

Phasor Measurements in State Estimation/State Solution

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GPS-Synchronized Measurements

- Technology became available to power systems about 15 years ago
- Addition of GPS synchronization in IDEs
- Cost is rapidly reducing
- GPS synchronized measurements are relatively more accurate than RTUs
- No time skewing associated with the GPS synchronized measurements



NYPA Phasor-Assisted SE

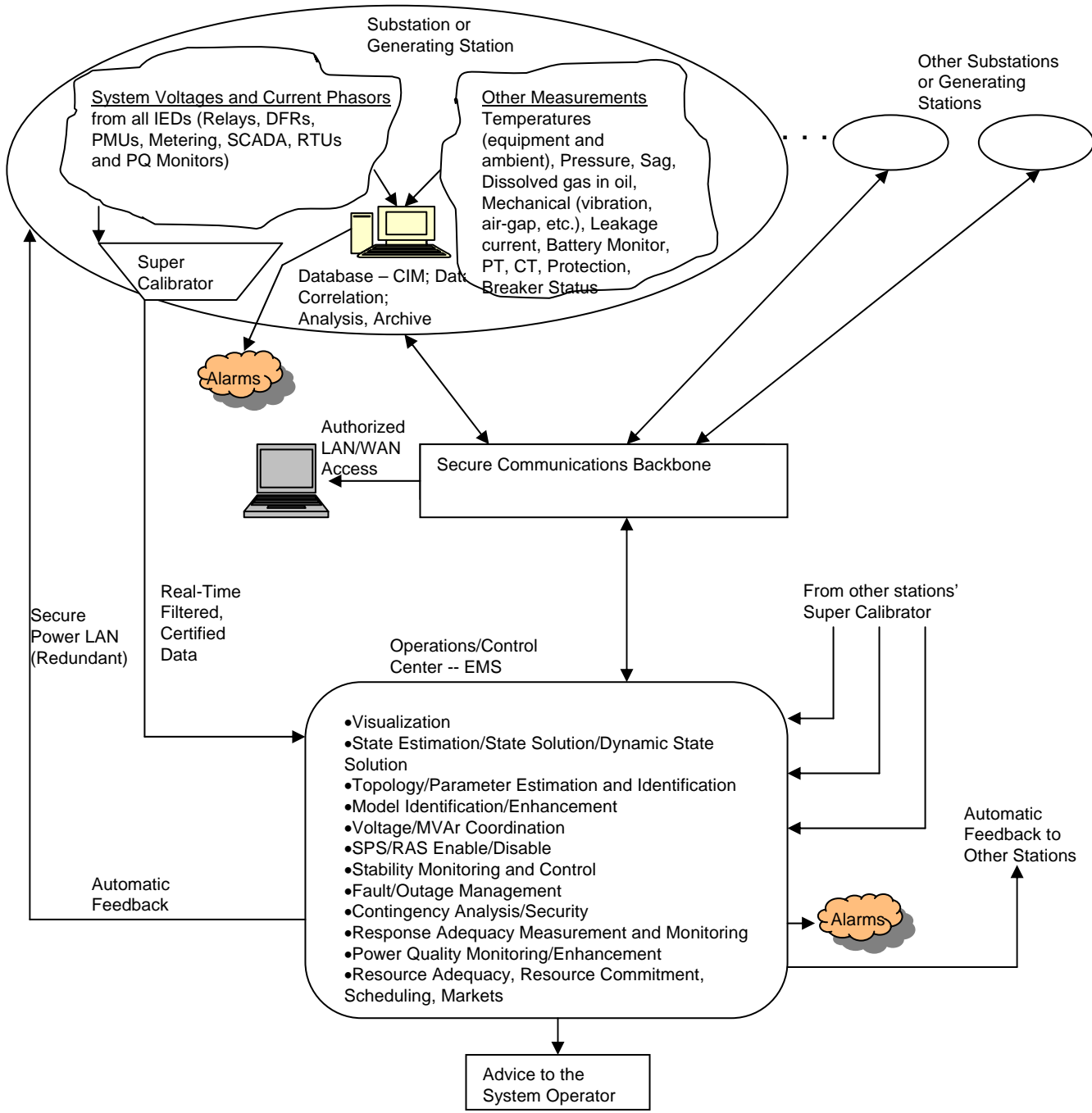
- On-line phasor data stream to the EMS computer at ECC
- Dedicated communication channels from PMUs to the EMS
- Modified the traditional SE algorithm
- Tested to confirm improvements to the traditional SE
- Adopted phasors as integral part of the EMS



Benefits of Phasors in SE

- Even with a very small percentage (~3%) of phasor vs SCADA data, better network observability was demonstrated
- Time synchronization is key for more robust applications
- More penetration of PMUs needed (30-50%)
- Hardware costs will come down but robust communication needs must be addressed
- With adequate synchronized and robust data (including the communication link), full AC SE and operator's power flow can be solved non-iteratively (one-shot) delivering much improved performance

A desired power system sensing and control architecture



A desired power system sensing and control architecture

Substation Level Filtering— Super Calibrator

