

# APV Electronics as MPGD standard readout system?

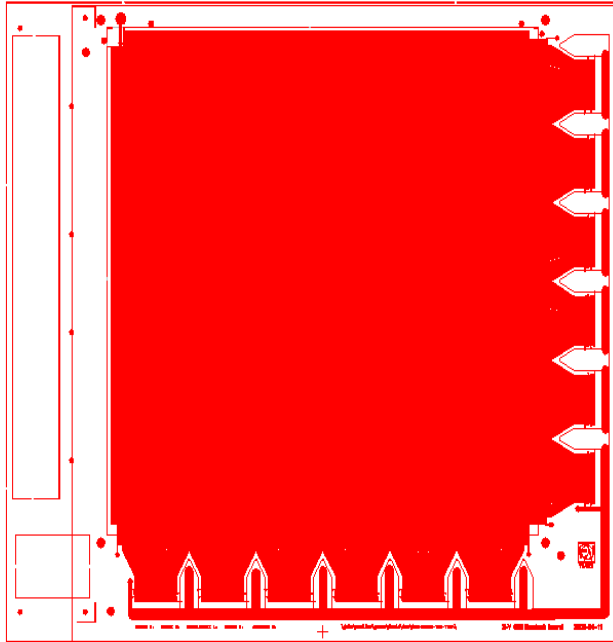
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# The context

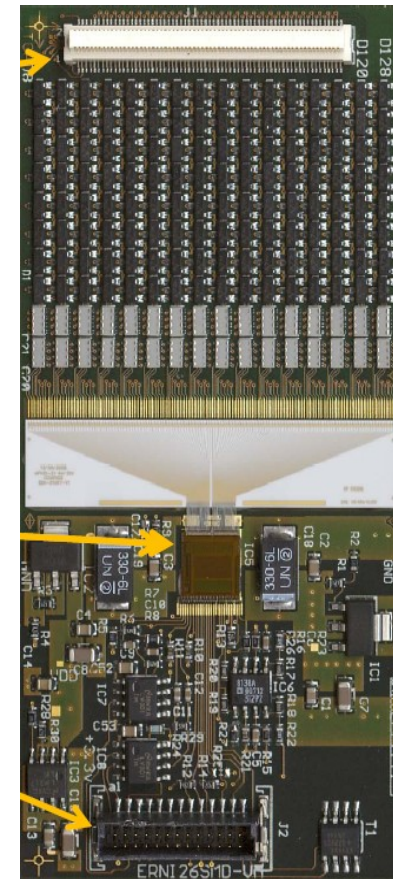
- We at FIT are studying Muon Tomography System using Cosmic Ray Muons for Homeland Security application
- Large area GEM Chambers for the tracking of the muons
- First medium size prototype with 33 cm x 33 cm GEM chambers
- We launched the production at CERN of 10 GEM Chambers (based TERA GEM chambers design)
- APV electronics is a potential for the readout of the chambers
- Discussion initiated with COMPASS PixelGEM group TUM Munich
  - Discussion meeting 11 March 2009
  - They have a developed readout system based APV chips
- TERA (Fabio Sauli), CERN GDD, RD51 interested ?

