
JJ Ross\textsuperscript{1}, M Mahfouf\textsuperscript{2}, MA Denai\textsuperscript{2}.
\textsuperscript{1} Anaesthetic Unit, Sheffield Teaching Hospitals Foundation NHS Trust, NGH, Sheffield S5 7AU.  
\textsuperscript{2} Dept of Automatic Control & Systems Engineering, University of Sheffield, Sheffield S1 3JD.

We have previously reported, via the ARS forum, on simulation results for modelling the function of the cardiovascular system in disease and drug responses, decision support and its validation in simulation [1]: we now propose to describe the development of the associated real-time decision support system.

The Decision Support System (DSS) setup includes the LiDCO\textsuperscript{+} plus hemodynamic monitor and its data interface which allows the real-time transfer of patient data from the monitor to the host computer. The link between the monitor and the host computer was established via a standard Ethernet cable and was based on the universal TCP/IP protocol.

The computer collects real-time beat-to-beat data from the LiDCO monitor and displays it on-screen. ‘Target ranges’ for the DSS (suitable parameters) are set by the clinician, which are displayed on screen. The DSS also displays real-time data in the ‘haemodynamic status’ box: coloured ‘low’, ‘normal’ and ‘high’ boxes light depending on whether the data falls within the target range or not. The DSS suggests the drug/fluid, and an infusion rate in the ‘therapy status’ box; the clinician assesses the suggestion: if he/she agrees, then he/she would click-on the syringe motif to acknowledge, and to manually adjust the syringe pump infusion rate. The infusion rate is displayed in the ‘advisor infusion rate’ box. This can be over-ridden by the expert inputting the desired infusion rate in the ‘expert infusion rate’ box should that be at variance with the DSS output. Real-time clinical data obtained from a run on one patient will be presented in Part 2 of this paper.