Celebrating 25 Years of Innovation

NASPI Interoperability Panel (1)

Driving Applications Forward

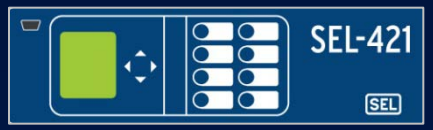
Greg Zweigle

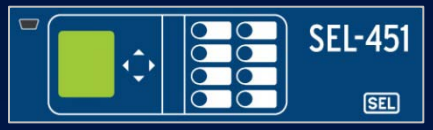
October, 2010

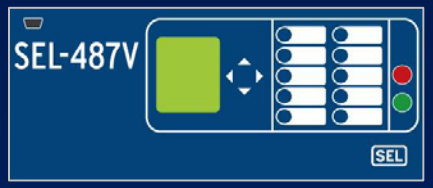
Making Electric Power Safer, More Reliable, and More Economical®

“What Components Are You Offering?”

Integrated PMUs



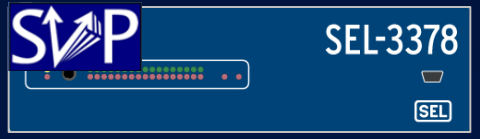




Data Concentration

SYNCHROWAVE PDC
SEL-5073

Distributed Control



Radios and Optical Networks

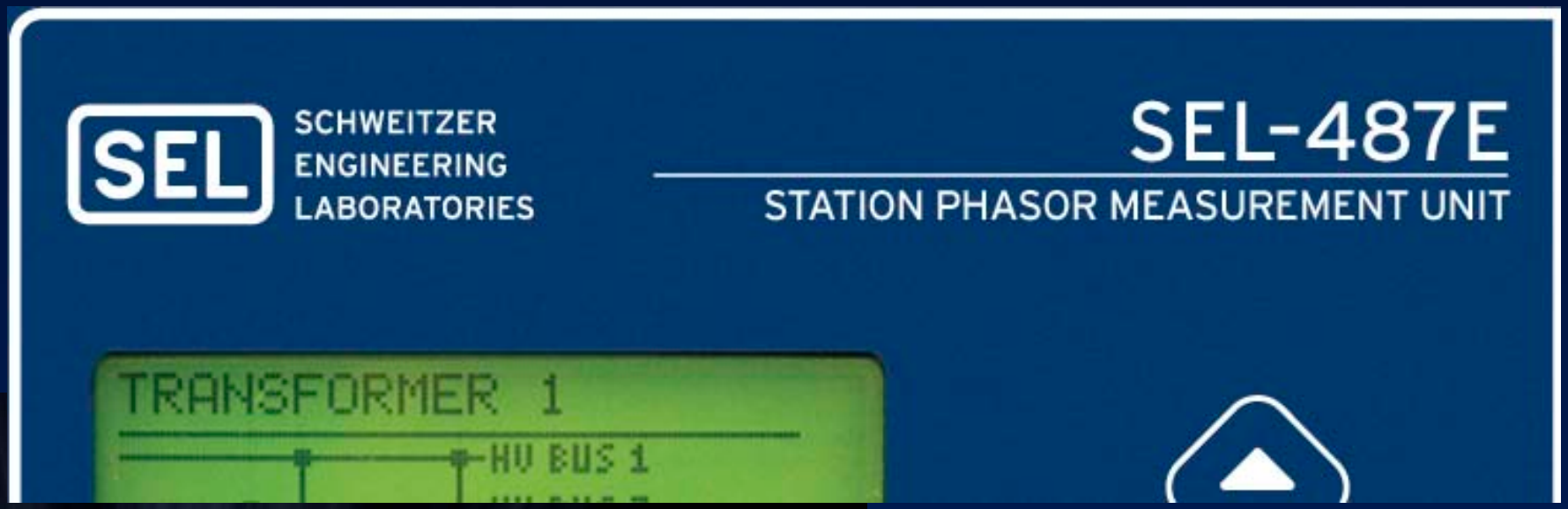
Visualization

SYNCHROWAVE Console

Secure Communications

Satellite Clocks

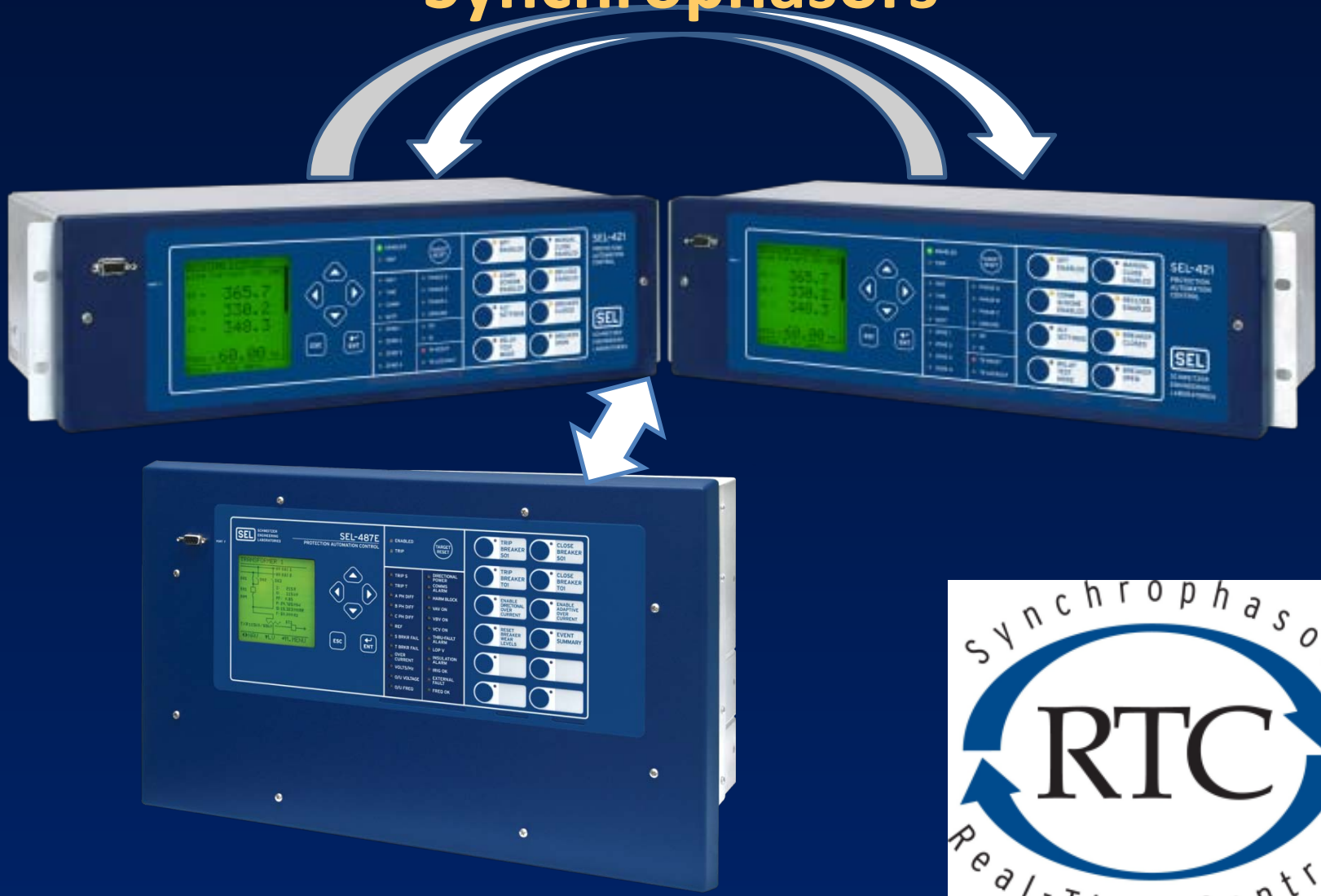
“Do you have stand-alone PMUs?”



