

Dear All,

Since there was a lot of brainstorming discussion during the meeting let me attempt to summarize these discussions in so far as I understood the important points. Although Will made an excellent attempt to record all our discussions I feel it useful to distil from these notes a few key conclusions, rather than issue conventional minutes. Furthermore, after the meeting I had a conversation with our operation coordinator, Olivier Callot, and I have taken the liberty of injecting thoughts and conclusions arising from these discussions into the below summary. Most importantly, there is embedded in the text an action list for the coming few months.

Summary of the Physics Coordination meeting

20/03/09 - 09:00 - CERN

People present:

Andrei Golutvin
Thomas Ruf
Hans Dijkstra
Vanya Belyaev
Andreas Schopper
Frederic Teubert
Mitesh Patel
Gerhard Raven
Guy Wilkinson
Marta Calvi
Patrick Koppenburg
Tatsuya Nakada

Phone:

Olivier Schneider
Vincenzo Vagnoni

Apologies:

Ulrik Egede
Olivier Leroy

Secretary: Will Reece

Introduction – Andrei

[Verbal report, no slides, hence essential points repeated here]

In preparation for analysis for next year we will need some consolidation of T-Rec + physics working groups. Need to agree on a model for trigger/stripping for

2009/10.

HLT1 is in a good state (~70% efficient). Output is 20 to 50 kHz. We need to reduce this to a rate where we can just store it on tape. Could consider storing 2 - 5 kHz for analysis during first months of data taking. We are looking for a few quick first results. Stripping will be important (2-5 kHz -> rates suitable for physics analysis). First analyses will be statistics limited. If some data, needed for study of systematics, are omitted at the stripping stage one can always go back to the data stored after HLT on tape.

Key questions for today:

What do we do with first data?

Focus should certainly be on the core channels, but bandwidth should also be made available for more generic flavor physics and other studies.

How to strip? What feedback can be provided in a few weeks to help make this decision.

Commissioning of HLT1. What data to use?

Optimization of HLT2. How do we do this?

MC data sets? Which ones are needed? Need to test whole trigger/stripping chain for 2009/10. Which data do we use?

Guy: Do we start with L0 only? How much data do we take in that configuration?

Hans: LHC lumi will be low to start. Can just start with L0 to get few kHz. Then need to use simple HLT1 to reduce rate. Perhaps start with just muon trigger. Start with just pre-scaling hadron alleys, and then perhaps commission some other trigger lines. We can commission HLT1 in a few weeks. A lumi of 2×10^{32} may well be optimistic for 2010, so a fully functioning HLT2 may perhaps not be essential for the coming run. If we have only few 10^{31} then we can run with low threshold settings for L0.

HLT Overview and Status - Hans

Slides posted – please look.

Comment on ghosts: significant fraction of tracks (30-40%?) surviving HLT are ghosts. (But we need to be careful in our terminology – some ghosts are really overlapping tracks which can never been separated). Anything which suppresses these ghosts will be a help.

Comment on Reco 2 step in HLT1: as stands it is merely a simple one pass fit after the alleys. This already reduces the rate by 30-40%. Work in progress is to

investigate the benefit and feasibility of a full fit in order to suppress the ghost rate still further. But this does not affect planning for HLT2 work.

There will be a dedicated T-Rec meeting on ghosts on 30th March

Subsequent discussion focused on HLT2. It was felt that the recent assignment of active people from the physics groups to HLT2 inclusive selections, has been a good and useful development, but further steps are needed to ensure effective coordination between the physics and the trigger.

Summary of the discussion on how to coordinate the work on HLT2

The present occasion – an ‘HLT2/stripping/physics forum’ – will become a semi-regular open meeting at which these matters will be discussed.

The coordinators of the core channels should take responsibility to provide the selection algorithms for HLT2.

The HLT project itself is responsible for the implementation and commissioning of these algorithms.

The coordinators of the core channels are responsible for testing the physics performance of HLT2.

