

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TEXTRON SPECIALIZED VEHICLES INC.,
Petitioner,

v.

SZ DJI TECHNOLOGY CO. LTD.,
Patent Owner.

Case No. IPR2023-01198
Patent No. 10,640,224

**PATENT OWNER'S PRELIMINARY RESPONSE
PURSUANT TO 37 C.F.R. § 42.107**

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I. INTRODUCTION

The Board should not institute *inter partes* review of claims 1-27 of U.S. Patent No. 10,640,224 (“the ’224 patent”) because Textron Specialized Vehicles, Inc. (“Petitioner”) fails to show that it has a reasonable likelihood of prevailing.

The petition challenges the claims of the ’224 patent based on three sets of grounds, each of which applies a single reference. For each set of grounds, the petition asserts that the challenged claims are anticipated by or rendered obvious over the single reference. However, as detailed more below, each of the petition’s grounds rests on insufficient analysis and unclear reasoning as to how each of the applied references discloses (or renders obvious) each and every element of the challenged independent claims. As a result, Petitioner fails to meet its burden in showing unpatentability.

More specifically, Petitioner’s first set of grounds, Grounds 1A and 1B, respectively challenge independent claims 1 and 12 as anticipated by or obvious over Takashi. These grounds, however, fail for several reasons. As an initial matter, Petitioner’s analysis makes no distinction between Grounds 1A and 1B. Instead, the petition advances arguments that are entirely premised on the notion that Takashi discloses each of the limitations of the claims, *i.e.*, anticipates the claimed subject matter. No other theory, and in particular any theory that applies a proper obviousness analysis, is advanced. Thus, although nominally advancing

two grounds, the petition actually relies on one ground based on a theory of disclosure—*i.e.*, anticipation.

In this respect, the petition fails to establish that Takashi discloses each and every limitation of claims 1 and 12. For instance, the petition fails to show that Takashi discloses “calculating a compensation amount of a control signal of the motor according to the present electrical parameter” as recited in claims 1 and 12. For this limitation, Petitioner contends that Takashi’s command duties read from memory satisfy the claimed limitation because, as the petition posits, Takashi’s pre-stored command duties are “calculated in advance.” Petitioner, however, fails to square this reasoning—*i.e.*, a supposed “advance” calculation of Takashi’s command duty—with the entire claim language, which requires that the compensation amount is calculated “according to the present electrical parameter.” The present electrical parameter is not known in advance and the petition does not explain how a pre-stored command duty that is allegedly calculated in advance can also be calculated “according to the present electrical parameter” as recited in the challenged claims.

Petitioner further presents an alternative theory that Takashi discloses that its command duty may be “calculated through computation,” rather than pre-written to memory, but this misreads the reference. For this theory, the petition cites to disclosure that is expressly limited to the control characteristics shown in Takashi’s

FIG. 3, which relate to Takashi's driving circuit. However, in mapping Takashi to the claimed "calculating a compensation amount," the petition relies on the control characteristics shown in Takashi's FIG. 2, which relate to a different circuit, Takashi's cargo handling circuit. The petition does not grapple with these distinct circuits and their distinct control characteristics described in Takashi nor does the petition allege a POSA would have applied Takashi's teachings relevant to its driving circuit to the cargo handling circuit relied upon in the petition, let alone attempt to explain how or why this would have been accomplished.

Also deficient is Petitioner's mapping of Takashi to the recited "compensation amount" and the "control signal of the motor." Petitioner provides two alternative mappings for these terms—one where Takashi's command duty is the "compensation amount" and its control signal is the "control signal of the motor," and a second where the command duty and control signal are the "compensation amount" and Takashi's pulse signal is the "control signal of the motor." The petition, however, fails to explain how these signals result in the claimed calculation of a "compensation amount" of a "control signal" and the claimed modification of "the control signal according to the compensation amount" as recited in the claims. Instead, under both theories, Petitioner's analysis fails to show any meaningful distinction between the disclosed command duty, control signal, and pulse signal—*i.e.*, the command duty is supplied as the control

signal and the control signal is supplied as the pulse signal—and the petition does not identify where in that process a “compensation amount” of a “control signal” is calculated and how “the control signal” is modified “according to the compensation amount.”

Petitioner’s second and third sets of grounds, which respectively challenge independent claim 9 as anticipated by or obvious over Onishi or Kim, also fail. Like Grounds 1A and 1B, the petition advances a theory that rests solely on the notion that the references disclose each of the claim limitations. A distinct obviousness analysis is not provided in the petition. Thus, although each set is also nominally presented as two separate grounds, only a single ground that is based on disclosure (*i.e.*, anticipation) is actually advanced.

Beyond the failure to present an obviousness theory, the petition fails to establish that either Onishi or Kim discloses each and every limitation of the claim. For example, with respect to Onishi, Petitioner’s mapping of Onishi to the claimed “obtaining a present electrical parameter of a battery” is in tension with the reference’s disclosure. Specifically, while Onishi expressly identifies a battery—storage battery 10—in its system, the petition argues that Onishi’s battery extends to other components, namely Onishi’s capacitor, control block, and power converter, despite Onishi’s own disclosure to the contrary. The petition fails to provide sufficient reasoning that justifies its deviation from Onishi’s express

disclosure and thus fails to show that Onishi discloses “obtaining a present electrical parameter of a battery” as recited in claim 9. In addition, the petition also fails to show how Onishi’s disclosure of voltages that are combined and inputted into a voltage-controlled controller constitutes “calculating a voltage compensation amount of the battery according to the present electrical parameter.”

