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Field Evaluations of the ASTRALiTe edge™ for Measuring River Bathymetry*

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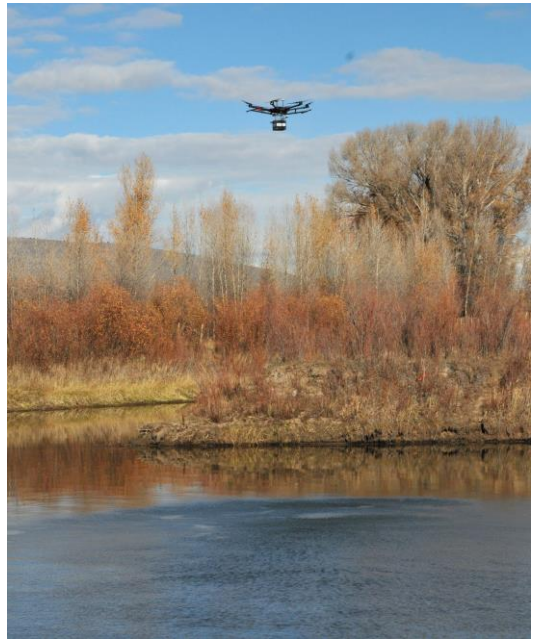
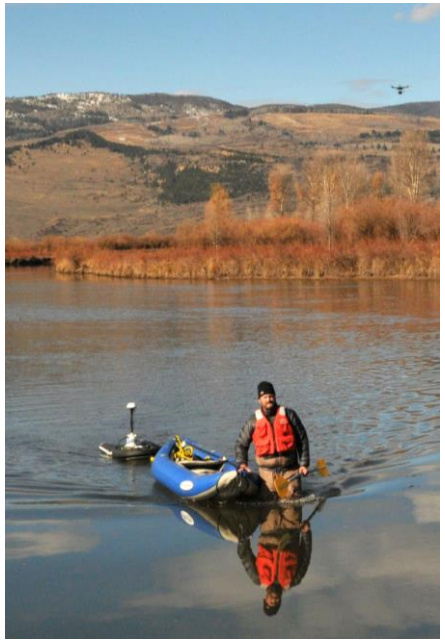
Overview

- Motivation
- Lidar (Technique & Specifications)
- Field deployments (Blue and Colorado Rivers, CO; Colorado River, AZ)
- Lidar comparison with wading and SONAR
- Conclusions
- Future Work
- Acknowledgements





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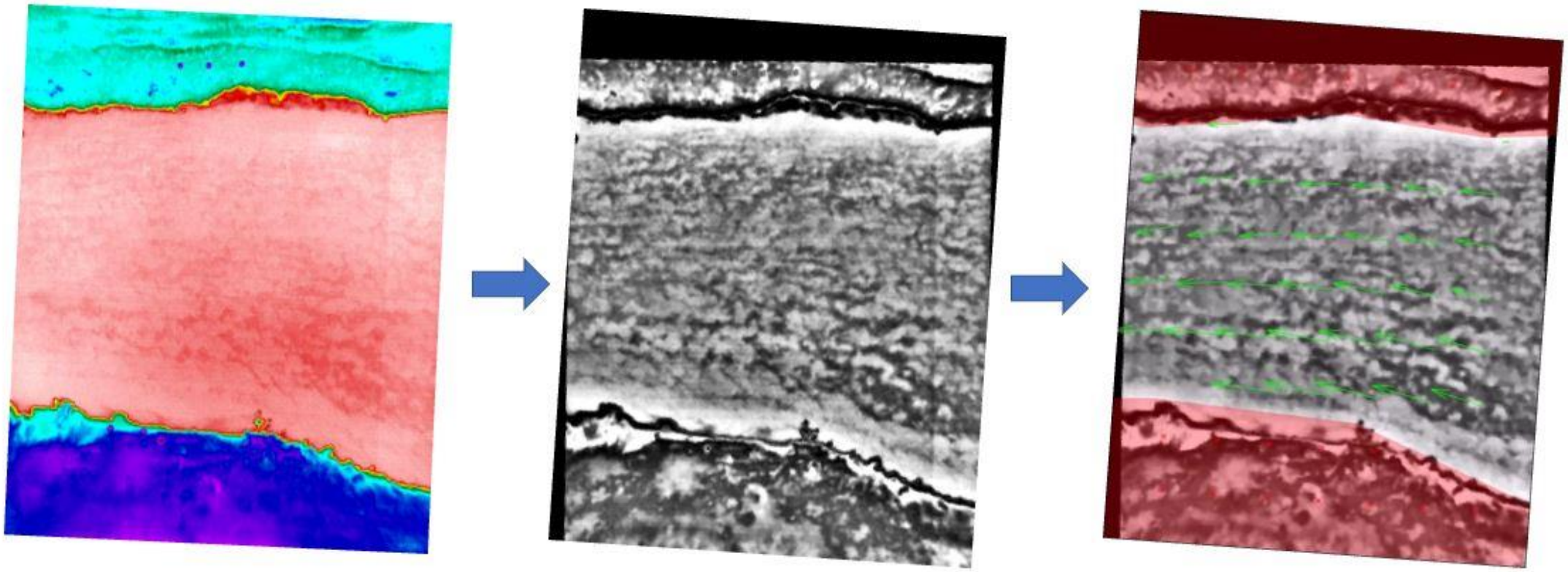
Motivation: Non-contact Streamflow Measurement



