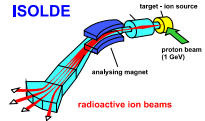


Instrumentation at ISOLDE

New developments

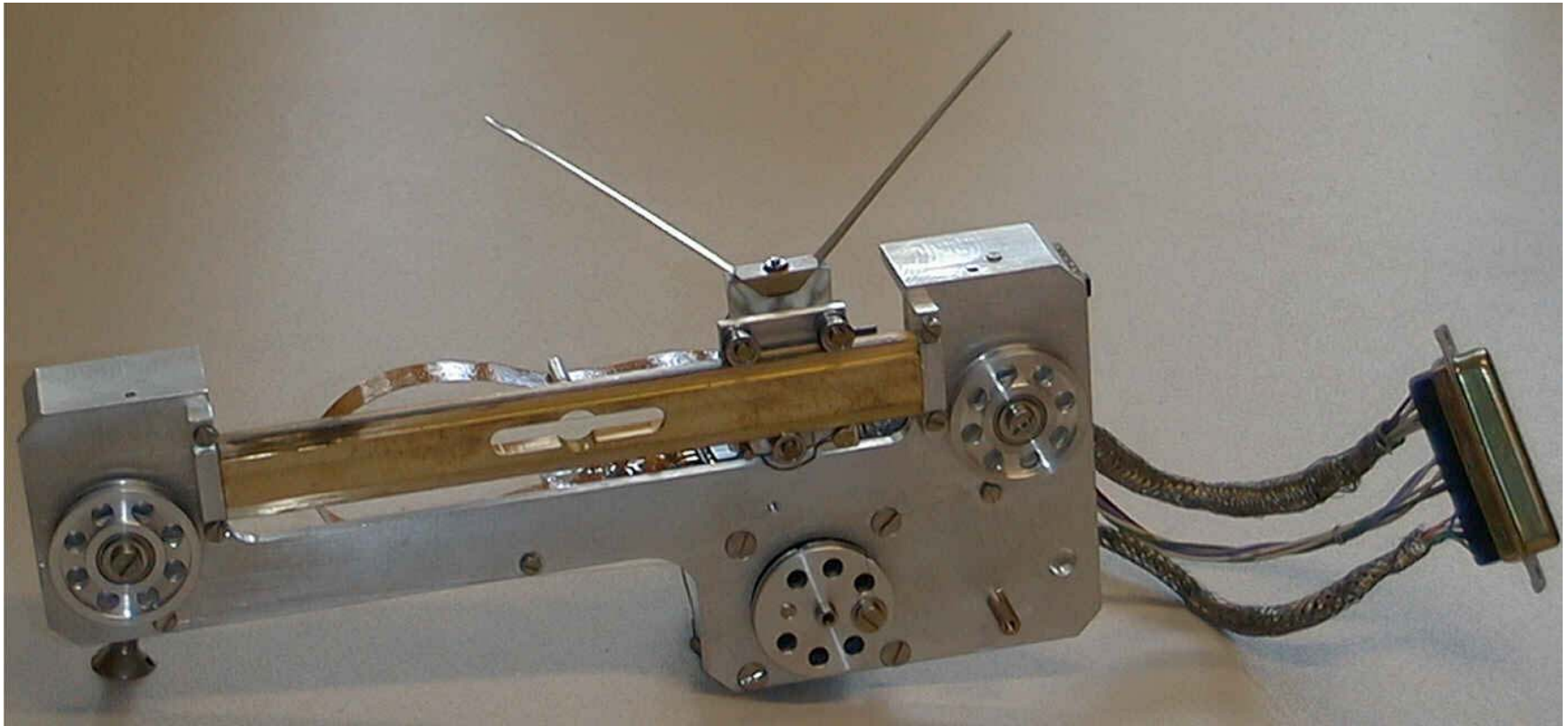
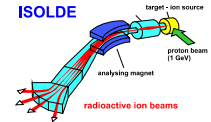
Gerrit Jan Focker
PM-section



