



There you stand in the elements, satellites above, new rover in hand, batteries charged, and a new bag of sunflower seeds. Then KA-fizzle! Nothing is working! In a perfect world you should be able to press a button or two and then start gathering high precision positions with the greatest of ease (but only if you know the secret handshake).

As discussed in previous installments of RTN101, initial use of an RTN takes quite a leap of faith on the part of the land surveyor. Not only are you now relying on infrastructure beyond your immediate control, having to reconcile the geodesy of the earth-centered reference system of GPS/GNSS to your local systems, but you are also having to having to wrestle with the pitfalls of live communications. With time, the comfort level with each of these new considerations improves. This can vary from a day to years depending on the

RTN-101: RTN Cheat Sheets (Part 11)

Deux chiens ne s'accordent point à un os.
(Two dogs cannot agree on one bone.) — French Proverb

individual, the condition of the local RTN, and the complexity of the gear.

Many initial forays into the world of RTN have been scuttled by the inability to get the gear up and running—perhaps during the initial demo by the local

dealer, or the first time you have to show off the capabilities of the expensive new gear your boss just bought for you, or right in the middle of that first critical project. That fancy new rover is going to work wonders, but only if you get

>> By Gavin Schrock, LS



Capturing screen images of the data controller menus and setting via a remote connection to a PC. Channa DeLaPaz of Seattle Public Utilities prepares screen snaps for an internal training document.

it configured right the first time, and can reconfigure it in a snap if need be. Configured for a specific use, a rover is not that complex to operate, but its inherent flexibility is one of its biggest liabilities.

The magic configuration settings that will make the rover sing for its supper can at first be so elusive, so easy to forget the next time you need them, and so different from one rover to the next, that the best thing you can do once you decipher this “code” is to document it, and document it well.

Just Check the Manual?

Sorry, but while the manuals from the various manufacturers are generally well written, they cannot possibly anticipate and explore every nuance of RTN rover gear combinations. Newer rovers give

you a lot of options in communications links (modem, cell phone, cell cards, W-Fi, radio), how to connect them (Bluetooth, serial, USB), and what software to use (manufacturers often offer more than one, then there are third party offerings). Then we spiral into the vortex of model, make, firmware, versions, and patches...eeeeek!

If you are trying to piece together a rover from various legacy parts, you may end up with a unique Frankenstein of your own creation. There may be some serious trade-offs in trying to save a few bucks. Unless someone else has pioneered that particular combination and was kind enough to post their cheat sheet on the web for you to find, you may well be on your own.

Most newer data collectors/controllers have an operating system (OS) that

closely emulates what your PC can do, run similar programs, cruise the web, cut/paste, etc. There are even those who have turned these little devices into mobile offices. These operating systems may include the likes of Microsoft Mobile, CE, Linux, Palm, and so forth. The OS of some may be completely proprietary (which certainly stifles flexibility) in which case you better make sure there are very explicit instructions available.

Getting the OS of your mobile device to talk to your various communications devices is likely the single most frustrating configuration step. You may even find that even within one cellular provider (like the one that kept changing names) depending on when/where you got your account, there may be completely different advanced modem commands. The good news is that you can create and store many connection “profiles” (one for each of the varied gear you want to connect to your rover). The downside is that various users of the same gear may just make minor changes to a current configuration on-the-fly. The current trend is towards individual “user profiles” to protect your own settings. For now the reality is that some rovers get used and abused by many; unfortunately you may not notice the changes until it is too late.

A Cheat Sheet Just for You

Many firmly believe that everyone should create their own cheat sheets. If you have ever cursed documentation created by someone else (including the manuals created by professional tech writers), then you know the liability of relying on someone else’s work. Instructions first need to cover how to configure the rover and set up a job/project with that specific configuration, then to successfully power-up/initialize said gear with that configuration. To ensure that the instruction precisely meets your level of understanding, you should write your own or edit someone else’s, but only if you test every step along the way.

One has to assume some familiarity with the general workings of modern user interfaces, as it is rare to find any instruction that drills down to the level of keystroke by keystroke. But you can delve as deep as you need; just take a lot more screen shots and take a lot more notes. A screen shot (or screen capture) of what you see on the data collector as you work through every step of

configuration and operation is best, since you see precisely what works and only what works, as well as all of the syntax, check-boxes, and messages. What might take minutes (or at the most hours) to prepare will save your tush in the field (or that of the folks you send out there to do your bidding).

