Assignment 6: Part 77 Analysis and Geometric Design Standards

Date Due: October 18, 2021

Instructor: Trani

Problem #1

Figure 1 shows three objects identified as critical in the siting of a new airport. The new airport will have a 7,500-foot long **non-precision** runway. The non-precision runway is expected to operate with visibility minima as low as 3/4 mile. Find if each object constitutes an obstacle to navigation. State the Part 77 imaginary surface applicable to each objects.
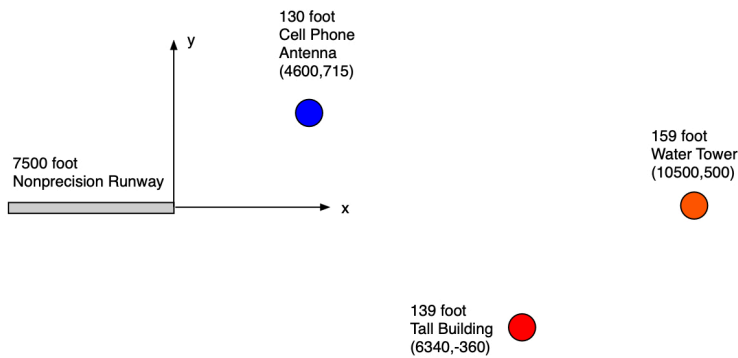

Figure 1. Objects Identified Near a Proposed New Airport.

Problem #2

a) Use the Airbus A321 (see Figure 2) as the critical aircraft to determine the following dimensions at a new airport. The airport will have a single 9,000 foot runway with Instrument Landing System Category 2 (visibility below 1/2 mile). The airport will be located at a site 3,200 feet above sea level.

Figure 2. Frontier Airlines Airbus A321 landing at Cleveland International Airport (A. Trani) .

Item	Dimension(s) State length and width if applicable
Approach RPZ	
Departure RPZ	
Runway Safety Area	
Runway OFA	
Distance between runway to parallel taxiway	
Distance between runway centerline and runway exit hold line	
Distance between two parallel taxiways	
Distance between a taxiway and a taxi lane	
Distance between a taxi lane and a fixed or movable object	
Distance between a runway centerline and parking area	
Runway width	
Runway shoulder width	
Taxiway width	
Taxiway shoulder width	
Taxiway safety area	
Taxiway safety distance	
Runway blast pad area	

Problem #3

Assume the same critical aircraft for this problem is the Airbus A321. Find the closest perpendicular distance from the runway centerline that an airline could build a 50-foot tall hangar without violating current standards. Explain the controlling surfaces and dimensions considered in your analysis. Your analysis must consider both Part 77 imaginary surfaces and the inner transitional OFZ surface (three-dimensional surface). Assume the airport has a 8,500 foot precision runway with an instrument landing system (Category 1).

Problem # 4

A new airport is expected to have commercial airline operations using aircraft such as the Airbus A321 aircraft (see Figure 1). The longest runway length needed has been determined to be 8,500 feet. The airport is located at an elevation 1,200 feet above mean sea level conditions. The airport will have a precision runway and serve approaches with **visibility minima down to 1/2 mile**. Determine the following dimensions for your design:

a)   The elevation of the horizontal surface **above mean sea level conditions**
b)   The slope of the Obstacle Clearance Surface (OCS).
c)   A company proposes building a 46-foot tall building to be located 4,500 feet from a precision runway. Determine if the proposed building violates the departure surface OCS surface (see Figure 3-4 in FAA AC 150/5300-13a). Assume no clearway is present on this runway.