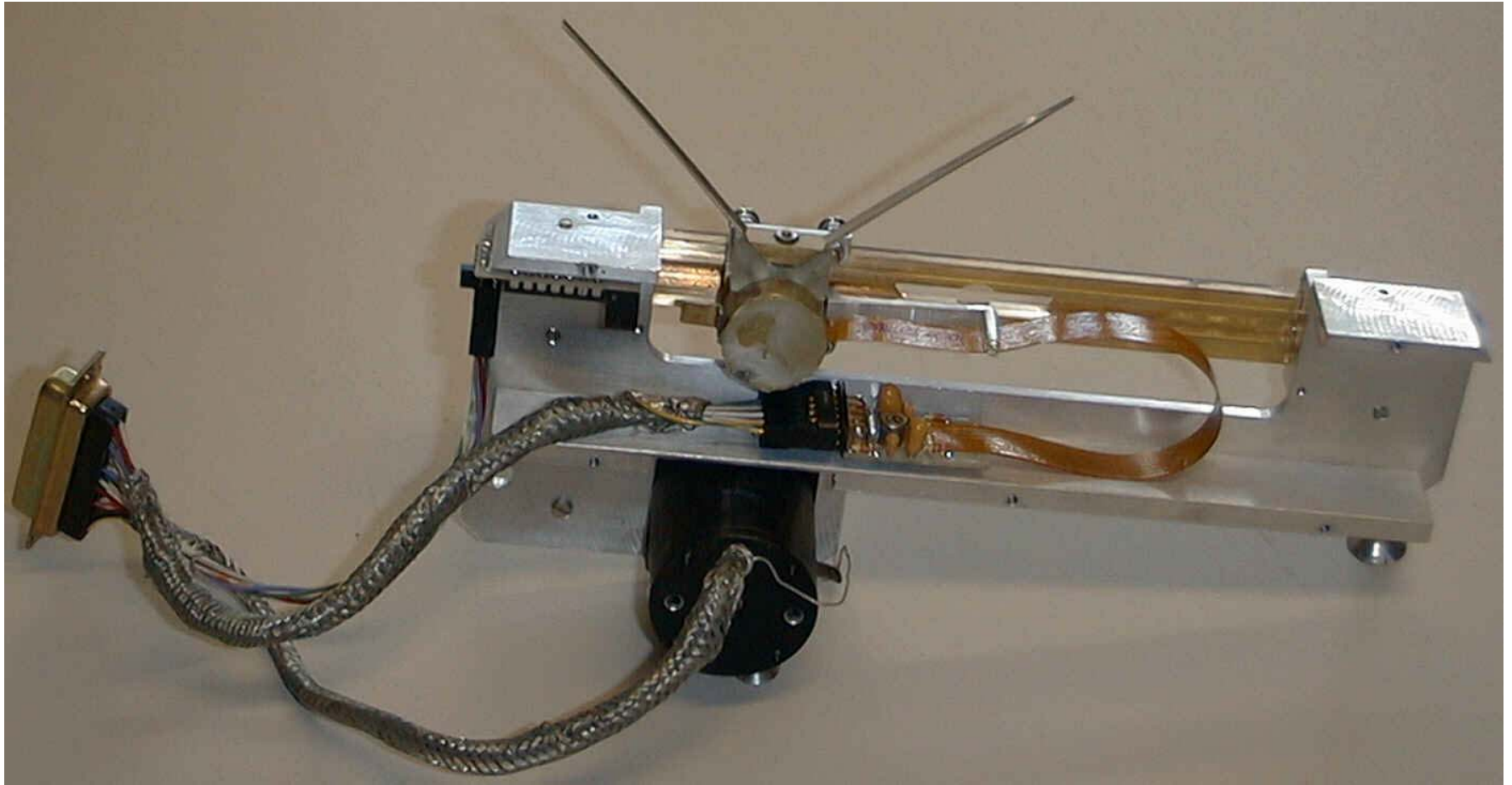
What will be proposed

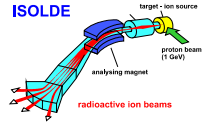
- New developments for the ISOLDE mass separators, not REX
- These developments are for the Consolidation Program (i.e. new Controls)
 - Scanners
 - Wiregrids
 - FNBS (and Emittance-meter)
 - High Current Faraday-cup