- 24 Channels of IEEE C37.118 Synchrophasors
- Includes Synchrophasor RTC
- SEL-351A Feeder PMU

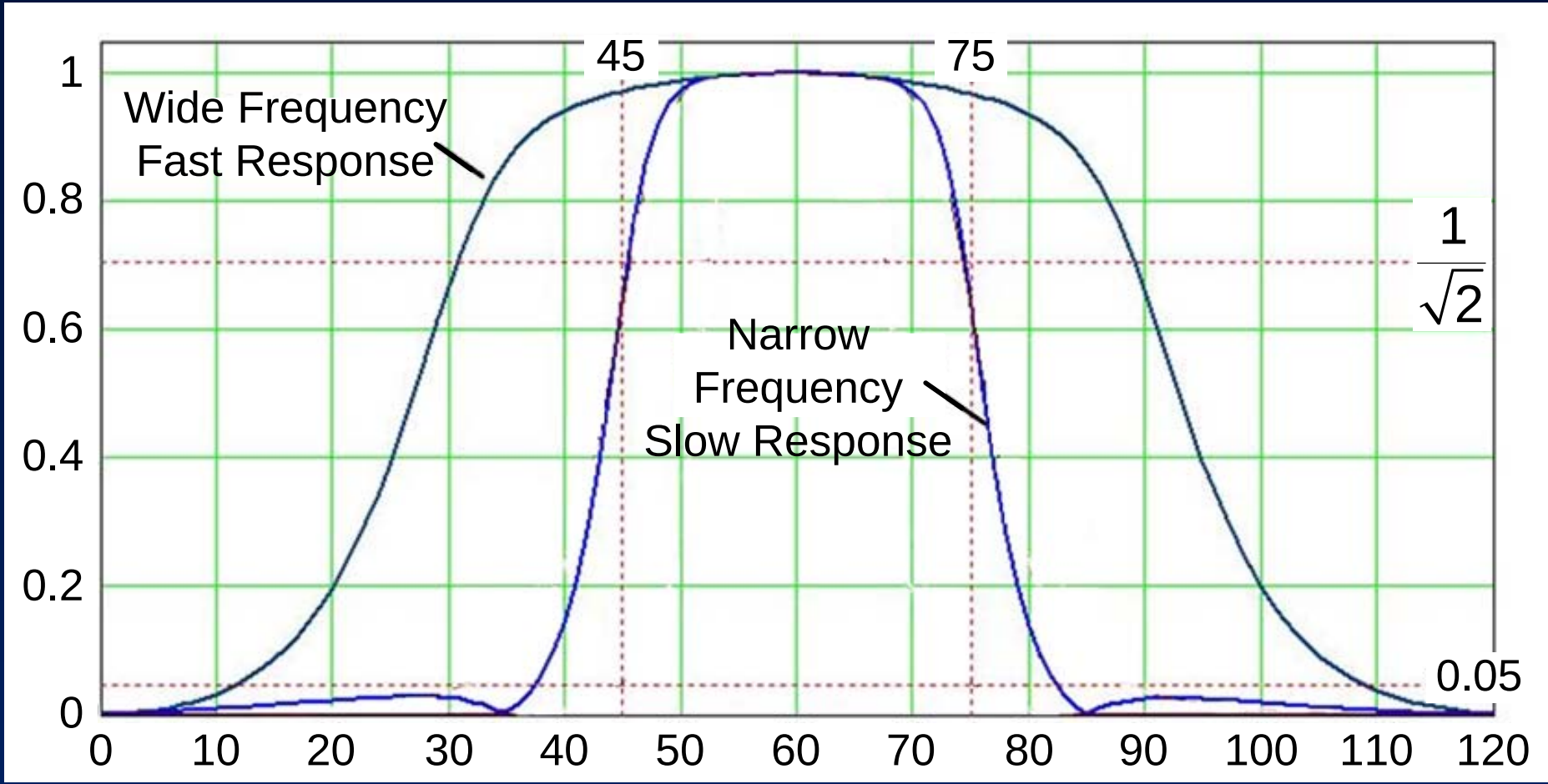
WORLDWIDE 10 years WARRANTY

Relays/PMUs Send And Receive Synchrophasors



Synchrophasor RTC Real-Time Control

“Filtering requirements & usage”



Planned compliance with new C37.118 standard

“PDC Functionality and Performance”

