

Real-time or Post-Processed?



Depends on the accuracy you need for the project

If you want the best possible GNSS accuracy



2 WEEKS BEFORE, MARK (TENT POLE, REBAR, ETC.) AND COLLECT 2HRS+ BASE STATION DATA

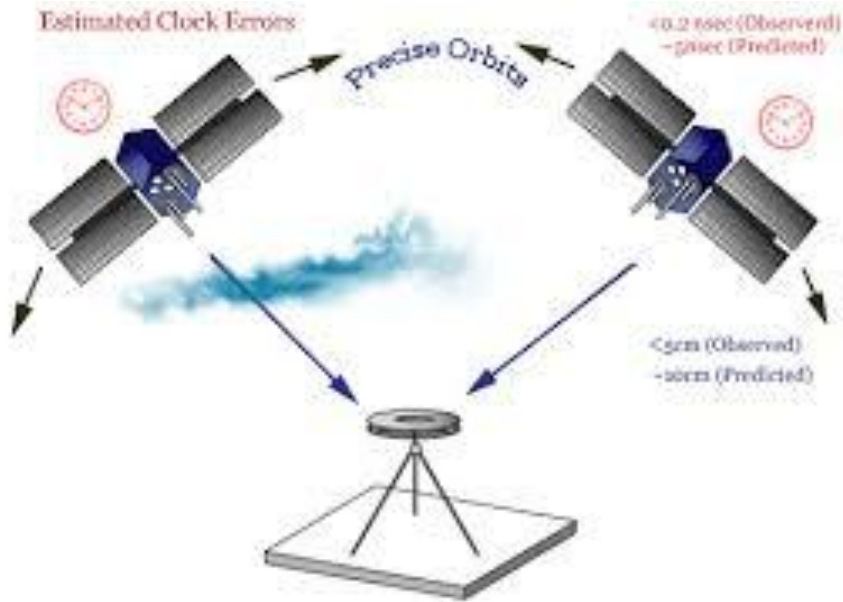


DURING COLLECT 4HRS+ BASE STATION DATA, ROVER DATA 1MIN+



POST-PROCESS 2 WEEKS AFTER

RTK, PPK, PPP



RTK- Real-time Kinematic

Realtime corrections are sent to the rover or drone from the basestation connected to the internet

PPK- Post-processing Kinematic

You collect the data without any internet connection, then post-process it after the fact

PPP- Precise Point Positioning- You can get accuracy with a wait

FINAL: the accuracy is about 2 cm, available 13-15 days after the end of the week

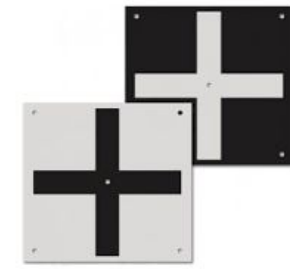
RAPID: the accuracy is about 5 cm, available the next day

ULTRA RAPID: the accuracy is about 15 cm, available every 90 minutes

Stop and Go Kinematic- Drone stops for each picture for retrofitted RTK

This is mainly for when you want RTK but you do not have a hotshoe attachment on the camera.

GNSS Configuration Options



CORS, Base (4hr), and Rover (1min)

CORS and Rover (1 min)

