

Digitalization of Network Operations with Geospatial Intelligence Platform for an Australian Energy Company



Overview

An Australian energy company with network assets spread across a vast area including remote and arid terrains were facing challenges in network maintenance and repair works. Their field force had to travel hundreds and thousands of kilometers without a prior view of the problem or a sure readiness of resolving it. Also, each network area was operating from separate geographic information systems (GIS), with inaccuracies regarding the asset locations, and no shared view of operational and maintenance processes. Tech Mahindra Altavec helped the client create a digital view of their network using Altavec's cloud-based geospatial intelligence platform AIMS 3D. This generated a 3D view of the client's network rapidly and cost-effectively leading to significant operational benefits, reduced safety risks, minimized network outages, and increased customer satisfaction.

Client Background and Challenges

The client is a commercially focused, state government-owned, power company that provides power supplies to Western Australia. It is responsible for generating, procuring, distributing, and retailing electricity to residential, industrial, and commercial customers and resource developments in its service area.

Their electricity network assets are spread across a vast area of Western Australia. The landscape includes urban, regional, and remote communities set across a mix of terrain, some of which face harsh and hot climate conditions. The regions are linked by sparse and lengthy road connections that can stretch to hundreds and thousands of kilometers and therefore any maintenance or repair works to the network can be a daunting task for the field force to drive with crew and equipment, without a prior view of the problem or a sure readiness of resolving it.

Moreover, each network area was operating from separate geographic information systems (GIS), with inaccuracies regarding the asset locations, and no shared view of operational and maintenance processes. The client identified that by creating a digital view of their network they could generate significant operational benefits, reduce safety risks, minimize network outages, and increase customer satisfaction.

The client launched their 'Utility of the Future Program' in 2021, which included the operational geospatial intelligence program, aimed at digitalizing and standardizing network operations, maintenance, and planning activities.

Our Approach and Solution

The Approach

Tech Mahindra Altavec has been working with the client since 2018 to run pilot field capture programs, these were collaborations with regional teams to capture a smaller set of network assets using LiDAR technology. These data sets were provided to the client via Altavec's AIMS visualization platform, delivering a sample digital model view of the network including network insights and reports that showcased the possibility of smartly maintaining and operating their network. This enabled the client to form a strong case to embark on a larger transformation program to radically digitalize their network maintenance. Altavec participated in the client's market competitive bid process and was awarded the contract to deliver. The client was impressed with the partnership-style exploratory journey led by Altavec, as we shared the art of the possible, demonstrated how our product roadmap aligned to deliver business-critical use cases, reflected industry needs from across our customer base, and demonstrated our experience working with network customer across Australia.

Difficulties faced

The team faced several challenges while executing the project. The pandemic saw locked state borders which led to program delays and amended project schedules. Altavec support deployed different capture technologies including drone-based capture to ensure the program kept moving.

Capturing network data over private property proved to be challenging from a customer information perspective, which was improved by working with the client's communication team for improved community engagement.

The geography was one of the most rugged and hostile terrains for the Altavec crew to perform capture works. Crew fatigue management and program scheduling proved tight and challenging; however, we remained focused on maintaining our high safety standards and customer satisfaction levels.

Solution

Once the program started on a full scale, we conducted the aerial and ground-based survey of the network, leveraging LiDAR and high-definition image capture to inform network realignment, remote site inspections, vegetation management, and asset inspection program of works. Tech Mahindra Altavec's cloud-based geospatial intelligence platform AIMS 3D, then processed LiDAR (for network realignment, vegetation analysis, and network clearance analysis) and images (for asset condition monitoring) in a highly automated fashion.

This enabled a 3D view of the client network rapidly and cost-effectively, the result being the full network was rendered in 2D and 3D, matched to the client's assets, and tagged with defects or vegetation encroachments. With the addition of artificial intelligence (AI) and machine learning (ML) techniques, Altavec scanned thousands of images collected across the network in minutes and guided the client to areas of concern

Altavec leveraged partners for:

- ▶ Aerial capture using helicopters, with our equipment fitted on them
- ▶ Manual image analysis

Critical use cases delivered via the program

- ▶ Centralized Image Repository
- ▶ Network Realignment
- ▶ Network Connectivity Model
- ▶ Asset Condition Monitoring
- ▶ Site Assessments
- ▶ Network Clearance Analysis
- ▶ Vegetation Analysis

Network critical insights from this operational geospatial intelligence program enhances the client's ability to:

- ▶ Resolve core data issues with network alignment
- ▶ Implement predictive maintenance strategies aimed at reducing network failures and damages.
- ▶ Improve SAIDI, SAIFI, safety and emergency planning and response outcomes
- ▶ Reduce risk, and optimize network design and performance



Business and Community Impact



Our survey covered 5800+ network km, 57,000+ spans and 58,000+ poles.



300+ aircraft survey hours and 100+ mobile survey hours captured around 15T of raw data.



Approximately 99% of spans (ex-service wires) have returns on conductors.



The capture phase of the program is complete for image and LiDAR data ahead of schedule despite risks such as weather, scheduling, and customer communication requirements.



Reduced the cost of span inspection by more than 50% compared to manual methods.



Virtual inspections provided the ability to plan beyond the near run-to-failure model and gain visibility into the health of assets and equipment that cannot be seen from the ground.



Accurate identification and quantification of non-compliant asset conditions, prioritization of asset maintenance/repairs, and targeted preventive maintenance increased the life of assets and reliability across the network.



Situational awareness of the network improved preparedness during emergency events and natural disasters.



Access to geospatial information assists in planning and prioritizing before crews begin fieldwork, and reduce site assessment visits and field travel time. The information improved permitting workflows, resulting in better data and time savings for both office and field crews.



Reactive maintenance costs are reduced, with improved system reliability and fault response efficiency.

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