CMS Internal Note

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CMS Software and Computing Tasks and Deliverables

The CPT Project

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Abstract

This document describes the task breakdown and deliverables of the CMS CPT project, where:

"C" denotes "Computing and Core Software" (CCS);
"P" denotes "Physics Reconstruction and Selection" (PRS); and
"T" denotes "Trigger and Data Acquisition Systems (TriDAS) but, in the context of CPT, covers only the online software components of the TriDAS project.

Cross-project activities, notably the SPROM (Simulation PROject Management) and RPROM (Reconstruction PROject Management) groups are included.

It is intended to form *a starting point for discussions* that will ultimately lead to:

- a complete task breakdown structure for all CPT activities;
- descriptions of the main deliverables of each task;
- the definition of an organisational sub-structure for the CPT activities with L2 managers and clear reporting lines and channels of communication between the CCS, PRS, TriDAS and detector sub-projects;
- a schedule with well-defined milestones;
- a baseline estimate of the resources required to complete the project according to the required scope and on schedule.

Executive Summary

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List of Tasks

List of Deliverables

CCS Project: Core Personnel Requirements (in FTE-years)

Notes:

1. Currently available personnel are shown in parentheses
2. *Red italic* denotes a shortfall in resources
3. *Green italic* denotes an excess of resources
4. Computing centre operations staff are not shown in this table

Deliverable / role	Start	End	2001	2002	2003	2004	2005	2006	2007
1.1-i T0/T1 Liaison	01/01/2004	31/12/2007				0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)
1.1-ii CMS T0/T1 coord	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
1.1-iv OnlineExpert	01/01/2004	31/12/2007				*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
1.1-v Comp.Expert	01/01/2001	31/12/2007	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
1.2-viii SW support at Tier1s	01/01/2001	31/12/2007							
1.2-ix SW development at Tier0s	01/01/2001	31/12/2007							
1.2-x DBAdmin at Tier1s	01/01/2001	31/12/2007							
1.2-xi ProdCoord at Tier1s	01/01/2001	31/12/2007							
1.2-xii GridIntegr at Tier1s	01/01/2001	31/12/2007							
1.2-xiii R&D at Tier1s	01/01/2001	31/12/2007							
1.3-i CMS T2 Manager	01/01/2004	31/12/2007				0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)
1.4- CMS WAN Coordinator	01/01/2001	31/12/2007	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)
1.4-i CMS WAN engineer	01/01/2002	31/12/2007		*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*
1.5-i CMS Comp.Specialist	01/01/2002	31/12/2007		*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*
1.5-ii CMS Comp.Specialist	01/01/2002	31/12/2007		*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*
1.5-iii CMS Comp.Specialist	01/01/2002	31/12/2007		*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*
1.6-i Model simulator	01/01/2001	31/12/2002	1 (1)	1 (1)					
1.6-ii Model simulator	01/01/2003	31/12/2007			0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)
1.6-iii Model simulator	01/01/2003	31/12/2007			0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)
1.6-iv Model simulator	01/01/2003	31/12/2007			0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)
1.7-i Cocotime rep	01/01/2001	31/12/2004	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)			
1.7-ii T1/T2 Liaison	01/01/2001	31/12/2004	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)			
1.7-iii T1 Manager	01/01/2001	31/12/2004	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)			
1.7-iv T1 Manager	01/01/2001	31/12/2004	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)			
1.7-v T1 Manager	01/01/2001	31/12/2004	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)			
1.7-vii T1/T2 Liaison	01/01/2001	31/12/2004	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)			
1.7-vii T1 Manager	01/01/2001	31/12/2004	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)			
1.7-vii T1 Manager	01/01/2001	31/12/2004	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)			
1.7-viii US-CCS-PM	01/01/2001	31/12/2004	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)			
1.7-ix T2 Manager	01/01/2001	31/12/2004	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)			
1.7-x T2 Manager	01/01/2001	31/12/2004	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)			
1.7-xi T2 Manager	01/01/2001	31/12/2004	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*			
Sum, task 1			*5.9 (4.2)*	*6.3 (4.2)*	*6.2 (4.1)*	*7 (4.4)*	*3.4 (1.3)*	*3.4 (1.3)*	*3.4 (1.3)*

Deliverable / role	Start	End	2001	2002	2003	2004	2005	2006	2007
2.1-i Toolsmith 1	01/01/2001	31/12/2007	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
2.1-ii Toolsmith 2	01/01/2001	31/12/2007	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
2.1-iii System Administrator	01/01/2001	31/12/2007	*0.5 (0.2)*	*0.5 (0.2)*	*0.5 (0.2)*	*0.5 (0.2)*	*0.5 (0.2)*	*0.5 (0.2)*	*0.5 (0.2)*
2.2-i System Administrator	01/01/2001	31/12/2007	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)
2.2-ii System Administrator	01/01/2001	31/12/2007	*1 (0.2)*	*1 (0.2)*	*1 (0.2)*	*1 (0.2)*	*1 (0.2)*	*1 (0.2)*	*1 (0.2)*
2.4-i Info. systems 1	01/01/2001	31/12/2007	*1 (0.3)*	*1 (0.3)*	*1 (0.3)*	*1 (0.3)*	*1 (0.3)*	*1 (0.3)*	*1 (0.3)*
2.4-ii Info. systems 1	01/01/2001	31/12/2007	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)
2.4-iii Info. systems 1	01/01/2001	31/12/2007	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)
2.4-iv Info. systems 1	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
2.4-v Info. systems 1	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
2.4-vi Info. systems 1	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
2.5-i Info. systems 2	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
2.5-ii Info. systems 2	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
2.5-iii Info. systems 2	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
2.5-iv Info. systems 2	01/01/2001	31/12/2007	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
2.6-i Info. systems 2	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
2.6-ii Info. systems 2	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
2.6-iii Info. systems 2	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
2.6-iv Info. systems 2	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
Sum, task 2			*7.7 (2.4)*	*7.7 (2.4)*	*7.7 (2.4)*	*7.7 (2.4)*	*7.7 (2.4)*	*7.7 (2.4)*	*7.7 (2.4)*

Deliverable / role	Start	End	2001	2002	2003	2004	2005	2006	2007
3.1-viii Architect 1	01/01/2001	31/12/2007	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
3.1-viii Architect 2	01/01/2002	31/12/2007		*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
3.3-v Framework 1	01/01/2001	31/12/2007	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*
3.3-v Framework 2	01/01/2003	31/12/2007			*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
3.3-v ToolKits 1	01/01/2001	31/12/2007	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
3.3-v Grid Integrator 1	01/01/2001	31/12/2007	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
3.3-v Grid Integrator 2	01/01/2003	31/12/2007			*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
3.6-x Graphics/UI/GUI arch	01/01/2001	31/12/2007	*0.5 (0.3)*	*0.5 (0.3)*	*0.5 (0.3)*	*0.5 (0.3)*	*0.5 (0.3)*	*0.5 (0.3)*	*0.5 (0.3)*
3.6-x Graphics	01/01/2001	31/12/2007	*1 (0.3)*	*1 (0.3)*	*1 (0.3)*	*1 (0.3)*	*1 (0.3)*	*1 (0.3)*	*1 (0.3)*
3.6-x UI/GUI	01/01/2001	31/12/2007	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*
3.7-v Det. Description 1	01/01/2001	31/12/2007	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
3.7-v Det. Description 2	01/01/2001	31/12/2007	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
3.9-i SPROM Coordinator	01/01/2001	31/12/2007	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
3.9-i OSCAR Engineer 1	01/01/2001	31/12/2007	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
3.9-i OSCAR Engineer 2	01/01/2002	31/12/2007		*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
3.9-i FAMOS Engineer	01/01/2002	31/12/2007		*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
3.9-i CMSIM Supporter	01/01/2001	30/06/2002	0.5 (0.5)	0.2 (0.2)					
3.9-ii RPROM Coordinator	01/01/2001	31/12/2007	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
3.9-ii ORCA Engineer 1	01/01/2001	31/12/2007	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
3.9-ii ORCA Engineer 2	01/01/2002	31/12/2007		*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
3.9-iii Online	01/01/2001	31/12/2007	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
Sum, task 3			*13 (6.1)*	*15.7 (5.8)*	*17 (5.6)*	*17 (5.6)*	*17 (5.6)*	*17 (5.6)*	*17 (5.6)*

Deliverable / role	Start	End	2001	2002	2003	2004	2005	2006	2007
4.1-ii SCRAM development	01/01/2000	31/12/2000							
4.1-iii Toolsmith/engineer	01/01/2001	31/12/2007	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*
4.2-i CMS librarian	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
4.2-ii CMS librarian	01/01/2001	31/12/2007	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
4.2-iii CMS librarian	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
4.2-iv Toolsmith/engineer	01/04/2001	31/06/2001	*0.2 (0)*						
4.2-v Toolsmith/engineer	01/04/2001	31/06/2001	*0.2 (0)*						
4.2-vi Toolsmith/engineer	01/07/2001	31/09/2001	*0.2 (0)*						
4.3-i Toolsmith/engineer	01/09/2000	31/12/2000							
4.3-ii Toolsmith/engineer	01/01/2000	31/12/2000							
4.3-iii deputy developer	01/01/2001	31/12/2001	0.5 (0.5)						
4.4-i Toolsmith/engineer	01/01/2001	31/12/2007	*0.3 (0)*	*0.3 (0)*	*0.3 (0)*	*0.3 (0)*	*0.3 (0)*	*0.3 (0)*	*0.3 (0)*
4.4-ii Toolsmith/engineer	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
4.5-i Toolsmith/engineer	01/04/2001	31/12/2001	*0.4 (0)*						
4.5-ii Toolsmith/engineer	01/04/2001	31/06/2001							
4.5-iii Toolsmith/engineer	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
4.6-i Toolsmith/engineer	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
4.6-ii Toolsmith/engineer	01/01/2001	31/06/2001	*0.2 (0)*						
4.6-iii Toolsmith/engineer	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
4.6-iv Toolsmith/engineer	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
4.7-i Toolsmith/engineer	01/06/2001	31/06/2001							
4.7-ii Toolsmith/engineer	01/06/2001	31/06/2001							
4.7-iii Toolsmith/engineer	01/07/2001	31/07/2001	*0.1 (0)*						
4.7-iv Toolsmith/engineer	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
4.7-v Toolsmith/engineer	01/01/2001	31/12/2007	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*	*0.1 (0)*
4.7-vi Toolsmith/engineer	01/01/2001	31/12/2007	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*	*0.2 (0)*
Sum, task 4			*4.6 (0.5)*	*2.8 (0)*	*2.8 (0)*	*2.8 (0)*	*2.8 (0)*	*2.8 (0)*	*2.8 (0)*

Deliverable / role	Start	End	2001	2002	2003	2004	2005	2006	2007
5.7-i SW process engineer 1	01/01/2001	31/12/2007	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*
5.7-i SW process engineer 2	01/01/2001	31/12/2007	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*
5.7-i SW process engineer 3	01/01/2002	31/12/2007		*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
5.7-i SW process engineer 4	01/01/2003	31/12/2007			*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
Sum, task 5			*2 (1)*	*3 (1)*	*4 (1)*	*4 (1)*	*4 (1)*	*4 (1)*	*4 (1)*

Deliverable / role	Start	End	2001	2002	2003	2004	2005	2006	2007
6.6-i Prod. Tools 1	01/01/2001	31/12/2007	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
6.6-i Prod. Tools 2	01/01/2001	31/12/2007	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
6.6-i Prod. Tools 3	01/01/2001	31/12/2007	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
6.6-i Grid Integrator 1	01/01/2001	31/12/2007	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
6.6-i Grid Integrator 2	01/01/2003	31/12/2007			*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*	*1 (0)*
6.6-i Grid Integrator 3	01/01/2003	31/12/2005			*1 (0)*	*1 (0)*	*1 (0)*		
6.6-i Prod. Operations 1	01/01/2001	31/12/2007	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*
6.6-i Prod. Operations 2	01/01/2001	31/12/2007	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*	*1 (0.5)*
6.6-i DB Chief Engineer	01/01/2001	31/12/2007	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
6.6-i DB Engineer T0	01/01/2001	31/12/2007	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
6.6-i DB Engineer T1	01/01/2001	31/12/2007	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
6.6-i DB Engineer T2	01/01/2001	31/12/2007	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*	*0.5 (0)*
Sum, task 6			*8.5 (3)*	*8.5 (3)*	*10.5 (3)*	*10.5 (3)*	*10.5 (3)*	*9.5 (3)*	*9.5 (3)*

CCS TOTAL			*41.7 (17.2)*	*44 (16.4)*	*48.2 (16.1)*	*49 (16.4)*	*45.4 (13.3)*	*44.4 (13.3)*	*44.4 (13.3)*

1 Computing Centres *(Martti Pimiä)*

This task entails the provisioning of the actual computing resources for CMS. This is primarily a coordination and negotiation task where the actual resources for the centers flow through other channels (IT at CERN, the regional centers etc).

1.1 T0/T1 Centre at CERN *(CMS T0/T1 Coordinator)*

The Tier0/Tier1 at Cern is to support all raw data storage, the first reconstruction pass and adequate connectivity to the outside Tier1 and directly supported Tier2 centres. In addition, user support for the Cern-resident community has to be provided. It will provide about 1/3 of the total required computing resources in CMS.

Deliverable:	**1.1-i CMS T0/T1 Liaison**	
Description:	The negotiation with IT on the actual physical implementation and usage of the T0/T1 facilities. Includes the current cocotime type of negotiation.	
Responsible:	CMS T0/T1 Coordinator	
Client/Sponsor:	CMS	
Completion:	From 2004	
Risks/Resources:	Common Facility for all four experiments. No direct authority.	
	Resource:	T0/T1 Liaison
	Period:	01/01/2004 – 31/12/2007
	FTE's:	0.2 (needed), 0.2 (available)
	Resource type:	FTE-MG, **Funding source:** NK

Deliverable:	**1.1-ii CMS T0/T1 Configuration**	
Description:	To fit the CMS computing model, the resources of the T0/T1 will need proper configuration, optimisation, tuning. (CPUs, disk servers, mass storage, network topology, etc...) Current (3/2001) estimates including efficiency factors are that the T0/T1 in 2007 should supply to CMS: 688kSI95, 917TB of Disk, 1540TB of Active tape, 2632TB of Archive tape, 800 MB/s of tape I/O.	
Responsible:	CMS T0/T1 Coordinator	
Client/Sponsor:	Production groups, Online DAQ.	
Completion:	Ongoing	
Risks/Resources:	Common Facility for all four experiments. No direct authority.	
	Resource:	CMS T0/T1 coord
	Period:	01/01/2001 – 31/12/2007
	FTE's:	0.2 (needed), 0.0 (available)
	Resource type:	FTE-SE, **Funding source:** NK

Deliverable:	**1.1-iii T0/T1 Distributed Computing**
Description:	Provide connectivity and services to Tier1 Regional Centres and attached Tier2s. Coordinate with outside centres.
Responsible:	CMS T0/T1 Coordinator
Client/Sponsor:	All outside centres.
Completion:	Ongoing.
Risks/Resources:	WAN bandwidth, No direct authority.

Deliverable:	**1.1-iv T0 Online connectivity**	
Description:	Specify the connectivity of CMS Online DAQ with Tier0.	
Responsible:	T0 Online liaison	
Client/Sponsor:	Online, CCS	
Completion:	Fully functional in 2005. Prototypes before then.	
Risks/Resources:	Online system design.	
	Resource:	OnlineExpert
	Period:	01/01/2004 – 31/12/2007
	FTE's:	0.5 (needed), 0.0 (available)
	Resource type:	FTE-SE, **Funding source:** NK

Deliverable:	**1.1-v T0/T1 monitoring and trouble-shooting**	
Description:	CMS needs have to be specified, usage of facilities has to be monitored, problems have to be investigated.	
Responsible:	CMS computing expert	
Client/Sponsor:	Production groups, CCS, Online DAQ.	
Completion:	Started already, fully functional in 2005.	
Risks/Resources:		
	Resource:	Comp.Expert
	Period:	01/01/2001 – 31/12/2007
	FTE's:	1.0 (needed), 0.0 (available)
	Resource type:	FTE-SE, **Funding source:** NK

1.2 Tier 1 Regional Computing Centres *(Tier 1 Managers)*

Each CMS Tier 1 Regional Center will provide deliverables to the experiment in several different categories. These include providing computing resources, staff to manage the computing, staff to provide software support, staff that will collaborate on development of CMS software products, and staff to share in the R&D and design of CMS computing systems. These contributions will be divided between deliverables to the experiment at large and meeting the needs of the local physics community. While the precise amount of the different contributions will vary from one regional centre to another, they will be present to some degree in each. We give figures here for a typical centre.

3/2001 we estimate that a canonical T1 facility should supply to CMS: 152kSI95, 276TB of Disk, 590TB of Active tape, 433TB of Archive tape, 400MB/s of Tape I/O.

