Asset Management: GPS Latest Technology

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Precision Laser & Instrument Inc.

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GPS: It Is Rocket Science…

GPS: (Global Positioning System)

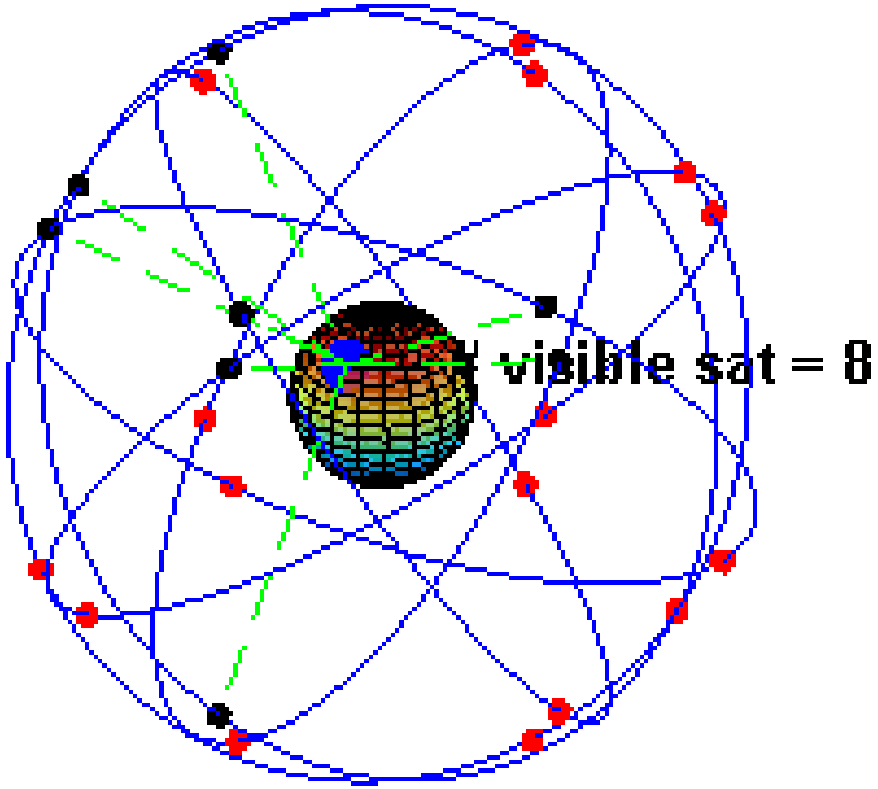
Managed by the USAF

Min SV's: 24

Current SV's: 32+

Real-Time Accuracy

10-15m



GLONASS

Russian Space Forces
21+ SV's
Real-Time Accuracy
-approx 4.5-8.5m
(7+SV's)