Scanners



Scanners

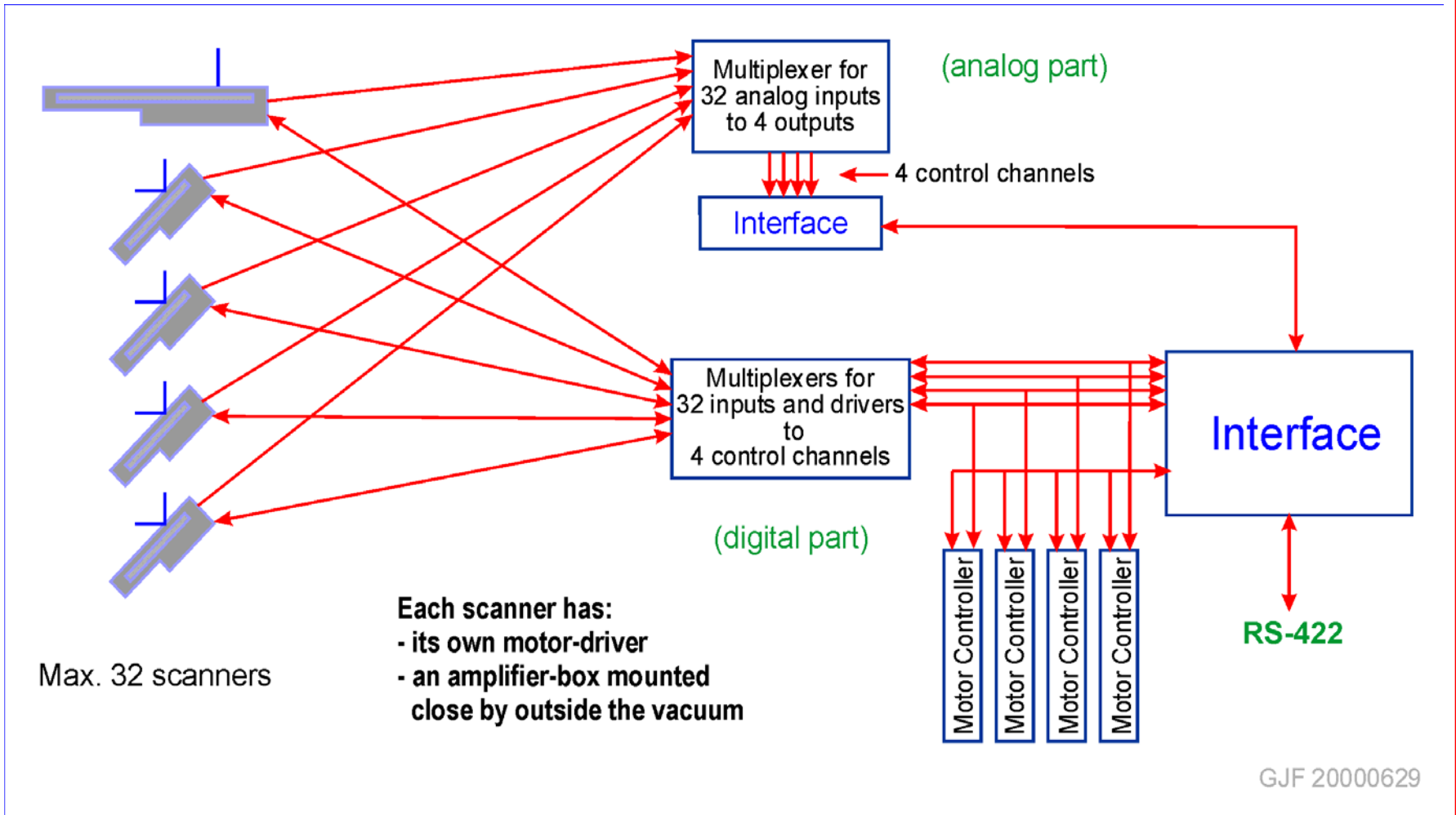


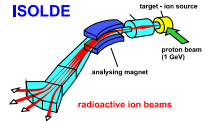


Scanners

- There are actually 29 Scanners
- Control over RS422 at 921.6kbit/s from PC running Windows NT
- PC will be replaced by VME

