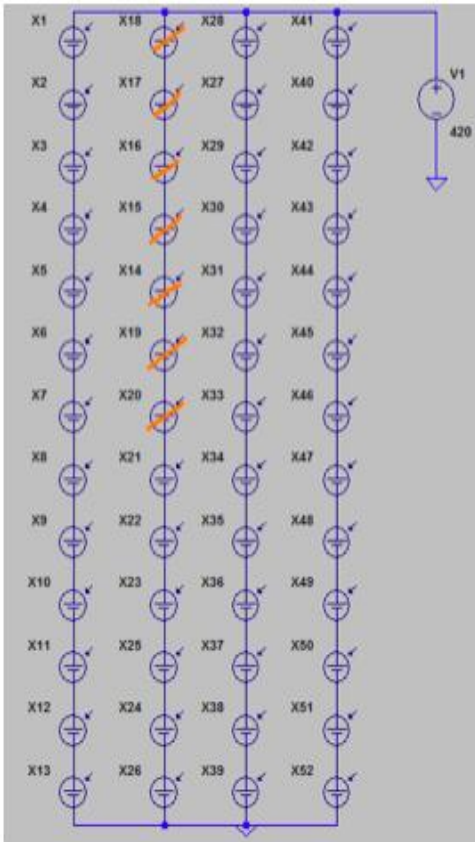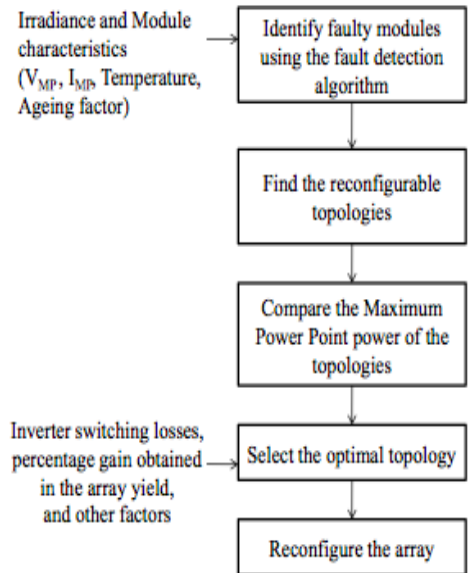# 18kW Solar Facility Programming Workshop for GOALI Project
April 2016 at ASU Macro Technology Works
ASU, Energy Wireless (Japan), ViaSOL Energy (Tempe)

A. Experiments with Shading Planned and Solar Panel Connection Reconfiguration

: Illustration of shading pattern-1.

: Block diagram explaining the topology reconfiguration method.

The experiments above with shading patterns and the GOALI project developed reconnection algorithm to optimize power shown above. Theoretical results in Elsevier SEGAN paper shown in NSF GOALI products in this report. In Figs. 1-4 (next pages) we show facility and workshop held in April 2016 to prepare facility for experiments to validate GOALI theoretical results in our SEGAN paper. We engaged PhD, Masters and one undergraduate REV student in experiments

B. Preparation of Facility (installing and programming SMDs)

Figure 1. Solar 18kW 13x8 Panel Facility with Sensors and SMDs at ASU Research Park dedicated to NSF GOALI Award 1308052.

Figure 2. Real time measurements from solar wireless transmitters and sensor fusion unit. Evaluating strength of transmitters, connectivity to servers, and analytics inside ASU Macro Technology Works at ASU Research Park. Facility managed byNSF GOALI PI and SenSIP center director Spanias. In the picture our students David Ramirez (REV UG), Jongming Lee and Sunil Rao. Also Co-PI Srinivasan of ViaSOL CTO and Poundra and Energy Wireless CEO and CFO Koizumi and Morrimoto that donated the sensors and SMDs.

Fig. 3. David Ramirez former USMC and currently GOALI REV undergraduate student programming and installing the sensors on each panel. Planning the installation at MTW ASU, ViaSOL and Energy Wireless.

Figure 4. Installing and Programming SMD sensors on solar panels and obtaining analytics. In 2016-17 we will be simulating solar panel faults, shading conditions, and developing algorithms, and programming actuators to reconnect panels to maximize power. Davd Ramirez, Jongmin Lee and Sunil Rao. Scientific research results already reported in two products of NSF GOALI.