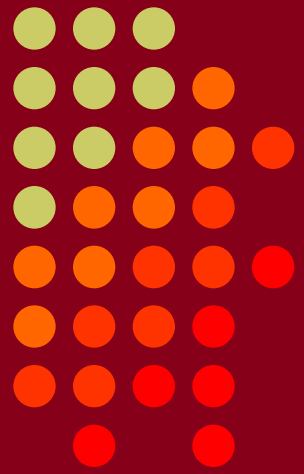
The Advantages of Waterfall Displays for Contesting and DXing

Presented by N6TV

n6tv@arrl.net



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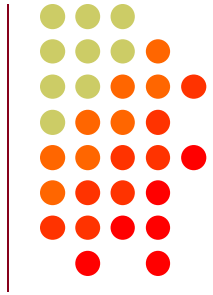
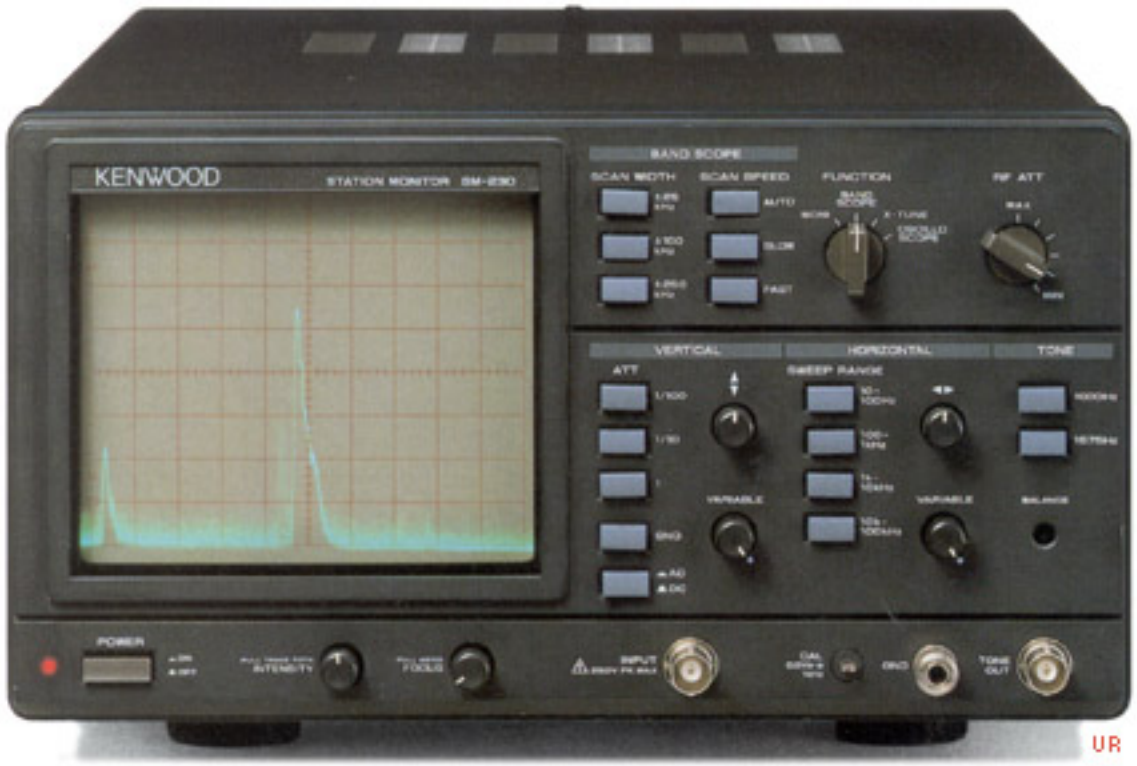
Presentation Overview



- Legacy “Panadapters”
- Waterfall scope in CW Skimmer
- Latest radios with waterfall displays
- Waterfall display advantages & disadvantages
- How to use waterfall displays while contesting or DXing
- Q & A

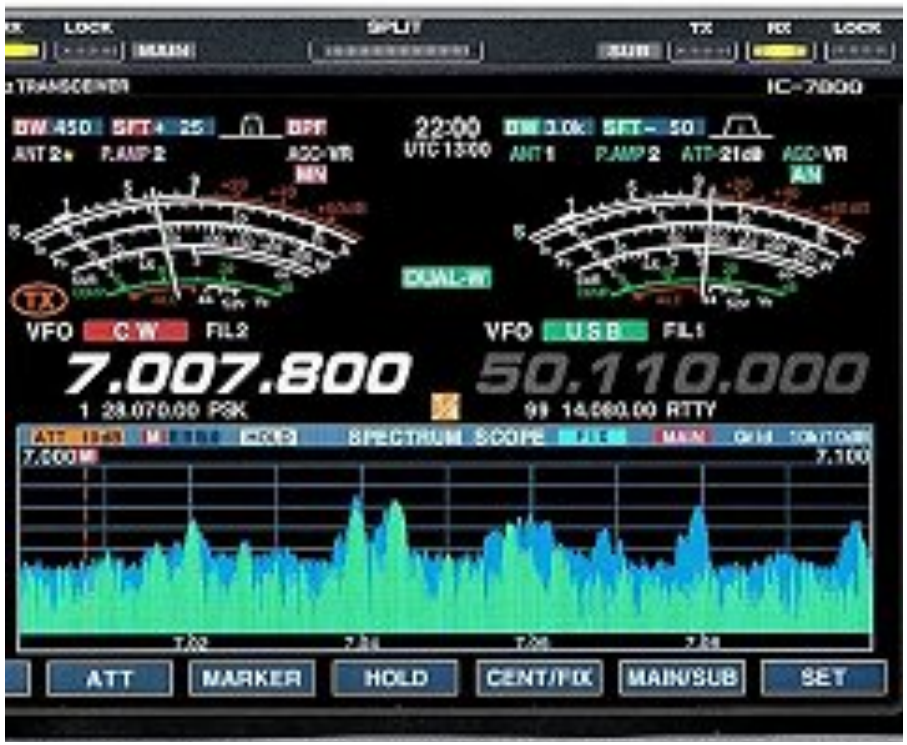
Legacy Panadapters

- Kenwood SM-230 Station Monitor (25, 100, or 250 KHz):

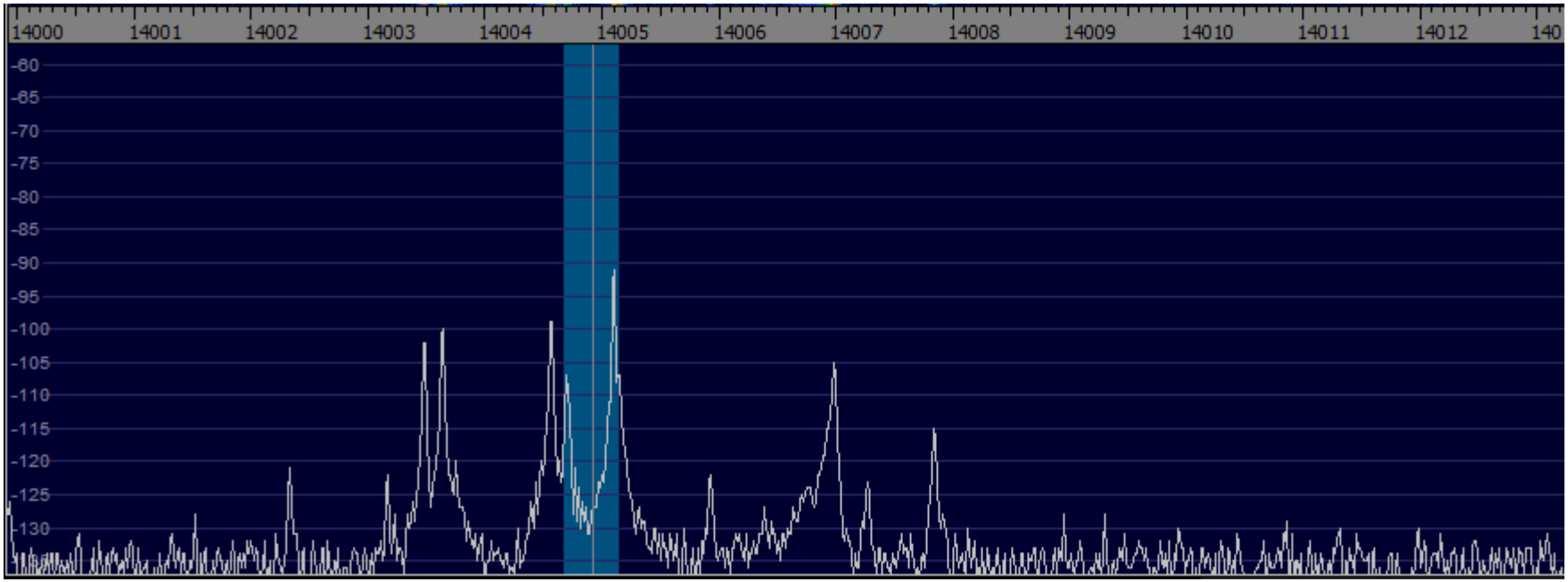


Legacy Panadapters

- “Band Scopes” in Icom IC-781, IC-756ProIII, IC-7800 (before V3.0), IC-7700 (before V2.0)

