

ECE SENIOR DESIGN PROJECT 2000-2001
FINAL REPORT

Small Scale Integrated Power System (SSIPS)

Submitted to Dr. D. Niebur and the Senior Design Project Committee
of the
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Abstract

Currently the US Navy is developing and implementing an Integrated Power System (IPS) for use on board future ships. The purpose of this IPS is to supply a totally autonomous shipboard electric power system that must be both extremely reliable and safe. This power system will supply numerous types of power to the ship for its operation. Different types of AC and DC power that are required include anywhere from 120 to 480 VAC at both 60 and 400Hz, while also providing a DC voltage from 15 to 1000VDC. Because this future system is currently still in the design phase, there are several aspects which have not been explored such as the security, vulnerability, survivability, and controllability of this system.

The goal of our design project is to construct a model and display various power distribution configurations. Using a model of a ship, we have built a Small Scale Integrated Power System (SSIPS) plant that is controlled and monitored by original software written in Visual Basic. This software interfaces with the hardware model/platform via a PCI-1200 National Instruments-Digital Acquisition Card (NI-DAQ) containing digital Inputs/Outputs. In addition, a graphic user interface (GUI) has been created to facilitate the control and monitoring of our system for a novice.

This SSIPS plant resembles the US Navy's future shipboard power system in a scaled down model. Through careful analysis we can explore the critical system performance and various reconfigurations, which are essential to the survivability of the ship and its crew. The ultimate purpose of this project is to fulfill both educational and training needs through the visualization of our Integrated Power System model.

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