Extraordinary TB meeting
Motivation for the TB meeting

- Update the collaboration on the status of the COMPASS experiment
- Illustrate the action taken to guarantee COMPASS safe mode operation
- Illustrate our requests to CERN services in view of a restart (!!! Booking is fundamental)
- Illustrate the requests to us for the 2020
- Coordinate the preparation of the activities
- Present a possible scheduling scenario (Nothing decided yet, we have to agree on the actions keeping some flexibility)
Dear Augusto,

Let me update you on the status of the COMPASS experiment towards the safe mode.

Few interventions are foreseen during today 18 March: fixing supports for some detector, delimitation of areas with red and white strip and labels.

Tomorrow the final controls will be performed and the detector safety check list to be performed will be written and distributed among a restricted number of people: (the list of COMPASS members you have authorized).

We will schedule the checks during the week to be performed by only one member who is allowed to enter CERN and 888 hall.

We will limit at maximum the presence in the area.

The refilling of liquid nitrogen (weekly) and few checks on the gas system (weekly if no alarm from DCS will appear) are the only two operations that will require a short time physical presence in the HALL.

An e-group for emergency has been created including TSO, EP safety contact, and the Liaison Physicist: compass-onsite@cern.ch

From Friday COMPASS will be declared in safe mode.

I hope this will help you to provide the needed input.

Thanks,

Kindest regards

Stefano

Since Friday 20 March minimal activities in the hall
Stefano Levorato COMPASS Technical Board 9 April 2020

COMPASS: Gas consumption and liquid nitrogen refilling

Evaluation of Gas consumption for COMPASS during the shutdown

Document ID 12, version 1

<table>
<thead>
<tr>
<th>Document</th>
<th>Page 1 of 2</th>
</tr>
</thead>
</table>

Gas consumption for COMPASS in shutdown mode

This document evaluates the gas consumption of COMPASS during the shutdown period. Two are the main gas needs for the COMPASS experiment: A regular delivery of liquid nitrogen to refill the vessels where the COMPASS target material is stored and the standard gaseous Nitrogen supply used to flush the experiment detector to avoid their deterioration or total loss of performance.

1 Target Material

1.1 Target Material needs

The COMPASS target material consists of $4.00$ cm$^3$ of LN$_2$, $400$ cm$^3$ of He, and $140$ cm$^3$ of Ar stored at cryogenic temperatures in four Dewars (as defined in D08 R-41). Regular check-ups of the Liquid Nitrogen (LN) levels are performed weekly and refilling if needed is performed. The presence of LN is mandatory to allow the material to be kept polarizable. The LN refills are performed every 3 to 4 weeks and the liquid gas amount request is of about 200L.

2 COMPASS detector requirements

2.1 Detector gas flow

The COMPASS gaseous based detector (MicroMegas, GEM, MJVPC, STRAW, MaxWall, DC, and others) as well as solid state ones (Silicon trackers) during the shutdown are kept under Nitrogen gas flow or in a slightly positive to avoid contamination from air and prevent the accumulation of gas resulting from the detector wall. If not avoided it will result in a loss of detector efficiency or to the complete damage of detector itself.

The total amount of Nitrogen usage at COMPASS has been evaluated by adding up the single detector gas consumption as measured from the gas distribution area at COMPASS BHE R-026.

Another source of consumption comes from the nitrogen needed to keep the $80$ m$^3$ RICH detector at a small overpressure of approximately $0.5$ mbar, with respect to the environmental one via the use of a manual Reservoir located in BHE R-022.

Several detectors are set via lines starting from different ports (BHE R-026 and BHE R-022) they have been included in the final consumption.

Finally several pneumatic valves are in use at the experiment, their consumption is hard to evaluate and a reasonable safety margin must be applied to the final estimate of monthly Nitrogen use.

Overall the total gas consumption is evaluated at 3 m$^3$/h.

+ procedure to extract the liquid nitrogen in case of non delivery of Liquid Nitrogen asked via Service Desk is issued to EN-EA Gas Team

Up to today no problem in delivery. Last delivery a couple of days ago

Email has been sent to all Detector Experts asking if any action extra to the “winter shutdown mode” should have been implemented

Daily check list
Most of the services are available, some degraded.

