

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUM INDUSTRIAL TECHNOLOGY, INC.

Petitioner

v.

AMSTED RAIL COMPANY, INC.

Patent Owner

Case IPR2023-00539

Patent No. 9,981,673

PATENT OWNER'S PRELIMINARY RESPONSE

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Ex #	Exhibit Description
2001	Expert Declaration of Dr. Michael Shamos (“Shamos Declaration”)
2002	<i>Curriculum Vitae</i> for Dr. Michael Shamos
2003	Joint Claim Construction Chart - Amsted Rail Company, Inc., v. Hum Industrial Technology, Inc., et al., Civil Action No. 4:22-cv-00445-AGF (E.D. Mo. March 31, 2023) (“District Court Claim Construction Chart”)
2004	Prosecution history of U.S. App. No. 13/842,427 (the ’427 Application) which is issued as U.S. Pat. No. 9,365,223
2005	Prosecution History of U.S. App. No. 13/105,293 to Armitage (“Armitage Prosecution History”)

Patent Owner Amsted Rail Company, Inc. (“PO”) submits this Patent Owner Preliminary Response to the Petition for Inter Partes Review (“IPR”) filed against U.S. Patent No. 9,981,673 (“the ’673 Patent”).

Pursuant to 35 U.S.C. §314, the Director may not authorize an *inter partes* review to be instituted unless the Director determines that the information presented in the petition and any response shows there is a reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged in the petition. Petitioner has failed to establish any reasonable likelihood of prevailing on any claim of the ’673 Patent.

I. INTRODUCTION

The Petition should not be instituted because of the following deficiencies:

Institution should be denied because the Petition is procedurally deficient for at least four reasons. First, Institution should be denied under 35 U.S.C. §325(d) because—for all proposed grounds—the same or substantially the same prior art and arguments were previously presented to the Office.

Second, Petitioners failed to comply with 37 C.F.R. §42.104(b)(3) and proffer, much less analyze the claim under, what it contends is the correct claim construction. Petitioner has offered claim constructions in District Court which conflict with its apparent positions on those claim terms in its Petition. Absent an

explanation for why Petitioners are justified in taking inconsistent positions in district court and this proceeding, denial of institution is warranted.

Third, much of Petitioner's expert declaration is nothing more than a verbatim recitation of the Petition without further explanation or additional citations to evidence and should therefore be afforded no weight. As such, the Petition amounts to little more than conclusory and unsupported attorney argument and denial of institution is warranted.

Fourth, Petitioner also fails to identify with particularity the grounds and supporting evidence for its challenge on a claim-by-claim basis, instead relying on bare cross-reference citations to claims which do not share the same scope or claim language. Petitioner's failure to explain how these claims should be similarly treaded to those with different language and scope renders the Petition deficient and denial of institution is warranted.

Institution should also be denied because the Petition is deficient on the merits. Grounds 1 and 2 fail because LeFebvre does not disclose, teach, or suggest at least limitations 1(b), 1(c), 1(d), 10(c), 14(a), or 21(c). Grounds 3 and 4 fail because Armitage LeFebvre does not disclose, teach, or suggest at least limitations 1(b), 10(a), 10(b), 14(b), 14(c), or 21(c).

II. OVERVIEW OF THE '673 PATENT AND ITS FILE HISTORY

The '673 Patent issued on May 29, 2018 and was filed as U.S. Patent App. No. 15/158,018 (“the '018 Application”), which was filed on May 18, 2016. Ex. 1002 at 55. The '018 Application is a continuation of U.S. Pat. App. No. 13/842,427 (“the '427 Application”), which issued as U.S. Patent No. 9,365,223. The '018 Application also claims priority to U.S. Provisional Application No. 61/661,661, filed on June 19, 2012. Ex. 1013. Additionally, the '018 Application, like the '427 Application, is a continuation-in-part of Application No. 12/861,713 (“the '713 Application”), filed August 23, 2010. Ex. 1014.

A. Technology Overview

The '673 patent relates to a system and method for monitoring various operating conditions of a railcar and reporting of those operating conditions, e.g., a bearing may be monitored and the condition of the bearing may be reported. Ex. 1001 1:1-2, 2:26-40. The '673 patent teaches a POSA how to directly measure an operating condition of a railcar component via sensor data and apply one or more rules (i.e., heuristics) to the sensor data to determine current operating conditions and predict future operating conditions. *Id.* at 1:14-20, 2:61-3:14, 8:14-11:58. In one example, the '673 patent teaches a POSA how a single communication management unit may include advanced software for wirelessly collecting large amounts of data from a plurality of sensors devices and applying a statistical analysis to individual

sensor data and the collective data of the plurality of sensor devices to form forward looking predictions of operating conditions of the railcar. *Id.* at 1:14-20, 8:14-11:58, 14:4-59. The communication management unit is capable, for example, of establishing a mesh network with a plurality of sensor devices, determining an alarm condition, and communicating alarm conditions off site to a remote location. *Id.* at 1:14-20, 5:23-35, 8:14-11:58, 14:4-59.

In one example, the '673 patent teaches a POSA how to use a temperature sensor in thermal communication with a wheel bearing and/or a wheel bearing adapter in such a way that the collected temperature data may be correlated to the overall operating health of the bearing by applying one or more rules to the temperature data in order to establish a conclusion regarding the current operating health of the bearing. *Id.* at 4:33-63, 8:14-11:58. Moreover, the '673 patent teaches a POSA how to apply statistical analysis to the collected temperature data by utilizing a statistical model to form forward looking predictions of the bearing health, i.e., time till maintenance is required, expected date of failure, and the identification of yet to occur but potentially urgent or imminent failures. *Id.* at 2:61-3:14, 4:33-63, 8:14-11:58, 14:4-15:46. This analytical leap enabled train owners and operators to understand the severity of a measured parameter in such a way that they could continue to safely operate the train until such a time that maintenance was convenient or necessary. *Id.* 2:61-3:14, 14:4-59. In one example, the '673 patent

teaches a POSA that by assigning a low-level severity level, the operator may continue to operate the train but within certain safety parameters by, e.g., reducing the speed of the train and planning scheduled maintenance of the railcar at a future destination. *Id.* at 13:30-14:9.

The '673 Patent revolutionized mobile train monitoring by, for example, teaching a POSA how a single universal sensor device could be assembled within a housing and mounted on a railcar at a location of interest without requiring the customized bearing adapters and pads of the prior art. *Id.* at 4:1-6:22, FIGS. 1-5A. This advancement enabled new and complex algorithms and operating software to analyze the collected sensor data because the placement of the sensor was uninhibited by the former constraints in the prior art sensor devices which were typically built directly into specific and expensive adapters. *Id.* at 4:1-6:22; *see also* Ex. 1005 FIG. 4 (showing pad 16 built into the railcar frame. The '673 patent teaches a sensor device that broke free of the prior placement constraints having advanced heuristics and statistical analysis to form better assessments of operating conditions and better predictions of future operating conditions. *Id.* at 1:14-20, 4:1-6:22, 8:14-11:58, 14:4-59.

The sensor devices of the prior art only analyzed sensor data to determine if a current failure existed by making a simple arithmetic determination that the sensor data exceeded a predetermined threshold indicating failure. *See* §§VII.A.1, VII.C.1,

supra. The '673 patent greatly improved upon this basic concept by teaching a POSA how the quantification of a deviation from operating norms, i.e., assigning a severity level, provided highly useful information to the operators of the railcar. *Id.* at 1:14-20, 4:1-6:22, 8:14-11:58, 14:4-59. The '673 patent also disclosed performing substantial amounts of computational analysis directly on the railcar and can report the results of this computational analysis off-railcar to a remote location for further assessment. *Id.* at 1:14-20, 4:1-6:22, 8:14-11:58, 14:4-59.

B. Prosecution History

In a non-final Office Action, the Examiner rejected the pending claims of the '018 Application over the combination of U.S. Pat. Pub. No. 2008/0195265 to Searle ("Searle"), official notice, and U.S. Pat. No. 6,339,397 to Baker ("Baker"). Ex. 1002 at 106-120. The Examiner acknowledged that Searle does not disclose "determining high level alarms based on data and alarms collected from said communication management unit" and instead relied on Official Notice in view of Baker. *Id.* at 109. The Examiner acknowledged that Baker "does [not] sic detail an alarm condition being communicated." *Id.* at 110. The Examiner also clarified that "Baker is introduced to teach determining high level alarms based on data and alarms collected." *Id.*

In reply to the non-final Office Action, PO explained that the combination of Searle and Baker fails to disclose limitations 1(b)-1(d) because Searle is directed to

a binary system in which an alarm is generated “if a monitored condition exceeds a predetermined threshold or parameter.” Ex. 1002, at 424-425; *see also* Ex. 1008 at ¶72 (“If a monitored condition exceeds a predetermined threshold or parameter the processor will generate an alarm which is transmitted via a RF network to the server”). Applicant further explained that “Baker fails to resolve the deficiencies of Searle.” Ex. 1002 at 425; *see also* Ex. 1009 at 5:1-10.

PO made this point to show that Baker, like Searle, is directed to a binary system in which an alert is sent if a change in orientation of a measured component is greater than a predetermined parameter or threshold. Ex. 1009, at 2:54-63; 3:60-63; 4:9-5:24. Baker teaches that a transmitter unit 12 is configured to detect an orientation change of a component by sensing the direction of gravity using accelerometers. The change in orientation may signify that a change in conditions has occurred. The applicable components measured for a change in orientation in the Baker invention are hatch 16, bolster 18, hand brake 20, and security pin 22. Baker at 2:54-63; 3:60-63; 4:9-5:24. Therefore, Baker is directed to a binary system in which an alert is sent if the system detects a change in orientation that is greater than a predetermined parameter. There is nothing in Baker that quantifies the severity of the measured condition in Baker. *Id.*

To aid the Examiner in understanding the importance and meaning of the step “assigning a severity level,” and how this step cooperates with other claim

limitations and therefore distinguishes over Searle and Baker, PO referenced the '018 Application's specification at ¶42. Ex. 1002 at 425; *see also* Ex. 1001 at 12:40-65. PO explained "determining an alarm condition based on the assigned severity level avoids an excess of stoppages and delays that could result if an alarm was generated for every deviation that is detected." *Id.* Armed with this information, the Examiner issued a notice of allowance explaining that "the closest prior art of record" fails to teach or suggest the subject matter encompassed by limitations 1(b)-1(d). Ex. 1002 at 493-94. This shows that the Examiner understood that the basic threshold analysis of Searle and Baker was not equivalent to an analysis method in which the extent of a deviation from expected operating conditions is quantified and an alarm notification that indicates the seriousness of this quantification is transmitted, i.e., the requirements of limitations 1(b)-1(d) of independent claim 1. The prosecution history shows that the Examiner understood that the cooperation of limitations 1(b)-1(c) required more than the simple initiation of an alarm when a measured condition, i.e., sensor data, exceeded a pre-established threshold or parameter. *See* Ex. 1002 at 493-94; *see generally* Baker and Searle.