Kinzel, P.J. and Legleiter, C.J., **sUAS-based remote sensing of river discharge using thermal particle image velocimetry and bathymetric lidar.** *Remote Sens.* 2019, *11*(19), 2317; https://doi.org/10.3390/rs11192317

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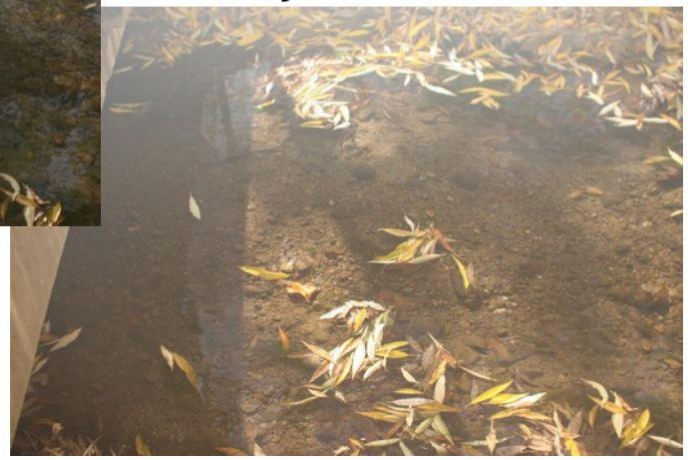
Polarization Technique

Passive (Sunlight)

Polarizer Allows for Different Views of Water

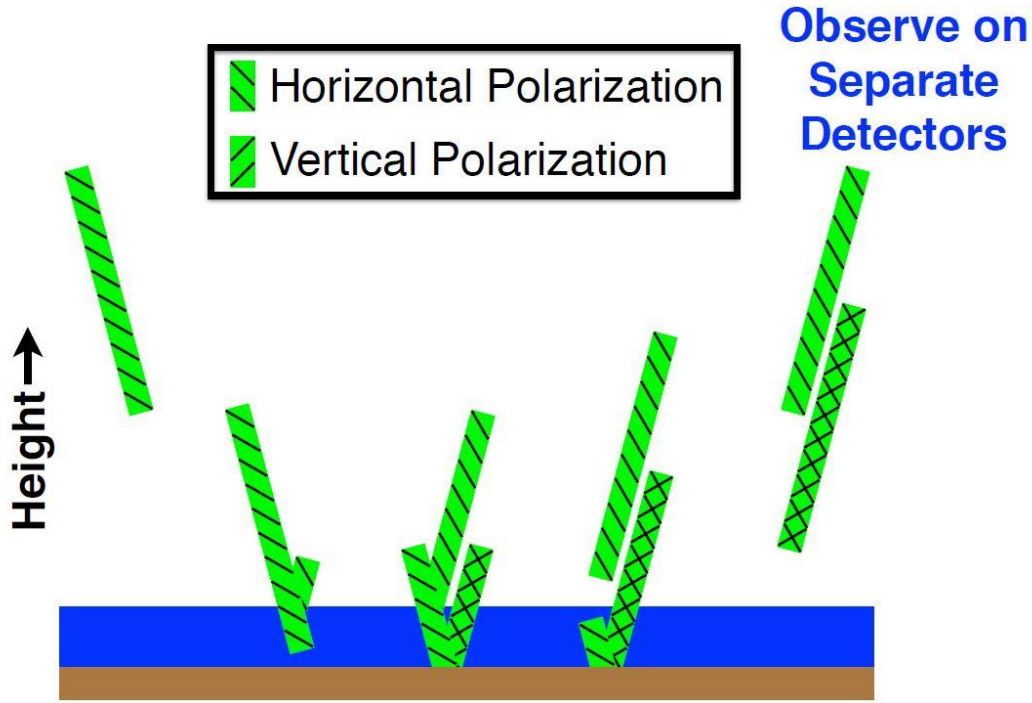
Accept Surface Glare

Reject Surface Glare



Active (Laser)

