

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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META PLATFORMS, INC.,

Petitioner,

v.

JAWBONE INNOVATIONS, LLC,

Patent Owner.

Patent No. 7,246,058  
Filing Date: May 30, 2002  
Issue Date: July 17, 2007

Inventor: Gregory C. Burnett  
Title: DETECTING VOICED AND UNVOICED SPEECH USING  
BOTH ACOUSTIC AND NONACOUSTIC SENSORS

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**PATENT OWNER'S SUR-REPLY**

Case No. IPR2023-01352

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**EXHIBIT LIST**

| <b>Exhibit No.</b> | <b>Description of Document</b>                                                                                                                                                                                                                                                           |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2001               | Transcript of the Deposition of David S. Anderson, Ph.D., taken February 3, 2023 in IPR2022-00623                                                                                                                                                                                        |
| 2002               | Wave Walker DSP, Cross Correlation Explained With Real Signals, Dec. 1, 2021, available at <a href="https://www.wavewalkerdsp.com/2021/12/01/cross-correlation-explained-with-real-signals/">https://www.wavewalkerdsp.com/2021/12/01/cross-correlation-explained-with-real-signals/</a> |
| 2003               | Gardner, William A., Statistical Spectral Analysis: A Non-Probabilistic Theory, 1988                                                                                                                                                                                                     |
| 2004               | Declaration of Akbar M. Sayeed, dated June 26, 2024                                                                                                                                                                                                                                      |
| 2005               | Curriculum Vitae of Akbar M. Sayeed                                                                                                                                                                                                                                                      |
| 2006               | Transcript of the Deposition of David S. Anderson, Ph.D., taken June 11, 2024                                                                                                                                                                                                            |
| 2007               | Merriam Webster Dictionary Definition of “Throat Microphone”                                                                                                                                                                                                                             |
| 2008               | Merriam Webster Dictionary Definition of “Laryngophone”                                                                                                                                                                                                                                  |
| 2009               | Acker-Mills et al., Speech Intelligibility in Noise Using Throat and Acoustic Microphones, U.S. Army Aeromedical Research Laboratory, April 2004                                                                                                                                         |

## **I. INTRODUCTION**

Petitioner's Reply (Paper 17) does not show that the Challenged Claims are obvious. As shown in Jawbone's Response (Paper 14), U.S. Patent No. 7,246,058 (Ex. 1001, the "'058 Patent") is not obvious because the combination does not disclose a "voicing sensor" or "physiological information" under the proper constructions, and because the recited "cross-correlation data" would not have been obvious.

The heart of the invention in the '058 Patent is to use a "voicing sensor," distinct from a "microphone" to receive "physiological information" distinct from "acoustic signals" in order to detect voiced and unvoiced speech in high-noise environments. While the '058 Patent discloses two embodiments—NAVSAD, which includes a voicing sensor and PSAD which is microphone-only—only the NAVSAD embodiment is claimed in the '058 Patent. Meta simply ignores this fundamental aspect of the invention, and attempts to conflate both "voicing sensors" with "microphones" and "physiological information" with "acoustic signals," eviscerating the invention of the '058 Patent.

Meta also raises new arguments in an attempt to show some reason or motivation to combine Meisel with Kaneda, but these are even further at odds with Meisel's approach.

Meta's arguments should be rejected, and the Board should therefore issue a Final Written Decision holding all the Challenged Claims not unpatentable.

## II. CLAIM CONSTRUCTION

### A. "Voicing Sensor"

Meta's Reply misses the fundamental point of the '058 invention – to use a voicing sensor, *distinct from a microphone*, in concert with microphones for improved detection of voiced and unvoiced speech in high noise environments. Indeed, on Reply Meta entirely fails to address the distinction between the separately claimed "voicing sensor" and "microphone," continuing to improperly conflate the two.

Meta also fails to recognize that the '058 Patent discloses two different embodiments: PSAD, which only includes microphones, and NAVSAD, which also includes a voicing sensor. *See* Figs. 1 and 2 below. Only the NAVSAD embodiment, which requires a voicing sensor, is claimed in the '058 Patent. Yet Meta erroneously relies on disclosure related to the microphone-only PSAD system throughout its arguments. *See e.g.*, Reply at 3-5, 16-18.

