

## Motivation and Objectives

**Motivation:** Although the characterization of methane emissions has substantially improved in recent decades, there are still opportunities to close gaps in emissions detection, localization, and quantification efforts. Integration of data from various methane monitoring efforts, infrastructure databases, and oil and gas operators holds promise for addressing these gaps, improving understanding of methane emissions, and enhancing mitigation efforts.

**Objectives:** This project has two objectives:

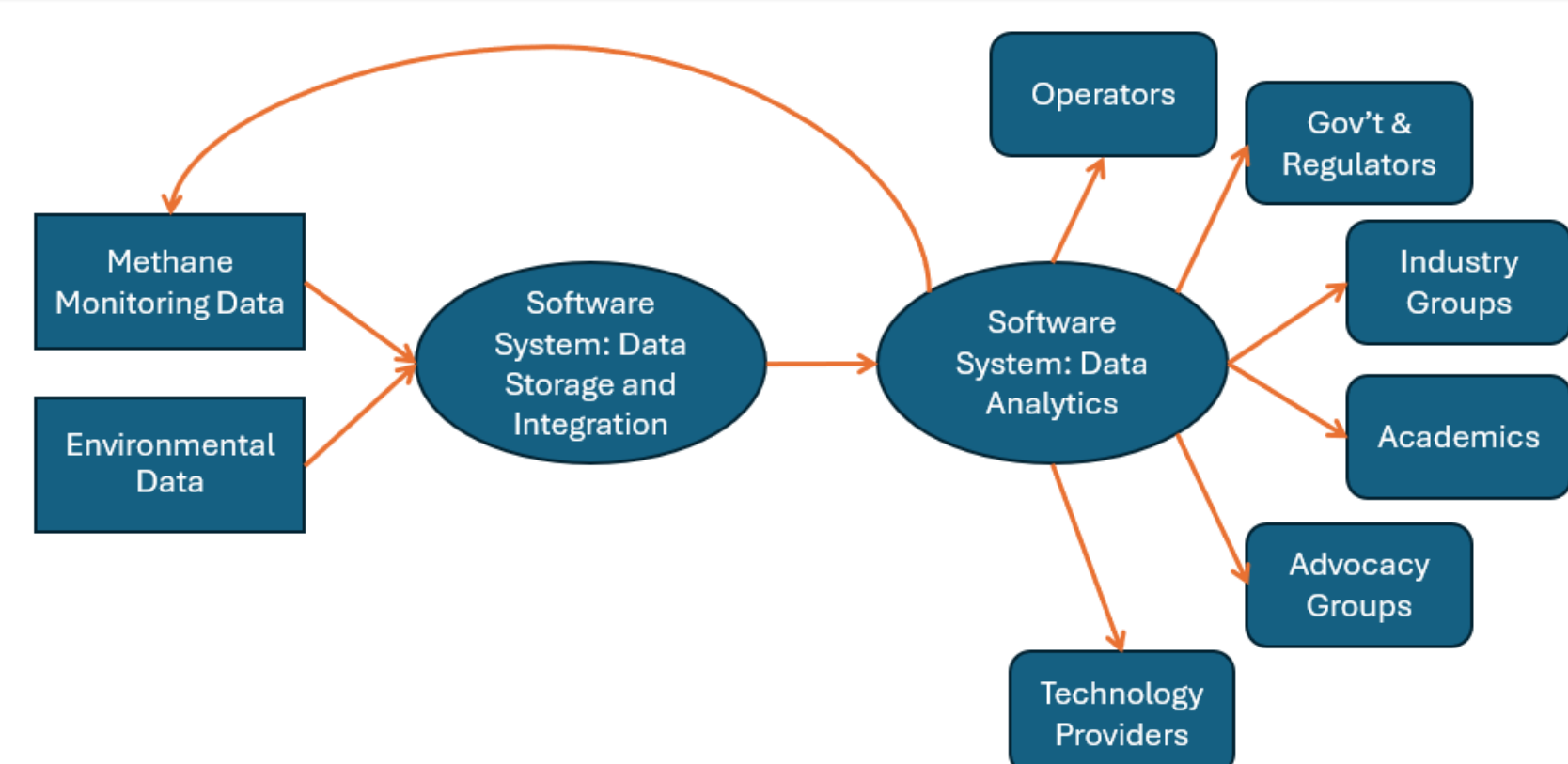
- (1) Gather requirements for an **integrated methane monitoring platform (IMMP)**, and
- (2) Create an **engineering, design, deployment, and operating plan (EDDOP)** to build an IMMP.

## Benefits and Value

Once fully deployed and operating, an IMMP would support data integration, transparency, and quality. These features would ultimately provide data and analytics that support decision-making and analysis that would:

- Reduce the frequency and duration of super-emitters by providing alerts and insights into their causes,
- Integrate top-down and bottom-up technologies to improve emissions estimates,
- Improve emissions understanding along the natural gas supply chain,
- Integrate with existing state or national emissions inventories,
- Guide selection of monitoring technologies that are efficient and cost-effective,
- Support MMRV efforts, and
- Enable communities and various stakeholders to access and understand methane emissions data.

