

# Enhancing Field Operations

## The Value of ACSL for Ameren's Drone Pilots



# Ameren, a leading utility provider in the Midwest, manages a vast network of natural gas and electric infrastructure across challenging and varied environments

Traditional inspection methods—manual mapping and on-foot surveys—are labor-intensive, time-consuming, and can pose safety risks to personnel. To overcome these challenges, Ameren collaborated with ACSL to integrate advanced drone technology into its inspection operations, enhancing both efficiency and data accuracy.

This whitepaper explores the implementation of ACSL's SOTEN drone and TENS0 smart controller within Ameren's inspection workflows, highlighting the specific advantages of these tools for field operators. The SOTEN drone offers secure, high-resolution data capture essential for precise asset monitoring, while the TENS0 controller provides user-focused features, such as high screen brightness and customizable controls, which allow operators to adjust settings quickly and effectively—even when facing glare, low light, or highly reflective surfaces.

Ameren's integration of ACSL's technology has led to significant operational improvements, particularly in high-demand areas like natural gas storage facilities, where complex layouts across large acreages present unique visibility and maneuverability challenges. The TENS0's customizable buttons and in-flight handoff feature also allow Ameren's operators to maintain continuous data review and adapt quickly to changing environmental conditions without compromising flight safety.

With Ameren's existing BVLOS (Beyond Visual Line of Sight) capabilities, ACSL's solutions further enhance mission flexibility by enabling seamless control transfer between pilots over large distances. This flexibility allows Ameren to maximize its inspection reach, leveraging both VLOS and BVLOS operations in a compliant and efficient manner.

As Ameren continues to scale its inspection operations, the collaboration with ACSL exemplifies how tailored drone technology can elevate infrastructure inspection standards, setting a new benchmark for safety, accuracy, and operational excellence within the utility sector.



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# INTRODUCTION

In the evolving field of infrastructure inspection, technology is changing how companies achieve greater operational efficiency and data accuracy.

Together, ACSL and Ameren are leading this change by integrating cutting-edge drone technology into inspection workflows for energy infrastructure.

This whitepaper explores the use of ACSL's SOTEN drone and TENS0 smart controller in Ameren's field operations, emphasizing the efficiency gains compared to traditional methods and how ACSL's tailored solutions offer unique advantages for field operators.



# THE NEED FOR ADVANCED INSPECTION SOLUTIONS

Maintaining a vast network of utility infrastructure—ranging from natural gas production facilities to electric distribution systems—presents significant challenges for Ameren. Traditional inspection methods, such as manual mapping and on-foot surveys, are labor-intensive, time-consuming, may have a high impact on customers, and expose workers to potential hazards. Drones have emerged as a game-changing tool, offering a safer and faster alternative to ground-based inspections.

## Why Ameren Chose ACSL

Ameren's Central UAS, Robotics, and Inspections department, led by James Pierce, identified the need for a drone solution that could further enhance operational efficiency while ensuring secure data capture. ACSL's SOTEN drone, coupled with the TENS0 smart controller, meets these requirements and offers additional value that enhances the experience for operators in the field. By utilizing ACSL's technology, Ameren is working toward further streamlining its inspection processes and taking full advantage of ACSL's dedicated support and R&D teams.

The Value of ACSL for Ameren's Drone Pilots



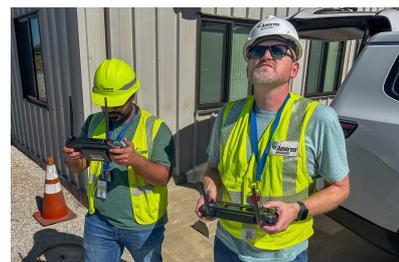
# SOLUTION OVERVIEW

## ACSL's SOTEN Drone and TENSO Smart Controller

ACSL's SOTEN drone is designed for efficient and secure operations in challenging environments. With its lightweight frame, advanced obstacle detection, and robust encryption protocols, SOTEN ensures secure and reliable performance in the field. Meanwhile, the TENSO smart controller enhances operational efficiency, offering high screen brightness for clear visibility, seamless mission preplanning, and an intuitive interface that enables smoother workflows.

## Key Features That Differentiate ACSL

- **Mission Preplanning:** The TENSO controller integrates with the TAKEOFF application, allowing operators to pre-plan complex missions on a desktop before heading into the field. This feature ensures precise flight paths, reducing time spent on-site and minimizing the risk of human error during manual setup.
- **Optimized Field Operations:** TENSO's screen brightness of 1000 nits ensures that operators can monitor flight progress and data capture even in bright sunlight, a common challenge in outdoor inspections. Additionally, TENSO's customizable buttons and wheels enable Ameren's operators to quickly adjust settings and execute specific commands tailored to their natural gas field workflows, allowing for smoother, more efficient missions.
- **Controller Handoff Capability:** The ability to transfer control in-flight between multiple operators allows one to focus on piloting while another reviews captured imagery in real-time, ensuring data accuracy without compromising flight safety.



