A) General Information

Acronym:	**MASGrid**
Title of the User-Project:	**Multi-Agent System for Self-Optimizing Power Distribution Grids**
TA Call:	**30/11/2012**
Host Research Infrastructure:	**ICCS-NTUA, Greece**
Starting Date:	**1/4/2013**
End Date:	**29/4/2013**
Lead User :	**Alexander Prostejovsky**
Organization:	**Automation and Control Institute (ACIN), Vienna University of Technology**
Additional Users:	**-**

B) Summary of the User-Project

MASGrid aims on developing a novel control system approach using Multi-Agent Systems (MAS) for energy distribution networks (Smart Grids). The purpose of this user project was a first implementation of the Smart Grid control system approach in a real laboratory environment. By making effective use of the provided laboratory infrastructure, an islanding case is considered where the grid equipment gets separated from the utility grid and reconnected again. The agents of the control system conduct their assigned equipment to react to the changed situation appropriately, hence demonstrating the control system's applicability on a small-scale electric grid.

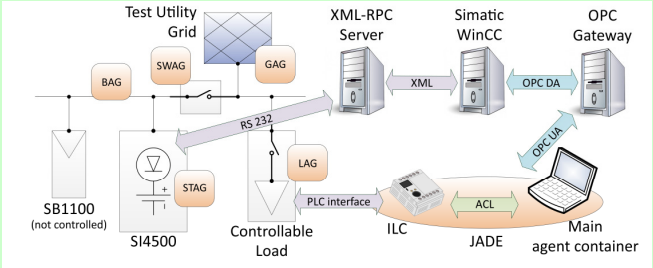

Figure 1: Laboratory and test setup.

C) Main Achievements

This first implementation of the MAS-based Smart Grid control in a laboratory environment was conducted successfully, as its applicability in a small-scale electric grid could be demonstrated. The correctness of the design has been verified for this particular test case as no changes to the basic architecture were necessary to adapt it to the very specific demands of the used equipment. The gain in practical experience helped improving the agent design on site, so that, for instance, the various uncertain reaction times due to signal propagation and frequency synchronization processes (which are of hardly any concern in our simulated environments) were also handled well.

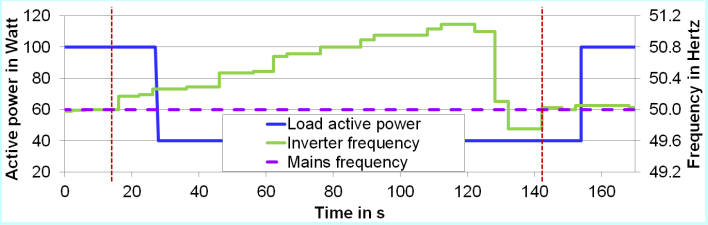

Figure 2: Measurment results for the islanding case.

D) Dissemination of the Results

A poster based on earlier works and the TA experiments was already designed during the last days of the TA in cooperation with the ICCS staff and has been presented at the Smart Grids Week 2013 in Salzburg, Austria. A more thorough description of the performed experiments will be presented at the IEEE IWIES 2013 workshop. It is planned to include the TA results also in a future journal publication.

E) Use of the Resources

Nr. of Users involved:	**1**
Access Days:	**21**
Stay Days:	**30**