

Industry: Pharmaceuticals, Chemicals

Cambridge Reactor Design Ltd.

www.crduk.com

“InTouch HMI is a ready-made software solution that is easy to implement even for complex processes. This is a far cry from the traditional route of trying to write code using complex high-level languages.”

Dr Bashir Harji,
Managing Director, Cambridge Reactor Design

Wonderware software improves integrated high throughput solutions and robotic platforms

by Wonderware United Kingdom

Goals:

- To create a homogenous machine visualization and vision system using robotic assistants for monitoring of downstream unit operations in the chemical and pharmaceutical industries.

Challenges:

- Cambridge Reactor Design had to find a way to streamline its design process, they needed a system that would communicate with various control and monitoring systems and thereby provide a solution that would be easier to implement, support and expand.

Wonderware Solution:

- InTouch HMI.

Results:

- Using a product-based solution, Wonderware InTouch HMI, Cambridge Reactor Design was able to integrate many disparate devices into one system, reducing business risk, development and support costs;
- Standard solution for future applications.

Cambridge, England – Cambridge Reactor Design (CRD) is a producer of integrated high throughput solutions and robotic platforms for the pharmaceutical industry and other businesses. CRD was founded in Cambridge in 1989 with the objective of producing customised engineering projects for Cambridge and other UK universities. Services were expanded to UK and European companies when CRD became a key developer of high throughput technology for Shell International and Avantium Technologies. Today, CRD is firmly established and has a growing global customer base that includes the Energy Research Centre of the Netherlands, Dow, ICI, Nestlé, The Royal Institution of Great Britain, and Total.

Machine vision is a good example of combining state-of-the-art technology, where the latest improvements in camera capabilities, including memory and resolution, offer research chemists access to new analytic methods for improving product quality. CRD realised new applications of intelligent vision meant that investigations of downstream processing operations within the chemical industry would become more manageable.



Figure 1: Machine vision.

The four most fundamental downstream processing operations in the pharmaceutical and chemical industries are filtration, extraction, distillation and crystallisation. Of these, both filtration and extraction are amenable to machine vision using the Robot Assistant system manufactured by CRD. Its Intelligent Vision capability is made possible through the application of InTouch HMI (Human Machine Interface) software.

“Our basic philosophy is to make our clients’ lives as easy as possible by offering a multidisciplinary skill-set that deliver solutions,” says Dr Bashir Harji, CRD’s Managing Director.

A Robot Assistant for Repetitive Processing Operations

Robot Assistant is a mechanical organic chemistry device capable of performing a variety of repetitive processing operations. The unit works 24x7, has a load carrying capability of 3kg, moves repeatedly and reliably to within 0.1 mm, recognises motion and takes video images. Machine vision is used in a variety of ways within the system. It captures images of key procedures and generates information on rate of change. The data gathered is then used for critical real-time decision making.

A Comprehensive Solution for Integration and Control

Wonderware InTouch HMI (Human Machine Interface) is a comprehensive solution used in the Robot Assistant. It easily integrates with all the required input/output hardware. It offers a guaranteed method for controlling articulated robot arms and enables users to interpret their downstream process using a variety of graphical representations. For example, variability in temperature, time, mixing, pH control and solvents used in the downstream process can be displayed visually with the intelligent vision elements fully incorporated.

Dr. Harji points out that the applications created using InTouch HMI are Federal Drug Administration

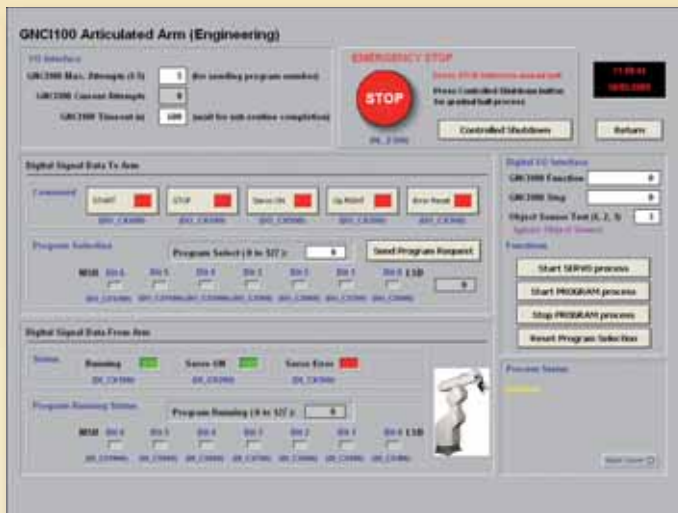


Figure 2: InTouch HMI screen.

(FDA) compliant. It will recognise information supplied from the Robot Assistant's log, and is designed to be tamper proof. The log is fundamental to the system because it tracks the robot and what it is doing at any moment in time, giving it a secure audit trail.

Method of Working

"InTouch HMI is installed in the master computer. The slave computers control the intelligent vision systems and analytical sample preparation workstations," says Dr Harji. *"The workstations take samples and offer the right level of dilutions so the samples are ready to be analysed by the appropriate analytical system e.g., gas chromatography (GC) or high pressure liquid chromatography (HPLC)."*

"InTouch HMI is a ready-made software solution that is easy to implement even for complex processes. This is a far cry from the traditional route of trying to write code using complex high-level languages," says Dr Harji. *"Also the availability of intelligent icons to reflect the ongoing performance of a real-time robotic process makes it easy for users to interpret where they are*



Figure 3: Robot in action.

during the course of continual processing. All that is needed is one Ethernet connection to the control system; one cable does it all."

Using Wonderware software with CRD's hardware and machine vision application makes downstream processing operations in the chemical industry more manageable.

Wonderware software facilitated CRD's robust and highly innovative approach to solving difficult issues in the chemical and pharmaceutical industries.

This document was realized thanks to the support of: Cambridge Reactor Design Ltd.