SEL-5073 SYNCHROWAVE PDC Functional Block Diagram

PMU or PDC Inputs

- >200 PMU or PDC inputs
- Variable input message rate from 1 to 240 messages per second
- Ethernet and/or serial inputs

Time Alignment

Data Concentration

Power Calculations (1P, 3P, P and Q)

Archive
- Continuous
- Triggered
- Logs
  - Access/Diagnostic

Outputs

Independent Outputs

- Fully configurable output message streams
- Send data to internal and external clients or entities
- Variable message rates from 1 to 240 messages per second

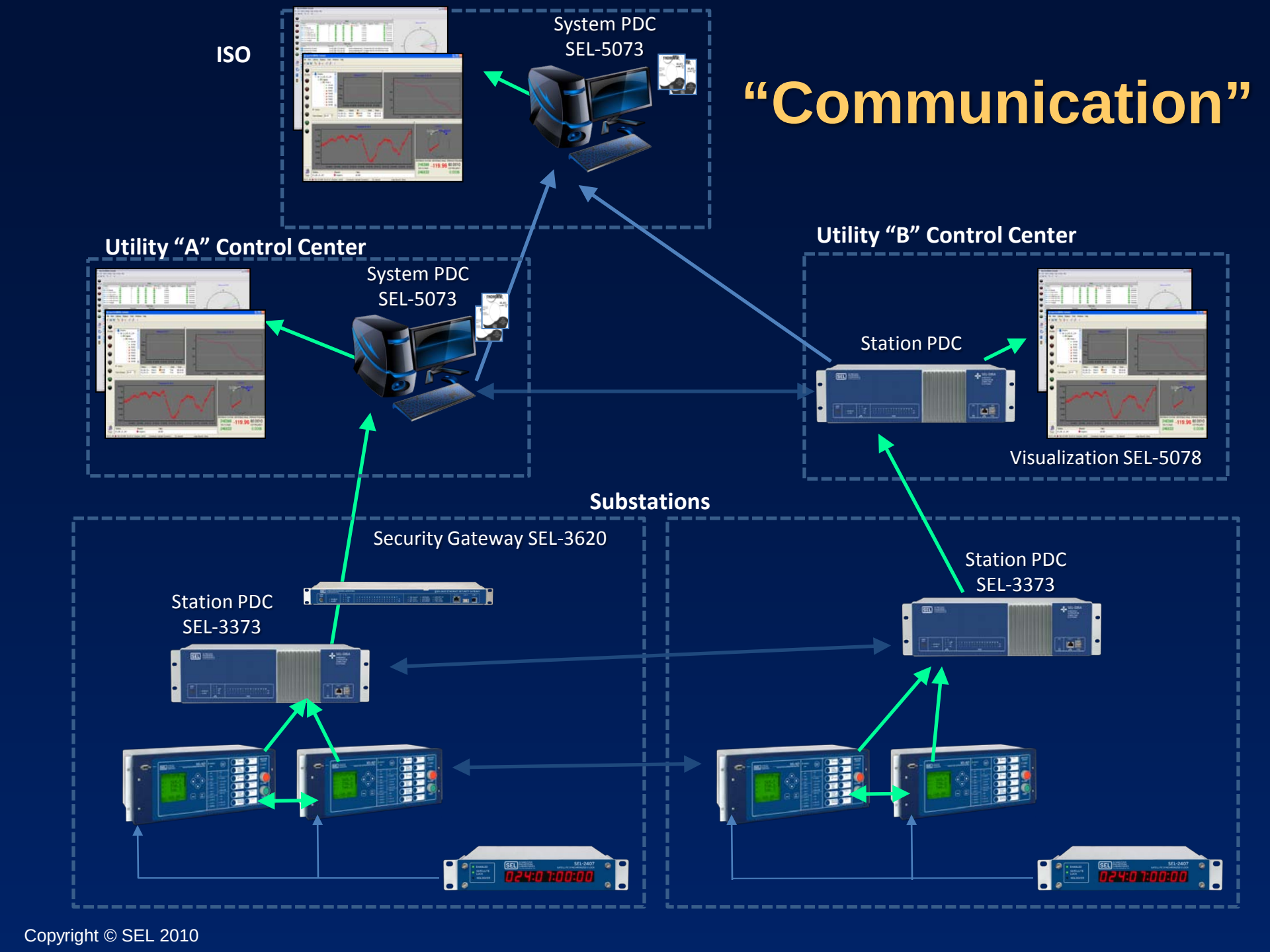
“PDC Functionality And Performance”

