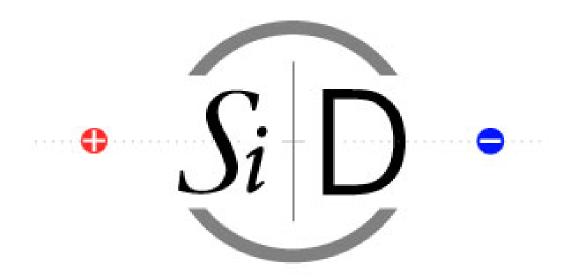
# Making Choices for the SiD LOI Some Points for Discussion



SiD @ ALCPG Workshop October 23, 2007 John Jaros

# How to get to an LOI from here

Date Milestone 10/1/08 Submit LOI

9/1/08 Begin Final Edit of LOI; complete authorlist

**Complete LOI Draft** 8/1/08

Collaboration Review and Comment

6/1/08 **GEANT4** Description Ready

> Performance Studies Ready Benchmarking Studies Ready

5/08 **Freeze Detector Design** 

SubSystems Fully Specified

Subsystem Technologies/Alternates Selected Conceptual Engineering Designs Ready

**Freeze Global Parameters** 3/08

First Pass Detector Design

2/08 **First Pass Global Parameters** 

12/07

**Subgroup Plans Defined**Milestones and Deliverables Manpower Resources Needed

# Lots of Choices Coming Up

SiD Global Parameters:  $R_{ecal}$ ,  $Z_{ecal}$ , B,  $\lambda_{hcal}$ 

How to optimize? PFAs evaluate performance vs R, Z, B,  $\lambda$  Marty's spread sheet evaluates costs vs R, Z, B,  $\lambda$ 

We need a simple metric for "performance"

Understand what performance the physics needs. Not done yet!

These are obviously critical parameters:

They establish how well SiD "works" They set the scale for all SiD Subsystems They control the cost.

#### Schedule

Review and Discuss First Pass Values February, 2008 Freeze Values March, 2008

See Marty's Talk on Optimization

### Lots of Choices Coming Up

### Specifying the Subdetector Parameters

The subgroups did this before for the Detector Outline Document. This is our chance to update and improve on those choices.

How to optimize?
Stand alone studies, full MC, BOTE???
Little time to wait for new tools!
Little time to gather warm bodies!
Subgroups will share their plans in December 2007

Criteria for optimization?

Performance and Cost. What else?

Subgroups Review and Defend Choices First Pass Detector Design Freeze Detector Design e.g. Hcal:Absorber?Transverse segmentation?No. of Layers?Gap Thickness?

Asking a lot from the Subgroups!

March 2008 May 2008

**Very Soon!** 

### **Technology Choices**

Resolved: There should be definite technology choices in the SiD LOI

#### YES

SiD is not defined, performance is not defined, costs are not defined if technologies aren't chosen

An indefinite SiD design weakens the LOI

Can't afford time or \$ or manpower to do multiple engineering designs for each tech choice

Can't afford to benchmark a multi-dimensional matrix of possibilities

Learn from the machine: Choose now, allow change control later

SiD has to learn to make choices. Start now.

Process demonstrates maturity of collaboration, a plus for LOI

Selection process focuses our attention on outstanding issues

# Technology Choices, cont.

Resolved: There should be definite technology choices in the SiD LOI

#### NO

There is insufficient data to choose some subsystem technologies rationally

If choose technology A, SiD may lose proponents of technology B

Some technology decisions can be made later, without impacting overall SiD design

Artibitrary choices weaken the LOI case

Choosing too soon could compromise SiD performance

We can evaluate performance and engineer designs for at least a couple of alternatives

### Suggested Next Steps

• Some subgroups should conduct technology reviews (the Hcal plan provides an example).

Demonstrated performance of candidate technologies

Robustness, reliability, track record

Physics performance expected

Conceptual design in SiD. What would it look like, electronics, power, calibration, cooling and all?

Cost of integrated system

What information is lacking for a sound technology choice?

How do we get it?

Do this for the following subsystems

Ecal (Si Pixels, CMOS Pixels)

Hcal (Scintillator, RPCs, GEMS, Micromegas)

Muon's (Scintillator Strips, RPCs)

Tracking (Long, Short, Type of Pixels)

Premature for other subsystems

Vertex

Beamcal

FCAL?

### Suggested Next Steps, cont.

- Subgroups Summarize the Technology Reviews for all SiD. This will inform our decision on selecting technologies, and which technologies to choose. Get this done in time to be relevant for the LOI process. That means by March 08 at the latest.
- The SiD LOI should allow for discussion of alternate technologies when a rational technical judgment can't be made.

### Lots to Talk About

We'll need a series of SiD Meetings throughout the next year to review new information, hear progress from the subgroups, debate the choices put before us, and stay on track.

**Tentative Meeting Schedule** 

Jan 28-30, 2008 SLAC PFA Status and Global

**Parameters** 

April 2008 RAL/Oxford Freeze Global Parameters

**Technology Reviews** 

1<sup>st</sup> Pass Detector Specs

June 2008 ??? Freeze Detector Design

Performance Studies Ready

Benchmarking Ready