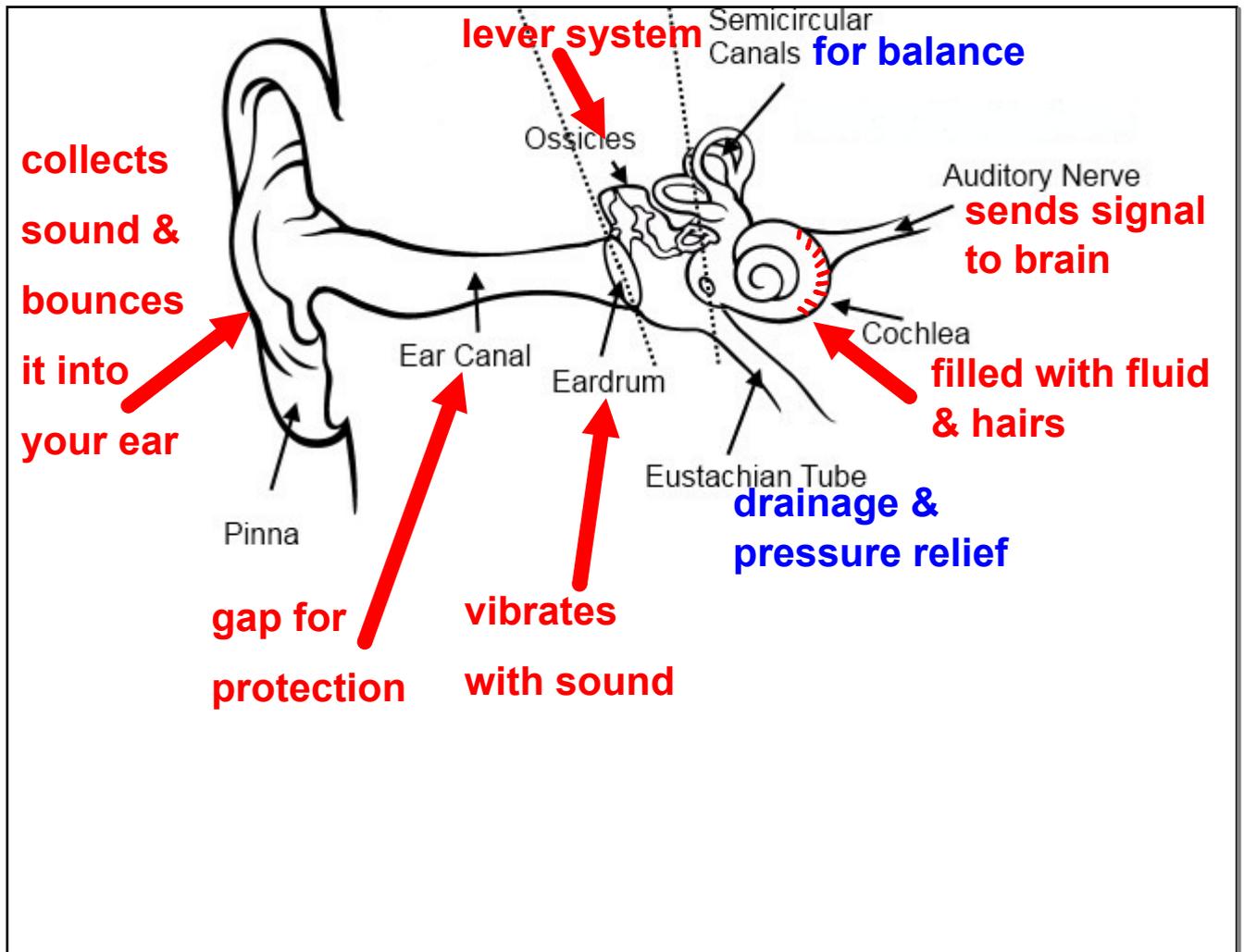


Volume (loud and soft) pressure difference (decibels)
between push
pull

Pitch (high and low) frequency (Hz)