Lastly, Petitioner’s theory that Kim discloses “calculating a voltage compensation amount of the battery” is unsupported by Kim. Instead, as with Onishi, Petitioner rewrites the reference. Petitioner manipulates an equation found in Kim to derive a new expression that the petition maps to the claimed “voltage compensation amount.” But this modified equation is found nowhere in Kim itself nor does Kim indicate that the petition-derived expression is actually calculated by its system. Thus, the petition identifies no explanation or evidence that would support a finding that Kim discloses the claimed calculation.

For these reasons, and as further detailed below, institution of *inter partes* review should be *denied*.

II. CLAIM CONSTRUCTION

A claim subject to *inter partes* review receives its plain and ordinary meaning, interpreted in light of the specification of the patent in which it appears. *See* 37 C.F.R. § 42.100(b). Petitioner asserts that “the Board need not expressly construe any term because the prior art invalidates the claims under any plausible

construction.” Pet., 15. However, for the claimed “obtaining a present electrical parameter of a battery” of independent claim 9, Grounds 2A and 2B of the petition rely on an interpretation of the applied prior art reference, Onishi (EX1006), that is at odds with what the reference discloses as the battery of its system. As explained more below, Petitioner’s argument that Onishi’s battery includes additional components of Onishi’s system that go beyond its storage battery is unsupported and insufficient to meet Petitioner’s burden to establish unpatentability. *See infra*, section IV.A.2.

III. GROUNDS 1A AND 1B FAIL

As detailed below, the petition fails to establish a reasonable likelihood of prevailing on Grounds 1A and 1B based on Takashi (EX1004). First, although presented as two separate grounds, the petition advances only one theory (and thus only one ground) that Takashi discloses each of the limitations recited in claims 1 and 12. As a result, Petitioner’s showing with respect to Ground 1B, which alleges obviousness over Takashi, rests on the adequacy of Petitioner’s showing with respect to Ground 1A, which alleges anticipation (*i.e.*, disclosure) by Takashi.

In this regard, the petition’s grounds based on Takashi are insufficient because the petition fails to show that Takashi discloses each and every claim limitation. In particular, the petition’s assertions that Takashi discloses “calculating a compensation amount of a control signal of the motor according to

the present electrical parameter” and “modifying the control signal according to the compensation amount” are based on deficient reasoning and unsupported contentions. Accordingly, Petitioner’s Grounds 1A and 1B fail.

A. Independent Claims 1 and 12

1. Ground 1B rises and falls with Ground 1A

Petitioner challenges independent claims 1 and 12 of the ’224 patent based on two grounds that apply Takashi alone.¹ However, although nominally applying two grounds, the petition does not advance any distinct analysis. For Ground 1A, Petitioner asserts that claims 1 and 12 are anticipated by Takashi and, for Ground 1B, Petitioner asserts, in the alternative, that the claims are rendered obvious by the same reference. *See* Pet., 5, 15. However, with the exception of the claimed “one or more processors” recited in claim 12,² Petitioner argues only that Takashi

¹ Patent Owner notes that Takashi is Mr. Hijima’s personal name. *Compare* EX1004, (72) (“HIJIMA Takashi) *with* EX1006, (72) (“ONISHI Tokuo”).

However, for ease of reference, this preliminary response will apply the petition’s naming of the reference.

² *See id.*, 43-44 (asserting “[a] POSITA would have understood from this disclosure, and at the very least found it obvious, that ‘controller 3 as a central processing unit’ with its detecting means 31, duty setting means[], and drive means

discloses the limitations recited in claims 1 and 12. *See id.*, 15-25, 42-45. No separate analysis is provided with respect to obviousness, especially one that properly applies the obviousness framework of *Graham*. In particular, the petition fails to identify any limitations that may be missing from Takashi nor does the petition provide any explanation as to how and why a POSA would have modified Takashi to arrive at the claimed subject matter. Therefore, with respect to claims 1 and 12, Petitioner’s Ground 1B rests on Petitioner’s Ground 1A assertions that Takashi discloses, *i.e.*, anticipates, the claimed subject matter.

2. The petition fails to establish that Takashi discloses “calculating a compensation amount of a control signal of the motor according to the present electrical parameter” (Element 1[b])

The petition contends that Takashi discloses “calculating a compensation amount of a control signal,” but the petition’s analysis is flawed and insufficient. First, the petition alleges that Takashi discloses “calculating a compensation amount” in one of two ways: (1) through its alleged disclosure of “pre-calculated command duties stored in memory” which, according to Petitioner, “are calculated in advance”; and (2) through its alleged disclosure of command duties that may be

24 are ‘processors’’). However, even Petitioner’s assertions for this limitation are insufficient to support an obviousness theory.

“calculated through computation.” Pet., 19-21. However, Petitioner’s first theory fails because the petition fails to explain how pre-stored command duties that are purportedly calculated in *advance* are also calculated “according to the *present* electrical parameter” as recited by the claim limitation. Moreover, Petitioner’s second theory fails because the disclosure relied upon in the petition that the command duties alternatively may be “calculated through computation” relates to control characteristics associated with Takashi’s driving circuit (shown in FIG. 3), while the petition’s theory rests on the control characteristics associated with Takashi’s cargo handling circuit (shown in FIG. 2). The petition fails to provide explanation and evidence that would justify the mixing-and-matching of Takashi’s teachings with respect to one circuit (Takashi’s driving circuit) with a different circuit (Takashi’s cargo handling circuit), particularly in a way that would result in the claimed invention.

Second, the petition further alleges that Takashi discloses “a compensation amount” and “a control signal” in one of two ways: (1) the command duty of Takashi’s FIG. 2 as “a compensation amount” and control signals 3a/3b as “a control signal”; or (2) the command duty and control signals 3a/3b as “a compensation amount” and pulse signals 13a/24b as “a control signal.” Pet., 21-23. The petition, however, shows that, at best, Takashi describes that the command duty is supplied as the control signal and the control signal is, in turn,

supplied as the pulse signal. The petition fails to explain how this relationship discloses “a compensation amount” for “a control signal of a motor,” especially in view of the claims’ later recitation that the control signal is modified according to the compensation amount.

