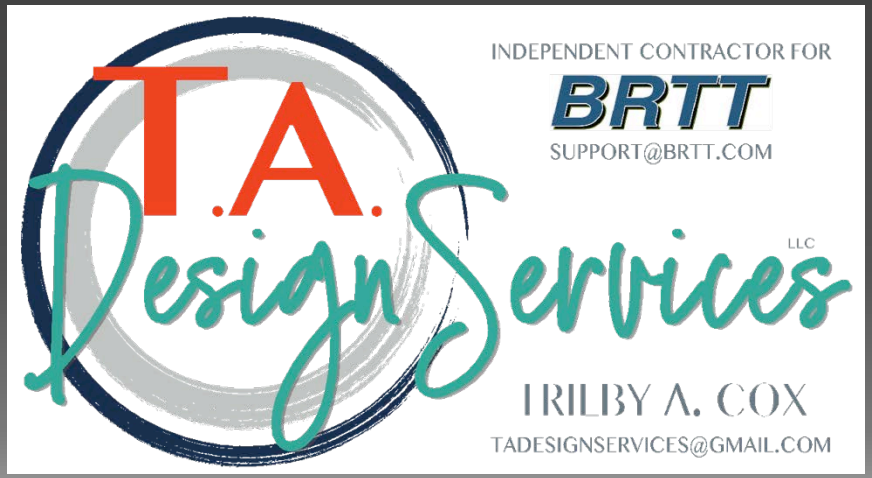
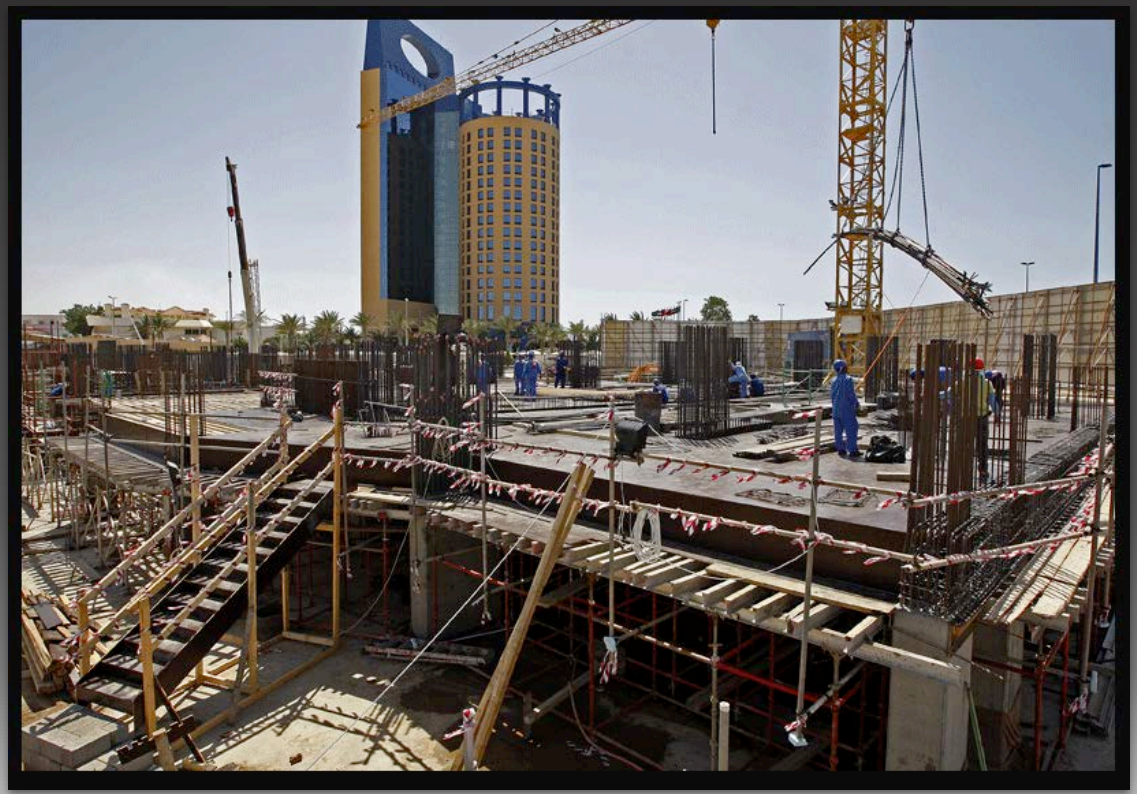
dbloc
work-in-progress prototype



