

King Fahd University of Petroleum & Minerals
City & Regional Planning Department
CRP 514

*Global Positioning System
(GPS)*

Definition, Applications

By:

Ziyad Bahamdan

993584

Outline

- ✧ Introduction
- ✧ What is GPS
- ✧ GPS Components
- ✧ Case Study
- ✧ Discussion
- ✧ Conclusions



The background of the slide features a stylized image of the Earth, showing the continents of North and South America. The image is overlaid with a white grid pattern, suggesting a global or technological theme. The overall color palette is light blue and white.

Introduction

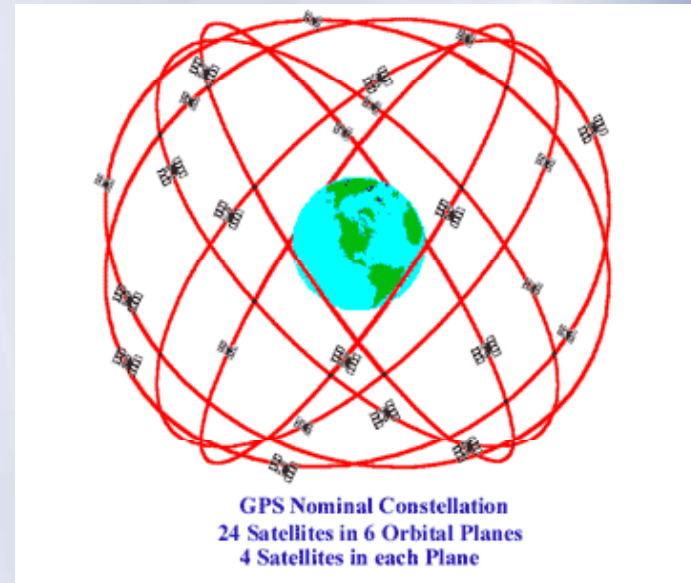
- ✧ Satellite Navigation System
- ✧ Innovative breakthrough
- ✧ Revolutionary technology
- ✧ Changing the way businesses operate
- ✧ Found in:
 - ✧ Planes - flying
 - ✧ Ships - sailing
 - ✧ Cars -driving
 - ✧ Mobile - walking

Introduction

- ✧ First developed US government for military use in the late 1970s
- ✧ Made available to the general public in the form of handheld receivers
- ✧ One of the most fantastic utilities ever developed
 - ✧ Bringing efficiency and cost savings to businesses, governments and individuals
- ✧ Provides your geographical locations

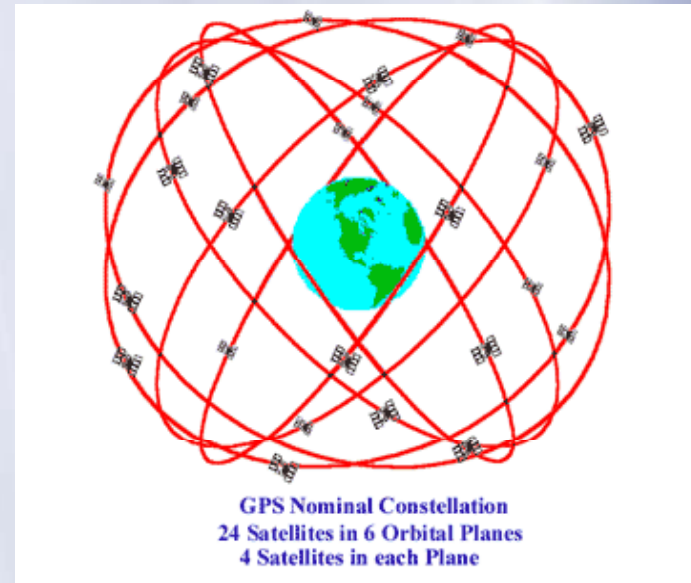
What is GPS?

✧ A satellite-based navigation system consisting of a network of 24 orbiting satellites that are eleven thousand nautical miles in space in six different orbital paths.



What is GPS?

- ❖ Satellites are constantly moving, making two complete orbits around the Earth in 24 hours.
- ❖ *If you do the math, that's about 2000mph.*



GPS Components

❖ Space Segment

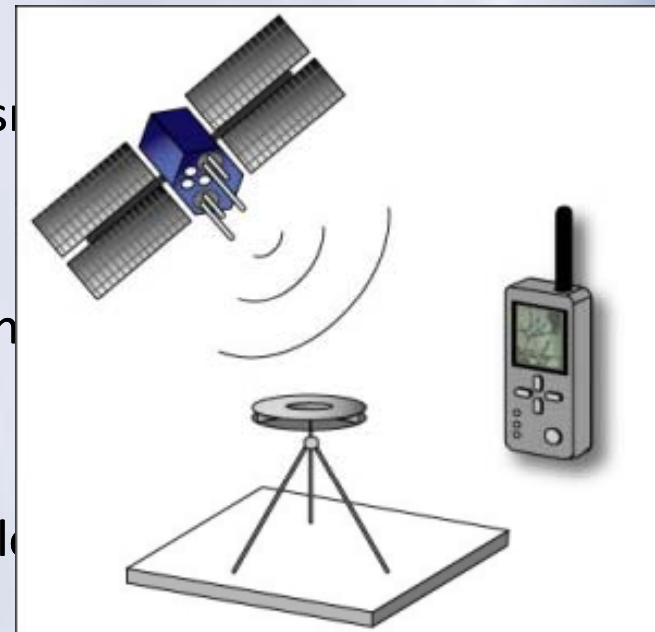
- ❖ Constellation of satellites, with transceiver and atomic clock