Scanners

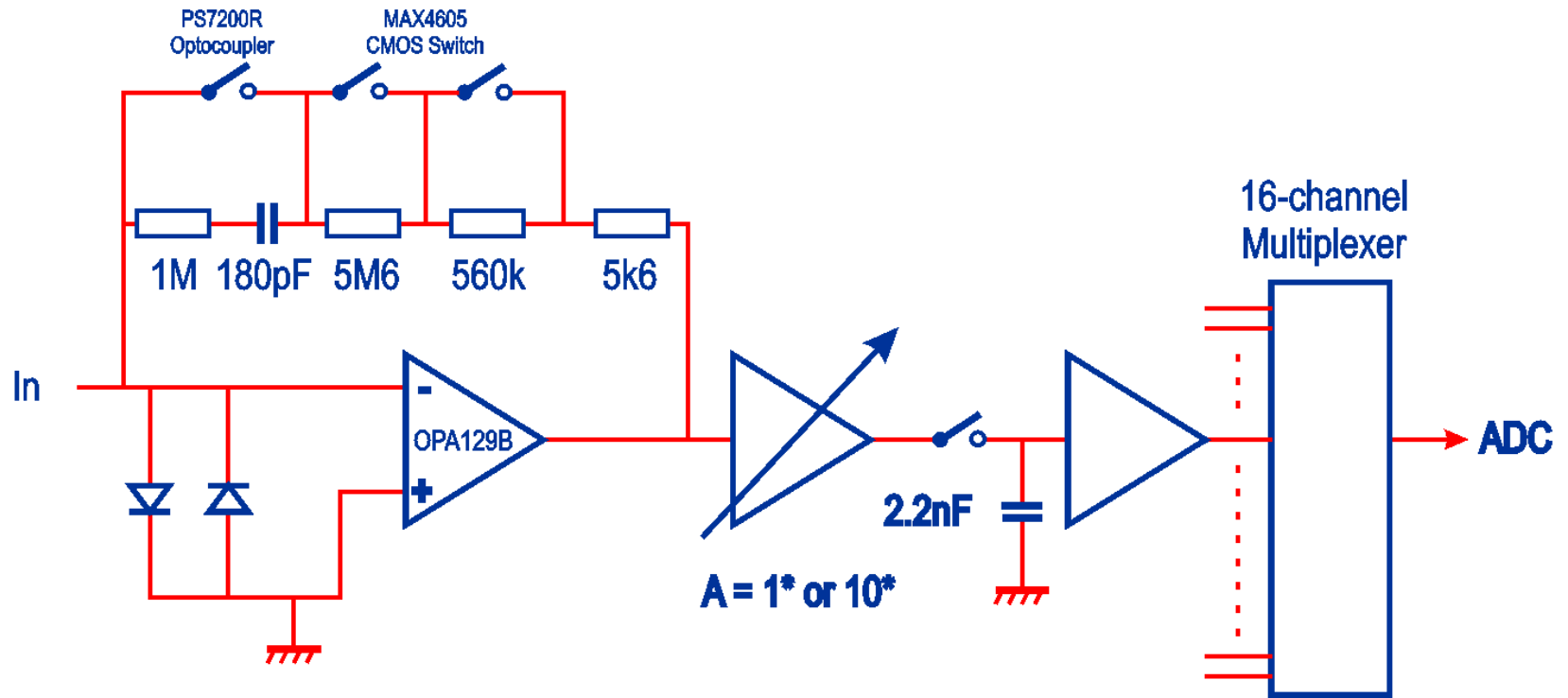




Wiregrids

- There are 8 grids
- Actual system:
 - All hardware in one box, controlled via a specific ISA-card from a PC running DOS
 - The FEC was ported to a newer PC last year (as precaution)
 - Far too complicated to “port” this system to new controls
- Future system:
 - Adapt new system for higher beam current
 - Full scale sensitivity: min 200pA, max 2mA
 - Resolution (13 bit + sign): 25fA
 - Controlled by Industrial Controls (Simatic)