Screen Captures

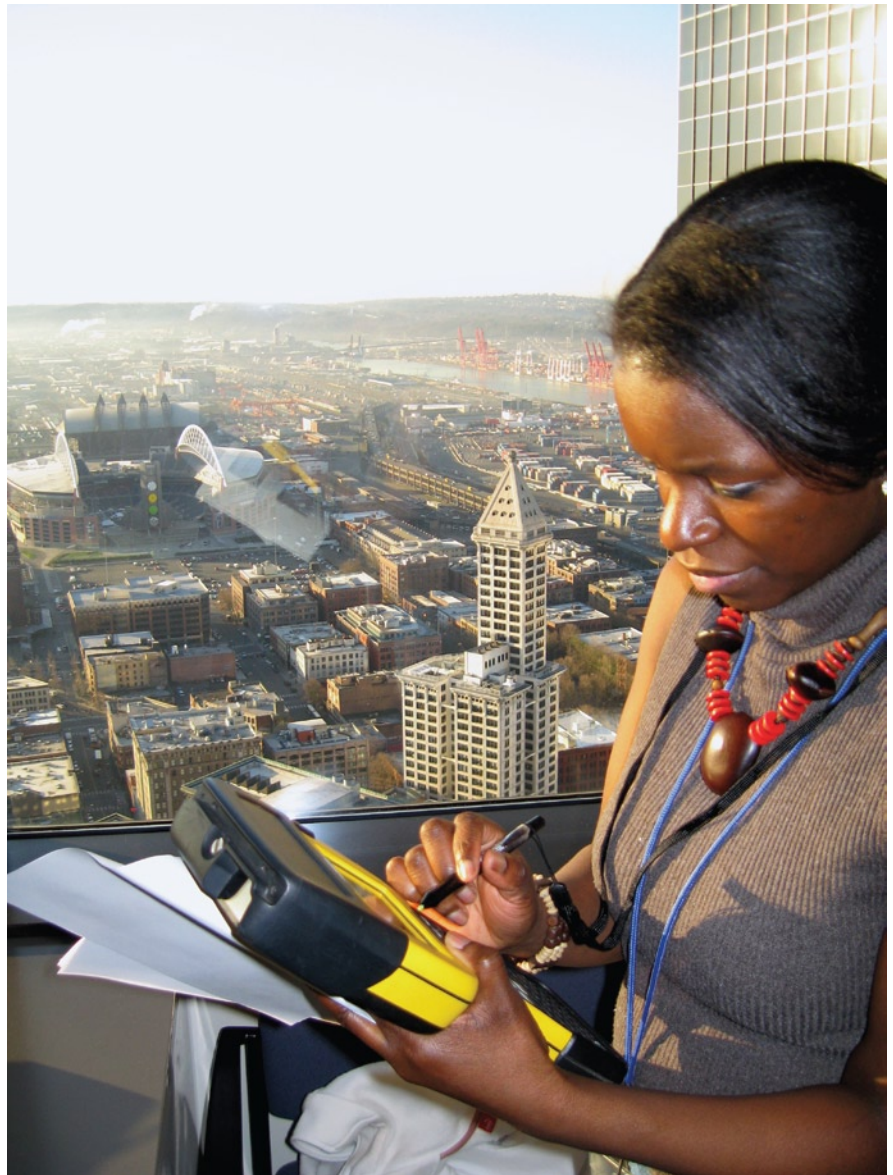
If you have never done a screen capture, try one on your PC. What works on most PCs is to simply press the “print screen” button on the upper row of your keyboard. In most operating systems, this action defaults to sending a screen capture to the clipboard, and then you can simply do a paste into something like Paint or other graphics program. There are lots of free graphics programs; your PC probably comes with one (like Paint). The graphics program does not need to be very sophisticated, it just needs to let you select the portion of the screen shot you want (cropping) and let you copy that portion into the document you are creating for your cheat sheet (e.g., Word).

How to get screen shots from your data collector/controller is nearly as easy. Instead of trying to find some kind of screen capture program to run directly on the mobile device, you could use remote operation software like Pocket Controller Pro. Low cost (less than \$50) programs like this let you connect a USB cable from your mobile device to a PC or laptop, operate the mobile device from your PC, and let you do screen captures.

