What's New in Antelope 5.8

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Boulder Real Time Technologies

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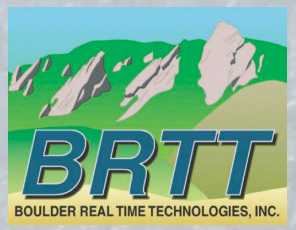
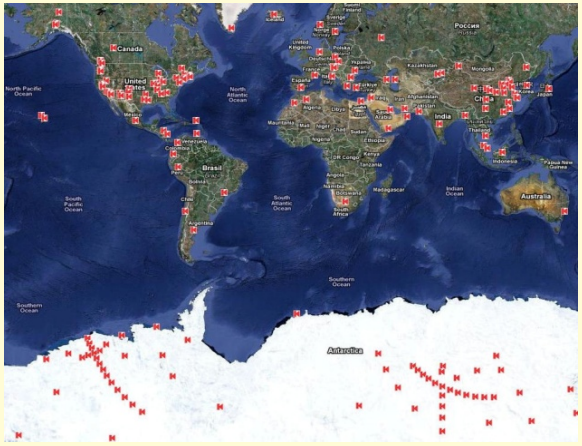


Introduction - KMI

Kinemetrics, Inc.

- Founded in 1969
- OYO Corp owned in 1991
- ISO9001 since 1999
- $35M FY2012 revenue (mostly international)



HQ's in Pasadena CA with Sales and Project offices in Switzerland & Abu Dhabi

Introduction – KMI Team

KINEMETRICS

Designs and manufactures sensors and digitizers – Provides complete systems design, installation and operations

QUANTERRA®

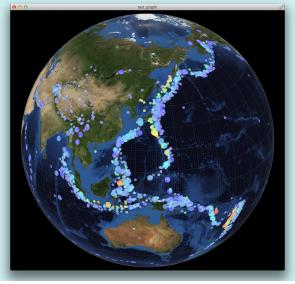
Designs High-End Digitizers

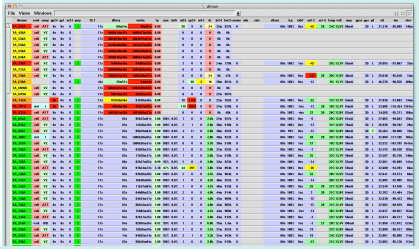
metrozet

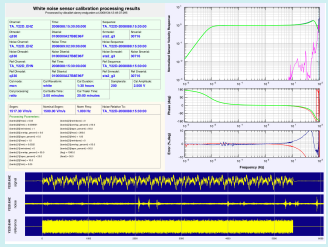
Designs High-End Sensors

BRTT

Antelope Software







Kinemetrics / BRTT
Comprehensive Hardware, Software, and Services

Kinemetrics Systems Solutions
- Turnkey complete systems including enterprise-class computing centers and full communications

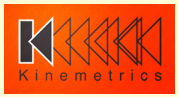
Kinemetrics Hardware Manufacturer
- World class Kinemetrics and Quanterra dataloggers
- World class Kinemetrics, Metrozet and Streckeisen sensors

BRTT Software Developer
- World class acquisition software for all Kinemetrics hardware products
- Proven track record for large networks with difficult remote deployments (USArray)
- World class, comprehensive automated and interactive seismic processing software
- Data neutral architecture for support of non-seismic environmental monitoring networks
- Extraordinary Command & Control capabilities with SOH displaying

Kinemetrics Services
- Complete systems procurement, installation and training including all aspects of both hardware and software
- Network operations

What's New In Antelope 5.8

- Infrastructure
  - Critical work for long-term health of the *Antelope* platform
  - Updated operating-system support
  - Node licensing for *RHEL/CentOS 7.4*
    - New root ***amd***(1) daemon
  - Licensing dongles
  - Toolchains for both *Linux* and *OS X*
  - *Qt*, *Perl*, and *MATLAB* version upgrades
  - Updated Installer
  - CD1.1 Testing
- Advances
  - Return of ***dbevents***(1) waveform display
  - Rewrite of ***dbmapevents***(1)
  - New parameter-file explorer ***pfe****(1)*
  - ***filter_designer***(1) *[Danny Harvey Presentation]*
  - ***inspect_detection***(1) *[Danny Harvey Presentation]*
  - *Bighorn* advances *[Frank Vernon Presentation]*
    - ***display_spec***(1)
  - Variety of noteworthy smaller improvements



Operating-system Support

- *Antelope 5.8* is released on
  - *RedHat/CentOS 7.4*
  - *Mac OS X 10.13* (High Sierra)
- Latest versions available for each operating system at time of release
- Forcing functions:
  - Apple update policies – hard to install older *OSX* versions
  - OS Support necessary for newly purchased hardware
  - Newer compilers necessary for *Qt*-based advanced graphics development
- Hiatus from previous policy of remaining several OS's behind to ease transitions for customers