INtrapulse PHAse Modification Induced by Scattering*



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ASTRALite

* Patented

ASTRALiTe edge™ 2-in-1 Topo-Bathy Lidar

2018 Prototype Specs*:

- Weight – 5 kg
- Dimensions – 18 x 20 x 23 cm
- Wavelength – 532 nm
- Laser Power – 30 mW
- Swath Width – ½ flight altitude
- Point Density – >100/m^2
- Depth Penetration – 1.2 Secchi depth
- Scan Technique – Whisk broom
- GoPro camera

Mounted on DJI Matrice 600 Pro, Photo credit - Bill Adams
Piloted by Jack Davis, Juniper Unmanned
(10 -12 minutes flight duration with this platform)

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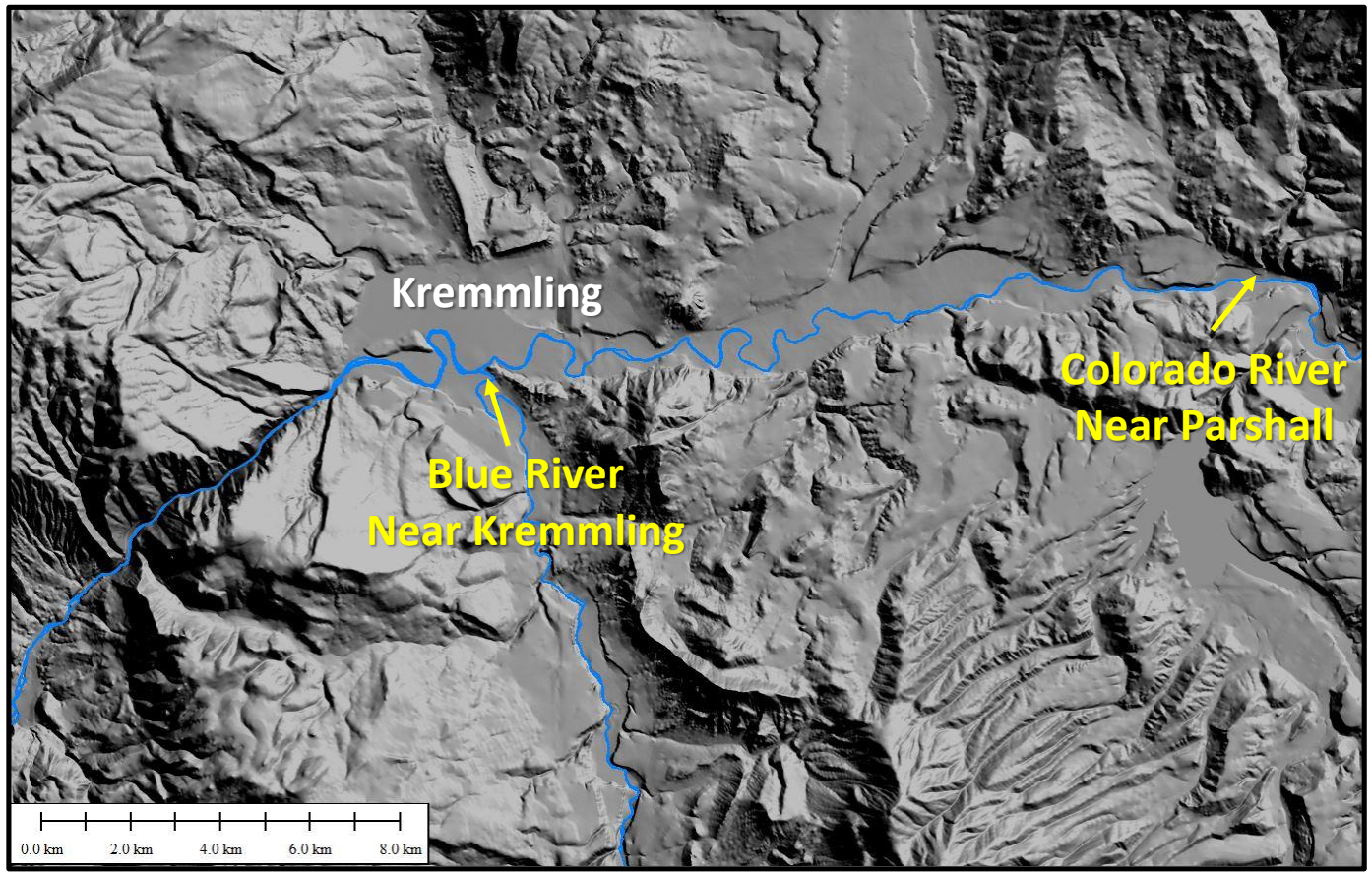
*Optics of current system are improved

