Configuring TSC2/Survey Controller for RTK over internet - connecting to an NTRIP caster

This Technical Tips document provides instructions for configuring the Trimble TSC2 data collector running Survey Controller software to obtain RTK reference-station data via an NTRIP (Networked Transport of RTCM via Internet Protocol) caster. .

If you are going to obtain RTK reference-station data from an internet-accessible GNSS receiver, please refer to the Inland GPS Technical Tips document titled *Configuring TSC2/Survey Controller for RTK over internet – connecting to a GNSS receiver*.

It is presumed that the TSC2 already has an internet-protocol (IP) connection to the internet via a Bluetooth-enabled mobile phone. The separate Inland GPS Technical Tips document titled *Configuring TSC2/Survey Controller for RTK over internet – establishing IP connection* provides the necessary instructions for that part of the configuration process. The TSC2 used in preparing this document was running Survey Controller Ver 12.46. If you are using a different version the screens and options may be slightly different.

The steps to complete the configuration are -

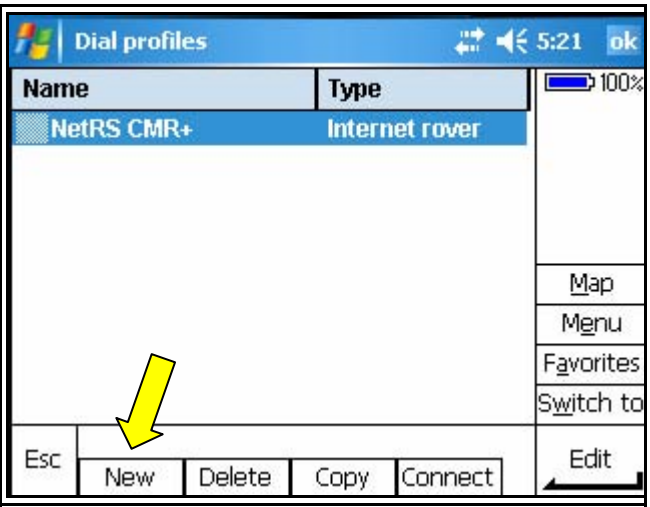
3B. Creating a dial profile that will connect to the NTRIP caster

On the TSC2, start the Survey Controller software.

From the main Survey Controller menu (where you see the six icons), tap the **Configuration** icon, and then tap **Dial profiles**.

The **Dial profiles** window will appear as shown at right.

Tap the **New** button at the bottom of the screen to get to the first page of the **Edit dial profile** dialog shown in the next row.



For this document the dial profile was named **UNAVCO NTRIP** because the NTRIP caster used in this example is operated by UNAVCO (University NAVSTAR Consortium). Obviously you will enter information appropriate for the actual NTRIP caster you plan to use.

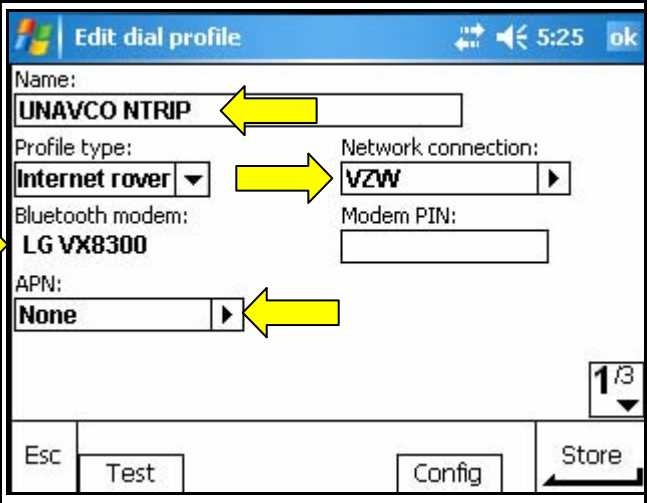
In the **Profile type:** field, select **Internet rover**.

At **Network connection:**, select the internet connection created earlier. The name of the **Bluetooth modem:** used for the internet connection should appear automagically.

If required, enter the **Modem PIN:** provided by your mobile-phone carrier to unlock the modem.

The **APN:** field is where you would enter an access-point name if required by your mobile-phone carrier. Tap the right-pointing arrow if you need to enter that information. Verizon does not require an access-point name, so for this document the **None** option was selected.

Tap the **1/3** button to advance to the next page.