Range of human hearing 20 Hz - 20,000 Hz

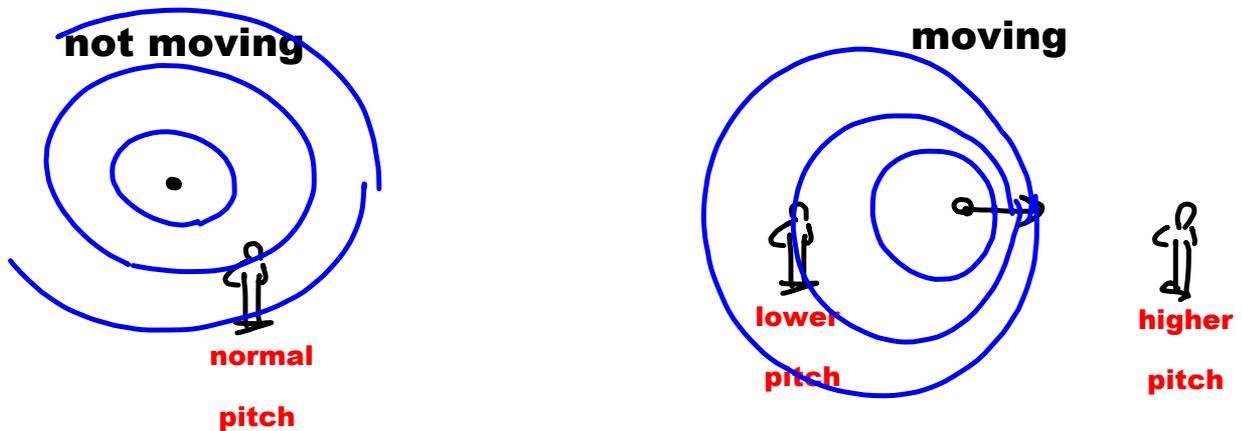


The Doppler Effect

Shift in frequency when a source of waves moves.

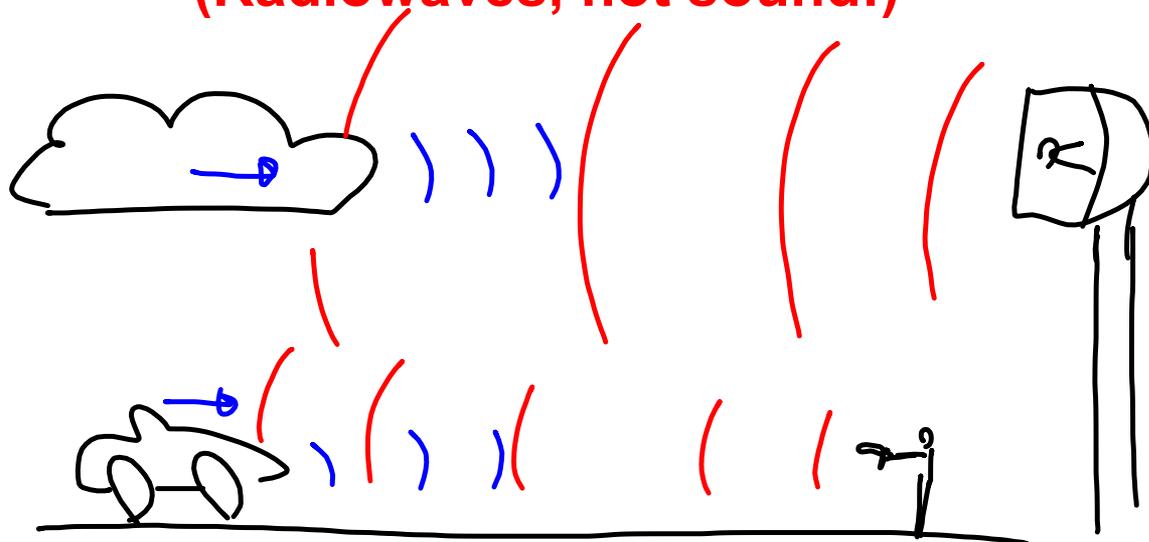
Frequency shifts **higher** as **moves toward** you.

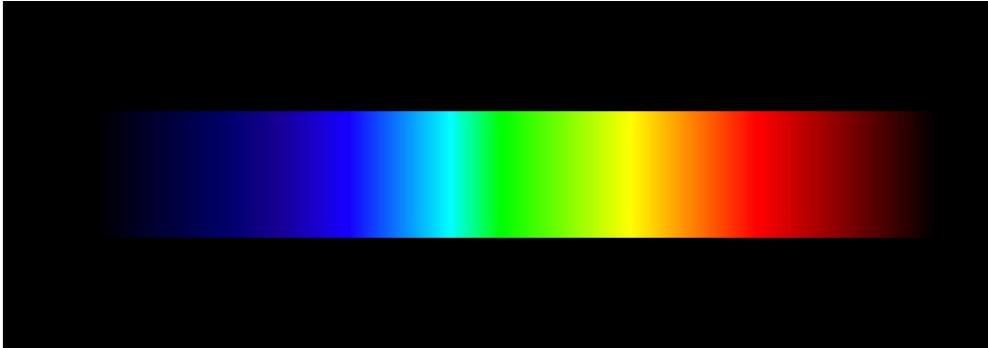
Frequency shifts **lower** as it **goes away** from you.