Field Sites
Upper Colorado River



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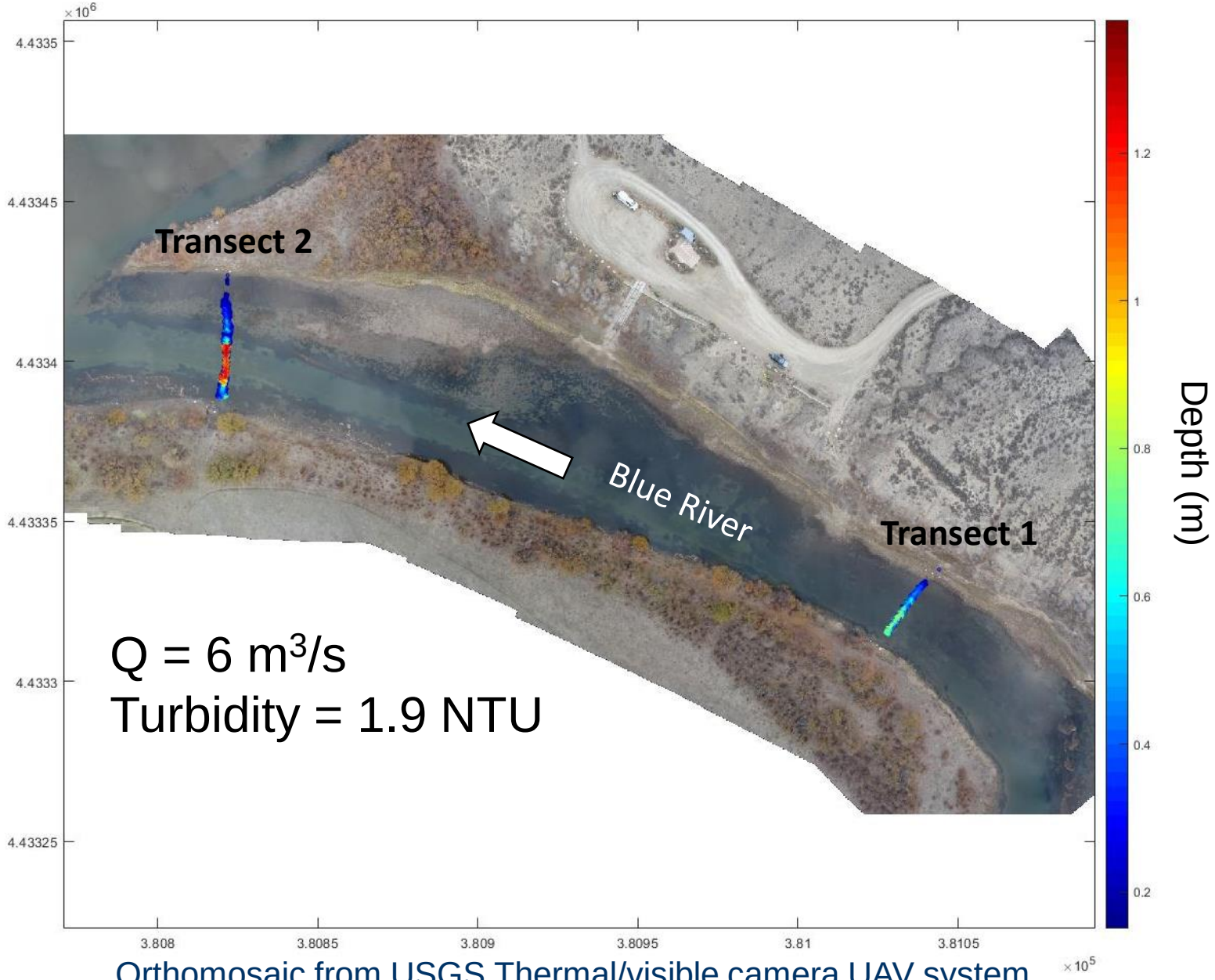
Field Evaluation – Blue R. near Kremmling, CO (10/18/18)



