

Upgrading the physical modelling facility.

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Banff, Alberta

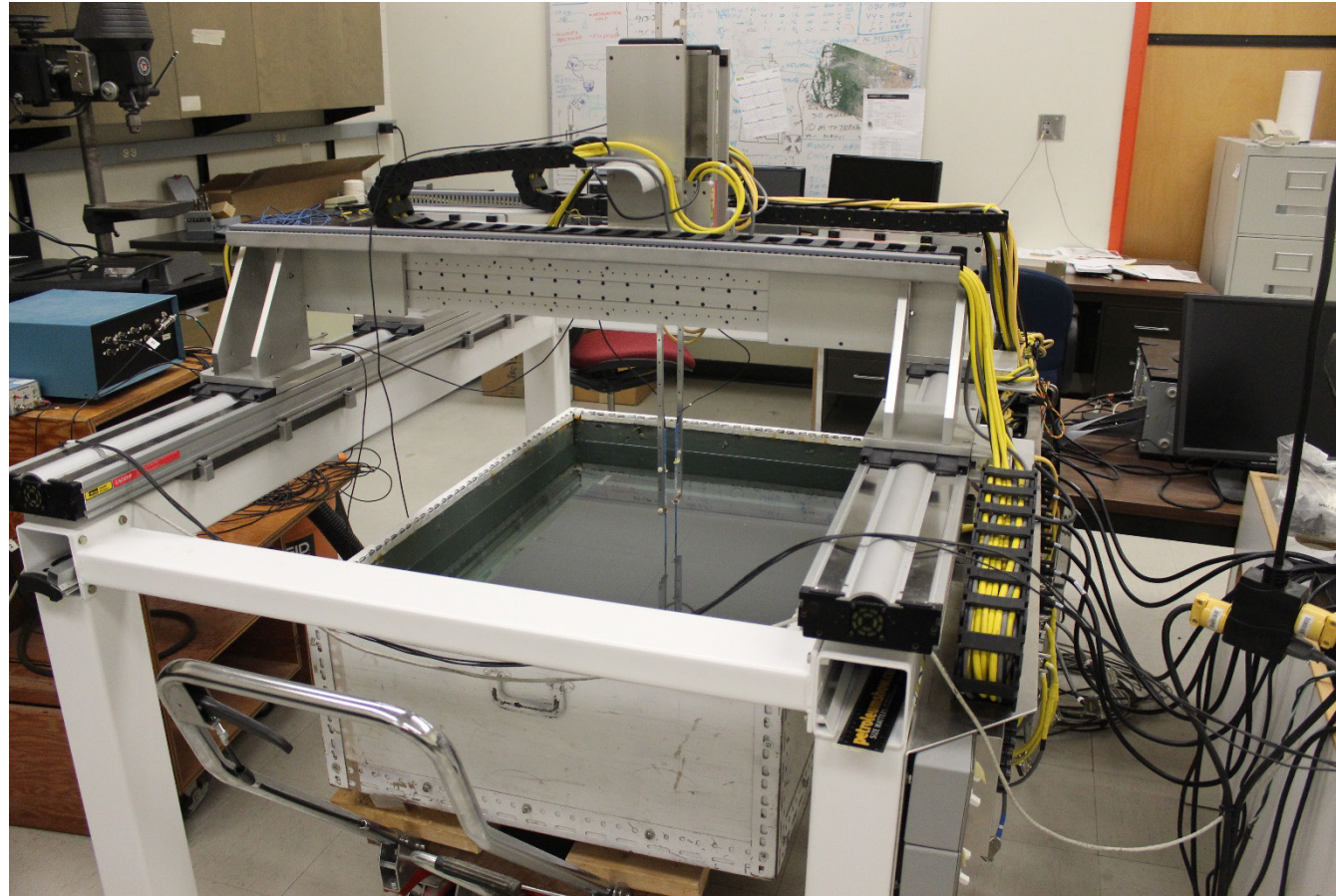
December 1st 2022



NSERC
CRSNG

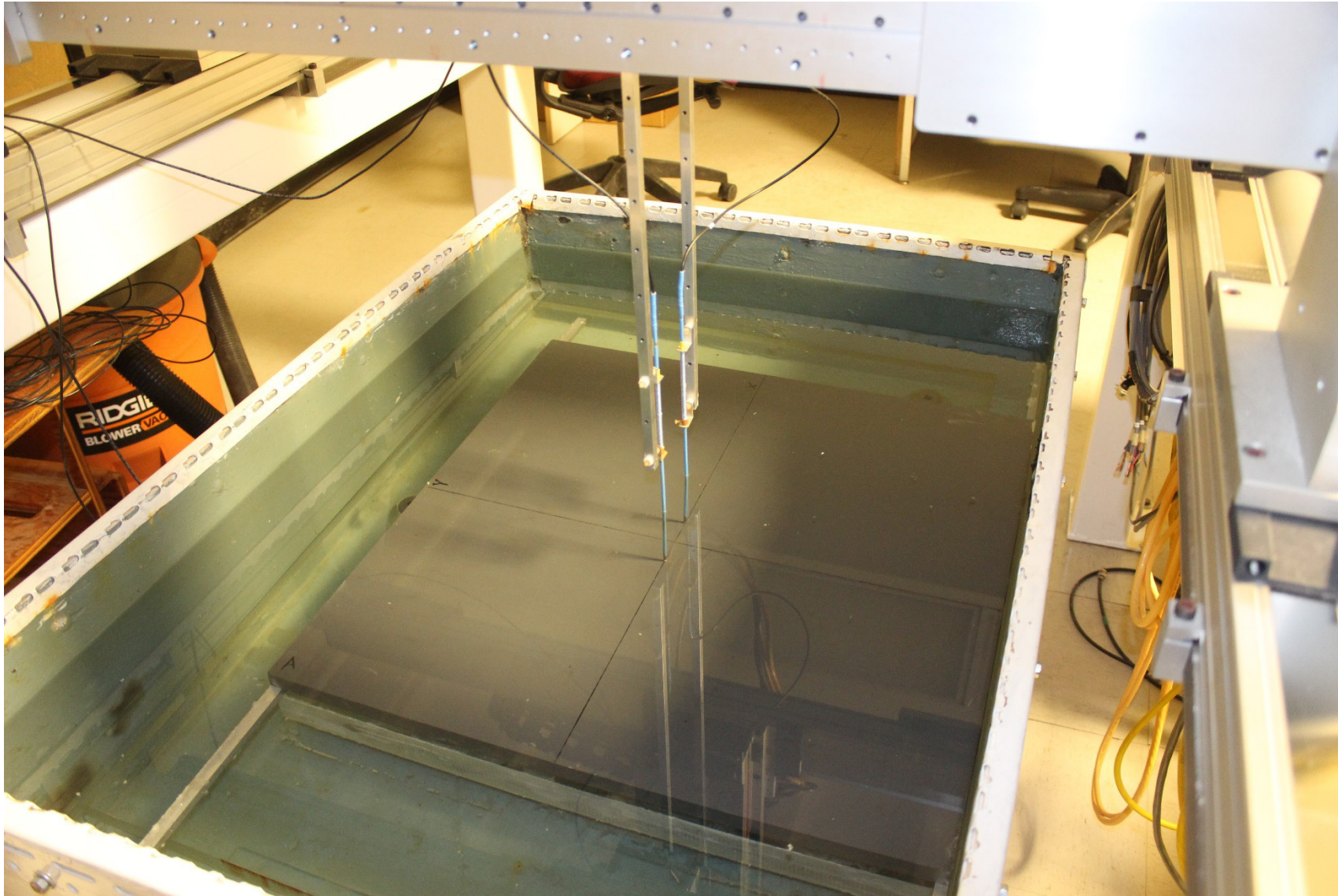


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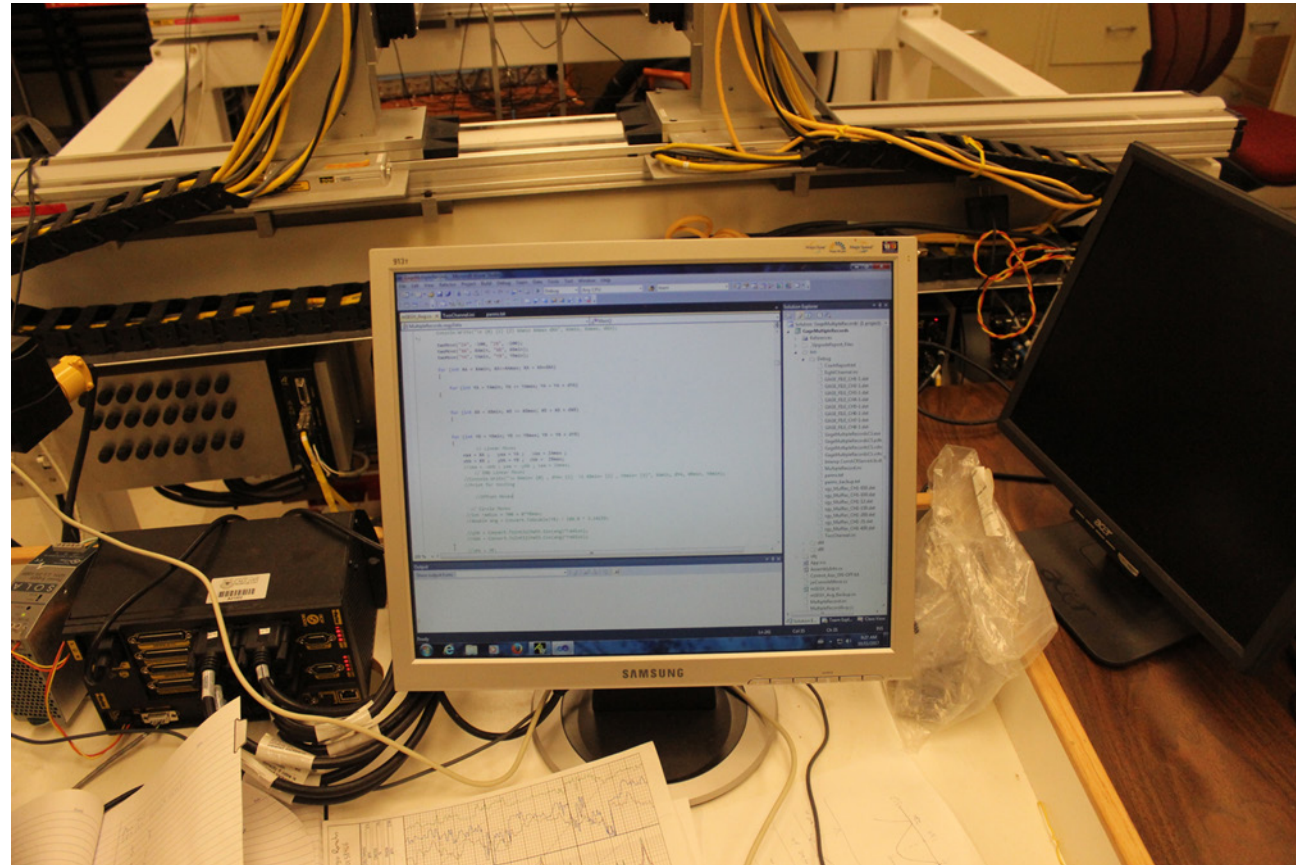