Work-in-progress



Outline

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

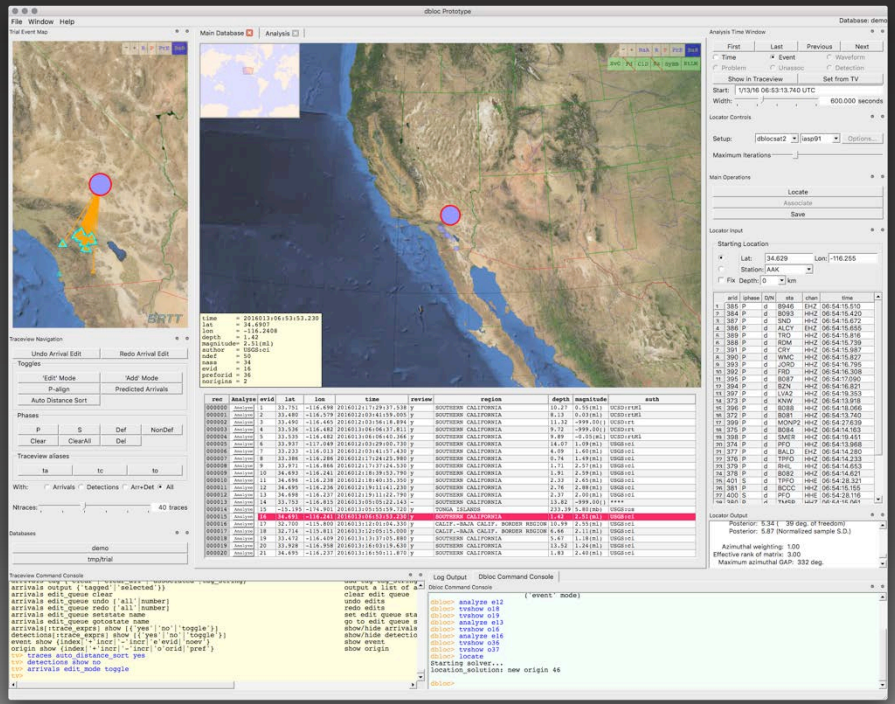
Short history of dbloc2 and dbloc

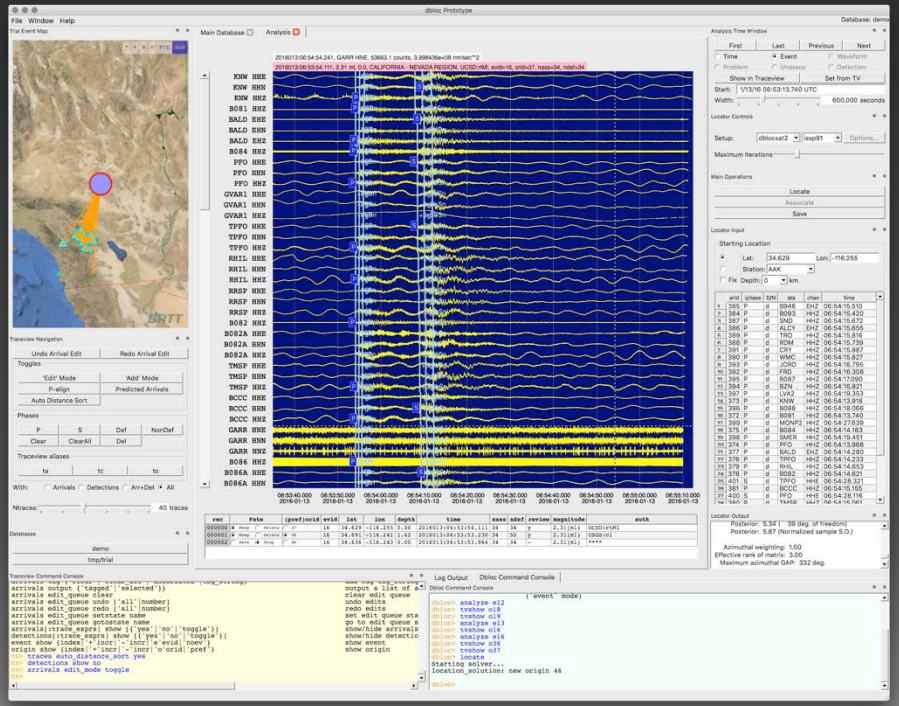
- Dan Quinlan and Luda Ratnikova designed initial dbloc2 in the 1990's for small regional networks
- From late 1990's to present, dbloc2/dbpick has worked well (dbpick even earlier)
- Mounting pressure from user community for modernization plus need to switch to modern toolkits for maintainability spurred 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

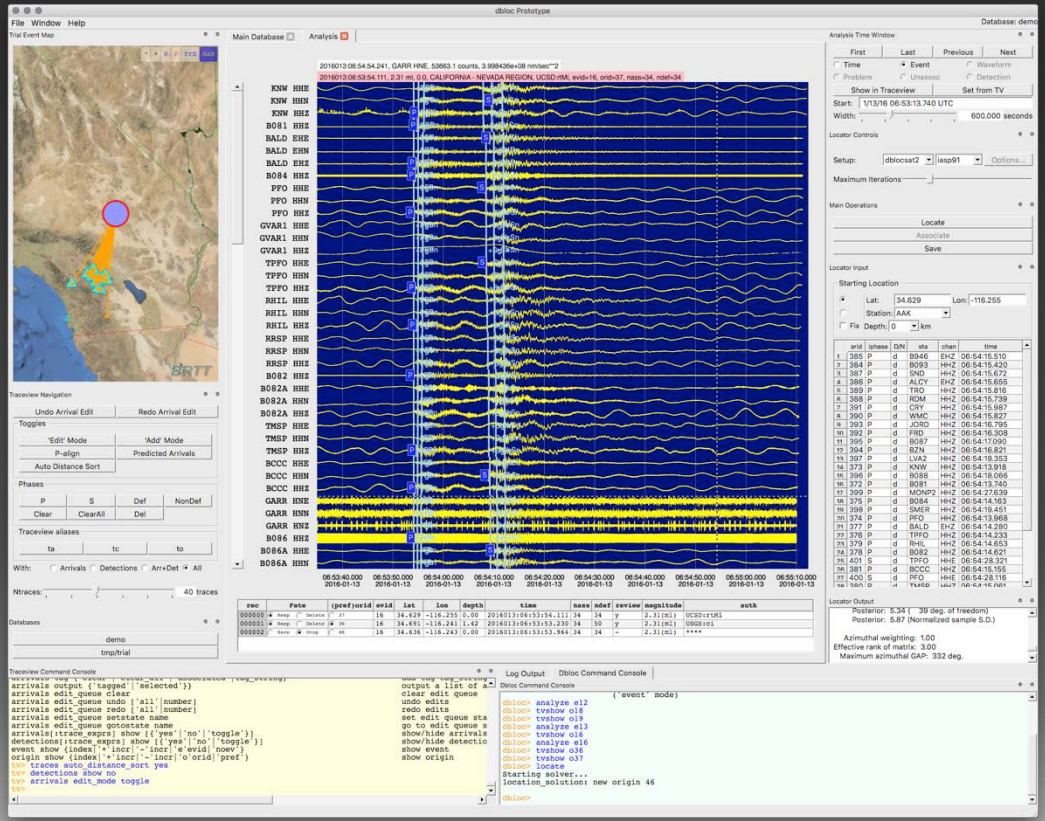
- Reestablish maintainability of software by switching to modern toolkits
- Support enterprise-scale network operations
- Continue supporting small-network operations
- Modernize user-interaction features and capabilities
- Retain main features of existing programs
- Integrate waveform-processing and 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