III. THE '673 PATENT IS A FIRST TO INVENT PATENT

Because the '673 Patent was examined under pre-AIA first to invent law, Patent Owner reserves the right to introduce, if a trial is instituted, evidence of the claimed invention's conception and reduction to practice and establishing a priority

date before the '673 Patent's effective filing date of August 23, 2010 or June 19, 2012. Petitioner does not challenge whether the '673 patent is entitled to the benefit of the provisional filing date (June 19, 2012). *See* Petition at 7 *concluding* "Accordingly, the challenged claims are entitled to a priority date of June 19, 2012 at the earliest."

IV. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art ("POSA") is a person with at least a B.S. degree in electrical or computer science or a related field, with at least two years' experience with sensing systems for railcars or similar industrial equipment, including familiarity with wireless networks and heuristics and statistical data analysis for failure prediction. Less work experience could be compensated for by a higher level of relevant education, and vice versa. *Ex. 2001* at ¶¶36-40.

V. CLAIM CONSTRUCTION

In Inter Partes Review proceedings, claims are interpreted "using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." 37 C.F.R. § 42.100(b). Under this standard, we construe the claim "in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." *Id.*; *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en banc). In determining a proper construction, the Board looks primarily

to “the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

A. “A Heuristic” and “Heuristically Analyzing”

The term “heuristic” appears in claims 1, 8, and 21. In the context of these claims, heuristic means “one or more rules.” Ex. 2001 at ¶42. Further, “heuristically analyzing” appears in claim 14 and means “applying one or more rules.” Fundamentally, a “heuristic” is a rule that is applied to information to assist in drawing conclusions from that information. *Id.*, see also *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1301 (Fed. Cir. 2014) (noting that the lower court “correctly determined that a person of ordinary skill in the art would understand ‘heuristic’ to mean ‘one or more rules to be applied to data to assist in drawing inferences from that data.’”) (overruled on other grounds by *Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed. Cir. 2015)). The specification contains a table spanning columns 7-12 of the ’673 patent with numerous examples of heuristics (i.e., rules) to be applied to the data received from the sensor units. See Ex. 1001 at pp. 12-14; Ex. 2001 at ¶42-43. In the context of the Challenged Claims, a POSA would understand a “heuristic” means “one or more rules” and “heuristically analyzing” means “applying one or more rules.” See Ex. 2001 at ¶44.

B. “Nominal [Operating Conditions]”

The term “nominal” in the context of the Challenged Claims means “expected.” Ex. 2001 at ¶45-46. The ’673 patent is directed to detecting operational failures (*see* Ex. 1001 at 1:20-21) and such failures can be predicted when operational parameters, like temperature, deviate from expected or usual values. Further, claim 20 recites “deviations from expected readings.” In the context of the full phrase, a POSA would understand “nominal operating conditions” to mean “expected operating conditions.” *Id.*

C. “Severity Level”

The phrase “severity level” means “assigning one from a plurality of known values indicating seriousness.” One of the features of the systems and methods disclosed in the ’673 patent that distinguishes over the prior art is “the ability to determine the severity of detected conditions to determine if immediate alarms should be raised to facilitate human intervention.” *See* Ex. 1001 at 2:15-22. The ’673 patent further teaches that an “action required to be taken by the locomotive driver varies based on the severity of the alert.” *Id.* at 11:44-46. Finally, the ’673 patent teaches “leveled alarms” which range from “Stage 1” identifying an alarm condition that need only be sent to base station for logging and future reference to “Stage 4” which requires immediate action to stop the train and perform emergency maintenance. *See Id.* at 13:30-14:3. Finally, the explicit claim language requires the

assigning of a severity level to particular deviations from nominal operating conditions. *See* Ex. 2001 at ¶¶47-49. A POSA would understand these passages and claim language to mean that the “severity level” assigned in limitation 1(c) is one of a plurality of severity levels. *See id.* at ¶48.

As explained *supra*, section II(b), Applicant informed the Examiner of the meaning of limitation 1(c) by explicit reference to ¶42 of Applicant’s as-filed specification. *See* Ex. 1002 at 425. In this regard, Applicant explained that “determining an alarm condition based on the assigned severity level avoids an excess of stoppages and delays that could result if an alarm was generated for every deviation that is detected.” *Id.* That is consistent with the meaning proposed here. Petitioner failed to consider how PO arguments during prosecution made with specific reference to ¶42 informs the scope of the relevant claim limitations.

For purposes of its preliminary response only, Patent Owner gives all other terms their plain and ordinary meaning, but reserves all rights.¹

¹ Patent Owner specifically reserves its right to assert additional arguments about the proper construction and scope of all terms if an IPR is instituted.

VI. THE PETITION IS PROCEDURALLY DEFICIENT AND SHOULD BE DENIED.

A. Petition Should Be Denied Pursuant To the Board's Discretion Under §325(d)

Institution should be denied because the art and issues raised by the Petition are cumulative and substantially similar to the art and issues already addressed by the Office during prosecution. In determining whether discretionary denial is warranted, the Board evaluates (1) whether the same or substantially similar art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of the first part of the framework is satisfied, whether the Petition has demonstrated that the Office erred in a manner material to the patentability of the challenged claims. *Advanced Bionics, LLC v. Med-El Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6 at 8-9 (PTAB Feb. 13, 2020) (precedential). If the first part of the framework is satisfied and the Petition fails to make a showing of material error, the Director generally will exercise discretion not to institute review. *Id.*

When evaluating whether to exercise its discretion when the same or substantially the same prior art or arguments were previously presented to the Office under §325(d), the Board weighs several non-exclusive factors, including, for example: (a) the similarities and material differences between the asserted art and the prior art involved during examination; (b) the cumulative nature of the asserted

art and the prior art evaluated during examination; (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection; (d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art; (e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and (f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments. *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17-18 (PTAB Dec. 15, 2017) (Precedential). “If, after review of factors (a), (b), and (d), it is determined that the same or substantially the same art or arguments previously were presented to the Office, then factors (c), (e), and (f) relate to whether the petitioner has demonstrated a material error by the Office.” *Advanced Bionics*, IPR2019-01469, Paper 6 at 10.

1. Petitioner Relies On the Same or Substantially the Same Prior Art Previously Presented to the USPTO (Becton, Dickinson Factors a, b, and d).

Contrary to Petitioner’s arguments, (Petition at 7, 15-17), the cited references for each of Petitioner’s four grounds are the same or substantially similar to references previously considered by the Examiner. “Previously presented art includes ... art provided to the Office by an applicant, such as in an IDS.” *Palo Alto Networks, Inc. v. Centripetal Networks, Inc.*, IPR2021-01156, Paper. 10 at 13-14

(PTAB Jan. 24, 2022). The Board “accept[s] that the Examiner considered [the prior art references] listed on the IDS,” especially where “the Examiner signed the IDS with the statement ‘all references considered except where lined through.’” *Biocon Pharma Ltd. v. Novartis Pharms. Corp.*, IPR2020-01263, Paper 12 at 9 (PTAB Feb. 16, 2021). Petitioner is simply wrong to argue that “a reference cited in an IDS ... should not serve as the basis for denying institution under 35 U.S.C. §325(d).” Petition at 16. *See Ivantis, Inc. et al v. Sight Sciences, Inc.*, IPR2022-01530, Paper 14, March 27, 2023 at 22 explaining “there is no requirement that [the] Examiner needs to rely on a reference in a rejection during prosecution in order for the reference to be 'considered' during prosecution.”

Petitioner relies on LeFebvre and/or Armitage as the sole references for Grounds 1, 3 and 4 and on LeFebvre as the primary reference for Ground 2. *See* Pet. at 6. But Petitioner fails to note that Patent Owner cited, and the Examiner considered, both LeFebvre and Armitage multiple times during prosecution. Indeed, during prosecution of the '018 Application, Patent Owner filed both an Information Disclosure Statement (IDS) and a corrected IDS citing LeFebvre² and Armitage.

² The IDS notice identified U.S. Patent No. 7,688,218, which is the patent that issued from the LeFebvre publication (Ex. 1005) relied upon by Petitioner (Ex. 1015).

(Ex. 1002 at 139-149 (citing LeFebvre at 143 and Armitage at 146), at 399-409 (citing LeFebvre at 403 and Armitage at 406.) Patent Owner also directly informed the Examiner that LeFebvre was a “document of particular relevance” through its submission of the International Search Report dated April 2015. (Ex. 1002 at 384-88.) Patent Owner also cited and informed the same Examiner of the relevance of both references during prosecution of the parent ’427 Application, to which the ’673 Patent claims priority.³ *See* Ex. 2004 at 172, 174, 364-65, 441-45.

The Examiner repeatedly confirmed their consideration of LeFebvre and Armitage. As an initial matter, and as discussed further in the related IPR2023-00538, the Examiner of the parent ’427 Application confirmed their consideration of LeFebvre and Armitage via initials and signatures on the IDS. *See* Ex. 2004 at 468-71, 479-80, 497-98. The same Examiner then reconfirmed consideration of both references during prosecution of the child ’018 Application. Ex. 1002 at 441-450 (confirming consideration of LeFebvre at 445 and Armitage at 448, through Examiner signature and date). The Examiner even used both references to locate relevant prior art. *See id.* at 132, 134, 470, 481 (using both LeFebvre and Armitage as part of “search query”). In addition, at the bottom of the IDS pages listing

³ The ’427 Application issued as U.S. Pat. No. 9,365,223 which is the subject of IPR2023-00538.

