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Controls' Aspects for LHC Hardware Commissioning:

BT

Compte-rendu de la réunion du 22 sept. 2003

Participants: P. Charrue, E. Carlier, A. Daneels, R. Lauckner, J. Uythoven.
Copie pour info: W.Salter.

Généralités

La structure de contrôle est représentée en Fig. 1 (Fig. 1: Controls Layout)

- VME : utilise pour tous les équipements « rapides » tels que MKI, synchronisation avec le beamdump LHC, … Ce VME doit être équipe de cartes timing classiques (Action : CO/HT), diverses autres cartes (Action : E.Carlier) ainsi que du driver LynxOS pour les cartes timing (Action : CO/HT)
- CI : pour visualiser les signaux analogiques rapides. Un environnement pour le développement de l'acquisition de ces signaux rapides dans le cadre de OASIS est requit pour décembre 2003 (Action : CO/HC)

Échange de données entre BT et VAC.

- Dans la mesure où ces données sont échantillonnées toutes les 100 msec et transmises toutes les secondes, le DIP pourrait être utilisé (sic W.Salter), sinon un autre moyen doit être développé. E.Carlier étudiera la transmission de ces données avec F.di Maio afin de décider de la solution à adopter.

Beam Energy Measurement (BEM)

- La génération et la distribution de l'énergie du faisceau (Beam Energy Measurement – BEM) vers différents clients (BDI, RF, …) est en cours de discussion.

Intégration des équipements de contrôle (racks, etc)

- P.Charrue discutera cette question avec T.Wijnands (CEIWG).

Phases de test des divers équipements et requêtes associées

Equipment	Type	Control location	Phase de Test	Requêtes		
			Equipment & Hardware Commissioning	Controls Infrastructure	Controls Framework Available	Control Functionalities Needed
MKI2	Injection kicker	UA23 & SR2	09/2005	03/2005	03/2005	06/2005
MKI8	Injection kicker	UA87 & SR8	06/2005	01/2005	01/2005	04/2005
MKD63	Extraction kicker	UA63 & SR6	03/2006	09/2005	09/2005	01/2006
MKB67	Dilution kicker	UA67 & SR6	???			
MKD67	Extraction kicker	UA67 & SR6	07/2006	01/2006	01/2006	04/2006
MKB63	Dilution kicker	UA63 & Sr6	???			

... et: MKQA, TCDS & TCDQ

Note:
- L'infrastructure et le Framework « Contrôles » sont requis **6 mois** avant la date du commissionnement
- La fonctionnalité de Contrôle est requise **3 mois** avant la date du commissionnement.

Détails des requêtes

Les requêtes sont résumées dans les tableaux ci-dessous fournis par E. Carlier

Requêtes non liées a AB/CO

– Infrastructure contrôle

System	Equipment concernes				Remarques
	MKI2	**MKI8**	**MKD63**	**MKD67**	
Electrical Power	Yes Specified	Yes Installed	Yes Specified	Yes Specified	
UPS	Yes Specified	Yes Installed	Yes Specified	Yes Specified	
Cables	Yes	Yes Installation in progress	Yes Draft	Yes Draft	
Fibres	Yes	Yes	Yes	Yes	Long distance fibers specified (i.e. fibers between LHC points) Fibers distribution for BEM systems not yet taken into account (Responsibility still to be defined)
Racks	Yes	Yes	Yes	Yes	Rack numbers and location defined defined (UA & SR) Rack location in UA and SR discussed within PIWG & MIWG (AB/BT representative Jan BONTHOND). Coherency with to be controlled.
Technical Services	Yes ST/EL ST/CV ST/MA Vacuum	Yes ST/EL ST/CV ST/MA Vacuum	Yes ST/EL ST/MA Vacuum	Yes ST/EL ST/MA Vacuum	

