Writeup- SCADA Systems

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CYSE 200T

4/6/2025

Critical infrastructure systems such as power grids, water treatment facilities, transportation networks, and manufacturing plants—are essential to modern society but face numerous vulnerabilities. These include threats like hacking, malware, and denial-of-service attacks, which disrupt operations and sensitive data. Insider threats and even unpatched software increase the risk even more. Physical security concerns such as terrorism, sabotage, and natural disasters also pose significant dangers. Additionally,risks like human error and old outdated equipment can lead to failures. Supervisory Control and Data Acquisition systems play a huge role in mitigating these issues. SCADA enables real-time monitoring of infrastructure, allowing operators to detect and respond quickly to things such as unusual pressure changes or power fluctuations. Automated control through Remote Terminal Units and Programmable Logic Controllers minimizes human error possibilities and ensures that essential processes can continue without manual intervention. These systems can initiate automatic shutdowns or even adjustments if safety thresholds happen to be exceeded, preventing possible damage or accidents. SCADA systems also enhance cybersecurity through features like encryption, user authentication, and even access control, helping to block unauthorized access. Built-in redundancy and backup systems allow infrastructure to continue functioning during failures or cyberattacks, while disaster recovery measures help restore operations quickly. SCADA also provides detailed data logging for post-incident analysis and continuous improvement of security

practices. Additionally, SCADA systems incorporate alarm functions that alert personnel to any not normal conditions, ensuring quick response. Notifications can be sent remotely via email or text, keeping operators informed even when they are offsite. Overall, SCADA systems significantly reduce the risk to critical infrastructure by improving awareness, automating responses, and providing a resilient framework for both physical and cybersecurity defense.

Citations for material used

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