

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

IRIUSRISK, INC.,
Petitioner,

v.

THREATMODELER SOFTWARE INC.,
Patent Owner.

IPR2023-00656
Patent 10,713,366 B2

Before KEVIN F. TURNER, JOHN D. HAMANN, and
STEPHEN E. BELISLE, *Administrative Patent Judges*.

BELISLE, *Administrative Patent Judge*.

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

I. INTRODUCTION

IriusRisk, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–20 (“Challenged Claims”) of U.S. Patent No. 10,713,366 B2 (Ex. 1001, “the ’366 patent”). Petitioner identifies itself and IriusRisk SL as real parties in interest. Pet. 2. ThreatModeler Software, Inc. (“Patent Owner”) identifies itself as a real party in interest (Paper 4, 2), and timely filed a Preliminary Response to the Petition (Paper 6, “Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314(b) (2018); 37 C.F.R. § 42.4(a) (2022). We may not institute an *inter partes* review “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). The “reasonable likelihood” standard is “a higher standard than mere notice pleading” but “lower than the ‘preponderance’ standard to prevail in a final written decision.” *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 13 (PTAB Dec. 20, 2019) (precedential). 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. 37 C.F.R. § 42.108(a).

Applying those standards, and upon consideration of the information presented in the Petition and Preliminary Response, we determine that Petitioner has demonstrated a reasonable likelihood of success in proving that at least one claim of the ’366 patent is unpatentable. *See* 35 U.S.C. § 314; 37 C.F.R. § 42.4(a). Accordingly, we institute an *inter partes* review

as to all Challenged Claims of the '366 patent on all grounds raised in the Petition.

II. BACKGROUND

A. *Related Matters*

The parties indicate that the '366 patent is involved in one U.S. district court action, namely, *ThreatModeler Software Inc v. IriusRisk, Inc.*, Case No. 1:22-cv-912-MN (D. Del.) (“District Court Case”). Pet. 2; Paper 4, 2.

Petitioner also indicates that Patent Owner asserts related U.S. Patent No. 10,699,008 B2 against Petitioner in the District Court Case. Pet. 2. The '008 patent is the challenged patent in IPR2023-00821 now pending before the Board.

B. *The '366 Patent*

The '366 patent is titled “Systems and Methods For Automated Threat Model Generation From Third Party Diagram Files,” and issued July 14, 2020, from U.S. Patent Application No. 16/542,263, filed August 15, 2019, and claims priority through a series of continuations-in-part to four U.S. Provisional Patent Applications filed in 2017 (priority is not presently at issue in this proceeding). Ex. 1001, codes (10), (21), (22), (45), (54), (63).

The '366 patent generally relates to “threat modeling processes and systems,” where “[t]hreat modeling is a process by which vulnerabilities of a system or process may be detailed and prioritized,” and “[t]hreat modeling allows a user to analyze potential attack vectors and prioritize vulnerabilities.” Ex. 1001, 1:51–62.

Threat modeling systems include one or more computing devices communicatively coupled with one or more databases, the database(s) including threat model components and threats

associated with one another. One or more mapping files coupled with the database(s) correlate the threat model components with visual diagram components of a third party software application. An import interface initiates reading of a third party generated data file by the computing device(s), the data file including a subset of the third party diagram components and relationships between the subset. An interface receiving input initiates a determination of threat model components correlated with the subset. A diagram interface displays a relational diagram using visual representations of threat model components correlated with the subset, the relational diagram defining a threat model. A threat report interface includes a threat report displaying each threat that is associated with one of the threat model components of the threat model.

Id. at code (57). According to the '366 patent, its system(s) and method(s) can generate threat models “for any application, process, or system under consideration,” including “modeling the possible threats to commuting to work safely, modeling the possible threats to preventing the spread of an infectious disease, or modeling the possible attacks on a computer network (cybersecurity).” *Id.* at 8:67–9:5.

For example, in the context of computer networks, one threat may be “bluejacking” and one component, which would be correlated to this threat through the database, could be a “BLUETOOTH port.” Ex. 1001, 9:55–59. In this scenario, if a user includes a BLUETOOTH port in a diagram of a computing system, the subject threat modeling system would identify that port as a relevant source for bluejacking in an associated threat model and threat report. *Id.* at 9:60–63. In this example, the component is a physical component of a computing device or system/network. *Id.* at 9:63–65. As another example, in the context of commuting to work safely, one threat may be a “freeway collision” and one component, which would be correlated to this threat through the database, could be “merging onto

freeway.” *Id.* at 9:66–10:3. In this scenario, “merging onto freeway” would be a relevant source for the threat of “freeway collision.” *Id.* at 10:4–5. In this latter example, the component (and relevant source) is defined as an action or step, and not as a physical component. *Id.* at 10:5–7.

C. Illustrative Claim

The ’366 patent includes twenty claims, all of which are challenged. Claims 1, 8, and 16 are the challenged independent claims. Claim 1 is illustrative and reproduced below with labels, such as “[a],” added to limitations in the same manner as used by the parties.

1. [p] A threat modeling method, comprising:
 - [a] providing one or more databases, the one or more databases comprising:
 - [b] a plurality of threat model components stored therein;
and
 - a plurality of threats stored therein, wherein each of the threats is associated with at least one of the threat model components through the one or more databases;
 - [c] providing one or more mapping files communicatively coupled with the one or more databases, [d] the one or more mapping files correlating the threat model components with visual diagram components of a third party software application (hereinafter “third party diagram components”);
and
 - [e] in response to receiving one or more user inputs, using one or more user interfaces displayed on one or more computing devices communicatively coupled with the one or more databases:
 - [f] using the one or more computing devices, reading a data file generated by the third party software application, the data file comprising a subset of the third party diagram components, the data file defining one or more

- relationships between the subset of third party diagram components;
- [g] determining using the one or more computing devices, for the subset of third party diagram components, correlated threat model components as defined in the one or more mapping files;
- [h] displaying on the one or more user interfaces a relational diagram of one of a system, an application, and a process, using visual representations of the threat model components correlated with the subset of third party diagram components, the relational diagram defining a threat model; and
- [i] generating, using the one or more computing devices, and displaying, on the one or more user interfaces, a threat report displaying each threat that is associated through the one or more databases with one of the threat model components included in the threat model.