LeFebvre and Armitage, the Examiner included text stating, “ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /Y.A.S./” *See* Ex. 1002 at 445, 448 (confirming consideration because neither the LeFebvre nor Armitage reference cites are lined through). Because these references were expressly considered by the Examiner, (*see id.*), denial of institution is warranted. *See Microsoft Corp. v. Koninklijke Philips N.V.*, IPR2018-00279, Paper 11 at 12, 14-15 (PTAB June 8, 2018) (finding, under similar facts, the reference “was previously presented to, and considered by, the Office”); *Fellowes, Inc. v. Treefrog Devs., Inc.*, IPR2020-01509, Paper 11 at 7-8, 17 (PTAB Feb. 22, 2021) (denying institution under § 325(d) where reference was cited in IDS and listed on the face of the patent); *Ocado Grp. PLC v. Autostore Tech. AS*, IPR2021-00412, Paper 9 at 34-35 (PTAB July 21, 2021) (denying institution because reference listed in IDS “was previously before the Office”); *Eyenovia, Inc. v. Sydnexis*, IPR2022-00963, Paper 7 at 10-11 (PTAB Nov. 8, 2022) (denying institution because references listed in IDS were “previously presented” under § 325(d); *BMW of N. Am., LLC v. Stragent, LLC*, IPR2021-00419, Paper No. 14 at 12-13 (PTAB July 19, 2021) (denying institution under § 325(d) in part because relied-upon prior art was cited on an IDS), *reh’g denied*, Paper No. 21 at 5 (PTAB Mar. 21, 2022).).

Petitioner’s argument “the prior art relied upon herein teaches the very limitation found by the examiner to be missing from the prior art” is entirely off

point. Petition at 16. Here, Petitioner conveniently misrepresents the Examiner's stated reasons for allowance. Compare petition at 16 to Ex. 1002, at 493-494. Moreover, Petitioner failed to even acknowledge the significance of at least two limitations quoted by the Examiner in the Notice of Allowance. *Id.*; *see also infra* VI.A.2; and limitations 1(c)-(d), 8(c)-(d). For example, the Examiner determined that the prior art failed to disclose, teach, or suggest "assigning a severity level to said deviations from nominal operating conditions [and] determining an alarm condition based on said assigned severity level." Ex. 1002, at 493-494. Therefore, Petitioner does not show that the prior art relied upon in the Petition teaches the very limitations found lacking by the Examiner because Petitioner fails to even consider the correct limitations. Compare petition at 16 to Ex. 1002, at 493-494.

Petitioner's conclusory argument — that both references are not substantially similar to other art because both are "directed to railcar monitoring systems" that "apply heuristics to collect sensor data both 'to determine if an actual failure exists' and 'to predict potential or imminent failures,'" Pet. at 16 — fails for multiple reasons. First, claims 1-13 do not expressly require a determination of an actual or potential failure. *See* Ex. 1001 at 15:62-16:61. Second, Petitioner does not explain how the teachings of LeFebvre or Armitage differ from or are not cumulative of other art considered by the Examiner. The Examiner initially alleged that Searle teaches applying heuristics to data to determine if an actual failure exists and to

predict potential or imminent failures, (Ex. 1002 at 118), which Patent Owner successfully traversed, (*id.* at 431.) The Examiner also considered art that, e.g., used an abnormality diagnosis system to determine if a sensed abnormality “is caused due to the wear or the failure of the constituent parts of the bearing.” *See* Ex. 1002 at 151-253 at ¶¶32, 69-70, 92-93, 259 (describing diagnosis system for railway vehicle axel in European Application EP1548419 and how a “degree of the damage” can be evaluated to determine when repair is required). Petitioner does not argue that the Examiner was wrong in considering these references. *See generally* Pet. at 15-17. Petitioner’s failure to explain how LeFebvre and Armitage are not substantially similar to or cumulative of these references further warrants denial of institution. *Nespresso USA, Inc. v. K-Fee System GmbH*, IPR2021-01222, Paper 9 at 13-14 (PTAB Jan. 18, 2022) (denying institution because asserted reference was cumulative of reference considered during prosecution because petitioner relied on references for similar purposes) *EcoFasten Solar, LLC v. Unirac, Inc.*, IPR2021-01379, Paper 11 at 38-39 (PTAB Feb. 8, 2022) (“the issue of § 325(d) is *not* limited to whether the Examiner ‘considered’ a reference or grounds during the original prosecution leading to issuance of the [] patent, but whether the same or *substantially the same* prior art or arguments ‘*previously were presented to the Office*’”) (emphasis in original). A review of the prosecution history confirms the similarity of LeFebvre and Armitage to the Searle-Baker combination applied during

prosecution. *See* §II.B, *supra* (incorporated here). As explained in further detail below, LeFebvre analyzes sensor data by relying on a binary system in which (a) an alarm is issued if the threshold limit is exceeded; or (b) no alarm is issued if the threshold is not exceeded. *See* §VII.A.1.b, *infra* (incorporated here); *see also* Ex. 2001 at ¶¶57-60. As also explained below, Armitage’s system dynamically determines a “failure threshold” and analyzes sensor data against that threshold. *See* §VII.C.1, *infra* (incorporated here); *see also* Ex. 1006 at ¶¶29-30. Therefore, Armitage and LeFebvre are cumulative of Searle and Baker because they each analyze sensor data by a binary methodology in which an alert is sent if a measured condition exceeds a threshold or parameter and an alert is not sent if the measured condition does not exceed a threshold or parameter. Further, Petitioner’s reliance in Ground 2 on Barone for dependent claims 8-9 is immaterial to this analysis. Pet. at 6. Petitions’ citation of references not considered by the Examiner only for “additional subject matter of certain dependent claims[] is insufficient to persuade us that exercising our discretion under 35 U.S.C. §325(d) is inappropriate.” *Kayak Software Corp. v. Int’l Bus. Machs. Corp.*, Case CBM2016-00075, Paper No. 16 at 10 (PTAB Dec. 15, 2016) (Informative) (declining to institute review); *see also Miltenyi Biomed, GmbH v. Trs. Of Univ. of Pa.*, IPR2022-00853, Paper No. 11 at 45 (PTAB Oct. 11, 2022) (denying institution because purportedly invalidating art was

cited or similar to art cited in IDS and/or used dependent claim limitations insufficient).)

Because the Petition relies on references which were in front of the Examiner and that are the same, substantially similar to, or cumulative of other references that were applied by the Office during prosecution of the '018 Application and the '427 Application, the first part of the § 325(d) discretionary denial framework is satisfied. *Advanced Bionics*, IPR2019-01469, Paper 6 at 20.

2. Petitioner Has Made No Showing of Material Error (Becton, Dickinson Factors c, e, and f).

Upon satisfaction of the first prong of the Advanced Bionics framework, “the Board’s decisions generally have required a showing that the Office erred in evaluating the art.” *Id.* at 8. Petitioner does not argue that the Examiner made any error with specificity, much less a material one. *See generally* Pet. In addition, and as discussed §VI.A.1, *supra*, the Examiner was fully aware of both LeFebvre and Armitage and of art substantially similar to or cumulative of the references asserted by Petitioner. *See* §VI.A.1, *supra*. (incorporated here). Despite this, Petitioner has not provided any additional facts or evidence for why the Examiner erred or was unreasonable. *See Hospira, Inc. v. Genentech, Inc.*, IPR2017-00739, Paper 16 at 18 (PTAB July 27, 2017) (Informative) (denying institution because the petition failed to “present[] new evidence or arguments that would convince us that the examiner’s

determination was unreasonable”). In fact, Petitioner entirely failed to properly address the second prong. (*Id.* at 16-17.) This should be dispositive.

At most, when discussing the Prosecution History of the '673 patent Petitioner alleges “[t]he Office should not have allowed the '673 patent over Searle and Baker because, in fact, those two references disclose all three features that Amsted argued were missing.” Petition at 8. This is insufficient to show material error by the Office for several reasons. First, Petitioner argues against three statements PO made during prosecution and does not even consider the Examiner’s stated reasons for allowance. *See* Petition at 8-9. That is to say that Petitioner does not actually allege that Baker and Searle teach the recitations that the Examiner explicitly quoted in the Notice of Allowance and found allowable over Baker and Searle. *Compare* Petition at 8-9 with Ex. 1002, at 493-494. Second, the three supposed errors argued by Petitioner do not show that the art teaches the corresponding claim limitations but rather that a preliminary non-final Office Action alleged that the art did. *Id.* For example, Petitioner’s specific points 1 and 2 only cite to and quote the Examiner’s claim mapping from the non-final Office Action. *Compare* Ex. 1002, at 110, 118 with Petition at 8-9. They do not provide any independent evidence whatsoever that Baker and Searle teach the corresponding limitations PO argued were missing in Searle and Baker. Petition at 8-9. *Moreover* - these arguments are, in fact, the exact same arguments that were overcome during prosecution. This should be dispositive

because Petitioner fails to present “additional evidence and facts” that “warrant reconsideration of the prior art or arguments.” *See, e.g.,* factor (f) of *Becton, Dickinson & Co.*, at 17-18.

Petitioner’s first alleged error simply claims, without evidence, that “Baker discloses the assignment of ‘multiple alarm states,’ including ‘high and low priority alarm alerts.’” *Id.* However, just like PO pointed out during prosecution, which Petitioner should have addressed, the claims do not require the assignment of multiple alarm states including high and low priority alarm alerts. Ex. 1002 at 426. Baker relies on a simple threshold analysis of sensor data to in which an alert is sent if a change in orientation of a measured component is greater than a predetermined parameter or threshold. *See* §II.b, *supra*; *see also* Ex. 1009, at 2:54-63; 3:60-63; 4:9-5:24. Thus, Petitioner’s first alleged error cannot show that Baker does in fact teach “assigning a severity level” much less one that is assigned on the basis of “deviations from nominal operating conditions.” This should also be dispositive because Petitioner has not “pointed out sufficiently how the Examiner erred in its evaluation.” *See, e.g.,* factor (e) of *Becton, Dickinson & Co.*, at 17-18.

Petitioner’s third alleged error is that “Searle states that its system uses heuristics to, at a minimum, detect actual failures including “wheel damage, failure, and derailment.” Petition at 9. Yet, even if this were true, Petitioner still fails to address anything at all about the claim language, “to predict potential or imminent

failures,” which Petitioner even previously acknowledged was a primary point of PO’s third argument against the Searle and Baker combination. *See* Petition at 8 quoting PO at Ex. 1002 p. 431 (“to predict potential or imminent failures”); *see also* limitations 14(b) and 21(c). This omission should also be dispositive because Petitioner has not “pointed out sufficiently how the Examiner erred in its evaluation.” *See, e.g.,* factor (e) of *Becton, Dickinson & Co.*, at 17-18.