Discussion turned to the store-to-tape rate, and the output rate of the stripping. For the former, it was agreed that though 2 kHz has been the value generally assumed in discussions, there is no technical reason to prevent us operating at a larger value (say 5 kHz). A higher output rate may well be wise particularly in the early months of operation.

Andrei later discussed this point with the Operations Coordinator; they concluded to somehow justify why we settled up 5 kHz in the meeting; at the same time Andrei invited Olivier to justify why he thinks that 2 kHz is a maximal possible rate from the operational point of view.

As for the stripping – what is relevant is the size of the final stripped data sample which the collaboration will be happy to analyze. There was consensus amongst coordinators of the core channels that this number was of the order of 10^7 events per analysis.

Summary of the discussion on the rate for for writing to tape, and the output rate of the stripping

The final decision on the HLT output rate for writing to tape will be taken when needed i.e. after start of data taking and in accordance with running conditions. It is very likely that this rate will be different at different stages of the 2010 run, as our understanding and confidence in HLT2 evolves.

For upcoming technical tests we will assume an output rate of 2 kHz as the baseline

For the output stripping rate the current recommendation to the core channel sub-groups is to stay below 10 Hz rate per channel. If this is successful then significant bandwidth will then exist for other channels and output streams to exploit.

In deciding on the output rate of the trigger and indeed stripping, the issue of bandwidth division needs to be resolved.

The core physics channels will need to show how the size of their signal (and control) samples vary with 'knobs' in the trigger, and then a forum will be required in which to discuss the overall optimization.

Discussion on how to coordinate the bandwidth division with L0+HLT1+HLT2

The HLT / physics meeting is the forum in which the bandwidth distribution between various triggers will be discussed. This discussion will be the primary input that the PPG will use in deciding the final allocation.

Stripping Overview – Marta

Slides posted – please look.

Marta described how existing studies are underway for the core channels. Most attempts so far have started from the offline selections, and have then loosened certain cuts. In surveying which background events survive, the initial impression is that the contribution from ghosts is significant. In discussions, Gerhard reminded the meeting of the importance of having several overlapping data sets of each selection, with different pre-scalings if necessary. This is in particular helpful in order to understand backgrounds and systematics using sidebands.

In continuing to develop the stripping algorithms it was felt that DC06 data are sufficient. However a large sample

of new background MC will be needed, with settings as close as possible to the conditions foreseen in 2010, in order to make a proper feasibility test of the full trigger (especially HLT2) and stripping chain. Having absorbed the lessons from this study a full scale test will be required, which most naturally could form part of a FEST exercise.

Discussion on what MC data sets to be used for the HLT/stripping test

The stripping and HLT cuts should be devised basing on existing experience with DC06 data.

For the feasibility test we will use 1 billion min bias generated with 10 TeV cm energy and pile-up corresponding to 10^{32} luminosity and 50 ns bunch spacing. According to Olivier Callot and Thomas Ruf the MC generation can start in the middle of April.

The generated events will not keep the MC truth information and their format should be similar to the real data.
Once the feasibility of the HLT / stripping has been demonstrated we will make a final FEST test.

General Discussion / Next Steps - all

The next meeting, which will be open, should include a first attempt to understand how the HLT2 inclusive selections perform on the core channels, and how it will be possible to allocate bandwidth. In order to do this we need the HLT2 selections to be frozen and available to use in a convenient form – this should include ‘knobs’ for key variables to allow for profiling of efficiencies vs rates.

ACTION: Hans and Gerhard to inform people working on the HLT2 that a new release is foreseen for this study, and to issue a deadline.

(It may be that not all selections will make the deadline for this test – for example there is a question mark over the D^* - but this is not a big deal as long as the majority are available)

ACTION: When timescale for trigger release is known, and for start of new MC generation,
Tatsuya will announce and organize the next meeting, with help from the core channel coordinators.

ACTION: A short document will be prepared for discussion in the PPG and subsequently in the OPG, summarizing the general strategy and route forward in the matters discussed today.