AT Measurement Systems - Outline

Project description

- To maintain for LHC completion
- Magnet Rescue Activities [MAR]
- Support to LHC optics

Support needed for these 3 projects

- Database activities
- Scada & PLC's
- Tests & measurement (Labview)

!! Does not Include !!

Magnet protection   [R. Denz, A. Gomez, MEL]

Cryogenics for LHC   [L. Serio, J. Casas, ACR]

Project : to Maintain for LHC Completion

Scope

- Measurement benches for production and assembly of magnets

   at manufacturer's : DIMM, QIMM, Corrector Benches

   at CERN : their reference benches , ACMole

- SM18 and Block 4 test stations for the magnet series tests

   Electrical tests and Power tests @ 1.9 K

   Magnetic measurement systems

Schedule

- End of production in factories : from Nov. 05 (BNN) to Dec. 2006

   (+ Spare Ansaldo MB's in 2007 ?)

- End of SM18 series tests (including spares) :   April 2007

Project : Magnet Rescue Activities MAR

Scope

- PS & SPS magnet measurement after repair or modification
- Winding, collaring, welding machines developped by MB, SSS manufacturers, CERN property.

    need : make new magnet assemblies from spare pieces.

    => to install operate and maintain at CERN
- SM18 will test "repaired" magnet assemblies

Schedule

- SM18 & Block 4 :

    replace PCVue by PVSS, S5 by S7 (according to Unicos ?) September 2007
- SM18 "simplified & according to L.T. standard"   Begin 2008
- Maintenance of all systems involved (Power, Magn. Meas.)   End of LHC

Project : Support to LHC optics

Scope

- Field Description for the LHC   FIDEL
- Fast Measurement Equipment (3 to 10 Hz)   FAME

Schedule

- FIDEL 1st version to complete for start-up with beams Sept. 2007
- FAME in non-automatic mode " " " " "
- Increase throughput of cycle (old "RMS") Later, according to needs

[cycle = request for beam , measurement with FAME , modify FIDEL]

DataBases Linked to On-Line systems

For LHC Completion : maintain , upgrade to Oracle v10

- Rawdata from "LabView Sun" for Magnetic Measurement
- Reference tables (MEB then MAD , AB-OP)
- Rawdata for power tests : quenches, H.V tests, etc, ...
- Hardware Recognition to maintain + develop :

    configuration files for tests of the MS-DS SSS   Urgent

SM18 for Magnet Rescue Activities [MAR] & Field Description [FIDEL]

- Reconfigure the relevant applications/DBases [small work]

    Going from 15 Tests/week to 1^+ test per month : automatic configuration systems will be downgraded to be more robust (if needed).

Support to LHC optics : FIDEL

- With hypothesis of 1 month for a cycle : AT-MTM concerned
- with faster throughput : presently not a priority

INDUSTRIAL SUPERVISION & PLC'S LINKED (1)

Maintain, for LHC completion, SM18 & Block4 on PCVue

- Block 4 : does not evolve much. All PLC's are on S5
- SM18 : developped by ACR
  & maintained with help of AB-OP   ! same person !

Web tools to control the test stations

- Now most handled by AB-OP & Indian Collaborators.
- Much simpler needs after April 2007 (AT-MTM will cover ?)

INDUSTRIAL SUPERVISION & PLC'S LINKED (2)

Going from PCVue to PVSS (from mid-2007 ?)

- Block 4 :

    from PCVue to PVSS : 100 analog+ 100 digital I/O

    (mainly for cryogenic control)

    from S5 to S7 :   PLC for I/O to PCVue : ongoing (AB-CO)

    + 10 local PLC's (AT-MTM)

- SM18: Cryo of the benches from AT-ACR (AB-OP) to AB-CO

    when moving to PVSS (PLC's already S7)

Instrumentation	CFB	Pumping Units		Cryogenic Test Handling	Total =
	(x 12)	WPU (x2)	CCU	CTH	
Analogue Inputs	56	24	8	208	936
Analogue Outputs	32	1	8	48	442
Digital Inputs	96	192	32	384	1952
Digital Outputs	64	128	32	288	1344
Closed Loop Control	29	1	1	37	388

INDUSTRIAL SUPERVISION & PLC'S LINKED   (3)

Manufacturing Tools for MAR

(Winding, collaring, welding machines to install , operate and maintain at CERN)

- Documentation exists : most are PLC's based

- Help to commission at CERN :   SSS for end 2007   MB : mid 2008 ?

