

Summary: "Future Sound Tech Solutions" – Meeting #07

Meeting # 07 in working group "Future Sound Tech Solutions" took place on May 17, 2022.

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.

Summary details

See the following pages.

Ad 1a & 1b: Proposals for Webinars

#	Subject	Background
1a	AI/Machine learning (ML) Workshop (virtual/physical)	Edge Workshop 01 completed April 5, 2022. The event will be repeated on June 7, 2022, now together with IDA. At a later point in time (second half of 2022) we will transmit a follow up webinar, now with focus on medical products.
2	“Demant Discovery”. Event at “Lydens Hus”	Completed March 17th 2022. Alvenir, IDUN Audio, Auricle & Dive.fm together with guests from Demant
3	Redress the great achievements of audio – and address the reality of unsolved audio challenges.	Theme dropped at previous meeting
4	Audio & privacy	Topic of “audio and privacy” to be included in half-day conference, May 4th 2022 (Copenhagen).
5	Position paper on ‘Sound Quality in Digital Meetings’	Draft version of ‘position paper’ on “Sound Quality in Digital Meetings” available, will be updated soon Presented at the May 4, 2022, conference at AAU-CPH.
6	Multisensory processing	Completed December 7 th , 2022
7	Green footprint of audio streaming	Webinar: “Sustainable Transformation in Audio Companies” Completed: January 25, 2022 A follow-up networking meeting at Interacoustics in Middelfart. completed April 6 th , 2022,
8	“Emerging Acoustic Sensor Technologies and Applications”	Planned for execution late 2022 In the future, sensors will be integrated into all kinds of products. Influence on the traditional sensor market? Candidates for speakers: <ol style="list-style-type: none"> 1. Magnus Hemer, Sonion 2. Thomas Jensen, Knowles 3. HBK (Claus Blaabjerg to check)? 4. G.R.A.S. (Niels Kjærgaard/others)? 5. Sergei Rotger Griful (Eriksholm) 6. Others (e.g. Auricle-Pedro Costa)? Will be planned together with Efren Fernandez Grande
9	‘Personalization’ of user needs	Event planned for June 1, 2022 Speakers: <ul style="list-style-type: none"> • Bert de Vries (GN Hearing), confirmed • Alessandro Pasta, senior data scientist at Oticon customer insights group at HQ, confirmed. Niels Pontoppidan will serve as moderator.

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10	Use of pre-simulated data	<p>Planned for June 7, 2022</p> <p>Focus on low bandwidth codecs for AI applications. Train neural networks using synthetic data.</p> <p>Speakers:</p> <ul style="list-style-type: none"> • Rasmus Kongsgaard Olsson, Jabra, confirmed. • Roman Serizel, Loria (F), contacted, not yet confirmed • Toon van Waterschoot, ESAT, Leuven, confirmed
11	Perceptual audio evaluation one-o-one	Completed
12	'Sound Day 2021 keynote	Completed
13	Hearables	<p>The topic seems less interesting for the hearing aid industry, who do not see hearables as an alternative to hearing aids. The hearing aid market is highly regulated and difficult to enter. However, hearables may serve as a useful complement for hearing aids. i.e. as a useful path for potential users of hearings aids and thus boosting the market for hearing aids.</p> <p>Hearables are seen as a consumer product, not at medical product. There is some uncertainty with respect to, what the market of hearables consists of but if earbuds in general are included, it is a huge market. Hearables possibly of more interest to e.g. Jabra, EPOS and other earbud manufacturers (see also Appendix 2).</p> <p>Agreement that it could be useful to run a webinar event, since many do not fully understand what the hearable market is and over-the counter products mean. Focus should be on identifying the market for hearables, including the evolution to date, use of ANC, etc. and what development are currently in progress. Contributions from the professional hearing aid industry, but more likely from the headset & earbud industries, e.g. including Apple.</p> <p>Potential speakers:</p> <ul style="list-style-type: none"> • Philippe Wargniez Jørgensen - GN, head of BU • Anders Jessen - WSA, director of competitive intelligence • Frederik Schurizek-Antonsen (FRSH), head of competitor insights, • Someone from other consumer industries. <p><i>At the next WG meeting we will aim at devising a speaker list.</i></p>
14.a	Noise cancellation	<p>Used in headsets, earbuds, etc. A challenge in application.</p> <p>Could be interesting to dive into the technology and challenges around noise cancellation.</p> <p>The technology in noise cancelation is rather straight forward, but the secret lies in the implementation (expert design). In addition there are physical constraints, e.g. speed in processing. Also, why do we need to use dynamic speakers, etc.</p> <p>In addition, e.g. FORCE (SensLab), is looking into the discomfort of using noise cancellations.</p> <p><i>We will contact Clément Laroche, Jabra and Torben Christiansen, EPOS for help in identifying speaker candidates.</i></p>