Other Systems

Galileo – European Union

COMPASS – People's Republic of China

IRNSS –India

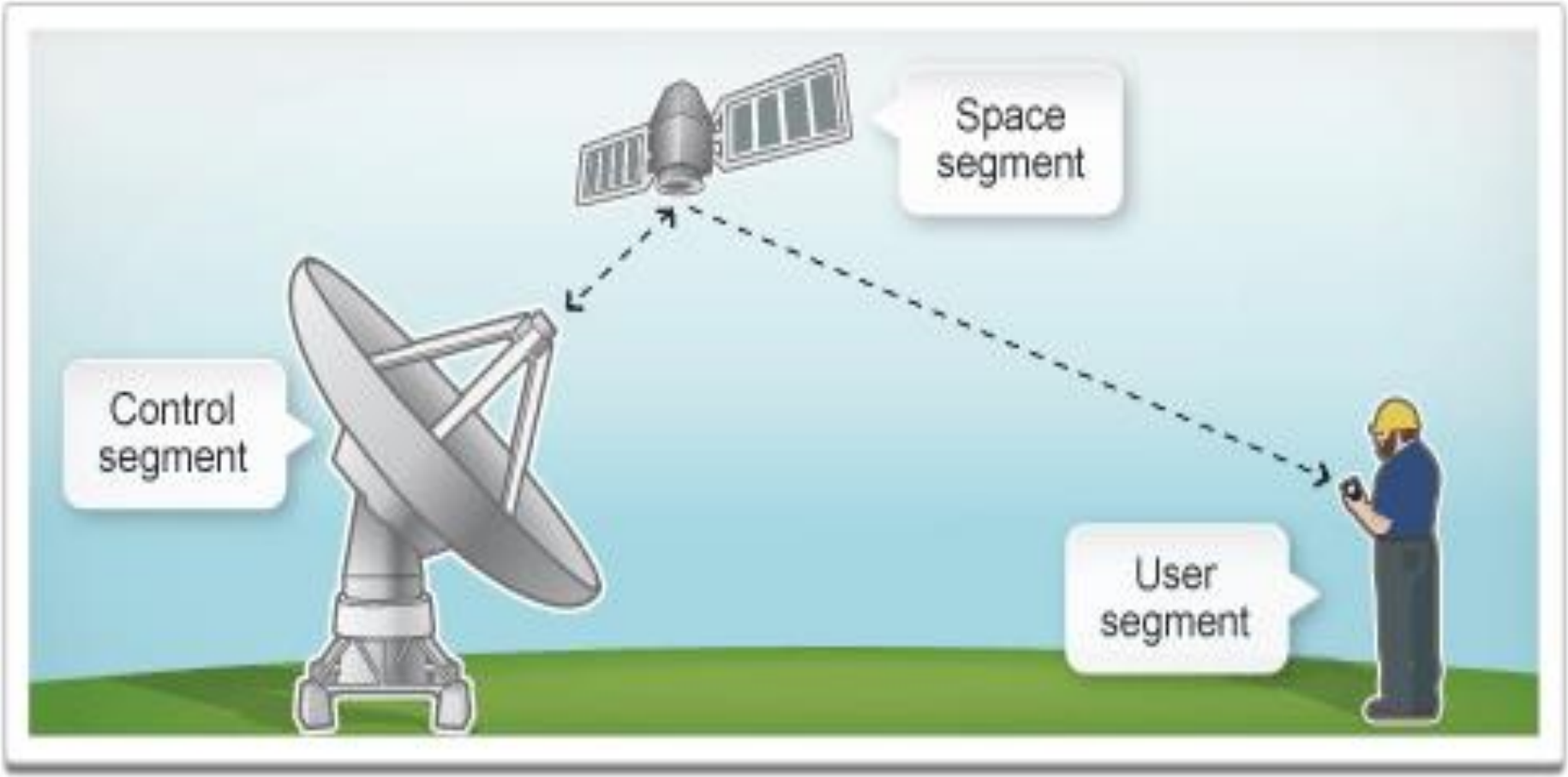
