U.S. DEPARTMENT OF ENERGY
Fossil Energy and Carbon Management

DOE FECM Methane R&D Program

Methane Controlled Release Satellite Testing

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September 3, 2024

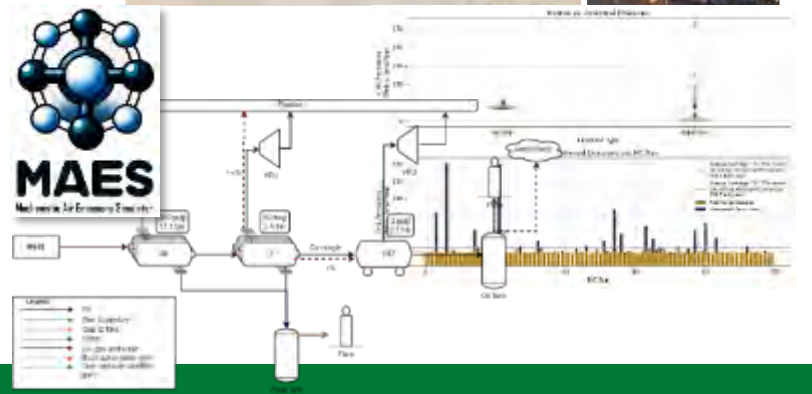

Source: Honeywell


Source: NETL


Source: Konica Minolta

Methane Emissions Technology Evaluation Center

1. **METEC Facility and Diverse Test Program**
   - Test leak detection solutions and aid / support solution developers at METEC facility and in field testing & development
   - Develop common methods for research or operations
   - Deliver results to operational community
   - Provide safety and operational guidance to first responders
2. **Field Measurements and Experiments**
   - “As operating” measurements across most sectors of NG industry
   - Specialty measurements for difficult / high impact sources
3. **Emissions Simulation**
   - MAES toolset for high temporal and spatial resolution simulation of O&G emissions – including (often confidential) data from operators
   - Use of field campaign data for measurement informed inventory from facility to basin scale



