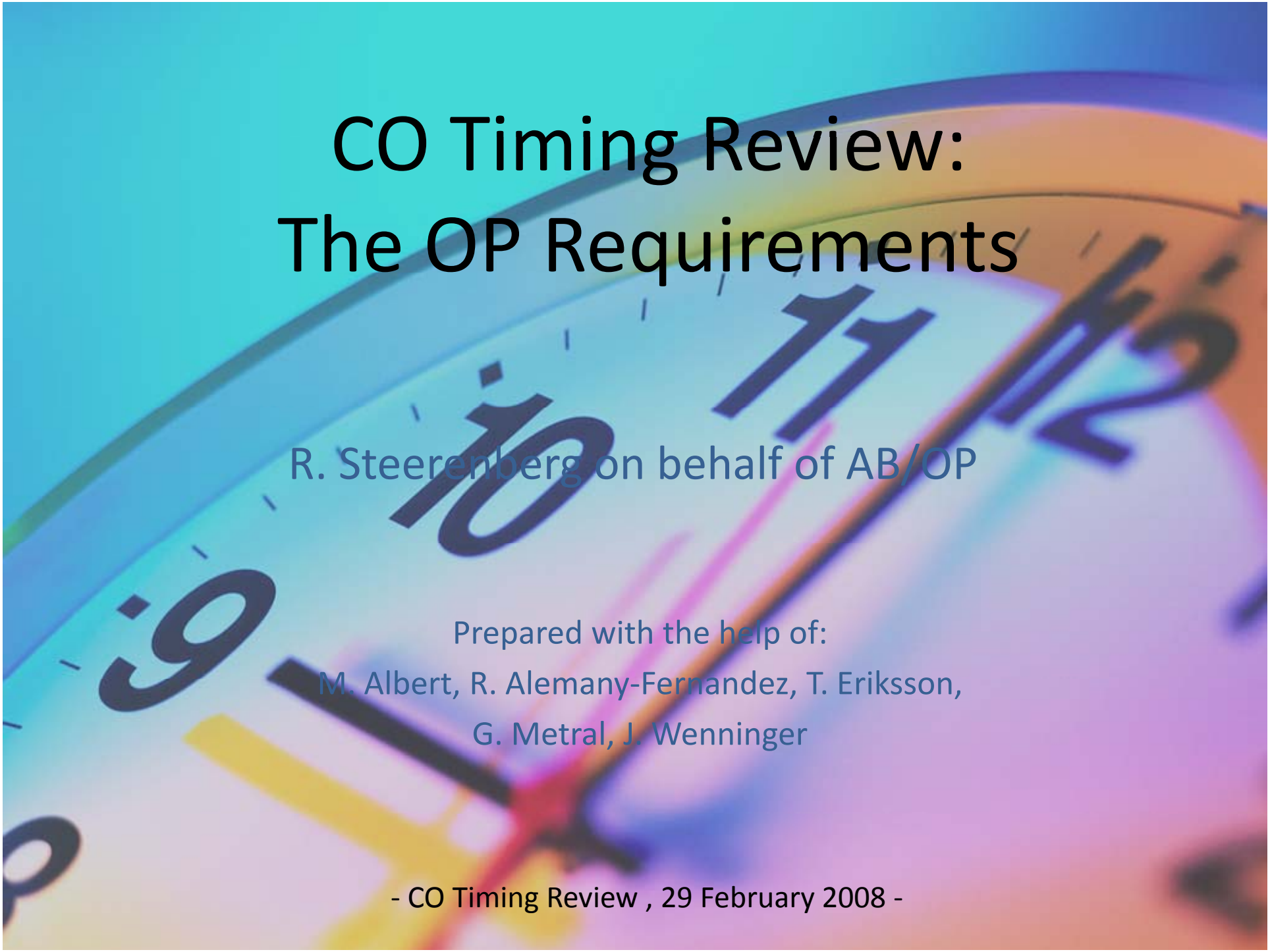

CO Timing Review: The OP Requirements

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- CO Timing Review , 29 February 2008 -

Scope

- The Machines included in this presentation are:
  - PSB, PS, AD, SPS, LHC
- Al the requirements are made with respect to the present (central) timing system(s).
  - Therefore these slides do not make this presentation a complete OP timing requirements document.

PS Booster & PS

- The Present system:
  - is working well and fulfills most of our requirements .
  - has evolved over many years by CO/OP collaboration.
- We need a guaranteed acquisition update for the cycle concerned (actually general control system issue).
- Diagnostic tools are available, but an important one is missing “TIMDIAG”.
- The system relies heavily on external conditions that are interpreted by FIDO.
  - FIDO is very specialized, complicated and not very transparent.
  - More flexible and transparent tool to program FIDO is welcome, but with same or better performance.

