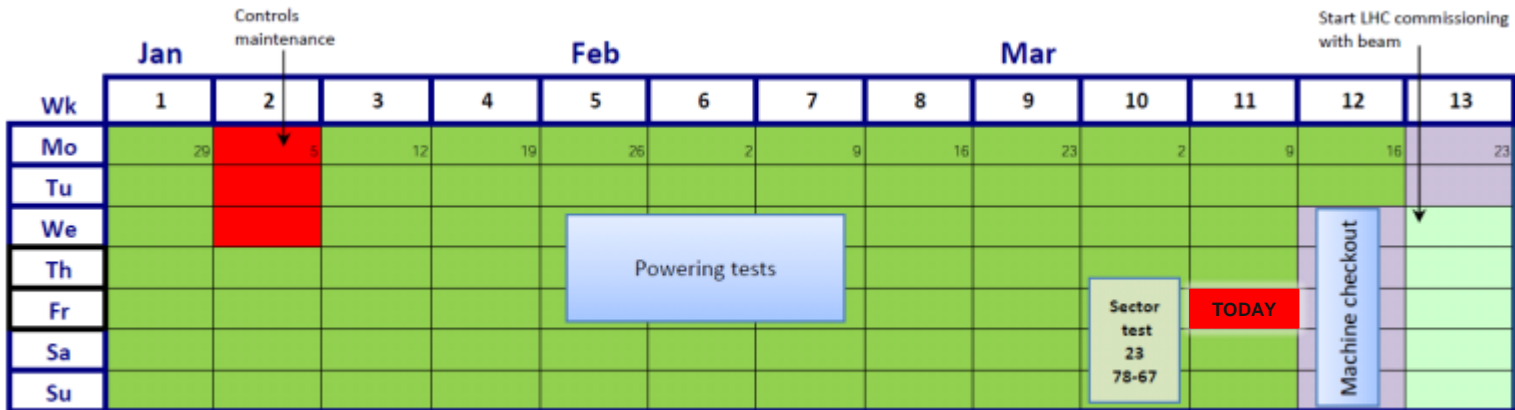




# MPS commissioning procedures – Status and next steps

M.Zerlauth, D.Wollmann, J.Wenninger et al

# 2015 Q1/Q2



- 8 weeks beam commissioning
- LHCf and VdM still before TS1
- Scrubbing run now after TS1

Courtesy M.Lamont @LMC

# Status of MPS commissioning procedures

- New template: [http://lhc-mpwg.web.cern.ch/lhc-mpwg/MPP-Meetings/No84-13-12-2013/MPS\\_Template.doc](http://lhc-mpwg.web.cern.ch/lhc-mpwg/MPP-Meetings/No84-13-12-2013/MPS_Template.doc)