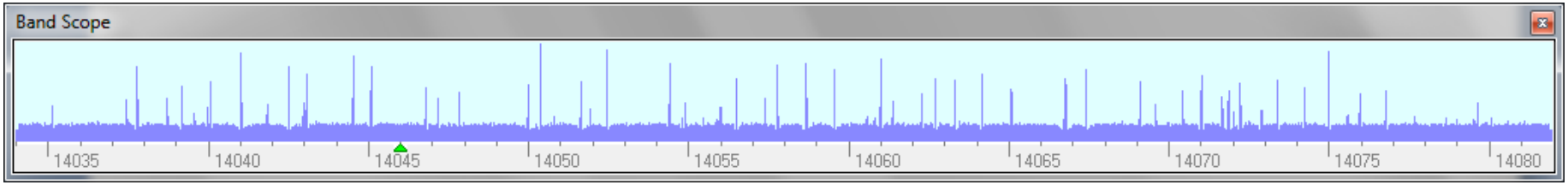


Spectrum Displays Hide Weak Signals



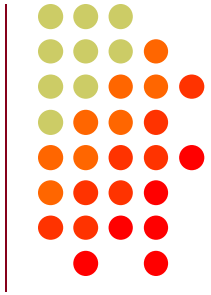
CW Skimmer's Band Scope

- From the CW Skimmer menu, select View → Band Scope



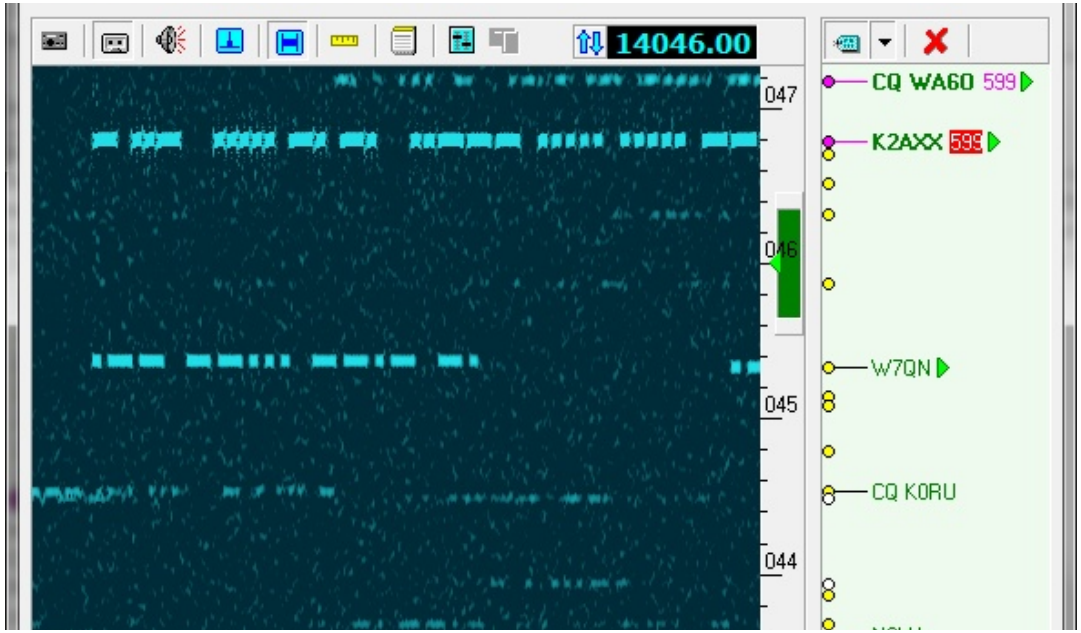
- Much better resolution, but display is very jumpy
- No "peak signal" memory
- Not useful on SSB

Legacy Panadapter Limitations



- Big signals dominate the display
- Weak signals very difficult to spot
- Signal peaks disappear, no history
- Difficult to find “clear spots” on a crowded band
- Limited zoom in or out
- Display jumpy, distracting
  - Signal averaging helps, but it also hides things

CW Skimmer Waterfall Limitations



- You only see 10 - 15 kHz of the band at most
- Scale is fixed, cannot “zoom” in or out, or tune smoothly
- Narrow 500 Hz CW filter – *not* usable on phone

