Work Package 5: Detector performance and system integration

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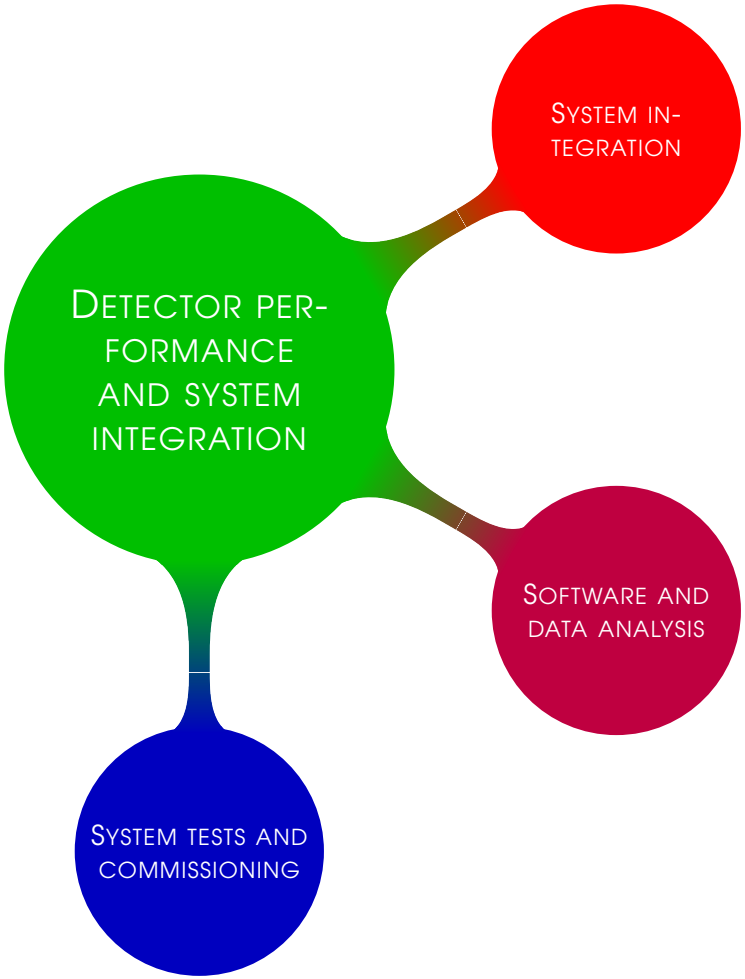
Outline

Detector performance and system integration



Electro-mechanical assembly and system integration and

A particular challenge for the IBL integration task is the extremely tight "turbine" stave layout combined with the overall size of the finished stave assemblies

Software development and data analysis

Portable, high-performance parallel data-processing algorithms are crucial to an efficient detector commissioning workflow.

System tests and detector commissioning

The IBL integration schedule is very tight, so it is important that possible system issues are identified and addressed as early as possible. Likewise, a thorough commissioning programme is essential to verify detector performance prior to operation.

Among the TALENT WPs this is arguably the one most closely coupled to the IBL construction project.

Researcher positions

Recruitment summary

- All positions have been filled — some in the nick of time
- An excellent team of motivated and hardworking people
- All researchers are now well integrated within their host organizations
- Secondment plans are being worked out

ESR10 (CERN) — Simon Feigl (Austria)

Host institution:	CERN, Geneva (Switzerland)
Responsible group:	PH/DT
Supervisor:	Mar Capeans
Starting date:	September 2012
PhD programme:	University of Oslo (Stapnes/Røhne)

System integration:	Contribute to the evaluation of the IBL thermal mockup, a critical part of the qualification of detector installation and operation; ref M-5.4 report.
Pixel sensors:	Lab. and test beam characterization of novel HV-CMOS sensors, measurements before/after irradiation.

ESR11 (Univ. Geneva) — Antonio Miucci (Italy)

UNIVERSITÉ DE GENÈVE

Host institution:	University of Geneva (Switzerland)
Responsible group:	DPNC
Supervisor:	Giuseppe Iacobucci/Didier Ferrere
Starting date:	July 2012
PhD programme:	University of Geneva (Iacobucci)

Stave construction:	Module reception tests, associated loaded stave QA
IBL integration:	Staves 7+8 integration study, follow up QA of staves in SR1
Commissioning:	See the IBL as an integral part of the ATLAS Pixel system

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ESR12 (Oslo) — Laura Franconi (Italy)

Host institution:	University of Oslo, Oslo, Norway
Responsible group:	MN/FI/EPF
Supervisor:	Ole Rohne
Qualification:	Physics
Starting date:	November 2012
PhD programme:	University of Oslo (Read/Røhne)

3D sensors:	Diagnostics of SINTEF Full-3D run-3, follow-up of planned run
Performance:	ATHENA bytestream converter (ATLAS Q-task), follow-up of physics data quality
Commissioning:	Contribute to SR1 program, eventually in ATLAS

ESR13 (CERN) — Sonia Fernandez (Spain)

Host institution:	CERN, Geneva (Switzerland)
Responsible group:	PH/ADE/ID
Supervisor:	Heinz Pernegger
Starting date:	September 2012
PhD programme:	IFAE/Barcelona (Padilla)

Silicon sensors: Lab. and test beam characterization of planar- and 3D sensors, measurements before/after irradiation

Commisioning: Module read-out scans, first data.