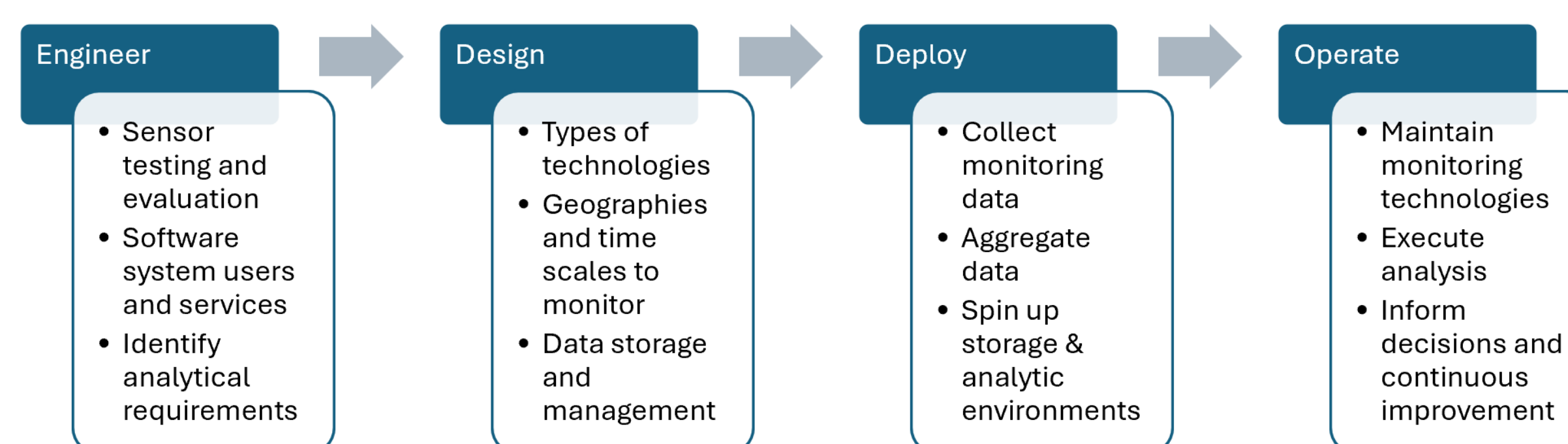
## Integrated Methane Monitoring Platform



An integrated methane monitoring platform (IMMP) is defined as a collection of methane detection and measurement tools acting at all levels (surface, aerial, satellite), coupled with environmental sensing tools (e.g., wind speed and direction), across multiple temporal frequencies and across a wide geographical range, the collected data from which is processed and analyzed using appropriate models via centralized software system, to deliver accurate estimates of oil and natural gas sector methane emissions, both chronic background volumes and super-emitter volumes, on a relatively continuous fashion.

## Approach

- **Industry engagement:** use learnings from GTI's previous and current efforts interacting with industry experts to inform platform design
- **Technical advisory panel (TAP):** convene a panel of methane emissions experts to meet periodically and discuss considerations for informing platform design.
- **Public outreach and environmental justice:** work with GTI Energy's community benefits team to engage with communities to inform design requirements.
- **Requirements gathering:** document functionality, usability, reliability, performance, and security (FURPS) requirements that will inform the software system
- **Develop EDDOP:** create the engineering, design, deployment, and operating plan



## Partners

- Colorado State University: TAP participants
  - Dr. Joe von Fischer: local distribution and environmental justice experience
  - Mr. Dan Zimmerle: upstream and midstream measurement expertise
  - Dr. Anna Hodshire: upstream and midstream measurement expertise
- University of Michigan: TAP participant Dr. Eric Kort, large-scale monitoring expertise
- Scarfe Consulting: Danielle Scarfe, consultant with application engineering expertise



## Industry Engagement

The project team is utilizing GTI Energy's and our partner's experience in the oil and natural gas industry to inform the EDDOP for an IMMP. This effort includes drawing guidance from the following efforts:

- Center for Methane Research: a consortium of local distribution companies that collects and disseminates fundamental scientific information on methane emissions
- Veritas: technology-neutral, science-based protocols for measuring methane emissions to develop measurement-informed emissions inventories
- iM4 AOI-2 Project: DOE-funded iM4 Project Astra to develop an innovative sensor network and analytics to monitor methane emissions from the Permian Basin
- iM4 AOI-3 Project: DOE-funded iM4 project to measure and estimate methane emissions in the Haynesville Basin using multiple measurement methods
- iM4 AOI-5 Project: DOE-funded iM4 project to measure and estimate emissions from storage tanks

