Assignment 3: Runway Length Analysis and EMAS Calculations

Date Due: February 12, 2017 Instructor: Trani

Problem 1

a) Tabulate the specifications for ROFA, OFZ (including the dimensions of the inner transitional surface), RSA and RPZ for a new runway at Portland International airport in the US. Consider the critical aircraft to be the Airbus A350-900.

b) How close to the runway centerline can an airline construct an 80 foot tall hangar without violating the inner transitional OFZ?

c) Draw your surfaces in the CAD application of your choice. Draw to scale and label accordingly.

Problem 2

Use Google Earth and review the Roanoke Regional Airport to answer the following questions.

The Roanoke-Blacksburg Regional airport has an EMAS system installed on runway threshold 16 (on the North of the airport). Verify and identify using Google Earth. The largest aircraft operating at ROA are a Federal Express Boeing 757-200 cargo plane (similar to that shown in Figure 1) and a United Parcel Service (UPS) Airbus A300-600 cargo plane. The largest commercial passenger aircraft operating today is the Boeing 737-700 operated by Delta Airlines.

Figure 1. Boeing 757-200 Cargo in UPS Colors (A. Trani).

a) Find the approximate length of the EMAS installed at ROA on runway end 16. Use the Google Earth measuring tool.

b) Estimate the length of an EMAS system to stop an aircraft of the size of the Boeing 757-200 (Maximum takeoff weight is 255,000 lbs). Refer to FAA AC 150/5220-22A to estimate the parameters of your design. Use the recommended FAA design speed for the EMAS design.

c) Is the EMAS installed at ROA consistent with the design found in part (b)? Explain.

Problem 3

An airline is studying adding new regional jet services from Charlottestville, VA airport to Houston Intercontinental airport (in Texas). The airline is planning to purchase two second-hand Airbus A319-200 with Snecma/GE CFM56 engines. The aircraft of interest have a maximum takeoff mass of 70,000 kg and seat 145 passengers in a single class configuration. The airline flight

planning department estimates 41 kilograms per minute for this trip. Additional 1,200 kilograms of fuel is carried as contingency. The aircraft cruises at 420 knots average between these two cities.

a) Find if the existing runway at CHO is long enough to support this operation in a hot summer day.

b) How much extra payload can the airline carry before the runway length limit at CHO is reached?

Figure 2. Airbus A319 Aircraft (A. Trani).

Problem 4

Review the accident of an Embraer E190 at Cuenca (in Ecuador) on April 28, 2016. The accident information is found at: http://avherald.com/h?article=4978aed0&opt=0.

a) Does the airport meet the runway safety area criteria? Explain.

b) Suggest measures to reduce the risk that future accidents cause loss of life at this airport.