National Park Service's Real Time Differential Service

ntrip.nps.gov

T. Smith, Sept. 2021

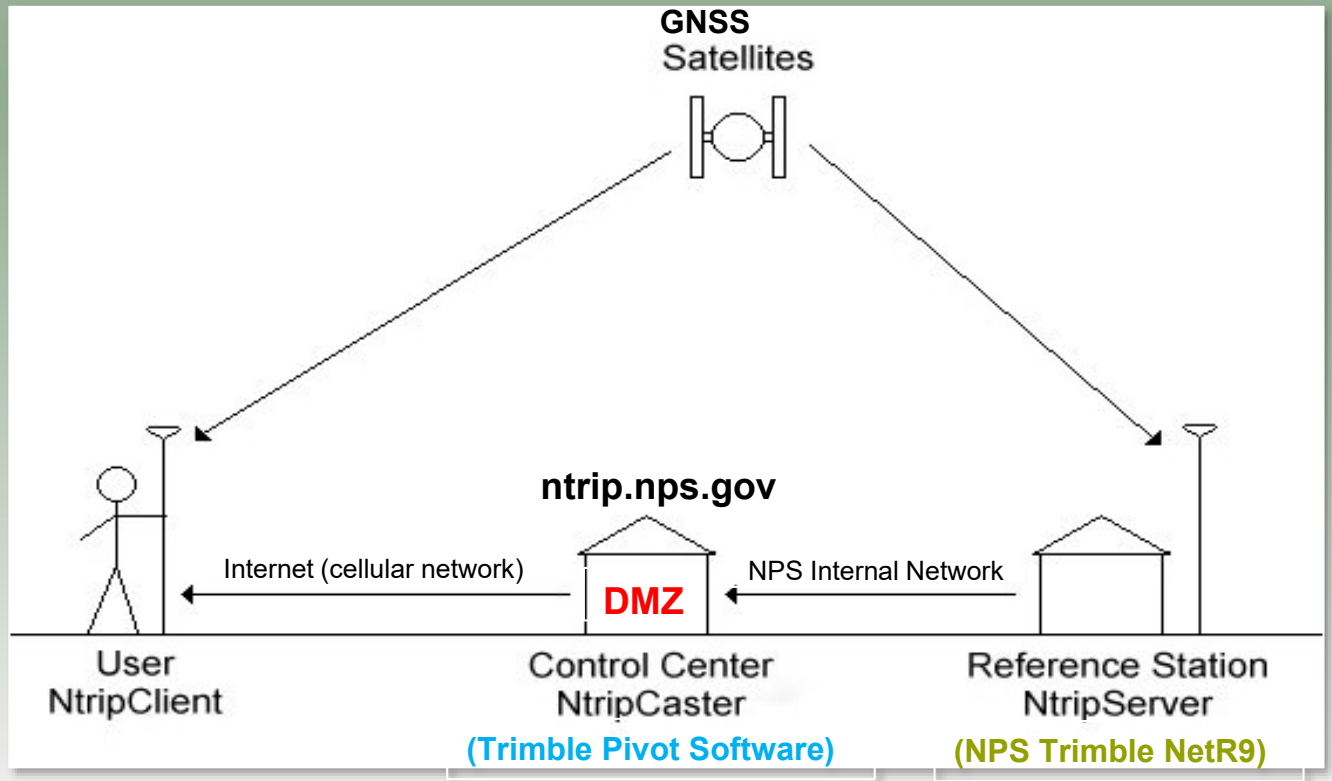
Why is this important for the NPS?