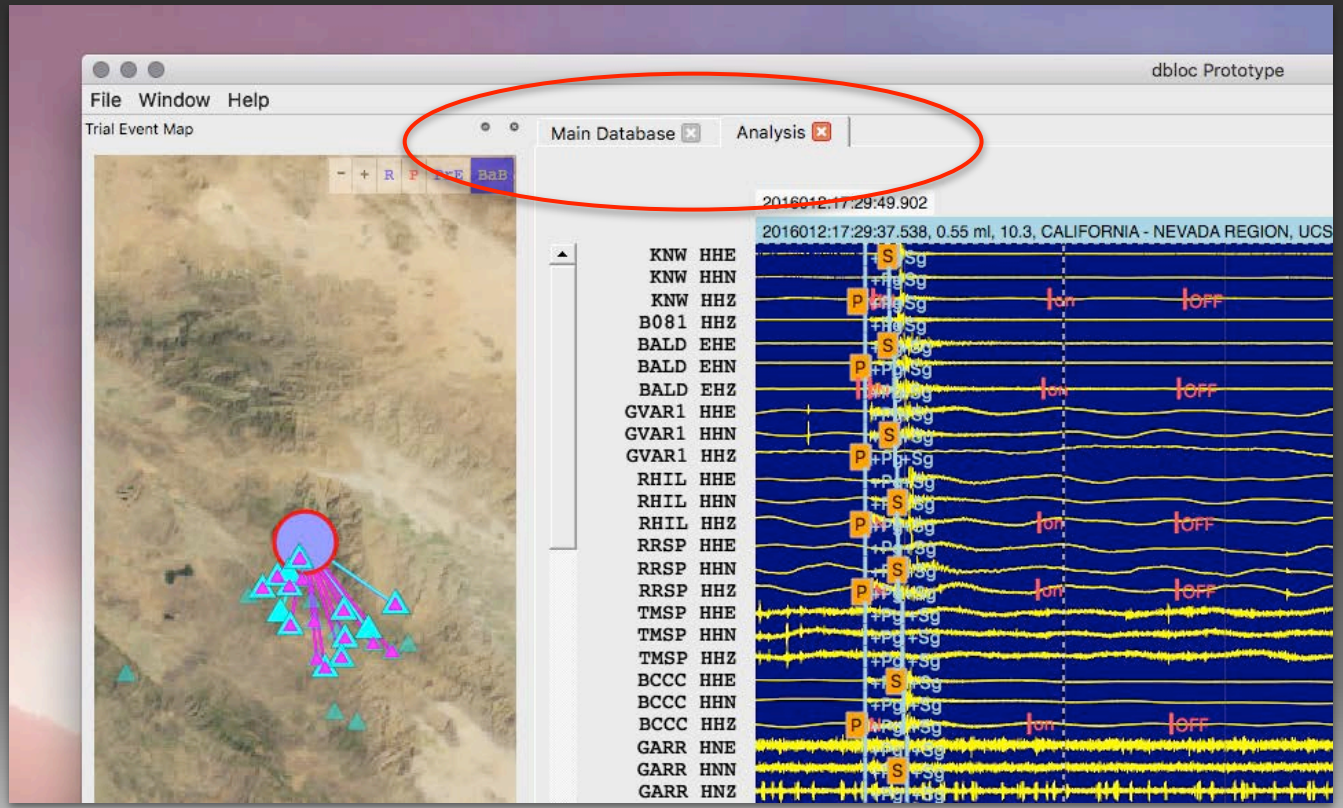




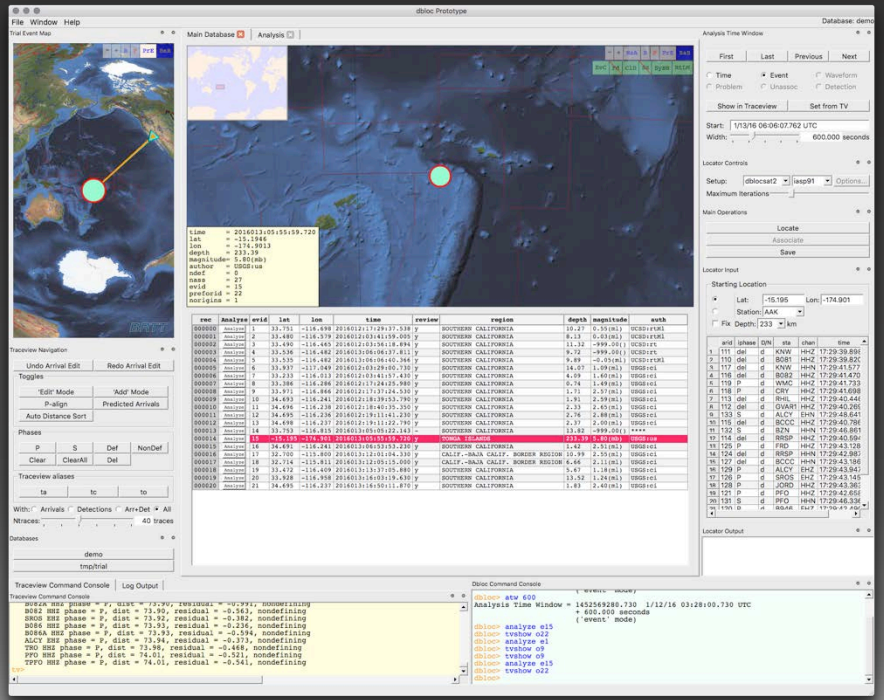
Major feature -- Full integration of waveform analysis via traceview