Running services must obey to all the prescriptions of the covid-19 emergency

Most of the core services available, \(\rightarrow\) grants reasonable safety for the experiment needs
EN-EL still confirms activities during the month of September

However, please take note that considering the backlog of activities EN-EL will have to recover due to the exceptional closure and the actual situation which evolves continuously in CERN host states and member states, I cannot confirm that what stated above will be kept as is. I invite you to consider this uncertainty while reporting to concerned bodies.
Dear Stefano,

We are doing a general planning to all machines and users according priorities and resources available (including works on certain equipment still needing to be finished) that will be communicated shortly.

At the moment all cooling is stopped at NA.

Best Regards,

Jani Lehtinen

<table>
<thead>
<tr>
<th>Chilled water, status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EP-DT Group</strong></td>
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<tr>
<td><strong>No Answer yet</strong></td>
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</tbody>
</table>
COMPASS: CERN requests to us in the next months

GAS Barrack renovation (flammable gas 908)
- No flammable gas available

- Mandatory, should be done this year, could be done during the month of September, can be done in parallel with EN-EL renovation, discussed with David Jaillet, waiting for our input

Rail renovation for the crane

- Must be done in 2020, budget is allocated, contractor company has been identified. Meeting with company representative and Bastien Rae (TSO) They are waiting for our input, major impact on our activities, but can be minimized.
Two cranes in operation since 1976-1977
Rail type: burback A100
Junction type: straight cut, induces peak loads!
No elastomer pad
Signs of damages along the rails
Remarkable noise during crane travelling, especially across junctions
Replacement of ~110 m of rails
Elastomer pad to reduce vibration transmitted to the structure
Welded junctions between sections to avoid stress concentration points
Existing clips are in good condition and will be reused: reduction of worksite duration

Two platforms (scaffolding) will be installed outside the building ("Lausanne side"); floor at the same height of the rails
COMPASS: Rail renovation, space requests

“Bellegarde side” entrance door; available area shown in the picture is sufficient

“Lausanne side” entrance door; some material needs to be removed
### COMPASS: Rail renovation, scheduling

<table>
<thead>
<tr>
<th>Task</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation of the scaffolding on the “Jura side”</td>
<td>1</td>
</tr>
<tr>
<td>Removal of handrail</td>
<td>2</td>
</tr>
<tr>
<td>Vacuum cleaning of rails</td>
<td>3-4</td>
</tr>
<tr>
<td>Installation of the scaffolding outside the building</td>
<td>5</td>
</tr>
<tr>
<td>Opening of two holes</td>
<td>6</td>
</tr>
<tr>
<td>Removal of the crane end-stops</td>
<td>7</td>
</tr>
<tr>
<td>Rails replacement</td>
<td>8</td>
</tr>
<tr>
<td>Re-installation of the crane end-stops</td>
<td>1-5</td>
</tr>
<tr>
<td>Dismantling of the scaffolding on the “Jura side”</td>
<td>6-8</td>
</tr>
<tr>
<td>Dismantling of the scaffolding outside the building</td>
<td>8</td>
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</tbody>
</table>

- Totale 8 semaines à de la semaine 3 à 7 pas de pont roulant.
- Mois de septembre pas d’électricité car rénovation de GAS à à voir avec David Jailet si compatible ?
- La décision doit être prise avant mi-Avril au plus tard.
- Proposition de commencer le 24 août 2020. Pour maximiser le temps sans pont roulant durant les travaux Gas (jusqu’au 12 Octobre 2020)

**Action:**
- Bastien Vérifier la compatibilité avec David Jailet.
  - Puis Roberto confirme les dates avec le contractant.
  - Puis Stefano doit propose les dates au expérience.
An SPS RUN in 2021 is considered highly probable, the starting date could be delayed
M2 Beamline is nearly ready.. no major issues there

- Target
- Micromegas
- APV – LV
- H1
- RICH-WALL
- Cold Silicon
- GEM $\rightarrow$ talk
- RICH $\rightarrow$ talk
- DC4 $\rightarrow$ talk
- Planning
### COMPASS: COMPASS Equipment, commissioning needed → PT

<table>
<thead>
<tr>
<th>SEP</th>
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- Precooling with LN2
- He cooling
- MSS Tests
- Sol. Dip. Test
- Stabili ty Test
- Field Rotat. Test
- Warm up

- Planning without DR and material tests
- Liquid helium and cooling water required
COMPASS: Micromegas Hardware Missing – and LV for APV

Hardware presently in hand:

3 Wiener LV PS 8 channels (from pool but rented for free due to long term rental rules, very old material)
1 Wiener LV PS 4 channels (Saclay property, very old material)
3 spares Wiener LV PS 4 channels Saclay properties, former F1 electronics LV PS for MM, very old material
1 spare Wiener LV PS 8 channels, under repair at Wiener (Saclay property)
3 CAEN A1821HN modules (Saclay properties)
We also assume that the CAEN crate SY1527 shared by several detectors is still available

Hardware needed in 2021:

1 Wiener LV PS 8 channels
1 CAEN crate SY2527
4 modules CAEN A1821N

But Damien communicated me he is missing 3 Saclay CAEN modules A1821N
Do we buy them?