Phasor Data Concentration

Integrated Protection and Control

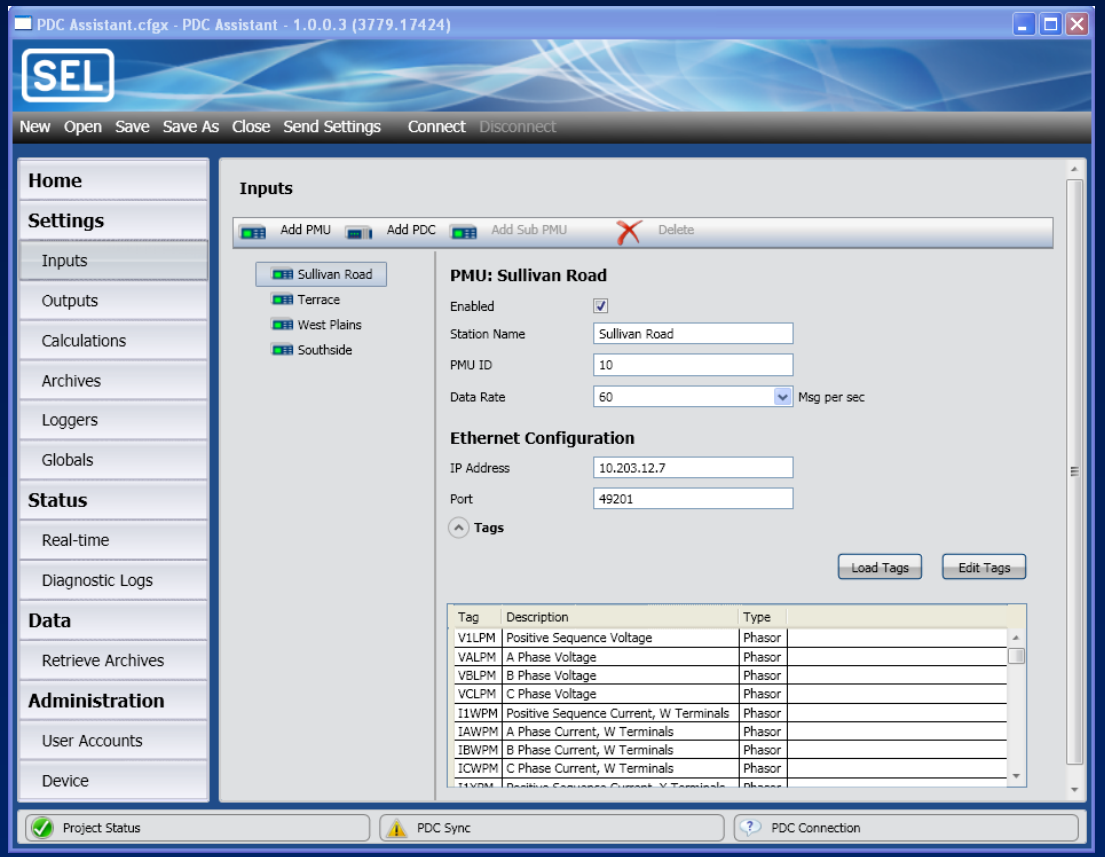
Built-in Functions like Modal Analysis, etc

“Communication”