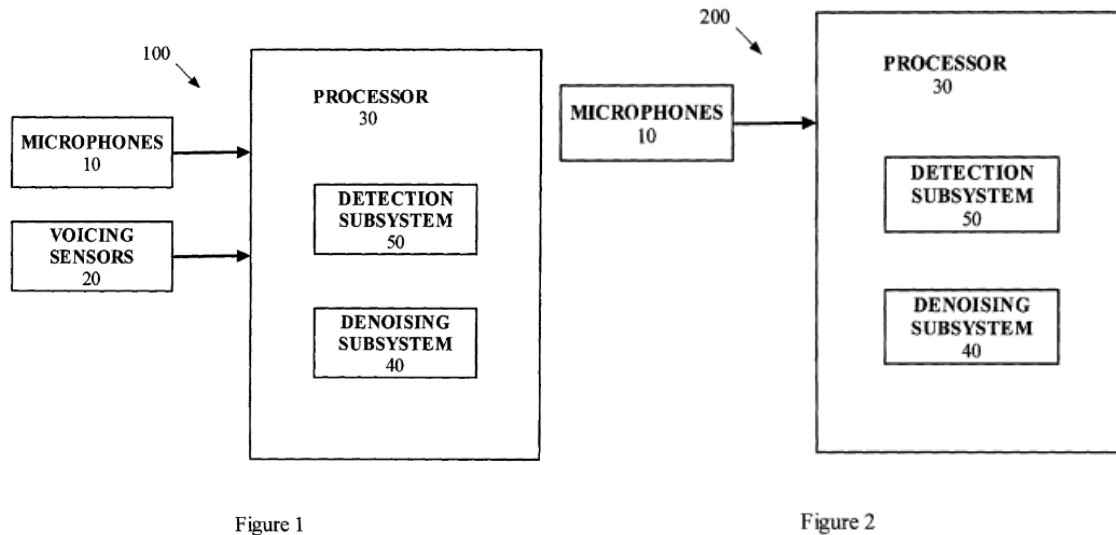


Figure 1

Figure 2

Compare Fig. 1 (NAVSAD) with Fig. 2 (PSAD).

At rock bottom, the '058 Patent claims a system in which the “voicing sensor” is **not** a conventional microphone, in order to function in high-noise environments. Meta’s attempt to conflate a “voicing sensor” with a “microphone” would remove the core inventive concept of the NAVSAD system from the claims, and would render the claimed functionality nonsensical.

This is entirely consistent with the intrinsic record of the '058 Patent, which explains that a voicing sensor is “any sensor that is able to detect human tissue motion associated with speech and is unaffected by environmental acoustic noise.” '058 Patent, 3:61-63. Meta’s unsupported suggestion that the “sensor” in this sentence could be *something* other than the claimed “voicing sensor” is plainly incorrect. The '058 Patent states that “sensor” refers to the “non-acoustic sensor.” *Id.*, 4:55-57 (“the non-acoustic sensor (or **hereafter just the sensor**)” (emphasis

added)). Moreover, the cited paragraph follows an extensive discussion of Figs. 1-3 – there is no other “sensor” at issue except the claimed “voicing sensor” of the NAVSAD system depicted in Fig. 1. Moreover, the ’058 Patent specification is replete with discussion that the sensor of the NAVSAD system must be “non-acoustic.” *See e.g.* ’058 Patent, 2:67-3:2 (“the Pathfinder system 300 is equivalent to the NAVSAD system 100 when the voicing activity detector (VAD) 320 **is a non-acoustic voicing sensor 20**”) (emphasis added); *id.* at 3:13-16 (“a NAVSAD system adds a non-acoustic sensor to enable detection of voiced speech in any environment.”). Moreover, the ’058 Patent consistently distinguishes between “microphones” and “sensors.” *Id.*; *see also id.*, 2:31-34 (“The NAVSAD system couples microphones 10 and sensors 20 to at least one processor 30. The sensors 20 of an embodiment include voicing activity detectors or non-acoustic sensors”).

