Overall Impressions

Overall Impressions

- we were impressed by the quality of the presentations

- huge amount of excellent work has been shown

- in general, the technologies under development and the choices of tracking methods seems adequate for the reconstruction problem to solve

- aim of this talk is not to give detailed feedback on individual presentations
  - ➡ we had detailed discussion during the review
  - ➡ detailed summary could become subject of detailed report

- concentrate here on overall recommendations

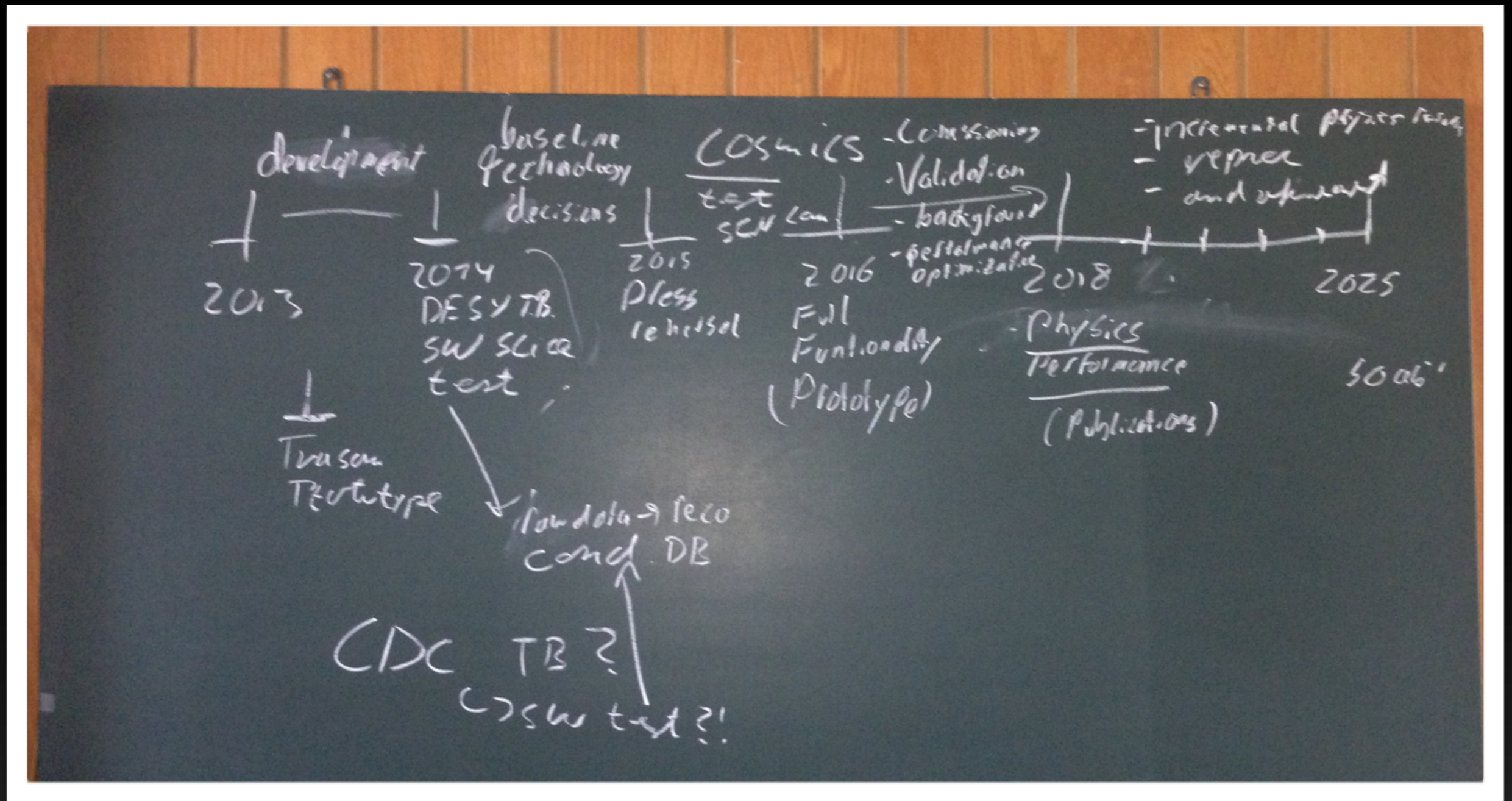main recommendation 1 :

