

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS, LLC,¹
Petitioner,

v.

MOBILITY WORKX, LLC,
Patent Owner.

Case IPR2018-01150
Patent 8,213,417

PATENT OWNER'S NOTICE OF APPEAL
35 U.S.C. § 142 & 37 C.F.R. § 90.2

¹ The cover sheet of the PTAB Final Written Decision (Paper 26) does not reflect an update to the name of Petitioner. (*See* Paper 27.) Patent Owner identifies the parties by their correct names here.

Pursuant to 37 C.F.R. § 90.2(a), Patent Owner, MOBILITY WORKX, LLC, hereby provides notice of its appeal to the United States Court of Appeals for the Federal Circuit from the Final Written Decision of the United States Patent and Trademark Office (“USPTO”) Patent Trial and Appeals Board (“PTAB”) in *Inter Partes* Review 2018-01150, concerning U.S. Patent 8,213,417 (the “’417 patent”), entered on December 2, 2019, attached hereto as Attachment A, which is based on the PTAB’s decision on behalf of the Director of the United States Patent and Trademark Office (“Director”) granting institution of *inter partes* review entered on December 3, 2018, Paper 9 (“Institution Decision”) (Attachment B).

ISSUES TO BE ADDRESSED ON APPEAL

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), Patent Owner indicates that the issues on appeal include, but are not limited to the Board’s ruling that claims 1, 2, 4, 5, and 7 of the ’417 patent are unpatentable as being obvious under 35 U.S.C. § 103(a) in view of Liu, U.S. Pat. 5,825,729, either alone or in combination with Gwon, U.S. PGPUB 2012/0131386 (claims 1, 5, and 6), and/or Lau, U.S. Pat. 7,536,482 (claims 2 and 7) or IETF Request for Comments 2402 (Nov. 1998) (claim 4), and any findings or determinations supporting or related to that ruling including, without limitation, the Board’s interpretation of the above-cited references and expert testimony introduced in the proceeding, and allocations of

burdens of proof between the parties.

Patent Owner further indicates that the issues on appeal include whether the appointment of the Administrative Patent Judges (APJs) that comprised the panel of the PTAB in this proceeding violated the Appointments Clause of the U.S. Constitution.

Patent Owner further indicates that the issues on appeal include whether in the present proceeding the Director violated 35 U.S.C. § 314, the Administrative Procedures Act, and/or U.S. Constitution by delegating his authority to institute the present proceeding under 35 U.S.C. § 314 to a panel of Administrative Patent Judges whose appointment violated the Appointments Clause of the U.S. Constitution.

Patent Owner further indicates that the issues on appeal include any further findings or determinations by the Director or the PTAB supporting or relating to the issues above, all other issues decided adversely to Patent Owner and/or the '417 patent in any orders, decisions, rulings, or opinions, whether written or oral, of the PTAB, on its own or on another's behalf, in this proceeding, as well as the procedures by which any of those issues were decided adversely to Patent Owner and/or the '417 patent.

Simultaneous with submission of this Notice of Appeal to the Director of the United States Patent and Trademark Office, this Notice of Appeal is being filed

with the PTAB and, along with the required docketing fees, is being filed electronically with the Clerk of the Court for the United States Court of Appeals for the Federal Circuit.

Dated: January 31, 2020

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Respectfully submitted,

/Tarek N. Fahmi/

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing

PATENT OWNER'S NOTICE OF APPEAL

was served on January 31, 2020, by filing this document through the PTAB E2E System as well as delivering a copy via electronic mail directed to the attorneys of record for the Petitioner at the following address:

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The parties have agreed to electronic service in this matter.

As required under 37 C.F.R. § 90.2(a), an additional copy was served by overnight express on Director of the United States Patent and Trademark Office at the following address:

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The undersigned also certifies that a true and correct copy of this Notice of Appeal and the required fee were filed electronically via CM/ECF on January 31, 2020, with the Clerk of Court for the United States Court of Appeals for the Federal Circuit.

Dated: January 31, 2020

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Respectfully submitted,

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ATTACHMENT A

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS INC.,
Petitioner,

v.

MOBILITY WORKX, LLC,
Patent Owner.

IPR2018-01150
Patent 8,213,417 B2

Before WILLIAM M. FINK, *Vice Chief Administrative Patent Judge*, and
MELISSA A. HAAPALA and KARA L. SZPONDOWSKI, *Administrative
Patent Judges*.

SZPONDOWSKI, *Administrative Patent Judge*.

JUDGMENT
FINAL WRITTEN DECISION
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

This is a final written decision in *inter partes* review of claims 1–7 of U.S. Patent 8,213,417 B2, issued on July 3, 2012 (Ex. 1001, “the ’417 patent”), entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons set forth below, we determine that Petitioner has demonstrated by a preponderance of the evidence that challenged claims 1, 2, 4, 5, and 7 are unpatentable. We also determine that Petitioner has not shown by a preponderance of the evidence that claims 3 and 6 are unpatentable.

II. BACKGROUND

A. Procedural History

Unified Patents Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–7 of the ’417 patent. Mobility Workx, LLC (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”) to the Petition. With our authorization, Petitioner filed a Reply to the Preliminary Response (Paper 8, “Reply”) to address a real party in interest issue. Pursuant to 35 U.S.C. § 314(a), on December 3, 2018, we instituted an *inter partes* review (Paper 9, “Inst. Dec.” or “Institution Decision”) on all challenged claims under all asserted grounds. Inst. Dec. 33.

During the trial, Patent Owner filed a Patent Owner Response (Paper 12, “PO Resp.”), Petitioner filed a Reply to Patent Owner’s Response (Paper 13, “Pet. Reply”), and Patent Owner filed a Sur-reply to Petitioner’s Reply (Paper 15, “PO Sur-reply”).

We held an oral hearing on September 6, 2019, and a transcript of the oral hearing has been entered into the record. *See* Paper 25 (“Tr.”).

B. Related Proceedings

The parties advise the '417 patent is the subject of two patent infringement lawsuits in the Eastern District of Texas:

Mobility Workx, LLC v. Verizon Communications, Inc. et al., 4-17-cv-00872 (E.D. Tex.), filed Dec. 18, 2017; and

Mobility Workx, LLC v. T-Mobile US, Inc. et al. 4-17-cv-00567 (E.D. Tex.), filed Aug. 14, 2017. Pet. 57; Paper 5, 2.

C. Real Party in Interest

Petitioner identifies United Patents, Inc. as the sole real party in interest. Pet. 57. Patent Owner does not identify any additional real parties in interest. *See* Paper 5, 2.

Patent Owner argued in its Preliminary Response that Petitioner failed to name all real parties in interest (RPIs) in its Petition as required by 35 U.S.C. § 312(a)(a). Prelim. Resp. 13–16. Patent Owner does not present this argument in its Patent Owner Response and, therefore, has waived it. *See* Paper 10, 5; *see generally* PO Resp. We rely on and incorporate our findings and determinations on this issue from the Institution Decision. *See* Inst. Dec. 3–4.

D. The '417 Patent (Ex. 1001)

The '417 patent is titled “System, Apparatus, and Methods for Proactive Allocation of Wireless Communication Resources” and is generally directed to allocation of communications resources in a communications network. Ex. 1001, codes (54, 57), 1:17–19.

Mobile communication systems comprise mobile nodes (e.g., cell phones) that communicate with each other through a series of base stations

that serve distinct cells. *Id.* at 1:28–31, 4:60–5:8. As the mobile node moves from one cell to another, it establishes a new connection with a new base station. *Id.* at 1:31–35. The mobile node must be able to let other nodes know where it can be reached when it is moving. *Id.* at 1:36–39. Typically, the mobile node registers with a home agent so the home agent can remain a contact point for other nodes that want to exchange messages or otherwise communicate with the mobile node as it moves from one location to another. *Id.* at 1:39–44, 5:9–17. Accordingly, a mobile node may use two IP addresses, one being a fixed home address and one being a care-of address, where the care-of address changes as the mobile node moves between networks. *Id.* at 1:45–49. When the mobile node links to a network other than the one in which its home agent resides, the mobile node is said to have linked to a foreign network. *Id.* at 1:49–52. The mobile node, therefore, receives an IP address from the home network, and when it moves to a foreign network and establishes a point of attachment by registering with a foreign agent, it receives a care-of address assigned by the foreign network. *Id.* at 1:52–56; 5:47–54.

According to the '417 patent, delays can occur in setting up a new communication link when the mobile node is handed off from one foreign agent to another because the new communication link cannot be set up until the mobile node arrives in the new foreign agent's physical region of coverage. *Id.* at 2:20–36, 6:3–10. In addition, data packets may be lost if they arrive during the time when set up is being established. *Id.* at 2:36–38, 6:10–13. The invention in the '417 patent seeks to reduce these problems by causing communication network resources to be allocated proactively rather than reactively. *Id.* at 2:52–54. The '417 patent accomplishes this through

the use of two different types of “ghost entities” that can act on behalf of a mobile node and a foreign agent. *Id.* at 2:44–47.

A ghost mobile node acts on behalf of a mobile node and “can be a virtual node and need not reside at the same physical location as the mobile node.” *Id.* at 6:20–22. The ghost mobile node operates by signaling the foreign agent before the mobile node arrives in the foreign agent’s physical region of coverage, based upon the predicted future state of the mobile node. *Id.* at 6:27–38. The predicted future state of the mobile node may be based upon, for example, an estimated location, trajectory, or speed of the mobile node. *Id.* at 6:39–46. Based upon this predicted future state, the ghost mobile node determines which foreign agent is likely to serve as the mobile node’s next communications link and signals that foreign agent. *Id.* at 8:58–62. This signal can be a registration request to cause an allocation of communications resources in the same way as would be performed if the mobile node were physically present in the foreign agent’s region of coverage. *Id.* at 9:7–17. Therefore, the signal results in preemptive setup that is performed before the mobile node arrives in the foreign agent’s coverage area. *Id.* at 9:54–57. This serves to increase the speed with which hand-offs occur, thereby reducing setup delays and avoiding information losses due to dropping of data packets. *Id.* at 9:65–10:1.

The second type of ghost entity described in the ’417 patent is a ghost foreign agent. *Id.* at 4:1–3. A ghost foreign agent acts on behalf of a foreign agent, and notifies the mobile node of the existence of a next foreign agent by transmitting an “advertisement” from the currently connected foreign agent. *Id.* at 10:17–21. In this way, the ghost foreign agent makes the mobile node aware of the foreign agent before the mobile node arrives in the

coverage region of the foreign agent. *Id.* at 10:26–29. Moreover, the vector of care-of addresses is included in the advertisement. *Id.* at 10:30–34.

E. Exemplary Claims

Among the challenged claims, claims 1 and 7 are independent. Independent claims 1 and 7 (reproduced below) are representative.

1. A system for communicating between a mobile node and a communication network; the network having at least one communications network node that is interconnected using a proxy mobile internet protocol (IP), comprising:

- at least one mobile node;
- at least one home agent;
- at least one foreign agent;

a ghost-foreign agent that advertises messages to one of the mobile nodes indicating presence of the ghost-foreign agent on behalf of one of the foreign agents when the mobile node is located in a geographical area where the foreign agent is not physically present; and

a ghost-mobile node that creates replica IP messages on behalf of a mobile node, the ghost-mobile node handling signaling required to allocate resources and initiate mobility on behalf of the mobile node, the ghost-mobile node triggering signals based on a predicted physical location of such mobile node or distance with relation to the at least one foreign agent.

Id. at 12:49–67.

7. A method, in a mobile node, for speeding handover, comprising the steps of:

updating, in a mobile node, a location in a ghost mobile node;

determining a distance, in the ghost mobile node in communication with the mobile node, to a closest foreign agent with which the mobile node can complete a handover;

submitting on behalf of the mobile node, from the ghost mobile node, a registration to the foreign agent to which the mobile node is going to complete the handover; and

upon completing the handover, updating a registration in the mobile node.

Id. at 13:32–14:11.

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–7 would have been unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	References
1, 5, 6	103(a)	Liu ¹ , Gwon ²
2, 3	103(a)	Liu, Gwon, Lau ³
4	103(a)	Liu, Gwon, IETF RFC 2402 ⁴
7	103(a)	Liu, Lau

Pet. 2. Petitioner also relies on the Declarations of Dr. Zygmunt Haas (Exs. 1006, 1010). Patent Owner relies on the Declaration of Suku Nair, Ph.D., P.E. (Ex. 2005).

III. ANALYSIS

A. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) if, to one of ordinary skill in the pertinent art, “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.” *KSR*

¹ U.S. 5,825,729 (issued Oct. 20, 1998) (Ex. 1003).

² U.S. 2012/0131386 A1 (published Sept. 19, 2002) (Ex. 1004).

³ U.S. 7,536,482 B1 (issued May 19, 2009) (Ex. 1005).

⁴ Internet Engineering Task Force Request for Comments 2402, *IP Authentication Header* (November 1998) (Ex. 1008).

Int'l Co. v. Teleflex Inc., 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103(a)). The question of obviousness is resolved based on underlying factual determinations, including the “scope and content of the prior art,” “differences between the prior art and the claims at issue,” “the level of ordinary skill in the pertinent art,” and objective evidence of nonobviousness, i.e., secondary considerations.⁵ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Prior art references must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)).

To establish obviousness, a petitioner must “demonstrate both 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) (internal quotation marks omitted); *see also KSR*, 550 U.S. at 418 (explaining that for an obviousness analysis, “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does”). A motivation to combine the teachings of two references can be “found explicitly or implicitly in market forces; design incentives; the ‘interrelated teachings of multiple patents’; ‘any need or problem known in the field of endeavor at the time of invention and addressed by the patent’; and the background knowledge, creativity, and common sense of the person of

⁵ The record does not include arguments or evidence regarding objective indicia of non-obviousness.

ordinary skill.” *Plantronics, Inc. v. Aliph, Inc.*, 724 F.3d 1343, 1354 (Fed. Cir. 2013) (citation omitted). Further, an assertion of obviousness “cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)); *In re NuVasive, Inc.*, 842 F.3d 1376, 1383 (Fed. Cir. 2016) (a finding of a motivation to combine “must be supported by a ‘reasoned explanation’” (citation omitted)).

B. Level of Ordinary Skill in the Art

Petitioner asserts that one of ordinary skill in the art at the time of invention “would have been a person with a Bachelor of Science Degree in computer science, electrical engineering, or computer engineering or equivalent, and at least two years of industry or academic experience with mobile IP communication methods and devices.” Pet. 7 (citing Ex. 1006, ¶¶ 37–39). Patent Owner’s declarant, Dr. Nair, testifies that he agrees with Petitioner’s assessment of the background of one of ordinary skill in the art. Ex. 2005, ¶ 7.

We find Petitioner’s proposal is consistent with the level of ordinary skill in the art reflected by the prior art of record, and, therefore, adopt it for purposes of this Decision. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

C. Claim Construction

In an *inter partes* review based on a petition filed prior to November 13, 2018, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the

patent in which they appear. 37 C.F.R. § 42.100(b) (2017);⁶ *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016). Under that standard, “words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history.” *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016).

Petitioner argues the terms “advertise,” “advertises,” and “advertisement,” as recited in independent claim 1 and dependent claim 4, are “at least broad enough to include a notification of the presence of a foreign agent in the foreign network.” Pet. 8. In support, Petitioner refers to the claim language (Ex. 1001, 12:56, 13:19) and the Specification (Ex. 1001,⁷ 4:1–3). *Id.* Patent Owner does not propose constructions for any terms. *See generally* PO Resp. Because the terms are not in controversy, we determine that we need not construe explicitly any terms to resolve the issues before us. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). To the extent the parties’ arguments are based on the scope of the claims, we will resolve the disputed claim scope in the context of the parties’ arguments as set forth below.