Tier1 RC's are supposed to provide a full service, 24×7, with an excellent connectivity to the T0/T1 at CERN and its attached Tier2s. It is optimised for scheduled tasks.

Deliverable:	**1.2-i Computing resources**
Description:	The Tier1 centre will provide CPU cycles, online disk storage, mass storage, I/O bandwidth between the CPU and disk/mass storage, and network bandwidth between the centre and CERN and between the centre and supported Tier2 and local CMS institutes. Typical quantities of these resources are 150-200 K SI95 CPU cycles, 300 TB of disk, 1-2 PB of mass storage, and 1 Gb/sec network connections. A substantial portion of the computing resources are assigned to perform some portion of the standard CMS processing, including simulation, reconstruction, event selection, physics object creation, and physics group analysis, as well as storage for canonical data samples. These computing tasks are predictable in their demands, and they will be shared among all the CMS centres to ensure all tasks are covered somewhere. These jobs will act as background activities in the centre, but enough resources must be reserved for these tasks to ensure timely completion. A fraction of the computing resources and storage will be available for allocation to CMS wide physics groups working on the data samples stored at that particular centre. The centre must be able to provide accounts for all CMS physicists working on those data samples independent of geographic location. Finally, some remaining portion of the resources will be reserved for the needs of local physics communities served by this centre. This includes needs of associated Tier2 and local centres which depend on the Tier1 to provide data samples and computing cycles. The centres will also need to provide testing and development facilities for CMS physics software development. The assignment of tasks and allocation of resources between these three portions will be negotiated on a regular basis between the centre and the CMS CCS project.
Responsible:	The T1 Managers
Client/Sponsor:	The T1/CMS Coordinators
Completion:	From 2004
Risks/Resources:	Sufficient staff must be in place at the centre to operate the facility and ensure resource usage is consistent with priorities set by the experiment. This includes staff for tasks including operations, system administration, network operation, database administration, security and storage management. Video conferencing and other remote cyber presence activities must be supported. Some of this infrastructure support may share resources with management of existing facilities, but there will be typically 10 FTE's providing CMS operational support at each Tier1 centre.

Deliverable:	**1.2-ii IN2P3 Tier1 Centre**
Description:	The big computing centre in France will be the IN2P3CC located in Lyon. It will be shared between the LHC experiments.
Responsible:	CMS IN2P3CC Manager
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	From 2004.
Risks/Resources:	

Deliverable:	**1.2-iii Main Computing Centre in Germany**
Description:	The big computing centre in Germany is under discussion. It may be shared between the LHC experiments.
Responsible:	CMS German Tier1 Manager
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	From 2004.
Risks/Resources:	

Deliverable:	**1.2-iv INFN Tier1 Centre**
Description:	The big computing centre in Italy will be hosted by INFN.
Responsible:	CMS INFN Tier1 Manager
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	From 2004.
Risks/Resources:	

Deliverable:	**1.2-v Moscow Computing Cluster**
Description:	The Moscow Region will form a cluster of computing centres with excellent connectivity between themselves, giving local data access services and a gateway connection to CERN.
Responsible:	CMS Moscow Cluster Manager
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	From 2004.
Risks/Resources:	

Deliverable:	**1.2-vi RAL Tier1 Centre**
Description:	The big computing centre in UK will be hosted by RAL and will be shared between the LHC experiments.
Responsible:	CMS RAL Tier1 Manager
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	From 2004.
Risks/Resources:	

Deliverable:	**1.2-vii FNAL Tier1 Centre**
Description:	The big US computing centre dedicated for CMS will be located in Fermilab.
Responsible:	CMS FNAL Tier1 Manager
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	From 2004.
Risks/Resources:	

Deliverable:	**1.2-viii Software Support**
Description:	The centre must provide personnel to aid in the installation and distribution of CMS software products, both at the centre itself and in associated Tier2 and local centres. Consulting support and help desk facilities should be provided. CMS distributed information resources must be provided and supported. Training in the use of CMS software should be provided.
Responsible:	The T1 Managers
Client/Sponsor:	The Regional physicists
Completion:	From 2004
Risks/Resources:	Typically 5 FTE's at each centre will participate in these activities. **Resource:** SW support at Tier1s **Period:** 01/01/2001 – 31/12/2007 **FTE's:** 0.0 (needed), 0.0 (available) **Resource type:** FTE-SE, **Funding source:** NK

Deliverable:	**1.2-ix Software Development**
Description:	Each Tier1 centre will provide a pool of software developers who will collaborate on the worldwide development of CMS software products, including working with physicists developing physics software. The software professionals at a particular centre may take on a specific development task, on their own or in collaboration with other centres, as well as providing ongoing consulting and code reviews for physics software.
Responsible:	The CCS Collaboration Board members
Client/Sponsor:	The CCS Project
Completion:	Ongoing
Risks/Resources:	Typically 5 FTE's at each centre will participate in these activities. **Resource:** SW development at Tier1s **Period:** 01/01/2001 – 31/12/2007 **FTE's:** 0.0 (needed), 0.0 (available) **Resource type:** FTE-SE, **Funding source:** NK

Deliverable: **1.2-x Database Administration**

Description: Each Tier1 centre will need a dedicated CMS database administrator.
Responsible: The T1 Managers
Client/Sponsor: The CCS Project
Completion: From 2002
Risks/Resources: CMS database administrator.

Resource: DBAdmin at Tier1s
Period: 01/01/2001 – 31/12/2007
FTE's: 0.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Deliverable: **1.2-xi Production Coordination**

Description: Each Tier1 centre will need a dedicated CMS production coordinator.
Responsible: The T1 Managers
Client/Sponsor: The CCS Project
Completion: From 2001
Risks/Resources: CMS production coordinator.

Resource: ProdCoord at Tier1s
Period: 01/01/2001 – 31/12/2007
FTE's: 0.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Deliverable: **1.2-xii GRID integration**

Description: Each center must integrate its computing system to use the agreed GRID methods and tools.
Responsible: The T1 Managers
Client/Sponsor: *Who wants the deliverable? As specific as possible.*
Completion: From 2002.
Risks/Resources: CMS grid integrator.

Resource: GridIntegr at Tier1s
Period: 01/01/2001 – 31/12/2007
FTE's: 0.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Deliverable: **1.2-xiii Computing System Research and Development**

Description: Staff will also participate in the design of new CMS computing systems and evaluation of new technology, and collaborate on advanced computing R&D needed for future CMS computing systems. The needs of the regional centres must be included in architectural decisions, and the centres need to participate in developing solutions to the unprecedented computing challenges presented by the volume and complexity of the CMS data samples.
Responsible: The T1 Managers
Client/Sponsor: R&D for the CCS group
Completion: Ongoing
Risks/Resources: Typically 5 FTE's at each centre will participate in these activities.

Resource: R&D at Tier1s
Period: 01/01/2001 – 31/12/2007
FTE's: 0.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

1.3 Tier 2 Regional Computing Centres *(The T2/CMS Coordinators)*

Typically, these are Institute or local community servers, providing attended services only during working hours (local time), and run unattended otherwise. The Tier2 centre will provide CPU cycles, online disk storage, and network bandwidth between the centre, its Tier1 and local CMS institutes.

Tier2s are optimised for analysis or chaotic access, running MonteCarlo work in spare time.

In 3/2001 we estimate that in 2007 a canonical T2 will supply to CMS: 36 kSI95, 100 TB of Disk, 50 TB of Archive Tape and 100 MB/s of Tape I/O.

The general assumption is that a T2 is CMS specific.

Deliverable: **1.3-i Computing resources**

Description: The Computing resources available to CMS at the T2.
Responsible: The T2 Managers
Client/Sponsor: The T2/CMS Coordinators
Completion: From 2004
Risks/Resources: Tier2 managers.

Resource: CMS T2 Manager
Period: 01/01/2004 – 31/12/2007
FTE's: 0.1 (needed), 0.1 (available)
Resource type: FTE-MG, **Funding source:** NK

1.4 Wide Area Networks *(Coordinator name)*

CMS will make extreme requirements on WAN's. The negotiation of WAN capacity is typically bigger than CMS, or CERN or even HEP. Nevertheless we must ensure that the computing facilities of CMS ore efficiently placed and used.

CMS WAN coordinator.

Resource: CMS WAN Coordinator
Period: 01/01/2001 – 31/12/2007
FTE's: 0.1 (needed), 0.1 (available)
Resource type: FTE-MG, **Funding source:** NK

Deliverable: **1.4-i Technology and cost projection of wide-area networks**

Description: Follow-up of technology and policy of wide-area network services.
Responsible: CMS WAN coordinator.
Client/Sponsor: The T1 and T2 managers
Completion: From 2002.
Risks/Resources: Policy not in our control.

Resource: CMS WAN engineer
Period: 01/01/2002 – 31/12/2007
FTE's: 0.1 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

1.5 Coordination of Technology Tracking *(Coordinator name)*

Each computing centre is evaluating new technology to be used in their centre. To avoid duplication of this work, some coordination effort is needed.

Deliverable: **1.5-i Projection of cost and technology of CPU power**

Description: Follow the field, make predictions.
Responsible: *Responsible person*
Client/Sponsor: *Who wants the deliverable? As specific as possible.*
Completion: From 2002.
Risks/Resources:

Resource: CMS Comp.Specialist
Period: 01/01/2002 – 31/12/2007
FTE's: 0.1 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**1.5-ii Projection of cost and technology of disk**
Description:	Follow the field, make predictions.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	From 2002.
Risks/Resources:	
	Resource: CMS Comp.Specialist
	Period: 01/01/2002 – 31/12/2007
	FTE's: 0.1 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**1.5-iii Projection of cost and technology of mass storage**
Description:	Follow-up of technology and costing of mass storage based on robotic tape systems, both for active use of the stored data and for archived data.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	From 2002.
Risks/Resources:	Follow the field, make predictions.
	Resource: CMS Comp.Specialist
	Period: 01/01/2002 – 31/12/2007
	FTE's: 0.1 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

1.6 System Simulation *(Iosif Legrand)*

Simulations of large scale computing systems are performed to help understand bottlenecks and optimise performance for a variety of configurations and running conditions: production, analysis, on-line, etc. After an initial verfication phase where the simulation should be performed and compared against measured results from prototype computing centers, the simulation should be capable of accurately predicting the behavior of the computing center. The should allow problems to be diagnosed and solutions tested in the simulation. The MONARC simulation toolkit is currently employed.

Deliverable:	**1.6-i Computational Simulation Verfication**
Description:	Simulations should be performed on prototype T0,T1,T2, and on-line computing centers and their interactions to reproduce measured behavior.
Responsible:	System Simulation Coordinator
Client/Sponsor:	Computing Center coordinators and Distributed Computing Developers
Completion:	Before 12/2002
Risks/Resources:	Simulation must be able to accurately predict computation center behavior given a finite set of measured parameters. T0/T1, and T2 coordinators must have faith in the predictive power and reliability of the simulation, otherwise it is pointless to continue with simulation deliverables.
	Resource: Model simulator
	Period: 01/01/2001 – 31/12/2002
	FTE's: 1.0 (needed), 1.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**1.6-ii Tier1 Simulations**
Description:	Aid Tier1 coordinators in the choice of hardware capability and configuration by supplying simulations of CPU usage, network usage, tape access, etc. Arrive at a system in which simulations can be modified easily, so that proposed changes and solutions can be quickly evaluated.
Responsible:	*Responsible person*
Client/Sponsor:	Tier1 Coordinators
Completion:	After 1/2003
Risks/Resources:	Simulation program must have been successfully validated, simulation packages must be able to be implemented by users.
	Resource: Model simulator
	Period: 01/01/2003 – 31/12/2007
	FTE's: 0.3 (needed), 0.3 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**1.6-iii Tier2 Simulations**
Description:	Aid Tier2 coordinators in the choice of hardware capability and configuration by supplying simulations of CPU usage, network usage, tape access, etc. Arrive at a system in which simulations can be modified easily, so that proposed changes and solutions can be quickly evaluated.
Responsible:	*Responsible person*
Client/Sponsor:	Tier2 Coordinators
Completion:	After 1/2003
Risks/Resources:	Simulation program must have been successfully validated, simulation packages must be able to be implemented by users.
	Resource: Model simulator
	Period: 01/01/2003 – 31/12/2007
	FTE's: 0.3 (needed), 0.3 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**1.6-iv Simulations of Tier0/Tier1/Tier2 Interactions**
Description:	Simulation of Tier interactions to evaluate network and CPU requirements and bottlenecks for the distributed computing system.
Responsible:	*Responsible person*
Client/Sponsor:	Computing Center Coordinators, Distributed Computing Developers
Completion:	After 1/2003
Risks/Resources:	Simulation program must have been successfully validated, simulation modules for distributed computing elements must have been developed.
	Resource: Model simulator
	Period: 01/01/2003 – 31/12/2007
	FTE's: 0.3 (needed), 0.3 (available)
	Resource type: FTE-SE, **Funding source:** NK

1.7 T0/T1/T2 Prototypes *(Coordinator name)*

These prototypes are required to test all aspects of the computing model including production, data distribution and analysis. They serve both as test facilities for stress-testing the model and as the production centers for the collaborations current large scale data processing, serving and analysis needs.

Deliverable: **1.7-i Prototype T0/T1 Liaison**

Description: The T0/T1 testbed is a critical component of our test strategy. It is typically the largest single facility available, but is only available for 30% of the year to CMS. This makes it valuable to test each level of increasing complexity before that problem is tackled by the remote centers. The liaison deliverable involves negotiating with CERN/IT/Cocotime to have in place the testbed functionality we require in a timely way and to schedule CMS use of the testbed. The canonical T0/T1 testbed in 2004 is expected to have a scale of 84kSI95, 119TB of Disk, 285 TB of active Tape, 487 TB of archive Tape and 148MB/s of tape I/O

Responsible: Tony Wildish

Client/Sponsor: The other parts of this subtask

Completion: Ongoing 2001-2004

Risks/Resources: Common Testbed for all four experiments. No direct authority.

Resource: Cocotime rep
Period: 01/01/2001 – 31/12/2004
FTE's: 0.1 (needed), 0.1 (available)
Resource type: FTE-MG, **Funding source:** CMS-US-DOE

Deliverable: **1.7-ii Liaison with Regional Prototype T1 Centers**

Description: A canonical prototype T1 center in 2004 would be configured to deliver: about 20 kSI95, 36 TB of Disk, 109 TB of Active tape, 80 TB of archive tape and 74 MB/s of Tape I/O. This corresponds to approximately 50% of an eventual T1 complexity.

Responsible: Someone

Client/Sponsor: The other parts of this subtask

Completion: Ongoing 2001-2004

Risks/Resources:

Resource: T1/T2 Liaison
Period: 01/01/2001 – 31/12/2004
FTE's: 0.1 (needed), 0.1 (available)
Resource type: FTE-MG, **Funding source:** NK

Deliverable: **1.7-iii Prototype T1 Center at FNAL**

Description: The FNAL T1 center will be dedicated to CMS and thus available year-round. It must also develop and supply the management ability of the US based prototype T2's

Responsible: Vivian O'Dell

Client/Sponsor: The other parts of this subtask

Completion: Ongoing 2001-2004

Risks/Resources:

Resource: T1 Manager
Period: 01/01/2001 – 31/12/2004
FTE's: 0.5 (needed), 0.5 (available)
Resource type: FTE-MG, **Funding source:** CMS-US-DOE

Deliverable: **1.7-iv Prototype T1 Center at INFN**

Description: The INFN T1 center will be a shared facility, but the CMS share of this center will be comparable to a canonical T1. It must also develop and supply the management ability of the INFN/CMS based prototype T2's

Responsible: Paolo Capiluppi

Client/Sponsor: The other parts of this subtask

Completion: Ongoing 2001-2004

Risks/Resources:

Resource: T1 Manager
Period: 01/01/2001 – 31/12/2004
FTE's: 0.5 (needed), 0.5 (available)
Resource type: FTE-MG, **Funding source:** CMS-IT-INFN

Deliverable: **1.7-v Prototype T1 Center at Lyon**

Description: The Lyon center will be a shared facility. Due to its current activities with Babar it can serve as an information interconnect with the Babar experience. The final CMS share of a Lyon T1 is expected to be of order 30-40%. We assume that we would have access to approximately this percentage of the Lyon facility scaled as a canonical prototype T1

Responsible: Philippe Mine

Client/Sponsor: The other parts of this subtask

Completion: Ongoing 2001-2004

Risks/Resources:

Resource: T1 Manager
Period: 01/01/2001 – 31/12/2004
FTE's: 0.5 (needed), 0.5 (available)
Resource type: FTE-MG, **Funding source:** CMS-FR-IN2P3

Deliverable: **1.7-vi Other Prototype T1 Center**

Description: Place-holder. Special T1 prototypes may be required for countries with particular problems, or the ability to address critical questions effectively

Responsible:

Client/Sponsor:

Completion: Ongoing 2001-2004

Risks/Resources: Resources?

