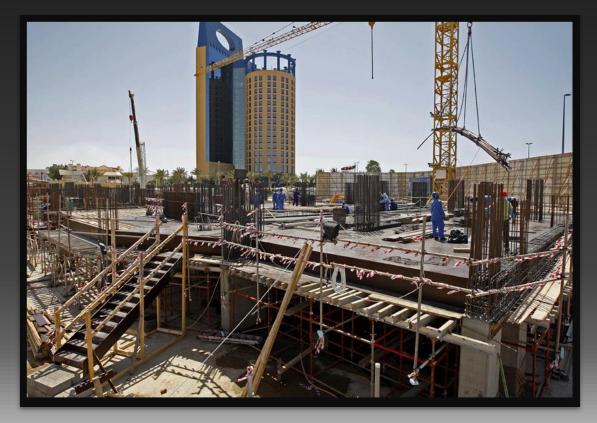
# dbloc work-in-progress prototype



# Work-in-progress



## Outline

- Short history
- Design goals
- Current prototype
- Demo
- Feedback welcome on where we're headed

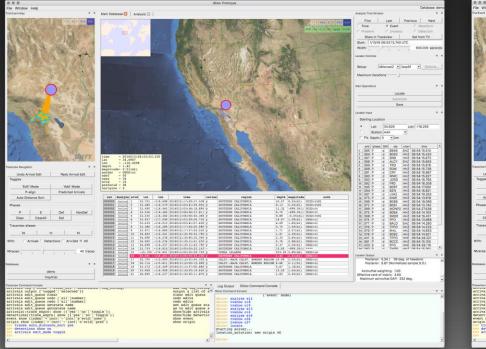
### Short history of dbloc2 and dbloc

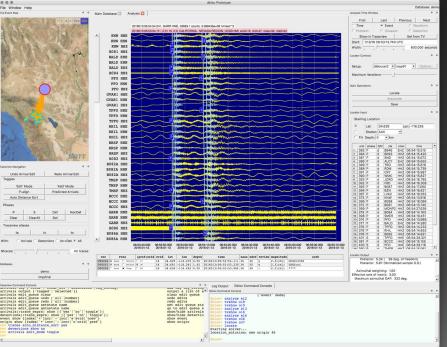
- Dan Quinlan and Luda Ratnikova designed initial dbloc2 in the 1990's for small regional networks
- From late 1990's to present, dbloc2/dbpick has worked well (dbpick even earlier)
- Mounting pressure from user community for modernization plus need to switch to modern toolkits for maintainability spurred rewrite
- New effort called 'dbloc' rather than objectionable 'dbloc3' -- history of original 'dbloc' lost to time, we're taking the name back
- Coding efforts begun Summer 2018
  - First glimpse at Victoria AUG 2018
  - First presentable early-prototype May 2019

## Design goals for dbloc

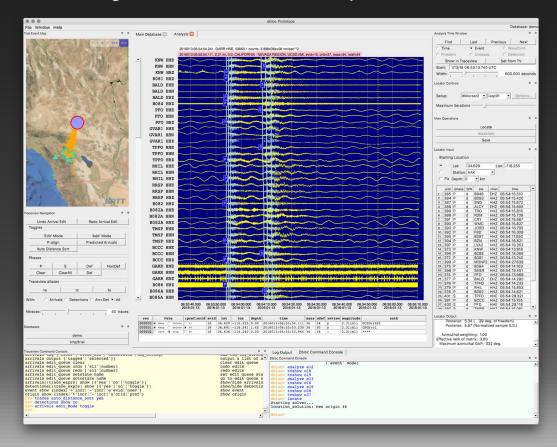
- Reestablish maintainability of software by switching to modern toolkits
- Support enterprise-scale network operations
- Continue supporting small-network operations
- Modernize user-interaction features and capabilities
- Retain main features of existing programs
- Integrate waveform-processing and earthquake-analysis components (dbloc2 vs dbpick) since that is now possible
- Integrate, modernize, and/or re-integrate myriad features such as magnitude calculation, moment tensors etc. to produce a unified analyst experience

### Current prototype -- overview

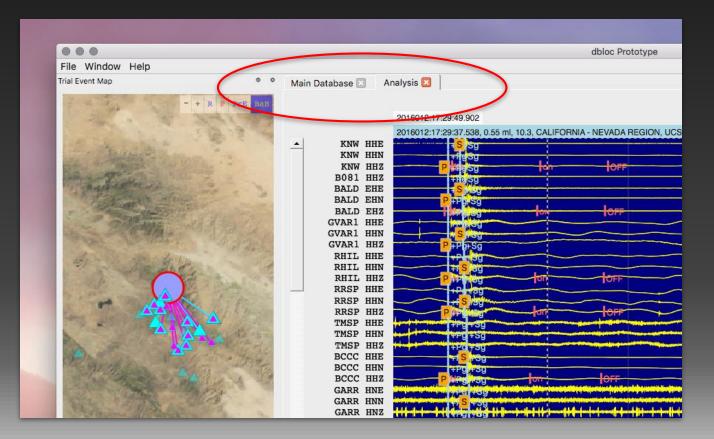




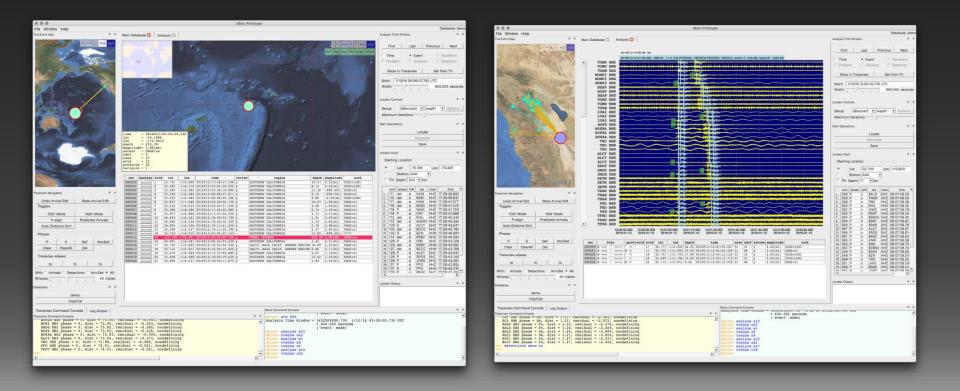
#### Major feature -- Full integration of waveform analysis via traceview