⁶ A recent amendment to this rule does not apply here because the Petition was filed before November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (codified at 37 C.F.R. pt. 42 (2019)) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018).

⁷ Petitioner’s citation is to Ex. 1003, however, in context, this appears to be a typographical error and we understand the citation is intended to be to Ex. 1001.

D. Summary of Prior Art

1. Liu (Ex. 1003)

Liu is titled “Distributing Network Services and Resources in a Mobile Communications Network” and is generally directed to a mobility data network architecture for accessing data. Ex. 1003, codes (54, 57). Liu uses a mobile floating agent protocol “to dynamically provide service and resource mobility in mobile wireless Local Area Networks and cellular networks.” *Id.* at 1:50–60. Liu describes that “[b]y combining Mobile-Floating agent functions with a method of predictive mobility management, the services and user data can be pre-connected and pre-assigned at the locations or cells to which the user is moving,” which “allows the users to immediately receive service and maintain their data structures with virtually the same efficiency as they could have at the previous location.” *Id.* at 2:3–9. Liu’s mobile floating agent pre-assignment protocol is depicted in Figure 6, which is reproduced below:

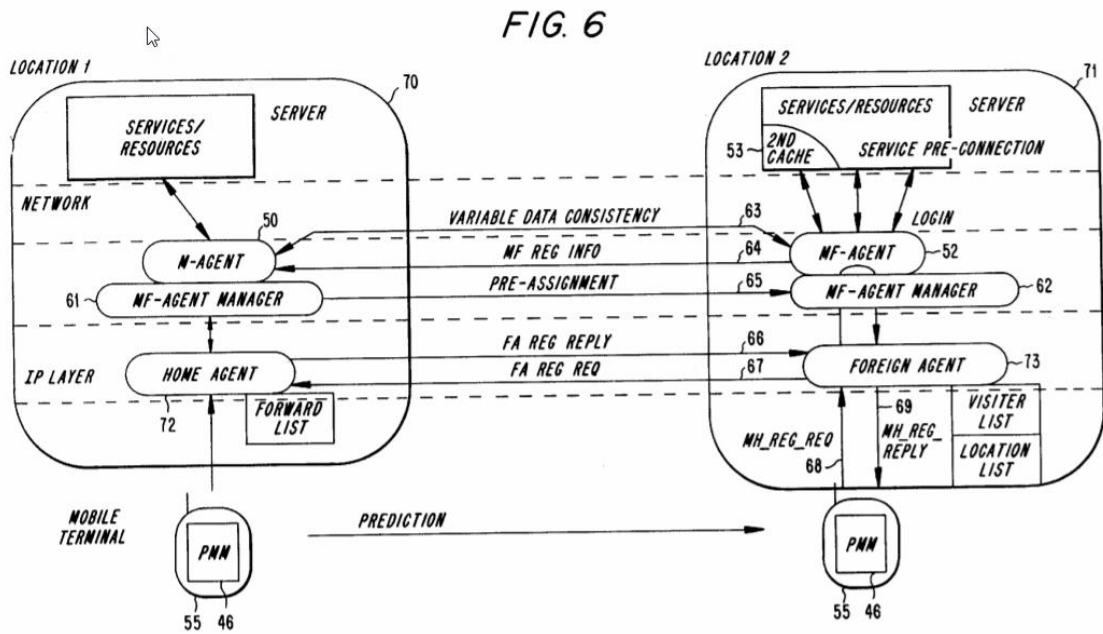


Figure 6 depicts an embodiment of the MF-agent pre-assignment protocol. *Id.* at 7:19–20. Liu describes the use of mobility agents (M-agents) and mobile-Floating Agents (MF-agents). *See, e.g., id.* at 2:12–34. M-agent 50 is representative of the user and “is preferably a software entity executing on a home fixed host or router, including a set of processes that communicates with and pre-assigns an MF-agent 52 to remote fixed hosts or routers on behalf of a mobile terminal 55.” *Id.* at 6:57–61, 7:23. MF-agent 52 “is preferably a software entity executing on a remote fixed host or mobile support router (MSR), including a set of processes that can communicate and connect with the local host or MSR resources.” *Id.* at 6:61–65. Liu describes that the M-agent and MF-agent “are not bound to the underlying network,” and are, “therefore . . . free to follow the mobile users.” *Id.* at 7:2–5. The MF-agent pre-connects services by using predictive mobility management (PMM) to predict where a user will be. *Id.* at 7:5–9.

“[M]obile terminal 55 sends an MF-agent assignment request to its M-agent 50, with an address of a new location it is traveling to.” *Id.* at 7:26–28. The new location may have been explicitly provided by the user or it may be predicted through PMM. *Id.* at 7:29–31. The assignment request is a request to establish (i.e., pre-assign) an MF-agent 52 at the location mobile terminal 55 is traveling to, so that the necessary services and data are ready for the mobile terminal when it arrives at the new location. *Id.* at 7:32–37. “M-agent 50 registers the request and forwards [it] to remote MF-agent manager 62 at the new location.” *Id.* at 7:37–38. Upon receiving the request, MF-agent manager 62 assigns or creates an MF-agent 52 for requesting M-agent 50. *Id.* at 7:38–50. MF-agent 52 registers itself with Foreign Agent 73 (F-agent) and sends an MF-assignment reply back to M-

agent 50 containing the registration information. *Id.* at 7:50–56. “M-agent 50 then sends a reply back to [] mobile terminal 55 and maintains a data consistency link 63 with [] MF-agent 52.” *Id.* at 7:54–56.

When mobile terminal 55 reaches the new location, it registers with MF-agent 52 by sending an MF-agent registration request 68 to F-agent 73 to begin the registration process. *Id.* at 8:7–12. F-agent 73 will then link mobile terminal 55 to MF-agent 52. *Id.* at 8:15–16. In some embodiments, MF-agent 52 may then perform as an acting M-agent (AM-agent) for mobile terminal 55, performing the same function as an M-agent at the new location. *Id.* at 8:17–20. Accordingly, through the use of MF-agent 52, an MF-agent “is waiting with the needed data and services” when the user arrives at a remote location. *Id.* at 8:43–47.

2. *Gwon (Ex. 1004)*

Gwon is titled “Mobility Prediction in Wireless Mobile Access Digital Networks” and generally describes methods for predicting the mobility of mobile nodes. Ex. 1004, codes (54, 57). Gwon describes “determin[ing] in advance when a network connection hand-off is imminent” so a mobile node can pre-establish a new network connection with a new router or agent. *Id.* ¶ 55.

Gwon uses mobility prediction analysis in mobile nodes so that the mobile node can select from among multiple available network connection nodes. *Id.* ¶¶ 55–59. As a mobile node moves locations, Gwon describes the use of Neighbor Discovery methodology, where the mobile node may receive Neighbor Advertisement messages from its local router and/or unsolicited Router Advertisement messages from its local router. *Id.* ¶¶ 51,

53. These messages “indicate[] the presence of other local routers which could provide network connections for the mobile node.” *Id.* ¶ 51.

3. *Lau (Ex. 1005)*

Lau is titled “Methods and Devices for Enabling a Mobile Network Device to Select a Foreign Agent” and is generally directed to enabling a mobile device to select a foreign agent from among a plurality of foreign agents that are transmitting position information. *Ex. 1005*, code (54), 4:29–42. This position information may include GPS data. *Id.* at 3:28–31.

4. *IETF RFC 2402 (“IETF”) (Ex. 1008)*

IETF is a request for comments memorandum regarding Internet standards track protocol for “IP Authentication Header.” *Ex. 1008*, 1. Specifically, *IETF* primarily describes IP Authentication Header formatting and processing, as well as authentication and security measures. *Ex. 1008*, §§ 1–3.

E. Ground 1 (Based on Liu and Gwon)

Petitioner contends claims 1, 5, and 6 would have been obvious over the combination of *Liu* and *Gwon*. *Pet.* 12–37.

1. *Claim 1*

a. “A system for communicating between a mobile node and a communication network; the network having at least one communications network node that is interconnected using a proxy mobile internet protocol (IP), comprising:”

Petitioner relies on Liu to teach or suggest the preamble of independent claim 1. Pet. 12–14. For example, Petitioner cites to Liu’s mobile floating (MF)-agent protocol, which accommodates the “mobile nature” of mobile users by offering service and resource mobility through intelligent service pre-connection, resource pre-allocation, and data structure pre-arrangement. *Id.* at 12–13 (citing Ex. 1003, 1:58–2:2). Petitioner further relies on Liu’s disclosure of proxy entities (e.g., M-agent and MF-agent) to facilitate communications between mobile nodes and networks employing Mobile IP. *Id.* at 13–14 (citing Ex. 1003, 2:11–34, 7:15–17).

Patent Owner does not dispute the teachings of Liu in connection with the preamble of claim 1. *See generally* PO Resp. Based on Petitioner’s arguments and evidence, we find Petitioner has shown that Liu teaches or suggests the limitations in the preamble.

b. “at least one mobile node;”

Petitioner contends Liu’s mobile terminal 55 teaches “at least one mobile node.” Pet. 14–15 (citing Ex. 1003, Fig. 6). Petitioner further asserts Liu’s mobile terminals may include cellular phones and laptop computers, and are capable of mobile communications. *Id.* at 15 (citing Ex. 1003, 6:4–7, 17:47–48).

Patent Owner does not dispute the teachings of Liu in connection with

this limitation. *See generally* PO Resp. Based on Petitioner’s arguments and evidence, we find Petitioner has shown that Liu’s mobile terminal 55 teaches or suggests this limitation.

c. “at least one home agent;”

Petitioner contends Liu’s home agent 72 teaches “at least one home agent.” Pet. 15–16 (citing Ex. 1003, Fig. 6). Petitioner further asserts Liu’s home agent may be a “home fixed host or router.” *Id.* at 16 (quoting Ex. 1003, 2:15–21).

Patent Owner does not dispute the teachings of Liu in connection with this limitation. *See generally* PO Resp. Based on Petitioner’s arguments and evidence, we find Petitioner has shown that Liu’s home agent 72 teaches or suggests this limitation.

d. “at least one foreign agent;”

Petitioner contends Liu’s F-agent 73 teaches “at least one foreign agent.” Pet. 17–18 (citing Ex. 1003, Fig. 6 (“Foreign Agent”), 7:50–56 (“After the MF-agent 52 is alternatively created or assigned, it registers itself with the Foreign Agent 73 (F-agent) (708).”).

Patent Owner does not dispute the teachings of Liu in connection with this limitation. *See generally* PO Resp. Based on Petitioner’s arguments and evidence, we find Petitioner has shown that Liu’s F-agent 73 teaches or suggests this limitation.

e. “a ghost-foreign agent that advertises messages to one of the mobile nodes indicating presence of the ghost-foreign agent on behalf of one of the foreign agents when the mobile node is located in a geographical area where the foreign agent is not physically present”

Petitioner, relying on Dr. Haas, contends Liu, or alternatively, Liu and Gwon, teach or suggest this limitation. Pet. 18–26 (citing Ex. 1006 ¶¶ 28, 32–34, 43, 72–79).

i. Liu

Petitioner contends Liu’s MF-agent 52 teaches the “ghost-foreign agent.” *Id.* at 18–19 (citing Ex. 1003, Fig. 6, 8:7–34, 6:53–65). Petitioner relies on Liu’s “MF-agent pre-assignment” protocol to teach the remainder of the limitation, and contends the MF-assignment reply back from the MF-agent to the M-agent teaches the “advertises messages” portion of the limitation. *Id.* at 19–20 (citing Ex. 1003, 7:19–31, 7:37–46, 7:51–57). Petitioner argues the registration information in the MF-agent assignment reply “contains information sufficient to notify the mobile node of the MF-agent’s presence in the foreign network.” Pet. Reply 4. Petitioner argues, and Dr. Haas testifies, that one of ordinary skill in the art would have understood that the MF-agent would acquire the IP address of the foreign agent as part of the registration process, and would then forward that registration information, including the IP address of the foreign agent, to the M-agent in the MF-agent assignment reply, which would then forward it to the mobile terminal. *Id.* (citing Ex. 1010 ¶¶ 10–14); *see also* Pet. 20. Petitioner also asserts, with support from Dr. Haas, that the MF-agent acts on behalf of the F-agent. *Id.* at 5–6 (citing Ex. 1006 ¶¶ 72–73). Petitioner also contends Liu teaches such advertising when the mobile node is located

in a geographical area where the foreign agent is not physically present. Pet. 24–25 (citing Ex. 1003, 7:24–37; Ex. 1006 ¶ 79).

Patent Owner responds that Liu’s MF-agent does not perform the actions recited in the claim language. PO Resp. 16. Patent Owner argues the MF-agent assignment reply does not indicate the presence of a foreign agent in a foreign network because it contains the MF-agent’s registration information, which only indicates the MF-agent’s successful registration with the foreign agent. *Id.* at 17 (citing Ex. 2005 ¶ 29); PO Sur-reply 6, 8. Patent Owner asserts that the M-agent is already aware of the presence of the foreign agent, and does not require the MF-agent to forward registration information of the foreign agent. PO Resp. 17 (citing Ex. 2005 ¶ 29); PO Sur-reply 6, 8. Patent Owner also argues that the MF-agent does not send information about the foreign agent to the mobile terminal, but instead, the foreign agent sends the mobile terminal information about the MF-agent. PO Sur-reply 3–4, n.2 (citing Ex. 1003, 8:9–12; 20:62–21:02).

Liu describes the following sequence of steps: (1) a mobile terminal requests the M-agent to establish an MF-agent at the location the mobile terminal is traveling to; (2) the M-agent is responsible for creating, deleting, and managing the MF-agents; (3) the MF-agent is created or assigned; (4) the MF-agent registers itself with the F-agent; (5) the MF-agent sends an MF-assignment reply back to the M-agent containing the registration information; (6) the M-agent sends a reply back to the mobile terminal and maintains a data consistency link with the MF-agent; and (7) when the mobile terminal reaches the new location, it registers with the MF-agent that has been created or assigned to it by sending an MF-agent registration request to the F-agent. Ex. 1003, 7:18–8:16.

Given the sequence described in Liu, the reply sent from the M-agent to the mobile terminal, regardless of what information it contains, is sufficient to “indicate the presence of the ghost-foreign agent [MF-agent] on behalf of one of the foreign agents.” Although we agree with Patent Owner that Liu indicates that a “reply” is sent from the M-agent to the mobile node (e.g., PO Sur-reply 5, 7), as opposed to explicitly forwarding the MF-assignment reply from the M-agent to the mobile node, as Petitioner argues (e.g., Pet. Reply 4), we are not persuaded that the “reply” does not “indicate the presence of the ghost-foreign agent on behalf of one of the foreign agents” as recited in the claim. Because the process begins when the mobile terminal requests that an MF-agent be established at the location it is traveling to, we find Liu teaches that the reply it receives from the M-agent indicates that the MF-agent has been established, is registered with the foreign agent, and is present. We credit Dr. Haas’ testimony in this regard, because it is consistent with Liu’s disclosures. *See* Ex. 1010 ¶¶ 10–12. Moreover, Patent Owner admits that the MF-assignment reply “indicates only the MF-agent’s successful registration [with the foreign agent].” PO Resp. 17; PO Sur-reply 6. We fail to see how an indication of a successful registration with the foreign agent does not also indicate the presence of the MF-agent on behalf of one or more of the foreign agents.

