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Joint Council on Aging Aircraft
Joint Group on Pollution Prevention



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Lead-Free Solder Project Meeting Minutes Monday, 15 March

Comments:

Attached please find the minutes for the March 15, 2004 Lead-Free Solder Working Group teleconference. Please further distribute as necessary.



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MEMORANDUM FOR RECORD

Subject: –Teleconference, Summary and Minutes – March 15, 2004

Next Teleconference: Tentatively scheduled for March 30, 2004, 11:00 EST

Next Meeting:

1. Board building/kickoff at Boeing Irving; March 18

Minutes:

Decisions arrived at by this meeting's participants → Recommendations for group-at-large.
Meeting led by Kurt Kessel, Project Integrator.

1. **Opening:** Kurt Kessel opened the meeting by welcoming everyone and thanking them for their participation.
2. **Discussion:**
 - a. **APEX 2005 Conference:** Mr. Dave Hillman has obtained a meeting room on Tuesday night at 6:00 P.M. for a face-to-face meeting. The question before the group is to have the meeting listed in the APEX directory and have it open to the public or keep it to invitation only. Mr. Reza Ghaffarian voiced concern that we would attract curiosity seekers and be so busy answering questions that we would not get anything accomplished. Mr. Denny Jarvi agreed and added that participants of the meeting should be involved in the project. That seemed to be the consensus of the group so the APEX meeting will be by invitation only. Next the discussion focused on whether to do a report, who to present it to, and where to present it. IPC is open to us to give a report at their fall meeting in Minnesota around September. It was suggested that data could be presented at the SMTAI conference in Chicago the last week in September. After a lot of discussion it was determined that, more information was needed before a decision could be made. Two action items came from this discussion. **ACTION ITEM:** Mr. Brian Greene to contact Paul Vianco to obtain more information concerning a lead-free session during the 2004 SMTAI. **ACTION ITEM:** Mr. Dave Hillman to contact IPC for more information. This topic will be further discussed during the meeting at Irving, Texas 18 March 2004.
 - b. **Mechanical Shock Test:** Mr. Lee Whiteman has determined that BAE Systems can accomplish the first two mechanical shock spectrums, 1) Crash hazard test for ground equipment and 2) Functional test for ground equipment and Crash hazard test for flight equipment. Mr. Reza Ghaffarian is still researching the new shock spectrum. His focus is on the failure sequence. Initially, the idea is to test the boards for x number of cycles. If no failures occur, the amplitude will be increased and another x number of cycles will



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be performed. This process will continue until failures occur. Mr. Ghaffarian commented that the main idea is to have tin-lead failure data that can be compared with lead-free failure data. Mr. Tom Woodrow suggested using the pathfinder board to define what level to test at. He would also like to see testing performed until as many parts as possible fail. This would give us as many data points as possible for comparison. Mr. Woodrow commented that once the pathfinder results were obtained, the group needs to review the data to determine the proper levels to test to. Mr. Jim Blanche cautioned that care needs to be taken to track failures to ensure at what level they failed. Mr. Jarvi commented that the group needs to be involved with the ACI tests and interact with BAE Systems as the tests are being accomplished to ensure they know what data we are after.

ACTION ITEM: Mr. Greene to contact Lee Whiteman to discuss the group's interaction with ACI and BAE Systems during testing to ensure proper data is obtained.

ACTION ITEM: Mr. Kessel, Mr. Greene follow-up with Lee Whiteman to determine if the boards are instrumented to measure strain and the costs associated with strain measurement.

- c. **Component Procurement:** Mr. Hillman briefed the status of various components. He stated that the LCCs were tinned 12 March 2004 and should be delivered to Ms. Lety Campuzano-Contreras by 18 March 2004. 291 hybrids were delivered but because of improper packaging, the leads were damaged beyond usefulness. The Hybrids are on their way back to Solitron in the hopes that the leads can be straightened. This pushes the installation of the Hybrids back to the April time frame. The late delivery of the Hybrids will force hand placement on the boards. **ACTION ITEM:** Further discussion of "Plan B" for the Hybrids will take place at the Irving, Texas meeting. After delivery and inspection of the PLCCs, it was determined that the components are not daisy chained. Mr. Hillman is in contact with Practical trying to resolve the issue. "Plan B" is to get the components from Practical as bulk parts. If this is possible, Ms. Campuzano-Contreras will be able to install the components with little impact on the schedule or build process. If we are not able to get the bulk parts, our only option is to use the non-daisy chained components and just deal with it throughout the testing matrix. Using the non-daisy chained components will limit the data collected, but we will be able to obtain useful information. The last issue raised was that the CSP-100 components do not match the boards. The component measures .8mm from center to center while the board placement measures .7mm. In other words, not all the balls align. Said still another way, the PWB and the part do not match. Mr. Hillman felt that an error was made in the drafting process. He will review the process and check the tolerances, but in reality, using this part is a dead issue. The boards are locked in and cannot be changed. The only possibility is to find a CSP that will fit the board, but the chances of that are slim to none. **ACTION ITEM:** Dave Hillman to check into the possibility of getting a different part that will match the board.
- d. **Air Force Funding:** The contract has gone through the Aging Aircraft Division's source selection. It is currently at the General Services Administration (GSA) waiting for a decision. We expect the decision to be made at anytime.