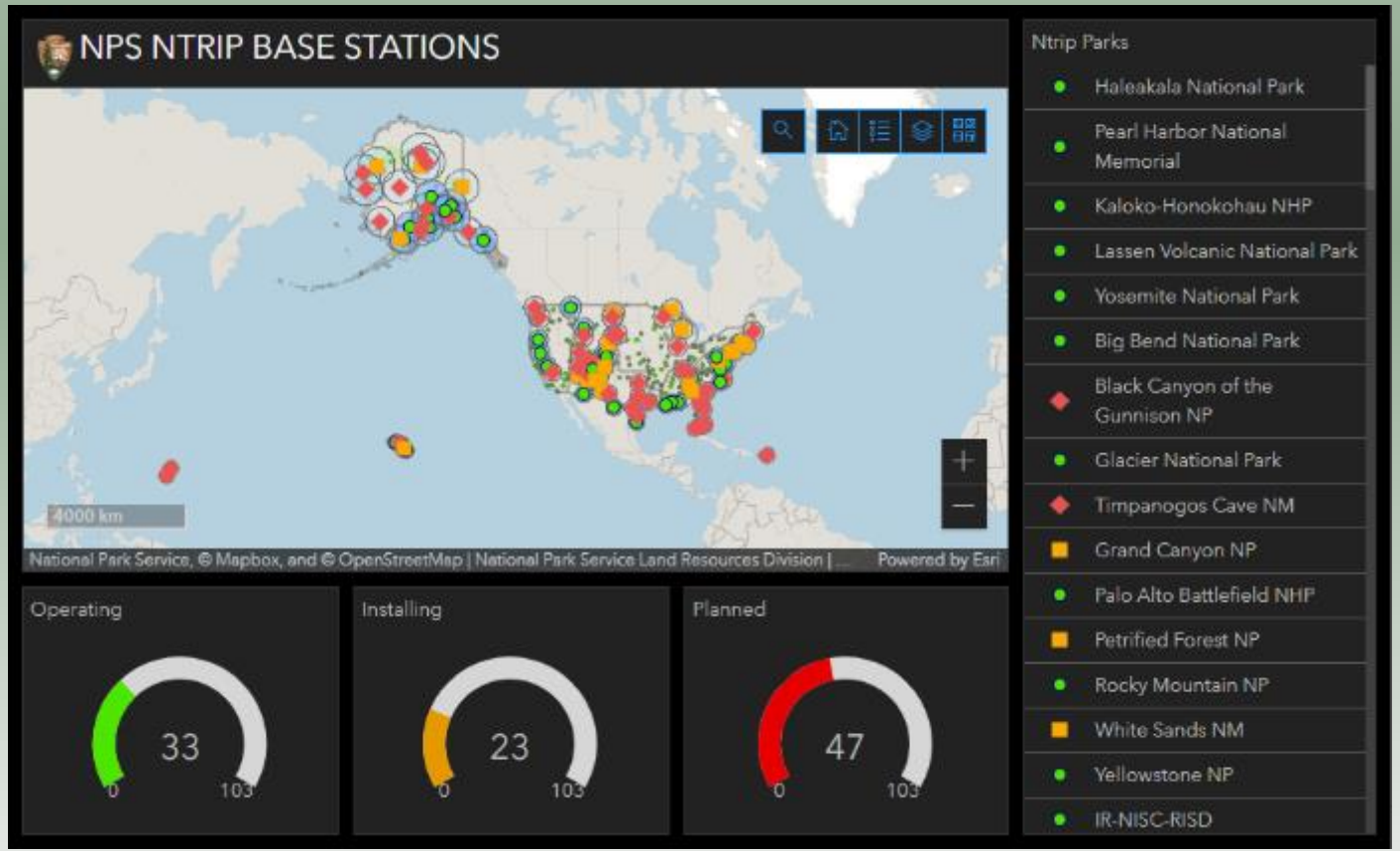
- Allows us to purchase **less expensive equipment** and still meet our required precision for data collection and navigation **in a real time world**.
- Supports an endless amount of rovers for a **one-time, single cost** unlike other subscription services that can cost thousands of dollars per year **per receiver.**
- Supports real time and post-process workflows
- **Makes datum shifts on the fly**. This helps the efficiency of real time workflows such as ESRI Field Maps.
- Can support survey grade (< 5 cm) as well as mapping grade (< 10 cm – 1 m) operations.
- Allows the user to be in control of their differential service and not another entity such as a state run RTN or UNAVCO, etc. ex: If they need 5hz data to support a lidar data collection project they can get it easily
- Other scientific uses such as reflectometry for water height and measuring of atmospheric and ground water content.