Requêtes envers AB/CO

System	Equipment concernes				Remarques
	MKI2	**MKI8**	**MKD63**	**MKD67**	
Network	Yes	Yes	Yes	Yes	UA & SR Ethernet 10 Mb/s Need for wireless network in the UA (UA63 & UA67) not yet decided
Video links					No specific requests
Timing - Calendar	Yes	Yes	Yes	Yes	At the μs precision in the UA
Timing - Slow	Yes	Yes			SPS & LHC timing in the UA
Timing – Fast	Yes Prepulse	Yes Prepulse	Yes frev	Yes frev	Private optical connections between RF and BT
Fieldbus	Yes	Yes	Yes Profisafe	Yes Profisafe	Profibus
PLC	Yes	Yes	Yes	Yes	Siemens
Front-end (VME, …)	Yes	Yes	Yes Redundant	Yes Redundant	In the UA
Back-end (Server)	Yes	Yes	Yes	Yes	One central system for signal analysis (“à la BTSRV1”)
Console	Yes	Yes	Yes	Yes	In the UA and in the SR
Front-end OS	LynxOS	LynxOS	???	???	
3rd party software	Yes	Yes	Yes	Yes	Siemens (Communication + Scada) LeCROY (Remote Scope)Tektronics (Signal analysis)
Backup and restore					
Remote monitoring of Control Chain & restart	Yes	Yes	Yes	Yes	Front-end, PLC…
IT Oracle Service	Yes	Yes	Yes	Yes	If all the required functionalities are not included in the equipment server framework (data publishing…)

System	Equipment concernes				Remarques
	MKI2	**MKI8**	**MKD63**	**MKD67**	
Data exchange (DIP)	Yes Vacuum	Yes Vacuum	Yes Vacuum BEM ???	Yes Vacuum BEM ???	Publication of beam energy, Acquisition of equipment vacuum level
Database support	Yes	Yes	Yes	Yes	Equipment calibration Reference signals
Application software (= Supervision SW)	Yes Based on equipment server framework	Yes Based on equipment server framework	Yes Based on equipment server framework	Yes Based on equipment server framework	Fixed-display: Injection process, beam dumping system Remote control from CR Settings management….
Alarms	Yes	Yes	Yes	Yes	
Logging	Yes Normal + shot-by-shot + Post-mortem	Yes Normal + shot-by-shot + Post-mortem	Yes Normal + Post-mortem	Yes Normal + Post-mortem	Through equipment server framework
Post-mortem	Yes	Yes	Yes Each pulse	Yes Each pulse	Application for data correlation between different LBDS equipment Time-stamping with 1 us resolution???
Real-time	No	No	No	No	
Analogue signals	Yes OASIS + shot-by-shot logging	Yes OASIS + shot-by-shot logging	Yes OASIS + Dedicated application based on OASIS low level framework	Yes OASIS + Dedicated application based on OASIS low level framework	Analogue signals needed for process optimization, shot-by-shot logging and post-mortem…
24 hours support					
Interlock	Yes From & to BIC	Yes From & to BIC	Yes From & to BIC	Yes From & to BIC	In the UA
Cryogenics	No	No	No	No	
Quench protection	No	No	No	No	
Timing	Yes Mandatory for HW commissioning	Yes Mandatory for HW commissioning	Frev form RF	Frev from RF	

