### July 27, 2021

### Objective:

Measure voltage output from pressure from intracochlear sensor at different depths.

Notes:

* Ch0 shaker
* Ch1 accelerometer
* Ch2 charge amp

### Procedure:

* Using decoy device measure noise floor
* Measure coupling with shaker stimulus with sine sequence
* If noise floor > coupling then proceed to real device
* Measure real device noise floor
* Measure frequency response with sine sequence

### Observations:

* Noise floor increases when the sensor is in water. Capacitance and Johnson noise of water contribute to amplifier output.
* Coupling decreases with depth. More of the wires are shielded by the grounded aluminum vessel.

### Conclusions:

* With greater depth more of the signal is due to pressure and less is due to coupling. With the current setup it is likely that the coupling is below the noise floor for low frequencies.
* Remaining coupling is likely magnetic since it is frequency dependent with a rise of +20 dB/dec with frequency.
* Using mu metal to shield shaker may eliminate magnetic coupling at higher frequencies.

| **File** | **Description** |
| --- | --- |
| 10 | Decoy outside water; noise spectrum |
| 36 | Sine seq 0.5 V -> 180 mV shaker; decoy outside water; +20 dB/dec rise (magnetic) |
| 37 | 8 mm touching water; noise spectrum |
| 63 | 8 mm; sine seq |
| 64 | 13 mm; noise spectrum |
| 90 | 13 mm; sine seq |
| 91 | 18 mm; noise spectrum |
| 117 | 18 mm; sine seq |
| 118 | 23 mm; noise spectrum |
| 144 | 23 mm; sine seq |
| 170 | 23 mm; sine seq; playing around with shielding caused the coupling to increase |
| 196 | 23 mm; sine seq; lower sine seq; seems to be connection to charge amp box |
| 300 | ~23 mm; sine seq; shielding all cable runs; device is centered. |
| 301 | ~23 mm; noise spectrum; verification |
| 302 | Outside water; real device; noise spectrum |
| 303 | 3.2 mm touching water; noise spectrum |
| 305 | 15 mm deep submerged (approximately); noise spectrum |
| 331 | 15 mm deep; sine seq |
| 392 | 15 mm deep; sine seq more points |
| 393 | 15 mm deep; log chirp |