CMS Upgrade MB Response to SLHC Review Reply:

10.02: R&D for a high η trigger and tracking detector for CMS

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The R&D described in the current proposal needs further justification of the need to complete the high eta region and the priority that this represents when compared with the other needs of the forward muon system. This may have been provided as part of the workshop held on Sept. 30 and should be forwarded to the Review Committee.

Before starting this program of R&D there should be an initial phase of simulation studies to determine the trigger demands, expected backgrounds and detector parameter requirements.

Please see the comments from the referees below.

Referee #1:

Part of the original charge was to determine if:

1) The R&D is appropriate for the needs of CMS at SLHC (ie focussed)
2) The R&D is not excessively duplicated (ie we don't have too many people have working on the same topics)

I think we can say for 2 it is not duplicated. We probably could use more people working on the project. Regarding 1, well, the case is not really justified. If we assume that there are good reasons to complete the high eta region beyond the present RPC coverage, then sure it is in CMS' interest. But the proponents prefer to do the generic R&D first on large-scale chambers with a new technology. So to answer 1, it is "maybe". I don't particularly mind R&D on a chamber technology for the forward region in case we need it, but it is rather generic at this stage since how the system could be used for triggering and how it would improve the capability of CMS is left for a future study.

Referee #2:

I went through the answers and the revised proposal.

I find the answers unsatisfactory, since they avoid the most relevant comments just claiming they are beyond the scope of the R&D. The project, apart from integration issues and some artificially added sentences in the global project description, looks just like a generic Detector R&D.

I still believe that the project is tackled in the wrong sequence.
It is CMS interest to know first if such a project can be applicable inside CMS, hence dedicated simulations of triggering and tracking performance in the CMS environment, even with a non-realistic and non-optimized detector, should come first.

The realization of a large scale detector is indeed an important step, but cannot be the only addressed item in an R&D of CMS interest.

As it is the project could stand on itself as a detector R&D without any reference to CMS.

Concerning the answers to the main questions

1) There is indeed no duplication and probably no interference within CMS (even if integration with CSCs and Forward RPCs is not addressed).
2) It can be of CMS interest, but nothing is foreseen in order to assess this interest on solid ground.

Referee #3:

I am still convinced that the study of feasibility of the large size detector is not the priority for the project, or at least it should proceed in parallel with other studies.

I also agree with other referees that first we need to explain physics motivations and justification with dedicated simulation studies. From those studies we have to understand the trigger demands, expected background and identify detector parameters (eg. detector rate capability vs expected trigger rate, integrated charge, time resolution etc).
It should be followed by R&D in order to study/optimize the detector (choice of gas mixture, construction parameters, front end electronics..) for CMS needs.

In my opinion thinks like finding the best mechanical solution for integration in the CMS system should come later.