

From: T3 Project  
To: IRTF  
Date: 8-27-2003  
Subject: TCS3 Conceptual Design Hot Wash meeting.

This memo documents the decisions of the T3 Conceptual Design Hot Wash meeting held on 8/27/2003.

In attendance: Tony Denault, Fred Keske, Alan Tokunaga, Eric Tollestrup, Geoge Koenig (summit), Peter Onaka (manoa), Ev Irwin (manoa).

The purpose of the meeting was to obtain closure on some of the Conceptual Design issues. Tony send a Hot Wash document on 8-22-03 summarizing the issues raised at the CDR and the T3 responses.

### **1. Future Procedures on Review.**

Alan formed a review committee consisting of George Koenig, Ev Irwin, Peter Onaka, Jim Harwood. The TCS3 designs, requirements, and safety documents will be reviewed by this committee.

Future design documentations will be signed off by the following individuals:

Tony Denault -representing the T3 project  
Alan Tokunaga – representing the IRTF Management  
George Koenig – representing the Summit Operations  
Peter Onaka – representing the T3 review committee

### **2. Lab Motors ( was Servo Simulator )**

Peter had additional input via email:

- 1. Lab motors should include the following:*
  - a. simple adjustable drag mechanism = split ring a nylon bushing.*
  - b. tachometers on motor axes.*
  - c. incermantal encoder on final axis.*
  - d. method of independently measuring velocity.*

We will attempt to add the tachometer and drag mechanism in our encoder design.

### **3. Model the Servo or Quick test with PCI controller board**

Tim Bond (IRTF Mechanical Engineer) will be asked to develop a mechanical model of the TCS structure. Peter provided a 1976 memo discussing the Input parameters for a Servo Analysis Model. It was agreed that Tim needs to development an mechanical model for work beyond the TCS Upgrade.

After the model is updated, Fred will use the data and consult with the technical support for Galil or PMAC to determine if there are any issues with using their motor control and his T3 design concept as the servo system.

#### **4. T3 Safety Circuit**

The TAC issue was re-opened. Fred feels it is not necessary to use the TAC as an overspeed input in the Emergency input. However, all the review committees endorsed this feature. The TAC will be used in the emergency input of the safety circuit. It was noted that the TAC will also be used in the feed forward option for the servo controller.

#### **5. Encoders & Frictional Drive**

George asked what effects would the varying dome temperatures have on the accuracy and repeatability of the incremental encoder. Could the bullgear and wheel's material contribute to encoder error? Has this been thought out in the design?

Tony will forward this concern to Tim Bond.

#### **6. Limitation of General Purpose Motor Controllers (specifically the Galil 18x0)**

Tony provided some information on the limitation of the Galil, and compare it to the PMAC. From the manuals and other vendor information it is not clear whether the Galil will limit our velocity resolution. Fred sees no problem with the Galil. The PMAC specifications exceed Galil, but also bring much more overhead and complexity to the servo design.

Tony indicated the PMAC extra servo modes `_might_` help, but we can't determine if this additional servo mode will work without experimentation.

The T3 may go with the PMAC because of its advance software architecture ( at the expense of complexity). However, the available data indicates both are accept choices.

#### **7. Network and Hacking**

Eric was concern about network hacking and sabotage and if we can take further step in shielding the TCS. You can always go further, but at greater cost to operation overhead and limitation in TCS accessibility from instrumentation and remote observing.

No changes to the current plan were recommended.

#### **8. Closure**

In the end, a verbal sign off was given by the meeting's attendees. The T3 Conceptual Design is done, and we will move on to the next scheduled task.