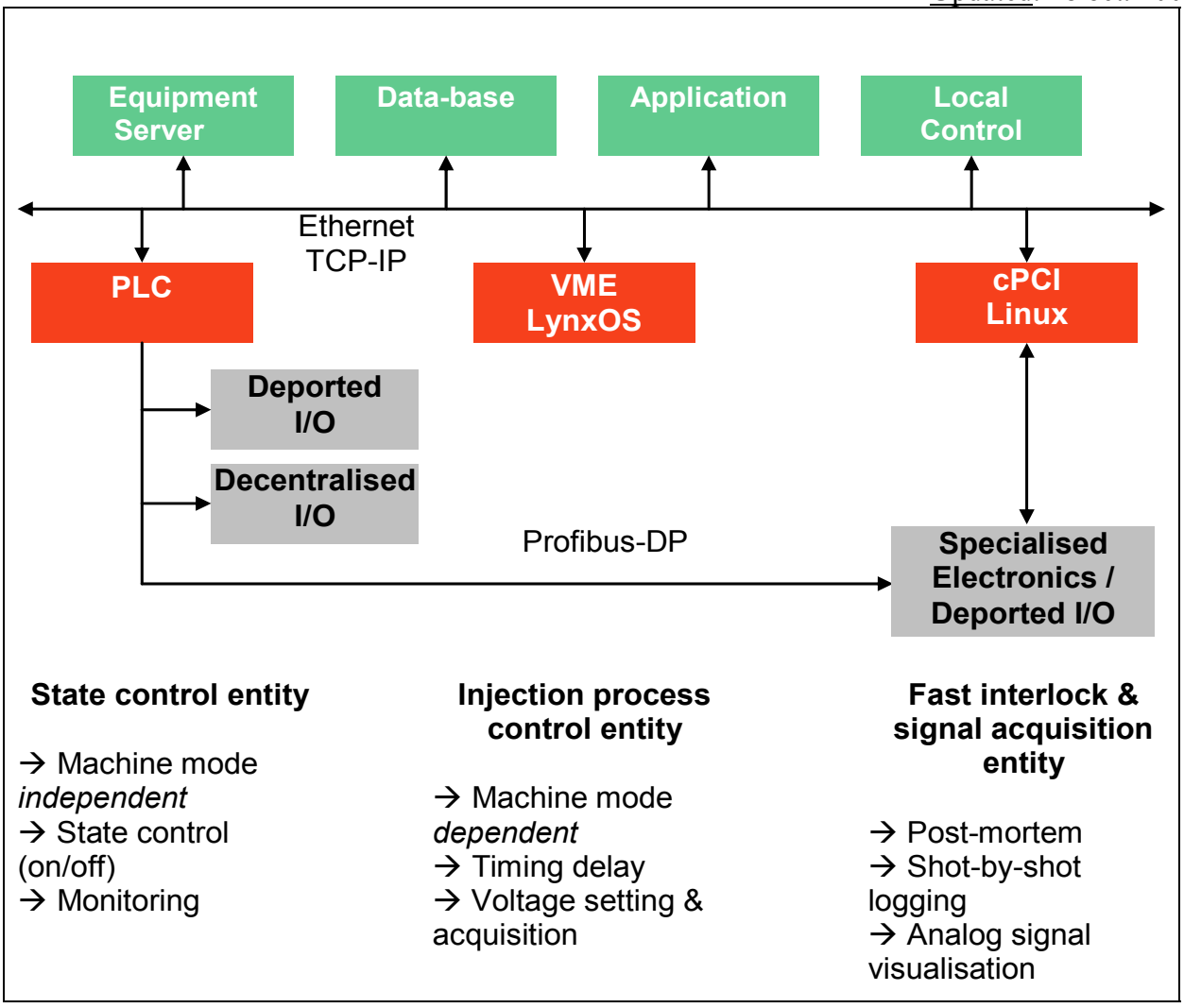

Fig. 1: Controls Layout

Milestones for AB/CO

Des tableaux précédents, fournis par E.Carlier, nous dérivons les jalons suivants pour les activités d'AB/CO. Celles-ci sont regroupées par Section concernée (colonne «Action») et apparaissent en ordre chronologique.

