

# Characterizing Air Emissions from Natural Gas Drilling and Well Completion Operations in Garfield County, CO

Project update  
Prepared for Garfield County Board of County  
Commissioners  
Sep. 16, 2013  
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# Pre-Project Timeline

Colorado State University

- Sep 2011 – Initial meeting at CSU
- Oct 2011 – Meeting/field site tour in Garfield County
- Dec 2011 – Pre-proposal submitted
- May 8, 2012 – 1<sup>st</sup> Technical Advisory Committee (TAC) meeting
- May 2012 – Final proposal submitted
- Aug 2012 – Citizen Group Meeting in Rifle
- Aug 2012 – Garfield County presentation



# Project Timeline

Colorado State University

- Late Oct 2012 – Contract signed; project begins
- Dec 2012 – Operations committee meeting
- Nov 2012 - spring 2013
  - Equipment acquisition
  - Installation
  - Testing
- Spring - summer 2013 – Meet with operators for
  - Training
  - Measurement plan review/approval
  - Initial site identification and initial field operations
- Spring - summer 2013
  - Model development
  - Testing and optimization of tracer release strategies
- May 2013 – Participation in Encana Expo 2013



# 2013 Field Measurements

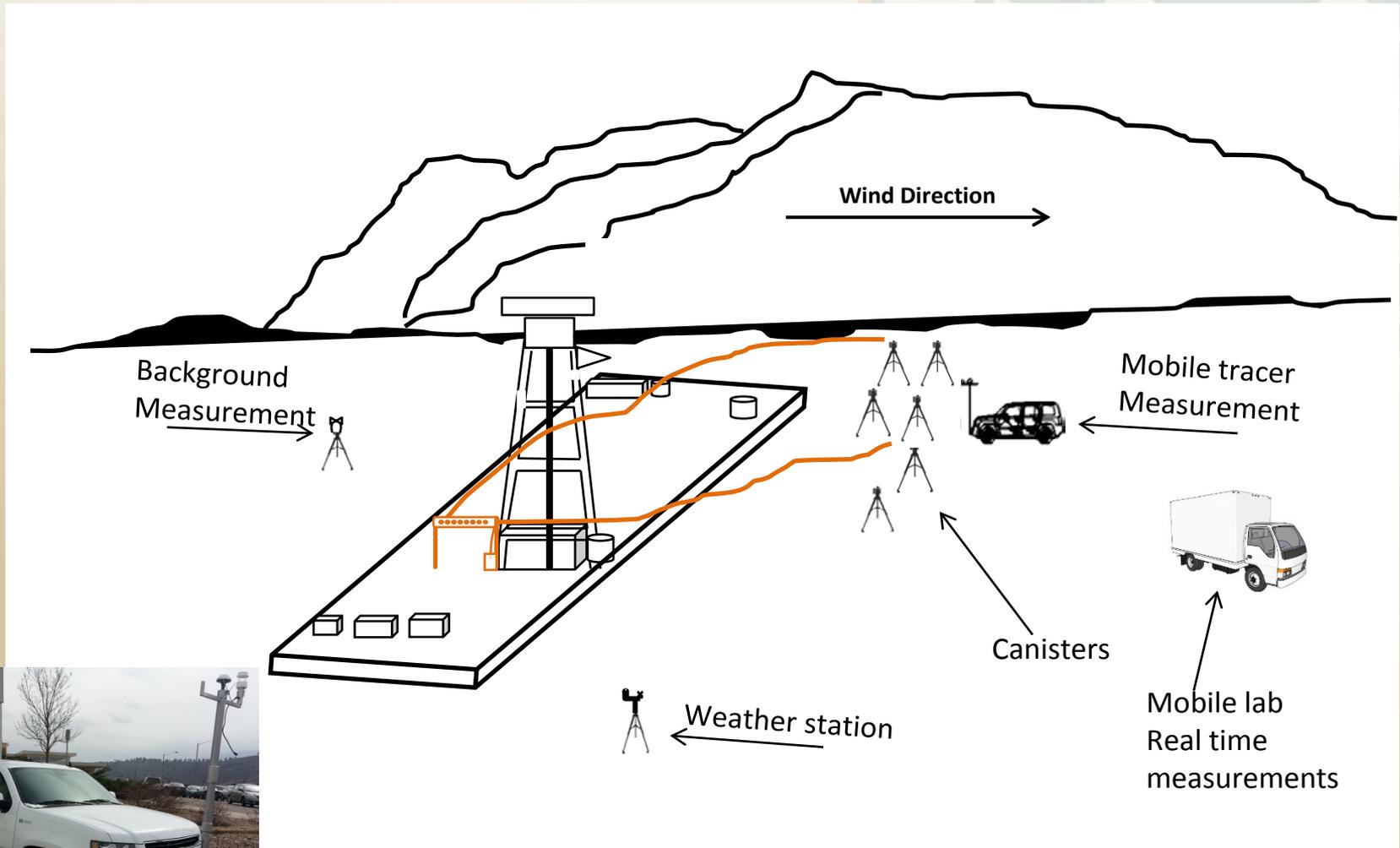
Colorado State University

- April 2013 – Measurements at site A
- July 2013 – Measurements at site B
- July 2013 – Additional measurements at site B
- April, June, August, and Sept 2013 – Tracer release and plume tracking tests at Christman field, Fort Collin, CO
- Sep 2013 (scheduled) – Measurements at site C
- Nov 2013 (scheduled) – Measurements at site B



# Typical Measurement Setup

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# Project Equipment

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## Mobile Plume Tracker



Canister triggering system

## Real Time Measurements Mobile Lab



# Field Tests of Tracer Release and Measurement System

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## Release of tracer gas (acetylene) and methane

*Location: Christman Field, Fort Collins, CO*

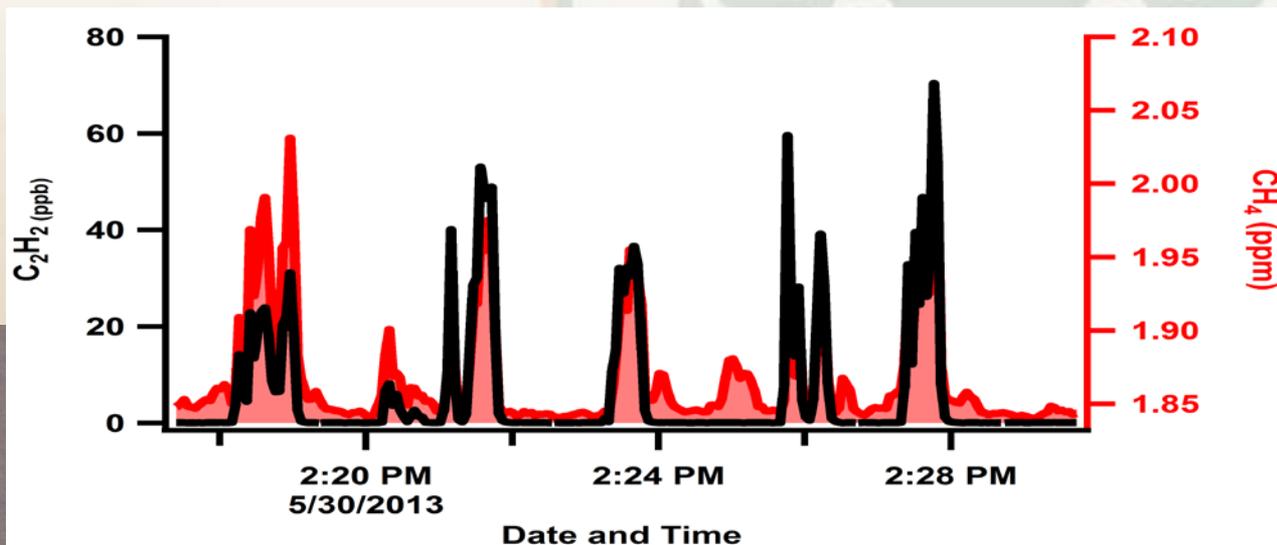
- Comparison of point vs. manifold release systems
- Co-located and mis-located tracer release tests
- Various release rates
- Diverse meteorological conditions
- These tests improve field tracer measurements, allow model testing, and help assess measurement uncertainty



