

Feedback from National Contacts to TF1 questionnaire

Summary of answers can be found here:

https://docs.google.com/document/d/1VCvbhsySyejost0BthNRTmqODFnXzn9S_pB3XN7zc0g/edit

About the interplay between experiment oriented R&D and generic R&D.

The core of our R&D is usually driven by the needs of possible future experiments.

- Typically the R&D effort focused on finalizing the prototyping phase before the production phase of the approved facilities and experiments.
- Common schema is: the core of the National funding is linked to specific experiments, while the generic R&Ds or blue-sky R&Ds are supported by applying to the European program funding schema.
- This hinders the exchange of experience between the groups and potential synergies cannot be optimally exploited.

 A constant investment into generic “blue sky” R&D is mandatory to retain the technical and engineering expertise to address the challenges of the future experiments.

Positive examples:

- *INFN dedicated National Commission (CSN5) funding to the technological and interdisciplinary research (next-generation prototypes of particle accelerators, radiation detectors, electronic and computer systems, and application outside the fundamental research). Also INFN **Calls for submission** for new ideas and technology challenges and **dedicated grants for young researchers** proposing new ideas.*
- *The German Research Foundation (DFG) is funding detector **R&D projects as well as small-scale experiments, but also for instance laboratory equipment.***

There is a need to setup laboratories for gaseous multi-technologies under common consortium or network that looks for synergies between the different groups making R&D in the different detector types.

The Universities also play a leading role in detector R&D through their academic staff, PhD, master and bachelor students, engineers and technicians, labs and equipment, but also through funding lines for smaller-scale R&D projects.

- The countries where the research is also supported and linked to the different university departments the multidisciplinary and exchange of information is more efficient.
- Some activities in the labs are needed to support the thesis work.

The exchange of ideas can be improved if there funding opportunities in each country which allow to support R&D across projects.

Positive examples:

- *Helmholtz Association of German Research Centres, with Labs like DESY and KIT, is a major player in technology development. It has formed a platform "Detector Technologies and Systems (DTS) which connects detector R&D activities of Helmholtz Research Centres.*
- *Spanish network for Future Colliders created in 2007, which now includes Higgs factories and FCC-hh. This network looks for synergies between the different groups making R&D in any detector type.*

About the promotion of CERN RD programs:

With the goal of promoting synergy and multidisciplinary the R&D performed in cooperation with external research groups or embedded in a CERN R&D programme (such as RD51) is considered necessary.

- RD collaboration (such as RD51) are fundamental for R&D progressing in electronics, software tools, infrastructures and relation with industries since it allows easy exchange of ideas, common developments, experience and to exploit synergies.

⇒ CERN-RD51 collaboration has provided important stimulus for the development of MPGDs and focused on a broad networking effort to share the “know-how” and the technologies, and to promote “blue-sky” generic R&D: a seminal activity for the enlargement of the application portfolio.

⇒ A combination of generic and focused R&D with bottom-up decision processes



The RD51 program has to be continued and the model exported to other detector technology domains.



Proposal to establish an European network of infrastructures for facilitating and advance in development and application of the new technologies.

- In the contest of CERN RD collaborations:
 - Setup a centralized facility at CERN, working as a pool of experts which would support groups in both R&D and detector construction. This facility would **work as a hub linking National Laboratories and collaborations.**
 - ➔ it allows also small groups with limited infrastructure to contribute to R&D through the access to the shared resources and infrastructures in the network.
 - This network of infrastructures would **support and sponsor specific workshop activities on particular R&D topics, with full involvement of potentially interested industries.**
- Export the CERN openlab - ICT model to the detector technology domain.
 - *"CERN openlab is **a collaboration between CERN and industrial partners** to develop new knowledge in ICT through the evaluation of advanced tools and joint research to be used by the worldwide community of scientists working at the Large Hadron Collider. CERN collaborates with leading ICT companies and research institutes...provides access to its complex ICT infrastructure and its engineering experience — in some cases even extended to collaborating institutes worldwide. "*

Opportunities for seeking future resources

Whenever possible dedicated national funding should be allowed for the generic R&D in order to improve the know-how and exchange of ideas in the country

Generic R&D across projects strongly relies on European Program funding schema:

- attention should be put on to **bottom-up inputs when shaping the European calls dedicated to our research field.**
- progress should be made in order to **offer enough opportunities to countries with limited infrastructures and capabilities to co-fund the projects.** Promote stronger interaction and support from large institutions with smallest independent groups as innovation drivers.
- **continue the co-funding CERN fellowship programme** (Marie-Curie, Fellini etc) that allows young researchers to stay at CERN and to benefit from the particular CERN environment.
- **CERN openlab** provides unique possibilities **for young talents** in computer science. It is hoped that the model can be **extended and intensified also in the domain of detectors.**