



Update: CLIC CDR (physics and detectors)

presented by Konrad Elsener (CERN)
on behalf of LCD@CERN



as you know:

There are many individual contributions by SiD colleagues to the CLIC detector study – we are very grateful for this.

Thank you very much !



CLIC, ILC and the European Strategy Update



The European strategy for particle physics was updated in 2006:

http://council-strategygroup.web.cern.ch/council-strategygroup/Strategy_Statement.pdf

An update of the strategy is foreseen in a series of meetings, starting in spring 2012, ending as late as possible in 2012.

for the Linear Collider, we plan to collaborate between ILC and CLIC in order to present a coherent Linear Collider strategy

Juan Fuster, new Chair of the ECFA unified study on Linear Collider physics and detectors in Europe, plans to bring the stakeholders together to initiate this joint ILC-CLIC approach .

CLIC approach to the upcoming European Strategy update:

- Present a staged approach to a future CLIC machine
- Ensure that the earlier stages are “realistic”, in terms of power consumption and cost
- For the physics motivation part ensure close links with the LHC, and with the outcome of the current LHC physics run.

Note:

- So far, studies of the CLIC machine were mainly focused on “feasibility”. More work needed to focus on cost effectiveness and power optimisation
- The choice for 3 TeV is linked to “showing feasibility”, because the 3 TeV case is the “most difficult” case for machine and for detectors. Provided feasibility is demonstrated for 3 TeV, one can assume that machine + detector are feasible at any lower energy CLIC.

Besides a 3 TeV CLIC, and an early-stage 500 GeV version, the CDR will also address CLIC in a range of intermediate energies (typically 1-2 TeV).

This requires new machine optimisation studies (currently ongoing);
addressing dependencies: energy \Leftrightarrow luminosity \Leftrightarrow power

For the physics/detector volume (Vol. 2), the impact of this change is small.

Main impact is on the “CLIC physics potential” chapter of Vol.2 .

Small impact on other chapters, so current time-line and work-plan are maintained.

Cost considerations go in Volume 2, cost values will go in Volume 3

- WG1 will look at physics scenarios, and establish dependence on CLIC energy
 - Was already foreseen in WG1 plan
- After summer, when initial CDR Vol.2 plan will be completed:
 - Establish some dependencies of precision of measurements at CLIC on beam energy (background conditions)
 - Repeat one or two suitable studies at an intermediate energy
 - Add a chapter/section in intermediate energies to our CDR volume



CLIC CDR – Overview



Volume numbers of the CDR have changed:

Volume 1: accelerator

Volume 2: physics and detectors

Volume 3: summary volume => focused on using Vol.3 as input to the European Strategy Update

In first approximation: physics/detector CDR volume plans (contents + timeline) are unchanged

Target date remains end-August for our current physics/detector CDR work plan

Recent changes:

Small shifts in deadlines for chapters 3 + 11

Good progress currently with draft versions of chapters 4&5, 9, 13 and 16



CDR Vol 2. initial plan: layout/timeline 1



Chapter #	Title	section #	Sub-title	Approx. page count	Submission deadline
1	Introduction			3	25-Oct-10
2	CLIC physics potential			15	30-Apr-11
		2.1	Overview		30-Apr-11
		2.2	Higgs boson physics		30-Apr-11
		2.3	Supersymmetry		30-Apr-11
		2.4	Alternative theories at the weak scale		30-Apr-11
		2.5	Precision studies		30-Apr-11
3	CLIC experimental conditions and detector performance requirements			20	30-Apr-11
		3.1	Signatures for Multi-TeV physics		18-Mar-11
		3.2	Detector benchmark reactions		18-Mar-11
		3.3	The CLIC experimental environment		18-Mar-11
		3.4	Detector Requirements for e+e- physics at 3 TeV		30-Apr-11
		3.5	Basic choice of detector concepts for CLIC		18-Mar-11
		3.6	Detector requirements under CLIC experimental conditions		30-Apr-11
4&5	CLIC detector concepts			14	31-Jan-11
		4.1	Rationale		31-Jan-11
		4.2	Design principles for the CLIC_ILD and CLIC_SiD detector concepts		31-Jan-11
		4.3	Sub-systems of the CLIC_ILD and CLIC_SiD concepts		31-Jan-11