METEC 2.0

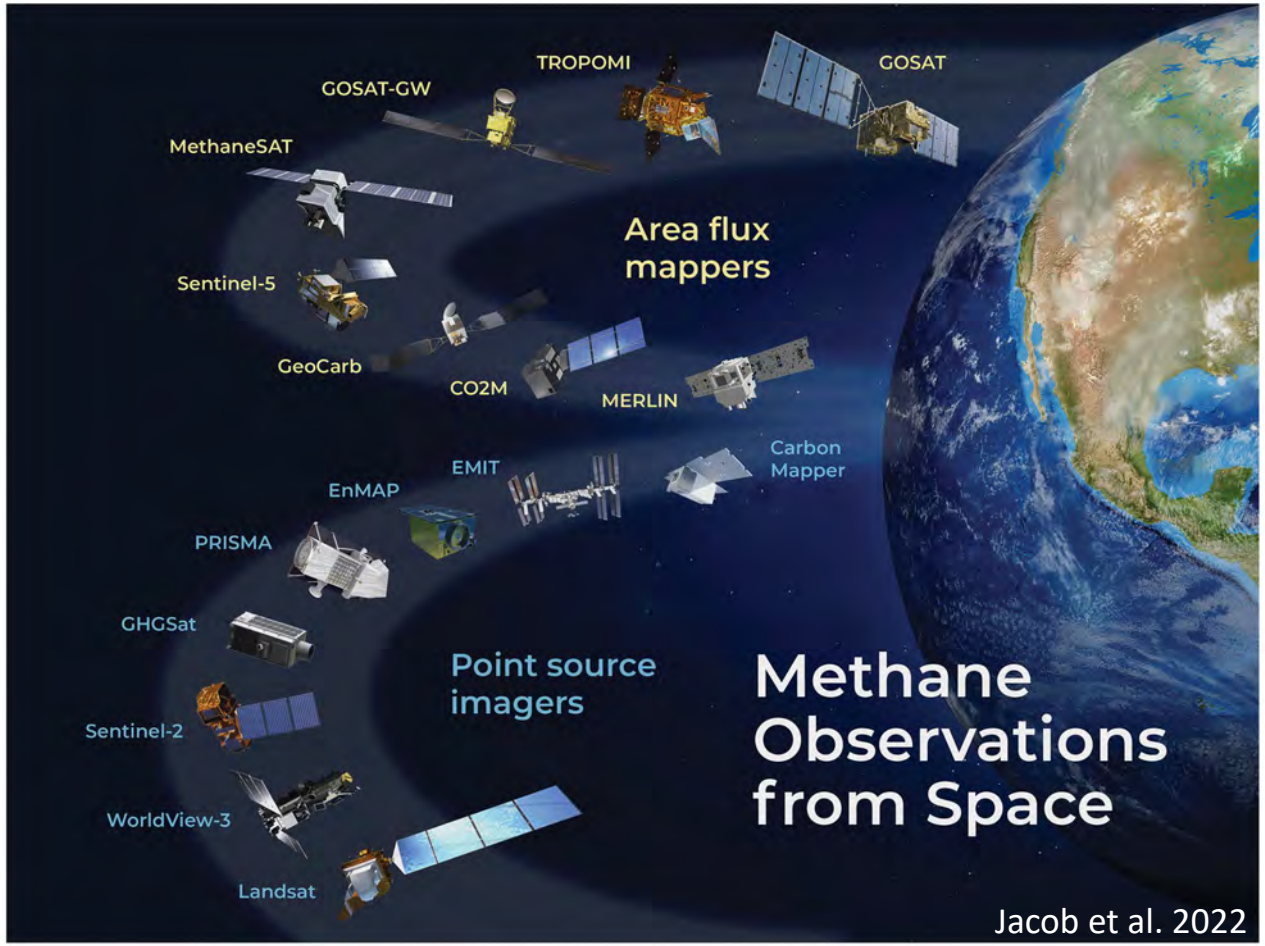
Increase the testing capabilities of the METEC facility, develop portable remote testing capabilities, and the associated control and analysis software.

- Task 2: METEC Facility Modernization
  - Increase complexity of site and emission points to make it more representative of today's facilities
- Task 3: Leak Detection and Quantification (LDAQ) Technology Testing
  - Leveraging synergy between ADED and METEC 2.0 to maintain testing momentum and support protocol development
- Task 4: Collect Large Data Sets to Improve LDAQ Analytics
  - Develop 8 Autonomous Methane Measurement Units (AMMU) to be deployed for data acquisition at more aerodynamically complex sites, and to be used in conjunction with the midstream and satellite testing campaigns.
- Task 5: Natural Gas/Hydrogen LDAQ
  - In support of DOE research efforts, extend LDAQ technology evaluation capabilities at the METEC site to include hydrogen (H2) and blended H2/natural gas transportation
- Subtask 6.1 – Expanding offshore testing capabilities
  - Design and develop an offshore methane emissions test facility and maintain it in operational condition for testing
- Subtask 6.2 – Expanding midstream and regional testing capabilities
  - Develop moveable controlled release systems to be sited at various host facilities for controlled testing at midstream locations with more complex facility types and meteorological conditions, and to support satellite testing