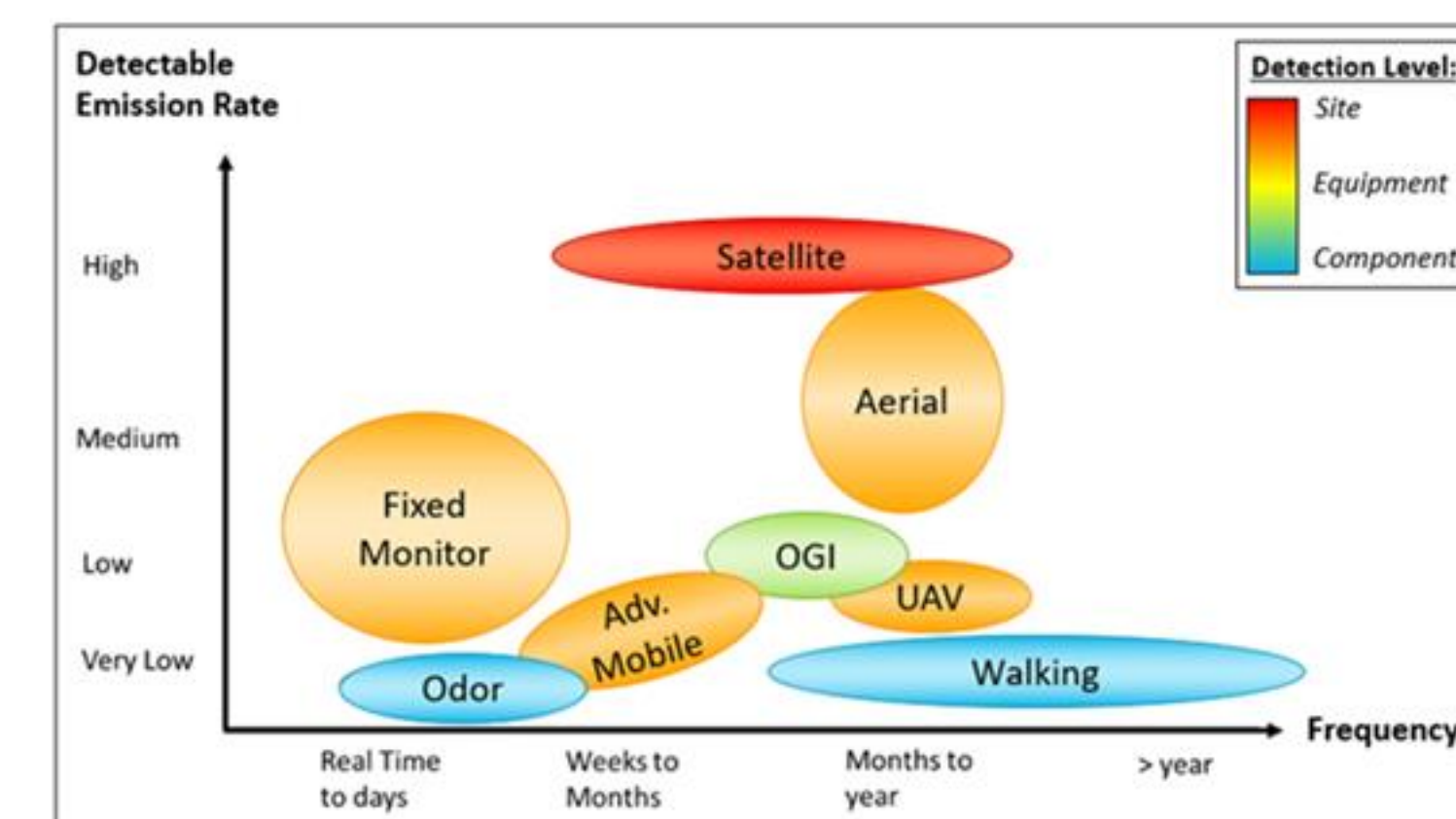


Developing Innovative Methane Measurement, Monitoring, and Mitigation (iM4) Technologies Across the U.S. Natural Gas Supply Chain

## Monitoring Technology Considerations

Important considerations for technology selection:

- Capabilities for
  - detection,
  - localization/attribution, and
  - quantification
- Spatial & temporal scale and coverage
- Cost
- Integration with operations



## Challenges, Barriers, Risks

- Cost to deploy, operate, and maintain monitoring technology and software platform
- Rapid development of new monitoring technologies and mitigation solutions
- Barriers to data sharing by industry partners
- Variety of potential users
- Data governance and security concerns
- Lack of standards for data formatting and analysis techniques



## DEIA Plan, Public Engagement, Environmental Justice

Implementation Strategies

- Conduct outreach to diverse stakeholders near methane impacted communities to complete a socioeconomic, public health, environmental factors survey to gather community needs to inform requirements
- Leverage DOE funded iM4 AOI-5 community engagement meetings
- Conduct DEIA & EJ training with technical staff and project partners

Survey on Community Priorities



## Planned Work

- Collect and incorporate additional input from the technical advisory panel
- Engage with additional industry stakeholders, especially technology providers
- Identify additional needs to support community benefits, DEIA, and environmental justice uses of the platform
- Finish requirements gathering and make final decisions on requirements
- Complete engineering and design plans using finalized requirements
- Develop a phased deployment and operating plan

## More Information and Contact

- Scan the QR code to visit GTI Energy's iM4 website
- Email: [GHGcommunity@gti.energy](mailto:GHGcommunity@gti.energy)
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