

Minutes BWS Upgrade: Electro-Mechanical Design Meeting #2 -- 24th July 2015 --

Participants: Bernd Dehning, Raymond Venness, Dmitry Gudkov, Jonathan Emery, Pierre-Jean Lapray, Luca Timeo, Jose Luis Sirvent

Agenda (<http://indico.cern.ch/event/435233/>) :

1. Communications

- The new optical disk fixation has been tested, observed imperfections on holder, the piece needs to be re-machined.

2. Follow-up Open Actions

- No remarks on follow-up open actions

3. Motor Selection (D.Gudkov)

- From 6 Companies contacted for motor procurement 3 are interested (Alxion, Kollmorgen, Parker)
- Quotation from Alxion and Kollmorgen available, waiting for Parker quotation.
- 4 Possible motors compliant with our specifications
 - ◆ Alxion: **14S5TX2M (short) & 14S5TK4M (long)**
 - ◆ Kollmorgen: **KBM-35x02**
 - ◆ Parker: **NK620**
- Motors delivery times (needed to consider holidays):
 - ◆ Off the shelf à **7 Weeks**
 - ◆ Custom models à **10 Weeks**
- Main Differences Custom vs Standard:
 - ◆ Saladium Cobalt magnets (and it's fixation for vacuum compatibility, no glue)
 - ◆ Increase of **Air Gap** by machining stator (**0.5 to 0.7 mm = 10 to 20% torque decrease** ETEL)
- Open question: Spares policy?
 - ◆ Buy a big amount of spares once VS Trust on companies availability guarantee
 - ◆ All contacted companies are relatively Big , production guaranteed for many years
 - ◆ **Decision not taken here.**

4. Electrical Requirements and test setups (J.Emery)

- Motor Study:
 - ◆ Motor 14S5TK4M (long) deeply studied by Jonathan in terms of torque, speed and performance for SPS, LHC and PSB.
 - ◆ This motor would experience acceleration **issues for the LHC configuration** .
 - ◆ Longer active length improves torque.
 - ◆ Exist two versions of this motor (For torque and for Speed).
 - ◆ This motor is **not suitable for 200rad/s** , no torque is achieved at this speed, meaning that constant speed is not guaranteed. However, 140rad/s would be fine (but it's slower than specified for the BWS).
 - ◆ The motor consists on 12 poles (Initial Parker motor had only 4), which means higher di/dt variations, moreover it has a very high inertia.

- Requirements:

- ◆ BWS Prototype:
 - ◇ **A mechanical piece is needed to keep the shaft in Home position , acting as angular reference** to align properly the fork, motor stator/rotor, resolver, break and optical disk.
- ◆ BWS Calibration Bench:
 - ◇ Both **Linear stages** must be on the **same orientation**
 - ◇ System needs to be properly aligned horizontally (to work on a table)
 - ◇ Fixation of optical parts needs to be defined.
 - ◇ **Design needs to be reviewed** Jonathan & Mechanics
 - ◇ Proposed the usage of two flanges with identical holes to align **Laser system**.

5. Test Planning (B.Dehning)

- No remarks on test planning

6. AOB

- Discussion:

- ◆ New Optical disk:
- ◆ New disk sent in September to CERN (a little sample to check quality)
- ◆ Possibility of testing the reflectivity of such disk with the real optical system.
- ◆ Check investigations on disks with micro holes.

- Decissions:

- ◆ 2 Off the shelf motors + 2 Custom motors to be purchased: Alxion **14S5TX2M & Kollmorgen KBM-35x02.**
- ◆ Integration with Alxion **14S5TX2M** .
- ◆ Two test-benches as flexible as Juan model needs to be built.
- ◆ Tests with original motors and stator machined (bigger air gap) motors to be done

- New Actions:

Action	Assigned to:
Investigations on optical alignment (flanges with holes)	William/Jonathan
Revision of BWS calibration system	
Communication with RF	Bernd
Ordering Motors	Dmitry
Test-Benches construction	

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