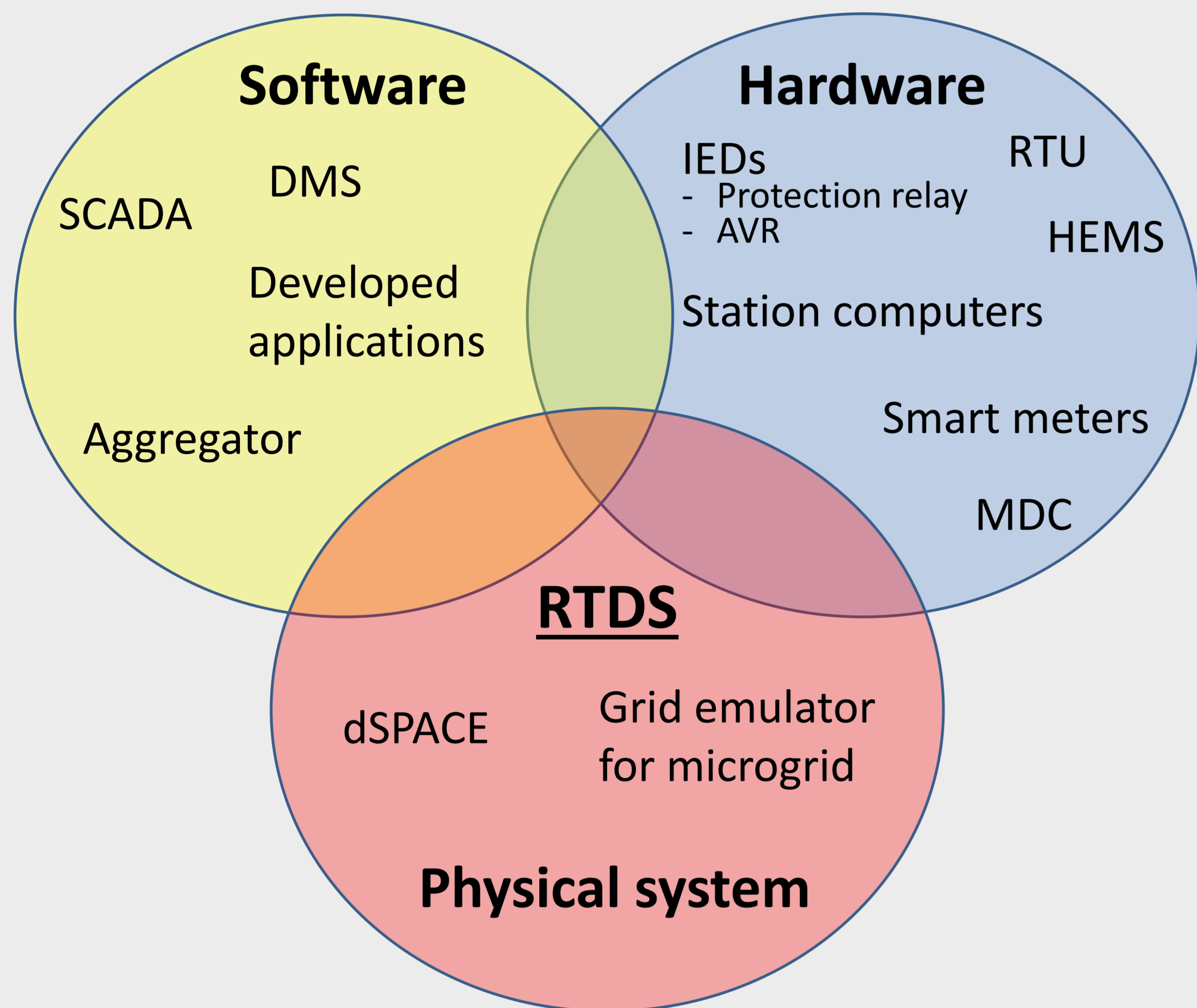


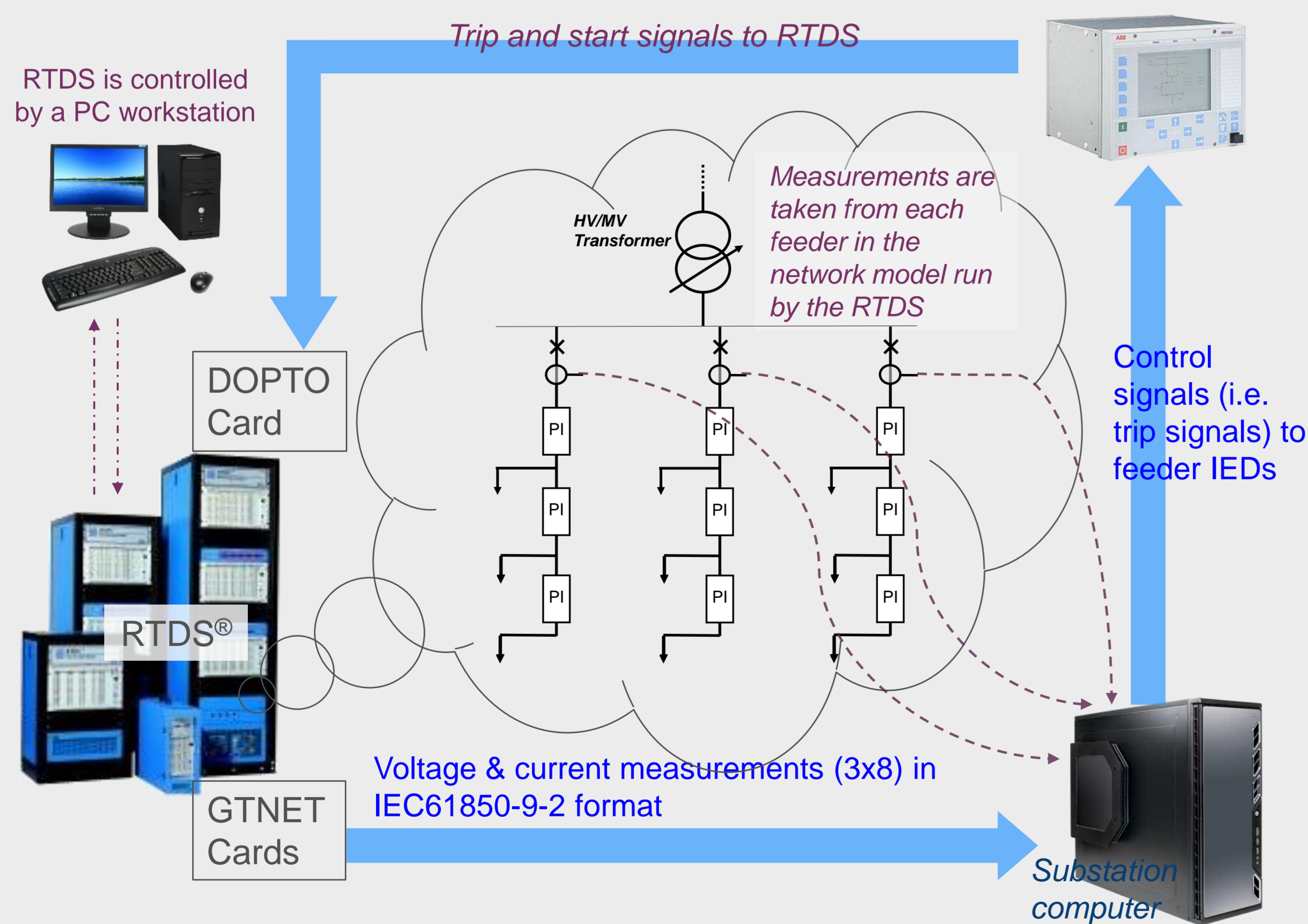
# TESTING FUTURE ENERGY SYSTEM SOLUTIONS

## Summary

The unique Real Time Digital Simulation (RTDS) laboratory at Tampere University of Technology provides an excellent environment for testing and developing new technologies. The following Venn diagram shows a few examples of the related studies.

