

Packaging Committee Minutes - July 23, 2015

Agenda:

1. Industry Session action items

Minutes

Industry Session Actions:

1. [May 26] Ralph suggested we explore a speaker at Oakridge National Laboratory that is working on printing a car using additive mfg technology. Kind of the ultimate 3D package. Ralph provided Craig Blue- Director of Manufacturing, bluca@ornl.gov, phone 865-574-4351 as the contact. **Action: Brian will follow up with Craig to see if he is interested in speaking. I have not contacted Craig. After thinking about it I felt this a bit far from power packaging. If the committee still feels it's a good idea I will pursue.**
[June 25] We discussed whether there was some aspect of the printed car that is more power packaging related that could be appropriate, or if Zhenxian knew of other work at ORNL that would be appropriate. Zhenxian suggested the inverter for DoE project that Madhu has presented on - this inverter is ~ 50% printed parts (heat exchanger, etc.).
Action: Zhenxian to contact Madhu
7-23-2015: Madhu has agreed to present on 3D packaged SiC inverter
2. [May 26] We discussed having one or two presentation's on packaging power supplies that contain Wide Bandgap Devices. A lot has been presented on packaging the devices, but not as much on packaging the entire power source. It was suggested we contact Dr. Lars Boettcher at Fraunhofer Institute. Louis Burgyan knows him quite well. **Action: Brian will contact Louis about recruiting him.** It was also suggested we contact FINsix about a packaging presentation on their new 60W power supply. **Action: Brian will try and find a contact at FINsix. This has been a blind alley. I got Rich Valley at TI to introduce me to Anthony Sagneri the CTO via email. But he does not respond to any of my emails. I think we should drop this unless someone has a contact in the company.**
[June 25] Lars not available; Louis recommended person from APEI that

presented on SiC for automotive at last IMAP conference - Ernie has action to contact (overlap with item 3 below).

[July 23] Yunqi has agreed to present on SiC packaging techniques in automotive applications

3. [May 26] Arkansas Power Electronics (APEI) has been writing about several innovative packages. We had them speak at APEC2014 and several committee members thought we should invite them back. Since Ernie recruited them before and was not present to defend himself he was given the action to contact them about speaking again. **Action: Ernie Parker to contact APEI about presenting on their latest innovations in 3D Packaging.**

[June 25] Action - Ernie to contact

4. [May 26] Arnold suggested we look for a speaker who can discuss embedding Wide Bandgap Devices in Magnetics. **Action: Arnold agreed to look for a contact name.**

[June 25] Arnold had dropped of call; Ernie to follow up with Arnold. Ed stated that while he is interested in topic he does not have suggested speakers. Ernie raised that CPES is working with NEC - Tokin metal flake magnetic material embedded in PCBs (Louis confirmed from 3D report) and that they had a 3D printed soft magnetic material in early stages of research at conference in April.

Action: Ernie to contact CPES about presenting on embedded magnetics with either Tokin flake material or 3D printed magnetic.

[July 23] Dr. Lee has agreed to support a presentation (Yipeng Su most likely) on embedded magnetics using Tokin flake material in POL. Dr. GQ Lu will check with Yasmine Yan regarding progress on 3D printed magnetics. Arnold suggested Noah Stricknen (sp) at Ferric Semi on embedded magnetics using Tokin material.

5. [May 26] We also discussed finding a speaker who could discuss capacitors for embedding. There was an excellent speaker at PwrSoc from Georgia Tech. An Arnold suggested ABB might have an expert. **Action: Arnold to contact Georgia Tech speaker to see if he would present and check with his contact at ABB to see what they have.**

[June 26] Action - Ernie to follow-up with Arnold

[July 23] Arnold to follow up with Ga Tech speaker and/or ABB

6. Ed suggested Arnold speak about "Unmet challenges of embedded components for 3D packaging" based on his knowledge and information in the Phase 2 report. Arnold agreed. **Action: Arnold will write a short abstract for the committee.**

[June 26] **Action - confirm with Arnold**

7. [May 26] Reliability of interconnects in 3D packaging was also suggested. Ed pointed out that Rick Fishbune from IBM has published papers on this topic, particularly focused on corrosion. Rick work has mainly been on logic level signals but we thought it would be interesting if he would speak on issues related to higher current interconnects. **Action: Brian will contact Rick about presenting. Rick has given me a tentative yes but needs to get management approval. He will be speaking on some aspect of interconnect reliability.**

[June 26] **Action - Brian to follow-up with Rick re. mgmt. approval**

8. [May 26] We also discussed if Tyndall was ready to present on some of their latest work in the magnetics area: **Action: Mike Hayes will investigate if Tyndall has a magnetics topic they would like to present.**

[June 25] **Mike said that Tyndall will present, exact topic / title / speaker is TBD. Mike to follow-up.**

9. [June 25] **Ernie said that Crane will probably be able to present on a recent IRAD project that used 3D printed microchannel coolers in a 50 kW ATRU (between core and windings). Use of these microchannel heatsink fingers provided improved thermal and allowed for significant weight reduction compared to prior liquid cooled baseplate; further weight reduction was achieved by changing the overall enclosure to carbon fiber since the overall enclosure no longer was no longer the heat path.**

Action: Ernie to obtain management approval to present this topic