

Task / Deliverable	Comments & Explanations	Grounding checks required? [Yes, No]	Study required? [Yes, No, Partially]	Are design work, drawings, specifications missing? [Yes, No, Partially]	Procedures are still to be defined and documented? [Yes, No, Partially]	Procurement required? [Yes, No, Partially]	Who has the technical responsibility?	Funding needs to be clarified? [Yes, No, Partially]	Who supplies materials and/or tooling?	Who supplies the manpower or money for manpower?
<b>5. HV-System Installation</b>										
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<b>5.1.P Planning: HV-PS installation</b>										
5.1.1.P Define needs and installation of HV custom Crates in USA 15							UWUP-CERN			
5.1.2.P Define needs and installation of HV ISEG Modules into HV Crates (48 EMB, 48 EMEC, 32 HEC, 16 FCAL, 4 PSEC, 2 Purity) in USA-15							UWUP-CERN			
<b>5.1.E Executing: HV-PS installation</b>										
5.1.1.E Install HV custom Crates in USA-15		Y			Y		UWUP-CERN			UWUP-CERN-KTH-Mainz
5.1.2.E Install HV ISEG Modules into HV Crates (48 EMB, 48 EMEC, 32 HEC, 16 FCAL, 4 PSEC, 2 Purity) in USA-15					Y		UWUP-CERN			UWUP-CERN-KTH-Mainz
<b>5.2.P Planning: HV control &amp; read out</b>										
5.2.1.P Define needs and installation of PVSSII HV-WS in USA-15	Several (3?) PCs		Y			Y	Milano-UWUP-CERN			
5.2.2.P Define cabling and needs of HV-WS <-> HV-modules (CAN Bus) in USA-15	Local Can in USA15						Milano-UWUP-CERN			
5.2.3.P Define needs and cabling of HV-WS (Local DCS) <-> LARG DCS (Ethernet PVSSII) in USA-15	Ethernet						Atlas infrastructure			
<b>5.2.E Executing: HV control &amp; read out</b>										
5.2.1.E Install PVSSII HV-WS in USA-15	Several (3?) PCs				Y		Milano-UWUP-CERN			UWUP-CERN-KTH-Mainz-Milano
5.2.2.E Connect HV-WS and HV-modules (CAN Bus) in USA-15	Local Can in USA15				Y		Milano-UWUP-CERN			UWUP-CERN-KTH-Mainz-Milano
5.2.3.E Connect Local HV-WS (Local DCS) <-> LARG DCS (Ethernet PVSSII) in USA-15	Ethernet				Y		Atlas infrastructure			TC Atlas infrastructure
<b>5.3.P Planning: Filter box (re)-installation</b>										
5.3.1.P Define Filter box (re)-installation	4 Feedthroughs						StonyBrook			
5.3.2.P Define Filter boards insertion							StonyBrook			
<b>5.3.E Executing: Filter box (re)-installation</b>										
5.3.1.E Install filter box	4 Feedthroughs	Y			Y		StonyBrook			StonyBrook
5.3.2.E Install filter cards		Y			Y		StonyBrook			StonyBrook
<b>5.4.P Planning: HV-cabling &amp; Safety GND cabling</b>										
5.4.1.P Define cabling and needs of HV-cables between USA-15 and UX-15	ATLAS TC cabling						UWUP-CERN			
5.4.2.P Define procedure and policy of HV-connector equipping	install 1 or 2 end at pit/counting room						UWUP-CERN			

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5.4.3.P Define GND reference connections and verification tests in UX-15 & USA-15	3 CRYOSTATS		Y				BNL-CERN			
5.4.4.P Define GND monitoring and interlock system in UX-15 & USA-15	3 CRYOSTATS, monitoring systems tbdesigned and made		Y			Y	BNL-CERN			
5.4.5.P Define connecting of HV-FT <-> HV modules in UX-15 & USA-15 and the needs	4 Feedthroughs						UWUP-CERN			
<b>5.4.E Executing: HV-cabling &amp; Safety GND cabling</b>										
5.4.1.E Install HV-cables between UX-15 and USA-15	ATLAS TC cabling	Y			Y		ATLAS TC			ATLAS TC
5.4.2.E Equip HV-connectors	install 1 or 2 end at pit/counting room				Y		UWUP-CERN			UWUP-CERN-KTH-Mainz-Milano
5.4.3.E Install and verify GND reference connections in UX-15 & USA-15	3 CRYOSTATS	Y			Y		ATLAS TC BNL-CERN			ATLAS TC BNL-CERN
5.4.4.E Install and verify GND monitoring and interlock system in UX-15 & USA-15	3 CRYOSTATS	Y			Y		BNL-CERN			BNL-CERN
5.4.5.E Connect Cables HV-FT <-> HV-modules in UX-15 & USA-15	4 Feedthroughs	Y			Y		UWUP-CERN			UWUP-CERN-KTH-Mainz-Milano
<b>5.5.P Planning: System Tests</b>										
5.5.1.P Define System Tests for Barrel (2 Barrel Wheels: B-PS, EM)			Y				Milano- UWUP- CERN			