Orthomosaic from USGS Thermal/visible camera UAV system

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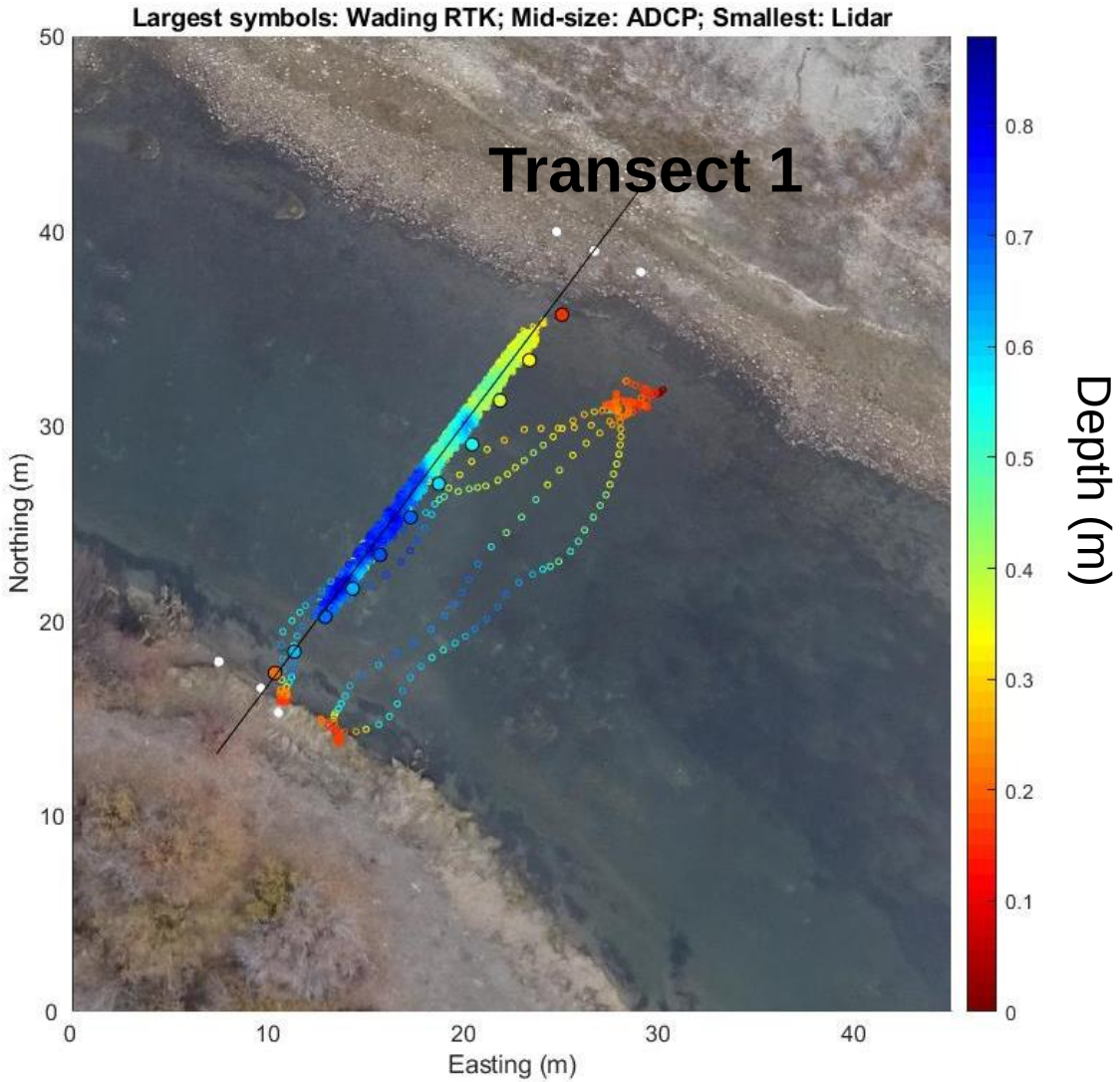