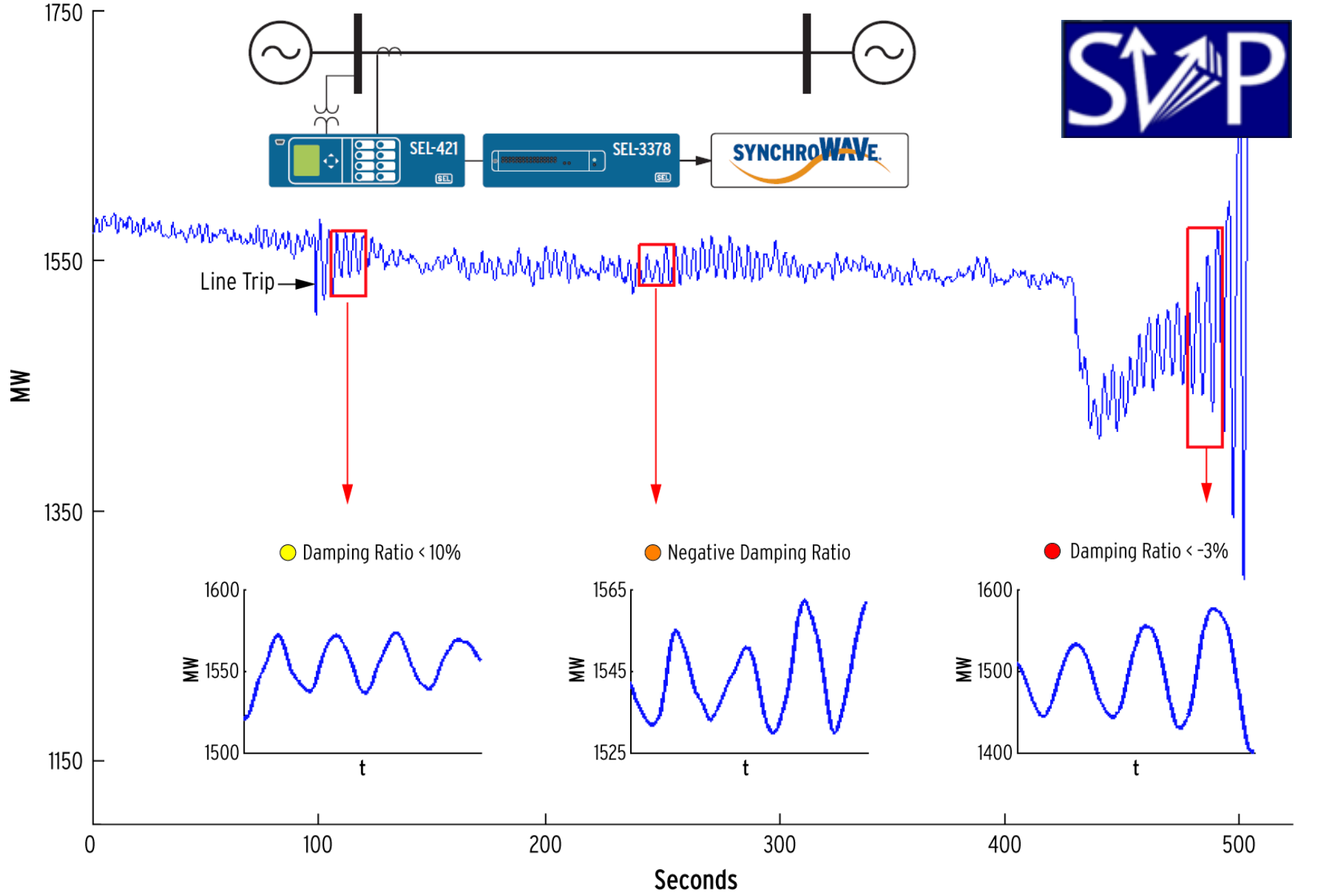


“PDC Functionality” – Easy to Use

- Simple configuration
- Flexible data access
- Real-time status
- Event logs
- Upgradeable



