

# Report from the Software Coordinator

Frank Gaede, DESY  
ILD Phone Meeting  
September 21, 2016

# Outline

- Recent Activities and Plans
  - Generator
  - Simulation
  - Reconstruction
  - Monte Carlo Production
- iLCSoft releases
- Summary

# Main Goal for next months

- prepare the software and computing tools for large scale Monte Carlo production for further ILD detector optimization in preparation of the update document to the TDR
  - using the newly developed software chain with:
    - DBD-like ILD model and
    - new small ILD model
      - talk by Ties in last ILD Phone Meeting
  - large SM and BSM data samples for ongoing and future physics analyses
- started by gathering information on status and open issues of software and computing tools
  - validation of new DD4hep based software chain
  - finalization and validation of new reconstruction chain for old (DBD) and new sim.
  - eventually information should be accessible centrally to everyone in the ILD Wiki-page :

<https://confluence.desy.de/display/ILD/ILD+Software+Working+Group>

# ILD Software Working Group on the Web

The screenshot shows a web browser displaying the Confluence page for the ILD Software Working Group. The page title is "ILD Software Working Group" and it was posted on 21. Jun. 2016 10:57h. The page is organized into sections: Overview, Mission Statement, and a list of sub-groups. The Overview section states that the ILD Software working group is one of three working groups of ILD and consists of four sub-groups: Generator, Simulation, Reconstruction, and Monte Carlo Production. The Mission Statement section lists the group's goals: to develop, maintain, and provide software tools for ILD detector and physics studies; to produce and provide Monte Carlo samples; to do this in close collaboration with technical and physics groups; and to continue collaboration on software tools with other LC detector concept groups and other HEP groups. A diagram shows the organizational structure with Technical, Software, and Physics Coordination at the top, and the four sub-groups below them.

Pages / ILD / ILD Working Groups

## ILD Software Working Group

Frank Gaede posted on 21. Jun. 2016 10:57h - last edited by Frank Gaede on 21. Jun. 2016 13:11h

### Overview

The ILD Software working group is one of three working groups of ILD. It consists of the four sub-groups:

- Generator
- Simulation
- Reconstruction
- Monte Carlo Production

Technical Coordination Coordinator/Deputy ↔ Software Coordination Coordinator: F.Gaede Deputy: A.Miyamoto ↔ Physics Coordination Coordinator/Deputy

Generator Convenors: M.Berggren (DESY), J.Tian (Tokyo) | Simulation Convenors: D.Jeans (Tokyo), Sh.Lu (DESY) | Reconstruction Convenors: L. Huong Tran (DESY), Y.Voutsinas (DESY) | MC Production Convenors: A.Miyamoto (KEK), H.Ono (NDU,Tokyo)

