Replies (shortened) to questionnaire about White Paper R&D work packages 4, 5, 6 , 7 and 11.

Full replies are available at http://indico.cern.ch/conferenceDisplay.py?confId=91663

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   a. If yes, how many of these deliverables should be available and when and what else are you expecting (production, integration, ...)?
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(3) Which resources are you able to inject in that particular project either to reach completion of new requirements or to customise or to integrate? With which time scale?

(4) How do you see the long term future (beyond 2011) of this WP ? (e.g. extension, reduction, re-focus, conversion to service, absorption in experiment specific upgrade projects, …).

(5) General comments

	WP4				
	(1) Relevance	**(2) Deliverables 2011**	**(3) Experiment's Resources**	**(4) Future >2011**	**(5) Comments**
ALICE	Test equipment & infrastructure extremely useful. → PH-DT service after 2011.	/	/	to become PH service or a PH core activity after 2011.	/
ATLAS	So far, profited mainly from infrastructure	Comments about model of collaboration ATE/DT	Small ATLAS R&D team; profits, when needed, from technical support of DT	Bonding and metrology facility to be maintained	Comments about ATE/DT collaboration
CMS	Key issue for CMS. Extremely useful.	Workplan perfectly in line with needs.	Small CMS R&D team; profits, when needed, from technical support of DT	Expect smooth transition of resources from WP to experiment specific projects.	Good communication and cooperation CMX /DT.
LHCb	Important for LHCb, in the frame of RD50; Studies of Diamond, Silicon, 3D sensors and guard-rings is fundamental for LHCb.	We expect the design (by LHCb) of radiation hard pixel design with minimal guard-ring at this time.	The LHCb VELO group is involved in the RD50 project. See question 1+2. A very precise beam telescope for test beam has been provided.	Expect facilities for radiation tests and qualification of design and product	
LCD	Radiation hardness is not a big issue for CLIC, however experience relevant for CLIC small-angle calorimetry (silicon-based or diamond-based).	/	/	/	/
NA62	Excellent cooperation for radiation hardness tests	Continue the cooperation on radiation hardness, understanding of radiation damage, influence on the pulse shape	Rad. hard test and time resolution: several FTE's are working on this from the collaboration.	R&D work should be finished by end 2011.	/
TOTEM	Radiation hard edgeless silicon detectors. Use more radiation hard material and/or use the 3D technology	It would be useful if some horizontal pots could be equipped with the new detectors, the rest could follow in 2013.	TOTEM can provide personnel to test the detectors during different phases of assembly.	As mentioned above the TOTEM programme can extend beyond 2013.	
Synthesis	WP4 activities and the associated infrastructure are considered very relevant.	Work plan perfectly in line with CMS plan. Apparently no conflicts with other experiments.	ATLAS and CMS work on sensor R&D. Profit from support by DT.	Expect smooth transition from R&D project to experiment specific projects. Expect facilities (bonding, metrology, sensor qualification) to be maintained available.	