Attachment 1: Action Item Status

New Action Items (from 03/15/2004 meeting)

LFS.04.03.16

Date Due: 3/26/04
Responsibility: Dave Hillman
Required Action: Check into the possibility of getting different CSPs that will match the boards.
Comments:

LFS.04.03.15

Date Due: 3/26/04
Responsibility: Kurt Kessel, Brian Greene
Required Action: Follow-up with Lee Whiteman to determine if the boards are instrumented to measure strain and the costs associated with strain measurement.

Comments:

LFS.04.03.14

Date Due: 3/18/04
Responsibility: Brian Greene
Required Action: Contact Lee Whiteman to discuss the group's interaction with ACI and BAE Systems during testing to ensure proper data is obtained. **Comments:**

LFS.04.03.13

Date Due: 3/18/04
Responsibility: All
Required Action: Prepare ideas for discussion for hybrid placement on the manufactured boards following the assembly process, include thoughts on solder alloys

Comments:

LFS.04.03.12

Date Due: 3/26/04
Responsibility: Brian Greene
Required Action: Contact Paul Vianco to discuss SMTAI and the details of presenting the LFS Project

Comments:

Open Action Items

LFS.04.03.04

Date Due: 3/16/04
Responsibility: Reza Ghaffarian, Lee Whiteman
Required Action: Revise Mechanical Shock Test procedure
Comments: Update 3/15/2004: Mr Ghaffarian will work to have a draft prepared by March 18, 2004 for discussion



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LFS.04.03.02

Date Due: 3/16/04
Responsibility: Lee Whiteman
Required Action: Confirm BAE's ability to measure board deflection and possibility of obtaining strain gage measurements. Pass information directly to Brian Greene.
Comments: ITB, Inc. will follow with Mr. Whiteman in order to confirm BAE's capabilities

LFS.04.02.08

Date Due: 2/24/04
Responsibility: Dave Hillman
Required Action: Make sure the appropriate Gerber files were provided to Lety for the IPC Electrochemical migration test coupons
Comments:

LFS.04.02.01

Date Due: *Date Changed from 2/20/04 to 03/10/2004*
Responsibility: Brian Greene
Required Action: Distribute article on lead contamination written by John Paul Clech
Comments: *Open:* Distributed to Tom Woodrow and Reza Ghaffarian for comment. This paper was presented at the Feb. 2004 APEX conference. This paper will be distributed following the March 18 meeting in order to avoid confusion.

Action Items Closed on March 15, 2004

(closed action items will be deleted from the next meeting minutes)

LFS.04.03.03

Date Due: 3/16/04
Responsibility: Mark Stibitz
Required Action: Send copies of MIL STD 810F graphs to Brian Greene
Comments: **Recommend close.** Figures sent.

LFS.04.03.01

Date Due: 3/16/04
Responsibility: Lee Whiteman
Required Action: Confirm with BAE that they can meet MIL STD 810F. The two spectrums include Functional Test for Ground Equipment and Crash Hazard Test for Ground Equipment
Comments: **Recommend Close:** Mr. Kessel discussed this with Lee Whiteman on March 10. Mr. Whiteman confirmed that BAE could meet the profiles as they appear in MIL-STD-810F



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LFS.04.02.11

Date Due: 3/02/04

Responsibility: All Stakeholders

Required Action: Send any lessons learned regarding board assembly to Lety Campuzano-Contreras

Comments: **Recommend close.** Comments were provided.

LFS.04.02.09

Date Due: 3/02/04

Responsibility: Lety Campuzano-Contreras

Required Action: Contact Mark Stibitz to confirm hybrid staking process

Comments: Mark Stibitz 03/01/2004: "I'll review and provide comment as soon as I get the procedure. If Lety's procedure is close to what I had previously described, we should be okay."

Recommend Close: Mr Stibitz confirmed on March 15 that adhesive on the corners will be acceptable.

LFS.04.02.02

Date Due: 2/17/04

Responsibility: Dave Hillman

Required Action: Send one empty board and one fully assembled board to Lee Whiteman for setup and test purposes.

Comments: 02/17/2004: Mr. Hillman sent the board to Mr Whiteman the week of February 09. Mr. Whiteman will check shipping to see if the board has arrived.

Recommend Close: Mr. Hillman has confirmed with Mr. Whiteman that the board did arrive at ACI

LFS.04.01.07

Date Due: 2/5/2004

Responsibility: Brian Greene

Required Action: Contact CALCE for support

Comments: 03/09/2004 – Michael Osterman, Ph.D., CALCE Consortium Director [osterman@calce.umd.edu], e-mailed Brian Greene indicating CALCE's strong interest in contributing a PoF modeling effort to the JCAA/JG-PP LFS study, so participants can extrapolate the test results to other loading conditions. Brian will provide Dr. Osterman the LFS test plans, a test vehicle, and test results, when available.

Recommend Close: March 15, 2004



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LFS.04.01.02

Date Due: 1/23/2004

Responsibility: Dave Hillman

Required Action: Determine additional cost associated with two tinning assemblies.

Comments: 02/17/2004 – In-progress. Total cost will be approximately twice that originally planned.

Recommend Close: Mr. Hillman determined that it should cost approximately \$7,000. Funding is available based on the reduced cost of the boards.