In addition, Petitioner offers testimony from Dr. Haas that the reply would contain “registration information,” including the IP address of the foreign router that would indicate the foreign router’s presence, as well as the presence of the MF-agent linked to that foreign router. Ex. 1010 ¶¶ 11,

12; Pet. Reply 4.⁸ Patent Owner’s argument that the MF-agent does not send information about the foreign agent to the mobile terminal, but rather, the foreign agent sends the mobile terminal information about the MF-agent, relies on disclosure describing what happens after the mobile terminal arrives in the new location, not what happens during the pre-assignment process. *See* PO Sur-reply 3–4, n.2; Ex. 1003, 20:62–21:01, 8:7–16 (“when the mobile terminal **55** reaches the new location . . . it sends an MF-agent registration request **68** to the F-agent **73** at the new location to begin the registration process . . . [and] [t]he F-agent **73** then links the mobile terminal **55** to the MF-agent **52**”) (emphasis added).

We are further persuaded by Petitioner’s arguments and evidence that Liu teaches advertising messages *to one of the mobile nodes*. Pet. 18–20; Ex. 1003, 7:19–57. We are not persuaded by Patent Owner’s argument that the MF-agent assignment reply is a message to the M-agent, not the mobile node. PO Resp. 17 (citing Ex. 2005 ¶¶ 28–29); PO Sur-reply 7–8. Patent Owner contends that because the MF-assignment reply is first sent from the MF-agent to the M-agent, and then a reply sent from the M-agent to the mobile terminal, that the ghost-foreign agent is not advertising messages to one of the mobile nodes. PO Resp. 17. We agree with Petitioner that it is inconsequential (Pet. Reply 5) because the claim language does not preclude transmittal to an intermediary before sending the message to the mobile

⁸ We disagree with Patent Owner that this is a new argument. *See* PO Sur-reply 3–4. Rather, we note that Dr. Haas testified in his original declaration accompanying the Petition that Liu’s MF-assignment reply is sent “with registration information of the foreign agent,” and that MF-assignment reply is “forwarded back to the mobile terminal.” Ex. 1006 ¶ 74.

terminal, as occurs in Liu. Moreover, Patent Owner admitted at the hearing that the claim language does not preclude an intermediary. Tr. 32:9–12.

We are further persuaded by Petitioner’s arguments and evidence that Liu teaches indicating the presence of the ghost-foreign agent *on behalf of one of the foreign agents*. Dr. Haas provides testimony that “reading the specification and the claim language [of the “417 patent] together, a ghost-foreign agent acts on behalf of a foreign agent when it furthers the proactive allocation of resources by sending advertisements on behalf of the foreign agent.” Ex. 1010 ¶¶ 13–15. Dr. Haas further testifies that “Liu’s MF-agent employs this same process with this same goal—having resources reconnected and preassigned.” *Id.* ¶ 14 (citing Ex. 1003 ¶¶ 6–8; Ex. 1006 ¶¶ 42, 59). Dr. Haas also testifies that Dr. Nair improperly interprets “on behalf of” to mean “directed by,” and one of ordinary skill in the art would have understood “on behalf of” to mean “in the interest of.” *Id.* ¶ 15.

Patent Owner argues the MF-agent assignment reply is not sent on behalf of the foreign agent, but rather, is sent on behalf of the M-agent. PO Resp. 18 (citing Ex. 2005 ¶ 30); Tr. 28:10–11; PO Sur-reply 8–10. Patent Owner asserts that “when the MF-agent is reporting its registration with the foreign agent it is acting on its own behalf and doing so at the direction of the M-agent.” PO Sur-reply 9 (citing Ex. 2005 ¶ 30; Ex. 1003, 7:24–38). Patent Owner draws our attention to column 2, lines 11 through 34 of Liu in support of this argument. *Id.* at 9–10. In support of its argument, Patent Owner also relies on an embodiment of Liu where the MF-agent may perform as an acting M-agent (AM-agent) for the mobile terminal. PO Resp. 18 (citing Ex. 1003, 8:17–20); Ex. 2005 ¶ 30.

We are not persuaded by Patent Owner’s arguments that Liu’s MF-agent does not indicate presence *on behalf of one of the foreign agents* because we find Dr. Haas’ testimony credible and persuasive. We disagree with Patent Owner’s conclusion that “the role of the MF-agent is always to act on behalf of the M-agent and not the foreign agent.” See PO Sur-reply 10–11. The portion of column 2 relied upon by Patent Owner indicates that the MF-agent may perform some processes on behalf of the M-agent, but we agree with Petitioner that the MF-agent may also be acting on behalf of the F-agent in other circumstances. See Tr. 12:22–13:14 (“[T]he MF-assignment reply . . . indicates the particular foreign router [with its assigned] MF-agent . . . [and] it is . . . doing so on behalf of the foreign agent, even if it’s also doing so on behalf of the M-agent as well.”). Indeed, the MF-agent is “established for use by the mobile user at each of the remote fixed hosts or routers,” and it must register itself with the F-agent after it is created or assigned. Ex. 1003, 2:28–30, 7:50–51. We are also not persuaded by Patent Owner’s arguments regarding the embodiment of Liu that describes the MF-agent acting as an AM-agent. Rather, we agree with Petitioner and Dr. Haas that this is an alternative embodiment that describes separate functionality performed “only after the mobile node has reached its new location and thus after the resource pre-allocation process has been completed.” See Pet. Reply 6–7; Ex. 1010 ¶ 16 (emphasis removed); Ex. 1003, 8:7–22 (“the MF-agent *now performs* as an acting M-agent (AM-agent) for the mobile terminal **55**, performing the same function as an M-agent *at the new location.*”) (emphasis added).

For the foregoing reasons, we find Petitioner establishes that Liu teaches or suggests this limitation.

ii. Liu and Gwon

Petitioner alternatively contends that to the extent that the claimed advertisement message must be unsolicited, Gwon teaches unsolicited advertisements from a router (i.e. a foreign agent) via its Neighbor Discovery methodology. Pet. 20–22 (citing Ex. 1004 ¶¶ 50–54, 58). Dr. Haas provides testimony that these unsolicited router advertisements “are consistent with the advertisement messages . . . disclosed in the ’417 patent” because both “notify the mobile device of the foreign agent’s presence in the foreign network to facilitate resource pre-allocation.” Ex. 1006, ¶ 75. Petitioner explains that:

In the proposed modification, MF-agents, operating as software on foreign routers, simply begin the resource pre-allocation process by advertising their presence and the IP address of the foreign router they are linked to, to the mobile device. [Ex. 1010] ¶¶ 20, 21. The mobile device is communicatively linked to the M-agent operating on the home router. *Id.* As the M-agent becomes aware of which MF-agents are available in the foreign network, the M-agent can initiate a data link between the next MF-agent and itself for proactive resource allocation. *Id.* The mobile device updates the M-agent with its location information as it travels, including its predicted destination, allowing the M-agent to initiate the data link with the optimal MF-agent. *Id.* This simplifies and enhances the pre-allocation process by obtaining the presence of available MF-agents and foreign agents early on, without the need for an original request by the mobile device. *Id.*

Pet. Reply 9–10; *see also id.* at 12–13. Petitioner also contends Gwon teaches such advertising when the mobile node is located in a geographical area where the foreign agent is not physically present. Pet. 25–26 (citing Ex. 1004 ¶¶ 52–53, Fig. 2).

Petitioner, with testimony from Dr. Haas, argues that a person of

ordinary skill in the art would have been motivated to modify Liu to allow Liu's MF-agent to proactively broadcast its presence to the mobile node since it is "simply applying a known technique to a known device ready for improvement to yield predictable results." *Id.* at 23 (citing Ex. 1006 ¶¶ 77–78). Petitioner asserts proactive broadcasts were well known and would have (1) "facilitated the pre-assignment of a mobile device before it reached the foreign network, decreasing the time required to complete a handover with a foreign agent at a new network to which the mobile device was travelling" and (2) "decreased the computational burden on the mobile device by removing the need to request the assignment of a MF-agent, shifting this burden to the MF-agent on a router in the foreign network." *Id.* (citing Ex. 1006 ¶¶ 77–78); *see also* Pet. Reply 10. Therefore, Petitioner contends combining Gwon's known Neighbor Discovery protocol with the MF-agent pre-assignment protocol of Liu "comports with the actual historical evolution of the technology at the time, which resulted in a more efficient and simplistic method to pre-allocate resources," and therefore, would have been obvious to one of skill in the art. Pet. 24–26 (citing Ex. 1006 ¶¶ 77–79).

Patent Owner does not dispute the teachings in Gwon, but, rather, disputes the combination of Liu with Gwon. PO Resp. 19–25; PO Sur-reply 11–14. Patent Owner argues that Gwon is a router, not a proxy acting on behalf of a router, and Petitioner does not "explain why a person of ordinary skill in the art would adopt a process performed by a foreign router ('foreign agent') itself (transmission of Gwon's unsolicited Router Advertisement message) in a proxy such as a ghost-foreign agent." PO Resp. 21. According to Patent Owner, relying on testimony by Dr. Nair, Petitioner's

proposed modification “is an entire change in the principle of operation of Liu’s MF-agent” because the MF-agent would be proactively broadcasting its presence rather than the MF-agent reporting its successful registration back to the M-agent, which would result in elimination of the means for provisioning the data link with the M-agent. *Id.* at 22 (citing Ex. 2005 ¶¶ 33–35). Patent Owner argues that because the proposed modification eliminates this vital component of Liu, the MF-agent assignment request through the mobile terminal, “it is not an obvious modification.” *Id.* (citing *In re Ratti*, 270 F.2d 810, 813 (CCPA 1959) and *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984)); PO Sur-reply 12. Patent Owner also argues that because the M-agent requests creation of the MF-agent and the MF-agent reports its registration to the M-agent, “the MF-agent does not need to perform any neighbor discovery.” PO Resp. 24 (citing Ex. 1004 ¶¶ 51, 53; Ex. 2005 ¶ 35).

We find that Petitioner has established that the combination of Liu and Gwon teaches or suggests the limitation. We further find Petitioner has provided persuasive rationale to combine Liu and Gwon in the proposed manner. *See* Pet. 23–26. Specifically, the modification applies a known technique (broadcasting unsolicited advertisements) to a known device (Liu’s MF-agent) ready for improvement to yield predictable results (e.g., to pre-connect, resource pre-allocate resources, and prearrange data structure). *See* Ex. 1006 ¶ 77; *KSR*, 550 U.S. at 418–419.

Petitioner offers unrebutted testimony that proactive broadcasting was well known at or before the time of filing of the invention. *See* Pet. 23–25 (citing Ex. 1006 ¶¶ 77–78; Ex. 1010 ¶ 19); Pet. Reply 10. Further, Petitioner offers testimony from Dr. Haas, which we find credible, explaining how and

why the proposed modification would optimize Liu's pre-allocation of network resources, and would comport with the natural progression of the industry at or around the time of filing of the '417 patent. Pet. 22–25 (citing Ex. 1006 ¶¶ 77–78); Pet. Reply 9 (Ex. 1006 ¶ 77; Ex. 1010 ¶¶ 18–19). We agree with Petitioner that the proposed modification is consistent with Liu's process to provide pre-connection, resource pre-allocation, and data structure-prearrangement to accommodate the mobile nature of mobile users through the use of a MF-agent. Pet. Reply 9 (citing Ex. 1010 ¶¶ 17–19); *see* Ex. 1003, 1:58–64. The modification proposed by Petitioner causes the MF-agent to broadcast its presence at the outset, and then proceed with the rest of what Liu teaches. *See* Ex. 1006 ¶ 77; Ex. 1010 ¶ 27; Tr. 15:23–25. In this way, the process is initiated by the MF-agent, rather than waiting for the MF-agent to be identified in response to a request from the mobile terminal. Pet. 23, Pet. Reply 9–10; Ex. 1010 ¶¶ 20, 27; Tr. 15:23–25. We find credible Dr. Haas' testimony that explains that the role of the M-agent does not change in the proposed modification. *See* Ex. 1010 ¶¶ 20–21. For example, the M-agent continues to be responsible for creating, deleting, and managing MF-agents, as well as to send a reply back to the mobile terminal and maintain a data consistency link with the MF-agent. Ex. 1003, 7:23–25, 55–57; Ex. 1010 ¶¶ 20–21. The proposed modification provides that the M-agent will already be aware if an MF-agent exists and is present, based upon the MF-agent broadcast.

The combination of Liu and Gwon, therefore, would operate in the same manner as Liu alone to provide pre-connection, resource pre-allocation, and data structure-prearrangement to accommodate the mobile nature of mobile users through the use of a MF-agent. Accordingly, as we

find the combination does not change the principle of operation of Liu, we find Patent Owner's reliance on *Ratti* and *Gordon* inapplicable here. *See, e.g., In re Umbarger*, 407 F.2d 425, 430–31 (C.C.P.A. 1969) (finding *Ratti* inapplicable where the modified apparatus will operate “on the same principles as before”).

We are also not persuaded by Dr. Nair's testimony that a person of skill in the art would be dissuaded from making the combination because it “deliberately add[s] redundant (indeed, unnecessary) messages with a wireless communication network as they would only serve to consume bandwidth while providing no additional capabilities or advantages.” Ex. 2005 ¶ 35. It is not necessary for a combination to be the most desirable combination described in the prior art to provide motivation for making the combination. *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1197–98 (Fed. Cir. 2014) (citing *Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013)) (obviousness “does not require that the motivation be the *best* option, only that it be a *suitable* option from which the prior art did not teach away”); *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004). We find any potential redundancies alleged by Patent Owner are not sufficient to obviate the rationale and motivation provided by Petitioner. *E.g.*, Pet. 22–25 (citing Ex. 1006 ¶¶ 77–78); Pet. Reply 9 (Ex. 1006 ¶ 77; Ex. 1010 ¶¶ 18–19); *see also* Ex. 1006 ¶¶ 20–21. For the same reasons, we are not persuaded by Patent Owner's arguments that the natural progression of the industry would dissuade a person of ordinary skill in the art from making the modification because the foreign agent itself would announce its own presence, rather than relying on a proxy. *See* PO Resp. 24.

We agree with Petitioner that the notification provided by the M-agent in Liu is a reply, sent after the MF-agent sends an MF-assignment reply back to the M-agent, containing the registration information. *See* Pet. Reply 11 (citing Ex. 1010 ¶ 11). Thus, we are also unpersuaded by Patent Owner’s argument that the MF-agent does not need to perform neighbor discovery (as in Gwon). *See* PO Resp. 24. In the proposed combination of Liu and Gwon, the MF-agent will still be responsible for notifying the mobile node of the presence of neighboring nodes, as it was in Liu alone. *See* Pet. Reply 11 (citing Ex. 1010 ¶¶ 20–21).

We are also unpersuaded by Patent Owner’s assertions that Dr. Haas is “wrong” that the modification requires only a simple modification of software on a router in the foreign network. PO Sur-reply 13–14 (citing Ex. 1010 ¶ 18). Patent Owner does not provide persuasive evidence that Dr. Haas is “wrong” or to persuasively rebut Dr. Haas’ testimony that only a simple modification of software on the router on the foreign network is required.