Better Waterfall Displays

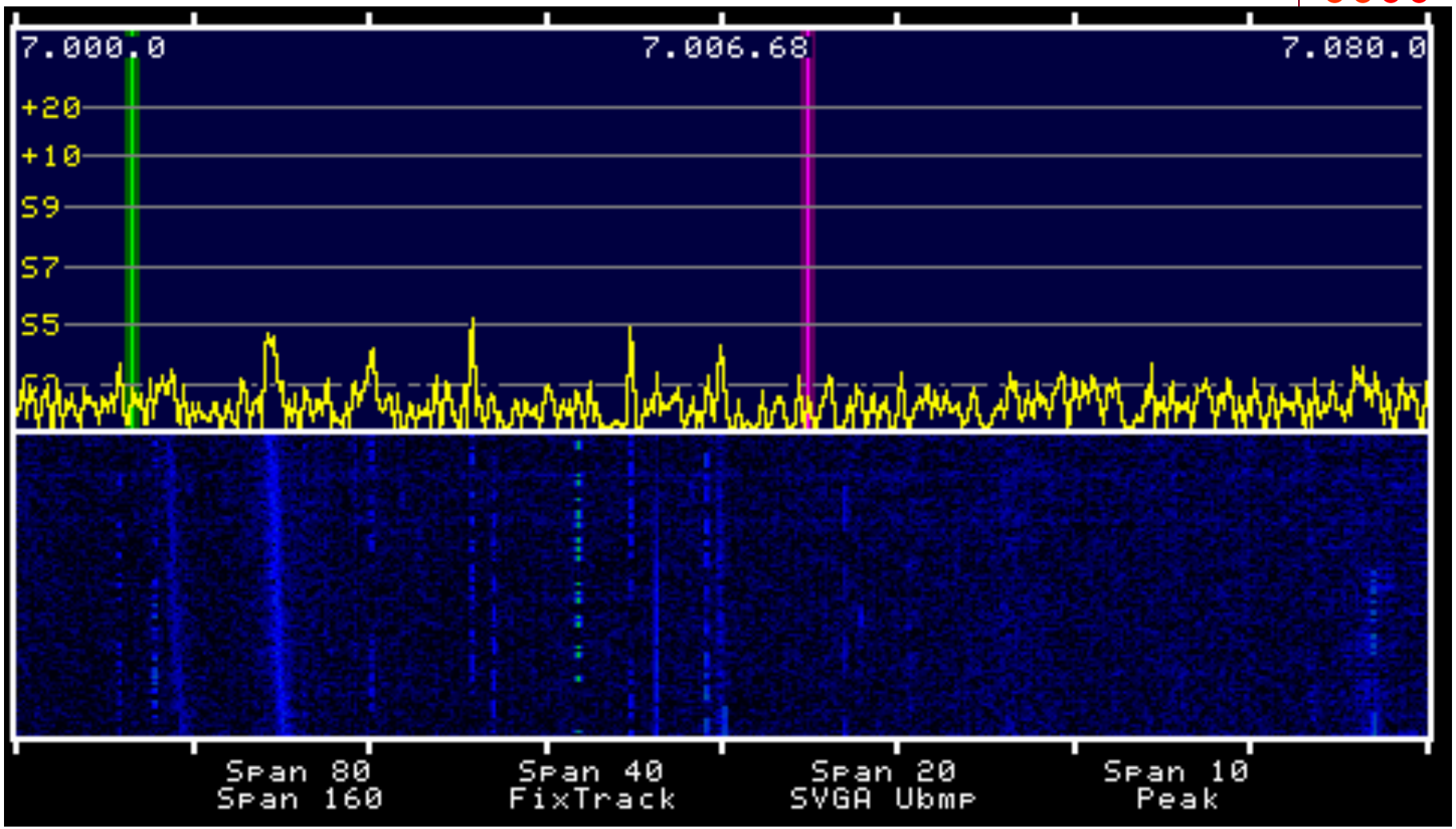
- The Elecraft P3 Panadapter

- Major improvement over legacy designs

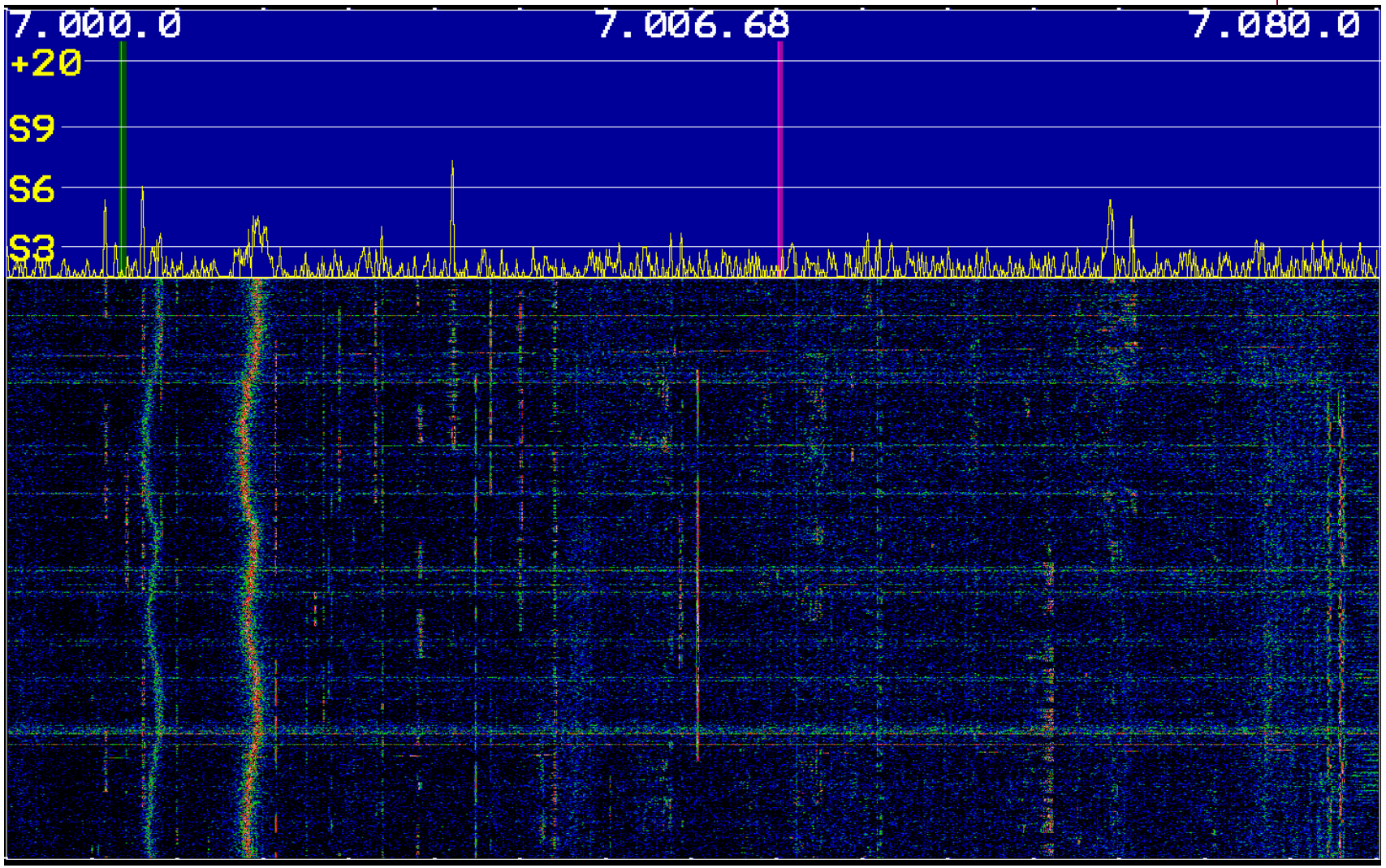
Elecraft P3 + P3SVGA Option

- P3 resolution only 480 x 272 pixels
- P3SVGA: internal SVGA Large Screen Adapter
  - 1024 x 768
  - 1280 x 1024
  - 1440 x 900
  - 1920 x 1080
- Displays far more signals

P3 Built-in Display at 480 x 272



P3SVGA at 1440 x 900



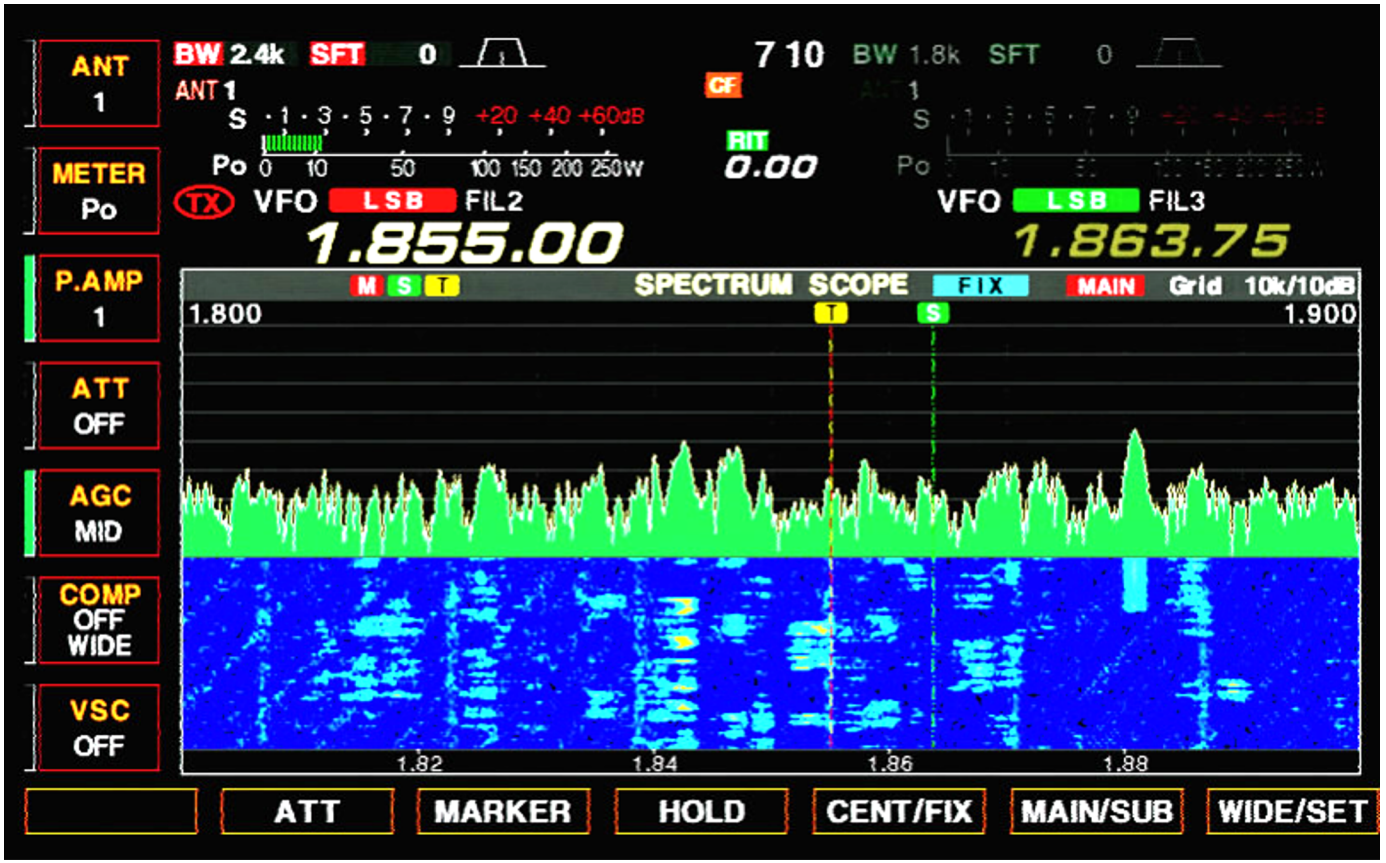
Old Icom IC-7800 firmware

Icom IC-7800 with V3.0 firmware

IC-7800 V3.0 Screen Shot

IC-7700 V2.0 Also Supports Waterfall Feature

- 800 x 480 (with or without external monitor)



IC-7850 significantly improves waterfall (800x600)