Define Roadmap with clear Milestones

Define Roadmap with clear Milestones

- several presentations were defining short term goals
  - ➡ hard to judge if individual plans are coherent overall
  - ➡ unclear how to monitor progress

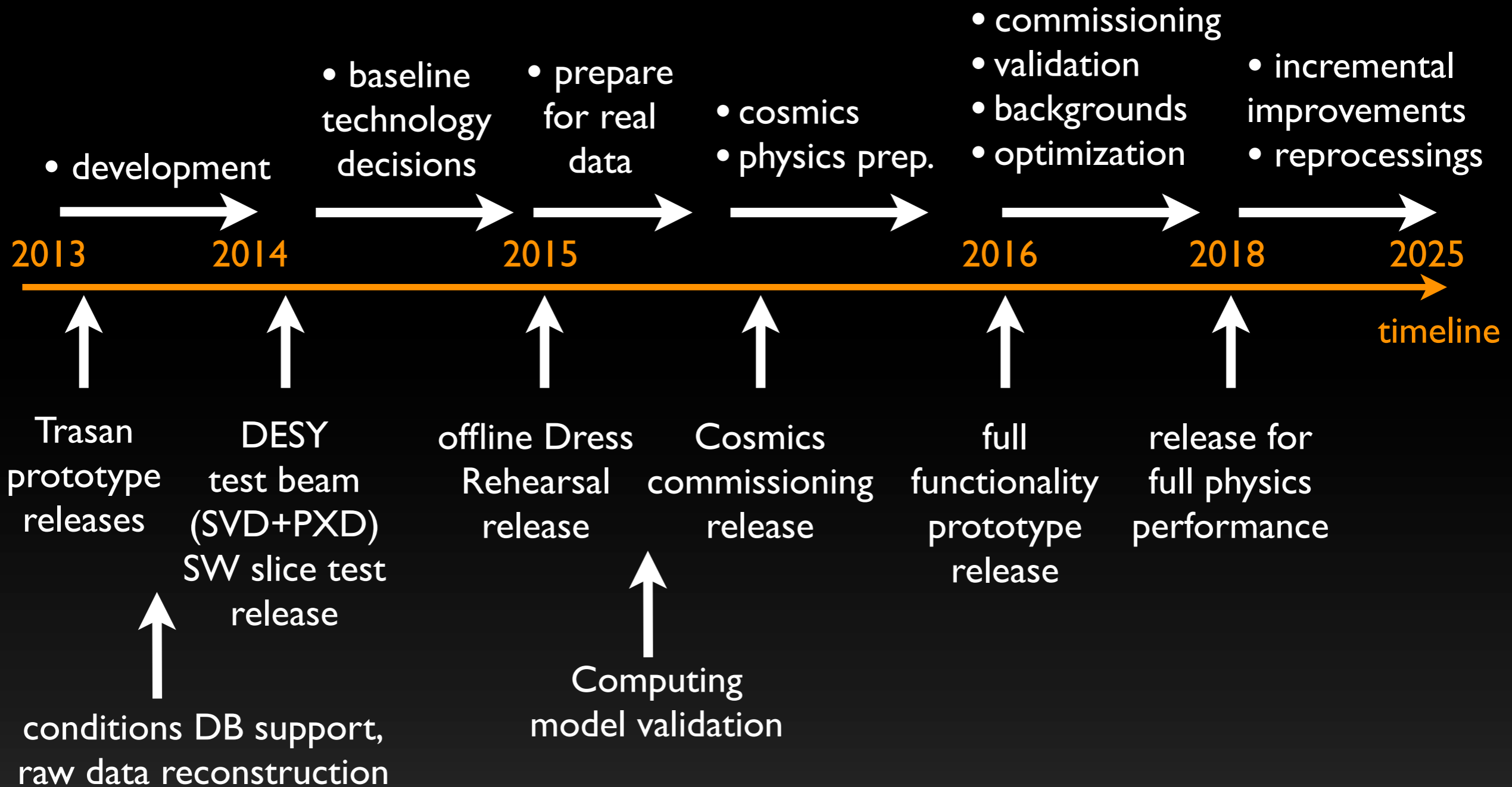- based on what we learned in the review, we tried to make up an overall release plan with milestone...

Straw Man Version of a Schedule

- our black board version of how this could eventually look like

Straw Man Version of a Schedule

- development

- baseline technology decisions

- prepare for real data

- cosmics
- physics prep.

