# RD51/SRS.. The context

- Hardware/Firmware
  - New Front End Chip interfaced with the SRS: VMM (BNL/ATLAS)
  Replacement of APV25 (discontinued)

- Software
  - New developments (VMM)
  - Several of the previous software used in RD51 outdated with limited support

- External support approaching their end
  - EU BrightnESS – ending now
  [significant contribution: 1fellow (M. Lupberger) x 3y +...]
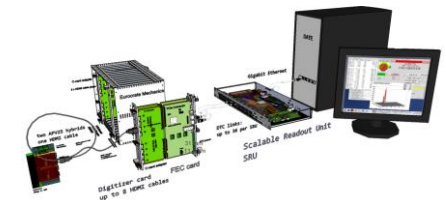 - EU AIDA2020 – ending in April 2019

- RD51 extension

<u>Main goal :</u>

making everyone of the collaboration aware that it is the right moment to <u>express needs</u> and/or to <u>contribute</u> to the SRS developments
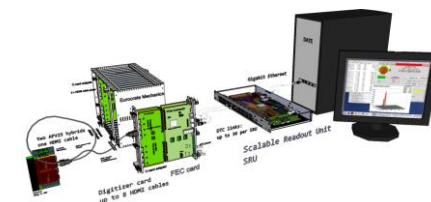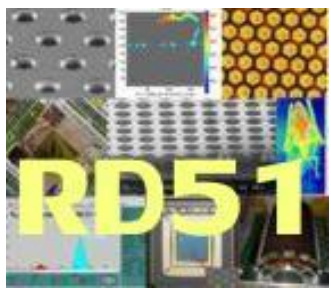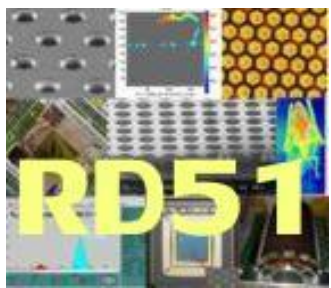
Future

- Hardware/Firmware
  - Small setups
    - FE Chips
    - FEC upgrades (bandwidth, …)
    - Adapter cards (high speed link (GBT),…)
  - Large setups
    - Scalability

- Software (new developments & support)

Near Future (2018-2019): VMM Pilots Systems and Startup

Pilot SYSTEMs: 3 systems (Crate, FEC, DCARD, CTF,..) and 24 VMM hybrids (3k channels in total) – COVERED by AIDA2020 budget

Users Startup:

- First 5 wafers on AIDA2020 budget in ATLAS production (more if resources available)
- More than 20 Wafers purchase (40-50kUSD) can be independent (big projects should lead/help/drive ...)
- Hybrids, DCARD, CTF, Crates,.. : need to update of the existing list / synch orders
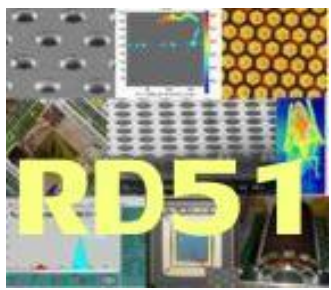
Firmware:

- current ATLAS/RD51/ESS

Software (Slow Control, DAQ, Offline/Online Monitoring):

- current RD51/ESS + collaboration with CERN EP-DT-DI
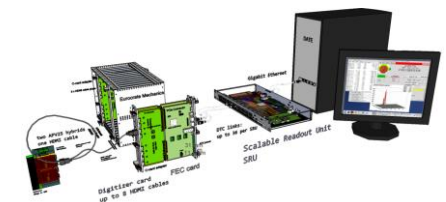
Manpower and resources...

- RD51 common fund and voluntary work (H.Muller) for SRS since 2014

- RD51 Lab (GDD) and test beam: Basic Support and Test facility

- UBONN:M. Lupberger's Proposal for SRS projects in BONN (see next Michael's contribution)

- ESS : D. Pfeiffer NMX – common activities on electronics and DAQ (see next Dorothea's contribution)

- CERN EP-DT-DI: G.L. Miotto Support (collaborative effort / direct involvement from our side is required) on DAQ.   (see next Enrico's contribution)

- CERN EP RD: trying to get support (fellow) from CERN EP RD process - not yet secured (cuts on RD budget) – if positive, available only after 2020
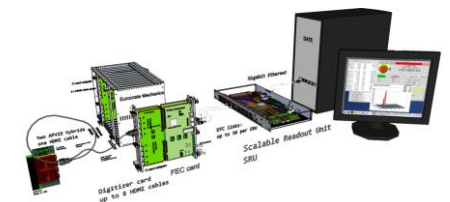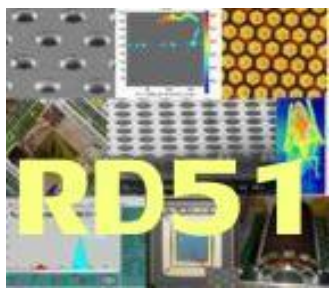
- ... contribution from RD51 institutes/laboratories
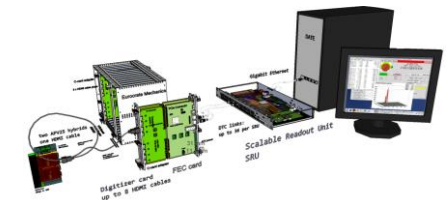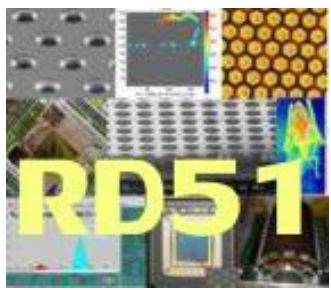
RD51 SRS