Petitioner concludes by baldly alleging that LeFebvre, Armitage, and Barone “disclose the methods claimed by the ’673 Patent with even greater clarity and detail than Searle or Baker.” Petition at 9. By doing so Petitioner tacitly acknowledges that LeFebvre, Armitage, and Barone are the same as, i.e., substantially similar to and cumulative of, Searle and Baker. *See* §II.b, *supra*; *see also* §§VII.A.1, VII.C.1, *infra* (showing that, on the merits, LeFebvre and Armitage both perform simple binary threshold analysis).

In summary, Petitioner’s allegations must be found deficient because (1) Petitioner presents the exact same arguments PO overcame during prosecution without any new evidence, (2) Petitioner does not sufficiently point out the supposed errors of the Examiner, and (3) Petitioner tacitly acknowledges that the art presented in the Petition is no different from the art which PO overcame during prosecution. Accordingly, exercise of discretion under §325(d) is warranted and the Board should deny institution.

B. Petitioner Fails to Propose a Construction It Believes Is Correct.

In addition to the reasons set forth above (*see* §VI.A, *supra.*), the Petition should be denied because Petitioner fails to proffer, much less analyze the claim under, what it contends is the correct claim construction. Rule 104 requires that “the petition must set forth... [h]ow the challenged claim is to be construed.” 37 C.F.R. § 42.104(b)(3). As the Board has previously explained, “[t]he ‘construction’ referred to by 37 C.F.R. § 42.104(b)(3) is the construction proposed by the Petitioner, *one that Petitioner believes is the correct construction* under applicable law and should apply in the involved proceeding.” *Toyota Motor Corp. v. Blitzsafe Texas, LLC*, IPR2016-00422, Paper 12 at 26 (PTAB July 6, 2016) (emphasis added). In addition, the 2018 change to claim construction standards in PTAB proceedings was meant to “prevent[] parties from taking inconsistent positions, such as a patent challenger arguing for a broad scope in a PTAB proceeding [] and a narrow scope [] in district court to avoid a finding of infringement.” 83 FED. REG. 51,342-51,343; 51,345 (Oct. 11, 2018) (further stating “the possibility of differing constructions for the same claim term is troubling, especially when claim construction takes place at the same time in parallel district court proceedings and USPTO proceedings”).

When a petitioner presents one construction in district court and another to the PTAB, “the subsequent decisions issued in reliance on these inconsistent claim constructions may lack ‘uniformity’” and “may undermine the ‘predictability’ of

the... patent’s claim scope and the ‘integrity of the patent system’ overall. *KioSoft Tech. LLC v. PayRange Inc.*, CBM2020-00026, Paper 11 at 17 (PTAB Mar. 22, 2021). The “potential problems inherent in [Petitioner’s] inconsistent claim constructions” favors a denial of institution under 35 U.S.C. § 324(a), “regardless of the Petition’s merits.” *Id.* at 17-18.

Here, Petitioner states there is “no formal claim construction necessary in this proceeding,” (Pet. at 15), but this is inconsistent with positions Petitioner has taken in the on-going district court litigation. Specifically, Petitioner proposed the following constructions of terms in the ’673 Patent along with citations to both intrinsic and extrinsic evidence in support thereof:

Claim Term	Petitioner’s Proposed Construction in District Court
“heuristics”, “a heuristic”, or “heuristically analyzing”	Indefinite, or alternatively: “one or more rules to be applied to data to assist in drawing inferences from said data”
“actual failure”	“a state where the component is no longer capable of performing its intended function”
“potential or imminent failures”	“an increased likelihood of experiencing an actual failure in the future”
“alarm condition”	“a condition that triggers an audible or visual warning or alert intended to draw immediate attention”

See Ex. 2003 at 10-17, 19-21. Petitioner tacitly admits these constructions are not the plain and ordinary meanings because, unlike with any of these terms, Petitioner

took that position with other terms. (*See, e.g., id.* at 21 (stating “assigning a severity level” should be given its plain and ordinary meaning and “no construction [was] needed”).) Petitioner’s avoidance of an actual position on the construction of these terms was almost certainly an intentional effort to use a broad construction for validity purposes and a narrow one for infringement purposes. Such gamesmanship is improper.

Because Petitioner did not provide “any arguments as to why [inconsistency] problems are not presented here, much less provided any reason behind its inconsistent claim constructions in general” dismissal is warranted. *KioSoft, CBM2020-00026*, Paper 11 at 17-18 (denying institution); *see also Orthopediatrics Corp. v. K2M Inc.*, IPR2018-01546, Paper 10, 10-12 (P.T.A.B. Feb. 14, 2019) (denying institution where petitioner failed to provide claim construction, which was inconsistent with position in district court); *Samsung Elecs. Co., Ltd. v. Ancora Techs., Inc.*, IPR2020-01184, Paper 11, 27 (P.T.A.B. Jan. 5, 2021) (denying institution where petitioner had inconsistent claim construction positions).

C. The Petition is Unsupported Attorney Argument.

Expert declarations that “merely repeats, verbatim, the conclusory assertion for which it is offered to support” without citation to “any additional supporting evidence [or] technical reasoning to support [the] statements” amount to “conclusory and supported” testimony that “adds little to the conclusory assertion for which it is

offered to support, and is entitled to little weight.” *Xerox Corp., et al. v. Bytemark, Inc.*, IPR2022-00624 Paper 9 at 15 (PTAB Aug. 24, 2022) (Precedential); ; *see also Samsung Elec. Co. Ltd. et al. v. Rightquestion, LLC*, IPR2022-00251, Paper 17 at 25 (PTAB June 9, 2022) (denying institution and holding expert declaration that “makes same statements verbatim, without more, and with no further explanation or additional citations to evidence” is “conclusory, unsupported assertions” that should be afforded “little or no weight”).

Here, the testimony offered by Petitioner’s expert is nothing more than a verbatim recitation of the arguments and evidence cited in the Petition. (*Compare generally* Pet. *with* Ex. 1003.) By way of non-exclusive examples, the following demonstrate that Ricca’s testimony is—other than minor additions, which have been underlined—simply a mirror image of attorney argument in the petition:

Petition at 36-37	Ex. 1003 ¶¶80-83
In LeFebvre’s system, the data control unit acts as an “aggregator of information”, collecting data from each of the instrumented pads on the railcar. EX1005, ¶¶[0036], [0056], [0095]. The data control unit then uses “inference	In LeFebvre’s system, the data control unit acts as an “aggregator of information”, collecting data from each of the instrumented pads on the railcar. EX1005, ¶¶[0036], [0056], [0095]. The data control unit then uses “inference

engine techniques” (i.e., heuristics) to analyze the collected data. EX1005, ¶¶[0036], [0056], [0095]. <i>See also</i> Section X.A.1.c; EX1003, ¶128. For example, LeFebvre discloses the use of heuristics, based upon data collected from one or more sensor units, to determine the existence of <i>actual</i> failure conditions. EX1005, ¶¶[0058]–[0066]; EX1003, ¶129. For example, heuristics may be used to identify the existence of wheel damage such as “a flat spot or shelled wheel tread,” EX1005, ¶[0060], or a wheel derailment. EX1005, ¶[0061]. LeFebvre also discloses the use of heuristics, based upon data collected	engine techniques” (i.e., heuristics) to analyze the collected data. EX1005, ¶¶[0036], [0056], [0095]. <i>See</i> Limitation 1(b), Section IX.C.1.c above, which is incorporated here by reference. For example, LeFebvre discloses the use of heuristics, based upon data collected from one or more sensor units, to determine the existence of <i>actual</i> failure conditions. EX1005, ¶¶[0058]–[0066]. For example, heuristics may be used to identify the existence of wheel damage such as “a flat spot or shelled wheel tread,” EX1005, ¶[0060], or a wheel derailment. EX1005, ¶[0061]. LeFebvre also discloses the use of heuristics based upon data collected
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from one or more sensor units, to predict <i>potential or imminent</i> failures based upon a statistical analysis of the collected data. EX1005, ¶¶[0058]–[0066]; EX1003, ¶130. For example, LeFebvre discloses that heuristics may be used to identify “long term trends” in wheel bearing temperature, “avoiding a potential bearing burn off and possible derailment.” EX1005, ¶[0058]. LeFebvre additionally discloses that “[s]pecific bearing defects can be inferred from frequency spectrum analysis.” EX1005, ¶[0059]. LeFebvre teaches that “identifying a failing bearing in its early stages is important in preventative maintenance programs.” <i>Id.</i>	from one or more sensor units to predict <i>potential or imminent</i> failures based upon a statistical analysis of the collected data. EX1005, ¶¶[0058]–[0066]. For example, LeFebvre discloses that heuristics may be used to identify “long term trends” in wheel bearing temperature, “avoiding a potential bearing burn off and possible derailment.” EX1005, ¶[0058]. LeFebvre additionally discloses that “[s]pecific bearing defects can be inferred from frequency spectrum analysis.” EX1005, ¶[0059]. LeFebvre teaches that “identifying a failing bearing in its early stages is important in preventative maintenance programs.” <i>Id.</i>
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This mirror imaging of attorney argument plagues Mr. Ricca's declarations. *Compare* Pet. at 18-24 (Petitioner's argument as to Claim 1) *with* Ex. 1003 at ¶¶70-86 (parroting nearly verbatim argument for Claim 1, including same quotations, emphasis, cited evidence, parentheticals, etc.); *compare* Petition at 30, 35-38, 41 (arguments as to other challenged claims in Ground 1) *with* Ex. 1003 at ¶¶86, 124-130, 152 (parroting same); *compare* Petition at 52-57, 66-67 (Ground 3 arguments) *with* Ex. 1003 at ¶¶191-201, 233 (parroting same); Petition at 66-67 (Ground 4 arguments) *with* Ex. 1003 at ¶¶262-268 (parroting same). That is, the declaration of Steven Ricca is nothing but a verbatim recitation of the Petition without further explanation or additional citations to evidence and should therefore be afforded no weight.

Accordingly, the Petition is nothing but conclusory and unsupported attorney argument that should be dismissed.