#### Major feature -- Tabbed panels for analyst tasks



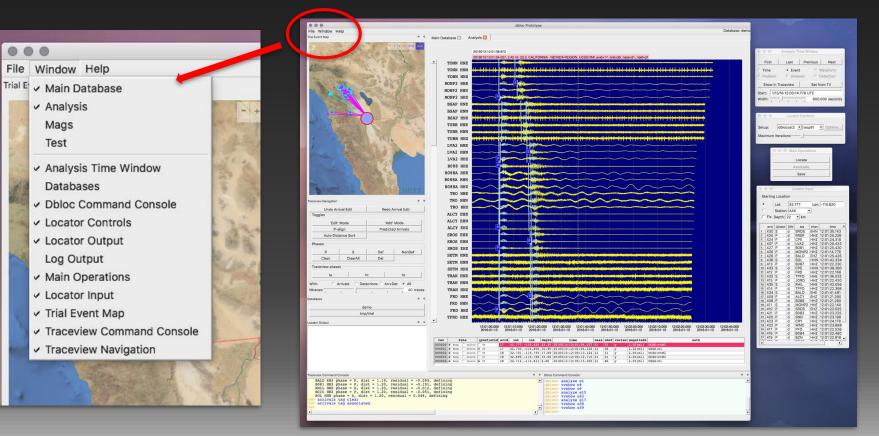
#### Major feature -- Integrated maps



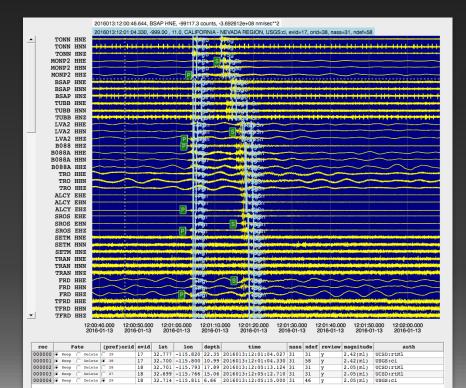
#### Major feature -- Built-in command consoles for command-driven interaction

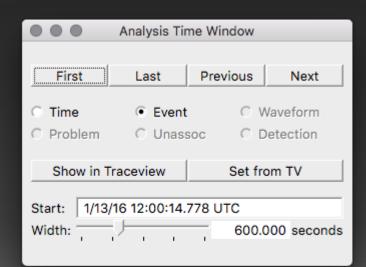
Traceview Command Console .... The full phase = P, dist = 1.17, residual = 0.444, defining BTO HIM phase = P, dist = 1.15, residual = -0.551, defining BTO HIM phase = P, dist = 1.15, residual = -0.164, defining BTO HIM phase = P, dist = -1.15, residual = -0.164, defining LVAE HIM phase = P, dist = -1.25, residual = 0.518, defining LVAE HIM phase = P, dist = -1.25, residual = 0.518, defining LVAE HIM phase = P, dist = -1.25, residual = 0.518, defining LVAE HIM phase = P, dist = -1.24, residual = 0.518, defining LVAE HIM phase = P, dist = -1.24, residual = 0.518, defining LVAE HIM phase = P, dist = -1.24, residual = 0.518, defining LVAE HIM phase = P, dist = -1.24, residual = 0.518, defining LVAE HIM phase = P, dist = -1.24, residual = -1.250, defining HIM phase = P, dist = -1.24, residual = -1.250, defining HIM phase = P, dist = -1.24, residual = -1.250, defining HIM phase = P, dist = -1.24, residual = -1.250, defining HIM phase = P, dist = -1.24, residual = -1.250, defining HIM phase = P, dist = -1.24, residual = -1.250, defining HIM phase = P, dist = -1.24, residual = -1.250, defining HIM phase = P, dist = -1.24, residual = -1.250, defining HIM phase = P, dist = -1.24, residual = -1.250, residual = -1.250, defining HIM phase = P, dist = -1.24, residual = -1.250, residual = -1.250, defining HIM Phase = P, dist = -1.24, residual = -1.250, dist = -1.250, dist = -1.250, residual = -1.250, residual = -1.250, residual = -1.250, dist = -1.250, residual = -1.250, residual = -1.250, residual = -1.250, dist = -1.250, residual = -1.250, resi ... **Dbloc Command Console** atw first Analysis Time Window = 1452569280.730 1/12/16 03:28:00.730 UTC + 600.000 seconds arrivals tag clear arrivals tag associated ('event' mode) dbloc> atw 600 arrivals tag D Analysis Time Window = 1452569280.730 1/12/16 03:28:00.730 UTC help + 600.000 seconds display help ('event' mode) help display help acho with substitutions bloc> analyze e12 alias name [substitution string] make a command alias tvshow o18 unalias name remove a command alias tyshow o19 show all aliases aliases hotkey name [substitution\_string] unhotkey name make a hot key assignment remove a hot key assignment analyze e13 tvshow ol6 hotkeys main import file name show all hot key assignments analyze el6 import commands main export file\_name display time\_start {time\_string|'+'time\_string|'-'time\_string} export commands tychow 036 set display start time > tyshow o37 display time\_start {time\_string | ''time\_str display time window time string display paing [{'yes | 'no' | 'toggle }] display abow\_pred [{'yes' | 'no' | 'toggle }] display bacch [{'yes' | 'no' | 'toggle }] traces maximum number set display time window duration zoom display time window by factor so that time\_anchor is in the same relative position > locate Starting solver ... enable/disable display P-arrival alignment enable/disable show display predicted arrivals location\_solution: new origin 46 enable/disable batch mode set maximum number of traces to display in the vertical window dbloc> analyze e15 traces minimum pixels number set minimum vertical height of traces traces minimum pixels number traces fit ('auto' 'toogle' yes ''no'] traces stat ('auto' 'toogle') traces stat ('yes ''no' 'toogle') traces stat ('yes ''no') traces auto\_distance\_sort ('yes ''no''toogle') traces (trace\_exprs) select ({'yes ''no''toogle') traces (trace) fit traces to vertical window subject to maximum and minimum\_pixels enable/disable show only traces with arrivals oc> tvshow o22 > tvshow o26 enable/disable show only traces with detections enable/disable show only traces with arrivals and/or detections locate enable/disable automatic trace sorting by distance from event set gains of all traces Starting solver... location solution: new origin 47 select/deselect traces whose labels match trace\_exprs configure traceview or trace objects traces[:trace\_exprs] dup traces[:trace\_exprs] show [{'yes'|'no'|'toggle'}] duplicate traces whose labels match trace\_exprs show/hide traces whose labels match trace\_exprs bloc> locate Starting solver ... traces[:trace\_exprs] order traces[:trace\_exprs] zoom [{first\_index number|number|factor [first\_y]}] order and show traces whose labels match trace\_exprs zoom traces to first and last labels that match trace\_exprs or to the specified indexes location solution: new origin 48 traces[:trace\_exprs] start [first\_index]
traces[:trace exprs] start factor pan traces to begin at first label that matches trace\_exprs or to the specified index stretch vertical heights of traces whose labels match trace exprs bloc> atw next traces[:trace\_exprs] color [color\_string] traces[:trace exprs] color background [color string] set foreground color of traces whose labels match trace\_exprs set background color of traces whose labels match trace\_exprs Analysis Time Window = 1452667973.230 1/13/16 06:52:53.230 UTC traces(trace\_exprs) color\_background (color\_string) traces(trace\_exprs) color\_background (color\_string) traces(trace\_exprs) tills("trade ('counts')se')) traces(trace\_exprs) cols("trade ('counts')se')) traces(trace\_exprs) cols("trade ('counts')se')) artivals select (clear' artid ('yss) [no'|'cogle')) artivals select (clear' artid ('yss) traces) (trade ('cogle')) + 600,000 seconds set linewidth of traces whose labels match trace\_exprs set filter of traces whose labels match trace exprs. ('event' mode) set units of traces whose labels match trace\_exprs bloc> window analysis set vertical scale factor of traces whose labels match trace\_exprs bloc> tyshow o37 enable/disable arrivals edit mode clear selected arrivals or enable/disable selected arrival enable/disable interactive add arrivals mode c> locate Starting solver ... copy selected arrivals into clipboard or clear clipboard paste arrivals in clipboard arrivals copy ['clear'] arrivals paste ['dont paste tags'] time string location solution: new origin 49 arrivals phase phase string arrivals tag {'clear |'clear all'|'associated'|tag string} set selected arrivals phase to phase\_string add tag tag string to selected arrivals or clear selected arrivals tags or clear all arrivals tags bloc> atw next arrivals tag { clear | clear ail | assoc arrivals output { tagged | selected } } arrivals edit\_queue clear arrivals edit\_queue undo [ all | number] arrivals edit\_queue setstate name arrivals edit\_queue setstate name output a list of arids and association status for tagged or selected arrivals Analysis Time Window = 1452686404.330 1/13/16 12:00:04.330 UTC clear edit queue + 600,000 seconds undo edits redo edits ('event' mode) set edit queue state dbloc> window analysis arrivals edit queue gotostate name go to edit queue state arrivals end queue gotostate name arrivals:trace exprs; show [{'yes'|'no'|'toggle'}] detections[:trace exprs; show [{'yes'|'no'|'toggle'}] event show {index''+'incr'-'incr'e'eid| noev'} origin show {index''+'incr'-'incr'o'rid 'pref} show/hide arrivals that match arrival\_exprs show/hide detections that match detection exprs show event show origin traces auto\_distance\_sort yes detections show no arrivals edit mode toggle