Thus, for the reasons detailed below, the petition fails to establish a reasonable likelihood of prevailing on Grounds 1A and 1B.

- a) The petition fails to show Takashi discloses “calculating” a compensation amount “according to the present electrical parameter”*

The petition alleges that Takashi discloses “calculating” a compensation amount “according to the present electrical parameter” through Takashi’s disclosure of FIG. 2. “Specifically, FIG. 2 of Takashi illustrates a method by which a command duty is increased inversely proportional to battery 4 voltage drop starting with a fully charged voltage V_a to the limit voltage V_b (in this example, 80% discharge).” Pet., 19-20 (citing EX1004, [0013] and reproducing Takashi’s FIG. 2). According to Petitioner, the figure shows that “when Takashi’s detecting means 31 detects the battery 4 in a fully charged state V_a , ‘the [duty setting means of] the controller 3 reads data such as 80% as the command duty’ and supplies this data ‘to drive means 24 as the control signal 3b.’” Pet., 20 (alteration original). “Similarly, when the battery 4 reaches the limit voltage V_b , ‘the [duty setting means of the] controller 3 reads data setting command duty to

100% and the control signal 3b based on this data is supplied to the drive means 24....” *Id.* (alteration original). Thus, Petitioner contends that this figure shows the claimed calculating a compensation amount because the control characteristics of the command duty “are written to the memory 32 in advance (*i.e.*, the characteristics are calculated in advance)” or “the same control characteristics may be calculated through computation.” Pet., 21 (citing EX1004, [0017]) (internal quotations omitted); *see also id.*, 19 (asserting Takashi’s “pre-calculated command duties stored in memory and/or calculate a percent command duty according to the detected battery voltage discloses ‘calculating a compensation amount’”).

Petitioner’s arguments fail to establish that Takashi discloses the claimed limitation.

For Petitioner’s first position, the petition contends that the pre-written duty commands shown in FIG. 2 meet the claimed limitation because the characteristics are allegedly “calculated in advance.” Pet., 21; *see also id.*, 19 (referencing “pre-calculated command duties stored in memory”). However, Takashi itself does not disclose that the pre-*stored* duty commands are *calculated* at all, regardless of timing. What’s more, even if Petitioner were correct that the duty commands are calculated in advance, the petition fails to explain how this would satisfy the limitation that the claimed compensation amount is calculated “according to the present electrical parameter.” That is, if the alleged calculation occurs in advance

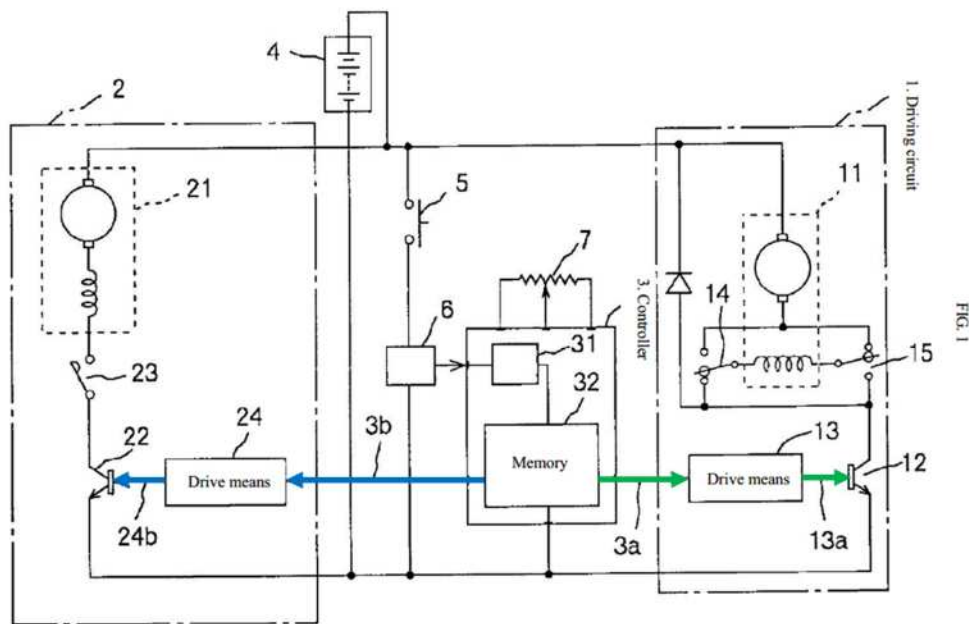
(i.e., *before* any measurement of the battery's present electrical parameter) as Petitioner contends, then it is not clear how the calculation is made "according to the *present* electrical parameter" of the battery. By failing to address this aspect of the claim language with respect to Takashi's pre-written duty commands that, under Petitioner's theory, "are calculated in advance," the petition fails to establish that Takashi's stored command duties disclose this claim element.

Petitioner's second argument, relying on an alleged disclosure that the command duties of Takashi's FIG. 2, which is associated with Takashi's cargo handling circuit, can "be calculated through computation" (Pet., 21 (citing EX1004, [0017])), also fails. Here, Petitioner relies on disclosure associated with a different circuit (Takashi's driving circuit) and its control characteristics shown in a different figure (FIG. 3), yet fails to acknowledge the distinction between circuits and figures. Petitioner does not allege a POSA would have applied teachings regarding FIG. 3 to the cargo handling circuit control characteristics of FIG. 2, let alone provide a motivation to do so.