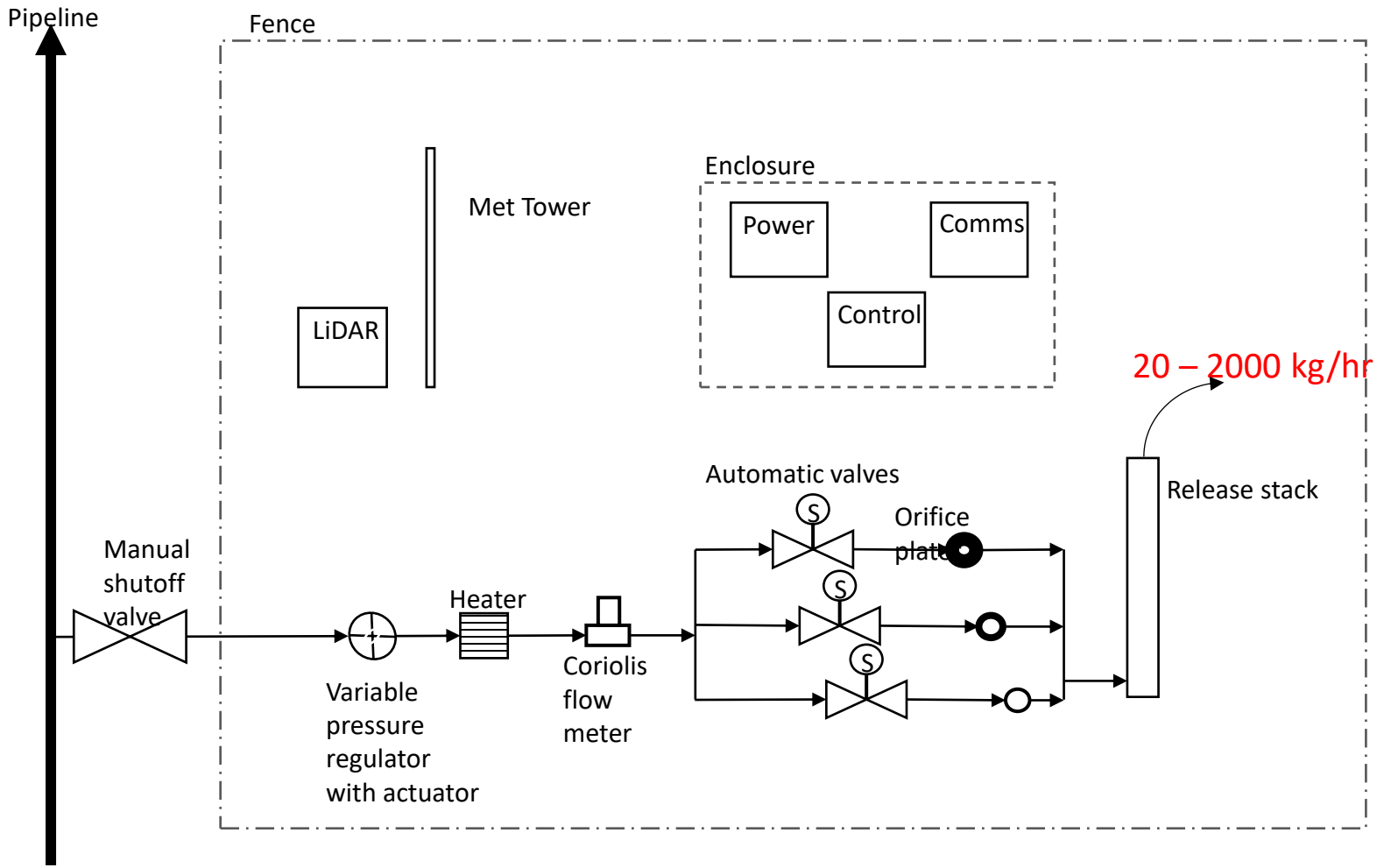
Task 6.2: Satellite Testing Protocol and Design

Satellite Testing Goal

Set up a controlled release system to emit a known amount of natural gas to the atmosphere to test satellite abilities to detect and quantify methane plumes.



