Summary: "Future Sound Tech Solutions" – Meeting #11

Meeting # 11 in working group "Future Sound Tech Solutions" took place on January 23, 2023.

The meeting agenda was:

1. Webinars:
    a. Follow-up on proposals and ideas from meeting # 06 including additional comments and proposals.
    b. Proposals for possible speakers
    c. New themes?
2. Physical events during 2022
    a. Meetings? Workshops? Others?
3. Collaborative projects, update of proposals, indication of possible project consortia
4. Other ideas for Danish Sound Cluster activities
5. A.O.B.

A new team member of Danish Sound Cluster, Jens Nedergaard, presented himself.

Summary details

See the following pages.

Ad 1a & 1b: Proposals for Webinars

#	Subject	Background
8	"Emerging Acoustic Sensor Technologies and Applications"	**Time schedule:** March 14, 2023 Event is now finally planned and will be announced in DSC Newsletter. In the future, sensors will be integrated into all kinds of products. Influence on the traditional sensor market? **Speakers:** 1. Sikko Van Reeuwijk, Sonion 2. Rémi Guastavino, G.R..A:S. 3. Sergei Rotger Griful, Eriksholm Pedro has managed to complete the planning for the event.
14.a 15	Noise cancellation Feedback cancellation/ suppression/control	**Time schedule:** April 2023, however not finally agreed The two topics have been combined into one event. Primarily a topic related to headset solutions. **Speakers:** • **Diego Caviedes Nozal**, Jabra, & **Franz Maria Heuchel,** DTU, both previously in Monica project • **Meng Guo**, Oticon, • **Professor Simon Doclo**, Oldenburg University, Germany, The speakers have accepted, but date not yet confirmed. Pedro has made the detailed planning of the event
14.b	Speech Prediction	This topic is seen as an activity on its own right. However, difficult to find speakers. The aim is to find an approach to overcome the middle frequency range challenge, where existing solutions seem to fail. Active noise cancellation, ANC, can remove low frequency noise and passive noise cancellation can remove high frequency elements. However, noise related to speech in between the two regions remain an issue. ANC will never be able to suppress noise related to speech in the middle frequency range. Can the challenge be handled to some degree through employment of speech prediction to overcome this downside of in ANC? A difficult research topic, where speech modelling may have solutions. Today classic speech modeling has been overtaken by neural network approaches, but may be original classic speech modeling could prove a way ahead. A Ph.D student at Jabra looked into the approach, but ran out of time(check with Clément). Another deep technical approach may come from Johannes Sars ? (check with Niels) Still a highly open topic. We need to discuss more in future meetings.
17	Use of sound with robotics	The topic has matured and a webinar in the area is in planning. **Time schedule:** April or May 2023, however not finally agreed. **Speakers:** • **Jesper Rindom Jensen**, AAU, • **Jonas Jorgensen**, Assistant professor at SDU Biorobotics, **Theme:** Use of robotics in sound generation (gave a presentation on sound with biorobotics at the recent Digital HiTech Summit) • **Tore Stegenborg-Andersen**, FORCE Technology **Theme:** Loudspeaker rotation robots, for synchronizing loudspeaker positions during test. Used for listening & comparing loudspeakers loudspeaker spinner robot: Pedro has been in contact with the speakers, and all three have confirmed. Data is not yet decided.

#	Subject	Background
18	'Sound Quality in Digital Meetings'	It is important that we obtain more traction on the area. Two-three approaches that we should try next are: • Present the topic in the DSC network-group for entrepreneurs and see, if we can stir up some interests in this group. Possibly we should use ½ hour or so in presenting the challenges. • If this approach is successful, we could follow up with a symposium/sound meeting on the topic, or the topic be part of a symposium/sound meeting • At the upcoming calls for projects in January 2023 we could prioritize projects that fall in this category. In general, we should look for people that are likely to consider the area and bring them into our circles. Jabra/DTU are still looking for SME partners to a project on a "biological" based approach to better understand the cognitive load on people when joining digital meetings for a substantial part of a working day. The idea of the study project is to use appropriate biosensors to derive a better understanding. Another suggestion is to people from Microsoft, Zoom, Google or others to present their views. Pedro will contact people he knows in Zoom, to check if they ar willing to contribute in a webinar.
20	AI and Sound in general	Brainstorming on activities related to uses of AI in sound. Niels has been in contact with: • AI related to e.g speech, Assistant professor Per Bækgaard Pedro to follow up on the contacts set up with Per Bækgaard. The topic area of natural language processing, NLP, related to e.g. the upcoming CoRaL project that is starting at Alexandra Institute, Alvenir and Corti/DTU was discussed. The project (3. Year project starting in March 2023 and running for 3 years, budget 13 mio. DKK) will have first results in October 2023. Working group "Healthcare & Welfare" have agreed with Dan Sattrup Nielsen, Alexandra Institute, to run a first webinar on the topic already in October/November 2023. We will follow the work and discuss, if also our working group on "Future Sound Tech Solutions should engage in the topic. Birger to distribute overhead slides on the CoRaL project proposal. An option is to have Dan Sattrup Nielsen give an overview on the project at our next working group meeting.

