

ILC High-Priority Areas*

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**on behalf of
ILC-Europe FP7 IA 'task force'**

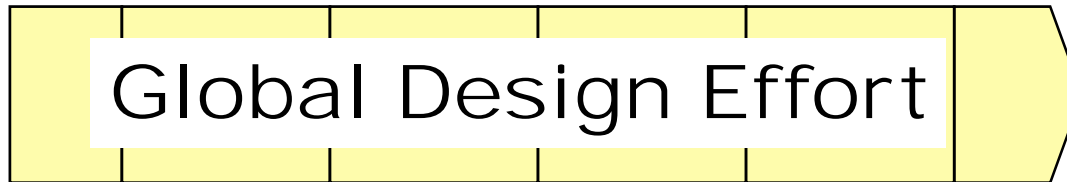
***Areas NOT related to RF, in framework of
'Novel Accelerator Systems'**

Outline

- **ILC project status**
- **European participation + FP7 IA opportunity**
- **Priority areas**
- **Summary of resources**

ILC – Global Design Phase

2005 2006 2007 2008 2009 2010



→ **Baseline configuration**

→ **Reference Design**

Official release of RDR, 15 August 2007

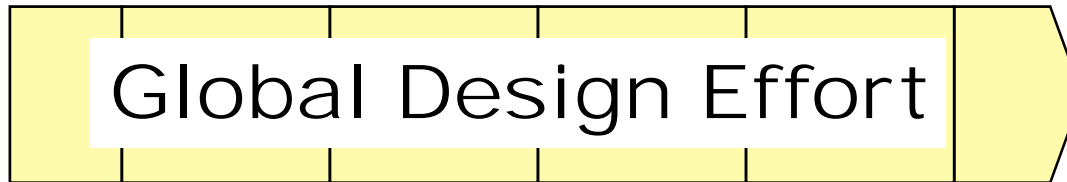


Philip Burrows

OMIA, CERN 10/09/07

ILC – Global Design Phase

2005 2006 2007 2008 2009 2010



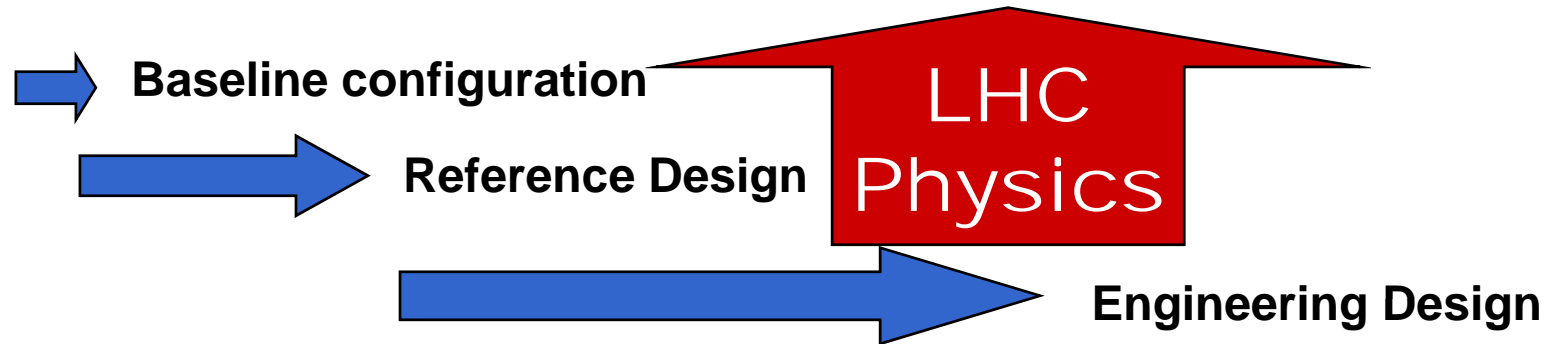
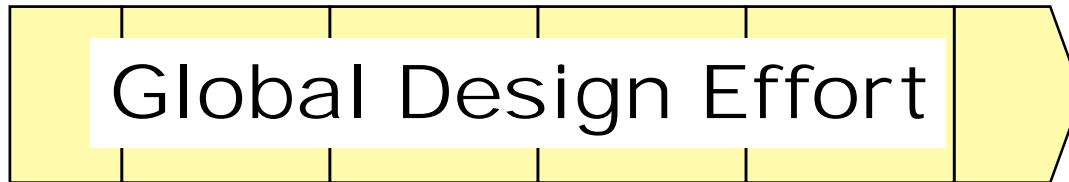
→ **Baseline configuration**

→ **Reference Design**

→ **Engineering Design**

ILC – Global Design Phase

2005 2006 2007 2008 2009 2010



ILC Engineering Design Phase 2007-10

- **Project Management Team set up (M. Ross)**
- **Project work structure (WBS) is being set up**
- **R&D and engineering tasks under discussion**
- **Definition of responsibilities and work programmes is in process NOW!**
 - **ILC-Europe participating in IA preparations**
- **EDR launch workshop FNAL 22-26 October, 2007**

