

Summary: "Future Sound Tech Solutions" – Meeting #15

Meeting # 15 in the working group "Future Sound Tech Solutions" took place on October 31, 2023.

Agenda

1. Discussion on:
 - a. Are we focusing on the right issues in the Working Group?
 - b. Should we invite new member to the Working Group to get fresh ideas?
2. Webinars & Physical events during 2023 & 2024:
 - a. Follow-up on proposals and ideas from meeting # 14 including additional comments and proposals.
 - b. Proposals for possible speakers
 - c. New themes?
3. Collaborative projects, update of proposals, indication of possible project consortia.
4. News from DSC secretariate
5. A.O.B.

Ad 1: Discussion on:

- a. **Are we focusing on the right issues in the Working Group?**
- b. **Should we invite new members to the Working Group to get fresh ideas?**

In general, WG members are OK with the approach taken in the WG. However, some members feel that at least the "low hanging fruits" have been adopted by now, and it is a challenge to come up with many new ideas.

Webinars are rather successful in terms of participation and content. Webinars also serve the general strategy required by the Government sponsors, where easy access to information and innovation across Denmark, not least for SME organizations is mandatory. It is optimal and efficient in relation to time spent, since participation only takes the typical 1½ hours per event, no idle time in travelling and waiting for meetings, and most people that have an interest can join even without asking their bosses for accept to participate.

However, networking and establishing personal relationships, getting easy counselling from colleagues in other companies, etc. are lagging in webinars. Danish Sound Cluster tries to balance this in physical meetings like SoundDay, focused theme meetings and in Network Group meetings. DSC has at present 3-4 such Network Groups, and more are likely to emerge over time. It was expressed that more such groups are welcomed.

It was backed in the discussions that Network Group meetings (focused groups) are productive and highly valuable, also because they often take place in companies, so there is an opportunity to get inspiration from setups in other organizations.

The DSC secretariat is always reflecting on what is happening, new themes, and tries to develop in new areas, when opportunities arise.

Consensus that a few new members will be useful to improve inspiration and outreach. First, we need a replacement for Niels Pontoppidan, so a new member from Eriksholm or Oticon would be welcome. Birger will contact Niels and others to identify a new member. It was also expressed that a member or two from the consumer audio industry would be highly useful. No individual persons were identified, but consensus that members from e.g., Bang & Olufsen, EPPOS, a game company etc. would be very useful to working group and its recommendations for Danish sound industry and academia.

Ad 2: Proposals for Webinars & Physical Events

#	Subject	Background
15	Speech Prediction	<p>Background:</p> <p>Speech Prediction is a topic in its own right - and interests seem high. The aim is to find an approach to overcome the middle frequency range challenge, where existing solutions (see below) appear to fail.</p> <p>Active noise cancellation, ANC, can remove low frequency noise and passive noise cancellation can remove high frequency elements.</p> <p>Some research on speech Prediction exists, but in general it is today still a tiny R&D domain.</p> <p>Potential speakers:</p> <ul style="list-style-type: none"> • Johannes Sars ? (check with Niels Pontoppidan) <p>Topic was originally proposed as a complement to "Feedback and Noise Cancellation" (webinar on May 9, 2023).</p> <p>We are currently short of potential speakers. Can the following people fit into the theme ?:</p> <ul style="list-style-type: none"> • Mads Græsbøll, AAU ("Voice analysis, automatic detection of signal degradation in sound databases") • Jan Østergaard, AAU ("Speech recognition ...") • Ivan ?, Microsoft (see: https://arstechnica.com/information-technology/2023/01/microsofts-new-ai-can-simulate-anyones-voice-with-3-seconds-of-audio/) <p>Jabra has a Ph.D. student working on the theme, but he/she does not at present have time to participate in a webinar.</p> <p>Birger will contact the two AAU persons (Mads and Jan) to learn if they fit into the theme. Jeppe will try to identify 'Ivan from Microsoft'.</p> <p>At our next meeting we will decide if we can identify sufficient content for a webinar on the theme. If not, we will drop it for now.</p>
21	Augmented sound in future society (Paneldiscussion, SoundDay 2023)	<p>Originally in Working Group proposed as Bluetooth Auracast™</p> <p><i>(Auracast broadcast audio will let people invite others to share audio experiences. People can log on to streams that are in the air. Is likely to change our society already short term).</i></p> <p>At Sound Day 2023, November 7, a panel discussion (40 minutes) will stress the topic.</p> <p>Panelists:</p> <ul style="list-style-type: none"> • Alex Costa, Director of Brainwors, GN Group • Nick Hunn, CTO at WiFore and moderator <p>Moderator:</p> <ul style="list-style-type: none"> • Tobias Neher, Professor, SDU