QZSS – Japan

Put them all together…

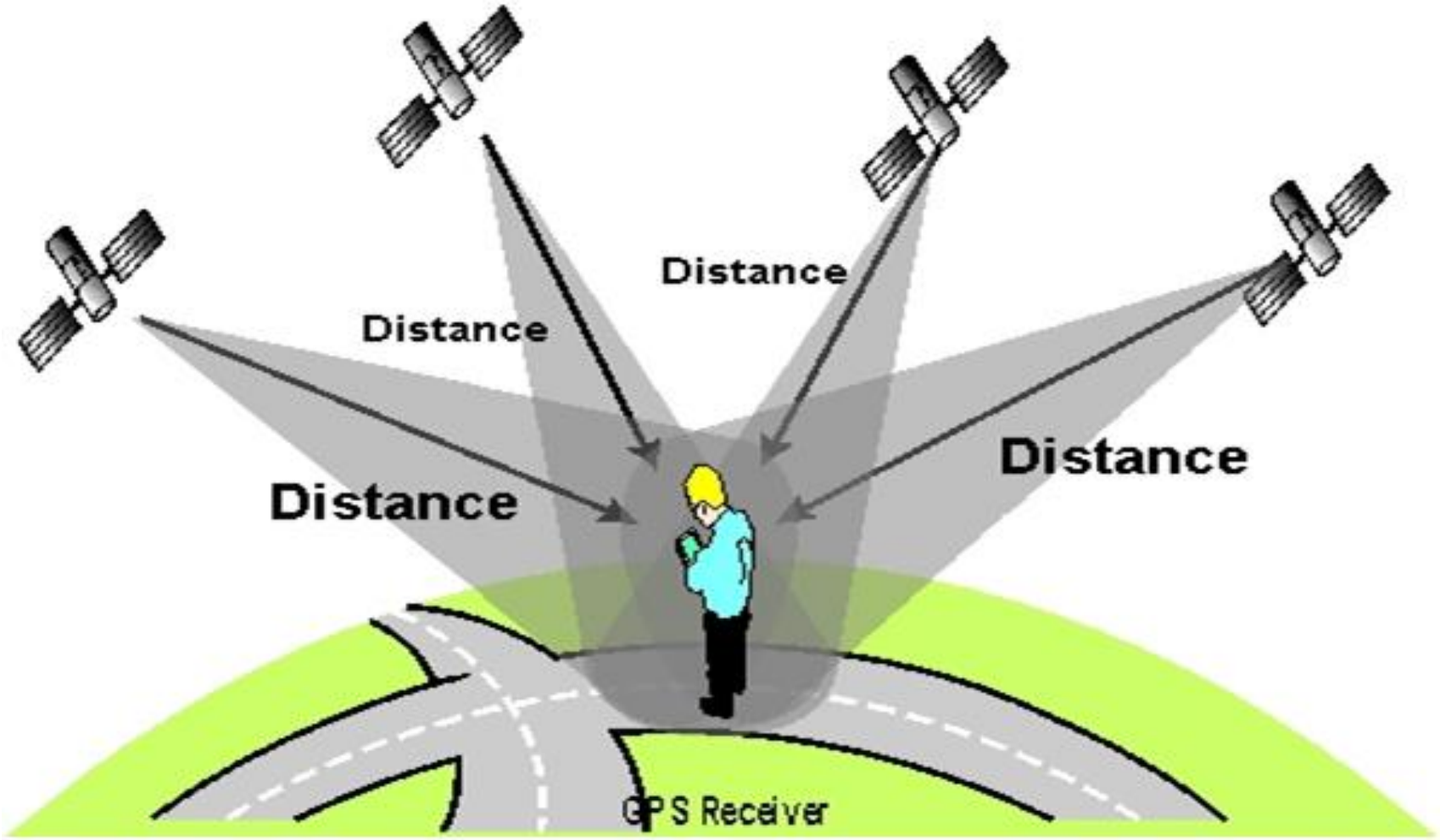
GNSS (Global Navigation Satellite System)

More is better!