#	Subject	Background
21	Augmented sound in future society	The aim of this topic area is to look for directions in augmented sound that could pivot the Danish sound Industry into a future leading technologically position in sound – rather than just wait for trends to come to us from the outside. How can 'augmented sound' support our future life? How can we interact with sound ?: • When we are 'connected' ? • When we are not 'connected' ? which directions do we expect augmented sound to take, and how do we envisage people would like to be supported by sound? • What type of help? • What service? • What features are needed? And do people know, what they would like to be supported on? Some universities are today visiting **'Meta reality Labs"** to learn about and get inspired of new directions. Can we make use different kinds of user groups to help in bringing up answers to support Danish sound industry? Ensure that we remain in the forefront of development, and who should help? Can we identify potential speakers who could assist in opening our minds for future directions of augments sound? The first debate (current meeting) on the topic was somewhat diffuse given the broad spectrum of opportunities. Sound and vision as employed in gaming was mentioned as one area to look at, since that could serve as a lab prototype for future solutions - although gaming in essence only is seen as a proxy of real life. Bringing in people from other areas, e.g. philosophers, psychologists and others could possible augment an opening of views in our traditionally rather technologically fixated domain. It was also argued that possibly we should try to bring into our brainstorming a broader group of our traditional core members in Danish Sound Cluster, for example in conjunction with a Sound Day event – or similar physical event. One idea is that we need to strive at some kind of "White Board" discussion meeting, where a multitude of ideas could be identified and discussed. All in all, the concept of trying to identify "Augmented sound in future society" is important – but as the first discussion also disclosed: rather difficult. At our next meeting, we will continue brainstorming this theme, since it is probably one of the most import directions of the future of sound tech solutions. All working group members are encouraged to assist in being creative on the subject.
22	Text-to-speech	Microsoft is reported to focus on text-to-speech in its Azure offerings. What will that mean to development in the sound sector. We will take a discussion at the next working group meeting Jens will circulate a recent Microsoft article on the topic.

Ad 2.: Physical Events (H1 of 2022)

No physical events published except networking meetings, see also www.danishsound.org .

Ad 3 Collaborative projects, update of proposals, indication of possible project consortia

Next round of project calls is out, see:

https://danishsoundcluster.dk/project-call-for-nye-lydprojekter-2/ .

Ad 4 4. Other ideas for Danish Sound Cluster activities

Next meeting

The next meeting in the working group on "Future Sound Tech Solutions" will take place:

- **Monday March 20, 2023 14:00 to 15:00**

Appendix 1: Participants in the meeting

Clément Laroche	GN Audio, Jabra	Senior Research Scientist
Jeremy Marozeau	Department of Electrical & Photonics Engineering, Acoustic Technology	Associate professor
Jonas Raun Hansen	GN-Hearing	Manager, Electro Acoustics
Morten Kroman	WS Audiology	VP R&D Electronics
Niels Pontoppidan	Eriksholm Research Centre	Research Manager
Birger Schneider	CHAMAJ Consult ApS	Director
Pedro Costa	Danish Sound Cluster	Project Manager
Jens Nedergaard	Danish Sound Cluster	Project Manager
Torben Vilsgaard	Danish Sound Cluster	CEO

Appendix 2: Events proposed and promoted by the working group

#	Title	Comments	Event type	Date
1.a	AI/Machine Learning	Workshop (Edge)	On-line	5 April, 2022
1.c	AI in signal processing		Webinar	
2	"Demant Discovery"	Start-up in dialogue with Demant	Networking event	17 March, 2022
4	Audio & privacy	Part of physical conference	Panel discussion	4 May, 2022
5	Sound Quality in Digital Meetings	• Position paper • Conference session	Conference	4 May, 2022
6	Multisensory Processing		Webinar	7 December 2021
7	Sustainable transformation in Audio Companies	Green footprint in sound	Webinar	25 January, 2022
9	Personalization of User Needs		Webinar	1 June, 2022
10	Data Simulation for AI		Webinar	7 June, 2002
11	Perceptual Audio Evaluation		Webinar	13 October, 2021
12	Key Note, Sound Day 2021 "The Sound of Metal"	Oscar Winning Mikkel E.G: Nielsen, Film editor & Nicolas Becker, Sound Designer	Conference, Sound Day 2021	17 November, 2021
	AI in Audio Applications	Conference event at Digital Hi-Tech Summit, Bella Center	Conference	26 October, 2022
19	AI in Audio Applications		Webinar	13 December, 2022

Appendix 3: List of potential Themes

Addressed or proposed in previous meetings' but for the time being put on the list of potential topics until the topics are better matured - or the need better identified.

#	Subject	Background	Proposers
13	Hearables, OTC	Theme is rather interesting. However, difficult to find speakers. Hearing aid companies are reluctant to contribute since the topic is too close to current business interests. It is not the products themselves but where and how such products are placed in the competitive landscape. University contribution is also not so likely since it is a topic mostly in the business domain. A discussion on what type of products is included under the term "hearables". The product term "hearables" was originally coined for a hybrid of the terms: wearable and headphone. • OTC ("over the counter" products) belongs to the category of medical product, i.e. hearing aids. The WG feels that this is a separate domain, and does not fit into the general term "hearables" • Instead, most of the "hearables" seen to date are Bluetooth devices that use phones or PCs as the central computing unit. Focus seems to be on mobile communication, real time information services, activity tracking including biometric data, e.g. temperature, heart rate or oxygen saturation. Although "hearables" is a business domain for many consumer technology manufacturers, several SME's and start-ups also have managed to obtain crowdfunding and soft funding from e.g. EU R&D funding, and are active in the area.	Niels Pontoppidan Jonas Raun Hansen Morten Kroman Clément Laroche Tobias Neher Peder Costa