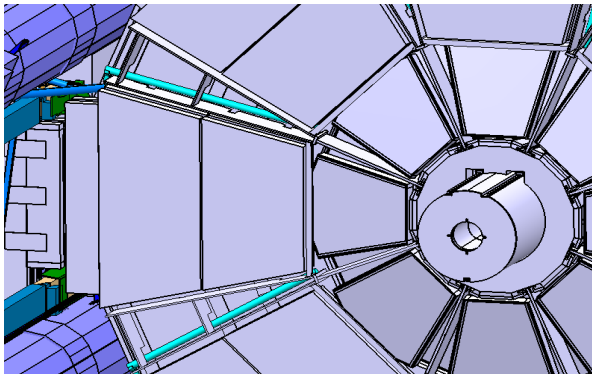




Development of a graphical interface for the configuration of the Micromegas DAQ system

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Student session 2014
Geneva, 14/08/2014

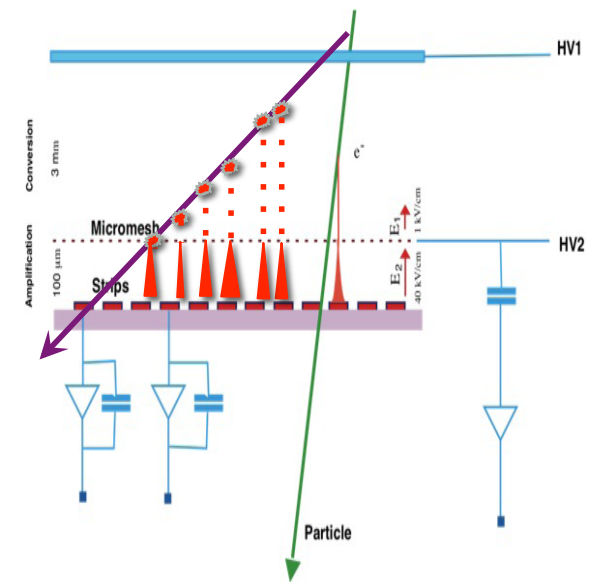
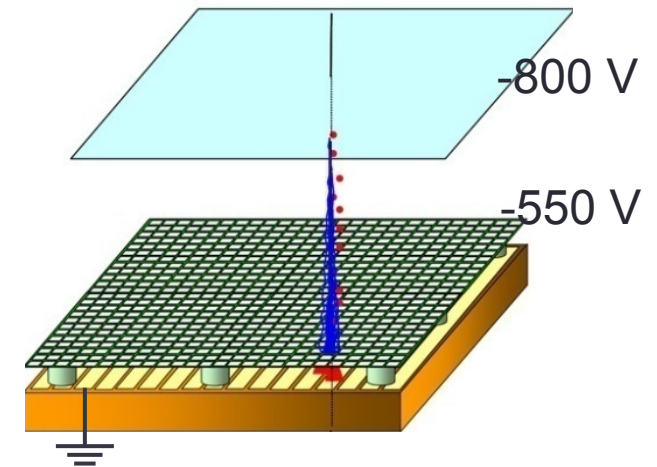


