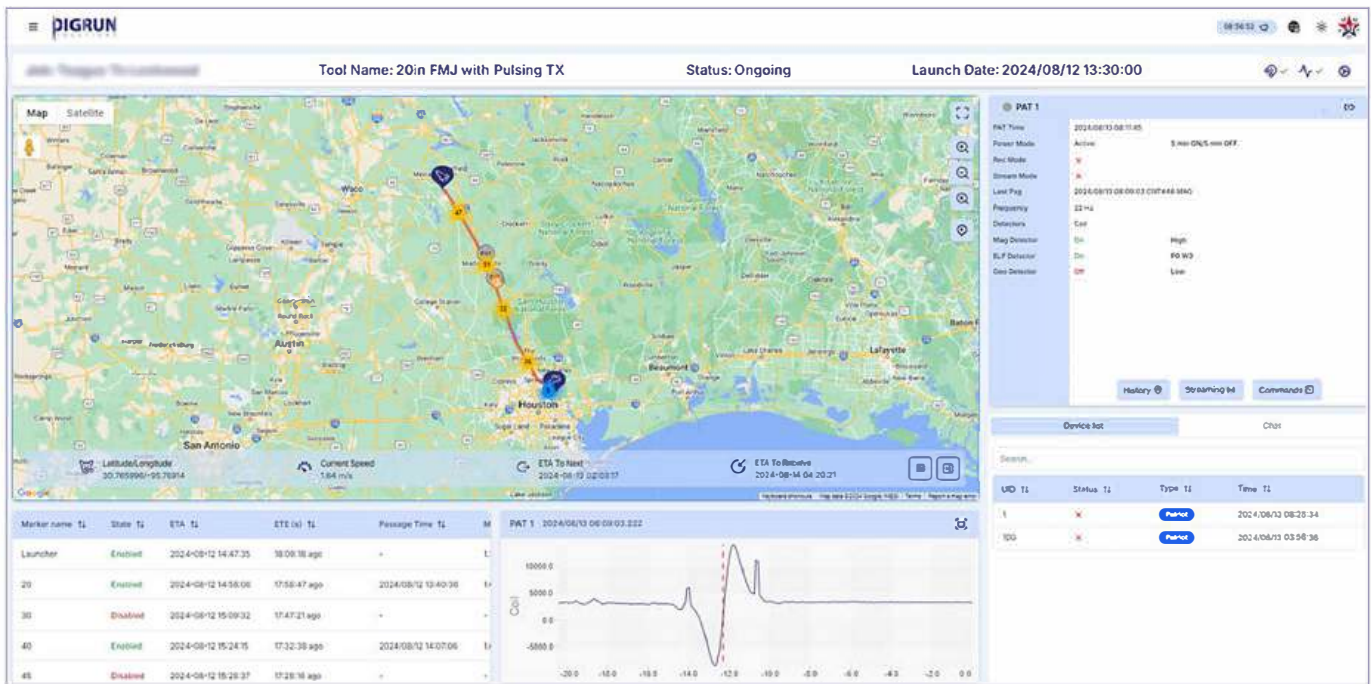


## OVERVIEW

At PigRun Solutions, we are dedicated to advancing pipeline pig tracking technology by developing the Patriot (PAT) AGM and Patrack Dashboard. These tools are designed to meet and exceed industry standards for safety, efficiency, and reliability. Recognizing the market's need for high-quality Above Ground Marker (AGM), we developed PAT AGM to address critical gaps in existing solutions, focusing on affordability, safety, and ease of use. This project aimed to demonstrate the effectiveness of these solutions in real-world conditions, validating their role as both pig tracking and remote monitoring tools.



## PROJECT SUMMARY

This project was a collaborative effort between PigRun Solutions and McDonald OilField Operations located in Damon Texas. The operations involved tracking their 20-inch Full Metal Jacket (FMJ) Utility Pig equipped with magnets and pulsing transmitter.

The job commenced on Monday, August 11, 2024, and concluded on August 14, 2024, with the pig successfully trapped. A total of 30 marker locations were tracked with PAT AGMs by the tracking teams. Despite some marker locations being inaccessible or difficult to reach, the primary objective was to capture as many pig passages as possible while always knowing the location of the pig and evaluate the performance and ease of use of the PAT AGM.