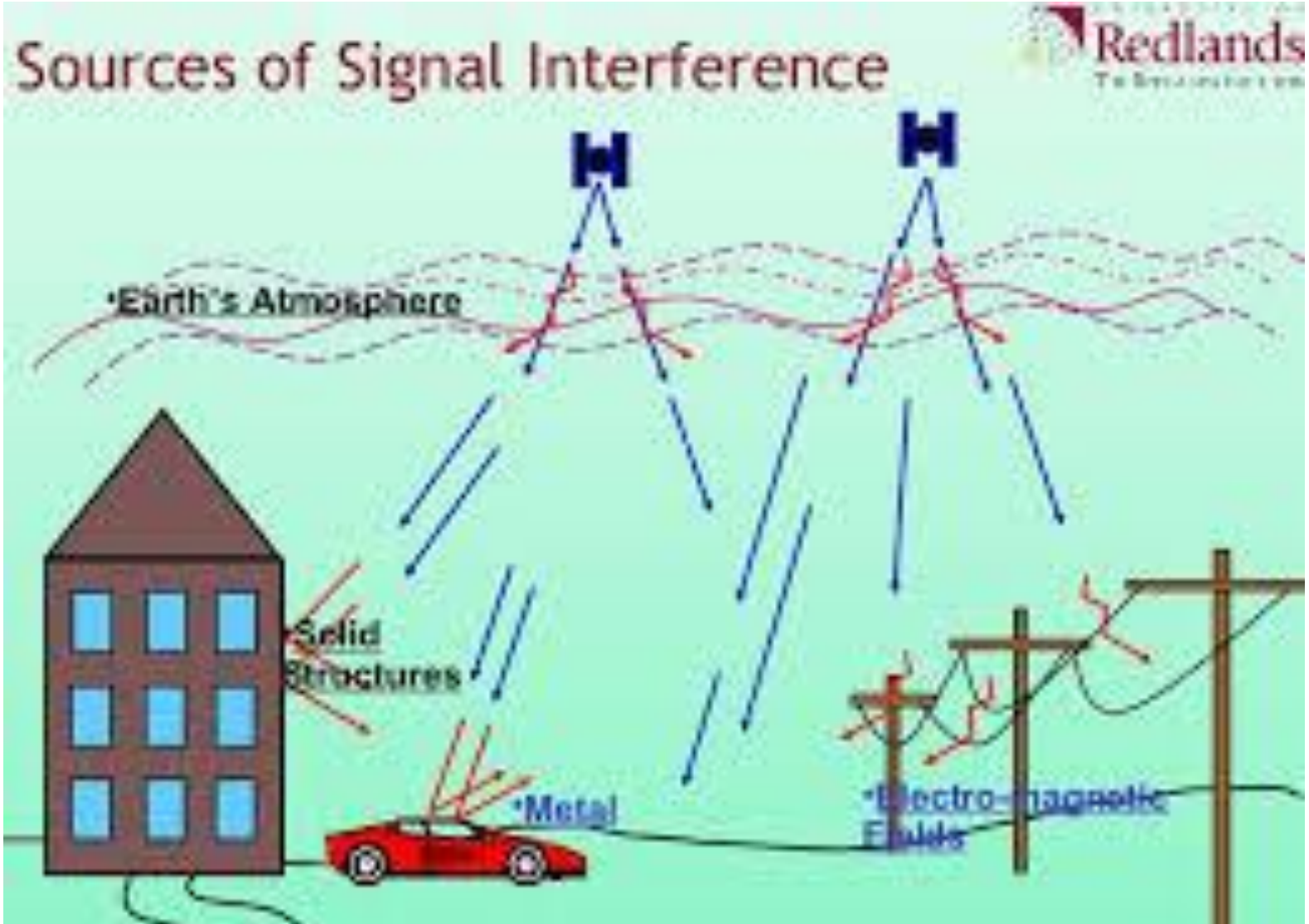
GNSS Segments



It’s All About Distance and Time



Sources of Error



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Accuracy

Levels of Accuracy

Commercial

- Raw GPS signal
  - 10-15 meters
- Location Services
  - 8 meters

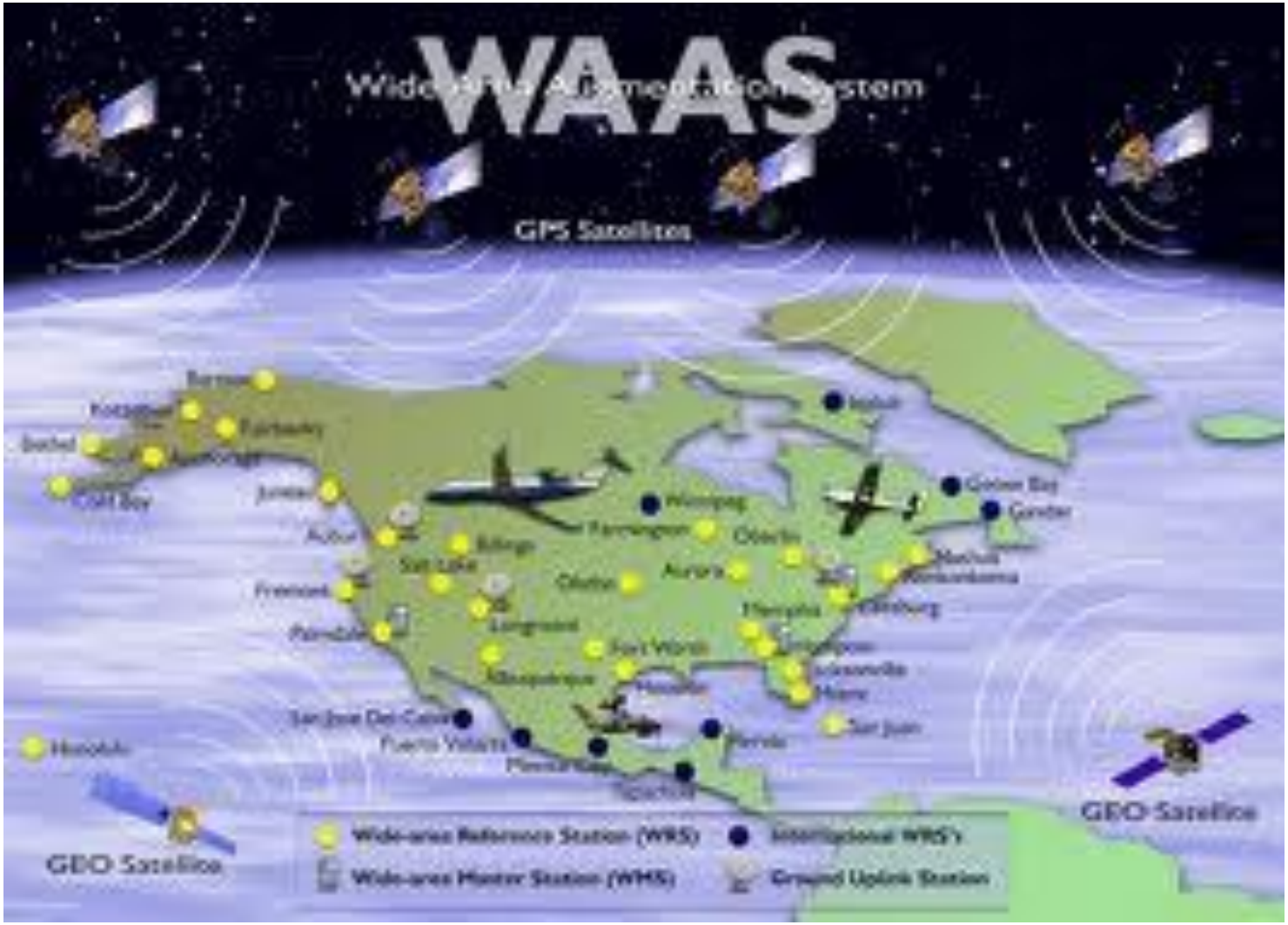
Mapping

- DGPS: Differential GPS
  - Sub-meter
- Post Processing
- Real Time
