Outline for the DBD Introduction and Common Chapters (approx. 55 pages):

Actions to be taken:

- Deadline for first draft 22nd of June.

IDAG recommendations and guidelines:

- Write the common chapter (backgrounds, radiation fields, power, magnets, etc..) parts to be used in the detectors sections as early as possible,
- show and emphasize the complementary of the two detector concepts,
- expand the two detector concepts discussion and implications,
- show maturity of detector development

General Introduction of the Detailed Baseline Design document (S. Yamada, 1 page)

- Motivation and description of the document.

1.0 Physics and detector performance of an e+e- Linear Collider up to 1 TeV center-of-mass energy (M. Peskin, J. Brau & H. Yamamoto, 12 pages)

Description of the purpose of this chapter:

1. to show the physics case for an e+e- collider (< 1TeV) based on existing results in 2012 (LHC, Tevatron, etc..). Meanwhile no Higgs or New Physics are found at the LHC this section should be open to admit changes up to the very end of 2012. It should demonstrate the necessity to cover the energy range up to 1 TeV,

2. to point-out the needed detector performances to accomplish with these physics requirements,

1.1 Physics reach (M. Peskin, 7-8 pages)

- should reflect the summary of the Physics document. It needs to include the open challenges in Particle Physics for the next decade and highlight those topics for which an e+e- machine can be unique, qualitative first (when discussing general principles) and as quantitative as possible later (when discussing the Physics program),
- has to justify the construction of the machine in the period 2015-2025, therefore the physics goals (Higgs, New Physics or Standard Model) should be competitive in concurrency with the operation of other machines, mainly LHC and its foreseen upgrades for this time period,
- if the Higgs is found, it should consider the operation as a Higgs factory but also should include the opportunity to study the ttH and ZHH couplings,
- New Physics in terms of SUSY models and/or Alternative models should be studied realistically considering LHC results (SUSY with light stop may escape LHC searches H. Baer & L. Randall-, etc..). In this context dark matter searches should be included,
- top physics should also be reflected as an important part of the program specially and with emphasis if the CDF results for the AFB are confirmed,
- di-boson sector (WW & ZZ) should also be covered (important for strong interacting schemes and operation at highest energies)

1.2 Detector challenges and technological requirements (J. Brau, H. Yamamoto, 5-6 pages)

- Generic detector performance required to accomplish with the above physics goals,
- the two detectors option and its implications (push-pull, etc..),
- define and comment on the different situations possible: GigaZ, Higgs factory, Top Yukawa couplings, di-bosons, tt+boson couplings, New Physics, SUSY, Alternative models, high energy 0,5-1 TeV,
- machine backgrounds and its impact to the detectors and beam instrumentation,
- definition of the benchmark processes (0,5 TeV and 0,5-1,0 TeV)

1.3 The Physics and Detector Study of the International Linear Collider (S. Yamada, 12 pages-mainly the same content as in the Interim Report)
This chapter essentially should follow the IR structure,

- Introduction and definition of milestones,
- history of the *ILC physics and detector study*,
- organization: Research Director and management,
- the International Detector Advisory Group (IDAG) definition and mandate,
- brief description of common task organization (PEB)
- detector activity and milestones accomplished (text and tables):
    - EoIs,
    - LoIs,
    - the two detectors selected: ILD and SiD
    - the present experimental set-up: push-pull system, etc..,
    - detector cost and methodology
- additional working groups:
    - cooperation with the ILC accelerator team to study the machine induced backgrounds at different operation energy points and consequences
    - cooperation with the Compact Linear Collider team,
- cooperation with R&D collaborations,
- Future perspectives post 2012 (structure and activity)

2.0 Description of common tasks and common issues (0,5-1 page)
The Physics and Experiment Board (PEB), motivation, definition and mandate, common task groups:

- detector R&D,
- simulation and software,
- Machine detector interface,
- physics
- engineering,
- beam instrumentation

2.1 Detector R&D (M. Demarteau, Wolfgang Lohman, 10 pages, open still for discussion)

- General overview, importance and relevance to the project, complementary role, synergies with other HEP projects,
- Highlights of ILC detector R&D:
  - Silicon vertexing and tracking
    - DEPFET
    - MAPS
    - FPCCD
    - kpix
    - lightweight structures
    - forward tracking
  - Gaseous tracking
    - TPC - GEM / Micromegas / TimePix / InGrid
    - dispersive readout with various readout techniques obtained precision, material budget, endplates
    - tracking performance
  - Calorimetry
    - experimental validation of particle flow algorithm
    - detailed validation of shower simulation models
    - technologies for instrumentation of large areas with high granularity: silicon, SiPMs, RPCs, GEMs, micromegas
    - ultra-low power mixed circuitry ASICs subsection:
  - Very forward instrumentation
    - radiation hard sensors
    - special ASICs
  - Muon system -
    - scintillator bar with WLS fiber and SiPM readout subsection:
  - Infrastructure -
    - Eudet, any infrastructure built at test beams etc.
  - Beam instrumentation
- Pulse powering
- Future R&D needed,

- Spin-offs
- Discussion and complement/synergy with the detector-concept

2.2 Common simulation and software tools (A. Miyamoto, N. Graf et al., 7-9 pages)

- **2.2.1 Common generator tools**
  - Definition of the common sevent generation and parameters for benchmark processes: process definition, energy, machine backgrounds (Guniea Pig), etc..(Mikel) 2 pages
  - Describe the Whizard (2-6 fermions) and Physim (8 fermions) generator schemes. Define generator parameters (Pyhtia, tuning-hadronization, kinematical conditions, etc..).
  - Whizard (Tim) 2 pages
  - Physsim (Akiya) 1page
  - Tuning (Mikael) 1 page
  - Emphasize main differences with respect to generation in LoI Code is shared with CLIC (Tim) 0.5 page
  - Results, status and existing generator samples
  - Table of processes, and tables (Akiya) 1 page
- **2.2.2 Common simulation and reconstruction tools** (2-page, N. Graf)

2.3 Machine-detector interface (K. Buesser,, M. Oriunno, Y. Sugimoto, T. Markiewicz, Ph. Burrows 5-7 pages)

- Functional requirements
- Hall layout and surface infrastructures
- Detector installation schemes and time lines
- Push-pull system
- Common services
- QD0 magnets

2.4 Common engineering tools (C. Clerc, 2 pages)

- Motivation, definition and status of ILC-EDMS (Engineering Document Management System) for detectors engineering data storage and exchange.

- Definition and selection of relevant technical documents of interest in order to ease the work of integration.

- **2.5 Beam Instrumentation** (J. Lists, E. Torrence, 2-3 pages)

  - Beam Energy Measurements (~1 page, E. Torrence)
    - upstream
    - downstream
    - complementarity

  - Polarization Measurements (~ 1 page, K. Moffeit, J.L.)
    - upstream
    - downstream
    - complementarity

  - Luminosity weighted averages at the e+e- IP (~1 page E. Torrence, J.L.)

2.6 Detector Costing and methodology (1-2 pages)

- Description of the detector costing methodology

3.0 The ILD detector concept

4.0 The SiD detector concept

5.0 Summary of the detector and physics study for the ILC (2 pages)

- Present status and understanding of the overall ILC project for physics and detectors
- Future R&D development
- Plans towards construction: best guess of the project timeline and milestones
- Issues remaining to be solved,
- Future organization (should be known by 2013)