Specifically, Takashi discloses a system for controlling two separate circuit paths that drive different components of an electric forklift: (1) driving circuit 1 having DC motor 11 for driving the forklift's drive wheels; and (2) cargo handling circuit 2 having DC motor 21 for driving a hydraulic pump. *See* EX1004, [0009]-[0011], FIG. 1. "[T]he controller 3 has a function of setting the command duty of

the pulse signal 13a for the driving circuit 1 and the pulse signal 24b for the cargo handling circuit 2 according to the voltage of the battery 4.” *Id.*, [0012].

Takashi discloses that the system’s “duty setting means reads and controls from the memory 32” the control characteristics of two different groups—one group of control characteristics that is associated with the cargo handling circuit 2 and another that is associated with the driving circuit 1. *Id.*, [0013]. Each of these control characteristics is illustrated in two different figures. Figure 2 (which Petitioner relies on as disclosing the claimed compensation amount (*see* Pet., 19-20)) illustrates one set of control characteristics where the “command duty is increased inversely proportional to voltage characteristics where the voltage of the battery 4 drops from fully charged voltage characteristic to the limit voltage at 80% discharge.” *Id.* Takashi discloses that the data associated with FIG. 2 is read from the memory 32 and outputted as control signal 3b, which is supplied to the drive means 24 of the cargo handling circuit 2 that then outputs the signal as pulse signal 24b to drive the hydraulic pump (annotated in blue below). *See id.*, [0013]-[0015] (stating “[f]rom the control characteristics of FIG. 2 based on the detected value V_a , the controller 3 reads data such as 80% as the command duty” and “[t]his data is supplied to the drive means 24 as the control signal 3b”), FIG. 1.



Takashi additionally discloses another “control characteristic group” in FIG. 3. In this figure, “duty gradient for changes in the accelerator depression angle is increased inversely proportional to the voltage characteristics described above as a gradient parameter for the battery voltage detection value.” *Id.*, [0013]. Takashi discloses that FIG. 3 is used as the basis for outputting control signal 3a, which is supplied to the drive means 13 of the driving circuit 1 that then outputs the signal as pulse signal 13a to drive the drive wheels (annotated in green above). *See id.*, [0016] (stating “in the case of driving operation, the controller 3 reads duty gradient characteristics according to the detected value from the detecting means 31 from the control characteristic group of FIG. 3”). It is with respect to this figure where Takashi discloses that, while the “control characteristics of the duty

command to the driving circuit 1 are written to the memory 32 in advance..., the same control characteristics may be calculated through computation.” *Id.*, [0017]. More specifically, “[t]his would be calculating each command duty and accelerator depression angle data for the offset setting point O as well as command duty relative to each accelerator depression angle based on the detection value of battery voltage corresponding to duty gradient.” *Id.*

Petitioner relies on paragraph [0017] of Takashi in asserting that, alternatively, “the same control characteristics may be calculated through computation.” Pet., 21. However, Petitioner’s assertions are insufficient to support this finding. As noted above, Petitioner relies on the control characteristics Takashi discloses with respect to **FIG. 2**, which relates to the cargo handling circuit 2. See Pet., 19 (“Specifically, FIG. 2 of Takashi illustrates a method...”), 21 (“As shown in FIG. 2 and described throughout the disclosure, Takashi’s duty setting means calculates a command duty...”). Paragraph [0017] of Takashi, however, does not indicate that the control characteristics of FIG. 2 “may be calculated through computation.” Instead, Takashi expressly limits that paragraph to the “control characteristics of the duty command to *the driving circuit 1*,” which Takashi teaches is illustrated by FIG. 3. EX1004, [0016]-[0017] (emphasis added). The petition fails to acknowledge Takashi’s disclosure that different control characteristics (illustrated in FIGS. 2 and 3) apply to the different circuits (cargo

handling circuit 2 and driving circuit 1, respectively) and fails to explain how a POSA would have understood disclosure relating to the driving circuit-specific control characteristics of FIG. 3 would also apply to the cargo handling circuit-specific control characteristics of FIG. 2. And, even if it did apply, the petition fails to provide any analysis as to how the control characteristics of FIG. 2 would have been modified to result in the claimed calculation of a “compensation amount of a control signal” (as opposed to, *e.g.*, calculation of the control signal itself).

Accordingly, for the reasons above, Petitioner fails to show that Takashi discloses “calculating” a compensation amount “according to the present electrical parameter.”

- b) *The petition fails to show Takashi discloses calculating “a compensation amount of a control signal of the motor”*

Petitioner also fails to establish that Takashi discloses calculating “a compensation amount of a control signal of the motor.” Petitioner advances two arguments in which Takashi allegedly discloses this limitation. First, Petitioner argues that “Takashi’s command duty is a compensation amount ‘of a control signal of a motor’...with control signals 3a and 3b each being the claimed ‘control

signal.””³ Pet., 21-22. Second, Petitioner argues that, “as an alternative, pulse signals 13a and 24b output from the duty setting means each also disclose the claimed ‘control signal’....” *Id.*, 22. “In this alternative mapping,” Petitioner contends that “Takashi’s calculated command duty and the control signals 3a and 3b that result from this calculated command duty serve as a compensation amount of pulse signals 13a and 24b (‘a control signal of the motor’)....” *Id.* Petitioner’s analysis is insufficient because it fails to account for the recited claim language as a whole.

Specifically, claim 1 recites “calculating a compensation amount of a control signal of the motor according to the present electrical parameter” and “modifying the control signal according to the compensation amount.” *See also* EX1001,

³ Although Petitioner points to the control signals 3a and 3b (and pulse signals 13a and 24b) for this claim element, as noted above, Petitioner relies on the control characteristics disclosed in FIG. 2 of Takashi, which specifically relate to Takashi’s cargo handling circuit 2 (*i.e.*, control signal 3b and pulse signal 24b). Thus, while Petitioner maps the control and pulse signals of both circuits to the claim element, the petition does not provide a basis for this reasoning in view of Takashi’s disclosure that different control characteristics apply to the circuits. *See supra*, section III.A.2.a.

claim 12 (reciting substantively identical limitations). Petitioner's theory is premised on the notion that Takashi's control signals 3a and 3b (or pulse signals 13a or 24b) are the claimed "control signal of a motor" and the command duty (or, alternatively, additionally control signals 3a and 3b) is the claimed "compensation amount." However, it is unclear from the petition that there is any distinction between these features such that one feature (*e.g.*, the command duty) would constitute "a compensation amount" of another feature (*e.g.*, the control signal).