  - Sub-foot
  - Centimeter

- Location Services
  - Smart devices
  - Assisted GPS
    - Satellites
    - WiFi
    - Cell Towers
  - Determine Location Quickly

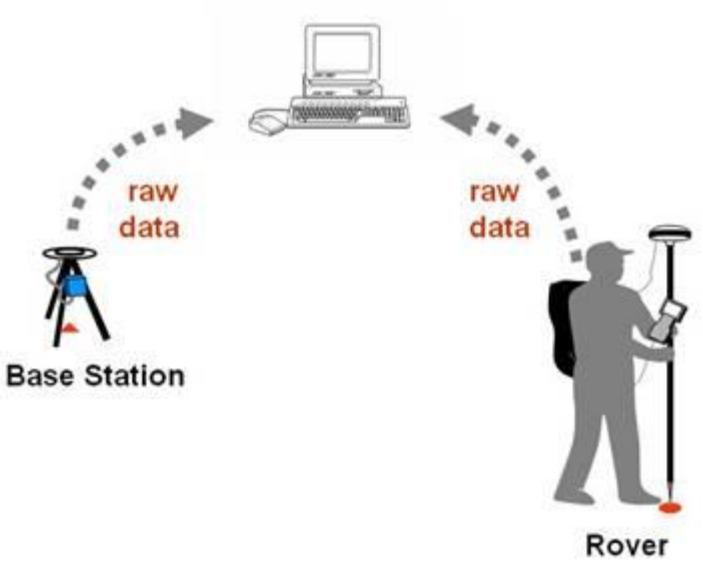
- Real Time
  - SBAS (WAAS: Wide Area Augmentation System)
    - Designed for aircraft navigation
    - No internet connection necessary
    - Free
    - < meters accuracy typically