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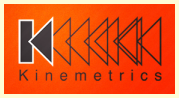
Linux Installation

- We recommend installing most complete *Linux* Environment Group (feature set) available
- In *RHEL*:
  - "*Development and Creative Workstation*"
  - (Not "*Minimal Install*")
- Missing dynamic libraries (*libnettle.so*, etc.) most common symptom of insufficient install
- Enterprise Class Software:
  - *Antelope* chosen to support mission
  - OS chosen to support Antelope
  - Hardware chosen to support OS
- (Recommendation would be different if we were tailoring for multi-purpose research environments instead of operational missions)
- The fix, per ***notes_linux_setup***(5):
  - % ***yum groupinstall "Development and Creative Workstation"***

Linux node-licensing and ***amd***(1)

- *Linux RHEL/CentOS 6.x* had ***hald***(1) to get serial-numbers as non-root
- *Linux RHEL/CentOS 7.x* removed this, thwarting our node-license strategy
- We have written ***amd***(1), a daemon that runs as root to support Linux node-licensing
- Requires *sudo* permission at installation, otherwise can't use node-licenses (IP licenses OK)
- Still requires a machine whose hardware manufacturer emplaces a valid serial number (e.g. not *012345*, *0000*, or *"O.E.M."*)



Licensing Dongles

- Alternative to IP and node licenses
- Small USB-stick with encrypted keys
- Does not require internet connection
- Works for Linux hosts without valid serial #
- Works for Virtual Machines _if_ the USB hardware is properly mapped
- Currently limited to one dongle per physical machine
- As with serial-number licensing on Linux, requires sudo-installed ***amd***(1) daemon
- Not offering this as standard-procedure licensing, but is an option if other alternatives fail

Toolchains for Linux and OS X

- *Antelope 5.7* shipped with the first '*Toolchain*', for Linux
- '*Toolchain*' = collection of compilers and tools we use to build Antelope
- Governed by *TOOLCHAIN* macro in Makefiles
  - Set to '*native*' to bypass ours and use what's available on your machine
  - Download ours from *AUG github* repository (e.g. via ***install_toolchain***(1) command)
- *Antelope 5.8*: Using toolchains for both *OS X* and *Linux*
  - *Clang 5.0.0* on *OS X*
  - *GCC 7.2.0* on *Linux*
- Only relevant if you're building software

Interpreter Version Upgrades

- Perl
  - *5.14.2 -> 5.26.1*
  - A few code changes necessary: no "." on *INC* path due to security; '*if(defined(@array))*' now '*if(@array)*'; several other probably-rare minor tweaks
- Qt
  - *5.5.0 -> 5.9.0*
  - Updates to stay current, per strategic campaign
  - Preserving *X11* support on *Mac*
    - for ***ssh*** forwarding of graphics
    - for web display via ***rtwebserver***(1)/***rtcache***(1))
- MATLAB
  - *Antelope 5.8* will support *MATLAB R2018a*
  - Mathworks has a relatively short software lifecycle
- Python 3
  - *Python* still at *2.7.8* for *Antelope 5.8*
  - *Python 3* Comments at end --

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Updated Installer

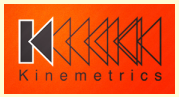
- *Antelope* installer showing its age, *X11*-bound
- *Antelope 5.8* has new installer
  - ***Transitional***, towards fully modern GUI installer
  - Part shell, part GUI at the moment
  - Better control during install and smoother user experience
  - Still using ***antelope_update_dep***(1)
  - New ***register_antelope***(1), ***setup_site***(1)
  - Can still invoke legacy installer
- On *Linux* asks for ***sudo*** privilege to install ***amd***(1)
- Expanded options:

```
% ./Install_antelope -h

Welcome to the Antelope Installer.

./Install_antelope Usage:

    -h      Help                    -- print this options list and exit
    -S      Skip checksum           -- proceed without media verification
    -C      Checksum verification   -- report media validity and exit
    -m      Mortal mode             -- run without invoking any sudo commands (e.g. amd daemon install)
    -o      Old mode                -- run legacy installer from earlier Antelope versions
    -t      Terminal mode           -- run without GUI
    -u      Unattended mode         -- run without asking questions
    -v      Verbose
```



CD1.1 testing

- Last year we introduced new CD1.1 tools:
  - ***orb2cd11s****(1)*
  - ***cd11s2cd11****(1)*
  - ***orb2cd11xmit****(1)*
  - ***cd11rcv2orb***(1)
- Extensive testing – thanks to colleagues – and some very minor tweaks show:
  - ***cd11rcv2orb***(1) successfully receives streams of data from Vienna IDC
  - ***cd11rcv2orb***(1) now supports multiple incoming senders
  - ***orbcd11xmit***(1) successfully sends CD1.1 data to NDC
- Coded correctly from first-principle IDC format specification (*IDC 3.4.3* CD1.1 Document)

