Technical Board Meeting:
News, communications & planning

February 20, 2018
Caroline Riedl
Communications - TB related

- Minutes of TB meeting December 4, 2017:

- Minutes of today’s meeting to be approved by TB before IWHSS Bonn.

- Igor Konorov, Daniele Panzieri, Fulvio Tessarotto, Bernhard Ketzer, Jens Barth: appointments as TB members confirmed by e-mail vote after CB meeting January 25.

- 2018 TB meetings:
  April 10: in parallel to subgroup meetings
  June 5
  September 4: in parallel to AM, no room on Prevesin site available
  November 6
Communications - 2018 DY run related

- Vladimir Frolov will coordinate 2018 DAQ.

- RichWall: installed week 6 (February 5-9)
  - No repair. Instead: modify gas system to allow a better flux in the critical tubes
  - Postpone full intervention to LS2

- Switch on equipment & crates mid-March!

- DAQ is running since ~ last week.
  Elastic mu-p (proton radius) & DY won’t interfere because of independent DAQ.
Other communications

- CAMERA moving-out discussion with Saclay scheduled for this Thursday.

- Power cut Sunday February 4 in the North Area

- 1st CERN EP R&D workshop on March 16
  indico.cern.ch/e/EP-RD-Workshop1

**What?** CERN’s Experimental Physics (EP) department has launched a process to define its R&D program on new Experimental Technologies. The R&D work would span a 5-year period from 2020 onwards (with a possible extension by another 5 years), and cover detector hardware, electronics and software for new experiments and detector upgrades beyond LHC Phase II.

**Who?** EP-DT invites the community to a full-day workshop at CERN on 16 March 2018. Working groups, which are forming to study the key themes, will report about the state-of-the-art, needs and prospects.

- Operating the small crane in 888…
Operating the small crane in 888

- As backup: need to authorize a 2nd person (apart from Didier) to operate the small crane in 888 (5T).
- Ideally someone who is stationed at CERN. Candidates: Christophe, Annika, Moritz, Vladimir …
Refurbishment of the Evaporative Cooling Tower (CT2) of the NA

- CT2 built in 1975 (bat 893) and never refurbished
- CT2 provides primary water to North Area users
- 4 cells of 13 MW each, total cooling power: 52 MW

(report by J. Philippe Rodary & S. Deleval at Jan. 16 EATM)

<table>
<thead>
<tr>
<th>Start of the contract</th>
<th>14 December 2017</th>
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</thead>
<tbody>
<tr>
<td>Launching of the critical material procurement</td>
<td>21 December 2017</td>
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<tr>
<td>Delivery of the first CT2 layout drawings</td>
<td>02 January 2018</td>
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<tr>
<td>Start of on-site dismantling</td>
<td>02 January 2018</td>
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<tr>
<td>Start of on-site installation</td>
<td>17 January 2018</td>
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<tr>
<td>Completion of the on-site installation</td>
<td>23 February 2018</td>
</tr>
<tr>
<td>Tests and commissioning according the technical specification</td>
<td>Between March 2018 and July 2018</td>
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</tbody>
</table>

Moreover (Mechanical works):
- Refurbishment of the air intakes
- Replacing of the ‘guillotine’ valves
- Removing of obsolete pipes,

Water cooling production will be in service

essential for COMPASS schedule
Target magnet cooling

- December 13: site visit with Johan Bremer from cryogenic group (TE-CRG)
  ⇒ Agreement to provide mobile LHe dewar of 500 liters in order to allow 80K pre-cooling of the magnet prior to the completion of the cooling-tower consolidation.
- January 18: “Dry test” with Johan Bremer and TE-CRG technicians (check that transfer line is long enough): OK
- February 15: delivery of 500 liter LHe dewar, connection by TE-CRG on the same day
- Week of February 19: start pre-cooling
During **pre-cooling to 80K**, the magnet is cooled with LN2, and the DR is cooled simultaneously with LHe to avoid mechanical stresses.

During **cooling to & at 4K**, magnet and DR are cooled with LHe.