Micromegas

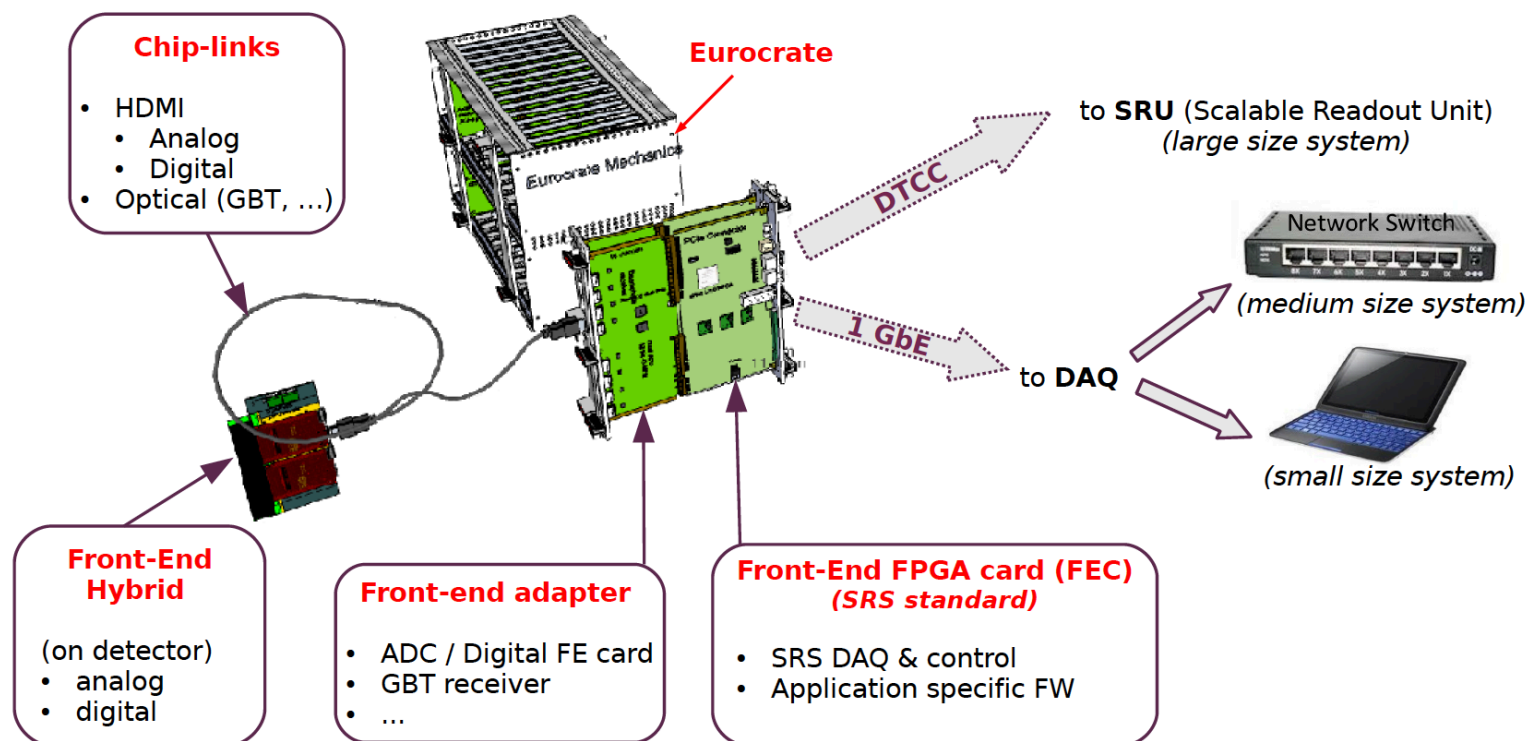
Micromegas is one of the detector technologies that has been chosen for precision tracking and triggering purposes of the ATLAS muon forward detectors in the view of LHC luminosity increase.

Micromegas characteristics:

- Wide drift region (typically a few mm) with moderate electric field of 100–1000 V/cm
- Narrow (100 μm) amplification gap with high electrical field (40–50 kV/cm); a factor $E_m/E_d \approx 70\text{--}100$ is required for full mesh transparency for electrons
- With drift velocities of 5 cm/ μs (or 20 ns/mm) electrons need 100 ns for a 5 mm gap



