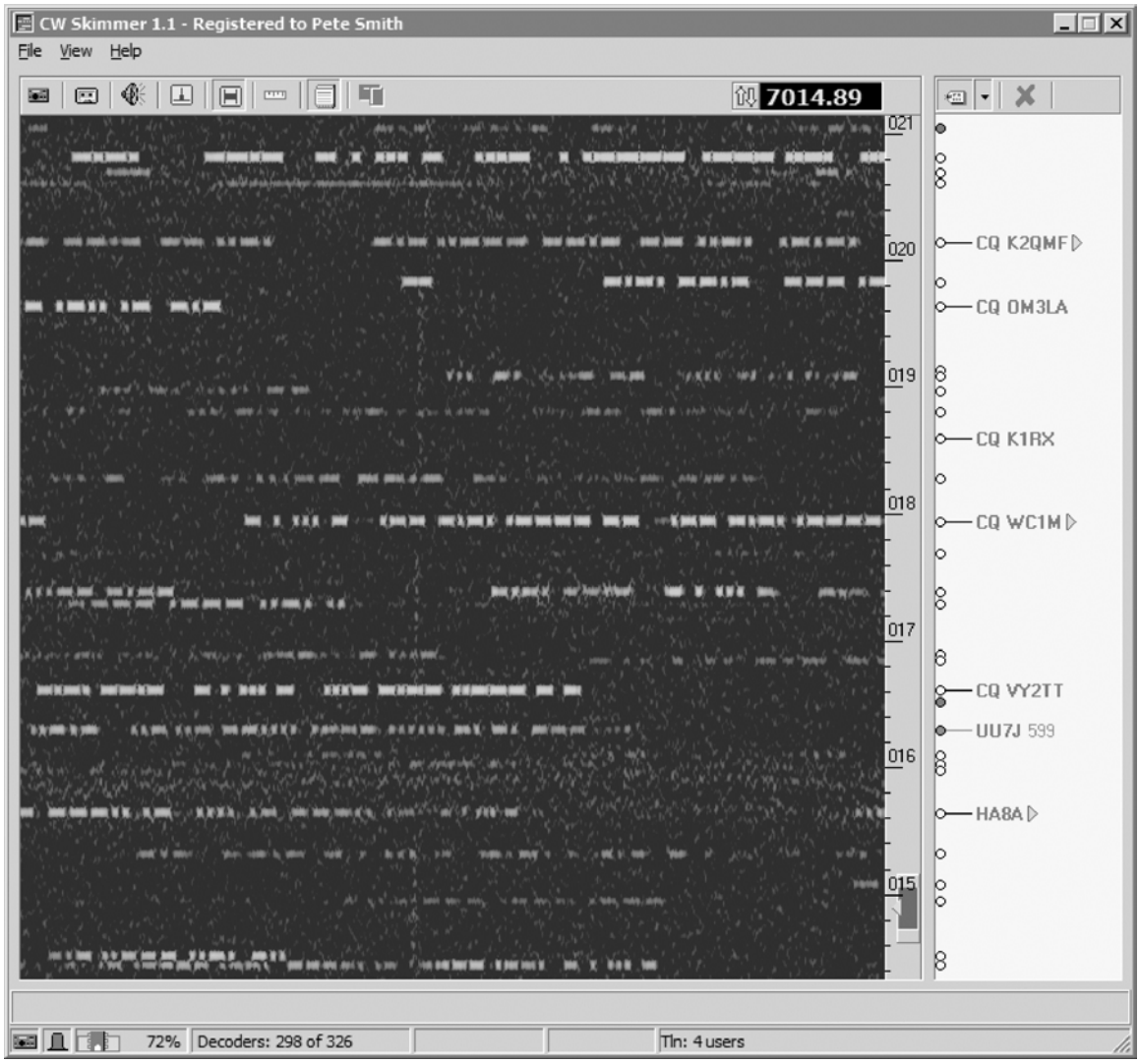
What's Next

By Pete Smith N4ZR

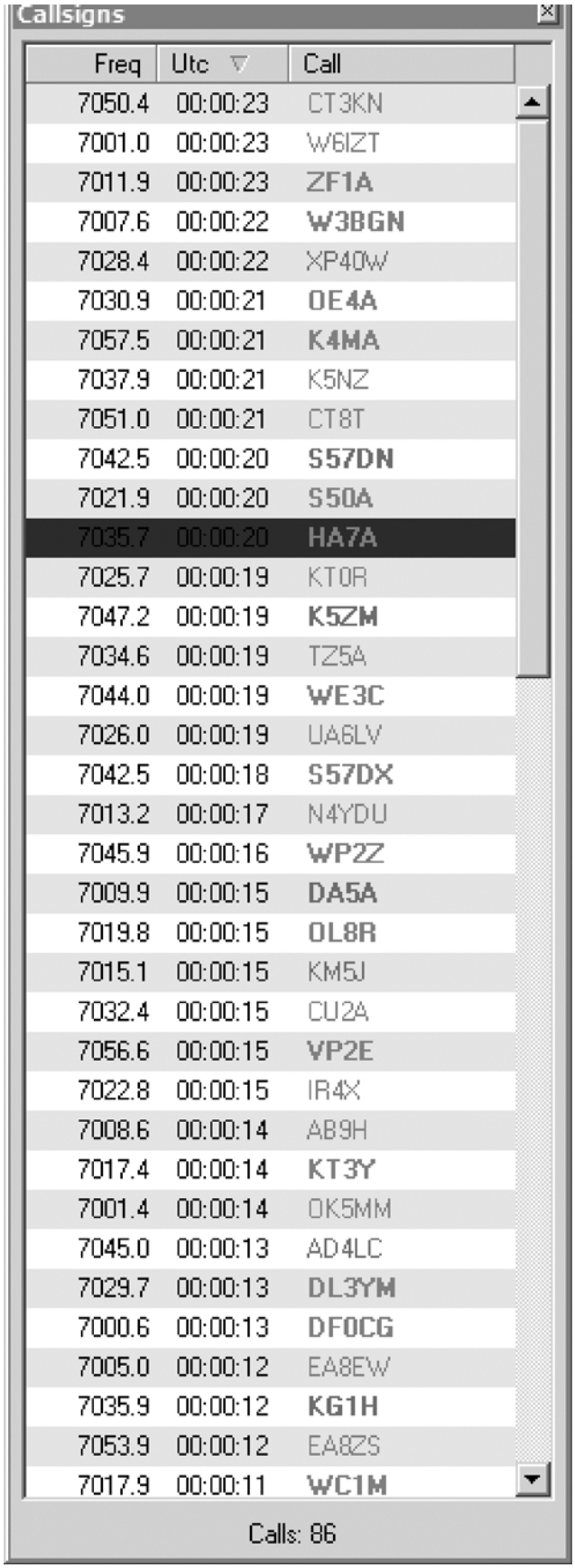
Unless you've been living under a rock, or maybe in the Spratley Islands, you're probably aware of the controversy over CW Skimmer. With this in mind, our esteemed editor asked me to write a column to provide a common understanding of what this new thing is. In the next issue, there'll be another article going into some detail on how to deploy CW Skimmer in a contest station environment.

So what is this thing called Skimmer? CW Skimmer is a software package, available from Alex Shovkoplyas, VE3NEA, at www.DXAtlas.com. A 30-day full-featured trial version of release 1.1 is available free of charge. Combined with your current transceiver, or with Software Defined Radio (SDR) hardware that is already available, CW Skimmer will enable operators to be aware of everything that is going on across large swaths of any band. You can pick out individual signals and enhance their readability by putting them through a tight audio DSP filter, or click on a station and move your transceiver to its frequency, but what is truly different about Skimmer is its mega-multi-tasking decoders. It looks at the entire swath of spectrum it can "hear", identifies CW signals, and decodes them all. Meanwhile, it looks at the decoded text and works to identify stations newly arrived on the band, stations calling CQ, etc. It generates a time-stamped list of these stations and their frequencies, and makes them available via Telnet to your logging program, or via the Internet to the hub server of the reverse beacon network (more on this below).

Here's a sample of CW Skimmer at work on 40 meters with an inexpensive SoftRock SDR (figure 1). It was "listening" to a brief period of a recent CQWW CW and decoding what it saw.



The first figure shows the main screen. The waterfall display only shows about 5 KHz from the center frequency of the principal decoder (the green zone at the bottom), but in fact, the SoftRock is receiving the entire slice of spectrum that the soundcard can handle. In this case, 326 different signals (or possible signals) were being copied across the band, and 154 calls were identified in less than 2 minutes (figure 2). The callsign list is dynamic – stations are constantly being added or dropped when they are no longer there.