5.5.2.P Define System Tests for ECs (Fcal, EC-PS, EMEC, HEC)			Y				Milano- UWUP- CERN			
<b>5.5.E Executing: System Tests</b>										
5.5.1.E Test Barrel System (2 Barrel Wheels: B-PS, EM)		Y			Y		Milano- UWUP- CERN			UWUP-CERN-KTH-Mainz-Milano
5.5.2.E Test EC-C System (Fcal, EC-PS, EMEC, HEC)		Y			Y		Milano- UWUP- CERN			UWUP-CERN-KTH-Mainz-Milano
5.5.3.E Test EC-A System (Fcal, EC-PS, EMEC, HEC)		Y			Y		Milano- UWUP- CERN			UWUP-CERN-KTH-Mainz-Milano
5.4.1.E Test Barrel System (2 Barrel Wheels: B-PS, EM)		Y			Y		Milano- UWUP- CERN			UWUP-CERN-KTH-Mainz-Milano
5.4.2.E Test EC-C System (Fcal, EC-PS, EMEC, HEC)		Y			Y		Milano- UWUP- CERN			UWUP-CERN-KTH-Mainz-Milano
5.4.3.E Test EC-A System (Fcal, EC-PS, EMEC, HEC)		Y			Y		Milano- UWUP- CERN			UWUP-CERN-KTH-Mainz-Milano

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<b>6. DCS Installation</b>										
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<b>6.1.P Planning: General DCS issues</b>										
6.1.1.P Define needs, installation of all LAr DCS workstations			Y				TRIUMF/Victoria			
6.1.2.P Develop software and tests for all LAr DCS workstations			Y				TRIUMF/Victoria			
6.1.3.P Define needs, installation and tests of LAr DCS interface software to DAQ			Y				TRIUMF/Victoria			
<b>6.1.E Execution: General DCS issues</b>										
6.1.1.E Install and set up LAr DCS workstation(s) on surface						Y	???	Y		???
6.1.2.E Install and set up LAr DCS workstation(s) in USA15						Y	???	Y		???
6.1.3.E Install and set up LAr DCS interface software to DAQ							???	Y		???
<b>6.2.P Planning: LAr + Module Temperature -&gt; control &amp; read out</b>										
6.2.1.P Define needs and installation of (barrel) ELMBs on cryo platform	Placement on cryo platform not yet known			Y			LAL			
6.2.2.P Define needs and installation of (EC) ELMB near extended Tile fingers	Need space allocation in tile extended barrel finger region finalized			Y			LAL			
6.2.3.P Define needs and installation of LV-PSs for ELMBs							LAL			
6.2.4.P Define needs and installation of LAr Temp. Monitoring Board in FEC							LAL			
6.2.5.P Define connection/cabling between Monitoring Boards (in FECs) and ELMBs							LAL			
6.2.6.P Define needs and cabling of CAN Bus between ELMBs and USA15							LAL			
6.2.7.P Write PVSSII software							LAL			
<b>6.2.E Execution: LAr + Module Temperature -&gt; control &amp; read out</b>										
6.2.1.E Install (barrel) ELMB on cryo platform					Y	Y	LAL	Y	LAL	LAL
6.2.2.E Install (EC) ELMB near extended Tile fingers					Y	Y	LAL	Y	LAL	LAL
6.2.3.E Install LV-PSs for ELMBs in USA-15					Y	Y	LAL	Y	LAL	LAL
6.2.4.E Install LAr + Module Monitoring Boards in FECs					Y		LAL	Y	LAL	LAL
6.2.5.E Connect/cable Monitoring Boards (in FECs) and ELMBs					Y	Y	LAL	Y	LAL	LAL
6.2.6.E Connect CAN Bus cables to ELMBs and in USA15	May need patch panels in UX15. ELMB LV carried on CANBus cable./ <b>TC resp.</b>				Y	Y	LAL	Y	LAL	LAL
6.2.7.E Test control & read out with PVSSII workstation					Y		LAL	Y		LAL
<b>6.3.P Planning: LAr Purity -&gt; control &amp; read out</b>										
6.3.1.P Define needs and installation of Purity ADCs/CAN-Interfaces in USA15 racks							Mainz			
6.3.2.P Define needs and installation of Purity Monitoring Boards in FECs							Mainz			
6.3.3.P Define cabling between Purity Monitoring Boards (in FECs) and of Purity ADCs/CAN-Interfaces in USA15 racks				Y			Mainz			

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6.3.4.P Define needs and cabling of CAN Bus between racks in USA15 and PVSSII workstation in USA15							Mainz			
6.3.5.P Develop PVSSII software							Mainz			
<b>6.3.E Execution: LAr Purity -&gt; control &amp; read out</b>										
6.3.1.E Install Purity ADCs/CAN-Interfaces in USA15 racks					Y		Mainz	Y		Mainz
6.3.2.E Install Purity Monitoring Boards in FECs					Y		Mainz	Y		Mainz
6.3.3.E Connect Purity Monitoring Boards (in FECs) to Purity ADCs/CAN-Interfaces in USA15 racks					Y		Mainz	Y		Mainz
