Sound localization for Sediment-Generated Noise (SGN) measurement

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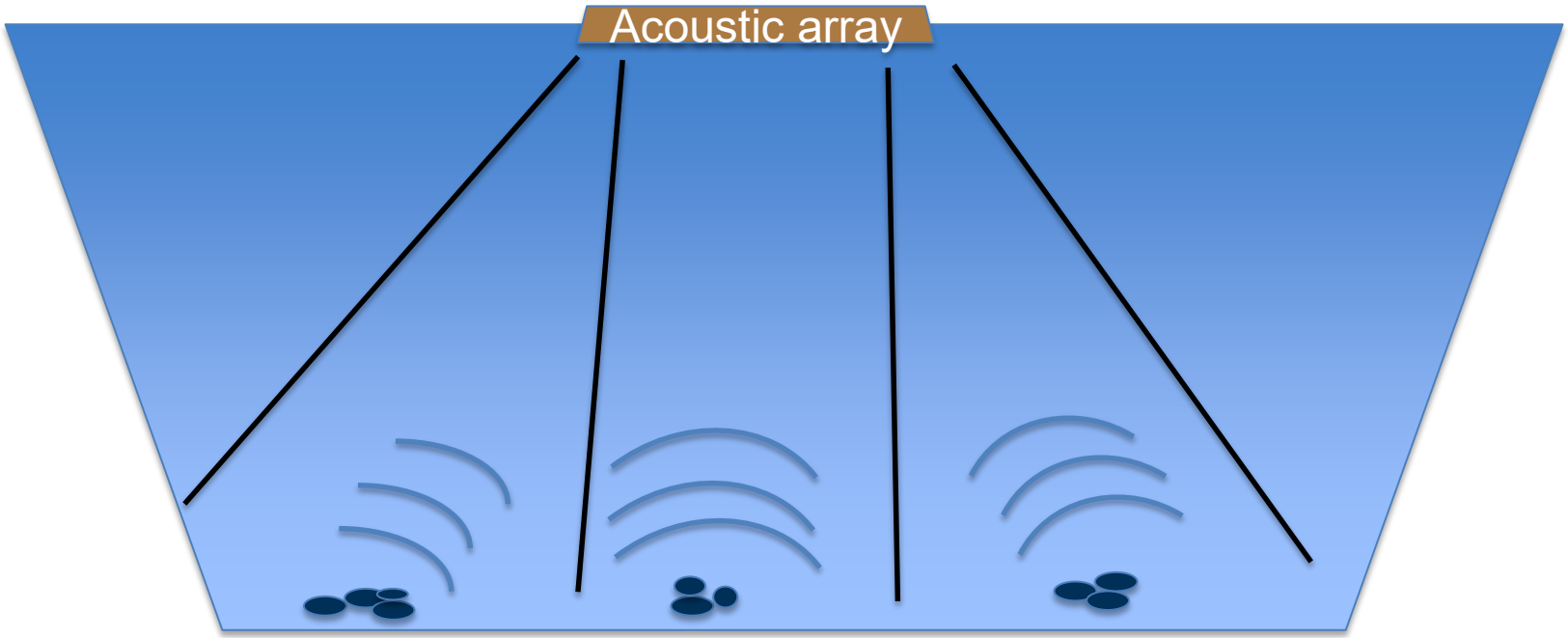
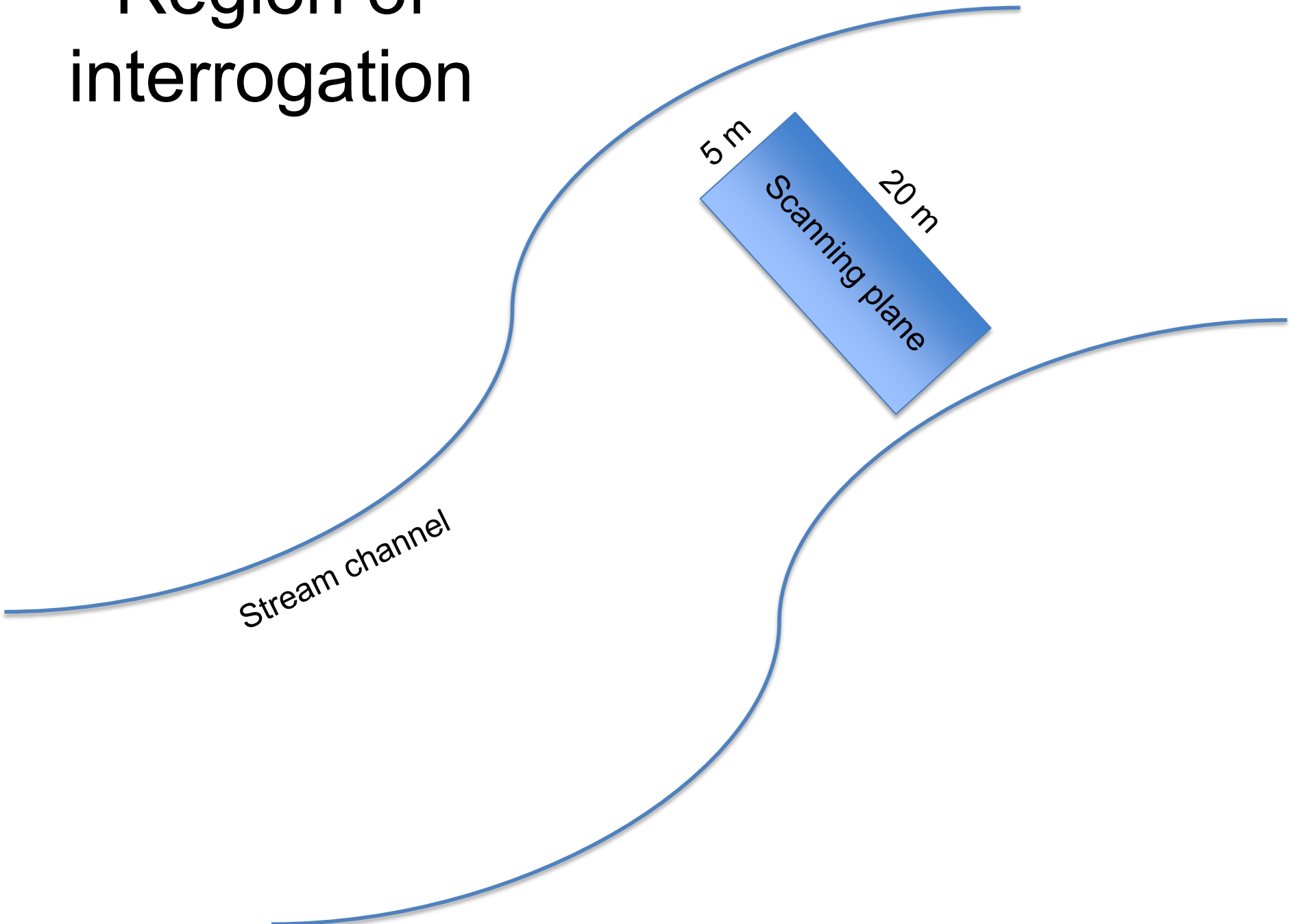
Introduction

