

GE Healthcare - High Integrity System for Patient Imaging

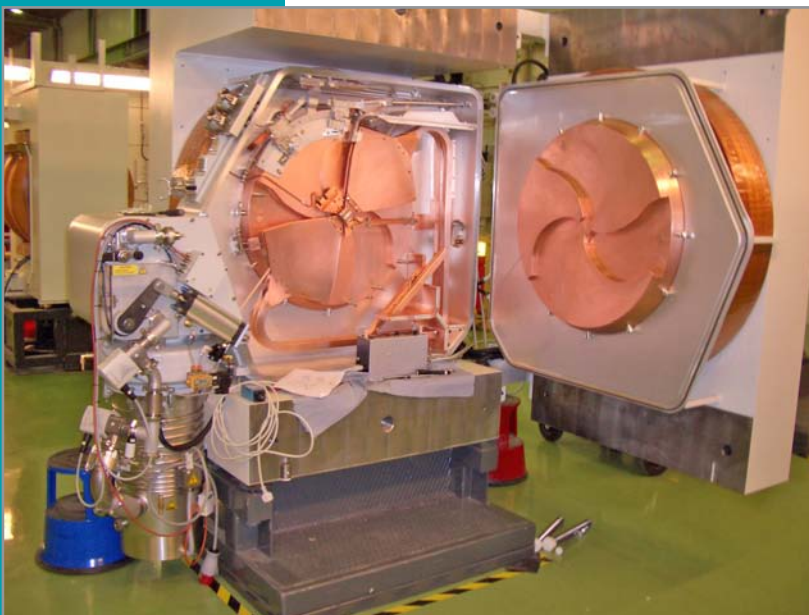
Hammersmith Imanet carries out basic research and provides specialist imaging services for the pharmaceutical drug discovery process; this often requires the imaging of soft body parts which is achieved by radioactive traces administered to the patient. When GE Healthcare won the contract for the supply of an additional cyclotron, the project team needed integration and operator interface systems to make a number of standalone components work together effectively. Cougar Automation and Wonderware's InTouch Terminal Services were chosen to provide a high integrity solution to supervise this critical system.

The system underwent rigorous testing and GAMP validation; the selected technologies proving to be reliable and rugged in operational use.

The imaging of soft body parts is a crucial technology in accurate diagnosis of severe illnesses. The better the image the better the information is for a consultant. To achieve good images, the particular part of the body is dosed with minute amounts of radioactivity. This radioactivity quickly decays to safe levels as it has a very short half life. The radioactive delivery system and the accuracy of dosing

hot cells for preparation of quality control samples and patient doses depending upon the method of application. The fluid is diluted to the correct proportion in a dispensing stage and is then ready for patient injection and the imaging task. This process has to be done in real time owing to the very short isotope half life. The whole process, once the radioactive isotope has been produced, requires safe distribution through the various paths of the process (in reality stainless steel pipes enclosed in lead conduit), delivering the right isotope to the correct point in the overall process. This is done through a complex manifold system that is controlled by valves. There is an extensive number of possible delivery and dispensing paths (each isotope has a dedicated line from a number of cyclotrons to various hot cells and different dispensing systems). Each one of these routes has to be verified as being correct and safe before the isotope transfer can begin. In the commissioning stage, these paths were rigorously witness tested and included safety testing of many failure scenarios to prove that the correct route is always enabled.

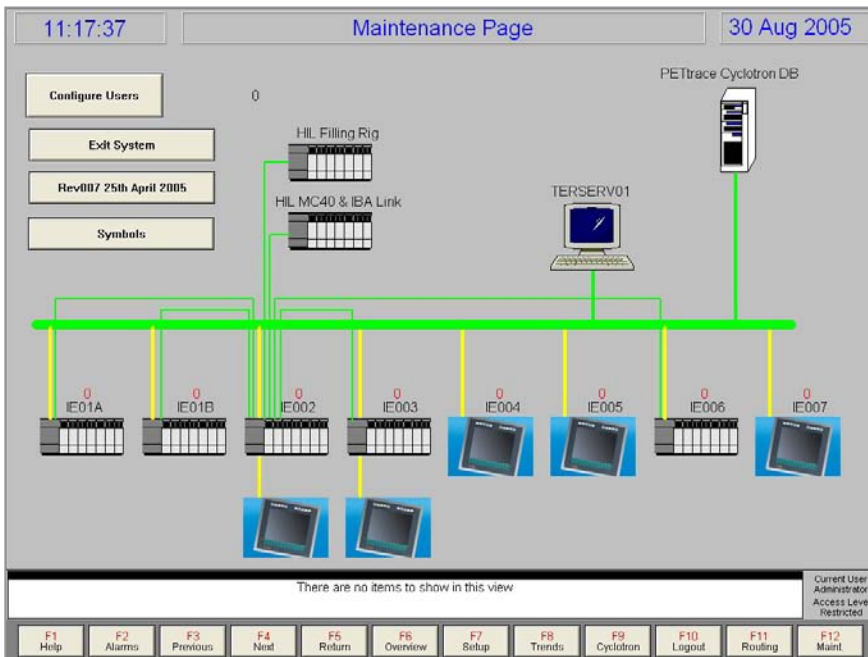
Various suppliers were involved in the project, with project management by Ashvin Sunak of Hammersmith Imanet, a business unit within GE Healthcare. The integration company was selected under competitive tendering with the ability to provide high integrity systems and adaptive working relationships high on the list. Cougar Automation was chosen as the system integration partner, and was awarded a pilot project. Cougar Automation quickly showed that they were the correct choice and recommended the use of Wonderware's InTouch SCADA system as the standard operator station. Ashvin remarked "Cougar



Cyclotron - showing internal structure

require very precise, proven and safe handling systems.

