MONTHLY PROGRESS REPORT

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Contract/Purchase Order No.	Task Order No.
W9132T-10-C-0008 (prime contract no.)	

Project Title:
Design and Simulation of Intelligent Control Architecture for Military Microgrids

Period Covered:
August 1 2010 – September 1, 2010

POC/COR (Reference Paragraph 5 of the SOW):

Achievements (Describe by task. Add additional tasks, if needed.):
task numbers refer to tasks in Odyssian's original contract

Task II: Model and Simulate Intelligent Microgrid

1) completed constructing preliminary simPower model of the UWM mesh microgrid whose layout was provided in the UWM February 2009 meeting.

2) initial testing of UWM mesh under islanding appears to match earlier results from UWM's testbed. Future plans involve completing testing on a number of additional scenarios that include 1) impact of induction motor after islanding, 2) Test of battery's SOC management scheme, 3) diesel generator startup after islanding.

Task III: Distributed Control Algorithm Development

No achievements this month.

Task VI: Develop Wireless Communication

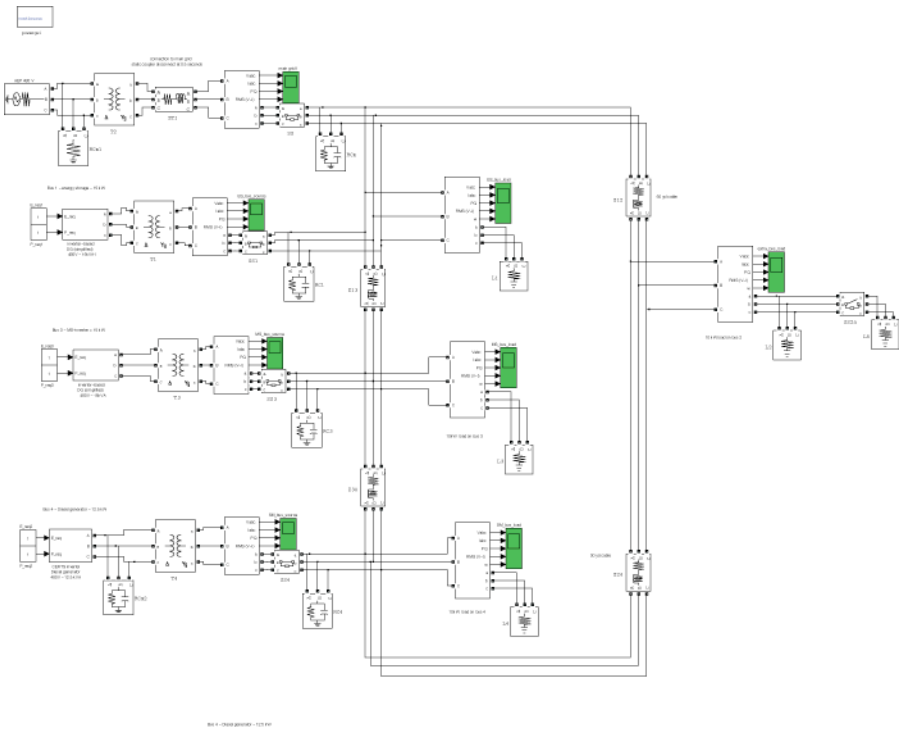
No achievements this month.

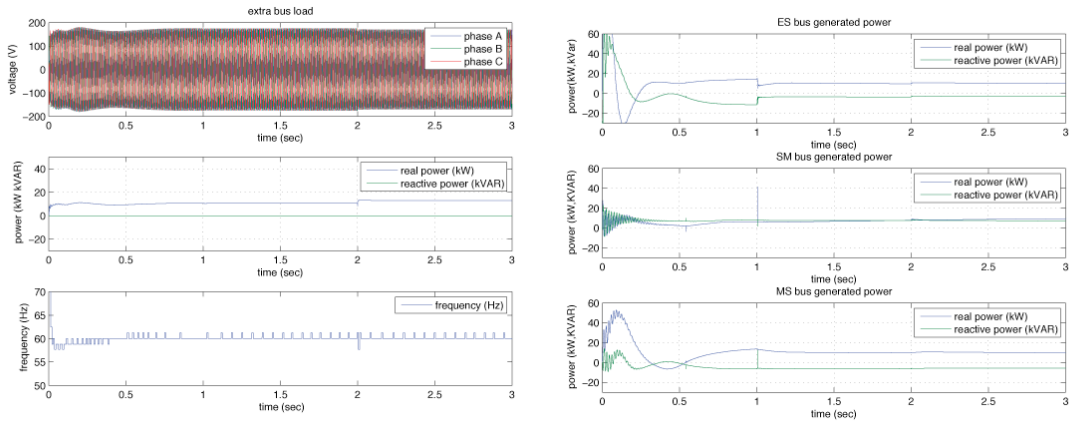
Task VII: Develop Wireless Distributed Control

No achievements this month

Problems Encountered (Describe by task. Add additional tasks, if needed):

Task II: None

Task III: None
Task VI: None
Task VII: None
Open Items (List items that require action by the Contractor or the Government):s No open items
Summary Assessment and Forecast (Provide an overall assessment of the work and a forecast of contract completion): The main objective of this reporting period was to complete construction of the simPower simulation of the UWM mesh microgrid. Preliminary simulation was completed for a mesh microgrid consisting of two MS sources, one SM source. The external storage (ES) source was not implemented in this simulation because some problems in the dynamics for the battery's State-of-charge (SOC) were uncovered. The simPower model shown below does not include harmonic filters since we don't model the high-frequency behavior of the inverter. RC filters were connected to each DG to reduce the size of switching transients. The simulation execution time could be very sensitive to coupling filter designs.      Simulation runs were used to verify the correctness of the low-level UWM controller implementations. The simulation assumed 42.5 kW of local generation and initially 30 kW of load that jumps to 33 kW at 2 seconds into the simulation. The main grid disconnects at 1 second into the simulation.



The simulation shows that there is a significant initial start-up transient prior to islanding at one second. This is because we start the simulation from zero initial conditions (black start). The system settles to its equilibrium within 1 second, after which the microgrid islands itself from the main grid. The voltage and power quality appear to be consistent with the UWM results shown in February. Frequency is monitored at the load using a simple zero-crossing algorithm. This was done because it is essentially equivalent to the frequency measuring approach used by Odyssian. These results suggest that we will need to adjust the approach to provide more accurate measurement of line frequency.

Next month's objective is to correct the errors in the external storage source, to conduct more thorough testing of the low-level UWM controller, and to provide an initial specification on the interface between the UWM controller and the event-trigger dispatch algorithm.