

# Localization and Quantification of Production Site Methane Emissions using sUAS Mounted Sensors

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AGU 12/10/2019

## Talk outline:

- 1) Leak localization and flux measurement at production site with VTOLs
- 2) Extending capability via ethane

# VTOL Flights at Production Site



Wind

Storage tanks

200 m

# Payload



**Miniature Sonic wind anemometer**

**OPLS**

**Separate telemetry system**

**Range-finder**

# Platforms



**DJI Matrice-200**  
25 min, 4.1 kg



**Procerus Indago**  
38 min, 2.5 kg



**3DR Iris+/Solo**  
14 min, 2.2 kg



**Straight Up Imaging**  
34 min, 3.5 kg

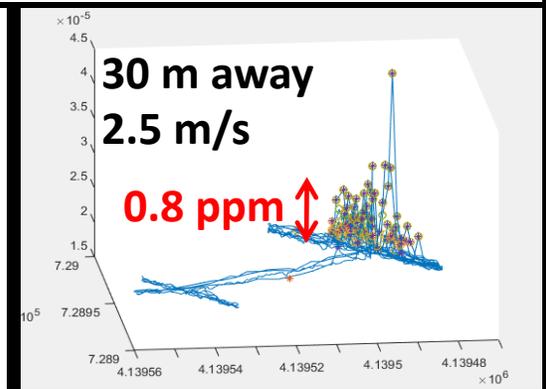
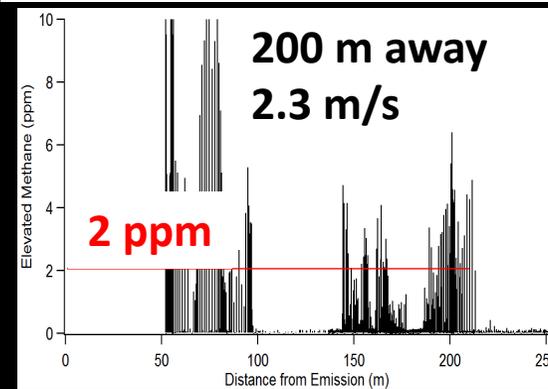
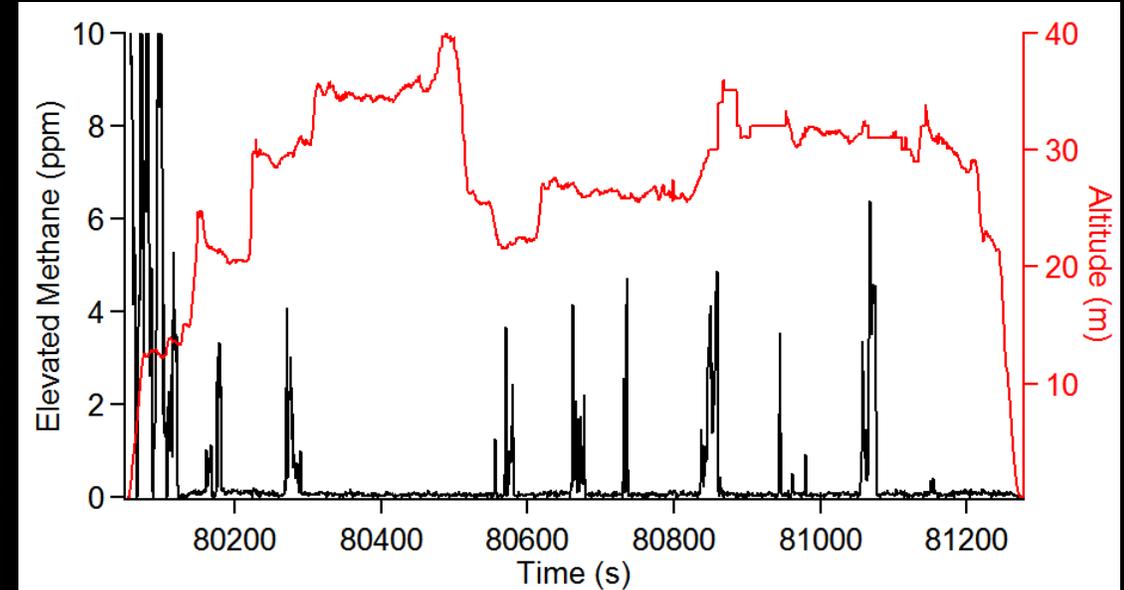
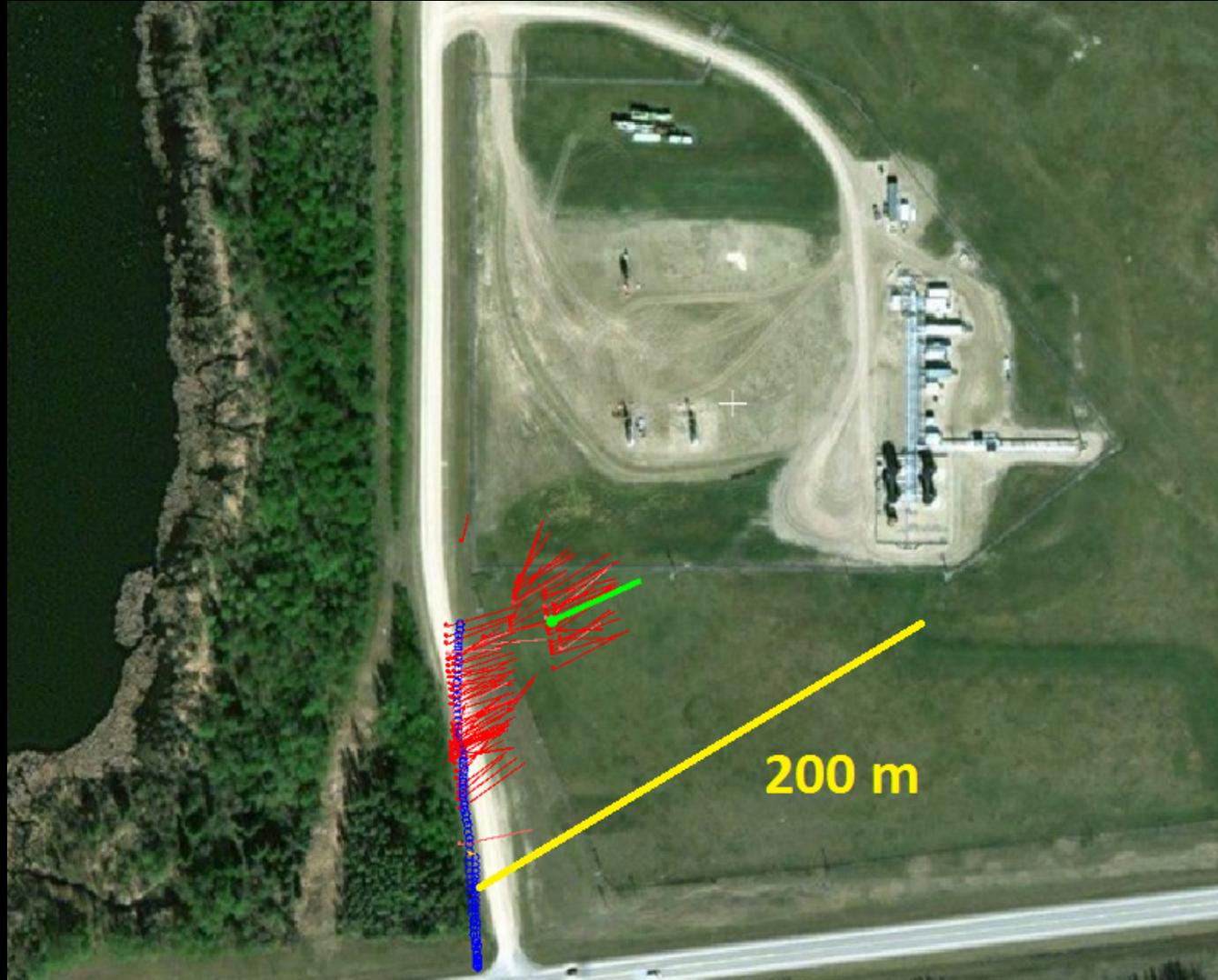