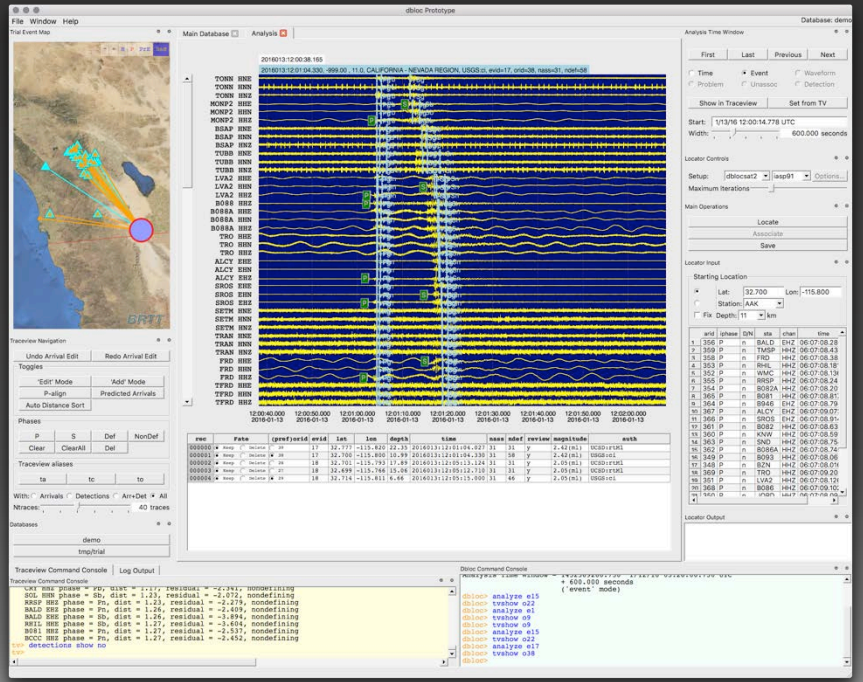


Major feature -- Tabbed panels for analyst tasks

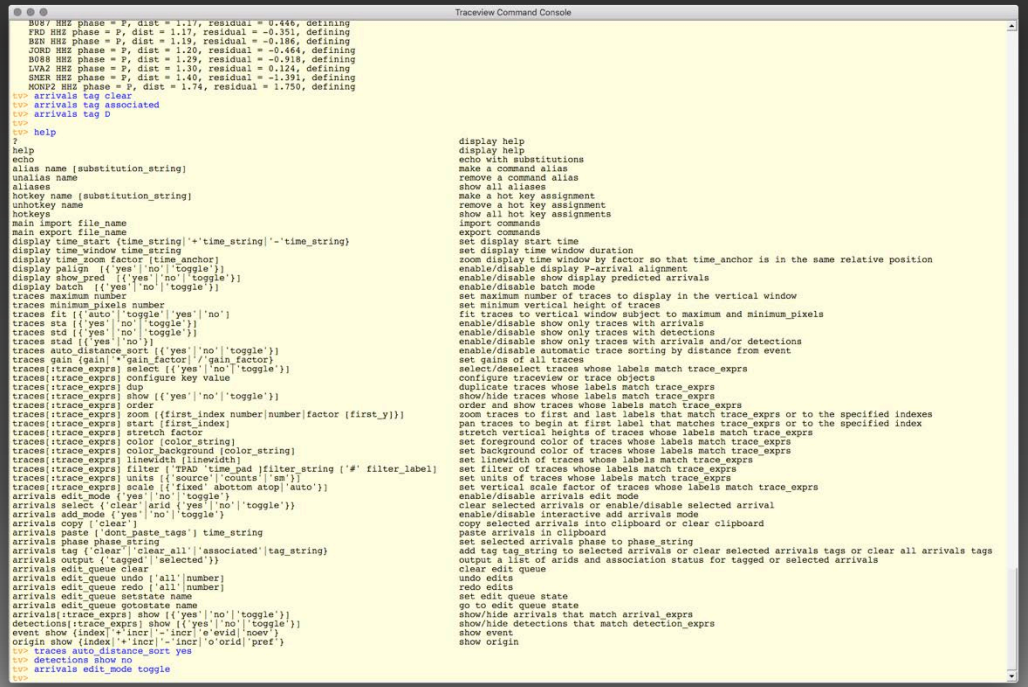


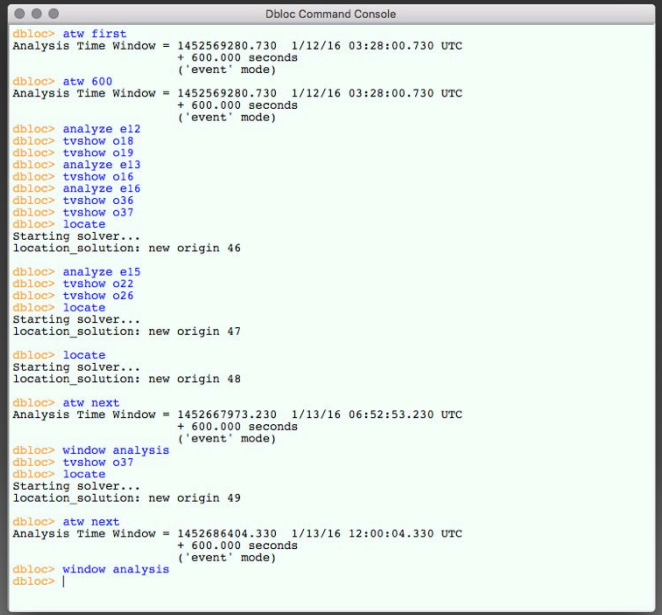
Major feature -- Integrated maps



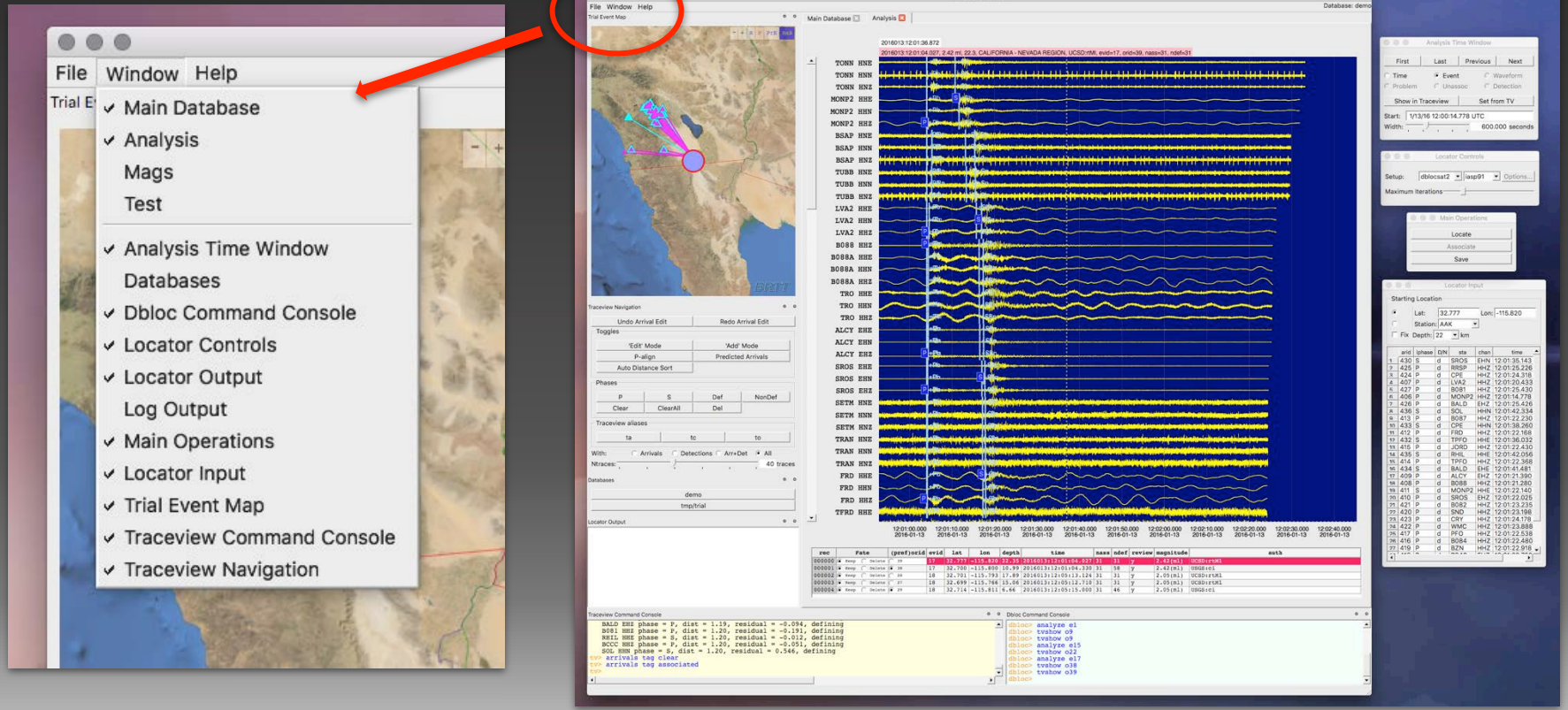


Major feature -- Built-in command consoles for command-driven interaction

