

Case Study: Factory Host Connectivity for Photo Voltaic manufacturing automation



Industry

Photovoltaic
Manufacturing

Solution

Host Connectivity using
ICEConnect

Customer:

A European company who designs, develops and manufactures handling systems and complete handling lines covering all areas of solar cell processing: from incoming wafer inspection to the final solar cell classification.

Problem Description:

Customer was enhancing the solar cell manufacturing equipment's automation software to enable it to talk to factory wide central controller. It required a ready-to-integrate highly configurable third party host connectivity solution which is easy for the developers at the customer site to integrate in shortest time. Host connectivity interface packages to be used in manufacturing equipments in solar domain needed supporting several thousands of variables, events and alarms. Also the high speed multiple trace data transmissions was also a must feature to be supported. Customer was also looking for a solution which will be lighter so that it won't take more power from CPU, so that the time-critical equipment automation software can run with enough CPU resources. Customer also wanted to do lot of custom message handling and processing which the host connectivity needed package to be very flexible with its interfaces and configurability.

Solution offered by NeST:

- Proposed using the factory host connectivity package from NeST called ICEConnect for integrating with equipment control software to enable communication with factory host using SEMI standard compliant messaging mechanisms.
- Suggested making use of SEMI GEM standard based services for Communication and Control, Alarm Reporting, Event Reporting, Terminal messaging and Remote Command processing.
- SDK and related documents along with a trial version was delivered to customer for evaluation by developers at customer site after signing NDA.
- Domain experts were identified at NeST for giving support to development teams at customer site.
- Compliance for CLS while integrating with Delphi based platforms were performed by NeST developing sample applications and delivering them to customer for reference.
- Developers at customer tried enabling a small set of features using the ICEConnect and interfaces provided by the ICEConnect SDK.
- Customer accepted the product for further development looking at the aspects of development easiness, configurability and performance.

E4 (SECS I)

E5 (SECS-II)

E30 (GEM)

E 37(HSMS)

Development Approach:

- **Analysis**

NeST analyzed the requirements for enabling factory host connectivity, especially the integration of host connectivity package with the equipment automation software.

- **Customization**

Implemented tool specific remote commands and custom message. Custom message processing requirements were met by making use of ICEConnect's message process by-pass feature. ICEConnect provides configurable custom message processing.

- **Integration & Compliance Testing**

Integrated host connectivity solution was tested by customer using NeST's ICEHost factory simulation software provided along with ICEConnect SDK.

All features needed for performance monitoring and central control were tested and evaluated for factory level real-time data analysis requirements .It included testing for high-speed data collection and support for several thousands of variables linked with reports.

Result:

A fully SEMI GEM standard compliant factory connectivity was enabled which made the equipment automation software factory ready. The testing done in simulation made the customer to save time in making the system ready for factory environment. The high level of configurability came in handy when factory specifications required minor changes in variable and reporting naming requirements. The highly mature and reliable software with zero defects made the customer winning more orders for similar equipment from the same factory.

Benefits to Customer:

- Ready-made and well tested factory host connectivity software with SDK helped the customer to reduce the development and testing time considerably making lab-to-fab time shorter reducing time-to-market.
- The developers at customer site could spend more time on their equipment specific features for high level of performance.
- The ready-made SECS/GEM manual with place holders for customer specific details saved time for factory specific documentation requirements.
- Testing using ready-made scripts for host simulation using ICEHost made different factory scenarios tested at customer premises before reaching the factory.
- Support given by NeST's domain experts made the customer also more insights into the SEMI standards and possibilities of using it for better and optimum performance of equipment.