Controlled Release Design



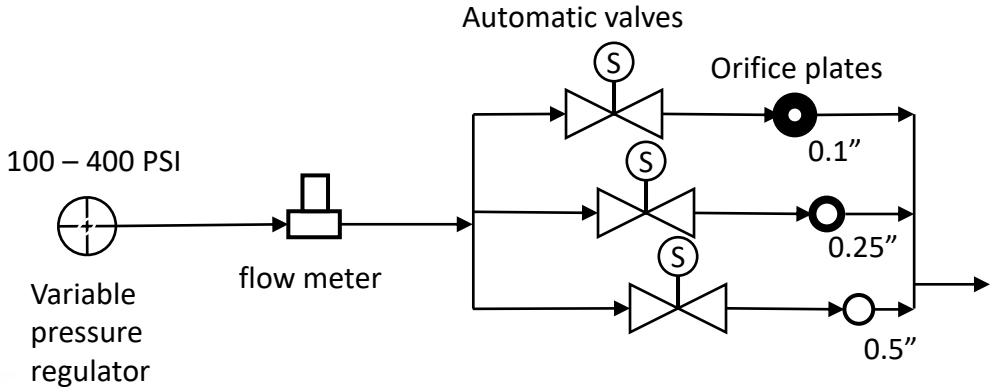
Main Flow Components

Pressure regulator
- Kimray EAI7P
- Kimray KSRADCWX

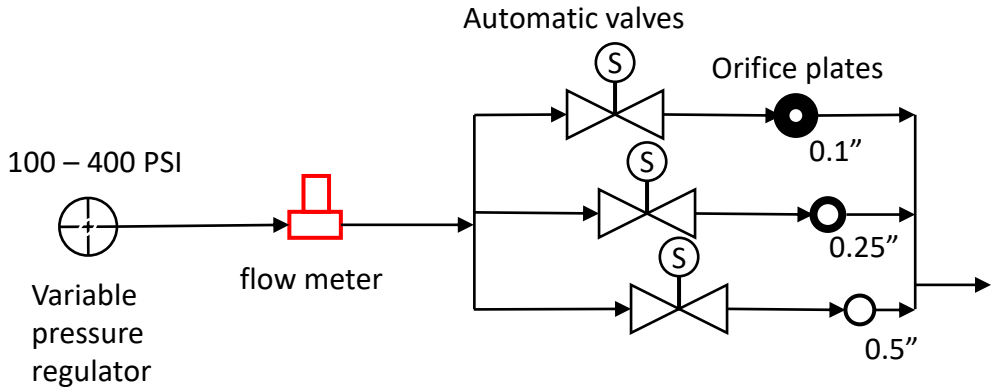
Flow meter
- Micro Motion ELITE Coriolis Meter