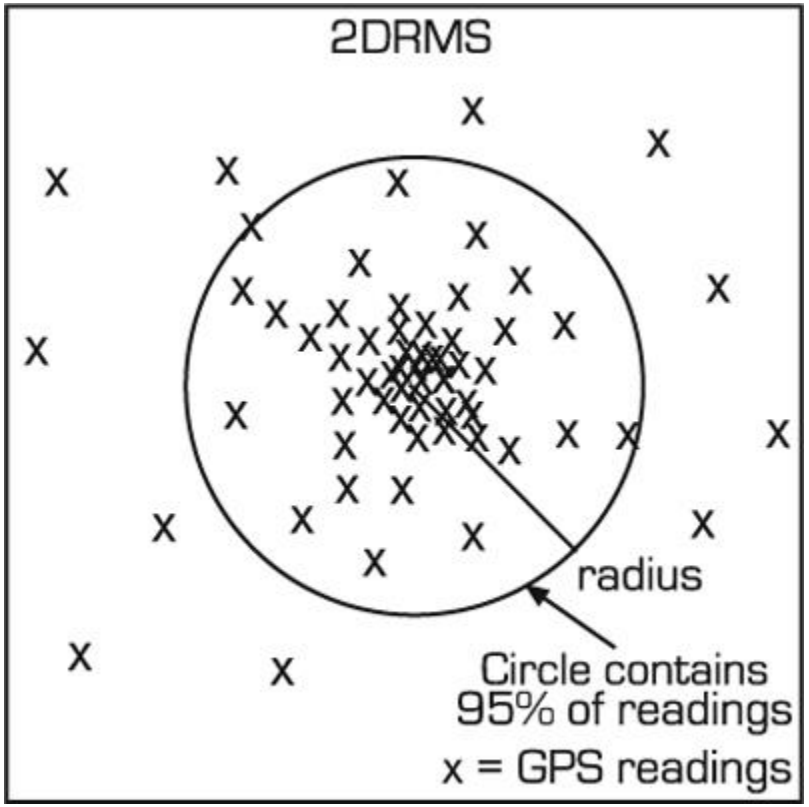
- Real Time (WAAS)



- Post Processing
  - the processing of GPS data after it has been collected in order to eliminate error. This involves using PC software to compare data from the rover to data collected at the base station. Because the base station is on a known location, systematic errors can be determined and removed from the rover data.

