Radiation project with Heidelberg's university clinic

In August 2003, Eckelmann AG received an order from Heidelberg's university clinic to produce a monitoring system for a heavy ion accelerator for cancer therapy. The order is for a volume of several million euros, and the project will have a term of approximately three years. The main processing phase will extend over the years 2004 and 2005, and commissioning is planned for 2005. For Eckelmann AG, placement of the order represents an important success on the strategically interesting market for medical and radiation apparatus.

Background information on cancer therapy with heavy ion radiation

The society for heavy ion research GSI (Gesellschaft für Schwerionenforschung) operates a heavy ion acceleration system in Darmstadt-Wixhausen. Within the scope of a pilot test for cancer treatment, on this system a worldwide novel method of patient radiation therapy, intensity-controlled raster scanning, has been developed and already used successfully on patients in a cooperation project by the German cancer research centre, the university clinic in Heidelberg and GSI. The Heidelberg clinic would like to use this technology in future for cancer treatment.

The essential advantage of radiation with ions in comparison with conventional radiation therapy methods lies in a more favourable dose profile. Whereas as the dose in conventional radiation therapy slowly decreases as penetration depth increases, with ion radiation is rises slowly and drops steeply after a keen maximum. The position of this maximum is defined precisely by magnetic fields and the penetration depth by the energy of the particles, thus achieving exact scanning of the tumour and minimising the destructive effect of the radiation in the neighbouring, healthy tissue. Thanks to these properties, radiation with heavy ions is also suitable for tumours in the close proximity of organs that are highly sensitive to radiation, for example the brain stem, brain nerves, the eyes and the visual nerves, which it has not been possible to successfully treat up to now.

Accelerator system project scope

Under the overall system project management of GSI, the tasks of Eckelmann AG consist of implementing a monitoring system (control system) for the radiation-controlling devices (mainly the deflection magnets), measured value recording for radiation diagnostics and the realisation of a vacuum monitoring system. In total, more than 300 devices have to be controlled, some of which have to be supplied with setpoints every microsecond and for which a device control timing synchronicity of <= 1 microsecond is required. These requirements cannot be met with standard components, with the result that a special module featuring fast digital interfaces and a special timing bus has to be developed internally. The fact that, as a systems house in control and automation with a considerable degree of performance, Eckelmann AG is capable of undertaking such hardware developments of its own and can simultaneously boast experience in system control, was one of the crucial factors for placement of the order by the Heidelberg clinic in face of the competition.

Eckelmann AG, Berliner Straße 161, 65205 Wiesbaden, Tel. 0611/7103-0,
Fax 0611/7103-133, info@eckelmann.de, www.eckelmann.de, certified DIN EN ISO 9001:2000