

AIDA 2020

Advanced European Infrastructures
for Detectors at Accelerators

Preparation of Advanced Software workpackage for AIDA++

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17.06.2019



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 654168.



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AIDA-2020 status



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Advanced European infrastructure
for Detectors at Accelerators

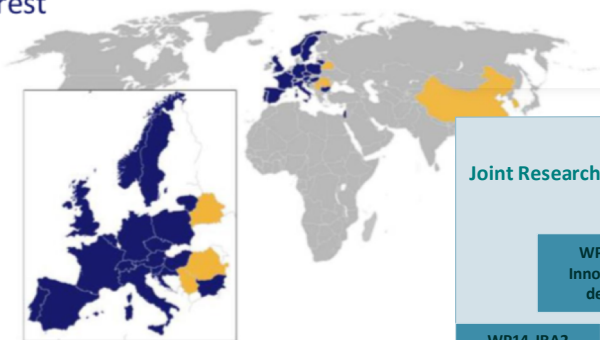
- Collaborative framework
- Infrastructure: common interest

<https://aida2020.web.cern.ch>

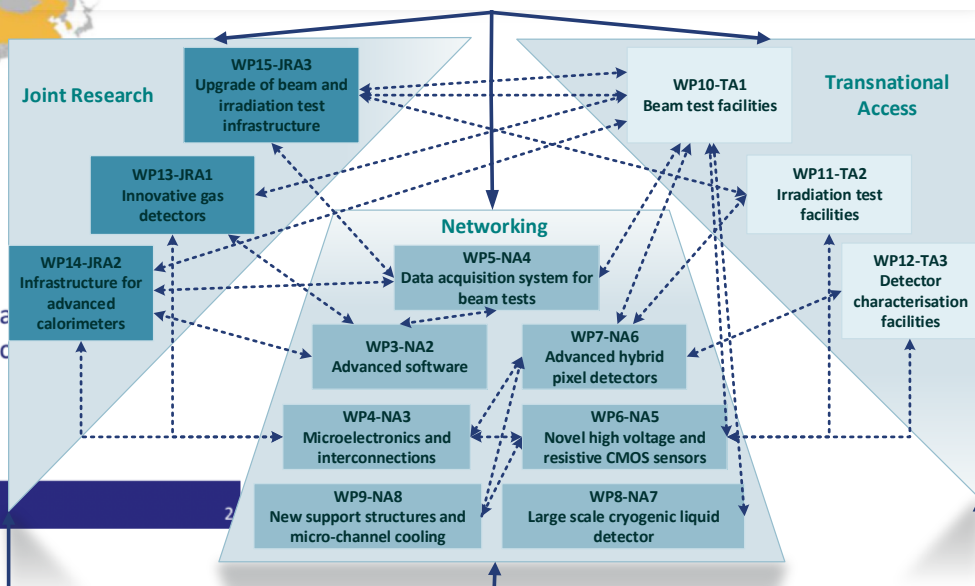
- 19 countries
- 38 beneficiaries
 - + 20 collaborating institutes
- Coordinated by CERN

- Total budget 29.8 M€
- EC contribution 10.0 M€

- Activities:
 - Mainly: Joint Research & Networks (85%)
 - Transnational Access (13%)



Participants bring in complementary
and a balanced coverage of project



AIDA-2020 Status , April 4, 2019

- Extension of AIDA-2020 into Year 5 **until April 30, 2020**
 - Submitted as discussed in Bologna
 - Approved without changes



Objectives

Task 3.1 Scientific coordination

- Coordinate and schedule the execution of the WP tasks
- Monitor the work progress (milestone and deliverable reports), follow-up on the WP budget and the use of resources
- Organise WP meetings

Task 3.2 Detector Description for HEP (DD4hep) and Unified Solids (USolids) extensions