### Mission Statement

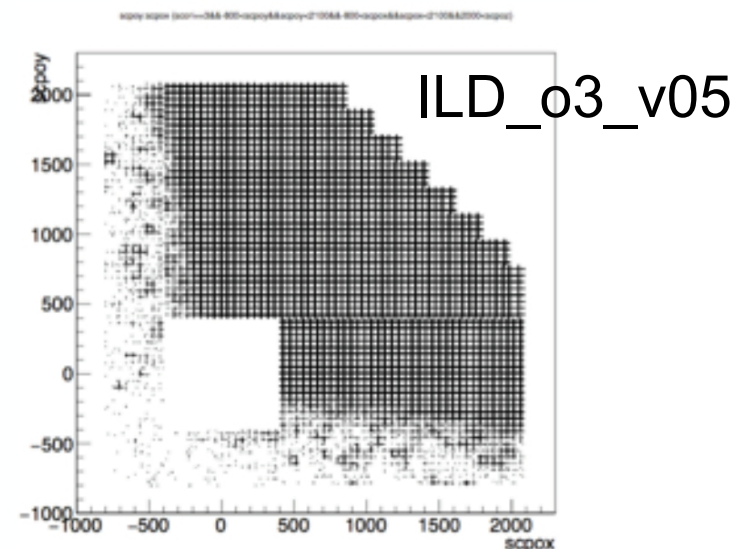
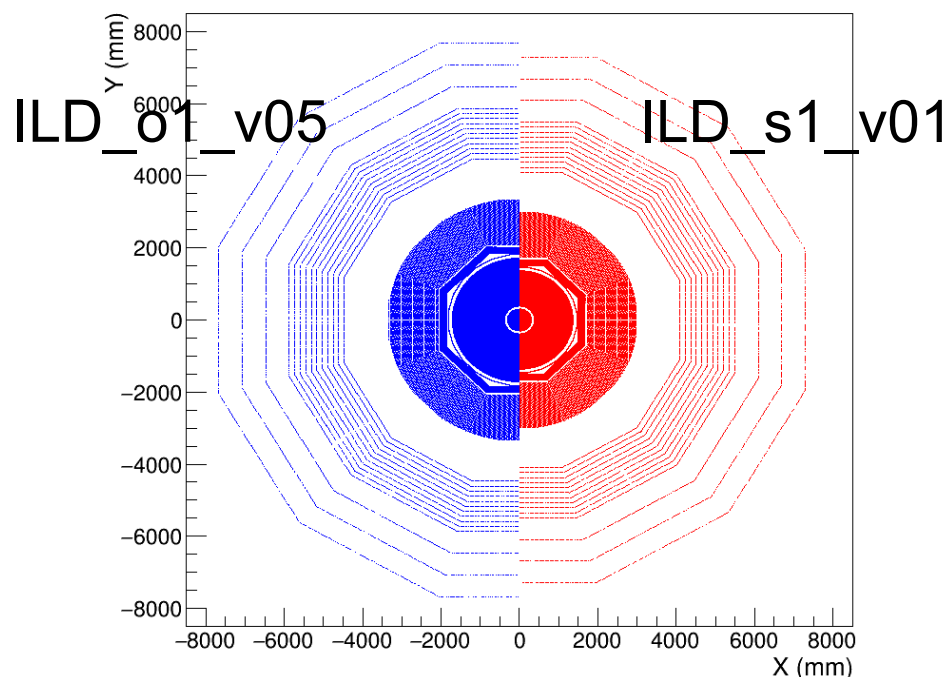
- **develop, maintain and provide** the software tools that are needed for ILD **detector** and **physics studies**
- **produce and provide** the necessary **Monte Carlo samples**
- **do this in close collaboration** and with the **support** from the **technical** and **physics groups**
- **continue the collaboration** on software tools with the other **LC detector concept groups** as well as other **HEP group**

- introduction to SW
- how to run Marlin et al.
- recent results from testing and validation
- ...

# Generator Group

J.Tian, M.Berggren

- ongoing activities:
- in contact with WHIZARD 2 authors addressing **known issues**:
  - particle multiplicities different in 4 jet events wrt. Whizard 1.9
  - ISR energy spectrum in 2 jet events (radiative return peak has moved by ~few GeV)
  - $H \rightarrow \tau, \tau$  issues in decays via Tauola (  $H \rightarrow \tau\tau$  is new feature in WHIZARD2)
- latest WHIZARD release 2.3.1 (Aug. 25, 2016)
  - => need detailed tests and iteration on issues



- created **documentation and tools for validation** of simulation models
- implemented (radial) scaling behavior for ILD simulation model (SL) and first version of small ILD model: **ILD\_s1\_v01**
- implemented **SciEcal** in DD4hep/lcgeo (K.Kotera): **ILD\_o3\_v05**
- iterate with technical groups (via **software contacts**) on details of new simulation models
- => all models need iteration and validation

