TRT DCS overview

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TRT DCS upgrade progress (1)

- Low Voltage and Temperatures:
  - New communication protocol: **done & tested OK**
  - TRT Framework Component modifications: **well advanced**
  - Final tests on ¼ of detector: **October/November**
  - Full system migration: **November/December**

- High Voltage:
  - New HV Controller firmware: **tested OK, uploaded**
  - OPC UA server development: namespace configuration **OK**, new firmware features implementation **in progress**
  - Final tests on 1/3 of detector + performance optimization: **November**
  - Full system migration: **November/December**

TRT DCS upgrade progress (2)

- Infrastructure Local Control Station:
  - Tests with hardware in USA15 **done, OK**
  - Full system migration: **November/December**

- Subdetector Control Station:
  - Linux SLC5 now
  - Implementation for new hardware in Gas System, when upgrade of Framework Component ready
  - Migration to SLC6 : **November/December (when LCS1 - migration done)**

- Gas Gain Stabilization System – **see Bartek's Mindur talk**

- Chromatograph:
  - Migration for firmware application to Windows2008 virtual machine on GGSS computer seems to be feasible- tests foreseen in **November/December**

Wiener PFC's preventive maintenance and their load capacity in the future

Almost all (22) PFC's returned from a preventive maintenance, we still wait for 2 spares.

A message from Wiener (which was fortunately not confirmed later) that some of Primary Rectifiers for Maraton Bulks didn't pass a full load tests triggered a review of their present load in the system and raised a question about future scenarios of power consumption increase.

- We estimated the load of PFC's in the system till now:
  - **12 PFC's** are loaded at the **80%** ratings level
  - **4 PFC's** are loaded at the **45%** ratings level
  - **4 PFC's** are loaded at the **63%** ratings level

We can safely run after LS1, as it isn't foreseen a significant increase of power consumption than, but we can expect it after LS2.

We can expect to reach following limits in TRT LV System when we try to increase FE boards supply voltages in a future:

LVPP Boards output voltages adjustment ranges

- **Present settings @FE boards**

Analog Positive	Analog Negative	Digital
3.0 V	- 3.0 V	2.5 V

- **Present settings @ LVPP regulators** (calculated in equalization procedure)

Analog Positive	Analog Negative	Digital
3.45 V – 4.05V	- 3.14 V – - 3.70 V	2.90 V – 3.45 V

- **LVPP output voltages ranges** (determined by resistors in regulators circuits)

Analog Positive	Analog Negative	Digital
3.40 V – 4.05V	- 3.12 V – - 4.04 V	2.58 V – 3.78 V

For Analog Positive = 3.3 V and Analog Negative = -3.3V @FE we have to be able to set @LVPP (simple estimation, increase of current not included):

Analog Positive	Analog Negative
3.75 V – **4.35V**	- 3.44 V – - **4.0 V**

The regulation range can be moved up by replacing reference resistors @LVPP boards (~800 resistors)

LVPP Boards temperatures

- We know that @85°C ELMB switches OFF
- We have a case (10-11.05.2011) when we raised all voltages @Maraton outputs by 0.5V. The rise of LVPP boards temperatures was ~ 1.7°C/1V.
- The highest observed temperature @LVPP board was 82°C .
- Additional power dissipation can be expected when we want to rise voltage @FE input (voltages @Maraton have to be higher by 0.3 -0.4 V, output voltages/currents @LVPP will be higher as well)
- We can expect that present PP2 Boxes cooling will be not sufficient for stable ELMB's operation.
- We have to remember that heat from PP2 Boxes have to be efficiently removed from RPC's area, which is a quite serious problem.

PFC's load capacity

- **CP4_B58 is a Maraton which shows power consumption = ~2.29 kW, which is a highest value in a system now**

- **Assuming that the current will rise linearly with a rise of output voltages @Maraton and we have to rise output voltages with the same ΔV as @FE the power consumed for CP4_B58 will be:**
  - **2.54 kW for ΔV = 0.3 V which is ~ 88% of PFC's load capacity**
  - **2.64 kW for ΔV = 0.4 V which is ~ 92% of PFC's load capacity**

Back-up slides

Present Settings @LVPP for Different Boards Groups

- **Present settings @FE boards**

Analog Positive	Analog Negative	Digital
3.0 V	- 3.0 V	2.5 V

- **Present settings @ LVPP regulators** (calculated in equalization procedure)

Boards	Analog Positive	Analog Negative	Digital
Wheels A	3.74 V – 4.05 V	- 3.25 V – - 3.70 V	3.05 V – 3.45 V
Wheels B	3.52 V – 3.81 V	- 3.16 V – - 3.62 V	2.95 V – 3.26 V
Barrel	3.45 V – 3.93 V	- 3.14 V – - 3.58 V	2.91 V – 3.32 V