

Draft DRD Proposal Guidance

18th February 2023

1. Overview

The new Detector R&D (DRD) Collaborations are intended to be the main vehicles for driving strategic R&D targeting the priority programmes outlined in the updated European Strategy for Particle Physics. Their roles are further described in CERN/SPC/1190 and further context can be found at <https://indico.cern.ch/event/957057/> including links to the approved Detector R&D Roadmap documents.

The DRD proposals should establish a programme and a collaborative framework (organisation) to achieve the ECFA roadmap Detector R&D Themes (DRDTs) outlined at [10.17181/CERN.XDPL.W2EX](https://indico.cern.ch/event/1017181/contributions/424241/). The self-organisation of each DRD is expected to be community-driven with the resulting collaborations anticipated to have management structures similar to the existing large-scale international R&D collaborations and major particle physics experiments with a Collaboration Board of the institutes having ultimate oversight of the proposed programme (since funds are expected to be awarded to and held at the participating institutes). It is anticipated that in each of the distinct communities covered by the DRD areas, there will naturally be sub-divisions by technology areas which may, but do not need to, have a one-to-one matching onto the DRDTs for that activity. The DRD Collaborations themselves will be best placed to decide what are the technology areas and their correspondence to the most suitable sub-structures for management of the proposed R&D programme.

2. Main Proposal

To keep the process manageable for both proponents and reviewers, it is recommended that the DRD proposal document should not exceed 20 pages, following a common outline template as suggested below:

- Introduction (objectives of the DRD collaboration)
- Planning technology area 1 (including a task/deliverable synoptic, resources and list of contributing institutes)
- ...
- Planning technology area n (including a task/deliverable synoptic, resources and list of contributing institutes)
- Common simulation tools and test facilities
- Partnerships (industrial, other research areas, other applications)
- Networking and training
- Proposal for the collaboration structure
- Resources (as discussed below) both existing and anticipated
- Summary (high level planning synoptic by DRDT broken-down to sub-areas)

For each DRDT and the associated technologies to be studied, key R&D deliverables during the coming three years, indicative deliverables planned for the following three years and longer-term ambitions

should be identified (see Table 1). It is only typically expected that at most a few major deliverables will be identified per technology area in the period up to 2026, so it could also be useful to further indicate some important milestones as well, especially for any deliverables only expected after this period. The performance parameters targeted by the deliverables should be described in association with one or more of the future strategic programmes considered in the updated European Strategy for Particle physics and listed in the Roadmap document. However, justifications for the technologies and research lines listed should not need to be given, since these are already provided in the Roadmap.

Timeline of milestones and major deliverables per DRDT and technology					
Deliverables or milestones in appropriate years	2024	2025	2026	2027-2029	≥ 2030
DRDT 1					
Technology 1	List of deliverables in year due (if any)				
...					
Technology n	List of deliverables in year due (if any)				
...					
DRDT n					
Technology 1	List of deliverables in year due (if any)				
...					
Technology n	List of deliverables in year due (if any)				
...					
Timeline of FTE per DRDT and technology					
Total FTE estimated to be required to deliver the outlined R&D programme	2024	2025	2026	2027-2029	≥ 2030
DRDT 1					
Technology 1	Total required FTE				
...					
Technology n	Total required FTE				
...					
DRDT n					
Technology 1	Total required FTE				
...					
Technology n	Total required FTE				
...					
Timeline of Materials and Services (non-FTE) Funding per DRDT and technology					
Total non-FTE funds estimated to be required to deliver the outlined R&D programme	2024	2025	2026	2027-2029	≥ 2030
DRDT 1					
Technology 1	Total required funds				
...					
Technology n	Total required funds				
...					
DRDT n					
Technology 1	Total required funds				
...					
Technology n	Total required funds				
...					

Table 1 Timeline of Key Deliverables plus Milestones and Associated Required Resources

As indicated above, it is anticipated that each DRD Collaboration will cover a number of different technology areas which would rather naturally map onto its internal management structure. The key R&D deliverables discussed above should be identified within each corresponding technology area and the associated resources in each technology area estimated.

The associated required resources for the outlined programme need to be split into effort in FTEs and material plus services (non-FTE) costs. It is expected that the figures for the total envisaged programme are consistent with anticipated resources, see below.

It is proposed that, in the text, the total FTE required per technology area be further broken down to indicate a rough percentage of: Academics + Postdocs; Engineers + Designers; Students; and Technicians. It is expected that the accompanying text will provide the justification for the required resources in terms of the outlined R&D programme by technology area, with specific reference to the listed deliverables.

For each identified technology area, a list of participating institutes should also be provided which indicates the DRDT being targeted with that technology by those institutes (see Table 2). Clearly this table assumes a matrix for linking the technology areas to the DRDTs has already been worked out for the proposed DRD Collaboration programme and is included in the proposal.

List of deliverables per technology and DRDT				
List of Contributing Institutes	Technology 1	Technology n
DRDT 1	List of contributors			
...				
DRDT n	List of contributors			

Table 2 List of Institutes in Matrix of Technology Area vs DRDT

3. Additional Confidential Material

Alongside the main proposal document it will be needed to compile estimates of resources to be submitted confidentially to the DRDC to provide evidence that the proposed R&D programme is realistically achievable. In Table 3, it is first requested to indicate the overall total of the numbers currently expected to be available from existing sources (institute supported staff, internal funds, awarded grants). Then it is suggested that the corresponding figures in support of the total envisaged programme are given which should include the proposed resources being sought as new “strategic” funding. It is expected to demonstrate a reasonable overall match within the first three years to the public Table 1 on the programme requirements. In the last column (≥ 2027) of Table 3 it is understood that national funding cycles will typically make it difficult to provide accurate projections, but some text with the prospective ranges of possible funding ramp-up should be added.

In compiling these estimated totals a further confidential matrix of both existing and proposed additional resources per technology area in each year would have been collected (typically grouped by Funding Agency) which justifies the figures appearing in Table 3. It is expected that, to provide the confidential supplied figures, institutes in each country will have entered into negotiations with their Funding Agency to ensure that the assumptions on additional support are reasonable but at this stage there would be no guarantees that the figures appearing can actually be committed. Arriving at the final committed numbers will require further iterations within the DRD collaborations and with the Funding Agencies to best balance the resources across the various technology areas, and leading to eventual signing of Memoranda of Understanding from 2024 onwards.

The confidential community inputs that will serve to build the DRD proposal and the resource tables, could be collected following a template format such as that presented in Table 4, but how this is best organised is left to each DRD to implement in the most appropriate way for their particular technology areas and DRDTs.

Timeline of FTE per DRDT and technology				
Estimate of expected total FTE from existing sources (not requiring new "strategic" support)	2024	2025	2026	≥ 2027
DRDT 1				
Technology 1	Total estimated FTE from existing sources			
...				
Technology n	Total estimated FTE from existing sources			
...				
DRDT n				
Technology 1	Total estimated FTE from existing sources			
...				
Technology n	Total estimated FTE from existing sources			
...				
Timeline of Materials and Services (non-FTE) Funding per DRDT and technology				
Estimate of expected total non-FTE funds from existing sources (not requiring new "strategic" funding)	2024	2025	2026	≥ 2027
DRDT 1				
Technology 1	Total estimated funds from existing sources			
...				
Technology n	Total estimated funds from existing sources			
...				
DRDT n				
Technology 1	Total estimated funds from existing sources			
...				
Technology n	Total estimated funds from existing sources			
...				
Timeline of FTE per DRDT and technology				
Estimate of total R&D programme FTE (sum of existing and hoped for given realistic assumptions)	2024	2025	2026	≥ 2027
DRDT 1				
Technology 1	Total number of FTE proposed			
...				
Technology n	Total number of FTE proposed			
...				
DRDT n				
Technology 1	Total number of FTE proposed			
...				
Technology n	Total number of FTE proposed			
...				
Timeline of Materials and Services (non-FTE) Funding per DRDT and technology				
Estimate of total R&D programme non-FTE funding (sum of existing and hoped for given realistic assumptions)	2024	2025	2026	≥ 2027
DRDT 1				
Technology 1	Total funding proposed			
...				
Technology n	Total funding proposed			
...				
DRDT n				
Technology 1	Total funding proposed			
...				
Technology n	Total funding proposed			
...				

Table 3 Confidential Compilation of Available and Required Resources

Proposed DRD input request to the community per DRDT				
Description/timeline/resources	Technology Deliverable 1	Technology deliverable n
DRDT 1				
Description of technology				
Strategic program(s) target				
Performance target				
Planned date, 2024-2025-2026, 2027-2029, ≥ 2030				
Existing R&D framework and/or list of contributors				
Description of contribution to the technology deliverable				
FTE contributions already covered or expected to continue				
"Materials" funding already covered or expected to continue				
Proposed FTE that would be needed to cover longer term strategic aspirations (≥ 2027)				
Proposed "Materials" that would be needed to cover longer term strategic aspirations (≥ 2027)				
...				
DRDT n				
Description of technology				
Strategic program(s) target				
Performance target				
Planned date, 2024-2025-2026, 2027-2029, ≥ 2030				
Existing R&D framework and/or list of contributors				
Description of contribution to the technology deliverable				
FTE contributions already covered or expected to continue				
"Materials" funding already covered or expected to continue				
Proposed FTE that would be needed to cover longer term strategic aspirations (≥ 2027)				
Proposed "Materials" that would be needed to cover longer term strategic aspirations (≥ 2027)				

Table 4 Suggested Template to Collect Community Input estimates. (A technology deliverable is a contribution to a physical object, it can be a component or a dedicated study prepared in collaboration with other contributors.)