# ILD sub-detector contacts

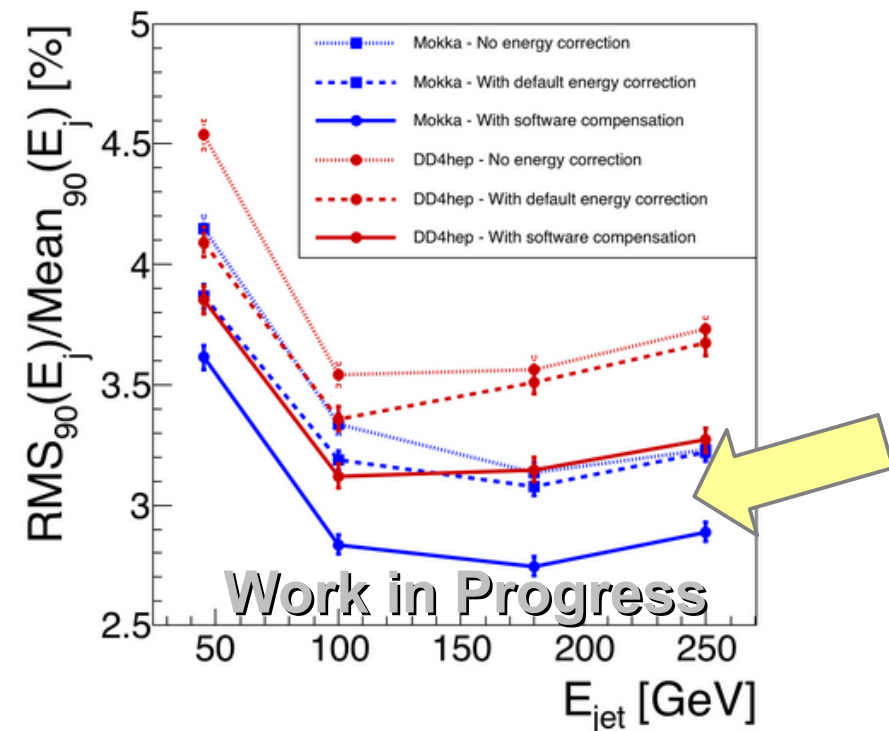
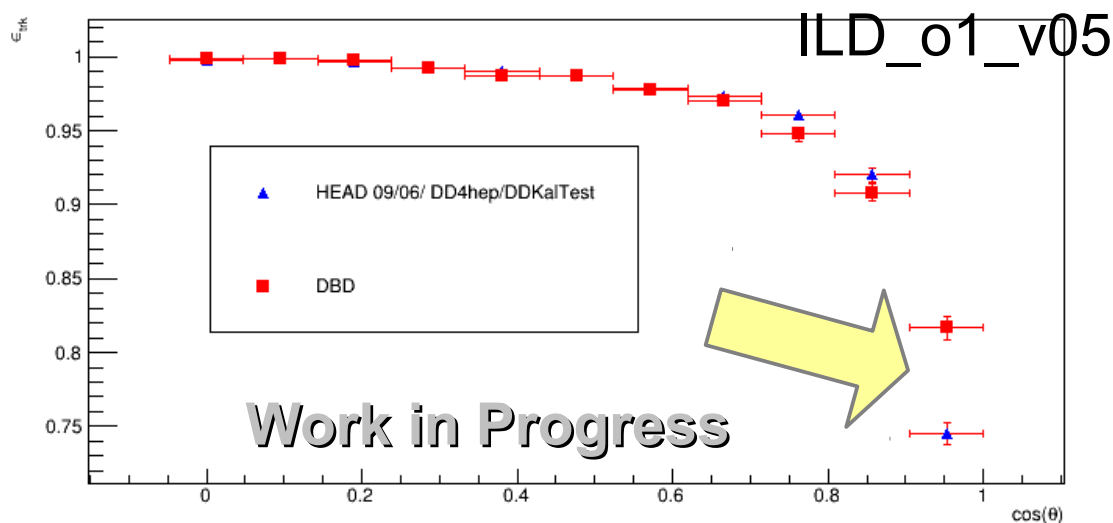
group	name	detectors/systems
Calo	Daniel Jeans	Ecal, Hcal
Si-Tracker	Marcel Vos	VXD, SIT, SET, FTD
VFS	Bogdan Pawlik	beamCal, LCal, LHCal
Yoke	Nicola d'Ascenzo	Muon, Coil
MDI	Karsten Buesser	beam pipe, cables, services
TPC	???	TPC