For instance, Takashi discloses that "[d]ata read from the memory 32 is supplied as control signals 3a and 3b that command duties of the drive means 13 of the driving circuit 1 and drive means 24 of the cargo handling circuit 2." EX1004, [0013]. With respect to the control characteristics of FIG. 2, Takashi discloses that, "when the battery 4 is in a fully charged state" and "a detection voltage V_a is detected," the controller "reads data such as 80% as the command duty" and "[t]his data is supplied to the drive means 24 as the control signal 3b." *Id.*, [0014]. "Thus, the drive means 24 outputs a pulse signal 24b with a duty of 80% and the transistor 22 supplies current to the DC motor 21 with intermittent operation of 80% ON time." *Id.* Thus, according to Takashi, the data read from FIG. 2 is the command duty, which is supplied to the drive means 24 as the control signal 3b and then outputted by the drive means 24 as the pulse signal 24b—in other words, each appears to carry the same data (*e.g.*, 80% ON). The petition relies on this

disclosure in asserting that Takashi's signals meet the claimed limitations. *See* Pet., 20 (quoting same from paragraph [0014] of Takashi). However, the petition does not explain how one signal can be "a compensation amount" of another signal when both signals are carrying the same data (*i.e.*, the 80% percent command duty). *See id.*, 21 (asserting only that the command duty is used "to determine control signals 3a and 3b"), 22 (stating same for pulse signals 13a and 24b). This lack of explanation is especially problematic because, as explained more below, the claimed control signal must be ***modified*** according to the claimed compensation amount. *See infra*, section III.A.3.

Accordingly, for these reasons, Petitioner fails to show that Takashi discloses "calculating a compensation amount of a control signal of the motor."

3. The petition fails to establish that Takashi discloses "modifying the control signal according to the compensation amount" (Element 1[c])

As noted above, Petitioner argues that "Takashi discloses the claimed control signal in two different ways: either as one or both of the control signals 3a and 3b or as one or both of the pulse signals 13a and 24b." Pet., 23. In both cases, however, Petitioner fails to show that Takashi discloses "modifying the control signal according to the compensation amount" because the petition fails to identify how any signal is modified in Takashi.

Specifically, with respect to the petition's assertions that control signals 3a and 3b of Takashi are the claimed control signal, Petitioner relies on Takashi's alleged disclosure that "the controller calculates a command duty between 80-100%..., which the duty setting means then supplies as control signals 3a and 3b to the drive means 13 and 24." Pet., 23; *see also id.*, 24 (stating "controller 3 determines an 80% command duty, which it supplies to the drive means 24 as control signal 3b"). However, despite the petition's conclusory statement that "Takashi's duty setting means modifies the controls signals 3a and 3b," the petition does not explain how a command duty that is **supplied** as a control signal represents a modification of that control signal. In other words, the petition fails to provide a showing that there is a modification occurring in Takashi.

Petitioner's alternative mapping to pulse signals 13a and 24b presents the same issues. That is, the petition similarly contends that Takashi discloses that, when the battery is fully charged, "the controller 3 reads data such as 80% as the command duty,' which 'is supplied to the drive means 24 as the control signal 3b,' which causes 'the drive means 24 to output a pulse signal 24b with a duty of 80%.'" Pet., 25. Again, despite the petition's conclusory assertions that the pulse signals are modified, the petition does not explain how a control signal that is **outputted** as a pulse signal represents a modification of that pulse signal nor does the petition identify a modification to the pulse signal that is occurring in Takashi.

Accordingly, the petition fails to show that Takashi discloses “modifying the control signal according to the compensation amount.”

B. Dependent Claims 3-8 and 13-17

Claims 3-8 and 13-17 depend from claims 1 or 12. Thus, for the same reasons explained above, the petition fails to establish that these claims are anticipated by or rendered obvious over Takashi.

IV. GROUNDS 2A AND 2B FAIL

As detailed below, the petition also fails to establish a reasonable likelihood of prevailing on Grounds 2A and 2B based on Onishi (EX1006). Like the Takashi-based grounds, the petition’s assertions that Onishi anticipates or renders obvious independent claim 9 is premised on the same theory: that Onishi discloses each of the limitations recited in the claim. Thus, Petitioner’s Ground 2B rises and falls with its Ground 2A.

Furthermore, with respect to the petition’s contentions that Onishi discloses the claimed subject matter, the petition’s analysis is insufficient and contrary to Onishi. Specifically, the petition contends that Onishi discloses “obtaining a present electrical parameter of a battery.” However, to support this assertion, the petition must assert that the battery of Onishi encompasses not only the component that Onishi identifies as the battery of its system, *i.e.*, storage battery 10, but also other components, including the system’s capacitor, switching power converter,

and control block. Thus, the petition's mapping is contrary to the express disclosure of the cited reference. The petition fails to sufficiently explain why a POSA would have departed from Onishi's own identification of the battery in its system and instead understood Onishi's battery to encompass other components.

Additionally, the petition's assertions that Onishi discloses "calculating a voltage compensation amount of the battery according to the present electrical parameter" are also insufficient. The petition relies on an alleged difference between voltages E_o and E_{oref} as meeting the claimed calculation of a voltage compensation amount. However, to the extent there is any difference between these voltages, Onishi indicates that these voltages are combined voltages inputted into a voltage-controlled controller. The petition fails to sufficiently explain how such combined inputs constitute the calculation of a voltage compensation amount as recited in claim 9.

