WHITEPAPER

Increasing Fleet Robustness with ACSL's SOTEN Drone

Firmatek's Approach to Offering Innovative and Secure Drone Solutions

Firmatek, a nation-wide leader in utility infrastructure inspections, is addressing the increasing need for diversified drone fleet solutions.

Due to unprecedented demands for inspection data, coupled with heightened regulatory and security requirements around the use of drones to capture such data around critical infrastructure, American utilities are seeking NDAA-compliant solutions that focus on efficiency and innovation. In response, Firmatek integrated the ACSL SOTEN drone into its operations.

This whitepaper explores the evaluation and integration of the SOTEN drone, demonstrating how it offers both a compliant and efficient solution for power pole inspections, with plenty of potential to define next generation workflows via an expanding payload lineup and onboard compute capabilities. This comparative analysis highlights the SOTEN drone's combined efficiency and regulatory benefits, making it a robust option for utility companies seeking to enhance their inspection processes while adhering to compliance requirements.

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> Working with the ACSL team has been a collaborative process, and thanks to their responsive feedback loop, the gap between the SOTEN and Chinese-made solutions is continually getting smaller and smaller.
>
> **Eric Bitzko, SVP of Electric Utilities, Firmatek**

TABLE OF CONTENTS

INTRODUCTION

In utility infrastructure inspection, drones have become essential for enhancing efficiency and data accuracy. Firmatek leads this innovation, offering advanced inspection services to hundreds of utility customers across North America.

Due to heightened geopolitical concerns about potential regulatory and security risks of using Chinese-made drones for critical infrastructure inspections, a growing number of American utilities have switched to using domestic and allied country drone manufacturers in an abundance of caution. In response, Firmatek has diversified its drone fleet to include compliant options, ensuring their operations are future-proof.

This whitepaper details how Firmatek evaluated and integrated the ACSL SOTEN drone into its operations to provide an NDAA-compliant solution for their more sensitive customers, while maintaining efficiency in power pole inspections.

THE SHIFTING LANDSCAPE FOR UTILITY DRONE SOLUTIONS

The National Defense Authorization Act (NDAA) restricts U.S. government agencies from using drones made by certain foreign manufacturers, particularly Chinese companies, citing national security concerns. Section 848 of the NDAA mandates that drones must be sourced from approved manufacturers meeting stringent security criteria to mitigate supply chain risks and push for a healthier landscape of drone options. Throughout the past couple of years, these regulatory pressures have trickled through to impact many critical infrastructure sectors as well.

Efficiency in Drone Inspections

As the drone industry strives to mitigate data security risk concerns, there is also an increasing focus on advancing data processing and analytics for utility customers. This shift can significantly improve the efficiency in monitoring and managing critical infrastructure, transforming the landscape of drone inspections.

While drones have effectively proved its value against legacy methods of power pole inspections, a remaining challenge lies in continuing to optimize workflows to maximize the number of inspections per day with fewer personnel in the field. To remain competitive, firms must enhance efficiency while ensuring robust data security.

The best practice for power pole inspections using drones involves a streamlined workflow that ensures safety, efficiency, and accuracy from the field to the back office. This process begins with pre-flight planning, where the inspection team outlines the specific poles to be inspected and sets flight paths using advanced drone software. Once in the field, trained operators conduct a safety check and launch the drone to capture detailed images of the power poles.

The collected data is then aggregated and uploaded to a secure cloud storage system. Here, the focus on data processing and analysis becomes paramount. Advanced data processing software analyzes the images, and the processed data is reviewed by journeymen linemen, who create detailed inspection reports.

These reports are sent to the back office, where maintenance teams can access them via a centralized dashboard, prioritize repairs, and schedule necessary maintenance work. This integrated approach ensures the integrity and reliability of the power infrastructure.

Firmatek excels at executing these steps exceptionally well, resulting in an extremely effective end-to-end workflow. They are recognized for not only collecting data extremely quickly and efficiently but also processing it swiftly and accurately. This speed and precision are essential for providing the best possible service to their customers. By advancing how data is processed and analyzed, Firmatek offers the confidence and key insights companies need to make informed decisions, significantly improving the efficiency of monitoring and managing critical infrastructure, and keeping the world moving forward.

The Impact of Geopolitics on U.S Utilities

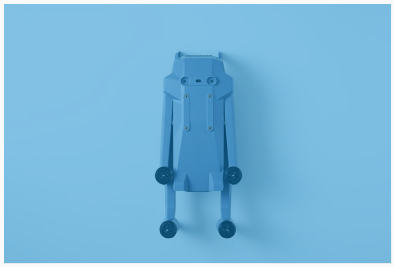
The 2024 National Defense Authorization Act (NDAA) has prompted many companies in the utility industry to reevaluate their use of Chinese-made drone technology. While U.S. utilities typically use drones from Chinese manufacturers, there is a growing trend toward transitioning to NDAA-compliant drones to enhance regulatory risk mitigation, especially for critical infrastructure inspections.