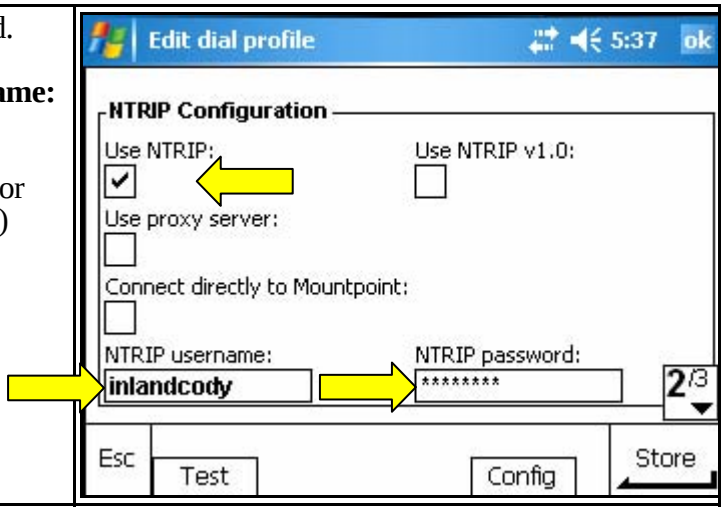


On the second page, make sure **Use NTRIP:** is checked.

Enter the appropriate information in the **NTRIP username:** and **NTRIP password:** fields.

(If you would like to use the UNAVCO NTRIP caster for testing, see the information at the end of this document.)

Tap the **2/3** button to advance to the next page.

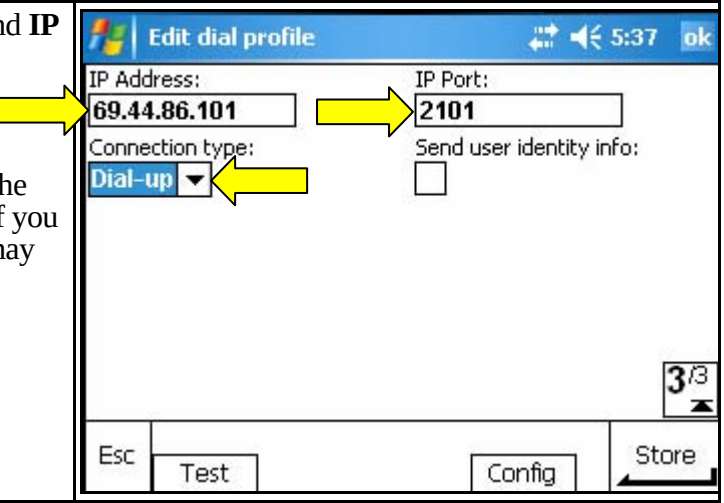


Enter the appropriate information in the **IP Address:** and **IP Port:** fields.

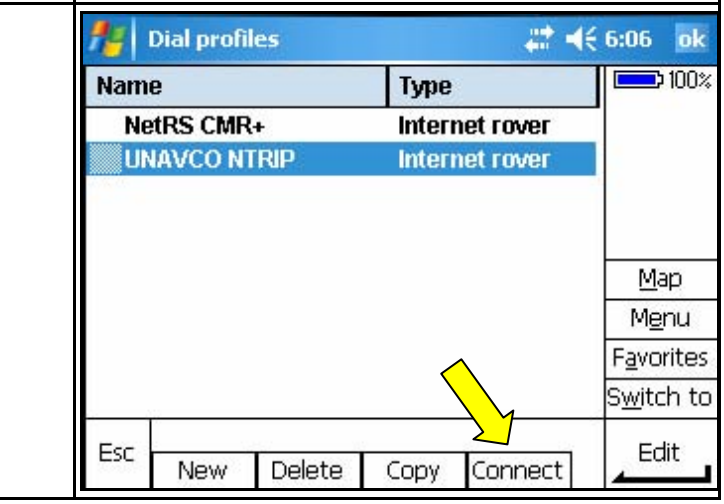
For **Connection type:** select **Dial-up**.

The Survey Controller Ver 12.46 Help document says the **Test** button only works for GPRS connections. Try it if you wish – it does seem to produce some information that may be useful in troubleshooting.

