



Kenmark International



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Technology User Group

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Cruise Control

Agenda

- Different levels of cruise controls
 - Basic
 - Adaptive
 - Advanced
 - Full Self-Driving (FSD)
- GPS (Global Position System)



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Cruise Control

- **Ralph Teetor** was an engineer and inventor who overcame blindness to develop the automotive feature we now know as **cruise control**
- A device that foreshadowed technologies like autonomous vehicles, GPS navigation, hazard automatic braking and lane assist systems.



Self-Driving Car Levels

A Brief Overview

- First, let's define exactly what constitutes 'autopilot'-like features.
- Autonomous systems many different forms:
 - Basic driver assistance features, like cruise control
 - Semi-autonomous
 - Full self-driving capabilities.
- The industry set of levels to classify this automation.



Self-Driving Car Levels

Level 0	No automation
Level 1	Semi-automated systems, like cruise control.
Level 2	Semi-automated systems, like steering, speed and braking.
Level 3	Primary driving functions are automated under some conditions.
Level 4	Primary driving functions are automated under most conditions.
Level 5	Primary driving functions are automated under all conditions.



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Basic Cruise Control

- The cruise control controlling the speed of your car.
- Can accelerate or decelerate the car by 1 mph with the tap of a button. Hit the button five times to go 5 mph faster.
- Several important safety features
 - The cruise control will disengage as soon as you hit the brake pedal
 - Early versions won't engage at speeds less than 25 mph (40 kph)
 - Will NOT stop or avoid obstacles



Basic Cruise Control

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- The **on** and **off** button for you might be hitting another button soon.
- The off button turns the cruise control off even if it is engaged. Some cruise controls don't have these buttons; instead, they turn off hitting the brakes, and turn on when hitting the set button.
- The **set/accel** button to maintain the speed. If setting button at 45 mph, the car will maintain your speed at 45 mph. Holding down the set/accel button will make the car accelerate
- If recently disengaged the cruise control by hitting the brake pedal, hitting the **resume** button the car to accelerate back to the most recent speed setting.



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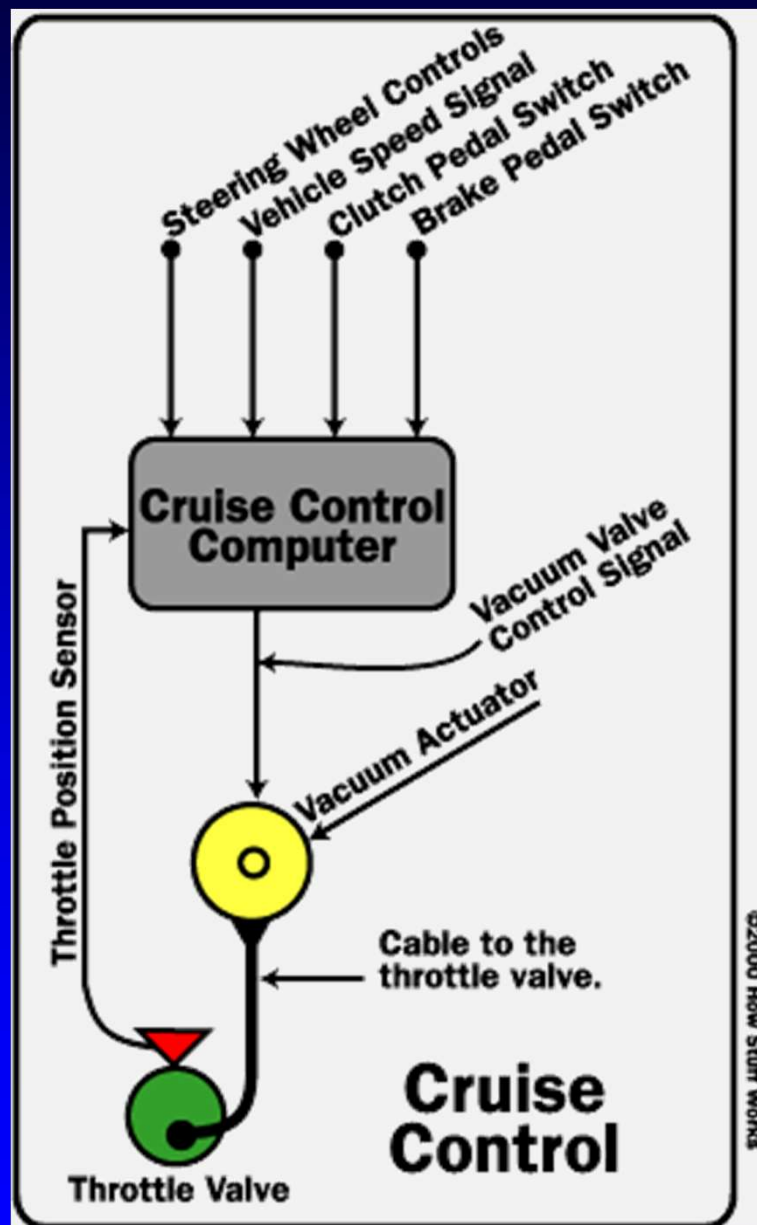
Basic Cruise Control