**DJI Matrice-600**  
23 min, 10 kg



**Foxtech Hover 1**  
Under test at UC Merced

# Tiered Approach: Start far away



**500 SCFH (this expt.)**

**5 SCFH (Merced)**

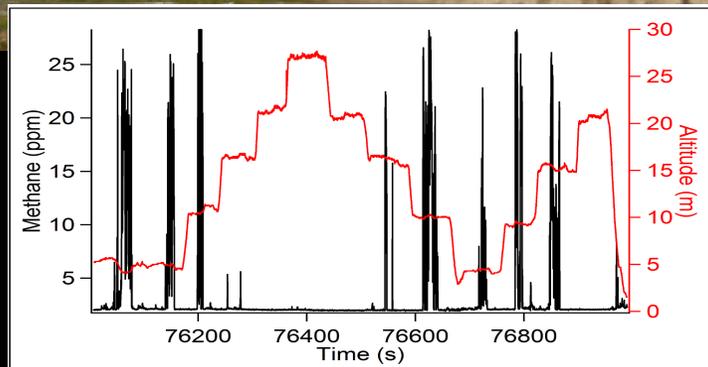
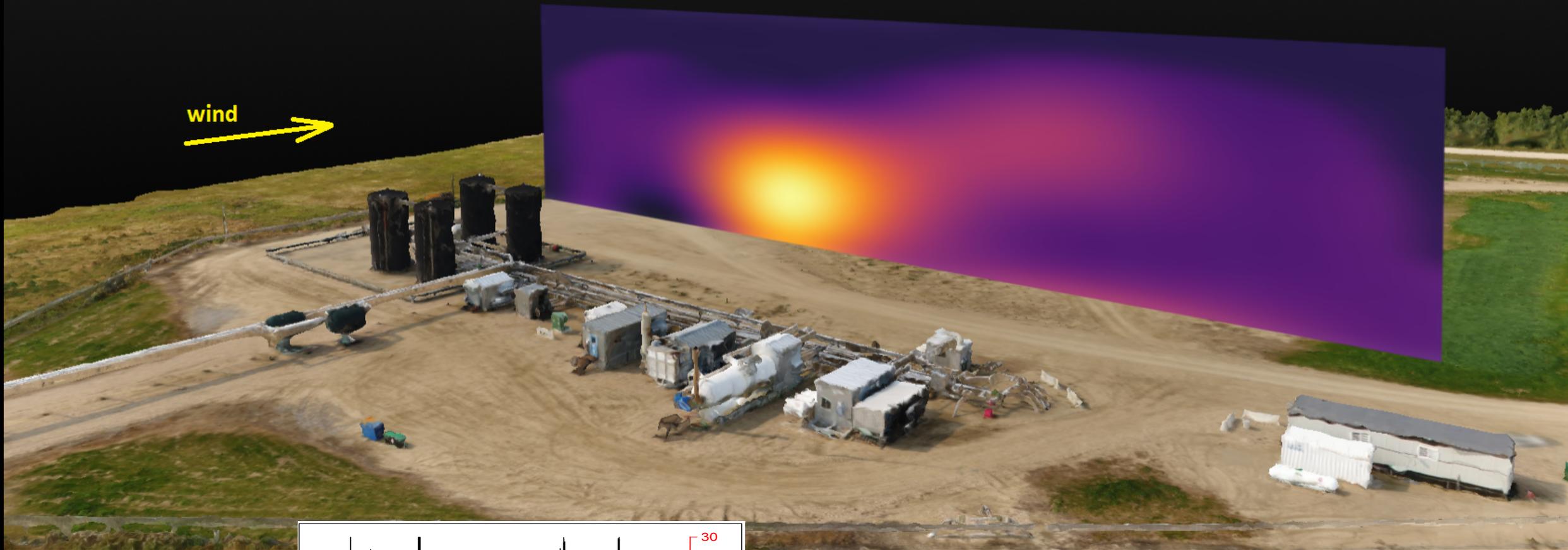
**Assume 500 SCFH expresses as 80 ppm 30 m away.  
Then at 180 m away, it should express at 2.2 ppm.**

# Up close: Leak Localization



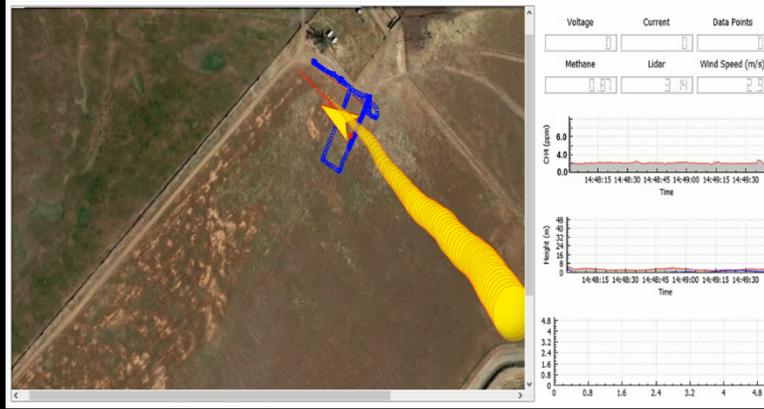
# Flux Measurement

wind →

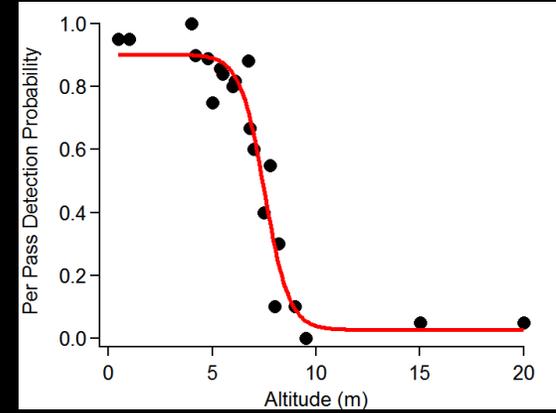


**3 Passes, 15 min  
+/- 50% uncertainty**

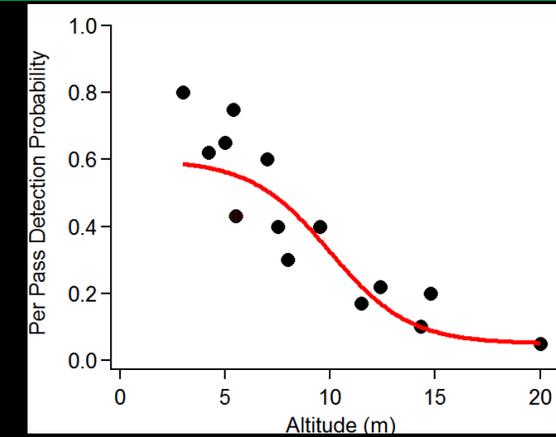
# Micrometeorology



**At 5 m  
altitude:  
85% per pass  
detection rate**



**At 5 m  
altitude:  
55% per pass  
detection rate**



# Ethane

Location A

Location B

