

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

INTELLECTUAL VENTURES II LLC,
Patent Owner.

IPR2025-00340
Patent 6,894,639 B1

Before KRISTEN L. DROESCH, SCOTT A. DANIELS, and
MATTHEW S. MEYERS, *Administrative Patent Judges*.

MEYERS, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background and Summary*

Tesla, Inc. (“Petitioner” or “Tesla”) filed a Petition to institute an *inter partes* review of claims 1–7 (the “challenged claims”) of U.S. Patent 6,894,639 B1 (Ex. 1001, “the ’639 patent”). Paper 2 (“Pet.”). Intellectual Ventures II LLC (“Patent Owner” or “Intellectual Ventures”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). Pursuant to the Memorandum by the Acting Director dated March 26, 2025, setting forth “Interim Processes for PTAB Workload Management,” Patent Owner filed a Brief in Support of Patent Owner’s Request for Discretionary Denial (Paper 6), and Petitioner filed an Opposition to Patent Owner’s Request for Discretionary Denial (Paper 9). On July 2, 2025, a decision denying Patent Owner’s Request for Discretionary Denial was issued. Paper 10. With our authorization, Petitioner filed a Reply to Patent Owner’s Preliminary Response (Paper 11, “Reply”) and Patent Owner filed a Sur-reply (Paper 12, “Sur-reply”).

We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review. 35 U.S.C. § 314; 37 C.F.R. § 42.4(a) (2020). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least [one] of the claims challenged in the petition.”

After considering the Petition and the evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood that it

would prevail with respect to at least one of the challenged claims.

Accordingly, we institute an *inter partes* review of all challenged claims on all asserted grounds pursuant to 35 U.S.C. § 314. *See SAS Inst. Inc. v. Iancu*, 584 U.S. 357, 370–72 (2018) (requiring institution on all claims, if any); *see also* Patent Trial and Appeal Board Consolidated Trial Practice Guide 64 (Nov. 2019) (“Trial Practice Guide”) (providing guidance in view of SAS).¹

B. Real Parties-in-Interest

Petitioner identifies Tesla, Inc. as the real-party-in interest. Pet. 82. Patent Owner identifies Intellectual Ventures II LLC as the real party-in-interest. Paper 3, 2.

C. Related Proceedings

The parties identify the following related proceedings: *Intellectual Ventures II LLC v. Tesla, Inc.*, Case No. 1-24-cv-00390 (WDTX); *Intellectual Ventures II LLC v. Tesla, Inc.*, Case No. 6-24-cv-00188 (WDTX); and *Intellectual Ventures II LLC v. Tesla, Inc.*, Case No. 1-24-cv-00884 (WDTX). Pet. 82; Paper 3, 2.

D. Overview of the '639 Patent

The '639 patent is titled “GENERALIZED HEBBIAN LEARNING FOR PRINCIPAL COMPONENT ANALYSIS AND AUTOMATIC TARGET RECOGNITION, SYSTEMS AND METHOD.” Ex. 1001, code (54). The '639 patent describes “a method for distinguishing targets from clutter” that comprises

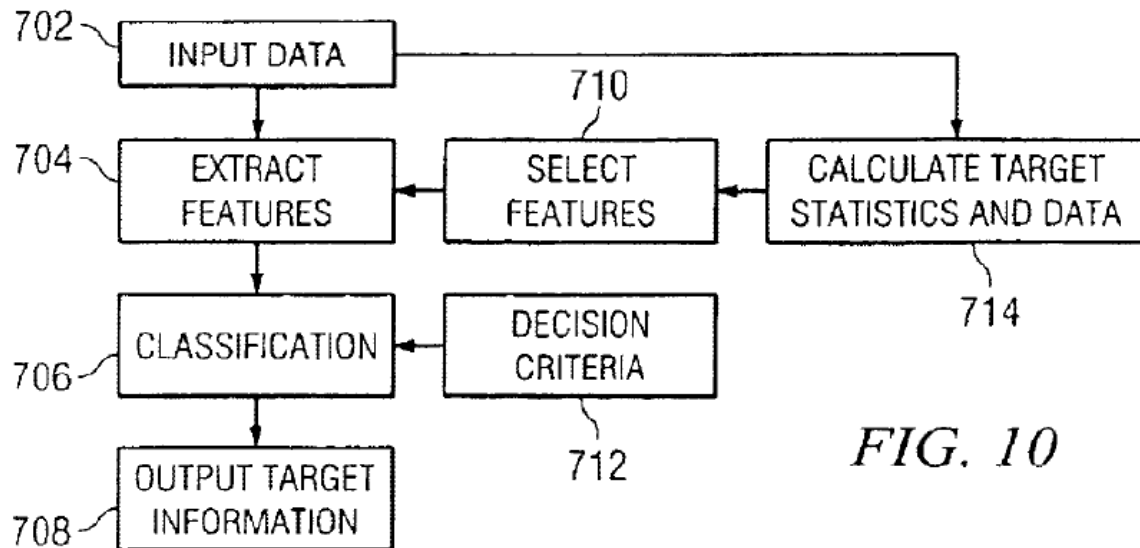
inputting data, calculating data statistics from said data and using said data statistics to select target specific feature information to distinguish specific targets from background clutter, generating

¹ Consolidated PTAB Trial Practice Guide (Nov. 2019), *available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

said target specific feature information from said data statistics, extracting said target specific feature information from said data, using said target specific feature information to distinguish specific targets from background clutter, and outputting target and background clutter information.

Id., code (57).

Figure 10 of the '639 patent, reproduced below, illustrates “a preferred classification system configuration” according to the claimed invention. Ex. 1001, 7:15–16.



The classification system shown in Figure 10 “accepts primarily long-wavelength infrared (IR) and television (TV) imagery” that are “primarily derived from two data sets that characterize two target scenarios: targets that are partially occluded (e.g., targets along tree lines) and targets that resemble background clutter.” *Id.* at 7:31–37. The classification system inputs data that are used to calculate target statistics and to extract data and feature information. *Id.* at 7:16–17, 7:21–23. A feature selection module uses the target statistics and data in a neural network to select and generate features specific to a given target class, and then inputs this information into a

module that extracts features. *Id.* at 7:21–25, 7:46–49. The module extracts the feature information from the inputted data, and then inputs the feature information into a classification module. *Id.* at 7:17–19. The classification module uses decision criteria to classify the target from background clutter and output this information. *Id.* at 7:19–21.

The neural network used by the feature selection module is a one-layer neural network that is trained to select and generate features for automatic target recognition that are specific to a given target class. Ex. 1001, 7:46–54, 7:63–64. The neural network is trained by a generalized Hebbian learning algorithm that is discussed in Sanger² (Ex. 2006). Ex. 1001, 7:50–53, 7:63–64. The input nodes of the generalized Hebbian learning algorithm “define arrays of pixel intensity values from image data and the output nodes index the principal components.” *Id.* at 7:63–66. The generalized Hebbian learning algorithm “determines the principal components of the data set in order of decreasing eigenvalue” such that “the higher eigenvalue components are generally the most important or prominent features.” *Id.* at 7:57–61.