#### Major feature -- Multi-window design with detachable docking widgets

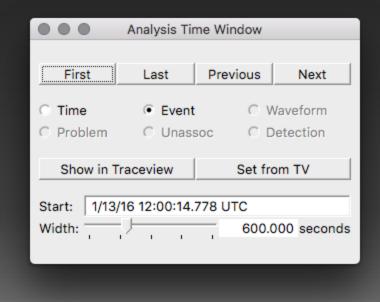


#### Major feature -- Clear primacy of "Analysis Time Window" concept





#### Minor feature -- Multiple hop modes (time-based, event-based, etc.) to advance Analysis Time Window

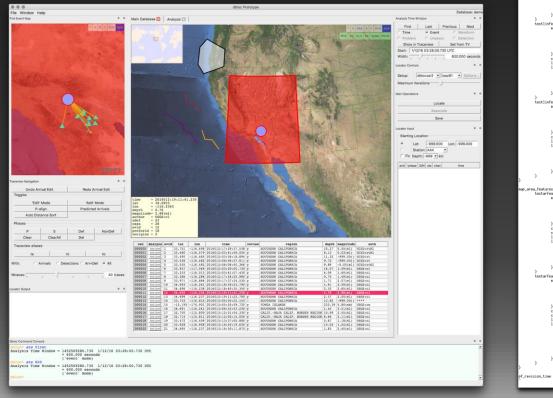


#### Minor feature -- Built in widgets to show log and locator output

 $\bullet \bullet \bullet$ Log Output dbloc: Focusing to first Analysis Time Window dbloc: Analysis Time Window changed: now 1/12/16 03:28:00.730 UTC + 600.000 seconds dbloc: Found 1 events in main database for time window 1/12/16 03:28:00.730 UTC + 600.000 seconds Ibloc: Rebuilding trial database 'tmp/trial' with 1 events Ibloc: Analysis Time Window unchanged: still 1/12/16 03:28:00.730 UTC + 600.000 seconds dbloc: Analysis Time Window changed: now 1/12/16 19:11:01.688 UTC + 600.000 seconds bloc: Found 2 events in main database for time window 1/12/16 19:11:01.688 UTC + 600.000 seconds loc: Rebuilding trial database 'tmp/trial' with 2 events bloc: Found 2 events in main database for time window 1/12/16 19:10:43.087 UTC + 600.000 seconds loc: Rebuilding trial database 'tmp/trial' with 2 events dbloc: Found 1 events in main database for time window 1/13/16 06:53:13.740 UTC + 600.000 seconds bloc: Rebuilding trial database 'tmp/trial' with 1 events dbloc: Locating event dblocsat2: File /opt/antelope/5.9/data/tables/dblocsat/iasp91.LQ will not open! dblocsat2: File /opt/antelope/5.9/data/tables/dblocsat/iasp91.LR will not open! dblocsat2: File /opt/antelope/5.9/data/tables/dblocsat/iasp91.Rg will not open! dblocsat2: File /opt/antelope/5.9/data/tables/dblocsat/iasp91.SS will not open! dblocsat2: Warning locate event: No observations to process dblocsat2: Starting solver... blocsat2: location\_solution: new origin 46 bloc: can't statfs tmp/trial.mt Ibloc: No such file or directory

