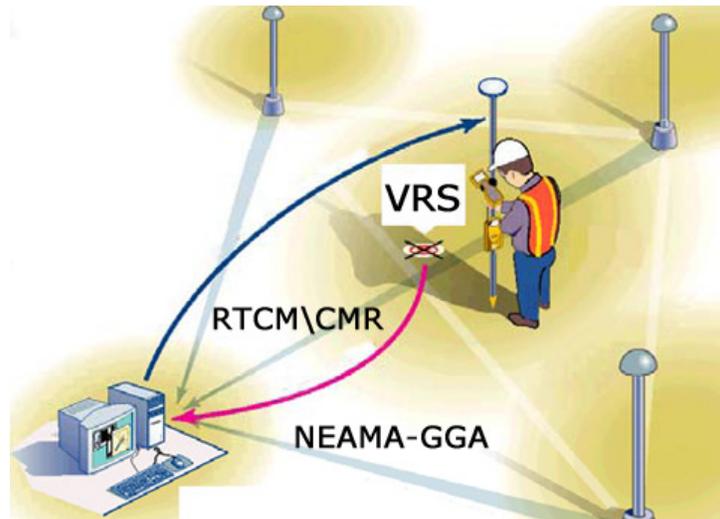# How CaronNet works

CaronNet is a "Virtual Reference Station" (VRS) Network consisting of a network
 (spaced at 30-60kms) of GNSS (GPS/GLONASS) reference stations
permanently connected to the control center (Network Server) via the Internet.
The networked stations collectively and precisely, model Ionospheric errors
for the individual GNSS rover in the network coverage area. The rover interprets
and uses the VRS network-correction data as if it is operating with a single physical
base station on a very short baseline which increases the RTK performance
tremendously (but it doesn't actually create a virtual vector). Corrections (vectors)
are from the closest base, but because the ionospheric error (which is traditionally
baseline dependent) is practically negated, the rover's degradation in accuracy
due to baseline length starts when the rover is first initialized and VRS point is created
at the work site, thus accuracies are increased and more consistent throughout the
working region.

When a field user (rover) logs into our network, one of the first pieces of information that is sent (via the NTRIP protocol) is the starting location of the survey (rover). This location, via a NMEA formatted message, is sent to the CaronNet VRS computing server and a customized correction is created based upon the rovers location. The delivered real-time correction service has used the collective data supplied by the entire ground network to solve for ionospheric conditions. The result is that the ionospheric degradation in accuracy of the GNSS positioning solution is reduced significantly at the rover's location. This can then be considered a zero baseline degradation in accuracy from the traditional RTK solution where the ionospheric degradation is typically unknown. The baseline vector from the closest reference station is still solved for but with no ionospeheric degradation.

In Summary

- Practically eliminates the ionospheric errors inherent in GNSS measurements and therefore significantly improves your measurement accuracy.

- Requires no base station set up – the base stations are provided by this service and this significantly reduces your start up costs.

- Creates actual vectors between your rover and physical base stations – the "virtual" term is in reference to the ionospheric error elimination process.

- Still requires you to maintain proper surveying techniques such as verifying the received data by doing a site calibration.

- Can greatly improve efficiency and productivity within your survey business.