## SOLUTION: PATRIOT AGM

Patriot AGM is a cutting-edge device specifically designed to meet the rigorous demands of pig tracking in the oil and gas industry. In this project, PAT AGM played a crucial role in monitoring and recording the movements of a 20-inch FMJ pig along the pipeline.



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## ADVANCED TRACKING AND DATA COLLECTION

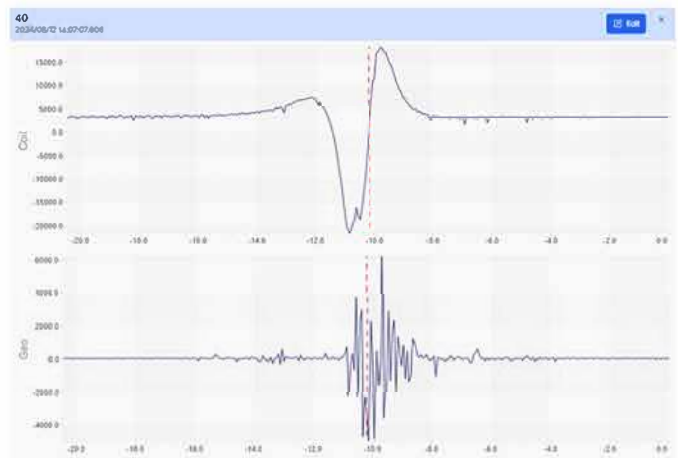
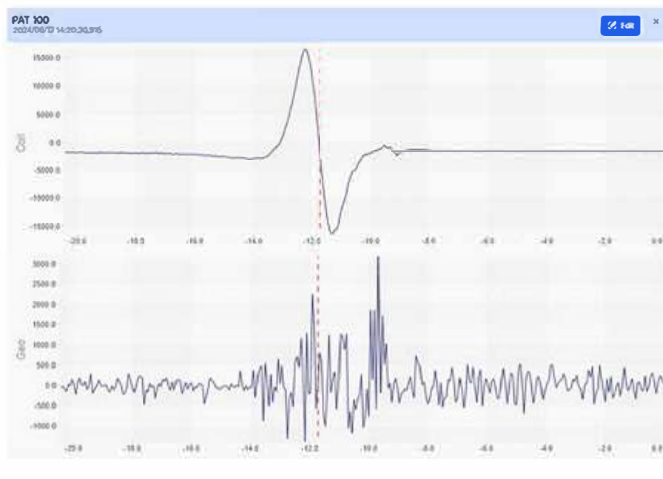
Equipped with a built-in geophone and electromagnetic antenna, PAT AGM offers dual-sensing capabilities. The geophone detects ground vibrations as the pig passes through the pipeline, as well as weld activity, ensuring precise detection of pig movements. The electromagnetic antenna collects the environment's electromagnetic waves, which are then processed using advanced digital signal processing techniques to convert them into magnetic and 22Hz signals. These signals can be recorded or used for automatic detection of pig passages or streamed to the phone app or Patrack dashboard.

To ensure no critical data is lost, PAT AGM is equipped with an SD card for continuous recording. Each data point is time-stamped and synchronized with the device's GPS module, which also provides accurate location data. This comprehensive data collection enables detailed post-operation analysis.

## SEAMLESS COMMUNICATION AND DEPLOYMENT

PAT AGM is designed with modern communication technologies, featuring a Bluetooth chip for mobile application connectivity and a cellular modem for real-time data transmission to the Patrack Dashboard. This allows operators to monitor the pig's progress remotely without delays.

During the project, two trackers per shift deployed PAT AGM boxes across 30 marker locations. The straightforward deployment process, coupled with the device's robust design, allowed for efficient setup, even in challenging conditions. Once deployed, the AGMs autonomously recorded and transmitted data minimizing the need for manual intervention.



## RELIABILITY AND EASE OF USE

PAT AGM offers an intuitive interface and reliable performance, making it a vital tool in this operation. Its consistent performance, even in difficult environments, ensured the success of the project, demonstrating its effectiveness as both a pig tracking and remote monitoring solution.