Meta’s argument that the ’058 Patent “discloses acoustic only embodiment” are irrelevant, as they rely on the **unclaimed** PSAD system, which does not include any claimed “voicing sensor.” *See* Reply at 3-5.

The term “voicing sensor” should therefore be construed as “a sensor that is able to detect human tissue motion associated with speech and is unaffected by environmental noise.”

Meta’s remaining arguments, addressed in turn below, are unavailing.

**1. An “acoustic throat microphone” is a Type of Skin-Surface Microphone, Consistent with Patent Owner’s Construction**

Meta first argues that Jawbone’s proposed construction is inconsistent with claim 5’s recitation of an “acoustic throat microphone.” Meta argues from the premise that an “acoustic throat microphone” senses acoustic noise, apparently based entirely on the use of the word “acoustic” in claim 5. Meta is wrong.

An acoustic throat microphone is a type of skin surface microphone that uses its membrane to detect skin vibration *instead of* acoustic sound waves. *See* POR at 11-13. While the *mechanism* that detects these skin vibrations remains that of an acoustic microphone, the entire point of a throat microphone is that it is pressed against the users’ skin, and therefore unaffected by background noise. *Id.* at 12 (“Throat microphones are designed to pick up (transduce) the vibrations of the vocal apparatus at the throat instead of the vibrations of air molecules at the mouth.”) Patent Owner’s expert confirms that a POSITA would understand the plain and ordinary meaning of an “acoustic throat microphone” as recited in claim 5 to refer to exactly such a sensor, which is unaffected by environmental noise. *Id.* at 12-13.

Meta does not address Jawbone’s evidence of the plain and ordinary meaning of “acoustic throat microphone” at all, instead asking the Board to ignore it as “extrinsic evidence.” Reply at 7-8. But a POSITA’s understanding of the term “acoustic throat microphone” is highly relevant to this dispute, and the intrinsic

record is otherwise silent on “throat microphones.” Dr. Sayeed’s identification of extrinsic evidence demonstrating a POSITA’s understanding of the plain and ordinary meaning of the term is highly instructive, and should be considered. *See Laitram, LLC v. Ashworth Bros., Inc.*, No. 2022-1044, 2023 WL 3449148, at \*4 (Fed. Cir. May 15, 2023) (“Here, the plain and ordinary meaning of ‘positively driven’ is supported by the specification and reinforced by expert testimony.”); *Tap Pharm. Prods., Inc. v. Owl Pharms., L.L.C.*, 419 F.3d 1346, 1354 (Fed. Cir. 2005) (“As a result, the term cannot be defined by some ordinary meaning isolated from the proper context, and it was appropriate for the district court not only to consider the intrinsic evidence, but also to consider Dr. Pitt’s interpretation of that evidence, both in context and from the perspective of a person of ordinary skill in the art.”).

Meta’s only substantive argument on this point is that the claim language “does not preclude the physiological information being an acoustic signal.” Meta’s argument again relies on incorrectly assuming that the disclosed PSAD embodiment is claimed. It is not. The central concept of this invention requires that the physiological information received at a voicing sensor not be affected by environmental acoustic noise. *See* ’058 Patent, 3:10-28 (“a NAVSAD system adds a non-acoustic sensor to enable detection of voiced speech in any environment . . . in high noise environments the unvoiced speech is unlikely to affect the voiced speech denoising. Unvoiced speech information is most important in the presence of

little to no noise and, therefore, the unvoiced detection should be highly sensitive in low noise situations, and insensitive in high noise situations.”). Meta’s position reflects another improper attempt to erase any distinction between the “voicing sensor” and “microphone” by further erasing the distinction between “physiological information” and “acoustic signals.” This argument should similarly be rejected.

**2. Petitioner Irrelevantly Conflates Electrical Interference with “environmental noise” at Issue in the Claims**

Meta attempts to confuse the dispute by conflating electrical or signal interference with the acoustic “noise” at issue in the claims, and suggesting that the existence of electrical interference renders various sensors inconsistent with Patent Owner’s construction.

