

Minutes of LHC-CP Link Meeting 24

- Subject** : LHC Controls Project
- Date** : 4th June, 2002
- Place** : 864-2-B14
- Participating Groups** :
- | | |
|---------|--------------------|
| LHC-ACR | no representative, |
| LHC-ECR | no representative, |
| LHC-IAS | J. Brahy |
| LHC-ICP | A. Hilaire, |
| LHC-MMS | no representative, |
| LHC-MTA | no representative, |
| LHC-VAC | R. Gavaggio, |
| PS-CO | F. DiMaio, |
| SL-AP | no representative, |
| SL-BI | J-J Gras, |
| SL-BT | apologies, |
| SL-CO | A. Bland, |
| SL-HRF | E. Ciapala, |
| SL-MR | R. Billen, |
| SL-MS | no representative, |
| SL-OP | M. Lamont, |
| SL-PO | Q. King, |
| ST-MA | P. Sollander. |
- Others** :
- P. Anderssen (ComIn)
 - B. Frammery (PS-CO),
 - P. Charrue (SL-CO),
 - A. Daneels (SL-DI),
 - R. Lauckner (Chair),
 - V. Mertens (LTI Project Leader)
 - H. Milcent (LHC-IAS),
 - B. Puccio (Machine Interlocks),
 - C-H Sicard (LHC-IAS)
 - M. Tyrrell (Alarm Project),
 - M. Vanden Eynden (Core Team).
- Distribution** : Via LHC-CP website: <http://cern.ch/lhc-cp>
Notification via: lhc-cp-info@cern.ch
- Agenda** :
- | | |
|--|--------------|
| 1. Matters arising from Previous Meeting | |
| 2. LHC-CP News | R. Lauckner |
| 3. Cost to Completion LHC-IAS | C-H. Sicard |
| 4. Cost to Completion SL-CO | P. Charrue |
| 5. Communications Infrastructure | P. Anderssen |
| 5. TI 8 Planning | A. Daneels |
| 6. AOB | |

1. Matters arising from Previous Meeting

M. Vanden Eynden reported that the VME procurement exercise now has an envelope of around 300 systems for BI, PO and BT groups. He is still waiting for information from the LHC groups in particular ICP who have over 60 front-end systems. H. Milcent reported that user requirements for these systems are being finalized and he will report to the LHC-CP in July.

R. Billen and A. Bland reported that the ENS system is referenced to GPS and that tools exist for the electricians to access the system directly, not through the TCR controls. More information is needed from S. Poulsen who is absent from CERN at present.

ACTION: A. BLAND, R. BILLEN

R. Billen reported that the Logging Functional Specification is now in the LHC Controls EDMS project. It is intended to submit this document for approval but in parallel work has entered the architectural design phase.

A. Bland enquired about the follow up on UPS protection for the Power Converter Controllers. Q. King said that no protection would be provided at the level of the embedded controller. R. Lauckner said that post mortem data for this system will be protected at the level of the gateway. In general people must decide on the UPS requirements for their equipment when they have defined the functionality.

Note: coordination of policy can be handled in the LHC-CP forum.

2. LHC-CP News R. Lauckner

R. Lauckner reported there have been three special meetings of the SLTC to exchange information and views as input for controls restructuring in the accelerator sector. He has emphasised his concerns about the fragmented management of controls resources and the need to re-define the structures to respond to the technical requirements. In particular units responsible for machine interlocks and post mortem must be identified.

R. Lauckner also reported briefly of a meeting of PS and SL management to discuss future structures. There is a proposal to merge PS-CO, SL-CO and LHC-IAS groups and to include the LHC-CP management within the enlarged group.

He also reported on a meeting to examine the alarm system database practices in the framework of the Alarm, Logging and Post mortem (ALP) activities. The alarm activity could be rationalized by stronger support and better organization of equipment data and by including the alarm archival management within the scope of the logging project.