According to the Specification, “[t]he inventor used test data sets with military targets to evaluate the effectiveness of the preferred system implementation.” Ex. 1001, 9:41–43. The images in the test data sets included TV and long-wavelength IR images. *Id.* at 9:44–45. The “[t]arget objects for both data sets were of several different types, so the preferred

² Sanger, T. D., *Optimal unsupervised learning in a single-layer linear feedforward neural network*, 2 NEURAL NETWORKS 459–73 (1989) (Ex. 2006).

embodiment needed to find receptive fields common to all types.” *Id.* at 9:45–48.

E. Illustrative Claim

Petitioner challenges claims 1–7 of the ’639 patent. Pet. 10. Challenged claim 1 is the sole independent claim. Claim 1 is illustrative, and is reproduced below.

1. A method for distinguishing targets from background clutter, comprising the steps of

- (a) inputting data;
- (b) calculating data statistics from said data and using said data statistics to select target specific feature information to distinguish specific targets from background clutter;
- (c) generating said target feature information from said data statistics;
- (d) extracting said target specific feature information from said data;
- (e) using said target specific feature information to distinguish specific targets from background clutter; and
- (f) outputting target and background clutter information.

Ex. 1001, 12:2–15.

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–7 of the ’639 patent are unpatentable on the following three grounds (Pet. 10):

Claim(s) Challenged	35 U.S.C. §³	Reference(s)/Basis
1–3, 6, 7	103	Barnard ⁴

³ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. §§ 102 and 103 effective March 16, 2013. Because the ’639 patent’s priority date is before the AIA’s amendments to § 103, this decision refers to the pre-AIA versions of § 103.

⁴ US 5,027,413, issued Jun. 25, 1991 (Ex. 1005, “Barnard”).

Claim(s) Challenged	35 U.S.C. § ³	Reference(s)/Basis
7	103	Barnard, Knecht ⁵
1–7	103	Barnard, Lawrence ⁶
7	103	Barnard, Lawrence, Knecht

Petitioner also relies on the Declaration of Dr. Jeffrey J. Rodriguez.
Ex. 1003.

II. ANALYSIS

A. Legal Standards

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)).

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and “the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which that subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness when presented. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

⁵ US 4,881,270, issued Nov. 14, 1989 (Ex. 1016, “Knecht”).

⁶ WO 90/16038, published Dec. 27, 1990 (Ex. 1006, “Lawrence”).

In analyzing the obviousness of a combination of prior art elements, it can be important to identify a reason that would have prompted one of skill in the art “to combine . . . known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418. A precise teaching directed to the specific subject matter of a challenged claim is not necessary to establish obviousness. *Id.* Rather, “any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* at 420. Accordingly, a party who petitions the Board for a determination of unpatentability based on obviousness must show that “a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1381 (Fed. Cir. 2016) (citations omitted).

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of invention. *Graham*, 383 U.S. at 17. Factors pertinent to determining the level of ordinary skill in the art include “(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior-art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field.” *Envtl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–97 (Fed. Cir.

1983). Not all factors may exist in every case, and one or more of these or other factors may predominate in a particular case. *Id.* Moreover, “[t]hese factors are not exhaustive, but [] merely a guide to determining the level of ordinary skill in the art.” *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007). Further, the prior art itself may reflect an appropriate skill level. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

Petitioner asserts that one of ordinary skill in the art “would have been someone knowledgeable and familiar with the image processing systems pertinent to the ’639 patent” and would have had “a bachelor’s degree in computer science, computer engineering, electrical engineering, or equivalent training, and four years of experience working in the field of image processing.” Pet. 9. Petitioner also asserts that “[l]ack of work experience can be remedied by additional education, and vice versa.” *Id.* (citing Ex. 1003 ¶ 18). Patent Owner does not dispute Petitioner’s proposed level of skill in the art at this time. *See generally* Prelim. Resp.

On the current record, we determine that Petitioner’s definition of a person of ordinary skill in the art is consistent with the scope and content of the ’639 patent and the asserted prior art, and, at this stage, we apply Petitioner’s definition for purposes of this Decision.

C. Claim Construction

In an *inter partes* review, a patent claim shall be construed 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). This rule adopts the same claim construction standard used by Article III federal courts, which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny.

Under that standard, the words of a claim are generally given their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *See Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally 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).

In the Petition, Petitioner contends that “no claim term requires express construction” for the purposes of this proceeding. Pet. 10.

In response, Patent Owner argues the Board should deny institution because “the Petition fails to satisfy the requirement to provide a clear and consistent articulation of how the challenged claims are to be construed” as “Petitioner’s claim construction theory in this proceeding rests on a meaning it disputes elsewhere.” Prelim. Resp. 11. More particularly, Patent Owner argues Dr. Rodriguez’s statement that the claims “are to be given their ordinary and customary meaning as would be understood by one of ordinary skill in the art” cannot be reconciled with Petitioner’s district court claim construction position, namely that the limitation reciting “generating said target feature information from said data statistics” in claim 1 is indefinite. *Id.* at 9–11 (quoting Ex. 1003 ¶¶ 38–39; Ex. 2004, 227–28).

Petitioner responds that its claim construction positions in the district court litigation are not inconsistent with the plain and ordinary meaning it applies here. Reply 5–6. Petitioner contends that in the district court litigation, it argued that “the term ‘said target feature information’ in claim 1

and the term ‘said feature information’ in dependent claim 7 are indefinite for lack of antecedent basis”—an argument Petitioner cannot raise in an *inter partes* review. *Id.* at 6.

We decline to deny institution based on Petitioner’s claim construction positions. The issue before us under 37 C.F.R. § 42.104(b) is whether the Petition provides Patent Owner sufficient notice of its claim construction and how Petitioner applies the asserted prior art in light of that construction. *10X Genomics, Inc. v. Bio-Rad Laboratories*, IPR2020-00086 Paper 8 at 18–19, 21 (PTAB Apr. 27, 2020). The Petition includes an analysis of each claim limitation of the challenged claims that shows how Petitioner is applying the prior art. *See, e.g.*, Pet. 23 n. 3 (citing Ex. 1003 ¶ 79) (explaining that “the Petition assumes, for purposes of the unpatentability grounds presented herein, that ‘said target feature information’ recited in [1.3] is the ‘target specific feature information’ recited in [1.2], as well as [1.4] and [1.5]”). The difference in Petitioner’s construction in one forum versus another is not necessarily inconsistent, and the Board’s rules “do not necessarily prohibit petitioners from taking inconsistent claim construction positions before the Board and a district court.” *Cambridge Mobile Telematics, Inc. v. Sfara, Inc.*, IPR2024-00952, Paper 12 at 8 (Dec. 13, 2024) (designated informative Mar. 20, 2025). As Petitioner notes (Reply 6), indefiniteness challenges cannot be raised in an *inter partes* review. *See* 35 U.S.C. § 311(b). Moreover, indefiniteness “does not necessarily preclude the Board from addressing the patentability of the claims on section 102 and 103 grounds.” *Samsung Elecs. Am. Inc. v. Priusa Eng’g Corp.*, 948 F.3d 1342, 1355 (Fed. Cir. 2020); *see also Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 813 (Fed. Cir. 2021) (“The

indefiniteness of a limitation . . . precludes a patentability determination only when the indefiniteness renders it logically impossible for the Board to reach such a decision.”).

