

Date: December 9, 2002
To: Norbert Holtkamp
From: Tom Shea
Subject: **Second report of the LLRF Advisory Board**

Introduction

The following LLRF Advisory Board (LAB) members contributed to this report:

Tom Shea (ORNL, Chairman)
Curt Hovater (JLab)
Coles Sibley (ORNL)
Craig Swanson (ORNL/AlphaCad)
Mike Thuot (LANL)

Assessment

Since the last LAB report was released, we have observed significant progress by the LLRF team. Some of this progress can be demonstrated by referencing the recommendations contained in the last report. These recommendations are presented in **bold** and followed by our observations.

For FY03, provide similar funding to the three participating labs. For FY04, provide reduced, but still significant funding for LANL and LBNL. The current plan and the draft Estimate to Complete (ETC) remain consistent with these recommendations.

ORNL should take on responsibility for production of the ultimate FCM. We will look for this in the detailed plan.

Restrict new development to the absolute minimum necessary to meet requirements. The team's design strategy is consistent with this recommendation. Nearly all hardware modules proposed for the ultimate system are revisions of existing circuits. We will provide further comments on the new system after the December 17th design review.

Produce the detailed system development plan. The detailed, resource-loaded plan is still in preparation. The team has said that it will be available before the December 17th review. Until then, we cannot provide a better assessment of funding or schedule.

Hold a design review during the week of December 2, 2002. This will be held at LANL on December 17th and will include detailed design information on the FCM. In the last report, we requested that several documents be made available for review. These are listed in **bold** and followed by our comment on status.

- 1. LLRF system block diagrams.** Drafts available.
- 2. FCM design description and block diagram.** Available.
- 3. System dataflow diagrams.** Draft available.
- 4. A flow-down from the amplitude and phase error budget into FCM component selection.** In preparation; expected 12-17-02.
- 5. A detailed system development plan.** In preparation; expected 12-17-02.
- 6. A test plan.** In preparation; expected 12-17-02.
- 7. An initial Interface Control Document (ICD).** In preparation; expected 12-17-02.
- 8. Latest test results from the initial system.** The first system is still being integrated at Oak Ridge. Another system has operated closed loop on the bench at Berkeley. Additional systems are still in the hardware debugging stage at Berkeley. Some components required for the JLab test have not been received.
- 9. Documentation of decisions on development tools.** Tools have been selected based on expediency, but integration issues are still being addressed.
- 10. Latest simulation and modeling results.** We have not reviewed any new results in this area, although the team is working toward integrated system simulations.

This progress demonstrates the effectiveness of the LLRF leadership. Since our last report, overall risk to the project has been reduced. However, the team is late on deployment of the initial system. The conceptual design of the ultimate system looks reasonable. This design has been reviewed internally over the past month or two and more importantly, there appears to be buy-in from all team members. Some schedule risk remains and this along with funding issues cannot be reassessed without a more detailed plan.

Recommendations

Complete the detailed, resource-loaded plan

To address inevitable resource conflicts, this should be an integrated plan covering all the activities of the three-lab LLRF team.

Accelerate deployment of the initial system

Timely demonstration at ORNL and JLab is necessary to maintain the team's credibility.

The next LAB report will be released December 20, 2002

This report will include results of the upcoming design review and an assessment of the detailed plan.