

Vertical antenna arrays:

A prototype system for full water column
detection

Phil Peterson, Erek Arnold, Tom Hoover and Bill Mavros

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Thank you!

Vertical antenna arrays:

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- Challenge is better juvenile detection in relatively large rivers
 - It's all about the antenna
- Where we've been
- Where we are today
- Where we're going

Orme, Rick and Cameron Albee. 2013. Integrated Status and Effectiveness Monitoring Project: Salmon Subbasin In-stream PIT Tag Array Site Descriptions and Data Collection, Contract QCI Inc. 2012-1-Nez Perce Tribe ISEMP, 48 pp.

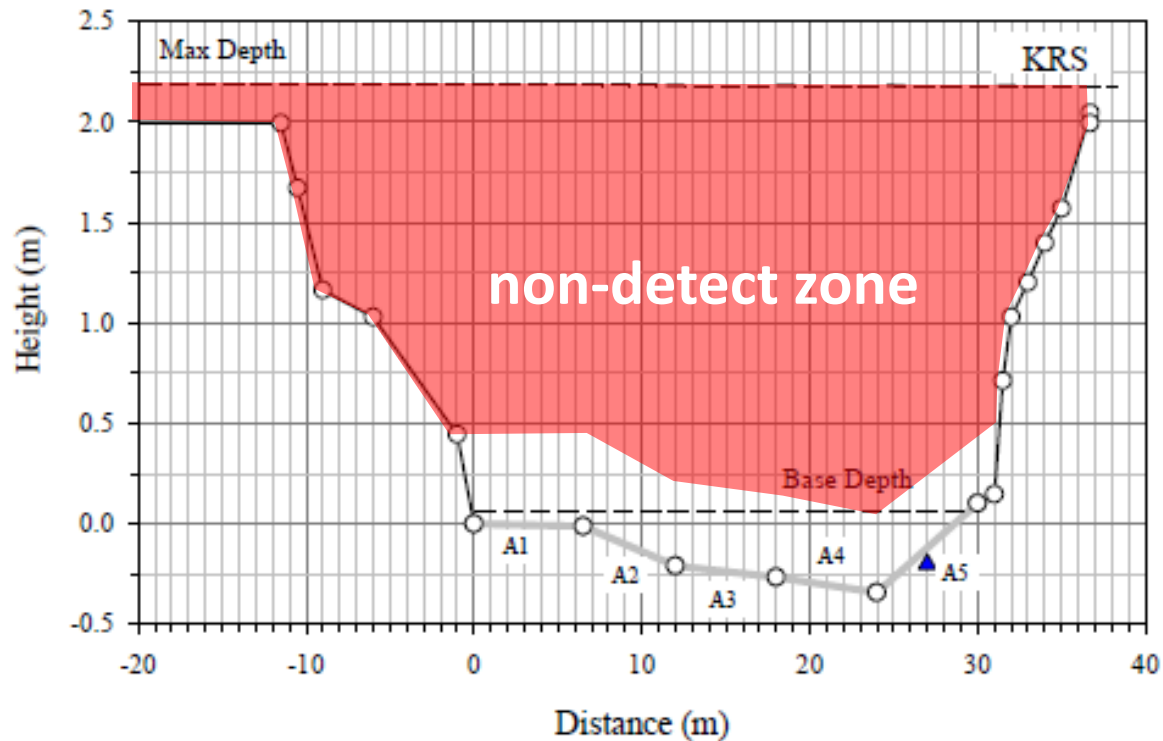
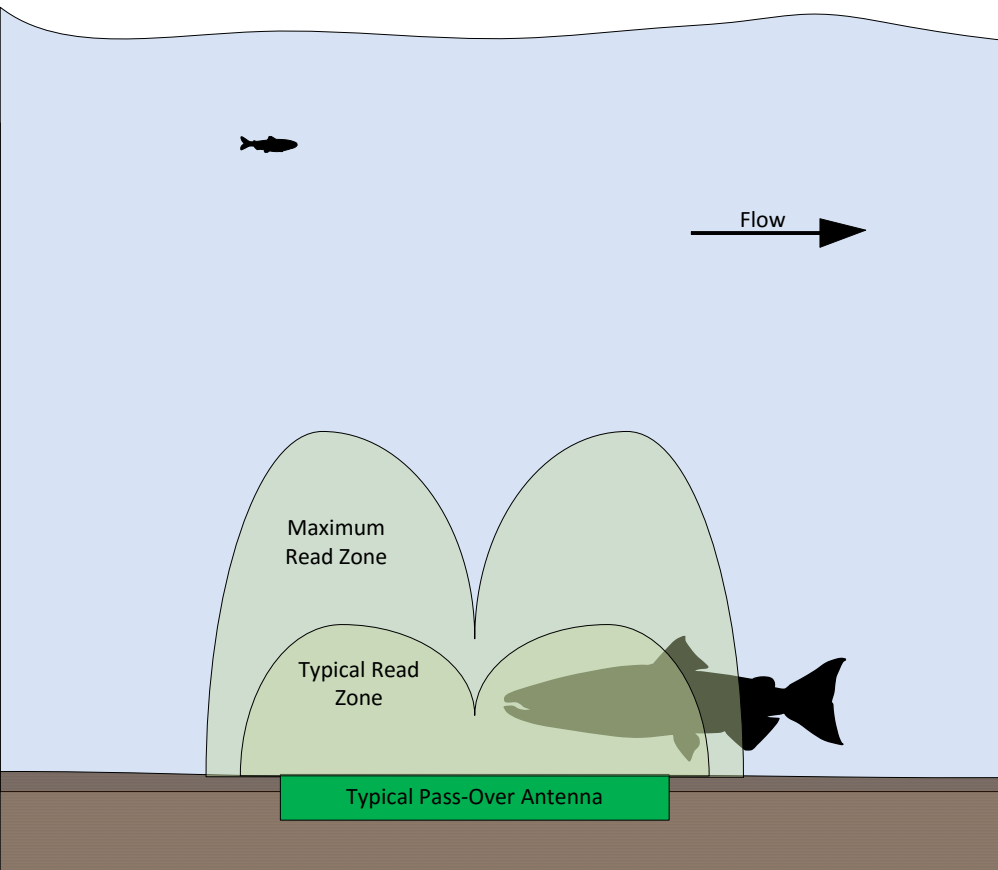