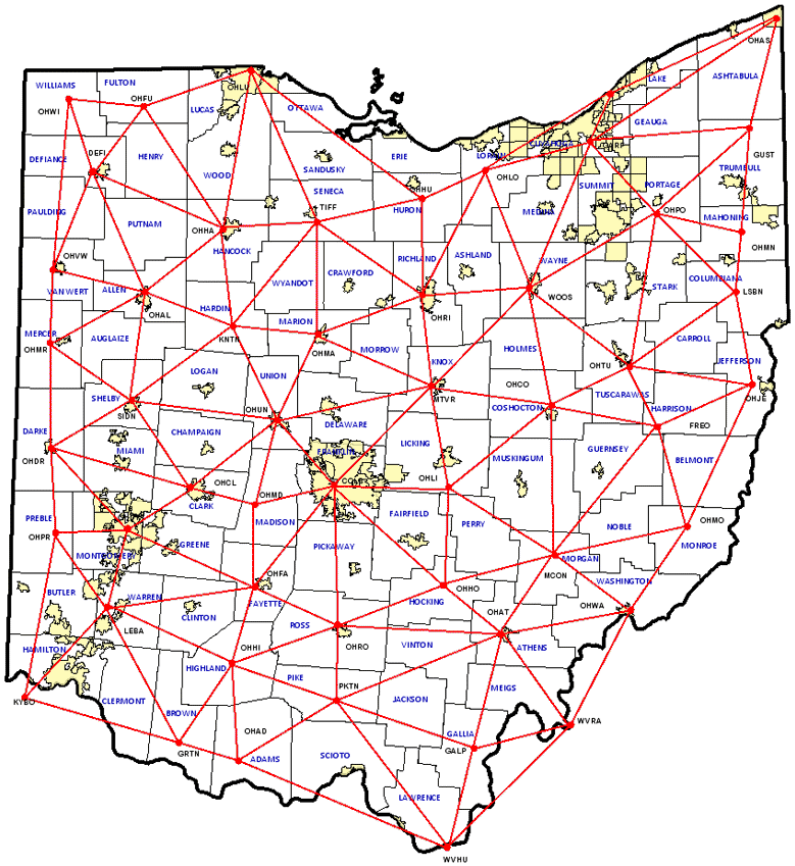
- Post Processing

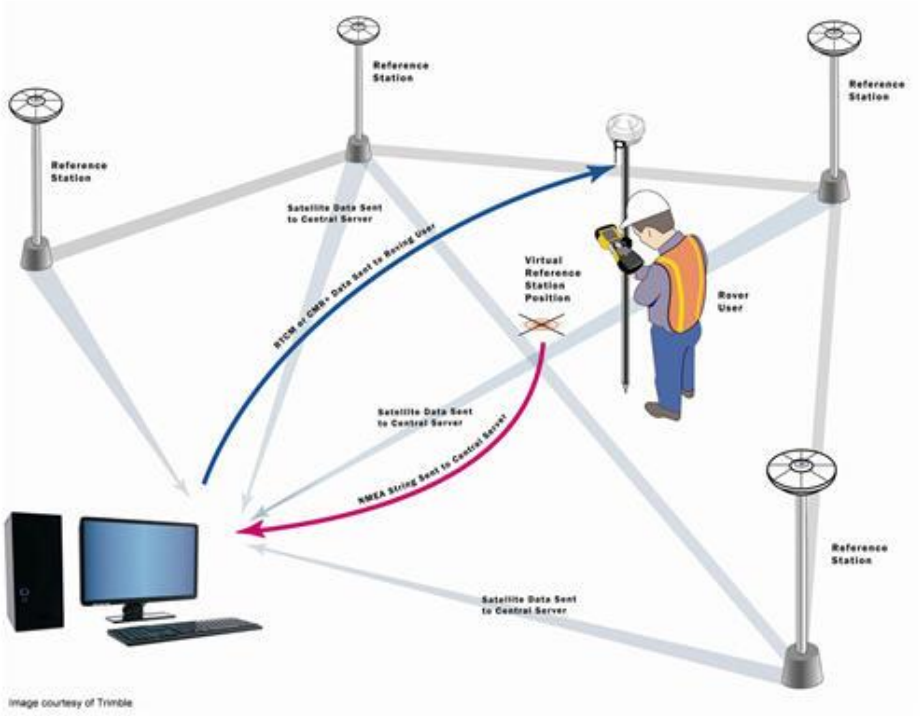




- Real Time
  - VRS (Virtual Reference Stations)
    - Operated by ODOT
    - Requires an internet connection
    - Free for now
    - 2.8” accuracy possible

- Real Time
  - VRS (Virtual Reference Stations) Ohio





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Why Integrate GNSS Into Your GIS?...

Why Integrate GNSS Into Asset Mgt.

- Regulatory Compliance
- Brain Drain
- Ease of Use
- Navigation back to assets
- Integrate Photos or Signatures

Regulatory Compliance

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Brain Drain

Don't let that knowledge walk out that door!!

"It's projected that in the next 10 years, 37 percent of the water utility workers and 31 percent of wastewater utility workers will retire." EPA Task Force on Workforce Sustainability Final Report

Why Integrate GNSS Into Asset Mgt.

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- Integrate Photos or Signatures

Ease of Use

- **Use your own device**
  - **iOS, Android, Windows 10**
- **Familiar map backgrounds**
- **Intuitive Apps / Work flows**
- **Work Connected or Offline**

Why Integrate GNSS / GIS?