Wiregrids, Amplifier

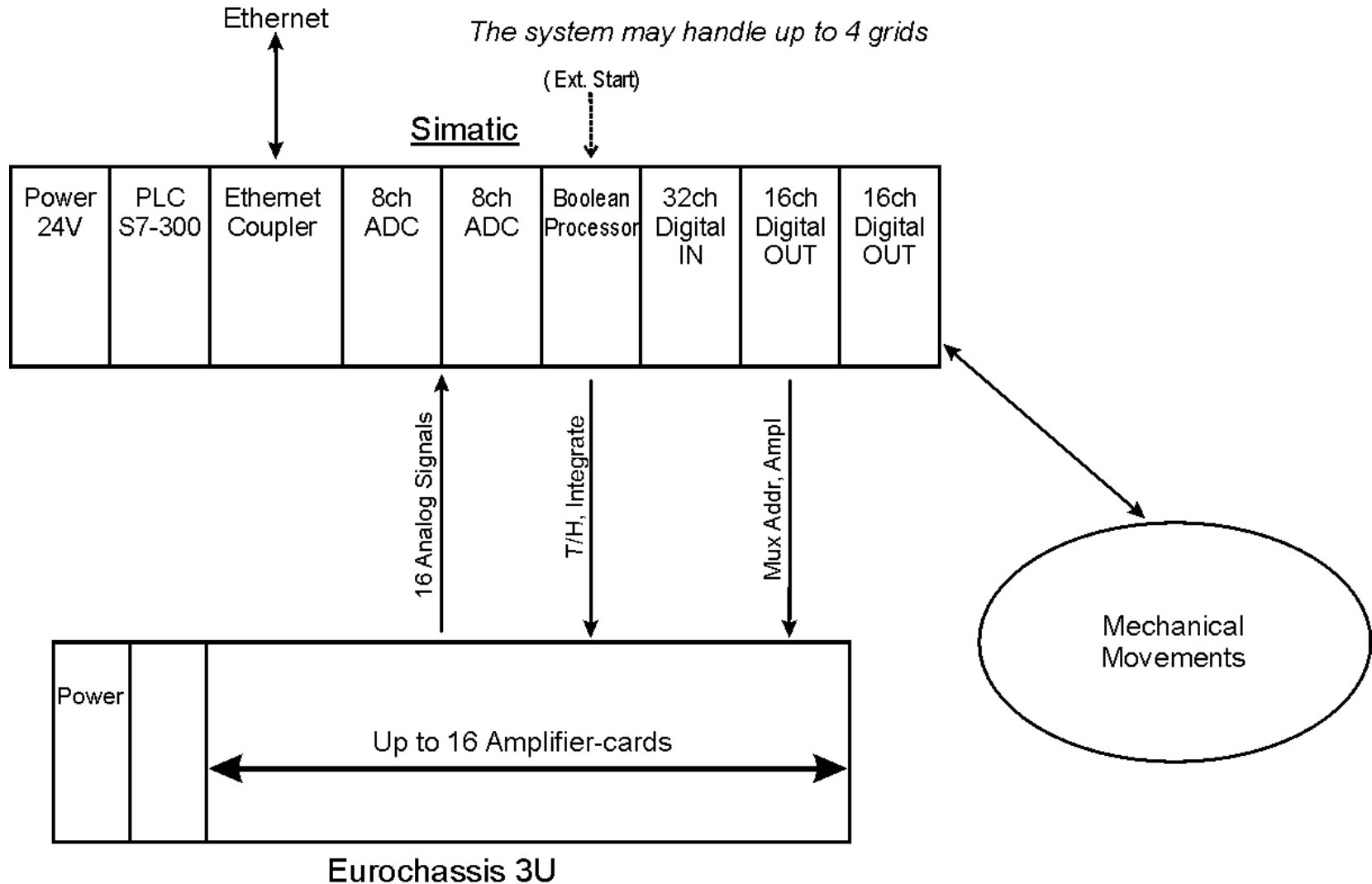
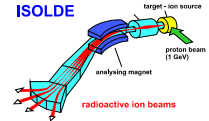