- commissioning
- validation
- backgrounds
- optimization

- incremental improvements
- reprocessings

2013 2014 2015 2016 2018 2025

timeline

Trasan prototype releases

DESY test beam (SVD+PXD) SW slice test release

offline Dress Rehearsal release

Cosmics commissioning release

full functionality prototype release

release for full physics performance

conditions DB support, raw data reconstruction

Computing model validation

CDC test beam ?

main recommendation 2 :

Foster Software Integration

Foster Software Integration

- large number of tracking modules were presented
  - ➡ all required tracking components are covered and many technical solutions have been developed, though sometimes manpower is limited
  - ➡ not all components are at the same level of maturity

- improve on integration of tracking components into overall functional reconstruction
  - ➡ this has various aspects

Aspects of Software Integration

- document (and where lacking define) reconstruction Event Data Model and interfaces to common tracking tools
  - ➡ ensure modularity of code and easy module replacement to allow for required flexibility in configuring the tracking strategy
  - ➡ avoid code duplication given same functionality or to recreation of same data model objects

- prepare a release with an initial tracking prototype
  - ➡ important to get functional prototype to allow feedback from users
    - even if some of it is still truth based
    - will allow other communities to try our new software infrastructure
  - ➡ improvements then come in subsequent releases

Aspects of Software Integration

- **evolve** initial tracking prototype to eventually achieve best possible physics performance
  - ➡ investigate iterative finding (CDC-to-Si vs Si-to-CDC)
    - including integration of low-momentum finder
  - ➡ investigate concept of 2nd stage track refinement
  - ➡ prioritize development of missing modules

- investigate full integration of **GenFIT** into Belle-II SW
  - ➡ better integration of EDM, material geometry and tool interfaces

- integrate **alignment** software with **reconstruction**
  - ➡ prefer common code for same functionality, where possible
    - e.g., same fitter for alignment and reconstruction (GBL vs KF)
    - field transport, material and geometry, hit creation from raw ...

- ...

Further Comments and Recommendations

Prioritization

- Takanori: "Highest priority is feedback to detector design"
  - ➡ unclear What detector questions need tracking to resolve and how those questions can be addressed in a timely way

- lots of projects are going on simultaneously
  - ➡ unclear, if the prioritization is consistent and coherent
  - ➡ unclear who sets the 'global' priorities and how are they communicated

- some features are not needed for early tests/early data
  - ➡ 'triage' could be used to reduce the immediate burdens

Role of Users Feedback

- what are users impressions of new tracking ?

- what impact has tracking development work had on physics studies ?

- what design feedback is needed from users ?
  - ➡ analysis Event Data Model (EDM) ?
  - ➡ analysis interface (unchanged from Belle ?)

- Takanori: "MC production with Trasan in ~6 weeks"
  - ➡ First exposure of users to new tracking (?)
  - ➡ What useful things can they do with this ?
  - ➡ Who will help them with problems ?

- what are other user-related development milestones ?

Functionality of Analysis EDM

- clarify requirements on mDST based on well defined physics, performance and alignment/calib. use-cases
  - ➡ e.g. boundary between full reconstruction (GenFIT) track and mDST track
  - ➡ requirements for detector commissioning and cosmics running
  - ➡ use cases for alignment (refitting ?)

Reuse of Trasan for Belle-II

- appears to be an excellent intermediate solution
  - ➡ enables physics users and developers to test a functional software chain
  - ➡ meanwhile, full functional tracking prototype can be developed

- investigate porting of functional modules
  - ➡ e.g. hough finder, curl finder

Reconstruction Test on Belle-I (MC) Data

- if technically feasible, aim for a Belle-I (MC) data reconstruction test with the new software
  - ➡ allows for a benchmarking of the physics performance of the new software based on a understood detector

Technology Details for GenFIT

- investigate STEP propagator

- at lower priority, define a simplified Tracking Geometry to speed up track fitting
  - ➡ and export material model to other tracking modules

- fully integrate GBL fitter if this becomes the baseline for reconstruction and alignment

Staffing

- overall staffing levels seem reasonable in many areas

- some important projects are orphaned
  ➡ senior person in charge of (CDC) track finding?

- new members are joining: very good!
  ➡ important to find appropriate projects for new people

Missing Pieces ...

- t_0 finding algorithm(s)

- CDC calibration prototype

- hit book-keeping data object

- track merging algorithm

- PXD ROI selection algorithm (offline→FPGA)

- export of Belle data/geometry to gbasf2 (?)

➡ can any of these be repurposed from Belle ???