The system comprises a cyclotron which is a high energy machine that produces isotopes under computer control; the resulting radioactive particles are then transferred to



Overview

The entire system was validated to GAMP 4.

provided the high calibre of engineers necessary for this safety critical integration project and their attitude, application and good team working led to a successful completion of this key control system.”

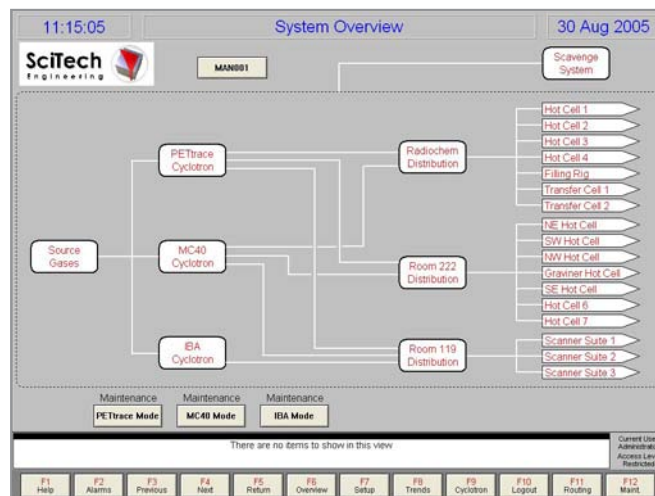
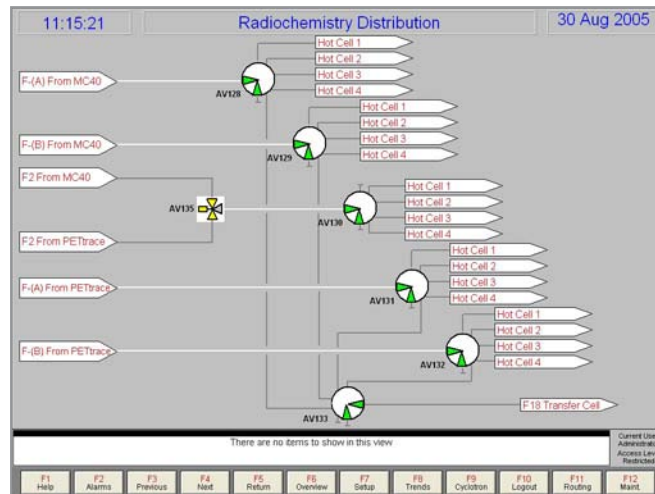
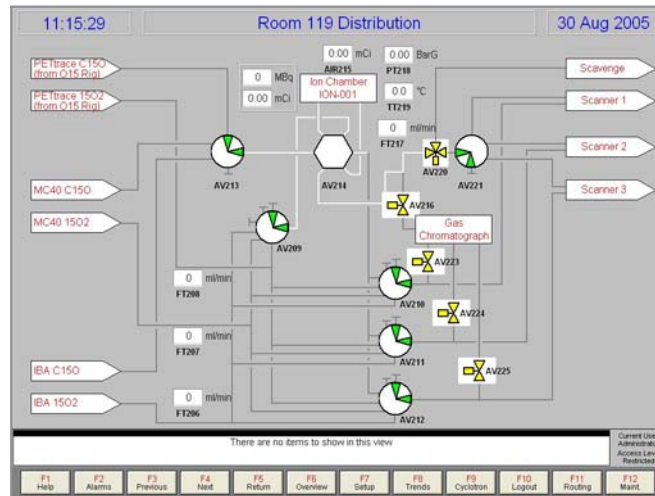
The Cyclotron has its own computer control and Beckhoff soft PLC was used for the sequencing. Paul Edwards (Project Manager at Cougar Automation) adopted InTouch 8 for Terminal Services as the best solution as this allowed easy connectivity to the Windows XPe. net that was within the Beckhoff PC, TwinCat soft PLC providing the software solution. The InTouch Terminal Services system has five clients. Further integration was needed with the robot controllers that run the automatic handling in the isotope dispensing cells; this was done using Modbus and Siemens MPI Link. Cougar Automation also provided connectivity with the Cyclotron’s Sun UNIX OS with IBM’s Informix Database. Web publishing is used to provide other users to view data live from the system. The entire system was validated to GAMP 4.

Cougar Automation is a SolutionsPT Certified System Integrator and with due regard to the high integrity of the application used Wonderware UK’s consultancy services to double check the proposed solution.

In use the primary control task is failsafe correct routing. The operator selects the number for the route and then, when conditions are correct, opens up the valves to enable the route. The Cyclotron provides the isotope and this is then fed through the route. At the end of the batch the operator closes the route causing the system to clear down that route so another can be entered. The tested

and verified routes are held in a SQL database and are accessed through the InTouch screens.

The facility at Hammersmith Imanet has 3 cyclotrons the latest being supplied by GE Healthcare. These are all integrated to form a comprehensive resource for this critical work. The use of the equipment is primarily for research, thus flexible operating is needed but at the same time with high integrity of function to protect operators and patients. The system underwent rigorous testing and GAMP validation; the selected technologies proving to be reliable and rugged in operational use.



Complex and fail-safe routing - clearly visualised on Wonderware InTouch screens

Wonderware UK wishes to thank the following companies for their valued contribution to this success story...

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