Availability Meeting Notes – September 8 / September 9, 2009

Marc Ross, Chair

This summary was written by Marc and lists his conclusions.

Attendees: Carwardine, Elsen, Enomoto, Fukuda, Paterson, Ross, Shidara, Terunuma, Toge, Yamamoto, Yokoya

Material by Ewan Paterson, Tom Himel (in-absentia) and Tetsuo Shidara.

Indico meeting location: http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=4159

Note that the Availability Task Force has a dedicated area with ILC-EDMS where all material is posted in addition to the indico site. The material from the September 1 / September 2 meeting is posted and internally linked.

NEXT Availability meeting: September 15 (2100 SLAC, 2300 Fermilab)/ September 16 (0600 DESY, 1300 KEK) 2009.

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The meeting consisted of a discussion of primary conclusions to be presented by the Availability Task Force at ALCPG09, a discussion of Tom's proposed talk outline and a presentation of the DRFS design status.

Review:

The goal of the availability task force is to provide viable availability models for SB2009. These are to be presented at the upcoming GDE meeting "ALCPG09", Sept 29 - Oct 3, 2009 for review and comment by the GDE community at large. The models (possibly revised) will be submitted to the Project Director by the end of 2009 along with the recommendation that they become part of the ILC TDP2 baseline. It is important to note that the components of SB2009 which most strongly impact ILC availability are the ML single tunnel, the low power option and the two HLRF options (KCS and DRFS) and the task force work will be limited to these dominantly ML issues. *Work on combinations of SB2009 components and Reference Design – RDR - components, (for example a single tunnel high power configuration), will be very limited.*

Summary:

(What follows is perhaps more a set of highlights than a summary and reflects Marc's conclusions.)

1) The focus was the summary excel sheet of the most recent studies, (copied in full in the minutes of the previous meeting). I have reformatted the table, below:

% time integrating luminosity vs energy overhead	Overhead %			
	3%	4%	6%	20%
Twin tunnel RDR	70.3	73.2	74.2	74.1
Klystron Cluster	72.0	73.7	73.7	73.7
DRFS	68.3	71.8	73.6	73.6
Single tunnel 'RDR'	57.5	62.8	68.5	73.7

2) Ewan strongly urged the Task Force to define a 'FEW CONCLUSIONS' to bring to ALCPG09. He suggested three (see indico posting) and I have paraphrased the first two (we should develop an additional one or two):
    a. "Availsim results with different energy overheads indicate the single tunnel RF systems should be dropped in favor of Klystron Cluster or DRFS". (In Ewan's posting, "and 1% overhead is on the order of 300 M ILCU's", should be corrected and should read: "and 1% overhead is on the order of 40 M ILCU's".)
    b. "The availability difference between Klystron Cluster and DRFS at low energy overhead shown by the simulation is not significant and is expected to be offset by differences in performance".

We agreed, generally, on 2.a and .b). Our discussion centered on 2.b. We will develop a better definition of 'differences in performance'. Shigeki had two comments:

    a. The suggested value of MTBF of DRFS klystron used in 'Availsim' gives the number of klystrons to be repaired (for the case of ~4% overhead) which is close to the limit that can be repaired in one shutdown so the result is sensitive to the adopted MTBF.
    b. When the installed cavities have a significant spread in the maximum gradient, KCS cannot make use of the full gradient of individual cavities as effectively as DRFS. This will affect the available energy overhead. (Also, it is expected that the required 'operational overhead' will be smaller with the DRFS scheme).

3) Tom's proposed talk outline includes a partial list of assumptions. We agreed to sort these, perhaps along the lines established by the three subgroup roles, and to add and rank new items.
4) Tetsuo presented the status of the development of the DRFS design and R & D plans. He made the following 4 points (also paraphrased):

a. The Asian DRFS / Single Tunnel study will report CFS costs at ALCPG09. For comparison purposes, we will adopt the hardware costs as given in the July presentation. Those cost numbers will be updated following the development of STF R & D plans. (Hopefully before publication of the SB2009 proposal). Estimations of utility loads have been submitted to the Fermilab CFS group.
b. The design of the mod-anode modulator will be updated at ALCPG09.
c. The R & D plan for S1 Global and STF2 will be revised based on the expected adoption of SB2009. This is important, as it means that the development of the 'RDR 10 MW 2007 baseline' will be reduced and may not be pursued per original plan.
d. The KEK-DRFS team will produce a revised availability analysis, including MTBF, for presentation at ALCPG09. It was requested that this be ready in time to be included in the opening AD & I session GDE plenary Availability Task Force talk (Tom's presentation).

5) Akira reported on two short conversations held during Marc's visit to KEK August 27. We met with Masaaki Ono and Yujiro Ogawa. They provided detailed KEKB and KEK Injector Linac uptime data. Both of these two KEK facilities have an excellent availability performance record and we should expect their data to be reported at one of our meetings. As is often the case, the data is summarized in such a way that makes it not trivial to extract observed component MTBF/MTTR parameters that can be directly used in 'Availsim'. Since these two machines have many 10's thousand operating hours on record, we should be able to do just that for selected components, e.g. klystrons. During our discussion, it was pointed out that a member of the JAEA JPARC staff had given a talk at KEK that week on availability modeling of accelerators for use in 'Accelerator Driven System' design work. Akira will pursue the possibility that he give a talk to the task force describing his simulation methodology.

Task force planning and homework:

Chris provided a refined LLRF 'failure-mode' block diagram that will allow us to separate LLRF-related failure modes with respect to cavity, RF unit (klystron) and full-cluster operation (posted). Marc will check with Chris to arrange a discussion of his proposal.

At our next meeting, we will review plans for the ALCPG09 Availability Task Force presentation. We will have a report on the Slac meeting - suggested agenda below.

Tom's ALCPG09 presentation is tentatively scheduled for the AD&I plenary the morning of Wednesday 30 September.

Marc will be at Slac Monday September 14 to meet with Tom and Ewan between 9 and 11 local time. (Tom indicated this general window was ok before he left on vacation, however this specific meeting slot was not confirmed.) We will have a teleconference link available. Eckhard has indicated he will participate. All are welcome.

The purpose of the Slac meeting is to:

1) Discuss and develop - for proposal to the task force - key points to be communicated at ALCPG09.

2) Review Tom's draft presentation outline, and attempt to rank and refine his list of caveats and assumptions.

3) Discuss and develop - also for the task force - key graphics. (Additional 'Availsim' runs may be necessary.)

4) Plan work following ALCPG.