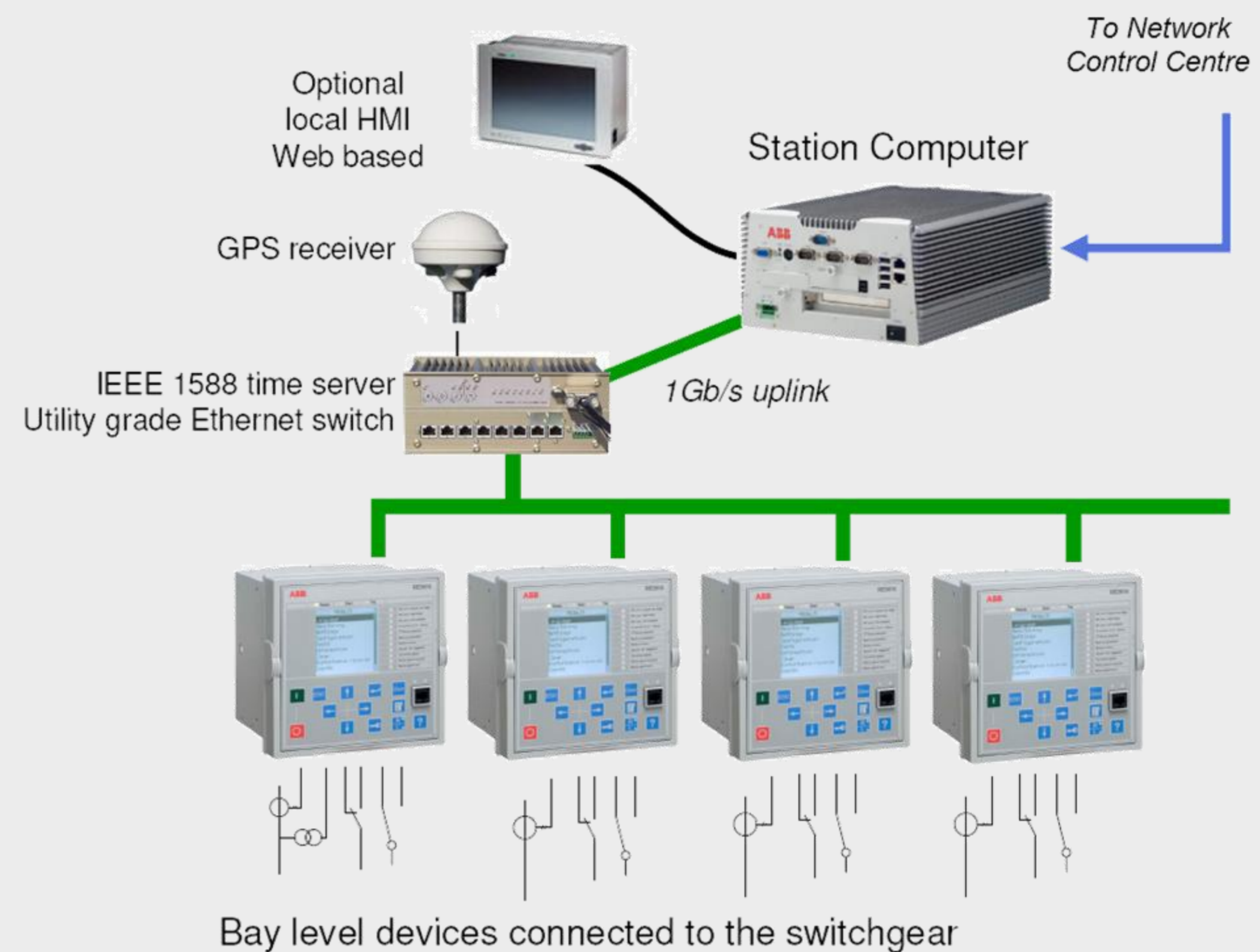


RTDS is a power system simulator that solves the electromagnetic transient simulations in real time. This environment provides a fast and reliable platform for both software-in-loop and hardware-in-loop testing. The following figure illustrates how the RTDS can be used for testing centralized protection.