Deliverable: **1.7-vii Liaison with Prototype T2 Centers**

Description: We estimate that to fully test the computing model, in particular the ability to effectively use the T2 centers for CMS production purposes and to test their effectiveness to serve the analysis requirements that we will need approximately 10 prototype T2 centers. The scale of a canonical prototype T2 in 2004 would be 7kSI95, 19TB Disk, 9 TB archive tape and 18MB/s of Tape I/O

Responsible: The Regional T1 centers coordinators and someone at CERN

Client/Sponsor: The other parts of this subtask

Completion: Ongoing 2001-2004

Risks/Resources:

Resource: T1/T2 Liaison
Period: 01/01/2001 – 31/12/2004
FTE's: 0.1 (needed), 0.1 (available)
Resource type: FTE-MG, **Funding source:** NK

Resource: T1 Manager
Period: 01/01/2001 – 31/12/2004
FTE's: 0.1 (needed), 0.1 (available)
Resource type: FTE-MG, **Funding source:** CMS-US-DOE

Resource: T1 Manager
Period: 01/01/2001 – 31/12/2004
FTE's: 0.1 (needed), 0.1 (available)
Resource type: FTE-MG, **Funding source:** CMS-IT-INFN

Deliverable:	**1.7-viii US Prototype T2 Centers**
Description:	To stress-test the US T1, both from a computing and management point of view, we estimate that 2-3 prototype T2 centers are required in the US. The aggregate US T2 prototypes should be scaled to match the US T1 computing power, with similar scaling factors for its Disk, Tape and connectivity. At least one of the US T2's will server as to integrate CMS Grid requirements with deliverables of GRID projects.
Responsible:	Lothar Bauerdick
Client/Sponsor:	The US T1 center and US based Physicists
Completion:	Ongoing 2001-2004
Risks/Resources:	
	Resource: US-CCS-PM **Period:** 01/01/2001 – 31/12/2004 **FTE's:** 0.1 (needed), 0.1 (available) **Resource type:** FTE-MG, **Funding source:** CMS-US-DOE

Deliverable:	**1.7-ix UK Prototype T2 Center**
Description:	A key deliverable of this T2 center will be the integration of CMS facilities with the deliverables of GRID projects. It may connect to a UK based T1 or to a CERN based T1
Responsible:	Dave Newbold/ Dave Collins
Client/Sponsor:	A UK T1 center and UK based Physicists
Completion:	Ongoing 2001-2004
Risks/Resources:	
	Resource: T2 Manager **Period:** 01/01/2001 – 31/12/2004 **FTE's:** 0.5 (needed), 0.5 (available) **Resource type:** FTE-MG, **Funding source:** CMS-UK

Deliverable:	**1.7-x RDMS Prototype T2 Cluster**
Description:	The particular requirements of the RDMS collaboration may be well served by a hybrid "T2 Cluster" of 4-5 tightly coupled T2 centers sharing data storage facilities and with a gateway/buffer to the CERN T0/T1 and the rest of the CMS computing. The RDMS T2 cluster concept will require testing. Special considerations of its typically worse WAN connections must be take into account
Responsible:	Ilyin Vlacheslav / Vladimir Gavrilov ?
Client/Sponsor:	RDMS based Physicists
Completion:	Ongoing 2001-2004
Risks/Resources:	
	Resource: T2 Manager **Period:** 01/01/2001 – 31/12/2004 **FTE's:** 0.5 (needed), 0.5 (available) **Resource type:** FTE-MG, **Funding source:** CMS-RDMS

Deliverable:	**1.7-xi INFN Prototype T2 Center**
Description:	A key deliverable of this T2 center will be the integration of CMS facilities with the deliverables of GRID projects. It would connect to the INFN T1
Responsible:	Paolo Capiluppi
Client/Sponsor:	The INFN T1 center and Italian based Physicists
Completion:	Ongoing 2001-2004
Risks/Resources:	
	Resource: T2 Manager **Period:** 01/01/2001 – 31/12/2004 **FTE's:** 0.5 (needed), 0.0 (available) **Resource type:** FTE-MG, **Funding source:** CMS-IT-INFN

Deliverable:	**1.7-xii Other Prototype T2 Center**
Description:	Place-holder. Special T2 prototypes may be required for countries with particularly complex connectivity problems. Efficient use of such facilities is vital to CMS and to the remote physicists
Responsible:	
Client/Sponsor:	The regional physicists
Completion:	Ongoing 2001-2004
Risks/Resources:	

2 General CMS Computing and Software Services *(Werner Jank)*

This is supposed to cover the fundamental computing and software infrastructure required for any collaboration. Many, but certainly not all, of the services covered are closely related to those provided in a general way at CERN by the CERN/IT division. Additional CMS-specific tools need to be provided in order to implement functionality required by the software, and to optimise the use of the available resources in the context of the CMS computing model.

All services are developed and made available only on the platforms supported by CMS, i.e. currently Linux on Intel-PC and SUN/Solaris on SPARC.

2.1 General Computing Facilities *(Nick Sinanis)*

CMS has access to computing resources, which are partly dedicated, and partly shared with other experiments and activities. Systems like workgroup servers and batch facilities are mostly managed centrally, while dedicated systems for prototyping work are managed by the collaboration. It is important to provide a computing environment for the user, which is to a large extent identical on all computing facilities where the users have access to.

Deliverable:	**2.1-i CMS Computing and Software Development Environment**
Description:	For every login-session, provide the standard CMS environment (HEPiX settings, shell flags, path settings, CMS flags, .. Creating and adapting software tools that facilitate the production of the software deliverables. Evaluation, configuration and integration of selected commercial development tools. Secure and easy-to-use job-submission, with clear job-status displays, queue manipulation, etc. Dynamic queue setup and configuration.
Responsible:	*Responsible person*
Client/Sponsor:	Physicists, offline software developers, engineers.
Completion:	On-going.
Risks/Resources:	On shared facilities, some configurations might be difficult to achieve. Online software may require (partially) different settings.
	Resource: Toolsmith 1
	Period: 01/01/2001 – 31/12/2007
	FTE's: 1.0 (needed), 1.0 (available)
	Resource type: FTE-SE, **Funding source:** CMS-CE-CMC

Deliverable:	**2.1-ii Tools for Data preparation for processing, Data search, Data recovery**
Description:	Tools for preparation of data for processing, like data (pre)staging, distribution, replication, re-clustering. Data location search, browsing (meta data). Data recovery after mistake, error, malfunction.
Responsible:	*Responsible person*
Client/Sponsor:	Physicist, Production manager.
Completion:	On-going.
Risks/Resources:	Available resources (e.g. disk space, system throughput, available network bandwidth. Data model, persistency not yet final. Some tools mainly for expert use.
	Resource: Toolsmith 2
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.5 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**2.1-iii Computing administration and operations**
Description:	Provide tools for monitoring (e.g. system/cpu/disk usage, performance, ..), error logging, etc.. Use tools on regular basis to produce necessary statistical data.
Responsible:	*Responsible person*
Client/Sponsor:	Computing managers, system administrators, developers.
Completion:	On-going.
Risks/Resources:	System information partly restricted.
	Resource: System Administrator
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.5 (needed), 0.2 (available)
	Resource type: FTE-SA, **Funding source:** CMS-CE-CMC

2.2 System Support and System Administration *(Coordinator name)*

All systems used (e.g. batch servers, workgroup servers, prototyping systems and desktop) need on-going support and administration. Stable running and efficient usage have to be guaranteed. Evaluation of new products, versions and features have to be made.

Deliverable:	**2.2-i Hardware configuration**
Description:	Hardware configuration has to be adapted to specific use (e.g. prototyping, disk servers, LANs).
Responsible:	*Responsible person*
Client/Sponsor:	System manager, production manager, developer.
Completion:	On-going.
Risks/Resources:	Breaking of warranty. Restrictions on LAN, as required by CERN/IT.
	Resource: System Administrator
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.3 (needed), 0.3 (available)
	Resource type: FTE-SA, **Funding source:** CMS-CE-CMC

Deliverable:	**2.2-ii System support and administration**
Description:	Installation, configuration, administration, trouble-shooting of standard (full CMS support) and prototyping systems. • Operating system, developer environments and compilers (C, C++, java, f77) • Utilities (shells, Perl, web-browsers, etc.) • Disk and network configuration (switches, up-links) • Backups (system and user files), archiving • etc...
Responsible:	*Responsible person*
Client/Sponsor:	System manager, production manager, developer.
Completion:	On-going.
Risks/Resources:	Version management. Disturbance of LAN.
	Resource: System Administrator
	Period: 01/01/2001 – 31/12/2007
	FTE's: 1.0 (needed), 0.2 (available)
	Resource type: FTE-SA, **Funding source:** CMS-CE-CMC

2.3 Local Area Network *(Coordinator name)*

....of the CMS clusters, work group servers,..

Deliverable:	**2.3-i** *xxx*
Description:	hepix, setenv, ...
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

2.4 Information Systems *(Jean-Pierre Porte)*

This item covers the construction, operation, and maintenance of the collaboration information systems.

Deliverable: **2.4-i Deployment and Operation of WWW Server**

Description: Deployment and operation of several kind of www-servers. Support is provided for

- Outreach server (cmsinfo)
- Workhorse server (cmsdoc)
- Special, secure server (FB, MB, SC, ..)
- Project and people home-pages
- Web-based download
- cgi-scripts, php support, servelets
- ftp server
- Automated support for meeting organisation (agenda, minutes, news, documents handling)
- Global search features

Responsible: Jean-Pierre Porte, Nick Sinanis
Client/Sponsor: Collaboration and general public.
Completion: On-going.
Risks/Resources: Secure access required.

Resource: Info. systems 1
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 0.3 (available)
Resource type: FTE-SE, **Funding source:** CMS-CE-CMC

Deliverable:	**2.4-ii Deployment and Maintenance of Collaboration Database System**
Description:	Collaborating institutes and people database. Advanced search features. Output selection and formatting (e.g. printable address labels).
Responsible:	Jean-Pierre Porte, secretariat
Client/Sponsor:	Collaboration, secretariat.
Completion:	On-going.
Risks/Resources:	Personal data privacy.
Resource:	Info. systems 1
Period:	01/01/2001 – 31/12/2007
FTE's:	0.2 (needed), 0.2 (available)
Resource type:	FTE-SE, **Funding source:** CMS-CE-CMC

Deliverable:	**2.4-iii System for Storing Documents (Technical Notes, etc.)**
Description:	Document repository, with advanced search features. Format conversion and checking. Support for writing (e.g. templates), submission and approval.
Responsible:	Jean-Pierre Porte
Client/Sponsor:	Collaboration, secretariat.
Completion:	On-going.
Risks/Resources:	Checking for print-ability difficult.
Resource:	Info. systems 1
Period:	01/01/2001 – 31/12/2007
FTE's:	0.2 (needed), 0.2 (available)
Resource type:	FTE-SE, **Funding source:** CMS-CE-CMC

Deliverable:	**2.4-iv Development and Maintenance of CCS WWW pages**
Description:	All information and documentation of CCS relevant material.
Responsible:	*Responsible person*
Client/Sponsor:	People active in CCS. Collaboration.
Completion:	On-going.
Risks/Resources:	*Describe constraints, assumptions and risks.*
Resource:	Info. systems 1
Period:	01/01/2001 – 31/12/2007
FTE's:	0.2 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK

Deliverable:	**2.4-v Development and Maintenance of PRS WWW pages**
Description:	All information and documentation of PRS relevant material.
Responsible:	*Responsible person*
Client/Sponsor:	People active in PRS. Collaboration.
Completion:	On-going.
Risks/Resources:	*Describe constraints, assumptions and risks.*
Resource:	Info. systems 1
Period:	01/01/2001 – 31/12/2007
FTE's:	0.2 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK

Deliverable:	**2.4-vi Development and Maintenance of Online software WWW pages**
Description:	All information and documentation of Online relevant material.
Responsible:	*Responsible person*
Client/Sponsor:	People active in Online. Collaboration.
Completion:	On-going.
Risks/Resources:	*Describe constraints, assumptions and risks.*
Resource:	Info. systems 1
Period:	01/01/2001 – 31/12/2007
FTE's:	0.2 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK

2.5 Communication Systems *(Coordinator name)*

This item covers the construction, operation, and maintenance of the collaboration information systems.

Deliverable:	**2.5-i E-mail systems including Lists**
Description:	List-driven e-mail system, where lists can come from subscription, expression of interest. Duplication of e-mail should be avoided.
Responsible:	Nick Sinanis, Jean-Pierre Porte
Client/Sponsor:	Collaboration.
Completion:	On-going.
Risks/Resources:	*Describe constraints, assumptions and risks.*
Resource:	Info. systems 2
Period:	01/01/2001 – 31/12/2007
FTE's:	0.2 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK

Deliverable:	**2.5-ii News System**
Description:	Announcements, with archive and search feature.
Responsible:	Jean-Pierre Porte
Client/Sponsor:	Collaboration.
Completion:	On-going.
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Info. systems 2
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**2.5-iii Calendar System**
Description:	Personal and group calendars. Conference room booking.
Responsible:	*Responsible person*
Client/Sponsor:	Collaboration, secretariat.
Completion:	On-going.
Risks/Resources:	To be linked to the video-conferencing system.
	Resource: Info. systems 2
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**2.5-iv Collaborative Working Tools**
Description:	This task includes (possibly) development and (definitely) support of network-based collaborative working tools such as videoconferencing, which are invaluable to the highly distributed members of any HEP collaboration.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Info. systems 2
	Period: 01/01/2001 – 31/12/2007
	FTE's: 1.0 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

2.6 Problem reporting system (*Responsible person*)

Problem Resolution ensures that problems reported are actually resolved in a well understood manner, and that trends or problematic areas are recognised. The work necessary to ensure that all discovered problems are analysed and fixed will be identified. Reports will be created when problems are found in a piece of software or an activity, and a mechanism of identifying and acting on trends in problems will be established.

Deliverable:	**2.6-i Problem reporting system**
Description:	Establish and deploy a problem reporting system, that allows to ensure problems can be reported, described, noted, analysed, classified, re-directed, traced, archived, etc.. Grouping of problems (FAQs) and retrieval with a search facility.
Responsible:	*Responsible person*
Client/Sponsor:	Developers, Users.
Completion:	On-going.
Risks/Resources:	Useful, once project areas and base-lined products or processes are available. Difficult to add specific features to tools existing in shared facilities.
	Resource: Info. systems 2
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**2.6-ii Maintained action list**
Description:	Take note, prioritise problems, initiate actions, and track them to closure.
Responsible:	*Responsible person*
Client/Sponsor:	Developers.
Completion:	On-going.
Risks/Resources:	Should be there now, independent of a formal problem reporting.
	Resource: Info. systems 2
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**2.6-iii Closed problem**
Description:	Review the solutions to problems as they come in, and distribute the corresponding software, documentation, etc..
Responsible:	*Responsible person*
Client/Sponsor:	Developers, Users.
Completion:	On-going.
Risks/Resources:	Assumes that we have any problems.
	Resource: Info. systems 2
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**2.6-iv Trend analysis**
Description:	Collect and analyse fault occurrences, frequency, correlation with coding habits, etc., and feed results back into the relevant processes.
Responsible:	*Responsible person*
Client/Sponsor:	Developers, project managers.
Completion:	On-going.
Risks/Resources:	Assumes the above is in active use for some time.
	Resource: Info. systems 2
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

3 Architecture, Frameworks and Toolkits *(Vincenzo Innocente)*

This task covers the implementation, support and documentation of the software foundation on which the applications are built on. The three parts of the foundation are the architecture, the frameworks and the toolkits.

The architecture describes the model or blueprint of the key components of the system: what they are, how they behave, how they interact and so forth. The model is implemented through a main framework and several auxiliary frameworks for specific tasks. Examples of the latter are frameworks for geometry database, visualisation or calibrations. Finally, toolkits define a common language for all the software as highly reusable classes for containers, physics quantities, algorithms and so forth.

3.1 Software Architecture *(Coordinator name)*

This item covers the definition and evolution of the model for the software systems. It defines the key components, including what they are, how they behave, how they interact with each other, what their design is, and how they are partitioned physically. The item also includes documentation on how the architecture was derived: the most important use cases and requirements, analyses of the problem domain, and key decisions made.

Deliverable:	**3.1-i Tools to Create and Manage Architecture Document Views**
Description:	Tools to document the many aspects of the software architecture. They provide a means to generate several consistent documents from a pool of information describing the architecture. That is, each produced document is a view to some aspect of the architecture. The tools will guarantee that different documents are consistent when they have drawn from the same pool originally. They also hyper-link the generated documents as one web.
Responsible:	*Responsible person*
Client/Sponsor:	*Architecture document authors, PRS groups?*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.1-ii Top-Level Architectural Description**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	It should be published as a CMS internal note.

Deliverable:	**3.1-iii Top-Level Core Framework Description**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	It should be published as a CMS internal note.

