LHC BWS Mechanics

BWS project team meeting

13/6/2023

Action in progress since the last meeting

- Build 2 additional Hybrid+ designs for installation in YETS23-4
  - Modified bellows extremity incorporating a mini-conflat(?) and support for the cable connector
  - No change to the fork/wire design
  - No change(?) to the bellows design – perhaps use recovered bellows?
- Work on the assumption that the Hybrids designs installed in LS2 can be considered ‘operational’ by YETS23-4
  - This means we are free to choose the best locations for the new Hybrid+ instruments

Fully consolidated design status

- ML still not able to fully commit to working on this design
  - SPS and LHC operational wire scanner issues are more urgent
  - Teresa still not out of the SPS-BGI production launch, but hopes to be (~fully) available in 2 weeks
  - New Quest will be Autumn 2023 earliest

Fully consolidated design development tasks

SLAC-type double bellows design

- Mass-optimisation for drive
- 45 degree design issues
- Impedance design due to ‘double-sided’ fork

BAT coupled drive design

- BAT development
- In-vacuum position sensor development
- [45 degree design issues]
- [Impedance design due to ‘double-sided’ fork]

‘Optional’ common development tasks

- Linear motor, either for SLAC or BAT design
- Wire ‘card’ for CNT-type wires

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2/5/2023

Some ‘definitions’

- Hybrid design
  - 2 instruments currently installed in the LHC
  - Compatible with the LIU control system
  - Using the existing support and infrastructure
  - 0/90 measurement configuration
  - Ball screw drive and encoder
  - All vacuum components (bellows, fork assemblies, feedthroughs) unchanged

- Hybrid+ design
  - Nothing currently installed in the LHC
  - Compatible with the LIU control system
  - Using the existing support and infrastructure
  - 0/90 measurement configuration
  - Ball screw drive and encoder
  - Re-design fork assemblies and feedthrough
  - Magnetically coupled drive depends on ongoing development

- Full Consolidated design
  - Nothing currently installed in the LHC
  - Compatible with the LIU control system
  - New support design
  - 45 degree measurement configuration?
  - Drive and fork position system to be decided
  - Fork assembly and feedthrough to be decided
  - Drive coupling (bellows/magnetic?) and (linear?) motor to be decided

Current list of ‘urgent’ questions

- Do we agree on the hybrid strategy that:
  - We aim to consider the 2 ‘Hybrid’ instruments as available for operations by end 2023
  - We aim to build and install 2 additional ‘Hybrid+’ designs, replacing 2 ‘legacy’ designs for YETS 23-4
- As a strategy for the Fully consolidated design…
  - We design and build a linear motor test bench
    - Procure one or more linear drives to test technology
  - We design and build a 45° tank
    - Do we install it in the SPS, LHC in YETS23-4 or just on a test bench?
  - Position sensor R&D
    - Depends on magnetically or bellows coupled