



CSDS RTN – Frequently Asked Questions

I can't connect. Have my logins been disabled?

CSDS will never disable logins for any reason without contacting the user directly beforehand. A rare reason for disabling is a long overdue invoice, but even then, we do not disable without direct contact first. The exception is the free 7-day test accounts; those automatically disable after 7 days. Additionally, if you attempt a login with an incorrect password 10 times, it may lock. In that case, contact Tech Support immediately, and we can unlock the account and/or reset the password for you. Call **(833) SOS-CSDS** – (833) 767-2737.

How much is Tech Support and what does it cover?

CSDS offers a Geospatial Support plan at \$995/year that offers accelerated priority support, unlimited incidents, and extended support hours from 5 am – 5 pm PST. GSP plan holders also receive discounted Trimble-certified on-site training and training courses as well as access to our online training platform, can-learn.ca (up to 3 users per office/location)

I can't connect. Is there an issue with the network today?

Network outages are rare but can happen for various reasons. The quickest way to see if there is an issue with either system is to go to the respective web pages: [CSDS sensor map](#) to open the sensor map. This will display all bases and their status (Green – Yellow – Red).

On the sensor map, green indicates connected and in solution. Yellow indicates that we may have a connection, but that there may be an issue with data completeness, spotty comms, or data quality and that it does not presently meet standards for inclusion in the solution. Red means we have lost connection altogether for the time being.

Stations might be down for various reasons, usually due to internet outages in urban areas. We can remotely fix many issues, but sometimes a trip is required to the site to see what the issue is. Fortunately, even if individual stations are down, the network solution (VRS) is usually still fine—another reason why the CSDS VSN was developed.

Are you doing maintenance on the system right now?

System maintenance and updates are done after hours, and typically on weekends (e.g., monthly security patches). On the rare occasion that there is a major upgrade planned that could take one of the servers offline for an extended time during business hours, we send notices a month in advance via our CSDS Monthly Newsletter.

My logins are okay, and the network looks okay. Why can't I connect?

This is almost always related to cellular service. It can be frustrating as you may see bars on your phone, voice works, and it may have worked on a different day, but that does not necessarily mean that data is steaming well enough where you are. One easy check is to open a browser on your field data collector and navigate to a website (choose one that changes a lot as you may see a cached page otherwise).

What can I do in a poor cell environment?

CSDS offers modern solutions for areas with poor cellular coverage, including Trimble receivers that support xFill, RTX, and other satellite-based correction support that can provide continuous RTK performance in areas with degraded (or no) cellular availability. For more information, please contact your local CSDS Geospatial account manager or sales@csdsinc.com for more information.

Unfortunately, you are at the mercy of the cellular coverage, and it might be poor in that area all the time, and somewhat usable on other days or different times of the day. The cell coverage maps from the main carriers are not always accurate but can give you a general idea. The larger cell carriers have been rapidly upgrading their systems and coverage and some apps show cell towers and what carriers are on each tower. It is nearly impossible to keep up with which carrier works best in which region of the state – this is constantly evolving. CSDS has no map of cell coverage; we rely on feedback from users and some note that they can now get cell service in areas they previously could not even a few years ago.

We do get asked if there are ways to improve the signals, like with boosters. From feedback via users: Carry phones/modems from two or more carriers if they work in multiple areas across the state. Some users who use their phone as a hotspot or have a portable WiFi hotspot will put those on a telescoping rod to get some elevation; it is surprising how an extra 10' can improve cell reception in some places. If you have a built-in modem, see if you have the option of connecting an external cell antenna. Some WiFi hotspots come with an external antenna jack (SMA coax connector). There are large dipole cell antennas, and directional (yagi-style) that you can point at the nearest cell tower. Adding a booster to the mix may not help: if you have RF 'garbage', the booster may just amplify the 'garbage'. In marginal cell areas, a booster may help, but it can be hit or miss. The in-line boosters work better than the proximity boosters. An effective booster can cost hundreds of dollars and needs its own power source.