AB/CO Activities by "Action" & in chronoligical sequence			
System		**Delivery Date**	**Action**
VME			**CO/HT**
	VME: crate (incl. CPU, RTOS, Drivers, ...) available for BT (MKI8)	05/01/2005	CO/HT
	VME: crate (incl. CPU, RTOS, Drivers, ...) available for BT (MKI2)	03/03/2005	CO/HT
	VME: crate (incl. CPU, RTOS, Drivers, ...) available for BT (MKD63: redundant)	30/08/2005	CO/HT
	VME: crate (incl. CPU, RTOS, Drivers, ...) available for BT (MKD67: redundant)	16/01/2006	CO/HT
	VME: Beam Energy Measurement (BEM) supplier & user interface available for BT	01/02/2006	CO/HT
	VME: Beam Energy Measurement (BEM) card available for BT	15/06/2007	CO/HT
	VME: Beam Energy Measurement (BEM) supplier & user interface defined for BT	15/06/2007	CO/HT
Timing (TIM)			**CO/HT**
	TIM: Time stamping: preliminary interface definition available for BT	30/01/2004	CO/HT
	TIM: Slow Timing Driver: defined for BT	01/07/2004	CO/HT
	TIM: Time stamping available for BT (MKI8)	05/01/2005	CO/HT
	TIM: Slow Timing available for BT (MKI8)	05/01/2005	CO/HT
	TIM: Fast Timing available for BT (MKI8, prepulse)	05/01/2005	CO/HT
	TIM: Slow Timing Driver: available for BT	05/01/2005	CO/HT
	TIM: Time stamping available for BT (MKI2)	03/03/2005	CO/HT
	TIM: Slow Timing for BT (SPS & LHC TIM in UA)	03/03/2005	CO/HT
	TIM: Slow Timing available for BT (MKI2)	03/03/2005	CO/HT
	TIM: Fast Timing available for BT (MKI2, prepulse)	03/03/2005	CO/HT
	TIM: Time stamping available for BT (MKD63)	30/08/2005	CO/HT
	TIM: Fast Timing available for BT (MKD63, frev)	30/08/2005	CO/HT
	TIM: Time stamping available for BT (MKD67)	16/01/2006	CO/HT
	TIM: Fast Timing available for BT	16/01/2006	CO/HT
	TIM: Fast Timing available for BT (MKD67, frev)	16/01/2006	CO/HT
Data Bases (DB)			**CO/DM**
	DB: Calibration ref. signals for BT (MKI8)	05/01/2005	CO/DM
	DB: Calibration ref. signals for BT (MKI2)	03/03/2005	CO/DM
	DB: Calibration ref. signals for BT (MKD63)	30/08/2005	CO/DM
	DB: Calibration ref. signals for BT (MKD67)	16/01/2006	CO/DM
PLC system			**CO/IS**
	PLC: installed for BT (MKI8)	05/01/2005	CO/IS
	PLC: installed for BT (MKI2)	03/03/2005	CO/IS
	PLC: installed for BT (MKD63)	30/08/2005	CO/IS
	PLC: installed for BT (MKD67)	16/01/2006	CO/IS
Communication (COM)			**CO/IN**
	COM: Ethernet available in UA(87) & SR (8) for BT (MKI8)	05/01/2005	CO/IN
	COM: Ethernet available in UA(23) & SR (2) for BT (MKI2)	03/03/2005	CO/IN
	COM: Ethernet available in UA(63) & SR (6) for BT (MKD63)	30/08/2005	CO/IN
	COM: Ethernet available in UA(67) & SR (6) for BT (MKB67)	30/08/2005	CO/IN
	COM: Ethernet available in UA(67) & SR (6) for BT (MKD67)	05/01/2006	CO/IN
	COM: Ethernet available in UA(23, 87, 63, 67) & SR (2, 8 6) for BT	16/01/2006	CO/IN
	COM: Ethernet available in UA(63) & SR (6) for BT (MKB63)	16/01/2006	CO/IN

