

Technical Coordinator Report

Vincent Boudry



Institut Polytechnique de Paris

ILD Optimisation Meeting

1st report from myself

- Probably some (large) missing parts, please correct any errors
- Task list and contacts are being built

Very fruitful meeting at CERN on “ILD for FCC-ee”

- <https://agenda.linearcollider.org/event/11033/>
 - (on the technical side), we had report of excellent quality on
 - Sub-Detectors (Muons, Calos, Tracker and TPC, VTX, Lumi, ToF)
 - Tools (SW, simulations, ML)
 - FCC-ee context (M. Dams), TDAQ (Z. Demiragli), background /MDI
 - Also some words on ILC380 and HALHF
 - Recent Physics Studies

Preparing ILD for the competition ...

ILD is:

- a mature and working collaboration
 - Detailed detector models (Physical, Mechanical), Services, Experience, Tools, MC samples, ...
- with CLD: single experiments with “high-granularity”
 - differences in tracker (**TPC** vs Si), detailed implementations
- (still) most advanced in
 - Complete implementation of services (placement, simulation)
 - Mechanical design (including vibrations)
 - Consolidated cost estimations
 - Prototype based claims (CALICE, LCTPC, VTX): getting old (world has changed)

... but we have to be attractive for new ideas (technologies, methods, refinements, ...)

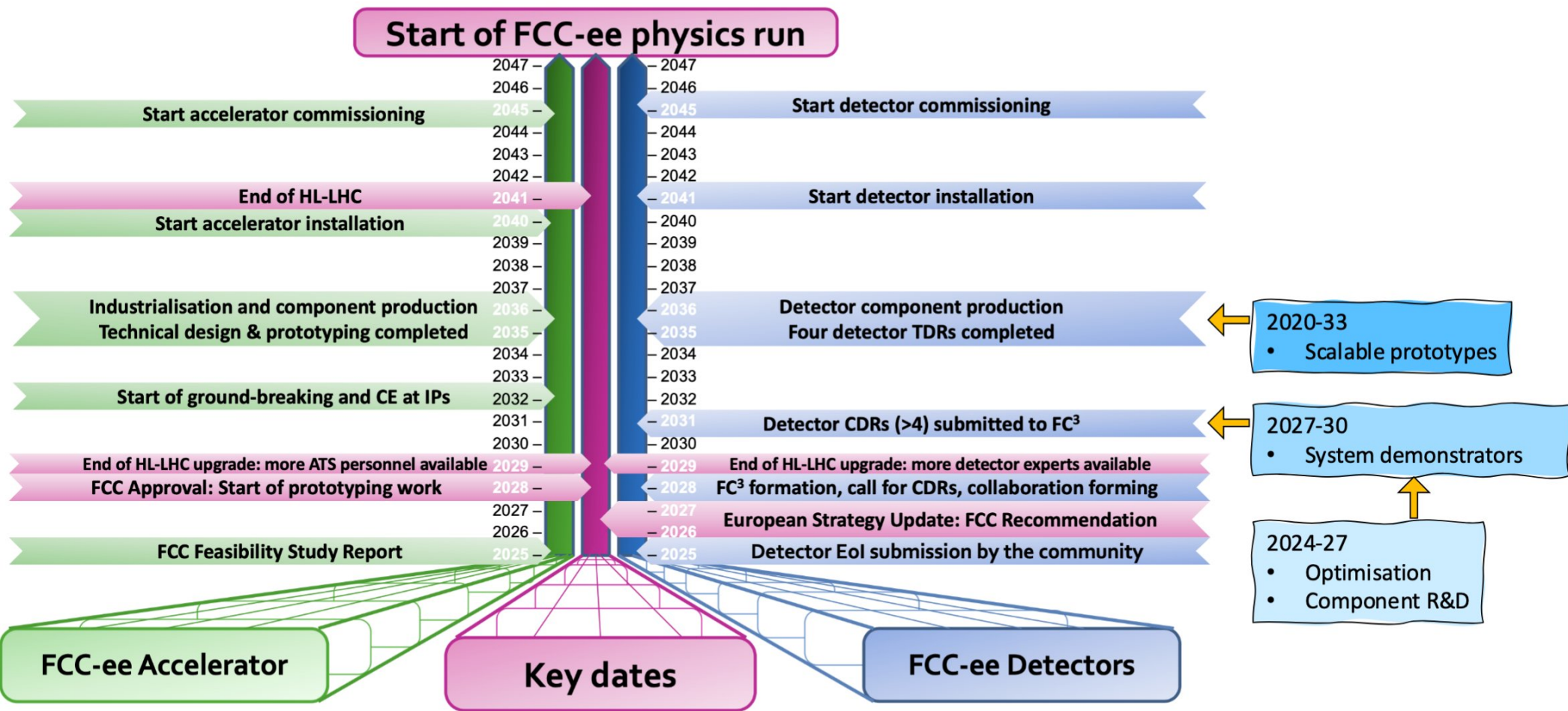
Preparing ILD for the race...