Ex. 1001, 43:21–61.

D. Evidence of Record

Petitioner relies on the following patent and published patent application evidence.

Name	Patent Document	Exhibit
Keenan	US 11,200,228 B2, issued Dec. 14, 2021	1004
Zheng	US 10,503,907 B2, issued Dec. 10, 2019	1005
Baker	US 2014/0236665 A1, published Aug. 21, 2014	1006
Jones	US 9,602,529 B2, issued Mar. 21, 2017	1007
Galliano	US 10,681,068 B1, issued Jun. 9, 2020	1008

Pet. 10–12, 14–21.

Petitioner also relies upon the Declaration of Robert Hurlbut (Ex. 1003).

At this stage of the proceeding, Patent Owner does not rely upon a declarant of its own.

E. Asserted Challenges to Patentability

Petitioner challenges the patentability of claims 1–20 of the ’366 patent on the following bases (Pet. 12).

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1–20	102 ¹	Keenan
1–4, 7–11, 15–18	103	Zheng, Baker, Jones
2, 9, 17	103	Zheng, Baker, Jones, Galliano
1–20	103	Zheng, Baker, Jones, Keenan
2, 5, 6, 9, 12–14, 17, 19, 20	103	Zheng, Baker, Jones ²

III. ANALYSIS

A. Applicable Law

Petitioner challenges the patentability of claims 1–20 of the ’366 patent on grounds that the claims are anticipated under 35 U.S.C. § 102 or would have been obvious under 35 U.S.C. § 103 in light of various references, namely Keenan, Zheng, Baker, Jones, and Galliano. “In an [*inter*

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102 and 103. Because the earliest possible effective filing date of the ’366 patent is after March 16, 2013, the effective date of the relevant amendment, the AIA versions of §§ 102 and 103 apply.

² Petitioner’s obviousness challenge to the listed claims is based on the listed references (Zheng, Baker, Jones) “in further view of the knowledge of a POSITA,” where “POSITA” means a person of ordinary skill in the art. Pet. 12; *see also Randall Mfg. v. Rea*, 733 F.3d 1355, 1362–63 (Fed. Cir. 2013) (providing that it is appropriate to consider such knowledge as part of an obviousness analysis).

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) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)) (emphasis added). This burden never shifts to Patent Owner. See *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review).

To serve as an anticipatory reference under 35 U.S.C. § 102, “the reference must disclose each and every element of the claimed invention, whether it does so explicitly or inherently.” *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009). “The identical invention must be shown in as complete detail *as is contained in the . . . claim.*” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989) (emphasis added). The elements must be arranged as required by the claim, “but this is not an ‘*ipsissimis verbis*’ test,” i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 832–33 (Fed. Cir. 1990) (citing *Akzo N.V. v. United States Int’l Trade Comm’n*, 808 F.2d 1471, 1479 & n.11 (Fed. Cir. 1986)).

A claim is unpatentable under 35 U.S.C. § 103 “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103; see *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 skill in the art; and (4) when of record, objective evidence of obviousness or non-obviousness, i.e., secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Secondary considerations may include the following: “commercial success, long felt but unsolved needs, failure of others, etc.”³ *Id.* The totality of the evidence submitted may show that the challenged claims would not have been obvious to one of ordinary skill in the art. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984). When evaluating a combination of teachings, we must also “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

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

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art, at the time of the earliest effective filing date of the ’366 patent:

would have had a Bachelor’s degree in computer engineering, computer science, mathematics, or a similar discipline, with at least three years of relevant industry or research experience, including experience in software development and designing or implementing threat models. Additional work or research

³ At this stage of the proceeding, Patent Owner has not presented objective evidence of non-obviousness.

experience can substitute for less or different education, and vice-versa.

Pet. 12 (citing Ex. 1003 ¶ 33).

Patent Owner does not present an alternative definition at this stage of the proceeding. *See generally* Prelim. Resp.

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). The level of ordinary skill in the art also is reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

Neither party argues, at least at this stage of the proceeding, that the outcome of this case would differ based on our adoption of any particular definition of the level of ordinary skill in the art. Considering the subject matter of the ’366 patent, the background technical field, the prior art, and Petitioner’s proposed and unopposed definition of the skilled artisan, we apply the level of skill set forth above, which is consistent with the testimony of Mr. Hurlbut (Ex. 1003 ¶ 33).

C. Claim Construction

We construe claims “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), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R.

§ 42.100(b); *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

In this context, claim terms “are generally given their ordinary and customary meaning” as understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips*, 415 F.3d at 1312–13; *see CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (There is “a ‘heavy presumption’ that a claim term carries its ordinary and customary meaning.”). “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). Extrinsic evidence is “less significant than the intrinsic record in determining ‘the legally operative meaning of claim language.’” *Phillips*, 415 F.3d at 1317.

Only those claim terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (stating that “we need only construe 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))).

Petitioner proffers constructions for four terms, namely, (1) “third party software application,” (2) “third party diagram components,” (3) “visual representations of the threat model components,” and (4) “threat model components,” each as recited, for example, in independent claim 1.

Pet. 12–14. Petitioner submits “[Patent Owner] defined [these] claim terms in the specification and file history,” “Petitioner is applying those definitions in this petition,” and “[f]or all other claim terms, Petitioner applies the plain and ordinary meaning that a [skilled artisan] would attribute to those terms.”