“PDC Functionality” – Wide Area Control



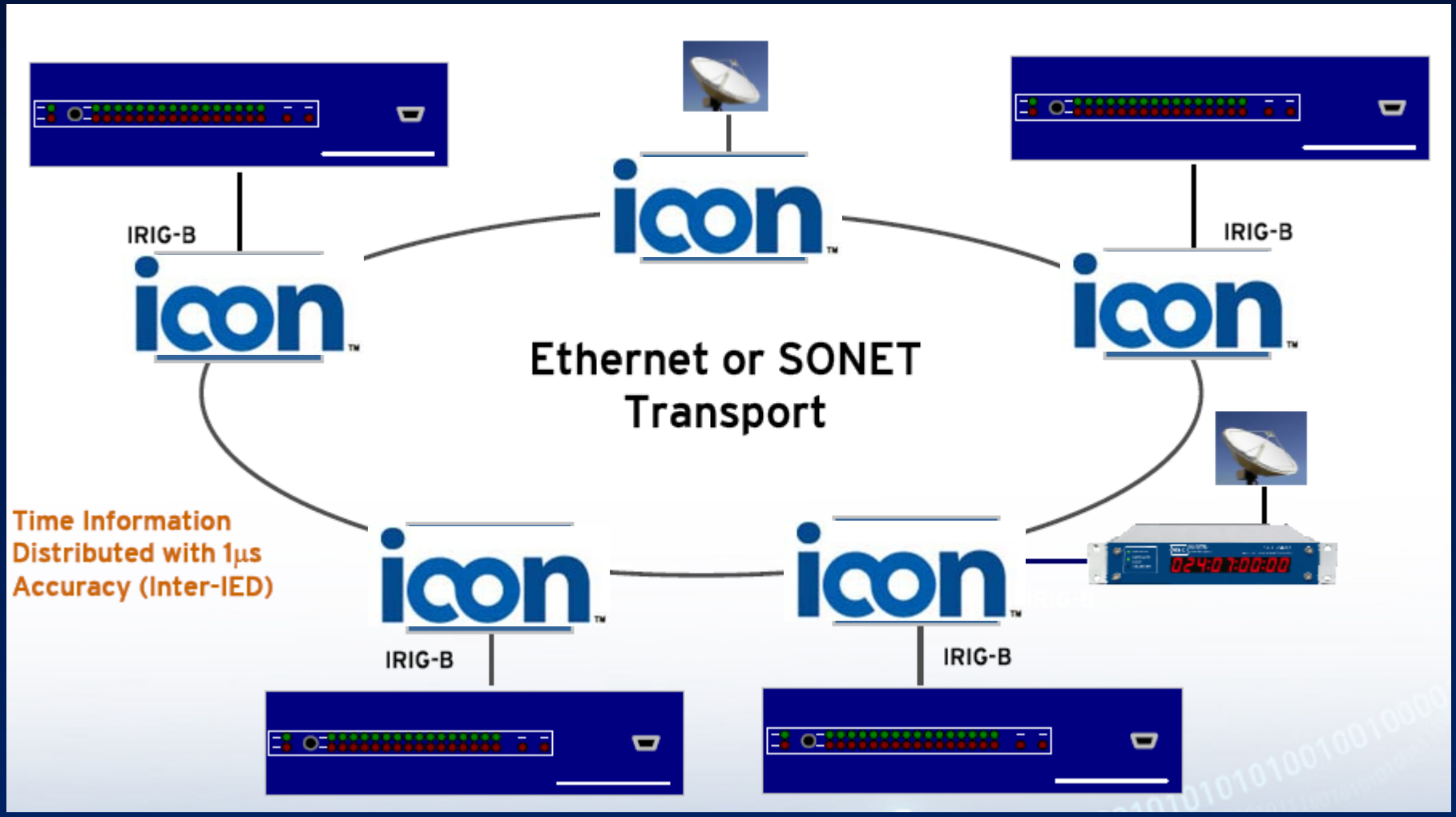
“PDC Functionality” - Reliability

- Conforms to
  - IEEE 1613
  - IEEE C37.90
  - IEC 60255
- Built-in diagnostics
- No moving parts – all solid state
- Same design, testing, and manufacturing practices as SEL’s proven protective relays

“PMU / PDC Testing Approach”

- PMU / PDC testing
  - SEL
  - other vendors
- Thorough testing
  - IEEE C37.118
  - Other industry stds
  - SEL standards

“Timing source approach”