6.3.4.E Connect CAN Bus to Purity ADCs/CAN-Interfaces and PVSSII workstation in USA15					Y		Mainz	Y		Mainz
6.3.5.E Test control & read out with PVSSII workstation					Y		Mainz	Y		Mainz
<b>6.4.P Planning: HEC-LV -&gt; control &amp; read out</b>										
6.4.1.P Define needs and installation of CAN Bus cables between HEC LV-PSs and PVSSII workstation in USA15							MPI			MPI
<b>6.4.E Execution: HEC-LV -&gt; control &amp; read out</b>										
6.4.1.P Connect CAN Bus cables to HEC LV-PSs and PVSSII workstation in USA15	May need patch panels in UX15 / <b>TC resp.</b>		1 / EC		Y		MPI	Y		MPI
6.4.2.E Test control & read out with PVSSII workstation	Need to clarify CAN power for ELMB in HECLVPS and Groundingine!		1		Y		MPI	Y		MPI
<b>6.5.P Planning: FEC-LV + FEC-Monitoring -&gt; control &amp; read out</b>										
6.5.1.P Define Barrel ELMB installation in Tile Barrel finger				Y			BNL			
6.5.2.P Define EC ELMB installation in Tile EB finger region				Y			BNL			
6.5.3.P Define LV-PSs installation in USA15 for FEC ELMB digital/Can power							BNL			
6.5.4.P Define CAN Bus cable needs from ELMB to USA15							BNL			
6.5.5.P Define PVSSII workstation installation in USA15							BNL			
6.5.6.P Define FEC Monitoring Board installation							BNL			
6.5.7.P Define needs for additional connections to FEC board							BNL			
6.5.8.P Define cabling between FEC Monitoring Board and							BNL			
6.5.9.P Define connection between LV-PSs and ELMB (digital/binary status signals)							BNL			
6.5.10.P Develop PVSII software							BNL			
<b>6.5.E Execution: FEC-LV + FEC-Monitoring -&gt; control &amp; read out</b>										
6.5.1.E I Install barrel ELMB in tile finger region					Y	Y	BNL	Y	BNL	BNL
6.5.2.E Install EC ELMB in extended tile barrel finger region					Y	Y	BNL	Y	BNL	BNL
6.5.3.E Install LV-PSs in USA15 for FEC ELMB digital/Can power		Y			Y	Y	BNL	Y	BNL	BNL
6.5.4.E Install CAN Bus cables from USA15 to ELMB					Y	Y	BNL	Y	BNL	BNL
6.5.5.E Install and set up PVSSII workstation in USA15					Y	Y	BNL	Y	BNL	BNL
6.5.6.E Install Monitoring Boards into FECs					Y	Y	BNL	Y	BNL	BNL
6.5.7.E Install Additional connections to FEC board					Y		BNL	Y	BNL	BNL
6.5.8.E Cable FEC Monitoring Board to ELMB					Y		BNL	Y	BNL	BNL
6.5.9.E Connect LV-PSs to ELMB (digital/binary status signals)		Y			Y	Y	BNL	Y	BNL	BNL
6.5.10.E Test control & read out with PVSSII workstation					Y		BNL	Y	BNL	BNL

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<b>6.6.P Planning: 300V PS (in USA-15) -&gt; control &amp; read out</b>										
6.6.1.P Define ELMB installation in USA15				Y			BNL	Y		
6.6.2.P Define needs and installation of LV-PSs for ELMB in USA15				Y			BNL	Y		
6.6.3.P Define connection between 300VPS and ELMBs							BNL	Y		
6.6.4.P Define PVSSII workstation installation in USA15							BNL	Y		
6.6.5.P Define CAN Bus cables between ELMB and workstation USA15							BNL	Y		
							BNL	Y		
<b>6.6.E Execution: 300V PS (in USA-15) -&gt; control &amp; read out</b>										
6.6.1.E Install ELMB in USA15	Number and use depends on 300VPS specification				Y	Y	BNL	Y	BNL	BNL
6.6.2.E Install LV-PS for ELMB in USA15					Y	Y	BNL	Y	BNL	BNL
6.6.3.E Connect 300VPS to ELMBs					Y		BNL	Y	BNL	BNL
6.6.4.E Install and set up PVSSII workstation in USA15	Same as FEC LV workstation				Y	Y	BNL	Y	BNL	BNL
6.6.5.E Install CAN Bus cables between ELMB and workstation USA15	CAN cable will carry all ELMB power. / <b>TC resp.?</b>				Y	Y	BNL	Y	BNL	BNL
6.6.6.E Test control & read out with PVSSII workstation					Y		BNL	Y		BNL

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<b>7. BE Electronics Installation</b>										
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<b>7.1.P Planning: ROD cooling system</b>										
7.1.1.P Define needs and installation of ROD cooling station			???	Y			Geneva			
7.1.2.P Define needs and installation of water distribution units in racks (in USA-15)			???	Y			Geneva			