The “environmental noise” recited in Patent Owner’s construction plainly refers to environmental *acoustic* noise, in the same way that the ’058 Patent specification refers to “noise” throughout the specification and claims. *See e.g.*, ’058 Patent, 1:28-31 (“In the speaker’s environment there may exist one or more noise sources that pollute the speech signal, or the signal of interest, with *unwanted acoustic noise*.”); *id.* at 2:38-40 (“The NAVSAD system works extremely well in any background *acoustic noise environment*.”); *id.* at 3:10-63, 4:42-57 (emphases added). Whether a sensor could be affected by some different type of “noise”

(electrical or signal “noise”) is completely irrelevant to the claim, and to Patent Owner’s construction.

Petitioner’s argument that various embodiments could be affected by *non-acoustic* environmental noises (*e.g.*, electrical interference or some other signal noise) are therefore irrelevant, and do not somehow render any embodiment inconsistent with Patent Owner’s construction.

Moreover, while Patent Owner disagrees that there is any legitimate confusion on this point, Patent Owner would not oppose modification of its proposed construction to refer to “environmental *acoustic* noise” if the Board finds that appropriate.

### **3. Patent Owner’s Construction Does Not Give Rise to 112 Issues**

Meta attempts to raise the specter of indefiniteness enablement issues, based on its argument that “environmental noise” could be read more broadly than acoustic noise. This ventures into the absurd. No reasonable interpretation of “environmental noise” in Patent Owner’s construction in view of the intrinsic record could possibly include non-acoustic noise. It simply does not matter whether a GEMs sensor, or any other voicing sensor, is vulnerable electrical “noise,” as opposed to the high acoustic noise environments which the ’058 Patent is concerned with.

The remainder of Meta’s argument again wrongly assumes that the PSAD system is claimed (despite its limitation to a “voicing sensor” not present in the PSAD system) and attempts to critique Patent Owner on that basis.

As above, while Patent Owner disagrees that any clarification of the construction is required, and finds it implausible that Petitioner has legitimately misinterpreted the construction to apply “environmental noise” outside context of acoustics, it would not oppose insertion of the word “acoustic,” such that its proposed construction of “voicing sensor” is “a sensor that is able to detect human tissue motion associated with speech and is unaffected by environmental *acoustic* noise.” This would resolve the issues now raised by Petitioner, to the extent that any confusion actually exists.

## **B. Physiological Information**

Meta attempts to read “physiological information” as including “acoustic signals,” despite the distinction between those terms in the claims. Ex. 2004, ¶ 49. Meta then goes a step further and suggests that sound waves travelling through *air* are “physiological information.” This is nonsensical, and again would erase the inventive concept of the ’058 Patent.

On Reply, Petitioner’s argument relies primarily on Dr. Sayeed’s deposition testimony that “at a very basic level, you can argue that, yes, it does” when asked “[c]an an acoustic signal produced by a person speaking contain physiological

information.” Dr. Sayeed’s deposition testimony reflects, at most, an acknowledgement that vibration in human tissue can produce sound waves. Even to the extent that human tissue motion and sound can correlate, nothing in Dr. Sayeed’s testimony suggests that a microphone, by merit of receiving acoustic signals, **receives** physiological information. Ex. 2004, ¶ 49. Nor does Dr. Sayeed’s testimony contradict Patent Owner’s proposed construction that physiological information means “information on human tissue motion.” On the contrary, Dr. Sayeed merely explained that motion in human tissue may generate acoustic signals. Ex. 2004, ¶¶ 48-49.

The remainder of Petitioner’s argument on reply amounts to a dispute as to whether the specification constitutes lexicography. But it is not necessary that the specification include a specific definition to adopt a construction. *Apple Inc. v. Masimo Corp.*, No. 2022-1890, 2024 WL 137336, at \*3 (Fed. Cir. Jan. 12, 2024) (“Although the specification does not state the term in explicit definitional format, the Board’s reading of the term is consistent with how the invention is described in the specification.”). Meta’s interpretation of the term “physiological information” improperly conflates that term with “acoustic signals” as part of its broader efforts to remove any requirement for a “voicing sensor” separate from a microphone from the claims. Construction is appropriate to resolve this dispute, and prevent Meta from effectively reading this requirement out of the claim.