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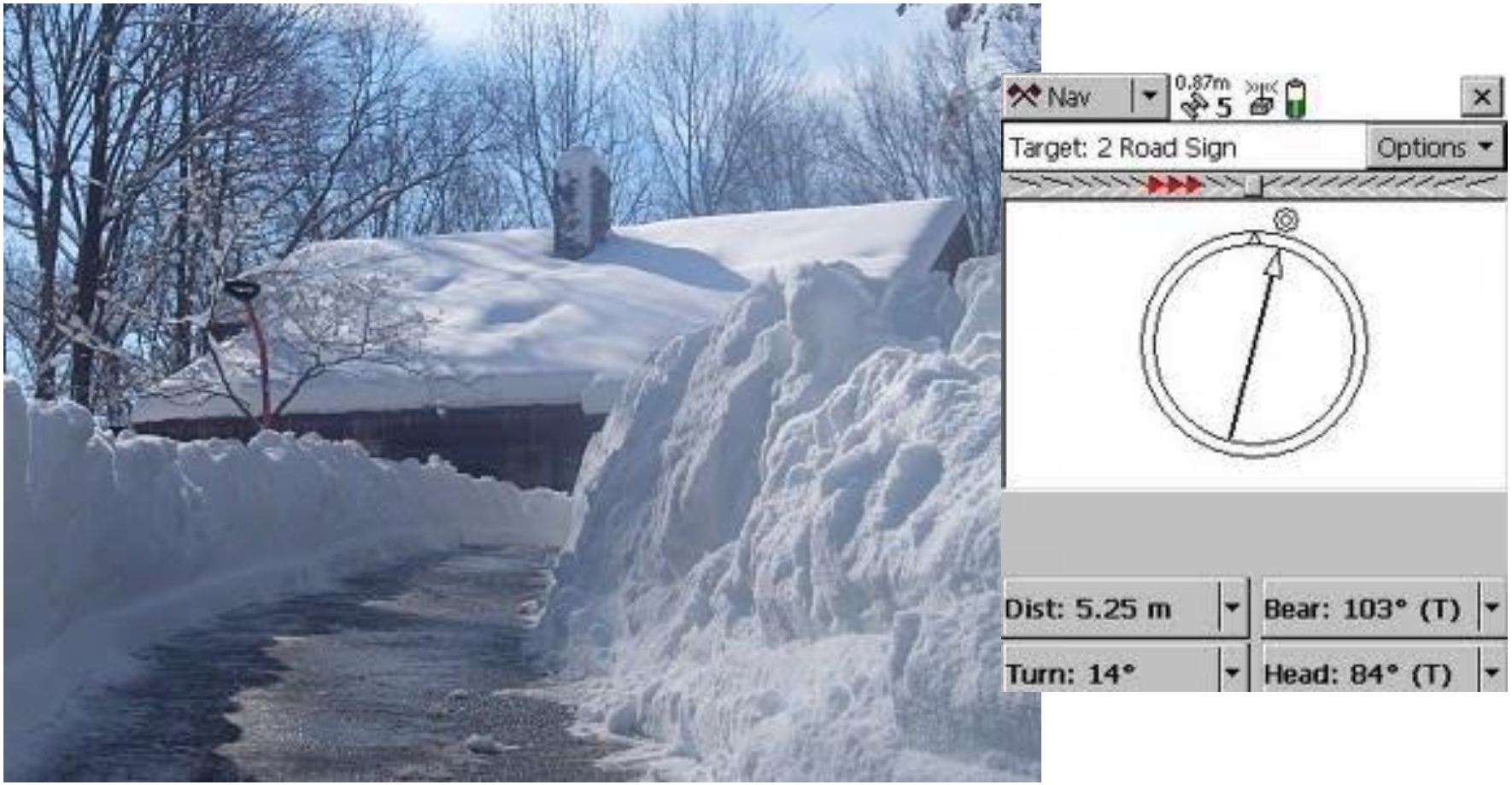
Navigate Back to Assets

Where Is That Valve?.....



Why Integrate GNSS?

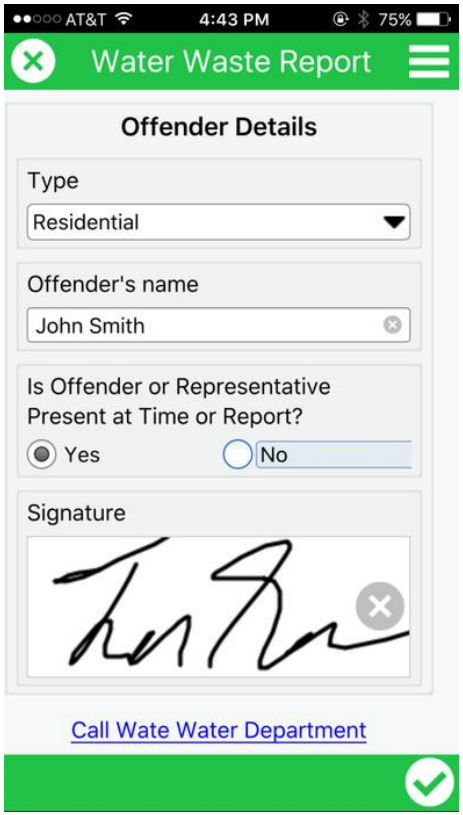
- Regulatory Compliance
- Brain Drain
- Ease of Use
- Navigation back to assets
- Integrate Photos, Signatures or Barcodes / RFID

Integrate Photos, Barcodes and Signatures

A picture is worth a thousand words…

- Associate a photo directly to an asset
- Watermark time and data directly on the image
- Watermark accurate XY coordinates on the image
- Capture customer or mgt. signature
- Scan and capture barcodes or RFID

(10) ABC123 (21) 0001



External Sensors

Street Sign Reflectivity

Ground Penetrating Radar

Utility Line Locator

The Bottom Line

- Technology has made GPS smaller, more accurate and affordable.
- Mapping grade GPS has enabled field workers to gather better, more accurate data in the field
- Advancements in GPS technology has enabled the professionals and the public to share data in almost real time.

Thank You

Any questions or feedback

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