# Case Study: Mapping at a Natural Gas Storage Facility

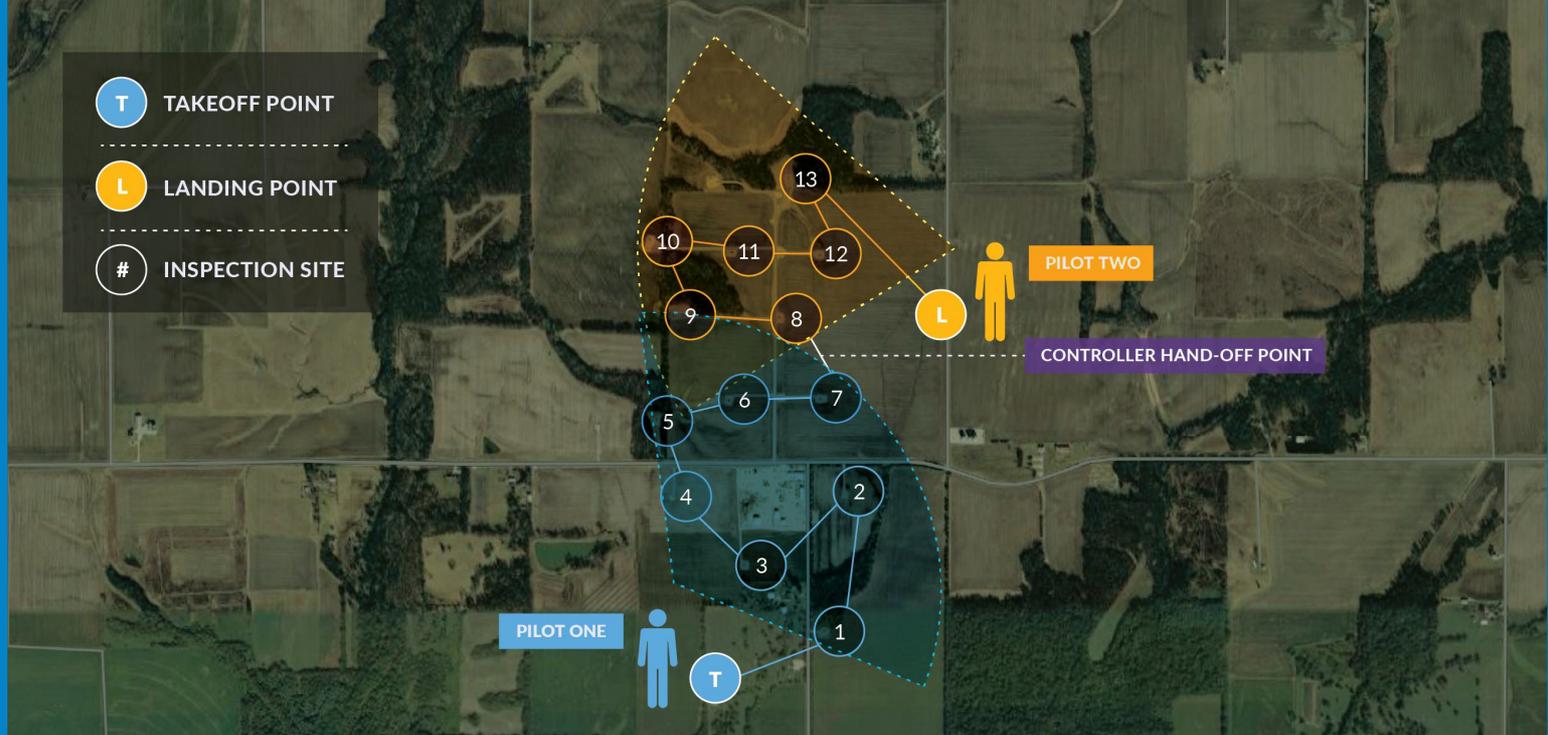
Ameren utilized ACSL's SOTEN drone for an autonomous mapping mission at a natural gas storage facility, aiming to create an orthomosaic to document newly constructed infrastructure. Natural gas storage facilities are extensive and complex environments, covering 1000s of acres, typically containing a mix of above-ground tanks and underground reservoirs interspersed among fields of crops, such as corn. This setup poses visibility and maneuverability challenges for pilots operating from the ground.

In the U.S., nearly 400 active underground storage facilities are operated by approximately 120 entities, including interstate and intrastate pipeline companies, local distribution companies, and independent storage service providers. The extensive layout of these facilities requires precise mapping and data capture to ensure efficient operations.

By leveraging the TENS0 controller's high-brightness display and mission preplanning features, Ameren's team could efficiently plan and execute missions across this expansive terrain without needing on-site adjustments. The TENS0's customizable buttons and dials allowed operators to adjust settings specific to Ameren's inspection workflow, optimizing their approach amidst a network of tanks, pipelines, and infrastructure hidden among crops. This setup enabled them to achieve accurate mapping and comprehensive documentation despite the visibility challenges posed by the scale and layout of the storage field.