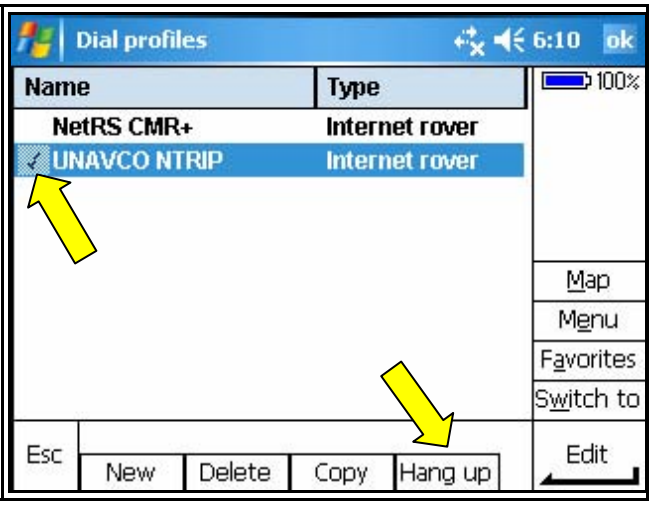
Tap **Store** to save the dial profile and return to the **Dial profiles** screen shown in the next row.



For a more comprehensive test of the new dial profile, highlight the dial profile you wish to test and tap the **Connect** button at the bottom of the screen.



If everything works as expected, the Survey Controller voice will say “Internet connection established” (at least on initial connection – may not sound on subsequent reconnections), an identical text message will appear for about a second in the space above the soft-key buttons, a check mark will appear to the left of the dial-profile name, and a **Hang up** button will appear where the **Connect** button had been.



4B. Creating a survey style to use the dial profile

This document will not attempt to provide detailed instructions on survey styles, but rather will only point out the settings that are changed from situations where the reference station broadcasts through a radio modem.

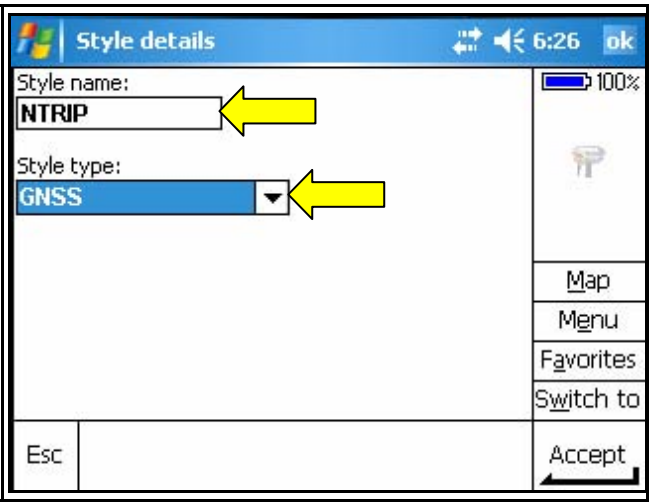
You may elect to copy one of your organization’s established survey styles and modify per the information that follows.

From the Survey Controller main menu (with the six icons) tap **Configuration**, and then tap **Survey Styles**.

Either tap the **New** button to start a new survey style from defaults, or tap the **Copy** button to copy an existing survey style.

For this document, the **Style name:** will be **`NTRIP`** and the **Style type:** will be **GNSS**. (If you copy an existing survey style the style type will be the same as the original survey type and you will not be prompted for that information.)

Tap the **Accept** button to get to the screen from which you can edit the various parts of the survey style.



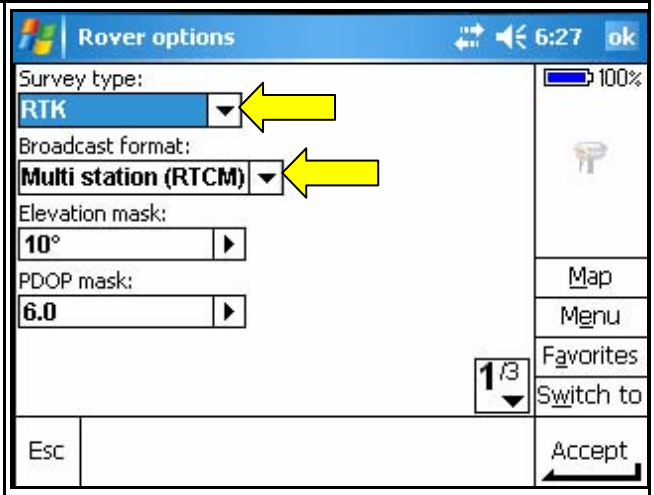
Tap on **Rover options** to open the first page of the **Rover options** dialog.