7.1.3.P Define needs and installation of water distribution pipes			???	Y			Geneva			
7.1.4.P Define tests of ROD cooling system			???	Y			Geneva			
<b>7.1.E Execution: ROD cooling system</b>	in design phase									
7.1.1.E Install cooling station					Y	Y	Geneva		Geneva	Geneva
7.1.2.E Insert water distribution units in racks					Y	Y	Geneva		Geneva	Geneva
7.1.3.E Install and connect water distribution pipes					Y	Y	Geneva		Geneva	Geneva
7.1.4.E Test cooling system					Y	Y	Geneva		Geneva	Geneva
<b>7.2.P Planning: ROD crates</b>										
7.2.1.P Define needs and installation of ROD crates					P		Geneva			
7.2.2.P Define needs and installation of Power supply units					P		Geneva			
7.2.3.P Define needs and cabling of power lines and CAN Bus					P		Geneva			
7.2.4.P Define needs and installation of heat exchangers					P		Geneva			
7.2.5.P Define tests of rack control system					P		Geneva			
<b>7.2.E Execution: ROD crates</b>										
7.2.1.E Install ROD crates		Y			Y		Geneva			Geneva
7.2.2.E Install Power supply units		Y			Y		Geneva			Geneva
7.2.3.E Connect water lines and test for leakage		Y			Y		Geneva			Geneva
7.2.4.E Connect power lines		Y			Y		Geneva			Geneva
7.2.5.E Insert heat exchangers	If not done by USA15 technical team				Y		Geneva			Geneva
7.2.5.E Connect crate CAN Bus cables		Y			Y		Geneva			Geneva
7.2.6.E Test rack control system					Y		Geneva			Geneva
<b>7.3.P Planning: ROD work stations and CPUs</b>										
7.3.1.P Define needs and installation of ROD work stations							MPI			
7.3.2.P Define IP configuration and functionality check							MPI			
7.3.3.P Define needs and installation of crate CPUs							MPI			
7.3.4.P Define basic VME tests							MPI			
<b>7.3.E Execution: ROD work stations and CPUs</b>										
7.3.1.E Install ROD work stations					Y	Y	MPI		MPI	MPI
7.3.2.E Configure IP, check functionality					Y		MPI			MPI
7.3.3.E Install crate CPUs					Y	Y	MPI		MPI	MPI
7.3.4.E Make basic VME tests					Y		MPI			MPI
<b>7.4.P Planning: ROD test bench</b>										
7.4.1.P Define needs and equipping of ROD test crate					P		LAPP, MPI			
7.4.2.P Define needs and installation of test workstation					P		LAPP, MPI			
7.4.3.P. Define test bench cabling and its needs					P		LAPP, MPI			
7.4.4.P Define needs and checks of test bench functionality					P		LAPP, MPI			

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<b>7.4.E Execution: ROD test bench</b>	in design phase									
7.4.1.E Equip ROD test crate		Y			Y		LAPP, MPI			LAPP, MPI
7.4.2.E Install test workstation					Y		LAPP, MPI			LAPP, MPI
7.4.3.E Plug cables		Y			Y		LAPP, MPI			LAPP, MPI
7.4.4.E Check test bench functionality		Y			Y		LAPP, MPI			LAPP, MPI
<b>7.5.P Planning: Links</b>										
7.5.1.P Define cabling and needs of TTC cables				Y			KTH			
7.5.2.P Define needs and installation of FE patch panels				Y			KTH			
7.5.3.P Define cabling and needs of readout link cables				Y			KTH			
<b>7.5.E Execution: Links</b>										
7.5.1.E Install TTC cables	If not done by USA15 technical team or TDAO	Y			Y		TC			TC
7.5.2.E Install FE patch panels		Y			Y		KTH			KTH
7.5.3.E Install readout link cables	If not done by USA15 technical team or TDAO				Y		TC			TC
<b>7.6.P Planning: ROD modules</b>										
7.6.1.P Define module insertion sequence					Y		LAPP			
7.6.2.P Define partition commissioning and its needs					Y		LAPP			
<b>7.6.E Execution: ROD modules</b>	partition by partition									
7.6.1.E Insert TBM modules					Y		LAL			LAL
7.6.2.E Insert ROD modules and plug water pipes					Y		Geneva			Geneva
7.6.3.E Insert SPAC modules					Y		Paris			Paris
7.6.4.E Insert transition modules					Y		LAL			LAL
7.6.5.E Make partition commissioning	with ROD test bench 7.4				Y		MPI			MPI
7.6.6.E Connect front-end cables					Y		Geneva			Geneva
7.6.7.E Connect readout cables					Y		LAL			LAL

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<b>8. Mechanical preparations for FE Electronics &amp; LV-System Installation</b>										