Accordingly, based on Petitioner’s arguments and evidence, we find Petitioner articulates sufficient reasoning for the proposed modification of Liu with Gwon to support the legal conclusion of obviousness. *See KSR*, 550 U.S. at 398, 417–418. For the foregoing reasons, we find Petitioner has established that Liu, in combination with Gwon, teaches or suggests this limitation.

f. “a ghost-mobile node that creates replica IP messages on behalf of a mobile node,”

Petitioner relies on Liu to teach or suggest this limitation. Pet. 27–29. Petitioner, with testimony from Dr. Haas, contends one of ordinary skill in the art would have understood a “replica IP message” to “at least include a reproduction of an original IP message.” *Id.* at 27 (citing Ex. 1006 ¶ 80, Ex. 1001, 10:1–6). Petitioner asserts that in Liu, the request to create or assign an MF-agent at a predicted location is initiated by the mobile terminal and sent to the M-agent (the ghost-mobile node). *Id.* at 29 (citing Ex. 1003, 7:22–38). Petitioner contends the M-agent then “forwards” the request to the remote MF-agent manager at the predicted location. *Id.* (citing Ex. 1003, 7:22–38). According to Petitioner, and with support of testimony from Dr. Haas, one of ordinary skill in the art would have understood this forwarding request to a remote location on a different network teaches “*creat[ing] replica IP messages on behalf of the mobile node*” because this “forwarding process results in a reproduction of the original message request.” *Id.* at 29–30 (citing Ex. 1006 ¶ 83).

Patent Owner does not dispute the teachings of Liu in connection with this limitation. *See generally* PO Resp. Similar to the ’417 patent, Liu explicitly discusses Mobile IP protocol. *See, e.g.* Ex. 1003, 1:28, 5:55–61; Ex. 1001, 1:44–56. Dr. Haas provides unrebutted testimony describing Mobile IP protocol, Ex. 1006 ¶¶ 25–36, and, more specifically, stating that Mobile IP encapsulation, such as that described in Liu, teaches the recited “creating replica IP messages.” *Id.* ¶¶ 80–83. Based on Petitioner’s arguments and evidence, we find Petitioner has shown that Liu teaches or suggests this limitation.

g. “the ghost-mobile node handling signaling required to allocate resources and initiate mobility on behalf of the mobile node, the ghost-mobile node triggering signals based on a predicted physical location of such mobile node or distance with relation to the at least one foreign agent.”

Petitioner asserts Liu, or alternatively, Liu and Gwon, teaches or suggests this limitation. Pet. 30–34. Petitioner, relying on testimony from Dr. Haas, contends a person of ordinary skill in the art would have understood “handling signaling required to allocate resources and initiate mobility” to include “preemptive setup and initiation of the mobility process.” *Id.* at 30 (citing Ex. 1006 ¶ 84). Petitioner relies on Liu’s M-agent’s (ghost-mobile node) pre-assignment signaling that allows for “services and/or data [to] be pre-connected/pre-arranged at the mobile user’s destination.” *Id.* at 31 (citing Ex. 1003, 2:29–35, Fig. 5). Petitioner further refers to the M-agent sending the pre-assignment signaling based on the use of predictive mobility management (PMM), including the predicted physical location of the terminal, to trigger service and resource pre-arrangement. *Id.* at 31–33 (citing Ex. 1003, 7:22–38, 19:4–14).

Alternatively, Petitioner argues Gwon teaches three different methods of mobility prediction analysis that may be used to “trigger pre-hand-off processing of authentication and security measures” or to “trigger selection of a new network connection.” *Id.* at 33 (citing Ex. 1004 ¶¶ 57, 59–104) (emphasis omitted). Petitioner argues, with supporting testimony from Dr. Haas, that a person of ordinary skill in the art would have been motivated to substitute Liu’s PMM mobility functions with the alternative mobility prediction functionality disclosed in Gwon, because it is simply

substituting one known element for another to obtain predictable results. *Id.* at 34 (citing Ex. 1006, ¶ 87). Petitioner further argues the substitution would have been a suitable and obvious variation to one of ordinary skill in the art. *Id.*

Patent Owner does not dispute the teachings of Liu or Gwon in connection with this limitation. We are persuaded by Petitioner’s unrebutted evidence that Liu or, alternatively, Liu and Gwon, teach or suggest this limitation. First, we agree with Petitioner that Liu’s M-agent handles pre-assignment signaling on behalf of the mobile device to prearrange services (allocate resources) and initiate mobility on behalf of the mobile device, and further does so based on a predicted physical location of the mobile device. *See* Ex. 1006 ¶¶ 85, 86; Ex. 1003, 7:22–38, 19:4–14. We also agree with Petitioner that Gwon teaches alternative location prediction methods that may be substituted for Liu’s PMM location prediction method. *See* Ex. 1006 ¶ 87; Ex. 1004 ¶¶ 60–62. Petitioner persuasively demonstrates that Gwon’s method could be substituted for Liu’s PMM to produce an accurate predicted location. Ex. 1006 ¶ 87 (“well known to utilize more than one location determination method to verify the results of the first method . . . [as] [t]he particular method for determining the predicted location of the mobile device could be selected for efficiency and convenience...”).

Accordingly, based on Petitioner’s arguments and evidence, we find Petitioner has shown that Liu, or alternatively, Liu and Gwon, teaches or suggests this limitation.

In view of the foregoing, we find Petitioner has shown by a preponderance of the evidence that the subject matter of claim 1 would have been obvious in view of Liu and Gwon.

2. *Claim 5*

Claim 5 depends from claim 1 and further recites “wherein allocation of resources on behalf of the mobile node is triggered based at least in part on location information, the location information determined by at least one of: a global positioning system (GPS) receiver, a triangulation process, and indirect measurements of location.” Ex. 1001, 13:21–26.

Petitioner relies on Liu, or alternatively, Liu and Gwon, to teach or suggest the limitations in dependent claim 5. Pet. 34–36. Petitioner contends Liu teaches “indirect measurements of location that trigger resource allocation on behalf of a mobile terminal utilizing predictive mobility management (PMM) functions to measure the user’s historical movement patterns.” *Id.* at 34 (citing Ex. 1001, 6:57–64; 8:56–57).

Dr. Haas provides testimony that a person of ordinary skill in the art would have understood Liu’s PMM functions to constitute indirect measurements of location. Ex. 1006 ¶ 89.

Alternatively, Petitioner contends Gwon teaches providing location information by a triangulation process and/or a global positioning system. Pet. 35 (citing Ex. 1004 ¶ 76). Petitioner, with supporting testimony from Dr. Haas, contends it would have been obvious to one of skill in the art “to substitute one location determination method for another, as this is substituting one known element for another to obtain predictable results.” *Id.* at 36 (citing Ex. 1006 ¶ 90).

Patent Owner does not dispute the teachings of Liu or the combination of Liu and Gwon in connection with this limitation. Based on Petitioner’s arguments and evidence, we find Petitioner has shown by a preponderance of the evidence that the subject matter of claim 5 would have been obvious

in view of Liu and Gwon.

3. *Claim 6*

Claim 6 depends from claim 1 and further recites “wherein the at least one ghost-foreign agent populates mobile IP Advertisement messages with at least one care-of-address of neighboring foreign agents in order to extend the range of neighboring foreign agents.” Ex. 1001, 13:27–31.

Petitioner relies on Gwon to teach that an advertisement message may also include the care-of address of neighboring foreign agents. Pet. 36 (citing Ex. 1004 ¶ 51). Petitioner asserts one of ordinary skill in the art “would have recognized that Gwon’s disclosure of a Router Advertisement message that indicates the presence of other local routers would contain the IP address of those other local routers (i.e. their care-of-address in the network) to indicate their presence.” *Id.* at 37 (citing Ex. 1006 ¶ 91).

In our Institution Decision, we were not persuaded Petitioner had shown a reasonable likelihood that it would prevail in showing that claim 6 is unpatentable over Liu and Gwon. Inst. Dec. 22. We stated:

However, based on our review of the Petition, Gwon describes providing a new care-of IP address to the mobile node’s home router as part of the registration process (after the new local router has been identified), but does not disclose populating the advertisement message with care-of addresses of at least one neighboring foreign agent (during the router identification process). Ex. 1004 ¶ 54; *see also* Ex. 1006 ¶ 52.

Id. Petitioner has not provided further evidence or argument as to claim 6. For the reason noted above, we reiterate our finding that the Liu-Gwon combination does not teach or suggest “at least one ghost-foreign agent populates mobile IP Advertisement messages with at least one care-of-

address of neighboring foreign agents.” Accordingly, we determine Petitioner has not demonstrated by a preponderance of the evidence that the subject matter of claim 6 would have been obvious over Liu and Gwon.

F. Ground 2 (Based on Liu, Gwon, and Lau)

Petitioner contends claims 2 and 3, which depend from claim 1, would have been obvious over the combination of Liu, Gwon, and Lau. Pet. 37–45. Aside from its arguments with respect to claim 1, Patent Owner has not disputed Petitioner’s analysis as to these claims. *See* PO Resp. 26.

1. Claim 2

Claim 2 depends from claim 1 and further recites “wherein signaling further comprises registration with a replica of the mobile node by the ghost-mobile node to communicate with the foreign agents, triggering tunneling and communication with a mechanism configured to maintain routing information to a mobile node.” Ex. 1001, 13:1–5.

Petitioner, with support from Dr. Haas, relies on Liu and Lau to teach or suggest the limitations in claim 2. Pet. 38–42. Specifically, Petitioner refers to Liu’s AM-agent as teaching the “replica of the mobile node” and Liu’s M-agent as teaching the “mobile node,” and asserts the M-agent registers and maintains a data consistency link with the AM-agent to communicate with a foreign agent. *Id.* at 38–39 (citing Ex. 1003, 2:6–10, 2:44–53, 8:7–34; Ex. 1006 ¶ 93). Petitioner relies on Lau to teach or suggest “tunneling and communication with a mechanism configured to maintain routing information to a mobile node.” *Id.* at 40–41 (citing Ex. 1005, 2:48–59). Specifically, Petitioner refers to Lau’s teaching a packet forwarding mechanism implemented by the Home and Foreign Agents that is referred to

as “tunneling.” *Id.* at 41 (citing Ex. 1005, 2:48–59).

Petitioner, with supporting testimony from Dr. Haas, contends one of ordinary skill in the art would have been motivated to combine the M-agent registration signaling of Liu with the well-known technique of Lau for tunneling because it is “applying a known technique to a known device ready for improvement to yield predictable results.” *Id.* (citing Ex. 1006 ¶ 94). We credit Dr. Haas’s testimony because we agree that tunneling was commonplace in mobile networks and provided many benefits that would have been well known to a person of ordinary skill in the art, such as providing a secure channel between two disjoint IP networks and allowing for circumvention of traditional routing limitations. *Id.* at 41–42 (citing Ex. 1006 ¶ 94).

Patent Owner does not dispute the teachings of Liu or Lau, or the combination of Liu and Lau in connection with claim 2. Based on Petitioner’s arguments and evidence, we find Petitioner has shown by a preponderance of the evidence that the subject matter of claim 2 would have been obvious in view of Liu and Lau.

2. *Claim 3*

Petitioner contends Liu, Lau, and Gwon teach or suggest the limitations in claim 3. Pet. 42–45. Petitioner relies on its arguments made with respect to claim 2 to support its assertion that Liu in combination with Lau discloses “signaling further comprises at least one of a tunnel and a communication network to allocate resources between the mobile node and foreign agent.” *Id.* at 42–43. In addition, Petitioner argues Gwon teaches the recited “signaling being triggered at a threshold distance to one of the foreign agents reported by one of the mobile nodes, the threshold distance

reported to one of the foreign agents at least one of a projected trajectory and a speed.” *Id.* at 43. Specifically, Petitioner contends “Gwon teaches a mobility prediction analysis that provides a threshold value indicating a distance from a mobile node to a node in the network, which informs the mobile node to begin signaling to establish a new network connection.” *Id.* (citing Ex. 1004 ¶ 57). Petitioner further contends Gwon “teaches the use of GPS information to provide the threshold value indicating how close the mobile node is to another node in the network.” *Id.* at 44 (citing Ex. 1004 ¶ 59). Petitioner asserts one of ordinary skill in the art would have understood “‘information such as that provided by GPS’ to include both a trajectory and a speed when calculating an estimated destination.” *Id.* (citing Ex. 1006 ¶¶ 95–96).

In our Institution Decision, we were not persuaded Petitioner had shown a reasonable likelihood that it would prevail in showing that claim 3 is unpatentable over Liu, Lau, and Gwon. Inst. Dec. 24–25. We stated:

However, based on our review of the Petition, we do not find Petitioner’s analysis convincing. Although Gwon describes determining a threshold value as part of the mobility prediction analysis to determine when some desired action should be taken by the mobile node (Ex. 1004 ¶ 57), Petitioner has not identified where Gwon teaches reporting the “threshold distance . . . to one of the foreign agents.”

Id. at 25.

Petitioner disputes our interpretation of claim 3. Petitioner argues, with supporting testimony from Dr. Haas, that our interpretation “requiring the mobile node to report the threshold distance to a foreign agent would be inconsistent with the claimed resource pre-allocation process . . . [because] the foreign agent in the foreign network would have no use for this threshold

indication” because it is the ghost-mobile node that makes use of the distance calculations. Pet. Reply 22 (citing Ex. 1010 ¶¶ 33–34); *see also* Tr. 24:26–25:21. Petitioner argues that the specification of the ’417 patent teaches that “the ghost-mobile node contains the algorithms and thresholds required to determine when to send the signaling information to the next foreign agent,” which supports that in claim 3 “the ghost-mobile node’s signaling process is triggered upon receipt of the mobile node’s distance calculation to a foreign agent.” *Id.* at 21–22 (citing Ex. 1010 ¶¶ 32–34). Petitioner, therefore, argues claim 3 does not require “the mobile node to report (i.e., transmit) a threshold distance calculation to a foreign agent in a foreign network.” *Id.* at 20–21.

At the hearing, Petitioner argued “[w]e have a threshold distance to a foreign agent first; and second, we have that the distance is reported by one of the mobile nodes . . . [but] it is not actually reported to a foreign agent.” Tr. 20:15–17, 22. Petitioner also asserted that the claim language was ambiguous because there is no antecedent basis for a threshold distance that has been reported to a foreign agent, but rather, only antecedent basis for a threshold distance that is reported by the mobile node. *Id.* at 22:15–23. Petitioner also argued that it is ambiguous if the term “reported” is modifying a threshold distance or a threshold distance to one of the foreign agents, but at any rate, the intrinsic evidence indicates that it makes no sense to report to the foreign agent, but rather, it is reported by the mobile node to the ghost-mobile agent. *Id.* at 24:5–25. Petitioner further argued the last limitation is not adding reporting the threshold distance to the foreign agent, but is just stating that the threshold distance is at least one of a projected trajectory and speed. *Id.* at 23:22–25. Patent Owner does not present

separate arguments for claim 3.

We do not find Petitioner’s arguments, or Dr. Haas’ supporting testimony, to be persuasive. Claim 3 depends from claim 1 and recites “wherein signaling further comprises at least one of a tunnel and a communication network to allocate resources between the mobile node and foreign agent, *the signaling being triggered at a threshold distance to one of the foreign agents reported by one of the mobile nodes, the threshold distance reported to one of the foreign agents at least one of a projected trajectory and a speed.*” Ex. 1001, 13:6–12 (emphasis added).