# Sample Tracer Release Experiment

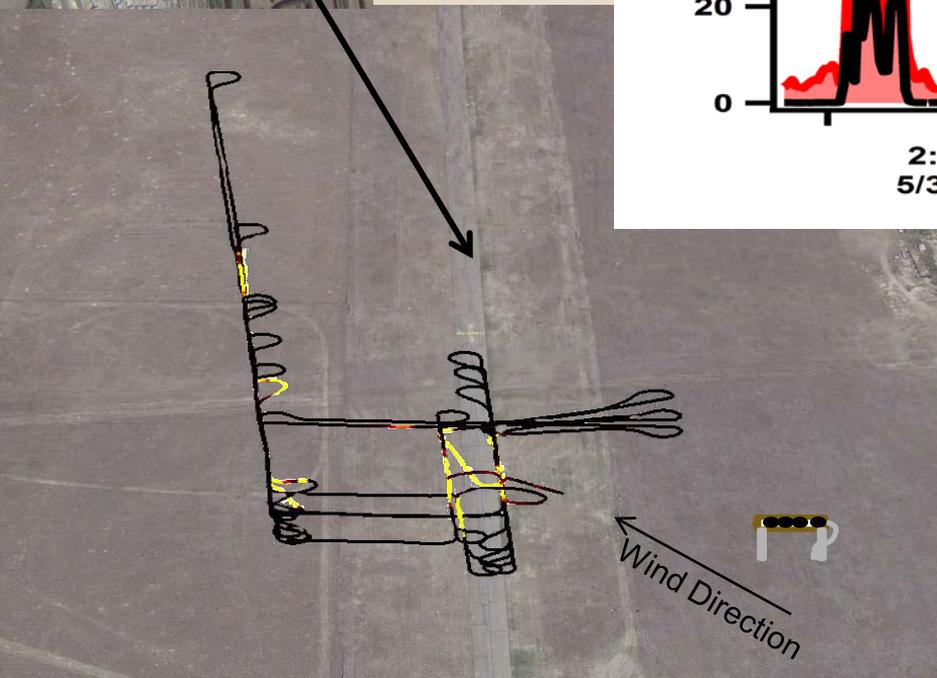
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Christman Field



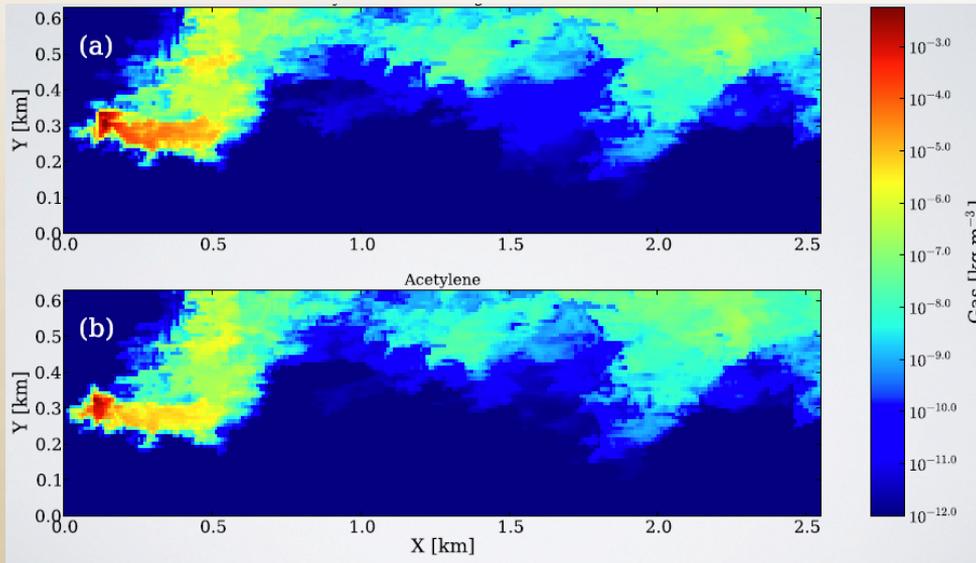
Released tracer and methane

View of plume trackers transects  
Observed tracer plumes are shown in yellow



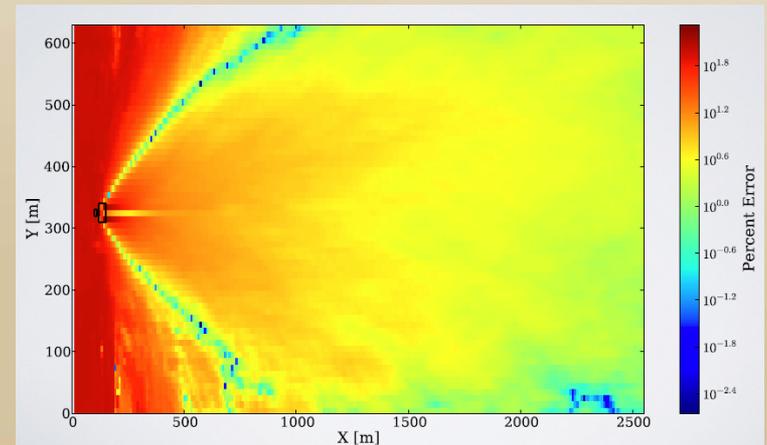
# Modeling Activities

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Model results for comparison of tracer and emission releases