Introduction



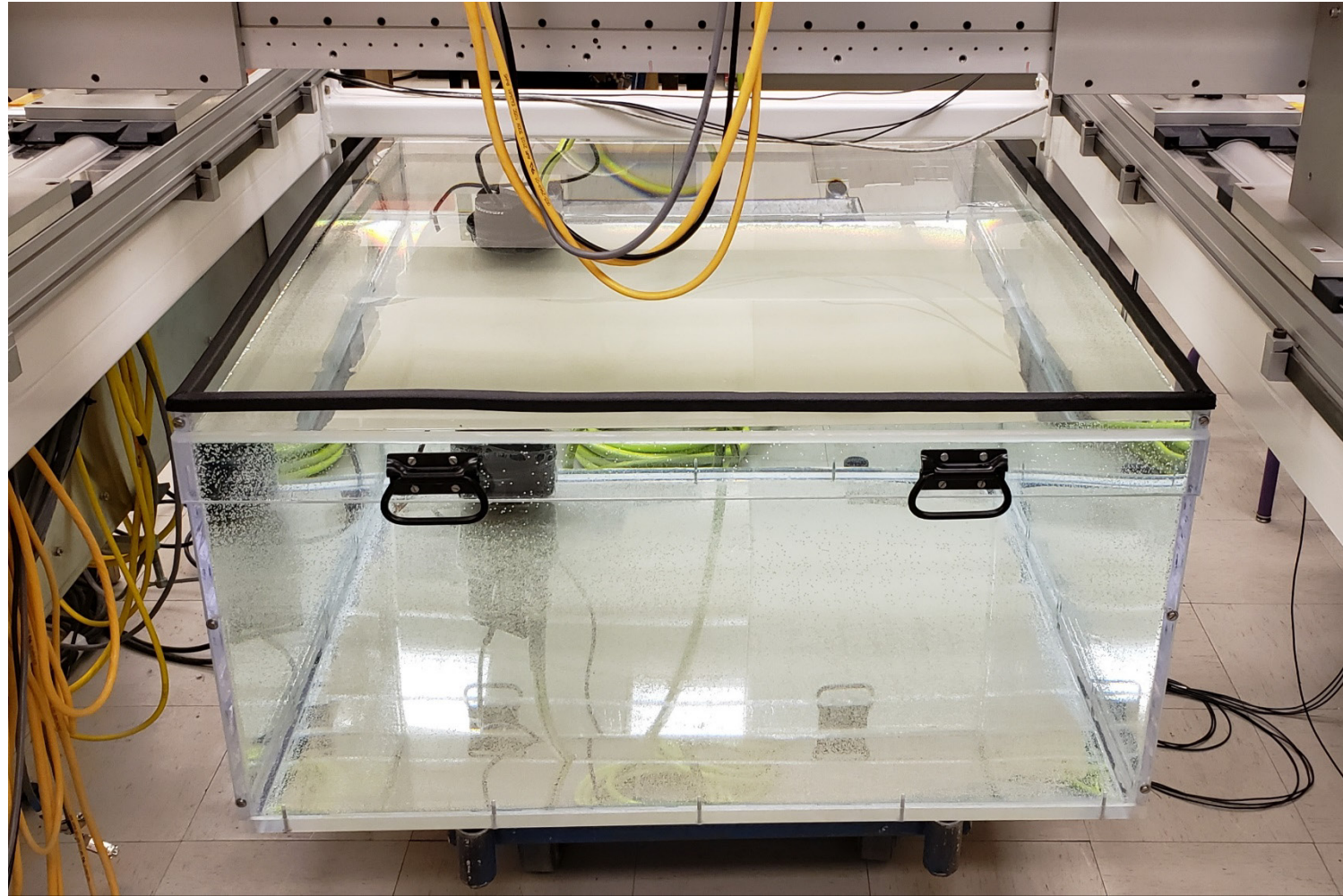


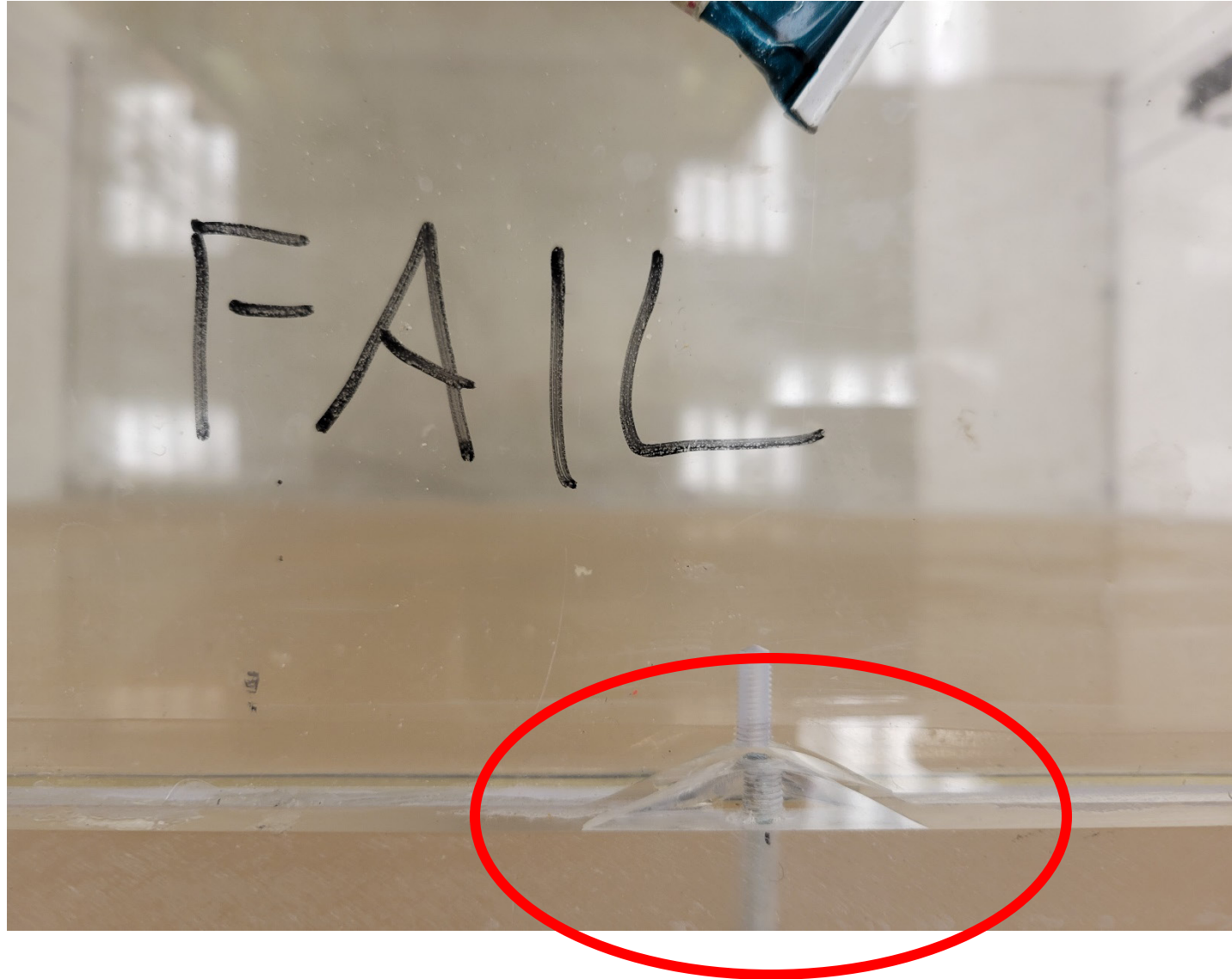
Introduction





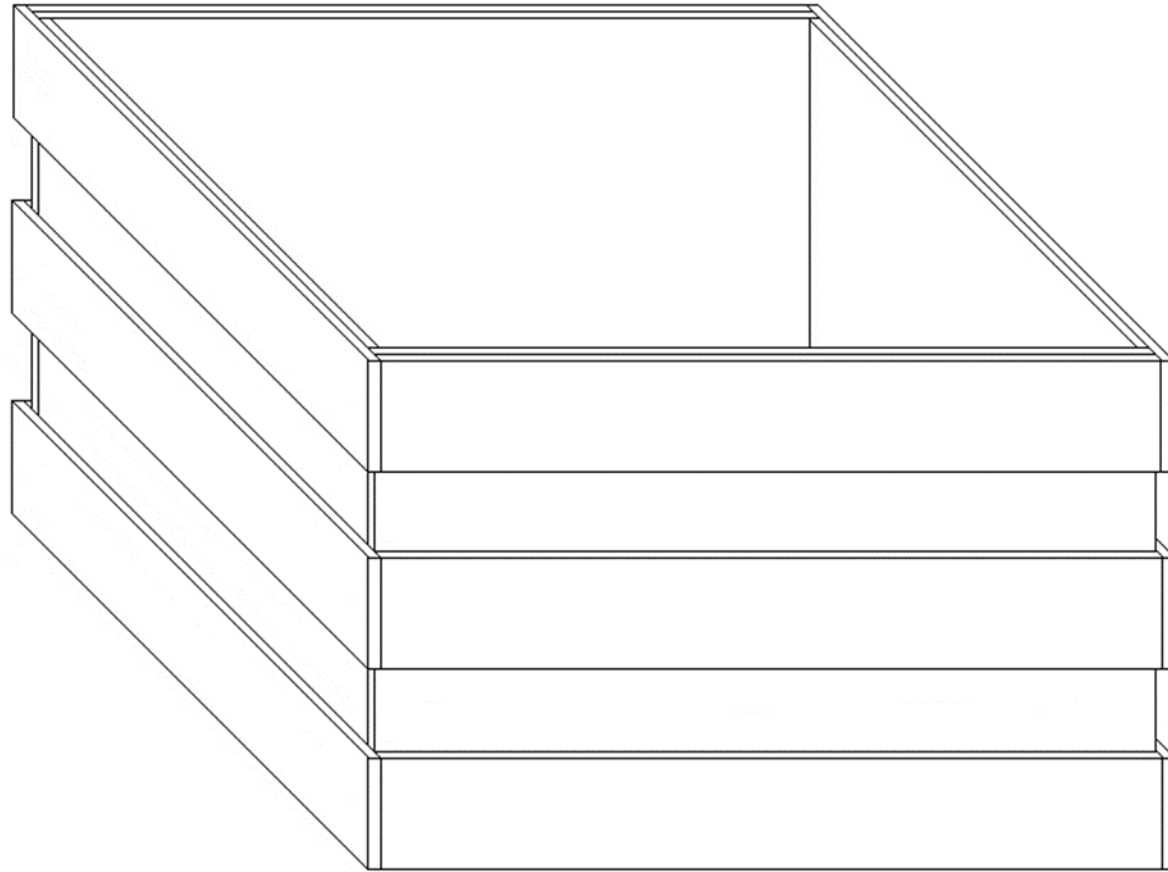
The new tank





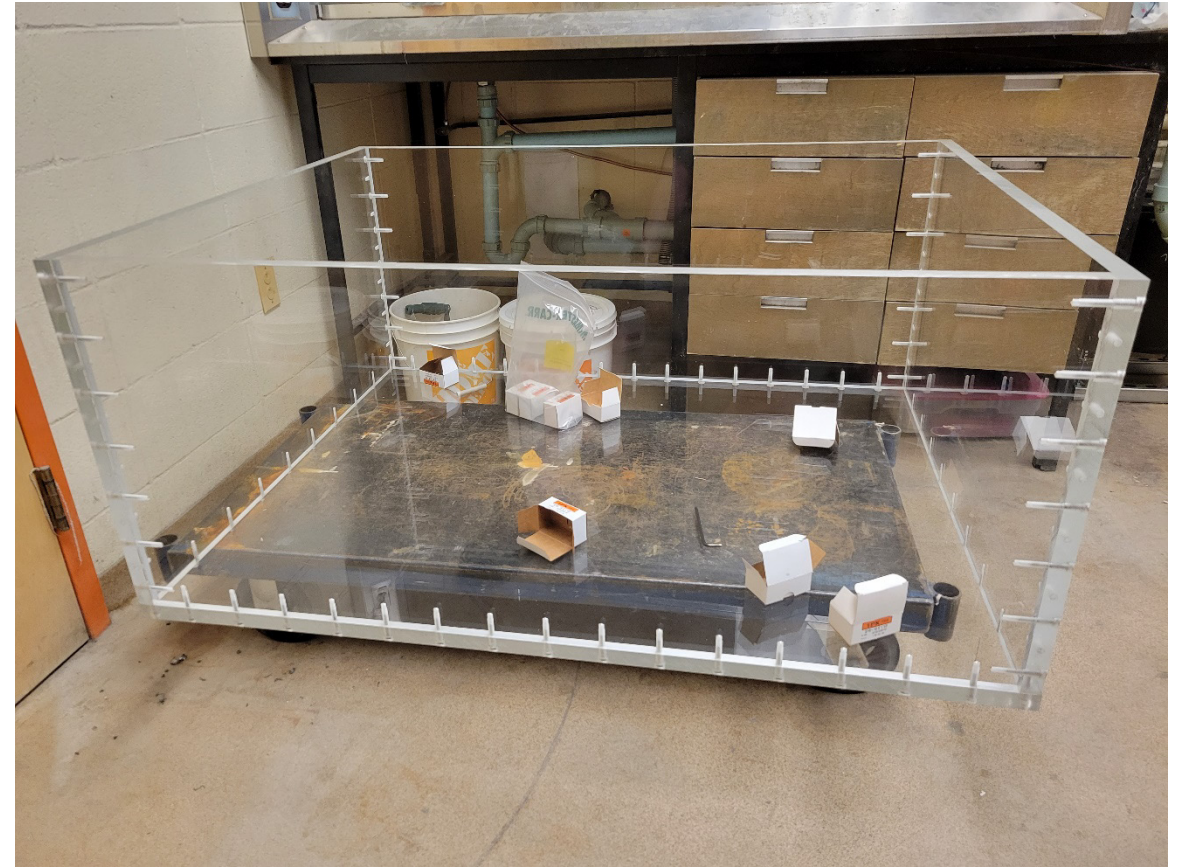
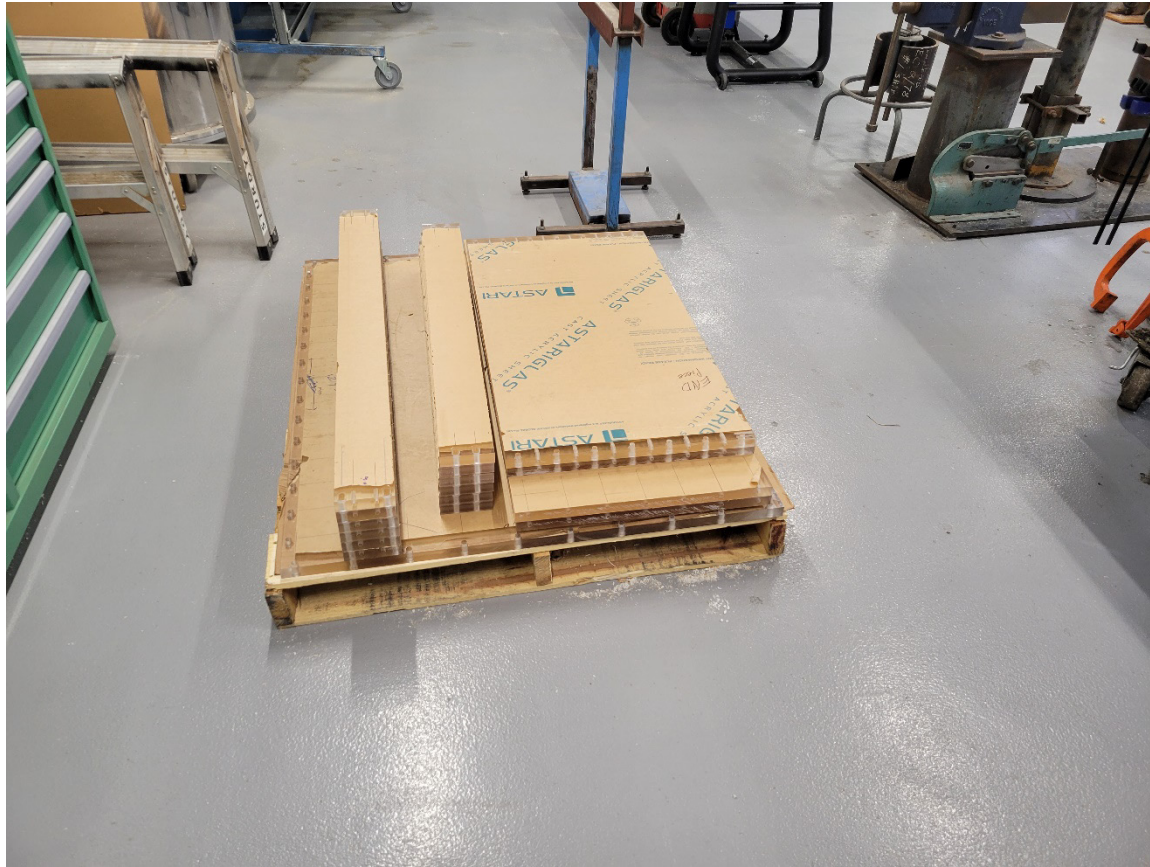


The design





The new tank



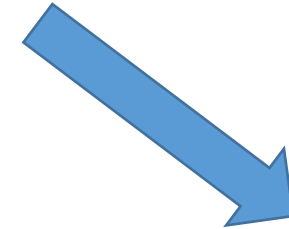
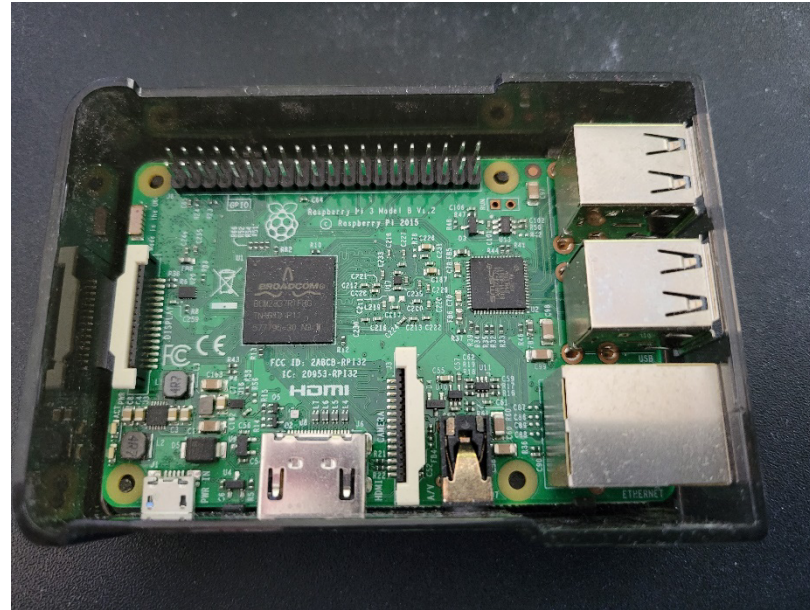
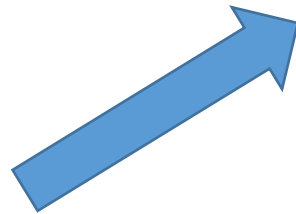