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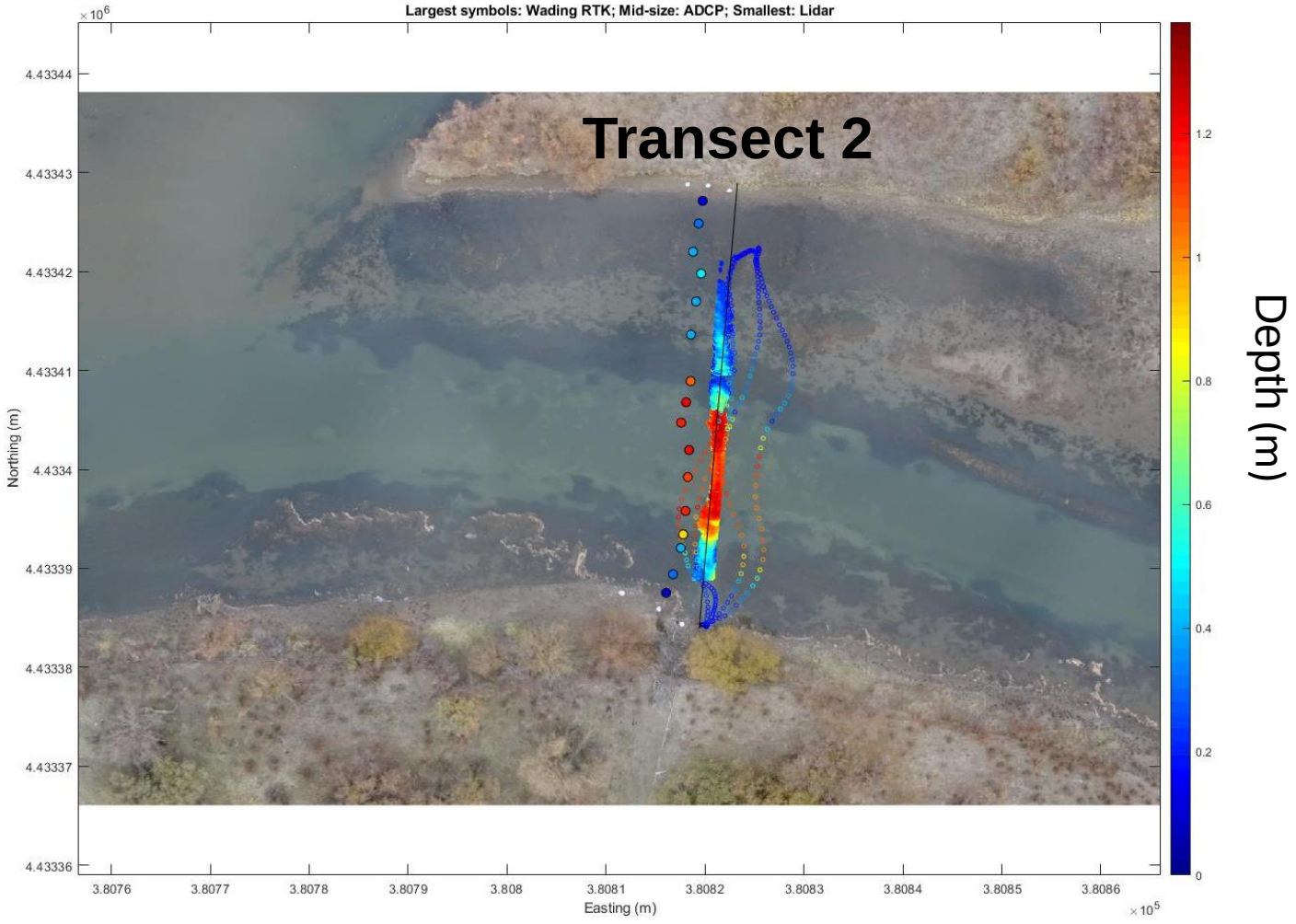
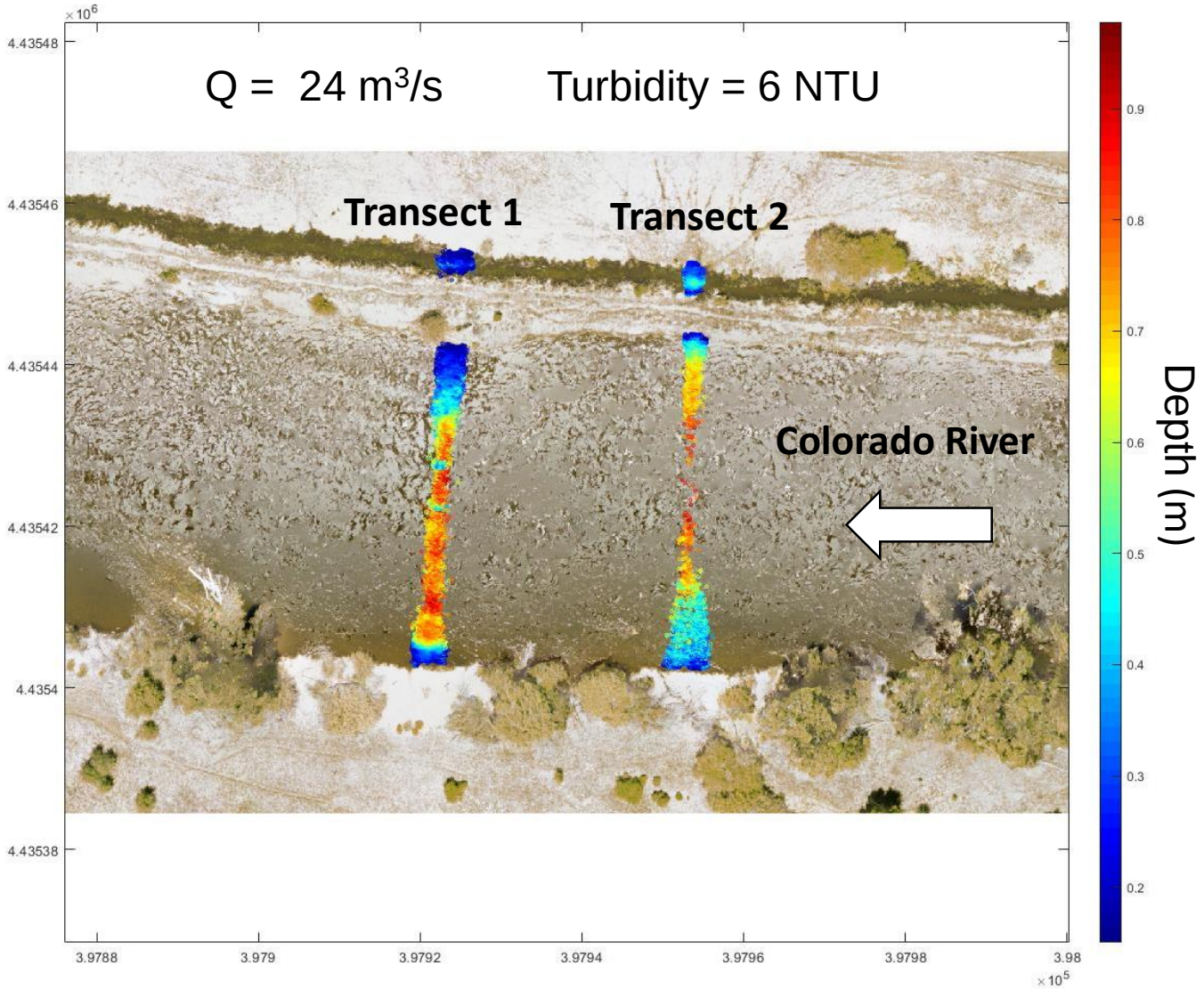