Figure 26. Cross sectional profile of the upper South Fork Salmon River (KRS) Passive Integrated Transponder (PIT) tag array showing the relative location of individual antennas (A1 through A5) and the pressure transducer (blue triangle) within the stream channel and the measured maximum and base water depth for the 2010 water year.

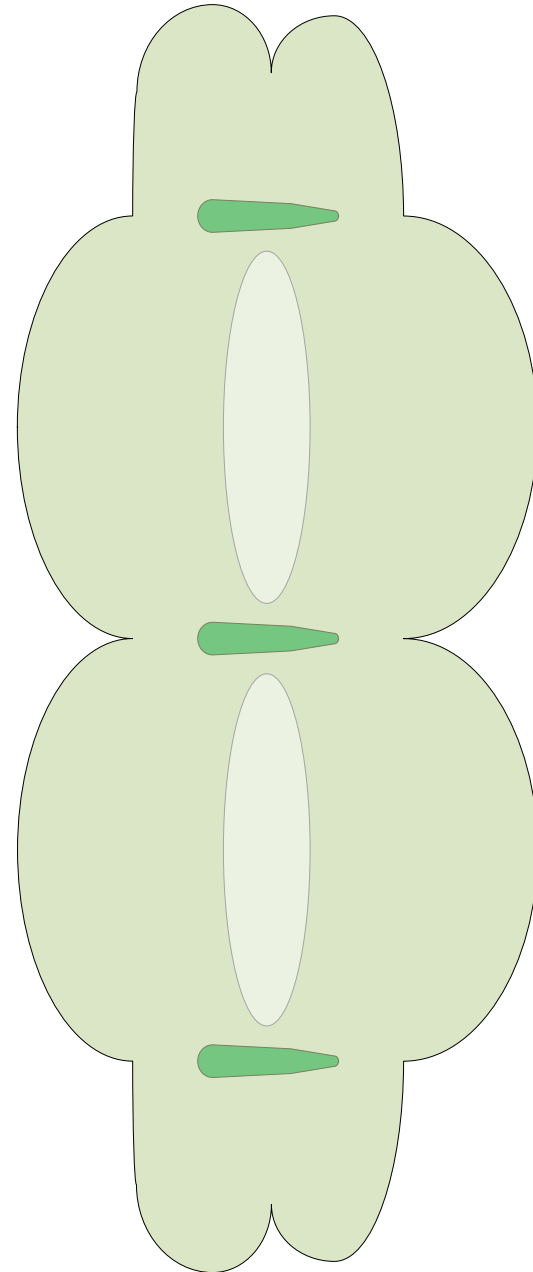
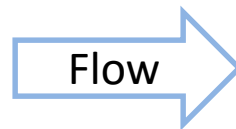
Conventional System

- Typical 12"-18" read range
- Maximum 30" read range
- Good performance near the antenna
- No detection of tags higher in the water column