- Holding down the **coast** button will cause the car to decelerate
- Tapping the coast button once will cause the car to slow down by 1 mph
- The **brake** pedal and **clutch** pedal each have a switch that disengages the cruise control as soon as the pedal is pressed
- To shut off the cruise control using a light tap on the brake or clutch for manual cars



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Basic Cruise Control





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Adaptive Cruise Control

- **Adaptive cruise control**, uses forward-looking radar, installed behind the grill or in front, to detect the speed and distance of the vehicle ahead of it.
- This is achieved through a **radar headway sensor**, **digital signal processor** and **longitudinal controller**.



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Adaptive Cruise Control

- The 77-GHz Autocruise radar system made by TRW has a forward-looking range of up to 492 feet (150 meters)
- Operates at vehicle speeds ranging from 18.6 miles per hour (**30 kph**) to 111 mph (180 kph)
- Delphi's 76-GHz system can also detect objects as far away as 492 feet, and operates at speeds as low as **20 mph (32 kph)**.
- Some more advanced versions of cruise control can stop your vehicle if needed.



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Advanced Cruise Control

Advanced Smart Cruise Control (ASCC) systems.

- Hyundai Smart Cruise Control also has the same elements of adaptive cruise control.
- The radar system emits waves that reflect off of the car in front of yours, detecting its speed. If the preceding car speeds up or slows down, the **Smart Cruise Control adjusts your vehicle's speed accordingly.**
- It also has a **Stop and Go setting**, which tracks the driving behaviors of cars around you during traffic.



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Advanced Cruise Control

Advanced Smart Cruise Control (ASCC) systems.

- Hyundai has a collection of other standard safety features:
 - Driver drowsiness monitoring
 - Forward automatic emergency braking
 - Lane-keeping assist.
 - Higher trims (I.E. Genesis models) can have blind-spot monitors, sensing any vehicle driving above 20 mph.



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Auto Pilot features

- **Top Cars with AutoPilot features for 2023:**
- **Tesla (Model 3, Y, S & X) only Tesla can do off-highway**
- GM – (Cadillac CT6, Cadillac Escalade, Chevy Bolt, Hummer EV)
- Audi (A6, A8)
- BMW (X5, 3 Series)
- Ford / Lincoln (Mustang Mach-E, Ford F-150)
- Kia / Hyundai (Telluride, Palisade, Sonata)
- Mercedes Benz (E-Class, S-Class)
- Volvo (XC90, XC60, XC40)
- Nissan (Rogue, Leaf, etc.)
- Infiniti (QX50)



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Tesla Full Self-Driving (FSD)

version 11.3.3

- FSD end-to-end driving version 11.3.3 or later
- Is a Beta version
- **When activating FSD under security screen all drivers must agree to have two hands on the steering wheel and be in full control.**
- **The car will remind you if not.**
- **If you don't control something after final warning, FSD will deactivate until next drive and flag you.**
- **After 5 flags FSD will not activate for 2 weeks.**



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Tesla Full Self-Driving (FSD)

- The cost of FSD is \$15,000
- Tesla Full Self Driving **subscription** is now available for **\$199 a month**
- To install the **FSD** computer, schedule an installation appointment from the **Tesla** app
- **Subscription Pricing** Your vehicle's current Autopilot package of Basic Autopilot or Enhanced Autopilot will determine the **FSD** capability subscription price. *Enhanced Autopilot (EAP) is only available in select markets



Tesla Full Self-Driving (FSD)

- Prior to version 11 Tesla used 2 stacks software controls:
 - One for Highways
 - One for inner city driving
 - Highway stack was 4 year was similar to advanced cruise control system
 - Tesla would not exit highways
 - Crashes that hit the fake news stating FSD was used. FSD did not exist on Highways stack then



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Tesla Full Self-Driving (FSD)