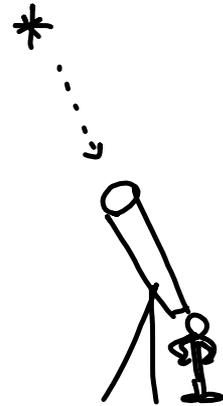
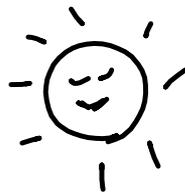
Doppler Radar & Radar Guns

(Radiowaves, not sound!)



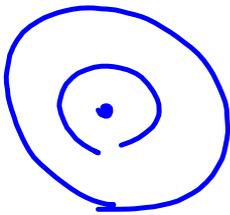


Light from distant stars is shifted to a lower frequency (color). That means they're heading away and the universe is expanding.

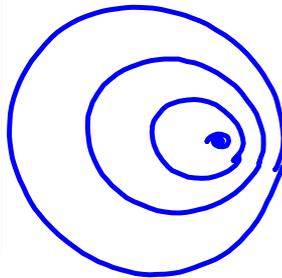


Shock wave = one big compression OR many piling up on top of one another

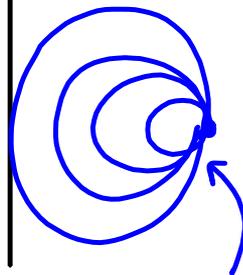
