AIDA 2020

Advanced European Infrastructures for Detectors at Accelerators

Report from the Science Advisory Board

3rd Annual Meeting

Marcel Demarteau

on behalf of the SAB

Bologna, April 27, 2017

Annual Meetings

Thank you for the great venues,
terrific hospitality, great food, superb support, ….

Third Annual Meeting

- First two workshops were impressive
- Third workshop as impressive:
  - 123 participants
  - 24 parallel sessions with a total of 110 excellent presentations in parallel sessions
- Very enthusiastic and dedicated teams in each working group and excellent progress reported by all groups.
- Many young scientists involved !
- Congratulations on the accomplishments to date!
- Thank you!

Venue

- **Many fascinating talks, but perhaps a most intriguing hidden message?**

Venue

Reminder of the SAB

Ariella Cattai
CERN

Lead for
- WP2
- WP9
- WP13

Marcel Demarteau
Argonne

Lead for
- WP2
- WP6
- WP7

Peter Mättig
Wuppertal

Lead for
- WP4
- WP2
- WP11
- WP12
- WP15

Greame Stewart
CERN

Lead for
- WP3
- WP2
- WP5

Jim Strait
Fermilab

Lead for
- WP1
- WP2
- WP8

Isabelle Wingerter
Annecy

Lead for
- WP2
- WP10
- WP14

SAB Charge and Activities

- We understand our task to provide constructive advice to the Management Team (MT) on a regular basis on technical and strategic matters related to the scientific program of the projects
- Dialogue with MT resumed ~2 months ago
  - SAB had a telecon on April 11, 2018 with all members attending
  - Submitted a list of questions to MT
  - Submitted a list of questions to MT related to the various work packages
- Received from MT:
  - Draft on Extension of AIDA-2020 as sent to the Governing Board
  - Reactions and Responses to the 2017 Report
  - Responses to the Questions to the MT
  - Responses to the WP-Specific Questions
- MT and SAB members had working lunch meeting on Wednesday
- SAB members had working lunch on Thursday

- We are here to help!

General Observations

- **THE** metric used to gauge the value of the work of the scientific community is publications in peer reviewed journals
- Last year, the project was at the mid-point, but publications were only at the ~25% level of the set goal (180).
- This year, huge improvement. **Congratulations**!
  - Target 60 (journal), 50 (conference), 180 (total)
  - Today 37 (journal), 33 (conference), 145 (total)
- However, some work packages are better than others.
- Within a work package, there are large differences:
  - WP15: Ratio of publications to number of selected project varies from ~90% to ~5% for different facilities
  - Closer monitoring, and incentive mechanism, is recommended.

Publication Score Board

WP	No. of journal publications	No.of conference/ workshop proceedings	Other publications	Total
WP2	0	0	7 press articles 9 "On track" newsletter issues	16
WP3	2	3	6 presentations 3 scientific notes	14
WP4	0	0	1 poster	1
WP5	0	2	6 presentations 2 scientific notes 2 posters	12
WP6	10	2	1 poster	13
WP7	12	8	2 presentations 2 posters	24
WP8	2	2	0	4
WP9	1	0	5 presentations 1 poster	7
WP13	4	2	1 presentation 3 posters	10
WP14	4	7	1 scientific note	12
WP15	2	7	11 presentations 5 scientific notes 7 posters	32
TOTAL	**37**	**33**	**75**	**145**
TARGET	**60**	**50**	**-**	**180**

General Observations

- Good to see more interaction among the different work packages; it is often the sharing of ideas and concepts that leads to innovative developments
- All working groups have strong ties to running or proposed experiments. Further strengthening these relations and strengthening relation among work packages is encouraged
  - Value of the work greatly enhanced if it advances technologies of current experiments and adopted by proposed experiments