In addition, the parties dispute the meaning of “target specific feature information to distinguish specific targets from background clutter,” as recited in claim 1. We authorized Petitioner to file a Reply and Patent Owner to file a Sur-reply to address the meaning of the claim limitation and whether the prior art teaches it. We address the parties’ arguments below.

1. *“target specific feature information to distinguish specific targets from background clutter”*

Patent Owner contends the limitation reciting “target specific feature information to distinguish specific targets from background clutter” requires “distinguishing among different types of targets based on tailored feature selection.” Prelim. Resp. 27. More particularly, Patent Owner argues that the claim language requires the “ability to discriminate among different types or classes of targets” because the limitation recites feature information that is “target specific,” and “us[es] said target specific feature information to distinguish *specific targets* from background clutter.” *Id.* (emphasis added). Accordingly, Patent Owner contends that “[a] system that merely detects the presence of any target, without distinguishing among different target types, cannot satisfy this limitation.” *Id.* at 27–28.

In its Reply, Petitioner argues that Patent Owner’s construction is “unduly narrow” and “directly contradicts the explicit claim language and the [S]pecification of the ’639 patent” because the claim language requires that the target specific feature information be used to distinguish specific targets *from background clutter*, not *from other targets*. Reply 1. Petitioner

argues its construction is supported by the doctrine of claim differentiation because “[c]laim 7, which depends from and further limits claim 1, recites ‘wherein said feature information is further used to distinguish two target classes or a plurality of target classes from one another.’” *Id.* at 2 (emphasis omitted).

In addition, Petitioner contends that “[t]here is no definition in the [S]pecification or prosecution disclaimer to support Patent Owner’s position” and “such an approach omits a preferred embodiment of the ’639 patent.” Reply 1–2. Petitioner contends that “[t]he ’639 patent explicitly describes that ‘target specific feature information’ may be used for ‘one-class, two-class, or multi-class classification procedures’” such that “[i]n a one-class system, ‘target specific feature information’ is only used to distinguish the specific targets associated with the single class from background clutter, not from other targets because there is only one class of targets.” *Id.* at 3 (citing Ex. 1001, 5:28–29, 5:48–49). Accordingly, Petitioner argues that Patent Owner’s proposed construction omits an embodiment in which the “target specific feature information” is used for “one-class” classification procedures. *Id.*

Patent Owner responds that Petitioner mischaracterizes Patent Owner’s position and argues that the limitation “requires that the feature information itself be specific to a target (or target class), and that such target specific feature information serve[s] to distinguish specific targets from the background.” Sur-reply 1 (emphasis omitted). Patent Owner contends its “position is not that ‘target specific’ feature information in claim 1 is used to distinguish one type of target from another type of target, but rather that the target specific feature information is used to distinguish *specific targets* (i.e.,

the ones associated with the target specific feature information) from the background.” *Id.* at 1–2 (emphasis omitted).

Patent Owner argues further that the Specification “describe[s] a learning process (e.g., Generalized Hebbian Analysis) that tailors background filters to ‘the characteristics of a specific target or target class.’” Sur-reply 2. More particularly, Patent Owner argues that the Specification discloses “that the system ‘uses said data statistics to select target specific feature information . . . (e.g., contrast-based and texture-based) . . . causing . . . one-class, two-class, or multi-class classification procedures” and “explains that the ‘feature selection module . . . uses target statistics . . . to select and generate features specific to a given target class.’” *Id.* (quoting Ex. 1001, 5:19–30, 7:22–26).

Patent Owner argues further that its construction does not exclude the one-class classification procedures disclosed in the ’639 patent “because the one-class embodiment explicitly relies on filters that are learned from target-only data and are therefore ‘target-specific.’” Sur-reply 4. Patent Owner contends the ’639 patent’s “learning module ‘uses target statistics . . . to select and generate features specific to a given target class,’ and that those features may then be employed in ‘one-class, two-class, or multi-class classification procedures.’” *Id.* (citing Ex. 1001, 5:26–31, 5:48–50, 10:26–30). According to Patent Owner,

[i]n the one-class scenario, the system trains on image patches that contain the target (for example, sea-skimming missiles) and computes principal components of those patches. During deployment, the classifier applies those missile-specific filters to every candidate window in the scene and decides whether the window contains a missile or clutter.

Id.

At this stage of the proceeding, we disagree with Patent Owner's construction that requires "distinguishing among different types of targets" in order to obtain "target specific feature information" because claim 1 does not recite such a limitation. Instead, we agree with Petitioner that the plain and ordinary meaning "requires target specific feature information for distinguishing specific targets from background clutter, not other targets." Reply 2. We note that claim 1 does not require distinguishing between different targets nor does it include any recitation directed to a particular "learning process (e.g., Generalized Hebbian Analysis)," as Patent Owner implies. Sur-reply 2.

We also agree with Petitioner that the doctrine of claim differentiation supports Petitioner's construction because claim 7 adds a limitation not present in claim 1 by reciting "distinguish[ing] two target classes or a plurality of target classes from one another." Ex. 1001, 12:28–30. Moreover, the Specification contemplates selecting target specific feature information to distinguish specific targets from background clutter without distinguishing among different types of targets because the Specification explains that the inventor tested the preferred classification system using target objects "of several different types" such that "the preferred embodiment needed to find receptive fields *common to all types*." *Id.* at 9:41–48 (emphasis added). Accordingly, we find Petitioner's proposed construction of "target specific feature information to distinguish specific targets from background clutter" as having its plain and ordinary meaning to be reasonable and consistent with the intrinsic record. Thus, we adopt it for purposes of this Decision.

On this limited record, and at this early stage of the proceeding, the Board has not made a final determination on the construction of “target specific feature information to distinguish specific targets from background clutter.” We encourage the parties to further develop this argument (such as to the extent it would differentiate the prior art) and their positions at trial.

2. Other Terms

At this preliminary stage, express interpretation of other terms is not necessary to determine whether Petitioner shows a reasonable likelihood of prevailing. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms that . . . are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Summary of Asserted Prior Art References

1. Overview of Barnard (Ex. 1005)

Barnard is titled “TARGET DETECTION SYSTEMS” and is directed to a target detection system for examining picture signals of a scene which may contain a target signal to be detected against background signals. Ex. 1005, codes (54), (57). Barnard describes a system which uses a thermal imaging apparatus to obtain images using infrared detectors. *Id.* at 3:6–18. Barnard’s target detection system divides images of the scene into sub-images and provides a sub-store for each of the sub-images. *Id.* at code (57). The system calculates and stores “[t]he values of a set of features, such as brightness, volume or quietness, of the background and target picture signals associated with each sub-image in the respective sub-store,” and then calculates the statistical distributions of the background and target features

in each sub-store to set a target decision threshold, in feature terms, for each sub-image. *Id.* The system provides a target detection signal by comparing the feature values of an incoming picture signal in a sub-image with the decision threshold in the associated sub-store. *Id.*

Figure 5 of Barnard is reproduced below.