not moving



slower than the waves

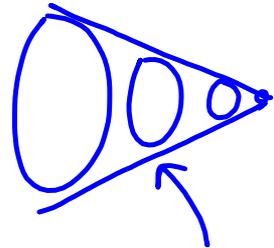


as fast as the waves



shock wave starting

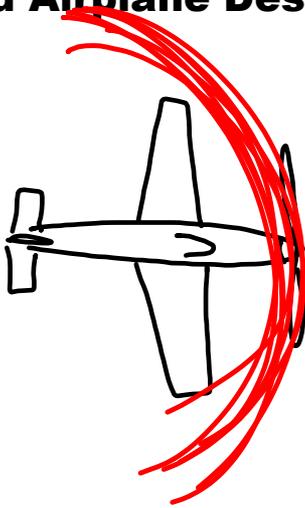
faster than the waves



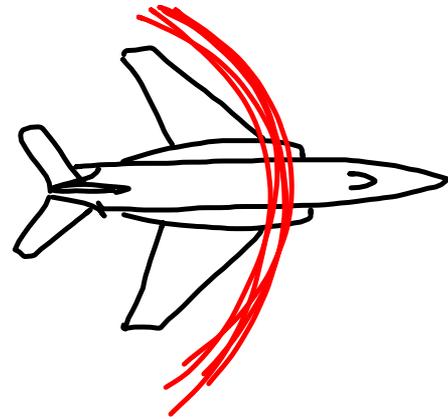
shock wave trailing behind

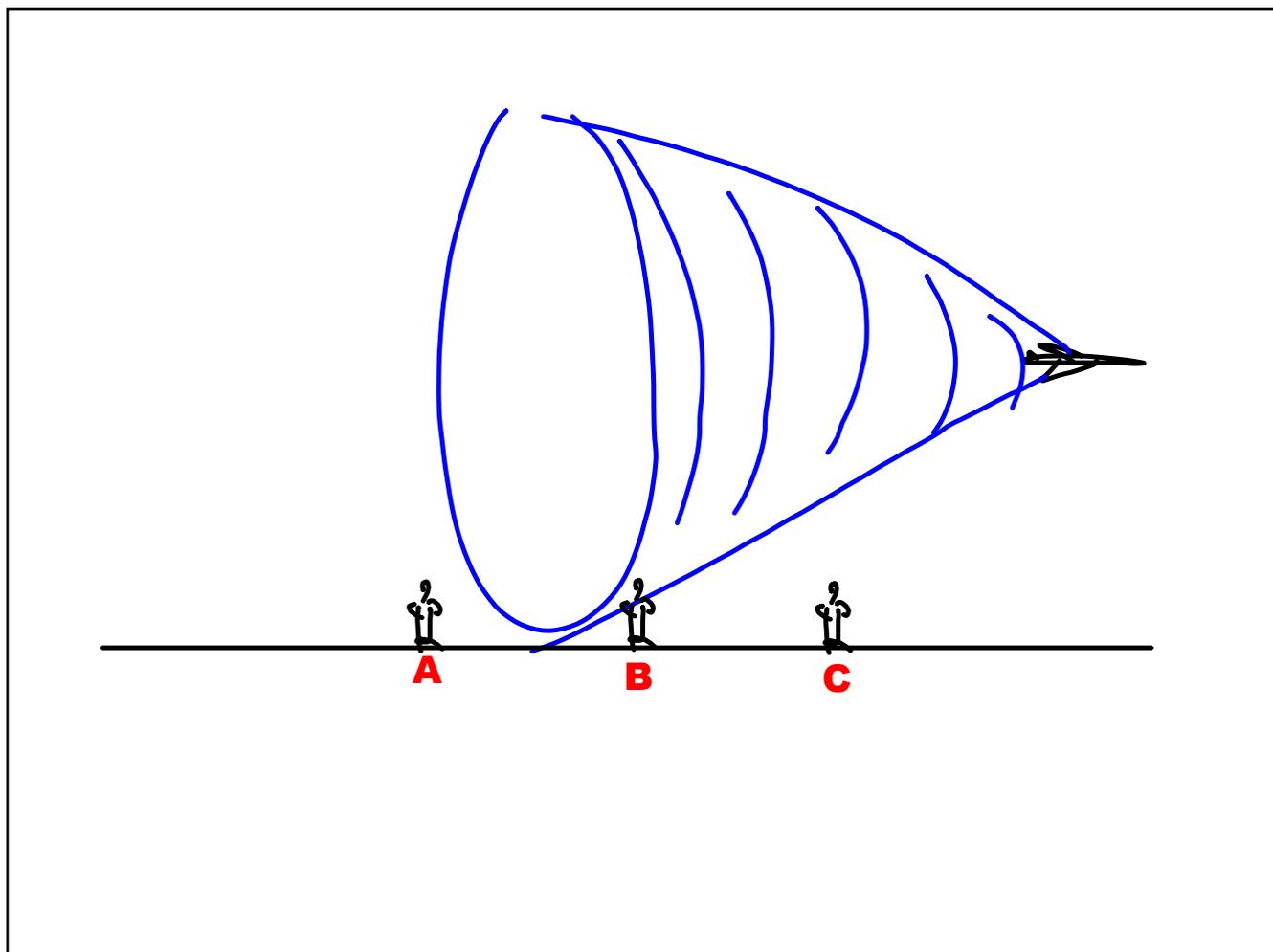


Old Airplane Design



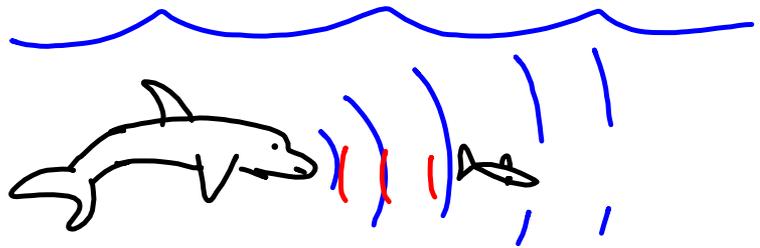
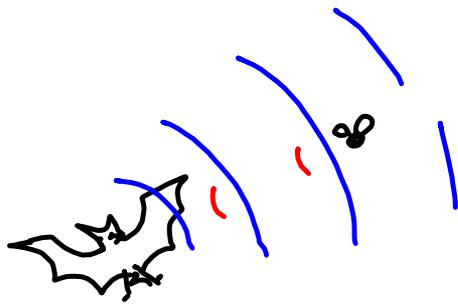
New Airplane Design