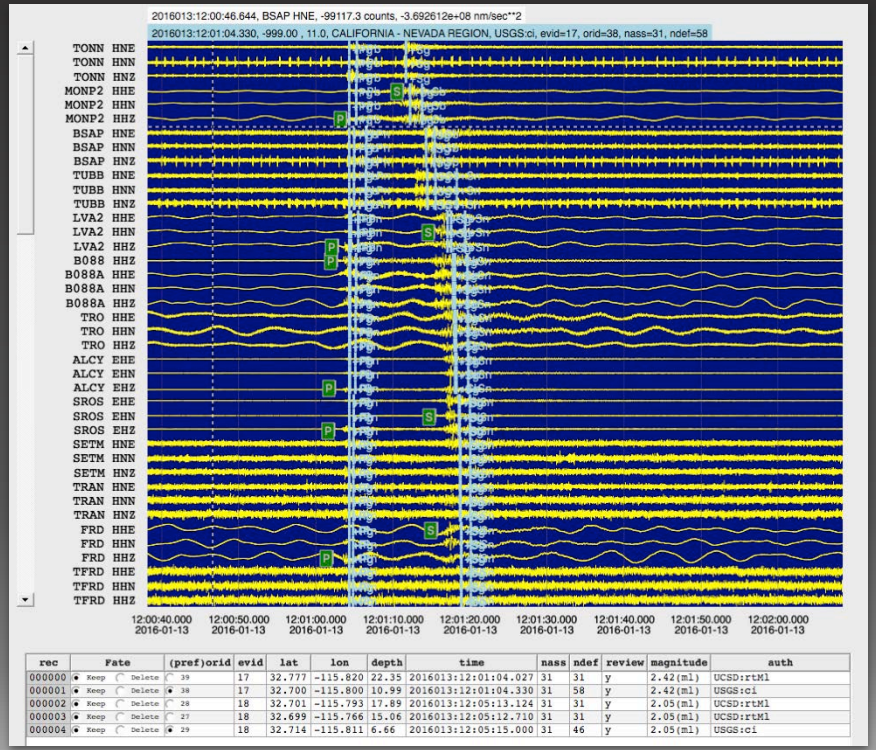


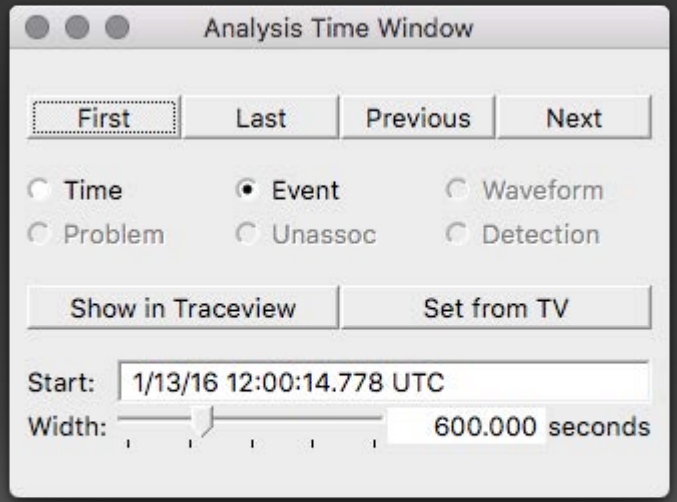


Major feature -- Multi-window design with detachable docking widgets



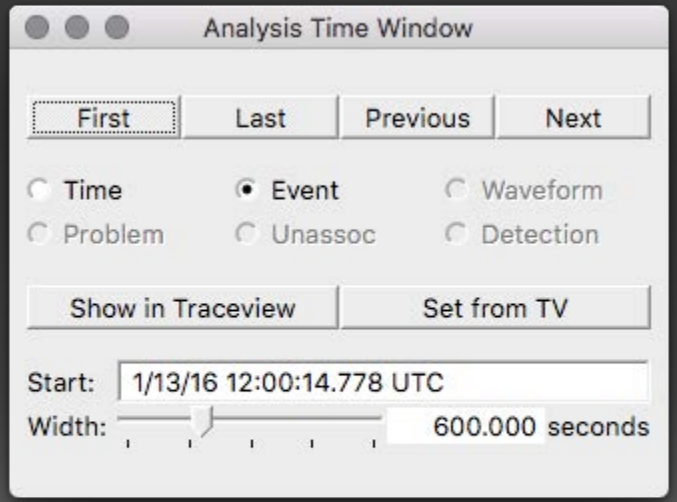
Major feature -- Clear primacy of “Analysis Time Window”concept