Fieldbusses			**CO/IS**
	WFIP: Profibus available for BT (MKI8)	05/01/2005	CO/IS
	WFIP: Profibus available for BT (MKI2)	03/03/2005	CO/IS
	WFIP: Profibus available for BT (MKD63) (Profisafe)	30/08/2005	CO/IS
	WFIP: Profibus available for BT (MKD67) (Profisafe)	16/01/2006	CO/IS
Alarms (AL)			**CO/IN**
	AL: available for BT (MKI8)	30/03/2005	CO/IN
	AL: available for BT (MKI2)	02/06/2005	CO/IN
	AL: available for BT (MKD63)	04/01/2006	CO/IN
	AL: available for BT (MKD67)	03/04/2006	CO/IN
Logging (LOG)			**CO/DM**
	LOG: available for BT (MKI8)	30/03/2005	CO/DM
	LOG: available for BT (MKI2)	02/06/2005	CO/DM
	LOG: available for BT (MKD63)	04/01/2006	CO/DM
	LOG: available for BT (MKD67)	03/04/2006	CO/DM
Post-Mortem			**????, R.Lauckner**
	Post-Mortem: available for BT (MKI8)	30/03/2005	????
	Post-Mortem: available for BT (MKI2)	02/06/2005	????
	Post-Mortem: available for BT (MKD63, at each pulse)	04/01/2006	????
	Post-Mortem: available for BT (MKD67, at each pulse)	03/04/2006	????
Interlocks			**CO/IN**
	Interlocks: available for BT (MKI8)	05/01/2005	CO/IN
	Interlocks: available for BT (MKI2)	03/03/2005	CO/IN
	Interlocks: available for BT (MKD63)	30/08/2005	CO/IN
	Interlocks: available for BT (MKD67)	16/01/2006	CO/IN
Front-End SW (FE-SW)			**CO/FC**
	FE-SW: O/S defined for BT	01/07/2004	CO/FC
	FE-SW: SW library to communicate with middle-layer defined for BT	01/07/2004	CO/FC
	FE-SW: O/S supplied for BT	05/01/2005	CO/FC
	FE-SW: SW library to communicate with middle-layer supplied for BT	05/01/2005	CO/FC
Back-End HW & SW (BE)			**CO/IN**
	BE: 1 central server for signal analysis ("à la BTSRV1") for BT	05/01/2005	CO/IN
	BE: 3rd party SW for [Siemens (Commun. & SCADA), Lecroy (Remote Scope), Tektronics (Signal Anal.)] for BT	05/01/2005	CO/IN
Supervision SW (SSW)			**CO/AP**
	SSW: available for BT MKI8)	30/03/2005	CO/AP
	SSW: available for BT (MKI2)	02/06/2005	CO/AP
	SSW: available for BT (MKD63)	04/01/2006	CO/AP
	SSW: available for BT (MKD67)	03/04/2006	CO/AP
Analog Signals (AN)			**CO/HT**
	AN: environment for developping the acquisition of fast analog signals for BT	15/12/2003	CO/HT
	AN: OASIS available for BT (MKI8: OASIS + shot by shot logging)	30/03/2005	CO/HT
	AN: OASIS available for BT (MKI2: OASIS + shot by shot logging)	02/06/2005	CO/HT
	AN: OASIS available for BT (MKD63: OASIS + dedicated application)	04/01/2006	CO/HT
	AN: OASIS available for BT (MKD67: OASIS + dedicated application)	03/04/2006	CO/HT
Data Interchange Protocol (DIP)			**CO/IS**
	DIP (or other solution): available for BT (MKI2, MKI8, MKD63 & MKD67: with VAC, for MKD63 & 67 also with BEM)	30/03/2005	CO/IS

Reboot			**CO/HT**
	Reboot: available for BT (MKI8)	30/03/2005	CO/HT
	Reboot: available for BT (MKI2)	02/06/2005	CO/HT
	Reboot: available for BT (MKD63)	04/01/2006	CO/HT
	Reboot: available for BT (MKD67)	03/04/2006	CO/HT
Monitoring of Control Chain (MON)			**CO/IN**
	MON: for BT	05/01/2005	CO/IN
Computing (COMP)			**CO/IN**
	COMP: PC Console available for BT (MKI8, in UA87 & SR8)	05/01/2005	CO/IN
	COMP: PC Console available for BT (MKI2, in UA23 & SR2)	03/03/2005	CO/IN
	COMP: PC Console available for BT (MKD63, in UA63 & SR6)	30/08/2005	CO/IN
	COMP: PC Console available for BT (MKD67, in UA67 & SR6)	16/01/2006	CO/IN