



Explain your answers with neat sketches whenever possible. If not clearly stated, assume that the mean radius of the earth is $R = 6371$ km if not mentioned.

Assignment 1 - LOS Engineering

1. Do you believe that intervisibility and line of sight checks should be mandatory for traditional geodetic stations? Why or why not?
2. How is LOS engineering applied in different industries or sectors?
3. Two triangulation station A and B, 110 km apart, have elevations of 125 m and 502 m, respectively. The intervening *peak* C 60 km from station A an elevation of 131 m. Ascertain if A is visible from B. If necessary, find the height of scaffolding at B so that the line of sight has a minimum clearance of 3m anywhere.
4. In a triangulation survey, the altitudes of two proposed stations A and B, 100 km apart, are respectively 425 m and 750 m. The intervening ground situated at C, 60 km from A, has an elevation of 435 m. Ascertain if A and B are intervisible, and if necessary, find by how much should be raised so that the line of sight must nowhere be less than 3 m above the surface of the ground. Take $R = 6400$ km and $m = 0.07$.
5. The proposed elevations of two points A and B, 70 miles apart, are respectively 516 and 1428 ft. above mean sea level. The only obstruction is situated at C; 20 miles from B, and has an elevation of 598 ft. Ascertain by how much, if any, should be raised so that the line of sight may clear C by 10 ft.
6. The elevation of station A is 812 ft., and that of B, 30.5 mile distant, is 857 ft. The intervening ground may assume a level plain of elevation 709 ft. Find the Minimum height of signal required at B, so that the line of sight may not pass nearer the ground than 6 ft.
7. Figure 1 shows the proposed placements of a set of transmission towers. It is required to check the signal clearance between the towers. In addition, provide possible solutions in case of unclear signals by either scaffolding or changing the placement. Start from station C. Use any online resource to get elevation data and profiles (e.g., Google earth). Table 1 lists the geodetic coordinates of the proposed towers' locations.

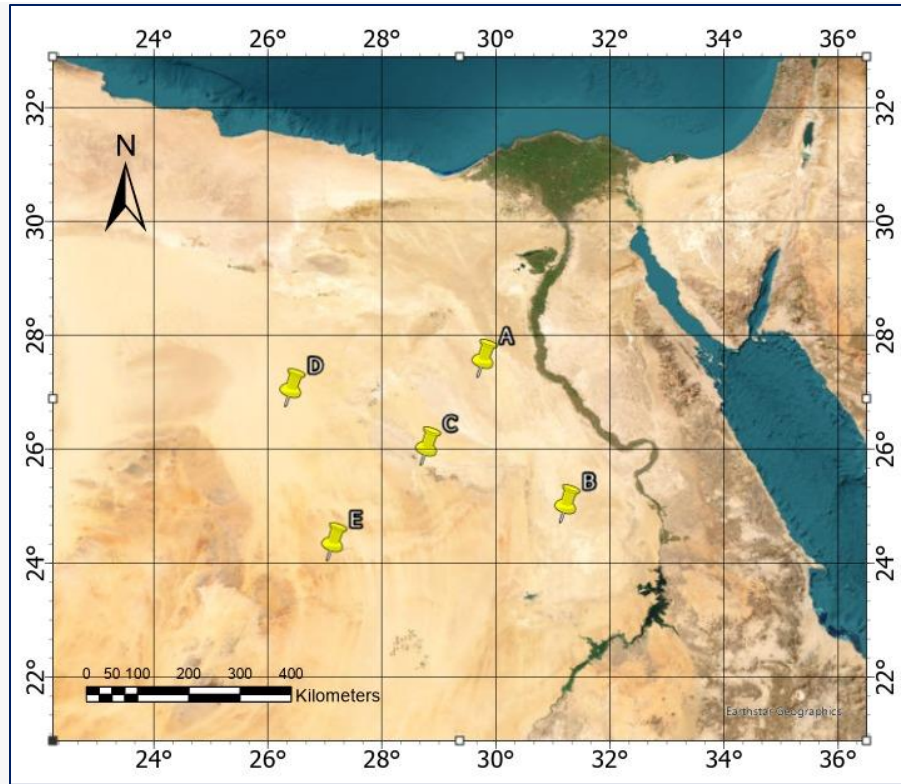


Figure 1. Proposed locations of the transmission towers

Table 1. Station Coordinates of the proposed locations of the transmission towers.

ID	Latitude	Longitude
A	26.9570443°	26.3452812°
B	25.1020207°	31.2196516°
C	26.0887354°	28.7528650°
D	27.1543872°	26.4242184°
E	24.4310548°	27.1543872°