# APV Electronics for readout of the chambers

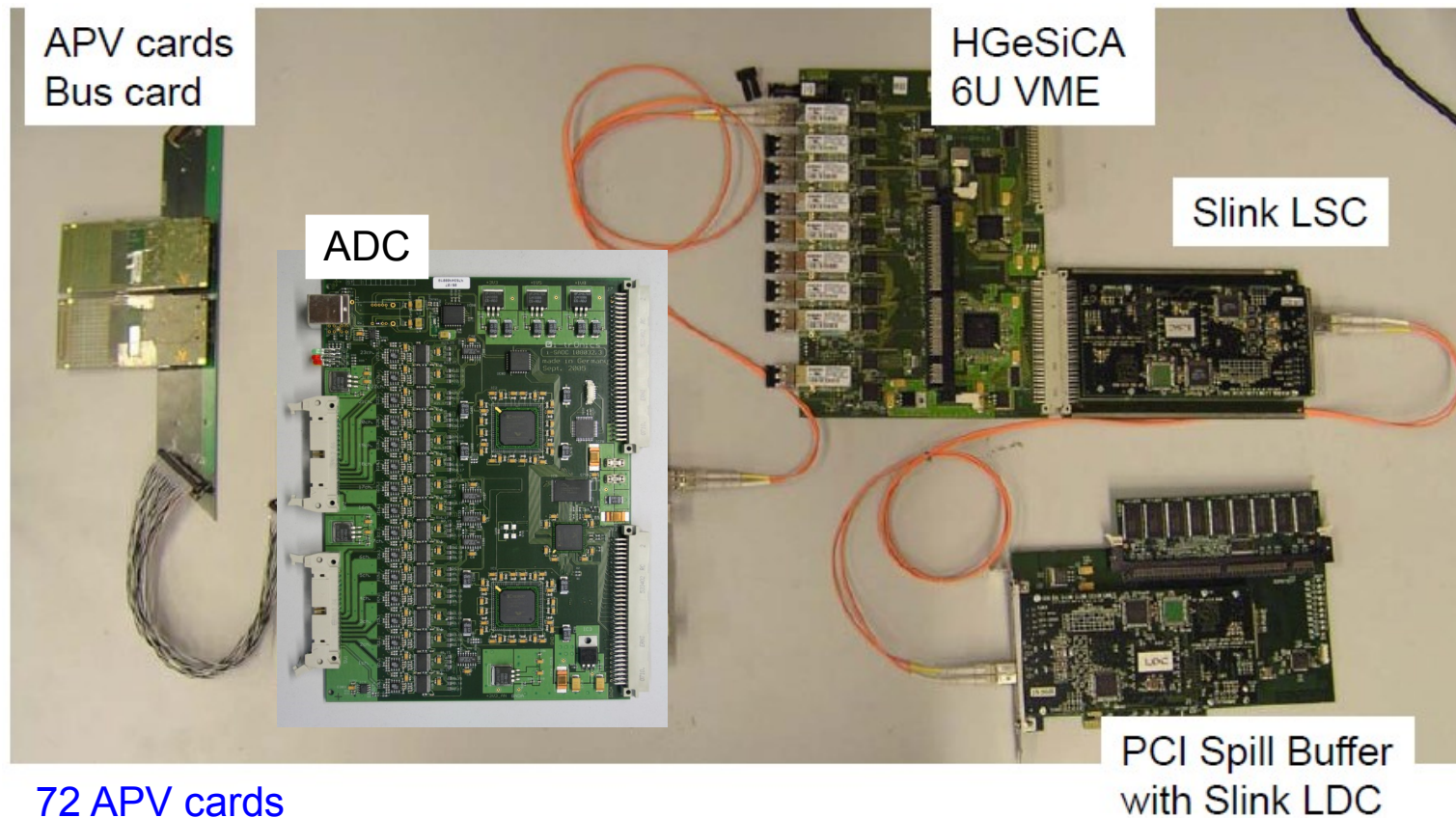


- Our MTS prototype: 6 GEM chambers
- A total of 9216 channels
- 72 Panasonic connectors, 130 pins

APV board (TUM Munich)



# The readout chain: minimum requirements



- 72 APV cards
- 5 Adapter cards: interface 16 APV cards/ADC module ?
- 5 ADC VME modules
- 1 HGeSiCA VME module (up to for 8 ADC cards)
- 1 Slink LSC and 1 PCI Slink LDC
- Do we need PCI Spill buffer ?

# The ADC card and HGeSiCA module



- We want to use this 6U VME SADC modules
  - Availability, cost and time scale for 5 to 8 modules
  - Module with RJ-45 type connector for copper cables
- Interface between the ADC module and the APV card
  - Is there an adapter card 16 APV board/1ADC module?
- 6U VME Interface ADC card and the DAQ
  - Input: 8 serial interfaces RJ-45 connectors
  - Effort to inject external trigger from Scintillator/PMT coincidence

# Configuration and software

- Front-end configuration via VME backplane P2
  - Loading FPGA firmware
  - Registers configuration
- Software effort for GEM channels monitoring
  - Measuring pedestals and thresholds
  - Data consistency checking
  - Debugging readout problems
- Software effort for configuration
  - HGeSiCA registers
  - ADC registers
  - APV registers
  - Loading pedestals and threshold

# The way forward

- APV electronics still an option for “standard” readout system within RD51 ?
  - Most of the development already done at TUM Munich
  - How many groups are interested in this solution?
  - Should we join effort for the development (if needed)
  - Must accommodate different needs of different groups
  - Cost and time scale are the critical issues for us at FIT
- Is there another alternative to APV solution ?
  - This meeting might provide the answer
  - Short term delivery (6-9 months time scale)
  - Cost issues to take into consideration

Thank you