B082 P t					Locator Ou	Itput	
	0.88	1.03	-0.15	-1.47	1.08		
TPFO S t	14.58	15.05	-0.47	-4.67			
BCCC P t	1.41	1.30	0.12	1.18			
PFO S t	14.38	14.88	-0.51	-5.06	1.04		
TMSP P t	1.32	1.12	0.20		1.08		
BALD S t		14.95	0.19	1.86	1.04		
3086 P t	1.52	1.54 13.62	-0.02	-0.16	1.10		
KNW S t	14.91	13.62	1.29	-0.16	1.00		
B086A P t		1.54			1.10		
B086A S t		17.05	0.22	2.17	1.10		
BCCC S t	16.00	16.62	-0.63	-6.25	1.10		
> Sighat: 5.341 > True Cond. No	NSSD: 5.	866 dLa Effect	et: -0.0	39 dLo d. Num.:	n: 0.005 i 9.58	JZ: 0.000	
Location ran for	10 iteratio	ns Cor	verged!				
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Longitude: 1	16.243 deg	. W +/-	0.754	cm.			
Depth: 0	.000 km.	+/- 0.0	000 km.				
Relative O.T .: -	19.776 sec	. +/- 0	0.067 set				
Absolute O.T.:	-19.776 set	a. +/-	0.067 se	BC.			
Confidence reg	ion at 0.90	level:					
Semi-major ax	is: 9.3 k	m. = 0.0	8 deg.				
Semi-minor as	is: 4.0 k	. = 0.0	4 deg.				
Major-axis strik	e: 107.7 d	eg. clock	wise from	m North			
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Maximum azi           Dr           Ariv ID Statn P           373 KNW P           402 KNW 2           373 Robit P           373 Robit P           400 FFO S           377 RALD P           400 FFO S           377 RALD P           401 FFO S           373 RHL P           403 BOT MSP I           404 BCCC F           389 TBO MWC I           389 RDM P           889 RDM P           888 RDM P           887 SND P	ata Rahase Type t d t d t d t d t d t d t d t d t d t d	esiduals at True 0.631 1.298 0.392 0.145 0.055 0.265 0.144 0.463 0.265 0.114 0.265 0.114 0.265 0.0148 0.196 0.117 -0.623 -0.017 0.221 0.250 0.063 0.099 0.0022	Distance Normal 6.315 12.980 3.917 1.452 0.547 -5.016 1.888 1.139 -4.631 2.646 -1.481 1.964 1.964 1.964 1.964 1.964 1.964 1.964 1.964 0.603 2.208 2.496 0.632 0.994 0.023	ce Azimu lized (d 1.000 2 1.000 2 1.000 2 1.039 18 1.040 1 1.040 1 1.040 2 1.045 18 1.045 18 1.045 2 1.075 1 1.075 1 1.075 1 1.075 2 1.095 2 1.095 2 1.104 1 1.104 1 1.104 1 1.121 1 1.123 18 1.123 1	th Data eg.] (deg.) 22.94 0.05 202.94 0.25 202.94 0.25 202.98 0.06 88.97 0.06 88.97 0.06 88.97 0.06 03.50 0.05 03.50 0.05 93.50 0.05 93.50 0.05 93.50 0.05 93.50 0.05 93.50 0.07 205.56 0.07 205.57 0.07 205.57 0.07 205.57 0.07 205.57 0.07 205.57 0.07 205.57 0.07 205.57 0.07 205.57 0.07 205.57 0.	Import Err 4 0 4 0 2 0 1 0 4 0 2 0 1 0 4 0 5 0 1 0 8 0 1 0 8 0 1 0 8 0 1 0 8 0 1 0 1 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6	
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Minor feature -- Specification of custom shade areas, linear features via map\_features.pf



... X xterm ap\_linear\_features &Arr{ test]infeature &Arr{ maps &Tbl{ dbevents\_events dbevents\_event dbevents\_origins dbloc\_maindb\_events dbloc\_trialdb\_event color\_outline purple newidth lonlat points sequence ATbl -125 33 -126 34 -127 34 -127 34 -127 35 -130 36 34,3 faotlinfeature2 8Arr{ maps &Tbl{ discente ecente dbevents\_event devents origins dbloc\_maindb\_events dbloc\_trialdb\_event color\_outline orange linewidth 3 lonlat\_points\_sequence &Tbl{ -122 -122.5 -123 32.5 33 33,5 -124 33.5 -124.5 34.5 / testlinfeature3 &Arr{ waps &Tbl{ dbevents\_events devents event. dbevents\_origins dbloc maindb events dbloc\_trialdb\_event } color\_outline brown linewidth 3 inewidth lonlat points sequence &Tbl -125 -125,5 36.5 -126 37.5 -127 37.5 -127.5 38.5 ao area Features súrri testarfeature &Arr{ maps &Tbl{ dbevents\_events dbevents\_event dbevents\_origins dbloc\_maindb\_events dbloc trialdb event } color\_outline red rolor\_fill \#88FF0000 color\_fill linewidth 4 lonlat\_points\_sequence &Tbl{ -121 -121 -111 -111 -111 -121 31 testarfeature2 &Arr{ maps &Tbl{ dievents events dbevents\_event dbevents\_origins dbloc\_maindb\_event: dbloc\_trialdb\_event }
color\_outline black
color\_fill \#88FFFFFF color\_fill linewidth lonlat\_points\_sequence &Tbl( -126 -126 -125 -122 -122 -122 -125 -126 -44 4 4 pf\_revision\_time 1555703380