The Controls Board had again called to re-activate the LHC Data Interchange Working Group. The scope would include dialogue between the Technical Services, Machine and Experiments. The board had also heard a report from E. Hatziangeli and A Silverman concerning possible support from IT for accelerator controls. User requirements have been compiled in the domains of networks, file servers, operating systems, Oracle, web infrastructure, tools for software development and 3rd party software. IT have made a preliminary response and Service Level Agreements (SLA) for networking and Oracle are being reviewed. It is important for the community to converge on their requirements. R. Lauckner has asked E. Hatziangeli to present the situation concerning supported 3rd party software at a future PCR Software meeting. He expressed his strong support for achieving a clear policy in this area.

Finally R. Lauckner noted that J. Lewis (PS) is preparing a preliminary version of the VMTG interface specification. The Timing FS has been approved.

The schedule and main topics for the next LHC-CP meetings are:

18/6	Time Stamping, FGC architecture	A. Bland, Q. King
2/7	QPS Controls Requirements, Controls for Machine Interlocks	H. Milcent, B. Puccio

Another topic to be presented is the HRF test stands. The chairman welcomes requests for other subjects to be discussed.

3. Cost to Completion Budget, LHC-IAS Claude Henri Sicard

C-H. Sicard **explained** that the figures he presented cover the period from 1996 to 2007 and various domains. The machine cryogenics budget includes some high-level software but does not cover the input output hardware in the tunnel. This radiation hard equipment has been developed at CERN by the ACR group. The ABB cryogenics are legacy systems that will operate until 1996. The PLC and Fieldbus activity extends CERN wide.

The machine cryogenics cost is split with roughly half for software and half for hardware. It does include network integration but there is no provision for integration into the LHC Control System in particular the LHC Alarms, Logging and Post Mortem requirements are not covered. Supervision, archiving and logging is mainly relevant to the String in SM18 and to the test benches. The situation is the same for the data acquisition expenses which are mainly incurred in the domain of labour costs. Finally the PLC and Fieldbus line includes a series of developments for example hardware for the WorldFIP and PLC material, software licenses and diagnostic software.

4. Cost to Completion Budget, SL-CO Pierre Charrue

Pierre Charrue **explained** that G. Shering had established the original LHC Controls budget in 1993. The budget had been reviewed in 1996 and allocated in 4 major areas. During the recent cost to completion exercise part of the budget had been transferred to the Communications Infrastructure Project which had become a separate responsibility. The remaining sum has been split into 6 main lines. Since the most recent costing the numbers of VME front-ends have increased and the anticipated cost of fieldbus cables has also risen.

The budget includes the SL costs for fieldbus cables and connectors, VME crates, VME power supplies, VME CPU cards and VME cards supplied by the CO group such as timing receivers. It does not include these items for LHC division.

J. Brahy pointed out that certain items fall between the budgets of the groups. He cited hardware for providing time stamping references to PLCs. These cost about 6 kCHF and a module is needed for each network segment. This can serve up to 16 PLCs.

M. Vanden Eynden reminded non-SL groups that they must also pay for their WorldFIP cabling costs which are higher than expected. Estimates for these costs are being prepared for the end of the month.

R. Gavaggio wanted to know if SL-CO included the cost of Windows servers for vacuum supervision. Pierre Charrue replied that this could be covered under the budget for central servers.

5. Communications Infrastructure P. Anderssen

R. Lauckner reminded the meeting that this was the final presentation from the QRL Controls session that had been cancelled at the 3rd LHC-CP Workshop.

P. Anderssen **said** that the communications infrastructure required for the control systems for QRL reception testing were within the scope of the ComIn project. Communications includes the needs for voice, video and data communication.