Deliverable:	**3.1-iv Top-Level Framework Specialisation Descriptions**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	It should be published as a CMS internal note.

Deliverable:	**3.1-v Background Document on CMS Physics Analysis Strategy**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	It should be published as a CMS internal note.

Deliverable:	**3.1-vi Background Document on CMS System Architecture for Computing for Physics Analysis**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	It should be published as a CMS internal note.

Deliverable:	**3.1-vii Background Document on CMS System Architecture for Computing for Online Event Filtering and Monitoring**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	It should be published as a CMS internal note.

Deliverable:	**3.1-viii Temporary Test Deliverable Containing Architecture Resources**	
Description:	...some text here...	
Responsible:	xxx	
Client/Sponsor:	yyy	
Completion:	zzz	
Risks/Resources:	...some text here...	
	Resource:	Architect 1
	Period:	01/01/2001 – 31/12/2007
	FTE's:	1.0 (needed), 1.0 (available)
	Resource type:	FTE-SE, **Funding source:** NK
	Resource:	Architect 2
	Period:	01/01/2002 – 31/12/2007
	FTE's:	0.5 (needed), 0.0 (available)
	Resource type:	FTE-SE, **Funding source:** NK

3.2 Software Framework *(Coordinator name)*

The foundation of the CMS software is a professionally engineered framework into which physics modules may be inserted. the framework should support standard operations performed by physicists, including: accessing the CMS data store; selection and classification of events; the ability to apply calibration algorithms; invocation of standard or custom-built reconstruction algorithms; interactive visualisation and physics analysis systems with presentation-quality output; and creation of user-defined transient or persistent objects. The user of the framework will be able to choose what specific actions to perform and which specific algorithms to use even at run-time or interactively.

Deliverable:	**3.2-i Framework Design Document**
Description:	*Elaborate on purpose and functionality.* NB: This is similar to the "Description" items in the architecture section. Essentially the "Description" and "Design" documents are two different things: the former is a top level design, this one here is a complete design. Whether we want to specify that we want both I (= Lassi) am not sure, getting even one of them would be fabulous.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	It should be published as a CMS internal note.

Deliverable:	**3.2-ii Framework for use by Reconstruction Software**
Description:	The current version of the "CMS Analysis and Reconstruction Framework" known as CARF, provides the user with an intuitive and flexible means of performing analysis and reconstruction tasks. CARF uses an ODBMS to store objects persistently and will provide classes and methods to shield end-users from details of the ODBMS storage and access mechanisms, mostly in terms of C++ smart-references and smart-iterators.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	Already delivered.
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.2-iii Common Framework for use in Software for Physics**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.2-iv Creation of an Independent Releasable Unit for the Framework**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

3.3 Software Framework Specialisations (*Coordinator name*)

Place-holder for other frameworks we will need.

Deliverable:	**3.3-i Framework Specialisation for Simulation**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.3-ii Framework Specialisation for Reconstruction**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.3-iii Framework Specialisation for Production Meta-Data Management**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.3-iv Creation of an Independent Releasable Unit for the Framework Specialisations**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.3-v Temporary Test Deliverable Containing Framework Resources**
Description:	...some text here...
Responsible:	xxx
Client/Sponsor:	yyy
Completion:	zzz
Risks/Resources:	...some text here...

Resource:	Framework 1
Period:	01/01/2001 – 31/12/2007
FTE's:	1.0 (needed), 0.5 (available)
Resource type:	FTE-SE, **Funding source:** NK
Resource:	Framework 2
Period:	01/01/2003 – 31/12/2007
FTE's:	0.5 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK
Resource:	ToolKits 1
Period:	01/01/2001 – 31/12/2007
FTE's:	0.5 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK
Resource:	Grid Integrator 1
Period:	01/01/2001 – 31/12/2007
FTE's:	1.0 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK
Resource:	Grid Integrator 2
Period:	01/01/2003 – 31/12/2007
FTE's:	1.0 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK

3.4 Toolkits (*Coordinator name*)

The toolkits needed by the project.

CMS philosophy is to encourage the use of a common set of basic components (externally or internally developed) for all kind of basic computing services. External components requires integration, maintenance and upgrades and form a basic configuration common to all CMS physics-software projects.

Internally developed components will be organized into toolkits. Each toolkit is a collection of rather independent software units that could be used in several contexts.

A toolkit depends on a limited and well defined set of external libraries of which, usually, extends and/or adapts functionality and interface.

Toolkits are released together with the corresponding Framework Specialisation.

Deliverable:	**3.4-i Integration, Maintenance and Upgrades of non-CMS Software used by CMS Physics-Software**
Description:	The philosophy of CMS is to exploit non-CMS software wherever possible, including Anaphe, HEP-wide, public-domain, and commercial components. While this strategy saves development time it does imply the need for non-trivial work to integrate and upgrade the external software.
Responsible:	Toolkits coordinator.
Client/Sponsor:	CCSs and PRS developers and users.
Completion:	There is already a full suite integrated and working. Support is continuously required as products evolve is ongoing.
Risks/Resources:	All CMS software projects are encoraged to use the same components and therefore this task should be centrally coordinated.

Deliverable:	**3.4-ii Basic class libraries**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.4-iii Persistent Basic class libraries**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.4-iv Specific toolkit for G3/CMSIM**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.4-v Specific toolkit for G4**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.4-vi Specific toolkit for Data Acquisition Environment**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.4-vii Specific toolkit for Grid Environment**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

3.5 Integration of Framework and Grid Services (*Coordinator name*)

...some text here...

Deliverable:	**3.5-i Requirement and Constraint Document to the Framework from Grid Infrastructure.**
Description:	Support and deliver tools and infrastructure to allow efficient use of CMS worldwide computing resources.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.5-ii Requirement and Constraint Document from the Framework to Grid Services.**
Description:	Tools will be created for database replication and synchronisation between production sites, remote job submission, system monitoring, and load balancing.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

3.6 Interactive Graphics Toolkits (*Coordinator name*)

For the moment, this means the "Interactive Graphical User Analysis (IGUANA)" software. The IGUANA software project addresses interactive visualisation software needs for three domains:

- graphical user interfaces (GUI's);
- interactive detector and event visualisation; and
- interactive data analysis and presentation;

for use in a variety of areas such as offline simulation and reconstruction, data analysis, and test beams. Tasks include the assessment of use-cases and requirements and the evaluation, integration, adaptation, verification, deployment, and support in the CMS environment of visualisation software from HEP, academia, the public domain, and the commercial sector.

Pre-existing software is exploited as much as possible to optimise the use of the resources available. Therefore, a significant component of this task will be the assessment of available tools and their adaptation, extension, deployment, and support in the CMS environment.

Deliverable:	**3.6-i Document describing the use cases and scenarios for interactive analysis**
Description:	In order to ensure delivery of anything useful from IGUANA it is imperative to re-evaluate the mission and priorities of IGUANA, following the delivery of the "Functional Prototype" software in October 2000 (CMS Note IN 2000/052). The use-cases and scenarios should come from the target IGUANA clients who ultimately should include the whole collaboration. For this deliverable it is assumed that the use-cases and scenarios will be collected by the Cafétask force from a variety of sources especially people involved in the CCS, RPROM, SPROM, and the PRS activities.
Responsible:	Cafétask force.
Client/Sponsor:	IGUANA developers.
Completion:	April 2001 *(check this with Café!)*
Risks/Resources:	The document describing the use cases and scenarios should be approved by their sponsors and the CPT project management. It should be published as a CMS internal note.

Deliverable:	**3.6-ii Requirements document derived from on an analysis of the use-cases and scenarios**
Description:	The requirements should be specified as derived from the use-cases and scenarios. Additional assumptions and constraints, if any, should be clearly described. The document should arrange the requirements according to natural sub-tasks of IGUANA and ensure that the boundaries between IGUANA and other projects are clear.
Responsible:	IGUANA coordinator.
Client/Sponsor:	IGUANA developers.
Completion:	Approximately two months after the use-cases and scenarios have been completed and agreed upon by their respective sponsors, i.e. June 2001.
Risks/Resources:	The requirements document should be approved by the use-case sponsors and the CPT project management. It should be published as a CMS internal note.

Deliverable:	**3.6-iii IGUANA Repository using the CMS-standard Configuration Management System**
Description:	This item consists of a coherent Software Infrastructure including a software repository, multi-platform build, release, distribution, and documentation systems, and regular public versioned releases of both software and documentation. All aspects of this infrastructure should exploit common CMS tools and procedures as much as possible.
Responsible:	IGUANA coordinator.
Client/Sponsor:	IGUANA developers.
Completion:	Already established. Support is an ongoing activity.
Risks/Resources:	This is absolutely required. The maintenance of this infrastructure requires ongoing effort from qualified personnel.

Deliverable:	**3.6-iv Generic Software for Event Display**
Description:	Event visualisation task covers the visualisation of the simulated and reconstructed data. It applies to both the underlying software packages as well as the specific applications developed within CMS. As a general principle, we aim for the well-known and successful Model-View-Controller paradigm in which the visualisation is divided into three largely independent parts: the *model*, which constitutes the underlying data to be visualised; the *view*, which is the representation of the data on a display; and the *controller*, which handles interactions between the user and the model and/or the view. This philosophy is reflected in the subdivision of this task into subtasks that relate to the underlying graphics engines, viewers and representations for CMS-related data.
Responsible:	IGUANA coordinator.
Client/Sponsor:	RPROM and PRS groups.
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Event display package relies heavily on externally developed an supported software.

Deliverable:	**3.6-v Detector Description Browsing and Visualisation**
Description:	This task is used to examine the contents of the Detector Description and perform 3D visualisation of the contents. Visualisation serves as an important debugging tool to verify the contents of the Detector Description.
Responsible:	IGUANA Coordinator.
Client/Sponsor:	Detector description, SPROM, RPROM, and PRS groups.
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	It is assumed that all the detector-specific work is carried out by the sponsors.

Deliverable:	**3.6-vi Event Collection Browsing and Manipulation Tools**
Description:	This task provides, in conjunction with the CMS framework, interactive tools which facilitate the users interaction and manipulation of event collections. In particular, they should support: browsing of meta-data associated to event collections; the creation of user collections; the creation of deep or shallow copies; and support for miscellaneous database administration tasks such as cloning, cleaning and deleting of events/collections.
Responsible:	IGUANA coordinator.
Client/Sponsor:	Users of CMS event collections, particularly the RPROM and PRS groups and probably the production teams.
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.6-vii Software for Histogram Plotting and Fitting**
Description:	This task involves the integration of histogram plotting and numerical fitting packages into the CMS analysis environment. Developing tools to plot and manipulate persistent histograms stored in the database.
Responsible:	IGUANA coordinator.
Client/Sponsor:	CMS Users Performing Analysis
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	This is assumed to be primarily an integration task with most of the underlying technology developed within Lizard and other off-project efforts.

Deliverable:	**3.6-viii Deployment of a GUI builder**
Description:	Down-loading of a pre-existing GUI builder (e.g. QtArchitect), building it on standard CMS platforms, and installing it in a generally accessible place.
Responsible:	IGUANA coordinator.
Client/Sponsor:	IGUANA developers and possibly developers of graphics applications which use the same GUI tools as IGUANA.
Completion:	We should just do it...it only takes a day or so...
Risks/Resources:	None.

Deliverable:	**3.6-ix GUI Widgets pool**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.6-x Temporary Test Deliverable Containing Graphics/UI/GUI Resources**
Description:	...some text here...
Responsible:	xxx
Client/Sponsor:	yyy
Completion:	zzz
Risks/Resources:	...some text here...

Resource:	Graphics/UI/GUI arch.
Period:	01/01/2001 – 31/12/2007
FTE's:	0.5 (needed), 0.25 (available)
Resource type:	FTE-SE, **Funding source:** NK
Resource:	Graphics
Period:	01/01/2001 – 31/12/2007
FTE's:	1.0 (needed), 0.25 (available)
Resource type:	FTE-SE, **Funding source:** NK
Resource:	UI/GUI
Period:	01/01/2001 – 31/12/2007
FTE's:	1.0 (needed), 0.5 (available)
Resource type:	FTE-SE, **Funding source:** NK

3.7 Detector Description (*Coordinator name*)

This task aims to provide an environment for creating, manipulating, and using the parameters describing the CMS detector in a consistent manner. In particular, it covers the geometrical description of the detector elements at various levels (full engineering detail, full GEANT detail, fast simulation, trigger tower geometries, etc.), associated material properties, magnetic field map, etc. The Detector Description sub-system will serve a number of clients, including OSCAR, the Fast Simulation, ORCA, the Calibration, and the User Analysis Environment. Deliver tools to encapsulate detector description at the various degrees of precision required for CMS software tasks.

Provide an environment for creating manipulating, and using parameters describing the CMS detector in a consistent manner.

Geometry description of the detector elements at various levels (full engineering detail, full GEANT detail, fast simulation, trigger tower geometries, etc.), associated material properties, and magnetic field map.

The sub-system will serve a number of clients including ORCA, OSCAR, Fast Simulation, Calibration, and User Analysis Environment.

Deliverable:	**3.7-i Central Repository of Detector Description Data**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.7-ii Interfaces to Engineering Descriptions of Data**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.7-iii Interfaces to Simulation, Reconstruction, and Analysis Software**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.7-iv Magnetic Field Description**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.7-v Temporary Test Deliverable Containing Det. Description Resources**
Description:	...some text here...
Responsible:	xxx
Client/Sponsor:	yyy
Completion:	zzz
Risks/Resources:	...some text here...

Resource:	Det. Description 1
Period:	01/01/2001 – 31/12/2007
FTE's:	1.0 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK

Resource:	Det. Description 2
Period:	01/01/2001 – 31/12/2007
FTE's:	0.5 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK

3.8 Technology Tracking, Evaluation and Choice of a Baseline Set of Products *(Coordinator name)*

In a fast evolving environment such as IT, technology tracking is essential. Each time a new technology and/or a new product become available, its impact on our computing and software system has to be evaluated. If it is relevant a proper R&D program, including unit testing, simple prototyping and integration in the current CMS computing and software system, has be be organized. If successful the new technology/product can became a baseline choice. A baseline technology/product still requires tracking to follow its evolution, test and eventually import new versions, detect possible obsolescence and consequentely plan a migration to a new technology/product.

Basic deliverables are evaluation documents, locally installed versions, and, if relevant, unit and integration test suites for functionality, performance and regression.

The evaluation results and the baseline choice of technologies should be documented in a CMS internal note. The baseline choice should be approved by the CPT project management.

Deliverable:	**3.8-i Computing, Networking and Mass Storage Performance**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.8-ii Databases and Data Storage Technologies**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.8-iii Distributed Computing Technologies**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.8-iv Software Analysis and Design Methods**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.8-v Object Oriented Technologies**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.8-vi Software Framework Technologies**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.8-vii Graphics Hardware and Software**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.8-viii OS's and compilers**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**3.8-ix Yet unknown products if it's relevant**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

3.9 Place-holder Subtask for: Architecture, Frameworks and toolkits *(Coordinator name)*

...some text here...

Deliverable:	**3.9-i Temporary Test Deliverable Containing Simulation Resources**
Description:	...some text here...
Responsible:	xxx
Client/Sponsor:	yyy
Completion:	zzz
Risks/Resources:	...some text here...

Resource: SPROM Coordinator
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 1.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: OSCAR Engineer 1
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 1.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: OSCAR Engineer 2
Period: 01/01/2002 – 31/12/2007
FTE's: 1.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: FAMOS Engineer
Period: 01/01/2002 – 31/12/2007
FTE's: 0.5 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: CMSIM Supporter
Period: 01/01/2001 – 30/06/2002
FTE's: 0.5 (needed), 0.5 (available)
Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**3.9-ii Temporary Test Deliverable Containing Reconstruction Resources**
Description:	...some text here...
Responsible:	xxx
Client/Sponsor:	yyy
Completion:	zzz
Risks/Resources:	...some text here...

Resource: RPROM Coordinator
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 1.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: ORCA Engineer 1
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: ORCA Engineer 2
Period: 01/01/2002 – 31/12/2007
FTE's: 1.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**3.9-iii Temporary Test Deliverable Containing Miscellaneous Resources**
Description:	...some text here...
Responsible:	xxx
Client/Sponsor:	yyy
Completion:	zzz
Risks/Resources:	...some text here...

Resource: Online
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

4 Software Users and Developers Environment *(Stephan Wynhoff Ad-interim)*

This item covers development and support for the CMS software and environment including the associated code and configuration management systems, version control mechanisms, change control and the code and software release, distribution, and build procedures. An important aspect of this task is the porting, technical verification, and support of CMS and external code on multiple systems. It also needs to provide suitable tools for developers and feedback and training for users.

4.1 Configuration Management *(Responsible person)*

The goal of configuration management is to establish and maintain the integrity of the software and other work-products of our projects and processes. A strategy for configuration management will be defined, all items to be put under configuration management will be identified, agreed on and base-lined, modifications and releases will be controlled, the status of work-products will be noted and made retrievable, completeness and consistency will be ensured, and storage and retrieval will be controlled.