For these reasons, Petitioner's Grounds 2A and 2B fail.

A. Independent Claim 9

1. Ground 2B rises and falls with Ground 2A

Petitioner further challenges independent claim 9 based on two grounds that apply Onishi alone. Similar to its challenges based on Takashi, while Petitioner nominally challenges claim 9 based on anticipation (Ground 2A) and obviousness (Ground 2B) in view of Onishi, the petition advances the same analysis for both

grounds. *See* Pet., 51-63. That is, for each of claim 9’s limitations, Petitioner alleges that Onishi ***discloses*** the element. Again, Petitioner does not identify any limitations that are missing from Onishi nor provide any explanation as to how and why a POSA would have modified the reference to arrive at the claimed invention. Thus, Petitioner’s Ground 2B rests on the same theory underlying its Ground 2A analysis—*i.e.*, Onishi anticipates the claimed subject matter.

2. The petition fails to establish Onishi discloses “obtaining a present electrical parameter of a battery” (Element 9[a])

Petitioner argues that Onishi discloses obtaining “a present electrical parameter” of a battery through voltage E_o , “which is the output voltage of the battery system formed by the series voltage of the storage battery 10 and capacitor 20 (voltage E_b + voltage E_c).” Pet., 54; *see also id.*, 55 (“The current output voltage E_o of the battery system is the claimed ‘present electrical parameter.’”). Petitioner contends that voltage E_o represents an electrical parameter of “a battery” because a POSA “would understand that the overall battery system of Onishi (*i.e.*, storage battery 10, capacitor 20, switching power converter 30, and control block 50)—and not just the storage battery cells 10—is the claimed ‘battery’ of Claim 9.” *Id.*, 55. However, Petitioner fails to adequately support its contention that the battery in Onishi is something other than what Onishi identifies as the battery—storage battery 10. While Petitioner attempts to map Onishi’s battery to additional

system components, including capacitor 20, switching power converter 30, and control block 50, such a mapping is at odds with Onishi's own disclosure.

First, Petitioner's argument that a POSA would have understood Onishi's entire storage battery system to represent Onishi's battery is facially inconsistent with Onishi. Specifically, Onishi explicitly identifies a battery: storage battery 10. *See* EX1006, [0010], FIG. 1. In addition, as Petitioner itself recognizes, Onishi also describes the storage battery 10 as being associated with its own electrical parameter, voltage E_B .⁴ *See id.*, [0021] (" E_B represents the voltage of the battery 10"); Pet., 54 (noting E_B as the voltage of the storage battery 10). Onishi further describes the battery 10 as a distinct component from the additional components Petitioner contends constitute Onishi's battery. *See id.*, [0009] ("The present invention connects a capacitor in series with a storage battery...and performs control so as to maintain a constant direct current voltage of the storage battery and capacitor combination connected in series...."), [0021] (" E_C represents the voltage of the capacitor 20"). Petitioner provides no explanation as to why a POSA would ignore this express disclosure—*i.e.*, Onishi's identification of a *battery* (and associated voltage E_B)—in favor of an expanded understanding where Onishi's

⁴ Petitioner does not assert that the voltage E_B of the storage battery 10 is obtained in Onishi.

battery also includes a capacitor, power converter, and control block, despite contrary usage of the term in Onishi itself. Petitioner's attempt to rewrite the reference should be rejected.

Second, the slim reasoning provided in the petition to justify its reading of Onishi is unclear and unsupported. Specifically, Petitioner contends that "Onishi explicitly defines the 'storage battery system' as comprising 'a storage battery and a capacitor connected in series' and states that the voltage of the 'entire storage battery system integrating the storage battery and the capacitor is kept constant.'" Pet., 55 (emphasis omitted). Petitioner, however, does not explain how Onishi's description of the components that make up its storage battery *system* relates to what constitutes the *battery*, especially in view of the fact that Onishi itself distinguishes between the system as a whole and the battery contained within that system. *See, e.g.*, EX1006, Abstract ("An object is to easily configure a storage battery system capable of maintaining a constant terminal voltage until the remaining capacity is exhausted, even if the terminal voltage of the storage battery drops...."), claim 1 ("A storage battery system, comprising a storage battery...."), [0007]-[0008].

Also insufficiently explained is Petitioner's contention that Onishi's battery system constitutes a battery because "it is clear that the battery voltage in Onishi that is kept constant is that of the storage battery system at E_0 , which is the battery

voltage applied to the load such as an ‘alternating current motor via an inverter.’”

Pet., 55. However, the petition does not make clear why, simply because the output voltage E_o of Onishi’s entire system is being kept constant, the entire system must be Onishi’s battery and the output voltage E_o must be the present electrical parameter of the battery. The same can be said for Petitioner’s argument that “[t]his is consistent with the use of the terms in Claim 9, where in the term ‘output voltage of the battery’ refers to the output voltage that is maintained to be ‘stable.’” Petitioner again provides no explanation as to why this has any bearing on what a POSA would have considered to be the battery in Onishi based on its disclosure.

Indeed, this lack of explanation is further underscored by the tension that arises when Petitioner applies Onishi to dependent claim 11, which recites that the voltage compensation amount is calculated “according to the present voltage of the battery and a full voltage of the battery.” Petitioner contends that a POSA “would have understood that E_{oref} ,” the reference output voltage value Onishi seeks to maintain its system at, “corresponds to the full voltage of the battery system.” Pet., 64. The petition, however, contends that Onishi teaches that the output voltage can *exceed* E_{oref} , making it unclear how E_{oref} can represent the “full voltage” of Onishi’s battery. *See* Pet., 60; EX1006, [0014], [0019], FIG. 3. This discrepancy further highlights Petitioner’s mischaracterization of Onishi’s disclosure.