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21a	<p>Augmented sound in future society</p> <p>(Webinar 2024)</p> <p>Follow-up to the SoundDay panel discussion</p>	<p>Timing:</p> <ul style="list-style-type: none"> • Q1 or Q2, 2024 <p>Industrial perspective. The Hearing Aid industry is promoting Bluetooth Auracast, and some companies are investing significantly in Bluetooth Auracast.</p> <p>Moderator: Nick Hunn should moderate and give an overview presentation.</p> <p>Potential candidates for industry case presentations:</p> <ul style="list-style-type: none"> • Bjarne Klemmensen, Oticon (confirmed by Niels, mail 11 May 2023) <p>or</p> <ul style="list-style-type: none"> • - Søren Vilsgaard?, WS-Audiology <i>(Morten will check with Søren Vilsgaard)</i> <p>Two other options for presentations have been proposed:</p> <ul style="list-style-type: none"> • Damian Murphy, Professor of Sound and Music Computing, York University "Sonic Home Project" • Gershon Dublon "How a Sensor-Filled World Will Change Human Consciousness" (Scientific American 2014) <p><i>Jeppe will contact Damian Murphy and Gershon Dublon to learn if they could fit into the event (and are willing to participate).</i></p>
21b	<p>Augmented sound in a Metaverse society</p>	<p>The aim of this topic is also to look for general trends 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.</p> <p>Directions to investigate could be:</p> <ul style="list-style-type: none"> • System devices • Metaverse, virtual/augmented audio (<i>Metaverse: Improved digital environment where it is possible to move seamlessly between work, play, shopping, socializing and creativity in one digital landscape</i>). <p>Professor Damian Murphy, University of York (see item #21a) and his Lab also seems to be quite active in this domain and may be able to give a presentation.</p> <p><i>Jeremy will at next meeting give some recommendations and whether the present theme makes sense in addition to them 21a, Jeemy will also try to identify people that can contribute.</i></p>
23	<p>Better tools for ensuring good audio quality in e.g. field recordings, hence reducing the need for dubbing</p>	<p>A long discussion did not bring a clear strategy to the theme. The original idea was to look for augmented audio support solutions for use already at the time of recording. A preferred aim would be that relatively novice users could make successful recordings of sound in the field, also noisier environments like Tivoli or in busy street.</p> <p>However, although some AI supported solutions are available, the most straight forward solutions seem to be to apply efficient post processing solutions (e.g. Adobe tools).</p> <p>We have not yet defined a clear strategy for an event. Maybe the most optimal approach could be to present some solutions, including post processing that users could employ to improve the situation of sound recording, especially in the field (less controlled environment). Although experienced people in sound recording in the field (including using post processing tools) will already know how to handle the challenges, we may focus on educating a broader community in how to make decent recordings in the field, including advise what post processing makes sense.</p> <p>The target audience could e.g. be the growing community of less experienced people making audio recordings, for example in conjunction with podcast recording.</p> <p><i>Jeppe has some ideas on what could be done in this context, and he will try to present a updated strategy for discussion of the theme at the next meeting.</i></p>

#	Subject	Background
24	'Sound Pollution'	It was confirmed that we should transfer the topic to the Working Group on "Environmental Sound Solutions". That working group already is engaged in more themes, where 'sound pollution' - e.g. related to electric cars - could fit in.
25	<p>"Sound Quality in communication systems"</p> <p>Reshaped from the original themes: 'Sound Quality in Digital Meetings' (#18) and 'Quality of sound in cell phone communication' (#25)</p> <p>(</p>	<p>Jeppe has had initial communications to • Stefan Bruhn (Dolby) and Markus Multrus (Fraunhofer), but due to workload related to SoundDay 2023, there has not been time to follow up. We will discuss the progress at our next meeting in January 2024.</p> <p>Background: Transmission of sound quality in communication systems (i.e. digital meetings") depends on several factors in the individual devices (headsets, speakerphones), echo cancellation, CODECS, compression algorithms, transmission solutions, etc. Even placement of the microphone close to the mouth of the speaker and the acoustic performance of the speaker/listener environments are essential. Add to that that products are getting more complex. Eg. Employing several microphones per unit to ensure better performance. 'AI' in various implementations is part of this in parts of the entire chain of transmission. Success in a quality transmission of sound depends on that basically all elements in a cascaded effort are performing in an optimal manner. The current webinar theme tries to address some of these vital elements.</p> <p>Timing:</p> <ul style="list-style-type: none"> • Q1 of 2024 <p>Audience: Researchers and developers of solutions, audio engineers in general, and other people interested in the technical details of communication links in relation to sound quality.</p> <p>Potential speakers and topics:</p> <ul style="list-style-type: none"> • Sebastian Braun - Microsoft "DNN-based speech enhancement for real-time communication" • Pejman Mowlae, Jabra • Stefan Bruhn (Dolby) or Markus Multrus (Fraunhofer) New immersive CODEC, 3GPP SA4 Codec supporting multi channels. Converts between headphones and multichannel systems. <p>Mads will provide additional names for potential speakers. Tore will assist in establishing contacts to 3GPP CODEC people.</p>
26	Autonomous Response to Audio	<p>Some companies, e.g. hearing aid companies, are highly interested in how sound influences human bodies, i.e. human nerve systems. In the past, these companies frequently sent students to Roskilde Festival with equipment to measure and indicate the effects that sound had on the human body. Today, some companies instead send students to New York, so that students can experience on their own body how the surrounding sound and noise are influencing them.</p> <p>Some companies also work closely with schools on the topic. However, there are ethical aspects related to this as well, when techniques are transformed into use in other contexts, e.g. the office, at political events, etc.</p> <p>Potential speaker:</p> <ul style="list-style-type: none"> • Dorothea Wendt, Eriksholm Research Lab • Jens Hjortkær, DTU (group of Jeremy) <p>The topic is about physiological response to different stimuli. Noise is well known to create a lot of issues in that context.</p> <p>Jeremy will come with a revised plan at our next meeting.</p>

