Introduction to Flight Simulation (List 11)

Due: 18 jan 2011

Consider the following VORs. (Taken from a 10 years old map. I am not sure if they still exist.)

name	frequency	latitute	longitude
Trebni	113.60	N51 18.6	E017 07.0
Łódź	112.40	N51 48.0	E019 39.5
Czempin	114.50	N52 07.9	E016 43.7

1. Convert the geodetic positions of the VORs into ECEF coordinates.
2. Compute the distance between Trebni and Łódź and between Trebni and Czempin in nautical miles.
3. Compute the magnetic heading, needed to fly from Trebni to Łódź. What is the magnetic heading, needed to fly from Trebni to Czempin?
4. In the picture of the Boeing 737-300, estimate the surface area of the wings. Estimate the surface area of the stabilizers. Assuming that the plane is at maximum landing weight, and that it is possible to obtain a lift coefficient $C_L = 2.2$ by extending flaps, compute the minimum theoretical landing speed for B737-300 loaded at maximum landing weight.
5. Assume that one engine of the B737-300 has failed, and the other engine runs at maximum power. Guess a reasonable position for the center of gravity of the airplane, and calculate the torque generated around the center of gravity for this configuration.
6. Estimate the surface area of the rudder. Assume that it has a maximal lift coefficient of 1.0. What is the minimum speed at which the B737-300 can fly, when one engined has failed, and the other engine is producing maximal thrust?