Which kind of needs my group has
## Which kind of help my group can give

Discussion at the end of the session

Hardware and firmware Developments

- CERN EP-DT (RD51) Fellow Sorin M. SRS/SRU/ADC/APV/BEETLE/VFAT/VMM-2/DCARD-1...
- Valencia (Curro et al.) FEC V3, V6 cards, SiPM adapters for NEXT
- CERN ALICE Alfonso: DTCC links FEC<->SRU
- INFN Naples (Giordano et al.) Zero Suppression
- BONN (Desh et al.) TimePix adapter SRS
- CERN & ESS A. Rusu VMM hybrids 3 and 4 / DVMcard
- CERN EP-DT (ESS) Fellow Lupberger M. VMM firmware on VMM3 and FEC-6, testbeam
- CERN TOTEM (quinto et al.) TOTEM optical Readout via SRU
- CERN CMS (Dorney et al.) Zero Suppression fw fecv6
- eicSys GmbH, SRS-ATCA system
- INFN Naples (Givi et al.   CTF versions 1-6
- UVA (Kondo et al) Firmware for high rate with APV25
- Colombia (Freddy) Firmware for High rate and VMM
- ESS/RD51 (Yan) Firmware for FEC (APV25 and VMM)
- …
- ……
- ……………
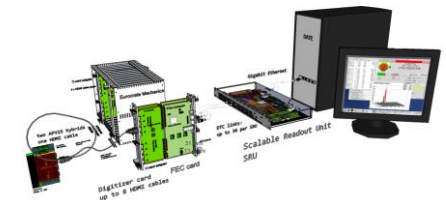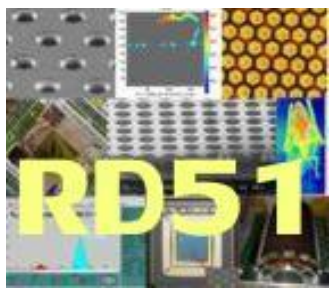
Software Developments

- CERN EP-DT (RD51) Fellow Sorin M. Labview/Slow Control
- CERN ALICE (Costa et al.) UDP equipment port for DATE,
- CERN ALICE DAQ Group DATE & AMORE
- INFN Naples (De Asmundis et al.) Labview DAQ
- CERN ATLAS (Byszewski et al.) mmDAQ
- BNL (Purschke et al.) rcDAQ
- FIT (Gnanvo et al.) AMORE SRS
- ESS (Pfeiffer et al.) VMM DAQ
- ATLAS NSW (Zibell et al.) Implementation in ATLAS DAQ
- ATLAS NSW (Zibell et al.) Zero Suppression
- CERN CMS (Dorney et al.) Virtual Machine
- FIT (Colafranceschi et al.) SCRIBE (slow control)
- NTUA (Iakovidis et al.) SDC (slow control)
- Trieste (Levorato et al.) Labview DAQ
- Weizmann/Aveiro (Moleri et al.) pads implementation in mmDAQ
- ATLAS (Iakovidis et al.) VMM DCS and DAQ
- GDD/RD51 Summer Student (Lara and manuel): vmm slo control and data analisys.
- GDD/RD51 Summer Student (Steven) APV25 Zero supporession
- …
- ……
- ……………
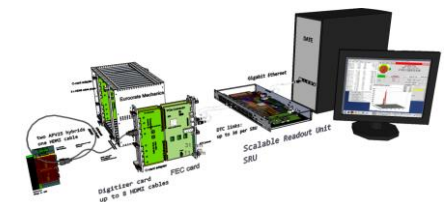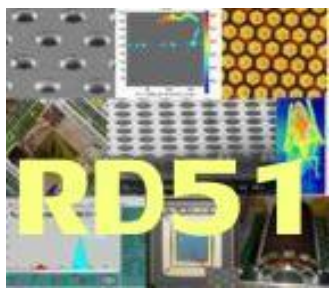
Small system

About 2000 APV delivered
About 250 Thousands Channels!

- Large success, more than 100

- Used in laboratory tests and test beam

- Important in detector characterization waiting for final electronics (ATLAS, CMS)

- Important in quality assurance (CMS)

- Success coming from collaboration/communication and sharing of needs

Large system

- Several cases successfully exploited

- Less general, need of the group behind driving the effort
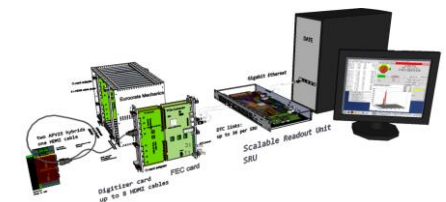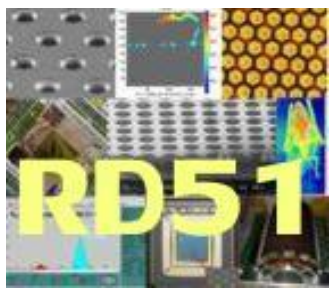
Interface with different FE

SRS frontends

APV25-RD51		V1,V2,V3 proto hybrids V4 became "working horse" up today
SiPM-NEXT		2 prototypes ATCA -SRS became standard for NEXT TPC
Timepix Univ.Bonn		2 prototypes A -> C-card -> AIDA project restart for Timepix 3 SRS
VFAT-RD51		V1 prototypes hybrid, discontinued, technical problems
Beetle RD51		V1 prototype hybrids, discontinued, manpower shortage
GEMROC-AGH/EicSys		AIDA-project: GEMroc hybrid with plugin adapter for SRS, non info
VMM-RD51		V1,V2,V3 proto hybrids, V4 becoming new standard 2018

successful frontends: man x years + resources required for HW, FW, SW

Several hybrids versions

*The successful ones (APV and VMM)
represent man-years of HW development
and up to 4 iterations with
test beam qualification*