SRS DAQ system



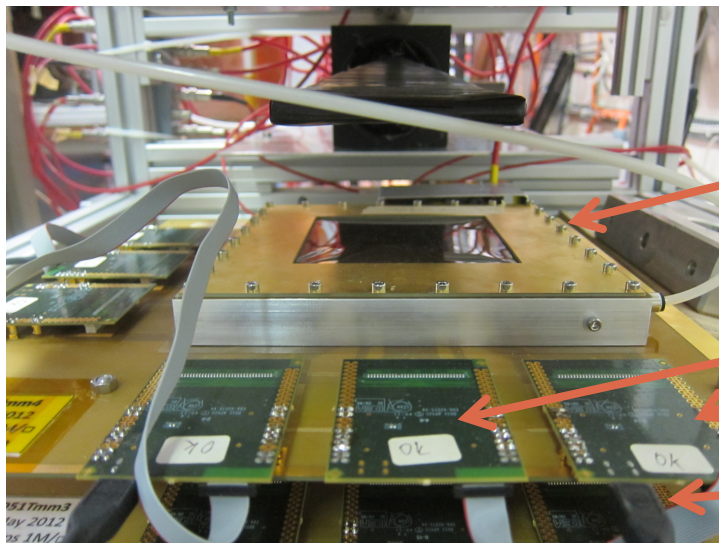
- General purpose multichannel readout solution for a wide range of detector types, detector complexities and different experimental environments
- Scalability to use different front-end hybrids - APV25 (analogue) and VMM (digital transmission) commonly used - and as many FEC cards as needed.

R&D 51 – SRS DAQ System

In the ATLAS Muon community SRS DAQ system is used:

- for Micromegas detector certification (small-medium sized labs and test beam setup)
- to readout a Micromegas prototype (4096 channels), installed on to the present ATLAS Muon Small Wheel (summer 2014)

10 chambers actually used in the lab to test multi FEC card DAQ system.
(4 Tmm / 5 T / 1 TH2)



Micromegas chamber

Apv 25 (master/slave)

Hdmi cable



MMDAQ

MMDAQ characteristics:

- No assumptions on the type of detector and electronics
- C++ multithread program based on server client mode
- Need configuration files in which chambers and electronics are described
- GUI based on ROOT framework
- Real time monitoring of chambers properties

Configuration file



Chambers described into the configuration file

MMDAQ XML Configuration

- Automatic generation of the the configurations files necessary for the acquisition system
- Provide a user-friendly graphical interface for the description of the detectors, the electronics and the entire experimental setup
- Allow a wide range of users, not only experts, to use the DAQ

The new version of MMDAQ has been successfully implemented and tested, already committed and at now is running as DAQ software for Micromegas test beam at PS facility (7-14 August 2014)

MMDAQ – XML configuration - FEC

The screenshot shows the 'mmdAQ Online Event Browser' software. The main window displays a list of channels (0-15) under the 'FEC' tab, with 'Fec Number: 1' and 'FEC1' at the top. A dialog box titled 'Insert a new FEC' is open, showing 'Name' as 'FEC2' and 'Address' as '10.0.0.15'. A 'Channels' label with an arrow points to the channel list in the main window. A 'Name' label with an arrow points to the 'Name' field in the dialog. An 'Address' label with an arrow points to the 'Address' field in the dialog. A 'FEC already saved' label with an arrow points to the 'FEC' tab in the main window.