For the QRL tests the major requirement in the underground areas is the leaky feeder antenna which will provide several services. Of most interest to the meeting was the data communication. Slow speed GSM modem will be supported and the future Telecom provider will be ask to provide medium speed GPRS. The new Technical Network is planned for installation in surface buildings in summer 2002 and in low radiation underground areas of sector 7-8 for March 2003. The situation in the RRs will depend on radiations levels. The technical network will have a security perimeter similar to that applied to accelerator controls today. Peripherals to be attached will be qualified and direct access from the internet will be blocked.

Of interest to the cryogenic and vacuum teams will be the results of test of the propagation of Wireless LAN signals along the tunnel. Tests will be performed in octant 8 in April 2003.

P. Anderssen reminded the meeting that he expects further pressure to reduce cost. Expensive items are routers and long distance fibre links. Consequently the number of separate networks must be reduced. In addition the policy will be to route all communications on TCP/IP.

Quentin King expressed concerned about the Electromagnetic Compatibility (EMC) of the leaky feeder with delicate measurement systems. P. Anderssen said that he was aware of this issue and that it may be necessary to switch off the feeder when such systems were operating. This has impacts on safety in the underground areas although the safety aspects beyond the construction period have not yet been addressed.

J-J Gras enquired about public address facilities. P. Anderssen reported that telephone message broadcasting would be too expensive. The ST-MA group has been mandated to review public address facilities.

6. Beam Line Planning A. Daneels

A. Daneels **set out** the rationale for a change in the method of coordinating and planning controls infrastructure activities within the scope of the LTI and CNGS projects. In particular isolated information from different teams implied that there was no correlation of the information and no overview of the work.

He has now grouped the responsible services into clients and suppliers. Furthermore he has defined the work phases as specification, ordering, testing, delivery and finally the operational deadline. He showed examples of client worksheets with columns representing these phases and rows relating to the services required and suppliers worksheets where rows report the client systems.

An overview is obtained by combining the client and suppliers reports to correlate the situation concerning each service for each system. This makes it apparent that for a worrying large number of items the clients and suppliers have misunderstandings about the state of the work.

A. Bland pointed out that the SL Controls group is missing as a client for various services including racks and electricity.

R. Billen asked why this work deviated from the approach of the LHC coordination based on work units and responsible engineers? R. Lauckner replied that this was not an issue for the meeting – he was concentrating on the apparently serious situation facing the project. V. Mertens thanked A. Daneels for his valuable work. He expressed the concern that the difficulties might be related to the lack of resources.

A. Daneels will arrange a plenary meeting for these teams to attack the misunderstandings.

ACTION: A DANEELS

7. AOB

There was no other business.

Long-Term Actions	People
Underground Control Rooms requested	R. Lauckner
Establish Post-mortem sub-project	R. Lauckner
Clarify Middleware Services to be used by LHC-CP	Core Team

Reported by R. Lauckner

LHC Industrial Controls & Automation Cost to Completion

C.H.Sicard LHC-CP 04.06.02

LHC Cost for Completion

- z From 1996 to 2007
- z Split into:
 - y Project
 - y R&D
 - y Infrastructure & suppl.exploitation
 - y Exploitation
- z Special Contributions (India)

LHC-CP 4/06/2002

- C.H.Sicard-LHC-IAS

IAS budget responsibility

- z LHC Machine Cryogenics controls budget (PLCs, I/Os, SCADA server & operator stations), excluding tunnel I/O
- z Cryogenics Controls for SM18, Cable tests (ABB)
- z String2 DAQ and Supervision software
- z Magnet Test Benches DAQ and Supervision Software
- z PLC and Fieldbus integration
 - y General tools procurement (devt, diagnostics)
 - y Rad. tests, connectivity, communication...
 - y General-purpose developments (e.g. WorldFIP)

Estimated Cost per domain

Package	Dates	amount	comments
ABB Cryo controls	1996-2004	970K	HW + SW devt (external contract)
Cryogenics Controls	2000-2007	6.95M	UNICOS External contract (HW+SW)
Supervision – Archiv-Logging	1996-2007	1.45M	Addit.personnel + India contrib. (BARC)
DAQ	1996-2006	2.5M	Additional personnel + HW
PLC - Fieldbus	1996-2006	2.3M	HW, SW, add.personnel