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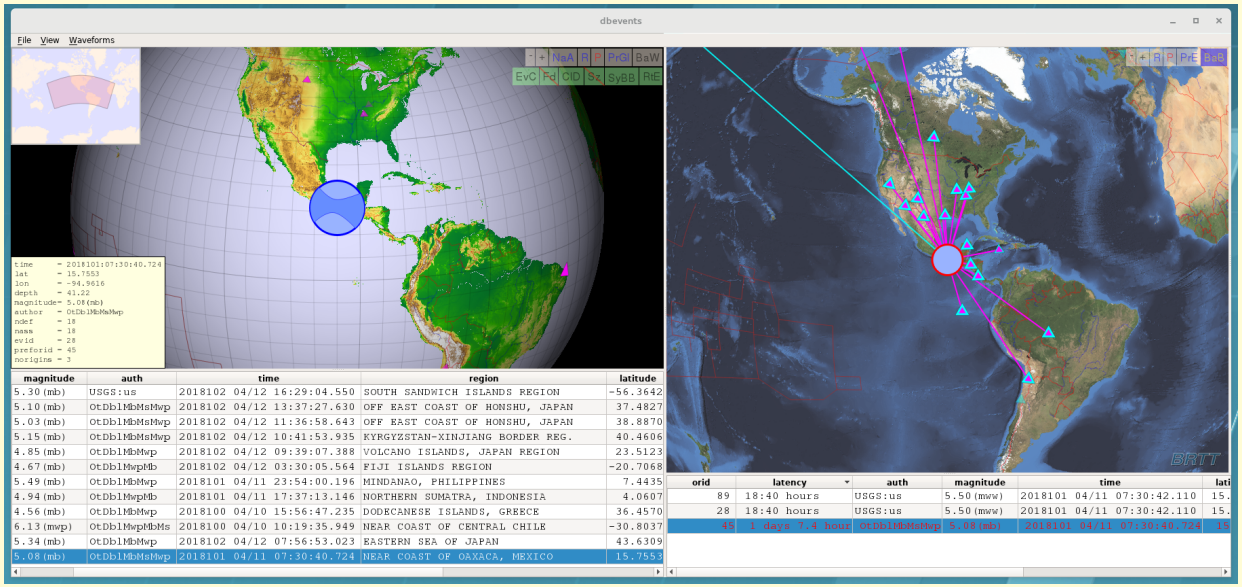
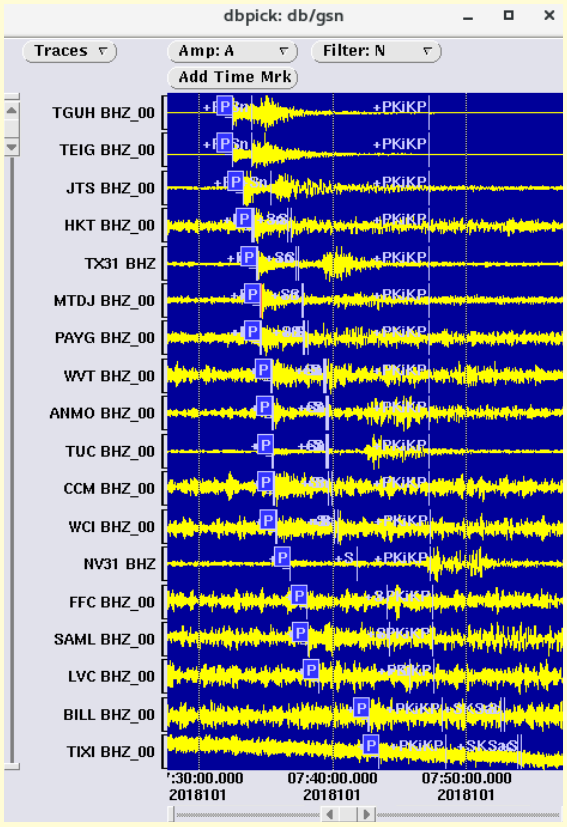
dbevents(1) waveform display





Once again launches and synchronizes ***dbpick***(1) via *Waveforms->Show* menu checkbox

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dbevents(1) waveform display: pf

New Parameters for ***dbpick***(1) launched from ***dbevents***(1)

