iPIPE
INTELLIGENT PIPELINE INTEGRITY PROGRAM

Satelytics

SUCCESS STORY No. 1

iPIPE Selection of Satelytics

In May 2018, iPIPE held its first technology selection event, hosting seven technology providers from around the world. The technologies presented included novel external leak sensors, advanced drone-based pipeline monitoring, miniaturized smart pigs, and earth-orbit monitoring solutions. iPIPE members openly expressed excitement in the first round of technology choices, saying that they would fund every one if they had the financial resources to do so.

Of these first seven emerging technologies presented, iPIPE selected two technologies for its inaugural efforts to assist in development of new tools for pipeline operators: Satelytics and Ingu Solutions' Pipers®.

Satelytics is a cloud-based software suite that applies proprietary algorithms to multispectral imagery, resulting in the identification, location, and measured concentrations of chemical constituents. Satelytics applies artificial intelligence and machine learning to positively identify liquid pipeline leaks. Satelytics is able to process data from a variety of sources, including satellites, drones, stratospheric balloons, airplanes, fixed cameras, or any combination of data sources.

Figure 1. Example of Satelytics leak detection.

Three Phases of Development Activities with iPIPE

Satelytics has achieved repeated success with iPIPE, obtaining something the program did not anticipate: three successive awards for development activities. After three phases of development work to mature the product, iPIPE Satelytics can be an effective tool for use by pipeline operators.

Phase I (2018)

- Feed existing hydrocarbon detection algorithms with a large quantity of data over 16 weeks.
- Provide groundtruthing to improve algorithm accuracy.
- Develop new brine detection algorithm.

Phase II (2019)

- Continue improving accuracy of hydrocarbon algorithm.
- Feed data to new brine algorithm.
- Hone the functionality of a new mobile platform to enable use in low-cellular-coverage areas.

Phase III (2020)

- Continue improving accuracy of hydrocarbon and brine algorithms.
- Investigate accuracy in winter months.
- Explore use of hyperspectral instruments.
- Demonstrate drone data pathway.

Real World, Real Results

During three separate 16-week monitoring campaigns, iPIPE subjected Satelytics to blind tests that simulated leaks of varying sizes, shapes, locations, and fluid types. Satelytics performed well, and the data provided served to validate the capabilities and limits of Satelytics technology.

During these campaigns, iPIPE members also experienced real leaks from pipelines and other oilfield hardware. Satelytics also captured these leaks, resulting in significantly diminished cleanup costs. In one instance, the pipeline operator (who is also a founding member of iPIPE) reported that the identification of a 400-barrel leak, because it was caught early, potentially saved the company more than a million dollars in remediation costs that would have resulted had the impacted soil continued to grow in size (see Figures 2 and 3).

Thus, the mission of iPIPE — to put new tools into the tool belts of pipeline operators — had its first success. This tool has been validated with real-world results, both staged and inadvertent. The members of iPIPE are pleased that their efforts have helped to develop this advanced tool.

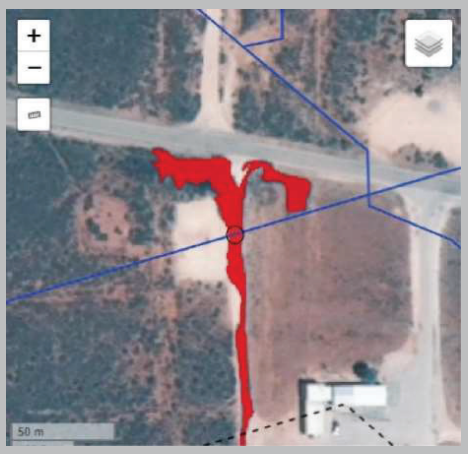

Figure 2. *Actual leak identified.*

Figure 3. *Actual small leak identified.*

iPIPE Development Leads to a Potential Global First?

Satelytics has achieved repeated success with iPIPE. Each year of success has matured the technology to the point where it is now ready for wide-scale commercial application, due, in part, to the efforts of iPIPE members to codevelop this technology.

In fact, several iPIPE members are now behind an effort to apply Satelytics monitoring of oil and gas assets across the state of North Dakota using a first-of-a-kind model that shares costs across many oil and gas companies to achieve a service cost approximately equivalent to currently used aerial services for monitoring of pipelines and oilfield assets. This approach promises not only cost neutrality but also greatly improved accuracy and history functions to positively identify ownership and history of issues revealed by Satelytics. The model will likely spread to other areas of the nation once the commercialized application proves beneficial in North Dakota (Figure 4).

Figure 4. *Proposed areas for commercial monitoring.*

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