Main challenges adapting to FCC-ee: ~priority-wise

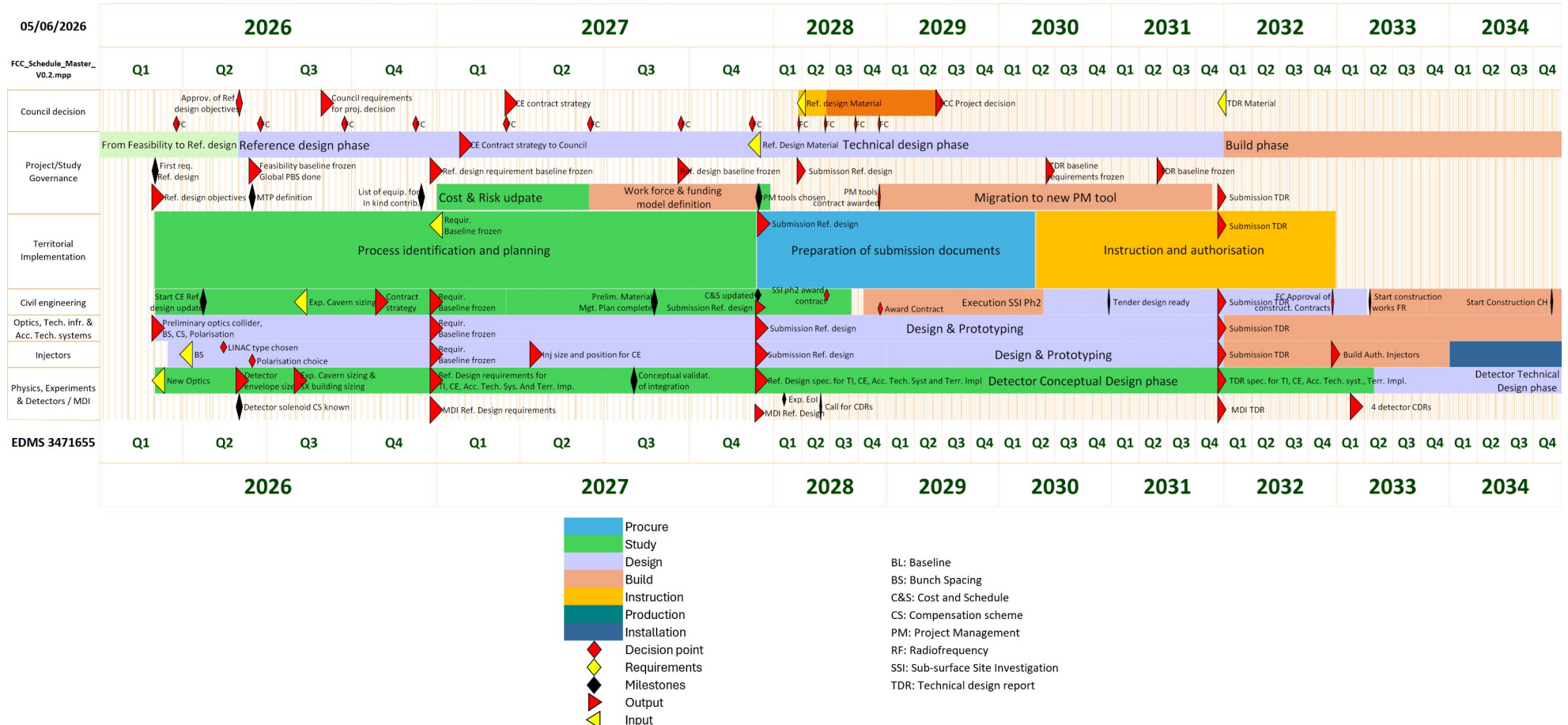
- 1) Work on MDI with machine groups to tame the noises, esp. Synchrotron Radiation
 - Establish working conditions for the inner trackers
 - ($\leftrightarrow$ beam-pipe, etc. $\supset$ impedance, cooling, ...)
- 2) Establish the data flux & thermal loads
 - Scaling the electronics & cooling systems
 - (Ensure to have the ecosystem electronics to build prototypes and the detector)
- 3) Redesign the detectors and sub-detectors systems with the services: Cooling, DAQ, Monitoring
- 4) Revisit the precision on Physics with the redesigned detector, esp. at the Z-pole
(Calibration/Alignment & Systematics)
- 5) Refine the costs, construction and installation plans

Different WG so some items can (must) advance in parallel or by steps

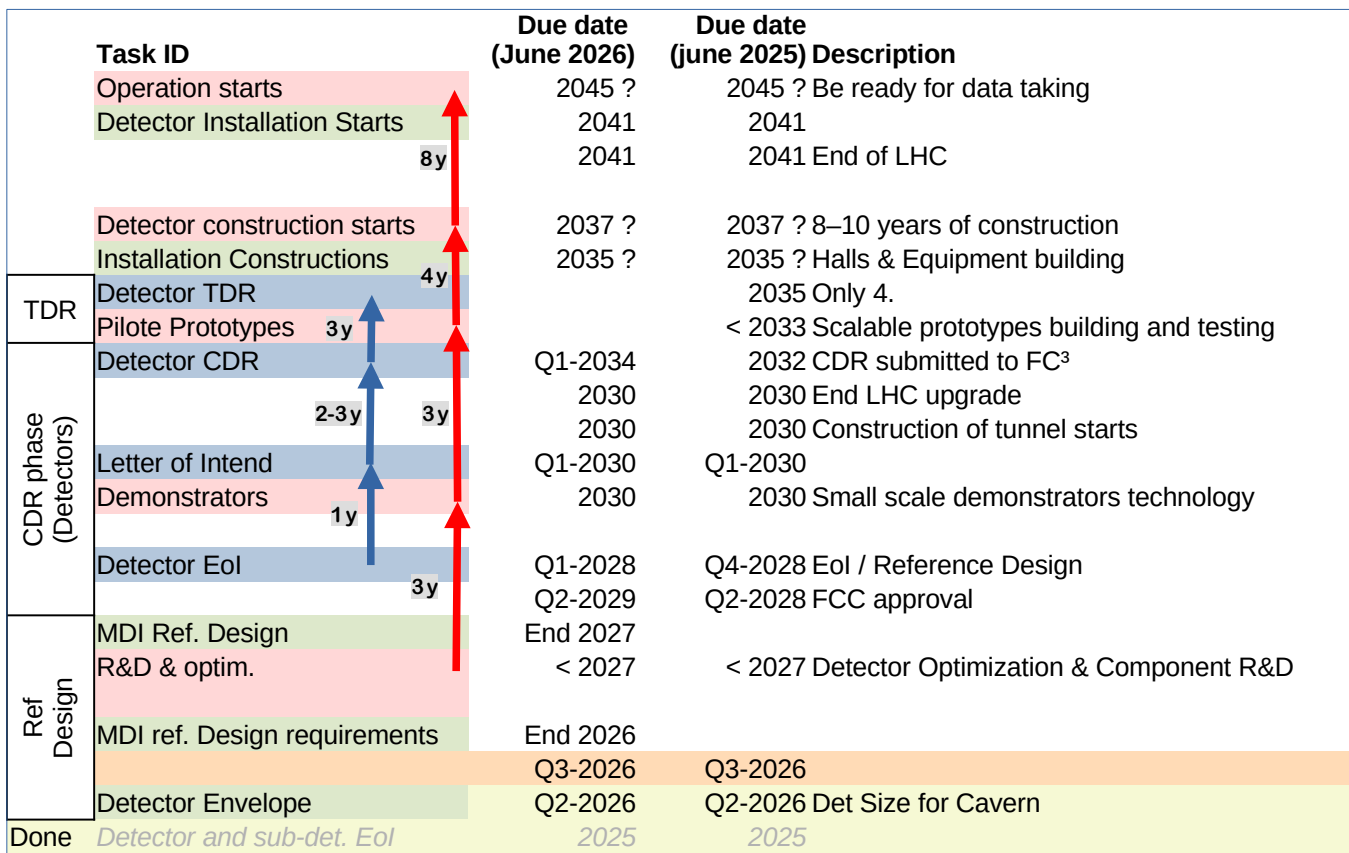
Schedule (FCC week 2025)