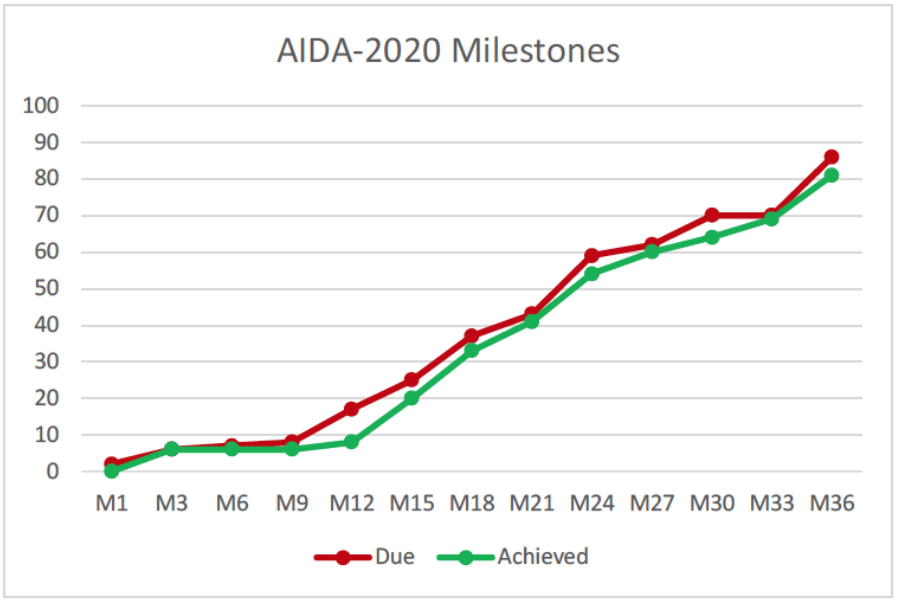
WP1: Observations

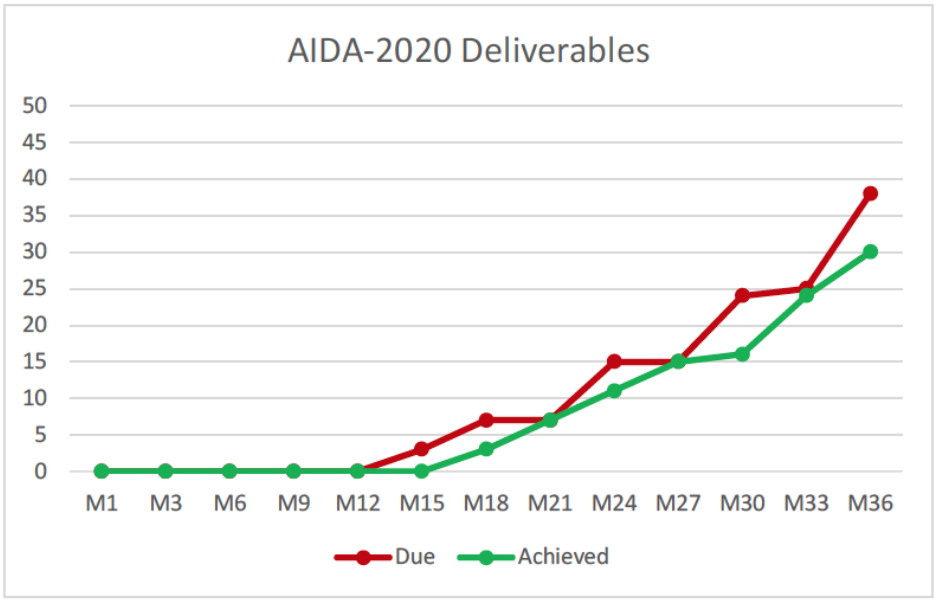
WP 1: Project management and coordination

- The management team continues to do a excellent of job running this wide-ranging and important program. The success of the program is a tribute to the work of the management team.
- The program is about 75% of the way through its 4-year duration, and in general it is progressing according to plan.
- Almost all (81 of 87) milestones due up until now have been met on-time or with only inconsequential delays. Most of the missed milestones are expected to be achieved soon.
- 30 of 39 deliverables due have been achieved. The overall delay is on the order of 2 months. The proposed no-cost extension of the program could help AIDA 2020 meet all of its deliverables with excellent results.
- Overall spending is on track, with some work packages spending a bit ahead of schedule and others a bit behind. AIDA-2020 management continues to monitor the expenditures properly.

Schedule

- Achieving the schedule of deliverables and milestones is very good, even though some have been late. After all, this is R&D and some delay is to be expected.





WP1: Extension

WP 1: Management

- The nominal end date of AIDA 2020 is April 2019. The MT is considering submitting a request for a no-cost 12 month extension of the project until April 2020.
- This would bridge the gap to the next EC call, which closes around March 2020. It provides an opportunity to “keep the community together”, that is, continue to do work in areas that met their goals already and prepare for the next call. A perhaps key example is transnational access. The transnational access has been a clear success story of AIDA and retaining its strength would add great value. Management is encouraged to preserve this capability.
- In addition, the extension provides for an opportunity to increase the impact of AIDA 2020 in certain areas

WP1: Extension

WP 1: Management

- The MT shared with the SAB the proposed set of deliverables to be extended:
  - Eight deliverables extended due to unforeseen delays (WP7,9,10,14,15)
  - Nine deliverables extended due to increased scope (WP2,3,4,5,6,8,12)
- The Committee supports the extension request and strongly agrees with the motivation for increased impact of various tasks.

WP1: Extension

WP 1: Management

- The committee strongly advises the team to use the extension period to re-evaluate the accomplishments and impacts of the work packages to provide input in the preparation for the next proposal.
- The AIDA-2020 program is highly integrated with the LHC upgrades and other approved projects, which has its advantages and disadvantages.
- Significant changes in experimental research needs are foreseen due to projects moving into construction. This will have a significant impact on the future structure of this program, which will have to be properly taken into account for a successful new proposal. A rigorous evaluation of the core AIDA contributions is suggested.
- The AIDA-2020 team is encouraged to start engaging in an active dialogue with a broad community outside the current core AIDA-2020 membership to guide the formulation of the next proposal submission.

WP2: Observations

WP 2: Innovation and outreach

- Impact of communication (website, newsletter) developments is being measured using industry benchmarks. It is recommended to compare the results using other (physics) benchmarks.
- Industrial relations and technology transfer: Academia Meets Industry (AMI) was well attended
  - Impact will be studied (survey, contacts)
  - Improvements of the Knowledge Transfer, Technology Transfer from AIDA2020 to industry for 2018-2019
  - It is suggested to continue to monitor the impact of the first AMI workshop.
- Proof of Concept: three projects seeking impact beyond HEP
  - Two projects (RaDoM, SMART) have built devices under tests
  - TSV is a common development with IZM, which is exploiting the process for other companies
- Industrialisation of large areas silicon detectors: market survey
  - ATLAS & CMS are evaluating prototype sensors
- Milestones since last AIDA2020 general meeting met.

WP2: Observations

WP 2: Innovation and Outreach;

- The reviewers acknowledge the very interesting suggestion on how to improve the KT/TT from AIDA2020 to Industry by preparing a proposition of what is unique in each WP. → *It would be profitable to identify in each WP a contact person who systematically accompanies KT/TT in the compilation process.*
- The Proof of Concept (PoC) formula found large support in the community and has been very successful. *The PoC concept and the outcomes should be further and widely publicised in the HEP community. The extension of the program should help in providing a better assessment of the impact of the POC projects.*

WP3: Observations

WP 3: Advanced Software

- Detector Geometry toolkit DD4hep and other *DD-suite programs are* attracting interest from quite a few experiments (CMS, Belle II), very positive
  - Use in large productions for ILC is proving robustness
  - On the threshold of becoming a successful commonly used piece of software
  - Documentation and support can now help to make adoption successful
- Vectorised geometry toolkit demonstrated to make a real difference to real experiments
  - Now need to work on documentation to support further adoption
- Particle Flow algorithms seem well established for neutrino and lepton experiments
  - Does not perform well for hadronic experiments, due to pile-up issues (resolving this is critical for MS92)
- Progress in tracking* and EDM is less than would have been hoped for in the last year
  - Tracking affected by entry of common ACTS toolkit into the community
    - Integration of AIDA2020 work into this project looks the best outcome for community, justifying some delay
  - EDM toolkit has a very promising design and prototype
    - Needs development work to really show performance boosts for IO and for vectorised data access
- Frameworks* work has been affected adversely by external factors
  - Work on how conditions and alignments are managed between the framework and DDAlign and DDCond really needs clarified – designs don't seem to work together well right now
- Licensing made progress – good
  - But LGPL now favoured over GPL as some experiments wish to license their software more openly

*Good candidates for project extensions, given these external factors

WP4: Observations

WP 4: Microelectronics and Interconnects

AIDA contributes successfully to essential developments in front–end electronics.

Last year important steps towards prototyping R/O electronics for pixel and calorimeters @ LHC upgrades:

- Key project for pixel upgrade: 65nm chip inside RD53: first chips arrived Dec 17 – good performance, first modules 2 weeks ago!
- The delivery was delayed for reasons outside of AIDA
- This means a tight schedule for LHC – upgrade
- Calorimeter chips on time (del. End of 2017); Testing started a month ago

Probably too late for LHC upgrade but important for future:

- Very good progress in interconnects: have been included in FEI4 pixel chips and wait to be tested. Understandable request to shift beyond M48.

Excellent to see the progress in these difficult areas

WP5: Observations

WP 5: Data acquisition system for beam tests

- Trigger Logic Unit production recovered well after initial production issues
  - Installation at various beam lines has been successful
  - CERN equipping all AIDA-type beam likes with AIDA2020 TLUs is a vindication of the utility of WP5
- EUDAQ2 being used for first real data taking is a large success
  - AHCAL and LYCORIS Si Tracker use has helped show the system really works all together
    - Problems with speed of LCIO conversion demonstrate an opportunity for WP3's PODIO EDM
  - Engagement with WP14 and WP15 is a strength of AIDA2020
  - Look forward to next set of tests, incorporating CMS HGCAL
- DQM4HEP has needed extensive refactorization
  - Worth taking the time to do this properly
  - Direct integration with EUDAQ2 is an important goal to achieve
  - License change to LGPL instead of GPL would be desirable
- Proposed extension of final deliverable, use of common DAQ at test beams, makes a lot of sense
  - This will allow extended use of this DAQ infrastructure to be reported back to the EU
- "Ensuring journal publications happen for main components is very important"

WP6: Observations

WP 6: Novel CMOS sensors

- Huge scope exploring innovative tracking-detector technologies based on active CMOS sensors and well organized task structure

  - **Large collection electrode variants**

Sensor	Technology	Size (mm²)	Pixel Matrix	Pixel Size (µm²)
LF_CPPD	LF 150 nm	5x5	140 x 32	33 x 125
LF_CPIX	LF 150 nm	10 x 9.5	34 x 168	50 x 250
LF_MONOPIX	LF 150 nm	10 x 9.5	142 x 36	50 x 250
H18CCPD	AMS 180 nm	2.2 x 4.4	Different versions	25x25, 33x125, 25x125, 25x350
H35DEMO	AMS 350 nm	18.49 x 24.4	16x300 (x2), 23x300 (x2)	50 x 250
LF_ATLASPIX	LF 150 nm	10 x 10	5 matrices	40x100 , 40x60, 40x250
MuPix8/ATLASPix	AMS 180 nm	22.6 x 21.3	2 matrices	25x25, 25x50, 33x125, 50x60, 40x125, 80x81
CACTUS	LF 150 nm	10 x 10	7 x 6	1000x1000, 1000x500

  - **Small collection electrode variants**

Sensor	Technology	Size (mm²)	Pixel Matrix	Pixel Size (µm²)
ALICE ALPIDE	TowerJazz 180 nm	15 x 30	512 x 1024	29 x 27
Investigator	TowerJazz 180 nm	5 x 5.7	8 x 8	20x20, 22x22, 25x25, 28x28, 30x30, 40x40, 50x50
DECAL/OverMOS	TowerJazz 180 nm		5 x 5	40x40, 40x400
TJ Monopix	TowerJazz 180 nm	10 x 20	224 x 448	36x40
MALTA	TowerJazz 180 nm	18 x 18	512 x 512	36x36

WP6: Observations

WP 6: Novel CMOS sensors

- Three main tasks: Simulation, Sensor Development, Hybridisation
- Designs fully supported by TCAD simulations
- All devices being studied for radiation hardness and characterized in test beams
- Excellent collaboration between the institutions, good task sharing excellent use of testbeam infrastructure.

- All milestones met; two key deliverables will be delayed with the extension:
  - Radiation tolerance assessment
  - Optimised interconnection process
- Good publication record over the course of the last year
- Activities very well integrated with the LHC experiments
- **Research extremely valuable for upgrades and next generation experiments; extension of the deliverables very strongly motivated**

WP7: Observations

WP 7: Advanced Hybrid Pixel detectors

- Three technologies (planar, 3D, LGAD) being studies in the framework of WP7
- Excellent progress in all four key areas of the work package:
  - TCAD simulations
  - Common process optimisation for hybrid pixel sensors
  - Detector validation for tracking devices
  - Detector validation for LGAD sensors
- Production:
  - The 3D and LGADs manufacturing processes started at CNM-CSIC during the first quarter of 2018, scheduled to be completed by M39 (LGAD) and M42(3D)
  - FBK has completed the small-cell 3D run, and the sensors are now ready with UBM to be interconnected to the RD53A chip. Devices to be shared with ATLAS and CMS. WP7 is making crucial contributions. The production of these modules is foreseen for May 2018.
  - The start of the planar sensors run with active edges at FBK has been delayed by the longer time needed by preparation of the SOI wafers. It is foreseen to start in June and it should be completed in time for meeting the milestone
- TCAD Simulations well advanced with continuous sophistication of the radiation damage models, notably the surface damage modeling.

WP7: Observations

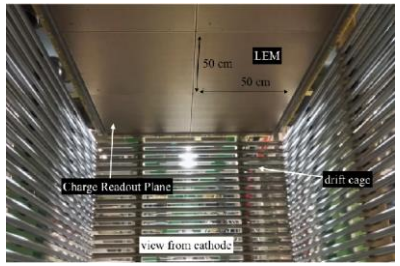
WP 7: Advanced Hybrid Pixel detectors

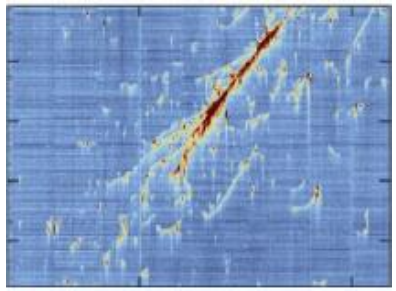
- Three deliverables suggested to be extended (TCAD modeling, pixel and LGAD characterization); the work is highly relevant for the HL-LHC program and the extension of the deliverables are well motivated.
- The work carried out within WP7 contributes in important ways to the technology development of pixel detectors, and informs the LHC upgrade programs in important ways.
- At the initiation of the work package some technologies were relatively immature; AIDA has helped in the maturation process.
- WP7 is in certain areas (LGAD, 3D) providing first devices for the experiments.
- Excellent coordination and integration with the LHC experiments, leveraging each others resources and expertise.
- The work load of this work package is very high and needed for the LHC upgrades. Excellent coordination is required; it seems LHC experiments will be the drivers.

WP8: Observations

WP 8: Large Scale Cryogenic Liquid Detectors

- Excellent work continues to be done to develop a number of key technologies that advance the state-of-the art in very large LAr neutrino detectors.
  - Instrumentation for monitoring purity and other key parameters
  - Large-scale dual-phase charge readout planes with gas amplification
  - Light readout with cryogenic PMTs; exploring use of SiPMs
  - Very-high voltage: 300 kV feedthrough; large cathodes and field cages.



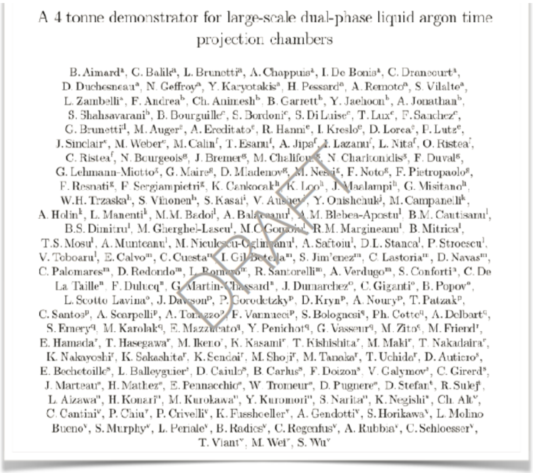


- The 1x1x3 m^3 WA105 demonstrator collected 350 k cosmic ray events, and provided valuable information about all of the technologies listed above.
- Synergy with WP3 on event reconstruction (Pandora) and WP13 on gaseous detectors (LEM); closer collaboration is encouraged
- Work is proceeding toward the completion and operation of the 6x6x6 m^3 dual-phase ProtoDUNE detector by the end of this year.
- The Baby MIND detector is starting to take data in the T2K neutrino beam. Attention now needs to turn to studies of magnetization of large liquid detectors with superconducting transmission lines.

WP8: Observations

WP 8: Large Scale Cryogenic Liquid Detectors

- WP8 met its 5 milestones in March with the release of interim reports on all sub-tasks.
- The results of this work are being well disseminated.
  - The interim reports cite nine published conference papers related to this work.
  - However, the WP8 group needs to be more diligent in acknowledging support from the EU Horizon 2020 program, since only 5 of the 9 papers include this.
  - Results are being collected in a twiki page: https://twiki.cern.ch/twiki/bin/view/AIDA2020WP8/WebHome
  - A major (~60 pages) paper is in preparation for submission in the near future.
- Five deliverables (full reports on the work of the five tasks) are due between M40 and M46.
- WP8 could benefit from extension of the AIDA 2020 program, particularly to:
  - Fully exploit the 6x6x6 m^3 prototype, which has been delayed due to external circumstances.
  - More completely explore the potential use of superconducting transmission lines for the magnetization of large volumes.



A 4 tonne demonstrator for large-scale dual-phase liquid argon time projection chambers

B. Aimard[a], C. Balik[a], L. Brunetti[a], A. Chappuis[a], I. De Bonis[a], C. Drancourt[a], D. Duchesneau[a], N. Geffroy[a], Y. Karyotakis[a], H. Pessard[a], A. Remoto[a], S. Vilalte[a], L. Zambelli[a], F. Andrea[b], Ch. Animesh[b], B. Garrett[b], Y. Jaehoon[b], A. Jonathan[b], S. Shahsavarani[b], B. Bourguille[c], S. Bordoni[c], S. Di Luise[c], T. Lux[c], F. Sanchez[c], G. Brunetti[d], M. Auger[e], A. Ereditato[e], R. Hanni[e], I. Kreslo[e], D. Lorca[e], P. Lutz[e], J. Sinclair[e], M. Weber[e], M. Calin[f], T. Esanu[f], A. Jipa[f], I. Lazanu[f], L. Nita[f], O. Ristea[f], C. Ristea[f], N. Bourgeois[g], J. Bremer[g], M. Chalifour[g], N. Charitonidis[g], F. Duval[g], G. Lehmann-Miotto[g], G. Maire[g], D. Mladenov[g], M. Nessi[g], F. Noto[g], F. Pietropaolo[g], F. Resnati[g], F. Sergiampietri[g], K. Cankocak[h], K. Loo[h], J. Maalampi[h], G. Misitano[h], W.H. Trzaska[h], S. Vihonen[h], S. Kasai[i], V. Aushev[j], Y. Onishchuk[j], M. Campanelli[k], A. Holin[k], L. Manenti[k], M.M. Badoi[l], A. Balaceanu[l], A.M. Blebea-Apostu[l], B.M. Cautisanu[l], B.S. Dimitru[l], M. Gherghel-Lascu[l], M.C. Gomoiu[l], R.M. Margineanu[l], B. Mitrica[l], T.S. Mosu[l], A. Munteanu[l], M. Niculescu-Oglinzanu[l], A. Saftoiu[l], D.L. Stanca[l], P. Stroescu[l], V. Toboaru[l], E. Calvo[m], C. Cuesta[m], I. Gil Botella[m], S. Jim'enez[m], C. Lastoria[m], D. Navas[m], C. Palomares[m], D. Redondo[m], L. Romero[m], R. Santorelli[m], A. Verdugo[m], S. Conforti[n], C. De La Taille[n], F. Dulucq[n], G. Martin-Chassard[n], J. Dumarchez[o], C. Giganti[o], B. Popov[o], L. Scotto Lavina[o], J. Dawson[p], P. Gorodetzky[p], D. Kryn[p], A. Noury[p], T. Patzak[p], C. Santos[p], A. Scarpelli[p], A. Tonazzo[p], F. Vannucci[p], S. Bolognesi[q], Ph. Cotte[q], A. Delbart[q], S. Emery[q], M. Karolak[q], E. Mazzucato[q], Y. Penichot[q], G. Vasseur[q], M. Zito[q], M. Friend[r], E. Hamada[r], T. Hasegawa[r], M. Ikeno[r], K. Kasami[r], T. Kishishita[r], M. Maki[r], T. Nakadaira[r], K. Nakayoshi[r], K. Sakashita[r], K. Sendai[r], M. Shoji[r], M. Tanaka[r], T. Uchida[r], D. Autiero[s], E. Bechetoille[s], L. Balleyguier[s], D. Caiulo[s], B. Carlus[s], F. Doizon[s], V. Galymov[s], C. Girerd[s], J. Marteau[s], H. Mathez[s], E. Pennacchio[s], W. Tromeur[s], D. Pugnere[s], D. Stefan[t], R. Sulej[t], L. Aizawa[u], H. Konari[u], M. Kurokawa[u], Y. Kuromori[u], S. Narita[u], K. Negishi[u], Ch. Alt[v], C. Cantini[v], P. Chiu[v], P. Crivelli[v], K. Fusshoeller[v], A. Gendotti[v], S. Horikawa[v], L. Molino Bueno[v], S. Murphy[v], L. Periale[v], B. Radics[v], C. Regenfus[v], A. Rubbia[v], C. Schloesser[v], T. Viant[v], M. Wei[v], S. Wu[v]