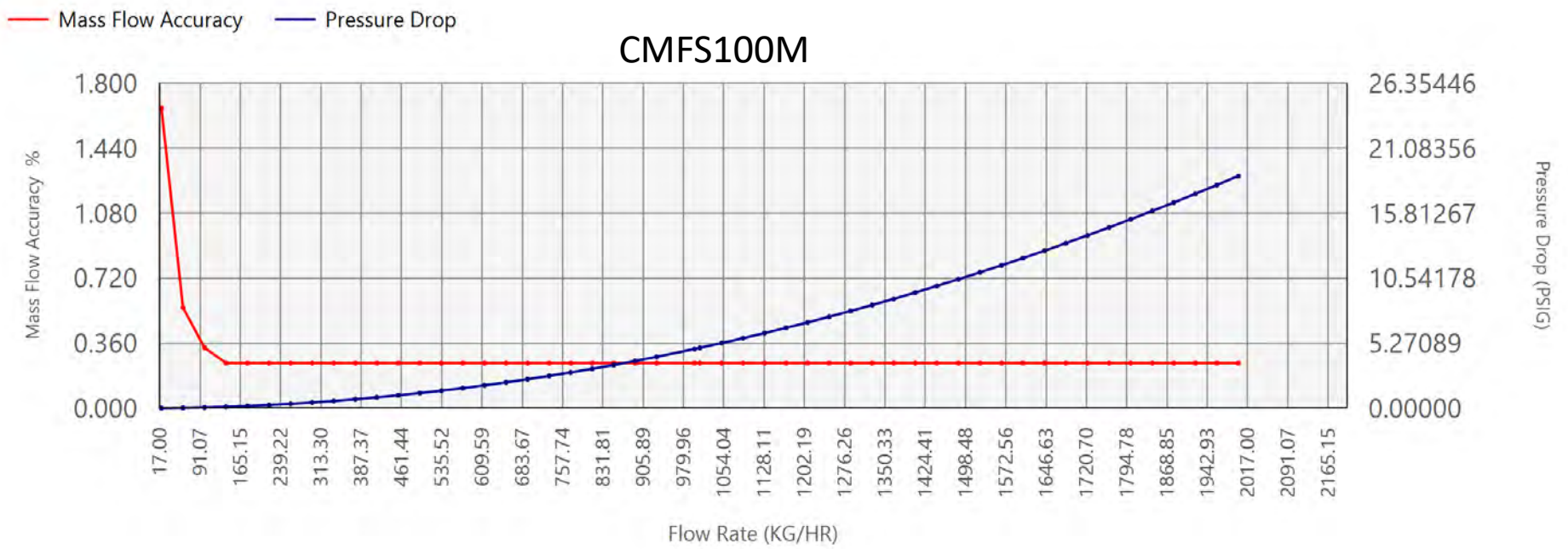
Automatic valves
- Magnatrol

Orifice plate/flow meter
- Rosemount

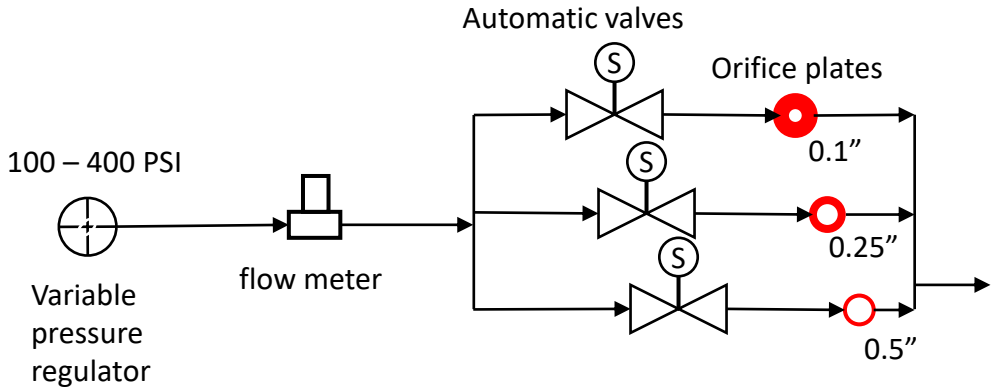


Maintaining Accurate Flow Control





Maintaining Accurate Flow Control



Diameter [in]	Upstream Pressure [PSI]	Flow [scfm]	Flow [kg/hr]
0.1	100	21	24
0.1	400	77	88
0.25	100	133	152
0.25	400	481	548
0.5	100	531	605
0.5	400	1923	2192

Operational Timeline

Satellite teams tell METEC when an overpass will occur.

METEC gets approval for release from pipeline operator

Two days before

Go/no go decision based on weather.

METEC communicates decision to satellite and pipeline operators

Morning of

20 – 2000 kg/hr CH_4

Controlled release event

Satellite teams provide METEC with measurement report.