6	CLIC vertex detectors			10	31-May-11
		6.1	Vertex detector constraints and parameters		31-Mar-11
		6.2	Detector technology and performance		31-May-11
7	Tracking systems			15	30-Apr-11
		7.1	Introduction		28-Feb-11
		7.2	Tracker concepts		28-Feb-11
		7.3	CLIC ILD tracker		28-Feb-11
		7.4	CLIC SiD tracker		28-Feb-11
		7.5	Tracker performance		30-Apr-11
8	Calorimetry			15	30-Apr-11
		8.1	A particle flow calorimeter for TeV energies		28-Feb-11
		8.2	Electromagnetic calorimeter		28-Feb-11
		8.3	Hadronic calorimeter		28-Feb-11
		8.4	Calorimeter performance under CLIC conditions		30-Apr-11
9	Superconducting solenoids and magnet systems			8	31-May-11
		9.1	Introduction		30-Apr-11
		9.2	Magnetic field design		30-Apr-11
		9.3	Solenoid coil design		30-Apr-11
		9.4	Anti-solenoid design		31-May-11
		9.5	Conductor options		31-May-11
		9.6	Magnet services under push-pull scenario		31-May-11
10	Muon systems at CLIC			4	30-Apr-11
		10.1	Introduction		28-Feb-11
		10.2	Layout and technologies of yoke instrumentation systems		28-Feb-11
		10.3	Muon detection performances		30-Apr-11



CDR Vol 2. initial plan: layout/timeline 3



11	Very forward calorimeters			8	31-Mar-11
		11.1	Introduction		31-Mar-11
		11.2	Lumical		31-Mar-11
		11.3	Beamcal		31-Mar-11
		11.4	Very forward calorimetry integration		31-Mar-11
		11.5	Backscattering of particles from the very forward region		31-Mar-11
12	Readout electronics and data acquisition			5	31-May-10
13	Interaction region and detector integration			15	30-Apr-11
		13.1	Introduction		30-Apr-11
		13.2	Detector layout		30-Apr-11
		13.3	Forwad region and pre-alignment		30-Apr-11
		13.4	Push-pull ooperation		30-Apr-11
		13.5	Detector opening and maintenance		30-Apr-11
		13.6	Underground experimental area		30-Apr-11
14	Physics performance			20	30-Jun-11
		14.1	Simulation and reconstruction		31-Mar-11
		14.2	Performance for physics observables		31-May-11
		14.3	Performance for physics benchmark processes		30-Jun-11
15	Future plans and R&D prospects			3	15-May-11
16	Detector cost			3	30-Apr-11
17	Conclusion			1	31-May-11
Appendix A	Software packages			4	30-Apr-11
Deadline for input to the R&D plan					31-Mar-11



CDR Vol. 2: documentation, comments



Current CDR versions are on SVN repository:

<https://svnweb.cern.ch/trac/crdvol3>

Access / upload CDR information, see S. Poss's presentation
Oct 25th 2010:

<http://indico.cern.ch/conferenceDisplay.py?confId=110092>

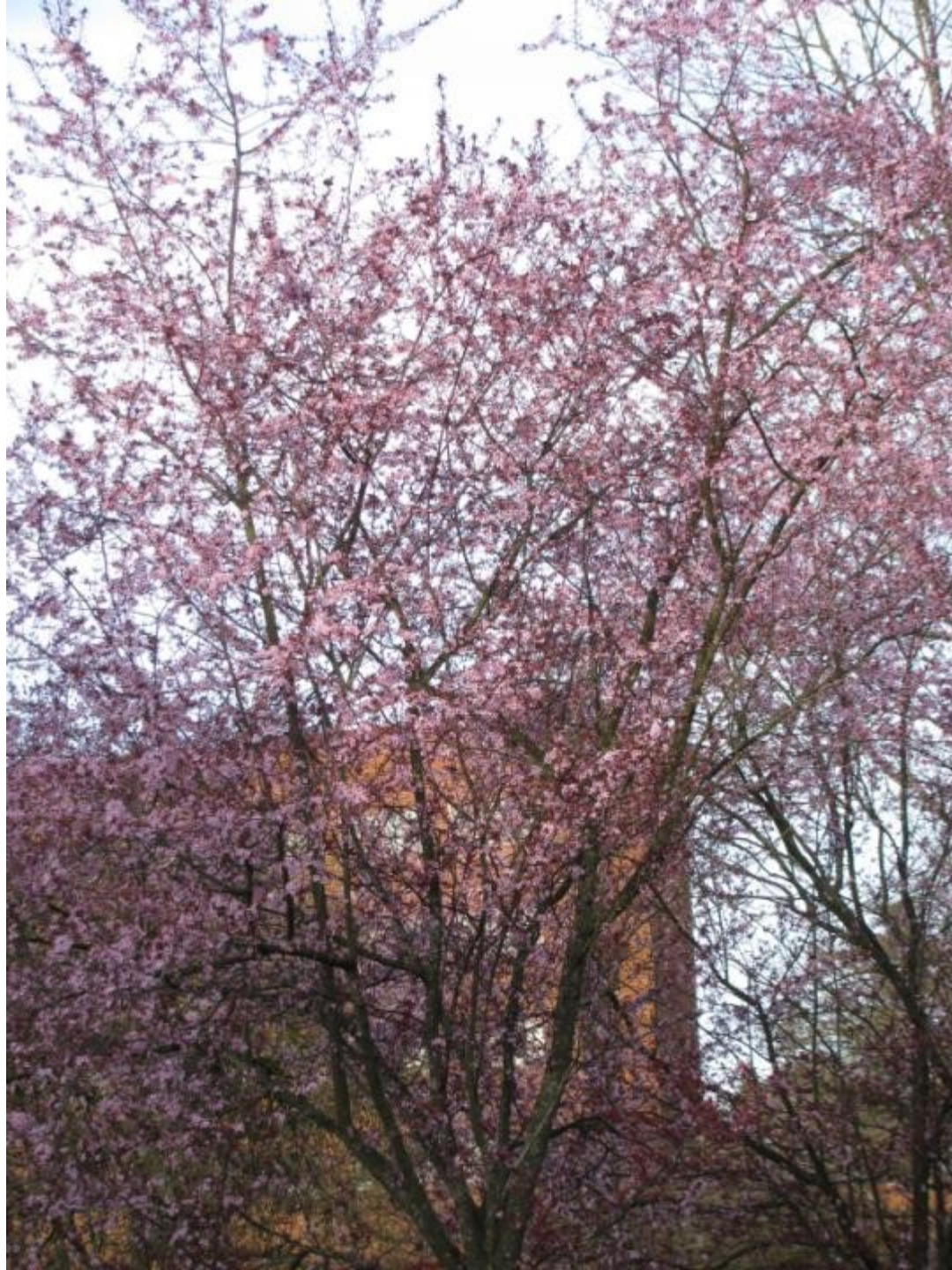
Nightly builds were created recently (thanks ! Marcel Stanitzki):

<http://stanitz.web.cern.ch/stanitz/nightlybuild.html>

N.B.

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Summary, Outlook and SiD DBD



- > still much work ahead for CLIC CDR Vol. 2 (physics and detectors)
- > some additional work will be required for the European Strategy Update
- > the CERN PH-LCD group has submitted a list of possible contributions to the SiD_DBD, this list is now with the SiD management, for discussion within SiD and later feedback to LCD

Disclaimer:

In 2011, the LCD project has come under increasing budgetary pressure at CERN; we hope 2012 will not bring additional surprises



SPARES