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

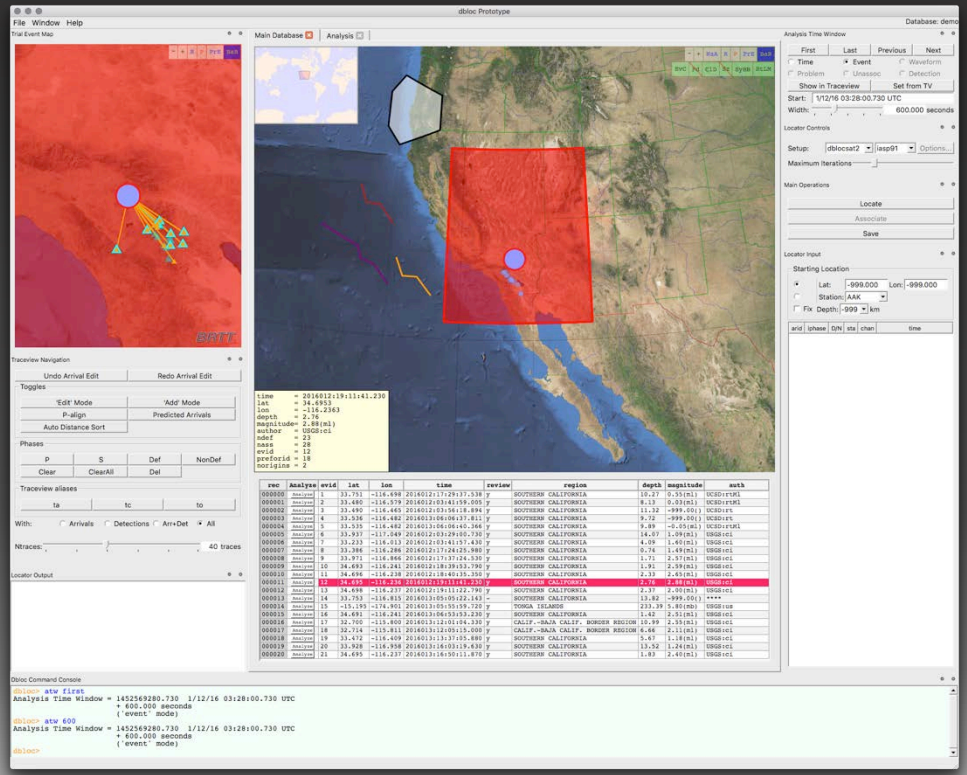
Log Output

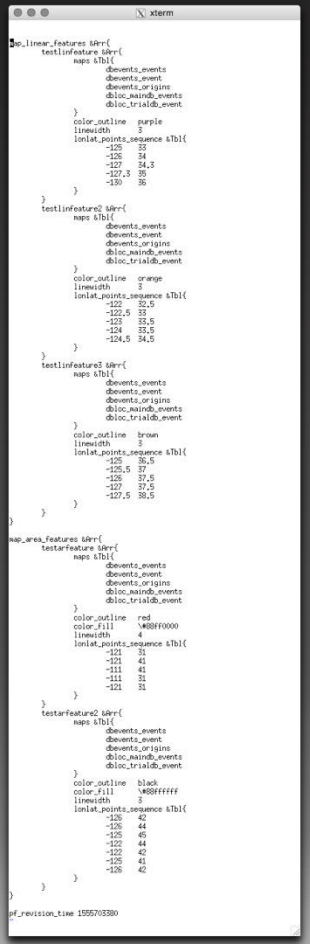
```
dbloc: Focusing to first Analysis Time Window
dbloc: Analysis Time Window changed: now 1/12/16 03:28:00.730 UTC + 600.000 seconds
dbloc: Found 1 events in main database for time window 1/12/16 03:28:00.730 UTC + 600.000 seconds
dbloc: Rebuilding trial database 'tmp/trial' with 1 events
dbloc: Analysis 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
dbloc: Found 2 events in main database for time window 1/12/16 19:11:01.688 UTC + 600.000 seconds
dbloc: Rebuilding trial database 'tmp/trial' with 2 events
dbloc: Analysis Time Window changed: now 1/12/16 19:10:43.087 UTC + 600.000 seconds
dbloc: Found 2 events in main database for time window 1/12/16 19:10:43.087 UTC + 600.000 seconds
dbloc: Rebuilding trial database 'tmp/trial' with 2 events
dbloc: Analysis Time Window changed: now 1/13/16 06:53:13.740 UTC + 600.000 seconds
dbloc: Found 1 events in main database for time window 1/13/16 06:53:13.740 UTC + 600.000 seconds
dbloc: Rebuilding trial database 'tmp/trial' with 1 events
dbloc: Locating event
dbloc: Starting dblocsat2
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...
dblocsat2: location_solution: new origin 46
dbloc: Assigning orid 46 to existing evid 16
dbloc: can't statfs tmp/trial.mt
dbloc: No such file or directory
dbloc: dbloc: can't statfs tmp/trial.wfmeas
dbloc: No such file or directory
```

Locator Output

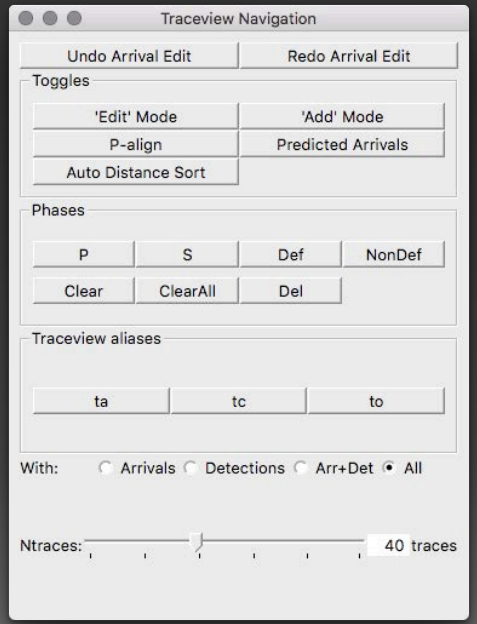
```
B082  P    t      0.88     1.03    -0.15    -1.47    1.08
TPFO  S    t     14.58    15.05    -0.47    -4.67    1.04
BCCC  P    t      1.41     1.30     0.12     1.18    1.10
PFO   S    t     14.38    14.88    -0.51    -5.06    1.04
TMSP  P    t      1.32     1.12     0.20     1.97    1.08
BALD  S    t     15.14    14.95     0.19     1.86    1.04
B086  P    t      1.52     1.54    -0.02    -0.16    1.10
KNW   S    t     14.91    13.62     1.29    12.95    1.00
B086A P    t      1.48     1.54    -0.06    -0.60    1.10
B086A S    t     17.27    17.05     0.22     2.17    1.10
BCCC  S    t     16.00    16.62    -0.63    -6.25    1.10

> Sighat: 5.341  NSSD: 5.866  dLat:  -0.039  dLon:   0.005  dZ:   0.000
> True Cond. Num.:  9.58      Effective Cond. Num.:  9.58

Location ran for 10 iterations ... Converged!

================================================================================


Final location estimate (+/- S.D.):
   Latitude:  34.636 deg. N +/-    0.403 km.
  Longitude: 116.243 deg. W +/-    0.754 km.
      Depth:   0.000 km.  +/-    0.000 km.
Relative O.T.: -19.776 sec.  +/-    0.067 sec.
Absolute O.T.: -19.776 sec.  +/-    0.067 sec.

Confidence region at 0.90 level:
 Semi-major axis:   9.3  km. =  0.08 deg.
 Semi-minor axis:   4.0  km. =  0.04 deg.
Major-axis strike:  107.7 deg. clockwise from North
    Depth error:    0.0  km.
 Orig. time error:  0.6 sec.

Standard errors (sigma):
        Prior:  2.40 (    8 deg. of freedom)