Wiregrids, Controls

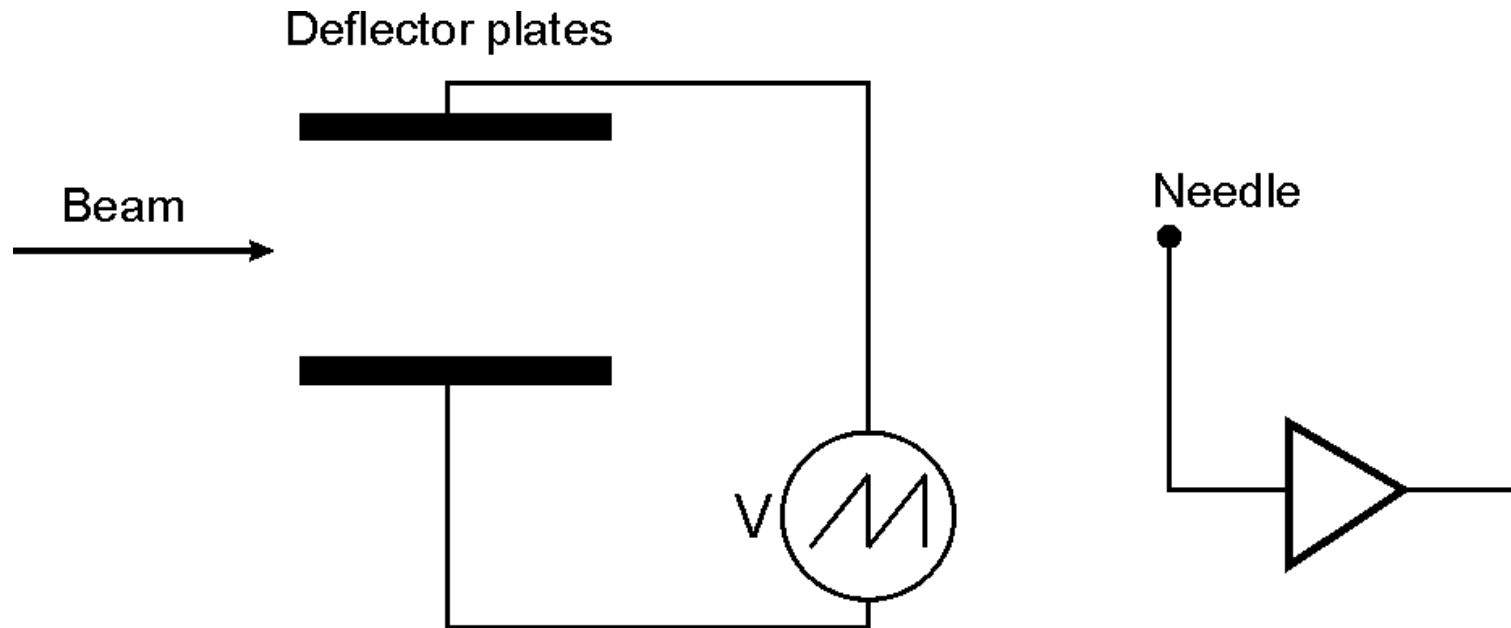
- Industrial Controls, Why?
 - We need the amplifiers to be close to the Machine
 - We want short cables between Amplifiers and Controls
 - There is good support for different Industrial Control Systems
 - Simatic now offers sufficiently fast ADC's for our application: $52\mu\text{s}$
 - “Fast” timing can be done with a “Boolean Processor” (integration-time, control of Track/Hold)
- Original idea: Frank Locci (AB/CO/IS)



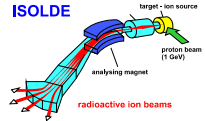
Wiregrids, Controls



Fixed Needle Beam Scanner (FNBS)



- Deflection-voltage max. $\pm 1000V$, up to few kHz
- Deflection at needle max. $\pm 4.9mm$