#### Minor feature -- Built-in Smartpick-style traceview control buttons

#### Minor feature -- Spreadsheet table for list of arrivals going into the location

Starting Location         June         June         Lon:         -116.241           Image: Starting Location         AAK         ✓         Lon:         -116.241           Image: Starting Location         AAK         ✓         Image: Starting Location         Image: Starting Location           Image: Starting Location         AAK         ✓         Image: Starting Location         Image: Starting Location           Image: Starting Location         Image: Starting Location         Image: Starting Location         Image: Starting Location           Image: Starting Location         Image: Starting Location         Image: Starting Location         Image: Starting Location           Image: Starting Location         Image: Starting Location         Image: Starting Location         Image: Starting Location           Image: Starting Location         Image: Starting Location         Image: Starting Location         Image: Starting Location           Image: Starting Location         Image: Starting Location         Image: Starting Location         Image: Starting Location           Image: Starting Location         Image: Starting Location         Image: Starting Location         Image: Starting Location           Image: Starting Location         Image: Starting Location         Image: Starting Location         Image: Starting Location           Image: Starting Location         Image:					Loca	Locator Input					
Construction         Construction           arid         iphase         DN         sta         chan         time           1         393         P         d         JORD         HHZ         06:54:16.795           2         392         P         d         JORD         HHZ         06:54:16.795           2         392         P         d         BORD         HHZ         06:54:170.90           4         394         P         d         BORD         HHZ         06:54:170.90           4         394         P         d         BZN         HHZ         06:54:18.066           7         399         P         d         MONP2         HHZ         06:54:18.066           7         399         P         d         MONP2         HHZ         06:54:18.061           10         376         P         d         MONP2         HHZ         06:54:18.041           10         376         P         d         MONP2         HHZ         06:54:14.233           11         385         P         d         MONP2         HHZ         06:54:16.423           12         379         P         d         MDR2 <td colspan="11"></td>											
Station:         AAK         ▼           Fix         Depth:         1         ▼ km           1         393         P         d         JORD         HHz         06:54:16.795           2         392         P         d         JORD         HHZ         06:54:16.795           2         392         P         d         BRD         HHZ         06:54:16.308           3         355         P         d         B087         HHZ         06:54:10.308           3         395         P         d         B2N         HHZ         06:54:10.308           5         397         P         d         B2N         HHZ         06:54:10.801           5         397         P         d         BAD         EX1:066         10:083           6         366         P         d         B088         HHZ         06:54:10.61           10         376         P         d         MONP2         HHZ         06:54:10.61           12         379         P         d         BALD         EHZ         06:54:10.61           13         384         P         B082         HHZ         06:54:16.423 <tr< td=""><td></td><td colspan="2">Lat:</td><td>34</td><td colspan="2">34.691</td><td>Lon: -116.241</td></tr<>		Lat:		34	34.691		Lon: -116.241				
Fix         Depth:         1         ■         km           1         393         P         d         JORD         HHz         06:54:16.795           2         392         P         d         JORD         HHZ         06:54:16.795           3         395         P         d         JORD         HHZ         06:54:16.795           3         395         P         d         BORD         HHZ         06:54:170.900           4         394         P         d         BZN         HHZ         06:54:18.081           5         397         P         d         LVA2         HHZ         06:54:18.066           399         P         d         MONP2         HHZ         06:54:18.061           9         398         P         d         MONP2         HHZ         06:54:18.020           10         376         P         d         MONP2         HHZ         06:54:16.233           11         355         P         d         BMAE         EHZ         06:54:16.233           13         344         P         d         BMS2         HHZ         06:54:16.233           13         344         P<	C	Lut		_			-				
1         393         P         d         JORD         HHZ         06:54:16.795           2         392         P         d         FRD         HHZ         06:54:16.308           3         395         P         d         BRD         HHZ         06:54:16.308           3         394         P         d         BZM         HHZ         06:54:170.900           4         394         P         d         BZM         HHZ         06:54:18.821           5         397         P         d         LVA2         HHZ         06:54:18.366           399         P         d         MONP2         HHZ         06:54:18.263           398         P         d         MONP2         HHZ         06:54:14.260           9         398         P         d         MANP2         HHZ         06:54:14.263           10         376         P         d         BYD         HHZ         06:54:15.510           12         379         P         d         RHIL         HHZ         06:54:15.610           13         384         P         d         B082         HHZ         06:54:15.615           14 <td< td=""><td>Г</td><td colspan="3">orationi</td><td></td><td></td><td>_</td></td<>	Г	orationi					_				
2         392         P         d         FRD         HHZ         06:54:16.308           3         395         P         d         B087         HHZ         06:54:17.090           4         394         P         d         B087         HHZ         06:54:17.090           4         394         P         d         BZN         HHZ         06:54:18.0821           5         397         P         d         LVA2         HHZ         06:54:18.053           6         396         P         d         BVA2         HHZ         06:54:18.066           7         399         P         d         MONP2         HHZ         06:54:14.233           9         396         P         d         SMER         HHZ         06:54:16.261           9         398         P         d         SMER         HHZ         06:54:16.261           10         376         P         d         TPFO         HHZ         06:54:16.261           13         384         P         d         B083         HHZ         06:54:16.621           13         384         P         d         B082         HHZ         06:54:16.672		arid iphase		D/N	D/N sta		time				
3         395         P         d         B087         HHZ         06:54:17.090           4         394         P         d         BZN         HHZ         06:54:17.090           5         397         P         d         BZN         HHZ         06:54:17.090           5         397         P         d         BZN         HHZ         06:54:18.066           7         399         P         d         MONP2         HHZ         06:54:19.353           8         377         P         d         BALD         EHZ         06:54:19.451           9         398         P         d         MONP2         HHZ         06:54:19.451           10         376         P         d         BALD         EHZ         06:54:19.451           12         379         P         d         BALD         EHZ         06:54:16.19.41           13         384         P         d         BUG         HHZ         06:54:16.420           14         378         P         d         BUS         HHZ         06:54:16.620           15         381         P         d         BUS         HHZ         06:54:16.621	1	393	Р	d	JORD	HHZ	06:54:16.795				