**C. Cross-Correlation Data**

The term “cross-correlation data” should be construed as “data generated by multiplying and adding the result of a windowed set of samples at one time from one source by a windowed set of samples from another source where the two sets of samples may be shifted in time relative to each other.” A “cross-correlation” is a well-known term of art in the field of acoustic signal processing, and the ’058 Patent uses the term consistent with its plain and ordinary meaning. Jawbone respectfully submits that the Board should afford this term its customary meaning.

Patent Owner’s Response identifies consistent definitions of “cross-correlation” functions in Dr. Sayeed’s Declaration, Dr. Anderson’s Declaration, and numerous references submitted with both the Petition and Response.

Meta’s Reply does not substantively address whether that definition is accurate, and does not dispute that “cross-correlation data” is a term of art. Indeed, the only “conflict” that Meta attempts to identify with the intrinsic record is that there is no explicit recitation of “multiplication, adding, windowing, sampling, or time-shifting,” and no explicit lexicography of “cross-correlation.” Petitioner’s argument boils down to an assertion that the intrinsic record does not explicitly define “cross-correlation.” However, Petitioner fails to identify anywhere that the term cross-correlation (or XCORR) is used inconsistently with its accepted meaning in the art. While Petitioner points to a statement that “cross-correlation (XCORR)”

is calculated “between the acoustic signal from microphone 1 and the sensor data “[t]o further differentiate sensor noise from tissue motion,” this **function** of a cross-correlation does not somehow change what a cross-correlation *is*. On the contrary, as Dr. Sayeed explains at length, such recitation would be unnecessary because a POSITA would recognize that cross-correlation (such as the XCORR MatLab function) necessarily includes those elements.

Petitioner also argues that the extrinsic record does not support the construction, without identifying anything in the extrinsic record *contrary* to the construction. This argument again relies on the flawed understanding that a term of art must have been “clearly unmistakably defined” by the patentee to have an accepted meaning. Reply at 12; *Apple Inc.*, 2024 WL 137336, at, \*3. To the contrary, as Dr. Sayeed explains, the extrinsic record further supports his conclusions regarding a POSITA’s understanding of the plain and ordinary meaning of cross-correlation.

Petitioner also attempts to argue a POSITA’s understanding of a cross-correlation, as claimed, in view of *Meisel*. In particular, Petitioner argues for the first time that Meisel somehow discloses “shift[ing] the samples in time,” as required by Jawbone’s construction. This is both immaterial to claim construction, and incorrect. Petitioner’s arguments also significantly depart from the position disclosed in the Petition, which only identified Meisel’s comparison of “*instant imbalances* in the

relative amplitude of each microphone” (and operated from the unsupported assumption that any comparison constitutes a cross-correlation). Pet. at 26. Petitioner also fails to address the requirement that “cross-correlation data” be “generated *by multiplying and adding* a windowed set of samples.” Reply at 10-11 (emphasis added). As discussed in detail below, Meisel does not disclose a cross-correlation, and Petitioner’s new arguments are unavailing.

Finally, Petitioner also falsely accuses Jawbone of “misrepresenting” Dr. Anderson’s testimony.<sup>1</sup> None of Patent Owner’s statements are incorrect. Dr. Anderson confirmed that a POSITA would understand that the XCORR function in MatLab, which the ’058 Patent identifies as cross-correlation, involves “multiplying a sample from one set of samples [] by a sample from another set of samples,” just as Patent Owner explained. POR at 18.

24           Q.   Cross-correlation usually involves  
25   multiplying a sample from one set of samples by

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<sup>1</sup> This portion of the reply appears to be copied from the Petitioner’s reply in IPR2022-00623. *See Google LLC v. Jawbone Innovations, LLC*, IPR2022-00623, Paper 21 at 11 (P.T.A.B. May 5, 2023). Yet Patent Owner’s argument regarding Dr. Anderson’s testimony are not even the same as in that proceeding. *Compare* IPR2022-00623, Paper 17 at 13 *with* IPR2023-01352, Paper 14 at 18.

1 another -- by a sample from a different set of  
2 samples.

3                   Isn't that right?

5                   THE WITNESS: One of the types I mentioned  
6 does that.

7 BY ATTORNEY COWELL:

8           Q. And that's the -- that's how the XCORR  
9 function of Mat Lab works. Isn't that right?

| 11               THE WITNESS: Yes.