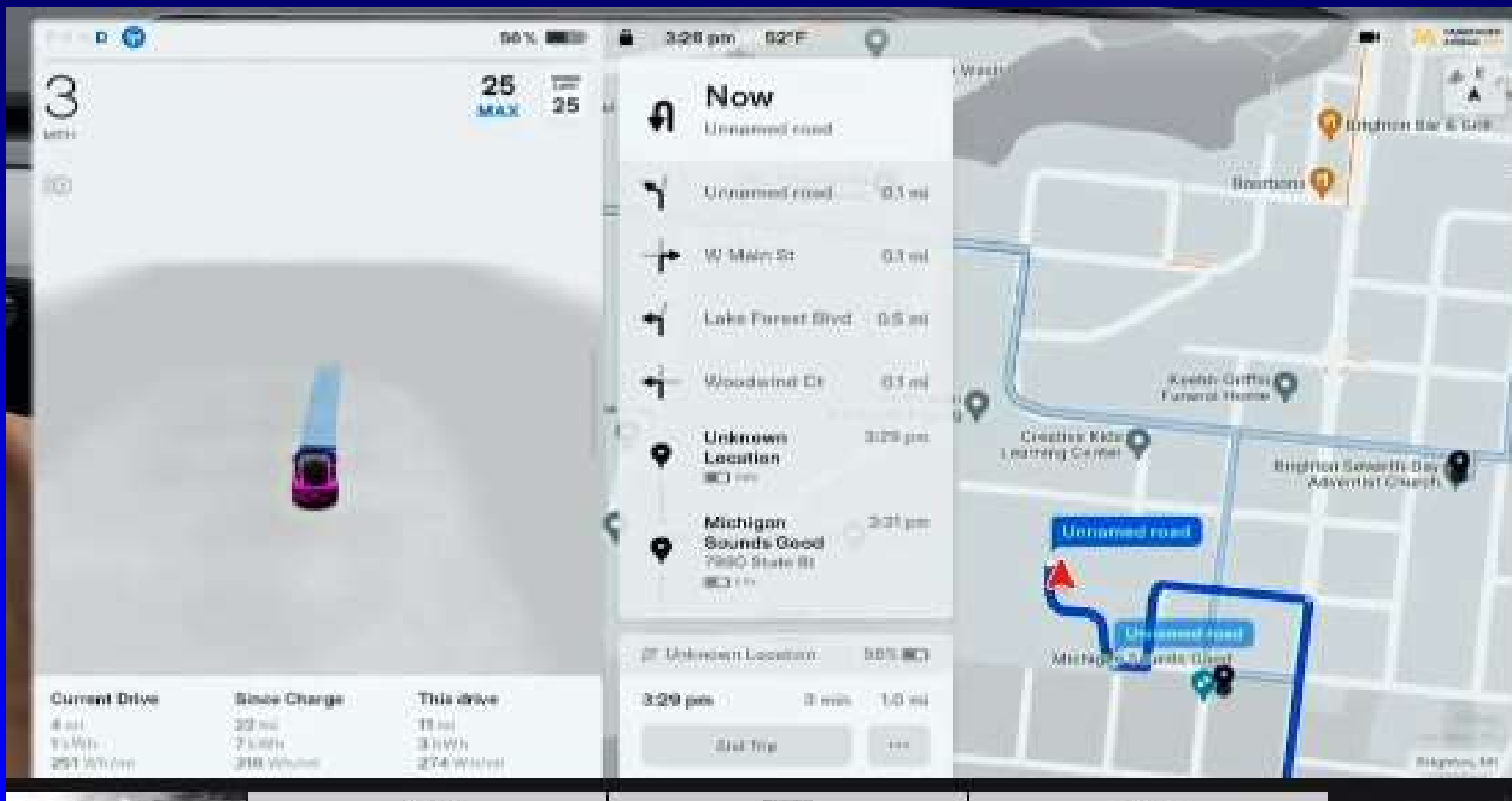
version 11.x.x

- Version 11.x.x Tesla use 1stack. Referred to end-to-end driving
- Latest versions 2022.45.15 and FSD 11.3.6
- Tesla will exit highways using FSD directions
- Forced take over from FSD the Microphone icon pops up and you can dictate the situation and the video clip with audio will be sent to Tesla
- Has happened to me a few times.



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Tesla Full Self-Driving (FSD) version 11.x.x





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Tesla Full Self-Driving (FSD) version 11.x.x





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Tesla Full Self-Driving (FSD)

version 11.3.3

- Tesla owner AI DRIVR – who has been testing Full Self-Driving (FSD) for years
- This time, he puts a Tesla Model S through a FSD torture tests, skipping over the easiest obstacles and attempting those that the technology struggled to avoid in his previous tests.
- **Watch Tesla's Full Self-Driving Beta V11 Avoid Various Obstacles**
- <https://youtu.be/rwPW2z6gcDM>



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GPS

Global Position System

- Originally developed in the 1970s for use by US armed forces, the Global Positioning System (GPS) network
- In 2003, physicist Dr. Ivan Getting and engineer Col Bradford Parkinson were awarded the prestigious Draper Prize by the US National Academy of Engineering for making **GPS a reality using 30-plus satellites**
- Has uses in everything from archaeological surveys to self-driving cars.