IC-7850 / 7851 – *Huge* Improvement

- Fast, 800 x 600, MAIN only, or MAIN + SUB
- “Click to tune” with USB mouse

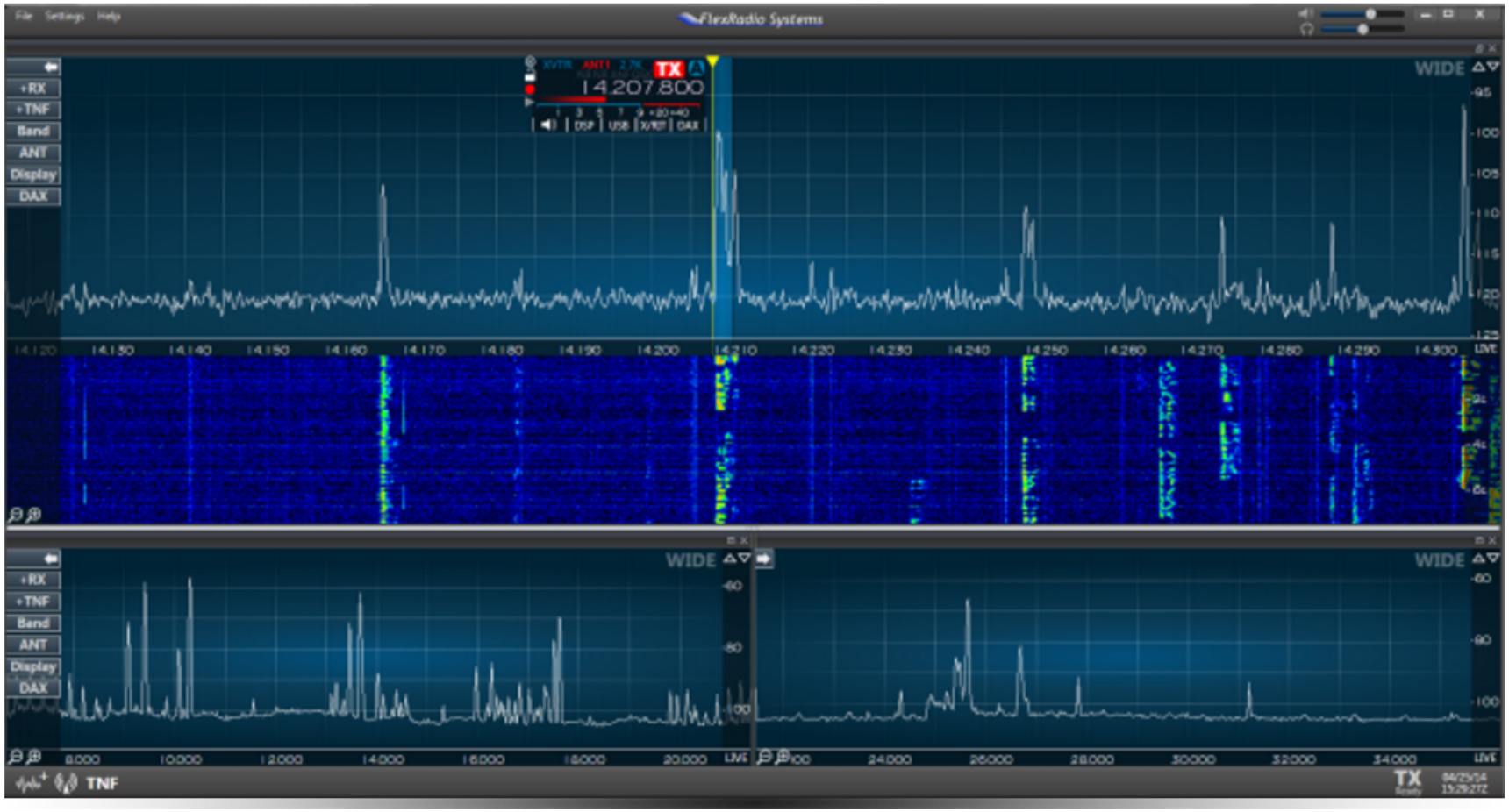
New IC-7300 has fast waterfall too!