We have tested a last resort option for spotty cell areas: switch to single-base. The reason this might work is that it does not require consistent bi-directional communications with our caster like VRS does; a single base solution is a request that starts the flow, and if there are gaps in the flow, your rover will simply wait until it has enough data. The one big caveat is that if you are in an area with poor cell, there is likely not a reference station nearby, and the long-baseline, single-base solution may be poor quality and inconsistent.

A key recommendation from users who encounter poor/no cell areas: collect static and or PPK and post-process or use one of the commercial PPP services that broadcast from L-Band satellites (lower precision, especially in the vertical, but good in a pinch).

How can I try out the CSDS VSN?

CSDS recommends all new users use a (one-time) test account, that is free for 7 days, to make sure the service will work for their needs. The login provided automatically expires after 7 days. To request a test account simply email sales@csdsinc.com.

What does it mean when the login page for www.CSDSVSN.com asks for an 'Organization'?

The organization is generally an abbreviation or initial of your company name – a signifier for web access. When you receive your CSDS VSN credentials via email it will state your organization. This is required to log in to the web portal.

Where do I find the current positions of the stations (e.g., for post-processing)?

You can go to the [CSDS sensor map](#) and click on any station, then choose the info tab. That will list the live NAD83-2011 Epoch 2010.00 position and ellipsoid height of the antenna reference point (ARP) of the station. Users may need this if they are doing their own post-processing.

How do I get RINEX files for post-processing?

If you are looking for static files within the past 60 days, you can use the 'Reference Data Shop'. Log in to the [website](#) and look for that option in the upper left. Create a request, choose one or more CORS (Continuously Operating Reference Stations) stations, a time period, the type of static file you want, and a sample rate.

Note your order numbers. It may take a while to process the order (usually 5 min to an hour depending on how much you order), but you can log in later and see your order status. Never pick the email option (this may cause problems due to file size limitations on various email providers) — choose the download option. When the order is ready you will see a download link; it will arrive in a single .zip file.

What datum, or reference frame does the CSDS VSN work in?

The CSDS VSN constrains all reference stations to the [National Spatial Reference Framework](#) (NSRS) of the National Geodetic Survey (NGS). Currently, this is NAD83-2011 Epoch 2010.00. Vertically, CSDS VSN stations are also NSRS, expressed in ellipsoid heights. Orthometric elevations, like NGVD88 are derived in your field or office software by applying a [geoid separation model](#), like GEOID 2018 from the NGS. We recommend using whatever the latest geoid model is from the NGS.

Does the CSDS VSN provide me with State Plane Coordinates?

No, the CSDS VSN works purely in geographic references. Any plane projections are done in your field or office software.

Does the CSDS VSN provide a grid or ground?

No. Again, this is all handled in your field or office software.

What do you mean by VRS and single-base?

VRS is a type of network RTK (NRTK) that uses data from multiple stations surrounding where you are working and creates corrections modeled for your location to send corrections as if you have a base right next to you with a near-zero baseline length.

A single base is where differential corrections are from one individual station. One drawback of a single base is that results deteriorate over distance, typically increasing greatly at distances of 6 miles or more. Real-time networks globally found that NRTK allowed for station spacing with much greater spacing; it would be impractical to be able to afford to build a network with 6-mile spacing. With NRTK they can be spaced 20 – 50 miles (depending on local conditions).

Is the CSDS VSN multi-constellation?

Yes, the NorCal network is roughly 60/40 Alloy to NetR9 stations while the SoCal network is 100% Alloy – all are four-constellation: GPS (U.S. Navstar), Glonass (GLN), Galileo (GAL), and Beidou (BDS). While all but those few stations in Northern California are four-constellation, we are in another phase of station upgrades to take advantage of newer signals and hardware. We have started this latest phase of upgrades based on areas of high usage, and we are on track for a full NorCal upgrade within the next 3 years.

Can solar storms mess up my results?