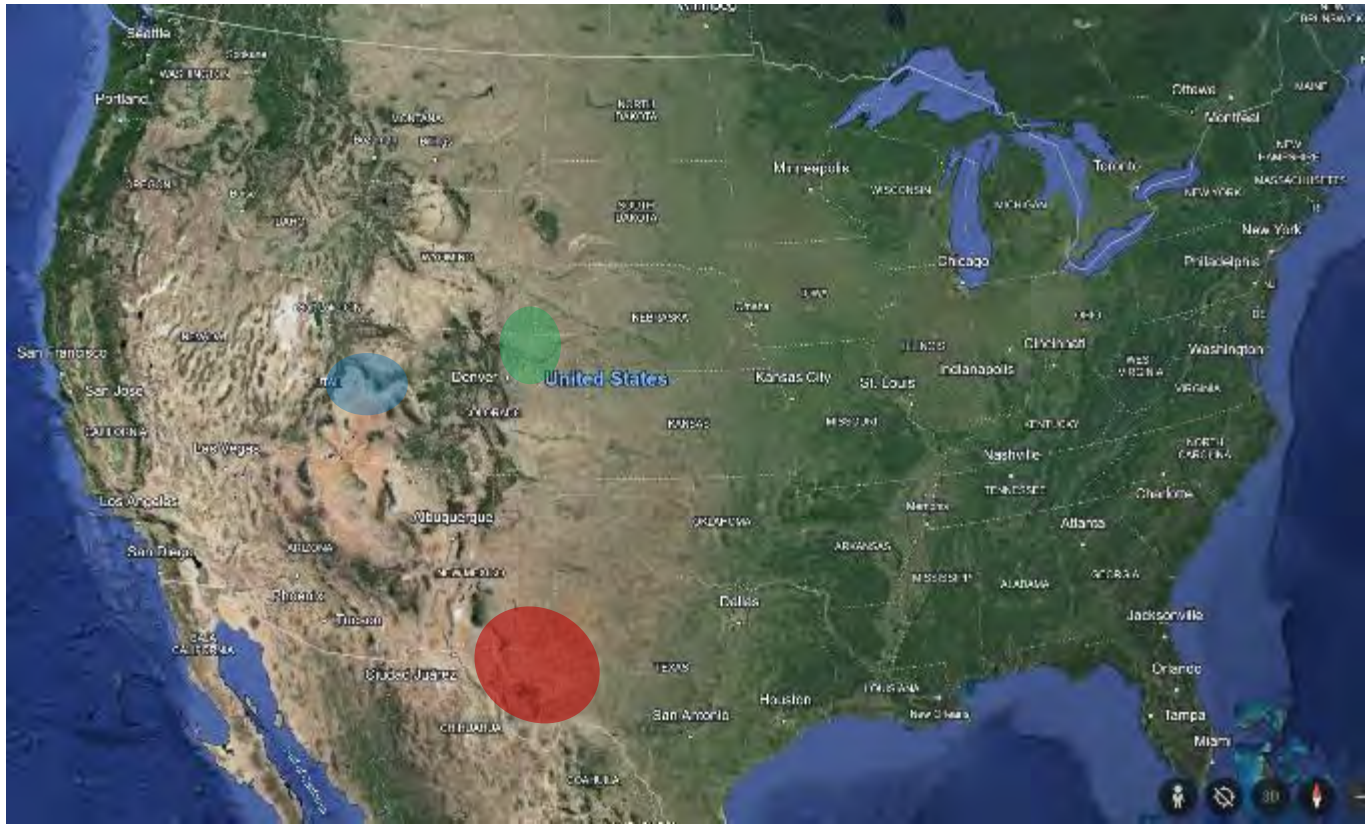
METEC shares release data.

Two weeks after

Location

Needs:

- Available gas source
- Far from other methane leaks or sources
- Low cloud cover
- Uniform surface
- On-site power (not crucial, but would be nice)



1. Denver Julesburg
2. Piceance
3. Permian

Location


Whitewater Creek Rd
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Whitewater Creek Rd
Whitewater Natural Gas Compression Station
Layers
3D
Google
100%
Data attribution
5/14/2022-newer
100 m
Camera: 3,304 m
38°59'28"N 108°23'07"W 1,489 m

Thank you

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