Utility companies have invested in drone dependent workflows for inspecting power lines, monitoring substations, and assessing storm damage. Drones have revolutionized these processes by providing aerial inspection data and reducing the need for risky manual inspections, with Chinese-made drones often offering market-leading solutions. However, the potential for stricter regulations and increasing security concerns has driven demand for US and Allied-country drones. As utilities evaluate and integrate these drones, a key consideration is maintaining the efficiency of existing drone inspection processes while also positioning for further innovation.

SOLUTION OVERVIEW

Who is ACSL?

Japan's largest drone manufacturer, ACSL Ltd., was founded in 2013 and became publicly listed on the Tokyo Stock Exchange in 2018.



In 2023, ACSL Inc. was established in California to bridge the needs of the US commercial drone market with Japan's innovative drone solutions. The leadership team brings extensive experience from renowned companies like Boeing and DJI, supported by an advisory board with decades of industry expertise.

Firmatek's collaboration with ACSL focuses on not only integrating the SOTEN drone into the company's fleet, but also improving and guiding the next generation of ACSL's drone products. While these efforts provide Firmatek the ability to offer compliant and efficient inspection services for utility companies today, the collaboration also seeks to push the boundaries of smarter drone operations in the future.

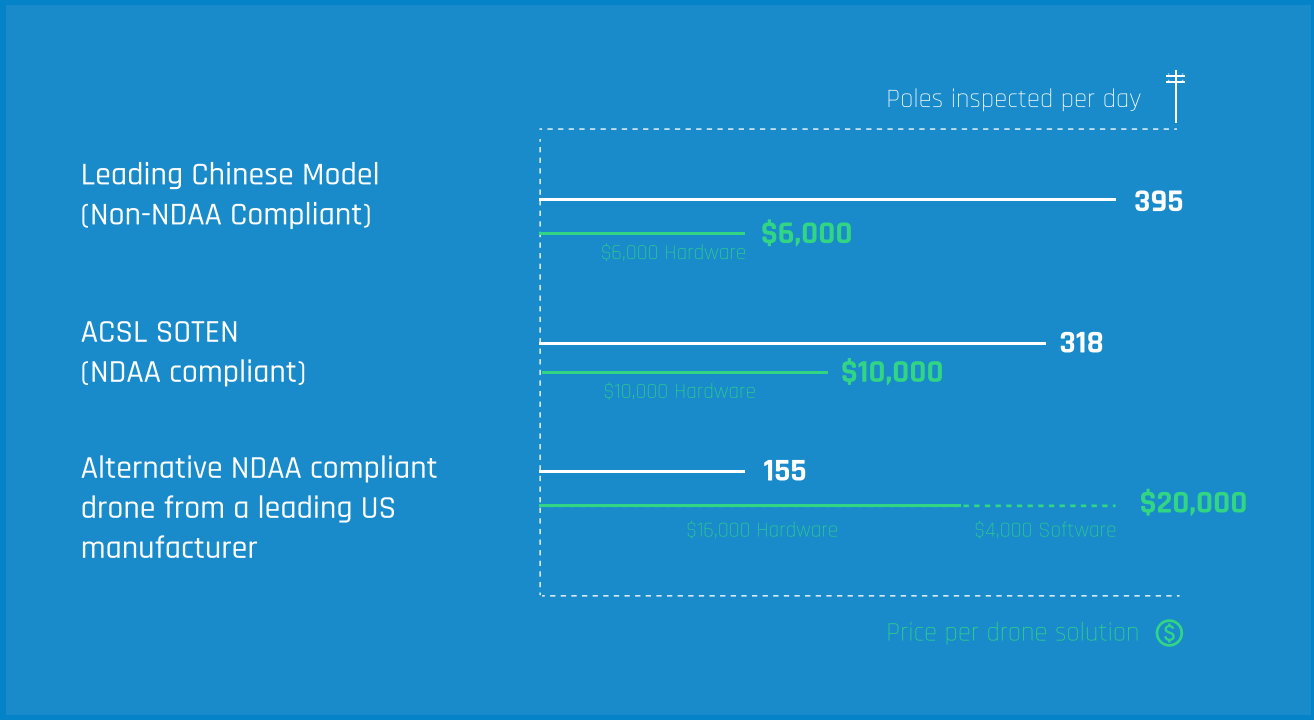
COMPARATIVE ANALYSIS

As part of diversifying their drone fleet, Firmatek evaluated several NDAA-compliant drones against the industry-leading Chinese-made and non-NDAA-compliant model.

One challenge in diversifying the drone fleet has been the significant efficiency gap between the industry-leading Chinese-made options and American-made alternatives, which formed the basis for Firmatek's comparative analysis. Another challenge lies in the price disparity of Chinese-made options and American and Allied manufacturer alternatives, a reflection of the global challenges around mass production costs and supply chain considerations.

With such factors in mind, the tests measured how many power poles each drone model could inspect during an 8-hour day in a real-world production project* that featured challenging terrain and flight conditions.

Each drone model tested was within $10,000 of the original Chinese drone.