## COMPARATIVE ANALYSIS

Ameren compared the data capture capabilities of the SOTEN against their existing daily mapping platform. While both systems offered high-quality outputs, the added value of ACSL's pre-planning features and enhanced user interface allowed for a smoother transition from planning to execution.



## Efficiency Gains Over Traditional Methods

### Reduced Field Hours

Where manual GPS mapping could take days, SOTEN drones enabled Ameren to complete surveys in a fraction of the time, reducing man-hours and exposure to hazardous environments.

### Less Ground Disruption

Traditional inspections often require driving and walking through fields, risking damage to crops. With drones, these risks are minimized, allowing Ameren to conduct checks remotely, especially utilizing the controller hand-off procedure, which is particularly beneficial for monitoring gas well heads.

### Enhanced Data Quality

With ACSL's controller handoff feature, Ameren's visual observers could review live imagery in real-time, ensuring complete data capture without needing to re-fly routes. The varying environments Ameren flies over—including dried-out cornfields, snow-covered landscapes in winter, and bodies of water—often introduce glare that requires quick adjustments in camera settings to maintain image clarity. The customizable buttons on the TENSO controller allow pilots to swiftly compensate for glare and then readjust when approaching an asset, all without taking their thumbs off the joysticks.

Additionally, structures within these facilities can be highly reflective, further emphasizing the need for rapid adjustments to reduce glare safely. Shadows from surrounding trees and crops can also introduce low-light conditions around the assets, making it essential for pilots to have immediate control over settings. With these capabilities, Ameren's operators can efficiently adapt to challenging lighting conditions, ensuring clear and accurate data capture across diverse environments.

# Beyond BVLOS

## Expanding Ameren's Mission Reach with ACSL's TENSO

Ameren has already secured BVLOS (Beyond Visual Line of Sight) approval for certain inspection operations, enabling them to conduct remote inspections over large distances and reduce the need for on-site personnel. As they look to expand their BVLOS capabilities, Ameren is integrating the ACSL SOTEN drone as an additional platform in upcoming waiver amendments.

### Enhancing Operational Flexibility with TENSO's Controller Handoff

ACSL's TENSO smart controller offers a feature that complements Ameren's BVLOS operations: in-flight control handoff. This capability allows one pilot to transfer control of the drone to another positioned further along the flight path, extending the operational range of missions while keeping the drone in Visual Line of Sight (VLOS) when needed.

### Enhancing Operational Flexibility with TENSO's Controller Handoff

- **Increased Mission Range and Flexibility:** The TENSO's handoff capability allows for seamless control transfer between pilots along an inspection route. This enables Ameren to leverage both VLOS and BVLOS operations within a single mission, maximizing coverage and operational reach.
- **Continuous Data Monitoring:** As control shifts between pilots, the drone's data feed remains uninterrupted, allowing for real-time data capture and imagery review. This feature enhances the efficiency and accuracy of inspections, whether they're conducted under VLOS or BVLOS.
- **Streamlined BVLOS Integration:** By adding SOTEN to Ameren's BVLOS operations, the TENSO controller's handoff feature provides an adaptable solution that supports BVLOS extensions, enabling Ameren to scale their drone inspections with greater flexibility.

Integrating ACSL's SOTEN drone and TENSO controller into Ameren's BVLOS framework not only strengthens their operational range but also provides a practical, field-ready solution to enhance both VLOS and BVLOS workflows.



# CONCLUSION

The collaboration between ACSL and Ameren underscores the transformative impact of advanced drone technology on infrastructure inspections

By integrating ACSL's SOTEN drone and TENS0 smart controller, Ameren has streamlined field operations, increased data accuracy, and enhanced safety. Among available drone solutions, ACSL stands out for its operator-focused features like mission preplanning, high-visibility controls, and seamless in-flight handoff.

Notably, as Ameren continues to expand its BVLOS capabilities, the TENS0's in-flight handoff capability offers a flexible tool to enhance both VLOS and BVLOS operations. Adding SOTEN to Ameren's BVLOS framework supports their commitment to efficient and compliant inspection workflows, offering extended operational reach without compromising real-time data capture.

As Ameren pursues its strategic vision of safer and more efficient infrastructure management, this collaboration with ACSL sets a benchmark for utility companies seeking to leverage drone technology for operational excellence and regulatory flexibility.





## **About Ameren**

Ameren Corporation is a major provider of electric and natural gas services, serving millions of customers across Missouri and Illinois. Their Central UAS, Robotics, and Inspections department leads the way in adopting innovative solutions for infrastructure management, ensuring the safety and reliability of Ameren's extensive network.



## **About ACSL**

ACSL Inc. is a leading provider of secure drone technology, bringing advanced Japanese innovation to the U.S. market. Committed to supporting the critical infrastructure sector, ACSL delivers high-performance, NDAA-compliant drone solutions tailored to the needs of utility providers.