Fig. 5.

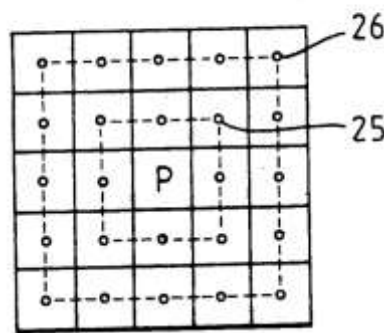


Figure 5 depicts an array of pixels around a given pixel which are used to calculate object features. Ex. 1005, 2:67–68. Each sub-image pixel store (“SIPS”) includes an array of 24 pixels surrounding a pixel P, as shown in Figure 5. *Id.* at 4:46–49. Each square indicates a storage location holding a pixel value. *Id.* According to Barnard, “[t]he first feature of P is the value of P itself, termed the brightness feature B.” *Id.* at 4:50–52. “The next feature is the sum of the pixel values of the eight pixels 25 immediately adjacent to P” and is “termed the size feature S since by its magnitude it gives an indication of the object size regardless of its shape.” *Id.* at 4:52–56. The third feature is the “sum of the sixteen pixels 26 next surrounding the pixels 25” and is “termed the quietness feature Q since the lower its value is, the less extraneous picture elements surround the object.” *Id.* at 4:62–66. “Other features may be used which are functions of the values of a selection

of all twenty-five picture element values. These features may indicate shape, width, height, symmetry or lack of symmetry.” *Id.* at 4:66–5:1. Barnard explains that “[f]or any one feature, the feature values of predetermined targets may lie in the range of values found for background objects” such that the “feature alone is not sufficient to discriminate the target from the background. It is known to resolve this problem by taking the numerical values of a number of selected features for objects found in the image and plotting them in a multi-dimensional feature hyperspace.” *Id.* at 5:6–13. If a feature’s variance is too large or if its mean varies too greatly with succeeding scans, the feature may be found unreliable and rejected. *Id.* at 6:11–15.

2. Overview of Knecht (Ex. 1016)

Knecht is directed to a method and system for the automatic classification of images of “a scanned object as the image of an object of one of a plurality of predetermined classes of objects,” or more particularly, “a method and system useful in a missile for classifying a potential target object, such as a ship, as a member of one class of several predetermined classes of ships.” Ex. 1016, 1:6–14.

Knecht describes a method in which a two-dimensional image is generated using raster scanning. Ex. 1016, 3:59–4:56. In Knecht’s method, a scanner scans objects along a horizontal axis and a vertical axis by receiving and focusing energy, such as infrared energy or visible light, from the various portions of each object scanned. *Id.* at 3:63–4:18. A digitizer connected to the scanner converts the amplitude of energy received from each portion of the object into a number representing the amplitude, such that numbers representing each of the successive lines of the raster scan are

provided sequentially by the digitizer. *Id.* at 4:5–11. A two-dimensional image of the object is represented in an image memory unit by “a matrix wherein the rows and the columns correspond to portions of the cruiser spaced, respectively, along the above-identified first or horizontal and longitudinal axis and along the above-identified vertical axis.” *Id.* at 4:56–61.

The image represented by the matrix is subjected to preprocessing operations for edge enhancement and to remove noise, and then the columns of the matrix are collapsed onto one of the rows of the matrix by arithmetically summing the elements of each of the columns to be collapsed. Ex. 1016, 4:64–5:19. This generates “a first vector in which the components thereof correspond individually to the columns so collapsed and thus to the elements of one of the rows of the matrix.” *Id.* at 5:11–17. This process is repeated to derive a multiplicity of feature vectors by repeatedly scanning “an object of each of a plurality of predetermined classes of objects of interest.” *Id.* at 6:15–21. The vectors are used to derive decision rules corresponding individually to each class, or to “train” the system, and the decision rules are used to classify “a feature vector obtained by the system in scanning a potential target object.” *Id.* at 6:22–40.

3. Overview of Lawrence (Ex. 1006)

Lawrence is directed to a neural network architecture “designed to perform adaptive, continuous Bayesian estimation on unprocessed large dimensional data.” Ex. 1006, 1:2–6. Lawrence describes embodiments in which a neural network is used to observe and track an object, such as a rocket, across a focal plane. *Id.* at 11:23–13:19.

Lawrence describes a neural network which includes an observation input, prediction device, novelty device, and threshold memory. Ex. 1006, 5:2–6:9. The observation input receives a timed series of observations. *Id.* at 5:3–5. The prediction device generates a prediction and includes a geometric lattice of nodes, each of which is associated with a memory and a CPU. *Id.* at 5:13–17, 5:28–35. The memory associated with each node stores spatial patterns representing a spatial history of the timed series of observations. *Id.* at 5:14–17. The nodes receive threshold output levels from selected other nodes. *Id.* at 5:22–25. The threshold memory stores threshold levels representing the prior probability for the occurrence of the stored spatial patterns. *Id.* at 5:25–28.

The novelty device uses a novelty filtering algorithm to compare the observations with the prediction from the prediction device and output a prediction error. Ex. 1006, 5:5–11. Signal inputs receive the prediction error from the novelty device and filter it through the stored spatial patterns in the memory to produce a correlation coefficient that represents the similarity between the stored pattern and the prediction error. *Id.* at 5:17–22.

The CPU at each node computes an updated threshold level using a differential-difference equation which operates on the stored threshold level from the threshold memory, the received threshold levels from the nodes, and the correlation coefficients to define and propagate a quantum mechanical wave particle across the nodes and to store the updated threshold in the threshold memory. Ex. 1006, 5:28–35. Each of the nodes provides a threshold output for outputting the updated threshold to other nodes. *Id.* at 5:35–6:2. The CPU also computes the prediction which “represents the probability for the occurrence of the storage spatial patterns conditioned

upon the prior probability represented by the storage threshold level” “by passing the correlation coefficients through a sigmoid function whose threshold level comprises the updated threshold level.” *Id.* at 6:2–9.

E. Alleged Obviousness over Barnard (Ground 1)

Petitioner asserts that claims 1–3, 6, and 7 are unpatentable as obvious over Barnard. Pet. 11–39. Petitioner relies on the Declaration testimony of Dr. Jeffrey J. Rodriguez (Ex. 1003) to support its arguments. *Id.* Patent Owner relies on the Declaration testimony of Dr. Aditi Majumder (Ex. 2007) to support its arguments.

1. Analysis of Claim 1

Petitioner asserts that claim 1 is unpatentable as obvious over Barnard. Pet. 12–34 (citing Exs. 1001, 1003, 1005, 1006, 1008). We address Petitioner’s contentions below. To provide context, we begin by providing an overview of Petitioner’s contentions with respect to each element of claim 1, but focus on disputed claim limitation [1.2] in our discussion below.

