Flight Planning Lab

Physics 1P Traeger

Purpose: To use vectors and their resultants to execute a flight plan.

Materials: Protractor, Pencil, Butcher Paper, Vis a Vis wet erase pen, LA Sectional Aeronautical Chart

Procedure:

1. Get in to groups of no more than 4.
2. Obtain a protractor, pencil, piece of butcher paper, and LA Sectional Aeronautical Chart.
3. Determine an airport that you want to take off from and an airport you want to land at.
4. Determine the distance between the airports using the scale at the top of the map. Measure this distance in nautical miles. Make sure that the distance you choose is 50 nautical miles or greater. Flights of 50 nautical miles or greater are defined in aeronautical terms as cross country flights.
5. Determine the height of the highest terrain you will fly over in feet and then add at least 1,000 feet to that to avoid flying in to terrain. You should maintain 1,000 feet of clearance over the ground throughout the flight.
6. Use your protractor to measure the true course you must fly to get from your departure airport to your arrival airport. Measure this angle counterclockwise from East. Up on the map is North. A typical general aviation aircraft travels at 100 nautical miles/hour, so use this as your true airspeed and scale the length of this vector appropriately. This is vector 1. Draw and scale it appropriately on your butcher paper. Make sure to tell me what your scale is somewhere on the map.
7. Go to the Internet and obtain wind information for the altitude you will be flying at and for the day you will be flying. See my class internet investigations page for links to this. Also note that the direction quoted on the Internet is direction the wind is coming from, NOT the direction the wind is going to. You will need to add 180 degrees to find the direction the wind is going to. Winds are always quoted in magnetic direction. You must add 13 degrees in our part of the world to get true direction. This is called accounting for magnetic declination. We will learn magnetic declination more when we do the unit on magnetism. Wind directions in real life are measured clockwise from north starting at 0 degrees. Ie.) N = 0 or 360 degrees, E = 90 degrees, S = 180 degrees, W = 270 degrees. Make an adjustment so that your wind direction is measured counterclockwise from east like your planeôs course was.
8. Plot the wind vector on your butcher paper tip to tail with your aircraftôs velocity vector.
9. Show the math required to determine X (cosine of angle = adj./hyp.) and Y components (sine of angle = opp./hyp.), sum these components, and then use Pythagorean theorem and theta = tan-1 (opp./adj.) to measure the magnitude and direction of the resultant vector.
10. Determine what you will need to do to keep your aircraft on course throughout the flight given this wind component. This is called establishing a crab angle.
11. Determine how long it will take you to get to your destination given the ground speed of your aircraft and the distance you need to fly. Rate x time = distance will help here. This should be based upon your ground speed determined from your resultant vector.
12. Put all required calculations on your butcher paper and explain why you did them.
13. Make all of this look attractive on your butcher paper.
14. Put all of the names of the people in your group on your paper.
15. Post the butcher paper on the West wall using masking tape (NO Scotch tape!).

Note: You may use the Vis a Vis wet erase pens if you need to draw on the laminated map. Use ONLY these wet erase overhead pens, as any other type of pen will not erase. Please erase any marks you make on the map by using a wet tissue.