Pet. 12. “Patent Owner submits that the Board need not engage in any pre-institution claim construction of these [four] terms.” Prelim. Resp. 11.

Based upon our consideration of the record at this stage of the proceeding, we conclude that it is unnecessary to interpret expressly any term in the ’366 patent claims for which we institute *inter partes* review. *See Nidec*, 868 F.3d at 1017.

Nevertheless, we determine that briefing during the trial on the proper interpretation of certain claim terms may assist us in resolving issues presented in this case. In particular, we invite the parties to address the proper construction of “threats,” “threat model components,” “visual representations of the threat model components,” and “mapping files,” and the evidentiary support therefor. To the extent that a party proposes that such a term should have its ordinary and customary meaning, we encourage the party to explicitly identify such meaning(s) and the evidentiary support therefor.

D. Alleged Anticipation of Claims 1–20 by Keenan

Petitioner contends claims 1–20 are unpatentable under 35 U.S.C. § 102 as anticipated by Keenan (Ex. 1004). Pet. 21–60. Patent Owner opposes Petitioner’s contentions. Prelim. Resp. 3–21. Based on our review of the record before us, we determine that Petitioner has established a reasonable likelihood that it would prevail in showing that claims 1–20 are

unpatentable as anticipated by Keenan, as discussed below. We turn first to an overview of Keenan.

1. Overview of Keenan (Ex. 1004)

Keenan generally is directed to “an Integrated Object Environment (IOE) running in a graph database environment.” Ex. 1004, 1:22–24. “Uses include storing, revealing and maintaining value and risk of information assets, such as the topology of an analytical infrastructure in [a] query-driven, graph database.” *Id.* at code (57). The IOE system “stores, reveals and links characteristics (Structural Metadata) of each object in the topology either within the IOE or in a linked repository, such that accountability, benefits and *consequences of using those assets* can easily and repeatedly be measured in the cost and profitability of the outcomes those assets enable.” *Id.* at 1:47–52 (emphasis added). A user may interact with the IOE through a Graphical User Interface (GUI), including “a View mode, where the user can view any section of the topology and Characteristics by Object” and “a Modify mode, where the user can add, change and delete Objects or Characteristics.” *Id.* at 11:42–51. According to Keenan, “[t]he intelligence embedded in the stored topology can be viewed in a variety of ways through the GUI, both in terms of the object-to-object relationships and the associated characteristics of objects.” *Id.* at 12:64–67. This includes processing and viewing objects by “*technical threat* vectors,” where “color fills the object shapes based on the value of the *technical risk* ranking characteristic of that object.” *Id.* at 16:21–23 (emphases added).

The major components of the IOE appear in Figure 1, reproduced below.

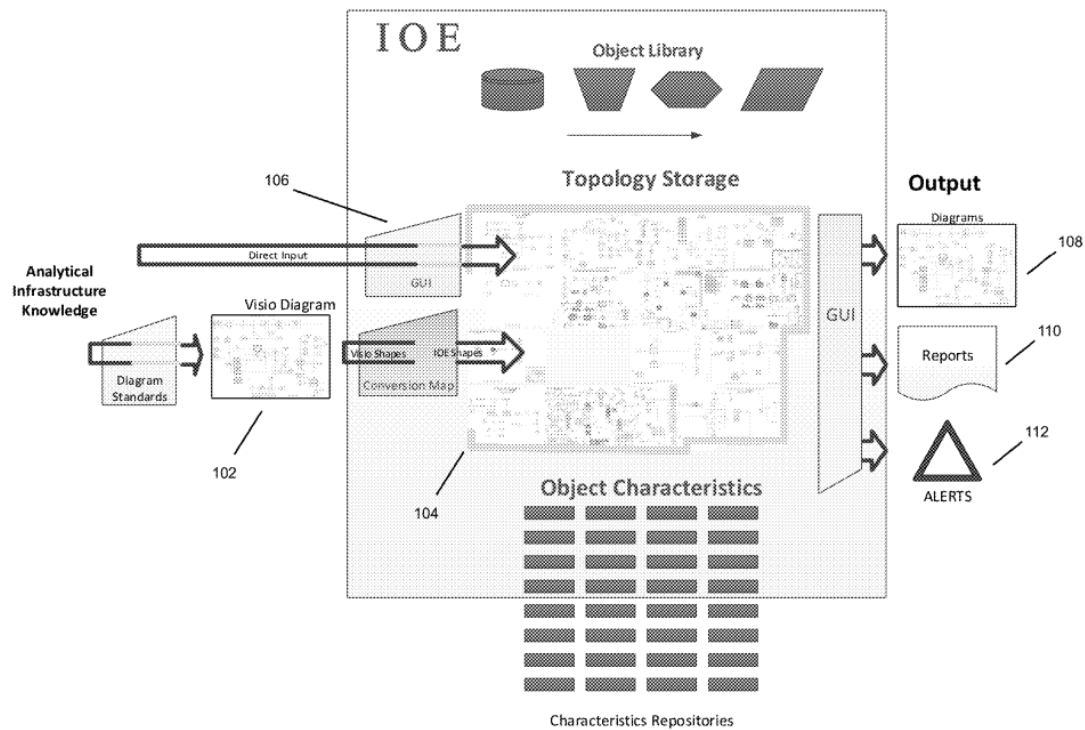


FIGURE 1

Figure 1 depicts an integrated object environment represented in a graph database.

Ex. 1004, 2:44–46, 5:28–33, Fig. 1. Referring to Figure 1, Keenan discloses:

[E]ach real world component in the infrastructure is defined as an object with associated characteristics such as state, and its relationship to other objects. The objects and characteristics are stored in a graphical format 102 such as a Visio file. The system converts the Visio files 102 into a standard, canonical format for storage in a topology graph database 104 of the infrastructure. Alternatively, a GUI 106 is provided for inputting directly into the topology database. Rendering software (GUI) 106 converts the graph database and associated characteristics into Views, which are exportable as diagrams 108, as well as reports 110 and alerts 112.

