News from Custom Electronics
Integrated Plant Management Systems for Industrial Control Applications

As more and more plants and processes involve either computer control or supervision, the ability to provide additional levels of plant integration into the business is more easily realised than most of us may think.

An Integrated Plant Management system typically encompasses:

- Computerised process control
- Data logging
- Barcode reading
- Shop floor data collection
- Job tracking and reporting
- Capacity Planning and Scheduling

Apart from improved process control, these systems offer business benefits such as:

- Reduced cycle times
- Improved throughput
- Comprehensive data logging
- Full traceability
- Enhanced process quality control
- Ease of data review
- Increased on-time delivery

The Control and Automation Division of Custom Electronics at Biggleswade, has been providing Integrated Plant Management systems for industry for over 25 years. The Company has developed highly advanced systems and techniques in high profile heat treatment applications in aerospace and high-tech materials applications.

In a typical situation, a client works closely with analysts and engineers from Custom Electronics to design, tailor and implement a system. Each piece of plant included within the scheme is provided with computerised digital control using industry standard PC technology and control equipment plant interfaces. As well as preserving the integrity and fault-tolerance provided by various levels of manual and semi-automatic control, the computers provide a user-friendly operator interface facilitating the entry of batch data from barcodes, the real-time graphical status display as batches progress and the automatic background process data logging and recording for Customer and management information.

System Structure:

The structure of a typical system is shown in Figure 1

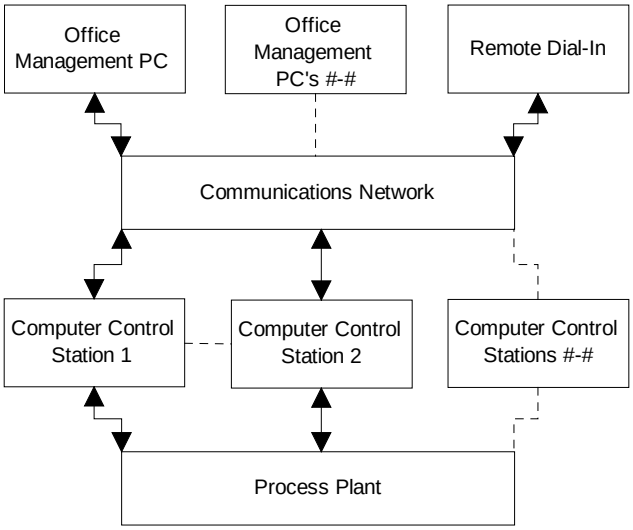

Figure 1

Key pieces of process plant are each provided with shop-floor computer control stations, managing the throughput of product in either continuous or batch processes in the plant. These are integrated with office computers, using fast networking and the dial-in routing as appropriate.

The information flow through the system is shown in Figure 2

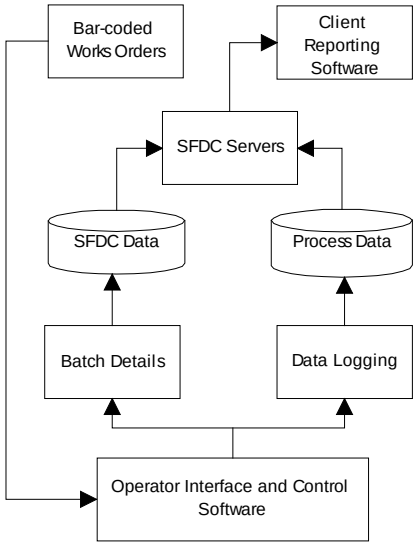

Figure 2

Batch information is operator generated at loading time with the use of pre-bar-coded labels tracking the relevant process route cards. This information is integrated

with the process data for that batch by the SFDC server systems, which can be interrogated in real-time by the client software across the network.

Software Structure:

The object-oriented software provided by Custom Electronics uses a technique of abstraction from the plant hardware. This allows the same software to be easily applied to process plant and machinery with a wide variety of requirements for control and data recording. Details are shown in Figure 3

<table>
<tr><td colspan="3">ERP Data Interface</td></tr>
<tr><td colspan="3">Planning and Scheduling</td></tr>
<tr><td>Data Review</td><td>Job Tracking</td><td>Plant Reporting</td></tr>
<tr><td colspan="2">Operator Graphics</td><td>Network Communications</td></tr>
<tr><td>Control</td><td>Data Logging</td><td>SFDC</td></tr>
<tr><td colspan="3">Hardware Abstraction</td></tr>
<tr><td colspan="3">Physical Plant Interface</td></tr>
</table>

Figure 3

All data recorded is integrated in Shop Floor Data Collection servers and made available to operators, management and authorised clients over the system's local area network. Interested parties using standard office PC's with the system's client software installed can easily report on activities within the plant, including:

- Tracking or locating a specific order.
- Inspecting the progress of a batch through a process in real time.
- Listing plant activities over a period.
- Providing detailed graphical data of all process data relating to a client's batch, see the example in Figure 4

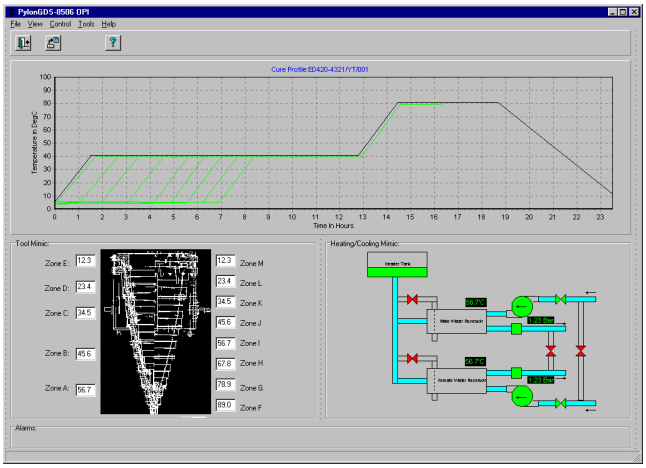

Figure 4

Implementations:

Custom Electronics have provided many integrated plant management systems in the Aerospace, Metals, Automotive and Heat Treatment industries.

TTI Group Ltd., a major UK supplier of heat treatment and surface engineering processes, has recently implemented a new furnace control and data logging system at its Hot Isostatic Pressing Plant in Letchworth, Hertfordshire.

Nick Lane, TTI's Project Manager comments, "TTI engineers worked closely with Custom Electronics to ensure that the things that were really important to us were included in the system. The ability, from a desktop, to easily see what is going on where, either now or historically, is a real plus. Being able to drill-down to give a client specific detailed data about his batch when he requires it, is allowing TTI to provide even higher levels of service to their clients. This project is an example of TTI's Group wide strategy for job planning and tracking."

TTI Group Limited – Hot Isostatic Pressing Facility at Letchworth

System implementation commenced in November 2001 with one installation, and completed in February 2002 on time and within budget. The shop floor data collection facilities will allow the plant to be monitored for effectiveness, and has provided the basic information necessary for the introduction of finite capacity planning and load scheduling if it is felt appropriate at some stage in future.

Further Information:
Technical descriptions of the Control Systems and the Shop Floor Reporting System described in this article can be found in literature available from Custom Electronics, which would include screen shots and sample outputs.

Custom Electronics' CCA division can be contacted on +44 (0)1767 313167 or online at http://www.custom-electronics.co.uk where full literature on the products available can also be found. Custom Electronics also has a Software Systems division specialising in development of tailored software for specific applications.

Roger Banks, Managing Director; Custom Electronics: