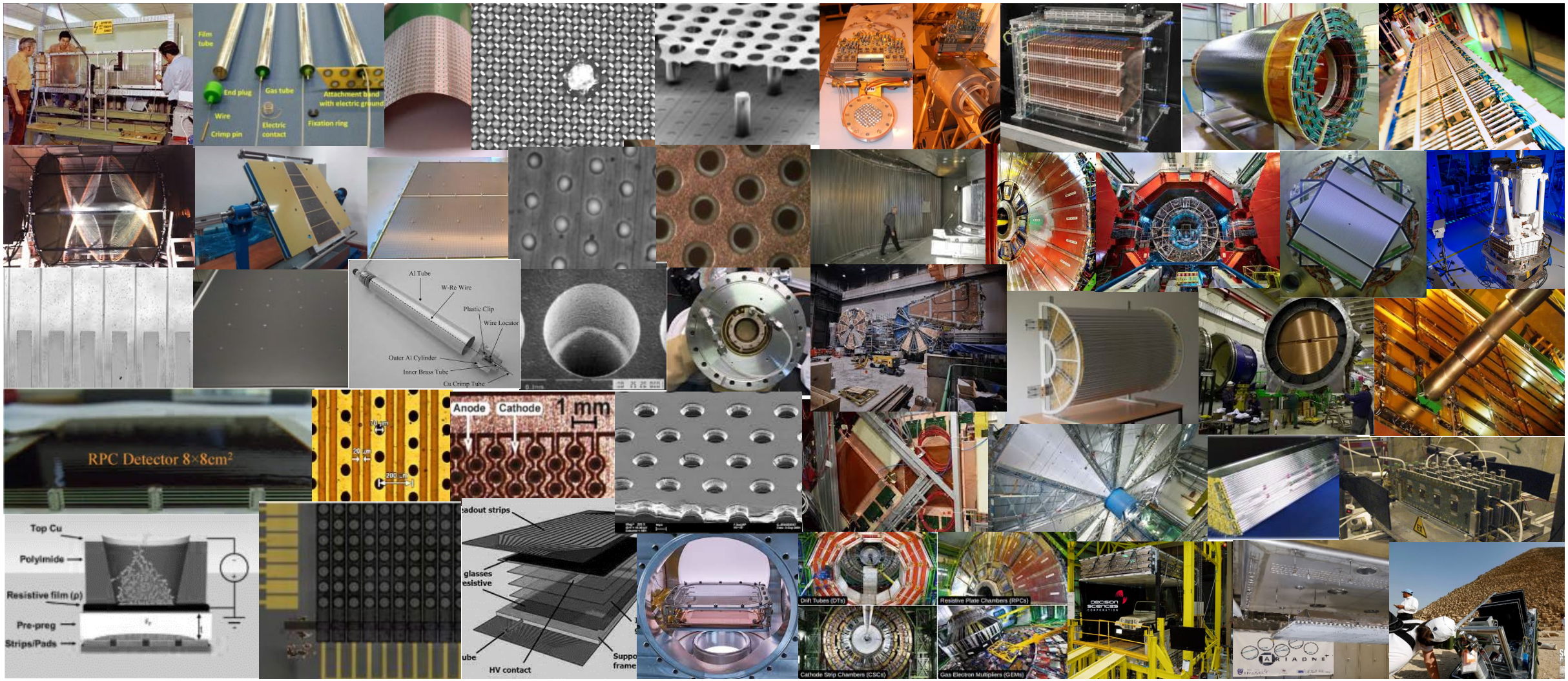
Development of Gaseous Detectors Technologies: DRD1

Eraldo Oliveri, Maxim Titov, on behalf of the DRD1 Collaboration



ILD General Meeting, April 16, 2024

DRD1 Implementation Phase

Community Meeting

Meetings

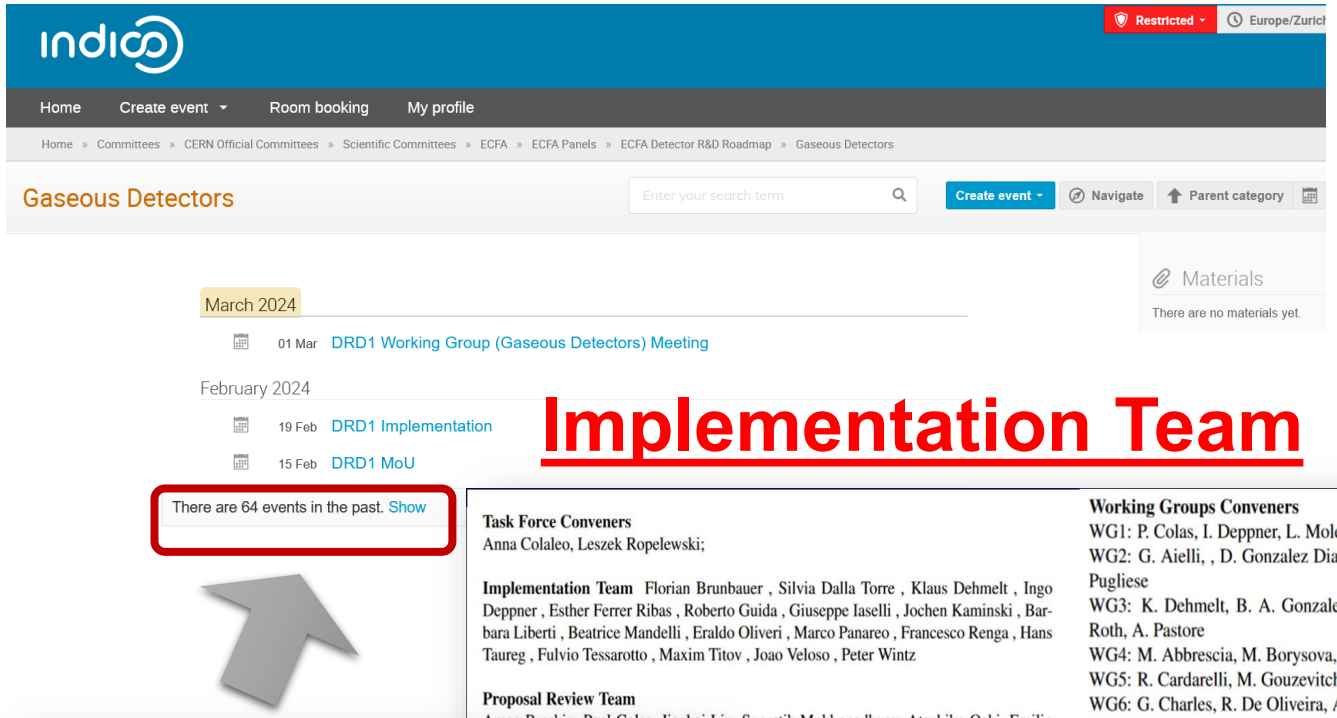
COLLABORATION MEETINGS

- Upcoming: DRD1 Collaboration Meeting, June 17-21, 2024 (location tbd)
- 1st DRD1 Collaboration Meeting, CERN/hybrid, January 29 - February 2, 2024

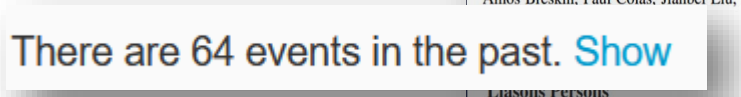
TF1 COMMUNITY MEETINGS

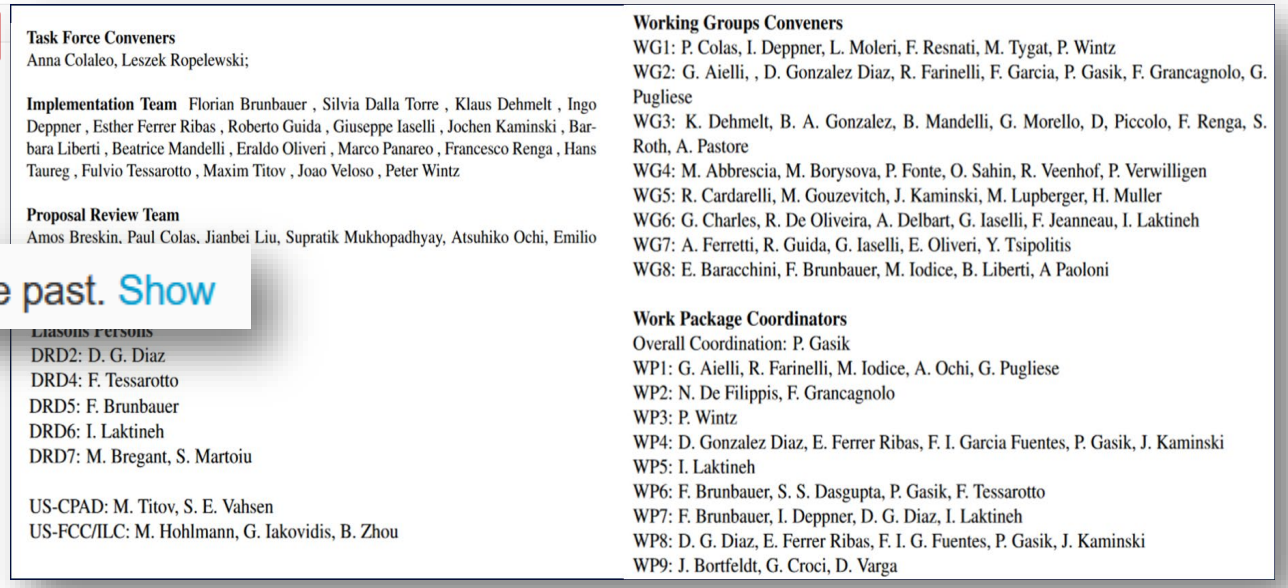
Community meetings in the gaseous detector community organised to define and work towards the DRD1 collaboration.

- DRD1 Community Meeting, CERN/hybrid, June 22-23, 2023
- DRD1 Community Meeting, CERN/hybrid, March 1-3
- ECFA Detector R&D Roadmap Symposium of Task F



Implementation Team





Task Force Conveners
Anna Colaleo, Leszek Ropelewski;

Implementation Team Florian Brunbauer , Silvia Dalla Torre , Klaus Dehmelt , Ingo Deppner , Esther Ferrer Ribas , Roberto Guida , Giuseppe Iaselli , Jochen Kaminski , Barbara Liberti , Beatrice Mandelli , Eraldo Oliveri , Marco Panareo , Francesco Renga , Hans Taureg , Fulvio Tessarotto , Maxim Titov , Joao Veloso , Peter Wintz

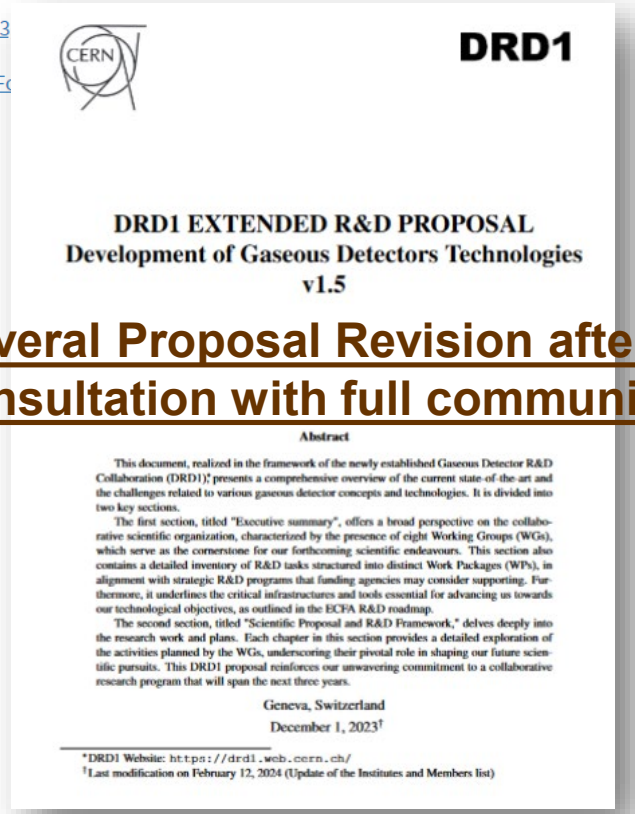
Proposal Review Team
Amos Breskin, Paul Colas, Jianbei Liu, Supratik Mukhopadhyay, Atsuhiko Ochi, Emilio

Liaisons Persons
DRD2: D. G. Diaz
DRD4: F. Tessarotto
DRD5: F. Brunbauer
DRD6: I. Laktineh
DRD7: M. Bregant, S. Martoiu

US-CPAD: M. Titov, S. E. Vahsen
US-FCC/ILC: M. Hohlmann, G. Iakovidis, B. Zhou

Working Groups Conveners
WG1: P. Colas, I. Deppner, L. Moleri, F. Resnati, M. Tygat, P. Wintz
WG2: G. Aielli, , D. Gonzalez Diaz, R. Farinelli, F. Garcia, P. Gasik, F. Grancagnolo, G. Pugliese
WG3: K. Dehmelt, B. A. Gonzalez, B. Mandelli, G. Morello, D, Piccolo, F. Renga, S. Roth, A. Pastore
WG4: M. Abbrescia, M. Borysova, P. Fonte, O. Sahin, R. Veenhof, P. Verwilligen
WG5: R. Cardarelli, M. Gouzevitch, J. Kaminski, M. Lupberger, H. Muller
WG6: G. Charles, R. De Oliveira, A. Delbart, G. Iaselli, F. Jeanneau, I. Laktineh
WG7: A. Ferretti, R. Guida, G. Iaselli, E. Oliveri, Y. Tsipolitis
WG8: E. Baracchini, F. Brunbauer, M. Iodice, B. Liberti, A Paoloni

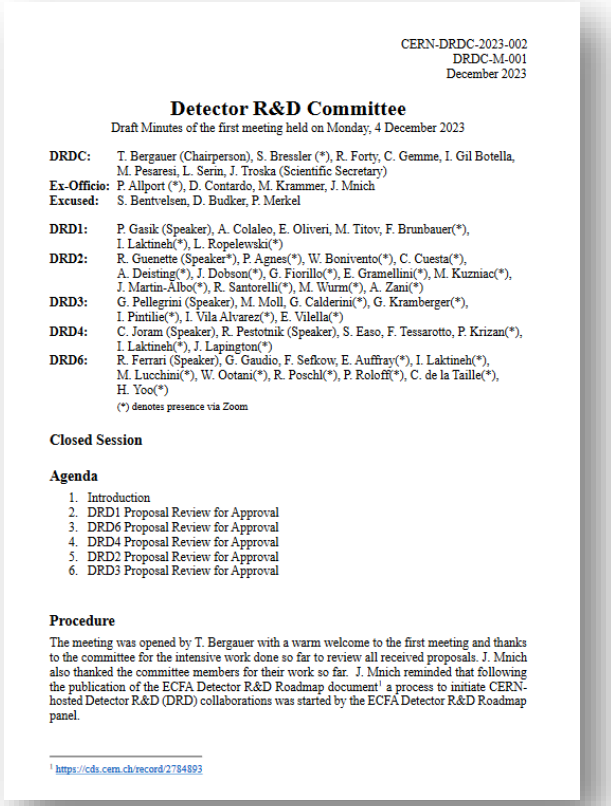
Work Package Coordinators
Overall Coordination: P. Gasik
WP1: G. Aielli, R. Farinelli, M. Iodice, A. Ochi, G. Pugliese
WP2: N. De Filippis, F. Grancagnolo
WP3: P. Wintz
WP4: D. Gonzalez Diaz, E. Ferrer Ribas, F. I. Garcia Fuentes, P. Gasik, J. Kaminski
WP5: I. Laktineh
WP6: F. Brunbauer, S. S. Dasgupta, P. Gasik, F. Tessarotto
WP7: F. Brunbauer, I. Deppner, D. G. Diaz, I. Laktineh
WP8: D. G. Diaz, E. Ferrer Ribas, F. I. G. Fuentes, P. Gasik, J. Kaminski
WP9: J. Bortfeldt, G. Croci, D. Varga



Several Proposal Revision after consultation with full community

CERN RB approval & DRDC recommendation and guidelines in view of the first review and next steps

DRDC Meeting (December 4)



CERN-DRDC-2023-002
DRDC-M-001
December 2023

Detector R&D Committee

Draft Minutes of the first meeting held on Monday, 4 December 2023

DRDC: T. Bergauer (Chairperson), S. Bressler (*), R. Forty, C. Gemme, I. Gil Botella, M. Pesaresi, L. Serin, J. Troska (Scientific Secretary)
Ex-Officio: P. Allport (*), D. Contardo, M. Krammer, J. Mnich
Excused: S. Bentvelsen, D. Budker, P. Merkel

DRD1: P. Gasik (Speaker), A. Colaleo, E. Oliveri, M. Titov, F. Brunbauer(*), I. Laktineh(*), L. Ropelewski(*)
DRD2: R. Guenette (Speaker*), P. Agnes(*), W. Bonivento(*), C. Cuesta(*), A. Deisting(*), J. Dobson(*), G. Fiorillo(*), E. Gramellini(*), M. Kuzniac(*), J. Martin-Albo(*), R. Santorelli(*), M. Wurm(*), A. Zani(*)
DRD3: G. Pellegrini (Speaker), M. Moll, G. Calderini(*), G. Kramberger(*), I. Pintilie(*), I. Vila Alvarez(*), E. Vilella(*)
DRD4: C. Joram (Speaker), R. Pestotnik (Speaker), S. Easo, F. Tessarotto, P. Krizan(*), I. Laktineh(*), J. Lapington(*)
DRD6: R. Ferrari (Speaker), G. Gaudio, F. Sefkow, E. Auffray(*), I. Laktineh(*), M. Lucchini(*), W. Ootani(*), R. Poschl(*), P. Roloff(*), C. de la Taille(*), H. Yoo(*)
(*) denotes presence via Zoom

Closed Session

Agenda

1. Introduction
2. DRD1 Proposal Review for Approval
3. DRD6 Proposal Review for Approval
4. DRD4 Proposal Review for Approval
5. DRD2 Proposal Review for Approval
6. DRD3 Proposal Review for Approval

Procedure

The meeting was opened by T. Bergauer with a warm welcome to the first meeting and thanks to the committee for the intensive work done so far to review all received proposals. J. Mnich also thanked the committee members for their work so far. J. Mnich reminded that following the publication of the ECFA Detector R&D Roadmap document[1] a process to initiate CERN-hosted Detector R&D (DRD) collaborations was started by the ECFA Detector R&D Roadmap panel.

[1] https://cds.cern.ch/record/2784893

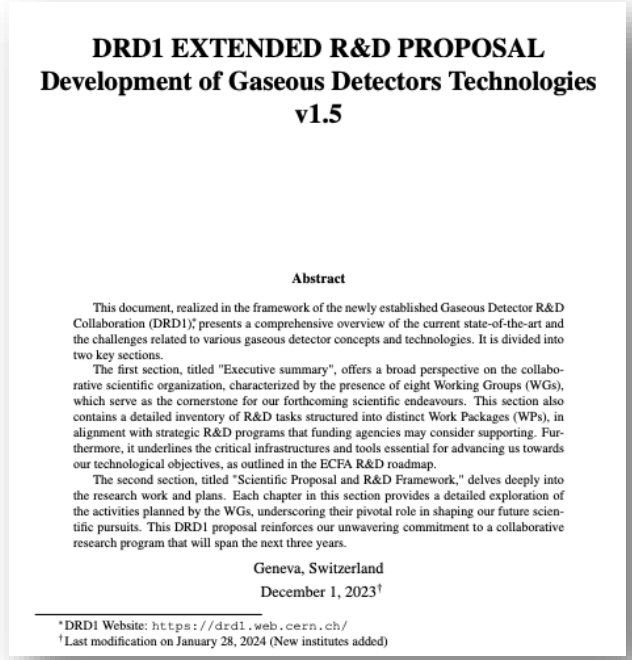
DRDC Minutes:
https://cds.cern.ch/record/2883179?ln=en

CERN RB Approval (December 6)

statement sent to the DRD1 proposal writing team on December 11th:

Five proposals for new Detector R&D collaborations were recommended for approval by the DRDC: DRD1 (Gaseous detectors), DRD2 (Liquid detectors), DRD3 (Solid-state detectors), DRD4 (Photon detectors and particle identification), and DRD6 (Calorimetry). The Research Board approved DRD1, DRD2, DRD4 and DRD6 for an initial period of three years. The proposals for DRD4 and DRD6 can now be made public, while the final versions of those for DRD1 and DRD2 that had been provided very recently will be further reviewed by the DRDC in the coming weeks before being made public. The Research Board preliminarily approved DRD3 so that work towards establishing the collaboration can progress, on condition that the new collaboration structure be established in a timely fashion following the guidelines provided by the DRDC, and the new management appointed; approval of DRD3 will be reviewed at the next Research Board meeting in March 2024, on the basis of an updated proposal.

DRD Proposal in CDS (January 9)



DRD1 EXTENDED R&D PROPOSAL
Development of Gaseous Detectors Technologies
v1.5

Abstract

This document, realized in the framework of the newly established Gaseous Detector R&D Collaboration (DRD1)*, presents a comprehensive overview of the current state-of-the-art and the challenges related to various gaseous detector concepts and technologies. It is divided into two key sections.

The first section, titled "Executive summary", offers a broad perspective on the collaborative scientific organization, characterized by the presence of eight Working Groups (WGs), which serve as the cornerstone for our forthcoming scientific endeavours. This section also contains a detailed inventory of R&D tasks structured into distinct Work Packages (WPs), in alignment with strategic R&D programs that funding agencies may consider supporting. Furthermore, it underlines the critical infrastructures and tools essential for advancing us towards our technological objectives, as outlined in the ECFA R&D roadmap.

The second section, titled "Scientific Proposal and R&D Framework," delves deeply into the research work and plans. Each chapter in this section provides a detailed exploration of the activities planned by the WGs, underscoring their pivotal role in shaping our future scientific pursuits. This DRD1 proposal reinforces our unwavering commitment to a collaborative research program that will span the next three years.

Geneva, Switzerland
December 1, 2023†

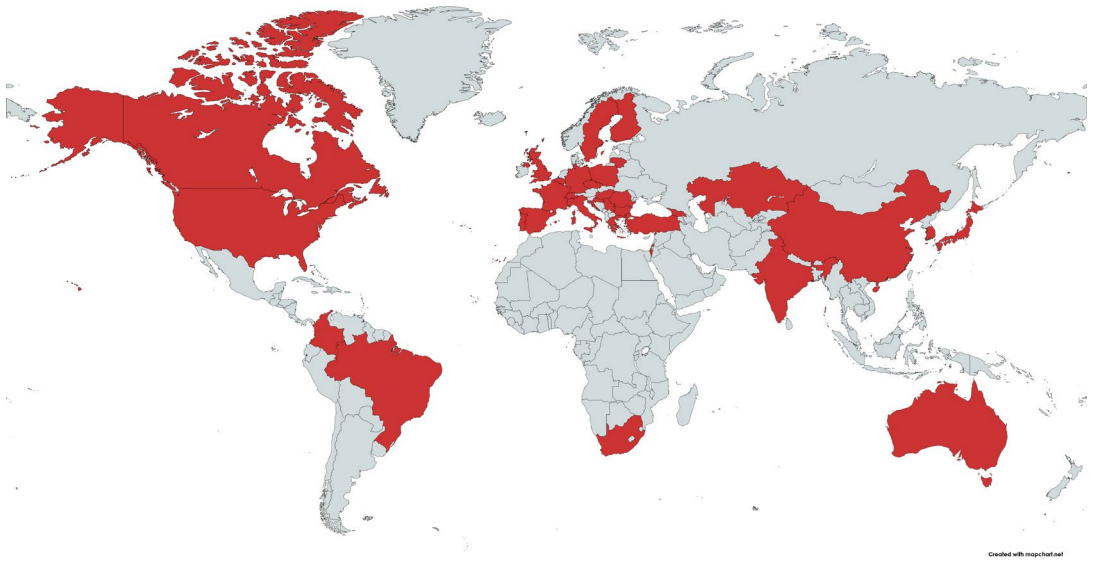
*DRD1 Website: https://drd1.web.cern.ch/
†Last modification on January 28, 2024 (New institutes added)

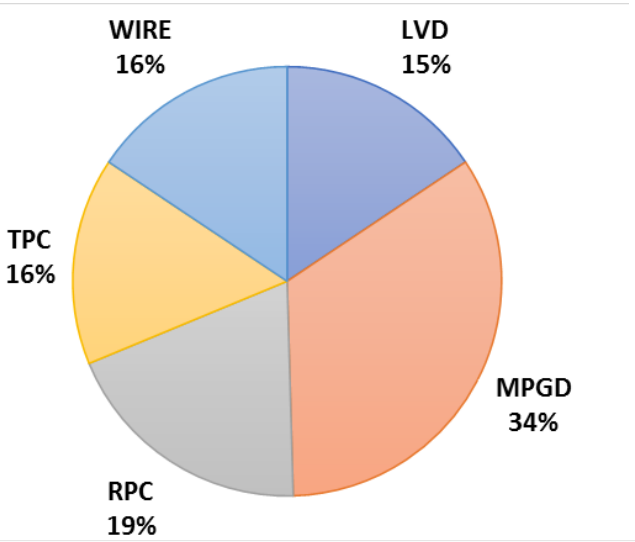
(116 pages)

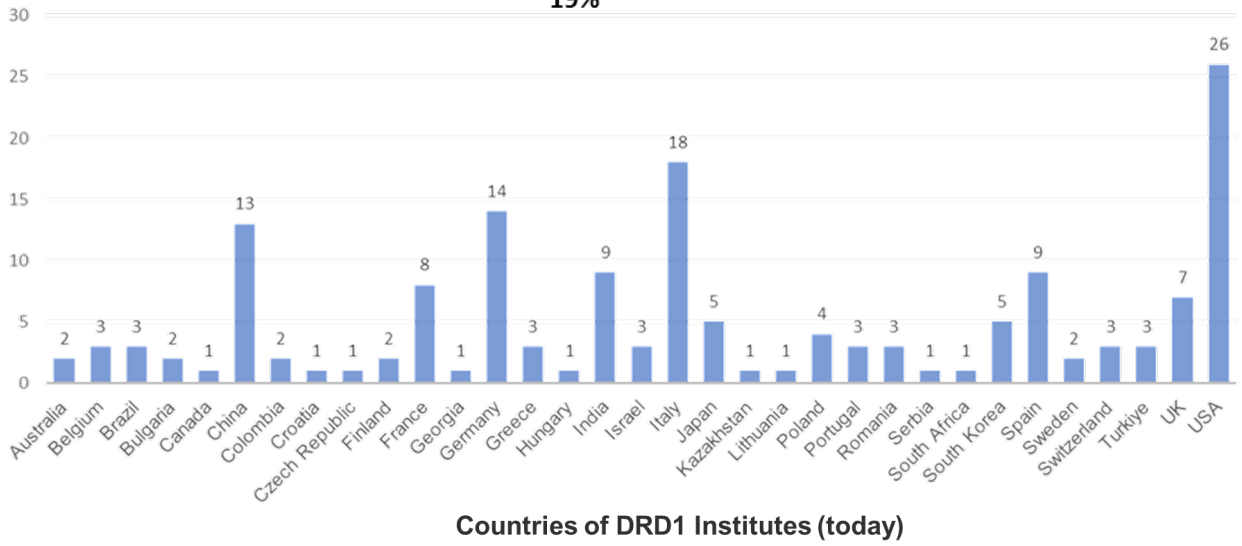
Submitted to CDS (2024-01-9)
Updated to DRD1 web (2024-1-28)

DRD1: Large and Diversified Community

- *161 Institutes*
- *5 Industrial, Semi-Industrial and Research Foundations*
- *33 Countries*
- *More than 700 members*

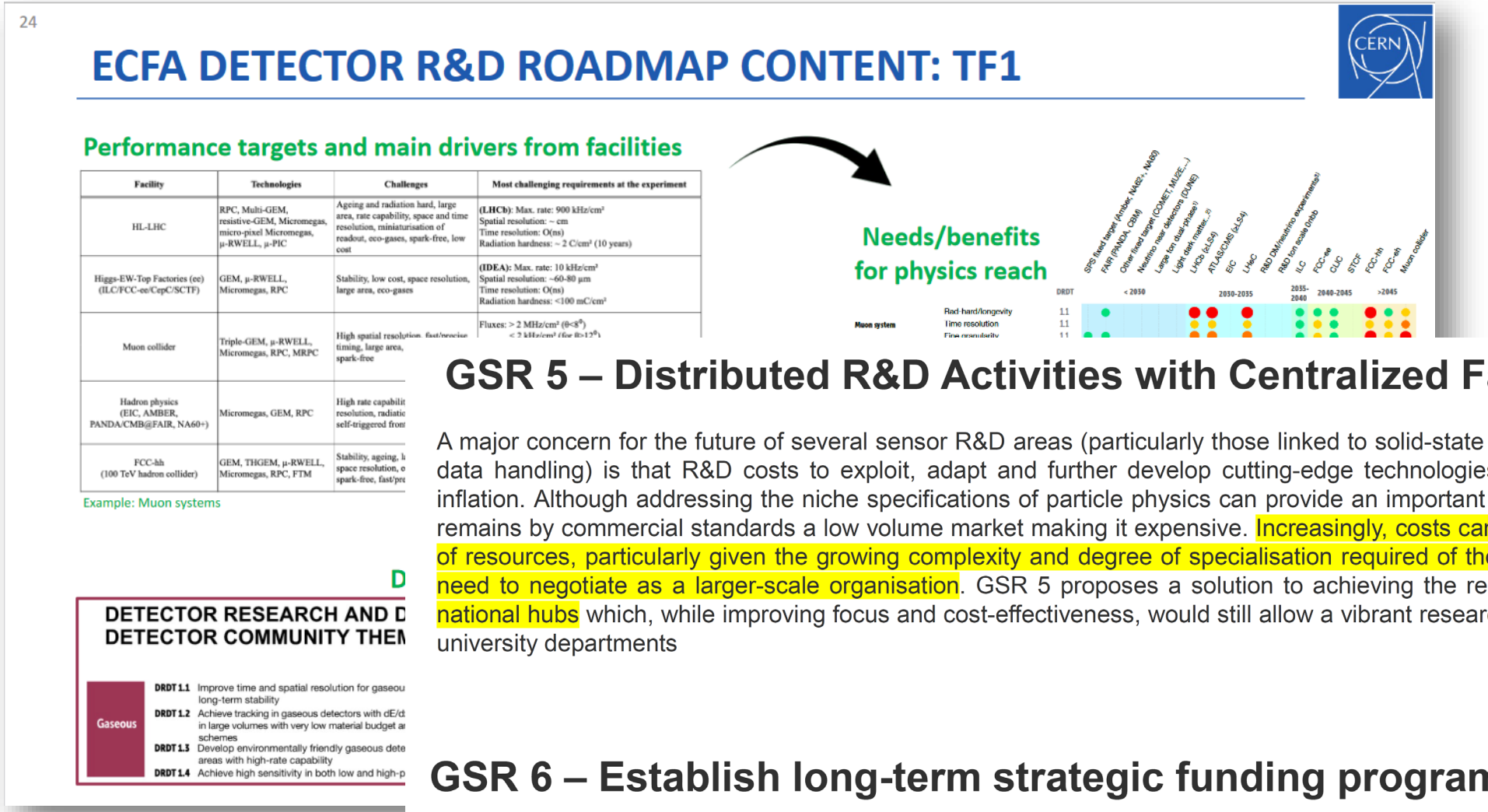






Countries of DRD1 Institutes (today)

ECFA Detector R&D Roadmap and GSR



GSR 5 – Distributed R&D Activities with Centralized Facilities

A major concern for the future of several sensor R&D areas (particularly those linked to solid-state devices, microelectronics and on-detector data handling) is that R&D costs to exploit, adapt and further develop cutting-edge technologies are rising much faster than the rate of inflation. Although addressing the niche specifications of particle physics can provide an important vehicle for product development, the field remains by commercial standards a low volume market making it expensive. Increasingly, costs can only be met through a significant pooling of resources, particularly given the growing complexity and degree of specialisation required of those involved in the device design and the need to negotiate as a larger-scale organisation. GSR 5 proposes a solution to achieving the required critical mass through a network of national hubs which, while improving focus and cost-effectiveness, would still allow a vibrant research base in individual smaller institutes and university departments

GSR 6 – Establish long-term strategic funding programs

Linked to rising R&D costs, the need for a critical mass and the decadal timescales for strategic R&D investments needed for the ESPP programmes, there is an urgent need to augment the short-term funding mechanisms, suited for exploratory stages of the R&D cycle, with funding mechanisms better suited to long-term programmes as outlined in GSR 6. The scale of the technical challenges, the long planning horizons and the need to build serious relationships with industrial partners make sustained strategic investment a must, particularly if matching resources are to be leverage

Scientific Organization

Strategic R&D and Long-Term Funding based on Work Packages → **GSR6** (but also GSR5)

Gaseous

- **DRDT 1.1** Improve time and spatial resolution for gaseous detectors with long-term stability
- **DRDT 1.2** Achieve tracking in gaseous detectors with dE/dx and dN/dx capability in large volumes with very low material budget and different read-out schemes
- **DRDT 1.3** Develop environmentally friendly gaseous detectors for very large areas with high-rate capability
- **DRDT 1.4** Achieve high sensitivity in both low and high-pressure TPCs

DRDTs

1.1	1.2	1.3	1.4	Work Packages
●		●		Trackers/hodoscopes
●	●	●		Drift chambers
●	●	●		Straw chambers
●	●	●	●	Tracking TPCs
●		●		Calorimetry
●	●	●		Photon detection (PID)
●		●		Timing detectors
●	●	●	●	Reaction/decay TPCs
●		●		Beyond HEP

- **WG1** Technologies
- **WG2** Applications
- **WG3** Gas and material studies
- **WG4** Detector physics, simulations and software tools
- **WG5** Electronics for gaseous detectors
- **WG6** Detector production
- **WG7** Common test facilities
- **WG8** Training and dissemination

R&D Framework based on Working Groups
→**GSR5**
(but also GSR6)

How DRD1 is addressing the general recommendations (I)

GSR 5 – Distributed R&D Activities with Centralized Facilities

A major concern for the future of several sensor R&D areas (particularly those linked to solid-state devices, microelectronics and on-detector data handling) is that R&D costs to exploit, adapt and further develop cutting-edge technologies are rising much faster than the rate of inflation. Although addressing the niche specifications of particle physics can provide an important vehicle for product development, the field remains by commercial standards a low volume market making it expensive. Increasingly, costs can only be met through a significant pooling of resources, particularly given the growing complexity and degree of specialisation required of those involved in the device design and the need to negotiate as a larger-scale organisation. GSR 5 proposes a solution to achieving the required critical mass through a network of national hubs which, while improving focus and cost-effectiveness, would still allow a vibrant research base in individual smaller institutes and university departments

R&D Framework & Working Groups

RD51 Legacy: Working Groups (2008-2023)

The scientific organization is structured in seven working groups (WG) each being defined through a set of tasks. Working-group conveners coordinate the R&D tasks of the respective working groups

Early list of RD51 Working Group convenors

RD51 – Micropattern Gas Detectors

	WG1 New Structures and Technologies	WG2 Detector Physics and Performance	WG3 Training and Dissemination	WG4 Modelling of Physics Processes & Software Tools	WG5 Electronics for MPGDs	WG6 Production and Industrialisation	WG7 Common Test Facilities
Objectives	Design optimization Development of new geometries and techniques	Common test standards Characterization and understanding of physical phenomena in MPGD	Organisation of dissimination and training events for the MPGD community	Development of common software and documentation for MPGD simulations	Readout electronics optimization and integration with MPGD detectors	Development of cost-effective technologies and industrialization	Sharing of common infrastructure for detector characterization
Tasks	Large Area MPGDs	Common Test Standards	Topical Workshops	Algorithms	FE electronics requirements definition	Common Production Facility	Testbeam Facility
	Design Optimization New Geometries Fabrication	Discharge Protection	Schools (Eletronics, Simulation, ...)	Simulation Improvements	General Purpose Pixel Chip		
	Development of Rad-Hard Detectors	Ageing & Radiation Hardness	Academy-Industry Matching Events	Common Platform (Root, Geant4)	Large Area Systems with Pixel Readout	Industrialization	
	Development of Portable Detectors	Charging up and Rate Capability	Dissimination of MPGD applications	Electronics Modeling	Portable Multi-Channel System		Irradiation Facility
		Study of Avalanche Statistics			Discharge Protection Strategies	Collaboration with Industrial Partners	

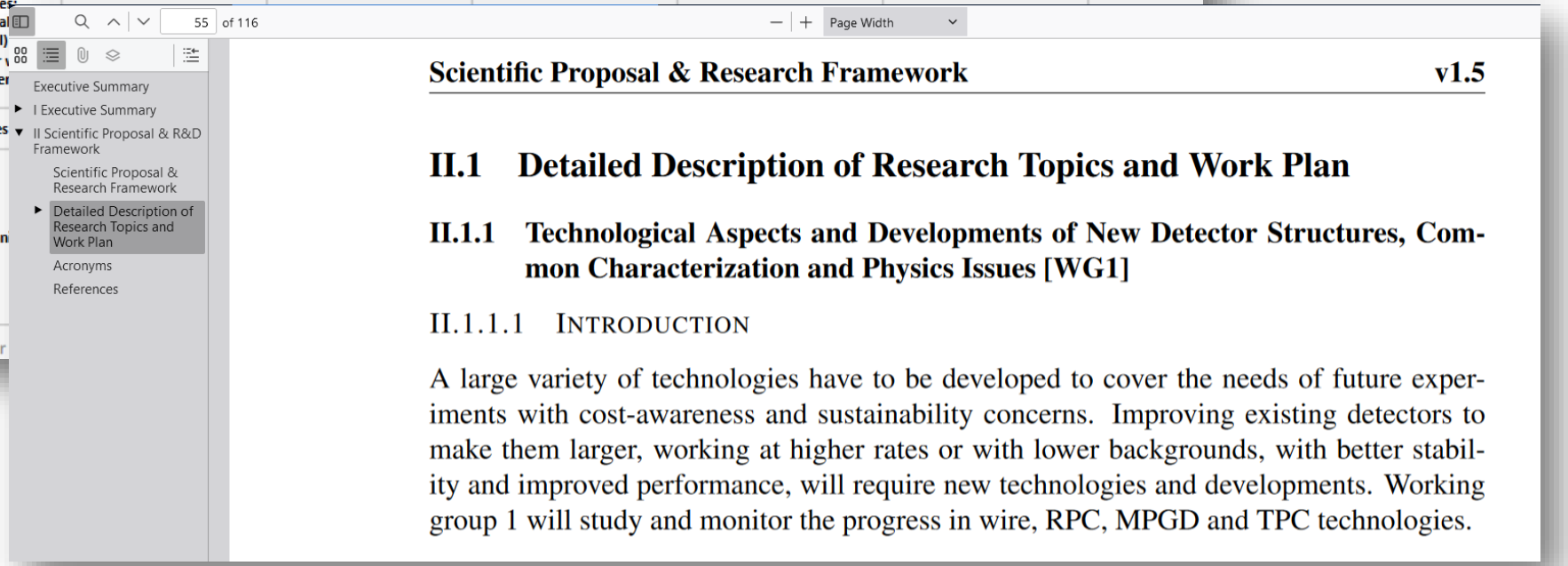
https://rd51-public.web.cern.ch/

Working group tasks

The collaborative structure of DRD1 keeps RD51 structure in Working Groups

Working-group conveners coordinate R&D tasks of the respective working groups. Two coordinators elected through a nomination process, approved by MB and CB

WG 1	WG 2	WG 3	WG 4	WG 5	WG 6	WG 7	WG 8
Technologies	Applications	Gas and material studies	Detector physics, simulations, and software tools	Electronics	Detector production	Common test facilities	Training and dissemination
Large Volume Detectors (Drift chambers, TPCs)	Trackers/Hodoscope	Measurement of Gas Properties	Garfield++	Front-End Electronics for Gaseous Detectors	Common Production Facilities and Equipments	Detector Laboratories Network	Knowledge Exchange and Facilitating Scientific Collaborations
MPGDs	Inner and Cenral Tracking with PID Capabilities: - Drift Chambers - Straw tubes - TPC	Studies on Eco-friendly Mixtures	Simulation of Large Charges and Space Charge	Modernised Readout Systems (DAQ): high performances	QA/QC	Test Beam Common Facilities	Training and Dissemination Initiatives
RPCs, MRPCs	Calorimetry	Ageing and Outgassing studies	Simulation of Detectors with Resistive Elements	Modernised Readout Systems (DAQ); FE Integration	Collaboration with Industrial Partner	Irradiation Common Facilities	Career Promotion
TPC	Photon Detector (PID)	Gas sytems	Modelling and Simualtion of Eco-friendly Mixtures	Modernised Readout Systems (DAQ): portability	Gaseous Detector FORUM (know-how)	Specialized laboratories (outgassing/ageing, gas analysers, photocathodes)	Outreach and Education
Straw tubes, TGC, CSC, drift chambers, and other wire detectors	Timing Detectors (PID & Trigger)	Materials studies: - novel material (nanomaterial) - new material for - new converter					
New amplifying structures	TPC as reaction and decay chambers	Photocathodes					
	Beyond HEP - Medical Application - Neutron Science - Muography - Space Applicatios - Oher (Dosimetry, Beam Monitoring, Cultural Heritage, Homeland Security,..)	Precision Mechan					



Detailed description of the R&D Framework and Working Groups in the 2nd part of the DRD1 Proposal

How DRD1 is addressing the general recommendations (II)

GSR 6 – Establish long-term strategic funding programs

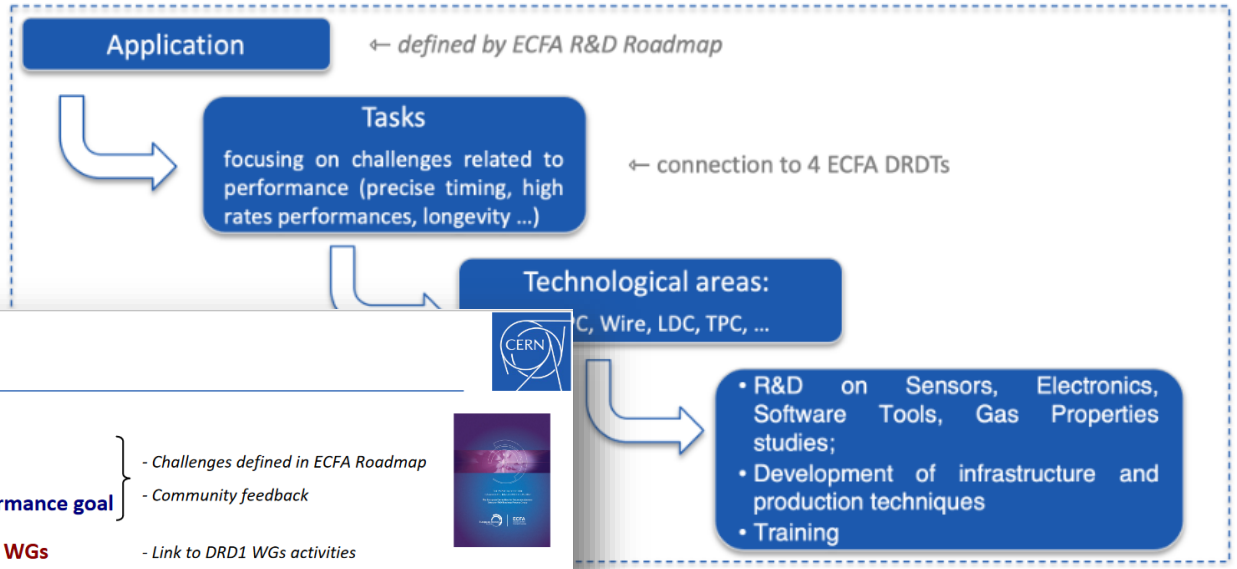
Linked to rising R&D costs, the need for a critical mass and the decadal timescales for strategic R&D investments needed for the ESPP programmes, there is an urgent need to augment the short-term funding mechanisms, suited for exploratory stages of the R&D cycle, with funding mechanisms better suited to long-term programmes as outlined in GSR 6. The scale of the technical challenges, the long planning horizons and the need to build serious relationships with industrial partners make sustained strategic investment a must, particularly if matching resources are to be leverage

Strategic R&D & Work Packages

Work Packages

Strategic R&D (according to the ECFA Detector R&D Roadmap) **is organized in Work Packages**

- group activities of the Institutes with **shared research interests** around **Applications** with a focus on a **specific task(s)** devoted to a specific DRDT challenge, typically related to specific **Detector Technologies and** to the development of **specific tools or infrastructure**

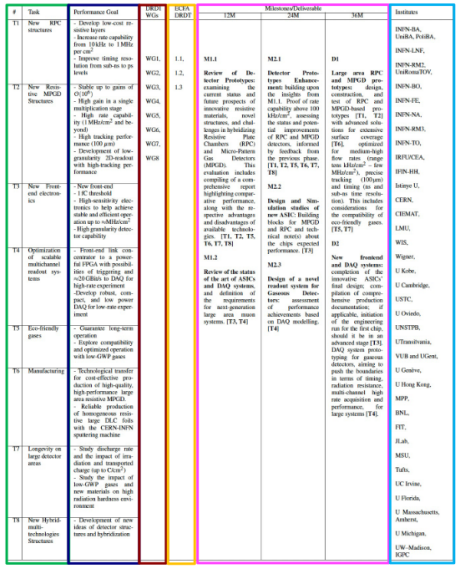


Currently envisaged WPs:

- **WP1: Trackers/hodoscopes**
- **WP2: Drift chambers**
- **WP3: Straw chambers**
- **WP4: Tracking TPCs**
- **WP5: Calorimetry**
- **WP6: Photo-detectors**
- **WP7: Timing**
- **WP8: Reaction/Decay TPCs**
- **WP9: Beyond HEP**

in a WP to be a member of DRD1.

WP tables - explanation



Example Work Package Table: WP1 - Trackers/Hodoscopes

- **Task** — *- Challenges defined in ECFA Roadmap*
- **Performance goal** — *- Community feedback*
- **DRD1 WGs** — *- Link to DRD1 WGs activities*
- **ECFA DRDT** — *- Connection to ECFA DRDTs*
- **Milestones/ Deliverables** — *- Top-level milestones and deliverables for the first three years of a WP activity. Based on detailed annexes (>330 pages), to be signed as MoU addenda.*
- **Institutes** — *- List of institutes interested in joining a WP. Estimate on available/additional resources and commitment to tasks/deliverables provided in detailed annexes.*

+ More than 300 pages document for DRD1 internal use
with all info and details about the proposed Work Packages

WP4: Inner and central tracking with PID (Tracking TPCs)

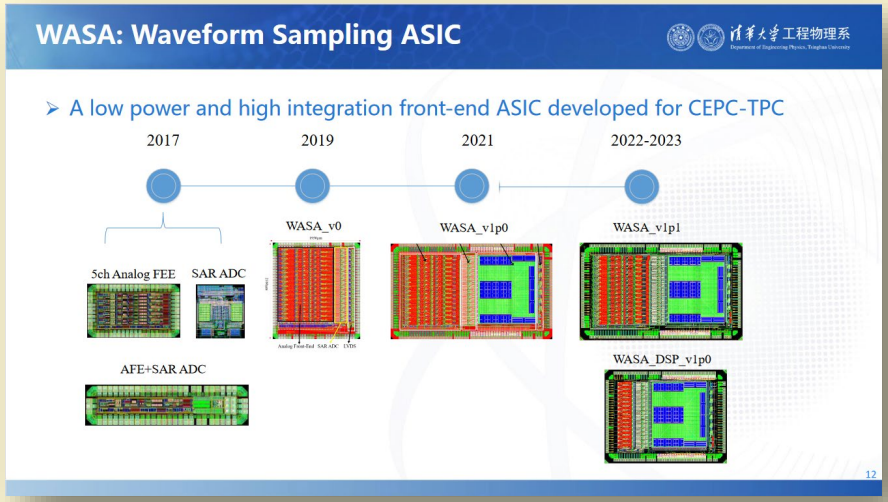
https://drd1.web.cern.ch/wp/wp4

StatusUpdate:*https://indico.cern.ch/event/1360282/contributions/5761372/attachments/2789303/4863818/WP4_presentation.pdf*

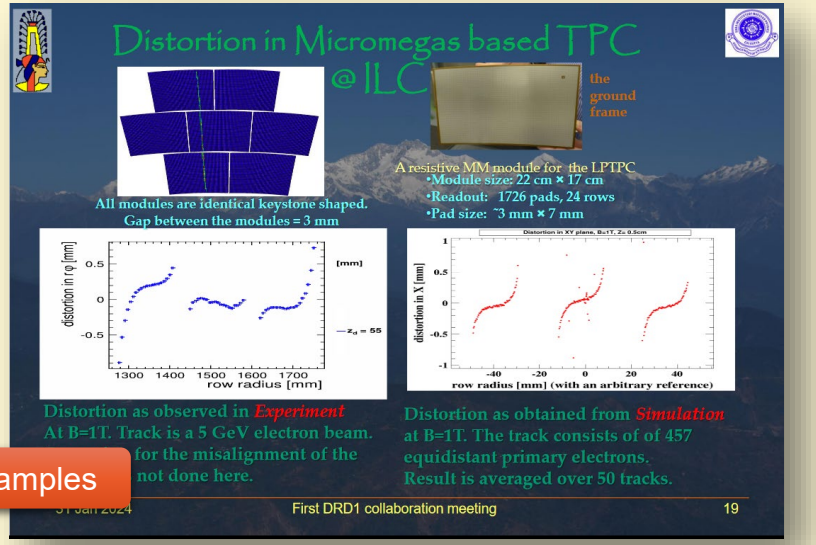
Time Projection Chambers (TPCs) have been extensively studied and used in many fields especially in particle, nuclear and neutrino physics experiments. Also smaller size TPCs are a good choice for beam diagnostics operating in high particle rate environments.

T1: IBF reduction
T2: pixel TPC development
T3: Optimization of the amplification stage and its mechanical structure, and development of low X/X0 field cages
T4: FEE for TPCs
T5: Gas mixture

WG5



https://indico.cern.ch/event/1360282/contributions/5786540/attachments/2790662/4866562/Development%20of%20front-end%20ASIC%20for%20gas%20detectors%20v1.pdf



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WG4

Extracting 2 examples

WP5: Calorimetry

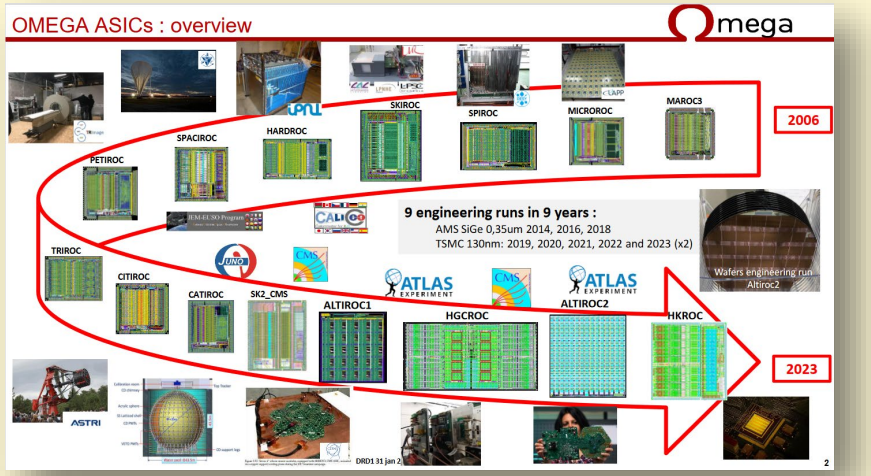
WG5

https://drd1.web.cern.ch/wp/wp5

StatusUpdate:https://indico.cern.ch/event/1360282/contributions/5761374/attachments/2789352/4864124/WP5_kick-off.pdf

Gaseous detectors have been playing an important role in sampling calorimeters since the birth of this kind of instruments. The possibility to produce large area detectors at affordable cost but still with excellent efficiency and high spatial precision make of them a choice of reference. Although many sampling calorimeters of the LHC experiments have opted for scintillators-based active media, **gaseous detectors are being proposed again to equip future sampling calorimeters that use the Particle Flow Algorithm (PFA) concept**.

T1 : Construction of large gaseous detectors for granular calorimeters
T2 : Timing performance of gaseous detectors for calorimeters
T3 : Readout electronics for calorimeter gaseous detectors
T4 : High-rate capability gaseous detectors for circular collider calorimeters



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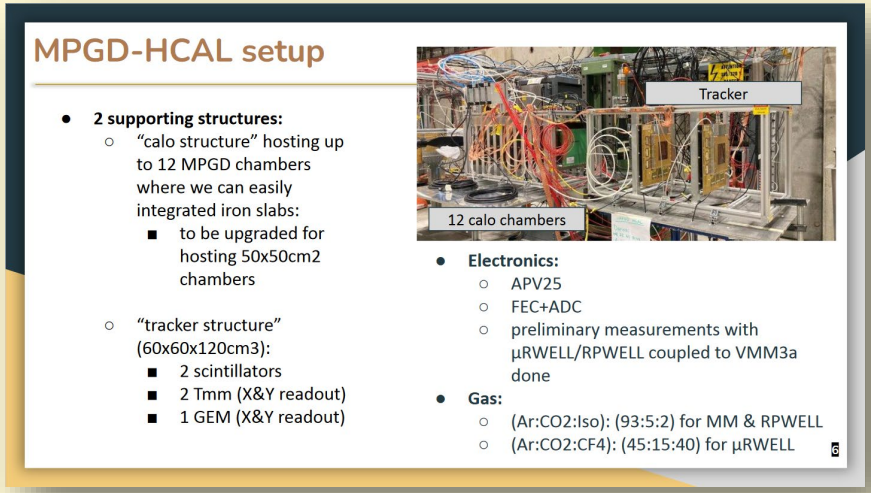
WG7



https://indico.cern.ch/event/1360282/contributions/5768394/attachments/2791972/4869090/DRD1_HCal_testbeam.pdf

Extracting 2 examples

Work Packages (WP1 as one example)

DRD1-WP1 mini-Workshop

Thursday 7 Mar 2024, 10:00 → 18:00 Europe/Zurich

Description First WP1 Kickoff Meeting to streamline and organise the activities and to share current status and plans.

PRELIMINARY AGENDA.

Videoconference DRD1-WP1 — Join

Registration Participants — Register

10:00 → 10:30 INTRODUCTION - Scope of this WP1 Mini-Workshop 30m

Speakers: Atsuhiko Ochi (Kobe University (JP)), Gabriella Pugliese (Universita e INFN, Bari (IT)), Giulio Aielli (INFN e Universita Roma Tor Vergata (IT)), Mauro Iodice (INFN - Sezione di Roma Tre), Riccardo Farinelli (Universita e INFN, Ferrara (IT))

10:30 → 11:00 Task 1 - New RPC Structures 30m

Speakers: , Alessandra Pastore (Universita e INFN, Bari (IT)), Atsuhiko Ochi (Kobe University (JP)), Barbara Liberti (INFN e Universita Roma Tor Vergata (IT)), Giulio Aielli (INFN e Universita Roma Tor Vergata (IT)), Oleg Brandt (University of Cambridge (GB)), Paolo Camarri (INFN e Universita Roma Tor Vergata (IT)), Serkant Cetin (Istinye University (TR)), alessandro paoloni

11:00 → 11:45 Task 2 - New Resistive MPGD Structures 45m

Speakers: Annalisa D'Angelo (INFN e Laboratori Nazionali di Frascati (IT)), Atsuhiko Ochi (Kobe University (JP)), Dr Calin Bira (Universitatea Nationala de Stiinta si Tehnologie Politehnica Bucuresti (RO)), Eraldo Oliveri (CERN), Esther Ferrer Ribas (Université Paris-Saclay (FR)), George Iakovidis (Brookhaven National Laboratory (US)), Gianluigi Cibinetto (INFN Ferrara), Dr Giovanni Benoivenni (INFN e Laboratori Nazionali di Frascati (IT)), Jianbei Liu (University of Science and Technology of China (CN)), Jona Bortfeldt (Ludwig Maximilians Universitat (DE)), Kondo Gnanvo (Southeastern Universities Research Association, Inc. (US)), Mariagrazia Alviggi (Naples University and INFN), Massimo Della Pietra (Universita Federico II e INFN Sezione di Napoli (IT)), Mauro Iodice (INFN - Sezione di Roma Tre), Maxence Vandenbroucke (Université Paris-Saclay (FR)), Paolo Camarri (INFN e Universita Roma Tor Vergata (IT)), Paolo Giacomelli (INFN Sezione di Bologna), Paul Colas (Université Paris-Saclay (FR)), Ralf Hertenberger (Ludwig Maximilians Universitat (DE)), Shikma Bressler (Weizmann Institute of Science (IL)), Sorin Martoiu (Horia Hulubei National Institute of Physics and Nuclear Engineering (RO))

INFN_Roma3_Napo...

11:45 → 12:30 Task 5 - Eco-Friendly gases 45m

Speakers: Alessandra Pastore (Universita e INFN, Bari (IT)), Alessandro Paoloni (INFN e Laboratori Nazionali di Frascati (IT)), Barbara Liberti (INFN e Universita Roma Tor Vergata (IT)), Dubravka Milovanovic (University of Belgrade (RS)), Eraldo Oliveri (CERN), George Iakovidis (Brookhaven National Laboratory (US)), Michael Tytgat (Vrije Universiteit Brussel (BE)), Oleg Brandt (University of Cambridge (GB)), Paolo Camarri (INFN e Universita Roma Tor Vergata (IT)), Serkant Cetin (Istinye University (TR))

14:00 → 14:40 Task 3 - New Front-end Electronics 40m

Speakers: Barbara Liberti (INFN e Universita Roma Tor Vergata (IT)), Dr Calin Bira (Universitatea Nationala de Stiinta si Tehnologie Politehnica Bucuresti (RO)), Daniele Panzieri (Univ. del Piemonte Orientale, Dip.Scienze eTecnologie), Dezso Varga (HUN-REN Wigner Research Centre for Physics (HU)), Eraldo Oliveri (CERN), Esther Ferrer Ribas (Université Paris-Saclay (FR)), George Iakovidis (Brookhaven National Laboratory (US)), Gianluigi Cibinetto (INFN Ferrara), Maxence Vandenbroucke (Université Paris-Saclay (FR)), Michele Greco (INFN-UniTO), Paolo Camarri (INFN e Universita Roma Tor Vergata (IT)), Paolo Giacomelli (INFN Sezione di Bologna), Radu Mihai Coliban (Transilvania University of Brasov (RO)), Sorin Martoiu (Horia Hulubei National Institute of Physics and Nuclear Engineering (RO))

14:40 → 15:10 Task 4 - Optimization of scalable multichannel readout systems 30m

Speakers: Barbara Alvarez Gonzalez (Universidad de Oviedo (ES)), Dr Calin Bira (Universitatea Nationala de Stiinta si Tehnologie Politehnica Bucuresti (RO)), Cristina Fernandez Bedoya (CIEMAT - Centro de Investigaciones Energéticas Medioambientales y Tec. (ES)), Eraldo Oliveri (CERN), George Iakovidis (Brookhaven National Laboratory (US)), Gianluigi Cibinetto (INFN Ferrara), Mary-Cruz Fouz Iglesias (CIEMAT - Centro de Investigaciones Energéticas Medioambientales y Tec. (ES)), Radu Mihai Coliban (Transilvania University of Brasov (RO)), Serkant Cetin (Istinye University (TR)), Sorin Martoiu (Horia Hulubei National Institute of Physics and Nuclear Engineering (RO))

15:10 → 15:40 Task 6 - Manufacturing 30m

Speakers: Annalisa D'Angelo (INFN e Laboratori Nazionali di Frascati (IT)), Barbara Liberti (INFN e Universita Roma Tor Vergata (IT)), Dezso Varga (HUN-REN Wigner Research Centre for Physics (HU)), Eraldo Oliveri (CERN), George Iakovidis (Brookhaven National Laboratory (US)), Dr Giovanni Benoivenni (INFN e Laboratori Nazionali di Frascati (IT)), Mariagrazia Alviggi (Naples University and INFN), Massimo Della Pietra (Universita Federico II e INFN Sezione di Napoli (IT)), Mauro Iodice (INFN - Sezione di Roma Tre), Paolo Camarri (INFN e Universita Roma Tor Vergata (IT)), Serkant Cetin (Istinye University (TR))

15:40 → 16:25 Task 7 - Longevity on large detector areas 45m

Speakers: Alessandra Pastore (Universita e INFN, Bari (IT)), Dezso Varga (HUN-REN Wigner Research Centre for Physics (HU)), Dubravka Milovanovic (University of Belgrade (RS)), Eraldo Oliveri (CERN), George Iakovidis (Brookhaven National Laboratory (US)), Dr Giovanni Benoivenni (INFN e Laboratori Nazionali di Frascati (IT)), Massimo Della Pietra (Universita Federico II e INFN Sezione di Napoli (IT)), Mauro Iodice (INFN - Sezione di Roma Tre), Oleg Brandt (University of Cambridge (GB)), Paolo Camarri (INFN e Universita Roma Tor Vergata (IT)), Shikma Bressler (Weizmann Institute of Science (IL))

16:25 → 16:55 Task 8 - New Detector Structures 30m

Speakers: Gianluigi Cibinetto (INFN Ferrara), Dr Giovanni Benoivenni (INFN e Laboratori Nazionali di Frascati (IT)), Giulio Aielli (INFN e Universita Roma Tor Vergata (IT)), Hubert Kroha (Max Planck Society (DE)), Jianbei Liu (University of Science and Technology of China (CN)), Lorenzo Paolozzi (CERN), Paolo Camarri, Yanjun Tu (University of Hong Kong (HK))

Activities of the DRD1 groups within the framework and tasks of the WPs have commenced, despite pending formal aspects (approvals, consultation with WP-FA,..)

DRD1 Organization & Management

Approved during the Collaboration Board with Consensus.

COLLABORATION BOARD

RESOURCE BOARD

MANAGEMENT BOARD

Management

SPOKESPERSONS

SCIENTIFIC COORDINATION BOARD
(Working Groups, Work Packages, DRDs Liaisons, Common Projects

Scientific Coordination

- Elections Opening: 1 week, from Monday December 12th to December 18th 2023
- DRD1 spokespersons and CB chair candidates, CV, statements and open presentations: https://indico.cern.ch/event/1352912/

- Wide consolations and nominations from whole community (about 160 institute)
- Election procedure discussed & approved by the DRD1 Implementation Team and DRD1 CB
- About 110 instates casted votes

Elections Results

2 Spokespersons: Eraldo Oliveri, Maxim Titov

1 CB Chair: Anna Colaleo

Mandate of the Implementation team extended till June.

The DRD1 MoU

Drafting of parts specific to DRD1 ongoing (based on RD51 MoU) with the aim of being ready to address once common template will be circulated:

- **Common Funds** (Working Groups & Common Projects)

- **Work Packages Rules** (Conditions, Scientific or Resource Internal Approvals)

Prompt release of the MoU template is crucial to advance interactions with Funding Agencies

- **IP Issues** and Involvement of **Industrial, semi-industrial partners and research foundations**

- **CERN Registration** (Working on CERN site and computing resources)

The DRD1 Constitution

Establishing a **guiding framework** to shape our collaboration

✓ Serves as a **guiding document**, embodying shared and best practices that form the foundations of our collaboration.

✓ It is a collective commitment, promoting transparency, effective collaboration, and a **dynamic exchange of ideas**.

✓ encapsulates **the essence** of how we work together, make decisions, define the common objective, collaborative policies.

It will serve in preparation of the MoU

MoU (Work Packages, DRD1Drafts)

From Collaboration Meeting Discussion:

- MoU signature decoupled from WP approval.
- In MoU approval rules will be defined.
- FA that will sign the MoU (i.e. FA funding the membership) are different from the FA in the Work Packages
- Approval will be done via dedicated boards, and the corresponding minutes will serve as a reference document.

Annex 10.1 Conditions applicable to Work Packages, Internal Scientific and Financial Approval

Conditions

1. A Work Package (WP) is established either as part of the initial DRD1 proposal or subsequently proposed to the Collaboration Board (CB) for approval.
2. Institutes wishing to participate in a Work Package must first be members of the DRD1 collaboration.
3. Being involved in at least one task and one deliverable of the chosen WP is strongly recommended for membership. Each case will be individually evaluated and approved by the relevant WP Leaders.
4. Upon WP creation, the CB will endorse an internal reviewer (a collaboration member) nominated by the WP Coordinator.
5. WP Leaders will submit the proposal to the CB for scientific approval, based on the criteria outlined in Annex 10.1.1.
6. Following scientific approval, WP Leaders will present the proposal to the Resource Board (RB) and relevant Work Package Funding Agencies (WP-FA) for financial approval, as per the criteria detailed in Annex 10.1.2.
7. Scientific and financial approvals will be conducted annually.

Prompt release of the MoU template is crucial to advance interactions with Funding Agencies

Internal Scientific Approval

Annex 10.1.1 CB Work Package Approval (Internal Scientific Approval)

1. During the CB meeting dedicated to WP internal scientific approval, the WP leaders will present an overview of the WP proposal. This presentation should encompass:
   - Alignment with relevant ECFA themes, referencing the ECFA Detector R&D Roadmap document.
   - Progress in the scientific program and its objectives.
   - A detailed list of milestones and expected deliverables.
   - Collaboration and interaction with Working Groups (WGs), other Work Packages, and other DRDs.
   - A resource table provided for informational purposes only, not for approval.
2. Following the WP Leaders' presentation, the designated internal DRD1 Reviewer will provide a comprehensive review of the proposal.
3. The CB will then reach a consensus decision on whether to approve the WP.

Annex 10.1.2 RB Work Package Approval (Internal Resource Approval)

1. During the RB meeting dedicated to WP internal resource approval, the WP Leaders will present the WP resources. All relevant WP Funding Agencies (WP-FA) listed in the Work Package Annexes (10.2.x) will be invited. The presentations will focus specifically on resource requirements and allocation.
2. To facilitate informed discussion, all relevant information for the presentation will be provided to the relevant WP-FA and RB members at least one month in advance of the meeting, with the best effort.
3. Before the RB meeting, WP Leaders are responsible for gathering and presenting confirmation from the WP-FA to ensure that the proposed resource table accurately reflects their allocated funding and support.
4. The method by which the proposed resource table will be acknowledged is left to each WP-FA, with the unique requirement that the acknowledgment is clear and unambiguous.
5. Work Package Annexes will indicate whether the WP-FA has acknowledged the resource tables or not. It is up to the Work Package Leaders to assess whether this will affect the membership of the corresponding group within the work package.
6. Following the presentation and discussion, the RB will reach a consensus decision on WP approval.

Internal Resources Approval

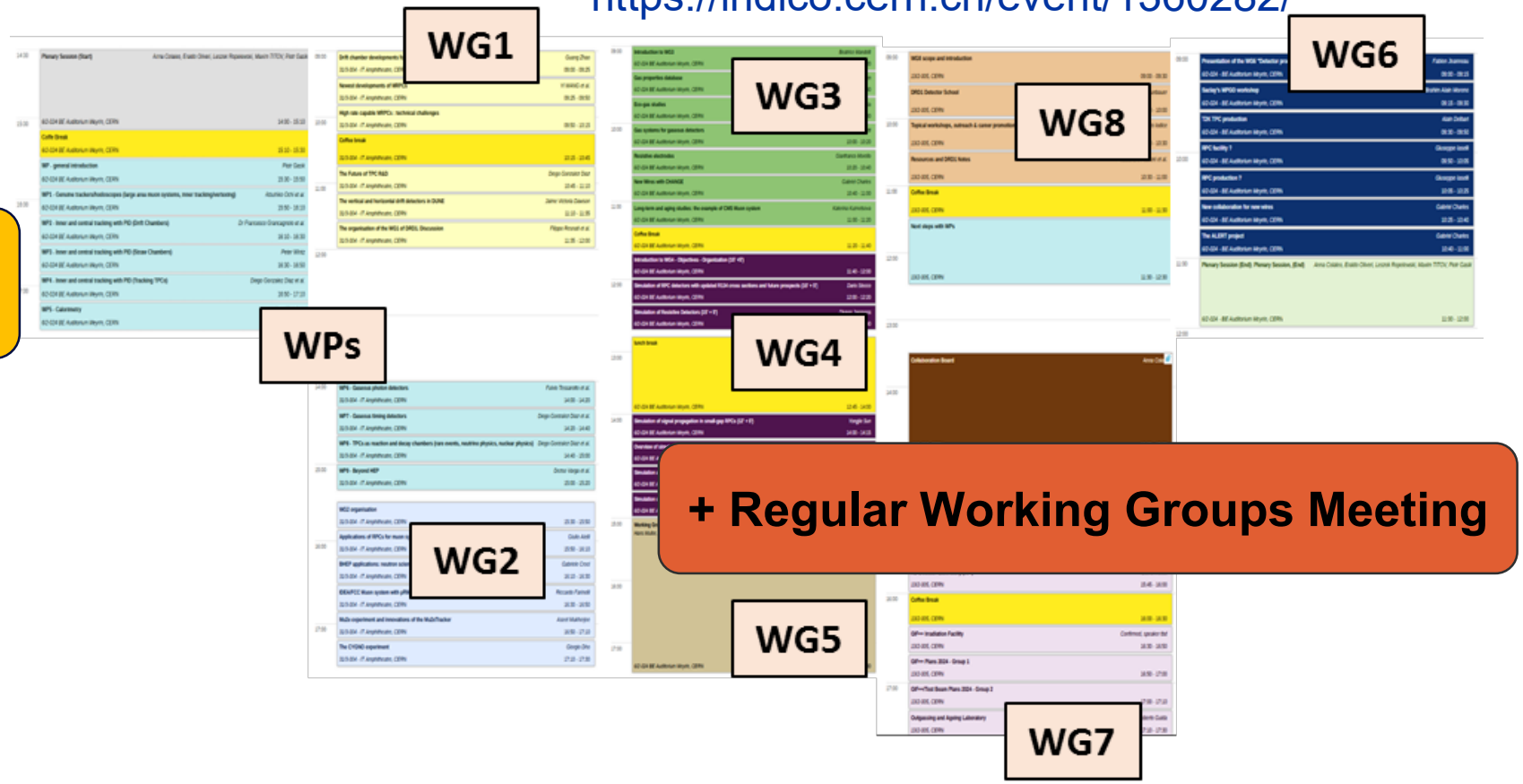
DRD1 Collaboration Meetings (2024) & Related Events

1st DRD1 Collaboration Meeting;
https://indico.cern.ch/event/1360282/

1st Collaboration Meeting
January 29-February 2 (CERN)

2nd Collaboration Meeting
June 17-21 (CERN)

3rd Collaboration Meeting
December 9-13 (CERN)



Gaseous Detector Conferences:

- RPC 2024, Santiago, 9-13 September: https://indico.cern.ch/event/1354736
- MPGD 2024, Hefei, 14-18 October: https://mpgd2024.aconf.org
- TPC 2025, Paris, December (tbc)

DRD1 Detector School (WG8)

CONFIRMED

Organising DRD1 Gaseous Detector School in 2024

- Single school for 2024, to be discussed for next years
- Regular (yearly) school targeted at students / young researchers / DRD1 community

- Based on previous school with **extension to other gas detector technologies**
- Similar format: lecture program open to community + lab exercises
- **Extended length** - 7-10 days?
- At CERN or other institute

- Planned for late 2024 - possibly connected to last DRD1 Collaboration Meeting this year

Follow-up of the RD51 Detector School

https://indico.cern.ch/event/1239595/

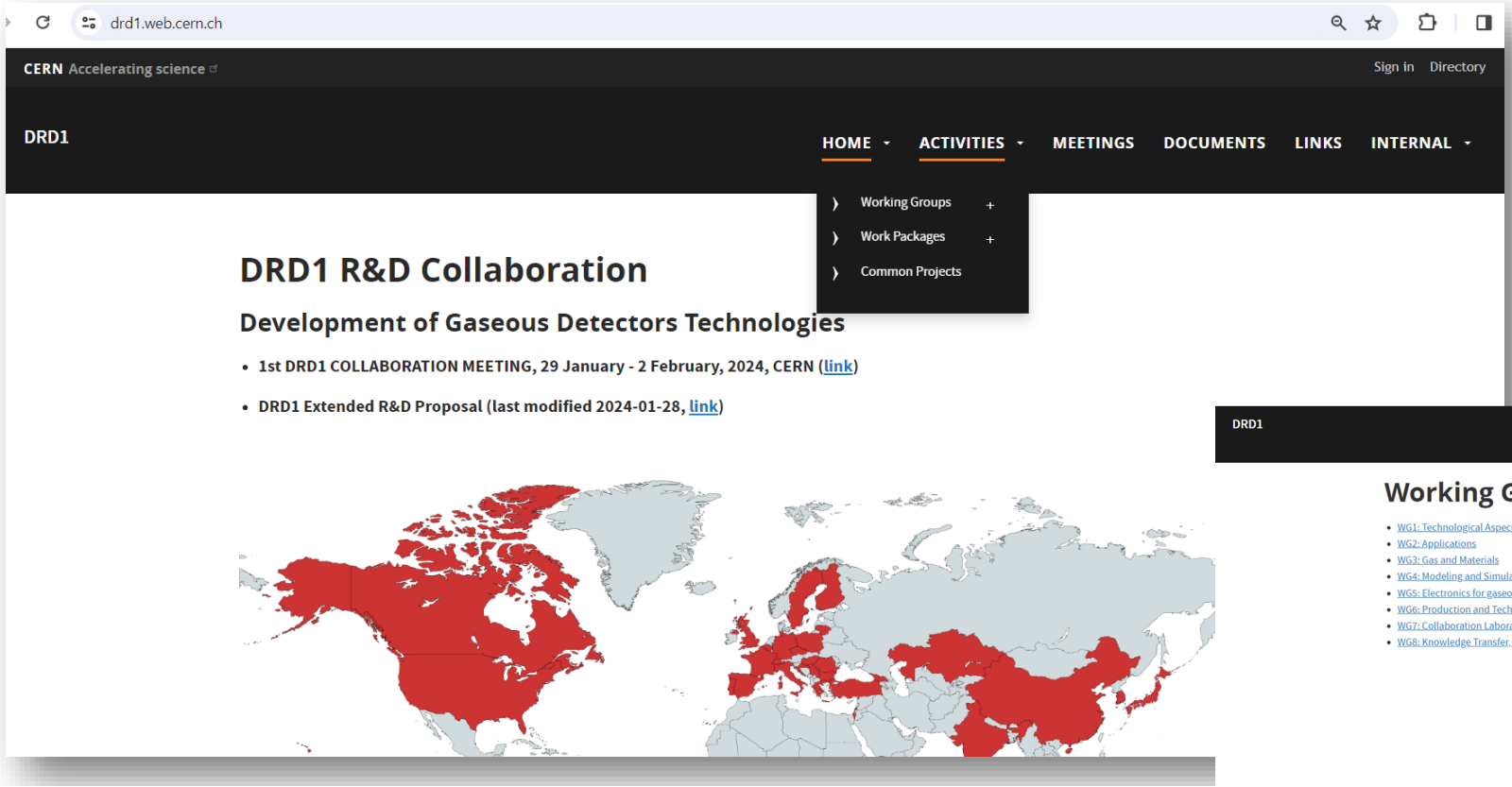
Extended to all gaseous detector technologies

https://indico.cern.ch/event/1360282/sessions/525034/attachments/2791402/4868283/DRD1%20WG8%20-%20Collaboration%20Jan%202024.pdf

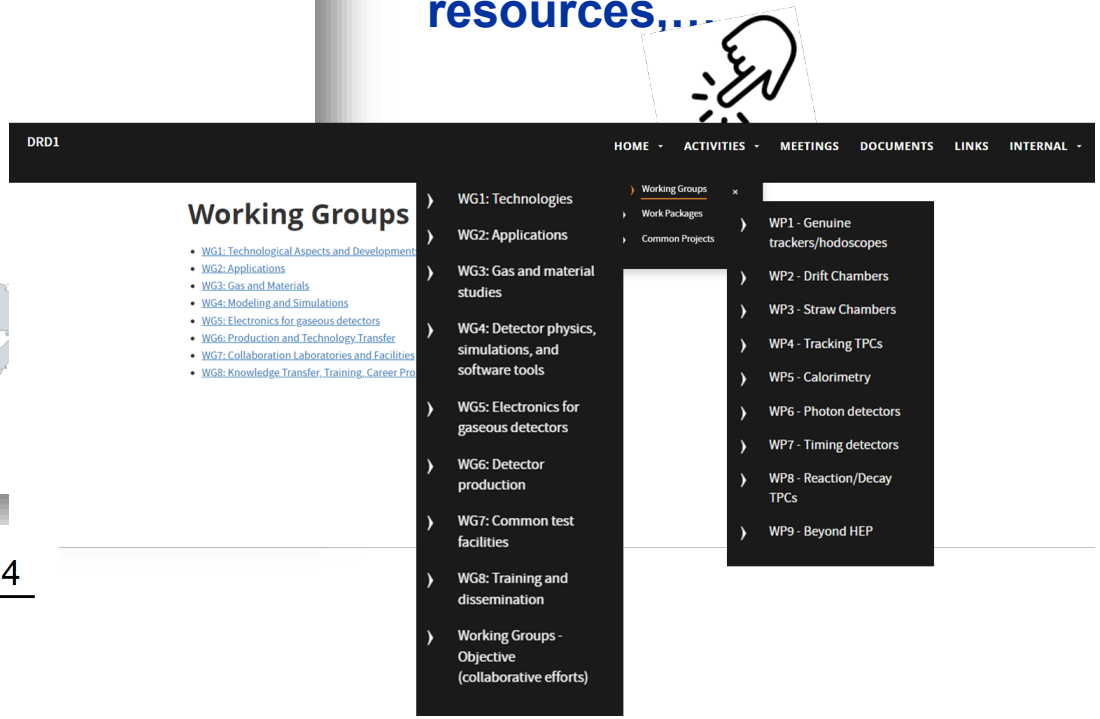
Webpage

https://drd1.web.cern.ch/

Description of WG and WP activities to start with …



Kept up to date on ongoing activities, resources,…



DRD1 Bulletin Issue Nr 1 / 2024 - April 2024

DRD 1

(While this one is pretty, we think that we can do much better. Therefore, we would like to take this opportunity to launch an official call for logo proposals. Please, send your ideas to the WG8 conveners before the next Newsletter is out!!)

+ DRD1 newsletter (in preparation) …

Summary

DRD1 covers a large set of different technologies, different applications and a **large and diversified community**

ECFA Detector R&D Roadmap and General Recommendations are addressed with a scientific organization based on:

- **R&D Framework & Working Groups** (RD51 Legacy) → Distributed R&D Activities with Centralized Facilities.
- **Work Packages** → Strategic R&D and Long -Term Funding.

DRD1 implementation and organization

- **Community Driven** with key role played by the Implementation Team (about 50 persons)
- Management **Elections** and Organization **approved by CB**. All roles will be soon covered.
- **MoU Drafting** of DRD1-specific Annexes ongoing

DRD1 Activities started

- **Prompt actions required** to preserve and enhance the current momentum in the community