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Contact Person: Agnes Rudert (HEC-LV only)☐ E-Mail: <agnes.rudert@mppmu.mpg.de> Phone: +49 89 32 354 313 (CERN: 7 38 83)										
<b>8.1. Planning: Mechanical preparations for FE Electronics &amp; LV</b>										
8.1.1.P Define reinstallation of pedestals on barrel cryostat and needs	handling tools required, dedicated test equipment required			P			BNL			
8.1.2.P Define Front End Crate (FEC) installation and needs	handling tools required, dedicated test equipment required			P			BNL			
8.1.3.P Define FEC LV-PS installation and needs	handling tools required, dedicated test equipment required		Y	P			BNL			
8.1.4.P Define needs and installation of HEC LV-PS in Tile-EB finger region	handling tools required, dedicated test equipment required		Y	P			BNL, MPI			
8.1.5.P Define Water Cooling Manifold installation and needs	dedicated test equipment required		Y	P			BNL			
8.1.6.P Define water cooling verification and needs				P			BNL/TC			
8.1.7.P Define connection to Smoke Detection System and needs	dedicated test equipment required		Y	P			BNL/TC			
8.1.8.P Define installation of patch panels for filter-box cable and needs			Y	P			LAL			
8.1.9.P Define installation of patch panels for optical fibres and needs			Y	P			KTH			
<b>8.1. Execution: Mechanical preparations for FE Electronics on Barrel Side-A</b>										
8.1.1.E Reinstall pedestals on barrel cryostat on Barrel Side-A (if needed)		Y			Y		BNL			BNL
8.1.2.E Install Front End Crate (FEC) on Barrel Side-A		Y			Y		BNL			BNL
8.1.3.E Install FEC LV-PS on Barrel Side-A		Y			Y		BNL			BNL
8.1.4.E Install Water Cooling Manifold on Barrel Side-A		Y			Y		BNL			BNL
8.1.5.E Verify water cooling to work on Barrel Side-A		Y			Y		BNL/TC			BNL/TC
8.1.6.E Connect to Smoke Detector System on Barrel Side-A		Y			Y		TC			TC
8.1.7.E Install patch panels for filter-box cable on Barrel Side-A		Y			Y		LAL			LAL
8.1.8.E Install patch panels for optical fibres on Barrel Side-A		N			Y		KTH			KTH
<b>8.2. Execution: Mechanical preparations for FE Electronics on Barrel Side-C</b>										
8.2.1.E Reinstall pedestals on barrel cryostat on Barrel Side-C (if needed)		Y			Y		BNL		BNL	BNL



Task / Deliverable	Comments & Explanations	Grounding checks required? [Yes, No]	Study required? [Yes, No, Partially]	Are design work, drawings, specifications missing? [Yes, No, Partially]	Procedures are still to be defined and documented? [Yes, No, Partially]	Procurement required? [Yes, No, Partially]	Who has the technical responsibility ?	Funding needs to be clarified? [Yes, No, Partially]	Who supplies materials and/or tooling?	Who supplies the manpower or money for manpower?
8.2.2.E Install Front End Crate (FEC) on Barrel Side-C		Y			Y		BNL		BNL	BNL
8.2.3.E Install FEC LV-PS on Barrel Side-C		Y			Y		BNL		BNL	BNL
8.2.4.E Install Water Cooling Manifold on Barrel Side-C		Y			Y		BNL		BNL	BNL
8.2.5.E Verify water cooling to work on Barrel Side-C		Y			Y		BNL/TC		BNL/TC	BNL/TC
8.2.6.E Connect to Smoke Detector System on Barrel Side-C		Y			Y		TC		TC	TC
8.2.7.E Install patch panels for filter-box cable on Barrel Side-C		Y			Y		LAL		LAL	LAL
8.2.8.E Install patch panels for optical fibres on Barrel Side-A		N			Y		KTH		KTH	KTH
<b>8.3 Execution: Mechanical preparations for FE Electronics on EC-C</b>										
8.3.1.E Install Front End Crate (FEC) on EC-C		Y			Y		BNL		BNL	BNL
8.3.2.E Install FEC LV-PS on EC-C		Y			Y		BNL		BNL	BNL
8.3.3.E Install HEC LV-PS on EC-C		Y			Y		MPI		MPI	MPI
8.3.4.E Install Water Cooling Manifold on EC-C		Y			Y		BNL		BNL	BNL
8.3.5.E Verify water cooling to work on EC-C		Y			Y		BNL/TC		BNL/TC	BNL/TC
8.3.6.E Connect to Smoke Detector System on EC-C		Y			Y		TC		TC	TC
8.3.7.E Install patch panels for filter-box cable on EC-C		Y			Y		LAL		LAL	LAL
8.3.8.E Install patch panels for optical fibres on EC-C		N			Y		KTH			???