Id. at 5:33–44, Fig. 1. Keenan discloses one such view or report as a “Technical Risk Measurement view,” which “uses color to represent

different types of risk (e.g., *cyber, environmental, accidental, etc.*).” *Id.* at 16:45–48 (emphases added), Fig. 7 (“Palette View” examples, including “Technical Risk Measurement”).

As shown in Figure 1, for example, Keenan also discloses that “[a] *map is preset that maps* Visio shapes and formats to IOE shapes and formats.” Ex. 1004, 18:36–37 (emphases added). In this context, a user selects an import function in the IOE GUI, “which first checks to see if [an] object already exists in [the] IOE based on external ID number first, then name match,” and “[i]f the object already exists, a message is posted to the screen, such as, ‘The following objects matched existing objects from the IOE, new relationships will be loaded to existing object.’” *Id.* at 18:37–43. Existing objects are then updated with new relationships based on the imported Visio diagram. *Id.* at 18:43–44.

We further discuss below the disclosure of Keenan in connection with the parties’ arguments.

2. *Analysis*

a) *Independent Claim 1*

The parties dispute whether Keenan explicitly or inherently discloses to the skilled artisan (i) limitation 1[b], namely, “a plurality of *threat* model components stored [in one or more databases]; and a plurality of *threats* stored therein, wherein each of the *threats* is associated with at least one of the *threat* model components through the one or more databases”

(Pet. 25–28; Prelim. Resp. 5–7, 11–19) (emphases added); and

(ii) limitations 1[c] and 1[d], namely, “providing one or more *mapping files* communicatively coupled with the one or more databases, the one or more *mapping files correlating* the threat model components *with* visual diagram

components of a third party software application” (Pet. 29–32; Prelim. Resp. 8–11, 19–21) (emphases added). We address these disputes in turn.

(1) *Limitation 1[b]*—“a plurality of threat model components stored [in one or more databases]; and a plurality of threats stored therein, wherein each of the threats is associated with at least one of the threat model components through the one or more databases”

Petitioner argues Keenan discloses limitation 1[b] by describing an Integrated Object Environment (IOE) that represents ““a dynamic map of an enterprise’s analytic infrastructure, preferably including ***all physical assets*** that contribute to [] analysis.”” Pet. 26 (quoting Ex. 1004, 5:27–44); *see* Ex. 1003 ¶ 81. Petitioner argues:

Each asset or “real world component,” *i.e.*, physical asset, is defined by an object within the IOE and is associated with risk and characteristics (*e.g.*, risk characteristics and the relationship to other objects). [Ex. 1004, 5:27–44.] The IOE allows a user to select views that display the associated risk and consequences for specific assets using threat vectors and models. *Id.*, 4:64–67, 16:1–29; *see also* 1:31–52, 7:41–59, 13:4–22, 14:35–39, 14:61–63, 16:40–63, 17:32–40, 18:6–22, 20:34–51, Figs. 1, 7. Keenan further explains that certain Views use color to “represent different types of risk (*e.g.*, cyber, environmental, accidental, etc.).” *Id.*, 16:40–51.

Pet. 26 (citing Ex. 1003 ¶¶ 81–83).

Petitioner argues that, although Keenan may not use the identical terminology as the ’366 patent, Keenan nevertheless explicitly discloses limitation 1[b] *to the skilled artisan*.⁴ Pet. 28. In particular, Petitioner

⁴ Contrary to Patent Owner’s arguments, based on the record before us, we disagree that Petitioner is “rely[ing] on its expert to supply disclosure of

argues the skilled artisan would understand Keenan to disclose the following:

(1) “the assets/objects in Keenan are ‘relevant sources of threats’ and thus threat model components, as defined by the ’366 patent, because the assets/objects in Keenan are subject to risks that Keenan’s system measures” (Pet. 28 (citing Ex. 1003 ¶ 82));

(2) “Keenan’s ‘risk’ includes threats because measuring risk includes a determination of threats, and Keenan discloses that Views may use color to ‘represent different types of risk (e.g., cyber, environmental, accidental, etc.)’” (*id.* (citing Ex. 1004, 16:40–51; Ex. 1003 ¶ 82)), where “‘types of risk’ are threats because the described examples are threats (cyber/environmental/accidental)” (*id.*; *see* Ex. 1003 ¶ 79);

(3) “‘each of the threats is associated with at least one of the threat model components’ because Keenan discloses associating risk with each asset” (Pet 28 (citing, *inter alia*, Ex. 1004, 1:33–38, 1:47–52; Ex. 1003 ¶ 82)); and

(4) “Keenan’s threats and threat model components are ‘stored therein’ in the database, and that the threats and threat model components are associated ‘through the one or more databases’ because Keenan discloses a method and system that is run in a ‘graph database environment’” (*id.* (citing Ex. 1003 ¶ 83)).

a claim element that is not expressly or inherently present in the reference.” Prelim. Resp. 14–15. Instead, at least in the subject context, Petitioner’s expert, Mr. Hurlbut, testifies as to what Keenan explicitly discloses *to the skilled artisan*. *See In re Bond*, 910 F.2d at 832–33 (anticipation “is not an ‘*ipsissimis verbis*’ test”).

Patent Owner responds, in sum, that the “risk” described in Keenan does not disclose the “threats” described and claimed in the ’366 patent. *See* Prelim. Resp. 5–7, 11–19. Based on the record before us at this stage of the proceeding, we disagree and preliminarily find Patent Owner’s arguments unavailing, as further discussed below.

In particular, Patent Owner concedes that “Keenan discloses that color *can* ‘represent *different types* of risk (*e.g., cyber, environmental, accidental, etc.*),’” where Keenan displays such colors associated with objects in a topology. Prelim. Resp. 17 (citing Ex. 1004, 16:40–51) (emphases added); *see* Ex. 1004, Fig. 7. But Patent Owner then merely concludes, without citing any factual support, that “use of a color identifying the generic nature of a risk still fails to disclose any threats associated with the risk.” *Id.* at 17–18. On the other hand, Petitioner’s expert, Mr. Hurlbut, testifies:

Keenan demonstrates that its risk measurement and display includes a determination of threats where Keenan discloses a risk measurement view that uses [] color to “represent different types of risk (*e.g., cyber, environmental, accidental, etc.*).” [Ex. 1004], 16:40–51. [The skilled artisan] would understand that “types of risk,” as disclosed in Keenan are threats because the described examples are all types of threats (*cyber, environmental, accidental*). Thus, Keenan discloses threats within its risk analysis. Moreover, [the skilled artisan] would understand that risk is a function of threats exploiting vulnerabilities to obtain, damage, or destroy assets. In other words, threat modeling is used to identify risk.

Ex. 1003 ¶ 79 (cited at Pet. 21–24); *see id.* ¶ 82 (cited at Pet. 26–28). Patent Owner disputes this testimony of Mr. Hurlbut using only attorney argument, and without telling us, for example, *why* Mr. Hurlbut allegedly is wrong (*e.g.,* by explaining why specific “types” of risk do not fall within the scope of “threats” as broadly recited in claim 1, or how “risk” is not a function of

“threats” in Keenan, as explained by Mr. Hurlbut). *See In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) (“Attorney’s argument in a brief cannot take the place of evidence.”). Moreover, although Patent Owner characterizes the “types of risk” disclosed in Keenan as identifying a “*generic* nature of a risk” (Prelim. Resp. 17–18 (emphasis added)), we note that “threats” is broadly recited in claim 1 with no requirement as to any level of specificity of such threats.

Patent Owner also argues Keenan “refers to the risk as a ‘value’” or “characteristic that is ‘preset,’” and that “‘risk’ in Keenan is a preset value as [a] property of an object.” Prelim. Resp. 15–16. But regardless, even if such disclosures alone were deemed not to disclose “threats,” they do not negate Keenan’s other disclosures discussed above, such as its disclosure of displaying types of risk (e.g., cyber, environmental, accidental, etc.). *See supra*.

Accordingly, on the current record and for purposes of institution, Petitioner sufficiently shows that Keenan discloses limitation 1[b], namely, “a plurality of threat model components stored [in one or more databases]; and a plurality of threats stored therein, wherein each of the threats is associated with at least one of the threat model components through the one or more databases,” as recited in independent claim 1.

- (2) *Limitations 1[c]/1[d]*—“providing one or more mapping files communicatively coupled with the one or more databases, the one or more mapping files correlating the threat model components with visual diagram components of a third party software application”

Petitioner argues Keenan discloses limitation 1[c], i.e., providing a mapping file communicatively coupled with a database, by describing “a preset ‘*map*’ that ‘*maps Visio shapes and formats to IOE shapes and formats*,’ as well as diagrams and ‘Views’ on a Graphical User Interface.” Pet. 29 (quoting Ex. 1004, 18:36-40; citing Ex. 1004, 16:5–11, 5:27–44 (“The IOE . . . represents a dynamic map.”), 11:65–12:4, 12:11–62, 16:5–11, 18:23–28, Fig. 7); *see* Ex. 1003 ¶¶ 84–86. Petitioner argues Keenan’s disclosure to the skilled artisan of a “map” itself “discloses a ‘mapping file’ because a mapping file is required to form a map.” Pet. 29 (citing Ex. 1003 ¶ 85). Petitioner’s expert, Mr. Hurlbut, testifies that Keenan both explicitly and inherently discloses this feature: “Keenan’s ‘map’ conveys, and *necessarily includes*, a ‘mapping file’ as claimed because a mapping file would be required to perform mapping techniques.” Ex. 1003 ¶ 85 (emphasis added). Petitioner argues “Keenan’s mapping file is ‘communicatively coupled with the one or more databases’ because Keenan discloses software that ‘converts the *graph database* and associated characteristics into Views.’” Pet. 29–30 (citing, *inter alia*, Ex. 1003 ¶ 86).

Petitioner argues Keenan discloses limitation 1[d], i.e., a mapping file correlating threat model components with visual diagram components of a third party software application, by describing that “a user may import Visio shapes and formats, where the system then ‘*maps Visio shapes and formats*

to IOE shapes and formats.” Pet. 30 (quoting Ex. 1004, 18:36–50); *see* Ex. 1003 ¶¶ 87–88. Petitioner argues “[t]he IOE shapes and formats (*i.e.*, objects/assets) are threat model components,” and in that context, “Keenan discloses ‘mapping,’ *i.e.*, through one or more mapping files, Keenan’s threat model components with *Visio* shapes and formats.” Pet. 30; *see* Ex. 1003 ¶ 87. Petitioner argues the skilled artisan would understand Keenan to disclose that its “Visio shapes and formats” are “‘visual diagram components’ because . . . the Visio shapes and formats are ‘mapped,’ *i.e.*, visually associated, with objects, which Keenan’s system visualizes, and because ‘shapes and formats’ are tools used for visualization.” Pet. 30 (citing Ex. 1004, 18:6–40; 5:27–44, 18:23–50, 19:17–29, 21:10–17, Figs. 12, 13; Ex. 1003 ¶ 87).

Petitioner argues the skilled artisan would understand Keenan also to disclose the following:

(1) “Visio shapes and formats are ‘of a third party software application’ because [a] user of Keenan’s system selects the option to ‘*import*’ the Visio visual diagram components to Keenan’s system,” and Keenan “‘*converts*’ Visio files ‘into a standard, canonical format for storage’” (Pet. 31–32 (citing Ex. 1004, 18:36–40, 5:37–44)); and

(2) “Visio is an independently-created software application ‘not created with a common schema, *such that a mapping file or the like as claimed in the claims would be useful to map between the two software application[s],*’ as defined in the file history, because Keenan utilizes a mapping file to map between the elements of Visio and Keenan’s system” (Pet. 32 (citing Ex. 1004, 18:36–40; Ex. 1003 ¶ 88)).

Patent Owner responds, in sum, that Keenan does not disclose “mapping files” and “has no need or use for any ‘mapping files’ as claimed.” Prelim. Resp. 19; *see id.* at 8–11, 19–21. Based on the record before us at this stage of the proceeding, we disagree and preliminarily find Patent Owner’s arguments unavailing, as further discussed below.

In particular, Patent Owner argues, “[t]hough not permitted under a theory of anticipation, Petitioner improperly relies on expert testimony to manufacture the claimed ‘mapping files’ in Keenan where none is disclosed.” Prelim. Resp. 19. Based on the record before us, we disagree that Petitioner’s expert, Mr. Hurlbut, “manufacture[d]” a disclosure of mapping files in Keenan. Keenan explicitly discloses that “[a] map is preset that maps Visio shapes and formats to IOE shapes and formats.” Ex. 1004, 18:36–37. As noted above, Mr. Hurlbut testifies that, from the vantage point of the skilled artisan, “Keenan’s ‘map’ conveys, and necessarily includes, a ‘mapping file’ as claimed because a mapping file would be required to perform mapping techniques.” Ex. 1004 ¶ 85. Patent Owner disputes this testimony of Mr. Hurlbut using only attorney argument (*see, e.g.*, Prelim. Resp. 20 (“nothing inherent”)), and without telling us, for example, *why* Mr. Hurlbut allegedly is wrong (e.g., by explaining why Keenan’s preset map would not necessarily include or require a mapping file). *See In re Pearson*, 494 F.2d at 1405 (“Attorney’s argument in a brief cannot take the place of evidence.”). We also note that “mapping files” is broadly recited in claim 1 with no requirement as to how the mapping files must be structured or provide for such mapping (i.e., for correlation between threat model components and visual diagram components).

Accordingly, on the current record and for purposes of institution, Petitioner sufficiently shows that Keenan discloses limitations 1[c] and 1[d], namely, “providing one or more mapping files communicatively coupled with the one or more databases, the one or more mapping files correlating the threat model components with visual diagram components of a third party software application,” as recited in independent claim 1.

(3) Undisputed Limitations at This Stage of the Proceeding

For the reasons stated in the Petition at pages 21–25 and 32–41, Petitioner sufficiently establishes for purposes of institution that Keenan discloses the further limitations of independent claim 1. Patent Owner does not contend otherwise at this stage of the proceeding.

(4) Conclusion

At this stage of the proceeding and based on the record before us, we are persuaded that the cited evidence adequately supports Petitioner’s contention that independent claim 1 is unpatentable as anticipated by Keenan.

b) Independent Claims 8 and 16 and Dependent Claims 2–7, 9–15, and 17–20

Petitioner contends independent claims 8 and 16 are substantially the same as independent claim 1, except that features of “method” claim 1 are variously embodied in “system” claims 8 and 16. Pet. 48–54 (citing Ex. 1003 ¶¶ 119–130), 58–59. At this stage of the proceeding, Patent Owner argues the independent claims as a group. *See, e.g.*, Prelim. Resp. 19 (“Because Keenan’s use of the term ‘risk’ fails to disclose any ‘threats’ as claimed, Keenan does not and cannot anticipate any of the challenged

claims.”); *see generally id.* We agree with Petitioner that independent claims 8 and 16 recite limitations commensurate in scope with independent claim 1. Thus, on the present record, and at this stage of the proceeding, we are persuaded that the cited evidence adequately supports Petitioner’s contentions that independent claims 8 and 16 are unpatentable as anticipated by Keenan, for similar reasons as discussed above regarding independent claim 1. *See* Ex. 1003 ¶¶ 119–130.

Petitioner also contends dependent claims 2–7, 9–15, and 17–20 are unpatentable as anticipated by Keenan. Pet. 21. The Petition provides a detailed assessment of these claims, with references to the Petition’s analysis of claims 1, 8, and 16, disclosures in Keenan, and the declaration testimony of Mr. Hurlbut. Pet. 41–48, 54–57, 59–60. At this stage of the proceeding, Patent Owner does not present any separate arguments that are distinct to any of these claims. Rather, Patent Owner generally is of the view its alleged deficiencies in the Petition with respect to claim 1 are also applicable to all Challenged Claims. *See, e.g.,* Prelim. Resp. 19; *see generally id.* As discussed above, on the present record and at this stage of the proceeding, we are persuaded that the cited evidence sufficiently supports Petitioner’s contentions that independent claims 1, 8, and 16 are unpatentable as anticipated by Keenan. For the reasons set forth in the Petition (Pet. 41–48, 54–57, 59–60), we also are persuaded that the current record sufficiently supports Petitioner’s challenges to dependent claims 2–7, 9–15, and 17–20 for purposes of institution.

c) Summary

For the foregoing reasons, and the reasons stated in the Petition (Pet. 21–60), we determine that Petitioner has established a reasonable

likelihood that it would prevail in showing that claims 1–20 are unpatentable as anticipated by Keenan.

E. Alleged Obviousness of Claims 1–4, 7–11, and 15–18 over the Combination of Zheng, Baker, and Jones

Petitioner contends claims 1–4, 7–11, and 15–18 are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Zheng (Ex. 1005), Baker (Ex. 1006), and Jones (Ex. 1007). Pet. 17–20, 60–85. Patent Owner opposes Petitioner’s contentions. Prelim. Resp. 21–25. Because we determine that Petitioner demonstrates a reasonable likelihood of success in establishing the unpatentability of claims 1–20 as anticipated by Keenan such that we institute this proceeding (*see supra* Section III.D), and because we must therefore institute *inter partes* review on all claims and all challenges in the Petition (*see* 37 C.F.R. § 42.108(a)), for purposes of institution, we need not and do not herein address in detail Petitioner’s assertions of obviousness of claims 1–4, 7–11, and 15–18 over the combination of Zheng, Baker, and Jones. However, we do provide below certain guidance on this challenge to assist the parties in the upcoming trial.

At this stage of the proceeding, the parties dispute whether the combination of Zheng, Baker, and Jones teaches limitations 1[c] and 1[d], as they disputed with Keenan (*see supra* Section III.D). Pet. 63–65; Prelim. Resp. 21–25. We first turn briefly to Zheng.

Zheng discloses a system comprising “a visualization module for *rendering, on a computer display, a map* with components representative of the suite of software applications and relationships among the software applications,” where “[t]he components are *displayed* in a base layer of *the map*.” Ex. 1005, 1:48–53 (emphases added). Zheng explains that,

“by utilizing *a visualization approach like cartography*, application architecture can be represented in a compressible view that enhances security and risk analysis,” and that “*mapping techniques* and concepts can be used *in the context of data visualization* to create a graphical representation of application connectivity and security.” *Id.* at 3:28–34 (emphases added). On its face, Zheng appears to use the term “map” consistently in the context of cartography, i.e., creating a digital view of components and their interconnections (like drawing for someone a map of how computer network components are interconnected).

Petitioner argues Zheng discloses limitation 1[c], namely, “providing one or more mapping files communicatively coupled with the one or more databases.” Pet. 63. In particular, Petitioner argues, *inter alia*, “Zheng’s ‘mapping techniques’ and its ‘map’ convey, and necessarily include, a ‘mapping file’ as claimed because a mapping file would be required to perform mapping techniques.” Pet. 63 (citing Ex. 1003 ¶ 162). Patent Owner responds that “Zheng’s ‘mapping techniques’ are related to visualization of the application architecture, ‘like cartography,’ and have nothing to do with ‘correlating the threat model components with visual diagram components of a third party software application’ as claimed.” Prelim. Resp. 22. Patent Owner further responds that “Zheng’s generic disclosure of ‘mapping techniques . . . in the context of data visualization’ does not necessarily require any ‘mapping files’ as claimed.” *Id.* We find Patent Owner’s arguments persuasive in the context of Zheng. Although in other contexts, “mapping” may require “mapping files,” based on the record before us, we agree with Patent Owner that Zheng discloses “maps” and

“mapping” in the context of cartography (i.e., visualization), not in the context of *correlating* components.

Petitioner then turns to Baker (Ex. 1006) for allegedly disclosing limitation 1[d], namely, “the one or more mapping files correlating the threat model components with visual diagram components of a third party software application.” Pet. 64–65. Baker discloses an “automated risk management system,” where a user is able to build a risk management flowchart (or multiple flowcharts) that “utilizes symbols of various shapes to indicate actions, determinations, or other elements of an activity or evaluation so that respective personnel of an organization can understand actions to be taken to successfully manage an activity or avoid a negative outcome.” Ex. 1006 ¶¶ 5, 20, 25. “Importantly, risk management or control flowcharts may be imported . . . from third party software such as that marketed as Microsoft Office Visio®.” *Id.* ¶ 25. Initially, we note that, by turning to Baker for the “correlating” feature, Petitioner appears to affirm that Zheng itself does not disclose “mapping techniques” in the context of “correlating” components.

Petitioner argues Baker discloses “visual diagram components of a third party software application” based on its disclosure of importing flowcharts from Visio, discussed above. Pet. 64. Petitioner also argues:

Baker allows a user to select the option to “*import*” the Visio visual diagram components to Baker’s system, such that “a mapping file or the like as claimed in the claims,” such as the mapping file of Zheng, “would be useful to map between elements of the two software applications,” as defined in the file history.

Pet. 64–65 (citing, *inter alia*, Ex. 1003 ¶ 164). Petitioner argues the skilled artisan would have combined these teachings from Baker with the system of Zheng “to enable the importation of diagrams from Microsoft Visio into the

threat modeling software of Zheng such that the mapping file of Zheng would correlate the threat model components with visual diagram components from the Visio diagrams.” Pet. 65 (citing Ex. 1003 ¶ 166); *see* Pet. 83–85 (alleged reasons to combine Zheng and Baker).

Patent Owner responds, “again, Zheng does not disclose any mapping file, either expressly or inherently, and even considered in view of Baker, fails to disclose or suggest the claimed ‘mapping files’ *correlations*.”

Prelim. Resp. 24 (emphasis added). Patent Owner argues:

Baker’s process has no need or use for any “mapping files” as claimed. Baker stores the “text and shape of each element of the flowchart . . . in the process database 30” and “automatically assign[s] or associate[s] predetermined objectives or controls according to the shapes of the imported flowcharts.” Baker, [0025]; *see also id.*, [0009]. Baker simply searches for a flowchart shape without disclosing any “mapping files” providing correlations as recited in the claims.

Id. (footnote omitted). Patent Owner submits that, in order to reach the claimed “mapping files” *correlations* recited in claim 1, “Petitioner first has to invent a mapping file to capture the threat actor/threat target association of Zheng, and then has to invent a modification to repurpose the associations.” *Id.*; *see id.* at 4–5. Patent Owner argues “[t]he sole motivation for these additions are hindsight-based creations of features not disclosed or suggested by the art.” *Id.*; *see id.* at 4–5 (alleging “impermissible hindsight”). We find Patent Owner’s arguments persuasive.