CORS, Base (4hr) and RTK UAS

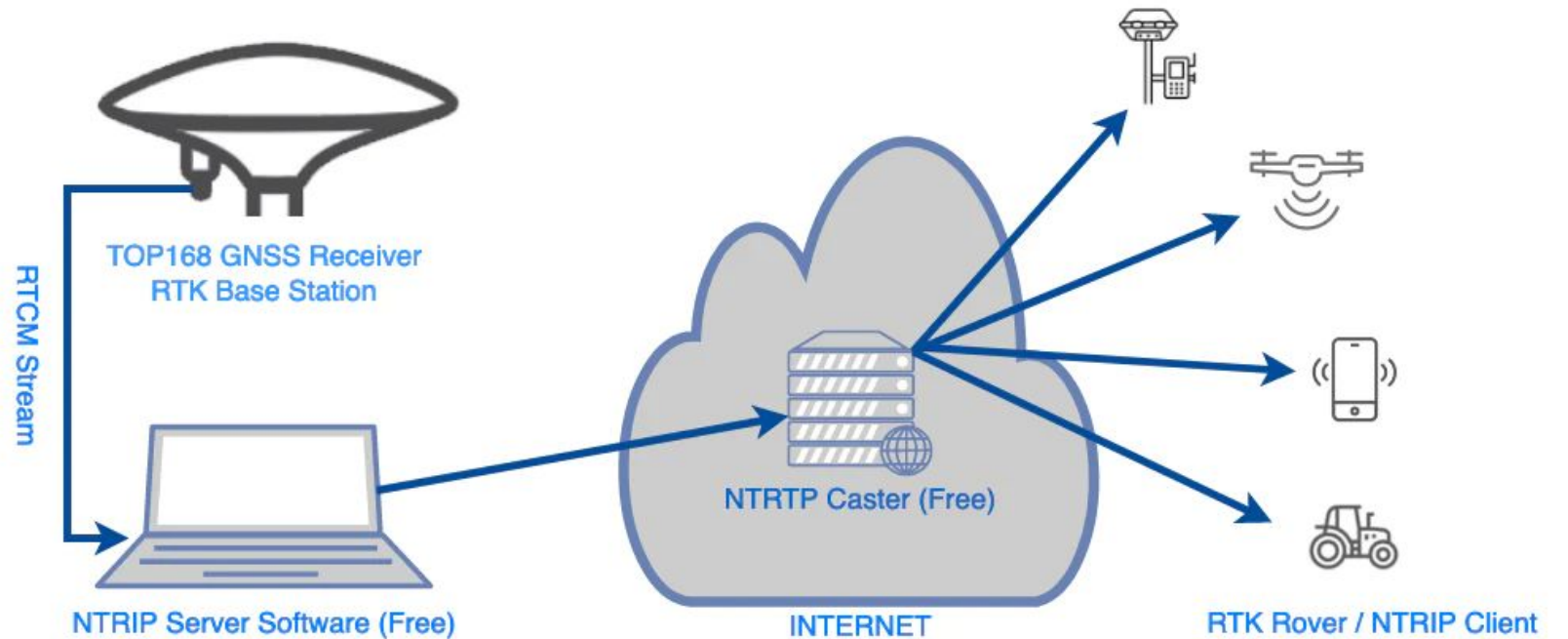
Retrofitted RTK



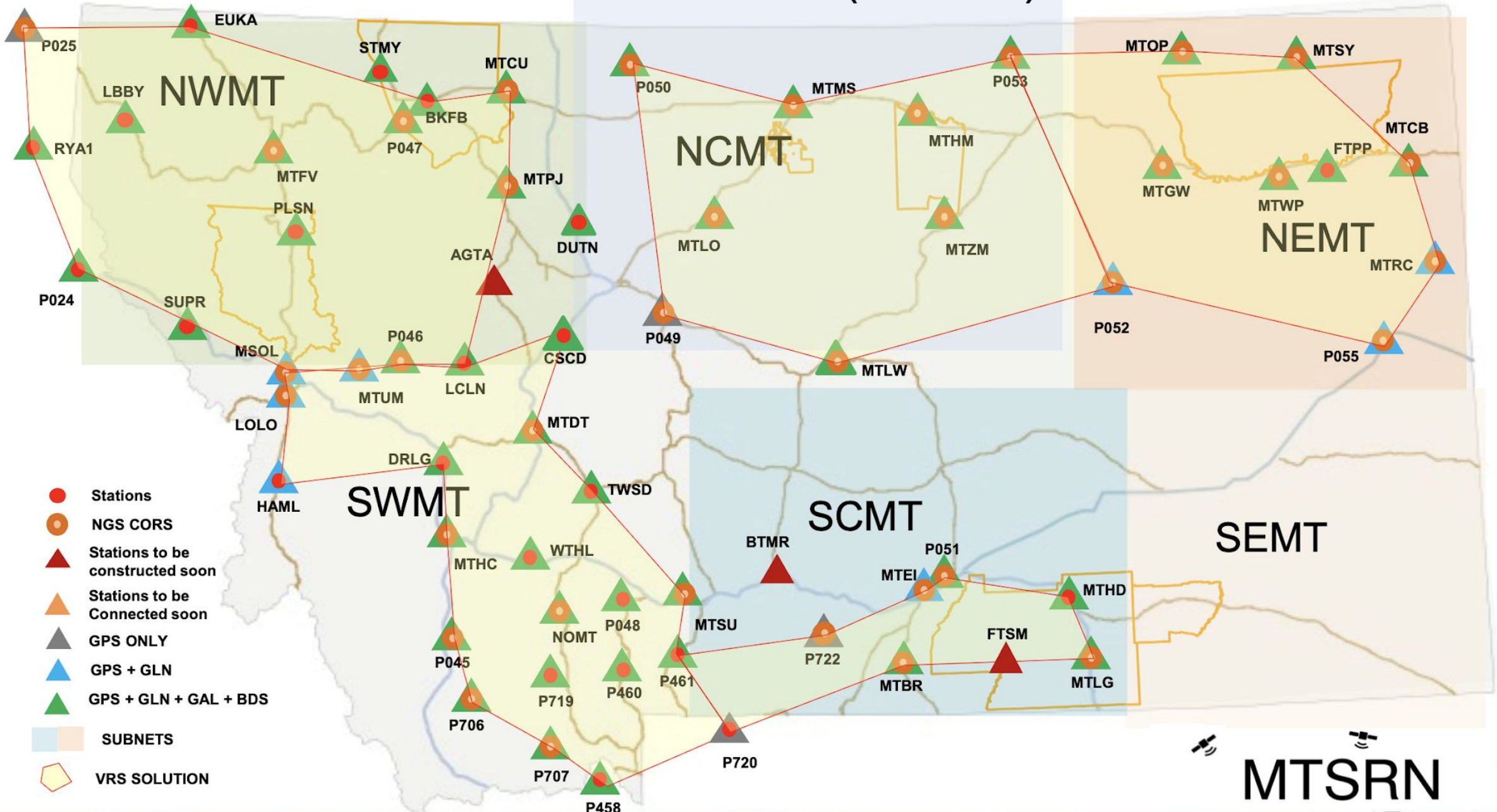
How do I connect to RTK?

