Report on the AAP Review – Recommendations and Suggestions - excerpted

Final ‘stamped’ Report:
http://ilc-edmsdirect.desy.de/ilc-edmsdirect/file.jsp?edmsid=*879165

CFS

1. *The AAP encourages the CFS groups to continue their efforts to explore the various tunnel configurations with a uniform approach and common methodology.*
2. *Technical designs of configurations such as RF power distribution and the treatment of operational reliability (downtime for klystron replacement etc.), safety and radiation aspects should be handled in a consistent and transparent manner. Each configuration should be subject to an in-depth risk analysis that includes consideration of the operation and maintenance aspects.*
3. *The AAP encourages further exchange between the various area groups. In many cases, guidance from the project managers is necessary for systematic application across the project. For these CFS efforts to be most useful, it is important to define clearly the main assumptions and technical choices.*
4. *The AAP is impressed by the progress of the 3d tool integration. The tools are recognized as an important aid in understanding critical aspects of a chosen layout, where the benefits from the resource-intensive implementation efforts may be justified.*

CESR-TA

5. *The AAP encourages the CesrTA collaboration to continue with their ambitious e-cloud experimental program. It is important that the phenomenon be fully characterized. In particular it is important that the various input quantities for the simulation be separately and independently determined to increase the predictive power.*
6. *The AAP also encourages the CesrTA collaboration to achieve further reductions in vertical emittance by applying more diagnostics and correction techniques, especially for the vertical dispersion.*
7. *The AAP notes that once the current rounds of measurements are completed and the modeling software has been updated to incorporate what has been learned from the measurements, the impact of the e-cloud must be reevaluated for the 12 ns and 6 ns bunch spacings in the damping ring designs. This will provide an updated assessment of the risk to damping ring performance from the effects of the e-cloud. Should the risk factor be too high, the AAP observes that a lower-current ILC machine with half the number of bunches in the 6-km configuration, i.e. 12 ns bunch spacing would operate in a safer regime with regard to*

electron cloud. Reducing the positron ring circumference to 3-km may risk losing this back-up solution.

8. *The AAP would like to see a plan laid out showing how the damping ring group plans to arrive at a decision for the viability of the ILC damping ring choice with respect to electron-cloud immunity. A clear set of criteria for the vacuum system should be developed that will lead to the choice of a baseline solution. Alternates along with required R&D can also be specified. A schedule for establishing the criteria and the baseline should be shown.*

FLASH

9. *AAP strongly encourages the collaboration to continue pursuing their planned program to fully exploit FLASH for the maximum benefit towards ILC. All aspects of LLRF should be explored and exercised under various bunch loading conditions to gain a complete understanding of the necessary control mechanisms. The program should include a study on HOM losses under operating conditions. Dark currents should be measured and characterized. These studies will allow better understanding of the system behavior at the level of a cryomodule. The collaboration is encouraged to extend both the international participation and the DESY engagement in these studies. The studies are crucial for the success of ILC. The studies can only be successful if a sufficient share of beam time is reserved at FLASH for dedicated high beam current running.*

SRF

10. *The AAP recommends a strong intera ction between laboratory experts and new vendors during all stages of cavity fabrication. The AAP recommends that for the yield study further evaluation be made of the quality of cavities (Q-values) along with gradient. Electron loading and x-ray intensities at 35 MV/m should be closely monitored.*
11. *The AAP suggests adapting the scientific goals for S1-global effort at KEK to better match the expectations.*
12. *The AAP encourages support for the ongoing cryomodule efforts at DESY, in the context of the XFEL activities, and at FNAL.*
13. *The AAP recommends an evaluation of the Quantum beam Project at KEK on the timeline for achieving the S2 goal. The AAP recognizes that the entire R&D program will not conclude by 2012, and still need results of these test facilities. The XFEL and Project-X will be also important, especially in evaluation of the manufacturing cost of a large linac.*
14. *Similar efforts to expand the industrial base for other components such as couplers, tuners and the cryomodule should also be explored.*
15. *The AAP fully supports the plug-compatibility concept for the SCRF R&D*

and suggests introducing an element of competition by maintaining a score list of advantages and disadvantages of individual design variants for cavity, coupler and tuner.

16. *The AAP encourages the Project Management to develop criteria for evaluating and eventually selecting optimal design variants.*
17. *The AAP believes that the final machine design, namely the design that will be sent to industry for manufacture, requires a single design for the RF components.*
18. *The AAP recognizes the merits of the proposals and suggests continuing the value engineering of these options. The value engineering must include a risk assessment, i.e. availability studies and maintenance ability in addition to the cost comparison.*

ATF

19. *The AAP commends the ATF collaboration for the sequence of successful experiments that have been carried out and led to an impressive record of successful publications. The flexibility of the ATF to react to experimental proposals has been impressive.*
20. *The AAP applauds the strong and well-organized effort of the collaboration to commission the ATF2 beam line. The collaboration is encouraged to focus on the diagnostics which are critical to understanding the ATF2 beam line.*

Minimum Machine

21. *The AAP suggests developing sufficient simulation and modeling capability to understand such dependences quantitatively. The cost of ameliorating any degradations should be assessed to allow informed decisions on which aspects of the MM design to include in the new baseline.*
22. *The AAP encourages the Project Management to form and vigorously engage the planned task force to assess the re-baselining effort. The decision making on the emerging new definition should involve representatives of the MDI group and must be collectively propagated throughout all subgroups.*
23. *The redesign should only be considered for those components and aspects where the benefits are high. During the transition time the RDR solution must be preserved to maintain readiness for construction of the ILC.*

AS

24. *Overall, the AAP is impressed by the progress in all accelerator systems. The work package goals and milestones are laid out in the technical design phase report.*

Electron source

25. *The AAP encourages the technical group to perform such a system test.*

Positron source

26. *The positron flux margins for the current layout are tight. The AAP suggests carrying out the detailed simulation studies to fully understand the requirements and possibly adapt the layout or choice of components.*
27. *The AAP suggests studying or, if applicable, compiling the existing documentation on, the effect of the 150 m undulator on beam emittance, stability, and possibly implied constraints on, and requirements for, linac tuning.*

RTML

28. *AAP notes a reduction in operating margins in the range of IP bunch lengths and of damping ring instabilities. The AAP notes that resources in the RTML area are very limited.*
29. *The AAP encourages the field studies at FNAL for noise measurements.*

Management

30. *The AAP recommends that these open issues should be addressed and more strongly supported by additional resources.*
31. *The AAP suggests that the following linked strategies would be helpful in sharpening the focus of the GDE effort: a) reserve, and protect, more time for the GDE Director and the troika to formulate and agree upon project objectives b) actively and visibly (to the GDE team at large) rebalance the objectives so that they are more focused on the milestone-related goals and less emphasize an ever broadening R&D program c) take active steps to create, and support broad and coherent ownership of the core goals.*
32. *Part of the 2012 report will be a new cost estimate. Unless the project simply wants to use the XFEL cryomodule costs it is necessary to start preparing this estimate.*
33. *The AAP suggests asking ILCSC to consider displaying and arbitrating the use of laboratory resources more formally. Proper orchestration of the in-kind contributions is mandatory to advance the likelihood of implementation of the ILC. Sudden changes in commitment should be avoided and, if necessary, should be communicated in the ILCSC.*