🖼 Images for who invented GPS





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GPS

- In 1983, President Ronald Reagan authorized the use of **Navstar** (or **GPS** as it became known) by civilian commercial airlines in an attempt to improve navigation and safety for air travel.
- The authorization to provide free access to **GPS** data to industries outside the U.S. military became the first step towards authorized civilian usage.



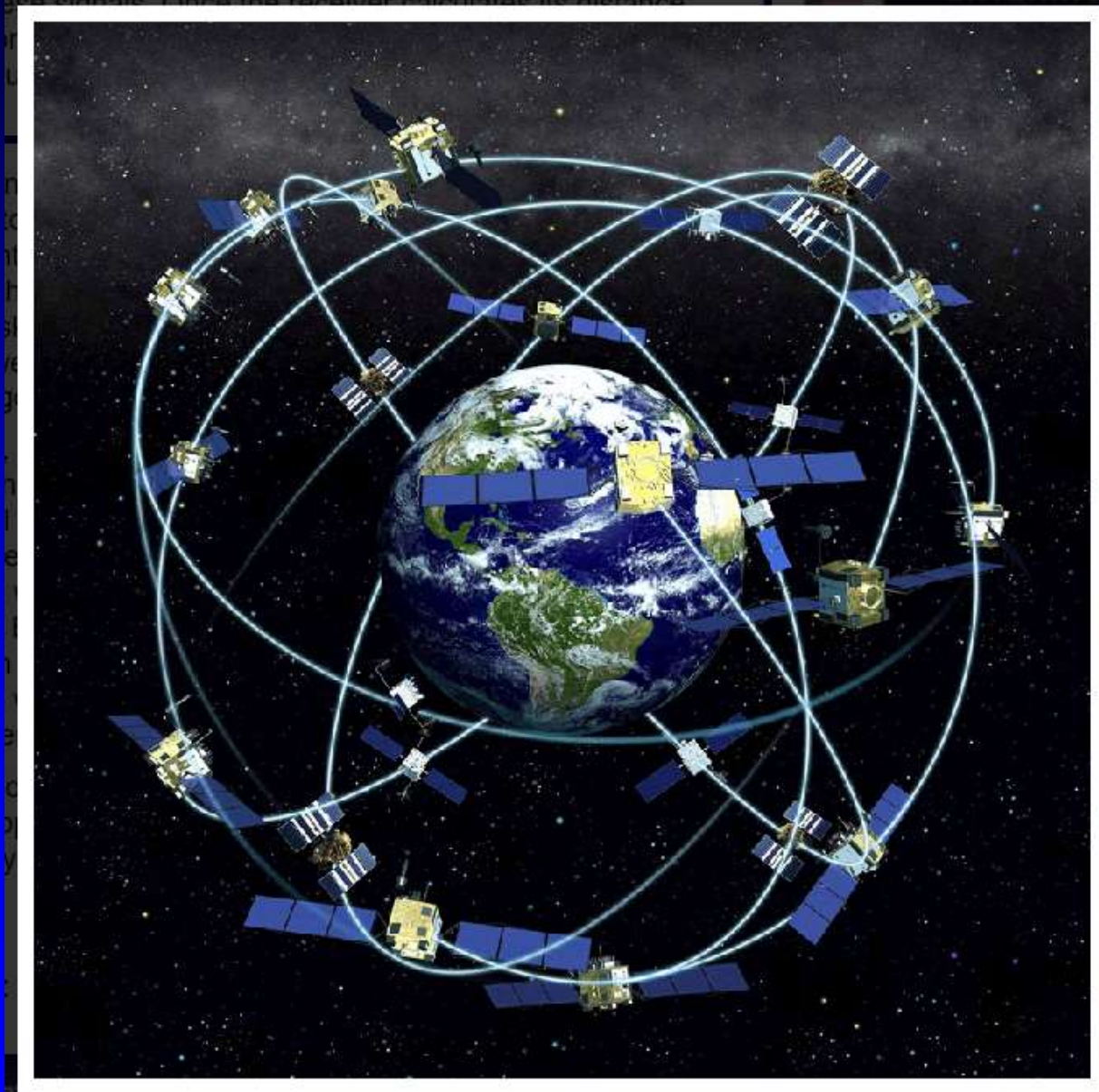
GPS

- GPS is a system of 30+ navigation satellites circling Earth.
- We know where they are because they constantly send out signals.
- Access GPS receiver in your:
 - Phone
 - Car
 - Tablet listens for these signals.
- The receiver calculates its distance from four or more GPS satellites, it can figure out where you are.