The new tank





Flood mitigation plans

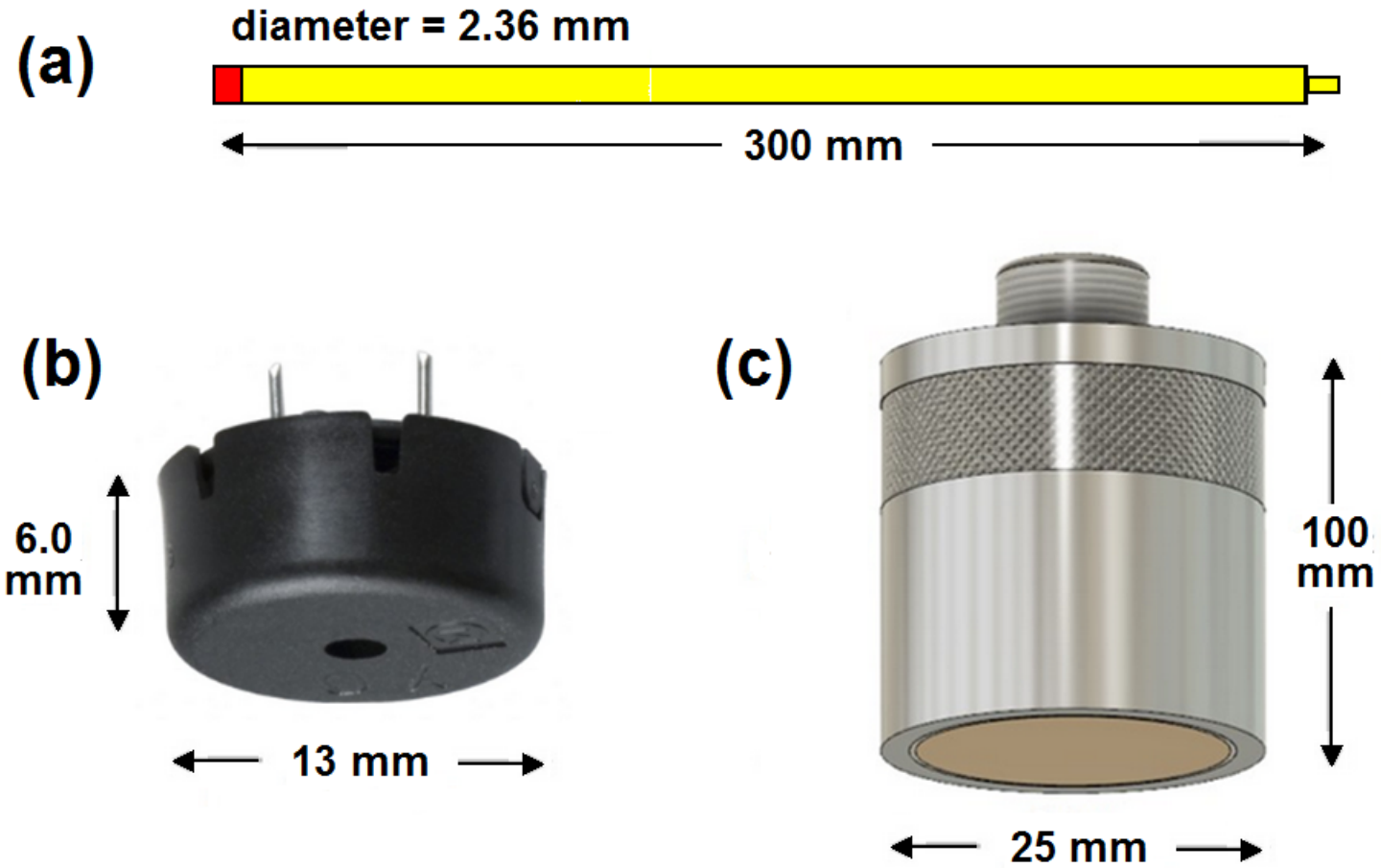


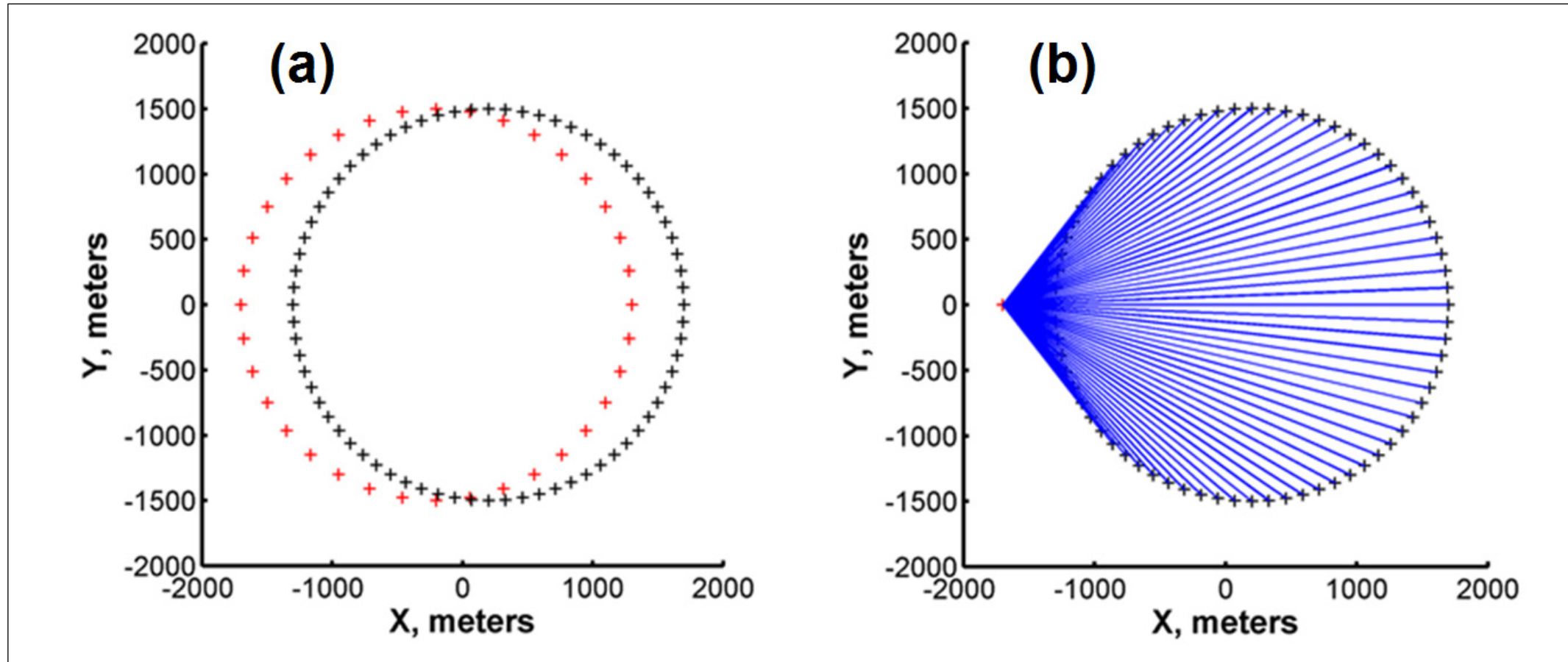
- Turn on Pump
- Send email



New transducers for recording data for FWI purposes.

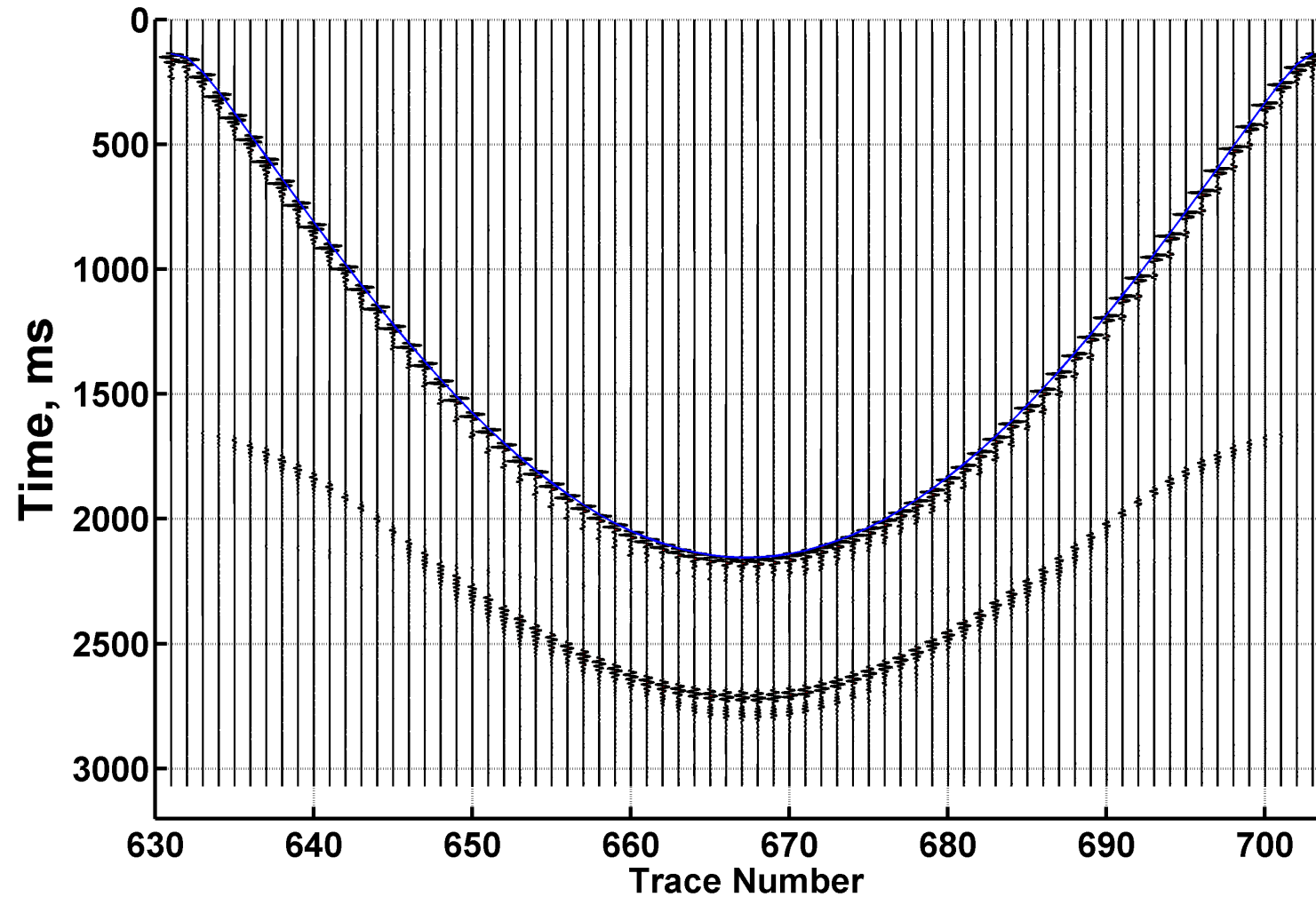
- Lower dominant frequencies desired.
- Transducers must produce data with high signal to noise.
- Any signal produced in the water in the tank has multiple reflections from all water boundaries.
- Because the wavelets are stacked, transducers with shorter wavelet durations are needed to prevent reverberations from previous source firings from creating noise in data.



