



RTS' Automated Blood Fractionation System Goes Live at UK Biobank

TWO OF RTS Life Science's unique automated robotic systems, incorporating machine vision, are now running at UK Biobank's co-ordinating centre in South Manchester. A third is expected to be commissioned in July. This is the first time anywhere in the world that a blood fractionation system has been automated. RTS was responsible for the concept, design, manufacture, installation and commissioning process. Teams from UK Biobank and RTS worked very closely together for two years on this successful programme.

Tim Peakman, Executive Director of UK Biobank, said: "The challenge for this part of the project was to convert UK Biobank's sample handling protocol into an automated process. It needed to be able to handle our high throughput and quality requirements, while managing the inherent variability of volume, viscosity and turbidity in blood samples. At the end of processing, we require separate aliquots of plasma, white cells, serum, and red cells. We then need to be able to track all of the sample aliquots from each participant using a computerised system that ensures we can find the right ones many years from now. Thanks to RTS, this is exactly what we've got: it is a great achievement. Now that the robots can be trusted to deal with the samples rapidly and efficiently, our focus can be on building the UK Biobank resource. This will allow researchers from around the world to study the causes of a very wide range of different diseases in the future."

Hosted by Manchester University, UK Biobank aims to build a major biological resource to support a diverse range of medical research that will improve the prevention, diagnosis and treatment of illness and promote health throughout society. 500,000 participants aged 40-69 years of age will be recruited from around the UK over the next four years. Participants are now starting to join UK Biobank by attending its first two assessment centres in Manchester and Oxford, with six assessment centres expected to be running by the end of the year. At the assessment centres, information is collected on environmental and lifestyle factors, along with physical measurements and blood and urine samples. With their consent, the participants' health will then be followed through medical records for many decades. The samples will be stored in an automated -80°C archive and in stainless steels tanks under nitrogen vapour, so that they can be used for biochemical and genetic analysis in the future. Currently, each day, UK Biobank is putting 6,000 samples from 200 donors into store. By the end of the year, each day, over 20,000 samples from 750 donors will be processed and stored. The RTS system has been specifically designed to deal with these large numbers of samples.

When centrifuged at low speeds, unclotted blood samples separate into three layers or fractions: plasma on the top, the "buffy coat" of white blood cells in the middle, and the red blood cells at the bottom. Experienced in the sphere of machine vision, RTS developed a system especially for the UK Biobank project. The RTS system identifies each sample, and centrifuges the blood. A digital camera then takes two types of image to identify the different fractions. Unique software then analyses these images and is able to determine the exact boundaries between the layers of centrifuged blood. These layers are then converted into liquid handling protocols so that the robot aliquots from each of the layers into racks of 96 1ml tubes for storage. In addition, the system boasts rigorous QA and QC procedures.

David Harding, technical director at RTS, said: "As experts in both robotic integration and machine vision, we are well placed to be at the forefront of this emerging market, which includes not only other biobanks, but also, DNA research, primary cell culture and diagnostics."

Notes

The RTS Group specialises in providing software, automation systems and equipment for a range of sophisticated manufacturing and scientific processes, life sciences and industrial automation. Deploying unique technologies to meet client specific requirements, RTS utilises state-of-the-art technology and know-how alongside proven engineering practices to provide the optimum automated solution. Extensive industrial and scientific experience exists throughout the Group and the Company operates globally, with facilities throughout the UK and the US.

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