4         394         P         d         BZN         HHZ         06:54:16.821           5         397         P         d         LVA2         HHZ         06:54:18.353           6         396         P         d         BO88         HHZ         06:54:18.353           7         9         G         MONP2         HHZ         06:54:18.066           7         399         P         d         MONP2         HHZ         06:54:12.639           9         398         P         d         MONP2         HHZ         06:54:14.233           10         376         P         d         BALD         EHZ         06:54:14.233           11         355         P         d         BYA6         EHZ         06:54:15.610           12         379         P         d         RHIL         HHZ         06:54:15.610           13         384         P         d         BYB6         HHZ         06:54:15.610           14         378         P         d         BYB7         HHZ         06:54:15.610           14         378         P         d         BYB7         HHZ         06:54:15.620	2	392	Р	d	FRD	HHZ	06:54:16.308				
5         397         P         d         LVA2         HHZ         06:54:19.363           6         366         P         d         B088         HHZ         06:54:18.066           7         399         P         d         B088         HHZ         06:54:18.066           9         398         P         d         BADL         EHZ         06:54:18.066           9         398         P         d         BALD         EHZ         06:54:14.280           9         398         P         d         SMER         HHZ         06:54:14.233           11         355         P         d         BADE         EHZ         06:54:15.151           12         379         P         d         RHIL         HHZ         06:54:15.61           13         384         P         d         B024         HHZ         06:54:15.651           13         384         P         d         B024         HHZ         06:54:16.651           14         378         P         d         B024         HHZ         06:54:15.615           16         387         P         d         B024         HHZ         06:54:15.621	3	395	Ρ	d	B087	HHZ	06:54:17.090				
6         396         P         d         B088         HHZ         06:54:18.066           7         399         P         d         MONP2         HHZ         06:54:18.066           8         377         P         d         BADD         EHZ         06:54:18.066           9         398         P         d         BALD         EHZ         06:54:18.280           9         98         P         d         SMER         HHZ         06:54:14.233           13         379         P         d         B946         EHZ         06:54:16.420           13         384         P         d         B093         HHZ         06:54:16.420           14         379         P         d         B082         HHZ         06:54:16.420           14         378         P         d         B082         HHZ         06:54:16.672           15         381         P         d         B082         HHZ         06:54:16.672           15         381         P         d         SND         HHZ         06:54:15.260           20         389         P         d         TRO         HHZ         06:54:15.271	4	394	Ρ	d	BZN	HHZ	06:54:16.821				
7         399         P         d         MONP2         HHZ         06:54:27.639           8         377         P         d         BALD         EHZ         06:54:14.280           9         398         P         d         SMER         HHZ         06:54:14.233           13         376         P         d         BMER         HHZ         06:54:14.233           11         376         P         d         B946         EHZ         06:54:14.233           12         379         P         d         B946         EHZ         06:54:16.423           12         379         P         d         BVIL         06:54:16.423         06:54:16.423           13         384         P         d         B020         HHZ         06:54:15.420           14         378         P         d         B020         HHZ         06:54:15.420           14         378         P         d         B02C         HHZ         06:54:15.621           15         381         P         d         SOC         HHZ         06:54:15.201           18         386         P         d         TMSP         HHZ         06:54:15.201 </td <td>5</td> <td>397</td> <td>Ρ</td> <td>d</td> <td>LVA2</td> <td>HHZ</td> <td>06:54:19.353</td>	5	397	Ρ	d	LVA2	HHZ	06:54:19.353				
8         377         P         d         BALD         EHZ         06:54:14.280           9         398         P         d         SMER         HHZ         06:54:19.451           10         376         P         d         TPC         HHZ         06:54:14.233           11         385         P         d         B904         EHZ         06:54:16.233           13         384         P         d         B093         HHZ         06:54:16.423           13         384         P         d         B093         HHZ         06:54:16.420           14         378         P         d         B093         HHZ         06:54:16.421           15         381         P         d         B02C         HHZ         06:54:15.672           15         387         P         d         SND         HHZ         06:54:15.672           18         386         P         d         ALCY         EHZ         06:54:15.672           18         381         P         d         B086         HHZ         06:54:15.676           18         382         P         d         B0864         HHZ         06:54:15.706     <	6	396	Ρ	d	B088	HHZ	06:54:18.066				
9         398         P         d         SMER         HHZ         06:54:19.461           10         376         P         d         TPFO         HHZ         06:54:14.233           11         385         P         d         B946         EHZ         06:54:14.653           13         384         P         d         B046         EHZ         06:54:16.4653           13         384         P         d         B093         HHZ         06:54:16.4653           14         379         P         d         B082         HHZ         06:54:16.4651           14         385         P         d         B082         HHZ         06:54:15.652           15         381         P         d         SND         HHZ         06:54:15.657           16         387         P         d         NSD         HHZ         06:54:15.652           17         380         P         d         ALCY         HHZ         06:54:15.652           18         86         P         d         RCM         HHZ         06:54:15.260           23         389         P         d         B086A         HHZ         06:54:15.739	7	399	Ρ	d	MONP2	HHZ	06:54:27.639				
10         376         P         d         TPFO         HHZ         06:54:14.233           11         385         P         d         B946         EHZ         06:54:14.233           12         379         P         d         B946         EHZ         06:54:14.233           12         378         P         d         B093         HHZ         06:54:15.420           14         378         P         d         B092         HHZ         06:54:15.420           14         378         P         d         B082         HHZ         06:54:15.420           15         381         P         d         B082         HHZ         06:54:15.621           16         387         P         d         SCCC         HHZ         06:54:15.621           17         380         P         d         ALCY         EHZ         06:54:15.260           18         382         P         d         B086A         HHZ         06:54:15.260           18         383         P         d         B086A         HHZ         06:54:15.260           18         383         P         d         B086A         HHZ         06:54:15.260	8	377	Р	d	BALD	EHZ	06:54:14.280				