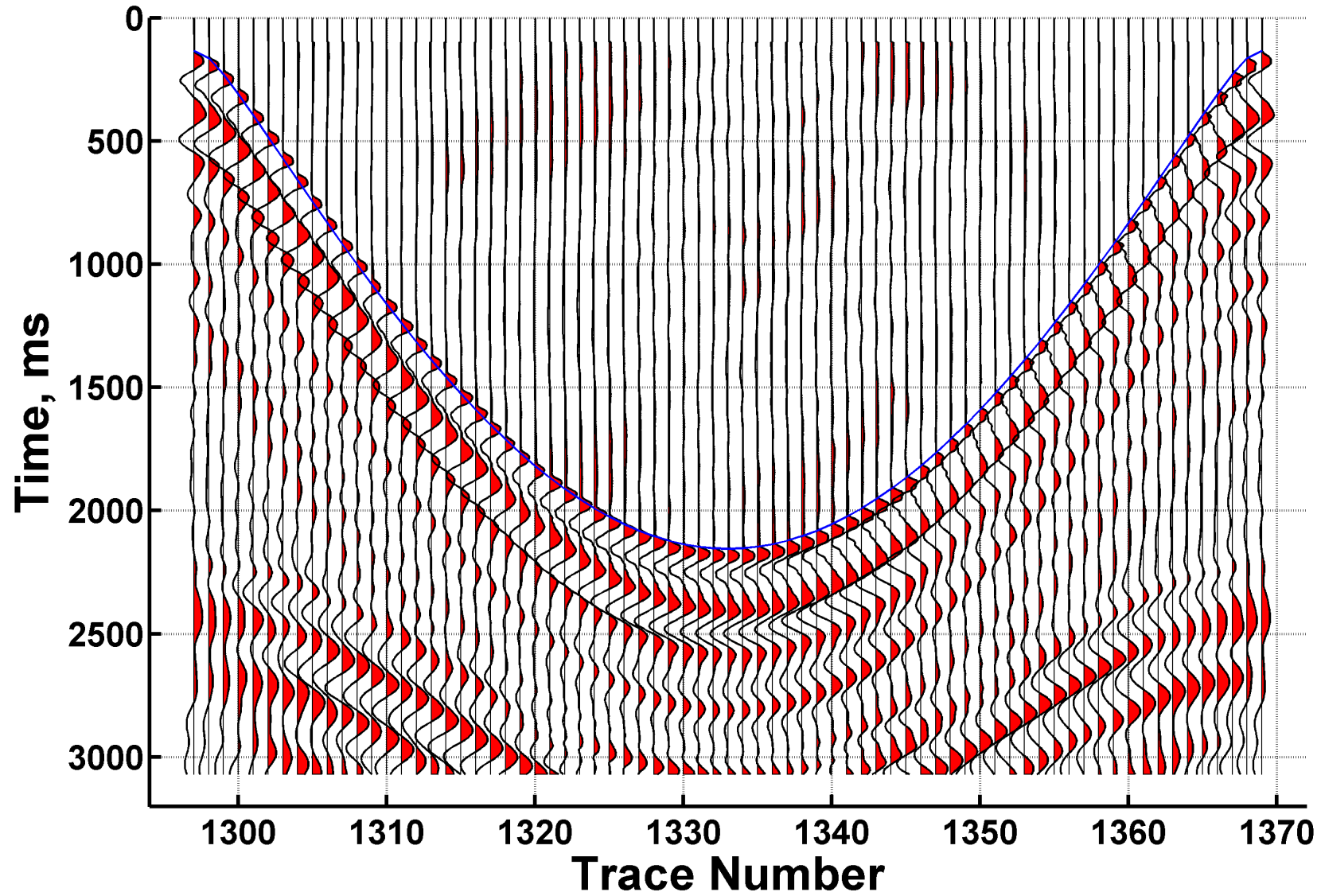


- (a) Sources in red and receivers in black position.
- (b) Raypaths for acquiring sample data.