LHC-CP 4/06/2002

- C.H.Sicard-LHC-IAS

LHC-CP 4/06/2002

- C.H.Sicard-LHC-IAS

Present situation

- z Budget estimated Aug 2001, revised Jan 2002 with minimal changes
- z Includes UNICOS porting to PVSS
- z Most work packages are in well advanced state (38% of budget spent)

SL/CO Cost to Completion

P. Charrue
4 Jun 2002

History

- In 1993, a first proposal for 30MCHF has been made
- In 1996, 20MCHF have been allocated as follows:
 - Machine equipment connection for 6 MCHF
 - Tunnel management and general services for 2 MCHF
 - Hardware for test and development for 4 MCHF
 - Software and licenses plus temporary labor for 8 MCHF
- Budget codes are 92640 and 92641

Second Iteration (Aug01)

- For Fibers and Network infrastructure, **11.5 MCHF** have been transferred to ST/EL and IT/CS .
 - For operator consoles and central computer servers :
 - **4.0 MCHF**
 - For FrontEnds (about 200 systems) and fieldbus :
 - **3.5 MCHF**
 - Timing generation and distribution :
 - **0.8 MCHF**
 - Application Software infrastructure :
 - **1.0 MCHF**
 - RealTime controls and communication :
 - **0.7 MCHF**
 - PVSS cost (0.4) + maintenance (0.6)
 - **1.0 MCHF**
- **Total 11.0 MCHF**

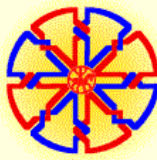
Already spent

- **1.5 MCHF** in
 - 0.7 for fibers (ST/EL and IT/CS now)
 - 0.8 for SL/CO (0.3 for IS)

Budget Available

- 3 MCHF for consoles and central computer servers
- 3 MCHF for FrontEnds (about 200 systems) and fieldbus
- 0.8 MCHF for Timing generation and distribution
- 1 MCHF for Application Software infrastructure
- 0.7 MCHF for RealTime controls and communication
- 0.4 MCHF for PVSS + 0.6 MCHF for PVSS maintenance
- TOTAL : 9.5 MCHF

Communication Infrastructure for the LHC Machine and Experimental Areas



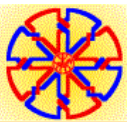
The ComIn Project

QRL Controls 21 March 2002

Pål S. Anderssen

IT-CS

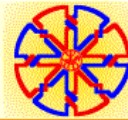
ComIn



➤ Scope of the Communication Services:

- Voice
 - Telephone, Intercom, Pompier's radio
- Video
 - Television
 - Site surveillance
 - Instrumentation
- Data
 - Networking
 - Monitoring and Controls
 - Access to Internet Services
 - Physics Data Transfer for LHC Experiments

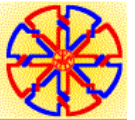
ComIn



➤ The Underground Leaky-Feeder Antenna will offer omnipresent radio access -

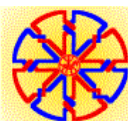
- Voice Communication
 - GSM portable telephones
 - (Intercom with group call if finance permits)
 - Legacy emergency bi-directional radio
 - Future TETRA radio system
- Data Communication
 - Slow speed GSM modem access to the Intranet
 - Medium speed GPRS digital access to the Intranet

ComIn



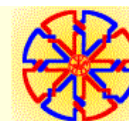
➤ IP/Ethernet infrastructure provides connectivity to the new Technical Network

- Available in radiation shielded underground locations
 - Alcoves (RE locations)
 - Tunnel Expansions (RR locations) Beware Radiation!
 - Pit bottoms (UJ locations)
 - Experimental caverns (UX locations)
 - Surface buildings



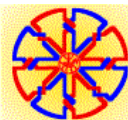
➤ **The Technical Network will offer high speed and availability -**