WP9: Observations

WP 9: New support structures and µ-channel cooling

Micro-channel cooling is a cutting-edge research program that could provide important spin-off applications and should be fully supported. In particular it was appreciated that:

- The good progress and achievements over the last months
  (on fabrication methods - QA/QC with (non)destructive procedures - large testing campaign – successful R&D on connectivity)
- The large work of revision and upgrades on the CO_2 test facility that will provide fundamental systematic measurements in controlled situations
  → *the team is strongly encouraged to timely produce all the documentation needed to reproduce the CO2 test facility set-up.*
- The significant progress on the Oxford Airflow System. Once in operation, the set-up could provide very valuable and unpublished results on displacement / vibration of mechanical components under a controlled gas flow. → *Results could drive a breakthrough in low-mass cooling systems hence, it is strongly suggested to fully support this activity.*

WP10: Observations

WP 10: Test beam (TA DESY & TA CERN)

- DESY infrastructure
  - Three beam lines, two equipped with Pixel Beam telescopes (three out of four teams request use of telescopes), one 1T solenoid, one big dipole
  - Common slow control system integrated to EUDAQ2: ready for users
  - Realised vs project: more users supported, 92% of units delivered.
- CERN infrastructure
  - 24 projects in 2015, 18 in 2016, then funds run out
  - CERN beam lines not available in 2019-2020
- Mode of operation (giving access to equipped beam lines, with support) has been very successful for R&D developments
  - Transnational Access is working well and is appreciated by users: try to preserve similar access post-AIDA2020
  - Level of publications still low: effort to publish results in the time line of AIDA2020

WP11 + WP12: Observations

WP 11 + 12: Transnational Access for Test Facilities

- All transnational facilities are significant for AIDA's theme of detector development.
- Transnational access is a big success of AIDA and underlines the complementarity and broadness of European infrastructure for testing particle detectors.
- Also during last 12 months: a significant use across experiments, countries and detectors
- It appears crucial and in line with the European spirit to maintain access at minimal cost at least during the extension period – hopefully continued with AIDA 2025

  (Note: test beams crucial in time towards producing detectors for upgrade)

WP13: Observations

WP 13: Gas Detectors: MPGD

A lot of progress, achievements and successful reply to the questions raised by SAB at the last meeting. Strong appreciation for:

- The successful and timely completion of the milestones
- The successful standardization of the quality control systems, electronics, power supply, testing and monitoring equipment, DAQ software, and common infrastructures.
- The successful qualification of the new candidate materials for thick MPGDs
- The successful studies & characterization of a new high rate μ-RWELL
- The successful application of an optical system to control the foil/micromesh mechanical tensioning

WP13: Observations

WP 13: Gas Detectors: MPGD

- There is good progresses towards the design of a miniaturized Multi-Chip Module. Nonetheless, some severe production problems have shown up. *The team is strongly encouraged to implement the proposed correction strategy*

- Strong appreciation for maintaining constant contacts with production industries during the R&D phase. *The team is strongly encouraged to maintain these contacts all along the production window.*