Deliverable: **4.1-i Configuration management strategy**
Description: Write up a configuration management strategy, which includes all activities of configuration management, and a schedule for performing them.
Responsible: *Responsible person*
Client/Sponsor: *Who wants the deliverable? As specific as possible.*
Completion: *A date, or "before xxx", or "after yyy".*
Risks/Resources: *Describe constraints, assumptions and risks.*

Deliverable: **4.1-ii Configuration management system**
Description: Establish a system for configuration management, that includes configuration item storage and retrieval, versioning, code and parameter organisation, build of libraries and executables, any standards and procedures to be used, and the supporting tools.
Responsible: *Responsible person*
Client/Sponsor: *Who wants the deliverable? As specific as possible.*
Completion: *A date, or "before xxx", or "after yyy".*
Risks/Resources: *Support all supported platforms and architectures; Support a distributed development model.*

Resource: SCRAM development
Period: 01/01/2000 – 31/12/2000
FTE's: 1.0 (needed), 1.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Deliverable: **4.1-iii Configuration description**
Description: Write and maintain an up to date list of all configuration items, including their eventual decomposition into lower level configuration items, who is responsible for each item, and when it is to be placed under configuration management.
Responsible: *Responsible person*
Client/Sponsor: *Who wants the deliverable? As specific as possible.*
Completion: *A date, or "before xxx", or "after yyy".*
Risks/Resources: *Describe constraints, assumptions and risks.*

Resource: Toolsmith/engineer
Period: 01/01/2001 – 31/12/2007
FTE's: 0.1 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Deliverable: **4.1-iv Configuration history**
Description: Ensure the maintenance of each configuration item in sufficient detail that previous base-lines can be recovered, when required.
Responsible: *Responsible person*
Client/Sponsor: *Who wants the deliverable? As specific as possible.*
Completion: *A date, or "before xxx", or "after yyy".*
Risks/Resources: *Describe constraints, assumptions and risks.*

Deliverable: **4.1-v Configuration status report**
Description: Make available the status of each configuration item, like external library, or some package library and headers, and their relationships in the current or base-lined system state.
Responsible: *Responsible person*
Client/Sponsor: *Who wants the deliverable? As specific as possible.*
Completion: *A date, or "before xxx", or "after yyy".*
Risks/Resources: *Describe constraints, assumptions and risks.*

4.2 CMS Software integration, release and distribution *(Responsible person)*

Run integration and acceptance test for all releasable CMS software. Provide tools to detect potential problems early. Distribute released CMS software.

Deliverable: **4.2-i Released and distributed software**
Description: Control and execute the storage, handling, releasing/base-lining and distribution of the items under configuration management; use a sub-set of the system tests for acceptance testing of configuration items at a defined level of granularity.
Responsible: *Responsible person*
Client/Sponsor: *Who wants the deliverable? As specific as possible.*
Completion: *A date, or "before xxx", or "after yyy".*
Risks/Resources: *Describe constraints, assumptions and risks.*

Resource: CMS librarian
Period: 01/01/2001 – 31/12/2007
FTE's: 0.2 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Deliverable: **4.2-ii Preparation of releases and installation at CERN**
Description: This task covers the preparation and installation of the CMS software in the central release area in various combinations of optimised, shared, debug libraries. It requires familiarity with external software, coordination and collection of consistent subsystem/project developers tags. The complexity of the software multiplies by the number of various components, subsystems, and projects that are used in a single system or the system relies on. The installation and validation of the final release.
Responsible: *Responsible person*
Client/Sponsor: *Who wants the deliverable? As specific as possible.*
Completion: Ongoing
Risks/Resources: *Describe constraints, assumptions and risks.*

Resource: CMS librarian
Period: 01/01/2001 – 31/12/2007
FTE's: 0.5 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**4.2-iii Integration testing**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: CMS librarian
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-DA, **Funding source:** NK

Deliverable:	**4.2-iv Automatic test procedure (using examples) for new releases**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Toolsmith/engineer
	Period: 01/04/2001 – 31/06/2001
	FTE's: 1.0 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**4.2-v Release distribution and installation tools**
Description:	Provide tools to facilitate the distribution and installation of CMS software. This includes aspects of software configuration, configuration verification as well as exporting the software to tier 1/2/3... centres.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Toolsmith/engineer
	Period: 01/04/2001 – 31/06/2001
	FTE's: 1.0 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**4.2-vi Nightly builds**
Description:	As a part of the release process the nightly builds with the proper log book keeping, building test programs and run them to detect critical points as soon as possible.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	The developers of the CMS software would be obliged to provide those tests for their code.
	Resource: Toolsmith/engineer
	Period: 01/07/2001 – 31/09/2001
	FTE's: 1.0 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

4.3 Development tools (*Responsible person*)

The goal of configuration management is to establish and maintain the integrity of the software and other work-products of our projects and processes. A strategy for configuration management will be defined, all items to be put under configuration management will be identified, agreed on and base-lined, modifications and releases will be controlled, the status of work-products will be noted and made retrievable, completeness and consistency will be ensured, and storage and retrieval will be controlled.

Deliverable:	**4.3-i Header File Checking Tool**
Description:	A tool (e.g. integrated with scram build command) to go over every header file, and for each one produce a `.cxx` file that includes just that header (and Architecture.h?). It would be used to check whether that header is stand-alone. Output could be of the form: `X/Y/interface/Z.h: PASS` in the event of success, or: `X/Y/interface/Z.h: FAIL <compiler error messages>` in the event of failure.
Responsible:	*Responsible person*
Client/Sponsor:	All software developers.
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Toolsmith/engineer
	Period: 01/09/2000 – 31/12/2000
	FTE's: 0.5 (needed), 0.5 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**4.3-ii Dependency analyser**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	All software developers.
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Toolsmith/engineer
	Period: 01/01/2000 – 31/12/2000
	FTE's: 0.5 (needed), 0.5 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**4.3-iii Coding rule and style rule checker**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	All software developers.
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: deputy developer
	Period: 01/01/2001 – 31/12/2001
	FTE's: 0.5 (needed), 0.5 (available)
	Resource type: FTE-SE, **Funding source:** CMS-Russia

4.4 External Software Support (*Coordinator name*)

This task covers the support associated to the use of non-CMS (HEP, public-domain, and commercial) software in the CMS environment. Examples of such software include: database software; graphics packages; documentation systems; design and code management tools; parsers; GUI builder; and so on.

Deliverable:	**4.4-i Verification and Integration of non-CMS software**
Description:	Build non-CMS software obtained as source code on the supported computing platforms and verify its functionality. Integrate self-build and binary imported non-CMS software with CMS specific software and environment.
Responsible:	*Name of deliverable here.*
Client/Sponsor:	*Responsible person*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	The maintenance of this infrastructure requires ongoing effort from qualified personnel.
	Resource: Toolsmith/engineer
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.3 (needed), 0.0 (available)
	Resource type: FTE-SE, **Funding source:** NK

Deliverable:	**4.4-ii Software Repository for non-CMS software using the CMS-standard Configuration Management System**
Description:	This item consists of a coherent Software Infrastructure for handling non-CMS software. It includes a software repository, multi-platform build, release, distribution, and documentation systems, and regular public versioned releases of both software and documentation. All aspects of this infrastructure should exploit common CMS tools and procedures as much as possible. In some cases the build, release and distribution mechanisms of other projects (e.g. CERN/IT) will be used but the configuration information is still required.
Responsible:	*Name of deliverable here.*
Client/Sponsor:	*Responsible person*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	The maintenance of this infrastructure requires ongoing effort from qualified personnel.
	Resource: Toolsmith/engineer **Period:** 01/01/2001 – 31/12/2007 **FTE's:** 0.2 (needed), 0.0 (available) **Resource type:** FTE-DA, **Funding source:** NK

4.5 Software Performance and Optimisation *(Coordinator name)*

Subtask Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

Deliverable:	**4.5-i Software profiling system**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Toolsmith/engineer **Period:** 01/04/2001 – 31/12/2001 **FTE's:** 0.5 (needed), 0.0 (available) **Resource type:** FTE-SE, **Funding source:** NK

Deliverable:	**4.5-ii Benchmark definition**
Description:	Define benchmarks for measurements to be taken. This can for example be performance measures done in "typical" running conditions, or the time it takes to do a concrete software release.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Toolsmith/engineer **Period:** 01/04/2001 – 31/06/2001 **FTE's:** 0.2 (needed), 0.0 (available) **Resource type:** FTE-SE, **Funding source:** NK

Deliverable:	**4.5-iii Benchmark report**
Description:	Perform the benchmark on processes and products at pre-defined check-points, and use normal improvement practices to narrow any performance gap.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Toolsmith/engineer **Period:** 01/01/2001 – 31/12/2007 **FTE's:** 0.2 (needed), 0.0 (available) **Resource type:** FTE-SE, **Funding source:** NK

4.6 User Support and Training *(Coordinator name)*

Provide information on CMS software to Users via a help-desk system and in dedicated training courses. Ensure that the support reflects the actual status of the software. Provide and verify example programs and their documentation.

Deliverable:	**4.6-i Help-desk**
Description:	Provide help material for all aspects of CMS software to the Tier-0/1 centres. This includes lists of responsible persons for particular subjects.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Toolsmith/engineer **Period:** 01/01/2001 – 31/12/2007 **FTE's:** 0.2 (needed), 0.0 (available) **Resource type:** FTE-DA, **Funding source:** NK

Deliverable:	**4.6-ii Problem reporting system**
Description:	Establish and deploy a problem reporting system, that allows to ensure problems can be reported, described, noted, analysed, re-directed, traced, etc., and is linked in with configuration management.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Useful, once project areas and base-lined products or processes are available.
	Resource: Toolsmith/engineer **Period:** 01/01/2001 – 31/06/2001 **FTE's:** 0.5 (needed), 0.0 (available) **Resource type:** FTE-SE, **Funding source:** NK

Deliverable:	**4.6-iii Training**
Description:	Organise and coordinate training courses for all CMS internal software.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Toolsmith/engineer **Period:** 01/01/2001 – 31/12/2007 **FTE's:** 0.2 (needed), 0.0 (available) **Resource type:** FTE-DA, **Funding source:** NK

Deliverable:	**4.6-iv Example Programs**
Description:	Ensure the existence and quality and documentation of example programs for all CMS specific software.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*
	Resource: Toolsmith/engineer
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-DA, **Funding source:** NK

4.7 Documentation *(Coordinator name)*

The purpose of documentation is to develop and maintain documents that record information produced by a process or activity. It includes producing a strategy for identification and maintenance of the documents to be produced during the life-cycle of the software, identification of the standards to be used for the development of the documentation, the identification of all documents to be written in a project or when performing a process, a specification review and eventual approval of the contents and purpose of these documents, the verification that documents are produced and maintained in accordance with the specified standards/templates. Note that this is very multifaceted, and can concern many areas. If documentation is not to diverge, focus must be given by very clearly defining the documents to be produced, with an eye on their maintainability.

Deliverable:	**4.7-i Documentation policy**
Description:	Define and agree on what should be documented where and when during the entire life-cycle of the software.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Needs more than rudimentary understanding of our needs for documentation.
	Resource: Toolsmith/engineer
	Period: 01/06/2001 – 31/06/2001
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-DA, **Funding source:** NK

Deliverable:	**4.7-ii Document templates**
Description:	Produce a set of document templates for the agreed on documents.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Documentation policy and documentation infrastructure available.
	Resource: Toolsmith/engineer
	Period: 01/06/2001 – 31/06/2001
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-DA, **Funding source:** NK

Deliverable:	**4.7-iii Documentation infrastructure**
Description:	Establish infrastructure and standard procedures for writing changing and maintaining documentation, including source code, design, or architecture documents.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Documentation policy available.
	Resource: Toolsmith/engineer
	Period: 01/07/2001 – 31/07/2001
	FTE's: 1.0 (needed), 0.0 (available)
	Resource type: FTE-DA, **Funding source:** NK

Deliverable:	**4.7-iv Verify documentation**
Description:	Review the documentation before releasing to general public.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Documentation available.
	Resource: Toolsmith/engineer
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-DA, **Funding source:** NK

Deliverable:	**4.7-v Distribute documentation**
Description:	Distribute the documentation, and verify availability.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Documentation released.
	Resource: Toolsmith/engineer
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.1 (needed), 0.0 (available)
	Resource type: FTE-DA, **Funding source:** NK

Deliverable:	**4.7-vi Up to date documentation**
Description:	Maintain documentation according to the defined procedures.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Software changes in ways relevant for the documentation.
	Resource: Toolsmith/engineer
	Period: 01/01/2001 – 31/12/2007
	FTE's: 0.2 (needed), 0.0 (available)
	Resource type: FTE-DA, **Funding source:** NK

5 Software Process and Quality *(Johannes Peter Wellisch)*

This is basically the scope of GPI....we should think about what name is clearest to the largest number of people... *Task Description here*...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

5.1 Software Process *(Responsible person)*

This item covers the process associated with the definition, design, development,documentation, integration, verification, deployment, and maintenance of the CMS Software with the aim of improving efficiency and quality. The pragmatic "Cyclic Life Cycle" model has been adopted by CMS that emphasises continuous improvement following ISO/IEC 15504 (SPICE). Items which have been implemented include the structure of the ORCA software repository and the strategy for ORCA development, release, and testing and the CMS coding rules, guidelines, and style. Processes currently under construction and only partly deployed include the more comprehensive assessment of user requirements, checking of software dependencies between software sub-systems and packages, automated checking of coding rule and style conformance, and more comprehensive integration test suites and examples. Processes to be implemented more rigorously in future include: more formal and uniform software requirements analysis and design procedures; documentation of code design, implementation, and usage; and problem reporting, tracking and resolution mechanisms. Deliver tools and methodologies to encourage and support efficient software management and quality assurance. The task here in more general terms is to establish a set of organisational processes for all software life-cycle activities, based on organisational alignment with the goals of our experiment, to assess in how far the different areas are indeed relevant to CMS and contributing to our success, and to improve the important processes continuously to the level where effort and gain are judged to be balanced in view of our goal of taking data doing great physics.

Deliverable:	**5.1-i Mission statements**
Description:	Define for each process instance invoked the goals the are to be achieved by following the process, and their relation to the goals of CMS as a whole. Include also examples of consequences of non-compliance
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.1-ii Process scopes**
Description:	Identify for each process instance invoked the activities, roles, authorities and responsibilities. These then are to be ratified and enforced by project management.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.1-iii Process descriptions**
Description:	Define and document the processes performed in CMS, including for each process instance invoked the input and output work products, entry and exit criteria, check-points, external interfaces with related processes that produce inputs and/or need the results, internal dependencies between the process activities, and metrics and measures that allow to demonstrate the achievement of the process.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.1-iv Tailoring guidelines**
Description:	Establish tailoring guidelines that describe how to optimise a specific process for individual sub-projects. Note that active but restricted contribution of the process/environment team to development at all levels is necessary to ensure the validity of the approach.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.1-v Performance expectation document**
Description:	Establish a document describing the performance expectations when using the process defined in the process description.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.1-vi Deployed process**
Description:	Deploy the defined and ratified processes throughout CMS, as far as applicable, and verify deployment at established check-points using assessment methods.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.1-vii Maintained process definition**
Description:	Maintain the process description documents.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.1-viii Improvement opportunity report (which would typically be a presentation)**
Description:	Identify possibilities for improvement, and define the scope of the improvement activity.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.1-ix Assessment record**
Description:	Define the method to be used for process assessments, and the goals of the assessment. Include the assessment inputs and the plan for the assessment. Collect relevant information and validate this information. Identify strength and weaknesses. Maintain, report, and exploit the assessment results
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Improvement activity is scoped.

Deliverable:	**5.1-x Impact analysis**
Description:	Define the priorities of improvement, and define measures for the impact of the improvement. Deploy the new process as prototype in one area, and confirm the improvement.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.1-xi New deployed process**
Description:	Update the process definition, and deploy the new process across the board.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

5.2 Measurement, Quality Management, and Quality Assurance *(Responsible person)*

The goal of the measurement process is to collect and analyse data related to the software architecture, design, implementation, testing, etc. in order to support the management of the individual activities. It also allows to objectively demonstrate the quality of the software. It includes the definition of an appropriate set of measurements, and the collection and analysis of the corresponding data. It also includes the distribution of these results to all people involved or interested.

The purpose of this activity is to provide assurance that the design, software, documentation, and other work products and processes comply with the specified requirements and stick to their established plans. This includes producing implementing and maintaining a strategy for performing the quality assurance activities, and recording evidence of their performance. problems/bugs or non-conformance will be found, and the correct application of any standards, procedures as well as fulfilment of requirements will be verified objectively. To be unbiased, the quality assurance activity must act independently from the direct responsible for developing the software.

