

# LHC Injectors Upgrade





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# LIU BI Review Summary

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# Specifications

- Status:
  - General Machine Parameters (of which LIU a subset)
    - Collected last year & documented
    - Need updating based on changes made
  - Intensity and position documents well advanced
    - Need final review & then release
  - Loss document can be published as draft for discussion
    - Already being used for construction of the LINAC4 system
  - Transverse beam size document started based on Gianluigi's 'bible'
    - <https://edms.cern.ch/document/772786/1>
    - Need to finalise & update with new LIU parameters
  - Tune document not yet started



# Commissioning in 2014

- 2014 start-up will be challenging
  - Several new or modified systems coming on-line
    - New PSB BPM & BLM in parallel to old systems
    - BCT renovation throughout the complex
    - SEM renovated throughout the complex
    - Wire scanners all removed & recalibrated
  - OP beams for PS & SPS physics will help debugging before LIU setting-up
  - BI (project linkmen + SW) to take active part specifying the tests and prerequisites during dry-runs and start-up with beam
  - A priority list per domain and instrument from OP and LIU would be appreciated

# Summary of New or Modified Work Units

- LINAC4 Injection BCTs
  - Need to be modified for LIU
  - Due to ALARA propose to renew rather than renovate
  - Needs additional 160kCHF
  - If approved then consider 280kCHF for consolidation of other monitors
- PSB injection system test
  - Estimate of infrastructure required for BI
  - Verification that all BI instruments can meet planning
    - Looks OK so far
- BLM
  - Cost increase for PSB system incorporated in LIU baseline
    - Due to new requests & increase in cost of fast diamond systems
  - Scope and related budget for the new PS and SPS systems need to be decided upon quickly
    - Propose a dedicated LIU / OP / BI meeting to discuss this in detail



# Summary of New or Modified Work Units

- Wire-scanners
  - Clear priority list required from LIU for new system
  - All currently foreseen for LS2
    - Gradual installation in PS & SPS should be considered from 2015 onwards
      - Depends on time required for cabling and vacuum interventions
    - Re-design & integration study still required to fit system in PSB
- Rest Gas Ionisation Monitor
  - Decision on new magnets for SPS required after 2014 run
    - Estimated cost 0.5MCHF
  - PS study underway
    - No budget for construction yet foreseen
    - Estimated cost 0.4MCHF
- SPS Orbit system
  - New system ready for 2016
  - Put into operation as soon as fibres are installed
    - May have to wait until after LS2





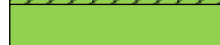
# Installation & Commissioning Plan

## Post LS1

	BPM	BLM Standard	BLM Fast	BCT	New Wirescanner	BGI
PSB injection	Full system					
PSB	Prototype or parallel to old system	Prototype or parallel to old system		Prototype or parallel to old system		
PSB-PS TL	Full system			Full system		
PS	Full system			Full system		
PS-SPS TL	Full system			Full system		
SPS	Prototype or parallel to old system			Prototype or parallel to old system	Prototype or parallel to old system	Prototype or parallel to old system

## Post LS2

	BPM	BLM Standard	BLM Fast	BCT	New Wirescanner	BGI
PSB injection	Full system	Full system	Full system	Decisions Pending		
PSB	Full system	Full system		Full system	Decisions Pending	
PSB-PS TL	Full system	Full system		Full system		
PS	Full system	Decisions Pending	Full system	Full system	Decisions Pending	Prototype or parallel to old system
PS-SPS TL	Full system	Decisions Pending		Full system		
SPS	Full system	LS3	Full system	Full system	Decisions Pending	Full system

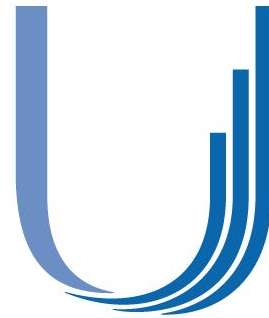
	Prototype or parallel to old system
	Decisions Pending
	Full system



# Summary

- LS1 work proceeding as planned - items to be watched:
  - PSB BLM cabling
  - PS wall current monitor manufacture
- Clarification needed on priorities & budget for:
  - PSB
    - Injection BCTs – do we refurbish or build new?
    - BPM system - is hybrid solution adequate for LINAC 4 commissioning?
  - PS
    - BLM system - is renovation limited to electronics?
    - BGI – needs construction budget if decision to go ahead
  - New wire-scanner installation across all machines
    - If we need to prioritise, which machine & which scanners first?
- Need continued LIU support for fellows & students
  - Currently:
    - 2 FELLOWS, 1 DOCT, 50% VIA, 3 TECH





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**THANK YOU FOR YOUR ATTENTION!**