<b>8.4 Execution: Mechanical preparations for FE Electronics on EC-A</b>										
8.4.1.E Install Front End Crate (FEC) on EC-A		Y			Y		BNL		BNL	BNL
8.4.2.E Install FEC LV-PS on EC-A		Y			Y		BNL		BNL	BNL
8.4.3.E Install HEC LV-PS on EC-A		Y			Y		MPI		MPI	MPI
8.4.4.E Install Water Cooling Manifold on EC-A		Y			Y		BNL		BNL	BNL
8.4.5.E Verify water cooling to work on EC-A		Y			Y		BNL/TC		BNL/TC	BNL/TC
8.4.6.E Connect to Smoke Detector System on EC-A		Y			Y		TC		TC	TC
8.4.7.E Install patch panels for filter-box cable on EC-A		Y			Y		LAL		LAL	LAL
8.4.8.E Install patch panels for optical fibres on EC-A		N			Y		KTH			???
<b>8.5.P Planning: 300 V PS installation in USA-15</b>										
8.5.1.P Define installation, test and needs of FEC 300 V PSs in USA-15							BNL			
8.5.2.P Define installation, test and needs of HEC 300 V PS in USA-15							MPI			
<b>8.5.E Executing: 300 V PSs installation</b>										
8.5.1.E Install and test FEC 300 V PSs in USA-15		Y			Y		BNL			BNL
8.5.2.E Install and test HEC 300 V PSs in USA-15		Y			Y		MPI			MPI
<b>8.6.P Planning: LV-cabling</b>										
8.6.1.P Define cabling and needs of LV-cables between USA-15 and UX-15	ATLAS TC cabling						BNL			
8.6.2.P Define procedure and policy of LV-connector equipping	install 1 or 2 end at pit/counting room						BNL			
8.6.3.P Define verification tests for the GND reference in UX-15 & USA-15							BNL			
8.6.4.P Define connecting of FEC <-> FEC LV-PS <-> FEC 300 V PS in USA-15 and the needs							BNL			
8.6.5.P Define installation and needs of FEC-LV Interlocks							BNL			
8.6.6.P Define installation and needs of HEC-LV Interlocks							MPI			

Task / Deliverable	Comments & Explanations	Grounding checks required? [Yes, No]	Study required? [Yes, No, Partially]	Are design work, drawings, specifications missing? [Yes, No, Partially]	Procedures are still to be defined and documented? [Yes, No, Partially]	Procurement required? [Yes, No, Partially]	Who has the technical responsibility ?	Funding needs to be clarified? [Yes, No, Partially]	Who supplies materials and/or tooling?	Who supplies the manpower or money for manpower?
<b>8.6.E Executing: LV-cabling</b>										
8.6.1.E Install LV-cables between UX-15 and USA-15	ATLAS TC cabling	Y			Y		TC			TC
8.6.2.E Install Interlock cables, equip with connectors and connect		Y					TC, BNL, MPI			TC, BNL, MPI
8.6.3.E Equip LV-connectors					Y		BNL			TC
8.6.4.E Verify GND reference connections in UX-15 & USA-15		Y			Y		BNL			BNL
8.6.5.E Connect Cables: FEC <-> FEC LV-PS <-> FEC 300 V PS	4 Feedthroughs	Y			Y		BNL			BNL
8.6.6.E Connect Cables: HEC-LV Boards <-> HEC LV-PS <-> HEC 300 V PS		Y					MPI			MPI
<b>8.7 Planning: FE LV monitoring</b>										
8.7.1.P Define FEC LV-PS connection to ELMBs and needs							BNL			
8.7.2.P Define Crate Monitoring Board installation into FEC, connection to ELMBs and needs							BNL			
8.7.3.P Define HEC LV-PS connection to CAN-Bus and needs							MPI			
8.7.4.P Define HEC-LV Board installation into EC FECs, connection to HEC LV-PS and needs							MPI			
<b>8.7 Execution FE LV monitoring</b>										
8.7.1.E Connect FEC LV-PS to ELMBs							BNL			BNL
8.7.2.E Install Crate Monitoring Board into FEC and connect to ELMBs							BNL			BNL
8.7.3.E Connect HEC LV-PSs to CAN-Bus							MPI			MPI
8.7.4.E Install HEC-LV Boards into EC FECs and connect to HEC LV-PSs							MPI			MPI
<b>8.8.P Planning: LV System Tests</b>										
8.8.1.P Define FEC-LV System Tests (Barrel + ECs)			Y				BNL			
8.8.2.P Define HEC-LV System Tests (ECs)			Y				MPI			
<b>8.8.E Executing: LV System Tests (incl. Interlocks)</b>										
8.8.1.E Test FEC-LV System Barrel Side-A (incl. Interlocks)		Y			Y		BNL			BNL
8.8.1.E Test FEC-LV System Barrel Side-C (incl. Interlocks)		Y			Y		BNL			BNL
8.8.2.E Test FEC-LV System EC-C (incl. Interlocks)		Y			Y		BNL			BNL
8.8.2.E Test HEC-LV System EC-C (incl. Interlocks)		Y			Y		MPI			MPI
8.8.3.E Test FEC-LV System EC-A (incl. Interlocks)		Y			Y		BNL			BNL
8.8.3.E Test HEC-LV System EC-A (incl. Interlocks)		Y			Y		MPI			MPI

Task / Deliverable	Comments & Explanations	Grounding checks required? [Yes, No]	Study required? [Yes, No, Partially]	Are design work, drawings, specifications missing? [Yes, No, Partially]	Procedures are still to be defined and documented? [Yes, No, Partially]	Procurement required? [Yes, No, Partially]	Who has the technical responsibility ?	Funding needs to be clarified? [Yes, No, Partially]	Who supplies materials and/or tooling?	Who supplies the manpower or money for manpower?