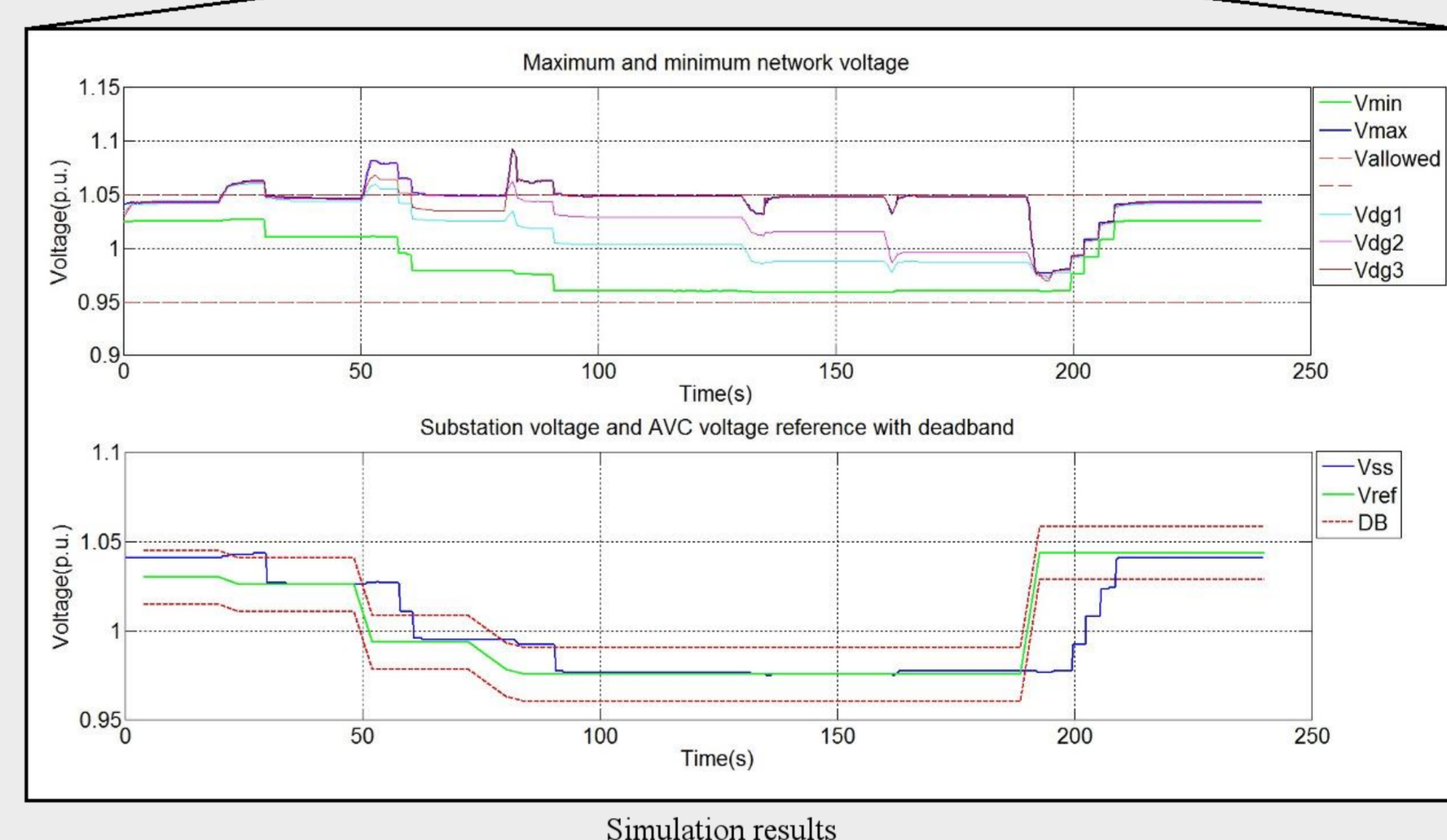
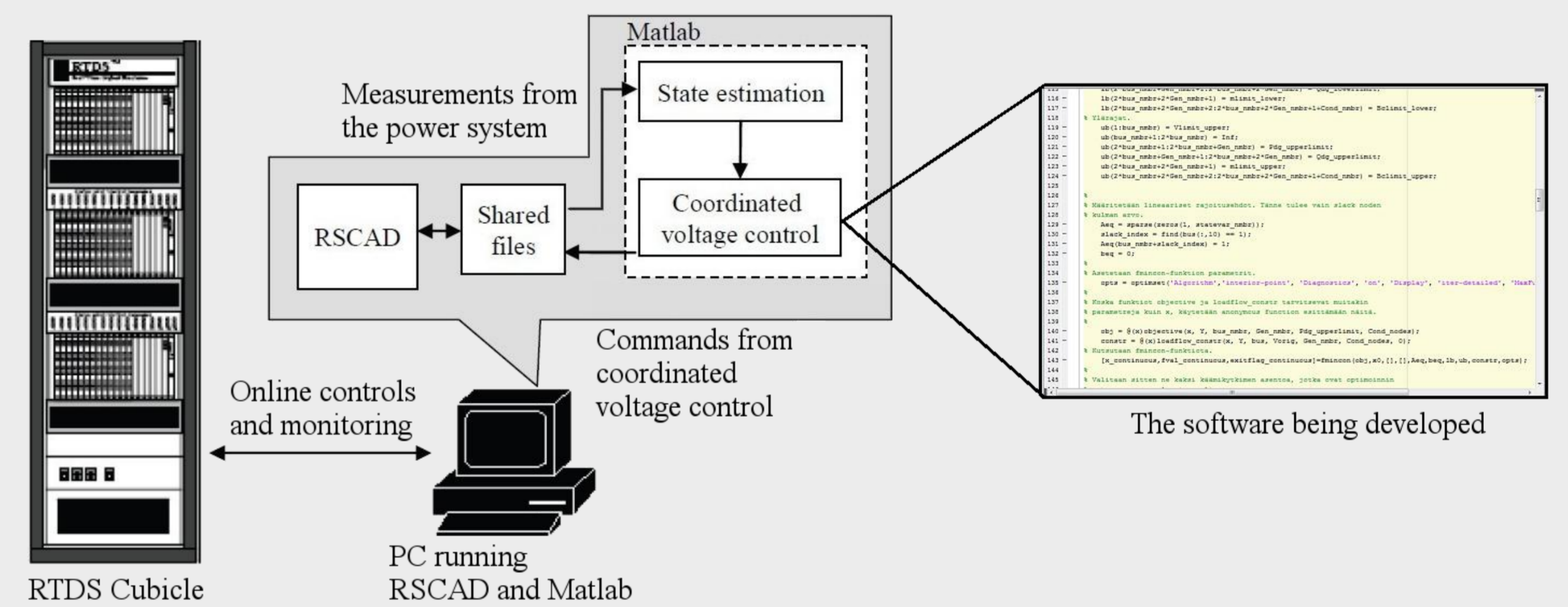
## Hardware-in-the-loop testing

### Centralized protection



## Software-in-the-loop testing

### Coordinated voltage control



## Benefits of collaboration

- Device testing for manufacturers (black box testing)
- Realistic test environment of implemented systems
- Rapid realization of new technologies or ideas
- The environment enables safe and comprehensive testing

## More Information

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