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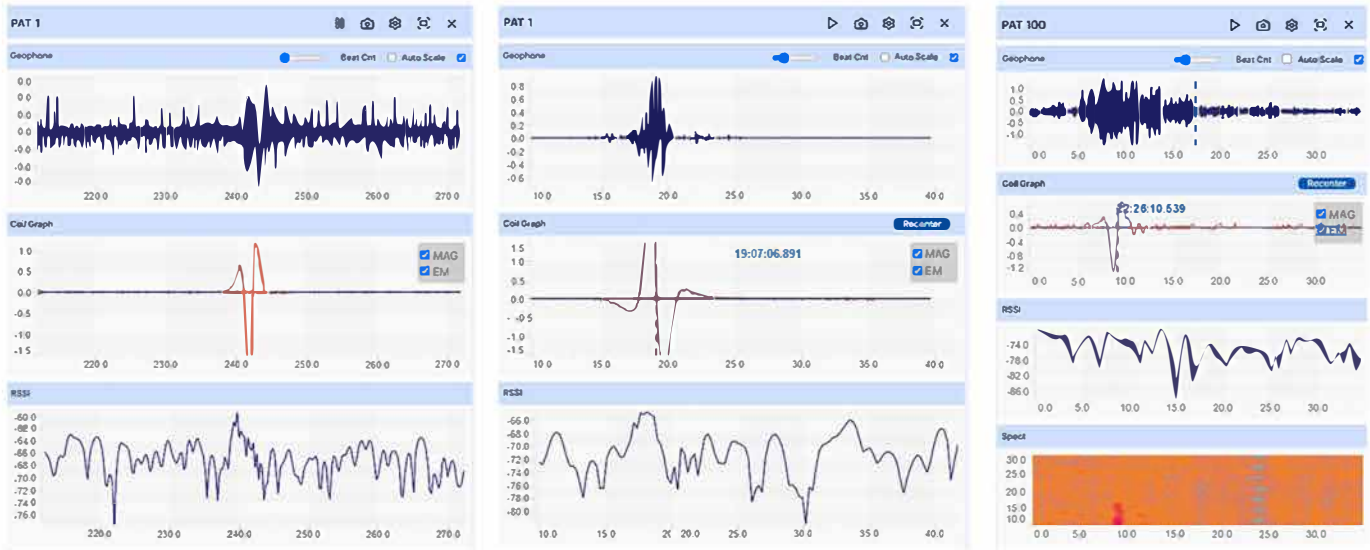
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## SOLUTION: PATRACK DASHBOARD

The Patrack Dashboard is a powerful and versatile web-based platform that serves as the central hub for all operations involving PAT AGM boxes. Designed to meet the needs of the modern pipeline industry, the Patrack Dashboard allows users to connect and communicate with any active PAT AGM box from anywhere in the world.



## COMPREHENSIVE DATA ACCESS AND REAL-TIME VISUALIZATION

The Patrack Dashboard provides comprehensive access to the historical data of each PAT AGM box, including box settings, coordinates, diagnostic information, and pig passage data. The dashboard's advanced sorting and filtering capabilities make it easy to find and analyze specific records.

The dashboard also offers real-time streaming capabilities, allowing users to stream live data directly from PAT AGMs. This generates real-time graphs of MAG, ELF and Geophone signals, providing immediate visualization of the pig's movements. Additionally, users can listen to the geophone's audio signal in real-time, offering auditory confirmation of the pig's passage through the pipeline. This combination of visual and audio data ensures a complete understanding of the pipeline's status at any given moment.



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## ENHANCED FEATURES AND PROJECT MANAGEMENT

Beyond basic tracking functionalities, the Patrack Dashboard includes tools for managing entire pipeline projects. Users can create PigRun jobs, import pipeline data, interact with marker locations, and manage tracking logistics. The project management section is continually improved to meet evolving user needs. The dashboard also supports the uploading and visualization of data recorded on the Patriot AGM's SD card, providing a comprehensive view of all collected data. To enhance team collaboration, the Patrack Dashboard features a group chatting service that automatically creates dedicated group chats for each tracking job, facilitating real-time communication among tracking teams. Notifications are sent based on subscribed events, keeping users informed and responsive.