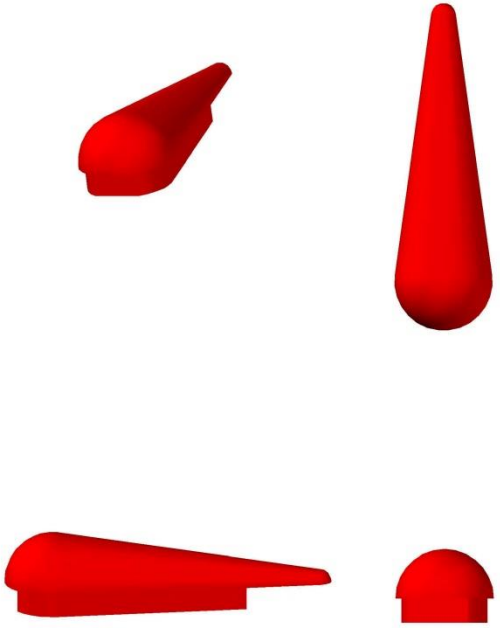
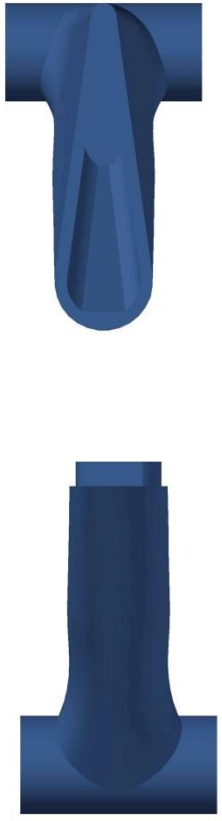
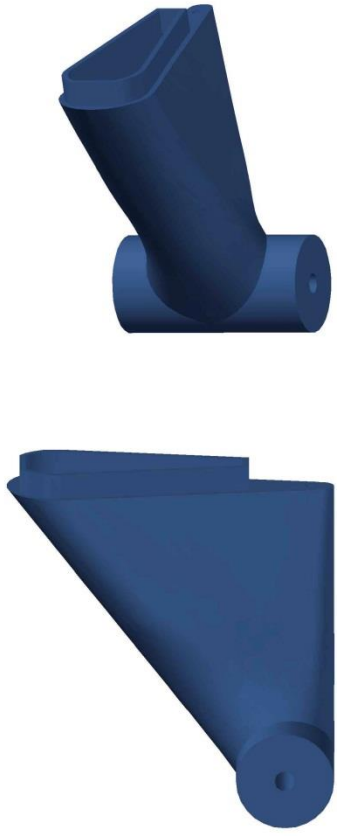
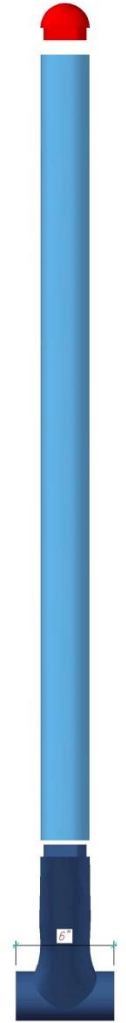
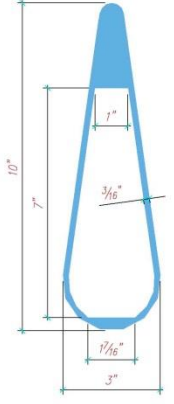
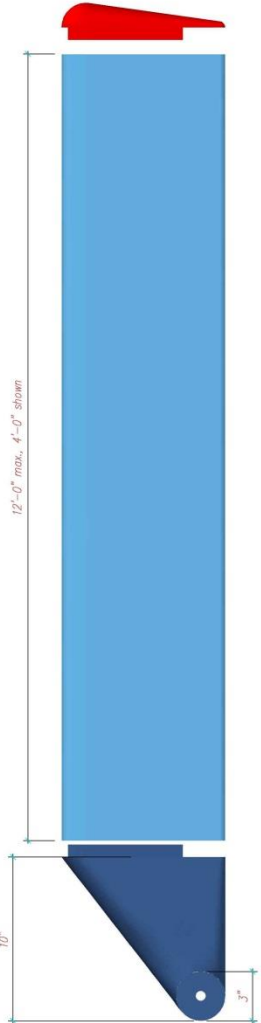
Top view vertical System

- Detection fields are coupled to produce a strong read zone between antennas
- Middle FIN is out of phase
- Overall 48 inch read zone
- Array of three FINs act as single antenna
- Cost is comparable to existing systems
- Can be anchored in river, on barge or above water infrastructure

