Dave Lauben Technical Memorandum **dsl039v1.0 *Draft***

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Date: March 18, 2002
Subject: Tracker Temperatures during the Balloon Flight
Release: v1.0 ***Draft***

Tracker Temperatures during the Aug. 2001 Balloon Flight

The Glast balloon flight engineering model (Bfem) had provision for up to 16 tracker thermistors mounted on MDM's within specific trays. The Bfem configuration retained 9 (active) thermistors after some trays were removed following the 1999/2000 Beamtest. The thermistor locations are noted in the "User Guide for the GLAST Beam Test Tracker", available at:

`http://scipp.ucsc.edu/groups/glast/btem/userGuide/node10.html`

The thermistors are YSI part # 44032, with nominal resistance 30 kohms at 25 C, resistance ratio 29.15 over range 25 to 125°C, advertised interchaneability ±0.1°C (over 0 to 70°C), and thermometric drift < 0.02°C over 100 months [YSI Catalog].

Plots of tracker internal temperatures are shown on the next page (top panel). The left-most group of curves are shows uniform temperature rise during an instrument health check following pre-launch overnight cold soak. The right-most group of curves are for launch, ascent, and float.

Temperature calibrations are as yet approximate (absolute to within 1 degree C) but sufficient to show gradients of magnitude > 1 degree C between various points on the tracker (top panel), following the drop in internal pressure within the Bfem vessel (bottom panel, red curve).

Note that the internal reference temperature (from the MicroDaq, middle panel, blue curve) remained fairly constant during ascent and float (following the post-launch turn-on transient). Note also that the chiller was re-hooked from about T-3.5 to T-1 hrs while awaiting launch.

Two conclusions can be drawn at this point:

1) The tracker remained at < 25 C during the entire flight.

This would seem to indicate that the cooling paths for the MDM's are adequate.

2) Gradients on the order of 3.5 C can arise between different MDM's.

It remains to examine whether the hotter MDM's are those at the tower corner near the Acd HV supply mount point. Finally, it would be prudent for an expert in thermal analysis to model the Bfem thermal environment.

-dsl

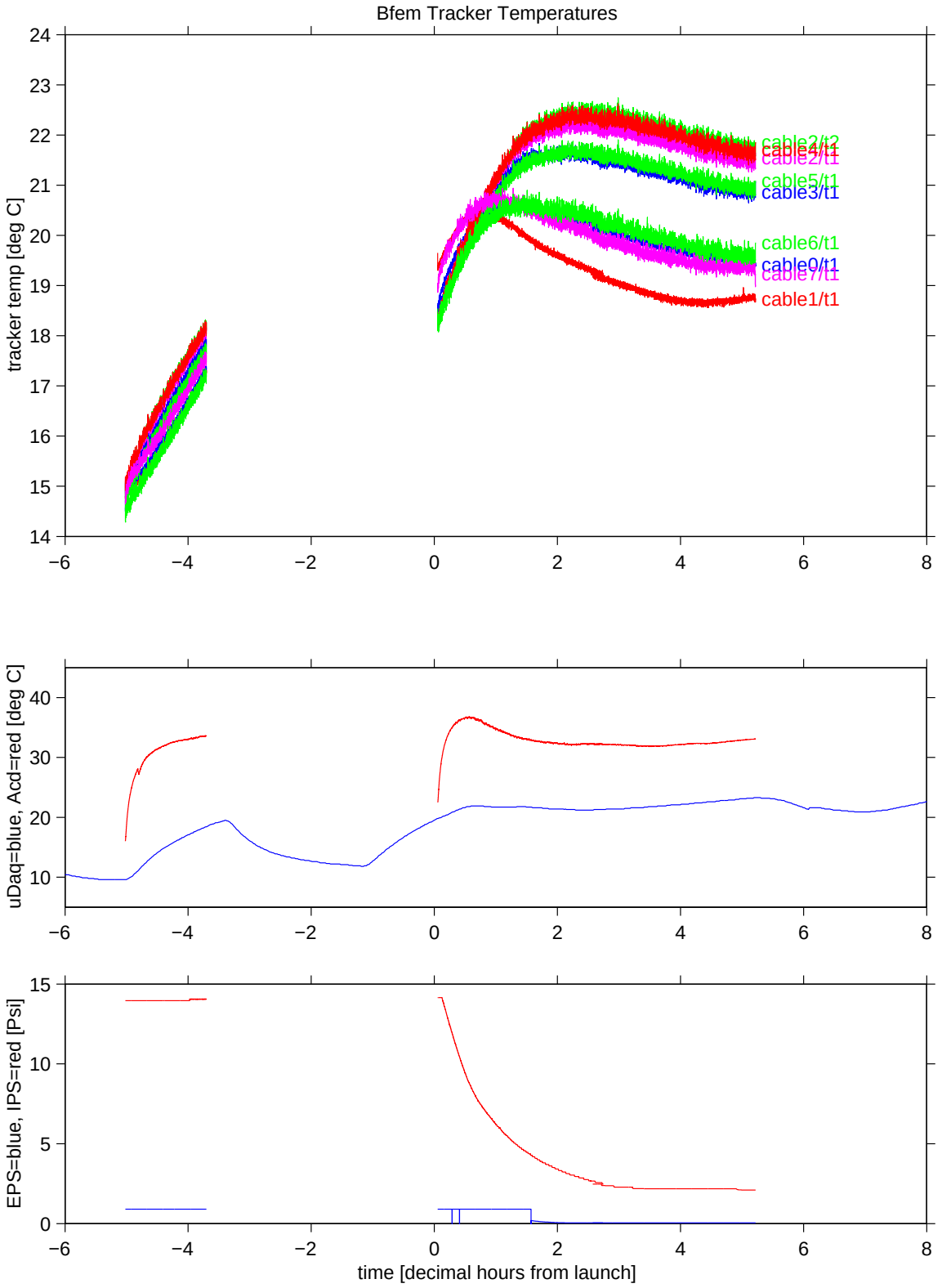

Figure 1: Glast Bfem Temperatures and Pressure. Top: Tracker (9 of 16 thermistors populated). Mid: Microdaq (blue), and Acd Hv (red). Bot: External (blue), and Internal pressure (red)