- Gigabit backbone
- Redundant paths for optical fibre cables
- Redundant electronics
- Surrounded by a security perimeter
- Managed and supervised device attachment



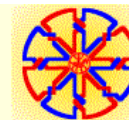
➤ **Installation Work**

- Leaky Feeder Antenna
 - Will be in the forefront of the installation of the General Services
 - Expect several hundred users during machine installation and commissioning
 - Will be a personal safety element
- IP/Ethernet
 - The embryo of the new Technical Network will be available in the surface buildings autumn 2002
 - The availability in the underground locations will follow closely the installation of the optical fibre cables 2003



➤ **Tentative Installation Schedule**

- June 2002: Leaky feeder in sector 78
- Summer 2002: Technical Network in all SR Buildings
- February 2003: Optical fiber in sector 78 and 81
- Mar 2003: Technical network in octant 78 (RE82, US85, RE99)
- (Apr 2003: WLAN test in octant 8)



➤ **Possible economies**

- Reduce the number of costly networking components to a minimum
- Ensure INB compliance by provide the networking redundancy in the backbone in order to reduce a proliferation of application level redundancy schemes
- Insist on IP/Ethernet as the universal communication method for controls, voice and video



Contrôles des Lignes de Transfert LTI + CNGS: Infrastructure Matériel

Suivi des installations: nouvelle procédure

Axel Daneels (SL/DI)

u Préambule: pourquoi une nouvelle procédure?

- u Jusqu'à présent
 - u le suivi des installations = entretiens avec les différents responsables.
 - u entretiens résumés sous forme de note = vue instantanée de la situation mais:
 - projets «LSS4, TT40, TI8, CNGS » et «LSS6, TT60, TI2, RA23 » amalgamés
 - pas de corrélation aisée des informations obtenues des diverses sources
 - pas de vue d'ensemble de l'évolution des installations



Nouvelle procédure

u Séparation «LSS4, TT40, TI8, RA87, CNGS » - «LSS6, TT60, TI2, RA23 »

- u différence de délais:
 - u TT40 test avec faisceau jusqu'à TED-400354: 5-10/05/03
 - TI8 commissionnement : 09-11/03
 - TI8 test avec faisceau jusqu'à TED-87765: 20/10-7/11/03
 - TI2 commissionnement : 06-07/04
 - CNGS: 2006
 - Etc.

u Corrélation des points de vues « clients »-« fournisseurs »:

- u "Clients"
 - BI (BPM, BCT) (D.Cocq, Rh.Jones) et (BLM, BTV, SEM/STEP) (G.Feroli)
 - ROCS Mugef (J.D.Hundzinger)
 - Détection incendie (F.I.Bonhond -> D.Raffourt)
 - Vide (J.Ch.Billy)
 - Radiation & protection (N.Aguilar, D.Perrin)
 - BT (TI8)et (TI2)(E.Carlier)
 - Surveillance Aimants (P.Dahlen/G. Mugnai)



Nouvelle procédure (suite 1)

u Corrélation des points de vues «clients» - «fournisseurs»:

u "Fournisseurs"

- Câbles de contrôle (incl. Bus terrain) (P.Woillet)
- Réseau (L.Guerrero -> J-M.Jouanigot)
- Fibres Optiques (L-K de Jonge)
- Racks (M.Condemine, P.Woillet)
- Distribution électrique (48V, 220V,...) (S.Akhtar)
- Secteur secours (UPS) (S.Akhtar)
- Timing (J-B.Ribes)
- Ordinateurs "Front-End" (M.Vanden Eynden)



Nouvelle procédure (suite 2)

u Mise en évidence de l' évolution (phases)

u Spécification

- p.ex. longueurs de câbles, emplacement racks, besoin en timing (MTG, pre-pulses,... emplacement,...) etc.
- Le point de vue "client" est de fournir ces spécifications au "fournisseur".
- Le point de vue "fournisseur" est d'agrèer ces spécifications.