At the **Survey type:** field select **RTK**.

At the **Broadcast format:** field, select the format appropriate for the NTRIP caster and mount point you will use. For this document we will select **Multi station (RTCM)** because the UNAVCO NTRIP caster provides only single-station RTCM data.

Make the remaining settings on this and the other pages of the **Rover options** dialog as appropriate for your equipment and preferences.

Tap the **Accept** button to return to the listing of the survey-style elements.



Tap on **Rover radio** to open the **Rover radio** dialog.

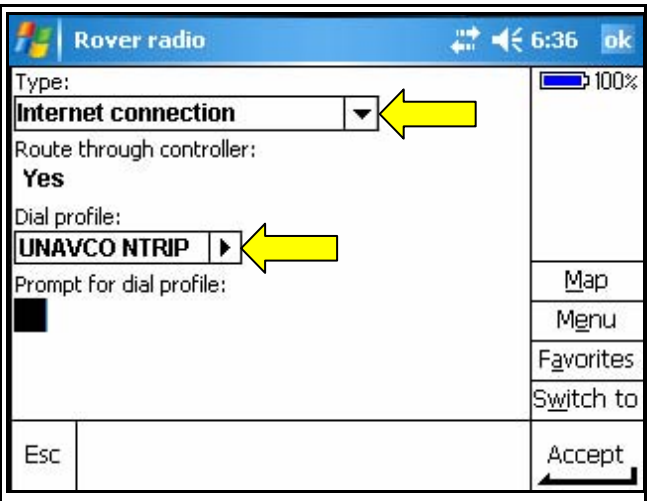
Set **Type:** to **Internet connection**.

The next two lines should confirm that the data will be routed through the controller.

At the **Dial profile:** field, tap the right-pointing arrow and select the dial profile created under Step 3B above.

If you have multiple dial profiles you may wish to check **Prompt for dial profile:** but since in this document we have only one NTRIP dial profile we will leave that unchecked.

Tap the **Accept** button, and then tap the **Store** button to save this survey style.

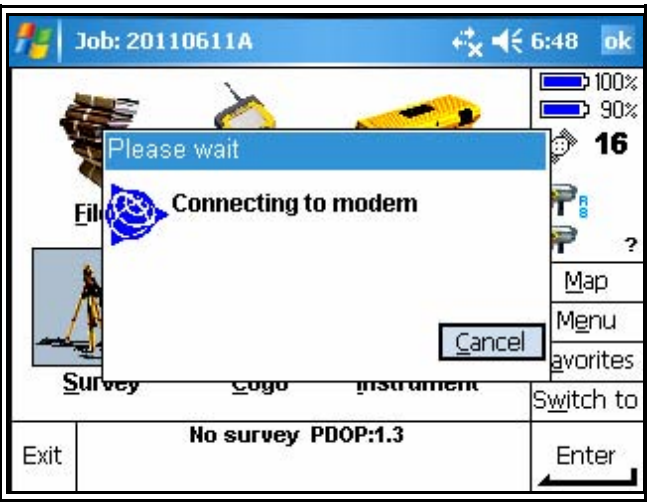


5B. Using the survey style that utilizes the NTRIP connection

Simply proceed as you normally would, but select the survey style created in Step 4B above and then click **Start survey**.

In the process of preparing this document, the progress screen at right and the progress screens in the next two rows appeared as Survey Controller made the connection to the reference-station receiver.

It may help to watch the mobile-phone screen to see if it is waiting for a response from you.

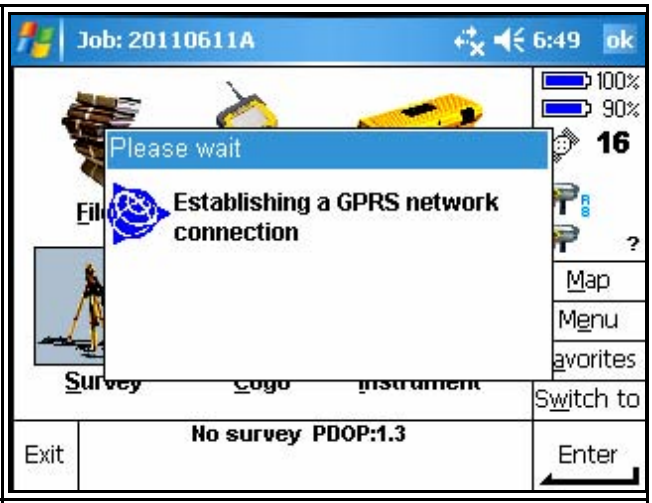


The second progress screen –

Depending on how your mobile phone interacts with the TSC2/Survey Controller, you may see different progress screens.