What made this possible?

- USCG surplus of 154 Trimble NetR9 base receivers from NDGPS program shut down.
- $4 million special appropriation from Congress to help modernize GNSS equipment in the NPS.
- Contracting for required upgrades to USCG receivers and antennas from single frequency to multi-constellation / multi-frequency.
- Willingness of individual parks to donate time and personnel to get them installed.

How does the NPS system work?

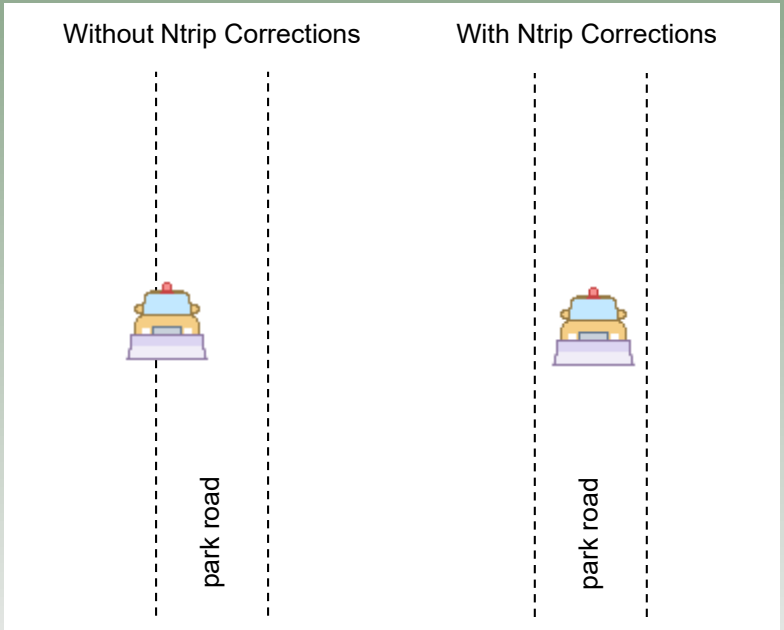




https://nps.maps.arcgis.com/apps/webappviewer/index.html?id=56e74aea75ce49b182f6ac8c737197dd

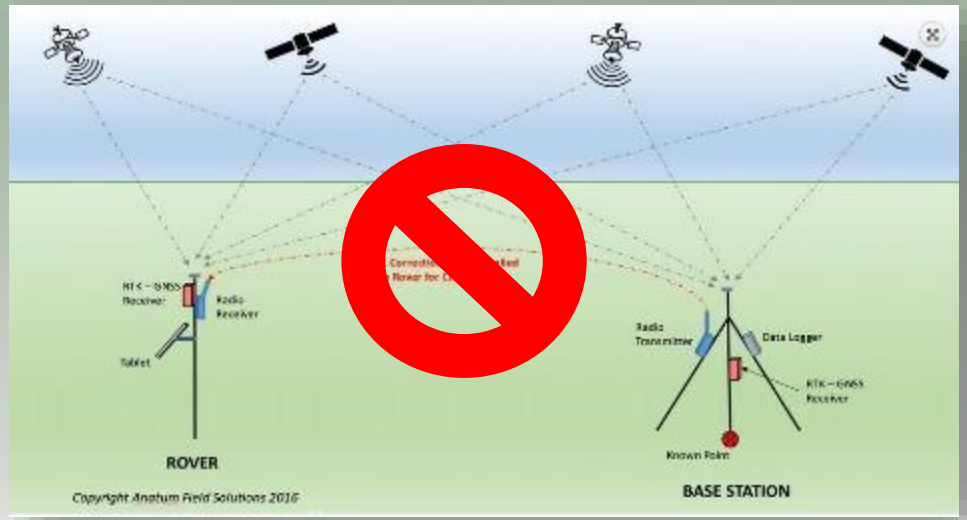
Why is ntrip.nps.gov important…

Ntrip protocol of streaming RTCM corrections improve accuracy of GNSS navigation.