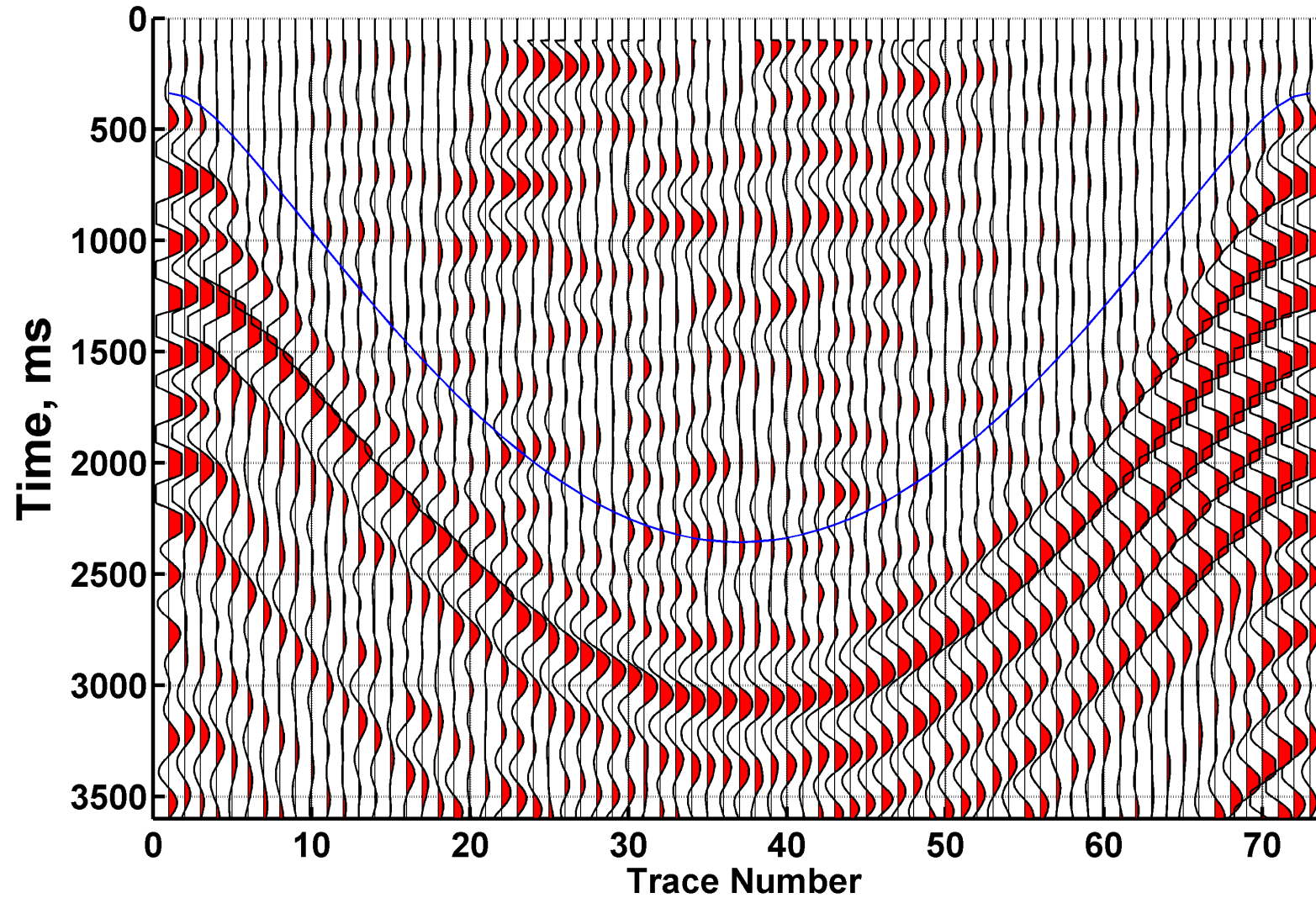
Piezopin Data



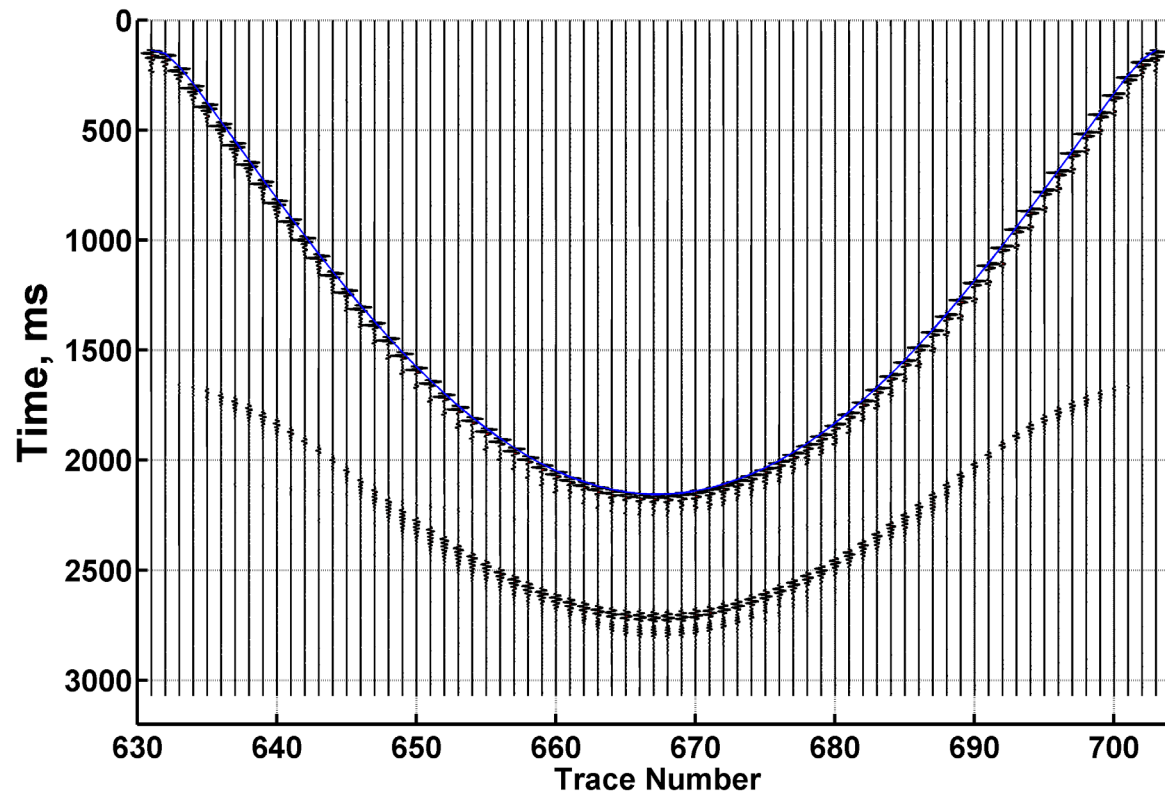
**Buzzer
Data**



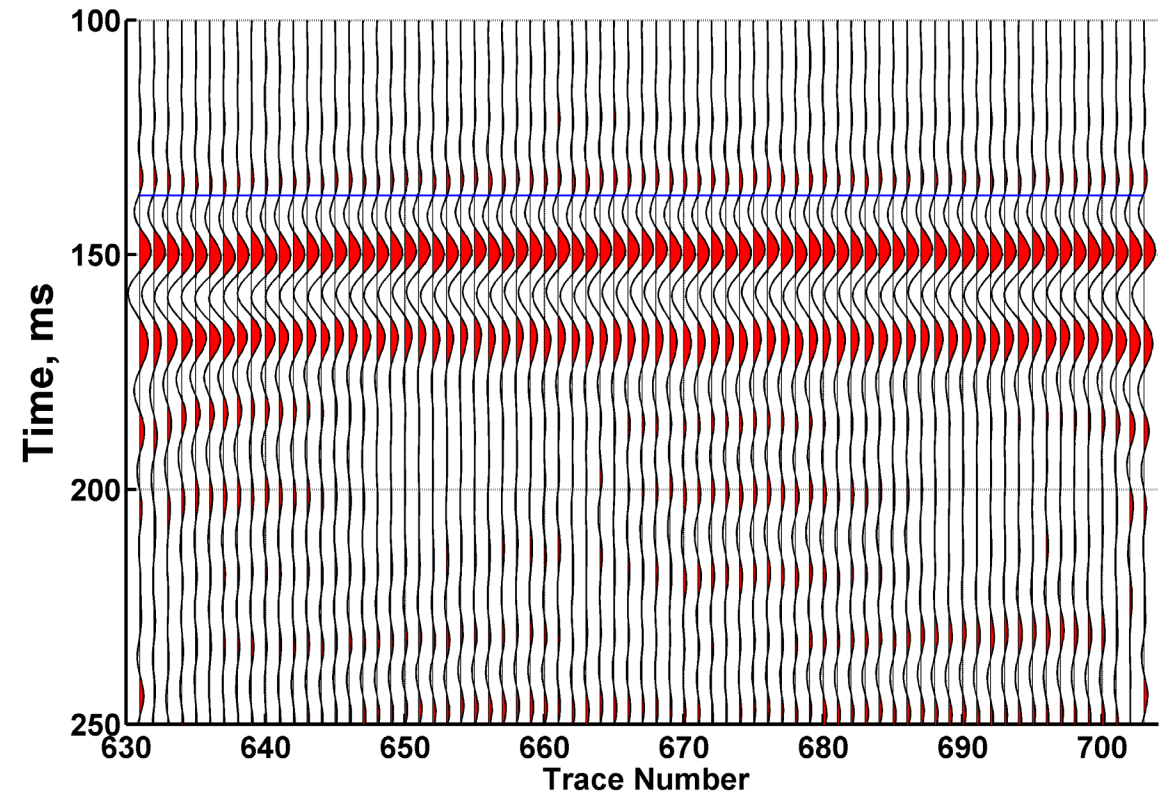
Ultran
Transducer
Data



Piezopin acquired data

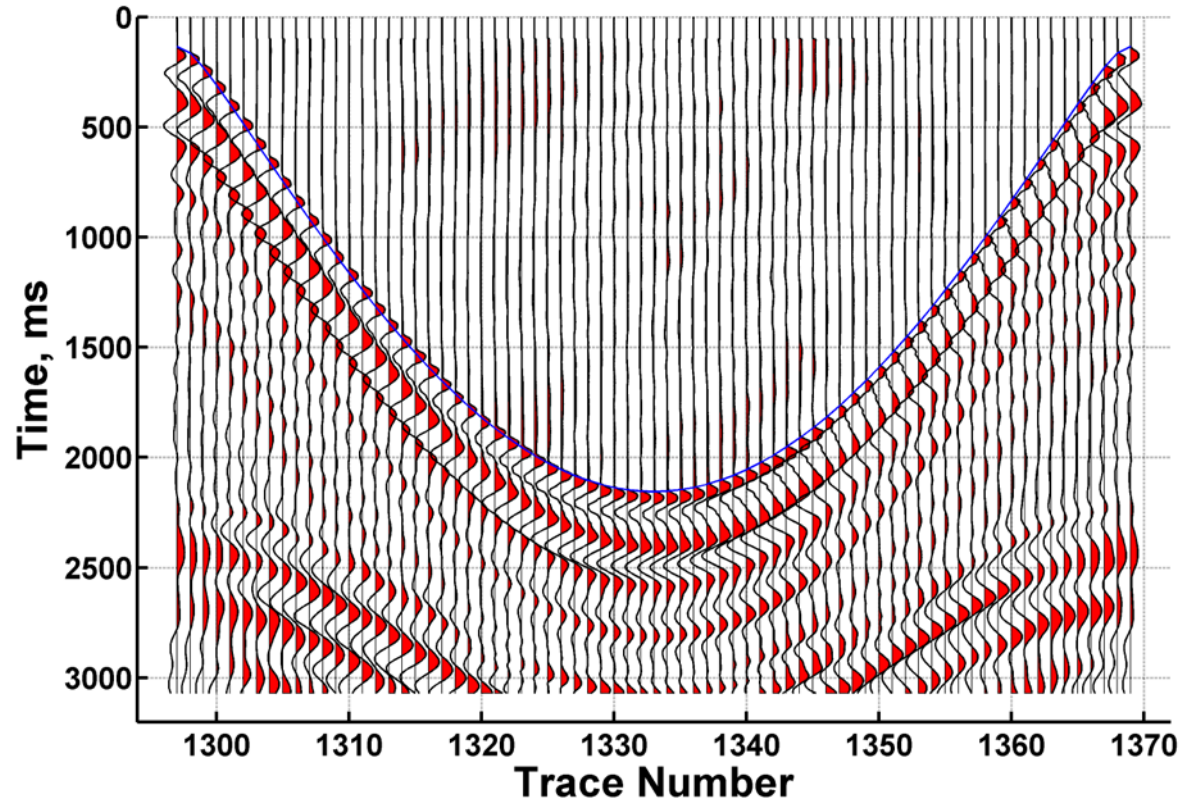