u Commande

- Les commandes "formelles" s'appliquent en général entre Divisions.
- Les commandes entre groupes ou services à l'intérieure d'une même Division, se font en général de manière moins formelle et se basent sur des spécifications.

u Test

u Disponible

- mise à disposition du demandeur,

u Deadline

- date à laquelle le système doit être opérationnel en vue des tests



Présentation (Excel)

- u **Workbook « Clients » et « Suppliers »**
Résumé des points de vues « Clients » et « Fournisseurs » pour chaque projet:
 - u Colonne
 - phases de l'installation (depuis spécification jusqu'à la mise en service)
 - u Rangées
 - tableaux "Clients" = fournitures nécessaires pour le contrôle de leurs systèmes.
 - tableaux "Fournisseurs" = différents systèmes de leurs "clients".
 - u Code couleur
 - **Vert** = semble **O.K.** en date du sondage.
 - **Rouge** = semble **critique** en date du sondage, ou **incohérence** de vue entre « client » et « fournisseurs »
 - Noir = pas critique en date du sondage.



Présentation (suite)

- u **Tableau « Summary »**
 - u Résumé simpliste de la situation vue par les « fournisseurs » (rangées) et les « clients » (colonnes).
 - u Cases à l'intersection « client » / « fournisseurs » **rouges** = problème potentiel dans une des phases, ou différence de perception entre les protagonistes.
- u **Les tableaux sont disponibles sur:**
 - u <http://proj-lti.web.cern.ch/proj-lti/ControlsInfrastructure.htm>



Conclusion

- u **Mise en évidence de problèmes**
 - u discordances entre la perception des "clients" et "fournisseurs", en particulier: "Réseaux", "Distribution électrique", "Secteur secours (UPS) "
 - u Ces discordances ont été notées et font l'objet de concertation entre les responsables (échange d'e-mails; réunions)
 - u Vérification lors du prochain " follow-up"
- u **Rappels**
 - u la "Détection incendie": reprise par Denis Raffourt (ST/MA)
 - u les "Réseaux": repris par Jean-Michel Jouanigot (IT/CS)
 - u demande de distribution électrique tant dans les bâtiments que dans le tunnel (type d'alimentation, emplacement,...) doit être envoyé à Shabbir Akhtar

Etat d'Avancement le: 2/May/02

SYSTEMES / FOURNITURES	CLIENTS	BI					ROCS / Mugef	Détection Incendie	Vide	Radiation & Protection	BT (T18)										Surveillance aimants	Timing	
		BPM	BCT	BLM	BTV	SEM / STEP					Extraction SPS					Injection LHC							
											MKE (LSS4)	MSE (LSS4)	TED4003 45 (TT40)	TBSE (T18)	TBSE (TT41)	T40 (TT41)	MKI (RA87)	TCDI (T18)	TED (T18)	TDI (RA87)			TCDD (RA87)
Matériel / Equipement du système																							
Câbles de contrôle (incl. Bus terrain)																							
Réseau: Ethernet (connexions & câbles)																							N/A
Fibres optiques			N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A								N/A	
Racks																							N/A
Distribution électrique																							N/A
Secteur secours (UPS)				N/A	N/A		N/A	N/A	N/A								N/A		N/A	N/A			N/A
Timing (MTG, pre-pulses,...)							N/A	N/A	N/A		N/A	N/A	N/A	N/A		N/A	N/A	?	N/A			N/A	N/A
Ordinateurs "Front-End"							N/A	N/A	N/A													N/A	N/A

KEY:

	= O.K. après vérification entre "clients" et "fournisseurs"
	- "clients" et "fournisseurs" devraient vérifier entre eux
	- apparemment O.K., mais n'a pu être vérifié
	- apparemment pas O.K., mais n'a pu être vérifié
N/A	- N'est pas Applicable
	- "pas encore urgent / plus tard / en cours d'étude / ... "