

25 May 2009
9:00 am Test Tank

MBARI Project 900907 Tank Testing
High Resolution Near-Surface Seismic Refraction Tomography

Attending: David Caress, Rich Henthorn, Mark Chaffey, Paul McGill, Bill Burgess

Bill is delivering two of the Acousondes today with current firmware.

- Serial numbers 7 and 8. The units will record about 30 seconds of data at a time, with about a 30 second hiatus while the data are written to memory.
- Paul is learning how to operate the sondes using his Palm Pilot

Mark and Rich have got the source ready. The one missing capability is time synchronization with the GPS time source – networking issues.

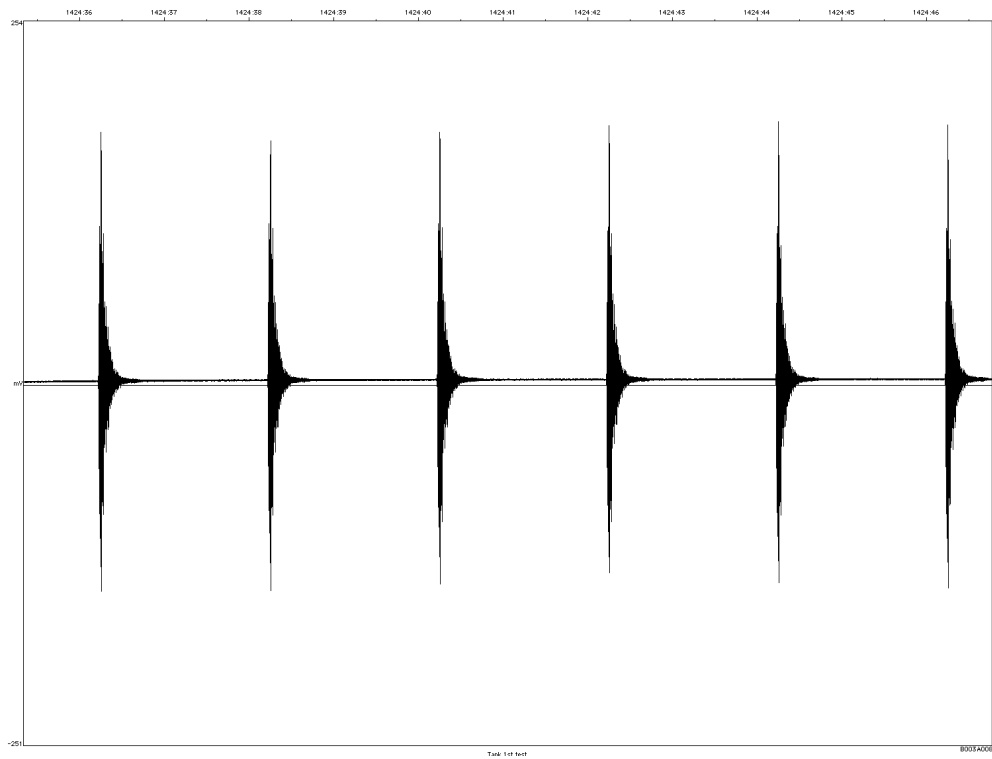
First Test

- Two sondes, about 3.5 and 6.5 m depth in tank, off bridge about 8 meters from south end
- Sampling 27310 kHz sampling
- Data files recorded using local time
- Source about 2 meters from north end, 2 meters deep.
- Amplitude setting 1 to 6, where 6=100% power, nominally 205 dB
- Using antialiasing filter – elliptical – 6 pole 9825 Hz
- Pinging started at 2108Z 1408L
- Sequence of pings each about 1 minute long
 - Waveform 0 Tone 25 msec, amplitude 1 – 14:08:02
 - Waveform 0 Tone 25 msec, amplitude 3
 - Waveform 0 Tone 25 msec, amplitude 6
 - Waveform 1 Chirp Hanning 25 msec, amplitude 1 – 14:13:38
 - Waveform 1 Chirp Hanning 25 msec, amplitude 3
 - Waveform 1 Chirp Hanning 25 msec, amplitude 6
 - Waveform 2 Chirp Notaper 25 msec, amplitude 1 – started with a few pings at amplitude 6 – 14:18:50
 - Waveform 2 Chirp Notaper 25 msec, amplitude 3 -
 - Waveform 2 Chirp Notaper 25 msec, amplitude 6
 - Waveform 3 Chirp Ramp 25 msec, amplitude 1– 14:23:18
 - Waveform 3 Chirp Ramp 25 msec, amplitude 3
 - Waveform 3 Chirp Ramp 25 msec, amplitude 6
 -
 - Waveform 4 Tone 50 msec, amplitude 1– 14:29:20
 - Waveform 4 Tone 50 msec, amplitude 3
 - Waveform 4 Tone 50 msec, amplitude 6
 - Waveform 5 Chirp Hanning 50 msec, amplitude 1– 14:33:42
 - Waveform 5 Chirp Hanning 50 msec, amplitude 3
 - Waveform 5 Chirp Hanning 50 msec, amplitude 6

