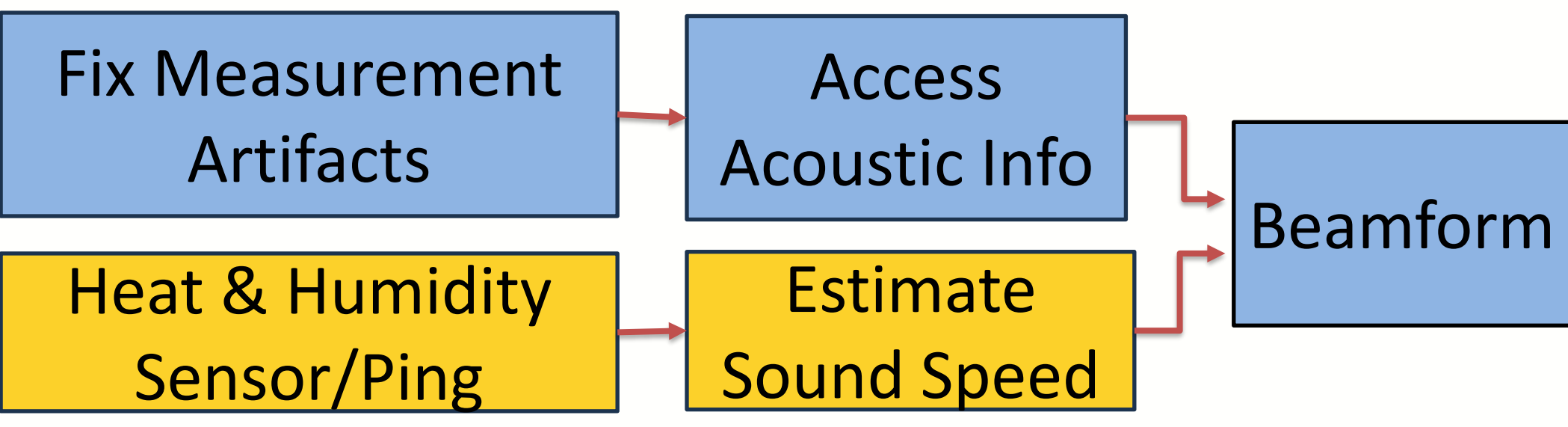
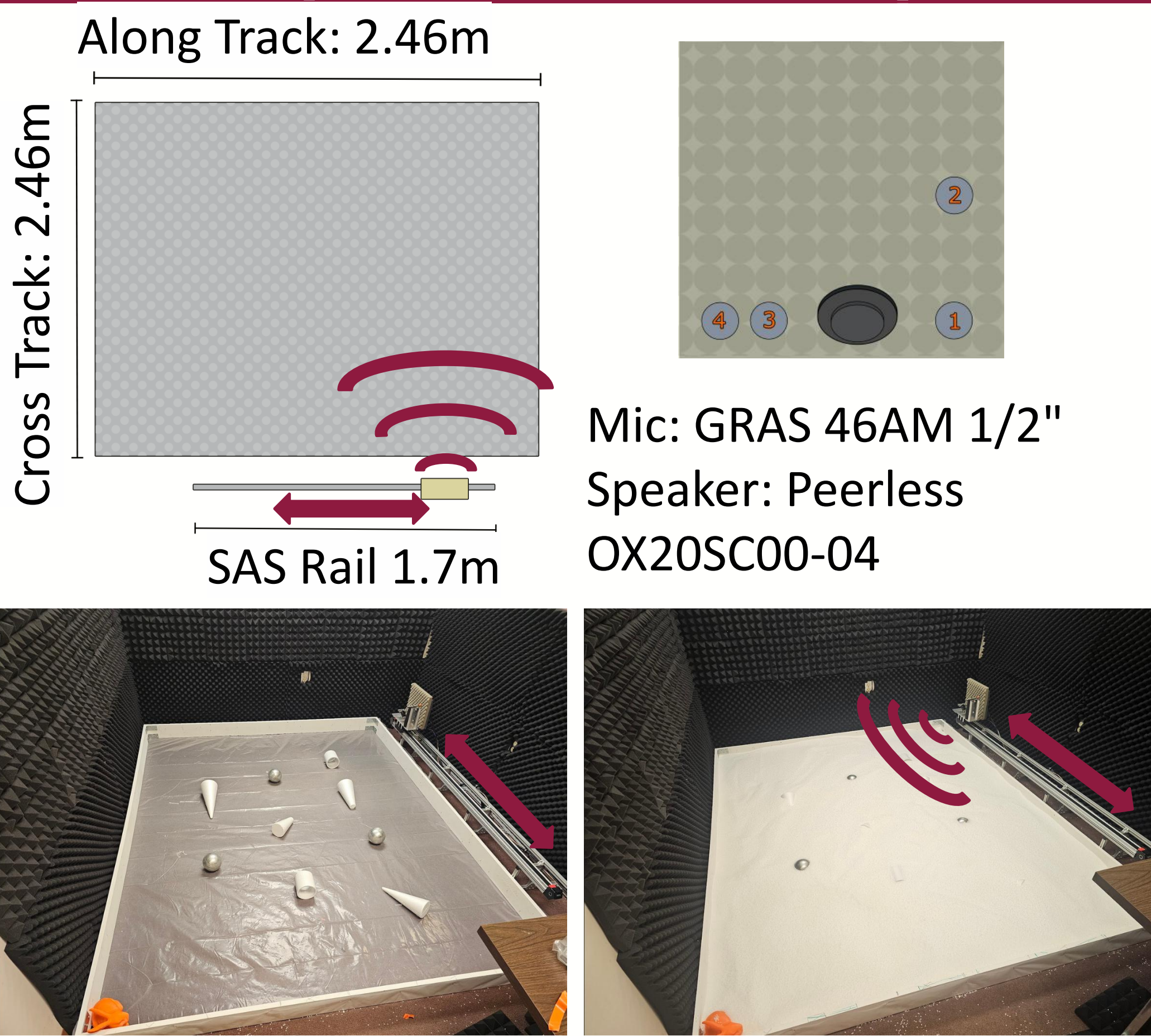