The third progress screen.

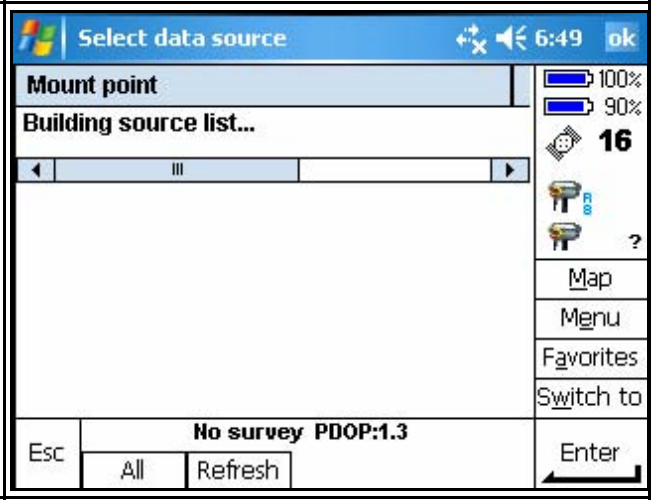
Inland GPS cannot offer any explanation why this screen says Establishing a GPRS network connection when we are establishing a dial-up connection.



Now Survey Controller will display Building source list, which means the NTRIP caster is sending a listing of all the available mount points along with some statistics, such as the distance from the client.

Since the UNAVCO NTRIP caster is offering many (536 as of 11 June 2011) mount points, this will take a few seconds.

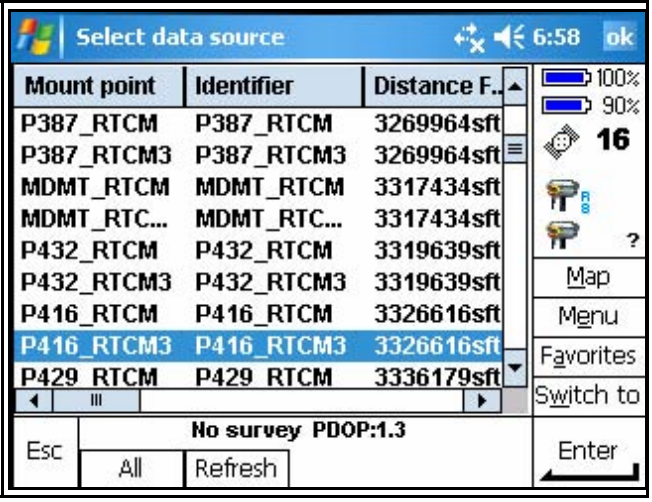
If you always use the same mount point, you can modify your dial profile to use the **Connect directly to Mountpoint:** option to avoid building the source list and the associated time delay.



The list of available mount points (sorted by distance from the rover receiver by default – tap any column heading to sort by that column) appears at right.

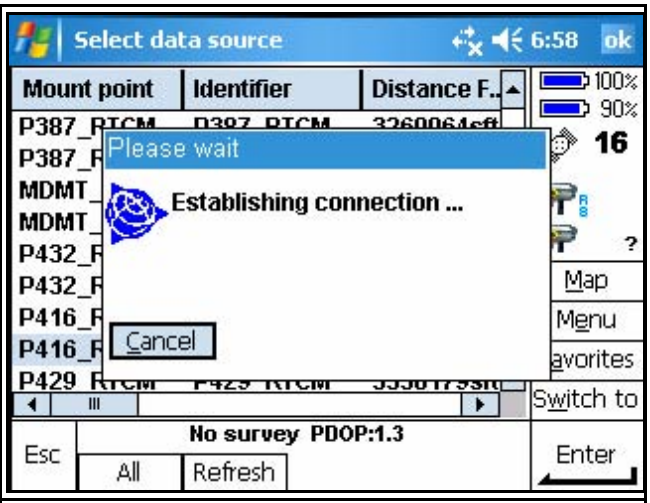
For this document the mount point named P416_RTCM3 was selected partially as a science project in long-distance initialization, but also because statistics on the UNAVCO realtime web page indicate this reference receiver generally has a good fast IP connection.