- Strong appreciation for optimizing the production/assembly in a clean environment and finalizing the production protocol and QA/QC → *strong encouragement to guarantee and systematically monitor the implementation of the production protocol in all the production/assembly centers.*

WP13: Observations

WP 13: Gas Detectors: RPC

RPCs still remain the key technology for fast triggering of present and future large-area detectors. → *maintenance and optimization of detectors/performances are of major importance and should deserve dedicated and focused attention.*

In this framework the reviewers acknowledge:

- The successful work of validation of new resistive materials complemented by encouraging results obtained with small prototypes in tests beam.
- The successful optimisation of large size high space resolution thin-gap RPC structures.
- The demanding effort for characterising eco-friendly gases.
- The progresses on the high-rate characterisation of large-size RPC prototypes.

WP14: Observations

WP 14: Infrastructure for advanced calorimeters

- Four key tasks:
  - Task 14.2 Test infrastructure for innovative calorimeters with optical readout
  - Task 14.3 Test infrastructure for innovative calorimeters with semiconductor readout
  - Task 14.4 Readout systems for innovative calorimeters
  - Task 14.5 Mechanical and thermal tools for innovative calorimeters
- 14.2 Large progress; equipment (former deliverables) are performing well
- 14.3 Large progress; test infrastructures have been developed.
- 14.4 Performing well; successful application of the EUDAQ infrastructure
- 14.5 Large progress
- The three deliverables for M36 have a slight delay; report drafts exist or are being written.
- Number of publications is good; many more results are expected and should be published.
- An extension of AIDA2020 by one year would serve to “external users”.

WP15: Observations

WP 15: Infrastructure at Test Facilities

- Continuous upgrade infrastructure for these European test beam facilities mandatory to optimize their usefulness and adopt to new requirements
- Allows also to strengthen the complementarity and focused use of the facilities. Very important in developing a European structure that includes also smaller labs and universities.
- This efficient approach is beautifully reflected in the now ‘finished’ database for irradiation facilities that simplifies the selection of the appropriate one.
- The AIDA contributions are in almost all cases on track, with the exception of the second beam line at INFN (moved into extension period) and the DESY beam telescope.
- But: improvement of infrastructure is a continuous task! In view of the extension, it would be excellent if the good contact between users and providers could be continued in the AIDA framework. This would allow to further optimize facilities in a European context.

Conclusions

- AIDA-2020 is has had a great year with tremendous progress in all areas; highly successful program.
- The impact of AIDA-2020 to date has been significant; with the extension the impact can even be more powerful.
- A lot of exciting work ahead; at the same time, there will be significant pressures on various work packages to deliver.
- It is excellent to see the collaboration between the (upgrades of) experiments and AIDA-2020, where the activities of each other are nicely leveraged
- The coming year will be an important year for AIDA-2020 to ensure maximum impact of the current program and start shaping its successor program. The future program will be of very different nature. The committee urges the team to continue to forcefully engage immediately.
- **We'd like to thank the organizers for the great program and hospitality and all participants for the presentations and discussions.**
- **Good luck!**

- Backup

Work Package Team Leads

	Technology Transfer Officer
• WP2: Aurélie Pezous	Aurélie Pezous
• WP3: Witold Pokorski, Frank Gäde	Witold Pokorski
• WP4: Christophe de la Taille, Valerio Re	Christophe de la Taille
• WP5: Matthew Wing, David Cussans	Matthew Wing
• WP6: Paul Dervan, Sebastian Grinstein	Ivan Peric
• WP7: Anna Macchiolo, Ivan Vila	Cinzia da Via
• WP8: Dario Autiero, Sebastien Murphy	Christian Regenfus
• WP9: Paolo Petagna, Georg Viehhauser	Alessandro Mapelli
• WP10: Henric Wilkens, Natalia Potylitsina-Kube	
• WP11: Marko Mikuz, Alexander Dierlamm	
• WP12: Stjepko Fazinic, Fernando Arteche	
• WP13: Silvia Dalla Torre, Imad Laktineh	Silvia Dalla Torre
• WP14: Roman Pöschl, Frank Simon	Etiennette Auffray Hillemanns
• WP15: Federico Ravotti, Marcel Stanitzki	Juozas Vaitkus