(*dbevents.pf*)

pfe

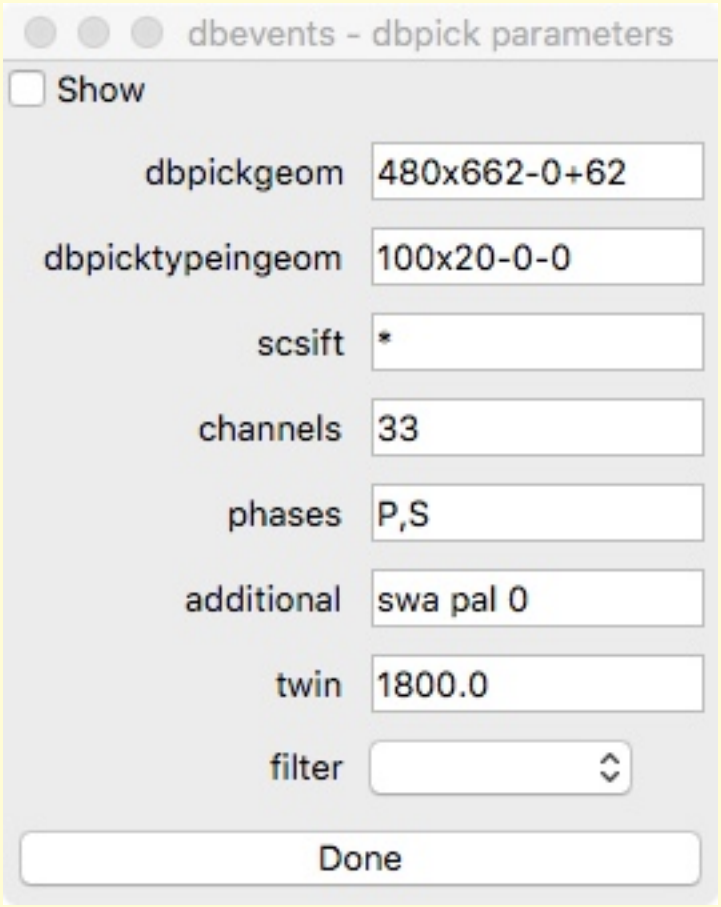
Expand all | Collapse all | Save as... | Options...

☑ Allow value edits ☑ Show non-inline comments ☑ Show comments ☐ Show constraints ☐ Show source

key	value	comment
update_interval	1.0	
width	1800	
height	800	
mapevents_width	900	
mapevents_height	300	
mapevent_height	500	
▶ external_commands &Arr		
dbpickgeom	480x662-0+62	# geometry of main dbpick display window
dbpicktypeingeom	100x20-0-0	# geometry of dbpick typein window
scsift	*	# default dbpick station-channel sifter
channels	33	# default number of dbpick channels to display
phases	P,S	# default predicted phases to display
additional	swa pal 0	# default additional dbpick commands
twin	1800	# default dbpick display time window
filter	None	# default dbpick filter index
startdbpick	0	# 1 = start dbpick at program startup
		# 0 = do not start dbpick at program startup
warpdbpick	0	# 1 = warp dbpick window to other display
		# 0 = don't warp dbpick window to other display
autorefresh_interval	60.0	# automatically refresh dbpick window interval
pf_revision_time	1523998907	

Status:

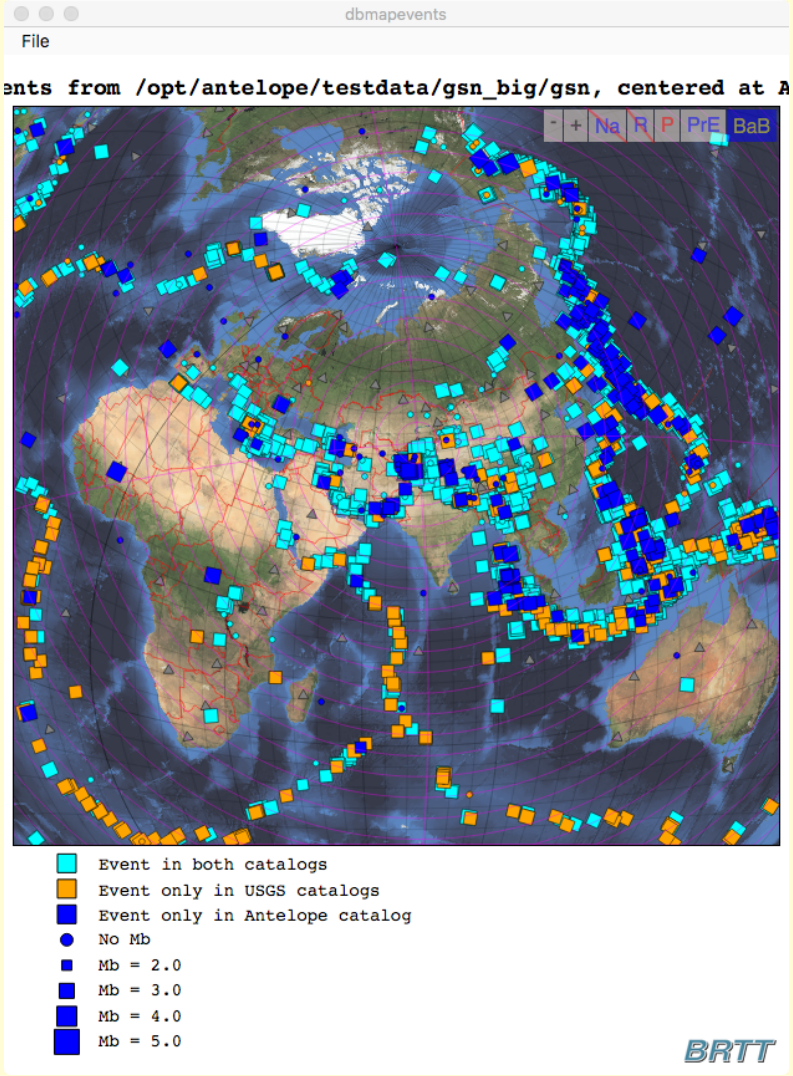
dbevents(1) waveform display: pf editor



GUI parameter-file editor window from within ***dbevents***(1)

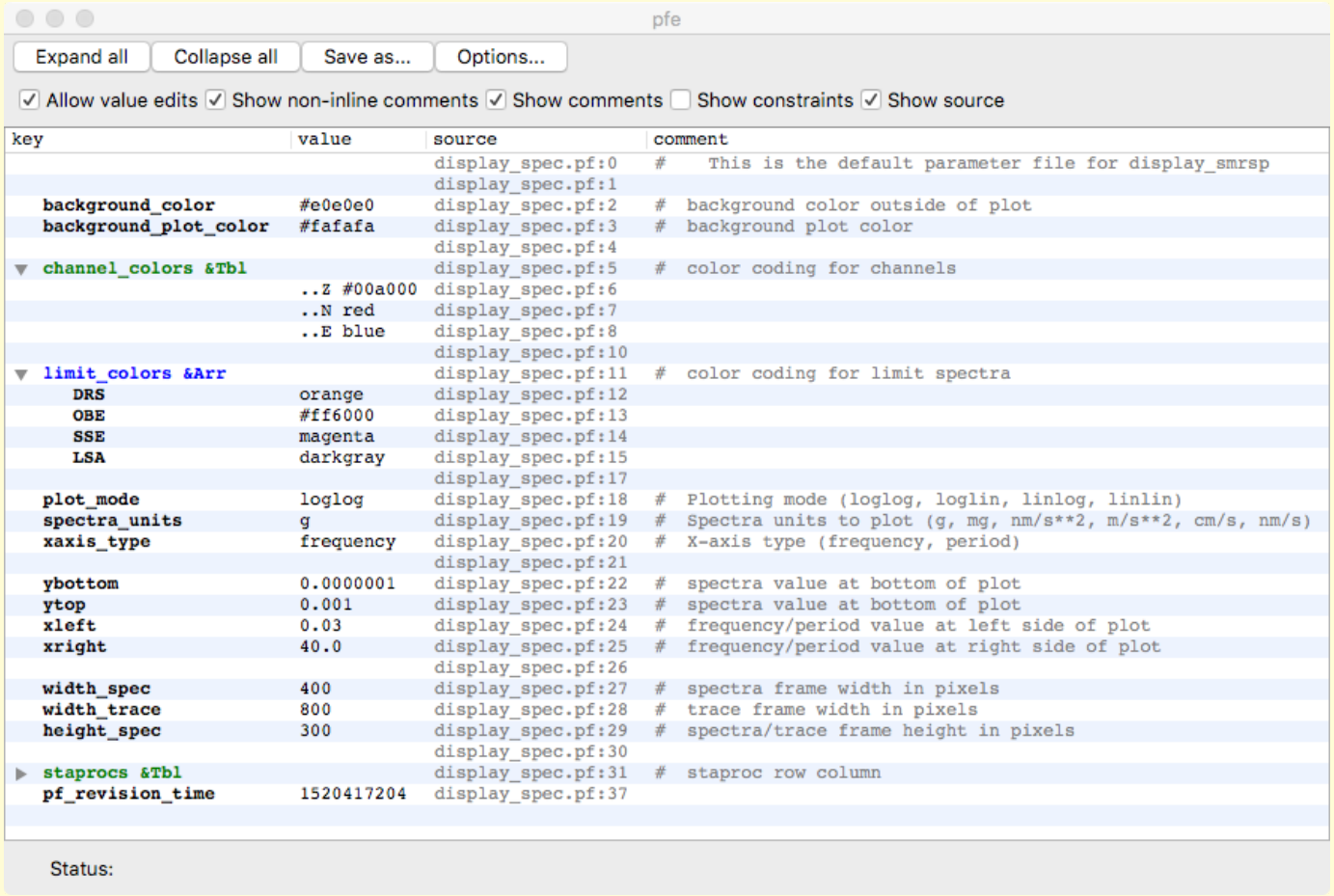
New dbmapevents(1)