D. The Petition's Claim-by-Claim Analysis Includes Impermissible Cross-Referencing.

Petitioner fails to identify with particularity the grounds and supporting evidence for its challenge on a claim-by-claim basis. Indeed, Petitioner provides analysis of select limitations in claims 2, 3, 5, 9, 14-18, 21, and 22 that consists entirely of internal cross-references to its prior analysis of other, different claims with different claim language or limitations. (*See* Pet. at 26, 38, 41, 49, 58, 71, 73-

75, and 77). Petitioner’s failure to provide analysis, e.g., explaining how the asserted art and prior analysis renders obvious different claims, is improper. *See, e.g., DIRECTV, LLC v. Qurio Holdings, Inc.*, IPR2015-02007, Paper 6 at 9 (PTAB Apr. 4, 2016) (denying institution where “[p]etition’s analysis of [cited] elements features internal cross-references to its discussion of other elements, with minimal—and often no—additional discussion specifically directed to the language of these claim elements”); *Apple Inc. v. ContentGuard Holdings, Inc.*, IPR2015-00449, Paper 10 at 6 (July 15, 2015) (rejecting obviousness analysis as “two or three levels removed from the actual disclosures of [the prior art]” where argument relied upon cross-references to other sections of petition).

For example, Petitioner’s analysis of Independent Claim 14, limitations 14(b)-14(c), does little more than refer back to the analysis of limitations 1(b)-1(d), 8(e), and 9(a). *See* Petition at 73-74; *see also, supra* § VII.D.3. Petitioner doubles down on the nested citations game with respect to independent claim 21 which refers back to the analysis of independent claim 14 (therefore referring even farther back to the analysis of limitations 1(b)-1(d), 8(e), and 9(a)). *See* Petition at 77. None of these cites to prior analysis explain the differences in claim language. (*See* Pet. at 26, 38, 41, 49, 58, 71, 73-75, and 77 (challenging claims without analysis).) Petitioner’s failure to address the actual claim language, and thus, failure to meet its burden warrants denial of institution.

VII. ARGUMENT

Institution should be denied because Petitioner’s prior art and arguments have been rejected by the USPTO during prosecution. Further, Petitioner has failed to show a reasonable likelihood of prevailing on any ground specifically challenging any claim of the ’673 patent.

A. Ground One: Petitioner has failed to show a reasonable likelihood that Claims 1–7, 10–18, and 20–22 are unpatentable under 35 U.S.C. § 103(a) over LeFebvre

1. Claim 1

a. LeFebvre does not quantify deviations from expected operating conditions

LeFebvre fails to disclose, teach, or suggest limitation 1(b): “applying a heuristic to said received data to determine deviations from nominal operating conditions.” Petitioner relies on LeFebvre (Ex. 1005) at ¶¶36, 56, 58-62, 64-66, and 95 with regard to this element. *See* Petition at 21-22. However, LeFebvre utilizes a data control unit 23 as an aggregator of sensor data to determine unsatisfactory behavior based on a comparative analysis of one sensors data against the pool of available sensor data. *See* Ex. 1005 at ¶¶36, 95. The data control unit 23 “is programmed to compare information from all of the trucks on the railcar.” *Id.* at ¶36 (emphasis added). This does not meet limitation 1(b).

As explained above, a POSA would understand that, in the context of claim 1, “a heuristic” means “one or more rules” and the phrase “deviations from nominal

operating conditions” means “deviations from expected operating conditions.” *See* §V.A., V.B., *supra*. (incorporated here). The comparison operation described in ¶36 of LeFebvre does not involve comparing sensor data for an operational characteristic of a component to expected operating parameters for that component, and does not apply heuristics to determine a deviation between a sensed operating characteristic and an expected operating condition. Ex. 2001 at ¶¶52-53; *see also* Ex. 1005 ¶36. LeFebvre’s comparison operation aggregates sensor data from a plurality of sensors and compares individual sensor data against the aggregated sensor data to identify specific sensors that are behaving “sufficiently poorly” relative to the other sensors. Ex. 1005 at ¶95; *see also* ¶58 (disclosing that the temperature sensor “monitors relative changes in temperature against other bearings”). Thus, LeFebvre can only detect relative deviations with respect to the performance of other bearings, not expected operation conditions. Ex. 2001 at ¶54. A POSA would not understand LeFebvre to apply “a heuristic to determine deviations from nominal operating conditions” at least because LeFebvre does not apply any rules to individual sensor data to quantify the extent to which the sensor’s data deviates from an expected operating condition of the that bearing. Ex. 2001 at ¶54.

b. LeFebvre does not assign severity levels

Additionally and alternatively, LeFebvre fails to disclose, teach, or suggest “assigning a severity level to said deviations from nominal operating conditions,”

and the step of “determining an alarm condition based on said assigned severity level,” as recited by limitations 1(c) and 1(d). As explained above, Applicant successfully argued these limitations were distinguishable over Searle and Baker. *See* §II.B, *supra*. (incorporated here); *see also* Ex. 1002 at 424-426 (explaining ¶42 of the specification, Ex. 1001 at 11:46-60, provides that an “assigned severity level avoids an excess of stoppages and delays that could result if an alarm was generated for every deviation that is detected”). These limitations are patentable over LeFebvre for substantially similar reasons.

As explained above, the phrase “assigning a severity level” means “assigning one from a plurality of known values indicating seriousness.” *See* §V.C, *supra*. (incorporated here). Lefebvre, in contrast, establishes a threshold limit that when exceeded results in the instrumented pads sending relevant attributes and timing to the data control unit. *See* Ex. 1005 at ¶55. A POSA would not consider LeFebvre to disclose “assigning a severity level” at least because LeFebvre only teaches a binary system in which (a) an alarm is issued if the magnitude is sufficient; or (b) no alarm is issued if the threshold is not exceeded, i.e., a single threshold. In fact, Petitioners arguments explicitly acknowledge that LeFebvre simply “distinguishes between (a) deviations from expected operating conditions that ***are not*** severe enough to raise an alarm; and (b) deviations that ***are*** severe enough to raise an alarm.” Petition at 23;

Ex. 2001 at ¶¶56-57. Thus, Petitioner itself acknowledges that LeFebvre does not meet the plain language of limitation 1(c). *See id.*

The cooperation between limitations 1(b)-1(d) of claim 1 recite that, once a deviation is determined, the deviation is quantified and assigned an appropriate severity level based on a seriousness of the deviation, and an alarm condition commensurate with the seriousness of the assigned severity level is determined. *See* Limitations 1(b)-1(d); Ex. 2001 at ¶58. In LeFebvre, there is no such assignment indicating seriousness of the measured unsatisfactory behavior on a ranked scale of seriousness. *See* Ex. 2001 at ¶58; *see also* Ex. 1005 at ¶¶57-66. Rather, LeFebvre monitors bearing defects (Ex. 1005 ¶¶58-59), wheel defects (*Id.* ¶60), wheel derailment (*Id.* ¶61), truck hunting (*Id.* ¶62), displaced roller bearing adapters (*Id.* ¶64), and brake performance and status (*Id.* ¶65) to determine if sensor data has crossed a threshold limit, and, if so, an alarm is sent. *See* Ex. 2001 at ¶58. LeFebvre does not assign multiple levels of significance for the measured conditions and report unsatisfactory behavior in the form of alarms that takes into account these multiple threshold levels. *See id.* at ¶59. The issued claims of LeFebvre '218 also confirm this understanding. *See* Ex. 1015 claim 7, claim 12 (“said values being communicated only upon a determination by the logic circuitry that the values are indicative of a potential operating failure”), claim 29 (“communicating to the prime mover messages identifying only the performance behavior sufficient to cause

alarm”), and claim 30. The Petition fails to show LeFebvre, in view of the skill of a POSA, discloses multiple levels of interest for a measured condition. *See* Ex. 2001 at ¶59.

Petitioner has not established independent claim 1 is unpatentable over LeFebvre. Therefore, Petitioner failed to show that claims 2-7 and 13, which depend from independent claim 1, are unpatentable over LeFebvre either. *Id.* at ¶60. *Mylan Pharms. Inc. v. Research Corp. Techs., Inc.*, 914 F.3d 1366, 1376 (Fed. Cir. 2019) (“Dependent claims, with added limitations, are generally not obvious when their parent claims are not.”).

2. Claim 10

LeFebvre fails to disclose, teach, or suggest limitation 10(c): “determining if said temperature of the desired part is outside an acceptable range of temperatures.” Similar to the deficiency identified with regard to limitation 1(b) above, LeFebvre discloses the comparison of “information from all of the trucks on the railcar.” *See* §VII.B.1.a, *supra*. (incorporated here); Ex. 2001 at ¶¶61-62; *see also* Ex. 1005 at ¶36. Although, Petitioner cites to LeFebvre (Ex. 1005) at ¶33, 58 to support its argument with regard to limitation 10(c), neither of these passages support Petitioner’s conclusory argument. The cited passages of LeFebvre are either general statements of purpose that do not disclose any specifics (in the case of ¶33) or disclose features that do not actually meet the language of limitation 10(c). Rather,

as with limitation 1(b) above, LeFebvre expressly discloses that the “temperature sensor in instrumented pad 16 monitors relative changes in temperature *against other bearings*.” See Ex. 1005 at ¶58 (emphasis added). As with the “nominal operating conditions” recited in limitation 1(b), properly construed as “expected” operating conditions, a POSA would understand that an “acceptable range of temperatures” is not dependent on the temperatures of other components. See §V.B, *supra*. (incorporated here); Ex. 2001 at ¶62. A POSA would not look to LeFebvre and its disclosure of aggregation of “information from all of the trucks on the railcar” and comparison of “relative changes in temperature against other bearings” to understand how to determine whether a temperature reading is inside or outside of “an acceptable range of temperatures.” Ex. 1005 at ¶¶36, 58; *see also* Ex. 2001 at ¶63.

Petitioner has not established independent claim 10 is unpatentable over LeFebvre. Therefore, Petitioner failed to show that claims 11 and 12, which depend from independent claim 10, are unpatentable over LeFebvre either. Ex. 2001 at ¶64.

3. Claim 14

a. LeFebvre does not determine if an actual failure exists nor apply statistical analysis techniques to sensor data

LeFebvre fails to disclose, teach, or suggest limitation 14(b): “heuristically analyzing said received [sensor] data to determine if an actual failure exists on said

railcar or to predict potential or imminent failures based on a statistical analysis of said received [sensor] data.” A first analysis applies heuristics “to determine if an actual failure exists” and the second analysis applies heuristics for forward looking predictive purposes that are “based on a statistical analysis” of the received sensor data. One aspect of this recitation is the determination of currently detected failures, i.e., “determine if an actual failure exists.” The other aspect of this limitation is the application of higher-level statistical analysis for predicting failures which are not currently detected but may potentially develop in the future. *See* Ex. 2001 at ¶¶65-69.

