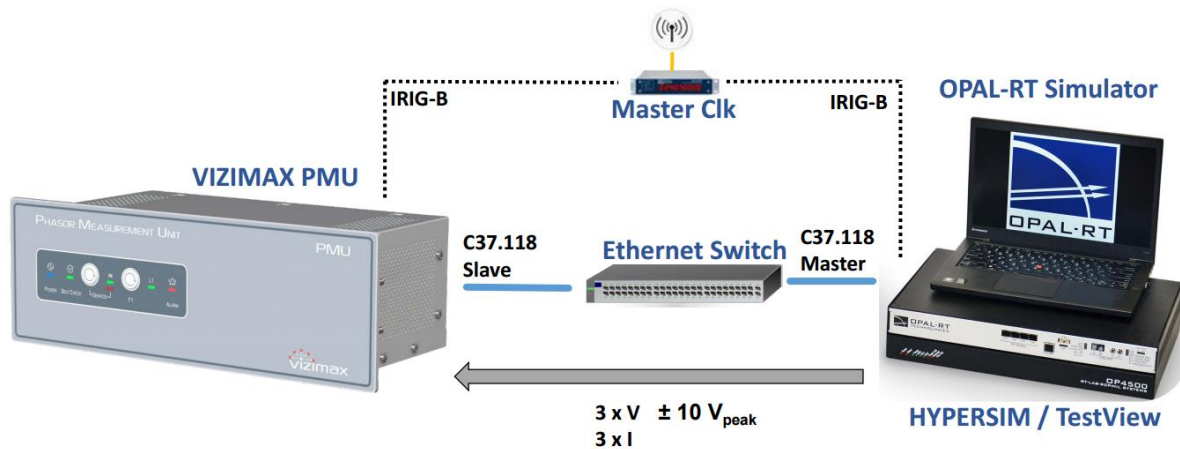




Collaboration between VIZIMAX and OPAL-RT leads to early certification of the VIZIMAX PMU and to the validation of OPAL-RT's accurate PMU algorithm test suite against official certification lab results.

1.Context

It was during the second quarter of 2015 when OPAL-RT approached VIZIMAX to express its interest in the implementation of the IEEE™ C37.118.1 test suite using their HYPERSIM TestView automation software and simulation platform. VIZIMAX responded by providing OPAL-RT with their latest PMU implementation, adapted to accept low-level signals directly from the simulator.



VIZIMAX built its reputation by developing and manufacturing innovative solutions to optimize how people generate, move and consume energy. By doing so, VIZIMAX helps its clients to better control, monitor and master their energy related equipment. OPAL-RT is the world leader in the development of PC/FPGA Based Real-Time Digital Simulators for Hardware-In-the-Loop (HIL) testing, design, study, and optimization of power system control and protections. Along with their global mission to help reduce design, implementation and testing time of complex products by supplying state-of-the-art products and cutting edge expert services, all favorable conditions were met for a great collaboration.

2. Testing

And so took place the cooperation with the exchange of valuable technical knowledge and information between both parties, allowing for serious validation, correction and improvement of both products. “Our engineering team was impressed with OPAL-RT’s test platform and its high level of accuracy. This collaboration has been valuable to us; thanks to the fast and wide test coverage offered by their test suite, we were able to gain satisfying confidence in our own algorithms before the certification process started”, explained Mr. Jean-Guy Lacombe, President and CEO of VIZIMAX.