- Design specifications for phased array of hydrophones to localize sound in channels
- Why a phased array?
  - Development of SGN (Sediment Generated Noise) methodology
    - Definition of measurement volume
    - Signal/noise discrimination
  - Studies of bedload transport
    - Locating areas of transport along stream in cross-section
    - Augmentation of physical sampling

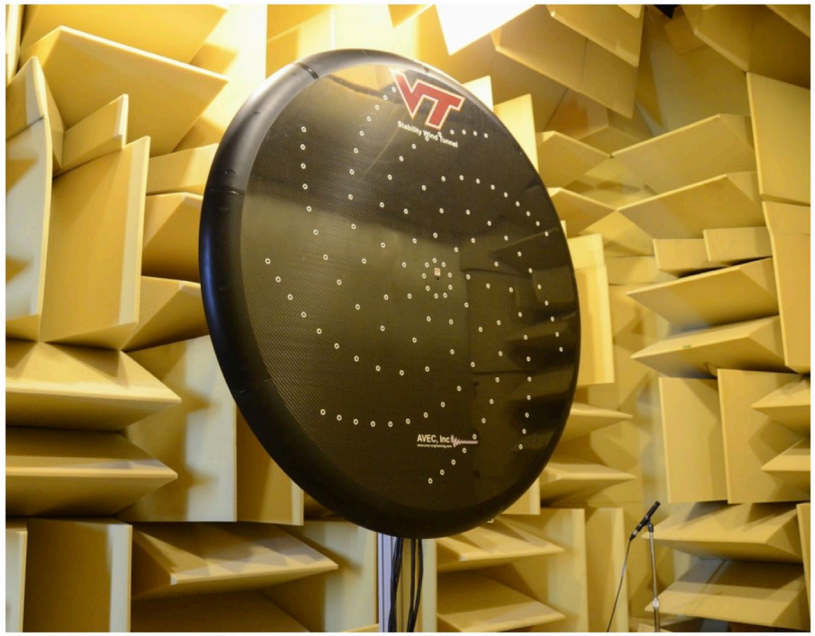
SGN localization



Region of interrogation



Spiral arrays

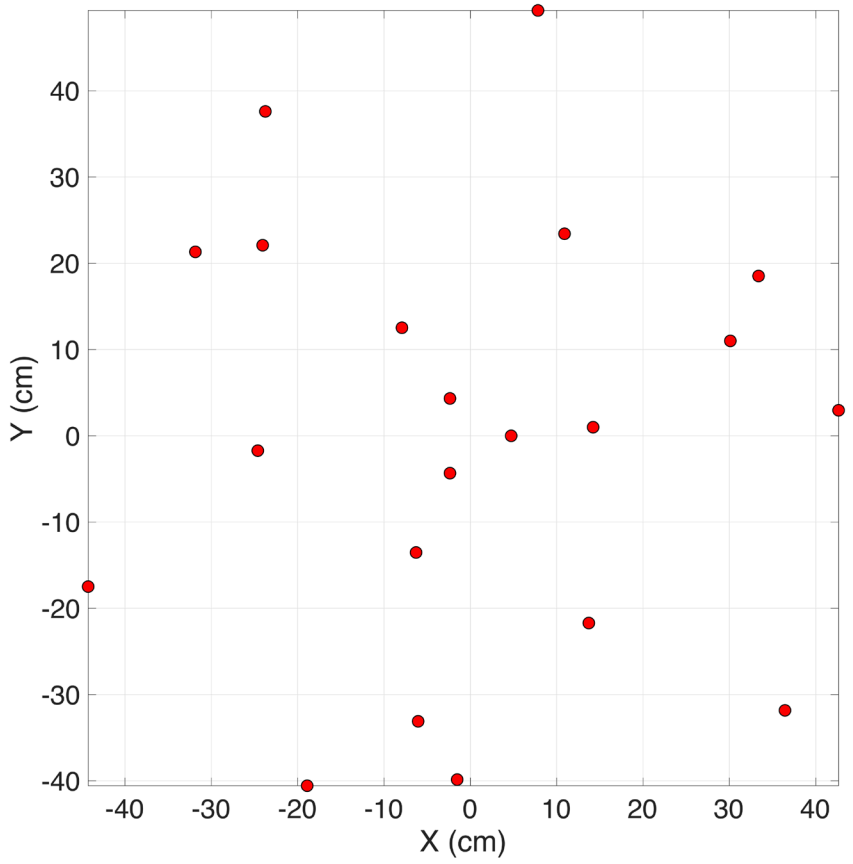


117-element Phased Array installed in the VT anechoic wind tunnel

From: https://www.avec-engineering.com/products.html

From: http://geluid.eu/gb/set-capsule-voorversterker/microphone-array