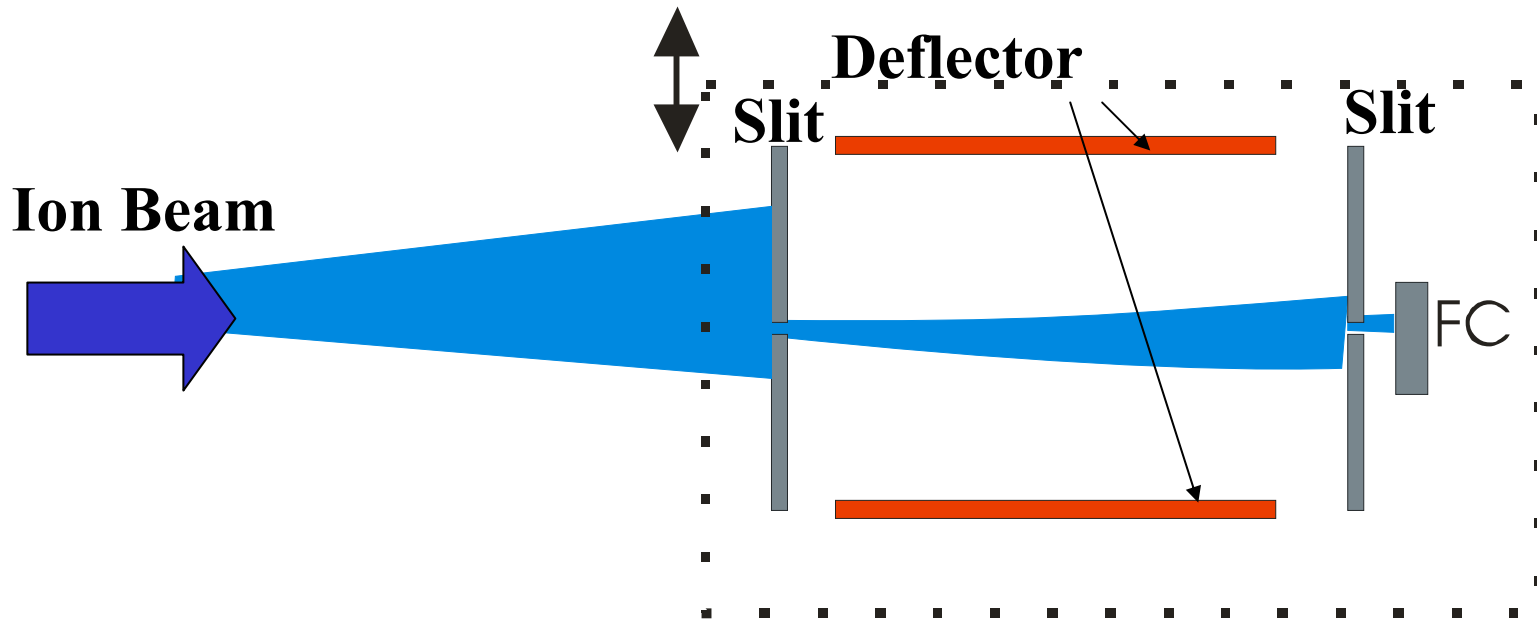


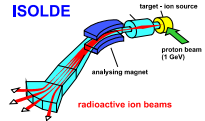
FNBS, Controls

- Actual Controls by the same DOS-FEC as Wiregrids, same ISA-card
- Planned to be controlled by Simatic
 - Does NOT need a Boolean Processor
 - Does need DAC and zero-crossing HV Power-supplies (HPRZC-series from Appliedkilovolts)
- Priority *after* Scanners and Grids, but without FNBS the Isolde “HRS” is just an “S”

Compact emittance meter or “Allison Scanner”

- Needs (stepper-) motor control as well
- Not for this year

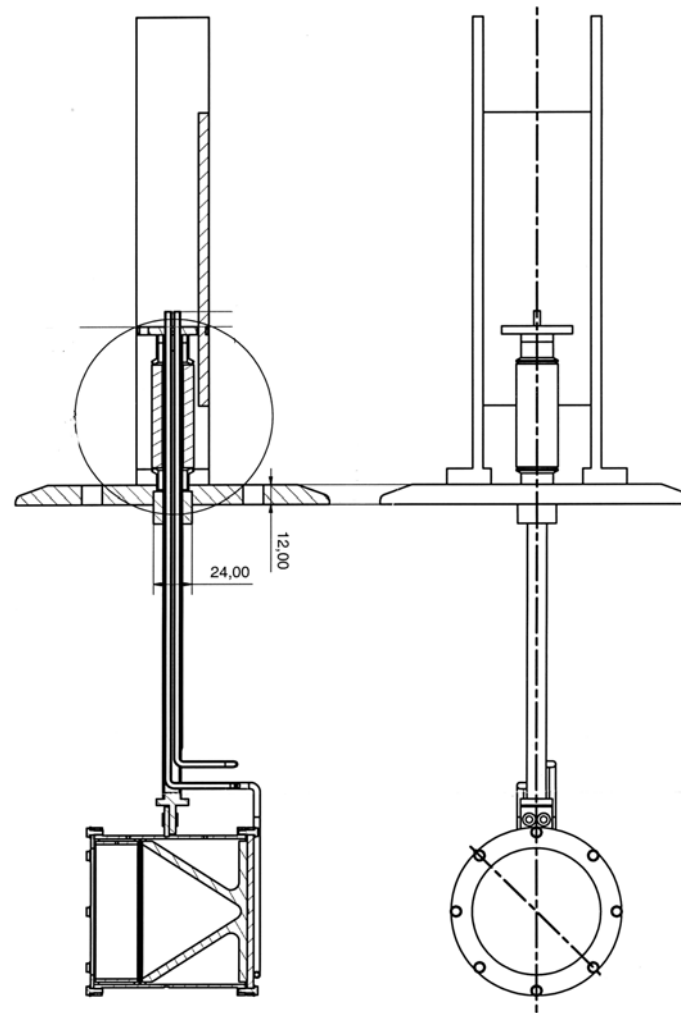
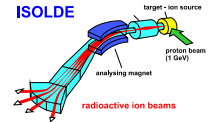




Front-end Faraday-cup

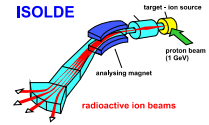
- New Isolde Frontend (FE6) is being built
- ECR Ion-source
- Result: up to 2mA of 60keV ion-beam
→ 120W dissipation in a faraday-cup
- Solution: Watercooling
- (designed by Cathelijne Bal, BDI/ML)