- almost all software contact persons are in place now
- they will play an important role in
  - validating the simulation models
    - geometry parameters and materials
  - validating the digitization ( and reconstruction )
    - realism of the digitizers
    - expected resolutions/performance
- in collaboration with Software Working Group

# Reconstruction Group

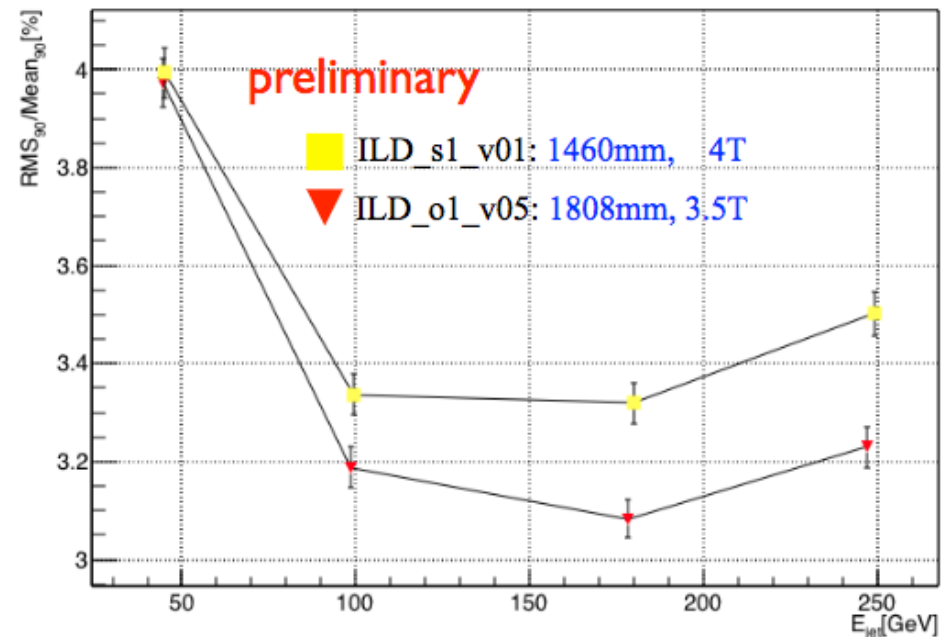
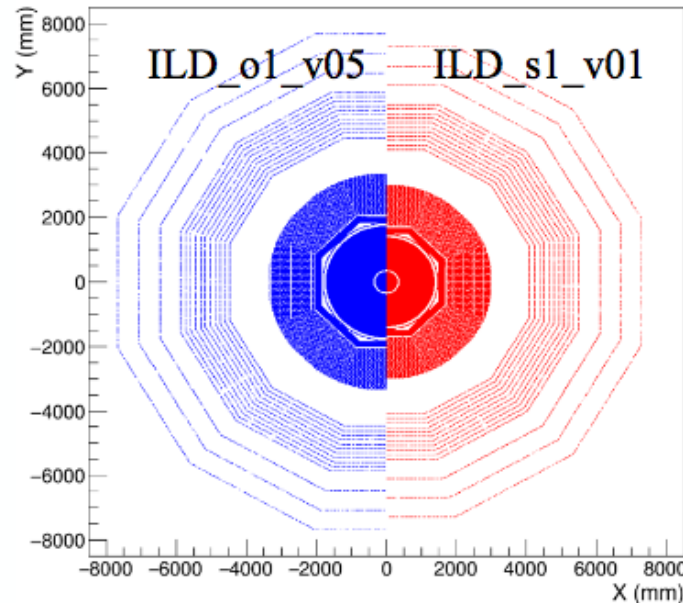
L. Tran, Y. Voutsinas

- created **documentation and tools for validation** of reconstruction performance ( → see **confluence page** ) :
- re-reconstruction of DBD simulated samples
  - works rather well ( in v01-17-10 )
- configuring, testing and validating the reconstruction for the new simulation models is ongoing
  - issues currently under investigation





# Reconstruction for smaller ILD



- reconstruction for smaller ILD model is working in principle
- JER is worse than for DBD-like ILD - as expected (!?)
- continue to improve reconstruction
  - need to port all tracking digitizers and pattern recognition to DD4hep/DDRec
  - iterate on detector parameters
  - calibration for Pandora ...