<b>9. FE Electronics Installation</b>	<b>Barrel-A, Barrel-C, EC-A, EC-C</b>									
<b>Contact Person: Pascal Perrodo</b> <b>E-Mail: &lt;perrodo@lappa.in2p3.fr&gt;</b> <b>Phone: +33 450 09 16 32 (CERN: 7 11 37)</b>										
<b>9.1.P Planning: FE-Crate Equipping (might be different for EM, HEC, FCAL)</b>	Gain experience from FEC test at BNL+ combined run. --> Software to be written for testing of all components		Studies required for handling and handling tools							
9.1.1.P Define installation and needs of Controller Board (connecting to TTC and SPAC cables, tests)			Y	P	Y		LAr			
9.1.2.P Define installation and needs of SPAC bus				P			LAr			
9.1.3.P Define installation and needs of Temp Boards (connecting, tests)			Y	P	Y		LAr			
9.1.4.P Define installation and needs of Temp Boards (connecting, tests)Purity Boards, connect, test			Y	P	Y		LAr			
9.1.5.P Define installation and needs of Calibration Boards, connect and test fir the logic			Y	P	Y		LAr			
9.1.6.P Define test system to readout the L1 signals and its installation			Y	P	Y		LAr			
9.1.7.P Define installation and needs of TBB/TDB (connecting, tests)			Y	P	Y		LAr			
9.1.8.P Define installation and needs of FEBs (connecting, tests)			Y	P	Y		LAr			
9.1.9.P Develop DB for mapping the FE electronics			Y		Y		LAr			
<b>9.1.E Execution: FE-Crate Equipping (to be repeated for each FEC -&gt; might be different for EM, HEC, FCAL)</b>	Auxiliary test equipment needed/to be procured					Handling tools are required				
9.1.1.E Install the Controller Board, connect to TTC and SPAC cables, test		Y			Y	Y	LAr	Y	LAr	LAr
9.1.2.E Install the SPAC bus		Y			Y	Y	LAr	Y	LAr	LAr
9.1.3.E Install all Temp Boards, connect, test		Y			Y	Y	LAr	Y	LAr	LAr
9.1.4.E Install Purity Boards, connect, test	to be repeated with LAr in the Cryostats	Y			Y	Y	LAr	Y	LAr	LAr
9.1.5.E Install the Calibration Boards, connect and test fir the logic		Y			Y	Y	LAr	Y	LAr	LAr
9.1.6.E Setup a test system to readout the L1 signals		Y			Y	Y	LAr	Y	LAr	LAr
9.1.7.E Install the TBB/TDB, connect and test		Y			Y	Y	LAr	Y	LAr	LAr
9.1.8.E Install a FEB, connect, test for the logic		Y			Y	Y	LAr	Y	LAr	LAr
9.1.9.E Pulse all lines assoc. to this FEB. Analyse the data,					Y	Y	LAr	Y	LAr	LAr
9.1.10.E Analyse the data from L1 receivers, validate					Y	Y	LAr	Y	LAr	LAr
9.1.11.E Go again with all FEBs					Y	Y	LAr	Y	LAr	LAr

Task / Deliverable	Comments & Explanations	Grounding checks required? [Yes, No]	Study required? [Yes, No, Partially]	Are design work, drawings, specifications missing? [Yes, No, Partially]	Procedures are still to be defined and documented? [Yes, No, Partially]	Procurement required? [Yes, No, Partially]	Who has the technical responsibility ?	Funding needs to be clarified? [Yes, No, Partially]	Who supplies materials and/or tooling?	Who supplies the manpower or money for manpower?