Based on the record before us, we find Petitioner does not sufficiently explain, for example, how Baker (or Zheng) teaches “correlating” (a) threat model components *with* (b) visual diagram components of a third party software application, let alone doing so using “mapping files.” We also find at this stage of the proceeding that Petitioner does not sufficiently explain

why the skilled artisan would have combined the alleged teachings of Zheng and Baker to arrive at limitations 1[c] and 1[d], but for hindsight, i.e., using claim 1 and the teachings of the '366 patent to bring those pieces together. See *InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327, 1351 (Fed. Cir. 2014) (“It appears that [the expert] relied on the [] patent itself as her roadmap for putting what she referred to as pieces of a ‘jigsaw puzzle’ together.”). Although “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton” (*KSR*, 550 U.S. at 421), the Federal Circuit has observed that “‘the prejudice of hindsight bias’ often overlooks that the ‘genius of invention is often a combination of known elements which in hindsight seems preordained.’” *Polaris Industries, Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1068 (Fed. Cir. 2018). Here, Petitioner’s rationale for combining Zheng and Baker, namely, “to enable the importation of diagrams from Microsoft Visio into the threat modeling software of Zheng such that the mapping file of Zheng would correlate the threat model components with visual diagram components from the Visio diagrams” (Pet. 65), appears to be gleaned only from applicant’s disclosure, not the art.

At this stage of the proceeding and based on the record before us, we preliminarily find that Petitioner has not established a reasonable likelihood that it would prevail in showing that claims 1–4, 7–11, and 15–18 would have been obvious over the combination of Zheng, Baker, and Jones.

- F. Alleged Obviousness of (1) Claims 2, 9, and 17 over the Combination of Zheng, Baker, Jones, and Galliano; (2) Claims 1–20 over the Combination of Zheng, Baker, Jones, and Keenan; and (3) Claims 2, 5, 6, 9, 12–14, 17, 19, and 20 over the Combination of Zheng, Baker, Jones and “the knowledge of a POSITA”*

Petitioner also contends certain claims are unpatentable under 35 U.S.C. § 103 as obvious over the following combinations: (1) claims 2, 9, and 17 over the combination of Zheng (Ex. 1005), Baker (Ex. 1006), Jones (Ex. 1007), and Galliano (Ex. 1008); (2) claims 1–20 over the combination of Zheng, Baker, Jones, and Keenan (Ex. 1004); and (3) claims 2, 5, 6, 9, 12–14, 17, 19, and 20 over the combination of Zheng, Baker, Jones and “the knowledge of a POSITA.” Pet. 12, 85–89. At this stage of the proceeding, Patent Owner does not present any separate arguments that are distinct to these challenges and claims. Prelim. Resp. 25–26 (“Grounds 3, 4, and 5 are not presented to address the defects in Keenan and Zheng (alone or in combination with the other References of Ground 2). . . . Rather, these defects infect each of the asserted grounds.”). Because we determine that Petitioner demonstrates a reasonable likelihood of success in establishing the unpatentability of claims 1–20 as anticipated by Keenan such that we institute this proceeding (*see supra* Section III.D), and because we must therefore institute *inter partes* review on all claims and all challenges in the Petition (*see* 37 C.F.R. § 42.108(a)), for purposes of institution, we need not and do not herein address in detail Petitioner’s additional assertions of obviousness of the foregoing claims over the noted combinations. However, we do provide below certain guidance on these challenges to assist the parties in the upcoming trial.

As for combination (1) above, Petitioner applies this combination only to dependent claims 2, 9, and 17, and does not appear to apply Galliano in any manner that would cure any deficiencies in Petitioner's challenges preliminary identified herein in Section III.E above, particularly to independent claims 1, 8, and 16. *See* Pet. 85–87.

As for combination (2) above, Petitioner applies this combination only to dependent claims 5, 6, 12–14, 19, and 20, and does not appear to apply Keenan, in this obviousness context, in any manner that would cure any deficiencies in Petitioner's challenges preliminary identified herein in Section III.E above, particularly to independent claims 1, 8, and 16. *See* Pet. 87–88. Although we recognize that Petitioner alleges Keenan anticipates claims 1–20, as discussed above in Section III.D, we discern no arguments *in the Petition* as to which teaching(s) of Keenan are applied in conjunction with teachings of Zheng, Baker, and Jones to arrive at claims 1–4, 7–11, and 15–18. *See* Prelim. Resp. 26 (“[I]n Ground 4, Keenan is added to the References of Ground 2 [i.e., Zheng, Baker, and Jones], but to challenge claims 5–6, 12–14, and 19–20, not to remedy the failure in Ground 2 to establish the disclosure or suggestion of the ‘mapping files’ as claimed.”).

As for combination (3) above, Petitioner applies this combination only to dependent claims 2, 5, 6, 9, 12–14, 17, 19, and 20, and does not appear to apply any alleged “knowledge” of the skilled artisan, in this obviousness context, in any manner that would cure any deficiencies in Petitioner's challenges preliminary identified herein in Section III.E above, particularly to independent claims 1, 8, and 16. *See* Pet. 88–89.

Accordingly, at this stage of the proceeding and based on the record before us, we preliminarily find that Petitioner has not established a reasonable likelihood that it would prevail in showing that any of the foregoing claims would have been obvious over the noted combinations (1), (2), and (3) discussed above.

IV. CONCLUSION

Based on the evidence before us, we determine that Petitioner has established a reasonable likelihood that at least one claim of the '366 patent is unpatentable. Accordingly, we institute trial on all the challenges in the Petition.

We base our factual findings and conclusions at this stage of the proceeding on the evidentiary record developed so far. This is not a final decision as to the construction of any claim term or the patentability of any claim. Any final decision shall be based on the full trial record, including any response timely filed by Patent Owner. Any arguments not raised by Patent Owner in a timely filed response may be deemed waived, even if they were presented in the Preliminary Response.

V. ORDER

Upon consideration of the record before us, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–20 of the '366 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '366 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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