# MC Production Group

A.Miyamoto, H.Ono

- preparing the infrastructure for ( large scale ) Monte Carlo productions on the Grid using iLCDirac
- AM and HO got started w/ learning and exercising the new system
- received MC requests:
  - 500GeV H->mumu - w/ DBD version **DONE**
  - 500 GeV 4f w/ DBD version **DONE**
  - 500 GeV 6f-ttbar sample - w/ DBD sim & new reco → **need v01-17-10 !**
- web page for new samples:

<https://confluence.desy.de/display/ILD/Monte+Carlo+Production>
- started to develop procedure for next big mass production
  - currently too much manual interference and 'baby sitting' required
- KEK-SE now accessible again after upgrade of KEK-CC

# iLCSoft release v01-17-10

- released iLCSoft **v01-17-10** in 1. week of August
  - progress in tracking, PFA and HLR for DBD re-reconstruction
  - starting point for validation of the new ILD simulation models
  - SL6 gcc4.4 and gcc4.8
  - last legacy release (up to patches)
- started to prepare patch release **v01-17-10.p01**
  - **LCFIPlus**: needs patch to ROOT for change in TMVA (normalization)
  - **CED**: wrong version included
  - **MarlinTrkProcessors**: improvement in MiniVectorCA based patrec
  - **Overlay**: missed some recent code in release tag
  - **MarlinKinfit**: ongoing development for improved fitting with track objects
  - **PandoraPFA**: new path release with bug fix available
  - anything else ?

# future iLCSoft releases

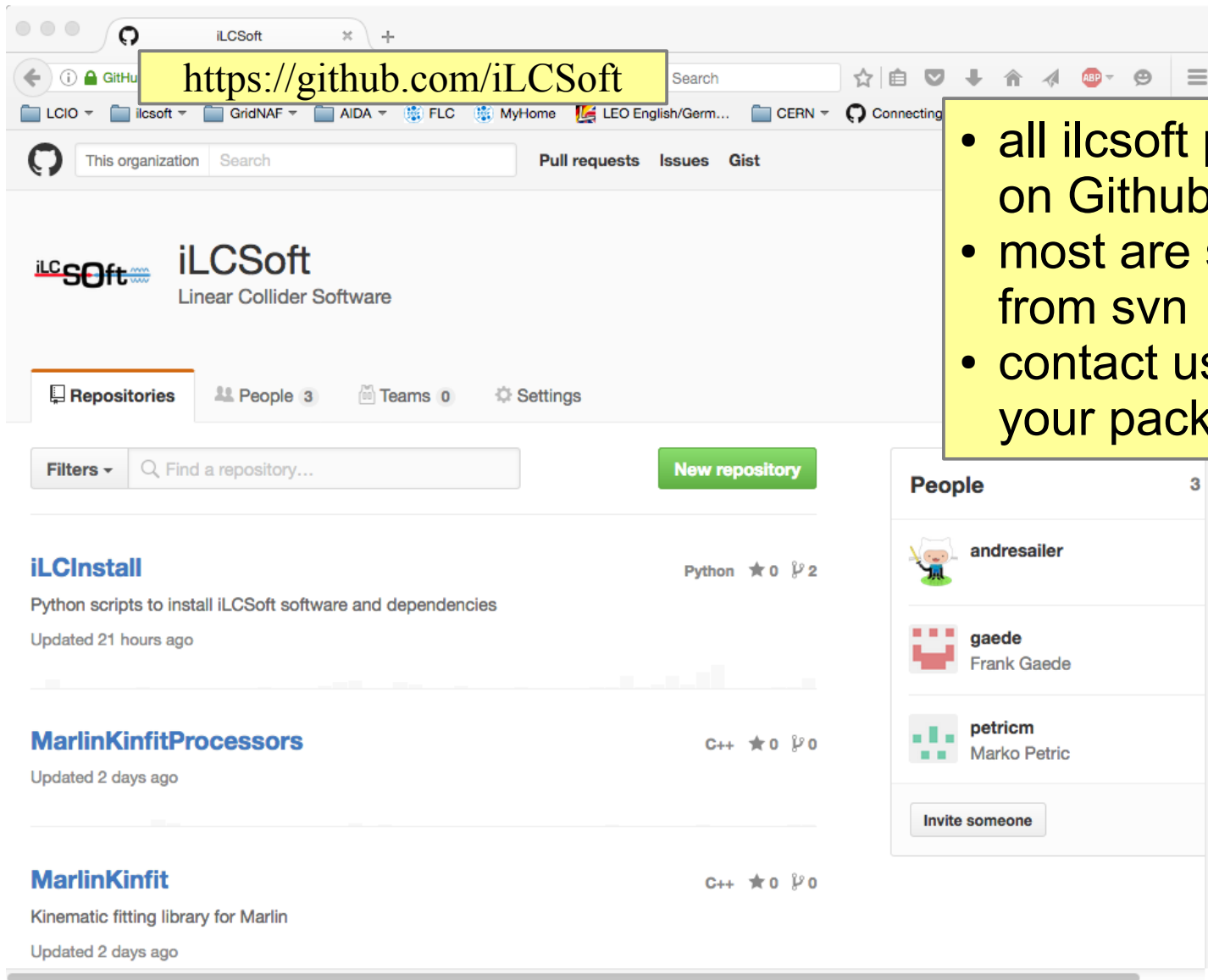
- started to move into the new world:
  - using **C++11** in the code
  - requires **gcc4.8** and higher only
  - **ROOT6** (requires C++11)
  - (partly) move the iLCSoft packages to **github**
    - started with DD4hep this week
  - phase out old (Mokka based) code and packages
  - create the software chain for the ILD MC mass production
    - cannot expect all code to be backward compatible