- With touch screen

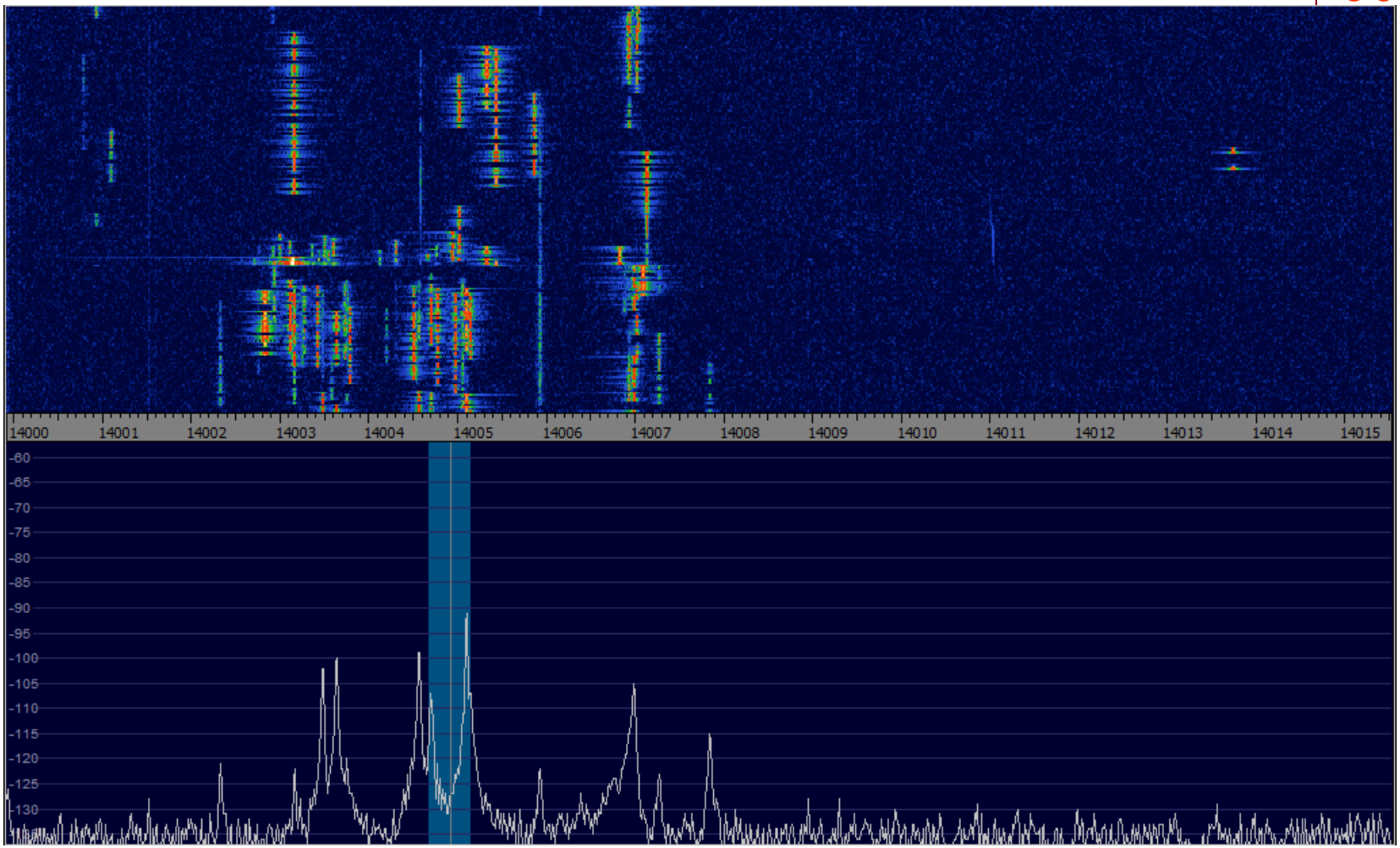
Kenwood TS-990S

FlexRadio FLEX-5000™, FLEX-6700™

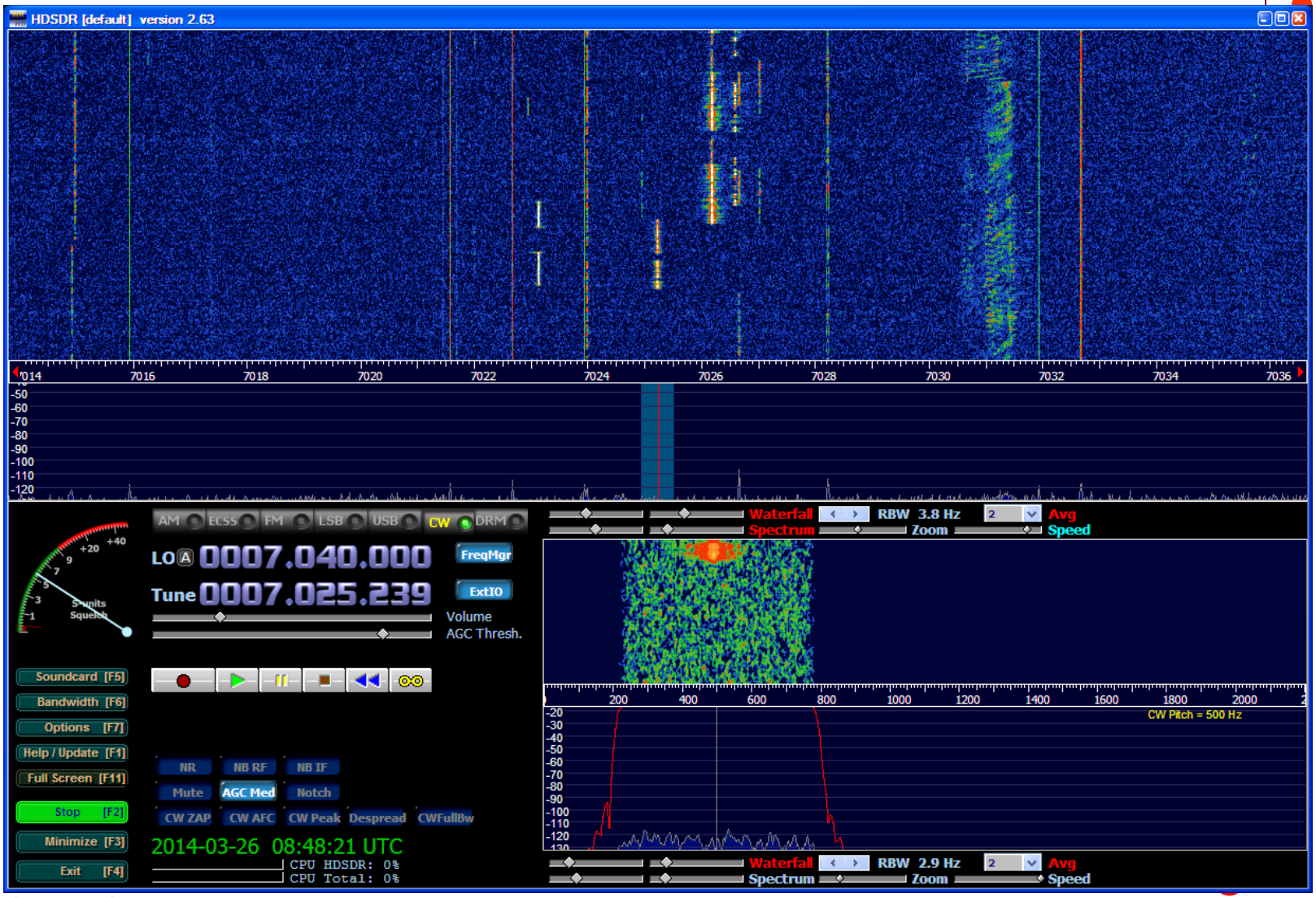
FlexRadio Systems® SmartSDR



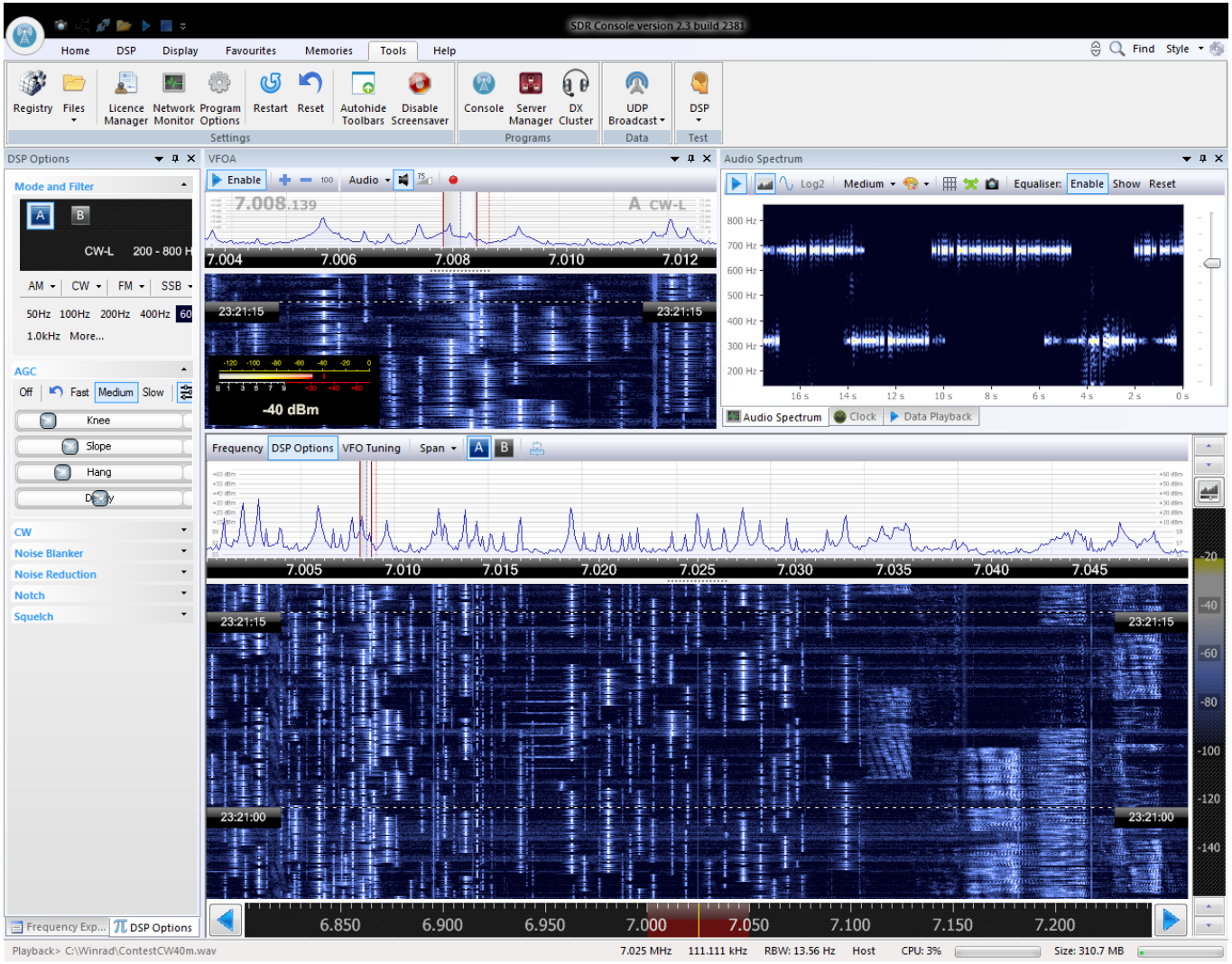
Winrad Software



HDSDR Software

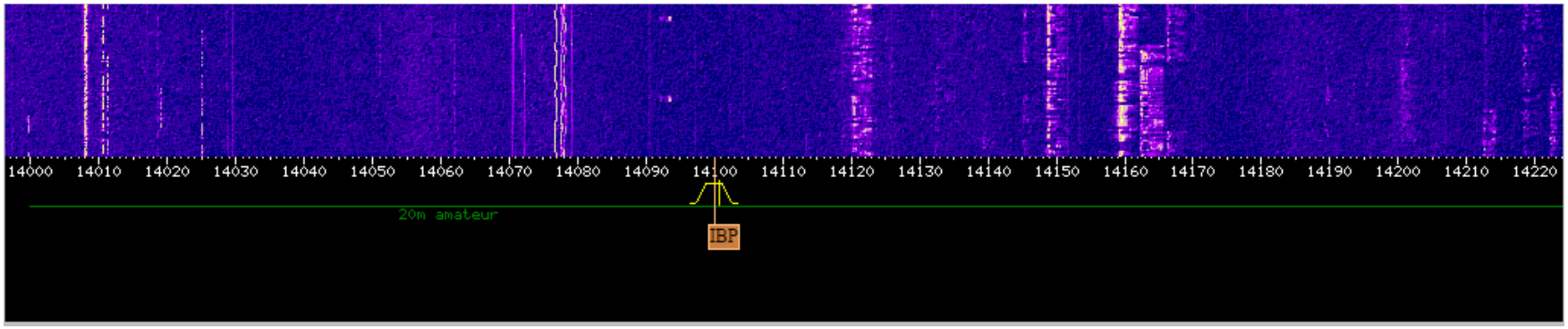


SDR-Radio.com SDRCconsole (V2) by HB9DRV

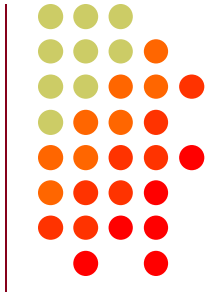


WebSDR: Waterfalls on the Web

- http://websdr.ewi.utwente.nl:8901/

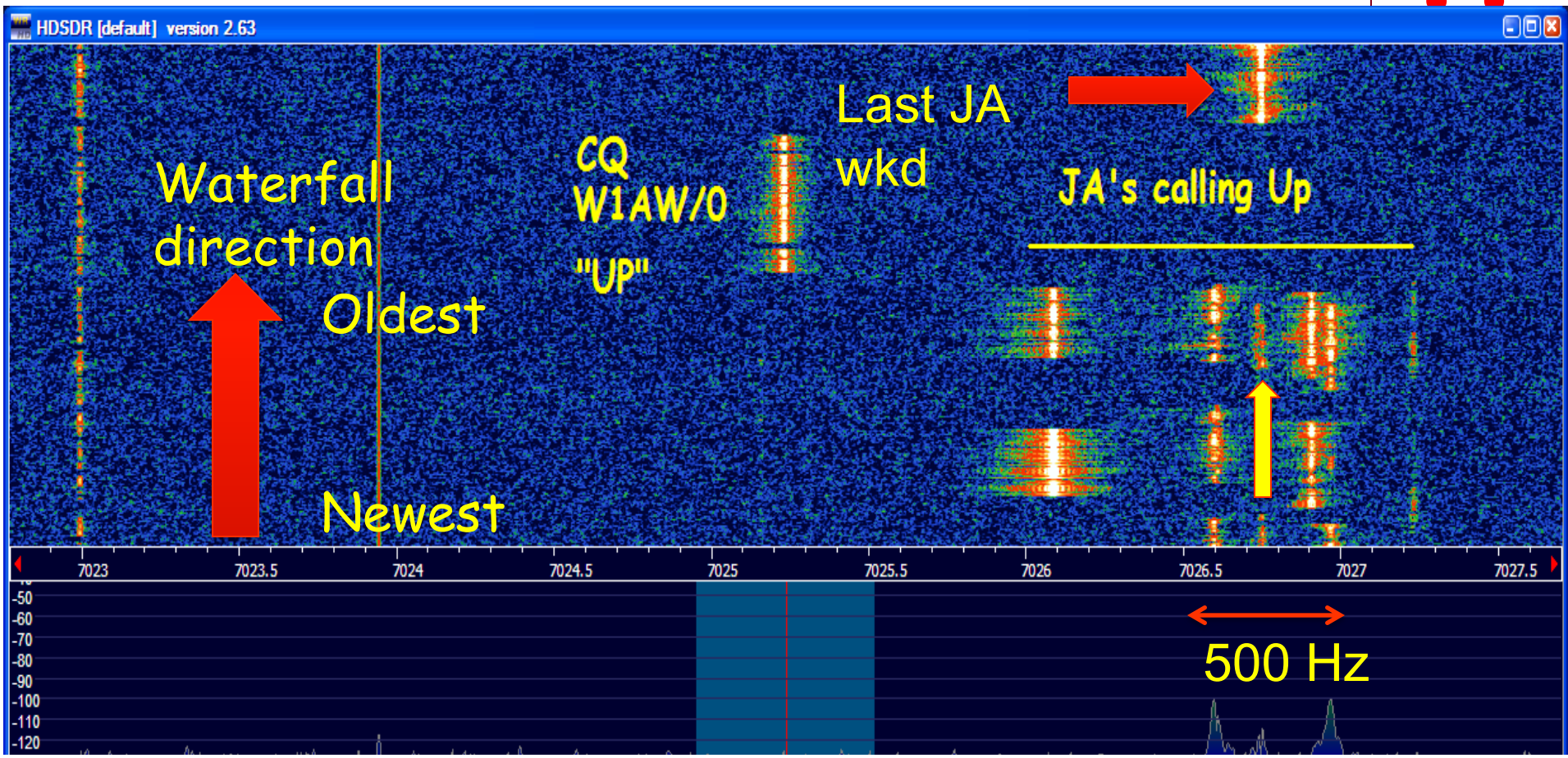


Waterfall Display Advantages



