Integration of FCAL in LC detectors



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- Assumptions on integration
- FCAL requirements on IP campus
- FCAL requirements on central campus
- Assembly/test timeline
- Interference with other subsystems
- Second detector?
- Outlook



FCAL Integration

Requirements and Timeline





Outline

Assumptions on integration

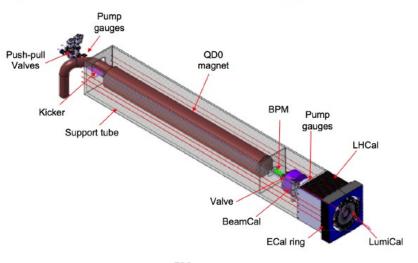
FCAL requirements on central / IP campus

First shot at timeline

Integration of FCAL Components

Assumptions:

- QD0 magnet, LumiCal, LHCal, BeamCal all assembled separately at arbitrary locations in the world.
- Requirements on and timelines of individual production / construction locations to be separately defined.
- Assembly and testing at central campus OR at IP campus



FCAL Integration TSS

FCAL Requirements at Central / IP Campus

- Assembly area: 100 m² ISO 7, temperature stabilisation
- Crane: 10 t
- Storage: negligible
- Workshop: normal equipment (HV, cooling media, ...)
- Access to bonding facility
- After assembly at central / IP campus:
 - Full test and calibration runs ~6 months
 - (Transport to IP campus thermally and vibrationally protected
 - Lowering and installation in ILD (1 week)
 - Short electrical / connection test
 - Commissioning (1 month)

Draft Timeline

- Assumptions see pages before, discussed again with Karsten.
- Questions
 - Many :-)
 - Do we need BPM and / or QD0 in for FCAL system test?
 - Can we work on / install all three Cals simultaneously?
 - What are realistic times for the individual steps?

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		4	Arriva	l ECal ring			Arrival ECal ring	\Diamond	
		5 🗹	∠ LHCa assen	I pre- nbly testing	10 days	LHCal p	re-assembly testing	\sim	
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st	180 days	30 days FCAL system test and calibr				\Box			
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ı	2 days	2 days				Transport to IP campus and I			
t	5 days					Installation in pit		40	
t	5 days					Electrical and connectivity te			5
							FCAL ready	<i>(</i> → ♦	
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Given Work Q2 / 2015

Q3 / 2015

07 08 09

Availability of assembly work...

FCAL-integration

Q4/2015

10 11 12

Q1/20

01

QUU magnet ∇ Installation of

> QD0 in inner support tube

→ Crane - 5 tons ∇ Insertion of inner

> support tube in outer support tube Crane - 5 tons

Insertion of beampipe

Installation of

FCAL system ter

and calibration

FCAL system

Transport to IP

Installation in pit

Electrical and connectivity test in ILD FCAL ready

campus and lowering into pit

BPM

20 🗹

Traits

0 € ⊙

FCAL Integration

▼ FCAL-integration

assembly

workspace

Availability of

Assumptions on integration

- Parts of LumiCal, LHCal and BeamCal produced separately at other locations in the world
- Test assembly of sample parts is done at the participating labs
- Final assembly at IP campus
- Test and calibration of the FCAL calorimeters ~1/2 year
- Installation in the support structure: 2 scenarios:

 -at the IP campus (support tube, QDO, part of beampipe, BPM, cooling, cables, ECAL ring, etc. etc.) seems to be not very attractive due to the interference with other subsystems and need of large amount of additional equipment
 - -assembly and test of calorimeter halves at IP campus, lowering parts down to IP and final assembly there in my view preferable
- Calibration period before installation? how to do and what equipment is needed
- Computers, back-end electronics, power supplies, cables to be specified

Infrastructure

- Assembly area 100 m² ISO 7 temperature stabilized
- Gas and cooling media supplies
- Additional area for long term calibration? Same requirements as for assembly area
- Delivery area 50 m²
- Room for power supplies, computers etc. 25 m²
- storage: we also need something, not much, but there are usually crates, instruments, spares, materials to be used for assembly which have to be kept somewhere nearby $\sim 20~\text{m}^2$ is sufficient.
- office space is also necessary. Lets assume there are 20 people present, 5 offices for 4 people each, or 10 for two is a good ansatz. Seems like it is more relevant for the central campus.

Installation schedule

- Installation 1 week per side (since in fact these are 3 detectors per side, BeamCal LumiCal and LHCAL) there is also the Ecal ring, which would be not in the responsibility of FCAL but may cause some interference/collaboration with ECAL.
- Comment from Thomas: So we say a month in order to be on the safe side - 2 weeks per side
- The calorimeters should be installed on each side by the same people, first LHCAL, then LumiCal, then BeamCal, two days per device (too optimistic?)

Outlook

- We need to prepare a document, summarizing our assembly, installation and test plans + preliminary timeline
- According to the plan we need to formulate our infrastructure requirements
- Probably we could also include there our plan for later usage of infrastructure at IP campus

It is all about ILD... What about the second detector?