Opportunities for Europe

- **GDE recognises that Europe strong in:**
 - positron source**
 - damping rings**
 - beam dynamics, transport, instrumentation**
- **based on capabilities of European institutes, and contributions to the Reference Design**
- **GDE requests European leadership + participation in these areas**
- **FP7 IA support is essential!**

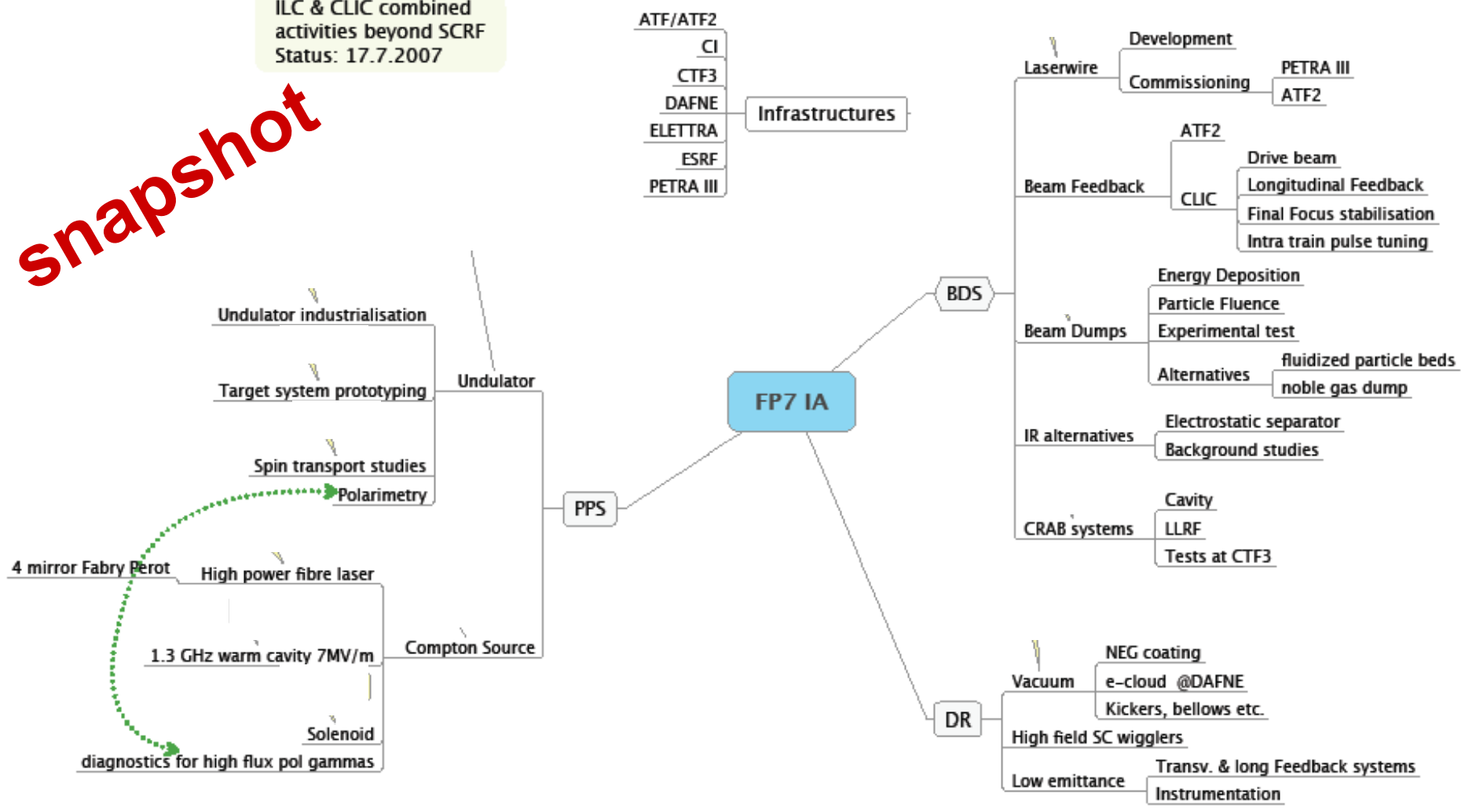
CLIC + ILC

- **Recognised strong synergies with CLIC:**
 - positron source**
 - damping rings**
 - beam dynamics, transport, instrumentation**
- **After discussion with J-P Delahaye and Erk Jensen worked with:**
 - Alessandro Variola, Hans Braun, Daniel Schulte**
 - to understand synergies, and relative emphasis**
 - scientifically optimised ‘linear colliders’ programme**

CLIC + ILC Synergies

ILC & CLIC combined activities beyond SCRF
Status: 17.7.2007

snapshot



Positron Source (1)