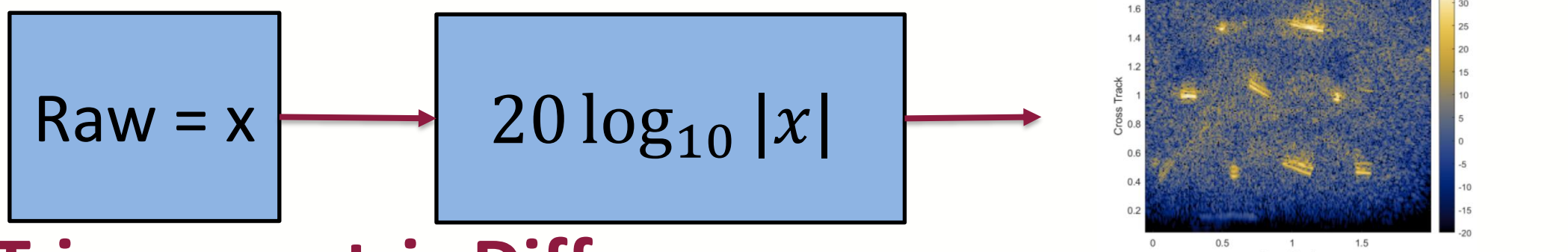
Introduction

- **Synthetic Aperture Sonar (SAS)** uses motion of a platform to create high resolution images with sound.
- **Applications** in marine archeology, studying changes in the seafloor & sediment, and ocean mapping.
- **Tone Mapping** is part of how we visualize the acoustic data for an image.
- The **goal** of this project is to determine how different Tone Mapping techniques impact imaging through the sediment

