



Energy Harvesting Committee (EHC) Minutes 25th July 2019

Attendees	Apologies/Non attendees	
Joe Horzepa, PSMA Roberto la Rosa, ST Mohamed Jatlaoui, Murata Maeve Duffy, NUIG Francesco Carobolante, IoTissimo Brian Zahnstecher, PowerRox Mike Hayes, Tyndall	Johan Pederson, Sigma Design Mike Wingard, Amphenol Katherine Kim, UNIST Chris Chen, Alta Anthony Laviano, NRAIT Henrik Zessin, Fraunhofer IIS Justin Knott, FCI Jae-Do Park, Univ of Colorado Denver Nathan Jackson, Univ of New Mexico Warren Wambsganss, Astronics Jeffrey Jouper, Astronics Seshank Malap, Tektronix Ben LeNail, Alta Devices Scott Thielman, Product Creation Studio Denis Pasero, Ilika Steve Savulak, UTRC Lorandt Foelkel, Wurth Marcus Taylor, Silent Sensors	Aarohi Vijh, Alta Devices <i>Doug Osterhout, Google</i> Wensi Wang, BJUT Peter Zou, Huawei Ajinder Singh, TI Aaron Stein, Dartmouth Kevin Parmenter, TSC Guoqing Liu, Huawei (HiSilicon) Jochen Koszescha, Infineon Laili Wang, Xi'an Jiatong University David Newell, NUIG Dan Stieler, PowerFilm Sam Jones, PowerFilm Baoxing Chen, Analog Devices Jamil Khan, Univ of Newcastle (AUS) Liubov Ebralidze, Silent Sensors Raj Budhabhatti, Alta Devices Robert Andosca, AEI Alex Liu, Alta Devices Thomas Becker, NTA- ISNY Dusan Vuckovic, Force Technologies Gary Johnson, Ilika (for Denis) Peter Haigh, Tyndall Michalis Kiziroglou, Imperial College London

(Co-chairs in bold font)

Next meeting:- Fri August 23rd at 10:00 Central

Agenda

1. **Welcome any new members.**
2. **EnerHarv 2020 planning.**
3. **APEC 2020.**

1. Welcome New Members

2. EnerHarv 2020

- **NCSU – North Carolina State Univ. SELECTED TO HOST ENERHARV 2020!!!**
 - *Adam Curry (admin – Innov. director of ASSIST), ‘Mehmet Ozturk’ (tech - flex TEG guy)*
 - *ASSIST actually brings 4 collaborating Universities to the table NCSU, Penn State, University of Virginia, Univ of UT, and Florida International University (where Dr. Raj is now located).*
 - *Hosted previous PSMA 3DPEIM workshop*
- Focus on event target dates:-
 - **Blackout dates** (Mike – 3rd to 9th June, anyone else?)
 - 5/27-5/29, 6/9-6/12, 6/16-6/19...Doodle for preferences distributed with EWC meeting mins.
- Volunteers so far (we shall set up separate meetings every 2 weeks and give a summary at each PSMA EHC all)...**MAEVE OFFERING TO TRAIN NEW TREASURER**
- **COMMITTEE (new additions in green, anyone else?)**
 - Baoxing Chen
 - James Rohan
 - Denis Pasero
 - Francesco Carobolante
 - Marcus Taylor
 - Michalis Kiziroglou
 - Lorandt Foelkel
 - Peter Spies

- Maeve Duffy
- Brian Zahnstecher
- Mike Hayes
- EPeas – Geoffroy Gosset
- Dusan considering....answer in Sept
- Johan also considering – meeting BZ 8th July
- Steve Savulak
- Adam Curry
- Mehmet Ozturk
- Sponsors
 - **TECH**
 - EnABLES
 - PELS should be included as per EnerHarv (tech but not financial)
 - **BZ MUST PREPARE PITCH DECK TO PELS TC2 AT ECCE TUE, 8/1**
 - **FINANCIAL**
 - PSMA
 - **COMMERCIAL** (more open this time, but MUST be related to program, content, etc.)
 - How2Power will circulate flyers – get preliminary one ready by end Sept (ECCE)
 - Brian socializing for commercial sponsors - so far preliminary interest from ADI, EPEAS?

3. APEC 2020

- FOR APEC 2020, WILL BUMP RIGHT UP AGAINST ENERHARV 2020 SO SUGGEST TAKING A SLIGHTLY LESS INVASIVE ROLE IN APEC 2020 (I.E. – 4-SLOT INDUSTRY SESSION INSTEAD OF SEVEN)...**BZ CONFIRMED 4-SLOTS available**
- Start planning from July onwards, this is our ‘trailer’ for EnerHarv2020... **COMM TO FINALIZE SESSION ABSTRACT BY NEXT (AUG) MTG**
 - “The Growing Energy Harvesting & Power IoT Ecosystem” Mike Hayes, Tyndall
 - Demo Session (as standalone, “speaking” slot), TEAM

Apart from a suggestion to cross reference with the education committee, Items 5 onwards were not reviewed since December meeting, will re-start in Aug.