Unprocessed traces

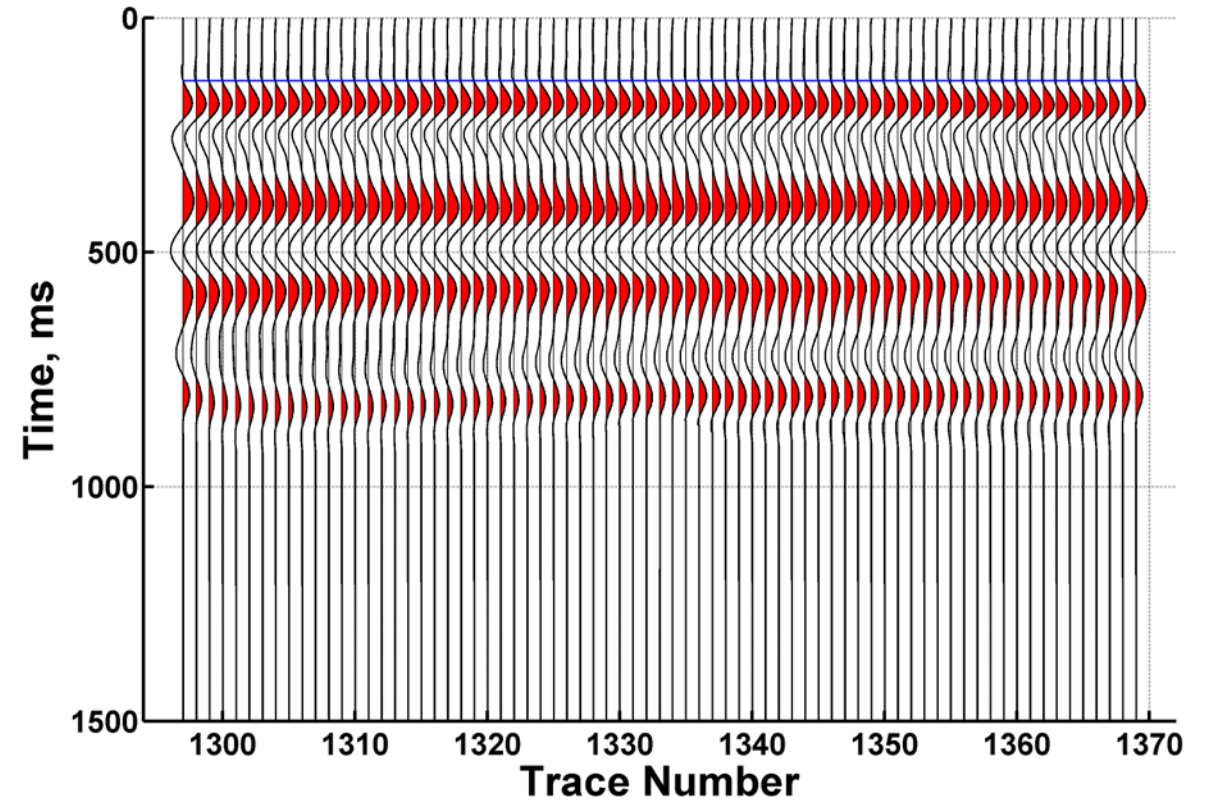


Pre-processed and
aligned traces

Buzzer acquired data

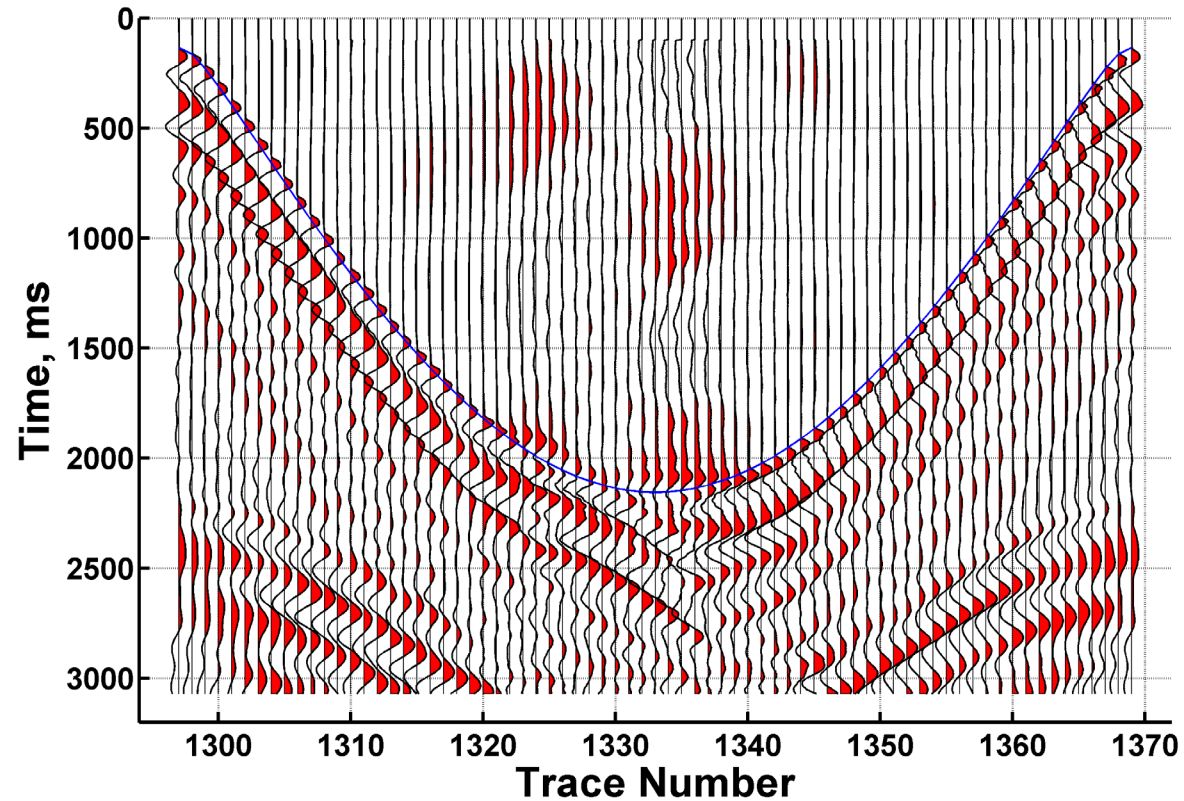


Unprocessed traces

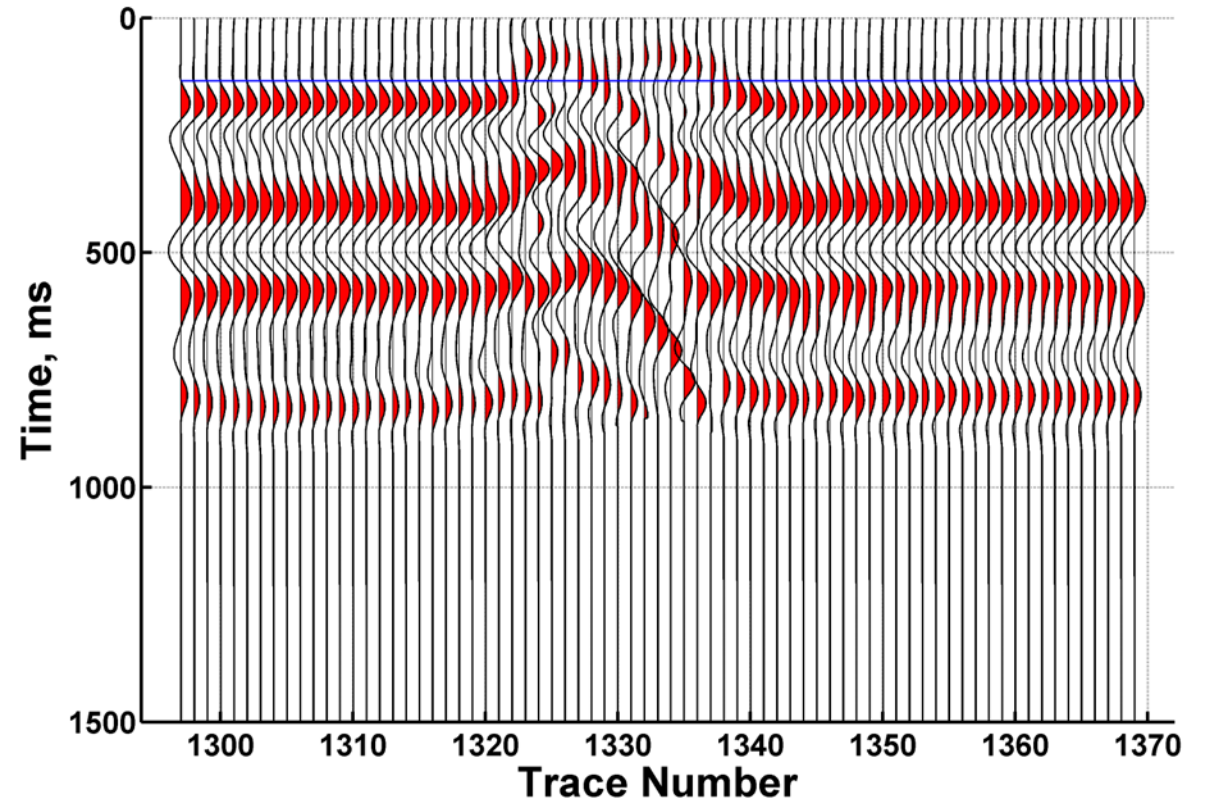


Pre-processed and