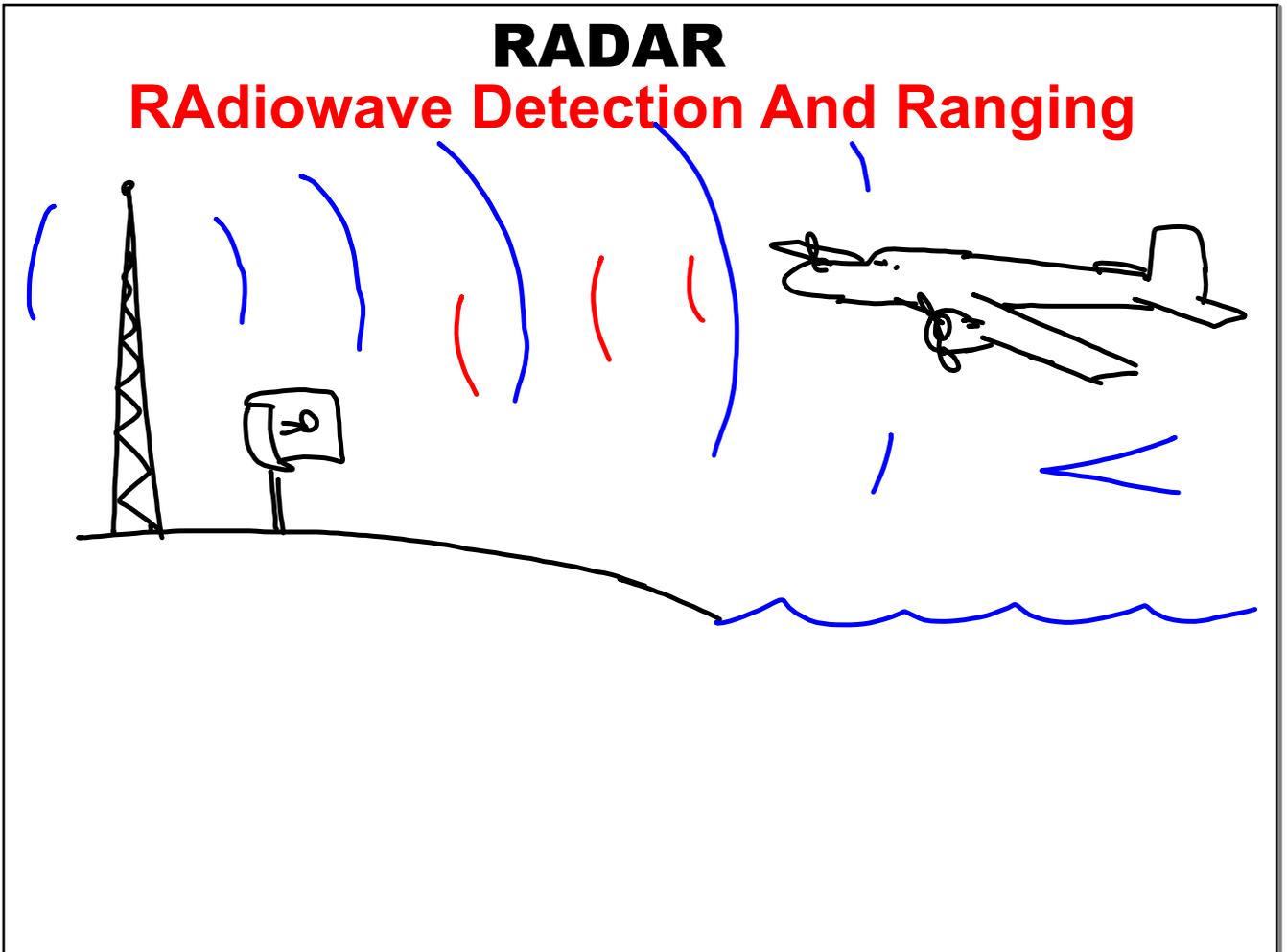


Echolocation

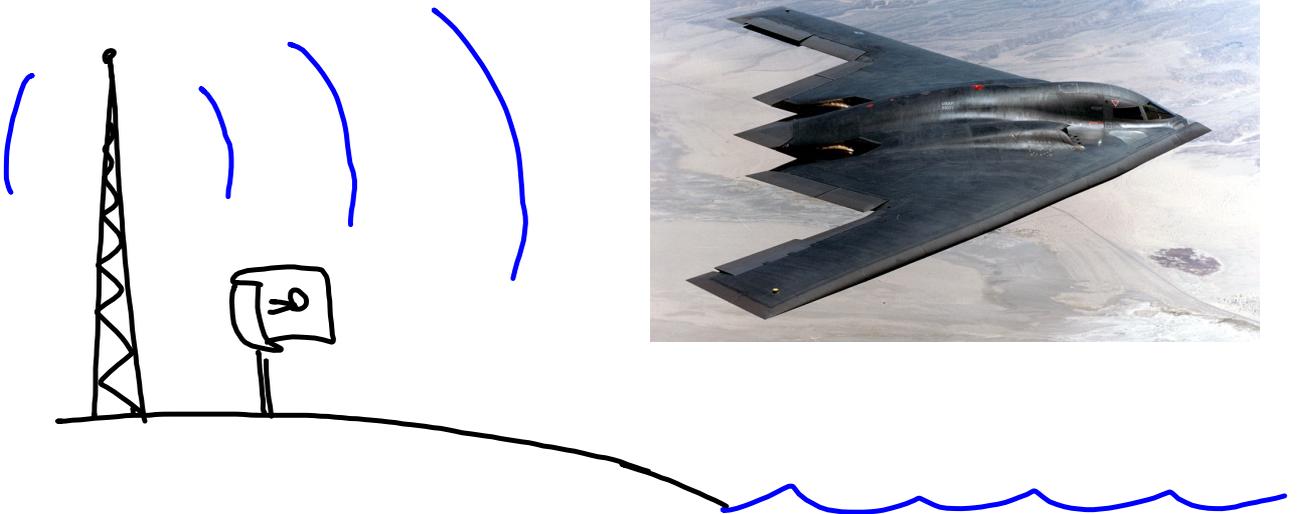
Locating things by sending out a sound and listening for the echo



RADAR **RA**diowave **D**etection **A**nd **R**anging



Stealth Technology