The goal of Quality Management is to make sure that the software satisfies the people using it. It needs the establishment of a focus on monitoring the quality of products and processes. Quality goals will be written down based on what we need, including implicit and explicitly stated requirements, for a set of check-points within the project life-cycle. An overall strategy will be defined to achieve these stated goals, and identified quality control and assurance activities will be performed and their performance will be confirmed. The actual state will be monitored against the goals, and appropriate action will be taken then the goals are not achieved.

Deliverable:	**5.2-i Quality assurance: Strategy**
Description:	Write and maintain a paper specifying the scope of quality assurance and the responsibilities for quality.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Basic technological decisions have been taken.

Deliverable:	**5.2-ii Quality assurance: standards**
Description:	Establish a set of standard quality criteria for the relevant processes and work products. Establish for each item in the quality standard fit-criteria.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Needs the policy statement.

Deliverable:	**5.2-iii Quality assurance: record**
Description:	Perform a set of tests that establish at the needed level of confidence that the processes and work-products (software, designs, documentation, etc.) are according to the agreed-on quality standards.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Needs the Quality standards at least in rudimentary form.

Deliverable:	**5.2-iv Quality assurance: Closed problem report**
Description:	Report, analyse, correct etc. any problems found, and trace the corresponding actions to closure.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Quality record available.

Deliverable:	**5.2-v Quality Management: Quality goals**
Description:	Based on what we need in terms of quality in the various operational environments, establish quality goals for the products throughout the project. Make sure these can be checked in a quantitative manner.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.2-vi Quality Management: Overall quality strategy**
Description:	Establish an overall strategy at the organisational and project level that allows to achieve the defined goals. Define metrics that will be used to measure the results of the various project activities, and by defining acceptance criteria at a course grained level, that will help to understand if the documented quality goals have been achieved.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Quality goals identified.

Deliverable:	**5.2-vii Quality Management: Quality activity specification**
Description:	For each goal, identify quality control and assurance activities, which will help to achieve the goals set at the organisational and project level. Note that the hand-shake with quality assurance is important, as these activities have to be integrated into the software development.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Overall quality strategy available.

Deliverable:	**5.2-viii Quality Management: Quality assessment record**
Description:	Assess the quality throughout the project at pre-defined check-points, applying the specified quality metrics to assess if the project is on track to meat the goals specified.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Quality activity specification available.

Deliverable:	**5.2-ix Quality Management: Corrective action**
Description:	In case high level quality goals have not been met, take corrective or preventive action at the project and organisational level, where appropriate.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.2-x Example Standard: Coding rules and style guidelines**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.2-xi Example infrastructure: Tool for checking style rules**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.2-xii Example infrastructure: Tool for determining CMS and external software dependencies and metrics**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.2-xiii Example infrastructure: Tool for analysing and displaying dependency and metric data**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.2-xiv Metrics analysis paper**
Description:	Establish measurable quantities for process and product measurement and make sure data can be and are collected and analysed against the metrics. An example would be essential cyclomatic complexity for code quality, number of pre-releases during release sequence for code organisation, or the result of path coverage analysis for testing.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.2-xv Measurement record**
Description:	Do the measurement on a base-lined work-product or process, and the above described metrics, benchmarks or statistical data. For example coding rule analysis of source code, using our rules standard, or a dependency diagram of released code. Make the measurement data available for decisions where it is relevant.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

5.3 Verification *(Responsible person)*

Verification confirms that piece of software, a process or a project reflects the specified requirements. It includes a verification strategy, verification criteria for the individual software work products, performance of the verification activity, ensuring that identified faults/defects/bugs can and will be found and fixed, and that any results of the activity can/will be made available to all people concerned.

Deliverable:	**5.3-i Verification strategy**
Description:	Provide a document specifying the criteria by which software, documentation, etc. will be verified, and which work-products are to be verified.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Assumes that we need actually this.

Deliverable:	**5.3-ii Verification results**
Description:	Perform verification, recording the results as needed, and specified in the corresponding strategy paper.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Verification strategy was made available, and we actually want to do this.

Deliverable:	**5.3-iii Closed action item**
Description:	Track initiated corrective action to closure, and maintain action list.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Action list available.

5.4 Validation *(Responsible person)*

Validation or productization confirms that the software is fit for a specific intended use. It includes the production and implementation of a validation strategy for each intended use considered, the identification of validation criteria for each piece of software, the performance of the validation activity, the resolution of the problems identified, providing evidence that the software is fit for a specific use (for example trigger), and that any results of the activity can/will be made available to all people concerned.

Deliverable:	**5.4-i Validation strategy**
Description:	Write down a validation strategy paper, that specifies the use-cases and operational environments and software/system concerned, along with validation criteria and fit-conditions for all items involved.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Can start now, but will have to turn into an ongoing activity.

Deliverable:	**5.4-ii Validated software/system**
Description:	Identify the techniques processes, test-cases etc. where not specified in the validation strategy, and perform the validation tests, ex when validating code for the trigger environment. Record validation results and fault history.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Validation strategy available.

Deliverable:	**5.4-iii List of action items**
Description:	Plan and initiate corrective action where needed, based on validation result analysis.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Validation results available.

Deliverable:	**5.4-iv Closed action item**
Description:	Track corrective actions to closure, and maintain list of action items.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Tests for system partitions available.

Deliverable:	**5.4-v Documented set of coding rules and style guidelines**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.4-vi Tool for checking coding rules**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.4-vii Tool for determining CMS and external software dependencies and metrics**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.4-viii Tool for analysing and displaying dependency and metric data**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.4-ix Integration testing**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.4-x Automatic test procedure (using examples) for new releases**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.4-xi Change control procedure and tools**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.4-xii Metrics analysis paper**
Description:	Establish measurable quantities for process and product measurement and make sure data can be and are collected and analysed against the metrics. An example would be essential cyclomatic complexity for code quality, number of pre-releases during release sequence for code organisation, or the result of path coverage analysis for testing.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.4-xiii Measurement record**
Description:	Do the measurement on a base-lined work-product or process, and the above described metrics, benchmarks or statistical data. For example coding rule analysis of source code, using our rules standard, or a dependency diagram of released code. Make the measurement data available for decisions where it is relevant.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.4-xiv Benchmark definition**
Description:	Define benchmarks for measurements to be taken. This can for example be performance measures done in "typical" running conditions, or the time it takes to do a concrete software release.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.4-xv Benchmark report**
Description:	Perform the benchmark on processes and products at pre-defined check-points, and use normal improvement practices to narrow any performance gap.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

5.5 Software Re-use (*Coordinator name*)

The purpose is to promote and ease the use of new and/or existing software from both the people and the product perspective. This includes the definition of re-use strategies, and identification of activities and infrastructure needed to facilitate and perform re-use, as well as their establishment and maintenance. This task in strongly coupled with configuration management and system integration.

Deliverable:	**5.5-i Re-use strategy**
Description:	Identify, develop and apply re-usable entities at all organisational levels, with the goal to improve productivity and quality.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.5-ii Re-use library**
Description:	Establish a re-use library for collection, categorisation, management, update, etc. of re-usable entities.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.5-iii Re-use planning**
Description:	Identify and document reusable entities such as code modules, tests, interfaces,components, documents, infrastructure, processes, etc...
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.5-iv Re-usable item**
Description:	Design and develop re-usable entities, and keep them stable and consistent. Maintain consistency stability and standardisation of re-usable entities in the re-use library (like magnetic field between simulation and reconstruction).
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.5-v Information session**
Description:	Inform potential users about the existence of re-usable entities, including features and possible restrictions or problematic areas.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**5.5-vi Technology report**
Description:	Evaluation of new technologies, using prototyping, with the goal of finding better arrangements for the main risks, and/or removing technology related constraints from software and system.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Assumes that the system constraints and architecturally relevant use-cases available; main risks are understood and currently planned arrangements are documented. Link between system and software constraints and technology understood and documented.

Deliverable:	**5.5-vii Database access utilities**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

5.6 System Integration *(Coordinator name)*

This item covers the development of a system integration test strategy for integrating system units consistent with the release strategy, and for testing the system in the different operational environments. It includes the development of a strategy to re-test (regression testing) system aggregates, in case of a change in a component of the system, and identifying aggregates of system units and a sequence and order in which to test them. This will be done consistent with the system architecture and release strategy. It includes the development of tests for the identified system aggregates, that ensure that the given part of the system satisfies requirements, running the tests, and the documentation of the test results. Each test to be run for a system aggregate will be described, indicating the requirements being checked, input data, system components needed to perform the test, and validation criteria.

Deliverable:	**5.6-i System integration test strategy**
Description:	Develop the strategy for integrating system units and for testing the system. This shall be done consistent with the release strategy.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Assumes that release strategy and system architecture are available.

Deliverable:	**5.6-ii System regression test strategy**
Description:	Develop a strategy for re-testing the system or parts of it, should a change be made.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	System integration test strategy available.

Deliverable:	**5.6-iii List of system partitions**
Description:	Build a list of aggregates of system units that can be separately tested. Identify the aggregates, and define a sequence in which to test them.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	System integration test strategy, release strategy and system architecture available.

Deliverable:	**5.6-iv Tests for system partitions**
Description:	Describe the tests to be run against each partition of the system. Include the requirements to be checked, input data, fit criteria, and a list of system components and supporting infrastructure needed for the tests.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	List of system partitions available.

Deliverable:	**5.6-v Tested system partitions**
Description:	Test each individual system partition and make sure that it satisfies the specified fit criteria. Write up and storage of the results is mandatory.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Tests for system partitions available.

Deliverable:	**5.6-vi System tests**
Description:	Develop and describe the tests to be run on the integrated system. Specify use-cases and/or requirements checked, input data and fit criteria.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	system architecture is available.

Deliverable:	**5.6-vii Tested system**
Description:	Integrate the system, and perform above tests on the integrated system. Make sure eventual faults are corrected, and document all results, including fault history.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Tested system partitions and system tests available.

5.7 Place-holder Subtask for: Group for Process Improvement *(Coordinator name)*

...some text here...

Deliverable:	**5.7-i Temporary Test Deliverable Containing Resources**
Description:	...some text here...
Responsible:	xxx
Client/Sponsor:	yyy
Completion:	zzz
Risks/Resources:	...some text here...

Resource:	SW process engineer 1
Period:	01/01/2001 – 31/12/2007
FTE's:	1.0 (needed), 0.5 (available)
Resource type:	FTE-SE, **Funding source:** NK
Resource:	SW process engineer 2
Period:	01/01/2001 – 31/12/2007
FTE's:	1.0 (needed), 0.5 (available)
Resource type:	FTE-SE, **Funding source:** NK
Resource:	SW process engineer 3
Period:	01/01/2002 – 31/12/2007
FTE's:	1.0 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK
Resource:	SW process engineer 4
Period:	01/01/2003 – 31/12/2007
FTE's:	1.0 (needed), 0.0 (available)
Resource type:	FTE-SE, **Funding source:** NK

6 Production Processing and Data Management *(Tony Wildish)*

xxx

6.1 Production Tools *(Coordinator name)*

Delivery and maintainance of the tools required to manage site-specific and worldwide simulation and reconstruction productions.

Deliverable:	**6.1-i Documentation of the production process**
Description:	A (set of) document(s) will be produced describing the required steps of a production. I.e. the steps that must be completed in order to produce a dataset, to validate it, and to export it. The documentation will describe which configuration items are to be stored and how they are to be made available for inspection, to ensure that all produced data has a complete audit trail. The documentation will also describe the necessary manipulations to perform on datasets after production (e.g. 'closing' a dataset, running 'ootidy' or validating runs in the meta-data). The documentation will describe the tools that exist to support productions and give references to their individual documentation (I assume the documentation for the tools will evolve with the tools, and that that the documentation described here will evolve much slower). This documentation will be the baseline introduction for new centres/personnel that wish to run productions, and allows centres to contribute usefully by following correct procedure even before all the tools are available.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*'Soon', so that RC's setting up productions know what is expected of them.*
Risks/Resources:	

Deliverable:	**6.1-ii Tools for production job specification**
Description:	Write down a format for complete specification of production processing jobs. In addition, where Monte Carlo generation is involved, the specifications should include the physics process. The implementation should support the ability to store and to easily switch between different sets of parameter definitions or data cards meaningful to distinct physics groups. The implementation should support a flexible interface for user input of parameter sets a few at a time and for automatic import of many parameter sets with versioning control.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	The other CMS production processing tools described here will be required to support this format. We must therefore take great care in defining the format in such a way so that it is easily extensible without breaking coexisting tools. Specification will also depend upon a reasonable definition of runtime environment since things like ORCA version will likely be included as part of the processing specification.

Deliverable:	**6.1-iii Tools for production job generation**
Description:	Tools for production job generation should include facilities for converting production job specifications into executable scripts. The target scripts should support some facility for recording and reporting exit status on successful completion or failure. The format of the target scripts will be something like Hans Wenzel's scripts with added routines to generate job tracking information. Also general purpose hooks should be included at various stages to external tools, eg- validation, staging, and recovery. The tools should include a high level interface for the production operations coordinator which assume that that person is not an expert, and which minimises human interaction with the tools.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Due to variations in local processing architectures, the actual scripts generated from the specifications may vary from site to site; but the results for a particular job specification must be required to be the same. This assumes that all sites have a well defined and common runtime environment for CMS executables and quality control procedures to ensure consistency of result.

Deliverable:	**6.1-iv Tools for high level tracking of production jobs**
Description:	Write down a specification of what needs to be tracked both at the remote sites and how it should be integrated at the central site. Tools for high level tracking of production jobs should provide facilities for keeping track of production job requests and statuses. The tools should make it easy for the production operations coordinator to discover the global state of progress of production and to identify problem areas quickly and focus attention there. The tools should assume that the production operations coordinator is not an expert. In particular, the production operations coordinator should be able to easily and quickly find out what has been requested, what is the overall status of the request, and any necessary information needed to give an expert in case a problem has arisen. The tools should also include facilities for generating tracking information at the remote processing sites automatically and for integrating that information automatically at other locations.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	The High Level Tracking Tools may depend upon the more low level tracking tools at remote processing sites to provide basic information. These tools also depend on the hooks to be placed in the actual production scripts. However, the door is open for remote sites to opt out and provide tracking information in their own way.

Deliverable:	**6.1-v Tools for low level tracking and control of production jobs**
Description:	It should be possible to stop/start/pause/resume jobs in a clean and controlled manner. It should be possible to do this automatically in the event that problems occur (e.g. with disks filling up). It should also be possible to resume a production job at the point where it was stopped.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	In practise the tools may have to be written by each centre if the farms are all radically different. It may not be possible to write a generic tool, but it should be possible to define a generic interface for the tools so they can fit into a framework. There may be requirements for architectural changes to support these tools (e.g. to the meta-data).

Deliverable:	**6.1-vi Tools for validation of results**
Description:	Tools for validation of results including programs for checking both output files and database integrity where applicable. Validation programs should run automatically from hooks in the processing scripts where practical and validation results should be part of the high level tracking specification. Among the output of the validation are the luminosity associated information in generation jobs and the number of events when files are produced and database integrity when using the database. The validation scheme should be flexible enough to add more validation tools later as they become available and perhaps some verification tools as well.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Validation should run from hooks in the production scripts. Verification tools should come from SPROM and the physics groups.

Deliverable:	**6.1-vii Tools for error discovery and recovery**
Description:	Write down an enumeration of failure modes and an analysis of what needs to be done in each case. The tools for error discovery and recovery should include facilities for analysing failed jobs. These should at least include a tool to roll back a production job to some logical point (ie- the beginning) and a tool to fix corruptions in the database as much as possible. As specific failure modes are discovered, the need for more specialised tools may become apparent.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	We assume that error detection is effected by detecting a non-zero exit status or by failed validation. Responsibility for reporting failures lie with the production scripts and tracking tasks. This is highly correlated with several other tasks in that specific recovery procedures may depend upon specific production procedures and on the nature of the executables themselves. It is required that errors be detected as early as possible to minimise waste of resources.

Deliverable:	**6.1-viii Tools for monitoring of production resources**
Description:	Write down a complete list of available CPU and storage resources for all production centres. Write down a list of entities that must be monitored at the remote sites including frequency of monitoring. Produce software that generates these statistics. Produce software that collects these statistics and generates reports. Include an interface for automatic tools that can decide where to send jobs.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	This has overlap with Grid functionality. In one sense, the monitoring tools should provide input to the Grid which will decide where jobs go. In another sense, the monitoring outputs are generated by Grid tools.

6.2 Production Operations *(Coordinator name)*

Operations of worldwide simulation and reconstruction productions.

Deliverable:	**6.2-i Definition of samples to be produced through liaison with PRS**
Description:	Using the specification formats defined in the production tools subtask, translate specific parameters sets and data cards from the physics groups and maintain them in a repository to be used by the production tools.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Depends on the format specification defined in the production tools.