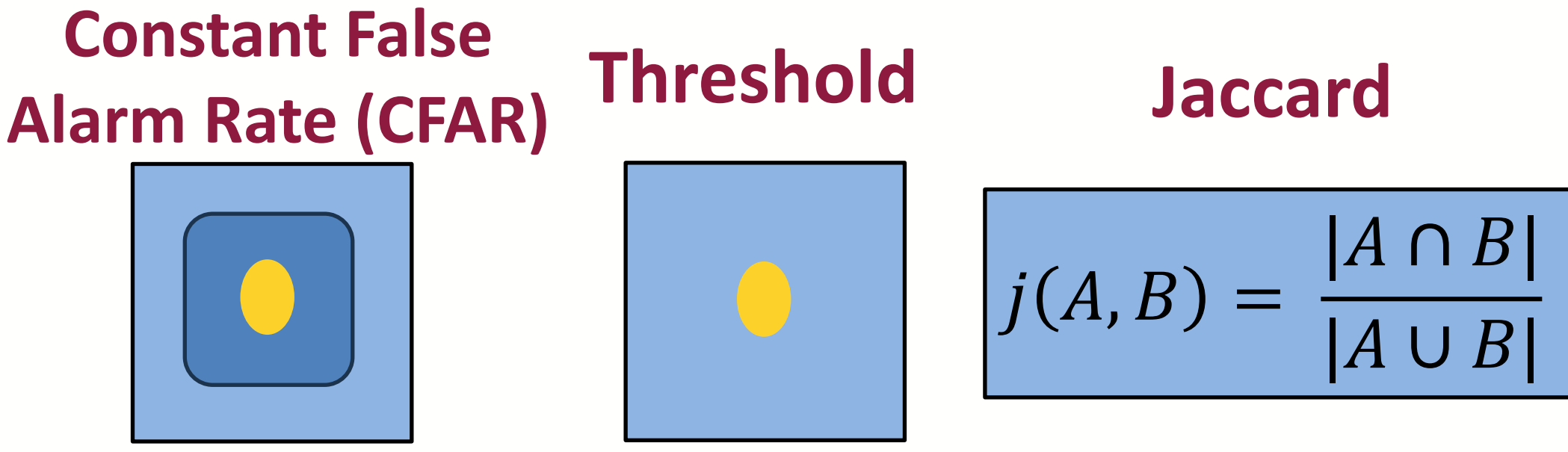
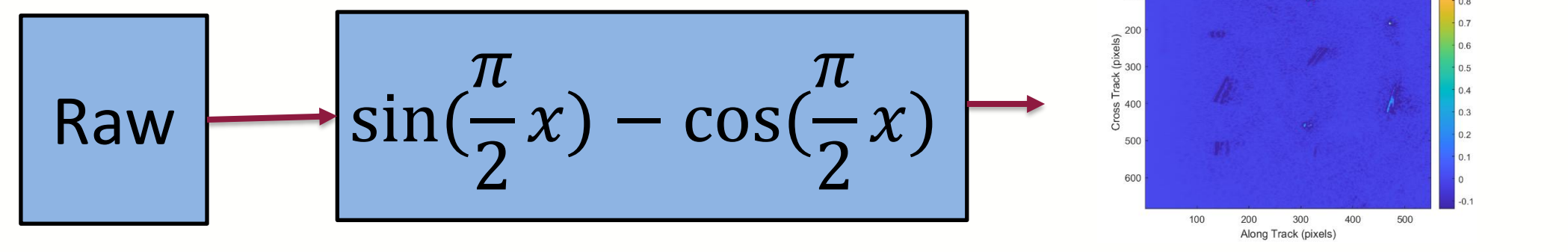
Experimental Setup