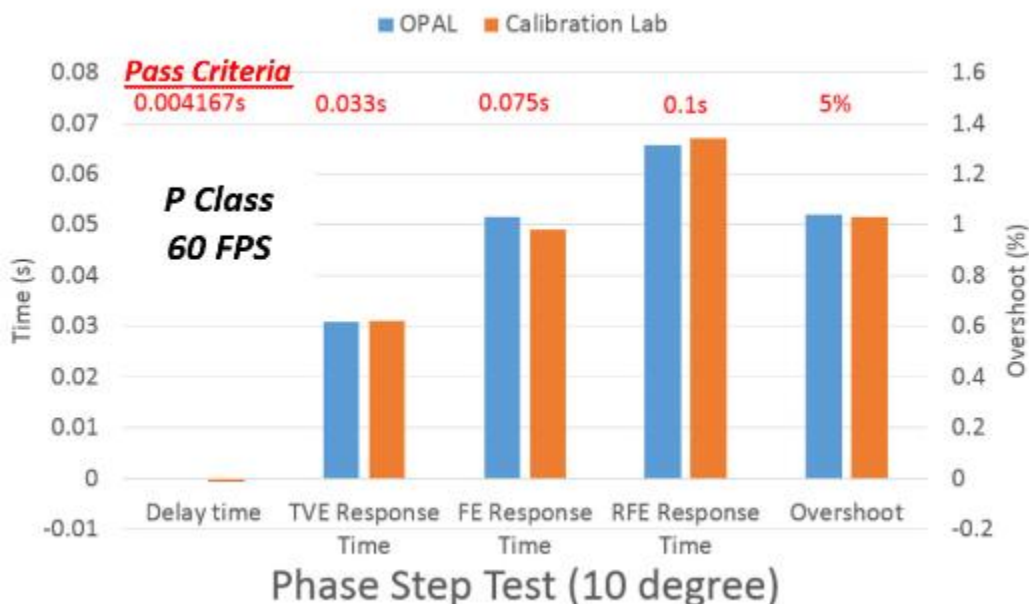
Additional tests confirmed that VIZIMAX’s PMU offers fast, reliable and accurate measurements exceeding the IEEE™ C37.118.1 requirements for both M and P class. Its high resilience to harmonics, sub-harmonics and interferences allow fast operations meeting the highest performance requirements for Remedial Action Scheme Systems. It was also demonstrated that the P class implementation could in fact easily meet the requirements of the M class. This in turn enables the more ambitious goal of feedback control of the grid through harnessing power electronics controls in SVC, STATCOM, HVDC converters, power plant excitation, batteries energy storage, wind power plant generators, etc.

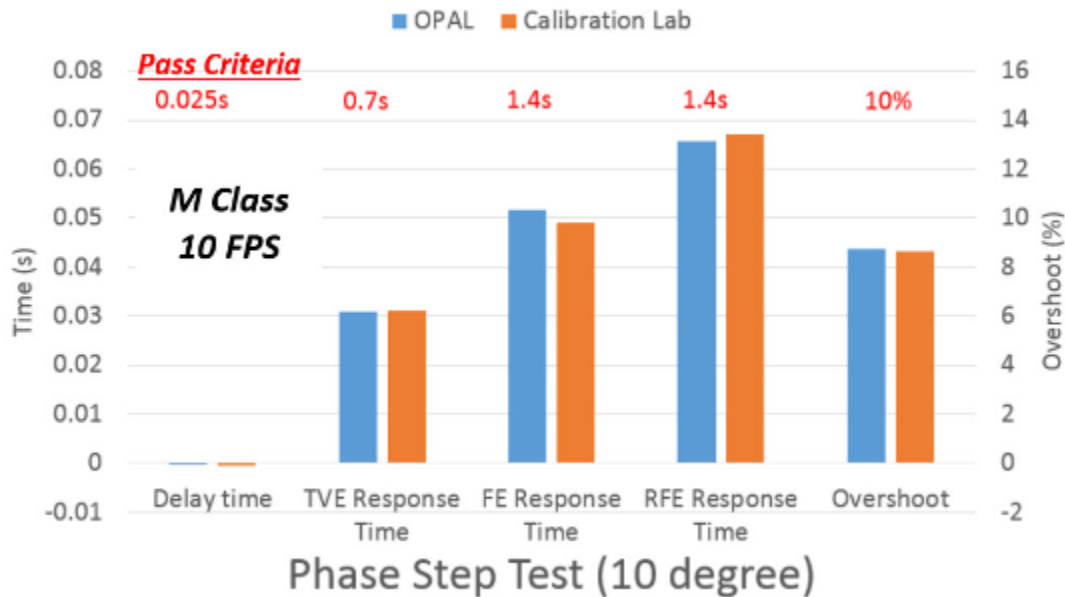
3. Outcome

On March 22, in a ceremony held in Atlanta (GA) at the North American Synchronphasor Initiative’s (NASPI) 1st International Synchronphasor Symposium, VIZIMAX proudly received a plaque from the IEEE Standards Association confirming the [full compliance of](#)