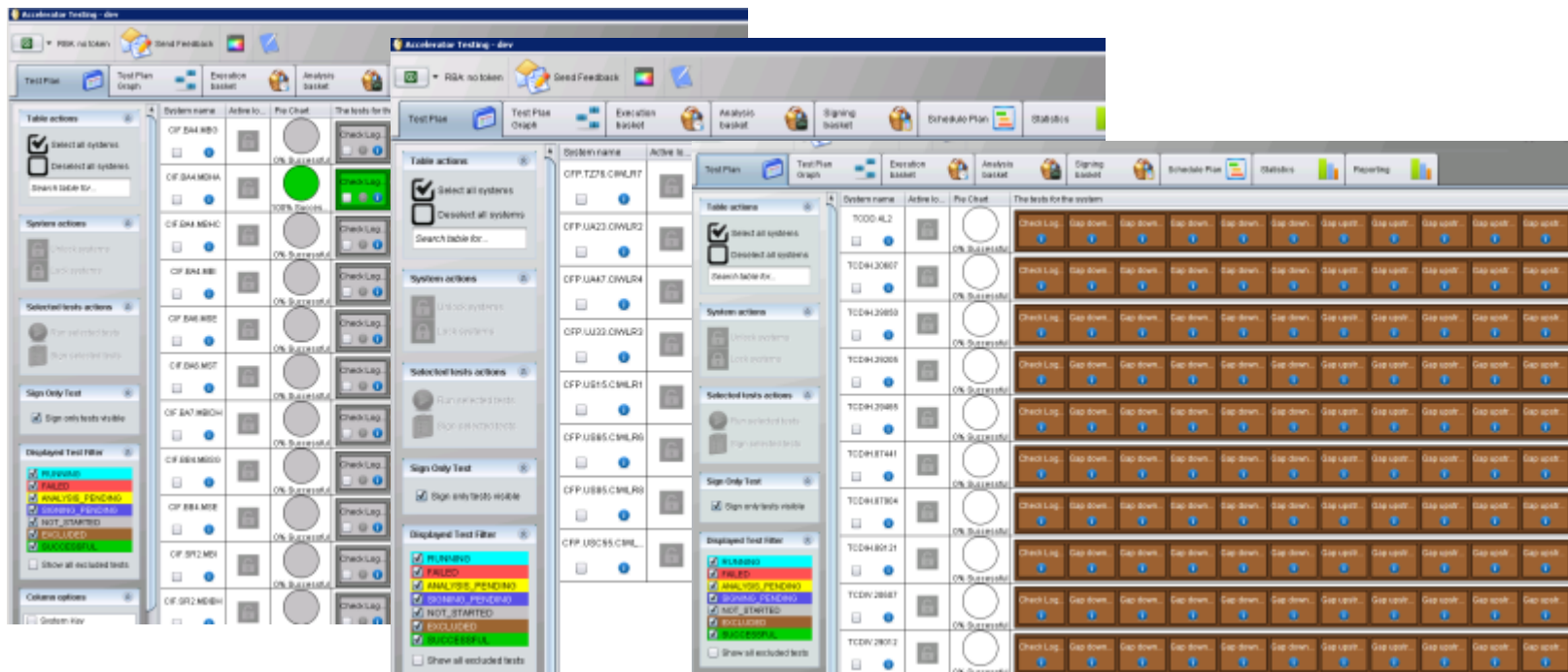
MPS procedure	MPS System	New responsible	MPP presentation	EC	Approved
LHC-OP-MPS-002	Collimation System Commissioning	B.Salvachua Ferrando	13.05.2014	Ongoing since Sep 2014	Approval ongoing
LHC-OP-MPS-003	Injection Protection System Commissioning	W.Bartmann, J.Uythoven	24.10.2014	Ongoing since Mar 2015	With Samy for EC/Approval
LHC-OP-MPS-004	Beam Interlock System Commissioning	S.Gabourin, C.Martin	25.04.2014		
LHC-OP-MPS-005	Powering Interlock System Commissioning	I.Romera	31.01.2014	Ongoing since Feb 2015	With Samy for launch of Approval
LHC-OP-MPS-006	Vacuum System Commissioning	G.Pigny	31.10.2014	Ongoing since Feb 2015	EC ongoing
LHC-OP-MPS-007	Beam Dump System Commissioning	C.Bracco, J.Uythoven	21.03.2014/13.05.2014	Ongoing since Mar 2015	With Samy for EC/Approval
LHC-OP-MPS-008	FMCM Commissioning	I.Romera	31.01.2014	Ongoing since Feb 2015	With Samy for launch of Approval
LHC-OP-MPS-009	BLM System Commissioning	B.Holzer	24.10.2014	Ongoing since Feb 2015	EC ongoing
LHC-OP-MPS-010	Warm Magnet Interlock System Commissioning	R.Mompo, M.Zerlauth	21.02.2014	Ongoing since Aug 2014	With Samy for launch of Approval
LHC-OP-MPS-013	Safe Machine Parameter System	S.Gabourin	25.04.2014		
LHC-OP-MPS-014	Software Interlock System	J.Wenninger	31.01.2014	Ongoing since Aug 2014	With Samy for EC/Approval
LHC-OP-MPS-0xx	Beam Current Change Monitor	D.Belohrad	30.01.2015		