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GPS





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GPS

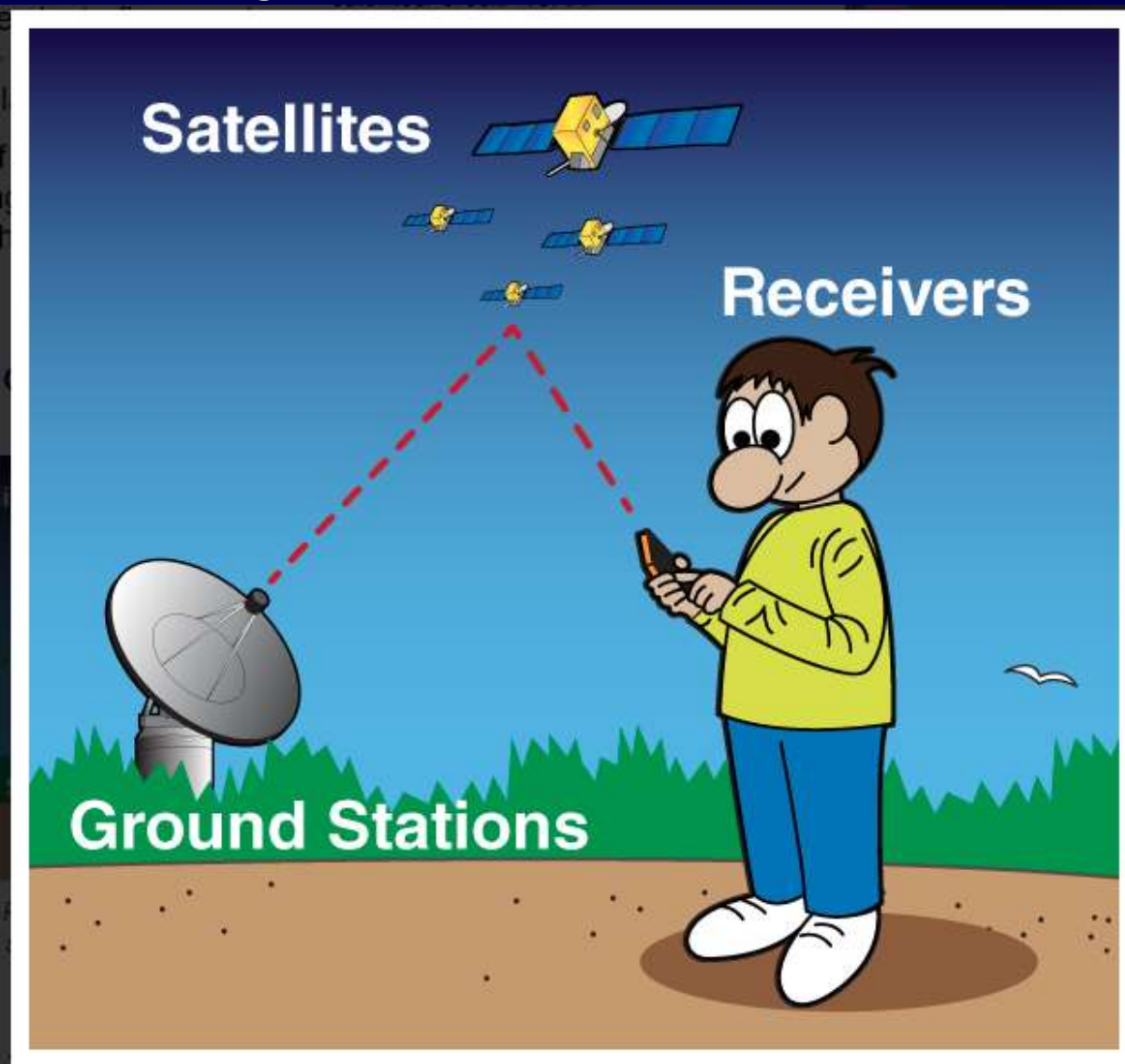




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GPS

GPS is a system. It's made up of three parts: satellites, ground stations, and receivers.





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GPS

Global Position System

- Using GPS and cruise control will not prevent you from having an accident.
- You are responsible to steer, Brake and stop if needed
- This is till true for Tesla FSD version 11.x.x