     Posterior:  5.34 (   39 deg. of freedom)
     Posterior:  5.87 (Normalized sample S.D.)

   Azimuthal weighting:  1.00
Effective rank of matrix:  3.00
  Maximum azimuthal GAP:  332 deg.

================================================================================
                  Data          Residuals  Distance Azimuth  Data
Arriv ID Statn  Phase Type at    True Normalized  (deg.)  (deg.) Import Err
================================================================================
   373 KNW   P     t    d  0.631    6.315   1.000  202.94   0.054   0
   402 KNW   S     t    d  1.298   12.980   1.000  202.94   0.214   0
   372 B081  P     t    d  0.392    3.917   1.003  202.98   0.054   0
   375 B084  P     t    d  0.145    1.452   1.039  189.83   0.062   0
   374 PFO   P     t    d -0.055   -0.547   1.040  189.97   0.061   0
   400 PFO   S     t    d -0.502   -5.016   1.040  189.97   0.244   0
   377 BALD  P     t    d  0.220    2.196   1.040  203.50   0.057   0
   403 BALD  S     t    d  0.189    1.888   1.040  203.50   0.224   0
   376 TPFO  P     t    d  0.114    1.139   1.045  189.69   0.063   0
   401 TPFO  S     t    d -0.463   -4.631   1.045  189.69   0.251   0
   379 RHL   P     t    d  0.265    2.646   1.057  204.56   0.066   0
   378 B082  P     t    d -0.148   -1.481   1.078  195.81   0.034   0
   380 TMSP  P     t    d  0.196    1.964   1.079  199.73   0.038   0
   381 BCCC  P     t    d  0.117    1.165   1.095  205.56   0.075   0
   404 BCCC  S     t    d -0.623   -6.226   1.095  205.56   0.271   0
   383 B086  P     t    d -0.017   -0.168   1.104  192.54   0.044   0
   382 B086A P     t    d -0.060   -0.603   1.104  192.54   0.044   0
   405 B086A S     t    d  0.221    2.208   1.104  192.54   0.198   0
   390 WMC   P     t    d  0.250    2.496   1.121  198.70   0.035   0
   389 TRO   P     t    d  0.063    0.632   1.123  187.78   0.080   0
   388 RDM   P     t    d  0.099    0.994   1.123  206.62   0.086   0
   387 SND   P     t    d -0.022   -0.223   1.126  195.87   0.034   0
   384 B093  P     t    d -0.290   -2.900   1.128  202.62   0.051   0
   385 B946  P     t    d -0.377   -3.768   1.136  194.84   0.036   0
   386 ALCY  P     t    d -0.415   -4.150   1.144  189.45   0.065   0
   391 CRY   P     t    d -0.061   -0.605   1.146  201.05   0.043   0
   395 B087  P     t    d  0.416    4.161   1.179  194.73   0.036   0
   392 FRD   P     t    d -0.381   -3.809   1.179  194.70   0.036   0
   394 BZN   P     t    d -0.222   -2.215   1.197  197.17   0.033   0
   393 JORD  P     t    d -0.497   -4.974   1.210  196.07   0.034   0
   396 B088  P     t    d -0.946   -9.458   1.299  194.03   0.038   0
   397 LVA2  P     t    d  0.105    1.048   1.311  191.70   0.050   0
   398 SMER  P     t    d -1.434  -14.339   1.407  213.37   0.167   0
   399 MONP2 P     t    d  1.790   17.896   1.750  184.93   0.124   0
================================================================================

= 0, No problem, normal interpolation
```