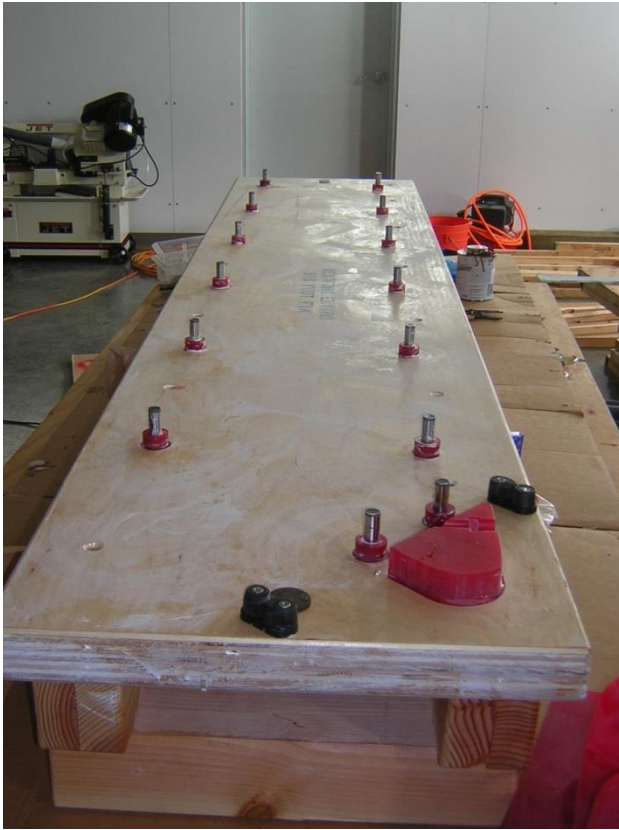


Basic Coil and Reader Testing 2012





Jig for coil winding and finished coil in place prior to sealing



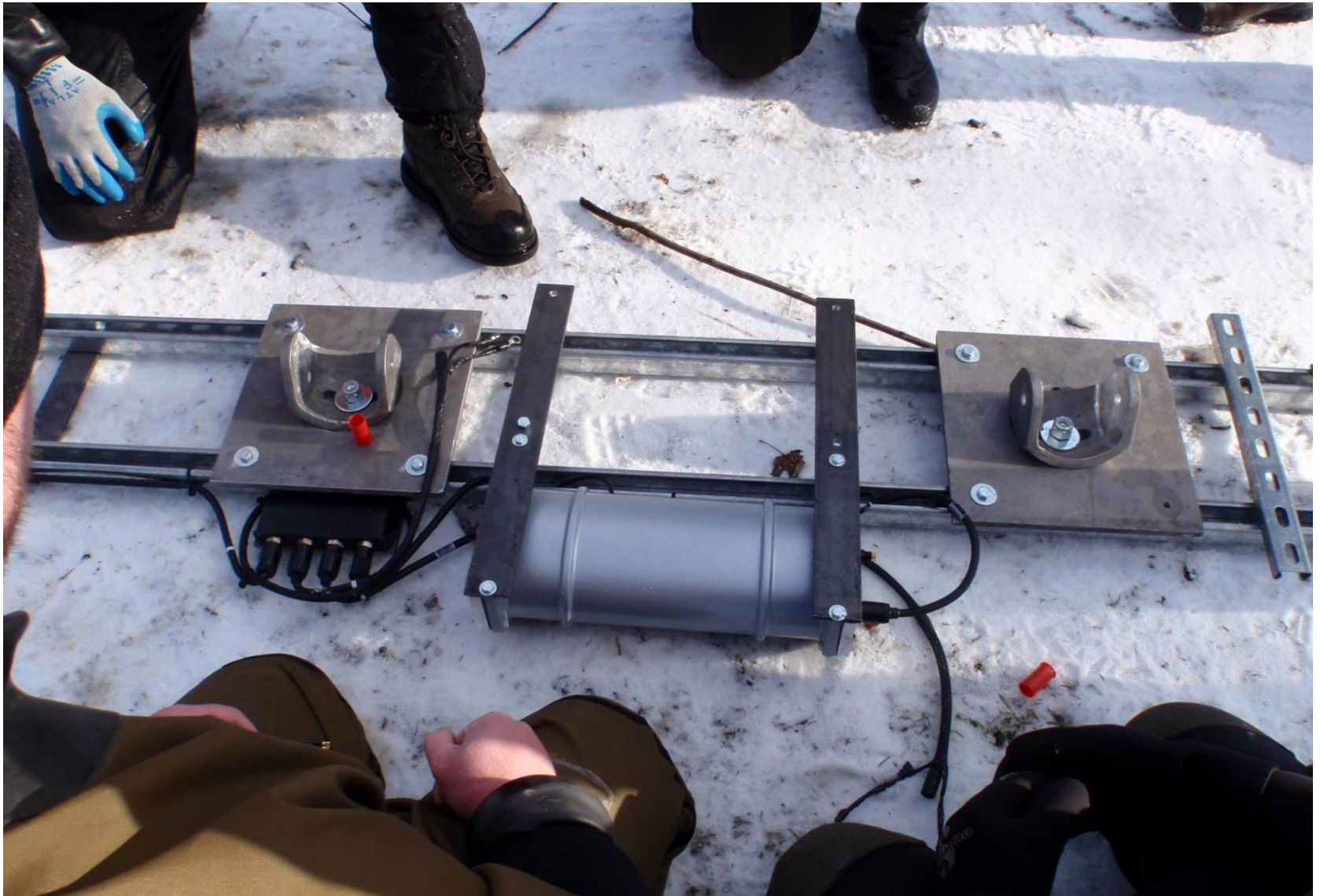
Hydraulic testing In flume at 8-10 fps



Shop jig for testing FINs



Prototype bottom mount anchoring system (track, junction box, cables and POD with enclosed ACN)