ER2 (Atostek) — Rafael Tedin (Spain)

Host institution: Atostek Oy, Tampere, Finland

Supervisor: Jarkko Niittylahti

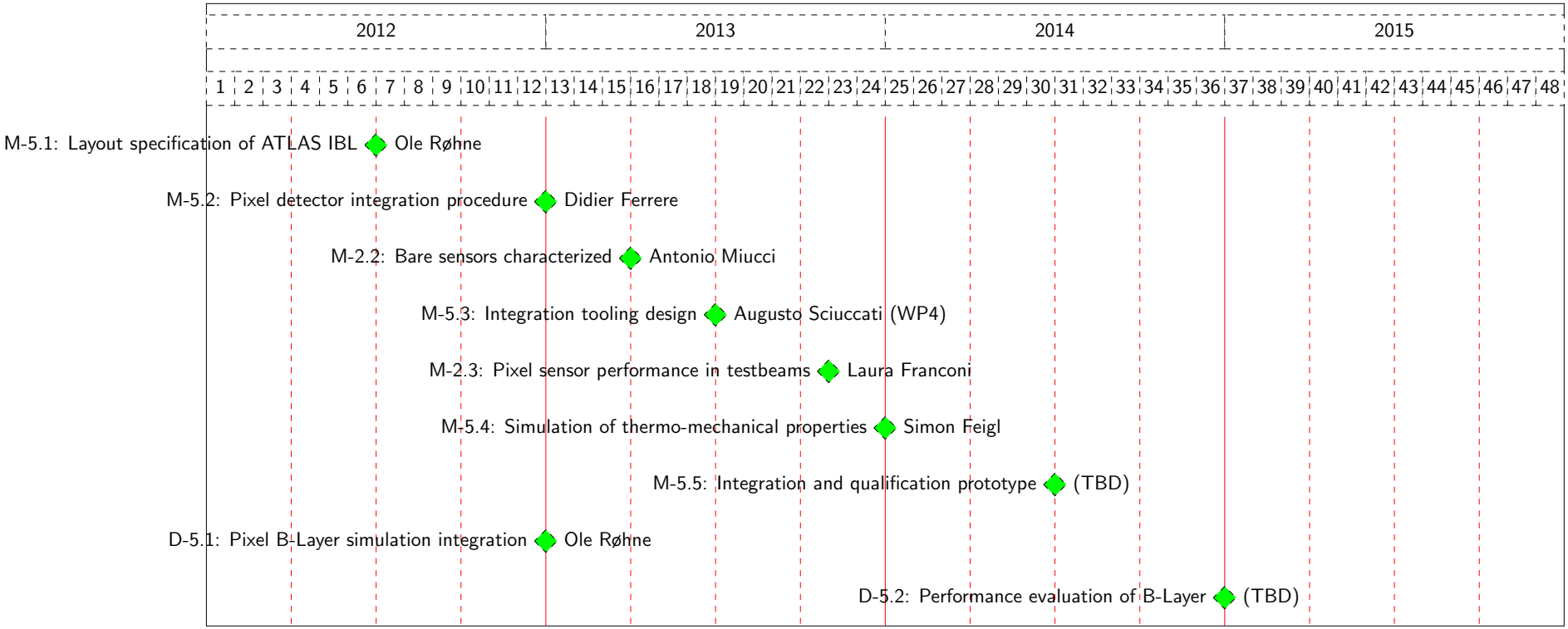
Qualification: Software engineering

Starting date: April 2013

Industrial modules: Development and benchmarking of signal processing algorithms using the Corento automatic parallel compiler

HEP specific: Application of parallel algorithms to ATLAS detector simulation, data analysis, signal processing.

Milestones and deliverables



Formal project reporting

- Our funding depends on their completion (quote from Hanna)
- Some shifting around between WPs (to be expected)
- In terms of delivering timely approved reports: So far, so good!

Follow the IBL until completion

- Completion of the construction and QA of staves including some spare parts for the project
- Qualification and better understanding of the recent corrosion issue
- B-field and coating/encapsulation wrt vibration and possible chemical aggressions
- DAQ tuning and qualification of the online tools, on-surface test set-up with final off-detector parts
- Offline software tools completion
- Installation and commissioning of the detector together with the off-detector components
- Work preparation towards the operation and shift with DCS, cooling and online data quality
- Tracking performance with the first cosmic run data, including full Inner detector (ID) operation
- First physics data and IBL performance

Beyond the IBL — ATLAS/ITK

- New technology to be investigated like CMOS technology that could get rid of pixel bump bonding and may lead to significant material and cost reduction
- Module layout definition and prototype construction for a new Pixel detector for the HL-LHC.
- Stave integration layout like conical shape, I-beam for inner most layers and alpine stave layout that could optimize the coverage and material budget