Tentative materials for series of expanded meetings of S4 task force DRAFT

February 27, 2007

Planning for EDR

- S4 task force is planning a series of expanded meetings, with participation of leaders or representatives of “work packages” or of collaborations working on sub-systems
- Goal – to discuss plans for EDR and beyond, to help GDE and funding agencies, via S4 and Global R&D board, to focus resources in most suitable way

Tentative list of S4 meetings

- Tentative topics for S4 discussion, and tentative list of colleagues to be invited:
- 1) Discussion of overall plans for EDR and beyond. **Feb26**
- 2) Plans for 07-09, overview. US: A.S. and Brett Parker (WBS level 2 deputy manager); UK: D.A-K; Japan: H.Y. **Feb26** → mid-Mar
- 3) Interaction region work, magnets & stability -- Brett Parker, Animesh Jain, Mike Anerella, et al. **Mar 5**
- 4) Crab cavity work -- Peter McIntosh, Sergei Nagaitsev, Elvin Harms, Leo Bellantoni, Zenghai Li, et al. **Mar 12?**
- 5) ATF2 work -- Toshiaki Tauchi, et al.
- 6) Beam dump and collimation work -- Chris Densham, Tom Markiewics, et al.
- 7) etc.

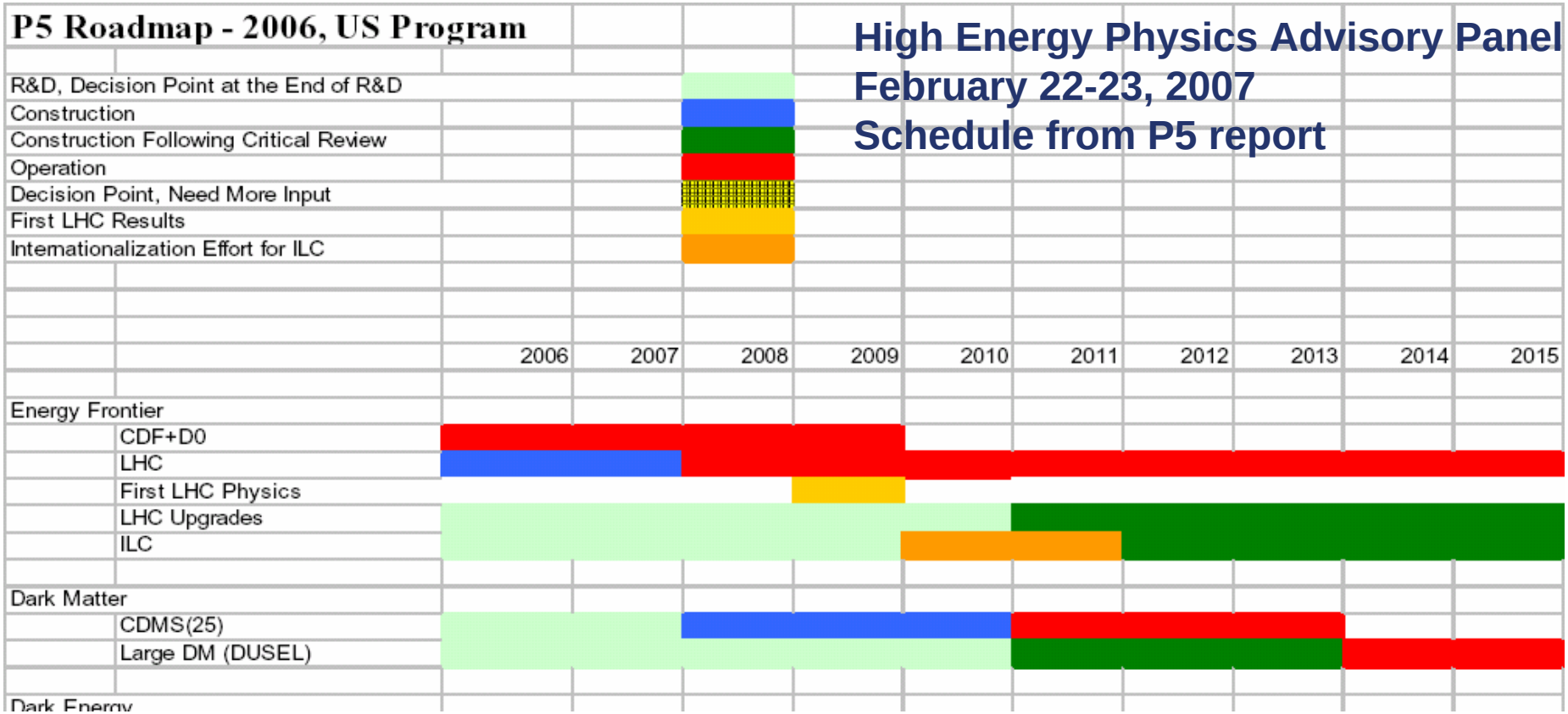
Schedule assumptions

- Assume *optimistic* schedule as shown on next page (~3year for EDR, two years for Approval phase and 7 years for construction)