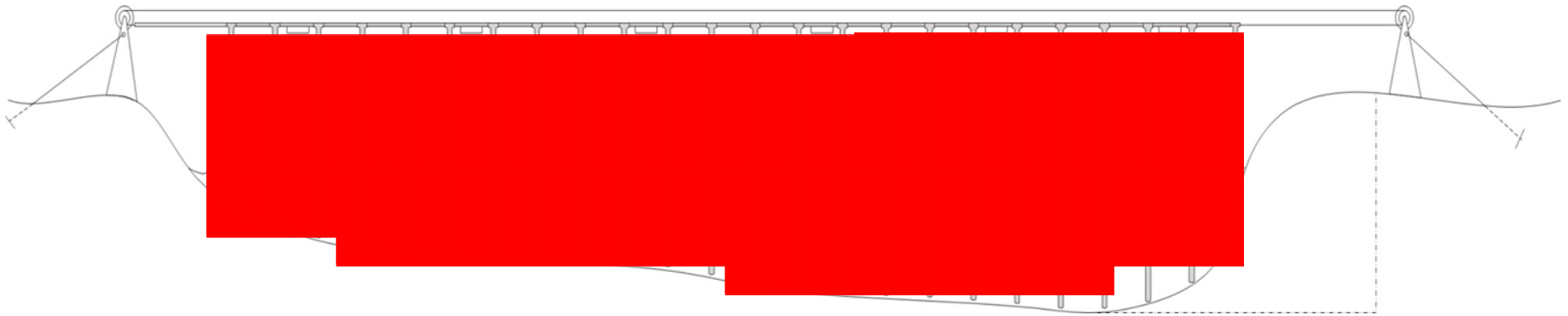
Pneumatic drive hammer on
extensions, diver in water





Section view top supported vertical antenna array

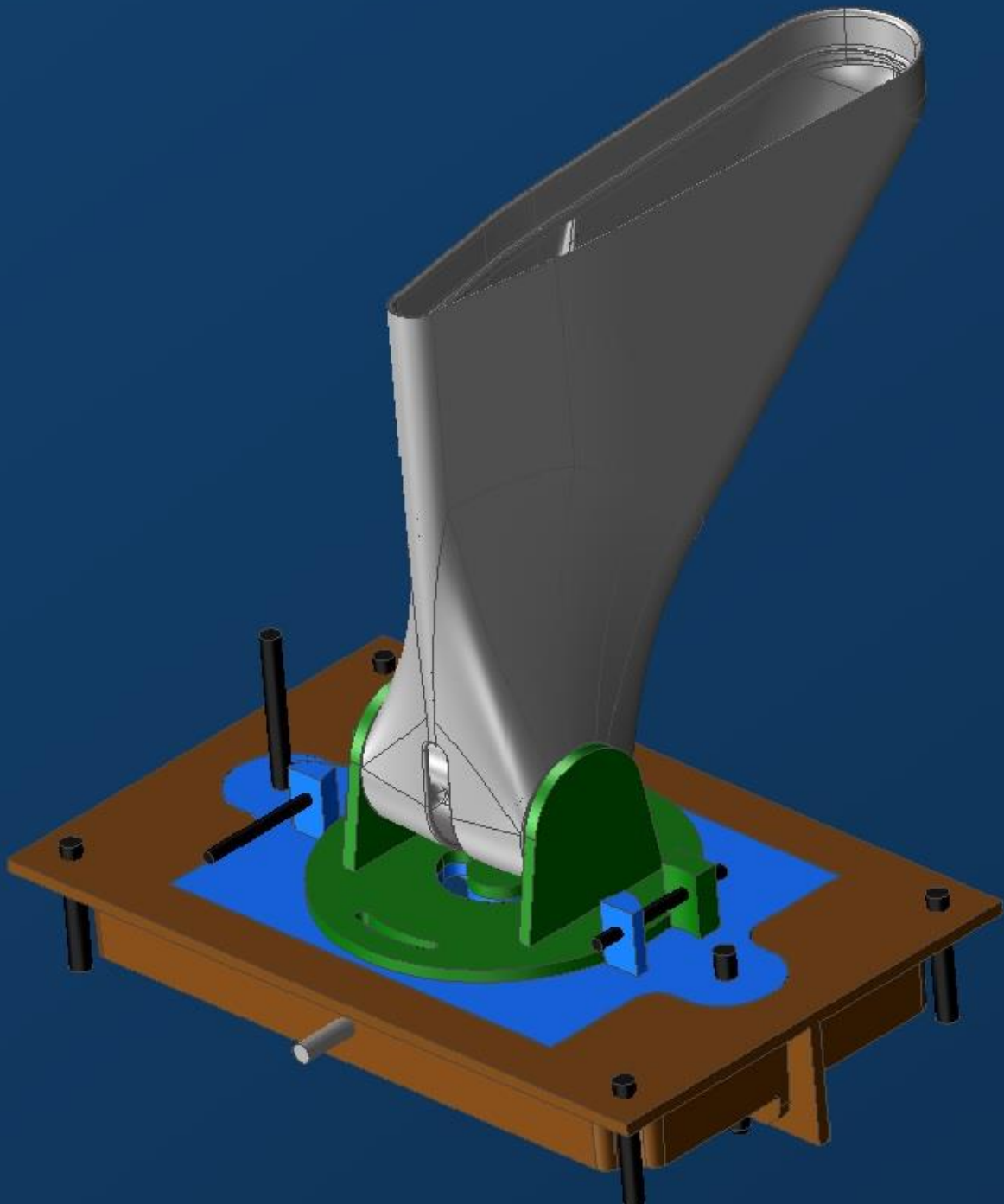
- High tension non-metallic cable
- Vertical or horizontal pulley system
- Engineered deployment and retrieval bay
- Variable FIN height to match channel cross section