Ex. 2001, 29:24-30:11;

16           Q. Here, you say the '058 Patent identifies  
17 the built-in conventional XCORR function rather than  
18 explaining cross-correlation. Right?

19           A. Yes.

20           Q. So that refers to a building function like  
21 the one in Mat Lab. Right?

22           A. I assume so. He didn't specifically call  
23 out Mat Lab, but that's what the function in Mat Lab  
24 is called.

*Id.*, 31:16-24. Meta's careless accusations of "misrepresentation," copied from another matter which did not even involve the same argument, are false. Dr. Anderson's testimony further supports Patent Owner's construction.

### III. ARGUMENT

#### A. Meisel Does Not Disclose a Voicing Sensor

Meisel's "throat microphone" is a conventional close talking microphone pointed at a user's throat from some distance away, named as such to distinguish from its mouth and nose microphones. Meta does not substantively dispute those facts. Moreover, while relying on disclosure that close talking microphones respond "very little to background noise," Meta cannot identify any support for its position that the microphone is *unaffected* by environmental noise. Nor can Meta support its position that Meisel's "throat microphone" receives anything other than acoustic signals through vibration of air molecules. Detecting such acoustic signals does *not* mean that the microphone receives information on movement of human tissue (as opposed to anything else that generates sound).

In reality, Meta's argument primarily relies on the similarity between the *name* of Meisel's "throat microphone" and the "acoustic throat microphone" recited in claim 5 of the '058 Patent. But as discussed above and in the POR, a "throat microphone" is a term of art for a specific type of skin surface microphone placed over the larynx, and a POSITA would understand the throat microphone recited in the '058 Patent is consistent with that meaning. The fact that Meisel names one of its microphones pointed at the throat a "throat microphone" does not mean that a POSITA would consider it within the scope of the '058 Patent claims.

The remainder of Meta’s argument rehashes its claim construction position, and boils down to an assertion that Meisel’s system is similar to the *unclaimed* microphone-only PSAD embodiment disclosed in the ’058 Patent. This is irrelevant to the Challenged Claims, and does not somehow alter the physical impossibility that a microphone (as opposed to a voicing sensor which is non-acoustic) as described in Miesel be unaffected by environmental noise.

**B. Meisel’s “Throat Microphone” Does Not Receive Physiological Information**

Petitioner again does not dispute that the only thing sensed by Meisel’s throat microphone are acoustic signals transmitted through air. This position boils down to conflating “physiological information” and “acoustic signals” which are claimed separately.

At most, acoustic signals may be *generated by* movement of human tissue. That does not render the acoustic signals *themselves* information on human tissue motion. To treat them as such would render the claims on “physiological information” a nullity. Nor does any microphone which senses acoustic signals *receive* information on human tissue motion – unless a microphone is physically in contact with skin surface to detect vibration, it *cannot* detect anything other than sound.

The fact that Meisel’s “throat microphone” is pointed at the throat simply means that it detects sound emanating from the throat. It is not sufficient that a sound from the throat could “correspond” with human tissue motion as Meta now suggests.

**C. Meisel in View of Freidin Does Not Render Obvious the “Cross-Correlation” Terms**

Meta does not argue that Meisel alone discloses the claimed “cross-correlation data” on Reply, instead limiting its argument to Meisel in view of Freidin.

Meta first argues that Jawbone “applies the wrong legal standard for motivation to combine,” again copying Google’s argument in IPR2022-00623, despite differences Patent Owner’s response. Reply at 19. In any event, Meta is incorrect. It’s arguments still boil down to an assertion that a POSITA *could* add a cross-correlation step to a voiced speech recognition system, not that a POSITA *would* add such a step to Meisel – as Dr. Sayeed explains, they would not.