Front-end Faraday-cup

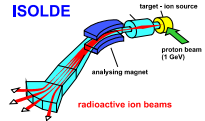




Front-end Faraday-cup

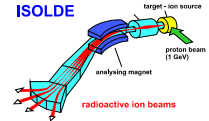


High Beam-current

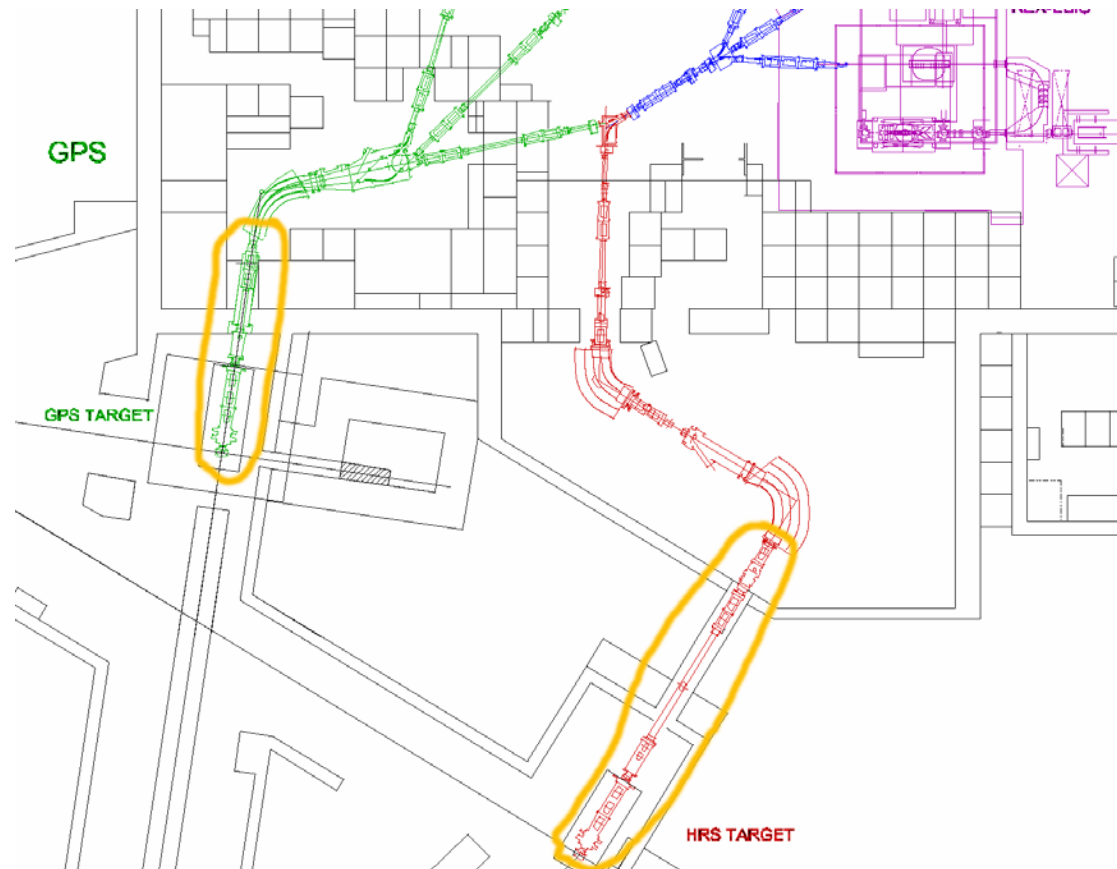


- Maximum electrical signal current possible:
 - Scanners:
 - Now: $20\mu\text{A}$. Amplifier will easily stand 2mA input
 - New amplifier-design can be “programmed” to work up to 2mA (with less input-sensitivity)
 - No heating-problems expected at normal (=high) speed??
 - Wiregrids:
 - Now: $80\mu\text{A}$. Amplifiers will easily stand 2mA
 - New Amplifiers will work up to 2mA
 - Will wires stand this beam-intensity??
 - Faraday-cups: no problem with high signal-current

High Beam-current



- High beam current mainly due to carrier-gas
- Responsibility of operator that this beam does NOT pass first bending magnets
- For the time being BDI cannot take responsibility when not adapted instrumentation dies



Conclusions

- Goals for 2004:
 - Scanner and Wiregrid Systems should be migrated next shutdown 2004/2005
 - FNBS a.s.a.p. after
- Not(hing) defined yet:
 - Emittancemeter??
 - Further adaptations for higher beam current?
 - (Tapestation)??? Discuss next year?