FCC Master schedule simplified FCC-PM-PM-0004 v0.2



Milestones and Deliveries (Tentative)



Schedule is still quite unstable

- Phase defined...
- Some schedules shifted by one year in a year...
 - To be stabilized....
- Some items ~decided without ILD

New PED General meeting:

- <https://indico.cern.ch/category/5307/>
- Monthly
 - “A monthly meeting with presentations about detectors, software, experimental studies, and phenomenology at FCC”
 - **1st session: tomorrow 14:00**

New FCC PED Website

- <https://fcc-ped.web.cern.ch/>

First action: register and get involved with FCC WG:

Group name	Email	Signup	Indico
Calorimetry	FCC-PED-DetectorConcepts-Calorimetry@cern.ch	click	click
Luminometry	FCC-PED-DetectorConcepts-Luminometry@cern.ch	click	click
Magnet	FCC-PED-DetectorConcepts-Magnet@cern.ch	click	click
Muon	FCC-PED-DetectorConcepts-Muon@cern.ch	click	click
TDAQ	FCC-PED-DetectorConcepts-TDAQ@cern.ch	click	click
Tracker & PID	FCC-PED-DetectorConcepts-Tracker@cern.ch	click	click
ALFA	FCC-PED-DetectorConcepts-ALFA@cern.ch	click	click
ALLEGRO	FCC-PED-DetectorConcepts-ALLEGRO@cern.ch	click	click
CLD	FCC-PED-DetectorConcepts-CLD@cern.ch	click	click
IDEA	FCC-PED-DetectorConcepts-IDEA@cern.ch	click	click
ILD	FCC-PED-DetectorConcepts-ILD@cern.ch	click	click

Concept Studies

ALFA
ALLEGRO
CLD
IDEA
ILD

Detector Subsystems

Calorimetry
Luminometry
Magnet
Muon
TDAQ
Tracker & PID

□ Indico categories for [Detector Subsystems](#) and [Concept Studies](#)

Collaboration goes in both direction:

- learn from those groups
- share the experience of ILD and motivate new people to join

Back-Ups

Cost Estimate – Methodology

Classification

- Published by the Association for the Advancement of Cost Engineering (AACE)
- Same methodology as during the Mid-Term Review
- Each Work Package class determined based on the maturity of the engineering design, and the methodology used for the cost estimate

Estimate Class	Maturity Level of Project Definition Deliverables (% Complete Definition)	Typical End Usage	Typical Estimating Methodology	Expected Accuracy Range
Class 5	0% to 2%	Concept screening	Capacity factored, parametric models, judgment, or analogy	Low: -20% to -50% High: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	Low: -15% to -30% High: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	Low: -10% to -20% High: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	Low: -5% to -15% High: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	Low: -3% to -10% High: +3% to +15%

Tentative To Do List...

Instrumentation

- Continue R&D on detectors ↔ DRD's
- Foster transverse collaboration on missing parts (e.g. Silicon trackers)
- Involve new partners: e.g maps for calorimeters (Lumi, SiW), Cherenkov / ToF
- Build scenarios for TPC (if;then;else)
- Revise Magnet + Yoke + Muons ← Q? From Karsten: Who ? Major cost issue (material, pit size)

Models

- Update detector descriptions in 2(3?) steps:
 - 1st version simulations with upgraded sub-detectors (▷ digitisers, timing, cooling for VTX, TPC, Calos)
→ prelim. Physics performance, rates, granularity, etc (→ Eol ?)
 - 2nd version Sim/CAD for full physics performance / large Production
 - Prelim Cost estimates → Lol ? (beg. 2030)