



## B5 – PROTECTION AND AUTOMATION PS 3 / INTEGRATION OF INTELLIGENCE ON SUBSTATIONS

10473\_2022

### Intelligent Monitoring, Testing & Diagnostics in a Process Bus Based Full Digital Substation – A Utility’s Experience

continued

#### c. Specific Tests

- Merging Unit testing (Figure 5)
- Testing an IED as a subscriber to GOOSE/SV
- Monitoring SV skew at reception ports of IEDs

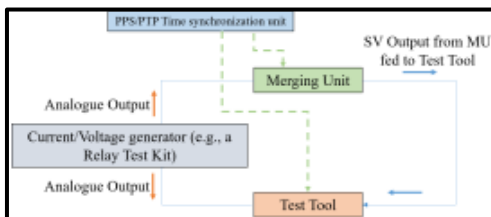


Figure 5: A setup for testing Merging Unit

#### Discussion

As all the control and protection schemes are based on high-speed information exchange, the monitoring of Network becomes important:

- Use of Local HMI and Network monitoring tools (Figure 7).
- Digital substation specific Network analyzers and recorders (Figure 6).
- Monitoring of PTP time synchronization.

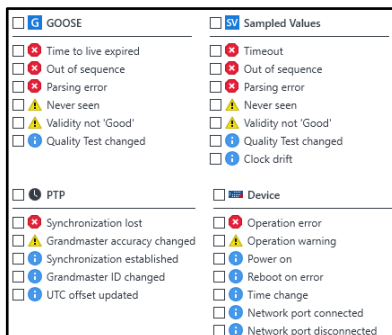


Figure 6: An example to show various monitoring and trigger options based on different system conditions



Figure 7: Network Monitoring integrated in HMI

#### Conclusion

IEC 61850 Process Bus based digital substations enable the utilities to implement systems with intelligent monitoring capabilities along with features for online testing and advanced diagnostics.

These capabilities and features along with the fact that these are vendor-neutral make utilities confident and encouraged to adopt Process Bus based Digital Substations.

The technology has been successfully adopted in POWERGRID and it has immensely benefitted in reliable and efficient operation of the substation. The technology has helped in quick diagnostics and faster troubleshooting.