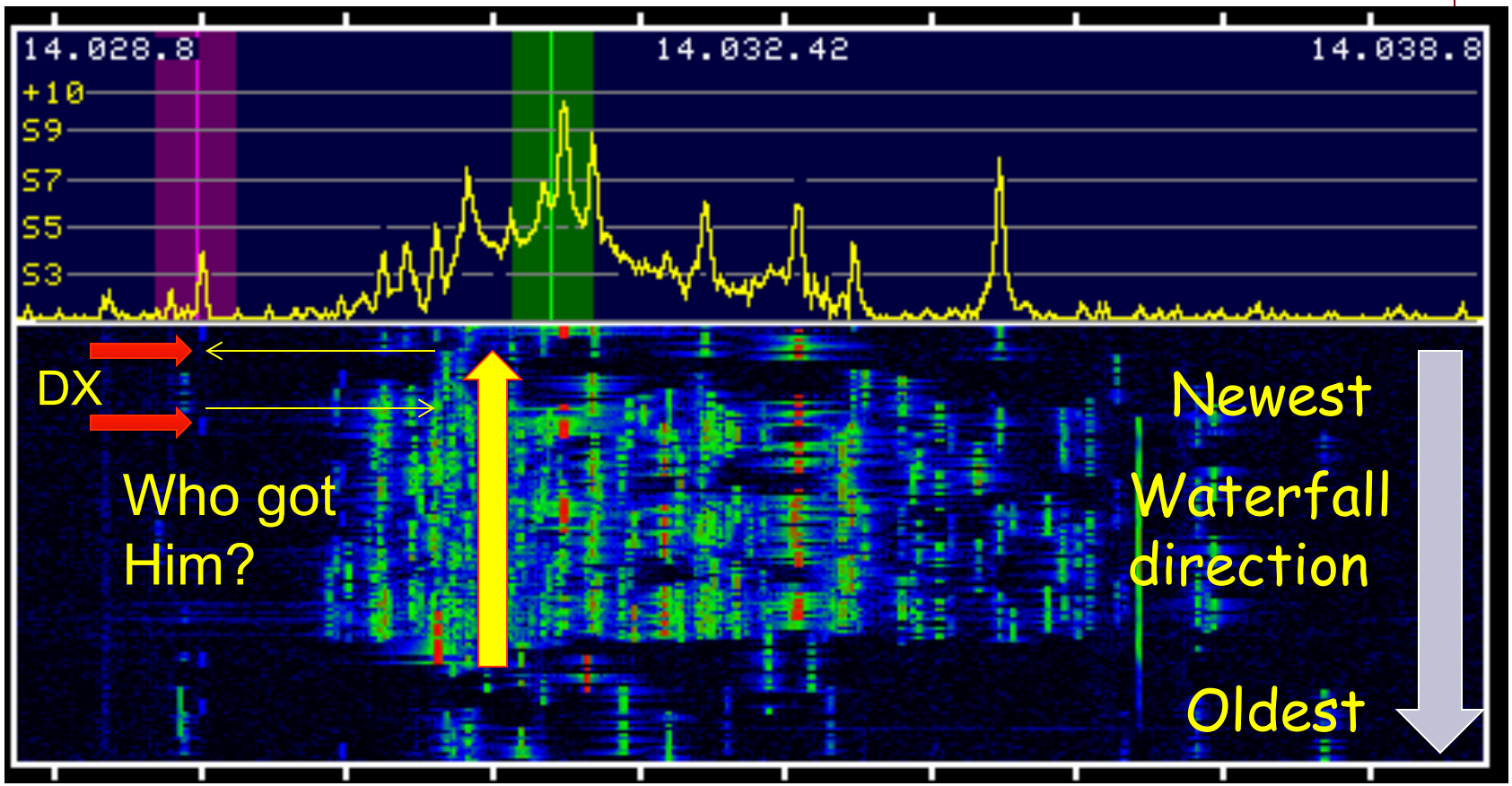
- "Click to Tune" – direct access using a mouse
  - IC-7300, IC-7800 V3.0, IC-7851, Flex/SmartSDR, HDSDR, SDRConsole (but *not* Elecraft P3)
- Weak signals easy to spot (faint traces)
- Many zoom levels: 5, 10, 30, 60, …, 800 KHz+
  - Watch the whole band at once, or a small slice
- Find clear frequencies *fast*
- Find who the DX just worked, *fast*
- Spot the gaps in a crowded CW pileup

Listening “Up”? Not a problem



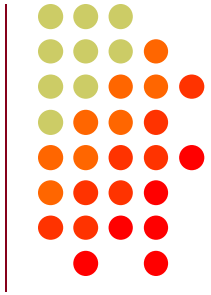
Who will W1AW/0 answer next?

