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SCADA, Cybersecurity, and Critical Infrastructure

Supervisory control and data acquisition systems are used to remotely control critical infrastructure systems. Using this modern take on critical infrastructure, companies can implement safer and more technical practices that can increase efficiency in company practices.

What is SCADA?

Supervisory control and data acquisition, SCADA, are control systems used to command critical infrastructure and industrial operations such as water treatment or manufacturing. SCADA systems often control and monitor entire infrastructural sites or make up complex systems spread out over large areas. (Scada Systems). SCADA systems gain information and perform control actions through remote terminal units (RTUs) or programmable logic controllers (PLCs) that often get information from sensors or manual input. PLCs or RTUs feed data to the SCADA system which then processes and displays the data for operators to use to help make decisions. (What is SCADA).

HMIs

A human machine interface (HMI) is used by the operator to view the processed data and control processes. The HMI, usually a tablet or computer, shows the information in a graphical format using mimic diagrams. An HMI can be used to solve issues and can provide diagnostic data, management information, troubleshooting guides and much more.

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Vulnerabilities in Critical infrastructure

One of the greatest vulnerabilities in critical infrastructure is operational risk, when systems experience unplanned downtime or can't accomplish its assigned task. (Rostick). Not only does this pose a threat of monetary loss to the company, processes such as water treatment can have large consequences if failures aren't detected. Any small flaw could have a huge impact on the result. Unknown errors in the system can hugely impact a company financially, they can not only lead to loss of product, but if these errors make it through the system and to the public, they can lead to a loss of reputation for the company which will cause it to lose customers or possibly even their license to operate.

Many of the plants housing these processes are unsafe as well. Not only are the working conditions hard, but the equipment is often vulnerable to catching fire or overheating.

Role of SCADA Systems

The primary role of SCADA is to provide a quick and efficient way of monitoring and controlling critical infrastructural processes. SCADA can mitigate the risks of critical infrastructure with its efficiency. Human error is a common problem in critical infrastructure however, with SCADA a lot of these issues can be avoided, most problems are quickly detected by sensors in the system, that information is then collected by an RTU or PLC and the operator can then quickly observe and correct the issue using an HMI. SCADA can, in many cases, replace dysfunctional without ever interrupting the process. SCADA can also keep more employees away from the equipment, making the job safer. SCADA hardware is also made to withstand temperature, voltage and vibration extremes. (SCADA Systems). Although SCADA is often criticized for the possibility of cyber-attacks that it brings, venders have developed

specialized VPN and firewalls for SCADA networks to help address these risks, whitelisting resolutions have also been used to prevent unauthorized changes. (SCADA Systems).

Conclusion

Overall, the efficiency of SCADA cannot be denied. The system mitigates a lot of common risks caused by critical infrastructure and makes the systems safer not only for the employees of the companies, but also those that benefit from the company's products or outcomes. Although it introduces new risks of its own, the increasing security reforms being implemented to protect SCADA systems make it a very reliable way of positively impacting critical infrastructural practices.

References

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