# Filling in the holes...Machine checkout

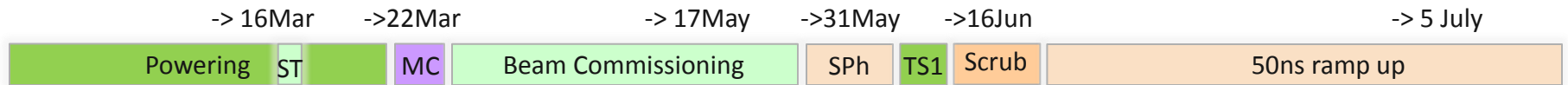
Wednesday	8:00	6	Timing	LHC request	start testing the LHC request
	8:00	6	BIS	BIS loop closing	connection to beam dump etc
	9:00	5	Vacuum	Valves interlock test	Beam LOOP Closed
	13:00	10	LBDS/MKI	BIS loop closed LBDS Test	debugging with everything connected - as prerequisite, plus experiments, connection to beam dump etc
	23:00	9	OP	Full machine cycle	All circuits at 6.5 TeV
	23:00	8	BLM	BLM //	Threshold triggering & HV modulation tests LOOP OPEN
Thursday	8:00	5	Vacuum	Valves Interlock tests	Beam Loop closed
	8:00	8	PIC	Outstanding Interlock MPS tests	Sector without faults ( 4 hrs * sector)
	16:00	10	OP	Pre-cycle and full sequence tests	Power converters, collimators, RF, Injection, Beam Instrumentation
	23:00	8	PIC	Outstanding Interlock MPS tests ?	Sector without faults/( 4 hrs * sector)
	23:00	8	BLM	BLM // Finished?	Threshold triggering & HV modulation tests
	23:00	9	OP	Full machine Operational cycle	Full machine
Friday	8:00	8	OP	LHC Access if needed	
	8:00	8	PIC	Outstanding Interlock MPS tests	Sector without faults/( 4 hrs * sector)
	16:00		OP	Pre-cycle and full sequence tests	Power converters, collimators, RF, Injection, Beam Instrumentation
	23:00		OP	Full machine Operational cycle	Full machine

# ACCTESTing will be (partially) used for MPS commissioning/Machine Checkout...

- PIC, WIC, FMCM, COLL, BTVs – with ACCTEST
- BLM/BIC/SMP prepared but probably not (yet) used
- SIS, injection, LBDS, VAC to continue with SharePoint for time being (advisable to limit variants)?!



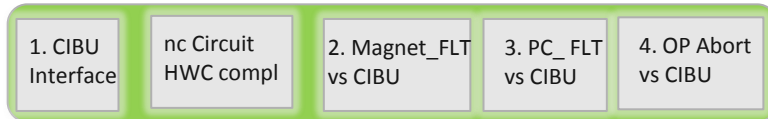
# WIC commissioning Plan



## Systems

CIW.US15.LR1  
...  
CIW.UA83.LR8

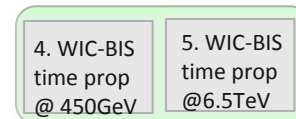
## Completed



Tunnel Access  
1 hour  
No powering  
N = Never/  
after LS

Remote 30 min No powering N	Remote 15 min No powering N	Remote 15 min No powering N
--------------------------------------	--------------------------------------	--------------------------------------

## tbd

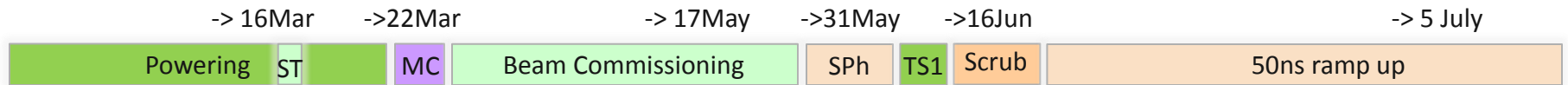


Remote 30 min Powering/Beam <3b = SBF EOF Selected Circ N	Remote 3 h Powering/Beam <3b = SBF EOF Selected Circ N
---	--