Not to forget the purchase also of the LV for the APV (GEM)
Magnet test commissioning is mandatory this year, must be scheduled it is our priority
Possibility of having a full commissioning with target material loading is probably not an option for 2020
We have on hold
   - the maintenance of two He pumps in the pump room, order has been sent, CERN
     waiting the covid-19 situation to improve to allow the external company to enter the Prevesnin site
   - one broken He root pump near the target platform (repaired several time ... buy new one ~ 10KCHF)
This does not prevent to perform at least the MSS @ room teperature \( \rightarrow \) Requires EP-DT support

Crain Rail renovation is possible with some early start in August, Crane available back in October, should be compatible with the MSS test,

Detector repairing and maintenance activities can be performed during the month of September while the rail exchange is ongoing (crane may be available for some operation not for sure from week 3 to 7)

I have discussed with David Jaillet, the renovation of the Gas 908 barrack is compatible with the rail exchange, work can be parallelized

Chilled water return is still unclear, if back we may have a DRY run starting after the 9\(^{th}\) of November (reduced configuration, Most probably no flammable gases, not all detectors \( \rightarrow \) Dry run till middle December then again technical stop
COMPASS: priorities and a possible scenario

H1 intervention most probably has to be postponed to winter 2020, here two possibilities:
- Move it to the Clean Room before the intervention for the rail renovation (End of August/September)
- Move it to the Clean room after the rail exchange
RICH-WALL support structure mounted on Lausanna side of HN2, can it be moved in the Clean area? If yes I can slowly take care... it complicates a little the detector test operation since all the RW detector layers are stored there if we want to test them in Clean area, or it can be moved back in October, I need input from Torino/Dubna.
Thanks to the work already done by Anosov cold silicon platform is already in place, I may start to contact Laura S. for the nitrogen line cooling exhaust to be reinstalled in September, should not interfere with PT operation

Saclay: what is the status of the cable rebuilding? PC purchase and OS/SW installation? Are these operation possible now in Saclay? Do you need material we can provide you?
COMPASS: priorities and a possible scenario

I will ask for EN/EL tests to be postponed and try to minimize the impact on our activities (first we have to agree upon)

Full commissioning of the PT should be foreseen at the beginning of 2021, we may even think to commission it and keep it running to give some time to the microwave responsible to gain experience in polarizing the target material. Do you consider this option reasonable?

In 2021 early restart of all the other detector related activities to be ready for April 2021, to try to fix all the issues not possible to study due to the unforeseen situation, HV, noise studies, etc, “Dry run with flammable gases” since as said most probably beam will not be back at the beginning of April

I would like to receive permission from those detector experts who consider this option feasible the permission To replace the HV mainframe and modules → please contact me and/or Cristophe

Aggressive restart scenario, needs presence of people on site, experts and in particular Vladimir Anosov

All this holds if the beam schedule is kept...not totally obvious...
Flash butt welding

Power and control equipment

Crane truck

Welding machine
The two cranes will be parked on the “Bellegarde side”
Rails sections will be pulled outside one at a time with a winch and rollers
They will be then lowered to the ground with a mobile crane
New rails sections will be lifted on the platform with a mobile crane

Sections will then be welded together
Working procedure – welding and installation

After each welding, the rail will be pulled inside the building with a winch and rollers.

Another section will be lifted on the platform and welded.
Working procedure – welding and installation

The rail sections corresponding to the parking position will be replaced for last.

The cranes will be moved on the new rails.
Both sections will be handled with a mobile crane inside the building.
Junctions will be welded via the puddle arc method (electrodes); specific protections will be put in place to contain sparks.
Preliminary activities

• Installation of a scaffolding on the “Jura side” of the building to guarantee a safe access / EN-EA
• Removal of handrail / EN-EA
• Vacuum cleaning of rails to avoid dust falling on the experimental area / EN-HE
• Installation of a scaffolding outside the building (“Lausanne side”) / EN-EA
• Opening of two holes (~ 50cm x 50 cm) on the façade to allow rail passage / SMB-SE
• Temporary removal of the crane end-stops (“Lausanne side”) / EN-HE