aligned traces

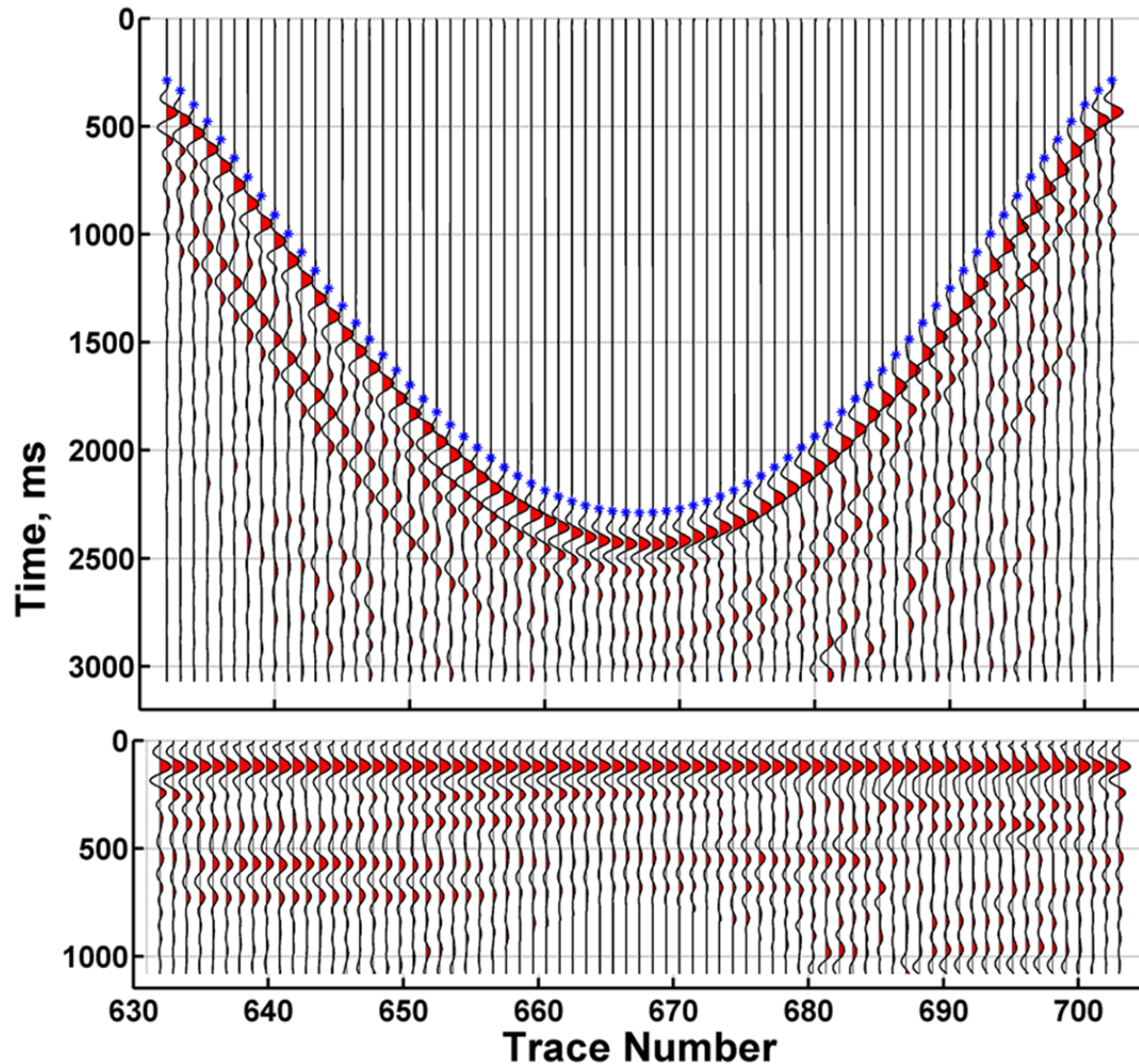
Buzzer acquired data with two targets



Unprocessed traces



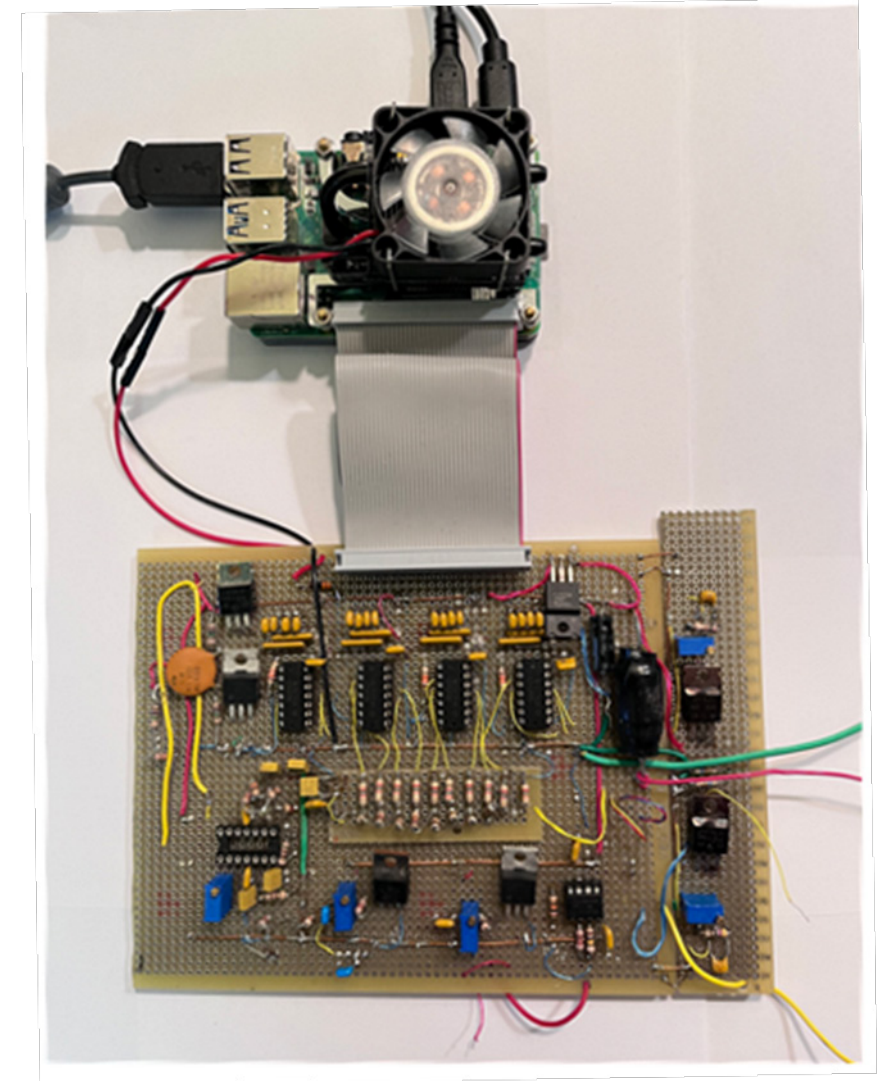
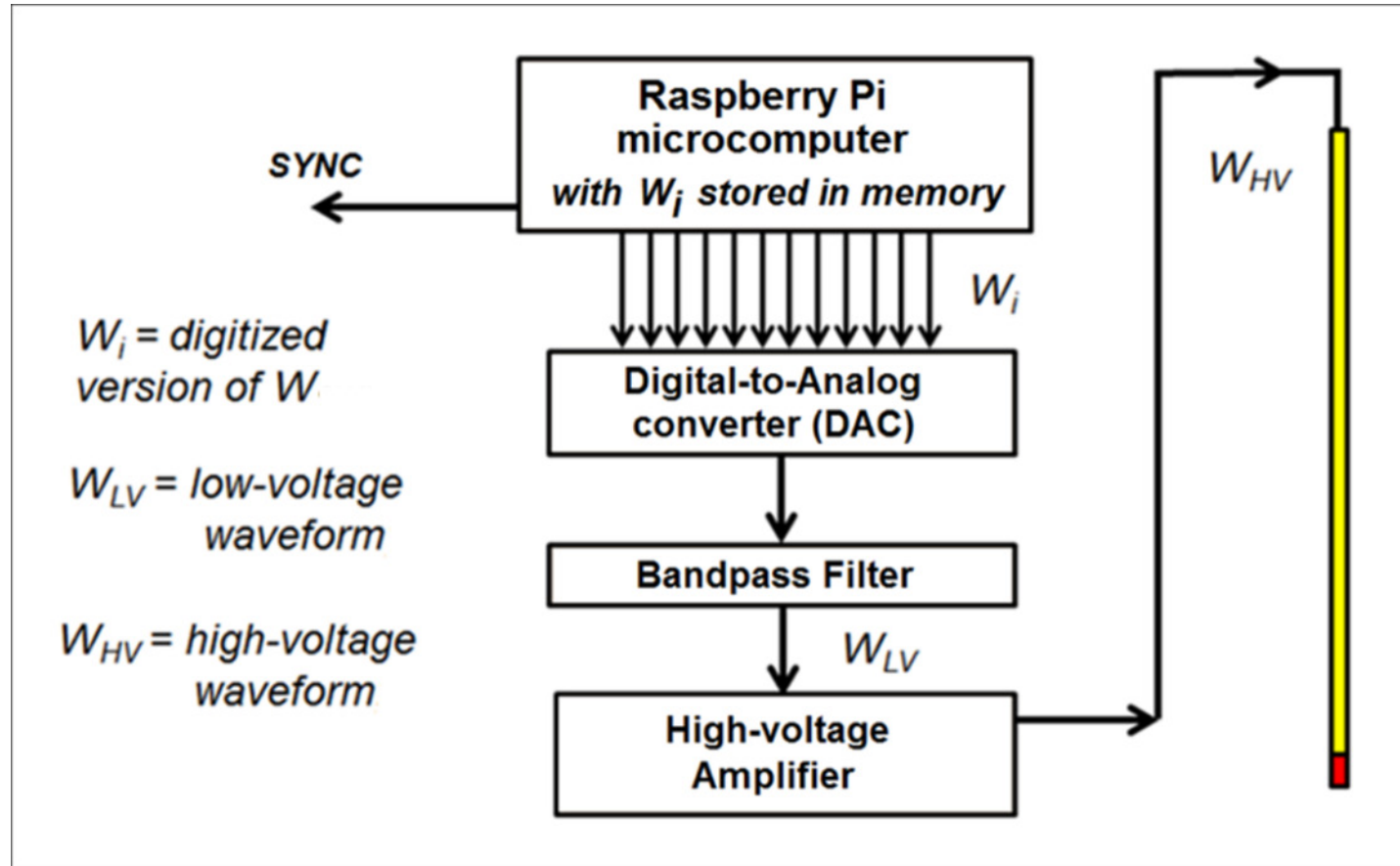
Pre-processed and
aligned traces



