

Upgrade of the AGOR Control system at Particle Therapy Research Center (PARTREC) UMCG

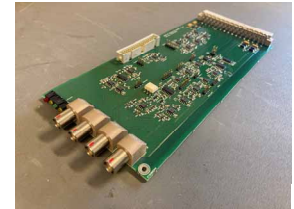
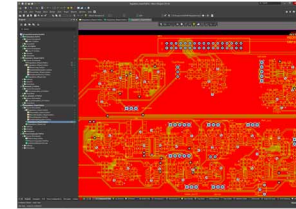
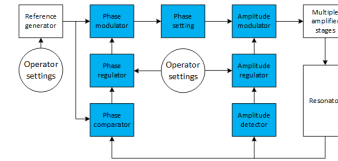
- Superconducting particle accelerator: AGOR (1997)
- Previously: KVI (University of Groningen, The Netherlands)
- Transfer to UMCG with new name: PARTREC (2020)
- Favorable investment climate
- Goal: invest to increase reliability



Upgrades and future plans

• In-house development:

- Upgrade of existing PLCs
- Beam current readout electronics
- Beam profile readout electronics
- Power and phase control electronics of RF system
- Quench detection electronics
- RF resonator control

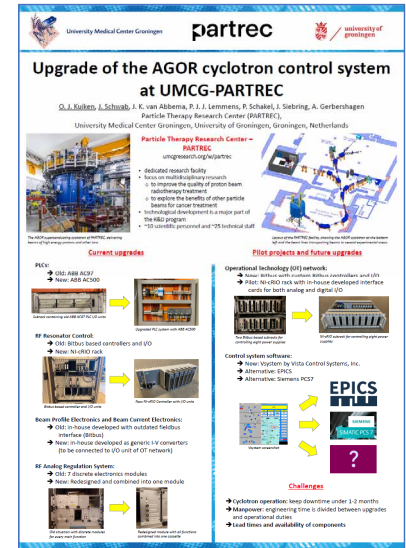


Plans:

- OT network (now: Bitbus based) → Ethernet → PLCs?
- Control system software (now: Vsystem) → ?
- Etc...

Progress is steady, but...

- A lot of work to be done
- Operational duties slow things down
- We're hiring:
 - Electronic Engineer
 - Software Engineer
 - Operator
- Interested? Got tips or tricks? Meet me at the poster session!



Upgrade of the AGOR cyclotron control system at UMCG-PARTREC

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Particle Therapy Research Center – PARTREC
umresearch.org/partrec

- Dedicated research facility
- Focus on multidisciplinary research
- To improve the quality of proton beam radiotherapy treatment
- To explore the benefits of other particle beams for cancer treatment
- Technological development is a major part of the R&D program
- ~70 scientific personnel and ~25 technical staff

Current upgrades

PLCs:

- Old:ABB ACS7
- New: ABB ACS100

RF Processor Control:

- Old: ETBUS based controllers and VO
- New: No-VO rack

Beam Modulo Electronics and Beam Current Electronics:

- Old: in-house developed with auxiliary fieldbus interface
- New: in-house developed as generic I-V converters (to be connected to VO unit of OT network)

RF Analog Regulation System:

- Old: 7 discrete electronics modules
- New: Redesign and combined into one module

Pilot projects and future upgrades

Operational technology (OT) network:

- New: 400V switch cabinet with conventional and I/O
- Plan: No-VO rack with in-house developed interface cards for both analog and digital VO

Control system software:

- New: System by Vista Control Systems, Inc.
- Alternative: OMCS
- Alternative: Siemens PCS7

Challenges

- Cyclotron operation: less downtime under 1-2 months
- Management: engineering time is divided between upgrades and operational duties
- Lead times and availability of components