- Another rewrite of classic tool
- *Qt*-based graphics with all the new mapping capabilities that brings (similar to other new tools)



new ***pfe***(1)

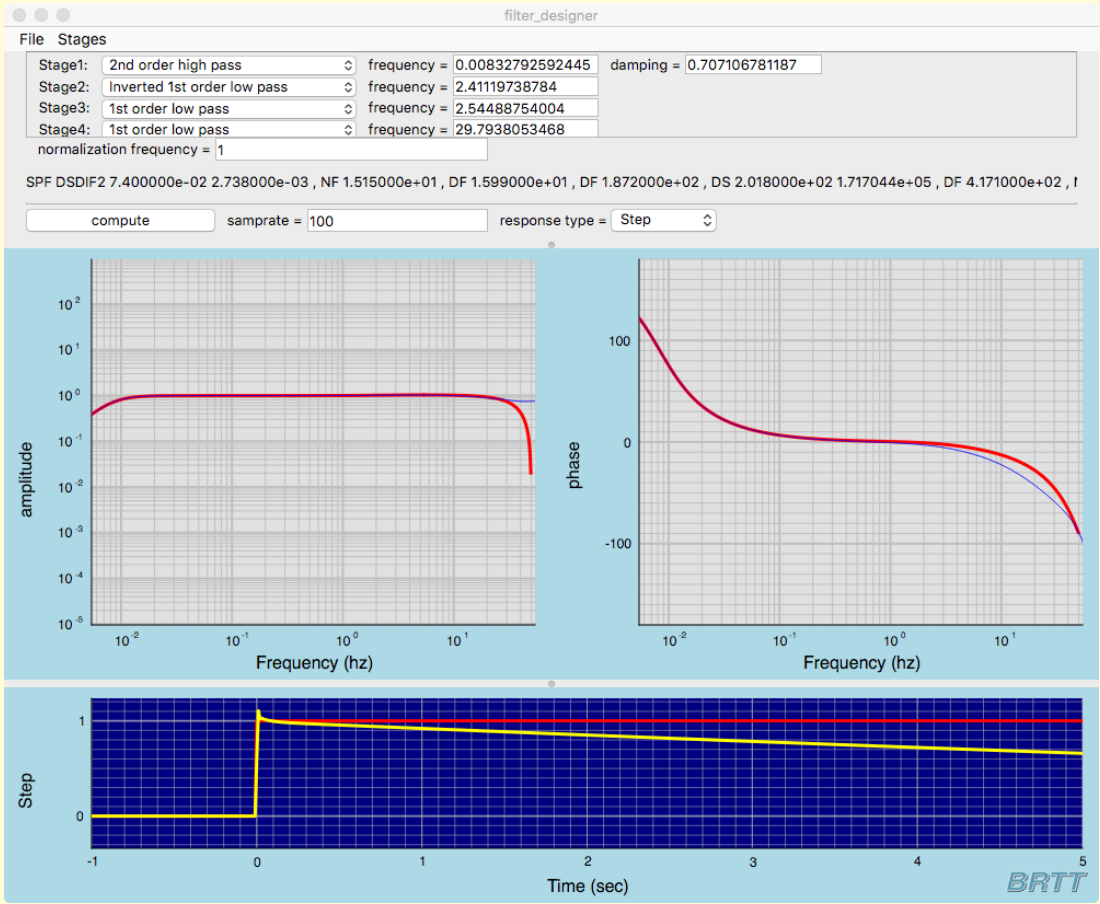
- Rewrite of previous ***pfe***(1)
- Lots of new features, to be described in upcoming talk
- Handles basic parameter-files



key	value	source	comment
		display_spec.pf:0	# This is the default parameter file for display_smrsp
		display_spec.pf:1	
background_color	#e0e0e0	display_spec.pf:2	# background color outside of plot
background_plot_color	#fafafa	display_spec.pf:3	# background plot color
		display_spec.pf:4	
▼ channel_colors &Tbl		display_spec.pf:5	# color coding for channels
	..Z #00a000	display_spec.pf:6	
	..N red	display_spec.pf:7	
	..E blue	display_spec.pf:8	
		display_spec.pf:10	
▼ limit_colors &Arr		display_spec.pf:11	# color coding for limit spectra
DRS	orange	display_spec.pf:12	
OBE	#ff6000	display_spec.pf:13	
SSE	magenta	display_spec.pf:14	
LSA	darkgray	display_spec.pf:15	
		display_spec.pf:17	
plot_mode	loglog	display_spec.pf:18	# Plotting mode (loglog, loglin, linlog, linlin)
spectra_units	g	display_spec.pf:19	# Spectra units to plot (g, mg, nm/s**2, m/s**2, cm/s, nm/s)
xaxis_type	frequency	display_spec.pf:20	# X-axis type (frequency, period)
		display_spec.pf:21	
ybottom	0.0000001	display_spec.pf:22	# spectra value at bottom of plot
ytop	0.001	display_spec.pf:23	# spectra value at bottom of plot
xleft	0.03	display_spec.pf:24	# frequency/period value at left side of plot
xright	40.0	display_spec.pf:25	# frequency/period value at right side of plot
		display_spec.pf:26	
width_spec	400	display_spec.pf:27	# spectra frame width in pixels
width_trace	800	display_spec.pf:28	# trace frame width in pixels
height_spec	300	display_spec.pf:29	# spectra/trace frame height in pixels
		display_spec.pf:30	
▶ staprocs &Tbl		display_spec.pf:31	# staproc row column
pf_revision_time	1520417204	display_spec.pf:37	