Deliverable:	**6.2-ii Coordination, priorities, distribution (parameters, tasks, ...)**
Description:	Someone to coordinate the scheduling activities of the production. This means deciding which of the requested samples should be produced when, co-operating with the PRS to understand the constraints and parameters that are imposed on each sample, and preparation of the runtime environment to implement the production of that sample. This person also needs to ensure that the PRS perform the physics/event-level validation of the samples in a timely manner. This person also needs to ensure that RC's offering production facilities follow the procedures to ensure that the data is correct.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	This person may be several people.

Deliverable:	**6.2-iii Production operations**
Description:	Someone to coordinate the day to day activities of the production. This means checking that the data is being produced/validated/exported, and ensuring that the production is running efficiently.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	There may be one such person per RC, or perhaps one person covering several Tier-2 centres. This is essentially a system administration task and is not necessarily performed by a physicist or even a member of CMS.

Deliverable:	**6.2-iv Validated Samples of Events**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

6.3 Integration of Production Tools and Grid Services *(Coordinator name)*

How related to e.g. production and computing tasks??? Deliver GRID tools and infrastructure to allow efficient use of the CMS worldwide resources. Collaborate with recognised GRID projects to specify and test GRID tool and applications. Wherever possible tools developed by the recognised grid projects (PPDG, GriPhyN, and DataGrid) will be exploited to avoid duplicating effort. It is assumed that the CMS grid activities are primarily integration tasks. If we have to develop everything ourselves, all bets are off. However, where the timescales of the grid are too long to meet our immediate needs, judicious prototyping may be used. This will allow us to feed back requirements into the grid, which will help ensure that it delivers what we need.

Deliverable:	**6.3-i** *Name of deliverable here.*
Description:	Support and deliver tools and infrastructure to allow efficient use of CMS worldwide computing resources.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**6.3-ii** *Name of deliverable here.*
Description:	Tools will be created for database replication and synchronisation between production sites, remote job submission, system monitoring, and load balancing.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

6.4 Database Management Tools *(Coordinator name)*

This item covers generic issues pertaining to the use of an ODBMS for the storage of CMS non-event and event data, including those associated to the operation of a database federation in a heterogeneous distributed environment. In addition, a construction database has been developed and deployed as part of the CRISTAL project. Objects are stored persistently, reusing as much as possible of what provided by the ODBMS itself to store, organise and retrieve data, and to administrate both data and meta-data including schema declaration, schema evolution, object versioning and database replication. Optimisation mechanisms such as caching, compression, and physical clustering of objects will be implemented such that they are transparent to the user. A large fraction of the ODBMS activities are carried out in the context of the CRISTAL, GIOD, MONARC, RD45, and WISDOM projects.

Deliverable:	**6.4-i Publish catalogs and contents (local and WAN) and check coherence**
Description:	Remote centres must be able to determine the existence and extent of completed datasets produced locally. From this information it must be possible for a remote centre to somehow gain access to that dataset, either by WAN-based direct access to the database or by bulk replication of all or part of the dataset. Remote centres must be able to determine the exact nature of the datasets that are published in conjunction with the bookkeeping information from the production of that dataset.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Assume that this will be web-searchable and indexable so that users can discover the location of '10k events with single electrons and no pileup' without having to know who produced them.

Deliverable:	**6.4-ii Tools for integrating results from distributed productions**
Description:	Data produced remotely and imported to a centre must be integrated into local federations in a manner that is transparent to the users. There should be no risk that jobs crash because of the state of the integration.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Data-import may take place over an extended interval, so we cannot assume it is atomic. At all times, the users must have a coherent picture of what is available, even if that picture is not (yet) complete.

Deliverable:	**6.4-iii Tools for resource allocation (disk, server etc)**
Description:	Hardware resources (disk/CPU/network) may be allocated to production farms and/or to users analysing data. It must be possible to partition the allocation in any centre in such a way that the users do not interfere with the production and vice versa. It must also be possible to allocate or remove resources dynamically, with no interruption of access to the data that is being served. Such reallocation may happen automatically in a load-balancing system.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Users with private federations (shallow copies) must also see the changes in resources, not just the 'official' federations.

Deliverable:	**6.4-iv Tools for optimising performance**
Description:	Based on information about the access patterns of the users and the performance of the hardware, tools will be needed to allocate resources to ensure high performance. This should include the possibility to allow users to give hints ('I will run on this dataset 24 times per day for the next week' or 'I want (all/only part of) that dataset') so that database files can be pre-staged or 'pinned' on disk intelligently. At a lower level, tools are needed for simple re-clustering of data on disk or on tape and for deciding which files are served by which servers.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	Describe constraints, assumptions and risks.

Deliverable:	**6.4-v Tools for facilitating common DB administration tasks**
Description:	Creation of new databases, shallow and deep copies, attaching/removing individual database files and entire datasets, validating and invalidating parts of datasets, relocation of files, monitoring of locks, automatic cleaning of stale locks, applying access-constraints (read-write/read-only etc), declaring database files as definitively closed etc.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**6.4-vi Tools for DB replication, re-clustering, object extraction,..**
Description:	Creation of new databases, shallow and deep copies, etc. This probably should be taken to mean user-space tools, not DBA tools. Still needs work...
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**6.4-vii Tools for making DB sanity checks, fixing corrupt DB's,...**
Description:	Tools are needed for checking the integrity of a database at the level of the database file, the DB structure and at the level of the CMS event model. It must be possible to cleanly remove corrupted events or parts of events from a dataset. It must be possible also to restore such removed items if the problem can be resolved later (e.g. restore from backup etc).
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Must be capable of making some level of sanity checks with only the meta-data, to avoid massive data-movement. I assume this is mostly a problem when importing new data from other RC's, or when disks or tapes start to die and corrupt files. As far as possible all surgery should be performed on meta-data alone, to avoid having to re-write stable data.*

Deliverable:	**6.4-viii Tools for DB serialisation, format-, version-, manufacturer changes**
Description:	This can mean anything from XML-based object exchange to schema evolution. Tools to support manufacturer-changes cannot easily be defined, but the ability to export objects and meta-data from a database with all its relationships kept intact will go a long way to supporting this. It also allows the possibility of lightweight object manipulation outside the framework of the DB. I have yet to be convinced we need this.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

6.5 Production System Prototyping (*Coordinator name*)

This task covers aspects of prototyping and development of the CMS Production System. This includes the first attempt to gather, make generic, and distribute existing tools to an initial set of remote production sites for use; the examination of use cases and establishment of requirements of a more general functional prototype system for production; the development of the functional prototype; the evaluation and recommendations for the future; and the development of a fully functional prototype.

Deliverable:	**6.5-i Initial Distribution of a Consistent Set of Production Tools**
Description:	In this task an initial consistent set of production tools is distributed to a small set of CERN and remote production sites for use and testing. Attempts will be made to make the tools generic for basic site specific elements. Tools will be provided for job creation of CMSIM, Hit Formatting, and Digitisation.
Responsible:	*Responsible person*
Client/Sponsor:	CERN and Remote Site Production Coordinators
Completion:	Before 01/04/2001
Risks/Resources:	Production coordinators at the test site will participate in the evaluation of the production tools and provide feedback for future development.

Deliverable:	**6.5-ii Functional Prototype Production System Design**
Description:	During this task additional remote sites will be encouraged to evaluate the initial distribution of tools to help determine what is additionally needed to make the tools generic. CAFE use-cases and requirements will be consulted to help define required functionality. Groups performing production as CERN and remote sites should help establish desired functionality. The task should complete with the release of a description of the functionality that will be achieved by the Functional Prototype and the techniques to be investigated.
Responsible:	*Responsible person*
Client/Sponsor:	Production System Prototyping Coordinator
Completion:	Before 1/6/01
Risks/Resources:	Consensus will need to be built for the desired functionality from a number of participants.

Deliverable:	**6.5-iii Functional Prototype Production System Development**
Description:	This tasks describes the development of the Functional Prototype of the CMS production system. The functionality should be defined by the previous task.
Responsible:	*Responsible person*
Client/Sponsor:	Production System Prototyping Coordinator
Completion:	Before 1/12/01
Risks/Resources:	The initial distribution of tools will need to be supported until the prototype call be used in a production environment.

Deliverable:	**6.5-iv Functional Prototype Production Evaluation**
Description:	This tasks describes the evaluation of the Functional Prototype of the CMS production system. The functional prototype will be distributed to a small set of willing test sites. An evaluation of the prototype should be compiled along with recommendations for future directions.
Responsible:	*Responsible person*
Client/Sponsor:	Production System Prototyping Coordinator
Completion:	Before 1/12/01
Risks/Resources:	The initial distribution of tools will need to be supported until the prototype call be used in a production environment.

6.6 Place-holder Subtask for: Production Processing and Data Management (*Coordinator name*)

...some text here...

Deliverable: **6.6-i Temporary Test Deliverable Containing Resources**

Description: ...some text here...
Responsible: xxx
Client/Sponsor: yyy
Completion: zzz
Risks/Resources: ...some text here...

Resource: Prod. Tools 1
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 1.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: Prod. Tools 2
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: Prod. Tools 3
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: Grid Integrator 1
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: Grid Integrator 2
Period: 01/01/2003 – 31/12/2007
FTE's: 1.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: Grid Integrator 3
Period: 01/01/2003 – 31/12/2005
FTE's: 1.0 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: Prod. Operations 1
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 0.5 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: Prod. Operations 2
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 0.5 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: DB Chief Engineer
Period: 01/01/2001 – 31/12/2007
FTE's: 1.0 (needed), 1.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: DB Engineer T0
Period: 01/01/2001 – 31/12/2007
FTE's: 0.5 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: DB Engineer T1
Period: 01/01/2001 – 31/12/2007
FTE's: 0.5 (needed), 0.0 (available)
Resource type: FTE-SE, **Funding source:** NK

Resource: DB Engineer T2
Period: 01/01/2001 – 31/12/2007

7 B-Tau / Tracker *(Marcello Mannelli)*

Task Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

7.1 Tracker Simulation *(Coordinator name)*

Subtask Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

7.2 Tracker Reconstruction *(Coordinator name)*

Subtask Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

7.3 Tracker Alignment *(Coordinator name)*

Subtask Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

7.4 Tracker Data Handling *(Coordinator name)*

Subtask Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

7.5 B-Tau Tagging *(Coordinator name)*

Subtask Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

8 E-Gamma / ECAL *(C. Seez)*

Task Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

8.1 ECAL Simulation *(Coordinator name)*

Simulation model. Geometry. Use of GEANT3. Transition to GEANT4. Effect of GEANT cuts. Optimization of geometric description.

Deliverable:	**8.1-i Geometry**
Description:	Geometry for GEANT3 and GEANT4 (in CMSIM and OSCAR). Geometry in agreement with construction parameters. Adequate description of passive material behind and in front of crystals. Canonical target longitudinal light collection curve of crystals to be included in the GEANT simulation. Adequate optimization for performance.
Responsible:	ECAL
Client/Sponsor:	CMS
Completion:	End of 2001 for GEANT3. Early 2002 for GEANT4.
Risks/Resources:	Final geometry is needed for tests against testbeam data.

8.2 ECAL detector response simulation and reconstruction *(Coordinator name)*

Digitization simulation and reconstruction. Selective readout and zero supression. Bunch crossing id. Trigger primitive generation.

Deliverable:	**8.2-i Maintenance, development and verification**
Description:	Code exists but needs maintenance, development and verification.
Responsible:	ECAL
Client/Sponsor:	CMS
Completion:	Continuous
Risks/Resources:	

Deliverable:	**8.2-ii Selective readout scheme**
Description:	Development of a selective readout and zero supression scheme compatible with hardware being developed. Must satisfy data volume constraints with minimal or zero significant impact on physics.
Responsible:	ECAL
Client/Sponsor:	CMS
Completion:	Urgent.
Risks/Resources:	Zero supression cuts currently used in production simulation already have noticable effects on reconstruction of unconverted photons and may impact on in situ calibration studies.

8.3 Electron/Photon Higher Level Triggers and Physics Objects *(Coordinator name)*

Development of algorithms and associated software for selection in higher level trigger. Electron and photon identification. Testing and detailed results from large scale simulation.

Deliverable:	**8.3-i Level-2 selection**
Description:	Reduction of data rate from Level-1 trigger using limited information (ECAL+pixels). (At present we are using the terminology Level-2=ECAL alone; Level-2.5=ECAL+pixels)
Responsible:	PRS
Client/Sponsor:	CMS
Completion:	Provisional scheme already exists
Risks/Resources:	LHCC Milestones imply working scenario by May

Deliverable:	**8.3-ii Level-3 selection**
Description:	Reduction of data rate from Level-2 trigger using full detector information (i.e. including tracker)
Responsible:	PRS
Client/Sponsor:	CMS
Completion:	May 2001
Risks/Resources:	LHCC Milestones imply working scenario by May

Deliverable:	**8.3-iii Full selection chain to O(100Hz)**
Description:	Reduction of data rate to what gets written to permenant storage
Responsible:	PRS
Client/Sponsor:	CMS
Completion:	November 2001
Risks/Resources:	LHCC Milestone. DAQ TDR.

8.4 ECAL Calibration *(Coordinator name)*

in situ calibration. First step is to develop credible scenario.

Deliverable:	**8.4-i Credible in situ calibration scenario**
Description:	Studies largely using software existing or being developed for HLT studies, to answer questions like: - calibration electron selection: efficiency (how long does it take) - unscrambling individual crystal constants (Householder method, or similar) - relation between electron and photon energy scales: non-linearities, eta (material) dependance etc - basket edges
Responsible:	ECAL
Client/Sponsor:	CMS
Completion:	November 2001
Risks/Resources:	LHCC Milestone

8.5 ECAL Test Beam and Pre-Calibration *(Coordinator name)*

Software and software organization for precalibration. Plan and definition of needs. Online checking. Reproducibility. Detailed comparison of testbeam data with ECAL simulation model. Availability of testbeam data for further checking against simulation in case of unexpected questions.

Deliverable:	**8.5-i** *Details of Test Beam and Pre-Calibration deliverables not available before full discussion with people involved in existing work*
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or “before xxx”, or “after yyy”.*
Risks/Resources:	*Describe constraints, assumptions and risks.*

9 Jets and Missing Transverse Energy / HCAL *(Shuichi Kunori, Sarah Eno)*

coordinate the various L3 efforts of the Jets and Missing Transverse Energy / HCAL group. Run bi-weekly meetings. maintain a web page with the results and status from the various L3 tasks.

9.1 HCAL Simulation *(S. Banerjee)*

This item covers the GEANT3, GEANT4, and ”fast” parameterized descriptions of the HCAL response. The sensitivity of the response to GEANT parameters must be investigated and documented. The response must be tuned to any available test beam data. The results from the parameterized description must be compared to the GEANT-based descriptions.

Deliverable:	**9.1-i CMS note describing GEANT3 description and tuning**
Description:	???
Responsible:	A CMS note that describes the GEANT3 description of the HCAL, documenting its sensitivity to the GEANT parameters and hadron shower models, and showing comparisons to all available test beam data.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

Deliverable:	**9.1-ii CMS note describing GEANT4 description and initial tuning**
Description:	???
Responsible:	A CMS note that describes the GEANT4 description of the HCAL, documenting its sensitivity to GEANT parameters and hadron shower models, and showing comparisons to the GEANT3 description and the associated code.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

Deliverable:	**9.1-iii CMS note comparing GEANT4 response to test beam.**
Description:	???
Responsible:	A CMS note that describes the GEANT4 description of the HCAL, documenting its sensitivity to GEANT parameters and hadron shower models, and showing comparisons to the GEANT3 description and the associated code.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

Deliverable:	**9.1-iv CMS note describing the fast parameterized simulation of the HCAL and the associated code.**
Description:	???
Responsible:	A CMS note that describes the parameterization and compares the results to those from the GEANT3 simulation. The note should also compare reconstruction of jets and missing transverse energy from both simulations.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

9.2 HCAL Reconstruction and Test Beam *(S. Abdullin)*

This item includes the development within ORCA of code to simulate the response of the HCAL electronics and to allow the analysis of test beam data. Also, the analysis of test beam data from summer 2002.

Deliverable:	**9.2-i CMS note describing code that allows the simulation of the HCAL electronics**
Description:	July 2001
Responsible:	A CMS note that describes code developed in ORCA to simulate the HCAL electonics. should include effects of time jitter in the deposit of energy, the effect of multiple events per crossing, allow the testing of different algorithms for the extraction of energy and zero supression.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	develop in time to do some testing of algorithms in early summer for hardware guys

Deliverable:	**9.2-ii CMS note describing the studies of algorithms to be used in the electronics.**
Description:	Nov. 2001
Responsible:	A CMS note that describes different algorithms one could use for beam crossing identification, energy extraction at level 1, and zero suppression. Documentation of the effect of these algorithms on HCAL resolutions.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	partial results for summer 2001 for electronics group, in time for fall 2001 production

Deliverable:	**9.2-iii CMS note describing optimization of HCAL algorithms at high luminosity energy**
Description:	Jan. 2002
Responsible:	CMS note describing optimization of HCAL algorithms, such as zero suppression, energy extraction, and beam crossing identification for high luminosity.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

Deliverable:	**9.2-iv CMS note describing analysis of test beam data from summer 2002 test beam.**
Description:	Nov 2002
Responsible:	A CMS note that describes the analysis of test beam data from the summer 2002 test beam.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	summer 2002 test beam must occur.