- In most cases need cellular to access internet
- Have to have an account with Network Transport of RTCM (Radio Technical Communication for Maritime Services) over internet protocol (NTRIP) or Virtual Reference Station (VRS), can use Emlid Caster for free
- Montana has a system- free for educational for now
- Most are subscription based

NTRIP System Diagram - by using TOP168 RTK Base Station



Montana State Reference Network (MTSRN) – Pilot www.mtsrn.org



What is a Baseline?



OR



Distance from CORS to Base
Hopefully less than 100km



Distance from Base to Rover
Ranges up to 8km
Put Base on top of a hill or building if possible
Works best in line of sight

Why Baseline Matters

Looking for more?

If you are looking for a multi-band receiver that works with a longer baseline and even in a blocked sky view, check out [Reach RS2+](#).



REACH RS2+

\$2599



REACH RS+

\$999

Frequency bands

Multi-band

Single-band

Time to first FIX

Up to 5 sec

1-2 minutes

Positioning in RTK

H: 7 mm + 1 pmm
V: 14 mm + 1 pmm

H: 7 mm + 1 pmm
V: 14 mm + 1 pmm

Baseline in RTK

Up to 60 km

Up to 10 km

LTE modem

Yes

No

[Explore](#)

More Baseline Stuff



Reach M+ UAV mapping kit

Reach M+, Reach
RS+ and GNSS antenna

\$1397

[Buy](#)



Reach M2 UAV mapping kit

Reach M2, Reach
RS2+ and GNSS antenna

\$3496

[Buy](#)

Choosing between Reach M+ and Reach M2

Reach M+ and Reach RS+

If you work within short
baselines, then Reach M+ is an
optimal choice.

RTK

Up to 10 km

PPK

Up to 20 km

Time to fix

1-2 min

Frequency bands

Single-band

RINEX logging update rate

Up to 14 Hz

Reach M2 and Reach RS2+

Provides robust performance
and quick initialization, allowing
work on long baselines.

Up to 60 km

Up to 100 km

5 sec

Multi-band

Up to 10 Hz

Why Baseline Matters

- Base to Rover
 - 8km max in good line of sight with base on a building
 - About 5km if base is on a hill and rover on a plain below with good line of sight
 - About 1km if line of sight is poor, in the forest, etc.