We use Petitioner’s notations to identify the claim elements. See Pet. 12–34 (Petitioner’s analysis of claim 1).

a) Claim Limitation [1.0]: “A method for distinguishing targets from background clutter, comprising the steps of”

Petitioner asserts that Barnard discloses or renders obvious this limitation. Pet. 12. More particularly, Petitioner asserts that Barnard teaches a method for distinguishing targets from background clutter. *Id.* at 12–13 (citing Ex. 1003 ¶¶ 54–56; Ex. 1005, Abs., 1:1–10, 5:16–17, Fig. 2). Petitioner contends Barnard teaches “a ‘target detection system . . . for examining picture signals of a scene which may contain a target signal

(15, 16) to be detected against background signals (17, 18),” and that its system “effectively separates target objects from background objects.” *Id.* at 12 (citing Ex.1005, Abs., 1:1–10, 5:16–17, Fig. 2). Petitioner provides the following copy of Figure 2 of Barnard, annotated in red and blue, to illustrate an example of Barnard’s system separating target objects from background objects. *Id.* at 13 (citing Ex. 1003 ¶ 55; Ex. 1005, Abs., 5:16–17).

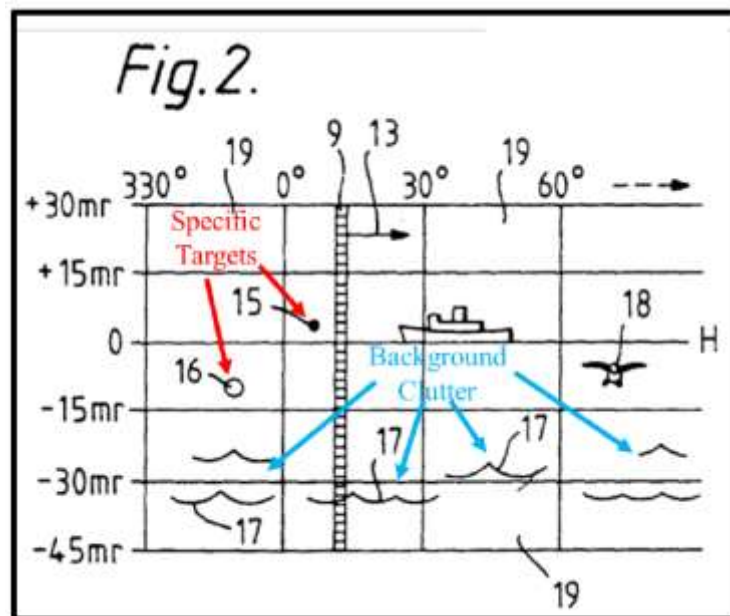


Figure 2 depicts an image divided into a plurality of sub-images in which each “sub-image is a selection of pixels from the image forming a contiguous group of pixels.” Ex. 1005, 4:1–8. Petitioner added labeling to identify specific targets and background clutter, annotated in red and blue, respectively. Pet. 13.

b) Claim Limitation [1.1]: “(a) inputting data;”

Petitioner asserts that Barnard discloses or renders obvious this limitation. Pet. 13–15 (citing Ex. 1003 ¶¶ 57–61; Ex. 1005, Abs., 1:7–8, 3:5–11, 3:42–59, 4:19–21, Figs. 1–3). Petitioner contends that Barnard

discloses “digital computer 20 . . . receive[s] the stream of digitised pixel values from a signal pre-processing unit 21.” *Id.* at 13 (citing Ex. 1005, 4:19–21; Ex.1003 ¶ 58). Petitioner asserts that Barnard teaches “the digitized pixel values are based on images obtained by ‘a thermal imaging apparatus.’” *Id.* at 14 (citing Ex. 1003 ¶ 59; Ex. 1005, 3:5–11, 3:42–59, Fig. 1).

c) *Claim Limitation [1.2]: “(b) calculating data statistics from said data and using said data statistics to select target specific feature information to distinguish specific targets from background clutter;”*

Petitioner asserts that Barnard discloses or renders obvious this limitation. Pet. 16–22 (citing Ex. 1001, 5:15–49, 5:55–6:2, 7:12–11:67; Ex. 1003 ¶¶ 62–77; Ex. 1005, 1:18–21, 2:9–39, 4:46–5:66, 6:11–15, 6:62–68, Figs. 2, 5, 6; Ex. 1006, 45:15–46:16; Ex. 1007, 5:26–29; Ex.1008, 23:59–24:2). As discussed above, we determine for the purposes of this Decision that this claim limitation has its plain and ordinary meaning and does not require “distinguishing among different types of targets” in order to obtain “target specific feature information.” *See* Section II.C.1.

Petitioner asserts that Barnard teaches “calculating various data statistics for features from the input image data, including ‘brightness feature B,’ ‘size feature S,’ ‘quietness feature Q,’ and ‘[o]ther features’ that ‘may indicate shape, width, height, symmetry or lack of symmetry.’” Pet. 16 (citing Ex. 1005, 2:9–27, 4:50–5:3, 4:46–49). Petitioner provides the following copy of Figure 5 of Barnard, annotated in green, red, and blue, to illustrate exemplary features. *Id.* (citing Ex. 1003 ¶¶ 63–64; Ex. 1005, Fig. 5).

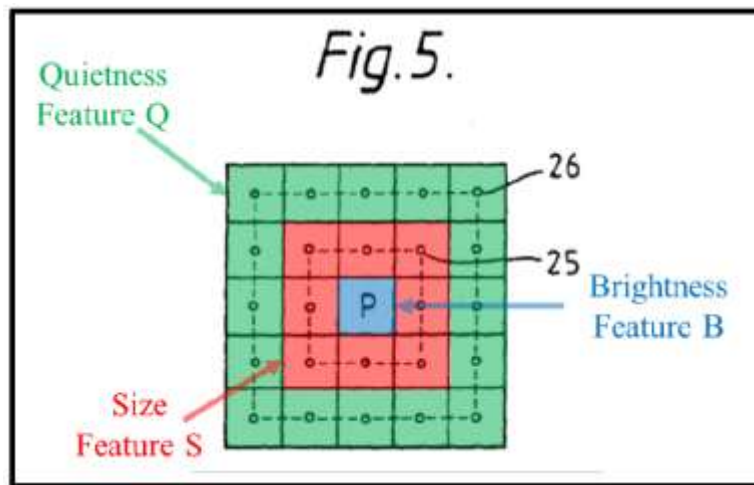


Figure 5 depicts an array of pixels around a given pixel which are used to calculate object features. Ex. 1005, 2:67–68. Petitioner’s annotations indicate the features Barnard discloses in its description of Figure 5 (Pet. 16), namely, “the brightness feature B” (“the value of P itself”) annotated in blue; “the size feature S” (“the sum of the pixel values of the eight pixels 25 immediately adjacent to P”) annotated in red; and “the quietness feature Q” (the “sum of the sixteen pixels 26 next surrounding the pixels 25”) annotated in green. Ex. 1005, 4:50–56, 4:62–66.