Why is ntrip.nps.gov important…

Ntrip eliminates the need for UHF radios and requires only one GPS receiver to complete a project.



Why is ntrip.nps.gov important…

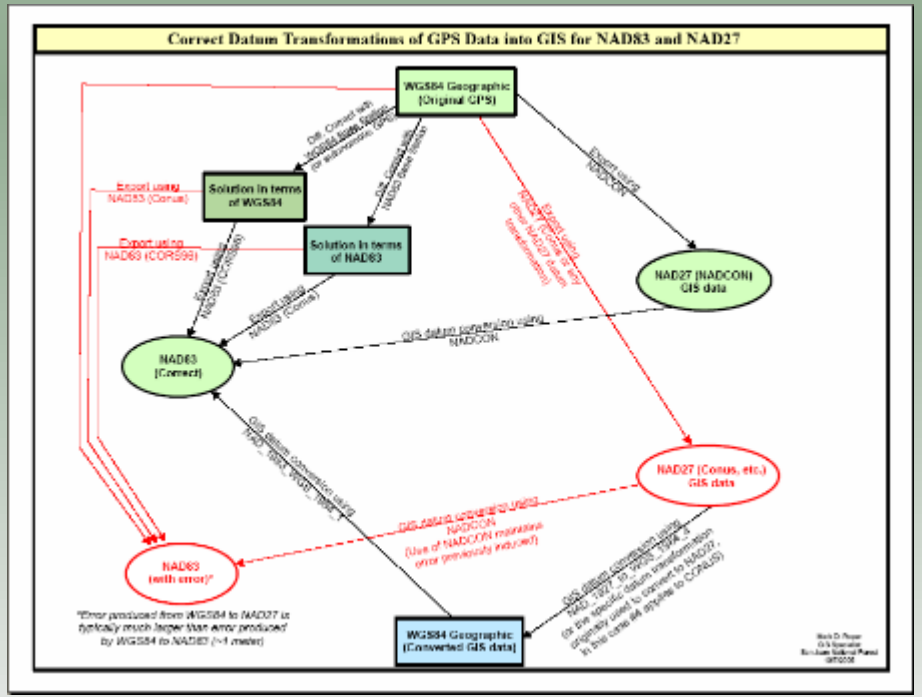
Ntrip service eliminates the need to set up ad hoc GPS base stations and increases safety for NPS field personnel.

Why is ntrip.nps.gov important…

Ntrip service eliminates the need to set up expensive GNSS base stations in insecure or unsafe locations

Why is ntrip.nps.gov important…

- On-the-fly datum shifting
- Eliminates the need for post processing and the associated required software
- Allows for accurate navigation and relative elevations.

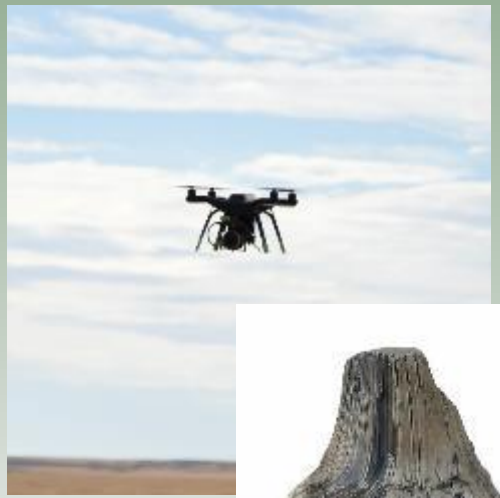


Why is ntrip.nps.gov important…

Cultural Resources: provides archeologists powerful tools to protect and perserve our Nation's cultural heritage through accurate and efficent location services.

Why is Ntrip important…

Natural Resources: provides scientists the ability to accurately, quickly and efficiently position themselves including elevations. Provides high-rate GNSS base data required for UAS and Lidar data collection



Why is ntrip.nps.gov important…

Facilities: provides survey quality, real time positioning for NPS staff and contractors during park operations such as snowplowing. This can save on contracting costs and increase safety for park personnel.