The process of creating the cheat sheet is fairly simple: create a text document, screen capture each step, paste the images into the document, and add text notes in between.

Bullet Points and Points of Pain

The term “points of pain” in the configuration and operation of the rover equates to “things you may not remember” or “choice points” in the process. You may choose to make shorthand notes of critical settings. I have seen this approach backfire; it is all too easy to forget the context of a cryptic note, and therefore better to document every step. Another pitfall is to write an “all inclusive” cheat sheet that provides too many “choice points” along the way (e.g., “If phone A, go to section 34.1.2; if phone B, go to section 34.1.3, etc.). Why not just copy the cheat sheet for one option, and edit it for others? It is perhaps better to have



Test your cheat sheets. Put the receiver by a window and go through the steps. Tokunbo Fatuga of Seattle Public Utilities construction management learns the testing routine.

one smooth flow in the steps than going off on tangents.

Some cheat sheets are created for specific steps in RTN rover setup and operations. Whether done in modules, or as a whole guide, here are a few elements you may want to include in every cheat sheet:

- **Summary or Abstract:** An explicit description of exactly what you are trying to accomplish in the instruction. Example: “*Setting up a GaoNav200-GNSS for use with an RTN for RTCM3.1 VRS corrections with a Nerftel Bluetooth GT306*

phone, with Survey-Dude V3.6 software and start a new project with calibration to local control for Topo”.

- **Title** A shorthand version of the summary. Example: “*GN200-G, NerfBT, VRS3.0, SD3.6, Topo w/ Calib*”. It may be a challenge to name the document file with an even shorter title (fortunately we are no longer limited to eight characters for file names, as in DOS).
- **Equipment Checklist and Image** Put some big sheets of white paper on the floor, lay out all of the gear that makes up your rover, take a digital photo, then stick that

in your document, take it a step further and label the gear in your graphics software.

A list of individual cheat sheet themes, modules of a more comprehensive document, or simply bullet points in a short checklist may include the following:

- **Receiver** Care and handling, power, boot procedures, cabling, BT pairing, etc.
- **Data Collector/Controller (DC)** Care and handling, power, boot procedures, cabling, BT pairing, etc.
- **Comms Device(s)** Care and handling, power, boot procedures, cabling, BT pairing, data account, when to use which device, etc.
- **DC Operating System** File management, memory management, comms connections, web access, soft boot procedures, etc.
- **DC Survey Software** Project/job setup, geodetic settings, calibration/localization, conventional/GPS toggling, data import/export, comms connectivity, profiles/styles, known glitches, NTRIP setup, etc.


- **Other Hardware** Poles, bipods, tripods, equipment clamps, phone pouches, cable straps, external antennae, etc.
- **Peripheral Hardware** Laser rangefinders, other external sensors
- **Field Procedures** This could turn out to be volumes on its own. Site quality considerations, quality indicator thresholds (*e.g.*, PDOP, RMS), quality control procedures, point naming and reporting conventions, deliverables, etc.

Create, Test, Share

Manufacturers, dealers, and individual users are creating good documents every day, and most are willing to share them. It would be nice to somewhere have a central repository of cheat sheets to choose from, but the reality is that it might take more effort to find one that fits precisely your needs than it would take to make your own.

It is a good idea to save copies of your documents as PDFs for distribution (you can find freeware PDF writers online that install like a printer on your PC). This in a sense “locks” the file so that

someone might not inadvertently alter it when viewing. It is also a really great idea to “blank-out” any usernames/passwords and perhaps any specific IP and port numbers before you share your documents with anyone outside of your immediate enterprise.

Some good examples, submitted by users, manufacturers, and dealers, have been posted to www.wsrn.org (select the Reference Materials link on the left side of the main page). These are submitted “as-is” from the users, and are stored as PDFs. Consider submitting some of your own as you create them. Anything we can do to help reduce the volume of “colorful metaphor” emissions from our fellow surveyors struggling with first-time RTN use has got to be good for the industry. 

Gavin Schrock is a surveyor in Washington State where he is the administrator of the regional cooperative real-time network, the Washington State Reference Station Network. He has been in surveying and mapping for more than 25 years and is a regular contributor to this publication.

Your deadlines are our deadlines



Custom orders your way ... when you need them.

When your name is on it, our name is behind it.

Berntsen delivers.

The professional's choice in survey products • www.berntsen.com • 877.868.9176