❖ Ground Segment

- ❖ Global network of monitoring stations that receive signals from the satellites and determine their positions

❖ User Segment

- ❖ Person or system, having antenna, receiver, and display



GPS Components

- ✧ **Positioning** means the determination of stationary or moving objects.
- ✧ In relation to a well-defined coordinate system, usually by three coordinate values
- ✧ In relation to other point, taking one point as the origin of a local coordinate system



GPS Components

❖ How the system work?

- ❖ Satellites sending information to receivers.
- ❖ Information includes time, position, and satellite strength.
- ❖ Receivers pick up this information and use it to determine the users location.
- ❖ Using signals from at least four satellites, a receiver can determine latitude, longitude, and elevation.
- ❖ Some receivers can then convert the latitude and longitude into other coordinate system values



Case Study: Paulding County School District

- ✧ **Company:** Paulding County School District. Includes 28 schools and more than 20,000 students.
- ✧ **Industry:** Education/Transportation
- ✧ **Region:** Americas
- ✧ **Company Size:** Large Enterprise - 370 employees
- ✧ **Challenge:** A busy transportation manager wanted a mobile device that would relay GPS information on the movement of county school buses while he is away from his desktop computer.
- ✧ **Partner Solution:** Comet Tracker from Actsoft Inc.
 - ✧ Leading developer of mobile management and GPS location tracking software
 - ✧ Offers solutions with built-in GPS services on wireless devices



Case Study: Paulding County School District

- ✧ Not a small challenge to know where 20,000 students are each day as they're bused between 28 schools and many after-school events.
- ✧ Yet Jim Black, *Assistant Director of Transportation at Paulding Country School District in Georgia*, must know exactly where his 280 buses are at all times.



Case Study: Paulding County School District

- ❖ Earlier, conversations on cell phones or two-way radios were utilized.
- ❖ Things changed for the better when each bus was equipped with GPS-enabled devices that sent their coordinates back to a central tracking system.
- ❖ But for Black, this still meant he had to be at his desktop computer to see where his buses were.



Case Study: Paulding County School District

Jim Black Said:

“I am out of my office about 75% of the time at driver locations, when there are bus incidents, and a lot of things happen after hours when I’m not in my office. Having GPS on the buses did no good when I could not get to the data”.



Case Study: Paulding County School District

✧ Solution:

- ✧ The School district now uses Comet Tracker, a wireless GPS application from Act Soft Inc.
- ✧ With the Comet Tracker application installed on a smart phone, they now have a solution to look up and pinpoint every GPS-tracked bus in the school district.

Discussion

✧ **Helps with Operations Management:**

- ✧ Looking up exact locations of school buses,
- ✧ Accurate reporting for their arrival times to schools,
- ✧ Allow parents to access all these data.

✧ **Accurate Decision-making:**

- ✧ Supervisor can easily and accurately assess bus traffic in order to supports the ability to make better management decisions.

✧ **Cost Reductions:**

- ✧ By saving unnecessary calls between dispatcher and the bus driver to get their locations.



Discussion

✧ **Faster Responses:**

- ✧ In an accident or disciplinary incident involving a bus, supervisor no longer has to rely on dispatchers or drivers to relay the location – which helps arriving to site faster and reduces the load on the dispatcher.

✧ **More Free Time:**

- ✧ Supervisor doesn't have to stay on call as much waiting for the phone to ring because he can easily check the status of all buses at any time.

Conclusions

- ✧ Introduction about GPS technology
- ✧ GPS was defined
- ✧ Discussed the GPS Components
- ✧ Case Study was demonstrated
- ✧ Discussion of results



Conclusions

- ✧ Accurate Information from the Road
- ✧ Responsiveness When It's Needed

Conclusions

❖ Other Fields can benefit from this:

❖ Dispatching process company

❖ Taxi Companies

❖ Personal Drivers

❖ Emergency responses

❖ In USA, mandated by FCC to be built in every mobile device and developed the E911 service to:

❖ Determine the location of accidents

❖ Determine the location of kidnapped



Conclusions

- ✧ The future of GPS is as unlimited as your imagination.
- ✧ New applications will continue to be created as technology evolves.
- ✧ GPS satellites are like stars in the sky, they will be guiding us well through out the 21st century.