Lastly, Petitioner’s argument is also internally inconsistent with the petition itself. For example, in certain instances, the petition explicitly acknowledges a distinction between Onishi’s battery and other elements of its system (*e.g.*, the capacitor), yet, when it comes to mapping Onishi to the claimed element, Petitioner collapses the two components out of necessity. *See* Pet., 52 (“The storage battery control system compensates for the voltage fluctuations caused by charging and discharging of ***the battery*** by actively charging and discharging ***a capacitor***.” (emphasis added)), 53 (“Onishi’s use of a storage battery control system to control a capacitor in series with a storage battery and a switching power converting device....”). Furthermore, for its other grounds, Petitioner maps the claimed “present electrical parameter of a battery” to a component referred to as a battery in the cited reference, rather than a collection of components that includes a battery. *See id.*, 16-19 (pointing to Takashi’s battery 4), 67-68 (relying on Kim’s battery pack). Petitioner does not explain the reason for these differences in the treatment of the same claim language nor does the petition advance a claim construction that would account for these differences.

Given the facial inconsistencies between Onishi’s disclosure and Petitioner’s mapping of the reference to the claimed limitation, and Petitioner’s lack of explanation justifying these inconsistencies, Petitioner fails to show that Onishi

discloses “obtaining a present electrical parameter of a battery” as recited in claim 9.

3. The petition fails to establish Onishi discloses “calculating a voltage compensation amount of the battery”

Petitioner further contends that Onishi discloses “calculating a voltage compensation amount of the battery according to the present electrical parameter,” asserting a POSA would understand that Onishi’s control block 50 “compares the obtained value of voltage E_o to the full/reference voltage E_{oref} to calculate a voltage compensation amount of the battery (*e.g.*, the difference between voltages E_o and E_{oref} , which is input into the voltage-controlled PI controller block 51 of control block 50).”⁵ Pet., 56. The petition, however, fails to show that Onishi discloses “calculating a voltage compensation amount of the battery” based on the voltage inputs of E_o and E_{oref} .

As an initial matter, the petition fails to show that voltage E_o fluctuates such that Onishi “calculate[s] a voltage compensation amount of the battery (*e.g.*, the difference between voltages E_o and E_{oref} ...).” *Id.*, 56. As shown in FIG. 5 of

⁵ As discussed above in Section IV.A.2., Petitioner does not explain how E_{oref} can represent a “full” voltage when, as the petition contends, Onishi discloses that E_o can exceed E_{oref} .

Onishi, E_o is a constant and it is the voltage of the battery E_B that fluctuates.

EX1006, FIG. 5; *see also id.*, [0020]-[0021] (“the battery voltage E_B fluctuates”).

In addition, even if E_o did fluctuate, the petition fails to show that Onishi’s system calculates any difference between E_o and E_{oref} . As depicted in Onishi’s FIG. 1, E_o and E_{oref} are combined inputs into a voltage-controlled PI controller. EX1006, [0027], FIG. 1; *see also* Pet. 56-57 (citing same). The petition’s assertion that Onishi compares E_o and E_{oref} to calculate their difference (the alleged “voltage compensation amount”) is wholly unsupported by the reference, which merely discloses that E_o and E_{oref} are input into controller 51. The petition does not explain why combining voltage signals for a controller input involves calculation of a difference between the two, nor does it cite to any disclosure of such a calculation in Onishi. To the extent Petitioner’s assertion that use of the claimed calculation would “be understood by a POSITA” (Pet., 56.) implies that Onishi inherently discloses such a calculation, the petition fails to substantiate such a theory. *See, e.g., Par Pharms., Inc. v. Twi Pharms., Inc.*, 773 F.3d 1186, 1196 (Fed. Cir. 2014) (inherency requires a showing that “the limitation at issue necessarily must be present”). As Petitioner’s theory that Onishi discloses the claimed “calculating a voltage compensation amount” rests entirely on the use of E_o and E_{oref} as inputs to controller 51, the petition fails to show that this element is found in Onishi.

Petitioner's mischaracterization of E_{oref} , discussed above in Section IV.A.2, further undermines Petitioner's "calculation" theory. Petitioner asserts Onishi "compares the obtained value of E_o to the full/reference voltage E_{oref} to calculate a voltage compensation amount." Pet., 56. However, as explained above, Petitioner's characterization of E_{oref} cannot be reconciled with its assertions that the output voltage E_o can exceed E_{oref} . This additional flaw in the petition theory regarding the claimed calculation highlights Petitioner's repeated twisting of Onishi's disclosure to suit its purpose.

Accordingly, the petition fails to show that Onishi discloses "calculating a voltage compensation amount of the battery according to the present electrical parameter."

B. Dependent Claims 10 and 11

Claims 10 and 11 depend from claim 9. Thus, for the same reasons explained above, the petition fails to establish that these claims are anticipated by or rendered obvious over Onishi.

V. GROUNDS 3A AND 3B FAIL

Finally, the petition fails to establish a reasonable likelihood of prevailing on Grounds 3A and 3B based on Kim (EX1008). As with the previous grounds, the petition's assertions that Kim anticipates or renders obvious independent claim 9 is premised on a single theory that Kim discloses each of the limitations recited in

claim 9. Thus, Petitioner's Ground 3B depends on its Ground 3A. In this regard, the petition fails to establish that Kim discloses the invention of claim 9.

Specifically, while the petition asserts that Kim discloses "calculating a voltage compensation amount of the battery according to the present electrical parameter," the petition's basis for this assertion cannot be found in Kim. Instead, the petition relies on an expression representing the difference between the supply voltage of Kim's battery pack, $V_a * n_s$, and the demand voltage, V_d , as the claimed calculated voltage compensation amount. This expression, however, does not appear in Kim—rather, it is the product of the petition's modification of another equation disclosed in Kim. The petition fails to point to any disclosure in Kim that indicates that this manipulated expression is actually calculated in Kim's system. For this reason, Petitioner's Grounds 3A and 3B fail.