AD

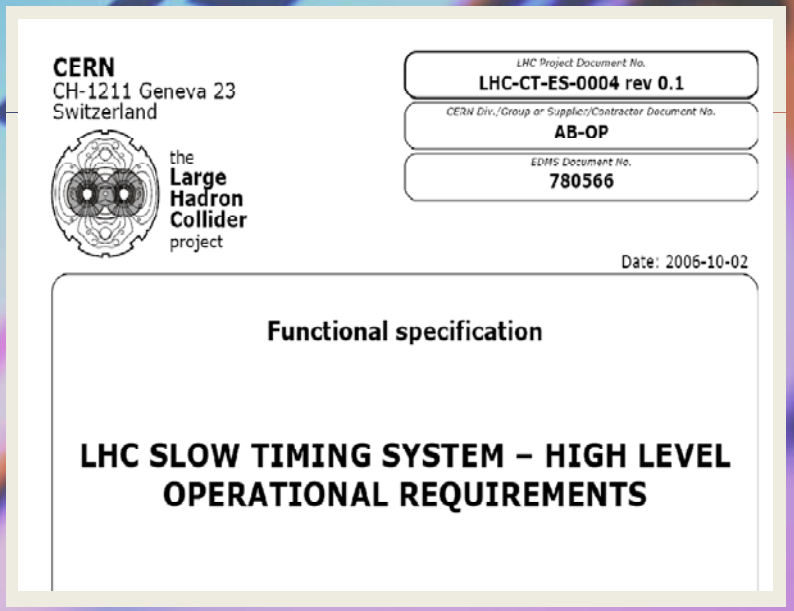
- Pseudo ppm on destination:
  - AD is a non ppm machine, but would like to be able to change beam line settings dynamically as a function the destination, like for PS East Area.
  - Presently an application/RT-task is being developed to handle this more efficiently than practiced up to now.
  - Should become integral part of the timing system, like for PS East Area.
- Acquisition of devices independent of “USER”
  - Acquisition of certain devices needs to be done selecting the “USER” corresponding to the cycle part.
  - Could these acquisitions be done on the “USER=ALL” ?

SPS

- Economy Mode Management does not fulfill OP requirements.
  - Should be improved (re-implemented).
  - Old economy mode was configurable (warm-up cycles).
- Key events cannot be enabled/disabled individually, nor can their settings be changed for a given user only.
  - Should be made possible, even though it bears some risks.

LHC: Slow Timing System

- The LHC Slow Timing System implementation is the result of a number of discussions around a Requirements Document where all the parties involved defined precisely their requirements. Therefore the system we have today for the LHC is what we defined.
- The main components are:
  - Machine Events to trigger real time tasks, like ramping synchronously all the LHC Power Converters.
  - Tables with Machine Events.
  - Telegrams
- The system has already been tested in several dry runs: inject-ramp-squeeze of a sector, injection system dry run, LBDS system dry run, with success.


