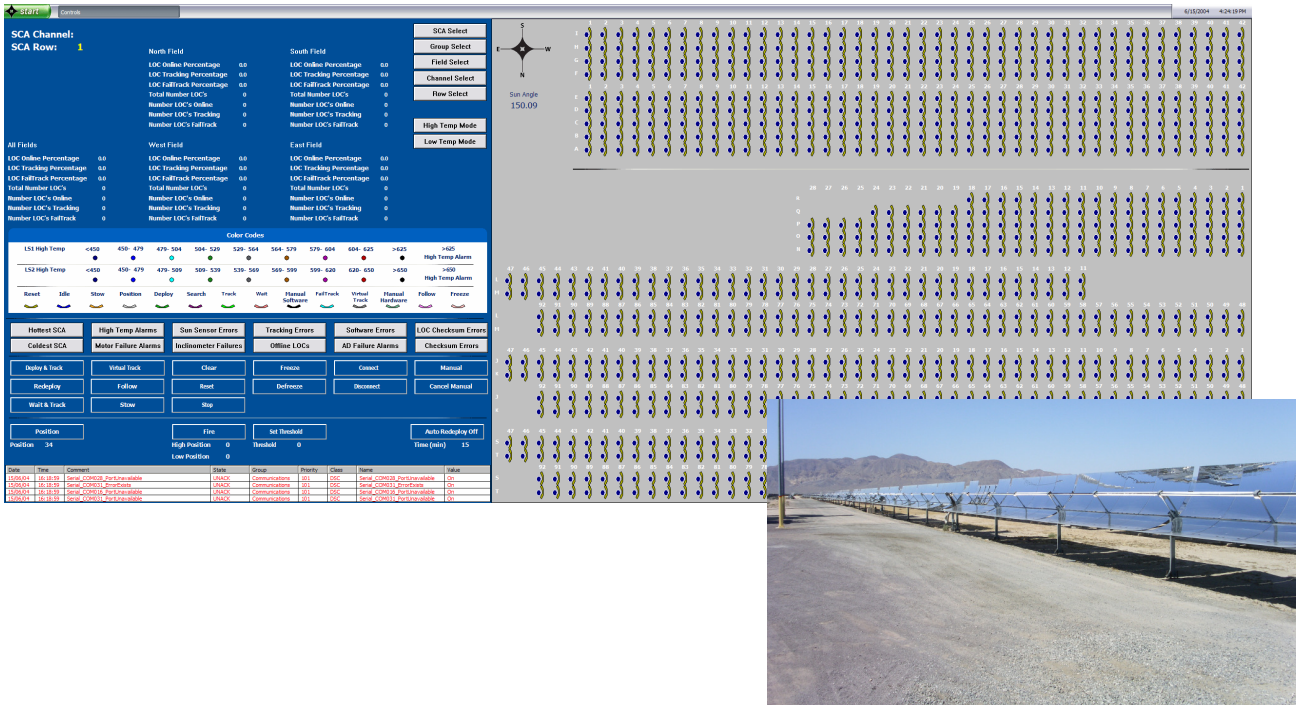


Overview

Sunray Energy, Inc. owns and operates solar thermal electric generating facilities in Daggett, CA. The two power generation sites are SEGS I and SEGS II. SEGS I consists of about 640 microcontrollers and SEGS II consists of about 1200 microcontrollers. Each microcontroller is used to control individual SCAs (Solar Collector Assembly). The microcontrollers communicate over RS422 connections, using a proprietary protocol, which was not documented. It was required that Enterprise Automation provide a new control system very similar to the original system from an operators standpoint. This was required to reduce re-training on the new system. The other major requirement was a low cost solution that provided high reliability.

Solution

Enterprise Automation approached this job from the standpoint that the proprietary serial communications was the highest risk portion of the job. For this reason the protocol was completely reverse engineered as a first step. (There were actually a number of different protocols, and checksums on different revisions of the microcontrollers.) Once completed, the protocol was turned into a Think and Do subchart which allowed for efficient and accurate replication. Wonderware InTouch was used for visualization. Enterprise Automation took advantage of SuperTags to make for a very well organized system. SEGS II pushed InTouch close to its tag limit using 46,000 tags. The HMI used two 19" TFT monitors to display the fields of SCAs to the operators. The layout and control methods were very similar to the previous system, so that training required only a few hours.



Technology

Think and Do's ability to control multiple com ports in a deterministic manner made it a very effective I/O server. Think and Do's OPC server communicated with InTouch's OPCLink. OPC Link communicated with InTouch using Suitelink. This communications scheme allowed for constant monitoring of the 'health' of the communications links. The field I/O was all RS422 serial devices, so Enterprise Automation selected the Control Rocketport PCI cards based on their history of success with Think and Do projects. Enterprise Automation supplied computers that had hot swap mirrored hard drives and hot swap redundant power supplies. There was also a cold backup computer supplied in case of catastrophic failure.