**Nominal operation after Feb.23**
Delay in magnet preparation due to unavailability of cooling water < Feb 23

- Original start of 4K-cooling
- Actual start of 4K-cooling due to support by cryogenic group (mobile LHe dewars)
- Start of 4K-cooling w/o mobile dewars
- 4 weeks of delay
- gain 2 weeks

1 week is gained later by skipping an item in the target commissioning:
Empty-target calibration.
- This means no online polarization values will be available during run, as in 2015.
- Will be done after end of run.

⇒ total 3 weeks of delay

Caroline.Riedl@cern.ch, 2018-01-19
**FI04: 2015** (between PM02 & PM03) $\Rightarrow$ **2018 (Beam Telescope)**

-748 -736 -625 -523 -449
FI01 VI01 FI15 FI04 VI02 FI03

black: 2015 configuration
black + red: 2018 configuration

$\approx$-550

z [cm]
(1st layer from 260876.detectors.dat)
Installation of SciFis / Vetos / Hodoscopes 2018

<table>
<thead>
<tr>
<th>Preliminary triggers (Jens Barth)</th>
<th>Modifications / improvements for 2018 (Rainer Joosten, Moritz Veit)</th>
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</thead>
<tbody>
<tr>
<td>- Beam trigger with SciFi01</td>
<td>- FI04: removal; creation of new holding structure; installation.</td>
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<tr>
<td>- Vetos for the physics triggers</td>
<td>- HO03: exchange of 6 central slabs with slabs of 2014/15</td>
</tr>
<tr>
<td>With preliminary triggers, we can</td>
<td>- HO04: exchange 2 x 6 central slabs (two halves) with slabs of 2014/15</td>
</tr>
<tr>
<td>start detector commissioning.</td>
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- March 9: remove target loading platform
- March 12/13: move chariot with FI01 & VI01 in beam
- March 14/15: Rainer at CERN to cable FI01 and move FI04 to new structure; cabling of VI01: Jens / Moritz
- April 9: **beam**
- April 13/14/15: uncable FI01 & VI01 (onsite persons)
- April 16-19: installation of target loading platform, loading of target
- April 20: remove target loading platform, move chariot with FI01 & VI01 into beam
- April 20-24 (asap): cable FI01 (tbc), cable VI01
- April 21-24: 1st TE calibration with filled target
- April 25-28: Rainer at CERN to install and cable FI15, FI04, FI03.
FI01 & VI01 allow preliminary trigger setup → spectrometer commissioning

R = Rainer at CERN
March 14/15: cable FI01; removal of FI04
April 25-28: final installation of BT
U = uncable FI01 & VI01 (onsite persons)
Magnet commissioning (January - April)

Magnet commissioning with
- new power converter
- new MSS2 input cards
- software upgrades
- new operation sequence

As kindly agreed upon with Markus Brugger (EP-DT), Fabrice Gautheron will support the recommissioning of the magnet safety & operation:
10 working days during 12 March - 13 April 2018, tasks to be performed:
- Verification of safety system and actual operation procedure
- Supervision of modification of the new "field rotation" procedure
Improved shielding for COMPASS 2018 run

- **Improvement of shielding for better radio protection**
  at intensity $10^8$ pions / second

- Simulation with FLUKA (A. Maggiora)

- Exploiting massive parallel computing resources of Blue Waters.

- **Improvement of PLC shielding to reduce the risk of SEEs**
  (Single Event Effects).
  2015: 9 SEEs during magnet operation, each causing ~48h loss

- New balcony shielding

- Improved shielding for COMPASS 2018 run
  - Concrete 80cm = factor 10 reduction in (high-energy) neutron flux, factor 3 thermal neutrons
  - Polyethylene ~2cm to thermalize neutrons
  - Boron-carbid sheet to absorb thermal neutrons (measured to be main source of radiation at PLC location)

- Simulation with FLUKA (A. Maggiora)
- Exploiting massive parallel computing resources of Blue Waters.