- Extend USolids for vectorisation using Single Instruction, Multiple Data (SIMD) instructions and reviewed algorithms
- Define proper interfaces for use of USolids in Geant4, Root and Vector prototype
- Implement thread safety and alignment procedures in DD4hep

Task 3.3 Alignment and conditions data (test beam)

- Complete alignment toolkit with tight coupling to DD4hep for simulating the misalignment
- Provide alignment and conditions data for DD4hep

Task 3.4 Event Data Model (EDM) toolkit and framework extensions

- EDM toolkit for efficient creation of Event Data Models in C++ with high performance I/O
- Implementation of parallel algorithm scheduling mechanisms in HEP frameworks

Task 3.5 DDG4 (Detector Description Geant 4): Geant4 based simulation toolkit

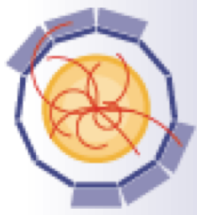
- Modular and flexible simulation toolkit based on DD4hep and Geant4
- Application to LC and FCC

Task 3.6 Advanced Tracking Tools

- Development of advanced parallel algorithms for track finding and fitting in AIDA Tracking Tool toolkit (aidaTT)
- Application to LHC and LC

Task 3.7 Advanced particle flow algorithms

- Development of advanced particle flow and pattern recognition algorithms in PandoraPFA (particle flow algorithms toolkit)
- Application to LHC, LC and neutrino experiments



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Advanced European Infrastructures
for Detectors at Accelerators

Towards the Call for Eols

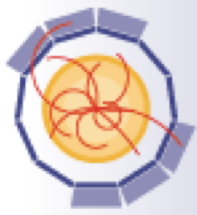
Felix Sefkow
DESY

Steering Committee Meeting
May 9, 2019

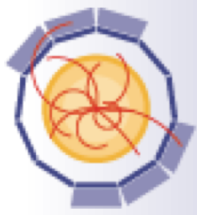


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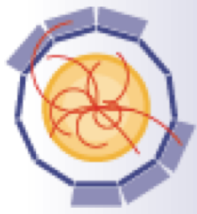




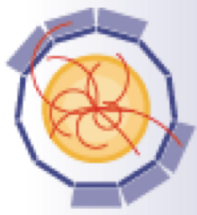
- ***The information is based on the available draft Work Programme for 2020***
 - The WP is expected to be finalised in May, adopted in July and the Call for the Innovation Pilots will be published in autumn
- **Topic: Innovation for Detector Technologies**
- Expected EC funding: up to 10 M€
- Objective:
 - Support **research infrastructure networks** developing and implementing a **common strategy/roadmap** including technological development required for **improving their services** through partnership with industry;
 - Support **incremental innovation** and **cooperation with industry and academia** in areas such as scientific instrumentation
 - Target : **Advanced Integrated Activities (i.e. the AIDA-2020 community)**, which have reached a high level of integration and can focus on joint research developments, here instrumentation for particle physics at accelerators
- Proposal Deadline March 17, 2020
- **Deadline for Expressions of Interest: July 15, 2019**
- Open Community Meeting: September 6, 2019 at CERN



- **Innovation for delivery of services, or new services of infrastructures**
 - Infrastructure can be interpreted as facilities, tools and platforms serving common interest for detector development, like in AIDA-2020
 - Innovation can be incremental
 - However, less emphasis on “integration” - enlarging the community
- Development of **technologies & techniques underpinning** the use of the RI
- **Prototyping** corresponding methodologies & instrumentation
- Activities of Joint Research and Networking type (no distinction)
 - Silicon, gas and cryogenic detectors, calorimeters mechanics, electronics, software, test beam, irradiation and test facility equipment
- But **no Transnational Access** mechanism
 - Infrastructure upgrades aiming at improving the performance or services of existing facilities can be included in the Innovation Pilots
- Main goal is **strategic R&D**
 - Activities must be related to the needs of future accelerator projects
- Generic and Blue Sky R&D will be addressed by a Proof-of-Concept funds distributed on a competitive basis after start of the project



