Pixel Fall-Back Options

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Assumptions

- Fall-back options are needed in case of continued difficulties with the FE electronics or later difficulties with module production and assembly.
- Schedule(time) and funds(cost) are both concerns
- Attempt to maintain continuity of the design - avoid or postpone to latest possible time radical changes in direction.
- Meet the apparent need to have an initial detector capable of “doing physics” ready by July 2005.
- But which might be completed, if necessary, 9-12 months later.
- “Real” LHC schedule likely not known until 2002.

Scope Possibilities

Possibility	No. of Modules	%
A. Current baseline	2146	100
B. 2 hits(remove Layer 1, 2x3 disks)	1254	58
C. Layer 2, 2x2 disks + “double” B-Layer	1618	75
D. “Double” B-layer only	650	30
E. Current B-layer only	286	13

- (B)
  - Current B-layer(286 modules). “Fixed” part is 968 modules.
- (C)
  - “Double” B-layer(guess total of 650 modules). “Fixed” part remains 968 modules. Roughly current B-layer + another as close as possible in R. “Double” can be inserted from outside ID.
- Of course, one can imagine other scenarios eg. start with (B) and replace with (C), or……...

Performance

- The 2 vs 3 hit scenario was studied in 1997 with the layout(s) at that time - see INDET-NO-188.
- The desirability of 3 pixel hits was indicated by this study.
- 2 vs 3 hit study should be updated with the most recent layout, material,……
- It would seem premature to study the performance of options C, D or E at this time(is there agreement on this…?)

FE- Electronics Options/Milestones

- DMILL(87-100%)/HSOI(13-0%)
  - If FE-D2 is not complete failure on arrival, what is date for go/no go with DMILL(Kevin…….)
  - If FE-D2 good, do we need another “turn”, date for start of (pre) production is(Kevin…)
- DMILL fails
  - Certain schedule delay => implement fallback option #1
- HSOI/0.25 micron(ratio not known)
  - When do we know if HSOI could meet spec(Kevin…)
  - Cost of HSOI option(Gil….)
  - If FE-H1good, do we need another “turn”, date for start of (pre)production is (Kevin)
  - When do we know if 0.25 micron could meet spec(Kevin..)
  - Decision date for fraction HSOI/0.25 micron(……)
- HSOI fails(for any reason, technical, cost,…)
  - Very likely more delay => if so, fallback option #2, if necessary.
  - Entire project depends on 0.25 micron
  - Date for start of (pre)production is(Kevin…)

Sensors

- Currently way ahead…can this be sensibly slowed if FE delayed?
- Preproduction fab this year and then evaluate through summer test beam in 2001?
- Begin production after yes/no decision on DMILL, first fall back option then known.
- Continue to split non-B-layer from B-layer.
- Tender limitations(Renate….)

Module Production

- What is needed….

	Good	Years	Years	Years	Mod/week
Scenario	Modules	10/week	20/week	30/week	for one yr.
A. Baseline	2146	6.5	3.2	2.2	65
B. 2 hits	1254	3.8	1.9	1.3	38
C. Layer 2/4 disks+double B-layer	1618	4.9	2.4	1.6	49
D. Double B-layer only	650	2.0	1.0	0.7	20
E. Current B-layer only	286	0.9	0.4	0.3	9
Working weeks per year	44				
Yield factor	1.33				

- See notes from Norbert http://www.physik.uni-bonn.de/~wermes select ATLAS and then "descoping_00.ppt"
- My conclusion: should understand in detail what is required to realistically produce all modules(all steps) in 1.5 years.

Mechanics Implications

- Some slow down is inevitable.
- Mechanics scope must follow critical FE IC decisions.
- Shift <u>some</u> more focus to solving outstanding problems not related to structure - coolant connections, cabling and related termination, module attachment,……..
- Decoupling SCT and pixel thermal barriers will arise again in any option but current baseline.
- Serious design of “double” B-layer can be postponed but is this feasible at all needs to be looked at now(Eric, Marco….)

Conservative(?) Schedule

ID	Task Name
1	**US ATLAS Pixel Project**
2	Baseline Review
3	Scope Decision Point #1
4	Scope Decision Point #2
5	**Electronics**
6	Design/Development
7	DMILL Yes/No Decision
8	Honeywell Yes/No Decision
9	Outer Layer(s) Production
10	B-Layer(s) Production
11	**Sensors**
12	Outer Layer(s) Production
13	B-Layer(s) Production
14	**Modules**
15	Design/Development
16	Outer Layer(s) Production
17	B-Layer(s) Production
18	**Mechanics**
19	Design/Development
20	Outer Layer(s)/Frame Fab
21	B-Layer(s) Fab
22	**Assembly**
23	Outer Layer(s)
24	B-Layer(s)
25	Final Assembly Outer Layer(s)
26	**Installation**
27	Outer Layer(s)
28	Outer Layer(s) Install Comp-Need Date
29	B-Layers
30	B-Layer(s) Install Comp.-Need Date