ACD PMT Failure - Thermal Design Options - from Tom M 7/16

Kevin, Al, Tom, Bernie, Art, Mike and Lee,

We convened a thermal brainstorming session this afternoon in our Branch Office, with several senior thermal system engineers participating, to discuss the ACD PMT problem.

Carlton Peters and I briefed the team on the problem, the thermal design of the existing architecture as well as a review of the system on-orbit predictions.

Our technical concensus was that isolating the BEA chassis from the grid (utilizing the 18C margin on the hot end) while adding a survival heater circuit under TS control should provide an adequate solution, given a (tbd) threshold temperature from the ACD team. The threshold temperature at this point is -10C with our suggested control done at 0C. From the system perspective, normal system operation controls the BEA to 0C. However, in our survival mode, the BEA reaches -19C, which would require additional heater power resources. Tailoring the isolation between the BEA/chassis to the grid will ensure warmer operation under normal operating conditions (biasing units hot), but will also benefit our survival case by reducing the heater power required to hold our 0C control point on the BEA/PMTs.

After much discussion, the following actions were identified:

1. Carlton will use his standalone ACD model to investigate the degree of thermal isolation and heater power needed to keep the PMT above 0C (and below 30C in the hot case) for both operational and survival cases.

2. Carlton will request detailed BEA chassis and PMT drawings to investigate available real estate for isolating washers as well as locating heaters and TS. Implementation of these circuits may involve installation directly on chassis, bonding heater plates directly onto the PMTs or wrapping the individual PMT housings with nichrome heater wire (similar to what is used on propulsion lines).

3. These assessments will be done by 7/30 (Carlton will be on vacation the week of 7/19 and will return to office on 7/26).

Regards,

Tom