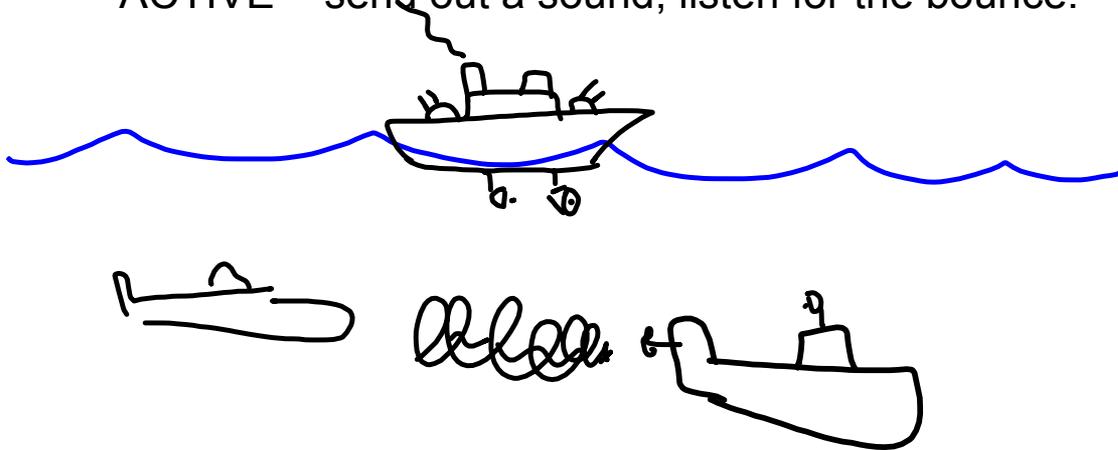


SONAR

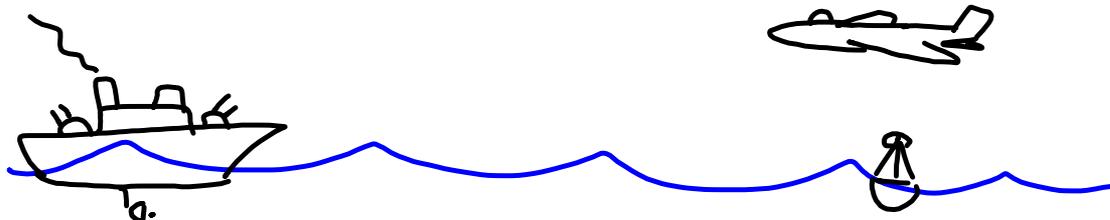
SOund Navigation And Ranging

PASSIVE = just listen

ACTIVE = send out a sound, listen for the bounce.



Modern Submarine Warfare



ocean



THERMOCLINE