- Specifies
  - Test can be mostly done in HWC/Powering already, only IR3 and IR7 need machine closed (RD34.LR3, RD34.LR7)
  - IR4 BIS interface masked (BGI only)
  - Beam tests in parallel with FMCM/BLM, only on RD1 and RD34 (eventually RQ4/5)
  - RBAC role for signing HwcMiExpert

LHC-OP-MPS-0010

# PIC commissioning Plan



## Systems

CIP.UL14.AL1  
CIP.UL14.LL1  
...  
CIP.UA87.AR1

36 PIC + 1  
Access

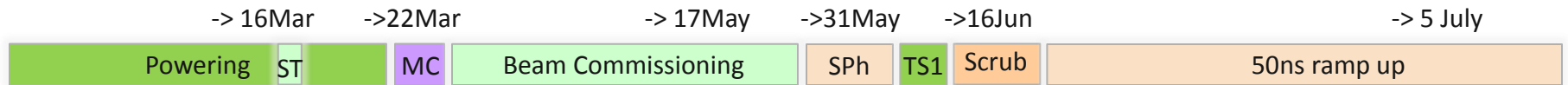
Systems	tbc	Completed						tbd	tbd	
	1. CIBU Interface	sc Circuit HWC compl	2. AUG test	3. UPS test	4. CRYO OK	4. ACCESS Interlock	5. CL Interlock	6. PIC-BIS config	4. PIC-BIS time prop @ 450GeV	5. PIC-BIS time prop @ 6.5TeV
	Tunnel Access (TA) 1 hour No powering (NoP) N = Never/ after LS	TA 1 hour NoP N	TA 1 hour NoP N	Remotely 15min NoP N	TA 1 hour NoP, DSO N	TA 1 hour NoP N	Remotely 2 hour NoP N	Remote 30 min Powering/Beam <3b = SBF EOF Selected Circ N	Remote 3 h Powering/Beam <3b = SBF EOF Selected Circ N	

- Specifies
  - Test can be mostly done in HWC/Powering already, PIC-BIS config only with multiple adjacent sectors ready
  - Test 5 CL Interlock only for RB.A45 (AL5, AR4)
  - Beam tests as EOF
  - RBAC role for signing HwcMiExpert

LHC-OP-MPS-0005



# FMCM commissioning Plan

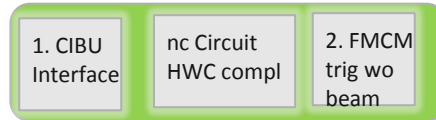


## Systems

CIF.US152.RD1  
...  
CIF.SR7.RD34

12xLHC, 16xTL

## Completed (tbc for TL)



Tunnel Access  
1 hour  
S = after Shutdown

Remote  
30 min  
Powering (Inj and top energy)  
No beam  
T

## tbd



Remote  
30 min  
<3b = SBF  
EOF  
Selected Circ  
T

Remote  
3 h  
SBF  
EOF  
Selected Circ  
S

- Specifies
  - Tunnel access for CIBU interface only in IR2, IR6 and IR8
  - Test can be mostly done in HWC/Powering already
  - No controls interface on TT66 devices
  - RD34 in IR3/7 only when machine closed
  - Beam tests as EOF
  - RBAC role for signing HwcMiExpert

LHC-OP-MPS-0008

# Others

- COLL awaiting final version of FESA class (start Monday)?
- BIS: Final CIBU tests ongoing (BLM/PIC), but >> IST tests to be finished (reserve time in Machine checkout)
- SMP: latest HW/Firmware to be deployed and >>IST tests to be finished, eventually start with current SMP version (without TL optics ID)
- BLM: HW coming up, Beam Permit in all crates, launched HC modulation tests
- SIS: Already ongoing, ~ 50% done?!
- Injection/LBDS: Started but >> tests...
- VAC: Almost complete din LHC run, to be repeated in TL
- BCCM: Tbd

# Conclusions

- MPS documents well underway, will soon push most docs for approval (BIS/SMP/BCCM tbd)!
- Start tracking progress with experts
- MPP team will help to digest/fit into commissioning program (especially for beam related tests)