Petitioner argues that Barnard discloses calculating data statistics for the various features from the input image data, such as “width of the statistical distributions,” “progressive means,” “variances,” and “statistical information.” Pet. 17 (citing Ex. 1003 ¶¶ 64–65; Ex. 1005, 2:30–36, 5:36–49, 6:62–68). Petitioner contends that Barnard teaches “using the calculated data statistics to select target specific feature information, and more specifically, to select the set of features and an associated target detection threshold used to distinguish specific targets from background clutter.” *Id.* (citing Ex. 1003 ¶¶ 65–68; Ex. 1005, 2:30–36, 5:36–49, 6:62–68). For example, Petitioner asserts that “Barnard describes

‘discard[ing] a feature as a threshold parameter if the width of the statistical distribution of that feature exceeds a predetermined amount.’” Pet. 17 (emphasis omitted, citing Ex. 1005, 2:28–34). Petitioner contends that “[i]n discarding or excluding features that have a statistical distribution width exceeding a predetermined amount, Barnard selects features (i.e., the remaining features not excluded) that are used to distinguish specific targets from background clutter.” *Id.* (citing Ex. 1003 ¶ 66; Ex. 1005, 2:28–39).

In addition, Petitioner asserts that “Barnard discloses ‘calculating the progressive means of each feature’ from the input image data and discarding a feature ‘if the feature mean varies by more than a preset amount over a succession of scene images.’” Pet. 18 (emphasis omitted, citing Ex. 1003 ¶ 67; Ex. 1005, 5:34–38, 2:34–36). Petitioner contends that “[i]n discarding or excluding one or more features that have a mean that varies by more than the preset amount, Barnard selects features (i.e., the remaining features not excluded) that are used to distinguish specific targets from background clutter.” *Id.* (citing Ex. 1003 ¶ 67).

Petitioner asserts further that Barnard teaches a target detection threshold by describing a “threshold hypersurface.” Pet. 18 (citing Ex. 1003 ¶ 68; Ex. 1005, 1:18–21, 5:13–19). Petitioner contends Barnard explains that “[a] selection of features can usually be found in which it is possible to place a threshold hypersurface in the feature space which effectively separates target objects from background objects.” Pet. 18 (emphasis omitted, citing Ex. 1005, 5:13–17); *see also* Reply 3–5.

According to Petitioner, “[t]he selected features and associated target detection threshold of Barnard used to distinguish specific targets from background clutter are separately, and collectively, ‘target specific feature

information’ as claimed by the ’639 patent.” Pet. 19 (citing Ex. 1003 ¶ 71).

Petitioner explains that

the ’639 patent indicates that “target specific feature information” can at least include information related to target specific feature(s) used to distinguish a target from background clutter, including the type(s) of target specific features, value(s) and/or threshold(s) for the type(s) of target specific feature(s), other information related to the target specific feature(s), and/or combinations thereof.

Id. (citing Ex.1001, 5:15–30, 5:55–6:2, 7:15–29, 7:46–57; Ex. 1003 ¶ 72).

Petitioner explains further that “in the ’639 patent—as well as Barnard—values of the selected target specific features extracted from the image data are utilized to distinguish targets from background clutter by determining whether the values indicate the presence of a target or background clutter.”

Id. at 21–22 (citing Ex.1001, 5:15–30, 5:55–62, 8:35–38, 8:57–60; Ex. 1005, 5:3–17, 6:11–15; Ex. 1003 ¶ 75).

d) Claim Limitation [1.3]: “(c) generating said target feature information from said data statistics;”

Petitioner asserts that Barnard discloses or renders obvious this limitation. Pet. 23–26 (citing Ex. 1001, 5:55–62, 7:55–58, 8:45–51; Ex. 1003 ¶¶ 78–87; Ex. 1005, 2:28–36, 5:3–66, 6:62–68, Figs. 2, 6). Petitioner contends Barnard teaches “that ‘[a] selection of features can usually be found in which it is possible to place a threshold hypersurface in the feature space which effectively separates target objects from background objects.’” *Id.* at 24 (citing Ex. 1005, 5:13–17). Petitioner asserts that Barnard teaches “the ‘target detection threshold’ for a set of features is generated ‘from the statistical information’ and is located ‘at the intersection of the two probability surfaces, i.e. where the probabilities of an object being a target or a background point are equal, that is, in accordance with Baye’s

criterion.” *Id.* (citing Ex. 1005, 5:59–66). Petitioner explains that “[o]nce the set of features is selected (e.g., as discussed in element [1.2]), Barnard determines the target detection threshold (e.g., threshold hypersurface) for the selected set of features.” *Id.* (citing Ex. 1005, 5:13–17; Ex. 1003 ¶ 82).

Petitioner provides the following copy of Figure 6 of Barnard, annotated in green, light blue, red, brown, and dark blue to illustrate exemplary features, targets, background clutter, and the target detection threshold. Pet. 24–25 (citing Ex. 1003 ¶¶ 82–83; Ex. 1005, 5:13–19, 5:25–28, Fig. 6).

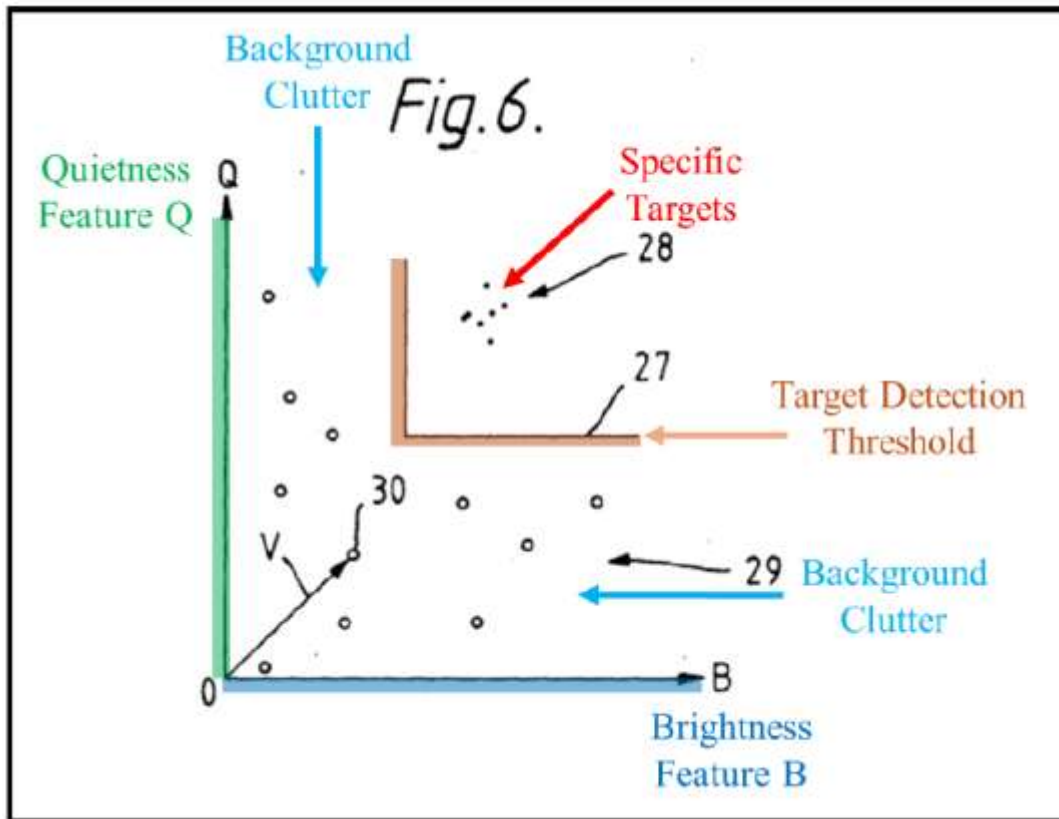


Figure 6 depicts an approach of separating target objects from background clutter “by taking the numerical values of a number of selected features for objects found in the image and plotting them in a multi-dimensional feature hyperspace.” *Id.* at 5:10–13. Petitioner added labeling to indicate a

