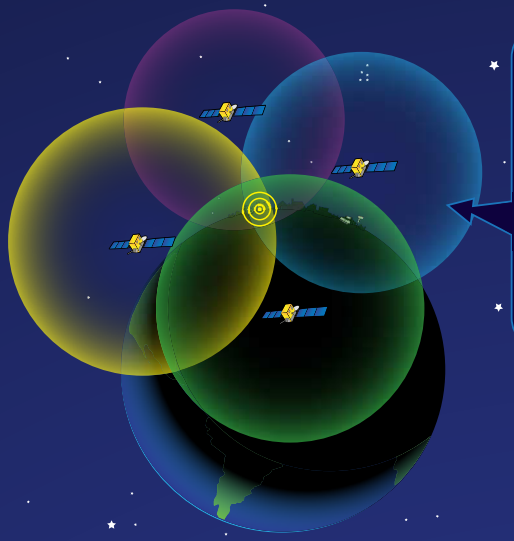
National Aeronautics and Space Administration

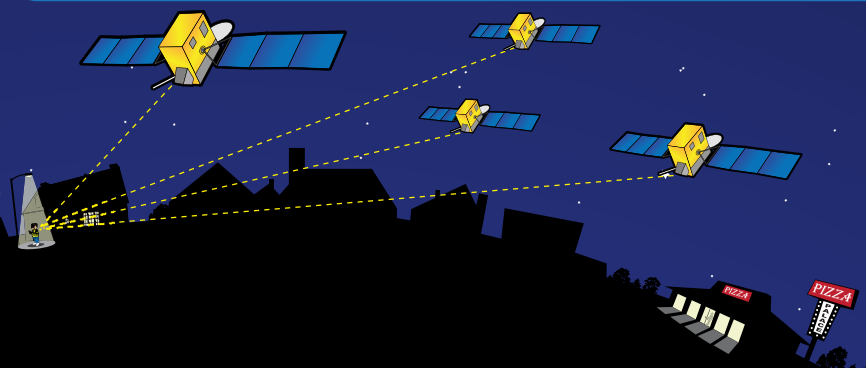
GPS and the Quest for Pizza

It's Friday night and you want some pizza. Somebody is going to have to pick that pizza up, though. How do you find the closest pizzeria? Plugging 'pizza' into a smartphone is a good start. But how does the phone know where you are? A Global Positioning System, or GPS, tells it, that's how…

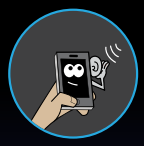


GPS receivers (your smartphone included) work by figuring out how far away they are from a number of satellites. They are programmed to know where the GPS satellites are at any given time.

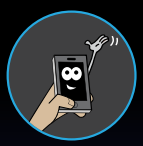
The satellites transmit radio signals towards the Earth. These signals identify the satellites and tell the receiver where they are located. The receiver then calculates how far away each satellite is by figuring out how long it took for the signals to reach it. Since it knows how far away the satellites are and where they are in space, it has all the information it needs. If the receiver knows its distance from four satellites, there is only one place on Earth it can be.



So, when you plug 'pizza' into your smartphone, this is what it is thinking:

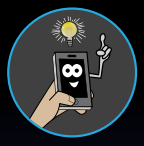


What satellites are talking to me right now?



Hey there, satellites! I know you guys! And I know where you are in the sky right now, too!

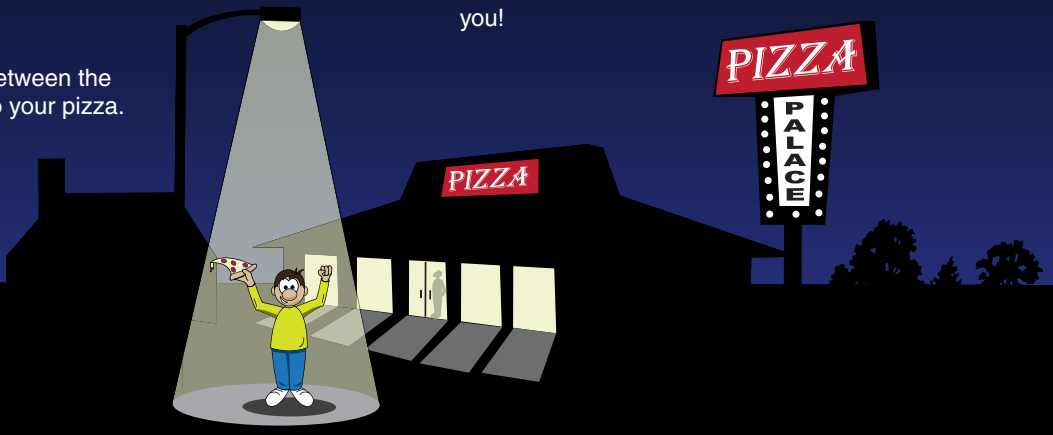
Let me listen to your signal to figure out how far away I am from each of you…



Oh! I must be right here! There's no other place that is the right distance away from each of you!

OK, let me check the internet to see what pizza places are near me…

Your phone connects the dots between the two points and leads you right to your pizza. All in a matter of seconds!



Space Place in a Snap!