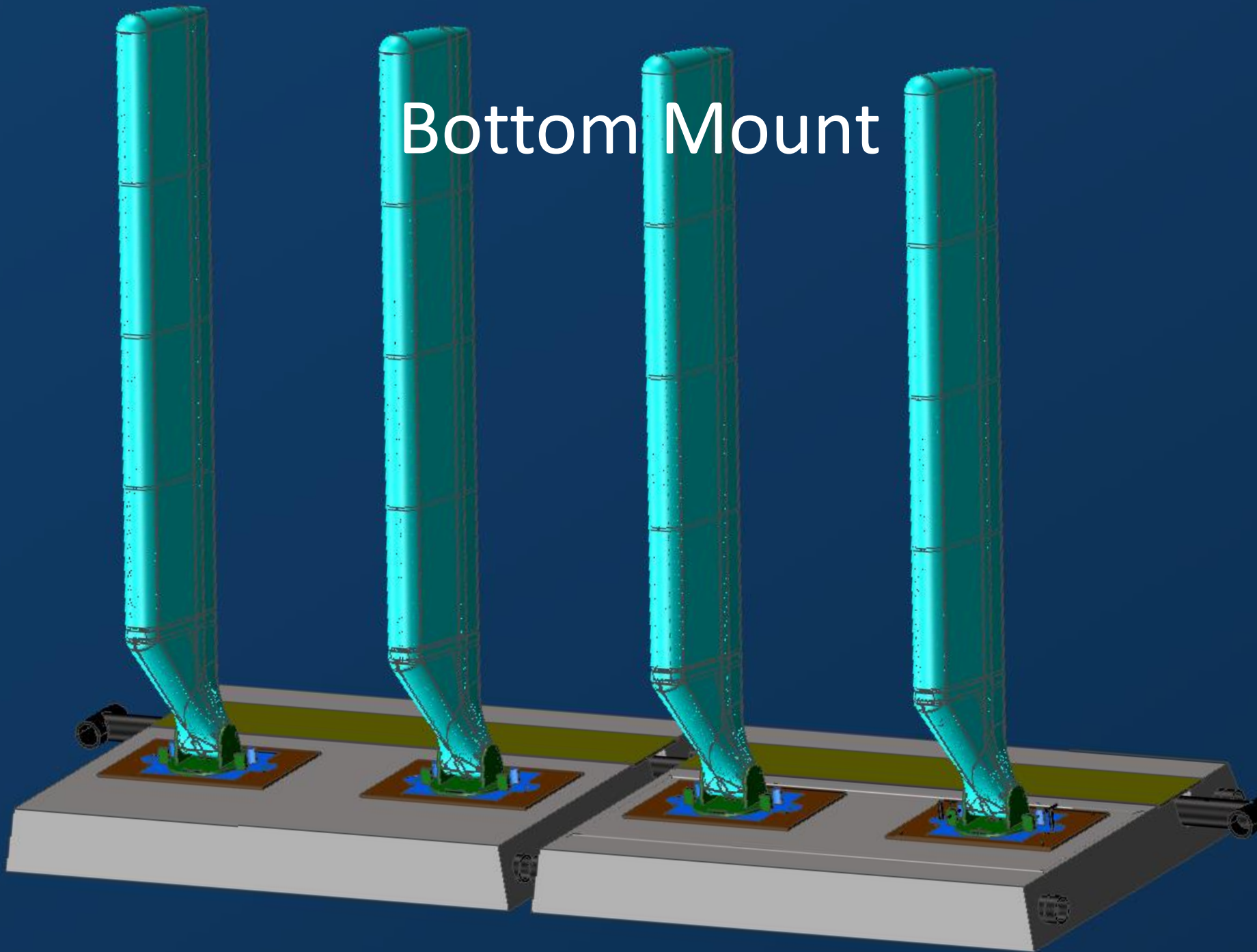
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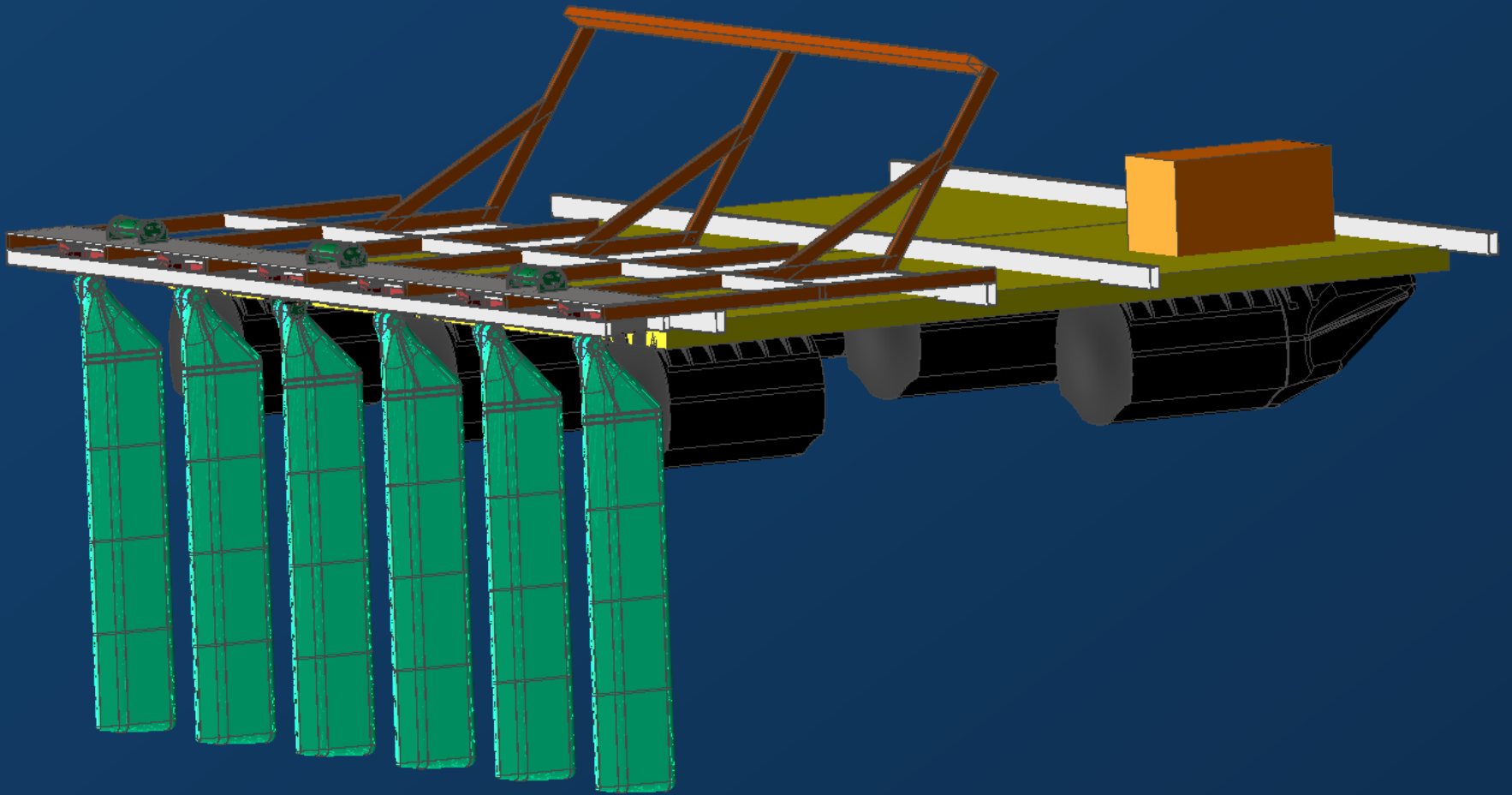
- Demonstrated feasibility of concept (mechanical and electrical redesign after prototype tests)
- Has the promise to produce substantially better detection data in deeper waters
- Costs will be competitive
- Configure as channel bed, barge or top mounted
- A solution for the right place and/or question