Yes, but very rare. There are many news alerts about various solar storms or other space weather events. Our network tracks the effects of ionospheric activity with data from our own sensors, and to see the status, log into the website and choose the [‘195 Ionosphere’](#) option in the upper left. Only when it goes into the red would you see enough degradation to consider using non-GNSS methods.

One caveat though about single base operations: if you do single base on one day with calm ionosphere activity, you may get different results than on a day of high ionosphere activity. Network corrections, like VRS, can model out most high ionosphere disruption, but neither will have much luck if in the red. There are hazards to mixing solutions: If you start a project with one method, you may get different results when switching baseline lengths or on different ionosphere status days.

Why do I sometimes see fewer satellites when I connect to the VRS?

It depends on the age of your rover. Some new sats and signals were only implemented in the past few years. An older rover may not be able to utilize all of the sats and signals it “sees”. In legacy solutions, it would cull out some satellites that were not fixed, to create the corrections. Your rover would likely not use bypassed sats for the same reason and your rover needs to use satellites that are in common with 6-9 surrounding stations. However, in April 2023 we implemented a new feature that includes more satellites for ranging, even if they are not among the fixed ones used in modeling the corrections. While this does not degrade results, it may not necessarily improve results, though some tests have shown it can in certain situations, like in some sky-view-challenged locations. In short, you now use more of the sats you see in your solutions (for newer rovers).

What kind of results should I expect using the CSDS VSN?

Just like with a base-rover RTK setup or static, there are many factors and sources of error that can affect **precision** and accuracy: sky view, capabilities of the rover, age and quality of the rover and what constellations it supports, multipath, user errors, space weather conditions, and (to a much lesser degree) weather conditions. In general, you should be able to get reliable and repeatable results under 3cm 3D. Our objective is to provide a network that is as precise and repeatable as possible. Best practices should always be applied for precision/accuracy-sensitive projects, so establishing and/or regular checking into local control, site calibrations, etc. should be executed to ensure your positioning is both **precise and accurate**. California is a very dynamic (moving) state due to several plates moving rapidly and in different directions. Because of this, occasional adjustments will have to be made to our reference stations to compensate for this movement. Additionally, major seismic events such as earthquakes can also affect the positions of our correction sources. These factors make local control and site calibrations a vital step in ensuring continuity in the precision/accuracy of your GNSS projects.

How far outside of the network can I use it?

While the VRS corrections will work outside of the network, the rule of thumb for base rover RTK should be followed: no more than 6 miles beyond the outermost stations.

Can I use the CSDS VSN for my drone operations?

Certainly, but there can be a lot of nuance to this answer, as there are many different approaches that drone (UAS) operators take to meet their desired relative/absolute precision and accuracy goals. You can use the CSDS VSN services, real-time and static, as part of such varied approaches—when appropriate.

For many drone operations, setting up a base on the site can be the best choice. Be that for real-time (RTK), or post-processing (baseline and PPK). This is because a very short baseline length can yield the best results. However, if your site is only a short distance from an existing CSDS VSN station (e.g., under 6 miles on a good iono day), this could work well for RTK and/or static post-processing. Some users use VRS for their real-time data, and/or for establishing ground control points (GCP). Generally, working without GCP is not a preferred choice, unless you are only interested in relative precision, and even for that, including at least some GCP can be a best practice.

One aspect of processing drone data is the inertial (IMU) data, that when processed together with the observations from the on-board GNSS, in a PPK workflow, has grown in popularity. It is not as if PPK is much different than RTK (it is simply delayed RTK so to speak) but the addition of the IMU, and precise orbit data, that can make a difference. Your drone vendor can recommend software to do this PPK/IMU step. This is essentially the same as many mobile mapping workflows.

Do you send out regular bulletins via email?

If you sign up for any CSDS services, the email you provided is added to our customer mailing list – your contact info is shared with no one. We send out a monthly newsletter and will use this medium to communicate if we are planning any major maintenance (though we typically do those after hours and users do not even notice).

If you receive a bulleting email and would like to stop receiving them, use the unsubscribe link in the bulleting. If you'd

like to add a colleague to the email list, use the subscribe link in the bulletin.