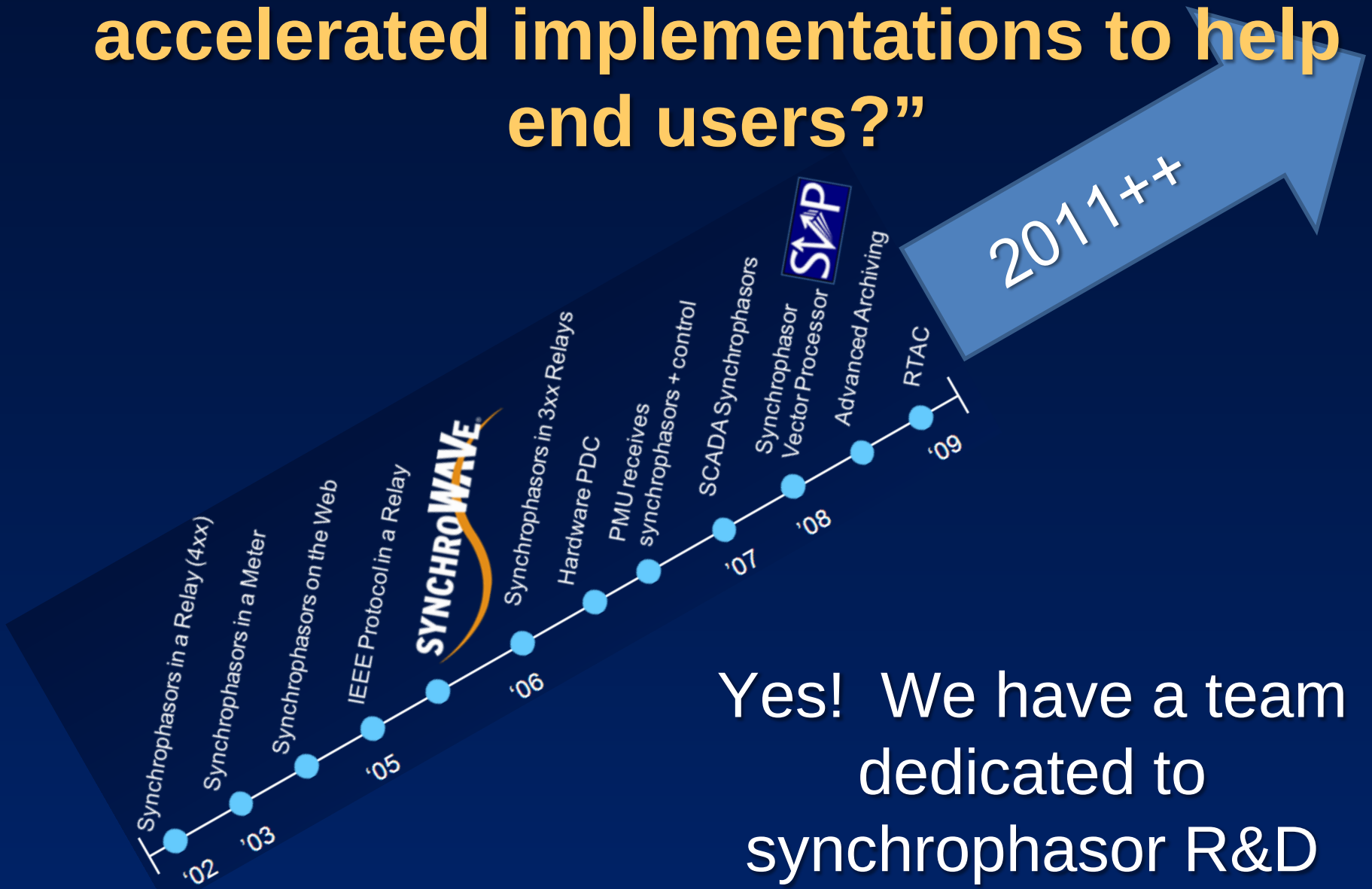
“How consistent are user requirements?”

- Conform to standards where applicable.
- Working on many distributed control solutions.
- Protection / control algorithms have system specific features.

“How do you comply to overall user’s requirements?”

1. Conform to standards.
2. Discuss end-users needs.
3. Inputs from SEL’s large team of field-application engineers.
4. Track all customer requests and commitment dates.
5. R&D team in Pullman, WA implementing new enhancements.

“Are you willing to participate in accelerated implementations to help end users?”



Yes! We have a team dedicated to synchrophasor R&D