11         385         P         d         B946         EH2         06:54:15.510           12         379         P         d         RHIL         HH2         06:54:16.653           13         384         P         d         B093         HH2         06:54:16.623           13         384         P         d         B093         HH2         06:54:16.420           14         378         P         d         B022         HH2         06:54:15.420           15         381         P         d         B02C         HH2         06:54:15.672           15         380         P         d         SND         HH2         06:54:15.676           18         86         P         d         ALCY         EH2         06:54:15.661           18         381         P         d         B086         HH2         06:54:15.816           21         382         P         d         B086         HH2         06:54:15.816           21         382         P         d         ROM         HH2         06:54:15.816           23         391         P         d         ROM         H42         06:54:15.987 </td <td>9</td> <td>398</td> <td>Р</td> <td>d</td> <td>SMER</td> <td>HHZ</td> <td>06:54:19.451</td>	9	398	Р	d	SMER	HHZ	06:54:19.451				
12         379         P         d         RHIL         HH2         06:54:14.663           13         384         P         d         B093         HH2         06:54:15.420           14         378         P         d         B093         HH2         06:54:15.4621           14         378         P         d         B082         HH2         06:54:15.155           15         381         P         d         BCCC         HH2         06:54:15.057           17         380         P         d         TMSP         HH2         06:54:15.657           18         386         P         d         ACV         HH2         06:54:15.657           19         383         P         d         ACV         HH2         06:54:15.657           18         387         P         d         B086         HH2         06:54:15.657           13         382         P         d         B086A         HH2         06:54:15.657           13         382         P         d         B086A         HH2         06:54:15.217           14         383         P         d         B086A         HH2         06:54:15.237	10	376	Р	d	TPFO	HHZ	06:54:14.233				
13         384         P         d         B093         HH2         06:54:15.420           14         378         P         d         B082         HH2         06:54:16.621           15         381         P         d         B082         HH2         06:54:15.655           15         387         P         d         SNCC         HH2         06:54:15.672           17         380         P         d         TMSP         HH2         06:54:15.672           18         386         P         d         ALCY         EHZ         06:54:15.661           18         383         P         d         ALCY         EHZ         06:54:15.260           20         389         P         d         TRO         HH2         06:54:15.260           21         382         P         d         B086A         HH2         06:54:15.270           22         388         P         d         ROM         HH2         06:54:15.237           23         381         P         d         ROM         HH2         06:54:15.237           23         381         P         d         ROM         HH2         06:54:15.237     <	11	385	P	d	B946	EHZ	06:54:15.510				
14         378         P         d         B082         HH2         06:54:14.621           15         387         P         d         BCCC         HH2         06:54:15.672           16         387         P         d         SNC         HH2         06:54:15.672           17         380         P         d         TMSP         HH2         06:54:15.672           18         86         P         d         ALCY         EH2         06:54:15.601           18         383         P         d         B086         HH2         06:54:15.260           19         383         P         d         B086         HH2         06:54:15.217           23         384         P         d         B086         HH2         06:54:15.987           24         391         P         d         CROM         HH2         06:54:15.987           24         392         P         d         CROM         HH2         06:54:15.987           23         381         P         d         CROM         HH2         06:54:15.987           24         392         P         d         CROM         HH2         06:54:10.987	12	379	Ρ	d	RHIL	HHZ	06:54:14.653				
15         381         P         d         BCCC         HH2         06:54:15.155           16         387         P         d         SND         HH2         06:54:15.052           17         380         P         d         TMSP         HH2         06:54:15.061           18         386         P         d         TMSP         HH2         06:54:15.061           19         383         P         d         ACV         HH2         06:54:15.061           19         383         P         d         BO86         HH2         06:54:15.260           21         382         P         d         BO86         HH2         06:54:15.217           23         381         P         d         BO86A         HH2         06:54:15.217           23         391         P         d         BO86A         HH2         06:54:15.237           24         392         P         d         ROW         HH2         06:54:15.987           24         373         P         d         KMC         HH2         06:54:13.918           25         72         P         d         BO84         H42         06:54:13.918     <	13	384	Ρ	d	B093	HHZ	06:54:15.420				
10         387         P         d         SND         HH2         06:54:15.672           17         380         P         d         TMSP         HH2         06:54:15.667           18         86         P         d         TMSP         HH2         06:54:15.667           18         886         P         d         RMSP         HH2         06:54:15.667           18         9         d         ROS         HH2         06:54:15.665         114           19         383         P         d         B086         HH2         06:54:15.260           20         389         P         d         B086A         HH2         06:54:15.73           21         382         P         d         B086A         HH2         06:54:15.73           23         391         P         d         CRY         HH2         06:54:15.73           23         373         P         d         KNW         HH2         06:54:15.73           24         372         P         d         B084         HH2         06:54:13.918           247         S         P         d         B084         HH2         06:54:13.968	14	378	Ρ	d	B082	HHZ	06:54:14.621				
17         380         P         d         TMSP         HH2         06:54:15.061           18         383         P         d         ALCY         EHZ         06:54:15.061           9         383         P         d         ALCY         EHZ         06:54:15.061           9         383         P         d         BA06         HHZ         06:54:15.061           18         382         P         d         BA06         HHZ         06:54:15.260           23         388         P         d         BA06         HHZ         06:54:15.217           23         381         P         d         CRV         HHZ         06:54:15.937           24         391         P         d         CRV         HHZ         06:54:15.937           24         370         P         d         CRV         HHZ         06:54:15.947           25         372         P         d         KNW         HHZ         06:54:13.740           26         372         P         d         B084         HHZ         06:54:13.740           28         374         P         d         B084         HHZ         06:54:13.946 <td>15</td> <td>381</td> <td>Ρ</td> <td>d</td> <td>BCCC</td> <td>HHZ</td> <td>06:54:15.155</td>	15	381	Ρ	d	BCCC	HHZ	06:54:15.155				
18         386         P         d         ALCY         EHZ         06:54:15.655           19         383         P         d         B086         HHZ         06:54:15.655           2         389         P         d         TRO         HHZ         06:54:15.816           2         382         P         d         TRO         HHZ         06:54:15.217           23         382         P         d         BRM         HHZ         06:54:15.217           23         381         P         d         RDM         HHZ         06:54:15.217           24         390         P         d         RDM         HHZ         06:54:15.217           24         397         P         d         WMC         HHZ         06:54:15.827           25         373         P         d         MMC         HHZ         06:54:13.918           26         372         P         d         B081         HHZ         06:54:13.918           27         375         P         d         B084         HHZ         06:54:13.968           28         374         P         d         PFO         HHZ         06:54:13.968	16	387	Р	d	SND	HHZ	06:54:15.672				