Petitioner relies almost exclusively upon the disclosure of certain “[e]xamples of performance that [LeFebvre’s disclosed] system is capable of monitoring” for allegedly disclosing limitation 14(b). *See* Ex. 1005 at ¶¶57-66; Petition at 21-22. A POSA would recognize that LeFebvre merely describes certain types of conditions that are directly measured. *See* Ex. 2001 at ¶70. In reference to bearing temperature, LeFebvre explains that a “temperature sensor ... monitors relative changes in temperature against other bearings ... providing *a direct measurement* that can be used to avoid false alarms from wayside hotbox detectors.” Ex. 1005 at ¶58 (emphasis added). Petitioner does not explain how the cited portions of LeFebvre’s disclosure can be used to determine an “actual failure” or to “predict potential or imminent failures.” Petitioner’s analysis is entirely conclusory. Petitioner’s expert declaration evidence for limitation 14(b) is a verbatim copy of its conclusory

analysis in the petition and provides no additional support. Because conclusory expert testimony is “entitled to little or no weight,” Petitioner has failed to meet its burden to establish its obviousness claim. 37 C.F.R. §42.65(a).

Petitioner also relies on the same disclosure in LeFebvre for both heuristic analysis and statistical analysis, ignoring that the different words “heuristics” and “statistical analysis” are recited in different claim elements. *See* Petition, 36-37. However, “[d]ifferent claim terms are presumed to have different meanings.” *Bd. of Regents of the Univ. of Tex. Sys. v. BENQ Am. Corp.*, 533 F.3d 1362, 1371 (Fed. Cir. 2008); *Hamilton Beach Brands, Inc. v. freal Foods, LLC*, 908 F.3d 1328, 1340 (Fed. Cir. 2018); *Google LLC v. Jawbone Innovations, LLC*, IPR2022-00888, Paper 12 at (PTAB Nov. 28, 2022). For both elements—heuristics and statistical analysis—Petitioner relies on the same disclosure in LeFebvre related to forming an “inference” of a measured condition via an inference engine. Petition, 37. This is not the same as performing “statistical analysis.” *See* Ex. 2001 at ¶¶67-69. Indeed, LeFebvre is silent regarding any “statistical analysis.” Moreover, Petitioner fails to point to any disclosure in LeFebvre that discloses a method utilizing statistical analysis. Petition, 36-37 (not identifying or even applying the words “statistical analysis” to LeFebvre); *See* Ex. 2001 at ¶67.

A POSA would understand that any forward-looking predictive analysis must necessarily take into account a sufficient amount of past acquired data to base such

predictions on, i.e., a statistical model. *See* Ex. 2001 at ¶68. The '673 patent explains: “The CMU is capable of wirelessly collecting data from each of the motes and performing higher-level analysis of the data to detect imminent or actual failures. During such data analysis, heuristics may be applied to determine potential failures ***based on statistical models*** and empirical data.” The '673 patent, Ex. 1001 at 2:63-3:1 (emphasis added). Accordingly, a POSA familiar with the specification and claims of the '673 patent would recognize that the analysis required by independent claim 14 necessarily involves a higher-level analysis than just the mere aggregation of collected sensor data to form an inference as to a condition of component of a train. *See* Ex. 2001 at ¶68. Indeed, the claim also requires that the specific “results of said analysis” must be communicated to an off-railcar location. *See* limitation 14(c); §VI.A.3.b, *infra*. (incorporated here).

LeFebvre is also silent regarding the prediction of “potential or imminent failures based on a statistical analysis of said received data.” *See* Ex. 2001 at ¶72. LeFebvre simply does not perform, or even disclose, any statistical analysis capable of forming forward looking “predictions” and is solely directed toward measurement of actual conditions. *See id.*; Ex. 1005 at ¶58-66.

Petitioner has not established that independent claim 14 is unpatentable over LeFebvre. Therefore, Petitioner failed to show that Claims 15-18 and 20, which depend from independent claim 14, are unpatentable either. Ex. 2001 at ¶73.

b. LeFebvre does not transmit the results of the statistical analysis

LeFebvre fails to disclose, teach, or suggest “communicating the *results* of said analysis to an off-railcar location,” as required by independent claim 14. Here, the Petition fails to address the substance of the *results* requirement of limitation 14(c). *See* Ex. 2001 at ¶74. The Petition merely states that LeFebvre discloses “transmitting data and alarm messages to a remote location.” Petitioner does not include any analysis whatsoever regarding how this alleged disclosure teaches “communicating the results of [the heuristic analysis] to an off-railcar location.” Rather, it copies word-for-word identical conclusory analysis of Petitioner’s Expert. *Compare* Petition at 26, 38 *with* Ex. 1003 at ¶¶131-32. The Petition simply fails to identify any step that LeFebvre takes to actually transmit *results* of any analysis off railcar. *See* Ex. 2001 at ¶75.

Petitioner’s cross reference to dependent claim 6 does not save its abjectly insufficient analysis first and foremost because claim 6 is limited to “transmitting said alarm condition.” *See* Petition at 26-27; Ex. 1003 at ¶¶93-95. Whatever the merits of Petitioner’s analysis regarding claim 6—which is equally conclusory and without evidentiary support—it is simply inapplicable to “communicating the results of said analysis” recited in limitation 14(c). *See CAE Screenplates, Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1317 (Fed. Cir. 2000) (“In the absence of

any evidence to the contrary, we must presume that the use of these different terms in the claims connotes different meanings.”). The Petition’s flawed premise here is that “transmitting [an] alarm condition” is equivalent to the scope encompassed by limitation 14(c). It is not. *See* Ex. 2001 at ¶75.

Even taking Petitioner’s analysis at face value, the Petition merely states that the data control unit “passes messages on to the communications device 24 for onward transmission.” *See* Petition, 26 (citing LeFebvre (Ex. 1005) at ¶¶38, 52, 95). Petitioner points to no disclosure in LeFebvre suggesting that the data control unit reports the “results” of any analysis, much less the heuristic and statistical analysis recited in limitation 14(b). *See* §VII.B.3.a, *supra*. (incorporated here). Petitioner appears to simply equate the transmission of messages to the communication of results of the recited analysis. *See* Petition at 26; Ex. 2001 at ¶76. There is simply no disclosure in the cited portions of LeFebvre that supports Petitioner’s position.

Petitioner has not established that independent claim 14 is unpatentable over LeFebvre. Therefore, Petitioner failed to show that Claims 15-18 and 20, which depend from independent claim 14, are unpatentable either. Ex. 2001 at ¶77.

4. Claims 21

LeFebvre fails to disclose, teach, or suggest limitation 21(c), specifically the use of heuristics to “(i) determine if an actual failure exists and (ii) to predict potential or imminent failures based on a statistical analysis of said collected data.”

As explained above, the Petition does not acknowledge the differences between the two clauses of limitation 21(c) and, in any case, LeFebvre fails to disclose any “statistical analysis.” *See* VI.B.3.a, *supra*. (incorporated here). Further, claim 21 requires both the determination of an actual failure and the prediction of potential or imminent failures. The Petition is silent regarding this distinction in claim scope. This deficiency is fatal to Petitioner’s argument against claim 21. *See* Ex. 2001 at ¶¶78-79. Petitioner has not established that independent claim 21 is unpatentable over LeFebvre. Therefore, Petitioner failed to show that Claim 22, which depends on independent claim 21, is unpatentable either.

B. Ground Two: Petitioner has failed to show a reasonable likelihood that Claims 8 and 9 are unpatentable under 35 U.S.C. § 103(a) over LeFebvre in view of Barone

As explained above LeFebvre fails to disclose, teach, or suggest limitations 1(b), 1(c), and 1(d) of independent claim 1. *See* §VII.B.1, *supra*. (incorporated here). Barone, which is merely relied upon by Petitioner for select limitations of dependent claims 8 and 9, fails to cure the deficiencies of LeFebvre with respect to independent claim 1. Ex. 2001 at ¶80.

Petitioner has not established that independent claim 1 is unpatentable over LeFebvre. Therefore, Petitioner failed to show that Claims 8 and 9, which depend from independent claim 1, are unpatentable over the combination of LeFebvre and Barone. Ex. 2001 at ¶81.

C. **Ground Three: Petitioner has failed to show a reasonable likelihood that Claims 1, 2, 4, 6–11, and 13 are unpatentable under 35 U.S.C. § 103(a) over Armitage**

1. **Claim 1**

Armitage fails to disclose, teach, or suggest limitation 1(b): “applying a heuristic to said received data to determine deviations from nominal operating conditions.” In Armitage, sensor nodes 121-124 are coupled to a railway car 110. *See* Armitage Ex. 1006 at Fig. 1; ¶26. “Each of sensor nodes 121-124 transmit ... the monitored information about the undercarriage portion to control node 130 coupled to the railway car 110.” *Id.* at 26. “Control node 130 processes ... the sensor information to determine a fault condition for the undercarriage portion. *Id.* This determination merely involves thresholding based on trend analysis. *See* Armitage Ex. 1006 at ¶¶29-30. The threshold value used in the thresholding process is dynamically determined based on a pool of sensor data. *Id.* at ¶82. The dynamically determined threshold value can include a running average of the temperature measurements for a population of sensors (e.g., all wheels on the railway car), a failure threshold dynamically determined based on a time series of sensor data from all sensors of the population of sensors, an upper limit for a dynamically normalized range of operation for the population of sensors, or a lower limit for a dynamically normalized range of operation for the population of sensors. *See* Armitage Ex. 1006 at ¶¶29, 42, 43. Ex. 2001 at ¶82.

The dynamic normalization of Armitage necessarily results in a change of the range of operational values for the undercarriage element in real time based on sensor data. *See* Ex. 2001 at ¶83; Ex. 1006 ¶43. During prosecution, Armitage argued that the claim limitation “monitoring for patterns of deviation in the information from a population of sensors” is a distinct type of analysis from merely using a predetermined static threshold that is set in advance as in the art applied by the Examiner against Armitage’s claims (referred to as “Sakatani”). *See* Ex. 2005 at 82-83; *see also* Ex. 2001 at ¶83. Armitage explains in response that “Sakatani merely discusses *individual* sensors detecting fault conditions based on *predetermined thresholds*.” Ex. 2005 at 82 (emphasis in original). These arguments contrasting Sakatani against the Armitage claims resulted in allowance. *Id.* at 88-90. These statements are highly probative how the Armitage system functions.

In Armitage, the threshold of interest has been dynamically determined, e.g., by establishing a low and high threshold that is three standard deviations away from the running average of the pool of sensor data. *See* Ex. 2001 at ¶84; Armitage at ¶41. Armitage explains the following operations are performed: (1) detecting when a data reading by a sensor deviates from the dynamically determined threshold value by at least a certain amount; and (2) determining that a fault condition does exist or could exist at the time such a detection is made. *See* Armitage Ex. 1006 at Fig. 4; ¶¶30, and 41-43. The severity of the fault condition can be inferred based on the degree to

which the data reading of the particular sensor deviates from the dynamically determined threshold value. *See* Armitage Ex. 1006 at ¶¶43-44.

However, Limitation 1(b) of claim 1 requires the determination of how much an operational characteristic differs from expected operating conditions. Ex. 2001 at ¶85; *see also* §V.B, *supra*. (incorporated here). The Armitage analysis is wholly untethered from any analysis taking into consideration acceptable operating conditions of the railcar. In Armitage, it is simply assumed that when a sensor's data is far enough away from the running average of sensor data that the corresponding component may experience a failure. Ex. 2001 at ¶85 A POSA would not look to Armitage's dynamic normalization disclosures to arrive at the claimed invention. *Id.* at ¶86

A POSA would recognize that Armitage's system is not the same as that recited in limitation 1(b). *Id.* For example, a POSA would understand that Armitage's dynamically determined threshold and normalization process do not represent expected operating conditions for the undercarriage elements. *Id.* Moreover, Armitage's methods have serious flaws in the context of trains having individual railcars of varying age and wear and tear. First, consider the scenario of an aging railcar in which all of the bearings are relatively old and worn. Determining a dynamic threshold of a population of sensor data where each sensor is feeding in data from equally as old and worn bearings would be incapable of determining

whether one of the sensors began to “deviate from nominal conditions” because all of the bearings are old and worn. *Id.* Second, consider the scenario of a train having plural railcars where each railcar has bearings with different wear and tear. Finding outlier sensor data from a train in which each individual car has a unique level of wear and tear would overlook potential problems and report problems that were not necessarily outside of expected operating conditions. *Id.* Therefore, a POSA would recognize that Armitage’s degree of deviation is not necessarily the same as or equivalent to the requirements of limitation 1(b), and, in fact, would view the claimed solution as a far superior solution than that of Armitage. *Id.*

Petitioner has not established that independent claim 1 is unpatentable over Armitage. Therefore, Petitioner failed to show that claims 2, 4, 6-9, and 13, which depend from independent claim 1, are unpatentable either. Ex. 2001 at ¶87.

2. Claim 10

Armitage and the skill of a POSA fail to disclose, teach, or suggest limitations 10(a) and 10(b): “(a) sensing the temperature of a part of the railcar other than the desired part by use of a temperature sensor in thermal communication with said other part; and (b) determining the temperature of the desired part by use of the temperature sensed in step (a).” Petitioner liberally interprets Armitage’s silence regarding the specific way sensor nodes are coupled to the railcar in view of an assumed level of skill of a POSA to reach the claim limitations. *See* Petition at 65-

67; Ex. 2001 at ¶88-89. The Petition does not explain “what a skilled artisan would have gleaned from the teachings of the prior art, and is instead an impermissible exercise of hindsight with the claims of the [’673] patent serving as a guide.” *Apple Inc. v. Voip-pal.com, LLC.*, No. IPR2016-01201, Paper 54 at 23 (PTAB Nov. 20, 2017). Petitioner does not explain at all how Armitage’s sensor node, being mounted on a bracket, would even be in “thermal communication” with another part and how the system would cross correlate the determination of this other unnamed part to the bearing temperature. For example, the embodiment cited to in the petition (Sensor nodes 320-327 and Fig. 3) does not discuss temperature sensing at all. Ex. 2001 at ¶90. Petitioner does not explain how a POSA would know, based on the disclosure of Armitage, what the sensor is in thermal communication with or how Armitage measures the temperature and determines the temperature of some other part. *Id.* at ¶90-91. Petitioner leaves each of these questions unresolved (yet hypothetically solved by a POSA), leaving the claim language itself as the only source of motivation.⁴ Petition at 65-67. This is hindsight reasoning. *See, e.g., Otsuka Pharm.*

⁴ Although Mr. Ricca cites to U.S. 2005/0194497 to Matzan, which is not a reference relied upon in Ground 3, there is no specific citation to this reference in the Petition nor is there any analysis for why this reference has any relevance. As such, this reference should be ignored by the Board. Even a cursory review of Matzan’s

Co. v. Sandoz, Inc., 678 F.3d 1280, 1296 (Fed. Cir. 2012) (“The inventor’s own path itself never leads to a conclusion of obviousness; that is hindsight. What matters is the path that the person of ordinary skill in the art would have followed, as evidenced by the pertinent prior art.”)

Armitage’s sensor nodes 121-124, 320-327 (i) are coupled to undercarriage elements 111-114, 312-315 that are being monitored, and (ii) are configured to measure the temperature of the undercarriage element. *See* Ex. 2001 at ¶92. Nowhere in Armitage is it taught explicitly or implicitly that (1) the temperature of a first part is determined based on the temperature of another part and/or (2) the temperature of a rotating portion of the first part of the undercarriage element is determined based on the temperature of a non-rotating portion of the first part. *See Id.* Armitage simply teaches that a contact temperature sensor or a non-contact temperature sensor can be used to monitor a temperature of an undercarriage element. *See id.* Since the temperature of the desired part is directly measured, there is no need in Armitage for transforming or otherwise using the temperature of another part to obtain the temperature of the undercarriage element. *See id.* Armitage does not contemplate such a configuration and hence Petitioner must resort to the

disclosure demonstrates that it does not provide any disclosure beyond that already present in Armitage, which, as explained in this section, is deficient.

assumed skill level of a POSA. *See id.* This type of computational analysis would unnecessarily burden Armitage's system.

Furthermore, with regard to limitation 10(c), Armitage does not teach or suggest “determining if said temperature of the desired part is outside an acceptable range of temperatures.” Similar to the deficiency identified with regard to limitation 1(b) above, Armitage calculates deviations from a dynamically normalized moving average of readings and does not compare a temperature reading of one component to “an acceptable range of temperatures.” *See* §VII.C.1, *supra.* (incorporated here); Ex. 2001 at ¶93-94. As with the “nominal operating conditions” recited in limitation 1(b), properly construed as “normal” operating conditions, an “acceptable range of temperatures” of one component is not dependent on the temperatures of other components. *See* §V.B, *supra.* (incorporated here); Ex. 2001 at ¶95. A POSA would not look to Armitage and its disclosure of dynamic thresholds to understand how to determine whether a temperature reading is inside or outside of “an acceptable range of temperatures.” *Id.*

Petitioner has not established that independent claim 1 is unpatentable over Armitage. Therefore, Petitioner failed to show that claims 2, 4, 6-9, and 13, which depend from independent claim 1, are unpatentable either. Ex. 2001 at ¶96.

D. Ground Four: Petitioner has failed to show a reasonable likelihood that Claims 3, 5, 12–18, and 20–22 are unpatentable under 35 U.S.C. § 103(a) over Armitage in view of LeFebvre

1. Claims 3, 5, and 13

As shown above, Petitioner has not shown that independent claim 1 is unpatentable in view of Armitage. *See* §VII.C.1, *supra* (incorporated here). This ground of the petition does not rely on LeFebvre for any limitation of independent claim 1. Therefore, Petitioner failed to show that claims 3, 5, and 13, which depend on independent claim 1, are unpatentable for at least the same reasons. Ex. 2001 at ¶¶97-98.

2. Claim 12

As shown above, Petitioner has not shown that independent claim 10 is unpatentable in view of Armitage. *See* §VII.C.2, *supra* (incorporated here). This ground of the petition does not rely on LeFebvre for any limitation of independent claim 10. Therefore, Petitioner failed to show that claim 12, which depends on independent claim 10, is unpatentable for at least the same reasons. Ex. 2001 at ¶¶99-100.

3. Claim 14

With regard to limitation 14(a), “one or more sensing units which periodically collect readings from one or more sensors,” Petitioner first appears to argue Armitage could be modified to use digital sensors and that such a combination would

inherently meet this limitation. *See* Petition at 73. Petitioner then relies on LeFebvre in the alternative, apparently recognizing the weakness in its position with regard to Armitage alone. *See id.* Both of these arguments fail. Petitioner also fails to identify with particularity the basis for its position that the Armitage/LeFebvre combination teaches or suggests limitation 14(b): “heuristically analyzing said received [sensor] data to determine if an actual failure exists on said railcar or to predict potential or imminent failures based on a statistical analysis of said received [sensor] data.” Finally, Petitioner fails to establish that the Armitage/LeFebvre combination teaches or suggests limitation 14(c): “communicating the results of said analysis to an off-railcar location.” Ex. 2001 at ¶¶101-02.

a. **There is no motivation to modify Armitage to include digital sensors**

Petitioner admits that “Armitage does not expressly disclose that its sensor nodes periodically collect sensor readings from the sensor units.” Petition at 73. It attempts to fill this gap by proposing to modify Armitage to include digital sensors and alleging that as-modified Armitage would “inherently transmit data on a periodic basis.” *Id.* Again, Petitioner’s Expert Report does not adequately support the Petition and is a conclusory verbatim copy of Petitioner’s argument, plus the statement “in my opinion.” *Compare* Ex. 1003 ¶273 with Petition at 73. As such, these arguments are equally conclusory and unsupported. Ex. 2001 at ¶¶103.