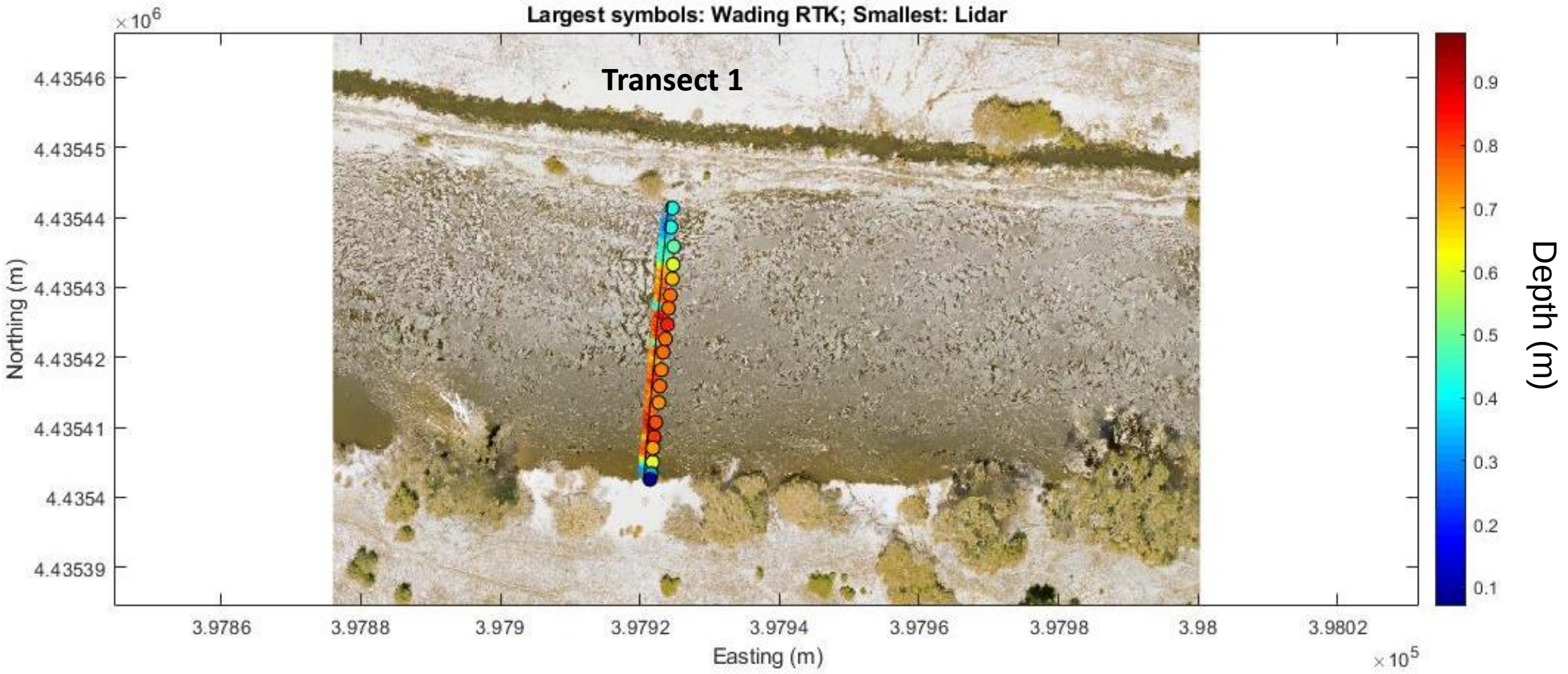
Orthomosaic from USGS Thermal/visible camera UAV system