– transition period ahead might cause some minor inconveniences and confusions

=> expect users/developers to **KEEP CALM and Learn Git**

follow at: [/afs/desy.de/project/ilcsoft/sw/x86\\_64\\_gcc48\\_sl6/HEAD-2016-xx-yy](/afs/desy.de/project/ilcsoft/sw/x86_64_gcc48_sl6/HEAD-2016-xx-yy)

# ilcsoft on Github



The screenshot shows the Github profile page for the iLCSoft organization. The URL <https://github.com/iLCSoft> is highlighted in the browser's address bar. The page header includes the organization name 'iLCSoft' and the tagline 'Linear Collider Software'. Below the header, there are tabs for 'Repositories', 'People', 'Teams', and 'Settings'. The 'Repositories' tab is active, showing a list of repositories. The first repository is 'iLCInstall', described as 'Python scripts to install iLCSoft software and dependencies', with 0 stars and 2 forks. The second repository is 'MarlinKinfittersProcessors', described as 'Kinematic fitting library for Marlin', with 0 stars and 0 forks. The third repository is 'MarlinKinfitters', also described as 'Kinematic fitting library for Marlin', with 0 stars and 0 forks. On the right side of the page, there is a 'People' section showing 3 members: andresailer, gaede (Frank Gaede), and petricm (Marko Petric). There is an 'Invite someone' button below the list.

- all ilcsoft packages are on Github now
- most are still synchronized from svn
- contact us, if you want to migrate your package

# Summary and Outlook

- the Software Working Group has re-started its work after the summer break with addressing the main goal for next months
  - prepare the software and computing tools for large scale Monte Carlo production for further ILD detector optimization in preparation of the update document to the TDR
- gathering documentation and tools for the SW validation and monitoring process - follow at:  
<https://confluence.desy.de/display/ILD/ILD+Software+Working+Group>
- preparing patch iLCSoft release v01-17-10.p01
- started the transition to the new iLCSoft (C++11, DD4hep, ROOT6, Git,...)
- continue the finalization and validation of the new software chain and models in communication with technical groups ( questions on new parameters)
  - need to get the sub-detector software contacts involved
- need to find replacement for Yorgos, who is going to leave for new tasks