As an initial matter, we are not persuaded the claim language is ambiguous or lacks antecedent basis. The limitation “a threshold distance to one of the foreign agents reported by one of the mobile nodes” indicates a threshold distance is reported by one of the mobile nodes, and the following limitation, “the threshold distance reported to one of the foreign agents at least one of a projected trajectory and a speed,” requires that the threshold distance is reported to one of the foreign agents and further requires that at least one of a projected trajectory and speed is reported to the foreign agent.

Petitioner’s interpretation of claim 3 urges us to read out the claim language “reported to one of the foreign agents.” We decline to do so. *See K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1364–1365 (Fed. Cir. 1999) (“Courts do not rewrite claims; instead, we give effect to the terms chosen by the patentee.”). The words of the claim are clear that the threshold distance is reported to one of the foreign agents. *See, e.g., Texas Instruments Inc. v. Int’l Trade Comm’n*, 988 F.2d 1165, 1171 (Fed.Cir.1993) (“[T]o construe the claims in the manner suggested by TI would read an express limitation out of the claims. This, we will not do because ‘[c]ourts

can neither broaden nor narrow claims to give the patentee something different than what he has set forth.” (quoting *Autogiro Co. of Am. v. U.S.*, 384 F.2d 391, 396 (Ct. Cl. 1967))).

We find Petitioner has not demonstrated that the combination of Liu, Lau, and Gwon teach or suggest the limitations in claim 3 because Petitioner has not shown that the references teach or suggest “the threshold distance reported to one of the foreign agents at least one of a projected trajectory and a speed.” Accordingly, we determine Petitioner has not demonstrated by a preponderance of the evidence that the subject matter of claim 3 would have been obvious over Liu, Lau, and Gwon.

G. Ground 3 (Based on Liu, Gwon, and IETF)

Petitioner contends claim 4 would have been obvious over the combination of Liu, Gwon, and IETF. Pet. 45–49. Aside from its arguments with respect to claim 1, Patent Owner has not disputed Petitioner’s analysis as to claim 4. *See* PO Resp. 26–27.

Claim 4 depends from claim 1 and further recites

wherein the at least one ghost-mobile node is a proxy element for the at least one foreign agent and the at least one mobile node, the at least one ghost-mobile node triggering registration based on a distance to a foreign agent by relaying security and shared secrets from a mobile node, and at least one advertisement message from a foreign agent in a vicinity of the ghost-mobile node.

Ex. 1001, 13:14–20.

Petitioner relies on Liu, Gwon, and IETF to teach or suggest the limitations in claim 4. Pet. 45–49. Petitioner asserts Liu’s M-agent is a proxy element between a mobile terminal and a foreign agent, and functions

as a proxy for both the mobile node and the foreign agent. *Id.* at 45 (citing Ex. 1006 ¶ 98). Petitioner also asserts Gwon teaches triggering registration using security information and authentication data based on a distance to a foreign agent. *Id.* at 46 (citing Ex. 1004 ¶ 57). Petitioner further contends IETF discloses the use of MD5 authentication algorithms and security protocols during registration of the mobile node, to provide security and confidentiality services between a mobile node connecting with a foreign agent. *Id.* at 47 (citing Ex. 1008 §§ 1, 3). Petitioner further contends Liu teaches an advertisement message, for the reasons asserted with respect to claim 1, and Gwon teaches a distance based triggering mechanism for foreign agent advertisements. *Id.* at 48 (citing Ex. 1004 ¶ 57; Ex. 1006 ¶ 98).

With respect to the combination, Petitioner, with supporting testimony from Dr. Haas, contends a person of ordinary skill in the art would have found it obvious to combine Liu’s pre-registration signaling and foreign agent advertising with Gwon’s triggering mechanism for these processes. *Id.* (citing Ex. 1006 ¶¶ 99–100). Petitioner asserts such a modification to Liu “would eliminate the need for a mobile device to use solicitation processing abilities or location prediction methods for registration, thereby increasing the processing speed of the mobile device and decreasing the overall computational complexity of the system.” *Id.* (citing Ex. 1006 ¶¶ 99–100). Petitioner argues adding IETF would be similarly obvious because Gwon provides an explicit motivation for the combination by incorporating the reference in its own disclosure. *Id.* at 49 (citing Ex. 1006 ¶¶ 99–100). Petitioner also contends implementing software algorithms for security protocols “would have been commonplace for preregistration and

would have added negligible complexity to the system.” *Id.* (citing Ex. 1006 ¶¶ 99–100).

Patent Owner does not present separate arguments in connection with claim 4. Based on Petitioner’s arguments and evidence, which we find credible, we find Petitioner has shown by a preponderance of the evidence that the subject matter of claim 4 would have been obvious over the combination of Liu, Gwon, and IETF.

H. Ground 4 (Based on Liu and Lau)

Petitioner contends claim 7 would have been obvious over the combination of Liu and Lau. Pet. 49–56.

1. Claim 7

a. “A method, in a mobile node, for speeding handover, comprising the steps of:”

Petitioner relies on Liu to teach or suggest the preamble of independent claim 7. Pet. 49–50. For example, Petitioner relies on Liu’s Mobile-Floating agent functions, which “allow[] the users to immediately receive service and maintain their data structures with virtually the same efficiency as they could have at the previous location. It also provides ‘soft data structure handoff’ capability.” *Id.* (citing Ex. 1003, 2:3–10 (emphasis omitted)).

Patent Owner does not dispute the teachings of Liu in connection with the preamble of claim 7. Based on Petitioner’s arguments and evidence, we find Petitioner has shown that Liu teaches or suggests the limitations in the preamble.

b. “updating, in a mobile node, a location in a ghost mobile node;”

Petitioner relies on Liu to teach or suggest this limitation. Pet. 49–50. Specifically, Petitioner argues “Liu discloses a mobile terminal (‘mobile node’) that updates an M-agent (‘ghost-mobile node’) with respect to its future travel and the M-agent then determines the closest foreign agent to that future predicted location.” *Id.* at 50–51 (citing Ex. 1003, 7:26–32). Petitioner further relies on Lau, which “discloses a mobile device (mobile node) that maintains its own current location information to calculate a distance between itself and approaching foreign agents.” *Id.* at 51 (citing Ex. 1005, 4:29–41).

Petitioner, with supporting testimony from Dr. Haas, contends one of ordinary skill in the art “would have been motivated to modify the mobile node in Liu to send current location information to the M-agent as it travels as disclosed in Lau, to supplement the predictive mobility analysis.” *Id.* (citing Ex. 1006 ¶¶ 102–103). Petitioner asserts “[t]his is merely using a known technique to improve a similar device in the same way and/or combining prior art methods according to known methods to yield predictable results.” *Id.* (citing Ex. 1006 ¶¶ 102–103). Petitioner further argues one of ordinary skill in the art would have understood the benefits of sending current location data, such as, for example, creating a more efficient system for locating the closest handoff point in the foreign network. *Id.* at 51–52 (citing Ex. 1006 ¶¶ 102–103).

Patent Owner argues that Petitioner’s analysis concerns updating the ghost mobile node (M-agent) with respect to future travel of a mobile terminal (mobile node), which is the reverse of what is claimed. PO Resp.

30. Patent Owner argues that “the mobile node is provided notification (i.e., the mobile node is updated) of a next foreign agent proximate the estimated future location of the mobile node (i.e., a location in a ghost mobile node).” *Id.* at 28 (citing Ex. 1001, 3:11–18). Patent Owner explains that “the mobile node is updated with a next foreign agent proximate its predicted future location—that is, a location in a ghost mobile node.” *Id.* at 29 (citing Ex. 1001, 2:55–67; 6:14–17, 7:4–7, 8:58–61). At the hearing, Patent Owner clarified that essentially, the mobile node is being updated with a location that has been determined by the ghost-mobile node. Tr. 37:2–5.

Petitioner argues that under Patent Owner’s interpretation, there is no reason for the ghost-mobile node to calculate the distance of the foreign agent, as claimed in the following limitation, because the mobile node would already have that location information. Pet. Reply 15–16 (citing Ex. 1010 ¶¶ 30–31). Petitioner further argues that Patent Owner’s arguments are contradicted by the Specification of the ’417 patent, which indicates that “the ghost mobile node acts according to a predicted future state, such as location, of the mobile node.” *Id.* at 16. Petitioner also states that two distinct district court proceedings involving the ’417 patent construed this limitation to mean “updating the ghost mobile node with a location of the mobile node.” *Id.* at 18. Petitioner also provides supporting testimony from Dr. Haas and points out that Patent Owner did not present any expert testimony as to how one of skill in the art would understand this limitation. *Id.* at 19; *see* Ex. 1010 ¶¶ 30–31.

As we stated in the Institution Decision,

Patent Owner’s argument is based on a claim construction: whether the mobile node itself must be updated with the location in a ghost mobile node. Patent Owner, however, does

not direct our attention to any portion of the '417 patent that supports its interpretation of this limitation. Rather, the '417 patent indicates that the ghost mobile node acts according to a predicted future state, such as location, of the mobile node. *E.g.*, Ex. 1001, 2:58–65, 6:27–30, 6:39–42, 6:46–56, 6:65–67, 7:4–7). The claim language recites “updating, in a mobile node, a location in a ghost mobile node,” which, for purposes of this decision, we understand to mean that the mobile node updates the ghost mobile node with its location. *See id.*

Inst. Dec. 28–29.

The central points of the parties’ dispute are (1) what is being updated (a location of a mobile node or a next foreign agent proximate the mobile node’s predicted location); and (2) where is the update occurring (in a ghost-mobile node or in a mobile node). The claim language recites “updating, in a mobile node, a location in a ghost mobile node.” When the claim language is not clear on its face, we may consider the rest of the intrinsic evidence, including the specification, to attempt to resolve the lack of clarity. *See Interactive Gift Exp., Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001).

After review of the complete record, we maintain our decision that “updating, in a mobile node, a location in a ghost mobile node” means the mobile node updates the ghost mobile node with its location. As Petitioner points out, the Specification supports this interpretation. *E.g.*, Ex. 1001, 2:58–65, 6:27–30, 6:39–42, 6:47–56, 6:65–67, 7:4–7. Specifically, the Specification describes that location information of the mobile node can be obtained from a GPS unit, for example, and be used by the ghost-mobile node to estimate future locations of the mobile node. *Id.* at 6:47–61; 7:4–9. We have reviewed the portions of the Specification relied upon by Patent Owner, *see* PO Resp. 28–29, but do not agree they describe that a mobile

node is updated with a location in a ghost mobile node, as Patent Owner argues. For example, Patent Owner cites to portions of the Specification describing that the ghost-mobile node predicts future locations of the mobile node, e.g., PO Resp. 29 (citing Ex. 1001, 2:55–67, 7:4–7), but none of these disclosures indicate that the location is updated in the mobile node. Patent Owner also cites to portions of the Specification describing sending a notification to the mobile node indicating a presence of a next foreign agent proximate to the estimated future location of the mobile node, e.g., PO Resp 28, 29 (citing Ex. 1001, 3:11–18; 8:58–61), however, such a notification indicating presence is not a location in a ghost-mobile node. We credit Dr. Haas’ testimony on this point. *See* Ex. 1010 ¶¶ 30–31.

Accordingly, we interpret this term as meaning that the mobile node updates the ghost mobile node with its location. Moreover, we note that our interpretation, is consistent with the district court’s interpretation. *See Mobility Workx, LLC v. Cellco P’ship d/b/a Verizon Wireless, et al.*, No. 4:17-CV-872 (E.D. Tex.) at Dkt. 74; *Mobility Workx, LLC v. T-Mobile US, Inc., et al.*, No. 4:17-CV-567 (E.D. Tex.) at Dkt. 48.

Based on Petitioner’s arguments and evidence, we find Petitioner has shown that the combination of Liu and Lau teach or suggest this limitation as construed. We further find Petitioner articulates sufficient reasoning for the proposed modification of Liu with Lau to support the legal conclusion of obviousness.

c. *“determining a distance, in the ghost mobile node in communication with the mobile node, to a closest foreign agent with which the mobile node can complete a handover;”*

Petitioner, with support from Dr. Haas, relies on Liu and Lau to teach or suggest this limitation. Pet. 52–53. For example, Petitioner argues “Liu teaches a system where the M-agent (‘ghost-mobile node’) uses the predicted location of the mobile terminal in conjunction with an MF-agent protocol to assign the closest MF-agents with which the mobile device may complete a handover.” *Id.* at 52–53 (citing Ex. 1004, 12:52–66). Petitioner also asserts “Lau allows for the mobile network device to utilize its own location information in conjunction with GPS information sent from foreign agents to calculate the distance to the closest foreign agent.” *Id.* at 53 (citing Ex. 1005, 3:43–57).

Petitioner, with supporting testimony from Dr. Haas, further contends one of ordinary skill in the art would have been motivated to modify Liu “with the method in Lau for measuring the position of a mobile device in relation to the position of the foreign agents in the network to calculate the nearest foreign agent since this is combining prior art methods according to known methods to yield predictable results.” *Id.* at 54 (citing Ex. 1006 ¶¶ 102–103). Petitioner asserts this “would have provided a more accurate method of finding the shortest distance to the next closest handoff point” and “would also have provided a faster system for finding the next handover location when the mobile device deviates from its original course.” *Id.* (citing Ex. 1006 ¶¶ 102–103).

Patent Owner does not dispute the teachings of Liu and Lau in connection with this limitation. Based on Petitioner’s arguments and

evidence, we find Petitioner has shown that the combination of Liu and Lau teach or suggest this limitation. We further find Petitioner articulates sufficient reasoning for the proposed modification of Liu with Lau to support the legal conclusion of obviousness. *See KSR*, 550 U.S. at 398, 417–418.

d. “submitting on behalf of the mobile node, from the ghost mobile node, a registration to the foreign agent to which the mobile node is going to complete the handover; and”

Petitioner relies on Liu to teach or suggest this limitation. Pet. 54. For example, Petitioner argues Liu’s “M-agent (‘ghost-mobile node’) submits registration request on behalf of the mobile terminal (‘mobile node’) to register with a foreign agent where handoff is to occur.” *Id.*

Patent Owner does not dispute the teachings of Liu in connection with this limitation. *See generally* PO Resp. Based on Petitioner’s arguments and evidence, we find Petitioner has shown that Liu teaches or suggests this limitation.

e. “upon completing the handover, updating a registration in the mobile node.”

Petitioner relies on Liu to teach or suggest this limitation. Pet. 55. For example, Petitioner argues “[i]n Liu, a registration reply is sent to the mobile terminal from the MF-agent linked to a foreign agent.” *Id.* (citing Ex. 1003, 7:51–57). Petitioner further argues “once the mobile terminal reaches its destination, it links with the MF-agent that has been assigned there and registers with the foreign agent to complete the registration process.” *Id.* (citing Ex. 1003, 8:7–16). Petitioner contends a person of

ordinary skill in the art “would have understood that this link also completes the updating of the registration with the new F-agent and linked MF-agent in the mobile node.” *Id.* at 56 (citing Ex. 1006 ¶ 105; Ex. 1003, 8:7–16, Fig. 8).

Patent Owner does not dispute the teachings of Liu in connection with this limitation. *See generally* PO Resp. Based on Petitioner’s arguments and evidence, we find Petitioner has shown that Liu teaches or suggests this limitation.

In view of the foregoing, we find that Petitioner has shown by a preponderance of the evidence that the subject matter of claim 7 would have been obvious in view of Liu and Lau.

IV. CONCLUSION

For the foregoing reasons, we determine Petitioner has demonstrated by a preponderance of the evidence that claims 1, 2, 4, 5, and 7 are unpatentable. We determine Petitioner has not demonstrated that claims 3 and 6 are unpatentable.

Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceedings subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

In summary:

Claims	35 U.S.C. §	References	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 5, 6	103(a)	Liu, Gwon	1, 5	6
2, 3	103(a)	Liu, Gwon, Lau	2	3
4	103(a)	Liu, Gwon, IETF RFC 2402	4	
7	103(a)	Liu, Lau	7	
Overall Outcome			1, 2, 4, 5, 7	3, 6

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, claims 1, 2, 4, 5, and 7 of the '417 patent have been shown by a preponderance of the evidence to be unpatentable;

FURTHER ORDERED that, claims 3 and 6 of the '417 patent have not been shown by a preponderance of the evidence to be unpatentable;

FURTHER ORDERED that, because this is a Final Written Decision, the parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2018-01150
Patent 8,213,417 B2

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ATTACHMENT B

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS INC.,
Petitioner

v.

MOBILITY WORKX, LLC,
Patent Owner

Case IPR2018-01150
Patent 8,213,417 B2

Before WILLIAM M. FINK, *Vice Chief Administrative Patent Judge*,
MELISSA A. HAAPALA, *Acting Vice Chief Administrative Patent Judge*,
and KARA L. SZPONDOWSKI, *Administrative Patent Judge*.

SZPONDOWSKI, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Unified Patents Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) to institute an *inter partes* review of claims 1–7 of U.S. Patent 8,213,417 B2, issued on July 3, 2012 (Ex. 1001, “the ’417 patent”). Mobility Workx, LLC (“Patent Owner”) filed a preliminary response (Paper 7, “Prelim. Resp.”) to the Petition. With our authorization, Petitioner filed a reply to the Preliminary Response (Paper 8, “Reply”). We have jurisdiction under 35 U.S.C. § 314.

Institution of an *inter partes* review is authorized when “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 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Having considered the Petition, the Preliminary Response, the Reply, and the associated evidence, we determine that Petitioner has established a reasonable likelihood that it would prevail with respect to at least one challenged claim. Accordingly, we institute an *inter partes* review as to all challenged claims and all grounds raised in the Petition.

II. BACKGROUND

A. *Related Proceedings*

The parties advise the ’417 patent is the subject of two patent infringement lawsuits in the Eastern District of Texas:

Mobility Workx, LLC v. Verizon Communications, Inc. et al., 4-17-cv-00872 (E.D. Tex.), filed Dec. 18, 2017; and

Mobility Workx, LLC v. T-Mobile US, Inc. et al. 4-17-cv-00567 (E.D. Tex.), filed Aug. 14, 2017. Pet. 57; Paper 5, 2.

B. Real Party In Interest

The statute governing *inter partes* review proceedings sets forth certain requirements for a petition for *inter partes* review, including that “the petition identif[y] all real parties in interest.” 35 U.S.C. § 312(a)(2); *see also* 37 C.F.R. § 42.8(b)(1) (requiring identification of real parties-in-interest in mandatory notices). Petitioner identifies Unified Patents, Inc. as the sole real party in interest and states “[n]o other party exercised control or could exercise control over Petitioner’s participation in this proceeding, the filing of this petition, or the conduct of any ensuing trial.” Pet. 57.

In its Preliminary Response, Patent Owner argues the Petition is deficient in addressing the identities of the real parties in interest and that Petitioner is required to “disclose its relationships to parties presently involved in litigation concerning the ’417 patent and demonstrate an absence of privies in those parties.” Prelim. Resp. 14 (citing *Applications in Internet Time, LLC v. RPX Corp.*, 897 F.3d 1336 (Fed. Cir. 2018)). Patent Owner argues this is necessary “so as to ensure proper estoppel effect attaches to them from any final decision in the IPR.” *Id.* Patent Owner cites to several statements on Petitioner’s web site in support of its argument. *Id.* at 15–16.

Petitioner filed a Reply addressing Patent Owner’s arguments as to this issue. Petitioner argues, *inter alia*, that Patent Owner has not brought Petitioner’s real party in interest identification into dispute because it has not presented sufficient evidence. Reply 2–3. Petitioner further argues neither *Applications in Internet Time* nor any other statute or regulation requires a petitioner to disclose all the relationships it may have to parties involved in litigation. *Id.* at 3. In addition, Petitioner argues it has properly identified

itself as the sole real party in interest and submitted the Declaration of Kevin Jakel, CEO and Co-Founder of Petitioner, in support of its argument. *Id.* at 4–7; *see* Ex. 1009.

“[A]n IPR petitioner’s initial identification of the real parties in interest should be accepted unless and until disputed by a patent owner.” *Worlds Inc. v. Bungie, Inc.*, 903 F.3d 1237 (2018). To put the issue into dispute, “a patent owner must produce *some* evidence that tends to show that a particular third party should be named a real party in interest. A mere assertion that a third party is an unnamed real party in interest, without any support for that assertion, is insufficient to put the issue into dispute.” *Id.*

On this record, and at this stage of the proceedings, the evidence presented by Patent Owner is insufficient to put the issue into dispute. Specifically, Patent Owner has presented no evidence that tends to show that either Verizon Communications, Inc. or T-Mobile U.S., the two parties in litigation, should have been named a real party in interest. Rather, Patent Owner’s evidence consists solely of generic statements from Petitioner’s web page that generally describe Petitioner’s business, but do not refer to either of the two parties. Accordingly, on this record, we are not persuaded the Petition should be denied for failure to name all real parties in interest.

C. The ’417 Patent (Ex. 1001)

The ’417 patent issued from Application No. 12/718,185 claiming benefit of the filing date of an earlier filed application, which claims benefit of Provisional Application No. 60/491,436 filed July 31, 2003. Ex. 1001, 1:7–11. The ’417 patent is titled “System, Apparatus, and Methods for Proactive Allocation of Wireless Communication Resources” and is

generally directed to allocation of communications resources in a communications network. Ex. 1001, Abstract, 1:17–19.

Mobile communication systems comprise mobile nodes (e.g., cell phones) that communicate with each other through a series of base stations that serve distinct cells. *Id.* at 1:28–30, 4:60–5:8. As the mobile node moves from one cell to another, it establishes a new connection with a new base station. *Id.* at 1:31–35. The mobile node must be able to let other nodes know where it can be reached when it is moving. *Id.* at 1:36–39. Typically, the mobile node registers with a home agent so the home agent can remain a contact point for other nodes that want to exchange messages or otherwise communicate with the mobile node as it moves from one location to another. *Id.* at 1:39–44, 5:9–17. Accordingly, a mobile node may use two IP addresses, one being a fixed home address and one being a care-of address, where the care-of address changes as the mobile node moves between networks. *Id.* at 1:45–49. When the mobile node links to a network other than the one in which its home agent resides, the mobile node is said to have linked to a foreign network. *Id.* at 1:49–52. The mobile node, therefore, receives an IP address from the home network, and when it moves to a foreign network and establishes a point of attachment by registering with a foreign agent, it receives a care-of address assigned by the foreign network. *Id.* at 1:52–56; 5:47–54.

According to the '417 patent, delays can occur in setting up a new communication link when the mobile node is handed off from one foreign agent to another because the new communication link cannot be set up until the mobile node arrives in the new foreign agent's physical region of coverage. *Id.* at 2:20–35, 6:4–11. In addition, data packets may be lost if

they arrive during the time when set up is being established. *Id.* at 2:36–38, 6:12–14. The invention in the '417 patent seeks to reduce these problems by causing communication network resources to be allocated proactively rather than reactively. *Id.* at 2:52–54. The '417 patent accomplishes this through the use of two different types of “ghost entities” that can act on behalf of a mobile node and a foreign agent. *Id.* at 2:44–47.

A ghost mobile node acts on behalf of a mobile node and “can be a virtual node and need not reside at the same physical location as the mobile node.” *Id.* at 6:20–22. The ghost mobile node operates by signaling the foreign agent before the mobile node arrives in the foreign agent’s physical region of coverage, based upon the predicted future state of the mobile node. *Id.* at 6:27–38. The predicted future state of the mobile node may be based upon, for example, an estimated location, trajectory, or speed of the mobile node. *Id.* at 6:38–46. Based upon this predicted future state, the ghost mobile node determines which foreign agent is likely to serve as the mobile node’s next communications link and signals that foreign agent. *Id.* at 8:58–62. This signal can be a registration request to cause an allocation of communications resources in the same way as would be performed if the mobile node were physically present in the foreign agent’s region of coverage. *Id.* at 9:7–17. Therefore, the signal results in preemptive setup that is performed before the mobile node arrives in the foreign agent’s coverage area. *Id.* at 9:54–56.

A ghost foreign agent acts on behalf of a foreign agent, and notifies the mobile node of the existence of a next foreign agent by transmitting an advertisement from the currently connected foreign agent. *Id.* at 10:17–21. In this way, the ghost foreign agent makes the mobile node aware of the

foreign agent before the mobile node arrives in the coverage region of the foreign agent. *Id.* at 10:26–28. Moreover, the vector of care-of addresses is included in the advertisement. *Id.* at 10:30–34.

D. Exemplary Claims

Among the challenged claims, claims 1 and 7 are independent. Independent claims 1 and 7 (reproduced below) are representative.

1. A system for communicating between a mobile node and a communication network; the network having at least one communications network node that is interconnected using a proxy mobile internet protocol (IP), comprising:

- at least one mobile node;
- at least one home agent;
- at least one foreign agent;

a ghost-foreign agent that advertises messages to one of the mobile nodes indicating presence of the ghost-foreign agent on behalf of one of the foreign agents when the mobile node is located in a geographical area where the foreign agent is not physically present; and

a ghost-mobile node that creates replica IP messages on behalf of a mobile node, the ghost-mobile node handling signaling required to allocate resources and initiate mobility on behalf of the mobile node, the ghost-mobile node triggering signals based on a predicted physical location of such mobile node or distance with relation to the at least one foreign agent.

7. A method, in a mobile node, for speeding handover, comprising the steps of:

- updating, in a mobile node, a location in a ghost mobile node;

determining a distance, in the ghost mobile node in communication with the mobile node, to a closest foreign agent with which the mobile node can complete a handover;

submitting on behalf of the mobile node, from the ghost mobile node, a registration to the foreign agent to which the mobile node is going to complete the handover; and

upon completing the handover, updating a registration in the mobile node.

E. The Prior Art

Petitioner relies on the following references (*see* Pet. 2), as well as the Declaration of Dr. Zygmunt Haas (Ex. 1006):

Reference	Exhibit(s)	Patent/Printed Publication
Liu	1003	U.S. Patent No. 5,825,759 to Liu issued Oct. 20, 1998
Gwon	1004	U.S. Patent Pub. No. 2002/0131386 A1 to Gwon published Sept. 19, 2002
Lau	1005	U.S. Patent No. 7,536,482 B1 to Lau filed Feb. 4, 2003 and issued May 19, 2009
IETF RFC 2402	1008	Internet Engineering Task Force Request for Comment 2402 IP (November 1998)

F. The Asserted Grounds

For purposes of the Petition, Petitioner assumes all challenged claims are entitled to the July 31, 2003 priority date. Pet. 1. The specific statutory grounds of unpatentability, claims challenged, and prior art relied on for each ground are summarized in the table below. *See* Pet. 2.

Ground	Claim(s) Challenged	Basis	References
1	1, 5, 6	§ 103(a)	Liu in view of Gwon
2	2, 3	§ 103(a)	Liu in view of Gwon and Lau
3	4	§ 103(a)	Liu in view of Gwon and IETF RFC 2402
4	7	§ 103(a)	Liu in view of Lau

II. ANALYSIS

We turn now to Petitioner’s asserted grounds of unpatentability and Patent Owner’s arguments in its Preliminary Response to determine whether Petitioner has met the threshold standard of 35 U.S.C. § 314(a).

A. *Claim Interpretation*

Petitioner proposes a construction of the term “advertisement” as recited in independent claim 1 and dependent claim 4. Pet. 8. Patent Owner does not address Petitioner’s proposed construction.

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b) (2016); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016). However, only 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) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). Other than as discussed below in Section F.1.b, we determine that it is unnecessary to expressly construe any claim terms at this time to resolve the disputed issues before us.

B. Summary of Prior Art

1. Liu (Ex. 1003)

Petitioner contends Liu issued on October 20, 1998, and, therefore, is prior art under (pre-AIA) 35 U.S.C. § 102(b). Pet. 9. Patent Owner does not dispute these contentions. Based on the present record, we agree Liu is prior art under 35 U.S.C. § 102(b).

Liu is titled “Distributing Network Services and Resources in a Mobile Communications Network” and is generally directed to a mobility data network architecture for accessing data. Ex. 1003, Abstract. Liu uses a mobile floating agent protocol to dynamically provide service and resource mobility in mobile wireless Local Area Networks and cellular networks. *Id.* at 1:50–60. Liu describes that “[b]y combining Mobile-Floating agent functions with a method of predictive mobility management, the services and user data can be pre-connected and pre-assigned at the locations or cells to which the user is moving,” which “allows the users to immediately receive service and maintain their data structures with virtually the same efficiency as they could have at the previous location.” *Id.* at 2:4–10. Liu’s mobile floating agent pre-assignment protocol is depicted in Figure 6, which is reproduced below:

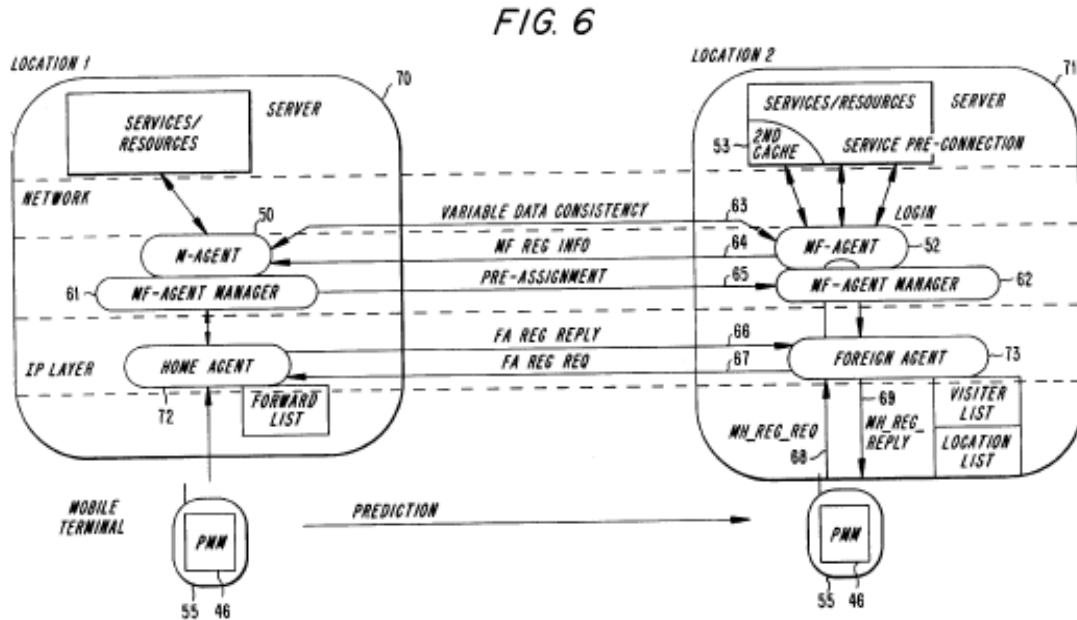


Figure 6 depicts an embodiment of the MF-agent pre-assignment protocol. *Id.* at 7:19–20. Liu describes the use of mobility agents (M-agents) and mobile-Floating Agents (MF-agents). *See e.g., id.* at 2:12–34. M-agent 50 is representative of the user and “is preferably a software entity executing on a home fixed host or router, including a set of processes that communicates with and pre-assigns an MF-agent 52 to remote fixed hosts or routers on behalf of a mobile terminal 55.” *Id.* at 6:57–61, 7:22. MF-agent 52 “is preferably a software entity executing on a remote fixed host or mobile support router (MSR), including a set of processes that can communicate and connect with the local host or MSR resources.” *Id.* at 6:61–65. Liu describes that the M-agent and MF-agent are not bound to the underlying network, and are, therefore, free to follow the mobile users. *Id.* at 7:2–5. The MF-agent pre-connects services by using predictive mobility management (PMM) to predict where a user will be. *Id.* at 7:5–9.