Tooling Dipoles	Origin	Provider	Software Package
Cable Insulation	Jeumont	Luxnexcable (Lu)	
Copper Insulation			
Winding Machine	Jeumont	S.D.I /CTE Systemi	S.D.I (Fr)
Curing Press	Jeumont	CTE Systemi	S.D.I (Fr)
E-Modulus Machine	Jeumont	CTE Systemi/Rejlers	ORSI (Siemens) + Vanenkov /Fessia
Electrical Test Rack	Jeumont/	CERN	AB/IAS
Collaring Press	Belfort	Fieldmann (Su)	Consultant Fieldmann (Su)
Warm Magnetic measurement DIMM	Belfort	CERN	CERN
Welding Press	Belfort	CTE Systemi	ORSI(Siemens)
Welding Machine	Belfort	Servo Robot	Servo Robot
Laser Tracker	Belfort	Leica	Standard + CERN User Interface
Pressure and Leak Test	Belfort	CERN	Interface Labview
Tooling Quadruples	**Origin**	**Provider**	**Software Package**
Winding Machine	ACCEL	CEA/Hagen&Funke	CEA/Hagen&Funke
Curing Press + Heat station	ACCEL	CEA/Enerpac/GWK	CEA/Enerpac/GWK
Electrical Test	ACCEL	SPS	ACCEL
E-Modulus Measurement	CEA	CEA	CEA
Head Pressure Measurement	CEA	CEA	CEA
Collaring Press	ACCEL	Enerpac	Enerpac
Warm Magnetic Measurement QIMM	CERN & CEA	CERN & CEA	AB/IAS & CEA
Yoke Stacking	CEA	Baudin-Chateauneuf (F)	CEA
Cold mass assembly tower (MQ)	CEA	CEA/Keller	n.a
Cold mass assembly tower (DS)	ACCEL	Keller	n.a
Laser Tracker	ACCEL	Leica	Standard + CERN User Interface
Pressure and Leak Test	CERN/ACCEL	CERN/ACCEL/Leybold	ACCEL

LABVIEW - SUN SYSTEMS (1)

Maintain, for LHC completion, Power & Electrical tests

File Server for Quenches, etc (≈ Post Mortem system for LHC)

Labview Applications

- Tema : Application to automatise sequence and data storage from all systems
- Analysis & On-line control/acquisition

    AQA , H.V. Tests , Loss , Hardware recognition , MRM (=DB associated to series tests)

PLC's linked to LabView Sun systems in SM18

PLCSE & PLCCU : S5 PLC for Interlocks and Controls of power tests, partially linked to the Cryo PLC's

Maintain / Upgrade Magnetic Measurement Systems

- MMP5 to MMP6 for Resistive Magnets (PS, SPS) (ongoing)
- Maintain MMP6 in SM18 & Block 4 (Hardware & software)

Reconfigure SMTP for Magnet Rescue (mid 2007)

- Power & electrical tests :

    Going from 15 tests/week to 1 (more ?) test per month :

    get rid of complexities no more justified.

    Minimum to keep : AQA , H.V. , Loss

    PLCSE & PLCCU : S5 to S7

    Downgrade Hardware Recognition and MRM

Magnetic Measurement Systems

    follow evolution as requested (all activities concerned)

Support to LHC optics : Fast Measurement Equipment [FAME]

- Fast Integrator in PXI (for rotating coil measurement)
  AT-MTM develops prototypes of "Intelligent module"
  (with help from Unisannio, Italy)

- Systems needed for LHC (Reference magnets in SM18)
  On-line Hall plate acquisition : prototype developped (MTM) ,
  to integrate by AB-CO   (started   :   3 man*month)
  On-line rotating coil acquisition : prototype to develop (MTM)
  then to integrate by AB-CO   (1 to 2 man*year)