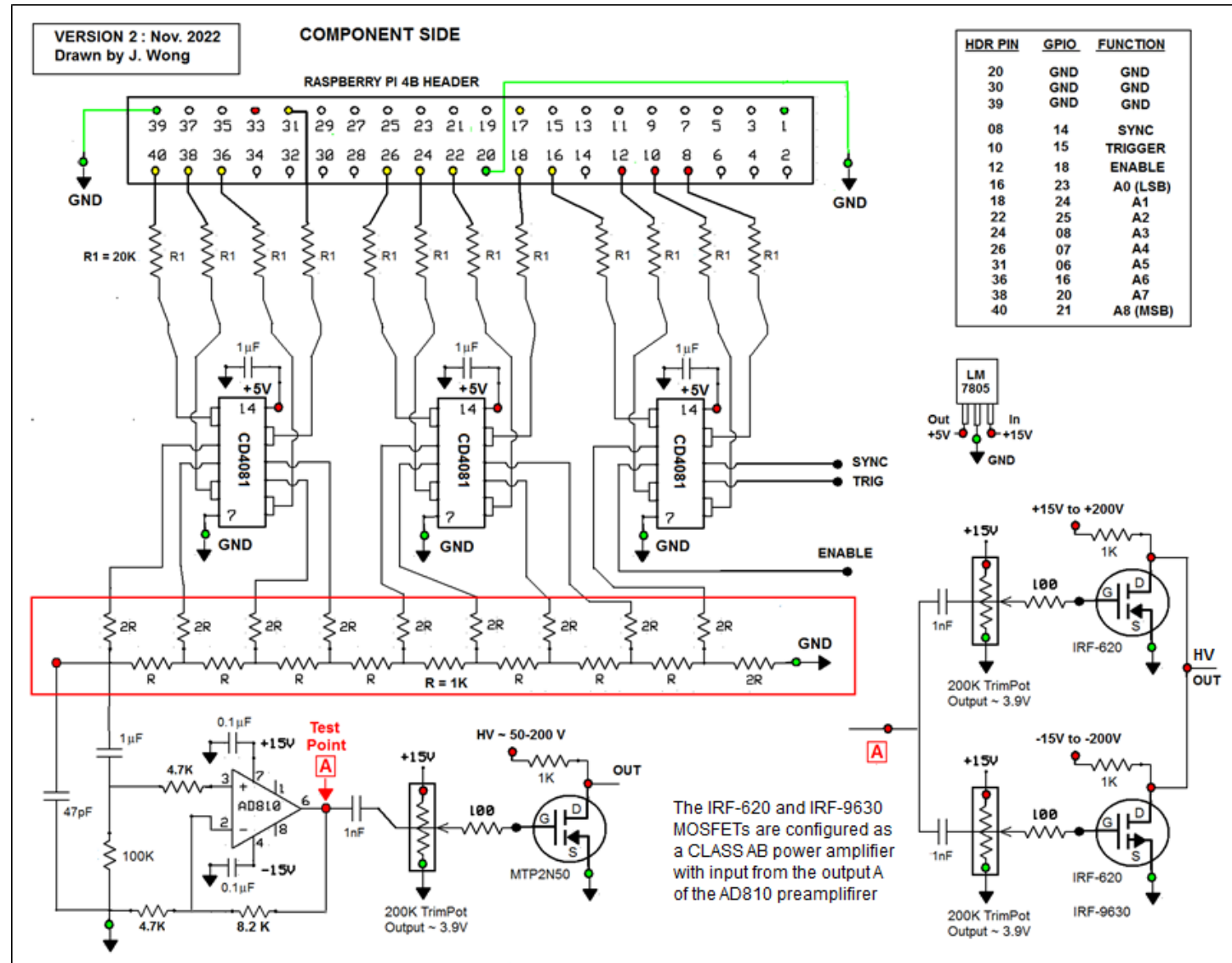
Buzzer acquired data do not always produce consistent wavelet shapes. In this case wavelet shape is dependent on buzzer orientation.

This is caused by asymmetries in the internal construction of the buzzers.

Arbitrary Waveform Generator

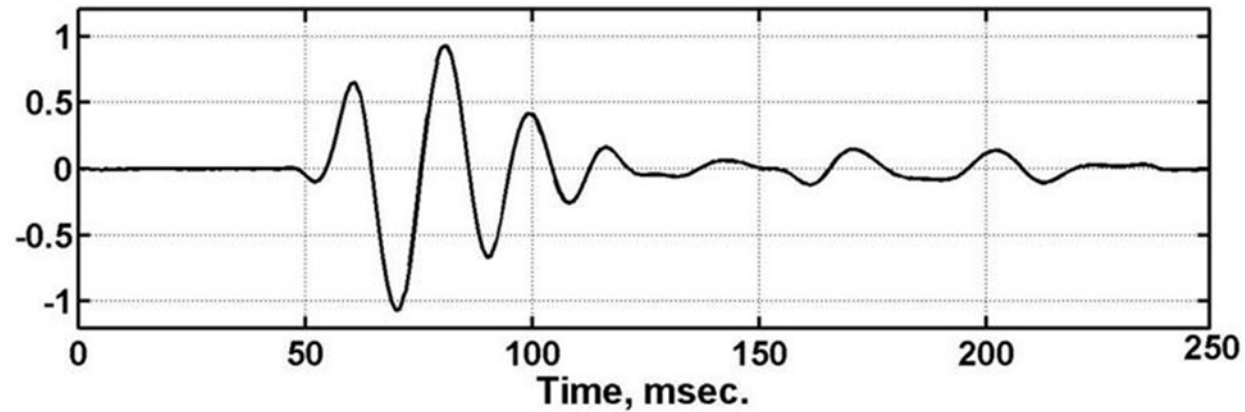


Arbitrary Waveform Generator



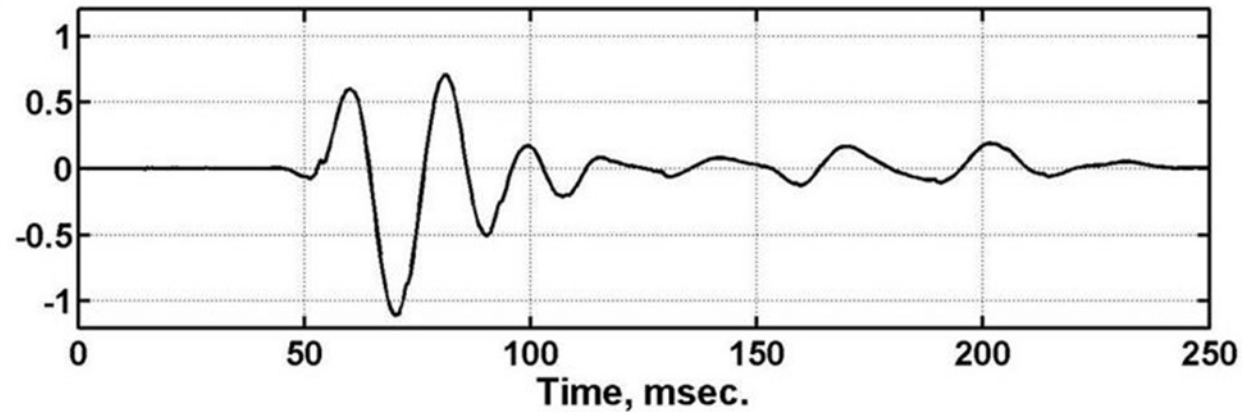
(a) Programmed wavelet

(a) input data to AWG



(b) AWG output

(b) output data from AWG



- The new tank is overbuilt, but that is just how we like it.
- The water leak detection system still needs to be built and put into place.
- The buzzers show the most promise for creating datasets for FWI purposes.
- The Arbitrary Waveform Generator will allow us to create datasets simulating real world sources.



Thanks to:

CREWES Industry Sponsors

NSERC (grant CRDPJ 543578-19)

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