E30FB CW Pileup on P3 display



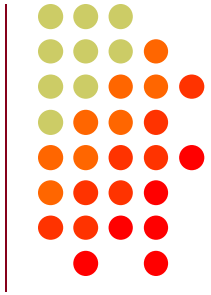
Where will he listen next?

Advantage: Waterfall



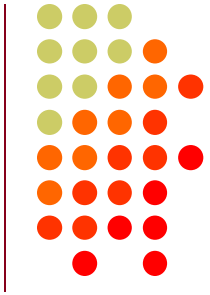
- Find “good spots to call” in a CW pileup
- Find clear spots to call CQ
- QRM? You can *see* where to move your VFO to minimize it
- During S&P, find the “next” signal fast (who needs careful tuning?)
- Position VFO B or 2nd receiver without having to *listen* to it
  - S&P while CQing, “SO2V” (single-op, two VFOs)
- Monitor overall band activity
- Keep an eye on the local competition

Waterfall Display *Disadvantages*



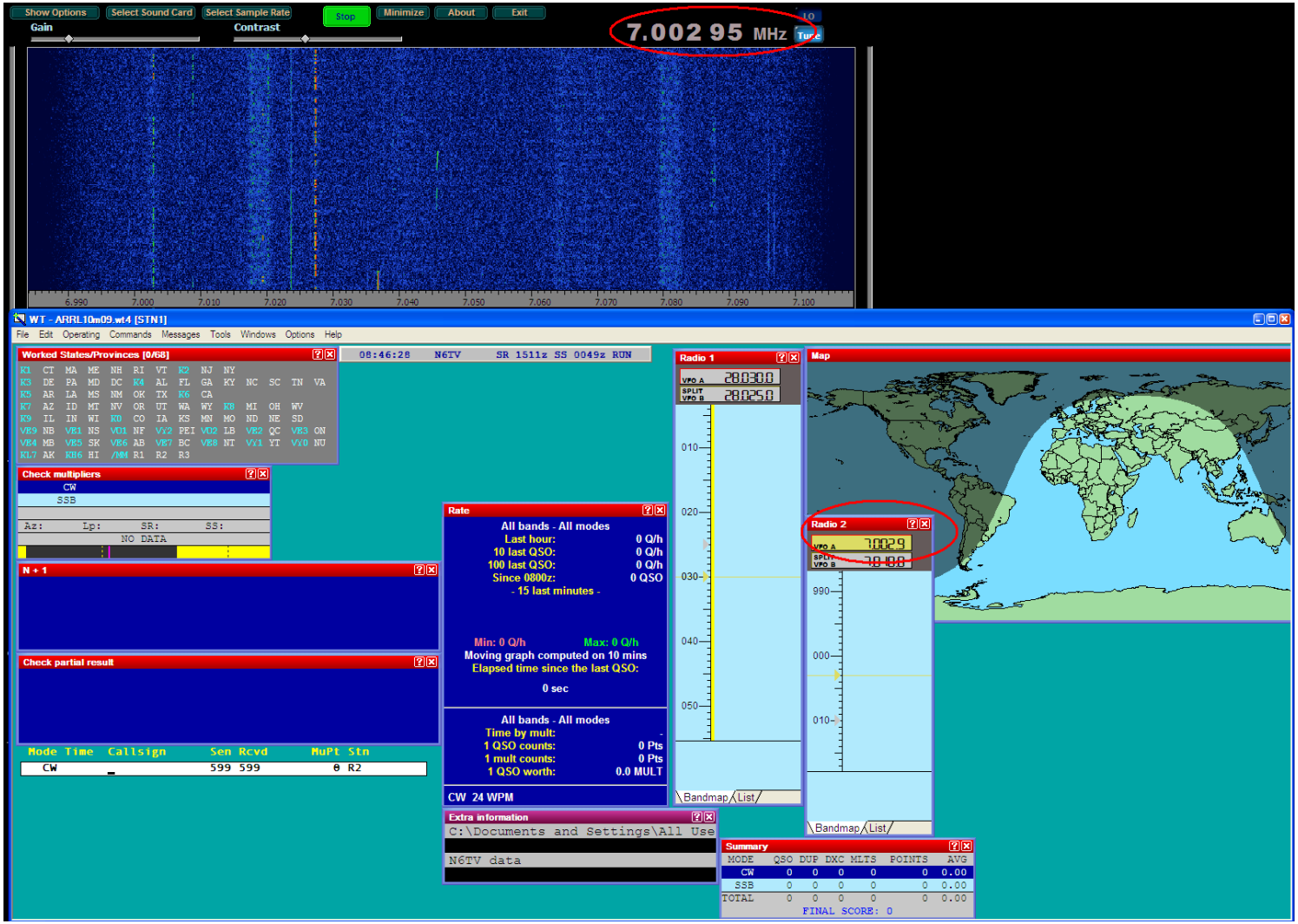
- Radios don't automatically tune from signal-to-signal like CW Skimmer (yet)
- Clicking on a signal with the mouse not as precise as tuning with VFO, must still fine tune, contest software loses focus
- Some find it visually distracting
- Cumbersome to adjust scope width and band edges
- **But, if you're *not* using a waterfall display in a contest, you're really operating "blind"**
- A waterfall display is really the "killer app"