- Involvement of **industrial partners** is strongly encouraged
 - If possible as beneficiary
 - Add a comment on IP aspects
- **Sustainability** and co-funding must be demonstrated
 - Relation to future projects must be explained
 - Long-term commitment of partners to be demonstrated by Matching Funds
 - In AIDA-2020: 200% (including personnel) on average, dependent on type of activities
 - For industrial partners 100% target
- **Complementarity** with other actions (e.g. ATTRACT) is strictly required
 - There will be collaboration agreements to exclude double funding
- **Non-European partners** can participate
 - no EC funds
 - Must have a defined role in work programme
- Awareness of environmental aspects may be relevant



- A **template** should be distributed
- **Title**
 - plus some keywords, topic
- Partner **institutes** (max 6)
- **Contacts** (1 per institute)
- **Description** (1/2 page)
 - Planned activity, envisaged deliverables
 - Relevance to future accelerator-based HEP project
 - Upgrade of existing facility where applicable
 - Common interest, added value for the community
 - Innovation aspects
 - What is new compared to existing R&D programmes and projects, what is the progress beyond work done in AIDA-2020, what is the level of novelty w.r.t. to the State of the Art, is it a new or an improvement of existing technology, etc.
- **Deliverables** (~1 per 100k EC funds)
- **Budget estimate**
 - Personnel (FTE years, total EC + Matching Funds)
 - Full cost including personnel (assuming 1/3 to be covered by EC funds, but without overheads)
 - Example: Project cost 300k, EC funds 100k, matching funds 200k (EC request 125k for assumed overhead of 20%)
- **Deadline July 15, 2019**



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EoI

- Email sent by Felix on 17th May 2019
 - guidelines
 - template for EoI

The screenshot shows the top section of the AIDA 2020 website. On the left is the AIDA 2020 logo. To its right is the text 'Advanced European Infrastructures for Detectors at Accelerators'. Below this is a horizontal navigation bar with buttons for 'Home', 'Project', 'Activities', 'Transnational Access', 'Proof of Concept', 'Events', 'Documents', 'Newsletter', 'Detector Innovation Pilot 2020', 'AIDA', and 'Contact'.

[Guidelines for submitting EoI](#)
[Expression of Interest template](#)

Detector Innovation Pilot 2020

H2020 Innovation Pilot: detector technologies at accelerators

The European Commission will open in **November 2019** the H2020 call INFRAINN0V-04-2019 for advanced communities that have been supported under H2020 and previous Framework Programmes and have reached a high degree of integration at European level. The Innovation Pilot Call will be targeted, with three communities invited to submit proposals in the domains of (i) light source technologies, (ii) accelerator technologies, and (iii) detector technologies at accelerators.

Call for Expressions of Interest

CERN is supporting and coordinating the preparation of a proposal for an Innovation Pilot on detector technologies. Institutes and laboratories interested in participating in the new Innovation Pilot on detector technologies are invited to submit Expressions of Interest for future detector R&D activities to be included in such a proposal and initiative, as described in this [guidelines document](#) and using the [EoI template](#).

EoI submission deadline = 15 July 2019

Submissions should be sent to [detector-innovation2020 \[at\] cern.ch](mailto:detector-innovation2020@cern.ch)



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Goal for this meeting

- Prepare a number of coherent Eols for the Advanced Software workpackage for AIDA++
- as for AIDA-2020 we see it as mixture of continuation of some of the current projects and new projects
 - new features and/or new use cases
 - beneficial to at least one community - ideally more than one
 - address immediate needs of **current experiments** (ATLAS, CMS, LHCb, Alice, Belle II, Dune, ...)
 - as well as **future experiments** (ILC, CLIC, CEPC, FCC-ee,hh,eh, . . .)
- the number of tasks has to be similar to AIDA-2020
 - same budget, so we shouldn't fragment it more
- Eols need to be submitted by July 15th