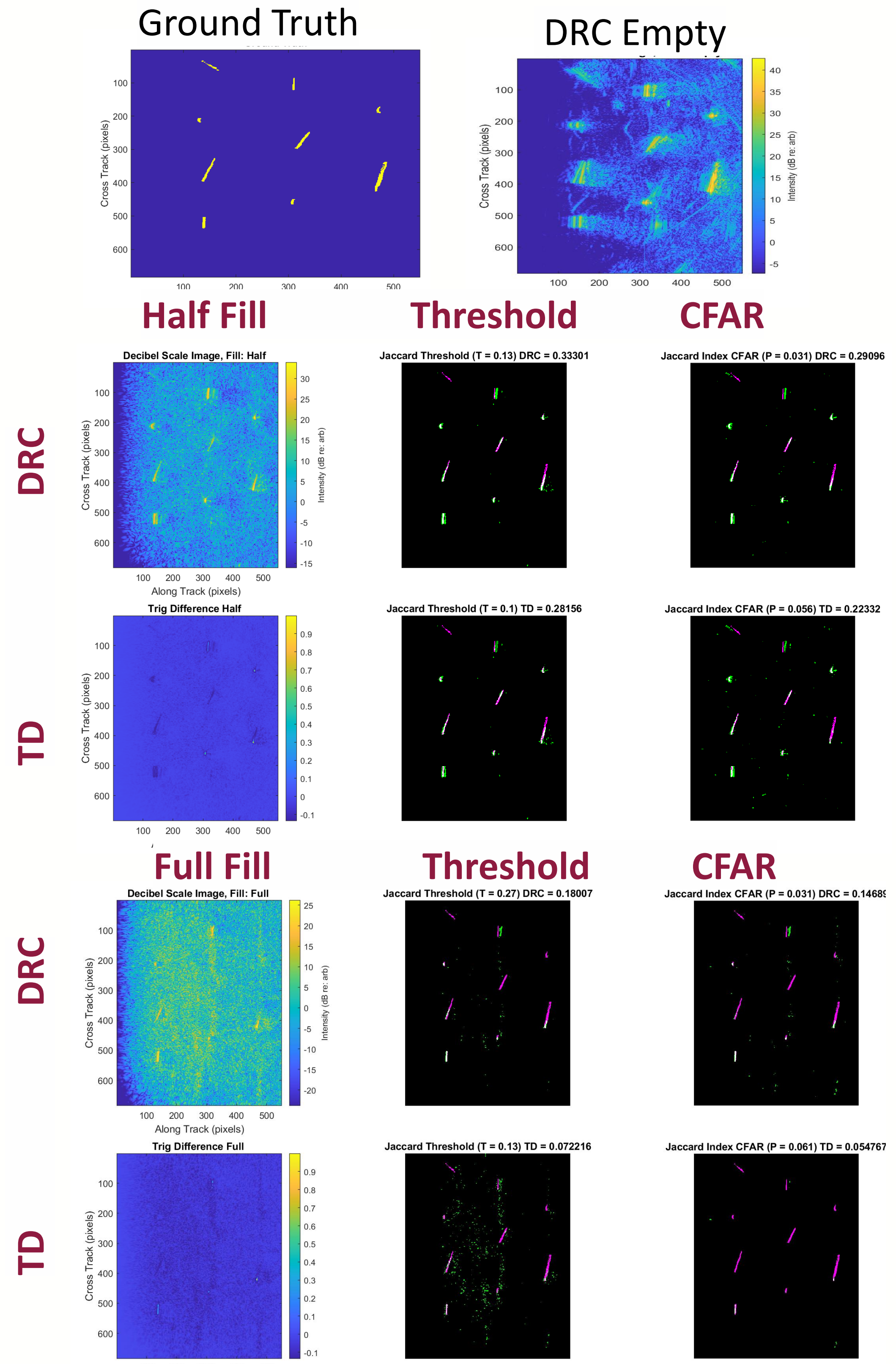
Dynamic Range Compression:



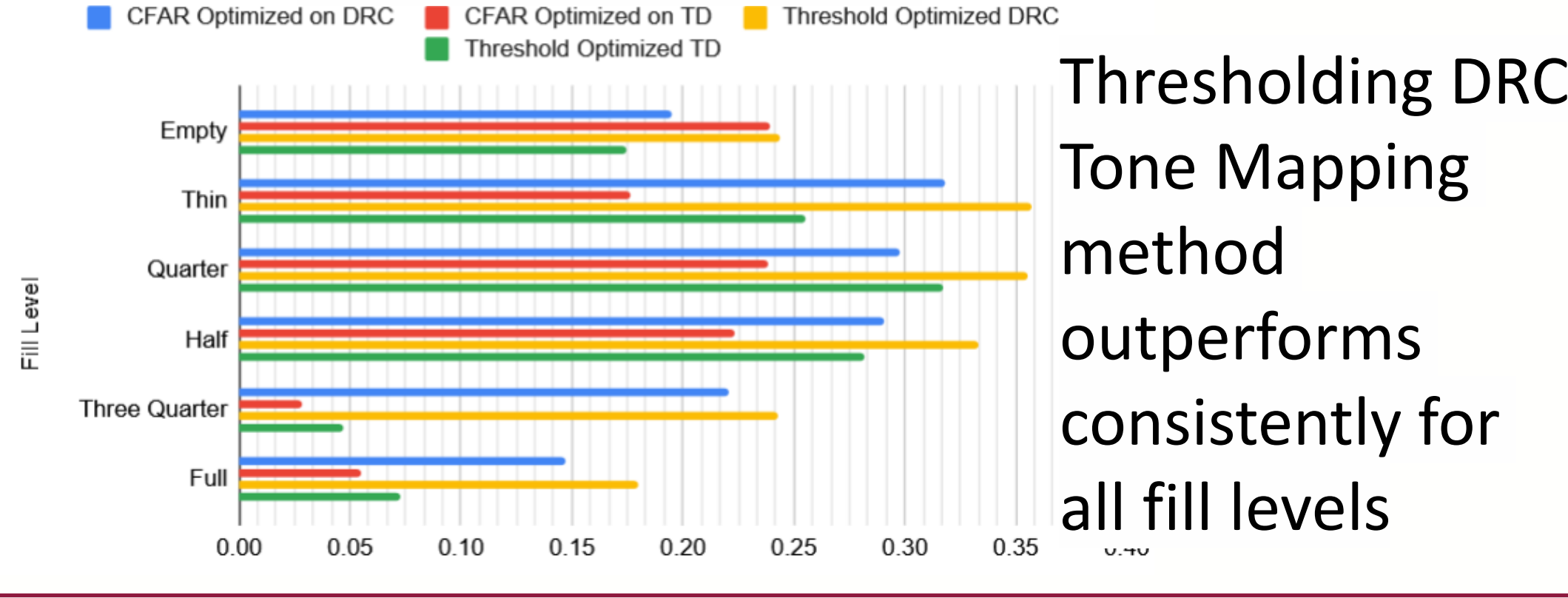
Trigonometric Difference



Results



Constant False Alarm Rate (CFAR) & Threshold vs Fill Level



Future Works

- Performance with additive noise as synthetic burial
- Developing machine learning algorithm to virtually "unbury" buried targets

References

[1] Vetaw GD, Jayasuriya S. The Bright Feature Transform for Prominent Point Scatterer Detection and Tone Mapping. *Remote Sensing*. 2025; 17(6):1037. <https://doi.org/10.3390/rs17061037>
 [2] Blanford, T.E., Williams, D.P., Park, J.D. et al. An in-air synthetic aperture sonar dataset of target scattering in environments of varying complexity. *Sci Data* 11, 1196 (2024). <https://doi.org/10.1038/s41597-024-04050-0>