Meta fails to address the substance of Jawbone’s arguments that a POSITA would lack any reason and/or motivation to combine Meisel with Freidin in the context of this limitation, instead mischaracterizing Jawbone’s argument to argue that it “applies the wrong legal standard.” Reply at 18-19. But it is well-established that “[a]n invention is not obvious simply because all of the claimed limitations were known in the prior art at the time of the invention. Instead, we ask ‘whether there is a reason, suggestion, or motivation in the prior art that would lead one of ordinary skill in the art to combine the references, and that would also suggest a reasonable

likelihood of success.”” *Forest Lab ’ys, LLC v. Sigmapharm Lab ’ys, LLC*, 918 F.3d 928, 934 (Fed. Cir. 2019). Moreover, a POSITA would not modify a reference “only to have the same features” already disclosed. *Lyft, Inc. v. Quartz Auto Techs. LLC*, IPR2020-01450, Paper 7, at 17-20 (P.T.A.B. Mar. 4, 2021) (“[W]e are left wondering why a person of ordinary skill in the art would modify Douglas only to have the same features as disclosed by Harrison.”).

Dr. Sayeed explains that Petitioner’s argument that a POSITA would be motivated to modify Meisel with a cross-correlation to “identify voiced speech types because such voiced speech types correlate when the signals at the throat microphone and signal microphone (*e.g.*, mouth microphone) are high and the differences of the ADCI calculation may therefore be small” is nonsensical. Meisel ***already*** includes all necessary functionality to classify a sound based on its ADCI output, and a POSITA would not go to the effort of modifying Meisel only to have the same features. Ex. 2004, ¶¶ 78-79. Petitioner and Dr. Anderson do not attempt to explain ***how*** such a modification would improve Meisel’s accuracy in any way. *Id.*

As Dr. Sayeed notes, Petitioner’s blanket assertion based on Freidin’s disclosure that “[c]orrelators have been widely used . . . to measure the degree of correspondence” is also irrelevant because there is no reason that a POSITA would believe such an addition would be useful ***to Meisel***. This is particularly the case

because Meisel’s system measures the degree of *difference* between signals – a POSITA would not make a substitution that would “destroy the basic objective” of Meisel by instead measuring *similarity* of signals. *See Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (finding insufficient motivation to combine two references by “substitut[ing] the recessed barbs of [one reference] with the protuberances of [another reference], since [the petitioner’s] proposed substitution would destroy the basic objective of the barbs”).

Petitioner also mischaracterizes Jawbone’s arguments as requiring a “known problem with the prior art system,” in order to miscast them as contrary to *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1002-03 (Fed. Cir. 2016). They do not. Rather, Jawbone observed that Meisel and Freidin themselves do not “state or identify a need” to add a cross-correlation to Meisel’s system in the context of noting Petitioner’s failure to articulate *any* motivation to modify Meisel, and failure to show that “a POSITA would perceive Meisel’s speech detection as lacking accuracy or even being susceptible to an improvement in accuracy.” POR at 29.

The remainder of the Petitioner’s Reply on this limitation raises a slew of improper new arguments attempting to buttress its combination with previously undisclosed motivations to combine. Reply at 20-24.

But these boil down to assertions that (1) Meisel’s “simple compare operation” and Freidin’s cross-correlation were both well known (Reply at 21);

(2) and that the two references are compatible (*Id.*). Neither of these arguments addresses the fundamental flaws in the Petition because they fail to show why a POSITA would have a reason or motivation to apply Freidin's cross-correlation *to Meisel*, or even that a POSITA would understand that to improve Meisel. Instead, Petitioner's argument amounts to an assertion that a POSITA would find it obvious to apply a cross-correlation to *any and all* well-known signal processing systems. This is not a sufficient basis to combine references.

Petitioner's new argument is also flawed because it relies *on the '058 Patent itself* for teaching that the XCORR cross-correlation function (found in MatLab) is susceptible to errors in high noise environments. Reply at 21-22. Petitioner then attempts to modify Meisel with Freidin, based on that teaching from the '058 Patent. *Id.* This is naked hindsight and should be rejected.

