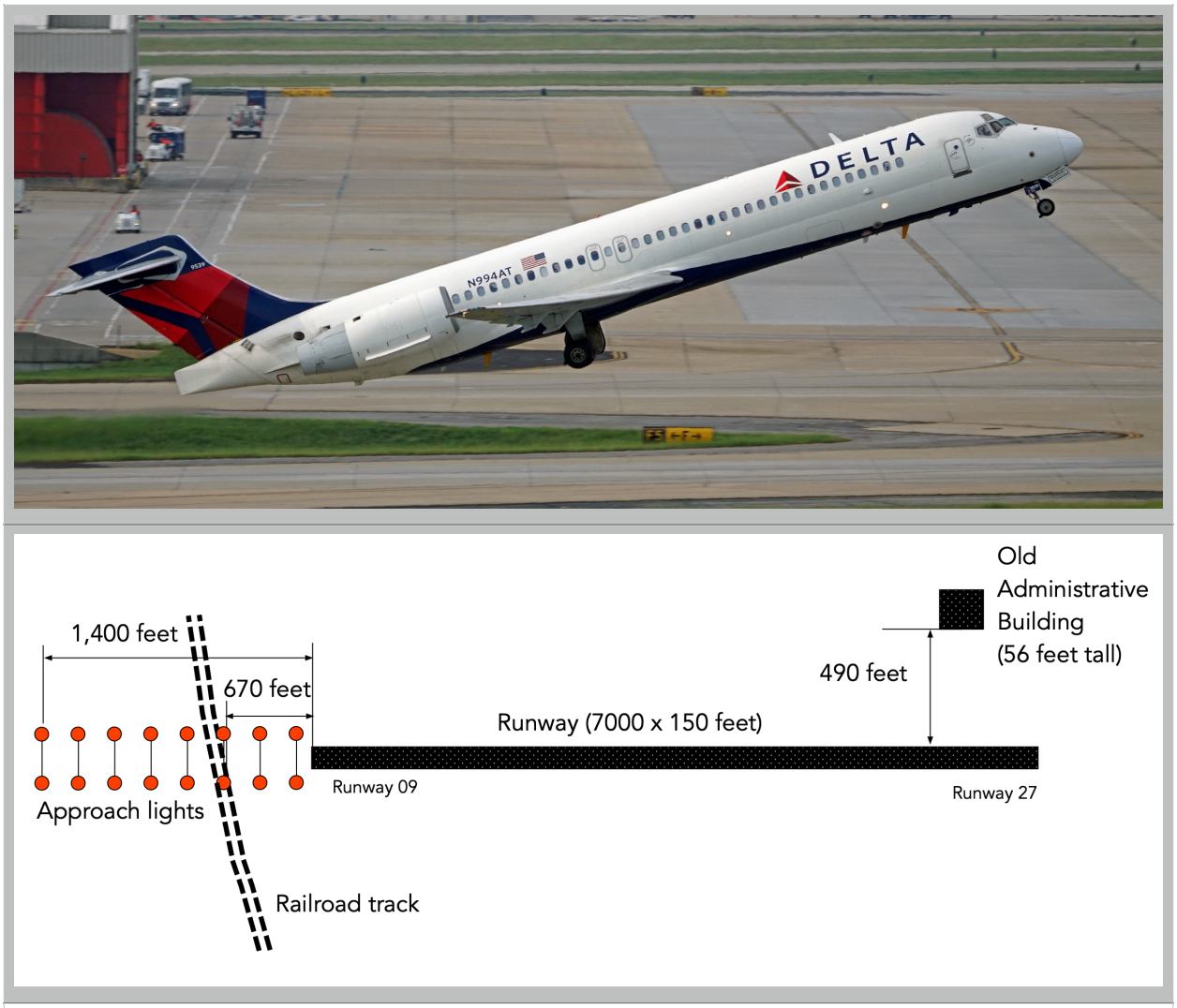

Figure 1. Boeing 717-200 Departs ATL Airport and Runway Layout for Problem 1.

Problem 2

Use Google Earth and review the EMAS systems installed at various airports and provide brief answers.

a) Estimate the size of the EMAS installed on runway 4 threshold at LGA airport. If the critical aircraft is the Boeing 757 (see Figure 2), estimate the EMAS maximum overrun speed protection at LGA for an aircraft landing on runway 22.

b) Estimate the size of the EMAS installed prior to runway 16 threshold at ROA airport. If the critical aircraft is the Boeing 757 (see Figure 2), estimate the EMAS maximum overrun speed protection at ROA for an aircraft landing on runway 34.

c) If the two EMAS systems are designed to stop the same aircraft, comment on the differences observed.

Figure 2. Boeing 757-200 Landing on Runway 26R at Atlanta Hartsfield International Airport (A.A. Trani).

Problem 3

Use Google Earth and familiarize yourself with Los Angeles International Airport (see Figure 3). Use Google Earth to measure distances.

a) An Airbus A380 lands on runway 25L in low visibility conditions (1/2 mile visibility or less) and the aircraft is instructed to taxi on taxiway H (Hotel) - the taxiway between runways 25L and 25R. Does the aircraft tail violates the inner transitional surface of runway 25R? Explain and show your calculations. The critical aircraft at the airport is the Airbus A380 (see Airbus documentation or the FAA Aircraft Characteristic Database). Consider the elevation of the airport in your calculations. In your analysis, assume the A380 taxies on the centerline of taxiway H.

Figure 2. Los Angeles International Airport Southside Runways. Source: Google Earth.

b) 95% of the time, aircraft depart LAX to the ocean using runways 24L and 25R. Are the runway safety areas protected for departures from runways 24L and 25R? The critical aircraft if the Airbus A380. LAX can operate with visibility minima below 1/2 mile. Explain and provide details of the distance measured to make your assessment.

Problem 4

Use Google Earth to examine runway 6-24 at Cuyahoga County Airport (CGF).

The critical aircraft is a corporate jet similar in size to the Gulfstream III. The airport has approach procedures with runway visibility minima of 1 nautical mile (RVR).

a) List all four declared distances for each runway end.

b) Verify if the Landing distance available for both ends is correct.

c) Estimate the standard EMAS required to stop the critical aircraft in case of an overrun.

d) Why do both ends require an EMAS. Explain.

e) Is the level of overrun protection the same on both runway ends? Explain.

f) Knowing the takeoff distance available at the airport, find the maximum distance that can be flown by a Gulfstream 350 (similar to the Gulfstream III) departing CFG. For this analysis use SARLAT. Use the design temperature at the airport.