

Make To Order Processing Plants (MOPP) TSB funded project

The Challenge

This TSB/EPSC funded project is being led by Perceptive Engineering with the HVM catapult Centre for Process Innovation (CPI) and AstraZeneca. This is a good representative example of research supported by public and private sectors. The project aims to develop an adaptive 'Dial a Product' control system to deliver the precise control required for high value low volume manufacturing systems. Combining control design and analytical techniques will enable the reactors to reach optimum performance quickly and efficiently as manufacture switches between products and reactors.

The Technology

At CMAC, the automated control system is being installed on Cambridge Reactor Design's Rattlesnake Oscillatory Flow Crystalliser. The system will be capable of fully automated running with model predictive control. The system will utilise in-line PAT (IR, UV-Vis, FBRM or Raman) for process monitoring and control. The control models are being developed for the heat/cool systems and full characterisation of the flow characteristics and residence time distribution have been carried out.

Next Steps

Initial work will focus on cooling crystallisation of lactose, from an aqueous solution, as a model compound focusing specifically on:-

- Long term continuous running (at least 72 hours building to 2 weeks)
- Understanding of the impact of process parameters on product attributes
- Use of model predictive control systems to provide consistent product quality as inputs and conditions vary.
- Ability to control and alter final product attributes "to order"

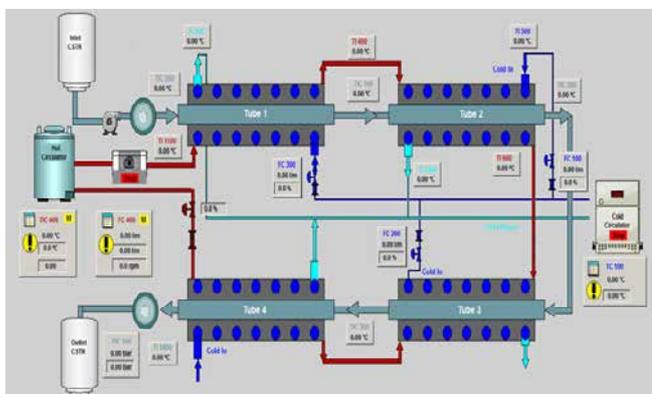


Figure 11. The automated control system user interface.

A more complex API molecule with an organic solvent will be selected for the second stage of the project. In parallel to the work at CMAC, an automated continuous reactor system with in-line PAT is being developed at CPI where an alkylation reaction will be carried out as a demonstrator.