Petitioner also attempts to confuse the fact that Meisel performs a simple comparison (outputting a 1 from the ADCI 58 when a source is voiced based on the throat mic having a higher amplitude than the side mouth microphone) by arguing that "Meisel's system recognizes speech as a voiced sound even where the throat microphone and the side mouth microphone both have high signal amplitudes, so long as the throat microphone signal is sufficiently higher than the side mouth microphone signal." Reply at 23. This does not change the fact that Meisel performs

a comparison. Even Petitioner acknowledges that in this situation, the microphone signal must be “sufficiently higher than the side mouth microphone signal.” *Id.*

The remainder of Petitioner’s arguments (1) rehash its conclusory assertions that the addition of Freidin’s cross-correlation would (somehow) make Meisel more accurate or (2) apply circular logic, assuming that a POSITA would make the combination *before* having any expectation of results in arguing that Meisel’s detection of vowels would have a high cross-correlation value if used with Freidin. Reply at 23-24. These arguments do nothing to cure Petitioner’s failure to show how or why a POSITA would expect Freidin’s cross-correlation to improve Meisel in the first place

**D. Meisel and Kaneda Do Not Render “identifying information of acoustic signals as noise when difference parameters are less than a gain threshold” Obvious**

This limitation is not rendered obvious because a POSITA would not have any reason or motivation to combine Meisel with Kaneda.

As noted in Patent Owner’s Response, Meisel does not contemplate any noise detection because Meisel relies on its specific implementation of a close-talking-microphone to minimize noise. POR at 34. In essence, Meisel takes the position that close talking microphones are good enough. Indeed, Meisel actively criticizes the Sakoe reference for using one of its two microphones for a non-speech purpose. *Id.* A POSITA would understand this teaching to, if anything, *discourage* the

speech/noise detection that Petitioner seeks to import from Kaneda. *Id.* The Petition incorrectly conflates the determination of whether a sound is a plosive or a fricative with speech/noise detection and fails to show any reason or motivation to the contrary.

On Reply, Petitioner simply re-hashes its argument that a POSITA would be motivated to add “noise detection to Meisel to further refine its speech signals and improve its accuracy.” Reply at 25. But Petitioner fails to provide any support as to why a POSITA would look to modify Meisel specifically in view of *Kaneda*, particularly in view of Meta’s misreading of Meisel’s critique of Sakoe which it wrongly interpreted as support for that approach.

Among other issues, Meta assumes that a POSITA would (somehow) apply Meisel’s T1 gain thresholds “appropriately to filter low level background noise” as a *prerequisite* to a combination with Kaneda. Reply at 26. Meisel does not disclose any such thing. To the contrary, T1 is the threshold for which the “output of rectifier 505 will be non-zero” based on the amount which the inputs at amplitude detector 501 exceeds that of amplitude detector 502. Ex. 1005, 9:23-50. Meisel ultimately feeds this result into outputs 60 and 61, which are used to assess whether a speech signal is plosive or fricative. *Id.*, 10:4-11. There is no disclosure of T1 representing a background noise filter, and it is telling that Petitioner relies on the new “Reply

Declaration” of its expert rather than any explicit disclosure of Meisel for this argument. *See* Reply at 26 Ex. 1042.

Petitioner also raises the new argument that because “each ADCI is designed to pick up signals with different amplitudes,” a POSITA would “set different T1 for each ADCI to accurately distinguish noise and speech.” Reply at 26. Petitioner similarly argues that Meisel’s criticism of Sakoe’s use of a microphone for non-speech purposes represents a known problem to solve with noise-detection, despite the fact that Meisel directly critiques the presence of that noise detection. *Id.* These new arguments circularly assume that a POSITA would want to alter Meisel in view of Kaneda in the absence of any noise/speech detection (as opposed to speech classification) in Meisel. There is no evidence that a POSITA would do any such thing.

Thus, a POSITA would not have any reason or motivation to combine Meisel with Kaneda to arrive at this limitation

#### **IV. CONCLUSION**

As discussed above, Petitioner’s combination fails to disclose or render obvious numerous limitations of the ’058 Patent, and therefore does not render obvious any claims. The Board should therefore issue a Final Written Decision holding all the Challenged Claims not unpatentable.

Respectfully submitted,

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**CERTIFICATE OF WORD COUNT**

The undersigned hereby certifies that the portions of the above-captioned PATENT OWNER'S SUR-REPLY specified in 37 C.F.R. § 42.24 has 4,694 words in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24. This word count was prepared using Microsoft Word for Office 365.

Respectfully submitted,

November 1, 2024

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**CERTIFICATE OF SERVICE**

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