- Hopefully, this optimistic schedule may be possible if
  - **LHC would give exciting results**
  - **Yield of SRF cavities production will reach high stable level**
  - **Process of site selection and approval will be expedited**
  - **Commitment to invest in ILC will form in all three regions**
  - **Cost uncertainty will be reduced**

Schedule for planning

- Assume *optimistic* schedule as shown below:
  (although longer period for internationalization and site approval was mentioned at HEPAP meeting)



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http://www.science.doe.gov/hep/HEPAPFebruary2007Agenda1.shtm

Planning for EDR and beyond in BDS

- EDR planning – focus on cost uncertainty reduction, which means:
  - **design of systems (at " ~30% level")**
  - **build and test critical prototypes to ensure performance**
- For EDR, can't & don't need to complete all the work & tests to 2010. Need to plan to continue optimization and final design after EDR and during earlier years of construction
  - ***Your input, what should be done and when, is needed***
  - **A tentative table is shown for your discussion on next page**
- We all wishing the ILC to be built as early as possible. Working on design and prototypes, should also take into account, and maybe plan accordingly, that results from prototypes or test facilities can have political meaning as well as scientific. For example, achieving an ultra small beam emittance or size at a test facility may be very important for early approval of ILC.

A tentative overall schedule for discussion

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	EDR			Approval		Construction							Commis
				LHC physics input									
				total length frozen			tunnel layout frozen				tunnels ready for install-n		
							optics layout frozen		optics details frozen				
Beam dumps	beam dump conceptual design and critical tests			pre approval		beam dump final engineering			b.dump design frozen	beam dump construction		beam dump installed	
crab cavity	crab cavity design work & developments and tests of conceptual phase control system; cavity fabrication			cavity fabrication, design of cryostat; integration		beam tests of one and two cavities		final engineering		production		installed	
ATF2	ATF2 construction and installation. Start of commissioning		Commissioning	Beam size and optics results	Beam stability results	Second phase, e.g. SC final doublet; smaller emittance & beam size		Instrumentation developments and tests at beamline					
Final Doublet	Engineering design; full length prototype; stability design study and initial stability tests			Stability tests & design optimization		final design		production		lab tests	installation and pre-commissioning		
Magnets	Optimization of number of styles; conceptual design of most magnets; Detailed design of low field and other special magnets; Vibration -wise design			Design and definition of interfaces; cost optimization; layouts with real space allocation,		final design & needed prototypes		production					

Not all topics are included.

Results of discussions…

- …will be used to provide feedback to GDE R&D board
- and may be used directly for re-planning purposes of this and next year efforts in three regions
- as example, the next page show earlier table of funds in US for 2008-09, which need to be re-planned, due to new budget targets and also due to recent changes of ILC design (single push-pull IR) which shifted the balance of challenges