Recommendations While Contesting

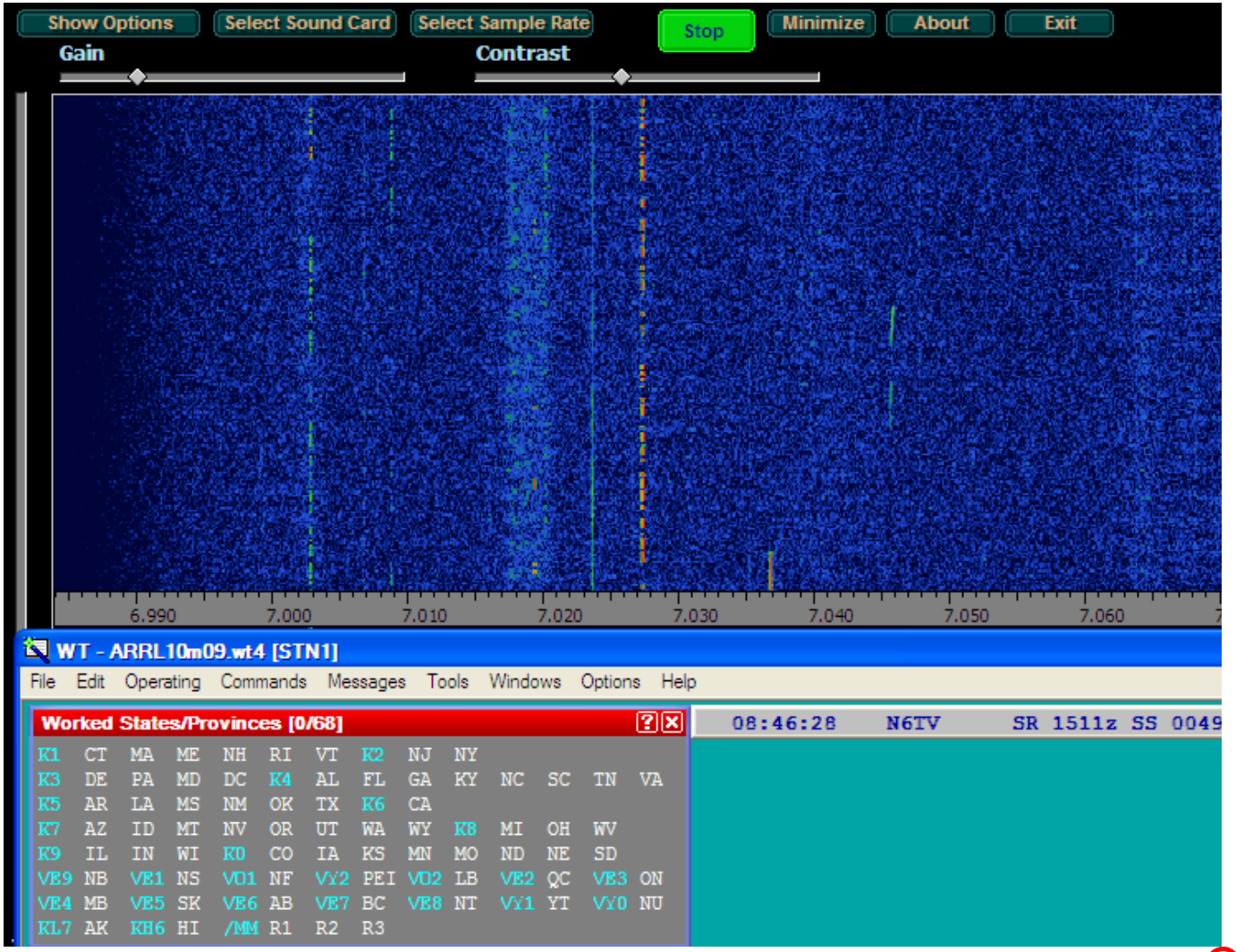


- Always enable the waterfall
- Use **Fixed** Mode (never "Center" mode)
  - You want the VFO cursor to move, not the scope
- Use narrow 5 - 20 kHz span for CQ, running
- Use wider 40 -100 kHz span for S&P, tuning
- Logging software can and should automate this:
  - In Win-Test, type **SPAN20** [Enter] to set a 20 kHz scope span, limited to band edges
  - See http://bit.ly/wtscripts - Win-Test Scripts P3scripts.zip, IcomScripts.zip, includes source code

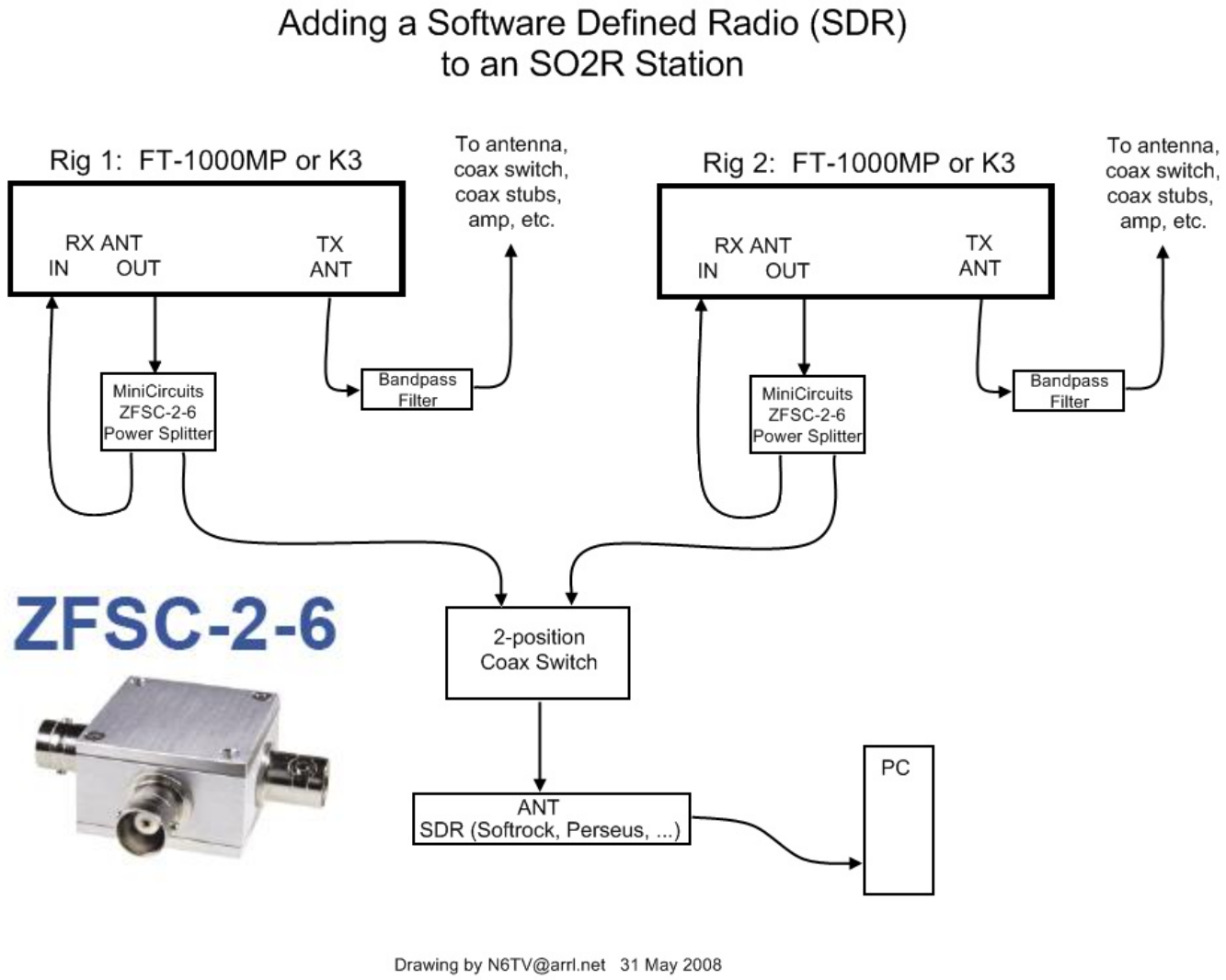
Winrad on Top, Win-Test on Bottom



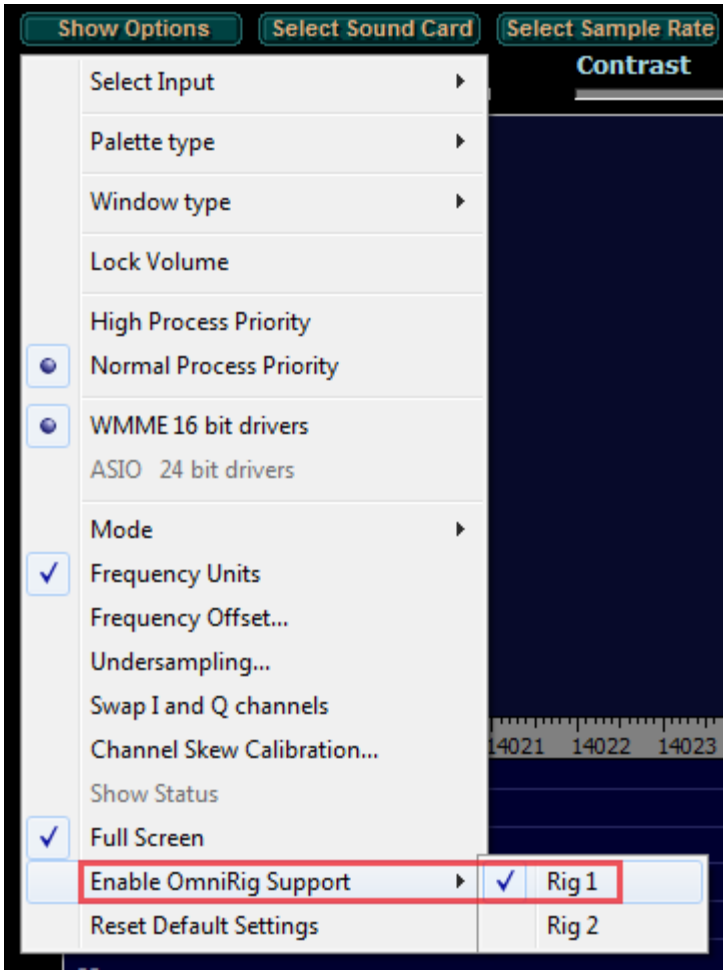
Winrad & Win-Test (zoomed)



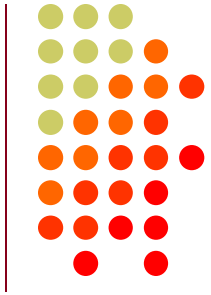
Click-To-Tune with a “Legacy” Transceiver + SDR



Use Omnirig support in Winrad or HDSDR to synch freq. with any transceiver

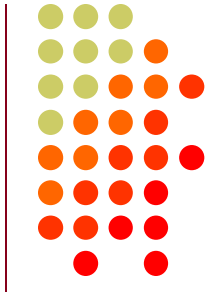


Try Winrad Waterfall Demo



- Perseus SDR used to make a wideband recording (122 KHz for 10 minutes = 300 MB)
- Demo will play back that recording and others
- To try the demo yourself, follow instructions at
  - http://www.kkn.net/~n6tv

Questions?



- http://www.winrad.org - Winrad software
- http://http://www.hdsdr.de/ - HDSDR software
- http://sdr-radio.com/Software - SDRConsole
- http://www.kkn.net/~n6tv - Winrad demo file
- http://www.qrz.com/db/n6tv - Links to this and other presentations