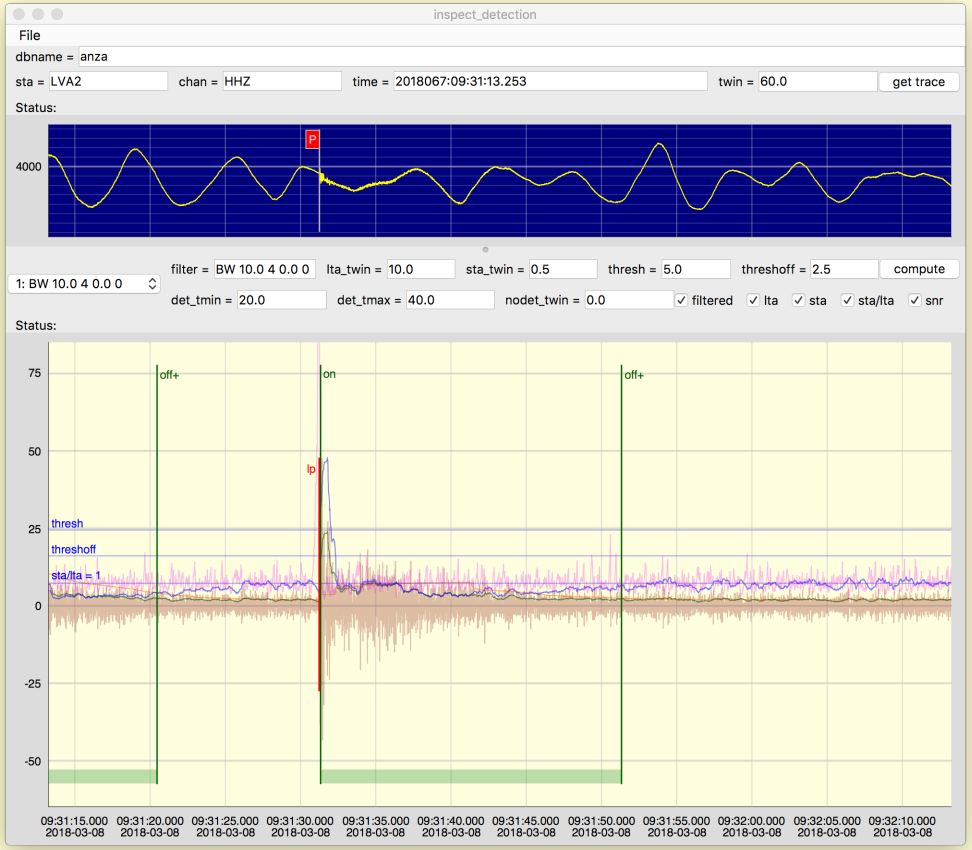
filter_designer(1)

- Sophisticated filter-visualization and filter-design tool
- Detailed features to be described in upcoming talk