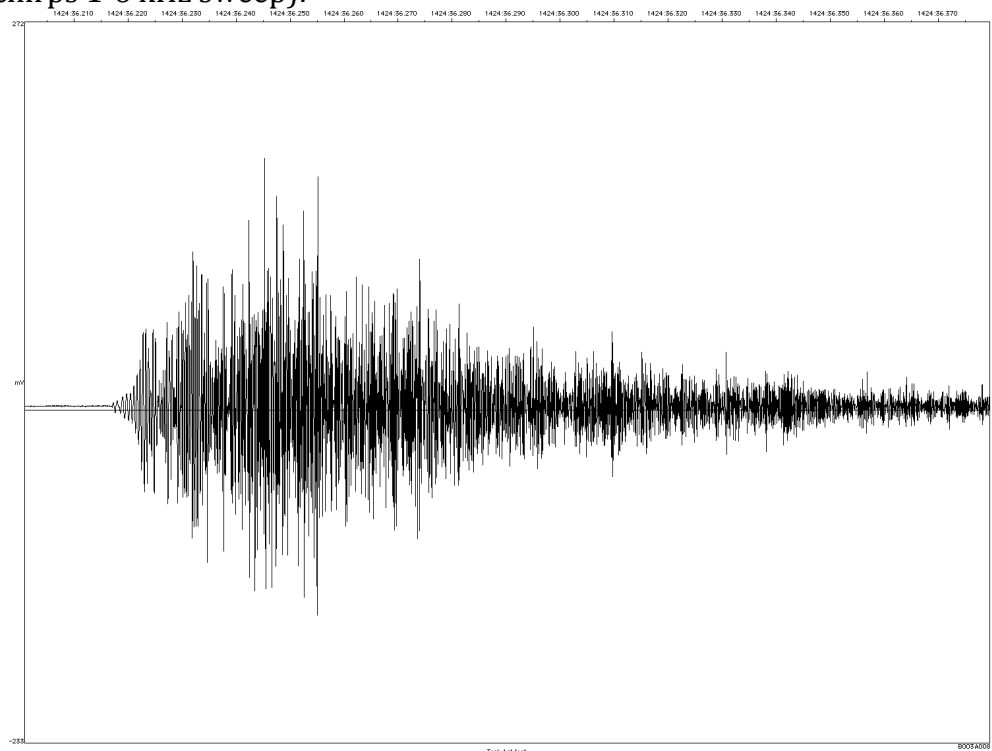
- Waveform 6 Chirp Notaper 50 msec, amplitude 1 - 14:38:11
- Waveform 6 Chirp Notaper 50 msec, amplitude 3
- Waveform 6 Chirp Notaper 50 msec, amplitude 6
- Waveform 7 Chirp Ramp 50 msec, amplitude 1 - 14:42:09
- Waveform 7 Chirp Ramp 50 msec, amplitude 3
- Waveform 7 Chirp Ramp 50 msec, amplitude 6
-
- Waveform 13 Chirp Hanning 100 msec, amplitude 1 - 14:47:23
- Waveform 13 Chirp Hanning 100 msec, amplitude 3
- Waveform 13 Chirp Hanning 100 msec, amplitude 6
- Waveform 15 Chirp Ramp 100 msec, amplitude 1 - 14:51:20
- Waveform 15 Chirp Ramp 100 msec, amplitude 3
- Waveform 16 Chirp Ramp 100 msec, amplitude 6
-
- Waveform 21 Chirp Hanning 200 msec, amplitude 1 - 14:55:55
- Waveform 21 Chirp Hanning 200 msec, amplitude 3
- Waveform 21 Chirp Hanning 200 msec, amplitude 6
- Waveform 23 Chirp Ramp 200 msec, amplitude 1 - 14:59:51
- Waveform 23 Chirp Ramp 200 msec, amplitude 3
- Waveform 23 Chirp Ramp 200 msec, amplitude 6
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- Turn antialiasing filter off
- Pinging started at 2108Z 1408L – do 25 msec pulses only
- Sequence of pings each about 1 minute long
 - Waveform 0 Tone 25 msec, amplitude 6 – 16:37:00L
 - Waveform 1 Chirp Hanning 25 msec, amplitude 6 – 16:38:58L
 - Waveform 2 Chirp Notaper 25 msec, amplitude 6 – 16:40:57L
 - Waveform 3 Chirp Ramp 25 msec, amplitude 6 – 16:42:58L

Results: Things worked well today. The source performed as desired, putting out all of the source pulses at the desired amplitudes. The source time logging hasn't been checked yet, but assuming that's ok, all is well. The receivers worked as expected – the sondes clearly do record data in the frequency band of interest. The native data viewer program MT Viewer includes a match filtering algorithm, so we were able to test both the repeatability of the source and the “chirpability” of the various source functions.

Thanks everyone for coming in on Memorial Day. Who would have thought there would be three groups vying for the test tank on a holiday?