Re-planning for Americas, FY08-09

	C	D	E	F	G	K	L	M	O	S	T	U	W	AA	AB	AC
2						FY08	FY08	FY08		FY09	FY09	FY09		FY10	FY10	FY10
3				Priority	FY08	Total	Target	Target	FY09	Total	Target	Target	FY10	Total	Target	Target
4	WBS(WP)	Description	Lab	Range	FTE		1	2	FTE		1	2	FTE		1	2
5				1-3		k$				k$				k$		
6																
7		**Acc design**														
8	2.10.1.1	BDS design	SLAC	1	5.2	962	1	1	6	1110	1	1				
9	2.10.1.2	ATF optics & operation	SLAC	1	3	555	1	1	3	555	1	1				
10	2.10.1.3	IR & FD acc phys design	BNL	1	1.5	313	1	1	1.5	323	1	1				
11	2.10.1.4	FD magnet design	BNL	1	1.5	292	1	1	0	0	1	1				
12	2.10.1.5	FD vibration analysis	BNL	1	0.6	129	1	1	0.7	151	1	1				
13	2.10.1.6	Background, collimation, rad.physics	FNAL	1	2.6	468	0.75	1	1.5	270	0.75	1				
14	2.10.1.7	BDS warm magnet design	FNAL	1.5	0.2	36	1	1	0.3	54	1	1				
15	2.10.1.8	Crab cavity design	FNAL	1	1	180	0.75	1	1	180	0.75	1	0.3	54	0.75	1
17		**R&D**														
18	3.10.1.1	BDS IR system design	SLAC	1	1.5	565	0.25	0.5	2.1	1021	0.5	0.5				
19	3.10.1.2	BDS collimation & dump design	SLAC	1	1	357	0.25	0.25	1	357	0.5	0.5				
20	3.10.1.3	Vacuum, magnet, crab-cav. design	SLAC	1	0.7	129	0.25	0.25	1.7	717	0.25	0.25				
21	3.10.1.4	ATF hardware & operation supp.&devel.	SLAC	1	1.1	376	0.75	1	1	357	0.75	1				
22	3.10.1.5	ESA experiments support	SLAC	1	2.2	522	0.5	0.5	2.6	596	0	0				
23	3.10.1.6	FD prototype: tooling assembly	BNL	1	0.3	190	0.5	1	0.7	152	0.5	1				
24	3.10.1.7	FD prototype: production	BNL	1	0	1688	0.5	1	4.4	1171	0.5	1				
25	3.10.1.8	FD prototype: magnet testing	BNL	1	0	0	0	0	0.6	238	0	0.5				
26	3.10.1.9	FD prototype: vibration analysis	BNL	1	0.5	224	0	0	3.8	843	0	0.5				
27	3.10.1.10	Fabricate crab cavity, couplers, tuners	FNAL	1	0.3	170	0.5	0.75	0.4	246	0.5	0.75	0.5	90	1	1
28	3.10.1.11	Fabricate crab cavity cryostat	FNAL	1	0.1	88	0.5	0.75	0.3	124	0.5	0.75	0.3	112	1	1
29	3.10.1.12	Prepare beam test area	FNAL	1	0	0	0	0	0	0	0	0	0.4	211	1	1
30	3.10.1.13	Develop RF system for beam tests	FNAL	1	0.1	41	0.5	0.75	0.2	210	0.5	0.75	0.3	141	1	1
31	3.10.1.14	Test cryomodules 1 & 2 with beam	FNAL	1	0	0	0	0	0	0	0	0	0.5	113	1	1
32	3.10.1.15	Warm BDS magnet vibration design	FNAL	1	0.5	148	0	0	0.6	224	0.5	0.5				
33	3.10.1.16	Support ATF nanoproject	LLNL	1	0.3	172	0	0.5	0.3	172	0.5	0.5				
34	3.10.1.17	Dump design: window & tritium treatm.	LLNL	2	0.5	220	0	0	1.2	508	0.5	0.5				
35	3.10.1.18	Laser for laser wires	LLNL	3	1	300	0	0	1.5	1010	0	0				
36	3.10.1.19	University based R&D	Univer	3	5	1000	0	0	8	1600	0	0				
39																
40	**total toward**						**4667**	**6164**			**5070**	**6619**			**708**	**722**
41																
42	**Gerry's targets**						4500	6000			5000	6500			N/A	N/A

BDS plans, earlier version (Dec 2006)

Work in 2010 will continue in many areas, but not described here except for crab cavity, which is explicitely stretched beyond EDR due to limit of the budget

New targets (Feb 2007): 4500k$ 6600k$

Additional questions

- For each particular work-package, a specific set of questions will be prepared and will be sent in advance to the invited leaders or representatives of “work packages” or of collaborations working on sub-systems

Appendix: S4 for BDS

- Chris Damerell, Hitoshi Hayano, Marc Ross
  - **representing RDB**
- Deepa Angal-Kalinin, Andrei Seryi, Hitoshi Yamamoto
  - **representing BDS**

S4 Charge (1)

- The S4 task force is formed to fulfill the following functions:
  - **To provide oversight for the overall coordination and progress of the BDS R&D program.**
  - **To advise the GDE via its Global R&D Board (RDB) on the research and development program for the ILC Beam Delivery System (BDS).**
- The environment, in which the Task Force is operating, is described by the following assumptions:
  - **Overall coordination and progress of international R&D and design work in BDS area is the responsibility of BDS area leaders.**
  - **Everyday responsibility for specific R&D work in BDS belongs to the leaders of particular work packages, which often involve two or more international partners.**

S4 Charge (2)

- In its advising and overviewing role, the Task Force is following the general charge of the RDB and of the BDS area, paying particular attention to the following:
  - **Perform prioritization of R&D**
  - **Determine optimal timeline for expected progress for various R&D and how they change as ILC moves from design to construction**
  - **Determine availability of test facilities and their suitability for specific R&D and for the integrated system tests**
  - **Identify the programs where the expertise is spread and which have to be performed by collaboration of several international partners**
  - **Identify duplications and determine if concentrated efforts or spreading the efforts may be beneficial**
  - **Identify missing R&D not addressed by any institute and suggest appropriate mitigation of R&D program**