Mobile terminal 55 sends an MF-agent assignment request to its M-agent 50, with an address of a new location it is traveling to. *Id.* at 7:26–28. The new location may have been explicitly provided by the user or it may be predicted through PMM. *Id.* at 7:29–31. The assignment request is a request to establish (i.e., pre-assign) an MF-agent 52 at the location mobile terminal 55 is traveling to, so that the necessary services and data are ready for the mobile terminal when it arrives at the new location. *Id.* at 7:32–37. M-agent 50 registers the request and forwards it to remote MF-agent manager 62 at the new location. *Id.* at 7:37–38. Upon receiving the request, MF-agent manager 62 assigns or creates an MF-agent 52 for requesting M-agent 50. *Id.* at 7:38–50. MF-agent 52 registers itself with Foreign Agent 73 (F-agent) and sends an MF-assignment reply back to M-agent 50 containing the registration information. *Id.* at 7:50–56. M-agent 50 then sends a reply back to mobile terminal 55 and maintains a data consistency link 63 with MF-agent 52. *Id.* at 7:55–57.

When mobile terminal 55 reaches the new location, it registers with MF-agent 52 by sending an MF-agent registration request 68 to F-agent 73 to begin the registration process. *Id.* at 8:7–12. F-agent 73 will then link mobile terminal 55 to MF-agent 52. *Id.* at 8:15–16. In some embodiments, MF-agent 52 may then perform as an acting M-agent (AM-agent) for mobile terminal 55, performing the same function as an M-agent at the new location. *Id.* at 8:17–20. Accordingly, through the use of MF-agent 52, an MF-agent is waiting with the needed data and services when the user arrives at a remote location. *Id.* at 8:43–47.

2. *Gwon (Ex. 1004)*

Petitioner contends Gwon was filed on January 26, 2001 and published on September 19, 2002, and, therefore, is prior art under (pre-AIA) 35 U.S.C. §§ 102(a) and (e). Pet. 11. Patent Owner does not dispute these contentions. Based on the present record, we agree Gwon is prior art under 35 U.S.C. §§ 102(a) and (e).

Gwon is titled “Mobility Prediction in Wireless Mobile Access Digital Networks” and generally describes methods for predicting the mobility of mobile nodes. Ex. 1004, Abstract. Gwon describes determining in advance when a network connection hand-off is imminent so that a mobile node can pre-establish a new network connection with a new router or agent. *Id.* ¶ 55. Gwon uses mobility prediction analysis in mobile nodes so that the mobile node can select from among multiple available network connection nodes. *Id.* ¶¶ 55–59. As a mobile node moves locations, Gwon describes the use of Neighbor Discovery methodology, where the mobile node may receive Neighbor Advertisement messages from its local router and/or unsolicited Router Advertisement messages from its local router. *Id.* ¶¶ 51, 53. These messages “indicate[] the presence of other local routers which could provide network connections for the mobile node.” *Id.* ¶ 51.

3. *Lau (Ex. 1005)*

Petitioner contends Lau was filed on February 4, 2003 and published on May 19, 2009, and, therefore, is prior art under (pre-AIA) 35 U.S.C. § 102(e). Pet. 39. Patent Owner does not dispute these contentions. Based on the present record, we agree Lau is prior art under 35 U.S.C. § 102(e).

Lau is titled “Methods and Devices for Enabling a Mobile Network Device to Select a Foreign Agent” and is generally directed to enabling a mobile device to select a foreign agent from among a plurality of foreign agents that are transmitting position information. Ex. 1005, Abstract, 4:29–42. This position information may include GPS data. *Id.* at 3:28–31.

4. *IETF RFC 2402 (“IETF”) (Ex. 1008)*

Petitioner contends IETF was published in November 1998 and is incorporated by reference in its entirety in Gwon. Pet. 47 (citing Gwon ¶ 54). Patent Owner does not dispute that IETF is prior art. Based on the present record, and for purposes of this Decision, we agree IETF is prior art under 35 U.S.C. § 102(b). IETF is a request for comments memorandum regarding Internet standards track protocol for “IP Authentication Header.” IETF 1. Specifically, IETF primarily describes IP Authentication Header formatting and processing, as well as authentication and security measures. IETF Sections 1–3.

C. *Ground 1 (Based on Liu and Gwon)*

Petitioner contends claims 1, 5, and 6 would have been obvious over the combination of Liu and Gwon. Pet. 12–37.

1. *Claim 1*

- a. “A system for communicating between a mobile node and a communication network; the network having at least one communications network node that is interconnected using a proxy mobile internet protocol (IP), comprising:”

Petitioner relies on Liu to teach or suggest the preamble of independent claim 1. Pet. 12–14. For example, Petitioner refers to Liu’s mobile floating (MF)-agent protocol, which accommodates the “mobile nature” of mobile users by offering service and resource mobility through intelligent service pre-connection, resource pre-allocation, and data structure pre-arrangement. *Id.* at 12–13 (citing Ex. 1003, 1:58–2:2). Petitioner further relies on Liu’s disclosure of proxy entities (e.g., M-agent and MF-agent) to facilitate communications between mobile nodes and networks employing Mobile IP. *Id.* at 13–14 (citing Ex. 1003, 2:11–34, 7:15–17).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests the preamble.

b. “*at least one mobile node;*”

Petitioner contends Liu’s mobile terminal 55 teaches “at least one mobile node.” Pet. 14–15 (citing Ex. 1003, Fig. 6). Petitioner further asserts Liu’s mobile terminals may include cellular phones and laptop computers, and are capable of mobile communications. *Id.* at 15 (citing Ex. 1003, 17:47–48, 6:4–7).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has

adequately shown Liu teaches or suggests this limitation.

c. “at least one home agent;”

Petitioner contends Liu’s home agent 72 teaches “at least one home agent.” Pet. 14–15 (citing Ex. 1003, Fig. 6). Petitioner further asserts Liu’s home agent may be a “home fixed host or router.” *Id.* at. 15 (citing Ex. 1003, 2:15–21).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests this limitation.

d. “at least one foreign agent;”

Petitioner contends Liu’s F-agent 73 teaches “at least one foreign agent.” Pet. 17–18 (citing Ex. 1003, Fig. 6, 7:50–56).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests this limitation.

e. “a ghost-foreign agent that advertises messages to one of the mobile nodes indicating presence of the ghost-foreign agent on behalf of one of the foreign agents when the mobile node is located in a geographical area where the foreign agent is not physically present; and”

Petitioner contends Liu, or alternatively, Liu and Gwon teach or suggest this limitation. Pet. 18–26. Petitioner contends Liu’s MF-agent 52 teaches the “ghost-foreign agent.” *Id.* at 18–19 (citing Ex. 1003, Fig. 6, 8:7–34, 6:53–65). Petitioner further relies on Liu’s “MF-agent pre-assignment” protocol to teach the remainder of the limitation, and contends the MF-

assignment reply back from the MF-agent to the M-agent teaches the “advertises messages” portion of the limitation. *Id.* at 19–20 (citing Ex. 1003, 7:19–31, 7:37–46, 7:51–57). Alternatively, Petitioner contends that to the extent that the claimed advertisement message must be unsolicited, Gwon teaches unsolicited advertisements from a router (i.e. a foreign agent) via its Neighbor Discovery methodology. *Id.* at 20–22 (citing Ex. 1004 ¶¶ 50–54, 58). Petitioner also contends both Liu and Gwon teach such advertising when the mobile node is located in a geographical area where the foreign agent is not physically present. *Id.* at 24–26 (citing Ex. 1003, 7:24–37; Ex. 1004 ¶¶ 52–53, Fig. 2).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu, alone or in combination with Gwon, teaches or suggests this limitation.

f. “a ghost-mobile node that creates replica IP messages on behalf of a mobile node,”

Petitioner contends one of ordinary skill in the art would understand a “replica IP message” to “at least include a reproduction of an original IP message.” Pet. 27 (citing Ex. 1006 ¶ 80, Ex. 1001, 10:1–6). Petitioner relies on Liu to teach or suggest this limitation. *Id.* at 27–29. Petitioner contends Liu’s M-agent 50 teaches the “ghost-mobile node.” *Id.* at 27 (citing Ex. 1003, Fig. 6). Petitioner asserts that in Liu, the request to create or assign an MF-agent at a predicted location is initiated by the mobile terminal and sent to the M-agent. *Id.* at 28 (citing Ex. 1003, 7:22–38). Petitioner contends the M-agent then “forwards” the request to the remote MF-agent manager at the predicted location. *Id.* at 28 (citing Ex. 1003, 7:22–38). According to

Petitioner, one of ordinary skill in the art would understand this forwarding request to a remote location on a different network teaches “*creat[ing] replica IP messages on behalf of the mobile node*” because this “forwarding process results in a reproduction of the original message request.” Pet. 28–29 (citing Ex. 1006 ¶ 83).

Patent Owner contends Petitioner does not “explain *why* such forwarded requests would be *IP messages*.” Prelim Resp. 7. Referring to Figure 6 of Liu, Patent Owner argues request 65 is sent outside of the IP layer. *Id.* at 10.

At this stage of the proceeding, we do not find Patent Owner’s argument persuasive. Similar to the ’417 patent, Liu explicitly discusses Mobile *IP* protocol. *See, e.g.* Ex. 1003, 1:28, 5:55–60; Ex. 1001, 1:44–56. Petitioner’s declarant, Dr. Haas describes the Mobile *IP* protocol (Ex. 1006 ¶¶ 25–36) and, more specifically, states that Mobile *IP* encapsulation, such as described in Liu, teaches the recited “creating replica *IP* messages” (*id.* ¶ 83). For purposes of this Decision, we find this explanation to sufficiently support Petitioner’s contention. With respect to Patent Owner’s arguments about Figure 6, it is unclear from the Figure whether the dotted lines are meant to delineate between different layers, given that only a network and *IP* layer are identified. Therefore, for purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests this limitation.

- g. *“the ghost-mobile node handling signaling required to allocate resources and initiate mobility on behalf of the mobile node, the ghost-mobile node triggering signals based on a predicted physical location of such mobile node or distance with relation to the at least one foreign agent.”*

Petitioner asserts Liu, or alternatively, Liu and Gwon, teaches or suggests this limitation. Pet. 30–34. Petitioner contends a person of ordinary skill in the art would have understood “handling signaling required to allocate resources and initiate mobility” to include “preemptive setup and initiation of the mobility process.” *Id.* at 30 (citing Ex. 1006 ¶ 84). Petitioner relies on Liu’s M-agent’s (ghost-mobile node) pre-assignment signaling that allows for “services and/or data [to] be pre-connected/pre-arranged at the mobile user’s destination.” *Id.* at 31 (citing Ex. 1003, 2:29–35, Fig. 5). Petitioner further refers to the M-agent sending the pre-assignment signaling based on the use of PMM, including the predicted physical location of the terminal, to trigger service and resource pre-arrangement. *Id.* at 31–33 (citing Ex. 1003, 7:22–38, 19:4–14). Alternatively, Petitioner argues Gwon teaches a mobility prediction analysis. *Id.* at 33 (citing Ex. 1004 ¶¶ 57, 59–104).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu, alone or in combination with Gwon, teaches or suggests this limitation.

2. *Rationale for Combining Liu and Gwon*

Petitioner contends a person of ordinary skill in the art would have been motivated to modify Liu’s MF-agent to proactively broadcast its

presence to the mobile node since it is “simply applying a known technique to a known device ready for improvement to yield predictable results.” Pet. 23 (citing Ex. 1006 ¶¶ 77–78). Petitioner asserts proactive broadcasts were well known and would have (1) “facilitated the pre-assignment of a mobile device before it reached the foreign network, decreasing the time required to complete a handover with a foreign agent at a new network to which the mobile device was travelling” and (2) “decreased the computational burden on the mobile device by removing the need to request the assignment of a MF-agent, shifting this burden to the MF-agent on a router in the foreign network.” *Id.* at 23 (citing Ex. 1006 ¶¶ 77–78). Therefore, Petitioner contends combining Gwon’s known Neighbor Discovery protocol with the MF-agent pre-assignment protocol of Liu “comports with the actual historical evolution of the technology at the time, which resulted in a more efficient and simplistic method to pre-allocate resources,” and therefore, would have been obvious to one of skill in the art. *Id.* at 24–26 (citing Ex. 1006 ¶¶ 77–79).

In addition, Petitioner contends one of skill in the art would have been motivated to substitute Gwon’s mobility prediction analysis into Liu, because it is merely substituting one known element for another. Pet. 34 (citing Ex. 1006 ¶ 87). Petitioner asserts a person of ordinary skill in the art “would have understood that any available method of determining an accurate predicted location would have been a suitable and obvious variation.” *Id.* (citing Ex. 1006 ¶ 87).

Patent Owner does not dispute Petitioner’s analysis. For purposes of this Decision, we determine Petitioner has provided evidence as well as “articulated reasoning with some rational underpinnings” in support of its

obviousness contentions. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2008). For the foregoing reasons, we determine Petitioner has established a reasonable likelihood of prevailing on its challenge to claim 1 as unpatentable over Liu and Gwon.

3. *Claim 5*

Dependent claim 5 depends from claim 1 and further recites “wherein allocation of resources on behalf of the mobile node is triggered based at least in part on location information, the location information determined by at least one of: a global positioning system (GPS) receiver, a triangulation process, and indirect measurements of location.” Ex. 1001, 13:21–26.

Petitioner relies on Liu, or alternatively, Liu and Gwon, to teach or suggest the limitations in dependent claim 5. Pet. 34–36. Petitioner contends Liu teaches indirect measurements of location in that it measures the user’s historical movement patterns to predict a new location. *Id.* at 34 (citing Ex. 1006 ¶ 89). Alternatively, Petitioner contends Gwon teaches providing location information by a triangulation process and/or a global positioning system. *Id.* at 35 (citing Ex. 1004 ¶ 76). Petitioner contends it would have been obvious to one of skill in the art “to substitute one location determination method for another, as this is substituting one known element for another to obtain predictable results.” *Id.* at 36.

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu, alone or in combination with Gwon, teaches or suggests this limitation. Therefore, we determine Petitioner has established a reasonable likelihood of prevailing on its challenge to claim 5 as

unpatentable over Liu and Gwon.

4. *Claim 6*

Dependent claim 6 depends from claim 1 and further recites “wherein the at least one ghost-foreign agent populates mobile IP Advertisement messages with at least one care-of-address of neighboring foreign agents in order to extend the range of neighboring foreign agents.” Ex. 1001, 13:27–31.