MMDAQ – XML configuration - Chamber

Chambers already saved and configured

Name

Type of the chamber

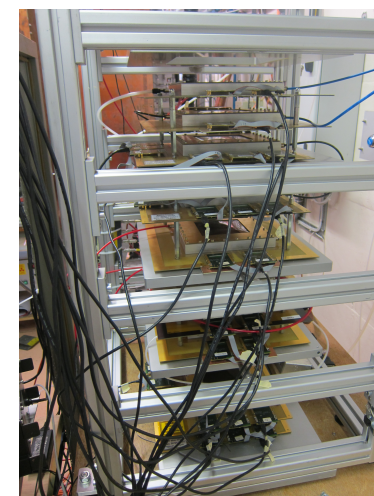
Electronics already configured

```
Name chamber: TMM2
type chamber: Tmm-chamber
C0 --> APV.1.00
C1 --> APV.1.01
C2 --> APV.1.02
C3 --> APV.1.03
C4 --> APV.1.04
C5 --> APV.1.05

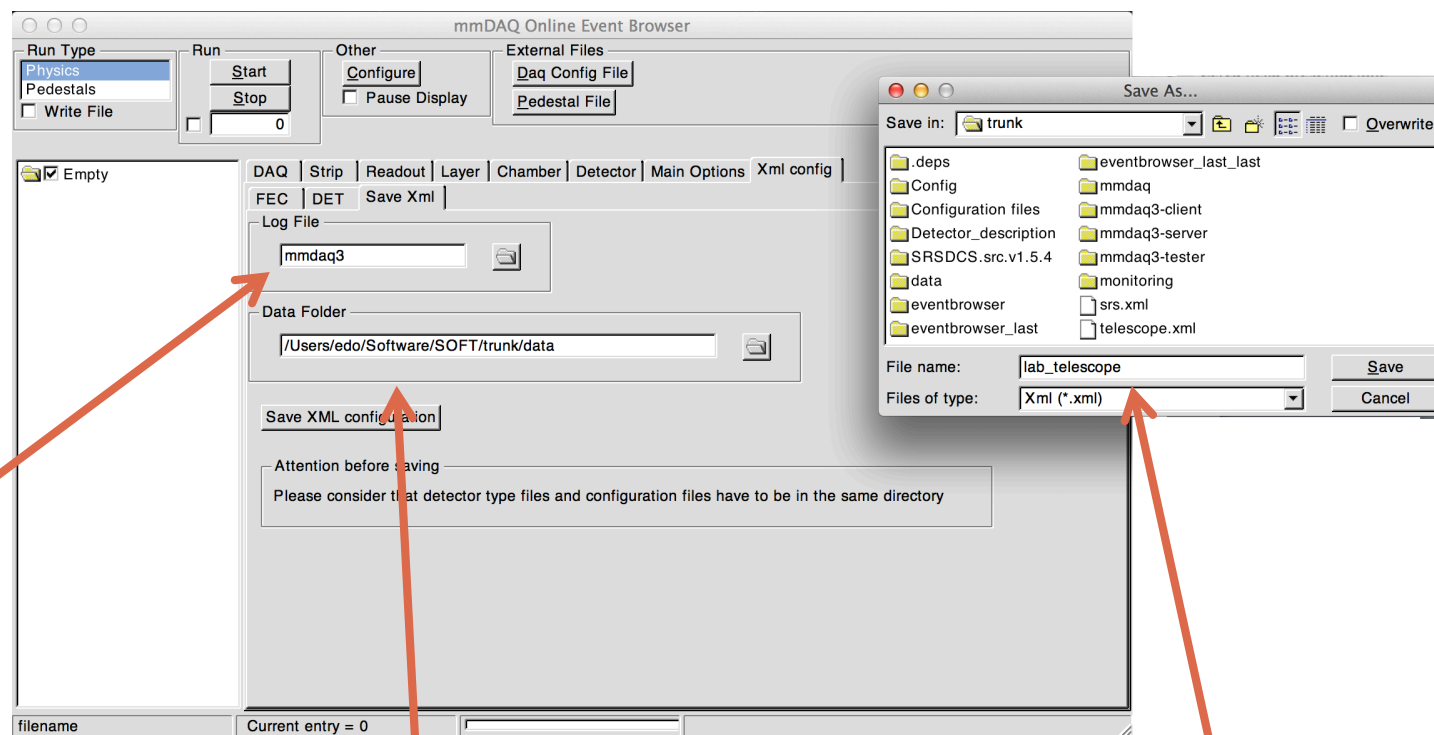
Name chamber: TMM5
type chamber: Tmm-chamber
C0 --> APV.1.06
C1 --> APV.1.07
C2 --> APV.1.08
C3 --> APV.1.09
C4 --> APV.1.10
C5 --> APV.1.11

Name chamber: T2
type chamber: T-chamber
C0 --> APV.1.12
C1 --> APV.1.13
```

Configuration of the electronics



MMDAQ



Log path

Data event directory

Saving configuration path

Summary

- A new data acquisition system has been developed for a wide range of detectors and electronics within the R&D51 collaboration
- A new software for the data acquisition to certify Micromegas detector and to test the prototypes has been released
- A graphical interface for the configuration of the data acquisition software has been released in order to allow a wide range of users to use the system

A new version of the software has been released in the last days with new features according to users feedbacks during the test beam