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	WP5				
	(1) Relevance	**(2) Deliverables 2011**	**(3) Experiment's Resources**	**(4) Future >2011**	**(5) Comments**
ALICE	Many gas based ALICE detectors. VHMPID: CsI coated thick GEMs. Large UV photon detectors for RICH based on THGEM technology". Expect GARFIELD guaranteed beyond 2011.	Technology choice of VHMPID matches with the outlined RD51 activities.	2 ALICE persons until 2011. Support for RD51 DAQ system must come from RD51 collaboration.	Expect activities to become PH services or a PH core activity after 2011.	/
ATLAS	High eta muon system upgrade with micromegas. 'Correct' collaboration ATE/DT.	Comments about model of collaboration ATE/DT	2.5 FTE	Too early to decide	/
CMS	Study on hight eta muon system with triple GEM.	0	Currently still modest	Infrastructure and expertise to be maintained. Additional resources to be linked to concrete projects in experiments	Comments about RD51 work programme ←→ funds and resources
LHCb	LHCb is using GEMs, so generally speaking, this WP is relevant	no specific requirements	None for general work, but resources required to do a particular job for LHCb are provided through LHCb collaborating institutes (INFN).	At present LHCb has no plans for using additional GEM chambers for the detector upgrade.	The usefulness of the activity "development of common, scalable electronics system" is questionable, as other systems of this kind exist
LCD	Relevant for several activities in the linear collider community (TPC, HCAL)	The new large-area MPGD facility is very relevant for the linear collider detector R&D.	Nothing, because this R&D is currently not the focus of the PH-LCD group itself	Maintain some of the facilities as a service. R&D itself shall become rather project-specific, once we have learned how to make MPGD at larger surfaces.	
NA62	So far, no contact with WP5 activities. R&D work on "ultra light gas detector architectures usable in vacuum" could be an interesting subject.	/	/	/	/
TOTEM	TOTEM intends to implement large area GEM chambers into the T1 telescope or even exchange the existing CSC chambers by large area GEM chambers.	Large area GEM chambers could be installed in the long shutdown (staring end of 2011). Prototypes should be tested and approved in 2011.	Production could be done in a TOTEM collaboration institute. DT would be needed for the assembly and the integration into the CMS end cap..	Beyond 2013 there will be always a need of support from DT for dismounting and remounting of the T1 telescope.	
Synthesis	WP5 is relevant for all experiments.	Work plan well matched to ALICE needs. Large area MPGD facility relevant for LCD.	CERN groups of ALICE, ATLAS, CMS and LHCb collaboration partner are actively involved in WP.	Expertise and infrastructure to be maintained. Access to facilities should become service. R&D shall become project specific.	

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(5) General comments

	WP6 / QA				
	(1) Relevance	**(2) Deliverables 2011**	**(3) Experiment's Resources**	**(4) Future >2011**	**(5) Comments**
ALICE	Interested in the infrastructure (test equipment) and expertise (trained personnel) to apply QA and Reliability Testing for the upgrade R&D and construction,	/	/	The WP activities that ALICE is interested in all fall in the category, which we hope to become PH service or a PH core activity after 2011.	
ATLAS	In principle very useful	/	/	/	/
CMS	Certainly very useful		Adequate resources will be provided when needed	QA should remain as a facility, further developed responding to specific needs	QART lab is an excellent initiative
LHCb	QART is certainly relevant and interesting for the LHCb upgrade	see (4) below and might be useful from 2011 onwards	none for general work, but resources required to do a particular job for LHCb will be added if required	This activity should become a service. For specific and volume test activities the resources should come from or be financed by the client. WP7	/
LCD	Very important for CLIC, in particular for vertex detector development.	For the QA, I cannot judge yet whether this satisfies our needs, or whether we need something in addition.	Can probably inject a fraction of an FTE (30% fellow or DOCT) into the development of Michael Campbell et. Al.	Keep the interconnect as a common R&D activity, and add TSV-type studies to it (see above). Maintain the QA as a service.	
NA62	see comments made after ESE steering.				
TOTEM	needs access to the bond lab for gluing, bonding and testing of silicon detectors and VFATs for their upgrade programme.	This activity will go on sporadically for the next years.	TOTEM personnel can help in gluing and testing.	As mentioned above this activity could go beyond 2013.	
Synthesis	QART is considered very relevant and useful for all experiments.		Resources will be provided when there is a concrete need	Should become a service. For specific and volume test activities, resources to come from clients.	

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	WP7				
	(1) Relevance	**(2) Deliverables 2011**	**(3) Experiment's Resources**	**(4) Future >2011**	**(5) Comments**
ALICE	The ALICE RPC detectors (TOF and Muon Trigger) used the GIF a lot. New needs will almost certainly arise during operation in the next years. The materials database and RPC gas system studies are interesting but not of prime importance for ALICE.	/	/	The WP activities that ALICE is interested in all fall in the category, which we hope to become PH service or a PH core activity after 2011.	/
ATLAS	Profited and made substantial use of GIF. Part of host lab activities	Keep GIF operational until GIF++ is available. Same holds for p/n facility. DT could assist collaborations in defining plans and programs	People and specific infrastructure can be made available case-by-case	Very important. Also add Silicon facility.	
CMS	Profited of GIF, notably for RPC studies. Availability is of crucial importance. For p/n, CMS uses mainly Karlsruhe facility.	Keep GIF operational until GIF++ is available.	CMS people available to test CMS detectors	CERN should invest in facilities which are not available elsewhere or which are needed a lot by machine and experiments. A mixed field facility would be particularly valuable	
LHCb	RPCs not relevant, but detector material DB and GIF++ are of general relevance; PS radiation facility is relevant for future tests	No specific requirements at present, but availability of irradiation facilities will be important for the qualification of e.g. the Upgrade VELO modules	GIF++: no current use of GIF, no future use of GIF++ foreseen, no injection of resources, Nevertheless, full support of the project and ready to re-discuss resources in case the need will arise.	For the GIF++ part and irradiation facilities: Should be treated similar to other test-beam areas.	/
LCD	WP is not so important for us. Nevertheless, we profit from the LHC experience for our small-angle calorimetry. There is also some interest by other LC groups.	/	/	/	/
NA62	no specific comments.	/	/	/	/
TOTEM	No reply	No reply	No reply	No reply	No reply
Synthesis	GIF/GIF++ and future p/n facility are relevant for all LHC experiments.	GIF to be kept operational until GIF++ available.	Human resources can be provided if concrete needs arise.	GIF++ and p/n facility to become/to be maintained as services.	