CERN
CH-1211 Geneva 23
Switzerland

the Large Hadron Collider project

LHC Project Document No.
LHC-CT-ES-0004 rev 0.1

CERN Div./Group or Supplier/Contractor Document No.
AB-OP

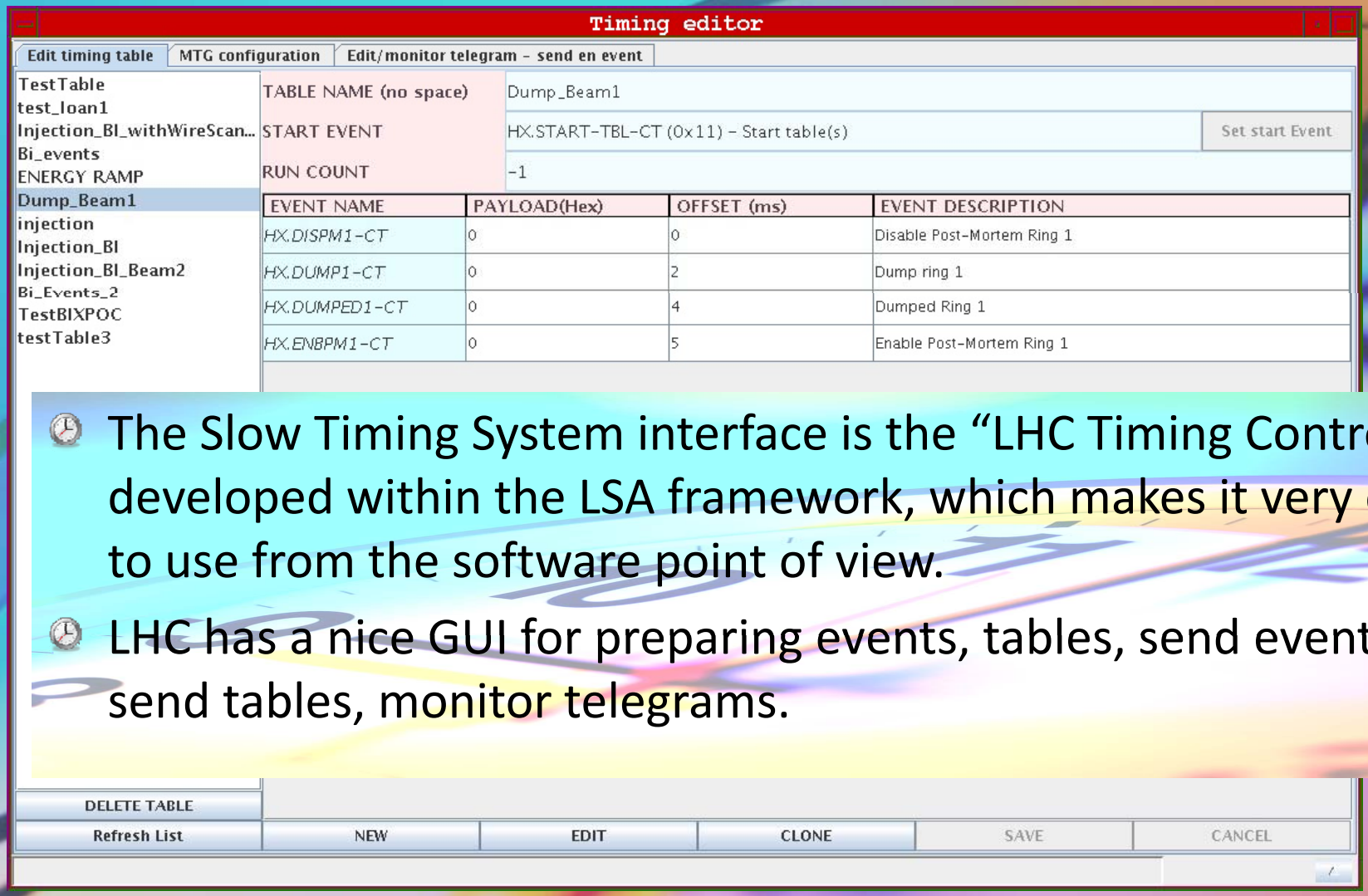
EDMS Document No.
780566

Date: 2006-10-02

Functional specification

LHC SLOW TIMING SYSTEM – HIGH LEVEL OPERATIONAL REQUIREMENTS

LHC: Slow Timing System Interface



- The Slow Timing System interface is the "LHC Timing Controller", developed within the LSA framework, which makes it very easy to use from the software point of view.
- LHC has a nice GUI for preparing events, tables, send events, send tables, monitor telegrams.

LHC: Missing components within current implementation Diagnostic & Logging

- Continuous survey of the activity of the system & Logging
  - The transmission of the event to clients must be extremely reliable, however, the current implementation of the timing system doesn't provide with tools to survey this reliability and the system itself doesn't do it.
- One could think about setting up a series of error flags like:
  - event didn't come out, mismatch between event in table and event going out, … and others that we may need.
  - Those error flags should be monitored by a kind of Timing Supervisor that could send alarms to the alarm system in case those errors appears.
- The requirements document specifies that test procedures should be provided to test the reliability of the system, but it is preferable to implement a continuous survey of the activity of the system.
- Events Logging is not yet implemented, but discussions have started to get this ready for LHC. The requirement is to log every event that comes out (with the corresponding timestamp) or equivalent information that would allow us to build up the sequence of events that came out.

General

- For the moment, when the different machines are not coupled their super cycle length must be identical.
  - We would like to be able to use non-equivalent super cycle lengths when the machines are not coupled.

Conclusions

- In general the present timing system fulfills most of the OP needs.
- Nevertheless there are a few short comings:
  - Powerful timing diagnostic tool “TIMDIAG”.
  - More transparent control over FIDO.
  - Pseudo destination ppm for AD
  - Better Economy mode management (like to old days)
  - More flexibility in configuring key events.
  - Independent SC length if machines are not coupled.
  - Event logging

Diagnostics are very important !!!

Continuing the good CO/OP collaboration is of vital importance for a successful timing system.