

Project Note

Control system for a new radiotherapy machine

This project involved the development of a new control system for a radiotherapy machine. Precise positioning of the patient allows the radiation treatment to focus on small areas of tissue. Reuse and new development are used here.

Task

Patients found to have a tumour are subjected to treatment with extremely high-energy radiation. The patient's healthy tissue should be spared, however, which is why the positioning of the patient during radio therapy is so important. An on-board imaging system was developed for this purpose. It allows x-rays to be taken of the patient before and after treatment. These x-rays are used for the precise positioning of the patient. The x-ray source and receiver are installed on the robot arms and can be positioned anywhere in the room.

Based on the existing software, Zühlke created a system for controlling these robot arms and integrated additional components as well as infrared remote control.

Implementation

The movement of the robot arms can be triggered from different input devices (requesters). A supervisor computer coordinates and monitors these movement requests. The existing software was adapted to the new requirements using RUP, an incremental and iterative development process. The main software components:

- Requesters can request robot arm movements and handle communication with the input device (infrared remote control, console, workstation PC).
- The requester service coordinate the mutual exclusion of individual movement requests.
- Motion sequencing handles the execution of a movement command by controlling and monitoring the individual axes.

One special feature was the use of state machines, which were modelled in UML Notation and generated with a script.



VARIAN
medical systems

Technical Data

Platform:
Motorola VME Computer with PPC750

Operating system:
VxWorks

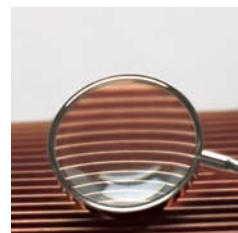
Development environment:
Rational Rose,

Programming language:
C++

Interfaces:
Ethernet, Arcnet,
RS-485, Infrarot Link

Customer benefits

- The use of generated state machines generated a code that can be managed more effectively.
- RUP ensured constant project monitoring and clear intermediate results.
- Extensive expertise on developing embedded systems and machine control systems kept development times short.
- Optimum ratio of reuse to new development



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