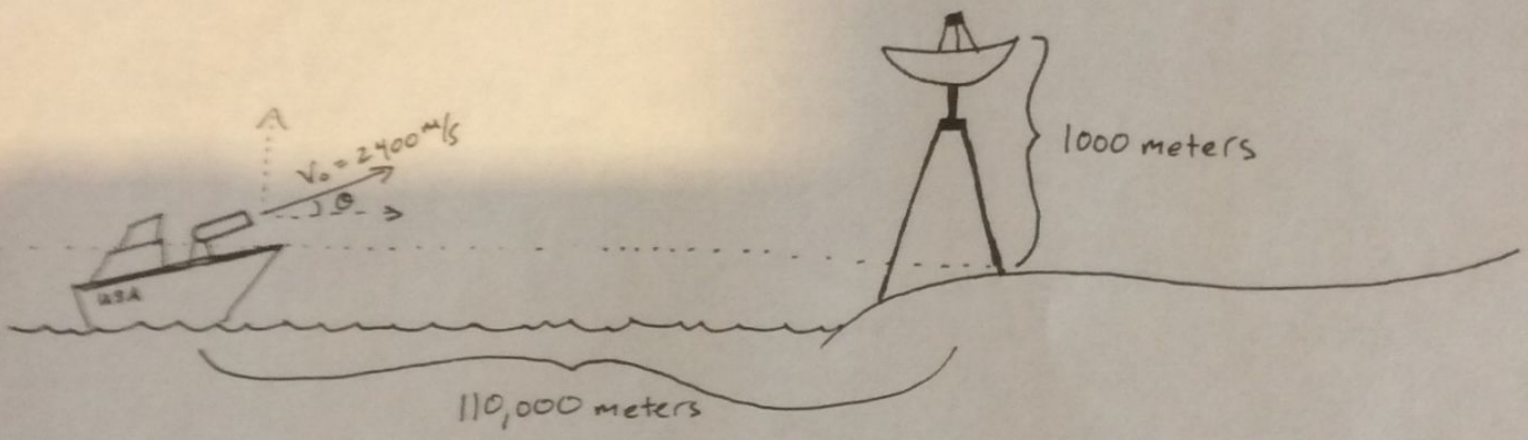
A U.S. Naval Destroyer is 110,000 meters off shore an enemy country. On the shore of the enemy country is a 1000 meter structure which supports a central satellite system used to transmit information to terrorist groups around the globe. The destroyer has a 'Rail Gun' that launches projectiles at a speed of 2400 m/s. Launch angle is θ.



Calculate V_x and V_y if $\theta = 10°$

Calculate V_x and V_y if $\theta = 80°$

1) If the launch angle is 10°, find the V_x and V_y components.

$V_x =$

$V_y =$

2) If the projectile lands at the same height at which it launched, how much time did it spend in the air? Given $\theta = 10°$ and $V_0 = 2400$ m/s.

3) What is the maximum height reached by the projectile? Given $\theta = 10°$ and $V_0 = 2400$ m/s.

4) After traveling 110,000 meters horizontally, what is the height of the projectile? Given $\theta = 10°$ and $V_0 = 2400$ m/s.

5) By how many meters will the projectile miss the top of the 1000 meter structure?

6) How many meters off shore should the Destoyer place itself in order to hit the bottom of the satellite structure?

7.) The difference in height between the rail gun and top of the satellite tower is 1000 meters. At what distance should the Destroyer place itself in order to hit the top? Given $\theta = 10°$ and $V_0 = 2400$ m/s.

a.) Find the two times at which $\Delta y = 1000$.

b.) Use $\Delta x = t \cdot V_x$ to determine horizontal distance.

8.) What if the tower satellite doubled to 2000 meters? Find the distance (horizontal) at which destroyer should be.

a.) Find the times at which $\Delta y = 2000$.

b.) Use $\Delta x = t \cdot V_x$ to determine horizontal distance.

9.) Repeat #1-8 using $\theta = 80°$.