- COMPASS hall beam
- New balcony shielding
- Environmental radiation monitor
- Supervised radiation area
  - 1 mSv / year dose limit
  - 2.5 µSv/h (max 400h / year)
  - 1 mSv / year dose limit
  - Simulation: (0.76±0.05) mSv yearly dose

-非指定区域
- 2.5 µSv/h (max 400h / year)
- 1 mSv / year dose limit

- New balcony shielding
- Environmental radiation monitor
- Supervised radiation area
  - $6 \times$ new balcony shielding

C.Riedl, Report from TC
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>News and schedule</td>
<td>30m</td>
<td>Speaker: Caroline Kathrin Riedl (Univ. Illinois at Urbana Champaign (US))</td>
</tr>
<tr>
<td>09:30</td>
<td>Report from the EATM</td>
<td>20m</td>
<td>Speaker: Annika Vauth (CERN)</td>
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<tr>
<td>09:50</td>
<td>Polarized target: status</td>
<td>45m</td>
<td>Speaker: Norihiro Doshiba (Yamagata University (JP))</td>
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<tr>
<td>10:35</td>
<td>Coffee</td>
<td>15m</td>
<td>——</td>
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<tr>
<td>10:50</td>
<td>Elastic mu-p scattering: preparations 2018</td>
<td>30m</td>
<td>Speaker: Sebastian Uhl (Technische Universitaet Muenchen (DE))</td>
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<td>11:20</td>
<td>EP R&amp;D workshop: opportunities beyond 2020</td>
<td>30m</td>
<td>Speakers: Alexander Nagaytsev (Joint Institute for Nuclear Research (RU)), Igor Savin (Joint Institute for Nuclear Research (RU))</td>
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<td>11:50</td>
<td>Round Table</td>
<td>30m</td>
<td>DAQ coordination, RiCHwall, CAMERA, etc.</td>
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<tr>
<td>12:20</td>
<td>Lunch</td>
<td>1h 40m</td>
<td>——</td>
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<tr>
<td>14:00</td>
<td>CEDAR status</td>
<td>30m</td>
<td>Speaker: Marcin Ziembicki (Warsaw University of Technology (PL))</td>
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<tr>
<td>14:30</td>
<td>FEE status</td>
<td>30m</td>
<td>Speaker: Maxim Alexeev (Università e INFN Torino (IT))</td>
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<tr>
<td>15:00</td>
<td>DAQ status</td>
<td>30m</td>
<td>Speakers: Igor Konorov (Technische Universitaet Muenchen (DE)), Ondrej Subrt (Czech Technical University (CZ))</td>
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<td>15:30</td>
<td>DCS status</td>
<td>30m</td>
<td>Speaker: Christophe Menezes Pires (LIP Laboratorio de Instrumentacao e Fisica Experimental de Part)</td>
</tr>
<tr>
<td>16:00</td>
<td>RICH status</td>
<td>20m</td>
<td>Speaker: Fulvio Tessarotto (Università e INFN Trieste (IT))</td>
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extra slides
CEDAR upgrade: schedule (Marcin Z. and S. Mathot)

- 16 of 18 PMTs still in Taipei, 2 at WUT.

- PMT characterization at WUT’s test stand.
  - Too large relative output, unlike what was expected from Hamamatsu specs.
  - Seems to be feature specific to each PMT.
  

Some delay in PMT installation likely.

- FEE:
  - Design of voltage divider delayed due to PMT issues
  - Time Interval Counter arrived damaged at WUT, repaired in place
  - Discriminator designed and manufactured at WUT
    - Finished prototype design
    - PCBs and other parts received.
    - Assembly and testing slightly delayed due to sickness
    - Agreement between Marcin & Igor on TDC specs
  

It should be possible to install FEE on time for the beginning of the run.

- New thermal housing ~ on track (CERN).
Shielding of target PLCs

- **Concrete** 80cm = factor 10 reduction in (high-energy) neutron flux, factor 3 thermal neutrons
- **Polyethylene** ~2cm to thermalize neutrons
- **Boron-carbid** sheet to absorb thermal neutrons

- Magnet & isolation vacuum PLCs (both in place since Nov. 28)

- Polyethylene around PLC

- Concrete bunker (Didier)