Tap **Enter** to start the initialization process.



Now that we have told the NTRIP caster which data stream we want it starts sending that data stream to us.

Note that when you use the UNAVCO NTRIP caster the reference-station point names that appear in Survey Controller do not match the mount-point names. Inland GPS does not know why this situation exists.



When the connection to the reference-station data is established the icon pointed by the yellow arrow at right appears where you are probably accustomed to seeing the radio-modem icon.

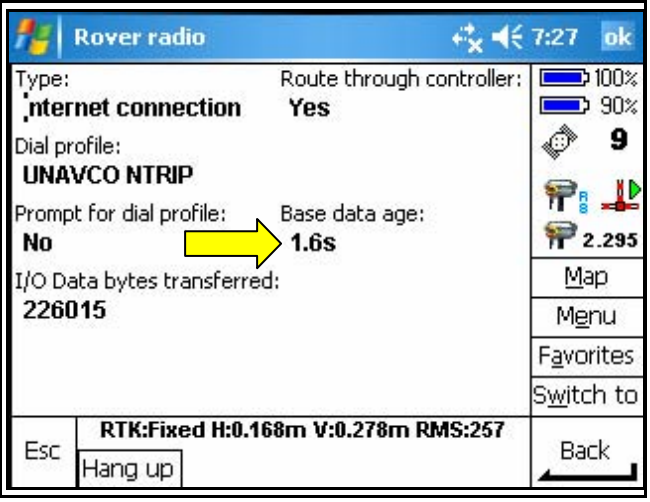
This icon indicates that a real-time survey is running and that the rover is receiving streaming reference-station data via an internet connection.

A red X over this icon indicates that the reference-station data is not arriving at the rover.

Tap the connection icon pointed by the yellow area in the previous row to bring up the screen shown at right.

Of particular interest is the **Base data age:**. In this case, the reference station was over 630 miles away from the rover but the base-data age is quite good, especially compared to the information shown in the next row.

You can also get the same screen when using a base radio modem – it would be a good idea to have an idea of the relative base-data age normally experienced with various connection methods, especially if you are doing a lot of stakeout work.

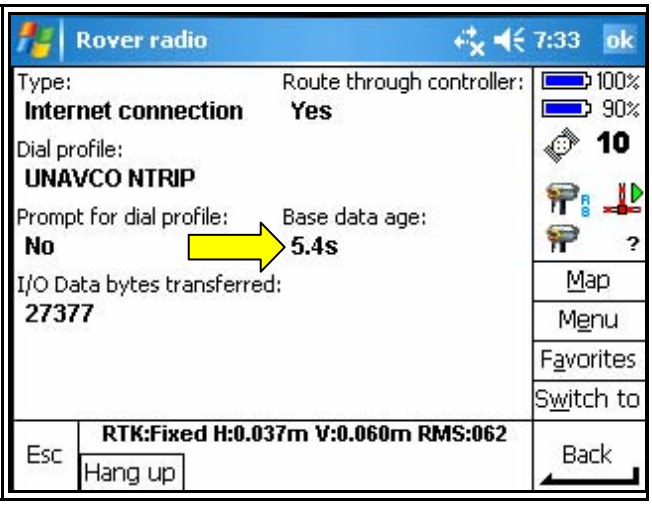


Here the reference station was the closest one on the list (just under 74 miles from the rover receiver), but the IP connection to that receiver is poor as indicated by the 5.4-second base-data age.

This agrees with the information available from UNAVCO, which showed a last-hour latency of 2590 milliseconds.

The precision estimates are much better, as one would expect from a closer reference station.

Inland GPS does not recommend using reference stations so far from the rover for anything other than testing and experimentation – the six-mile recommendation still holds for single-base solutions.



UNAVCO real-time data

The University NAVSTAR Consortium (UNAVCO) operates an NTRIP caster providing access to streaming real-time GNSS data from many reference stations, as shown at *http://pbo.unavco.org/data/gps/realtime*. Click on the *Email us for Realtime Access* hyperlink on that page to request a username and password that will allow no-charge use of the NTRIP caster and its streaming data. The web page includes a map showing the locations of the various reference stations, as well as latency and completeness statistics.

Other considerations –

Other no-charge NTRIP casters?

Please advise Inland GPS if you learn about other no-charge NTRIP casters, especially anything in the northern Rockies.