

Assignment 6: Obstruction Analysis and Geometric Design Standards

Date Due: October 19, 2022

Instructor: Trani

Problem #1

Use the Elevation Profile function in Google Earth to check obstructions to the NW of the Roanoke-Blacksburg Regional Airport (ROA). Here is the analysis to be done.

- Create a straight path from runway 16 threshold as demonstrated in class. Make sure the path segment is 8 miles long and aligned with runway 34 heading (see Figure 1).
- Create an elevation profile using the Google Earth tool and identify the “peaks” of the elevation profile within 8 statute miles.



Figure 1. Sample Image in Google Earth Showing Straight Path Away from Runway 16 Threshold.

- Estimate if the “peaks” identified constitute natural obstacles to navigation for a **precision runway**. You only need to check the peaks identified in your elevation plot. Use the FAR Part 77 standard to do the analysis.
- Estimate if the “peaks” identified constitute natural obstacles to navigation for a **non-precision runway**. You only need to check the peaks identified in your elevation plot. **Use the FAR Part 77 standard to do the analysis.**
- Given the analysis in parts (3) and (4), tell me what type of runway is runway 16 (i.e, approaching from the NW).
- Verify your answer in part (5) with the runway markings.
- Is Runway 34 a precision runway? Briefly explain.

- h) Verify (with geometric and numerical calculations) the reason on why runway 24 at ROA is a non-precision runway. Hint: look at the terrain in the NE quadrant.

Problem #2

Use Google Earth and Airnav to answer the following questions for Boston Logan International Airport.

- 1) Determine if the 174-foot tall building shown in Figure 2 constitutes an obstruction to navigation for landings on runway 14. According to the runway markings in Google Earth, Runway 14 is a visual runway.
- 2) Are landings allowed on runway 14? Explain.
- 3) BOS runway 15R has 62-foot tall tree located 3,040 ft. from runway, 140 ft. left of centerline (see Figure 3). Check if the tree is an obstruction to navigation. Check the runway precision in the Airnav site.
- 4) Use Google Earth to determine the distance between runway centerline to taxiway (B) centerline. Find if the distance complies with ADG V standards. Runway 15R has an instrument landing system with visibility minima down to 1/2 mile. The largest aircraft operating at BOS is a Boeing 747-400. You can find airport maps at: https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dtpp/search/results/?ident=bos&state=&airport=&ver=2211&eff=10-06-2022&end=11-03-2022&diagrams=1&cycle=2210

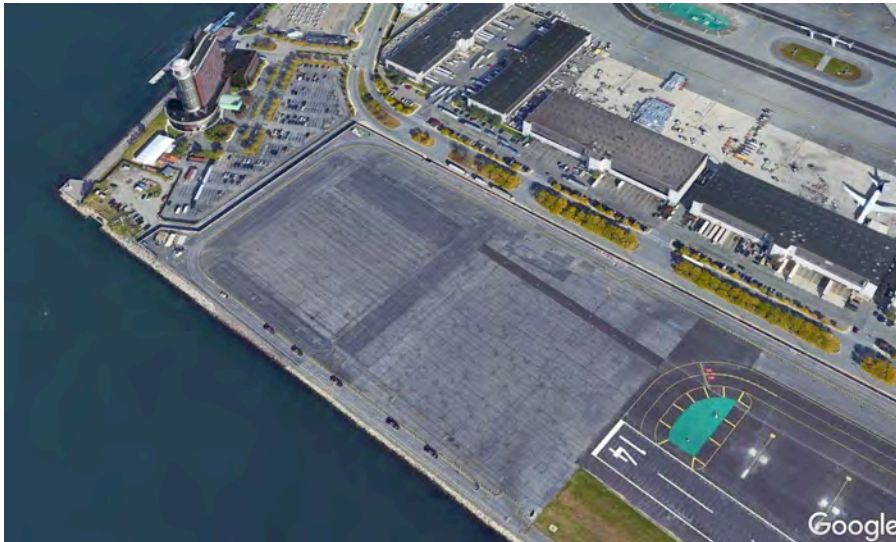


Figure 2. Boston Logan Airport Runway 14 Threshold. Source: Google Earth.



Figure 3. Tree Located 3,040 feet (and 140 feet left off centerline) from runway 15R threshold at Boston Logan Airport. Source: Google Earth.

Problem #3

Figure 4 shows three objects identified as critical in the siting of a new airport. The new airport will have a 10,300-foot long **precision** runway. The precision runway is expected to operate with visibility minima as low as 1/2 mile.

- Find if each object constitutes an obstacle to navigation. State the Part 77 imaginary surface applicable to each object.
- Find if the 56-foot tall parking structure violates the Precision Runway Approach Surfaces defined in the FAA AC 150/5300-13B (called Surfaces 5 and 6 in the AC).
- If any of the objects is an obstruction to navigation, propose a mitigation strategy.

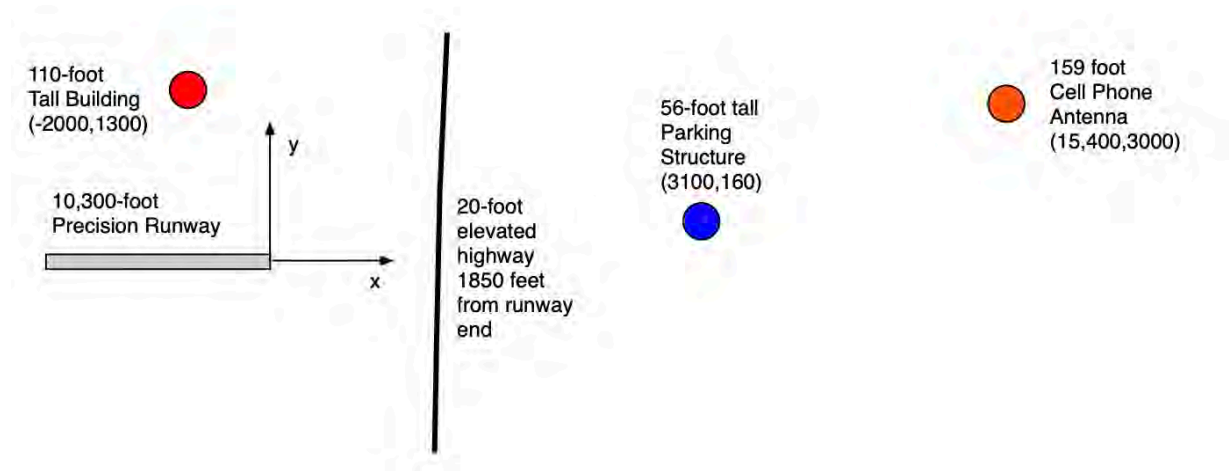


Figure 4. Objects Identified Near a Proposed New Airport.

Problem #4

Use the Embraer 145 (see Figure 5) as the critical aircraft to determine the following dimensions at a new airport. The airport will have a 8,500 foot runway with Instrument Landing System Category 1 (visibility is 1/2 mile). The airport will be located at a site 4,300 feet above sea level.



Figure 5. United Express Embraer 145 Landing at DCA Airport (A. Trani) .

Item	Dimension(s) Length and width if applicable (in feet)
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 taxilane	
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 edge safety margin	
Runway blast pad area	