GPU Solutions for PSCAD: IT17112

Reporting Period	April 16, 2020 - April 23, 2020
Activities	• Used Docker to construct a CUDA environment for developing QRFactor on U of W servers. See *Issues* for more. • Wrote in randomized check of GPU code output against CPU versions of the CUDA commands. • The output of the checks are then read and compared in a separate program. • Investigated possible discrepancy between CPU and GPU outputs. Further examination is required.
Issues	• Docker environment is currently not able to launch NSight Eclipse, which is needed for building QRFactor. This needs to be resolved before full runs can be done on the U of W servers. • When comparing the output of the CPU and GPU versions of QRFactor, there was a strange increase in the relative differences between the two data sets in rows 2208-2210 in all the sampled data sets. At this point, more investigation is required to know whether the error exists with either the GPU or CPU method.
Milestones Accomplished	• Coded and ran a comparison between the output from CPU functions and GPU functions in QRFactor. Aside from the anomalies mentioned above, results differed on the order of 10^{-10}. • Created a CUDA container for development and linked it to the local directories for easier access to existing data.
Milestones Not Accomplished	• Run QRFactor on U of W servers
Next Week's Milestones	• Investigate discrepancies between CPU and GPU methods for possible issues with GPU program. Ideally, compare against the known solutions to the system provided by MHI. • Resolve X11 forwarding from within container in order to run NSight Eclipse through Docker.
Forwarded Issues	• None