Armitage discloses analog sensors and analog-to-digital converters and accordingly it is unclear why a POSA would incorporate digital sensors into Armitage. Armitage at 4:67-5:22. Moreover, Petitioner does not explain what other modifications to Armitage would be necessary to include digital temperature sensors. Petition at 73; Ex. 1003 ¶273. Ex. 2001 at ¶104.

b. There is no motivation to modify Armitage in view of LeFebvre

Petitioner does not establish any motivation to modify Armitage in view of LeFebvre to arrive at claim 14 because doing so would alter the basic operating principles of Armitage as explained in more detail below. Petitioner relies exclusively on LeFebvre’s power-management features to meet limitation 14(a). *See* Petition at 33 (citing Ex. 1005 at ¶¶34-35). The only motivation alleged by Petitioner to make the modification is because “it predictably saves power.” Petition at 74. However, the specification of the ’673 patent expressly distinguishes between the power-saving functionality and the periodic collection of data for analysis. *Compare* Ex. 1001 at 5:36-42 *with* 14:11-14. A POSA would therefore appreciate that these are two different concepts. *Id.* at 73-74. Ex. 2001 ¶105.

Petitioner relies on a data analysis technique in Armitage that requires “continuous monitoring” and does not point to any indication in Armitage that power saving is a concern. *See* Ex. 1006 at ¶44 (“Realtime, continuous monitoring of all

critical railway car components can be monitored....”); Ex. 2001 at ¶¶106. The sensors disclosed in Armitage operate in the conventional manner by continuously sensing while the railcar is moving. *See id.* Particularly, Armitage analyzes sensor data through a comparison of the data from one sensor to a running average of data from a population of sensors to identify outliers. *See id.* (citing Armitage at ¶¶30, 42).

LeFebvre discloses a sensor which “is programmed to switch on briefly” but would normally be “in a low powered state most of the time.” LeFebvre at ¶¶34-35. Modifying Armitage with LeFebvre would frustrate the ability of Armitage’s sensor to “continuous[ly] monitor[] all critical railway components.” Armitage at ¶44; Ex. 2001 at ¶107. A POSA would understand that placing a sensor in a low power standby state is different from “periodically collect[ing] readings from one or more sensors” as recited by limitation 14(a). *See* Ex. 2001 at ¶107. Petitioner has not shown that LeFebvre discloses limitation 14(a) because a POSA would readily perceive the difference between the periodic collection of readings from one or more sensors with a power management method. *Id.*

For at least these reasons, a POSA would not try to combine Armitage’s dynamic continuous monitoring with LeFebvre’s power management features to perform periodic collections of sensor data with any probability of success. Ex. 2001 at ¶108. This is because the power management features disclosed in LeFebvre

would prevent Armitage’s system from establishing an accurate running average of the sensor data. *Id.*; *see also* Ex. 1006 at ¶¶41-44. Thus, LeFebvre’s alleged “power-saving scheme” would not motivate a POSA to modify Armitage in the manner described in the Petition. Ex. 2001 at ¶108.

Petitioner has failed to show that independent claim 14 is unpatentable over Armitage and LeFebvre at least because there is no motivation to modify Armitage in view of LeFebvre. *Id.* Claims 15-20 depend from independent claim 14 and consequently Petitioner failed to show that they are unpatentable either. Ex. 2001 at ¶109.

c. Petitioner does not adequately address how the prior art teaches limitation 14(b)

Petitioner does not adequately address how the disclosure of Armitage heuristically determines that an “actual failure” exists or predicts “potential or imminent failures,” as recited in limitation 14(b). Ex. 2001 at ¶110-11. Rather, Petitioner attacks independent claim 14 by relying wholesale on the same arguments presented for limitations 1(b)-(d), 8(e), and 9(a) (none of which require an actual failure or predictions based on statistical analysis). Petition at 74. The difference in claim language amongst these claim limitations is shown below. It is readily apparent that Petitioner is improperly combining disparate arguments in a confusing and desperate attempt to reach the claim language of limitation 14(b). Relying

wholesale on analysis from entirely different limitations having substantively different claim scope cannot satisfy Petitioner’s burden of proof. A notable problem with this type of analysis is that because Petitioner has not outlined a sufficiently clear prima facie case against limitation 14(b). For example, none of limitations 1(b)-1(d), 8(e), or 9(b) even include key claim terms “actual failure”, “potential or imminent failures”, “predict”, or “statistical analysis” and there is no analysis at all for why these dissimilar limitations would have any bearing on why or how Armitage discloses limitation 14(b). It is unclear why anything about a “display unit” of limitation 8(e) is remotely relevant. PO cannot realistically respond to Petitioner’s arguments.

Limitation 14(b)	heuristically analyzing said received data to determine if an actual failure exists on said railcar or to predict potential or imminent failures based on a statistical analysis of said received data
Limitation 1(b)	applying a heuristic to said received data to determine deviations from nominal operating conditions
Limitation 1(c)	assigning a severity level to said deviations from nominal operating conditions
Limitation 1(d)	determining an alarm condition based on said assigned severity level
Limitation 8(e)	transmitting said raised alarm to a display unit on a train of which said plurality of railcars are a part
Limitation 9(b)	determining a recommended course of action based on said alarm condition

The petition—without any analysis—simply equates “statistical methods” with detecting deviations from nominal operating conditions and refers to limitation

1(b). *Id.* at 74. Petitioner does not explain why the analysis applicable to limitation 1(b) would be equally applicable to limitation 14(b). *Id.* Petitioner’s expert is similarly conclusory and provides no support for this linkage with limitation 1(b). *See* VII.D.1, *supra.* (incorporated here); *see also* Ex. 1003 at ¶266.

Taking Petitioner’s references at face value, its reliance on the analysis for limitation 1(b) appears misplaced. As noted above, in the discussion of limitation 1(b) there is no analysis regarding why a POSA would consider this disclosure to even be relevant to the limitation 14(b). There is simply no analysis of the specific claim terms in limitation 14(b) nor is there any explanation for why a POSA would find them similar to those in limitation 1(b). Ex. 2001 at ¶111. The same is true with respect to limitation 1(c). *See* §§VII.A.3.b, *supra.*, VII.D.3.b, *infra.* (both incorporated here). It is not Patent Owner’s job to reconstruct Petitioner’s invalidity position from a maze of cross references, and it is not the Board’s job either.

d. The combination does not transmit the results of the analysis

Petitioners’ Armitage/LeFebvre combination fails to disclose, teach, or suggest limitation 14(c): “communicating the results of said analysis to an off-railcar location.” Here, the Petition fails to address the substance of limitation 14(c), similar to Ground 1. *See* Petition, 60, 74; §VI.B.3.b, *supra.* (incorporated here). The Petition, again, refers to its analysis for claim 6 and this reference fails for the same

reason: claim 6 is limited to “transmitting said alarm condition” and there is no explanation for why this analysis—insufficient and conclusory on its own—would have any applicability to limitation 14(c). Petitioner also, again, merely copies word-for-word the same conclusory analysis offered by Petitioner’s Expert. *Compare* Petition, 60 with Ex. 1003 ¶210-215.

The Petition alleges that Armitage “discloses wirelessly reporting alarm conditions to a ‘collection system’ that is located off the train, as required by limitation 6.” Petition, 61; *see also* Ex. 2001 at ¶¶112-13. Here, Petitioner fails to appreciate that limitation 14(c) is different in scope than limitation 6 and therefore fails to identify any step that Armitage takes to actually transmit **results** of any analysis. *See* Ex. 2001 at ¶113. Claim 14 is a method claim and this type of conclusory attack is insufficient at least because no steps taken by Armitage concerning the “results” of any analysis are even discussed by Petitioner. *See* Ex. 2001 at ¶113.

As noted above, Petitioner exclusively relies on earlier analysis of a different claim requirement of limitation 6. Petition, 61. Even taking Petitioner’s analysis at face value, the Petition merely quotes Armitage disclosing that “if the control node detects a fault condition, it wirelessly reports the fault (i.e., sends an alarm message) to a collection system.” Petition at 60 (quoting Armitage ¶28). There is no disclosure in Armitage suggesting that the control node reports the “results” of any analysis,

much less the heuristic and statistical analysis recited in limitation 14(b). *See* §VII.D.3.a, *supra*. (incorporated here). Petitioner appears to simply equate the transmission of messages to the communication of results of the recited analysis. *See* Petition at 60; Ex. 2001 at ¶114-15. There is simply no disclosure in the cited portions of Armitage that supports Petitioner's position.

Petitioner has not established that independent claim 14 is unpatentable over the Armitage and LeFebvre combination. Therefore, Petitioner failed to show that Claims 15-18 and 20, which is dependent from independent claim 14, are unpatentable either. Ex. 2001 at ¶116.

4. Claim 21

Petitioner has failed to establish a motivation to combine Armitage and LeFebvre beyond improper hindsight. Petitioner relies wholesale on its prior analysis of claim 14. That analysis is just as insufficient for claim 21. *See* §VII.D.3.c, *supra*. (incorporated here). Claim 21 requires both a determination of an actual failure and a prediction of potential or imminent failures. Similar to limitation 1(b) as explained above, a POSA would not be motivated to modify Armitage in view of LeFebvre because doing so would change the basic operating principles of the Armitage invention. *See* §VII.C.1, VIV.D.3.c, *supra*. (both incorporated here); Ex. 2001 at ¶¶117-18. For example, incorporating the power saving scheme of LeFebvre in Armitage would change the basic operating principles of Armitage. *Id.* Petitioner

has not established that independent claim 21 is unpatentable over the Armitage and LeFebvre combination. Therefore, Petitioner failed to show that Claim 22, which depends from independent claim 21, is unpatentable over the combination either. Ex. 2001 at ¶119.

VIII. CONCLUSION

For the reasons described above, the Board should decline to institute *inter partes* review.

Respectfully submitted,

Dated: May 15, 2023

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Amsted Rail Company, Inc.

CERTIFICATION

Patent Owner's Preliminary Response, excluding the caption, Table of Contents, Table of Authorities, Table of Exhibits, and this Certification contains 13,866 words as measured by the word processing software used to prepare the document, in compliance with 37 C.F.R. § 42.24(d).

Respectfully submitted,

Dated: May 15, 2023

By: / Ryan N. Miller /

Ryan N. Miller
Reg. No. 68,262
Counsel for Patent Owner
Amsted Rail Company, Inc.

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §42.6(e), I certify that on this 15th day of May, 2023, a copy of PATENT OWNER'S PRELIMINARY RESPONSE under 37 C.F.R. §42.107 was served by electronic mail on Petitioner's counsel, lead and back-up, as follows:

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Counsel for Petitioner has consented to service of all documents via electronic email. *See* Petition, Paper 1 at 2.

Dated: May 15, 2023

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