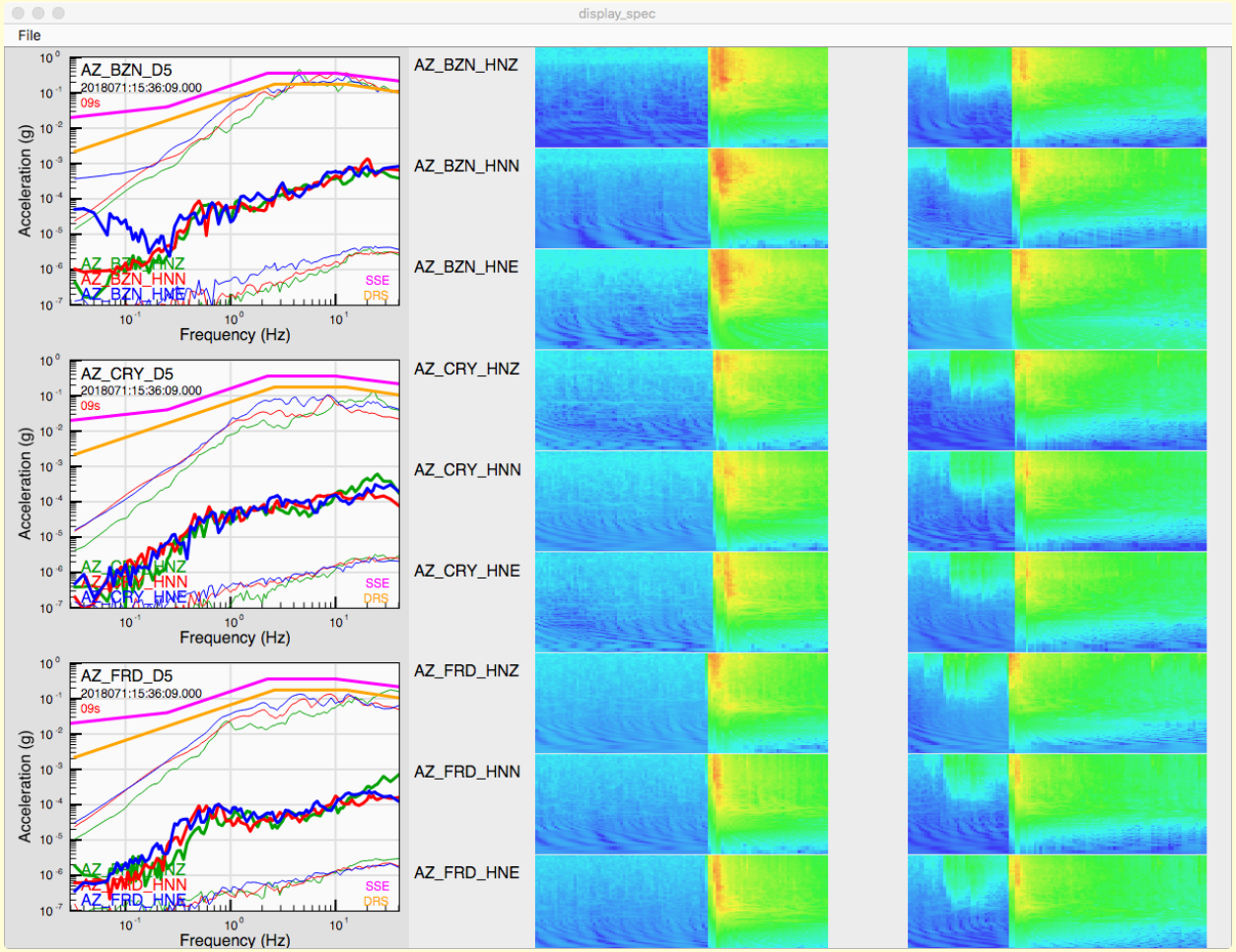
inspect_detection(1)

- View the effects of ***dbdetect***(1) and ***orbdetect***(1) parameter settings
- Tune detection for optimal performance with your network and your seismic setting
- Detailed features to be described in upcoming talk



display_spec(1)

- Completely rewritten tool to display real-time streaming spectral processing and monitoring
- Part of *Bighorn* monitoring system included with *Antelope*
- Detailed features to be described in upcoming talk

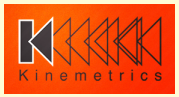


Plans for Coming Development Year

- Infrastructure
  - Complete, modern GUI Installer
    - Remove assortment of small inconveniences
  - Matched toolchains on OS X, Linux
    - *clang* compiler on both
    - Improve development efficiency
    - No 3-week drills from *gcc/clang* mismatches
  - *Python 3*
    - Becoming Critical
      - Python 2 EOL 2020
      - Community support (e.g. *ObsPy*; programming talent)
    - Very complicated job, *Antelope* use of *Python* is extensive and involved
    - Month of work done already towards *Python 3* support, June ’17
    - Hired contractor working on *Python 3* port for us
    - ***Update since Slovenia ‘18 meeting: Python 3 port succeeded, Antelope 5.9 will come out with Python 3***

Plans for Coming Development Year

- *Qt* Strategic Initiative on Graphics
  - X11 *questionable on Apple (Xquartz circa 2016)*
  - *Qt 5.11*
  - *Python Qt* support via *PySide2*
    - *Promising but problematic*
  - New ***rtdemo***(1)
  - New ***inspect_snapshot***(1)
  - *QTraceView* waveform interaction



Plans for Coming Development Year

- cd11rcv2orb(1):
  - Testing underway with Kinemetrics *Q330M+*

Plans for Coming Development Year

- Locations – *dbloc*
  - Also part of *Qt* graphics modernization initiative
  - Component parts finally coming together
  - Initial design work courtesy of:
    - Taimi Mulder
    - Trilby Cox
  - Aiming for first prototype for *Antelope 5.9*
  - Will likely take several years to stabilize
  - More details in upcoming talk

Plans for Coming Development Year

- Further:
  - *Comments ?*
  - *Suggestions ?*
  - *Requests ?*

Thank You!

Questions?

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