Minor feature -- Specification of custom shade areas, linear features via map_features.pf

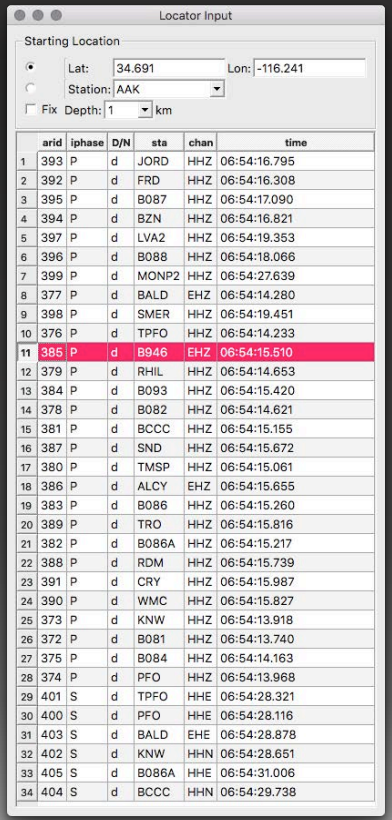




Minor feature -- Built-in Smartpick-style traceview control buttons



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



	arid	iphase	D/N	sta	chan	time
1	393	P	d	JORD	HHZ	06:54:16.795
2	392	P	d	FRD	HHZ	06:54:16.308
3	395	P	d	B087	HHZ	06:54:17.090
4	394	P	d	BZN	HHZ	06:54:16.821
5	397	P	d	LVA2	HHZ	06:54:19.353
6	396	P	d	B088	HHZ	06:54:18.066
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	06:54:19.451
10	376	P	d	TPFO	HHZ	06:54:14.233
11	385	P	d	B946	EHZ	06:54:15.510
12	379	P	d	RHIL	HHZ	06:54:14.653
13	384	P	d	B093	HHZ	06:54:15.420
14	378	P	d	B082	HHZ	06:54:14.621
15	381	P	d	BCCC	HHZ	06:54:15.155
16	387	P	d	SND	HHZ	06:54:15.672
17	380	P	d	TMSP	HHZ	06:54:15.061
18	386	P	d	ALCY	EHZ	06:54:15.655
19	383	P	d	B086	HHZ	06:54:15.260
20	389	P	d	TRO	HHZ	06:54:15.816
21	382	P	d	B086A	HHZ	06:54:15.217
22	388	P	d	RDM	HHZ	06:54:15.739
23	391	P	d	CRY	HHZ	06:54:15.987
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	06:54:14.163
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	06:54:28.116
31	403	S	d	BALD	EHE	06:54:28.878
32	402	S	d	KNW	HHN	06:54:28.651
33	405	S	d	B086A	HHE	06:54:31.006
34	404	S	d	BCCC	HHN	06:54:29.738

I could go on for days...

Demonstration!

Thank you -- Questions?

Feedback:
support@brtt.com