



# **SNS COLLEGE OF TECHNOLOGY**

**(An Autonomous Institution)**



## **Wide Area Measurement System(WAMS)**



# Wide Area Measurement System(WAMS)



A Wide Area Measurement System (WAMS) is a sophisticated monitoring and control system used in the field of electrical power engineering. It is designed to provide real-time data and situational awareness for the operation and management of large-scale power systems, such as electrical grids or networks. WAMS employs advanced sensors, communication infrastructure, and data processing techniques to monitor and analyze the performance of power systems over wide geographic areas.

Here are some key components and functions of a WAMS:

1. Phasor Measurement Units (PMUs): PMUs are specialized devices that measure the voltage and current phasors (magnitude and phase angle) at various points in the power grid. These measurements are synchronized with a common time reference, typically obtained from Global Positioning System (GPS) signals. PMUs provide highly accurate and time-stamped data, enabling the precise monitoring of power system dynamics.
2. Communication Infrastructure: WAMS relies on a robust communication network to transmit data from PMUs and other monitoring devices to a central control center. This network may use fiber optics, microwave links, or other communication technologies to ensure low-latency and secure data transfer.



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3. Data Processing and Analysis: The data collected from PMUs and other sources are processed and analyzed in real-time. Advanced algorithms and mathematical models are applied to the data to identify disturbances, voltage instability, frequency fluctuations, and other anomalies in the power system.
4. Situational Awareness: WAMS provides operators and grid managers with a comprehensive view of the entire power system's state in real-time. This situational awareness helps them make informed decisions to maintain system stability, prevent blackouts, and optimize power flow.
5. Grid Monitoring and Control: WAMS can assist in controlling power system operations by issuing control commands to devices like circuit breakers, transformers, and generators. These commands are based on the analysis of real-time data to maintain system reliability and security.



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6.Event Detection and Analysis: WAMS is capable of detecting and analyzing significant events in the power system, such as faults, disturbances, or abnormal operating conditions. Post-event analysis helps in understanding the causes and consequences of these events.

7.Visualization and Reporting: WAMS provides graphical user interfaces and reports that allow operators and engineers to visualize the power system's performance and historical data for further analysis and decision-making.

WAMS plays a critical role in modernizing and enhancing the reliability of electrical grids. It enables utilities and grid operators to respond rapidly to changing grid conditions, reduce the risk of blackouts, and optimize the utilization of power resources. Additionally, it supports the integration of renewable energy sources and the development of smart grids by providing real-time data necessary for effective grid management.



# THANK YOU