#	Subject	Background
14.b	Speech prediction	<p>Active noise cancellation, ANC, can remove low frequency noise and passive noise cancellation can remove high frequency elements. However speech is in between, and ANC will never be able to suppress speech. Can this challenge be handled to some degree through employment of speech prediction to overcome this downside of in ANC? A difficult research topic.</p> <p>The two areas, noise cancellation and speech prediction could be handled in a combined webinar where these issues are highlighted.</p> <p>Proposal to have one presentation in the combined webinar focusing on 'speech predictions'</p> <p><i>We need a good speaker?</i></p>
15	Feedback cancellation/suppression/control	<p>Topic is related to hearing aids, stage performance issue (microphone control), speaker phones etc.</p> <p>Echo cancellation. Very different depending on applications. In hearing aids, one type of solutions, in PA systems different solutions, etc.</p> <p>Potential speakers from companies, alternatively people such as:</p> <ul style="list-style-type: none"> • TC Electronic (Music Tribe), • Kim Rishøj • Knud Bach Christensen ?j • Jabra • EPOS • Harman (Struer) • Meyer Sound • Demant (Meng Guo)
16	DSP event	<p>Broad focus on DSP. WG not fully clear of status and actions taken, need to be clarified.</p> <p>Possible speaker:</p> <ul style="list-style-type: none"> • Roland Baduit (name misspelled?) professor in mathematics, Paris. <p><i>Awaits next meeting (Efren & Clément inputs ?)</i></p>
17	Use of sound with robotics	<p>We touched on the topic in recent webinar, 'Robot Audition' (April 19, 2022). We should focus on making a joint follow up event with the Robot Cluster, 'Odense Robotics':</p> <p>Contact persons:</p> <ul style="list-style-type: none"> • Søren Elmer, Project Director, Odense Robotics • Jens J. Tybo Jensen, Indesmatech ? <p><i>More work on the topic needed.</i></p>
18	'Sound Quality in Digital Meetings'	<p>Agreement that we should enforce the activity related to the position paper on 'Sound Quality in Digital Meetings'.</p> <p>We can repeat the presentations from the May 4 event (AAU-CPH) in a webinar. Possibly we should check if some of the material and focus need some minor updates.</p> <p>In addition, we should use the summer period to try to get companies and knowledge institutions to line up collaborative projects in the area. It is important that a 'position paper' is seen to have effect.</p> <p>Later on, we can aim at position papers in other areas, if we can find the right recipe for actions.</p>

Ad 2: Physical Events

Sound Day 2022 will take place on November 9, 2022, at DTU SkyLab, Centrifugevej 374, 2800 Kongens Lyngby

Ad 3: Collaborative projects

A new call for collaborative projects under DSC will be announced for August 2022. Projects under that call must be completed in 2022.

Now is a good time to start building consortia for upcoming collaborative projects. Experience show that it takes time to form consortia. Often the knowledge institutions are initiators since they in contrast to companies can obtain funding from DSC and thus have the greater incentive. However, a consortium should focus on projects that will be essential for the participating private enterprises.

It is recommended to contact the DSC secretariat early on, partly to obtain counselling on what is possible and what needs to be included in an application, partly to obtain assistance in finding partners for a consortium, if that is an issue for establishing a project application.

Next meeting

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

- **Wednesday September 7, 2022** **15:00 to 16:00**

Appendix 1: Participants in the meeting

Jonas Raun Hansen	GN Hearing A/S	Manager, Electro Acoustics
Morten Kroman	WS Audiology	VP R&D Electronics
Niels Pontoppidan	Eriksholm Research Centre	Research Manager
Tore Stegenborg Andersen	FORCE Technology	Senior Researcher
Birger Schneider	CHAMAJ Consult ApS	Director
Torben Vilsgaard	Danish Sound Cluster	Director
Shelley Uprichard	Danish Sound Cluster	Project Manager
Stine Hundahl Villadsen	Danish Sound Cluster	Project Manager

Appendix 2: Hearables, some references

<https://www.hearingtracker.com/hearables>

September 28, 2021

Hearables are essentially “smart” earbuds. Wikipedia defines hearables and smart earbuds as “technically advanced, electronic in-ear-devices designed for multiple purposes ranging from wireless transmission to communication objectives, medical monitoring and fitness tracking.” There are currently five main categories of hearables:

- Sports true wireless earbuds
- Voice-focused true wireless earbuds
- Commodity true wireless earbuds
- Hearing enhancement earbuds
- Hearing aid hearables

<https://theconversation.com/wearable-tech-for-your-ears-hearables-can-teach-you-a-language-or-music-with-the-help-of-ai-161571>