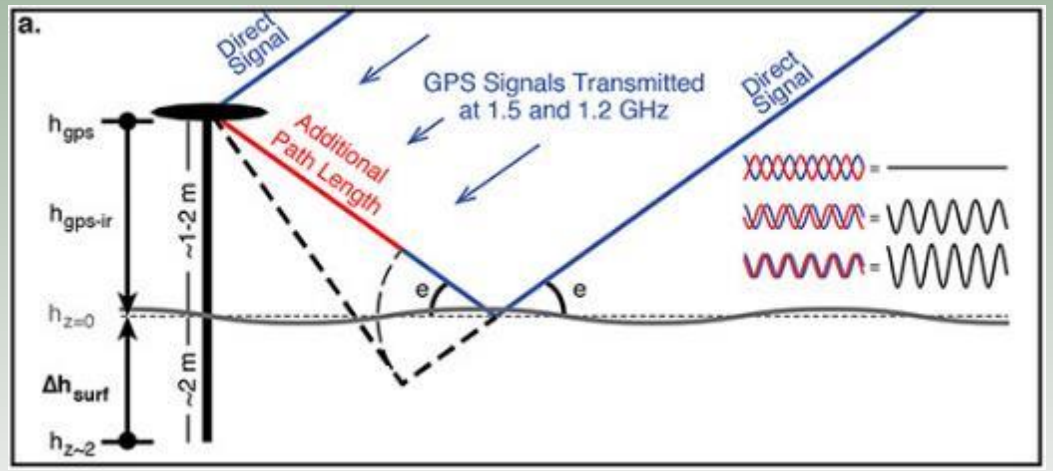
Why is ntrip.nps.gov important…

Fire, SAR and LE: provides emergency services the ability to quickly, accurately and efficiently position themselves.

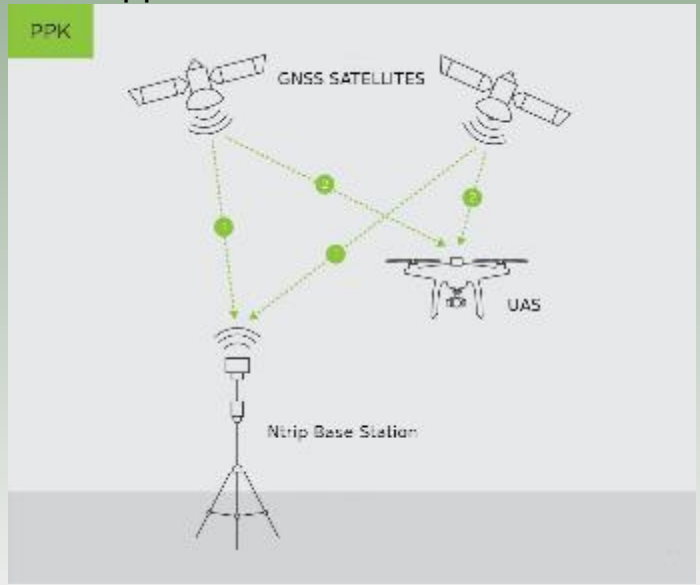
Why is ntrip.nps.gov important…

- Support for Reflectometry which will precisely measure water heights
- Support for UAS and other aerial platform data collection

Water height measurement support



UAS support



How does an Ntrip service help meet the NPS Mission?

- Provides real time accuracy for park operations (such as snowplowing) at a substantially reduced cost.
- Reduces NPS personnel cost by limiting time spent post processing field collected data.
- Reduces costs for desktop and mobile software.
- Reduces equipment costs.
- Reduces possibility of a very expensive equipment being stolen.
- Reduces costs by eliminating the need for costly UHF radios.
- Increases safety for NPS field personnel.
- Helps to assure high-quality, standardized field data.
- Supports reflectometry (water height measurement)
- Supports UAS and other aerial platforms
- Can be used to monitor any GNSS interference

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