## REPORTING AND CONTINUOUS IMPROVEMENT

At the conclusion of each tracking job, the Patrack Dashboard generates detailed reports summarizing pig passages and providing critical information about the run. These reports are essential for post-operation analysis, helping users review the performance and outcomes of their tracking efforts.

PigRun Solutions is committed to the continuous improvement of the Patrack Dashboard, heavily investing in its development to ensure it remains a cutting-edge solution that meets the needs of our partners.

## RESULTS

The deployment of the Patriot AGM boxes and the use of the Patrack Dashboard during this project yielded highly positive results, demonstrating the effectiveness and reliability of these tools in real-world conditions.



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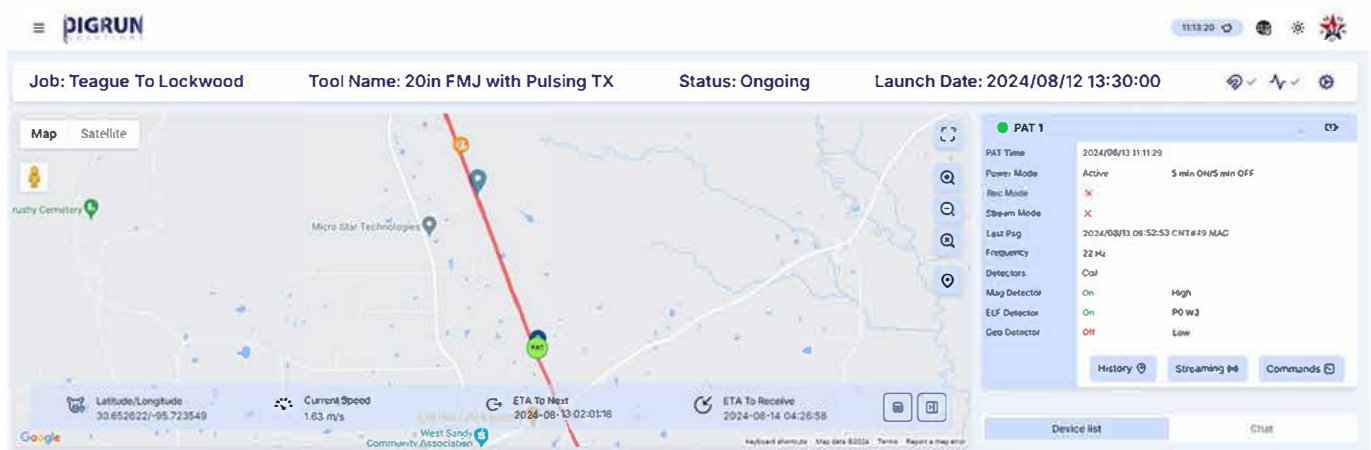
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## EFFECTIVE PIG TRACKING AND REAL-TIME INTERACTION

Over the course of the project, Patriot AGM boxes successfully tracked and recorded pig passages at 30 out of the 30 designated marker locations which they were used at. The real-time streaming capabilities of the Patrack Dashboard allowed users to monitor live data, generate real-time graphs, and listen to geophone audio signals as the pig passed, ensuring that no critical events were missed.

## ENHANCED COLLABORATION AND PROJECT MANAGEMENT

The Patrack Dashboard's group chatting and project management features played a key role in coordinating the efforts of the tracking teams. Real-time communication between day and night shifts facilitated seamless information transfer, contributing to the smooth execution of the project.



## COMPREHENSIVE REPORTING AND SYSTEM PERFORMANCE

At the conclusion of the project, the Patrack Dashboard generated detailed reports summarizing the pig passages and providing critical information about the run. These reports offered valuable insights into the performance of the Patriot AGM boxes and the overall success of the tracking operation, validating the effectiveness of the technology.



## CONCLUSION

The results of this project clearly demonstrated that the Patriot AGM and Patrack Dashboard are powerful tools for pipeline tracking. The success of this pilot test with McDonald OilField Operations marks a significant step toward broader adoption of this technology in the industry. The positive outcomes from this project underscore PigRun Solutions' commitment to delivering innovative, reliable, and user-friendly solutions that enhance the safety and efficiency of pipeline operations.



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