August 25, 2021

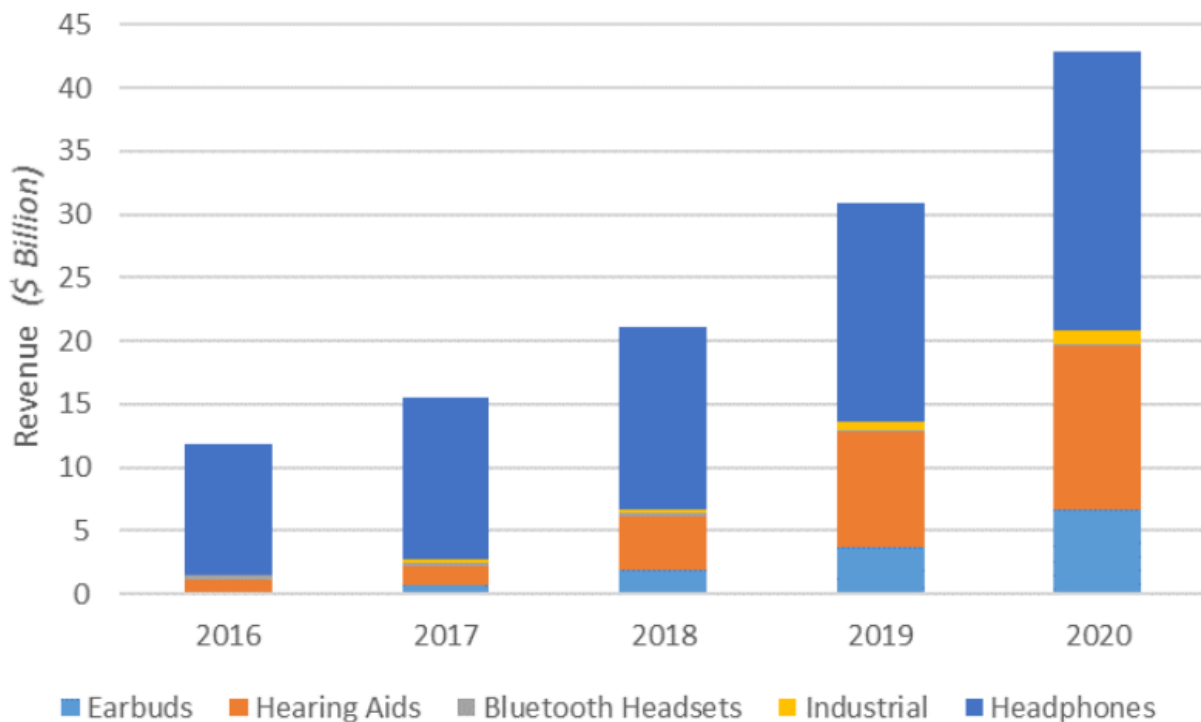
<https://www.reviewgeek.com/114421/what-are-hearables/>

April 30, 2022

<https://www.vrtonung.de/en/hearables-earbuds/>

<file:///E:/Innovationsnetv%C3%A6rk/Dansk%20Lydteknologi/2020%20Danish%20Sound%20Cluster/Arbejdsgrupper/WG%203%20Future%20Sound%20Tech%20Solutions/2022-05-17%20Meeting%20%2307/The-Market-for-Hearable-Devices-2016-2020.pdf>

Nick Hunn, Nov. 2016



Appendix 2: "Guiding star" note

Danish Sound Cluster
WG "Future Sound Tech Solutions"



"Guiding star" note:

"Sound quality in digital meetings"

"Guiding star" paper, i.e. reference note for focus areas within the sound area.

- Purpose: A 1-2 page paper to describe: 1) The background, 2) the situation today, 3) what needs to be done, 4) what it means for Danish companies, 5) expected future development in the market and 6) what it means for Danish companies and knowledge institutions. Topic is defined based on general interest in relation to DSC and SoundDenmark.
- Future use: The reference paper may find application, for example, in connection with fund application for projects as well as for general inspiration, e.g. in connection with creating interest in the area for companies, educational institutions, student recruitment, etc.
- Activity: A small Ad Hoc working group prepares the focus paper.

Current case: "Sound quality in digital meetings" is important. In an era, where video meetings have become common, it is essential to improve sound quality to a level where participants are not affected negatively as a result of joining in video meetings.

Many, who frequently participate in Zoom and Team's video meetings, experience fatigue and stress caused by poor sound quality. For several Danish companies, it is a core area of competence to ensure high sound quality with their products. It is known that to have a strong position in the market, a company's audio products must be better than that of competitors in the market:

Danish global players in the field include:

- Jabra (GN Audio)
- Epos (Demant)
- Bang & Olufsen

Marketing of "sound quality in digital meetings" as focus area on its own right for research is considered a poor approach to success. The subject does not have great opportunities to obtain support in Danish research councils, at EU project funding, etc. Competition from other R&D areas is fierce. However, if the subject can be coupled with stress, cognitive challenges, etc., one stands much stronger.

Many people do not understand why they often feel tired after video meetings. The fact is that sound quality is generally poor in video conferencing, and here much of the explanation of fatigue and stress must be found.

We want a perspective paper on the subject, not least including articulation of future impact.

For the present topic, a small ad hoc working group is proposed with the participation of:

- Clement Laroche, Jabra,
- Torben Christiansen, Epos
- Tore Stegenborg-Andersen, FORCE Technology
- Birger Schneider, CHAMAJ Consult

We envision that the perspective paper can be utilized well in connection with e.g. project applications, as it can serve as a common framework that can be referenced, when needs are to be identified.

Furthermore, we think that a similar approach can be used to put into perspective other significant areas under the DSC.

When proposal of the sub-group is presented, it will be discussed in the working group and possibly also with one or more of the other working groups. The finalized reference paper is published.

Niels Pontoppidan
Mads Græsbøll Christensen
Birger Schneider