

Software Coordinators Report

F.Gaede, DESY

ILD SW&Ana Meeting, May 10, 2017



- status of software as reported in Lyon
- some open questions for simulation model
 - geometry of HCal barrel
 - thickness of Ecal
 - VXD and inner trackers layout
- Summary and Outlook

Status of Core tools



- iLCSoft core tools for ILD mass production are in a rather good state
 - completed the transition to **DD4hep**
 - $\bullet\,$ completed migration to ROOT6, c++11 and GitHub !
- Generator Whizard
 - quite some progress but also some open show stoppers
 - currently addressed by Whizard authors
 - MB: "to be ready for a mass-production during this summer seems more than probable !"

• MC Production

- very good progress made on ILCDirac production chain
- now have to productions chains for DBD and Opt2017
- need only a few final preparations for large scale MC production



large DBD like	new smaller model	technology	Hcal geometry	Ecal
ILD_I1_v01	ILD_s1_v01	analog	Tesla	SiW
ILD_I2_v01	ILD_s2_v01	semi-digital	Videau	SiW
ILD_I4_v01	-	<i>both</i>	Tesla	SiW

- all models use shared parameters for all but the Hcal
- for large MC production: will use only two models (large and small)
- agreement in Lyon: will use a hybrid model for MC production
 - unless *show stoppers* identified

achieve comparable (or better) performance for the tracking

- efficiencies and resolution
- some minor technical changes in pat rec code required
 - will not affect actual performance
- many more **detailed checks and** validation needed:
 - fake rates, broken tracks, track state at Calo,...

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Status of (Pandora)PFA

- achieve comparable or better JER compared to DBD model ILD_v01_v05
- one post-DBD model has shown yet better performance
 - under investigation by calorimeter group
- this is currently the **most urgent** issue in the software chain





Validation of detector models

^{iLC} SOft₩

group	name	detectors/systems
Calo	Daniel Jeans	Ecal, Hcal
Si-	Marcel Vos	VXD, SIT, SET,
Tracker		FTD
VFS	Bogdan	beamCal, LCal,
	Pawlik	LHCal
Yoke	Nicola	Muon, Coil
	d'Ascenzo	
MDI	Karsten	beam pipe.
	Buesser	cables, services
TPC	Dimitra	TPC
	Tsionou	

- Calo: extensive tests and validation: OK
- Si-Tracker: validation pending
- VFS: geometry checked, need check of reconstruction
- Yoke: some checks done, needed for reconstruction ?
- MDI: some checks done, some open issues w/ cables & services
- TPC: extensive tests and validation: OK

overall good progress

- need to address some open issues and continue validation
- depending on changes made to the detector layout now, we will have to (partly) re-start the validation process

- observe **compatible JER** to canonical *ILD_I1_v01* model
 - despite issue in slice ordering and no *re-calibration*
- works from software side
 - more checks needed from R&D groups ?

use this for large MC production

• agreed to use a *hybrid model* in Lyon





• have to select a geometry for the Hcal barrel layout in ILD simulation model

• decision today in ET meeting:

- for the Hcal we will use the **Tesla** geometry with hybrid readout for the MC production
 - use this for large scale MC production
- also create a hybrid model with Videau gemetry for dedicated studies
 - create a small set of samples, if needed



- it turns out that the Ecal thickness in the simulation models used so far is unrealistic
 - $\bullet\,$ need to increase the Si and electronics thickness of the Ecal by $\sim 3\ cm$
- decision today in ET meeting:

- \bullet will update the simulation model for the Ecal and increase the thickness by \sim 3 cm inwards for both models
 - use uninstrumented gaseous volume in the TPC ($\sim 6~cm)$
 - to be **approved** by TPC group
- will extend the Ecal endcap inside into the gap wrt. TPC
 - need to check if gap is still sufficient by MDI group
- exact parameters for all necessary changes will be provided by Ecal group



- could improve the *impact parameter resolution* for physics by improving the inner tracker forward layout
 - add VXD endcap, move 1. FTD disk closer, add more FTD disks,...
 - potentially difficult adjustments in simulation model needed
- decision today in ET meeting:

- ask VXD groups for design of VXD cable routing asap and implement in simulation model
- do not change the existing layout for the production model now
 - can have studies for optimizing the tracker layout in dedicated simulation models



- overall good progress made on ILD models and new software chain
- still have some open issues to address and implement changes to ILD simulation models
 - as discussed in today's ET meeting

- starting a production this summer is *ambitious* and might actually not be *feasible*
- have to see how much progress we can make, given the critical manpower situation