quietness feature Q annotated in green, brightness feature B annotated in dark blue, background clutter annotated in light blue, a target detection threshold annotated in brown, and specific targets annotated in red. Pet. 25. According to Petitioner, “Barnard discloses using the calculated data statistics to generate target specific feature information—the set of features and/or associated target detection threshold—used to distinguish specific targets from background clutter. *Id.* at 25–26 (citing Ex. 1005, 2:28–36, 5:13–66, 6:62–68, Figs. 2, 6; Ex. 1003 ¶ 84).

e) *Claim Limitation [1.4]: “(d) extracting said target specific feature information from said data;”*

Petitioner asserts that Barnard discloses or renders obvious this limitation. Pet. 26–29 (citing Ex. 1001, 7:17–22; Ex. 1003 ¶¶ 88–95; Ex. 1005, 2:28–39, 5:2–3, 5:13–17, 5:36–49, 5:59–66, 6:1–2, 6:62–68). Petitioner contends Barnard teaches a process using a target detection threshold in which

the set of selected features may be extracted from the input image data by calculating numerical values of features of the image data, calculating the width of the statistical distributions and/or progressive means of the features, and excluding from the set of selected features any features with a statistical distribution width exceeding a predetermined amount or a mean that varies by more than a preset amount.

Id. at 27–28 (citing Ex. 1003 ¶¶ 90–91; Ex. 1005, 2:28–39, 5:13–17, 5:36–49, 5:59–66, 6:62–68).

Petitioner asserts Barnard also teaches extracting target specific feature information from the input image data by calculating values for each of the features from the input image data. Pet. 28 (citing Ex. 1001, 7:17–22; Ex. 1003 ¶¶ 92–93; Ex. 1005, 5:2–3, 6:1–2).

f) Claim Limitation [1.5]: “(e) using said target specific feature information to distinguish specific targets from background clutter; and”

Petitioner asserts that Barnard discloses or renders obvious this limitation. Pet. 29–32 (citing Ex. 1003 ¶¶ 96–101; Ex. 1005, 1:9–10, 1:21–36, 3:34–41, 4:50–5:1, 5:13–28, 6:57–60, Figs. 2, 6). Petitioner contends that Barnard teaches an “incoming picture signal ‘may contain a target signal to be detected against background signals’” and “describes ‘comparing the feature values of an incoming picture signal with the threshold to detect a target.’” *Id.* at 29 (emphasis omitted, citing Ex. 1005, 1:9–10, 1:21–23, 6:57–60). According to Petitioner, Barnard distinguishes specific targets from background clutter “by comparing the calculated feature values of the incoming image to the target detection threshold associated with the set of selected features.” *Id.* at 29–30. Petitioner further relies on copies of Figures 2 and 6 of Barnard annotated, as shown above, to support its argument. *Id.* at 30–31.

g) Claim Limitation [1.6]: “(f) outputting target and background clutter information.”

Petitioner asserts that Barnard discloses or renders obvious this limitation. Pet. 32–34 (citing Ex. 1001, 2:47–52, 3:2–4, 5:55–58, 7:16–22, 12:38–45; Ex. 1003 ¶¶ 102–106; Ex. 1005, Abs., 1:53–57, 4:19–34, Fig. 3). Petitioner contends that Barnard teaches a computer “may output target and background clutter information to a ‘sub-image feature store SIFS.’” *Id.* at 32 (citing Ex. 1005, Abs., 1:53–57, 4:19–34). Petitioner asserts that “[w]hen the computer outputs the calculated feature values of the background and target picture signals to the SIFS, Barnard is outputting target and background clutter information.” *Id.* (citing Ex. 1003 ¶ 103).

2. Patent Owner's Contentions Regarding Claim 1

Patent Owner contends that Petitioner's ground of unpatentability based on Barnard is deficient because Barnard fails to teach the use of "target specific feature information" to distinguish specific targets from background clutter, as recited by limitation [1.2]. *See* Prelim. Resp. 15–34; *see also* Sur-reply 4–6. Patent Owner further contends that Barnard's architecture does not teach the claimed invention because Barnard's system "eliminates background clutter during analog preprocessing, before any feature information is extracted or applied." Prelim. Resp. 16; *see also* Sur-reply 5–6. Patent Owner argues that "[a]s a result, Barnard lacks access to the background information that the claims expressly require to be distinguished from target signals using target-specific features." *Id.*

3. Discussion of Claim 1

Having considered the conflicting positions of the parties, we conclude that, at this stage of the proceeding, Petitioner has shown a reasonable likelihood that it would prevail in challenging the patentability of independent claim 1 for the reasons set forth below. In our view, Petitioner's analysis, on this record, adequately explains how Barnard teaches all the elements of claim 1.

a) Whether Barnard teaches "target specific feature information"

Patent Owner argues that Barnard does not teach or suggest "the use of 'target specific feature information' to distinguish specific targets from background clutter, as required by the challenged claims." Prelim. Resp. 15. According to Patent Owner, "[r]ather than selecting and applying features tailored to particular target types, Barnard processes all potential targets using a uniform approach that does not account for target class." *Id.*

Relying on the Declaration testimony of Dr. Majumder, Patent Owner contends that, “[w]hile the above passages (and Barnard as a whole) refer to identification of generic target features (such as edges), there is no mention of “target specific” features, e.g., ones tailored to a particular target type or class.” *Id.* at 19 (citing Ex. 2007 ¶ 68). Thus, Petitioner concludes that “there is absolutely nothing in Barnard to support the assertion of Petitioner’s that the reference discloses the use of ‘the calculated data statistics to select target specific feature information—the set of features and associated target detection threshold—used to distinguish specific targets from background clutter.’” *Id.* at 19–20 (citing Ex. 1003 ¶ 69).

On this record, we find Petitioner has shown sufficiently that Barnard teaches using “target specific feature information” to distinguish specific targets from background clutter, as required by claim 1. *See* Pet. 16–32. As set forth above, on the current record we do not construe the claim limitation reciting “target specific feature information to distinguish specific targets from background clutter” to require “distinguishing among different types of targets based on tailored feature selection,” as Patent Owner suggests. Prelim. Resp. 27. Instead, we agree with Petitioner that the plain and ordinary meaning of the claim limitation simply “requires target specific feature information for distinguishing specific targets from background clutter, not other targets.” Reply 2; Section II.C.1.