<b>9.2.P Planning: FE-Crate test (might be different for EM, HEC, FCAL)</b>	Gain experience from FEC test at BNL+ combined run. --> Software to be written for testing of all components									
9.2.1.P Define logical test for the entire crate and their needs				P	Y		LAr			
9.2.2.P Define recovery tests for clock failure and power failure for the crate and their needs				P	Y		LAr			
9.2.3.P Define noise tests for the full crate and their needs				P	Y		LAr			
9.2.4.P Define pulse tests of the entire crate (delay run - data from the FEBs and the L1 to be recorded)				P	Y		LAr			
<b>9.2.E Execution: FE-Crate test (to repeat for each FEC -&gt; might be different for EM, HEC, FCAL)</b>	Auxilliary test equipment needed/to be procured									
9.2.1.E Run logical tests for the entire crate.					Y		LAr	Y		LAr
9.2.2.E Recovery tests for clock failure, power failure for the crate					Y		LAr	Y		LAr
9.2.3.E Noise tests for the full crate					Y		LAr	Y		LAr
9.2.4.E Pulse the entire crate (delay run). Data from the FEBs and the L1 to be recorded.					Y		LAr	Y		LAr
<b>9.3.P Planning: Partition test (to repeat for each Partition)</b>	Gain experience from FEC test at BNL+ combined run. --> Software to be written for testing of all components									
9.3.1.P Test for Power on, Initialize the partition				P	Y		LAr			
9.3.2.P Define logical test for the partition and their needs				P	Y		LAr			
9.3.3.P Define noise tests for the partition and their needs				P	Y		LAr			
9.3.4.P Define pulse tests of the partition (delay or calibration run)				P	Y		LAr			
<b>9.3.E Execution: Partition test (to repeat for each Partition)</b>	Auxilliary test equipment needed/to be procured									
9.3.1.E Test for Power on, Initialize the partition					Y		LAr	Y		LAr
9.3.2.E Run logical test program					Y		LAr	Y		LAr
9.3.3.E Noise test for the partition					Y		LAr	Y		LAr
9.3.4.E Pulse the partition (delay or calibration run)					Y		LAr	Y		LAr

Task / Deliverable	Comments & Explanations	Grounding checks required? [Yes, No]	Study required? [Yes, No, Partially]	Are design work, drawings, specifications missing? [Yes, No, Partially]	Procedures are still to be defined and documented? [Yes, No, Partially]	Procurement required? [Yes, No, Partially]	Who has the technical responsibility?	Funding needs to be clarified? [Yes, No, Partially]	Who supplies materials and/or tooling?	Who supplies the manpower or money for manpower?
<b>10. Level-1 Interface</b>										
<b>Contact Person: Bill Cleland</b>										
<b>E-Mail: &lt;cleland@pitt.edu&gt;</b>										
<b>Phone: +1 41 26 24 92 24 (CERN: 7 59 40)</b>										
<b>10.1.P Planning:</b>										
10.1.1.P Define installation of TBB (EM), TDB (HEC,FCAL) into FEC and needs							Saclay. MPI			
10.1.2.P Define Trigger cable installation and needs			???	???	???		TC			
10.1.3.P define installation and tests of cable connectors (tests for continuity and crosstalk)			???				Saclay			
10.1.4.P Define cable connecting to TBB, TDB							Saclay. MPI			
10.1.5.P Define installation of L1 receivers in USA-15							Pittsburgh			
10.1.6.P Define cable receiver crates, I.e. distribute and strain relief cables			Y	Y	Y	Y	Pittsburgh	Y		
10.1.7.P Define communication set up between ROD and L1 digitizer (stand alone Work Station + Ethernet)							Pittsburgh			
10.1.8.P Define crate tests (to be repeated for each crate)					Y		LAr			
<b>10.1.E Executing:</b>										
10.1.1.E Install TBB (EM), TDB (HEC,FCAL) into FEC							LAr	Y		LAr
10.1.2.E Install Trigger cable							TC			TC
10.1.3.E Install Cable Connectors and Test for continuity and crosstalk							Saclay	Y		Saclay
10.1.4.E Connect cables to TBB, TDB							LAr			LAr
10.1.5.E Install L1 receivers in USA-15							Pittsburgh			Pittsburgh
10.1.6.E Cable receiver crates (distribute and strain relief cables)		Y					Pittsburgh	Y		Pittsburgh
10.1.7.E Set up communication between ROD and L1 digitizer (stand alone Work Station + Ethernet)							Pittsburgh			Pittsburgh
10.1.8.E Perform tests crate by crate							LAr	Y		LAr

Task / Deliverable	Comments & Explanations	Grounding checks required? [Yes, No]	Study required? [Yes, No, Partially]	Are design work, drawings, specifications missing? [Yes, No, Partially]	Procedures are still to be defined and documented? [Yes, No, Partially]	Procurement required? [Yes, No, Partially]	Who has the technical responsibility ?	Funding needs to be clarified? [Yes, No, Partially]	Who supplies materials and/or tooling?	Who supplies the manpower or money for manpower?
<b>11 Inst. &amp; Maintenance Electronics Lab (IMEL)</b>										
Contact Person: Luis Hervas E-Mail: <Luis.Hervas@cern.ch> Phone: +41 79 201 38 05 (CERN: 16 38 05)										
Electronics preparation for installation, repair etc. are parallel tasks to the UX-15 and USA-15 activities. They will last as long as the LAr installation (maybe also during commissioning) and require additional manpower.										
»»» We have to decide about policies, manpower needs and financing!										