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	WP11				
	(1) Relevance	**(2) Deliverables 2011**	**(3) Experiment's Resources**	**(4) Future >2011**	**(5) Comments**
ALICE	Very relevant for tracker upgrade project. ALICE is using a C4F10 evaporative cooling for the Pixel detector → strong interest in evaporative cooling systems based on µ-channel technology.	/	Close follow-up in the context of the NA62 Giga tracker project.	/	/
ATLAS	CO2 cooling is IBL baseline. Essential: Relations with EN group and cryolab to be maintained.	Work planned on CO2 and keeping existing plants operational is fundamental.	Already now: 1 staff + 1 fellow. Will continue to build planned plants.	/	Issue of a single CERN cooling group to be re-addressed at a later stage.
CMS	CO2 cooling is baseline for pixie and full tracker upgrade. Technical leadership by CMX+DT is vital throughout the whole project cycle. Other activities of WP11 potentially useful.	CO2 cooling and fibre optic sensors well matched to CMS needs.	CMS and other CMS institutes active in the field. Expect increasing resources in coming years.	Main focus should be on CO2 cooling. Avoid weakening of CO2 by too many other activities. CERN PH must retain technical leadership of the projects. Will require substantial financial and human resources.	CO2 cooling systems should have full support from PH department throughout all phases of projects.
LHCb	Relevant for LHCb upgrade and replacement. Mobile CO2 units are required (VELO, silicon tracker). Equipment for vacuum qualification of components essential (thermal behaviour, out-gassing etc.)	We expect a mobile CO2 cooling unit for test purposes such as test beam activities and VELO replacement quality control.	Not really, the knowledge for CO2 cooling is with NIKHEF/LHCb for the LHCb VELO cooling.	We expect to use the existing CO2 cooling system for the upgrade at point 8. Mobile systems will be used for test beam purpose until then.	/
LCD	Very important LCD project. CO2 cooling, but also gas-flow solutions or micro-channels directly on/through the chips.	LCD has different time-scale and requirements. Nevertheless, we follow the R&D in CO2 cooling and micro-channel cooling with much interest,	I expect that from 2011 or 2012 onwards, PH-LCD will inject 1 FTE in cooling studies. Could be quite project-specific.	Partly conversion into a service, partly with injection of experiment resources for project-specific developments.	
NA62	Very interested in the Micro-Channel cooling. If successful, it has a very high chance to be selected as the final choice for the cooling of the NA62 GTK.	The main deliverables expected by NA62 are: 1. A micro channel cooling prototype made of a thin Si-Pyrex assembly using Anodic bonding. 2. Same prototype with Si-Si assembly. (thickness 2x50 µm + channel depth (50-90 µm)). (Timescale: ≈ End 2010)	NA62 will continue to participate with 2 FTE's in the micro-channel development.	Our timeline is to build the detector by the end of 2012, so the R&D work should be finished by end 2011.	./.
TOTEM	No reply	No reply	No reply	No reply	No reply
Synthesis	WP11 is considered very relevant by almost all experiments, in particular CO2 activity.	Several experiments count on availability of (portable and full) CO2 plants, also micro-channel cooling.	Substantial support from ATLAS, CMS and NA62. Expect increase in coming years.	Main focus should be on CO2 activity.	