19         383         P         d         B086         HH2         06:54:15.260           2         382         P         d         TRO         HH2         06:54:15.261           2         382         P         d         B086A         HH2         06:54:15.217           2         388         P         d         R086A         HH2         06:54:15.739           23         381         P         d         ROW         HH2         06:54:15.739           24         390         P         d         ROW         HH2         06:54:15.739           25         373         P         d         KMC         HH2         06:54:13.918           26         372         P         d         B084         HH2         06:54:13.740           27         375         P         d         B084         HH2         06:54:13.463           28         374         P         d         PFO         HH2         06:54:13.264           29         471         P         d         PFO         HH2         06:54:13.263           29         401         S         d         PFO         HH2         06:54:28.21	17	380	Р	d	TMSP	HHZ	06:54:15.061				
20         389         P         d         TRO         HH2         06:54:15.816           21         382         P         d         B086A         HH2         06:54:15.27           23         388         P         d         B086A         HH2         06:54:15.29           23         389         P         d         CRV         HH2         06:54:15.89           24         390         P         d         CRV         HH2         06:54:15.89           24         397         P         d         CRV         HH2         06:54:15.99           25         373         P         d         KNW         HH2         06:54:13.918           26         372         P         d         B084         HH2         06:54:13.740           27         375         P         d         B084         HH2         06:54:13.740           28         374         P         d         B084         HH2         06:54:13.968           2401         S         d         PFO         HH2         06:54:28.321           38         400         S         d         PFO         HH2         06:54:28.116	18	386	Р	d	ALCY	EHZ	06:54:15.655				
21         382         P         d         B086A         HHZ         06:54:15.217           22         388         P         d         RDM         HHZ         06:54:15.217           23         391         P         d         RDM         HHZ         06:54:15.297           24         390         P         d         CRY         HHZ         06:54:15.927           24         392         P         d         KWK         HHZ         06:54:13.218           25         373         P         d         KNW         HHZ         06:54:13.918           26         372         P         d         B081         HHZ         06:54:13.740           27         375         P         d         B084         HHZ         06:54:13.682           28         374         P         d         PFO         HHZ         06:54:13.686           28         374         P         d         PFO         HHZ         06:54:13.968           29         401         S         d         PFO         HHZ         06:54:28.2116	19	383	Р	d	B086	HHZ	06:54:15.260				
22         388         P         d         RDM         HH2         06:54:15.739           23         391         P         d         CRY         HH2         06:54:15.827           24         390         P         d         WMC         HH2         06:54:15.827           25         373         P         d         KMC         HH2         06:54:13.918           26         372         P         d         B081         HH2         06:54:13.918           27         375         P         d         B084         HH2         06:54:13.918           28         374         P         d         B084         HH2         06:54:13.968           28         374         P         d         PFO         HH2         06:54:13.918           29         401         S         d         TPFO         HH2         06:54:28.21           20         S         d         PFO         HH2         06:54:28.2116	20	389	P	d	TRO	HHZ	06:54:15.816				
23         391         P         d         CRY         HH2         06:54:15.987           24         390         P         d         WMC         HH2         06:54:15.987           25         373         P         d         KMV         HH2         06:54:15.987           25         372         P         d         B084         HH2         06:54:13.918           27         375         P         d         B084         HH2         06:54:13.040           28         374         P         d         B084         HH2         06:54:13.968           28         401         S         d         PFO         HH2         06:54:13.968           29         401         S         d         PFO         HH2         06:54:28.321           30         400         S         d         PFO         HH2         06:54:28.116	21	382	Р	d	B086A	HHZ	06:54:15.217				
24         390         P         d         WMC         HHZ         06:54:15.827           25         373         P         d         KNW         HHZ         06:54:13.918           26         372         P         d         B081         HHZ         06:54:13.740           27         375         P         d         B084         HHZ         06:54:13.968           28         374         P         d         B084         HHZ         06:54:13.968           29         401         S         d         PFO         HHZ         06:54:28.321           30         400         S         d         PFO         HHZ         06:54:28.116	22	388	Ρ	d	RDM	HHZ	06:54:15.739				
28         373         P         d         KNW         HHZ         06:54:13.918           26         372         P         d         B081         HHZ         06:54:13.740           27         375         P         d         B084         HHZ         06:54:13.740           28         374         P         d         B084         HHZ         06:54:13.968           29         374         P         d         POO         HHZ         06:54:13.968           30         401         S         d         TPO         HHZ         06:54:28.321	23	391	Ρ	d	CRY	HHZ	06:54:15.987				
28         372         P         d         B081         HHZ         06:54:13.740           27         375         P         d         B084         HHZ         06:54:14.163           28         374         P         d         PFO         HHZ         06:54:13.968           29         401         S         d         TPFO         HHZ         06:54:28.21           30         400         S         d         PFO         HHZ         06:54:28.21	24	390	Ρ	d	WMC	HHZ	06:54:15.827				
22         375         P         d         B084         HHz         06:54:14.163           28         374         P         d         PFO         HHZ         06:54:13.968           29         401         S         d         TPFO         HHZ         06:54:28.321           30         400         S         d         PFO         HHE         06:54:28.3116	25	373	Ρ	d	KNW	HHZ	06:54:13.918				
28         374         P         d         PFO         HHZ         06:54:13.968           29         401         S         d         TPFO         HHE         06:54:28.321           30         400         S         d         PFO         HHE         06:54:28.311	26	372	Р	d	B081	HHZ	06:54:13.740				
29         401         S         d         TPFO         HHE         06:54:28.321           30         400         S         d         PFO         HHE         06:54:28.116	27	375	Р	d	B084	HHZ	06:54:14.163				
30 400 S d PFO HHE 06:54:28.116	28	374	Р	d	PFO	HHZ	06:54:13.968				
	29	401	S	d	TPFO	HHE	06:54:28.321				
	30	400	S	d	PFO	HHE	06:54:28.116				
31 403 S d BALD EHE 06:54:28.878	31	403	S	d	BALD	EHE	06:54:28.878				
32 402 S d KNW HHN 06:54:28.651	32	402	S	d	KNW	HHN	06:54:28.651				
33 405 S d B086A HHE 06:54:31.006	33	405	S	d	B086A	HHE	06:54:31.006				
34 404 S d BCCC HHN 06:54:29.738	34	404	S	d	BCCC	HHN	06:54:29.738				

## I could go on for days...

Demonstration!

## Thank you -- Questions?

Feedback: support@brtt.com