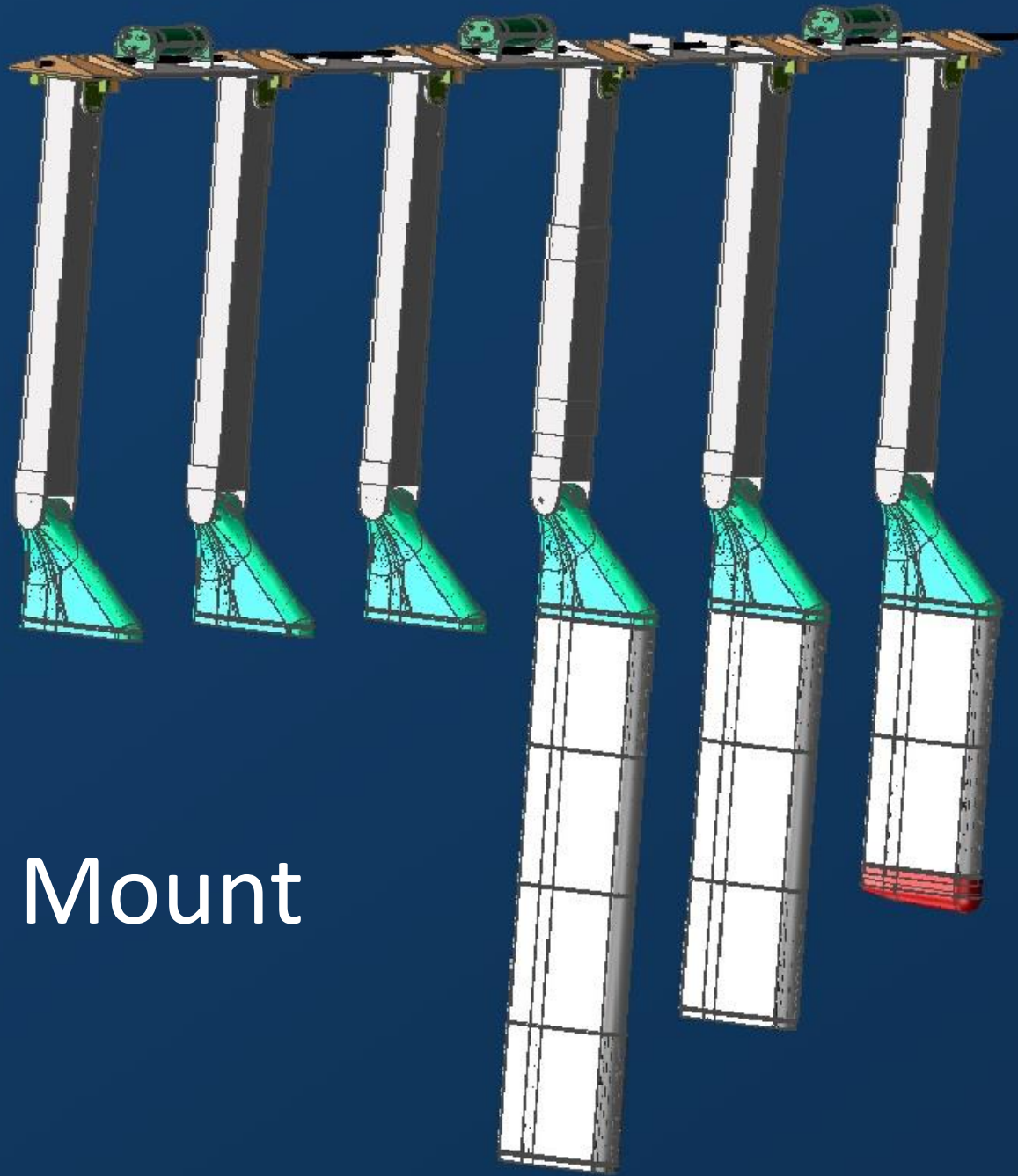


Bottom Mount



Barge Mount





Top Mount

Next steps

- Tag detection tests with live fish (this year)
- Actively recruiting for the first major deployment site
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