9.3 HCAL Calibration *(O. Kodolova)*

This item involves the development of code to store calibration constants within ORCA, and to use them to calculate HCAL energies. Also, the development of methodologies to calibrate the HCAL in-situ.

Deliverable:	**9.3-i CMS note on calibration strategy for the HF**
Description:	June, 2001
Responsible:	A note describing methodology of HF calibration, recalibration and ”in situ” monitoring including aging problems.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

Deliverable:	**9.3-ii A CMS note on calibration strategy for the HB/HE**
Description:	June 2002
Responsible:	A note describing methodology of HB/HE calibration, recalibration and ”in situ” monitoring including aging problems.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

Deliverable:	**9.3-iii CMS note describing methodology for storing HCAL calibration constants in an ORCA-compatible data base and the associated code.**
Description:	Jan. 2002
Responsible:	A note describing all the various kinds of calibration constants that will be stored in data bases for the HCAL, and how this will be done within the ORCA framework
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	coordination with the CMS-wide database effort.

Deliverable:	**9.3-iv CMS-note describing the detailed methodology for in-situ calibration of the HCAL**
Description:	Nov. 2002
Responsible:	A CMS-note describing the methodology for calibrating HCAL ”in situ” using gamma+jet, Z+jet, isolated pions, energy flows and a study this methodology using full ORCA reconstruction.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

Deliverable:	**9.3-v CMS note describing the optimization of weights for the calorimeter layers for jet finding**
Description:	June 2001
Responsible:	A CMS note describing the optimization of weights for the calorimeter layers for jet finding. should include plots demonstrating that the weights have been successfully implemented into ORCA without bugs.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

9.4 Jet/MET Physics Objects and Higher Level Trigger *(A. Nikitenko)*

This item concerns the development of algorithms for the identification of jets, missing transverse energy, and taus. It also includes developing a trigger table for physics channels that do not include leptons.

Deliverable:	**9.4-i CMS note describing tau identification using the tracker in the HLT**
Description:	July 2001
Responsible:	A CMS note describing tau identification using the tracking in the HLT
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	tracking information available, sufficient production capacity

Deliverable:	**9.4-ii CMS note detailing sources of jet energy resolution**
Description:	???
Responsible:	A CMS note detailing the sources of the jet energy resolution
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

Deliverable:	**9.4-iii CMS note describing the implementation jet-finding that includes tracking and the identification of individual hadrons inside of jets.**
Description:	???
Responsible:	A CMS note describing the implementation jet-finding that includes tracking and the identification of individual hadrons inside of jets.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

Deliverable:	**9.4-iv CMS note describing a trigger table for physics for channels that do not contain leptons.**
Description:	Dec 2001
Responsible:	A CMS note describing a trigger table for physics for channels that do not contain leptons, including Higgs to taus, invisible Higgs, SUSY to jets plus missing transverse energy, and ttH.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	manpower, adequete production facilities, 9.1-A, 9.2-A, 9.2-B, for LHCC milestone

Deliverable:	**9.4-v CMS note describing algorithms for removing fake jets**
Description:	June, 2001
Responsible:	A CMS note describing algorithms for removing fake jets caused by pileup at high luminosity.
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	student leaving

Deliverable:	**9.4-vi CMS note describing an ntuple maker containing electrons, muons, jets, and missing transverse energy**
Description:	June 2001
Responsible:	A CMS note describing an ntuple maker containing electrons, muons, jets, and missing transverse energy
Client/Sponsor:	HCAL
Completion:	CMS
Risks/Resources:	none

10 Muons *(Ugo Gasparini, Darin Acosta)*

The goal of this task is twofold: the development and integration in the CMS software environment of the simulation, reconstruction and analysis tools needed to fully exploit the capabilities of the CMS experiment in producing physics results using muons in the event final state; the detailed study of these capabilities and the definition of the strategies to obtain the optimal response in the various physics channels of interest, in close coordination with the other PRS tasks dealing with different physics objects.

10.1 Muon Detector Simulation *(Coordinator name)*

This item covers the simulation issues specific to the muon sub-systems, assuring the implementation and integration of the relevant code in the OSCAR simulation program. In particular, the proper simulation in the GEANT4 framework of the physics processes involved in the muon detection, including multiple scattering, muon showering and δ-ray production, neutron background parameterization and punchtrhough effects, must be cross-checked against test-beam available data and already existing GEANT3 simulation results.

Deliverable:	**10.1-i Hit simulation in muon detector.**
Description:	Mantenance of existing simulation code in CMSIM and its porting in OSCAR/GEANT4.
Responsible:	MUON
Client/Sponsor:	CMS
Completion:	Continous
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.1-ii Verification of simulation model.**
Description:	Study of muon showering modelling, δ-ray production, punchthrough effects.
Responsible:	MUON
Client/Sponsor:	PRS
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.1-iii Neutron background parameterization.**
Description:	Provide neutron parameterization in CSC,DT and RPC chambers, according to latest shielding geometry.
Responsible:	MUON
Client/Sponsor:	PRS
Completion:	Sept.2001
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.1-iv Fast simulation**
Description:	Provide parameterization of muon showering and δ rays production in CSC,DT and RPC chambers. Code porting and mantenance in FAMOS program.
Responsible:	MUON
Client/Sponsor:	PRS
Completion:	Dec.2001
Risks/Resources:	*Describe constraints, assumptions and risks.*

10.2 Muon Detector Response Simulation and Reconstruction *(Coordinator name)*

This item covers the reconstrution issues specific to the muon sub-systems, assuring the implementation and integration of the relevant code in the ORCA program. In particular the maintenance of already existing hit digitization and reconstruction, L1 trigger simulation and local track reconstruction code in the Drift Tubes, RPC and CSC muon systems must be guaranteed, as well as further developments to improve the code performance and to allow transparent usage of the code at the following stages of the reconstruction, including integration with other detectors and studies of alignment and calibration issues.

Deliverable:	**10.2-i Digitization in ORCA.**
Description:	Mantenance and update of hit digitization code in CSC, DT and RPC systems. Implementation of neutron background effects.
Responsible:	MUON
Client/Sponsor:	PRS
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.2-ii Muon L1 trigger simulation in ORCA.**
Description:	Mantenance and update of L1 trigger primitive generation in CSC, DT and RPC systems. Global Muon Trigger simulation code.
Responsible:	MUON
Client/Sponsor:	PRS
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.2-iii Local track reconstruction in muon system.**
Description:	Mantenance and update of muon track candidates reconstruction code in muon system.
Responsible:	MUON
Client/Sponsor:	PRS
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

10.3 Muon Detector Alignment, Calibration, and Databases *(Coordinator name)*

The aim of this sub-task is the development of the software tools needed for the alignment and calibration studies in the muon system. In particular, the interface of existing muon alignment software with the ORCA reconstruction, together with the development of general software tools to displace/rotate in ORCA the muon subdetector units, is mandatory to study mis-alignment effects at different reconstruction/selection stages (L1 trigger, HLT, off-line) , to link the muon and the tracker alignment systems and to develop strategies for aligment corrections using the event data. As far as calibration is concerned, the simulation of realistic trigger syncronization data and specific behaviour of electronic-channels to be recorded in the Calibration Database must be provided, and strategies for calibration updating using event data must be studied. Finally, tools for converting the existing geometry detector database developed within CMSIM to a GENT4/OSCAR format, including recent and possible future updates, also from engineer drawings, must be developed.

Deliverable:	**10.3-i Geometry database.**
Description:	*Elaborate on purpose and functionality.*
Responsible:	MUON
Client/Sponsor:	PRS, Alignment group
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.3-ii ORCA interface to muon alignment software.**
Description:	*Elaborate on purpose and functionality.*
Responsible:	MUON
Client/Sponsor:	PRS, Alignment group
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.3-iii Tools for alignment studies in ORCA and strategy for aligment with tracks.**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.3-iv Calibration database and tools for trigger syncronization.**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

10.4 Muon Detector Online and Control software (*Coordinator name*)

This item has to provide and mantain transparent and user-friendly interface of muon test-beam data to the event object database of CMS, allowing the usage of reconstruction code developed in the ORCA framework in the test-beam analysis activities. Tools for online software (e.g. event monitoring) and forthcoming combined test-beam activities (e.g DT+RPC , CSC+RPC) must be provided as well. Development of slow and fast controls software for the muon systems.

Deliverable:	**10.4-i DAQ software for muon test-beams.**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.4-ii Interface of muon test-beam data to CMS ODBMS.**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.4-iii Muon test-beam monitoring.**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.4-iv Muon reconstruction in test-beam data with ORCA.**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.4-v Common software for combined Test-beams.**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.4-vi Slow control software for the muon systems**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.4-vii Fast control software for the muon systems**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

10.5 Muon High Level Triggers and Physics Objects (*Coordinator name*)

The goals of this sub-task are the muon identification at the different stages of the reconstruction and event selection (L2 and L3 triggers, off line), the definition of algorithms to identify and select interesting events for the different Physics channels with muon(s) in the final state, the development of benchmark physics analyses using the full detector simulation and reconstruction chain developed in the OSCAR and ORCA frameworks. Tools for common issues with other sub-detectors (e.g. muon-tracker matching, energy isolation algorithms, minimum ionizing particle definition) must be developed in close collaboration with other PRS groups. The setting-up of Monte Carlo productions, including the configuration of MC generators and the definition of relevant samples needed for bacgkround rejection and benchmark signal studies, is a crucial part of this sub-task activity.

Deliverable:	**10.5-i Muon L2 trigger selection.**
Description:	Reduction of data rate from L1 trigger using Muon (L2.1) and calorimetric (L2.2) information. Seeding of L3 reconstruction.
Responsible:	PRS
Client/Sponsor:	CMS
Completion:	June 2001
Risks/Resources:	Realistic L1 simulation needed. Working L2 scheme by May 2001.

Deliverable:	**10.5-ii Muon L3 trigger selection.**
Description:	Reduction of data rate from L2 trigger to O(100) Hz using tracker data. Definition of physics selection strategies.
Responsible:	PRS
Client/Sponsor:	CMS
Completion:	End 2001
Risks/Resources:	

Deliverable:	**10.5-iii Tools for muon identification.**
Description:	Develop tools to define muon physics objects to be used at various level of selection (L2, L3, off-line). Define muon quality categories (tight, standard, loose), study matching and isolation criteria. Matching with m.i.p. deposits in calorimeters.
Responsible:	PRS
Client/Sponsor:	CMS
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.5-iv Configuration of MC productions for HLT, Physics TDR and specific detector studies.**
Description:	Define and provide MC configurations of relevant datasets in low luminosity and high luminosity scenarios for High Level Trigger studies and off-line physical analyses involving muons in the final state. Provide tools for fast cross-check of MC productions.
Responsible:	PRS
Client/Sponsor:	CMS, MUON
Completion:	Continous
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.5-v Analysis tools and benchmark channels studies.**
Description:	Develop analysis tools to study detector functionality and performance, testing them on different benchmark channels. Efficiency and background rejection optimization.
Responsible:	PRS
Client/Sponsor:	CMS, MUON
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**10.5-vi HLT rate and efficiency tables**
Description:	Develop HLT analysis scenario down to 0(100)HZ level, providing trigger rate and signal efficiency for all discovery channels involving muons.
Responsible:	PRS
Client/Sponsor:	CMS, MUON
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

11 Online Software Infrastructure (*Coordinator name*)

Task Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

11.1 Online Operations (*Coordinator name*)

Subtask Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

Deliverable:	**11.1-i Deliver and validate tools for CMS online farm operations.**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

12 Café: CMS Architecture Forum for Evaluation *(James Branson)*

Task Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

12.1 Analysis of Use Cases and Requirements *(Coordinator name)*

Design, validate and support architectures for CMS projects. ...some text here....

Deliverable:	**12.1-i Documentation of the Existing CMS Architecture**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

Deliverable:	**12.1-ii Documentation of Critical Use Cases and Requirements**
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

13 SPROM: Simulation PROject Management *(Albert de Roeck)*

Task Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

13.1 Physics Event Generator Infrastructure *(Coordinator name)*

This item covers the software required to support external physics event generator programs in the CMS environment. In particular, it includes software for the management of input parameters in a consistent fashion and procedures for storing output events with a standard format for subsequent use by, for example, OSCAR and the Fast Simulation software. This task does not cover the software of the generator programs themselves.

Deliverable:	**13.1-i Validated interfaces for third-party event generator programs.**
Description:	Validated interfaces for third-party event generator programs to allow them to be used in CMS Physics studies.
Responsible:	*Responsible person*
Client/Sponsor:	*Who wants the deliverable? As specific as possible.*
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

13.2 GEANT3-Based Detailed Detector Simulation *(Coordinator name)*

CMSIM is the Fortran-based CMS simulation package. Since new development has essentially ceased, CMSIM will need to be supported for physics studies until GEANT4 and the corresponding OSCAR simulation software have comparable functionality. Maintain while required the Fortran Simulation of the CMS detector. Does not include manpower for detector code changes.

13.3 GEANT4-Based Detailed Detector Simulation *(Coordinator name)*

This item covers the full simulation of particles traversing the CMS detector using the GEANT4 Toolkit, including the use of an appropriate detector description, tuning and validation of physics processes, and simulation of neutron and other backgrounds. OSCAR will provide simulated signal and background events for ORCA. It will also be used to develop and tune parameters and algorithms of the Fast Simulation software.

13.4 Fast Detector Simulation *(Coordinator name)*

This item covers fast simulation of particles traversing the CMS detector and the response of the detector elements, readout electronics, and triggers. Parameterisations will be verified with OSCAR simulations, test-beam analyses, and ultimately real CMS data. The Fast Simulation should use the common Detector Description and be consistent OSCAR, ORCA, and the Physics Object Reconstruction software to permit flexible the use of varying degrees of simulation detail according to the requirements of the user.

14 RPROM Task: Reconstruction *(Stephan Wynhoff)*

The RPROM task force is responsible for the coordination of the development of CMS reconstruction software between the CCS, PRS and TriDAS projects. It provides consistent and tested releases of the basic reconstruction code, the high-level reconstruction code for production and physics analysis and the reconstruction code for the higher level trigger on the online farm.

14.1 Basic Reconstruction Software (ORCA of today) *(Responsible person)*

This is ORCA as we know and love it.

Deliverable:	**14.1-i** *ORCA*
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	PRS groups as input of high-level reconstruction code, TriDAS to run the HLT
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

14.2 Full Reconstruction Software (Integration with physics code) *(Responsible person)*

Mostly configuration, selection of algorithms from PRS and integration for official production

Deliverable:	**14.2-i** *pORCA*
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	Production centres, physics groups, individual physicists
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

14.3 Online Reconstruction Software (Integration with TriDAS) *(Responsible person)*

Mostly configuration and integration on the online farm

Deliverable:	**14.3-i** *tORCA*
Description:	*Elaborate on purpose and functionality.*
Responsible:	*Responsible person*
Client/Sponsor:	Online farm
Completion:	*A date, or "before xxx", or "after yyy".*
Risks/Resources:	*Describe constraints, assumptions and risks.*

15 "CPROM" (?) Calibration Project Management *(Coordinator name)*

This task aims to provide the software infrastructure to support the determination, storage and provision of data describing the detector configuration. This includes the engineering description, validation data, alignments, energy calibrations, etc. using data from: test beams; laboratory measurements; survey data; in-situ dedicated systems; slow control systems; and and physics event samples.

15.1 Validation of Physics Data Quality *(Coordinator name)*

This subtask is responsible for validation of event data prior to subsequent reconstruction and analysis.

15.2 Calibration of Event Data *(Coordinator name)*

This item covers software associated to the calibration of the CMS subdetectors including alignments, energy calibrations, etc. using data from: test beams; laboratory measurements; survey data; in-situ dedicated systems; slow control systems; and and physics event samples. The Calibration clients include ORCA and potentially the OSCAR and Fast Simulation projects, which may ultimately incorporate realistic detector performance data into the simulations.

15.3 Luminosity Determination *(Coordinator name)*

Subtask Description here...what it aims to achieve and key functionality... should be easy to check if achieved or not ...some text here....

16 GRID *(Coordinator name)*

Deliver GRID tools and infrastructure to allow efficient use of the CMS worldwide resources....and some more... ...some text here....

16.1 Initial Grid Prototypes *(Coordinator name)*

Collaborate with recognised GRID projects to specify and test GRID tool and applications. Wherever possible tools developed by the recognised grid projects (PPDG, GriPhyN, and DataGrid) will be exploited to avoid duplicating effort. It is assumed that the CMS grid activities are primarily integration tasks. If we have to develop everything ourselves, all bets are off.

16.2 Computing Model Simulation *(Coordinator name)*

Deliver the modelling tools to simulate worldwide simulation, reconstruction, analysis and data movement.