5. Updated goals

- Open to suggestions.
- Consider a white paper? (Who will co-write and when?) – **REMINDER** can members please give Mike & Brian inputs offline
- Mike & Brian to revert with proposal for doing a white paper if so approved
 - OR other dedicated champion from EH Comm, **will put call out**
- We should try to forge links with other groups/sessions, e.g. capacitor, magnetics, packaging. – **addressing this via “Tiger Team” effort within PSMA (multiple focused initiatives with small teams from various committees)**
- **BZ INITIATIVE:** working on feasibility for an official, IEEE Future Directions initiative on Energy Harvesting
 - JOE notes PSMA would be happy to support such an initiative, **BZ to figure out if/how**

6. Organise webinars for PSMA & PELS **(FOCUS STARTING AUG MTG ONWARDS)**

- We are ok for PSMA webinars (did 1 in Nov) for now but need to discuss PELS et al.
 - Dan Stieler, PowerFilm was considering one (will be chased by way of Sam)
 - Sample abstract suggested per existing blog (<https://www.powerfilmsolar.com/about-us/the-horizon-blog/2018/08/10/outdoor-vs-indoor-solar-the-key-differences>), BZ reviewed/supports, **need Committee input. Worth reviewing seeing as Powerfilm’s abstract did well in voting but was not in top 2.**
 - Lorandt willing to do 1 – getting back up to speed (in your own time Lorandt) – Q1/2 2019? Also depends on whether Lorandt/delegate does APEC paper. **BZ TO FOLLOW-UP WITH LORANDT**
- Dan & Dusan willing to revert with suggestions – no commitment yet – Dusan thinking about an applications orientated presentation but no commitment yet.
- Brian and Raj (GeorgiaTech) gave IEEE EPS webinar on IoT with Dushan, Marc & Denis – Went very well. Can do a variant for PSMA later in the year.
- Would be good to do 1-2 on ‘practical real life performance’ of parts and systems – comparison of technologies. Saw some good examples at EnerHarv e.g. Ilika & ARM presentations

7. Sponsorship of a program where students build demonstrators.

- Lorandt has a budget to supply kits
- Help with education links – Qualcomm ‘High Tech High’. Francesco will follow up.
- Green story. International dimension. Technology and applications dimensions.
- Wurth running design challenge.
- Keep simple, easy to use
- Competition or roadshow?
- PSMA has money to support.
- Action:- Catherine and Mike met at EnerHarv & discussed, She will write ½ page strawman for student engagement mechanism. Mike will ping again. **NEED A CHAMPION TO LEAD EFFORT FOR COMM**
Maeve willing to help but does not have bandwidth to lead.

“Here are Katherine’s thoughts on the competition:

There are two main styles of the competition that could be developed:

1. Engineering-Style Competition

- planning committee chooses specific EH devices that can be used and the target load
- planning committee also specifies energy input conditions (lighting setup, vibrational input, etc) for testing
- specifications are announced and teams would develop the power converter solution based on the specification
- teams can submit videos and/or reports on their team and proposed idea
- final teams are selected and they test their prototypes on site at an event competition (could be a conference)
- judging is based on technical criteria measured during the test (size, weight, efficiency, etc.)
- implementation is the most important aspect for this style of competition
- over different years, the specification and scenarios would focus on different technologies with the same basic format
- more similar to the International Future Energy Challenge run by PELS

2. Design-Style Competition

- planning committee could choose a theme based on a technology or application (e.g. smart homes, wearables, building monitoring, etc.)
- planning committee may want to specify some constraints or scenarios for the competition
- teams come up with complete EH design ideas (transducers, circuitry, load) and develop a prototype
- teams can submit videos and/or reports on their team and proposed idea
- final teams are selected and they present and demonstrate their prototypes on site at an event competition (could be a conference)
- judging is based on mostly qualitative and some quantitative judging criteria (so balanced judge selection will be important)
- this style of competition is more focused on the idea and design, but implementation is also important

There should probably be some discussion on which style the committee would like to see. The engineering-style requires a lot of prep work before even announcing the competition, while the design-style is more work for the judging and evaluation. I could see either being good for students. I hope someone can take these basics ideas and further development them into a competition.”

8. Technical forum (links, list of forthcoming events, etc.)

- Johan will review and update the list of events when he gets a chance but EnABLES project is creating a calendar of events, Mike should be able to share this (edited version) in July/Aug
 - Johan delivered updated list on 7/23/18, which MH & BZ will digest and share with group.
- Any volunteer(s) for white papers, weblinks, use cases, etc.
- Reach out to other societies/groups and cross link? – Mike & Brian to discuss.
- Note activities underway separately to re-vamp PSMA website.
- Does this add any value, should we remove??

9. AOB, actions, next meeting, etc.

- Software? Packaging/industrial design? Modelling?

Mike Hayes & Brian Zahnstecher,
25th July 2019