Model results will be used with real time measurements to choose optimal canister locations



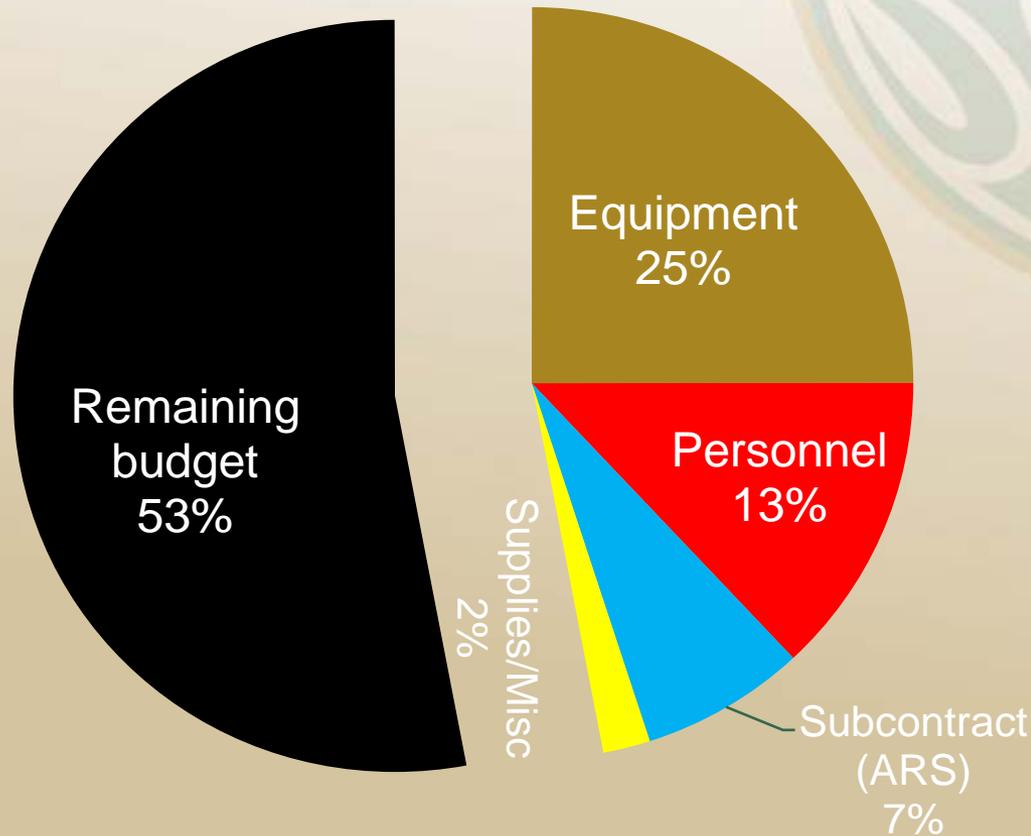
# Budget Overview

Colorado State University

- 3 year project (Nov. 2012-Oct. 2015)
- \$1.76M budget
  - University overhead costs waived
- Contributions from both industry and county
  - Contract with Garfield County signed late Oct 2012
  - \$800K sought in industry support
    - Three industry partners have provided, as gifts to CSU, between 33% and 100% of their \$200K pledges to date
    - Fourth partner now committed to \$200K; first payment expected soon



## Garfield County Contract Expenses



# Future Plans

- Sept. and Nov. 2013 – additional field emission studies
- Nov/Dec 2013 – 2<sup>nd</sup> TAC meeting
- 2014/15
  - Additional measurements
  - Data analysis
  - Modeling studies of emissions
  - Status reports to sponsors and TAC
- Fall 2015 – Study complete
  - Peer-reviewed publication
  - Publish final study report and data
  - Public presentation of findings