Hydrophone locations



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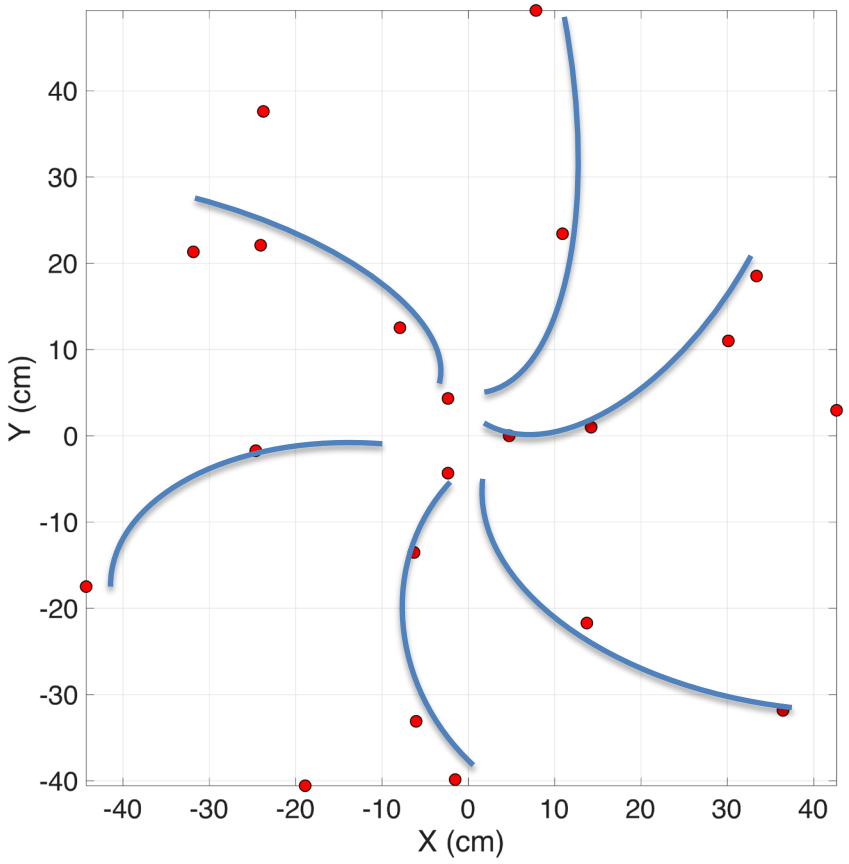

Project status

- Design is complete
- Hydrophones for prototype array have been ordered (delayed)
- Next steps:
  - Prototype array
    - Acquire hydrophones
    - Set up data acquisition system
  - Laboratory testing
    - Conversion algorithms
  - Field testing
- BUT: JR Rigby is now at the USGS heading up the Mississippi Alluvial Plain Water Availability Study


Questions?

Specifications

- Optimized for 5-20 kHz
- 20 x 5 meter scanning plane oriented with long axis cross-stream
- 21 hydrophones
- Spatial resolution depends on range
  - About 1 m for 2 m depth