VisNet® Hub Predicts the Distance to a Low Voltage Cable Fault Caused by Hit-and-Run Incident

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Background

On an early Sunday morning at 6am, a 240/415 volt distribution pillar box on the side of a residential street was ran over by a car, exposing bare low voltage (LV) conductors to the general public.

A phone call was made two hours after the incident by a passer-by to the local authority who then secured the area.

This cable box was coincidentally being monitored in real-time by an EA Technology VisNet Hub from the nearby substation. The VisNet Hub is a LV monitoring device which whilst monitoring was also able to detect the collision instantly and sent an alert to asset managers.

At the time of fault, an alarm was raised by VisNet Hub with the recorded fault data.

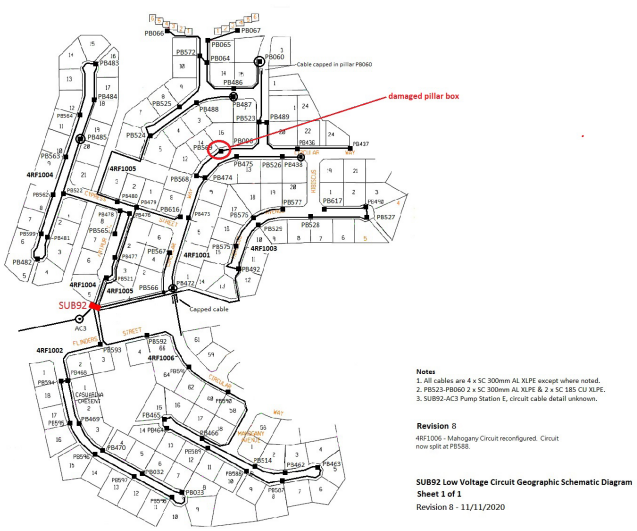


Figure 1. Distance of fault from the substation

Finding the fault location

As seen in Figure 2, the VisNet Hub captured a phase-to-phase peak in current which occurred at the time of collision. The current spike indicated a red phase to white phase flashover at 4,300 Amps for 1.5 cycles.

Figure 2. Data from the VisNet Hub

Our engineer proceeded to use the fault data to pinpoint the fault location.

Impedance Analysis

The impedance analysis performed gave a phase impedance of 60.3 milliohms, indicating with high credibility that there was fault activity present. This impedance value was then mapped onto the LV feeder cable which gave a distance to fault in the range between 380 to 400 meters from the substation.

When overlaid on a map, the distance from the substation to the damaged pillar (when measured as per Figure 1) was roughly 385 meters. This closely aligns with the fault location/ distance previously identified by the VisNet Hub, providing further confidence in data accuracy.

Inspecting the crash site

Figure 3. LV pillar crash site

Upon arrival at the accident site, field crew found that this was a hit and run car accident that had left exposed live LV conductors at the roadside, adjacent to residential properties. A flashover mark could be seen on the red and white phase bare conductors. The red and white phase damage was consistent with the red to white

fault data recorded by VisNet Hub. This was a safety hazard to anyone in the area as contact with live LV may have led to severe injury or death. Field crew took immediate action to cordon off the area before proceeding with repairs.

Conclusion

In summary, a passer-by made a report to authorities after finding exposed LV conductors left behind by a hit-and-run incident. Authorities then secured the area and proceeded with repairs.

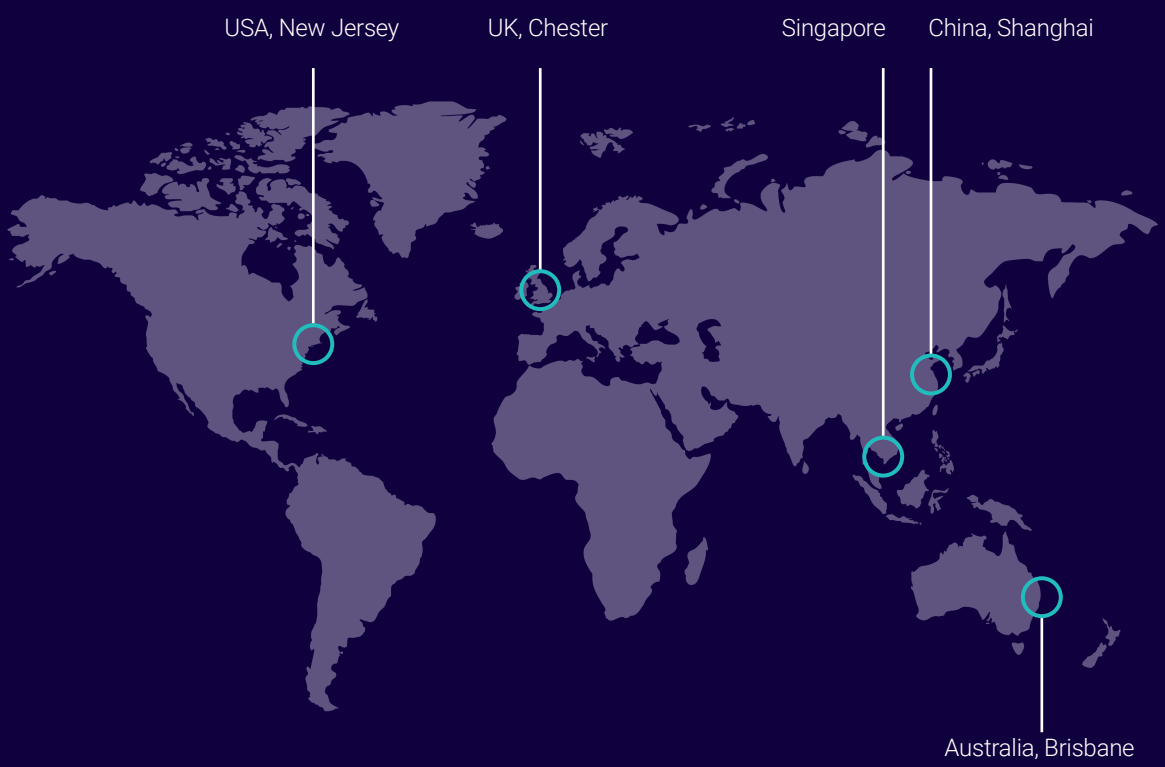
At the time of fault, VisNet Hub's alarm system was activated and the device recorded critical data that can be remotely analysed to determine the distance to fault and the fault location.

VisNet Hub is able to perform a range of monitoring and fault detection tasks simultaneously for up to six LV cables. Voltage, current, power flow, transformer temperature and voltage total harmonic distortion are all measured and recorded. Additionally, systems that calculate distance to cable faults, distance to faults and indication of blown fuses (amongst other alarm conditions) run in the background to alert asset operators when necessary.

Overall, this case study shows how the VisNet hub can be used to detect operational situations whilst performing its monitoring duties. With the rise of renewable energy and greater loads placed on our LV networks, visibility of LV data will become more prevalent and necessary in LV network management.

Global Footprint

At EA Technology we specialise in asset management solutions for owners and operators of power network assets.



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We work with a lot of our clients on a long-term basis to help them safeguard their power networks.

We advise our clients on strategy and implementation of a range of technology solutions to manage power assets, delivering maximum life and minimise cost.

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