- Daresbury, RAL, Liverpool, Durham, DESY (SLAC, LLNL)
- Undulator-based source (ILC baseline)
 - undulator + target prototypes
 - polarisation + spin tracking (also CLIC)
 - pre-industrial undulator section prototype*
- Daresbury target facility
- RAL undulator facility
- 3.5ME total, 0.8ME requested
 - + 0.75ME, 0.25ME requested

Positron Source (2)

- LAL Orsay, IPN Lyon, Frascati
- Compton-based source, CLIC 'baseline' (ILC alternative):
fibre laser
capture section RF cavity
- FLASH, CTF3, DAFNE, ATF
- 1.7ME total, 0.6ME requested
+ 0.75ME total, 0.25ME requested

Damping Rings

- **CERN, Frascati, Cockcroft**
- **DR vacuum systems (ILC + CLIC):**
 - e-cloud studies and mitigation eg. NEG coatings**
 - design of chamber components**
- **DAFNE: tests of coatings for suppressing e-cloud**
- **Light sources (ANKA, SLS, ESRF...): meas. of yields**
- **CERN + Cockcroft Vacuum Labs: prep./study coatings**
- **2.3ME total, 0.7ME requested**

'Beam Transport'

- **Beamline design + beam simulation**
- **Collimator wakefields**
- **Instrumentation:**
 - Laserwire**
 - Luminometer + polarimeter**
 - BPMs for beam delivery system**
 - Alignment monitoring**
- **Beam dump feasibility study + design**

Instrumentation: laserwire

RHUL, Oxford (DESY, KEK)

- **2-d fast scanning (PETRA III)**
- **Micron-scale beam profile measurement (ATF2)**
- **Input emittance reconstruction to ILC/CLIC simulations**
- **Development of fibre-based laser system**
- **PETRA III, ATF2**

Instrumentation: Alignment monitoring + FB

Oxford (Annecy, CERN, KEK ...)

- **Develop alignment monitoring system for CLIC**
- **Prototype/demonstrator at CTF3**
- **Build on ILC prototype at ATF2**
- **Integrate alignment monitoring into global low-emittance transport + feedback simulation for ILC/CLIC**
- **Develop luminosity tuning techniques and optimisation strategy for ILC/CLIC**
- **CTF3, ATF2**

Instrumentation: BPM development

RHUL, UCL (KEK, CERN...)

- **Commission C- and S-band BPM systems at ATF2**
- **Optimisation of BDS commissioning and tuning strategy**
- **New BPM system design for CLIC/ITB**
- **CTF3/ITB, ATF2**

Instrumentation: luminometer/polarimeter

LAL, Univ. Paris Sud 11, Orsay (CERN, KEK)

- Design + development of combined luminometer/polarimeter based on Compton events at IP
- Detailed specification of laser requirements
- Study post-IP instrumentation for beam monitoring
- Evaluation of backgrounds from particle losses in IR
- Development of BDSIM
- **CTF3, ATF2**

Beamline design + beam simulation

RHUL, Oxford (DESY, CERN, KEK)

- **Develop BDSIM, interface to PLACET**
- **BDS/linac interface**
- **Simulate diagnostics performance (laserwire)**
- **Benchmarking against data**
- **ATF2, CTF3, PETRA III**

Short-range collimator wakefields

Manchester

- **Compilation of delta-wake formulae, regions of validity**
- **Benchmarking, coding**
- **Wakefield library: materials, shapes**
- **Implementation in MERLIN, PLACET ...**
- **Emittance growth in ILC + CLIC BDS**
- **Software infrastructure: wakefield library + codes**

Beam dumps

RAL, Cockcroft, Uppsala, DESY (CERN, KEK)

- **Feasibility of water dump concept**
- **Energy deposition in window and water**
- **Power dissipation and shockwaves**
- **Benchmark simulations + window tests**
- **Alternative technologies: noble gas dump**
- **CTF3, ATF2**

'Beam Transport': resources summary

- **Instrumentation:**
 - Laserwire*** **2.9M, 0.9M**
 - Luminometer + polarimeter*** **1.1M, 0.3M**
 - BPMs for beam delivery system*** **0.7M, 0.2M**
 - Alignment monitoring*** **2.1M, 0.6M**
- **Beamline design + beam simulation*** **0.4M, 0.1M**
- **Sub-total*** **7.2M, 2.1M**
- **Collimator wakefields** **1.0M, 0.3M**
- **Beam dump design** **0.9M, 0.3M**

Next steps

- **Deadline for submission of input was last Thursday!**
- **Numbers listed here PRELIMINARY!**
- **Another round of consolidation beneficial, especially w.r.t. 'beam transport' work programme**
 - understand any overlaps**
 - optimise use of infrastructure**
- **Will meet this week to resolve these issues**
- **Would be helpful to understand new IA/JRA structure, eg. 'Linear Colliders' JRA?**