A. Independent Claim 9

1. Ground 3B rises and falls with Ground 3A

As with its other grounds, Petitioner fails to apply a separate obviousness analysis with respect to its grounds relying on Kim. The petition asserts that Kim discloses each of the elements recited in claim 9 and thus anticipates the claim under Ground 3A, but, for Ground 3B, in which Petitioner alleges obviousness, the petition does not identify any missing limitations nor advance an articulated rationale as to why a POSA would have modified Kim to arrive at the claimed

invention. *See* Pet., 66-72. Therefore, Petitioner’s Ground 3B also depends on the sufficiency of Petitioner’s showing that Kim anticipates claim 9.

2. The petition fails to establish Kim discloses “calculating a voltage compensation amount of the battery according to the present electrical parameter” (Element 9[b])

Petitioner contends that Kim’s battery system calculates “a voltage compensation amount of the battery according to the present electrical parameter” through Kim’s disclosure of equation (4). Pet., 69. Specifically, Petitioner maps “the supply voltage of the battery pack,” $V_a * n_s$, of Kim to “the present electrical parameter of the battery” as recited in claim 9. *Id.* Petitioner then points to equation (4) of Kim, which Petitioner argues shows that “the controller 50 then compares the measured supply voltage (*e.g.*, $V_a * n_s$) of the battery pack to a demand voltage V_d and calculates the difference between the supply voltage and demand voltage.” *Id.* Kim discloses equation (4) as:

$$V_d \leq V_a * n_s < V_d + \alpha$$

EX1008, 6:44.

According to Petitioner, “[t]his equation can be rewritten as ‘ $0 \leq V_a * n_s - V_d < \alpha$ ’ by subtracting V_d from all three terms.” Pet., 69. Only after performing this mathematical manipulation, Petitioner then argues that a POSA “would understand that the calculated difference between $V_a * n_s - V_d$ is ‘a voltage

compensation amount of the battery according to the present electrical parameter.”

Id.

Petitioner’s assertions are insufficient to show that Kim discloses the claimed limitation. First, the petition ignores the purpose of equation (4) as disclosed by Kim. Specifically, Kim discloses that the system is monitored by controller 50, which, “[a]t each monitoring interval (Δt),...checks the average voltage and triggers a reconfiguration event unless” equation (4) is satisfied. EX1008, 6:40-47. Kim explains that “[t]he reconfiguration event causes the controller to change the topology of the battery circuits” via “a semantic bypassing mechanism [that] configures battery connectivity.” *Id.*, 6:47-57. Thus, Kim explains that equation (4) serves as a check for whether to trigger a reconfiguration event. The petition does not explain how Kim’s equation (4) that prompts the system to change battery connectivity relates to “calculating a voltage compensation amount of the battery according to the present electrical parameter” and “compensating an output voltage of the battery according to the voltage compensation amount to maintain the output voltage of the battery stable.”

Furthermore, even assuming that $V_a * n_s - V_d$ can represent the claimed “voltage compensation amount,” Petitioner provides no citation to Kim to establish that Kim’s system actually calculates this value. *See* Pet., 69-70 (citing EX1008, 6:40-54, 6:65-7:42, 8:12-19, 15:45-16:7, FIGS. 8A-8D). Instead, the portions of

Kim relied upon by Petitioner merely indicate that $V_a * n_s$ is compared to predefined lower and upper boundaries (*i.e.*, the demand voltage V_d and the upper bound of voltage unbalancing beyond the demand voltage, $V_d + \alpha$), as illustrated in Kim's equation (4). *See* EX1008, 6:40-54 (stating a reconfiguration event is triggered unless equation (4) is satisfied), 6:65-7:42 (discussing constant-voltage-keeping policy in view of battery-cell failure), 8:12-19 (discussing reconfiguration example), 15:45-16:7 (stating "the constant-voltage-keeping policy is applied to keep the supply voltage above or equal to the demand voltage while the supply voltage is being monitored" and describes reconfiguration events when the supply voltage does not satisfy equation (4)), FIGS. 8A-8D.

Thus, rather than disclosing the calculation of $V_a * n_s - V_d$ (the voltage compensation amount as Petitioner contends), Petitioner must re-work what Kim actually discloses in order to arrive at the claimed limitation. For this additional reason, Petitioner fails to show that Kim discloses "calculating a voltage compensation amount of the battery according to the present electrical parameter" as recited in claim 9. Moreover, because Petitioner fails to show that Kim discloses such a calculation, the petition also fails to show that Kim discloses "compensating an output voltage of the battery according to the voltage compensation amount to maintain the output voltage of the battery stable."

B. Dependent Claims 10 and 11

Claims 10 and 11 depend from claim 9. Thus, for the same reasons explained above, the petition fails to establish that these claims are anticipated by or rendered obvious over Kim.

VI. CONCLUSION

Accordingly, for at least the reasons set forth above, institution of *inter partes* review should be *denied*.

Respectfully submitted,

Dated: October 24, 2023

/Matthew A. Argenti/
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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that this paper contains no more than 14,000 words, not including the portions of the paper exempted by § 42.24(b). According to the word-processing system used to prepare this paper, the paper contains 7,658 words.

Respectfully submitted,

Dated: October 24, 2023

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CERTIFICATE OF SERVICE

I certify that the foregoing Patent Owner's Preliminary Response Pursuant to 37 C.F.R. § 42.107 was served this 24th day of October 2023, on the Petitioner at the electronic service addresses of the Petitioner at the following electronic service addresses:

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