Based on the current record, and consistent with this understanding, we find Petitioner has shown sufficiently that Barnard uses various calculated data statistics to select a set of features and an associated target detection threshold in order to distinguish specific targets from background clutter. *See* Pet. 16–17 (citing Ex.1003 ¶¶ 65–68 (citing to Ex. 1005,

2:30–36, 5:36–49, 6:62–68)). Petitioner explains that Barnard “discard[s] or exclude[es] features that have a statistical distribution width exceeding a predetermined amount,” and as such, “Barnard selects features (i.e., the remaining features not excluded) that are used to distinguish specific targets from background clutter.” *Id.* at 17 (citing Ex.1005, 2:28–39; Ex. 1003 ¶ 66).

Patent Owner argues that “[a]t best, Barnard generically applies the same set of features to all potential targets, and then filters out those deemed unreliable due to statistical variance,” and relying on the Declaration testimony of Dr. Majumder, contends that “[t]his is not the same as selecting features based on their discriminative power for specific target classes, as required by the claims.” Prelim. Resp. 21 (citing Ex. 2007 ¶ 71); *see also id.* at 25 (“The reference makes no distinction between different types of targets and does not describe using different feature sets or decision boundaries tailored to particular target classes.”), 30 (“Petitioner’s attempt to equate Barnard’s one size-fits-all filtering with the claim’s target-specific discrimination reflects a misunderstanding of both the reference and the invention.”). However, on the current record, Patent Owner’s argument is unpersuasive at least because it is based on an overly restrictive construction of the limitation “target specific feature information to distinguish specific targets from background clutter.” As discussed above, claim 1 does not require distinguishing between different targets or between specific target classes. *See* Section II.C.1.

Although Patent Owner argues that “there is no mention of ‘target specific’ features, e.g., ones tailored to a particular target type or class” in Barnard (Prelim. Resp. 19 (citing Ex. 2007 ¶ 68)), on the preliminary record,

we are persuaded that Barnard’s statistic-based selection process uses “target specific feature information” (i.e., features and thresholds) to distinguish specific targets from background, as the claim requires. *See, e.g.,* Pet. 19 (citing Ex.1005, 2:28–36, 5:13–66, 6:62–68, Figs. 2, 6). While Barnard does not explicitly refer to this selected information as being “tailored,” Barnard’s feature-selection process discards or excludes features that it deems to be unreliable when “discriminating between background and target features.” Ex. 1005, 2:28–39. Therefore, at this stage of the proceeding, Petitioner has shown sufficiently that

Barnard discloses or renders obvious *calculating data statistics* (e.g., “width of the statistical distributions” of features and/or “progressive means” of features, such as brightness feature B, size feature S, quietness feature Q, and other features and/or “statistical information”) *from said data* (e.g., the input image data (stream of digitized pixel values or picture signals)) *and using said data statistics to select target specific feature information to distinguish specific targets from background clutter* (e.g., selecting the set of features and an associated target detection threshold used to distinguish specific targets from background clutter by excluding features whose width of statistical distribution exceeds a predetermined amount or whose mean varies by more than a preset amount and/or using statistical information).

Pet. 22 (citing Ex. 1003 ¶¶ 79–77).

b) Whether Barnard’s Architecture Teaches the Claimed Invention

Patent Owner argues that Barnard’s system does not teach “using said target specific feature information to distinguish specific targets from background clutter” and “outputting target and background clutter information” because it removes background clutter through analog preprocessing prior to digital feature analysis. Prelim. Resp. 31–33; Sur-reply 4–6. Patent Owner contends Barnard teaches “the raw signals undergo

standard preprocessing steps that are well known in the field” before applying the detection technique, including “filtering the detector outputs to suppress noise and background clutter, typically using a prewhitening or bandpass filter, followed by sampling the filtered signals to produce discrete pixel values.” Prelim. Resp. 32 (citing Ex. 1005, 3:59–68, 42–59). Relying on the Declaration testimony of Dr. Majumder, Patent Owner argues that because “Barnard removes background clutter from the analog signal before digitization and feature calculation, it does not—and cannot—perform the claimed step of using target specific feature information to distinguish targets from background clutter.” *Id.* at 33 (citing Ex. 2007 ¶ 96).

At this stage of the proceeding, we do not agree with Patent Owner’s arguments. At the outset, we note that Barnard does not eliminate background clutter, but “attenuate[s]” the “signal frequencies characteristic of background signals” using a filter “matched to the expected target signal.” Ex. 1005, 2:40–46. And, following this attenuation process, Barnard discloses that “the matched filter output and the surviving pixel values [are] retained in a store preserving their relative positions” (*id.* at 3:55–57), and

The target detection system in accordance with the invention is applied to the results of this prior processing, these results being contained in a store having a store location for each pixel in the whole horizon image. Each store location will contain the value of that pixel for a complete scan of the horizon. Thus the present situation of each pixel and its neighbours are available to be subjected to the target detection processes described.

Id. at 3:59–68. Thus, we do not agree with Patent Owner’s argument that Barnard’s system does not teach “using said target specific feature information to distinguish specific targets from background clutter” and “outputting target and background clutter information” because it removes

background clutter through analog preprocessing prior to digital feature analysis. Prelim. Resp. 31–33; Sur-reply 4–6.

4. *Conclusion for Claim 1*

After reviewing Petitioner’s assertions with respect to claim 1 and the supporting evidence (as summarized above), we determine that Petitioner has shown, sufficiently at this stage, that Barnard teaches all the limitations of claim 1. *See* Pet. 12–34. We therefore determine that Petitioner is reasonably likely to prevail in showing that claim 1 is unpatentable under § 103 as obvious over Barnard.

We have also reviewed the arguments and evidence of record addressing claims 2, 3, 6, and 7 in Ground 1, and similarly find that for purposes of institution, Petitioner has demonstrated a reasonable likelihood that Barnard would have rendered these claims obvious. *See* Pet. 34–39.

On this basis, we institute *inter partes* review of all challenged claims on all grounds in the Petition. *See SAS Inst. Inc.*, 584 U.S. at 368; 37 C.F.R. § 42.108(a).

F. *Remaining Grounds*

Petitioner contends that claim 7 is unpatentable as obvious over Barnard and Knecht (Ground 2), claims 1–7 are unpatentable as obvious over Barnard and Lawrence (Ground 3), and that claim 7 is unpatentable as obvious over Barnard, Lawrence, and Knecht (Ground 4). *See* Pet. 39–76. Because we have determined above that, at this stage of the proceeding and on the present record, the information presented in the Petition shows that there is a reasonable likelihood that Petitioner will prevail with respect to at least one claim based on the alleged obviousness over Barnard (Ground 1),

we need not address Petitioner's additional challenges at this time. *See* 35 U.S.C. § 314(a).

III. CONCLUSION

We determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in challenging at least one claim of the '639 patent. Based on the foregoing, we institute *inter partes* review of all challenged claims on all grounds raised in the Petition. *See* 37 C.F.R. § 42.108(a) ("When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim."). At this stage of the proceeding, we have not made a final determination with respect to the patentability of any of the challenged claims or the construction of any claim term.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that *inter partes* review of claims 1–7 of the '639 patent is instituted on the grounds asserted in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial will commence on the entry date of this decision.

IPR2025-00340
Patent 6,894,639 B1

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