



ABB satellite monitoring system protects earthbound power networks

ABB's Wide Area Monitoring System (WAMS) technology uses GPS satellite signals to accurately measure and analyze the condition of a power grid and detect system instabilities as they appear.

Now installed by Swiss energy company ETRANS in the critical Swiss North-South transmission corridor, the ABB technology helps detect critical operating conditions more quickly, to keep the power flowing from Switzerland to Italy.

ABB's WAMS technology was recognized in 2003 by the Massachusetts Institute of Technology (MIT) in the U.S. as one of the "top 10 emerging technologies that can change the world."

Large power outages are usually the result of multiple system failures that happen within minutes, and sometimes in seconds. Utilities are usually well equipped with contingency plans to maintain electrical service for most expected sets of problems.

But when a complex chain of events begins, the ability to take appropriate action to prevent cascading for the most part depends on the kind of information available to help operators understand the cause of the failure.

The monitoring and control systems of individual utilities gather information from sensors within their own grid, and then evaluate this information to determine whether their system is operating to deliver the power to meet demand conditions.

When things go wrong, the system either reacts automatically to take contingency actions, or displays information that allows system operators to take action. Using the component PSGuard, ABB's Wide Area Monitoring System gathers and analyzes system data in milliseconds, compared to every two to five seconds in conventional network control systems.

This means some emerging network problems, like shifts in frequency, can be documented and even predicted because precise and synchronized measurements can be taken consistently across the grid. Operators can also detect emerging problems in a neighboring grid before they can build up, allowing them to take preventative action.

ABB's WAMS technology has proven to be a reliable and effective early warning system in pilot projects over the past two years, and became the first commercially operative wide area grid monitoring system in Europe during the summer of 2004.

The system gives operators more time to prevent blackouts, or to keep blackouts from cascading as they did on August 14, 2003 in the United States and eastern Canada.

Grid reliability can be enhanced significantly if WAMS is combined with fast network controllers, such as FACTS devices (Flexible AC Transmission Systems). With technology like this, grid operators can fully control the flow of power in their networks – even in emergencies.