#	Subject	Background
27	AI created music (and the threat to artistic generated music)	<p>Completed.</p> <p>The webinar on:</p> <ul style="list-style-type: none"> • AI in Music & Sound <p>was transmitted on 26th October 2023.</p> <p>Andreas Hemmeth and Anders Øland did a good job in addressing issues linked to ethical, legal, artistically challenges in AI in sound and music. There were also some interesting perspectives on how we strategically can use music and AI in music in the future.</p> <p>About 80 people had signed up, 45 attended the webinar transmission, and more are likely to have seen the webinar 'off-hours' (we do not have statistics for people viewing the webinar events after the transmission time. All past webinar events are visible on the DSC webpage).</p> <p>The theme is broad, and the interest is high. We should probably follow up on related issues.</p>
28	Cultural, ethical, and social consequences of new use of sound	<p>How will the way we consume music/sound in the future affect the way we interact?</p> <p>What are the social consequences?</p> <p>As audio producers how do we take this into account?</p> <p>The theme has been proposed by Lotte M. Klixbüll, Senior UX designer, Jabra.</p>

Ad 3 3. Other events of interests

Danish Sound Day, 7th November, 2023 at The Center for Hearing & Balance

Still in early stages of development, but the themes we are working with now include:

- Sound & Mental Health
- AI in the Clinical Environment
- Hearing Health

New this year, is that we will have a poster session. The event invite and more info will be coming in our next newsletter.

If someone in the group feels that they already know a fantastic topic/research/demo that should be part of Danish Sound Day 2023, please get in touch with Jeppe Lindgaard.

Next meeting

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

- **Tuesday, January 30, 2024, 14:00 – 15:00**

Appendix 1: Participants in the meeting

Clément Laroche	GN Audio, Jabra	Senior Research Scientist
Jeremy Marozeau	DTU, Department of Health Tech.	Associate professor
Morten Kroman	WS Audiology	VP R&D Electronics
Tore Stegenborg-Andersen	FORCE Technology, SenseLab	Senior Researcher
Birger Schneider	CHAMAJ Consult ApS	Director
Jeppe Lindegaard	Danish Sound Cluster	Program Manager

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	<ul style="list-style-type: none"> • 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, 2022
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
8	Emerging Acoustic Sensor Technologies and Applications		Webinar	14 March, 2023
14	Feedback and noise cancellation		Webinar	9 May, 2023
17	Use of sound with robotics		Webinar	23 May, 2023
27	AI in Music & Sound		Webinar	26 October 2023

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	<p>Theme is rather interesting.</p> <p>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.</p> <p>University contribution is also not so likely since it is a topic mostly in the business domain.</p> <p>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.</p> <ul style="list-style-type: none"> • 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. <p>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.</p>	<p>Niels Pontoppidan Jonas Raun Hansen Morten Kroman Clément Laroche Tobias Neher Peder Costa</p>

Appendix 4: Noise added to electric cars

Response mail from Torben Holm Petersen in relation to the requirement of noise added to electric cars.

From: Torben Holm Pedersen <thp@forcetechnology.com>
Sent: 11. maj 2023 10:27
To: Tore Stegenborg-Andersen <toan@forcetechnology.com>
Subject: RE: Elbilstøj

Hej Tore.

Ja, jeg lavede et projekt om det. Resultaterne kan ses i:

T. H. Pedersen, T. Gadegaard, K. Kjems, and U. Skov, "White paper on external warning sounds for electric cars - Recommendations and guidelines," 2011.

som ligger i Mendeley og på vores hjemmeside. Jeg har også et par PP-shows om emnet.

Jeg forsøgte dengang at overtale kommissionen til at lade lydstyrken afhænge af tydeligheden af det specifikke signal i baggrundsstøj. Ideen er også beskrevet i de amerikanske forskrifter.

Man ville dog kun have en metode, der var så enkel, at den kunne kontrolleres med en billig lydtrykmåler. Dvs. at kravene er specificeret i dB(A), detaljerne kan ses i EU direktivet.

Konsekvensen er så, at nogen signaler er svære at høre og andre opfattes som unødigt larmende. De gælder både kørsels- og baklyde, hvilket man kan observere hvis man lytter efter i trafikken og på P-pladser.

Hvis man er opmærksom på det, kan man også konstatere, at i langt de fleste tilfælde hører man lyden af dæk før advarsels- og motorlyde. Det gælder både for el- og mange fossilbiler.

Måske er reglerne nu så gamle, at der er basis for at se på dem igen. Dels er der mange flere typer af elbiler og dels er der mange fossilbiler med meget støjsvage motorer.

Vh. Torben.