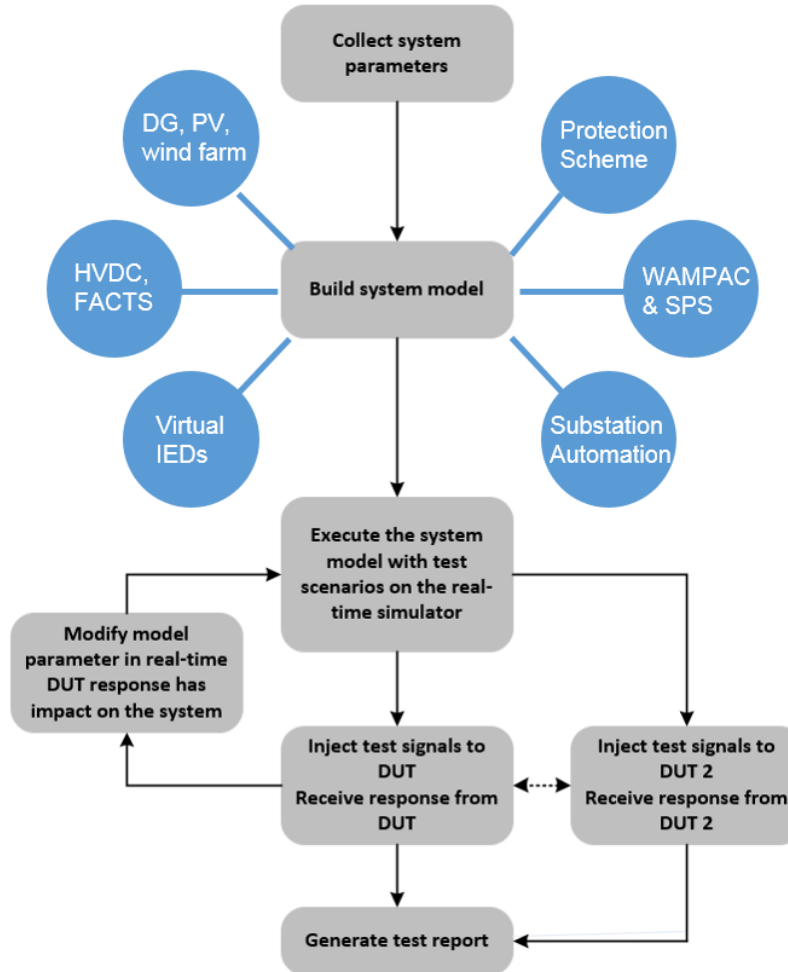
[their PMU with the IEEE™ C37.118.1 standard](#). At the same conference, OPAL-RT presented on [PMU applications using their real-time simulators](#), including the automation and performance of the IEEE™ C37.118.1 test suite as well as their collaboration with VIZIMAX towards the official laboratory compliance testing of their PMU model 010000.

“This collaboration has accelerated our comprehension of the IEEE™ C37.118.1 test specifications and helped in validating our platforms and software in this very precise context, thanks to the help of knowledgeable Engineers from VIZIMAX. Working in close collaboration with key manufacturers and industry leaders has always been our approach and we are always opened to renew the experience anytime stars align”, says Mr. Jean Bélanger, President and CEO of OPAL-RT Technologies. OPAL-RT compared their test suite results, using the same PMU model and version, with those of the [Consumers Energy Laboratory Services](#), the sole IEEE™-authorized independent laboratory to date. It has been demonstrated that test results are quite similar in both cases, as seen on the following bar charts.





Not only did the [presentation at the NASPI symposium](#) show that the OPAL-RT HYPERSIM simulator allows for accurate pre-certification testing of new PMU algorithms, but thanks to the accurate I/Os, time synchronization and communication protocols provided with their common hardware platforms, each of OPAL-RT real-time simulation software can play major roles in the design of control, monitoring and protection systems using Hardware-in-the-Loop testing.



With a model-based design approach, Engineers are now capable of reducing the time to market, or to commission advanced PMU-based technologies with a wide test coverage provided by the modeling and testing tool suite offered with OPAL-RT real-time simulators.