*While the leading Chinese and American drones were always flown with their respective smart controller counterparts, SOTEN was initially tested with only a standard controller. Further flights with the newest ACSL TENSO smart controller saw notable improvements in efficiency, connectivity and range, resulting in performance gains overall as reflected in final numbers above.

The comparative analysis shows that the Chinese model sets the industry benchmark for inspection efficiency.

- The American-manufactured drone achieved 39% of the efficiency of the Chinese model over an 8-hour inspection period, requiring an additional 1.54 man-days to inspect the same number of poles.

- The ACSL SOTEN achieved 80% of the efficiency of the Chinese model over the same period, requiring 0.19 additional man-days to inspect the same number of poles.

ACSL's SOTEN Drone

This Japanese-manufactured quick-deploy drone combines advanced technology with leading security features, ensuring safe and efficient operations. The SOTEN drone is equipped with high-resolution cameras and thermal imaging capabilities, making it ideal for detailed inspections of power lines, substations, and other critical infrastructure.

Its compact design and lightweight frame allow for agile maneuverability in complex environments. Additionally, the SOTEN drone's secure data transmission and storage protocols safeguard sensitive information, aligning with the stringent industry best practices for work around critical infrastructure. Captured data can be optionally encrypted even before being written and stored onboard the drone. As utility companies look to mitigate risks and ensure operational continuity, the ACSL SOTEN drone presents a reliable and innovative solution for their aerial inspection needs.

Firmatek found that the ACSL SOTEN offered a reliable NDAA-compliant option without significantly sacrificing efficiency compared to the Chinese model, a development not consistently found in the market prior to ACSL launching in the U.S. in 2023. Just as importantly, Firmatek found the ACSL SOTEN to have notable superiority in connectivity and flight dynamics compared to other NDAA-compliant drones that Firmatek has tested over the years.

IMPLEMENTATION STRATEGY

Firmatek's strategy for integrating ACSL's SOTEN drone involved several key steps.

Training and Certification

Ensuring that operators were fully trained and certified to use the SOTEN drone was a priority. This process included field training from the ACSL team and incorporating the SOTEN drone into Firmatek's existing training regimen. However, the Firmatek team found that little additional training was needed to transition to using the SOTEN drone.

Workflow Optimization

The SOTEN drone seamlessly integrated into Firmatek's existing workflows, eliminating the need to overhaul or adjust standard operating procedures.

"We are thrilled to have integrated the ACSL SOTEN drone. Its advanced performance and security standards align perfectly with our commitment to delivering future-proofed solutions to our clients."

Eric Bitzko, SVP of Electric Utilities, Firmatek

CASE STUDY

SOTEN use in production projects

Since incorporating ACSL's SOTEN drone into their fleet, Firmatek has used the system on various production projects with utility customers who have adopted a stricter standard for equipment flown around their assets.

Notably, the system was used for a utility customer in Arizona, USA. The inspection of critical infrastructure with the SOTEN was conducted in high desert, mountainous terrain, with difficult access from the roads, under less than ideal flying conditions in Arizona, with light snow and wind gusts reaching 35 mph.

High Efficiency

318 poles inspected per day; 80% of the average inspection output of non-compliant alternatives in similar conditions.

Compliance Assurance

Firmatek's utility customer required full adherence to NDAA requirements.

Arizona, United States

Gusts of up to 35 mph

318 poles inspected per day

CONCLUSION

Firmatek's integration of the ACSL SOTEN drone reflects an increasing trend in the field of utility infrastructure inspection.

By adopting efficient NDAA-compliant drones, Firmatek addresses the growing regulatory and security concerns while maintaining high operational output for their customers, allowing for increased focus on data process enhancement. The SOTEN drone has proven to be a robust and effective alternative to Chinese-made models, while offering notable improvements in connectivity, and handling when compared to other NDAA compliant solutions.

Firmatek and ACSL are dedicated to enhancing SOTEN's performance and operational efficiency for inspection workflows. Their collaboration focuses on future advancements such as the implementation further improvements to connectivity, additional payloads, and exploring AI and machine learning capabilities onboard the drone. This ongoing partnership aims to drive continuous improvement and innovation in inspection processes.

Through this strategic diversification, Firmatek not only meets the evolving needs of utility companies but also sets a benchmark for industry practices. The successful implementation of the SOTEN drone underscores Firmatek's commitment to innovation, customer satisfaction, and regulatory sensitivity. This move ensures that Firmatek continues to provide future-proof inspection services, empowering utility companies to make informed decisions and maintain the integrity and reliability of their infrastructure.

About Firmatek

Firmatek believes in the democratization of geospatial data, providing actionable insights to foster collaboration and confidence. The company excels in simplifying complex decision-making processes through advanced technology, unmatched services, and dedicated expertise.

About ACSL

ACSL Inc. is the US subsidiary of Japan's largest drone manufacturer, ACSL Ltd. Established in California in January 2023, the company bridges the needs of the US commercial drone market with Japan's innovative drone solutions. The leadership team brings extensive experience from renowned companies like Boeing and DJI, supported by an advisory board with decades of industry expertise.