Callsigns
Freq
Utc
Call
7050.4 00:00:23 CT3KN
7001.0 00:00:23 W6IZT
7011.9 00:00:23 ZF1A
7007.6 00:00:22 W3BGN
7028.4 00:00:22 XP40W
7030.9 00:00:21 OE4A
7057.5 00:00:21 K4MA
7037.9 00:00:21 K5NZ
7051.0 00:00:21 CT8T
7042.5 00:00:20 S57DN
7021.9 00:00:20 S50A
7035.7 00:00:20 HA7A
7025.7 00:00:19 KT0R
7047.2 00:00:19 K5ZM
7034.6 00:00:19 TZ5A
7044.0 00:00:19 WE3C
7026.0 00:00:19 UA6LV
7042.5 00:00:18 S57DX
7013.2 00:00:17 N4YDU
7045.9 00:00:16 WP2Z
7009.9 00:00:15 DA5A
7019.8 00:00:15 OL8R
7015.1 00:00:15 KM5J
7032.4 00:00:15 CU2A
7056.6 00:00:15 VP2E
7022.8 00:00:15 IR4X
7008.6 00:00:14 AB9H
7017.4 00:00:14 KT3Y
7001.4 00:00:14 OK5MM
7045.0 00:00:13 AD4LC
7029.7 00:00:13 DL3YM
7000.6 00:00:13 DF0CG
7005.0 00:00:12 EA8EW
7035.9 00:00:12 KG1H
7053.9 00:00:12 EA8ZS
7017.9 00:00:11 WC1M
Calls: 86

The Skimmer software is very simple to operate and seems quite able to copy CW at or near the noise floor, though not quite as well as a good CW operator. The software automatically adjusts the number of decoders available, to keep your CPU utilization below 100 percent, so it resumes skimming as soon as it can.

Here are a few more possible applications to think about:

- You can use Skimmer to feed the bandmaps of your contest logging program, simply connecting to it via Telnet. Potentially, it is far superior to packet, because it will “notice” a station soon after it comes onto the band, and it will spot everything it hears calling CQ, not just the juicy ones. Imagine having this capability on Sunday during CW Sweepstakes, when everything depends on how much new blood you can work. Contest sponsors are actively debating what class Simmer-equipped stations will be placed in.
- Contest sponsors themselves could use strategically placed Skimmer/SoftRock combinations to record an entire band worth of activity for a 48-hour contest. The hard drive space required (roughly 95 Gigabytes) is no longer prohibitive, and the resulting record could be extremely useful in resolving accusations of two signals on the same band simultaneously, rubber-clocking and other rule violations. Total coverage would not be required; like radar in the control of speeding, the deterrent effect of not knowing whether he was being recorded could be an excellent deterrent to a prospective cheater.
- CW Skimmer software can enable a network of “reverse beacons,” listening to a given band and reporting what it hears via the Internet. PY1NB and I are field-testing this concept now at http://Skimmer.dxwatch.com . You can see lists of spots, or view them on a map that shows where Skimmers are located and what stations they are hearing. You can query the Skimmers in a given area and get a list of stations they have recently received, or call CQ and see whether you turn up on the list a few seconds later. A later evolution might even provide signal strengths (or received signal-to-noise ratios), so that you could compare with your friend across town and see who has the better signal in Europe or Japan.
- There are a variety of DXing applications, which were VE3NEA’s original target audience. Rare DXpeditions equipped with Skimmers could use them to capture 15-20 callsigns our of one of those wide-split pileups, and then work them one after another, much faster than the current one-at-a-time. DXers on the other end of the pileup can use Skimmer to figure out more easily where the DX is listening.

There’s a lot of work yet to be done. Some contest experience shows that CW Skimmer is somewhat prone to multiple miscopies of a single callsign, dependent

on QRM and signal strength. Because it currently tries to do all its analysis in a 5-10 millisecond interval while listening to a given decoder, Skimmer can't figure out that a station working one caller after another on a given frequency is, in fact, running, unless it sends tip-offs like "QRZ?" It requires a lot of CPU horsepower – my 2.2 GHz Celeron, for example, is stretched to the limit (sometimes beyond) by the decoding requirements of a contest-busy band. Alex is aware of all this, and working hard on it. Don't forget, this is the first public release; there will doubtless be many improvements in coming months.

One of the concerns people have raised is that, before long, some enterprising programmer type will develop a true robot, capable of operating an entire contest without human intervention. I bounced this idea off Alex, and he responded, "Fortunately, it doesn't look like such a robot will become a possibility in the next few decades. Automatic decoders can be as sensitive as a human ear, because the same laws of physics apply to both, but the computer cannot fully understand the meaning of the message it has decoded and thus cannot use context information to fill the gaps. Humans are unbeatable in this area."

As always, technology seems to challenge our imaginations, as well as our entrenched ideas. Someone recently lamented that we were getting away from the original idea of "a boy and his radio." A waggish friend immediately commented that Skimmer is more like "a boy and his sound card." I hope we can all agree that change is inevitable, and exciting. In fact, isn't that a lot of the fun of amateur radio?