Field Evaluation – Colorado R. near Parshall, CO (6/13/19)



Orthomosaic from USGS Sony ILCE-6000 on topo-lidar system

Field Evaluation – Colorado R. near Parshall, CO (6-13-19)



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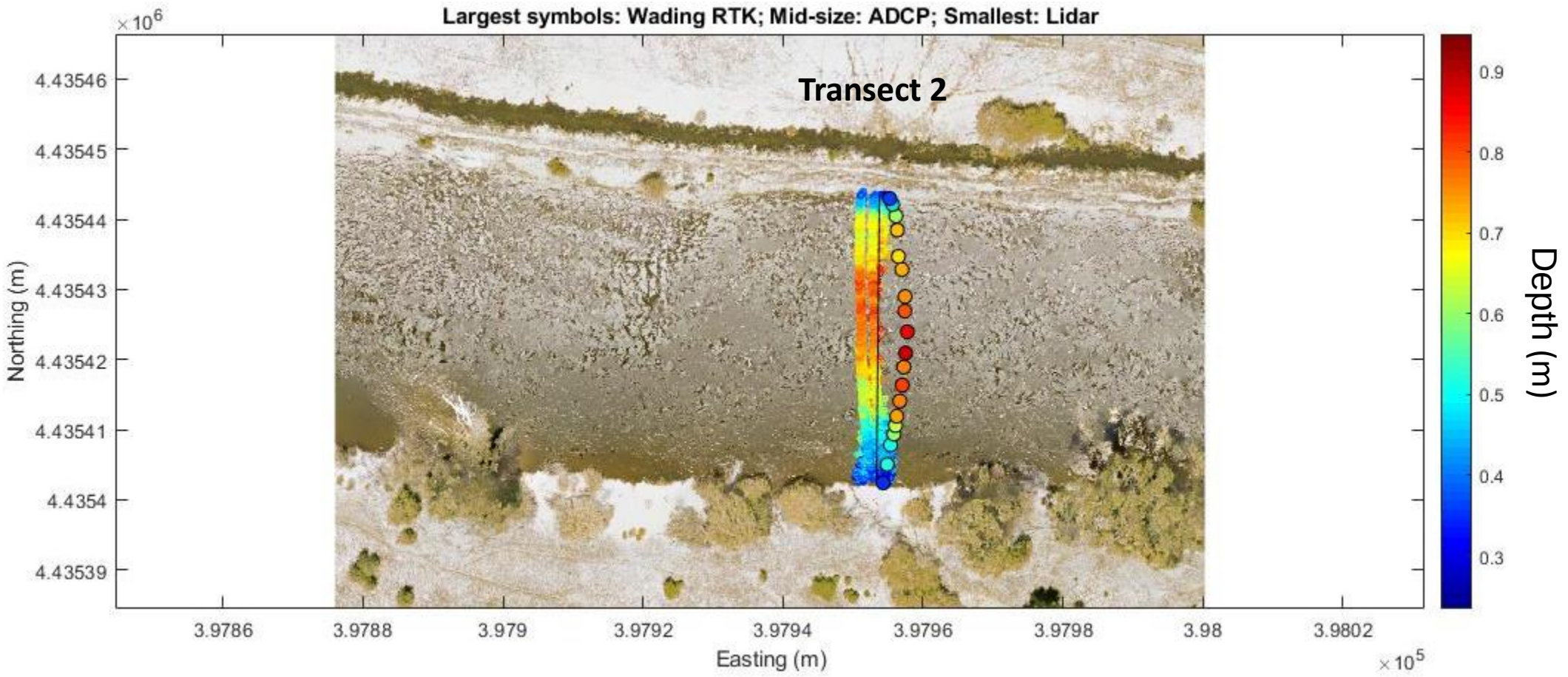
Orthomosaic from USGS Sony A7-R on YellowScan lidar system

Field Evaluation – Colorado R. near Parshall, CO (6/13/19)



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Orthomosaic from USGS Sony ILCE-6000 on topo-lidar system

Questions

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