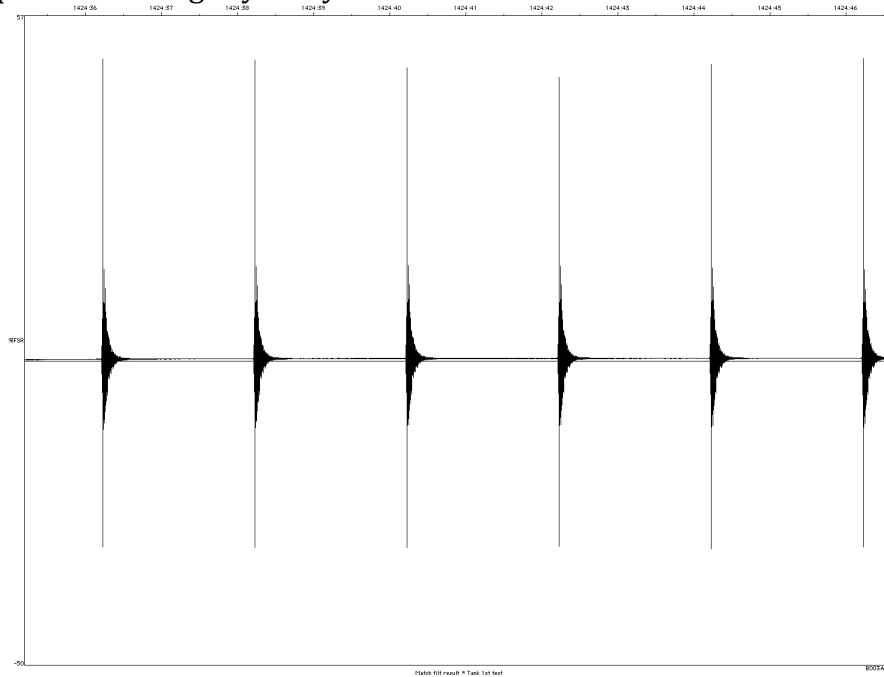


Above is a screen dump of the pings when running the 25 msec ramp chirp (all chirps 1-6 kHz sweep):

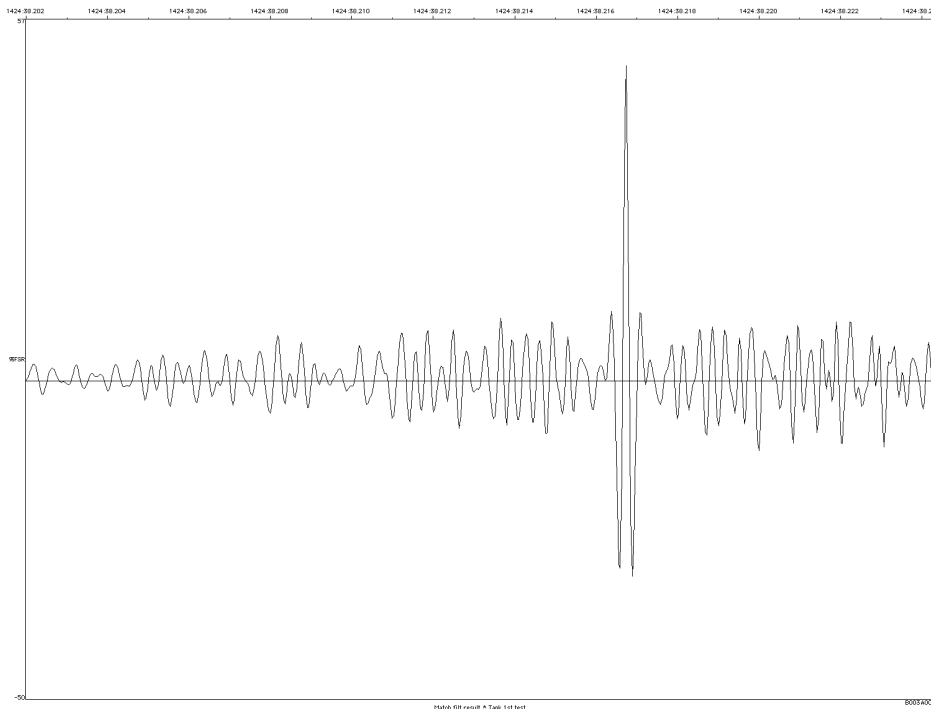


Above is a zoom on a single ping. Working in the test tank means that reverberations/reflections dominate the wavefield. In particular, the direct arrival of the 25 msec long ping at the sondes is followed 3-4 msec later by the reflection off

the wall behind the source, so what's observed is the combination of the desired pulse and a slightly delayed reflection.



Above is the result of selecting the first 25 msec of the first ping and using it as a match filter for the entire time series. Clearly the match filter resolves the direct arrivals of all the pings (no surprise).



Above is a zoom on the match filtered result showing the Klauder Wavelet structure of the correlate function.