

Renovation of Control System post-CTF3

- As I don't know the 'master plan' for the CTF3 facility post 2016, I assume that all parts of the machine remain.
 - Linac
 - Delay Loop and Combiner Ring
 - Two Beam Test Stand
 - CLEX
- I hope to identify any “show stoppers” which would prevent renovation going ahead.

Renovation of Control System post-CTF3

- CTF3 was not officially part of the ACCOR project
 - The aim of ACCOR was the renovation of the control systems of all non-LHC accelerators
 - CTF3 was excluded because:
 - There was no LS1 for CTF3
 - LHC injectors took priority
- Nevertheless, the CTF3 control system has seen much renovation over the past few years....

Renovation of Control System post-CTF3

- There are 49 Front End Computers (FECs) in CTF3.

cPCI	3
MEN-A20	20
KONTRON/KISS	11
RIOS2	4
RIOS3	9
Other	2
Total	49

- From the h/w point of view the systems which need to be renovated are the RIO2 & RIO3 systems:
 - Old hardware
 - Old, unsupported, software (Lynx OS)

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dctfvacu	RIO2	CTF Vacuum	Replaced by PLC(s)	
dctfmdk	RIO2	CTF MKS and MKL ctrl & aqn	Replaced by PLC(s)	
dctfimag	RIO2	CTF ctrl fine delay trigger streak cam	VME32	
dctftim	RIO2	CTF central Timing	VME32	
dctfblm	RIO3	CTF Beam loss monitors	VME32	
dctfgunp	RIO3	CTF Gun, SEMGRID, MTV & video mux ctrl	WES Chassis	Split into 2 FECs
dctfshb	RIO3	CTF Sub-Harmonic Buncher	VME32	
cfv-2010-actrfmp	RIO3	CTF RF Monitoring Probe beam line	WEINER VMSE64x	
cfv-2010-actrfmt	RIO3	CTF RF Monitoring Test beam line	WEINER VMSE64x	
cfv-2010-bctfbpmcal	RIO3	CLEX Beam Position Monitors Califes	WEINER VMSE64x	
cfv-2010-rctfpow3	RIO3	CLEX Power Supplies	WEINER VMSE64x	
cfv-2010-bctfbdi1	RIO3	CLEX VIDEO MATRIX	WEINER VMSE64x	
cfv-2002-mk1	RIO3	CTF SKSU building 2002	ELMA VME64x	GM -> FESA

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cfi-2010-ccaos2	cPCI PP-300	CTF OASIS CLEX	WEINER VMSE64x	Change CPU to PP-913
cfi-2010-ccaos3	cPCI PP-512	CTF OASIS CLEX	WEINER VMSE64x	Change CPU to PP-913
cfi-2013-ccaos1	cPCI PP-CP1	CTF OASIS	WEINER VMSE64x	Change CPU to PP-913
dctfumad	MEN-A20	CTF uma in delay loop	VME32	Upgrade to WEINER VME64x
dctfumal	MEN-A20	CTF uma in linac	VME32	Upgrade to WEINER VME64x
dctfumar	MEN-A20	CTF uma	WES Chassis	Upgrade to WEINER VME64x

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- The major systems in CTF3 are:
 - Modulators controls (RF)
 - Vacuum controls (TE-VSC)
 - Power Converters (TE-EPC)
 - Controls (Timing, OASIS, etc.)

Renovation of Control System post-CTF3

- **Modulators:**
 - Some modulators date from 1985.
 - 8 modulators need to be renovated from CAMAC, G64 to PLC-based controls.
 - In some cases, new power supplies, which are compatible with PLC-based controls, will be needed
- **Estimate from BE-RF-MK (for one system)**
 - PLC part 12.5kCHF
 - Powering part 28.5kCHF
 - Cabling, manpower 21 kCHF
 - Total 62 kCHF

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- Vacuum Controls:
 - Need to replace “old” X-25-based control system with a PLC-based one.
 - Don’t forget slow acquisitions requested by OP for breakdowns
 - The vacuum system is under the responsibility of TE-VSC
 - TE-VSC-ICM for the controls part
 - TE-VSC-DLM for the vacuum infrastructure part
- Don’t have any estimate of what this will cost neither in CHF not m-m.
 - TE-VSC to define Work Plan and get Dept approval

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- **Power Converter Controls:**
 - During 2013/2014 renovated MIL1553 converters.
 - On-going renovation of RS422 converters
 - In its current state, the power converter controls should not need any major renovation.
 - TE-EPC are moving to FCG-based controls across all accelerators, so may wish to renovate CTF3 to reduce maintenance load
 - Don't have any estimate of what this will cost neither in CHF not m-m.

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- Other Controls:
 - No major renovations needed (except DCTFGUNP).
 - Need to remove all OLD RIO processors.
 - Implies moving software from Lnyx OS to Linux (e.g. kickers)
 - Some processors on OASIS front-ends need updating
 - Some work to be done on the timing system
 - Transparent to users
 - Replace old video muxes with new ethernet based system close to source of signals
 - Need to move to new responsibility model:
 - Don't mix equipment groups in one FEC
 - Worst case is DCTFGUNP which will need a significant renovation

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- Summary:
 - Apart from Modulators & Vacuum control
 - No show stoppers to upgrade FECs and h/w modules
 - Will gain from simplification (e.g. video mux)
 - Significant effort to convert GM to FESA
 - Rare or orphaned classes will be a problem
 - FEC renovation cost:
 - Approx 100kCHF for hardware
 - Estimate 30kCHF for cabling
 - Estimate 40kCHF for manpower (FSU)
 - FECs should fit into the new responsibility model
 - E.g. Don't have instrumentation and RF in same FEC