Petitioner relies on Gwon to teach that an advertisement message may also include the care-of address of neighboring foreign agents. Pet. 36 (citing Ex. 1004 ¶ 51). Petitioner asserts one of ordinary skill in the art “would have recognized that Gwon’s disclosure of a Router Advertisement message that indicates the presence of other local routers would contain the IP address of those other local routers (i.e. their care-of-address in the network) to indicate their presence.” *Id.* at 37 (citing Ex. 1006 ¶ 91).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. However, based on our review of the Petition, Gwon describes providing a new care-of IP address to the mobile node’s home router as part of the registration process (after the new local router has been identified), but does not disclose populating the advertisement message with care-of addresses of at least one neighboring foreign agent (during the router identification process). Ex. 1004 ¶ 54; *see also* Ex. 1006 ¶ 52.

Based on the record before us, we are not persuaded that the evidence presented in the Petition shows a reasonable likelihood that Petitioner would prevail in showing that claim 6 is unpatentable over Liu and Gwon.

D. Ground 2 (Based on Liu, Gwon, and Lau)

Petitioner contends claims 2 and 3 would have been obvious over the combination of Liu, Gwon, and Lau. Pet. 37–45.

1. Claim 2

Dependent claim 2 depends from claim 1 and further recites “wherein signaling further comprises registration with a replica of the mobile node by the ghost-mobile node to communicate with the foreign agents, triggering tunneling and communication with a mechanism configured to maintain routing information to a mobile node.” Ex. 1001, 13:1–5.

Petitioner relies on Liu and Lau to teach or suggest the limitations in claim 2. Pet. 38–42. Specifically, Petitioner refers to Liu’s AM-agent as teaching the “replica of the mobile node” and Liu’s M-agent as teaching the “mobile node,” and asserts the M-agent registers and maintains a data consistency link with the AM-agent to communicate with a foreign agent. *Id.* at 38–39 (citing Ex. 1003, 2:6–10, 2:44–53, 8:7–34; Ex. 1006 ¶ 93). Petitioner relies on Lau to teach or suggest “tunneling and communication with a mechanism configured to maintain routing information to a mobile node.” *Id.* at 40–41 (citing Ex. 1005, 2:48–59). Specifically, Petitioner refers to Lau’s teaching a packet forwarding mechanism implemented by the Home and Foreign Agents that is referred to as “tunneling.” *Id.* at 41 (citing Ex. 1005, 2:48–59).

Petitioner contends one of ordinary skill in the art would have been motivated to combine the M-agent registration signaling of Liu with the well-known technique of Lau for tunneling because it is “applying a known technique to a known device ready for improvement to yield predictable results.” Pet. 41 (citing Ex. 1006 ¶ 94). Petitioner asserts tunneling was

commonplace in mobile networks and provided many benefits that would have been well known to a person of ordinary skill in the art, such as providing a secure channel between two disjoint IP networks and allowing for circumvention of traditional routing limitations. *Id.* at 41–42 (citing Ex. 1006 ¶ 94).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu and Lau teach or suggest this limitation and has provided sufficient evidence and “articulated reasoning with some rational underpinnings” in support of its obviousness contentions. Therefore, we determine Petitioner has established a reasonable likelihood of prevailing on its challenge to claim 2 as unpatentable over Liu, Gwon, and Lau.

2. *Claim 3*

Dependent claim 3 depends from claim 1 and further recites “wherein signaling further comprises at least one of a tunnel and a communication network to allocate resources between the mobile node and foreign agent, the signaling being triggered at a threshold distance to one of the foreign agents reported by one of the mobile nodes, the threshold distance reported to one of the foreign agents at least one of a projected trajectory and a speed.” Ex. 1001, 13:6–12.

Petitioner contends Liu, Lau, and Gwon teach or suggest the limitations in claim 3. Pet. 43–45. In addition to arguments made with respect to claim 2, Petitioner further argues Gwon teaches the recited “signaling being triggered at a threshold distance to one of the foreign agents reported by one of the mobile nodes, the threshold distance reported to one

of the foreign agents at least one of a projected trajectory and a speed.” *Id.* at 43. Specifically, Petitioner contends “Gwon teaches a mobility prediction analysis that provides a threshold value indicating a distance from a mobile node to a node in the network, which informs the mobile node to begin signaling to establish a new network connection.” *Id.* at 43 (citing Ex. 1004 ¶ 57). Petitioner further contends Gwon “teaches the use of GPS information to provide the threshold value indicating how close the mobile node is to another node in the network.” *Id.* at 44 (citing Ex. 1004 ¶ 59). Petitioner asserts one of ordinary skill in the art would have understood “information such as that provided by GPS” to include both a trajectory and a speed when calculating an estimated destination.” *Id.* at 44 (citing Ex. 1006 ¶¶ 95–96).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. However, based on our review of the Petition, we do not find Petitioner’s analysis convincing. Although Gwon describes determining a threshold value as part of the mobility prediction analysis to determine when some desired action should be taken by the mobile node (Ex. 1004 ¶ 57), Petitioner has not identified where Gwon teaches reporting the “threshold distance . . . to one of the foreign agents.”

Based on the record before us, we are not persuaded that the evidence presented in the Petition shows a reasonable likelihood that Petitioner would prevail in showing that claim 3 is unpatentable under Liu, Lau, and Gwon.

E. Ground 3 (Based on Liu, Gwon, and IETF)

Petitioner contends claim 4 would have been obvious over the combination of Liu, Gwon, and IETF. Pet. 45–49.

Dependent claim 4 depends from claim 1 and further recites “wherein the at least one ghost-mobile node is a proxy element for the at least one foreign agent and the at least one mobile node, the at least one ghost-mobile node triggering registration based on a distance to a foreign agent by relaying security and shared secrets from a mobile node, and at least one advertisement message from a foreign agent in a vicinity of the ghost-mobile node.” Ex. 1001, 13:13–20.

Petitioner relies on Liu, Gwon, and IETF to teach or suggest the limitations in claim 4. Pet. 45–49. Petitioner asserts Liu’s M-agent is a proxy element between a mobile terminal and a foreign agent, and functions as a proxy for both the mobile node and the foreign agent. *Id.* at 45 (citing Ex. 1006 ¶ 98). Petitioner also asserts Gwon teaches triggering registration using security information and authentication data based on a distance to a foreign agent. *Id.* at 46 (citing Ex. 1004 ¶ 57). Petitioner further contends IETF discloses the use of MD5 authentication algorithms and security protocols during registration of the mobile node, to provide security and confidentiality services between a mobile node connecting with a foreign agent. *Id.* at 47 (citing Ex. 1008 §§ 1, 3). Petitioner further contends Liu teaches an advertisement message, as discussed above, and Gwon teaches a distance based triggering mechanism for foreign agent advertisements. *Id.* at 48 (citing Ex. 1004 ¶ 57; Ex. 1006 ¶ 98).

With respect to the combination, Petitioner contends a person of ordinary skill in the art would have found it obvious to combine Liu’s pre-registration signaling and foreign agent advertising with Gwon’s triggering mechanism for these processes. *Id.* at 48 (citing Ex. 1006 ¶¶ 99–100). Petitioner asserts such a modification to Liu “would eliminate the need for a

mobile device to use solicitation processing abilities or location prediction methods for registration, thereby increasing the processing speed of the mobile device and decreasing the overall computational complexity of the system.” *Id.* at 48 (citing Ex. 1006 ¶¶ 99–100). Petitioner argues adding IETF would be similarly obvious because Gwon provides an explicit motivation for the combination by incorporating the reference in its own disclosure. *Id.* at 49 (citing Ex. 1006 ¶¶ 99–100). Petitioner also contends implementing software algorithms for security protocols would have been commonplace for preregistration and would have added negligible complexity to the system.” *Id.* at 49 (citing Ex. 1006 ¶¶ 99–100).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu, Gwon, and IETF teaches or suggests this limitation and has provided sufficient evidence and “articulated reasoning with some rational underpinnings” in support of its obviousness contentions. Therefore, we determine Petitioner has established a reasonable likelihood of prevailing on its challenge to claim 4 as unpatentable over Liu, Gwon, and IETF.

F. Ground 4 (Based on Liu and Lau)

Petitioner contends claim 7 would have been obvious over the combination of Liu and Lau. Pet. 49–56.

1. Claim 7

- a. “A method, in a mobile node, for speeding handover, comprising the steps of:”*

Petitioner relies on Liu to teach or suggest the preamble of

independent claim 7. Pet. 49–50. For example, Petitioner relies on Liu’s Mobile-Floating agent functions, which “allow[] the users to **immediately receive service** and maintain their data structures with virtually the same efficiency as they could have at the previous location. It also provides ‘soft data structure handoff’ capability.” *Id.* at 49–50 (citing Ex. 1003, 2:3–10 (emphasis omitted)).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests the preamble.

b. “updating, in a mobile node, a location in a ghost mobile node;”

Petitioner relies on Liu to teach or suggest this limitation. Pet. 49–50. Specifically, Petitioner argues “Liu discloses a mobile terminal (‘mobile node’) that updates an M-agent (‘ghost-mobile node’) with respect to its future travel and the M-agent then determines the closest foreign agent to that future predicted location.” *Id.* at 50–51 (citing Ex. 1003, 7:26–32). Petitioner further relies on Lau, which “discloses a mobile device (mobile node) that maintains its own current location information to calculate a distance between itself and approaching foreign agents.” *Id.* at 51 (citing Ex. 1005, 4:29–41).

Patent Owner argues “the claim requires updating the mobile node with a location in a ghost mobile node.” Prelim. Resp. 12. Patent Owner asserts Petitioner “directs its arguments to teachings concerning updating an M-agent (an alleged ‘ghost-mobile node’) with respect to future travel of a

mobile terminal (or ‘mobile node’) [which is] the reverse of what is claimed.” *Id.* At this stage of the proceeding, we disagree.

Patent Owner’s argument is based on a claim construction: whether the mobile node itself must be updated with the location in a ghost mobile node. Patent Owner, however, does not direct our attention to any portion of the ’417 patent that supports its interpretation of this limitation. Rather, the ’417 patent indicates that the ghost mobile node acts according to a predicted future state, such as location, of the mobile node. *E.g.*, Ex. 1001, 2:58–65, 6:27–30, 6:39–42, 6:46–56, 6:65–67, 7:4–7). The claim language recites “updating, in a mobile node, a location in a ghost mobile node,” which, for purposes of this decision, we understand to mean that the mobile node updates the ghost mobile node with its location. *See id.* At this stage of the proceeding, and in light of our review of the ’417 patent, Petitioner has identified support Liu discloses a mobile terminal that updates the ghost mobile node (i.e., “an M-agent”) with its location. Accordingly, for purposes of institution, Petitioner has adequately shown Liu and Lau teach or suggest this limitation.

- c. *“determining a distance, in the ghost mobile node in communication with the mobile node, to a closest foreign agent with which the mobile node can complete a handover;”*

Petitioner relies on Liu and Lau to teach or suggest this limitation. Pet. 52–53. For example, Petitioner argues “Liu teaches a system where the M-agent (‘ghost-mobile node’) uses the predicted location of the mobile terminal in conjunction with an MF-agent protocol to assign the closest MF-agents with which the mobile device may complete a handover.” *Id.* at 52

(citing Ex. 1004, 12:52–66). Petitioner also asserts “Lau allows for the mobile network device to utilize its own location information in conjunction with GPS information sent from foreign agents to calculate the distance to the closest foreign agent.” *Id.* at 53 (citing Ex. 1005, 3:43–57).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu and Lau teach or suggest this limitation.

d. “submitting on behalf of the mobile node, from the ghost mobile node, a registration to the foreign agent to which the mobile node is going to complete the handover; and”

Petitioner relies on Liu to teach or suggest this limitation. Pet. 54. For example, Petitioner argues Liu’s “M-agent (‘ghost-mobile node’) submits registration request on behalf of the mobile terminal (‘mobile node’) to register with a foreign agent where handoff is to occur.” *Id.*

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests this limitation.

e. “upon completing the handover, updating a registration in the mobile node.”

Petitioner relies on Liu to teach or suggest this limitation. Pet. 55. For example, Petitioner argues “[i]n Liu, a registration reply is sent to the mobile terminal from the MF-agent linked to a foreign agent.” *Id.* (citing Ex. 1003, 7:51–57). Petitioner further argues “once the mobile terminal reaches its destination, it links with the MF-agent that has been assigned there and registers with the foreign agent to complete the registration

process.” *Id.* at 55 (citing Ex. 1003, 8:7–16). Petitioner contends a person of ordinary skill in the art “would have understood that this link also completes the updating of the registration with the new F-agent and linked MF-agent in the mobile node.” *Id.* at 56 (citing Ex. 1006 ¶ 105; Ex. 1003, 8:7–16, Fig. 8).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests this limitation.

2. Rationale for Combining Liu and Lau

Petitioner contends one of ordinary skill in the art “would have been motivated to modify the mobile node in Liu to send current location information to the M-agent as it travels as disclosed in Lau, to supplement the predictive mobility analysis.” Pet. 51 (citing Ex. 1006 ¶¶ 102–103). Petitioner asserts “[t]his is merely using a known technique to improve a similar device in the same way and/or combining prior art methods according to known methods to yield predictable results.” *Id.* (citing Ex. 1006 ¶¶ 102–103). Petitioner further argues one of ordinary skill in the art would have understood the benefits of sending current location data, such as, for example, creating a more efficient system for locating the closest handoff point in the foreign network. *Id.* at 51–52 (citing Ex. 1006 ¶¶ 102–103).

Petitioner further contends one of ordinary skill in the art would have been motivated to modify Liu “with the method in Lau for measuring the position of a mobile device in relation to the position of the foreign agents in the network to calculate the nearest foreign agent since this is combining prior art methods according to known methods to yield predictable results.”

Id. at 54 (citing Ex. 1006 ¶¶ 102–103). Petitioner asserts this “would have provided a more accurate method of finding the shortest distance to the next closest handoff point” and “would also have provided a faster system for finding the next handover location when the mobile device deviates from its original course.” *Id.* at 54 (citing Ex. 1006 ¶¶ 102–103).

For purposes of this Decision, we determine Petitioner has provided evidence as well as “articulated reasoning with some rational underpinnings” in support of its obviousness contentions. Patent Owner has not disputed Petitioner’s analysis. Therefore, at this stage of the proceeding, we determine Petitioner has established a reasonable likelihood of prevailing on its challenge to claim 7 as unpatentable over Liu and Lau.

G. Conclusion

For the foregoing reasons, we determine Petitioner has demonstrated a reasonable likelihood that it would prevail in establishing the unpatentability of claims 1, 2, 4, 5, and 7 of the ’417 patent based on the grounds asserted in the Petition. Petitioner has not, however, shown on the current record a reasonable likelihood that it would prevail in establishing the unpatentability of claims 3 and 6 of the ’417 patent. We nevertheless institute an *inter partes* review of all challenged claims on all of the grounds set forth in the Petition. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

At this stage of the proceeding, the Board has not made a final determination as to the patentability of any challenged claim. Any findings of fact and conclusions of law made herein are not final, but are made for the sole purpose of determining whether Petitioner meets the threshold for

initiating review. Any final decision shall be based on the full trial record, including any response timely filed by Patent Owner.

III. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an inter partes review is hereby instituted as to claims 1–7 of the '417 patent on the following asserted grounds:

Claims 1, 5, and 6 under 35 U.S.C. § 103(a) as obvious over the combination of Liu and Gwon;

Claims 2 and 3 under 35 U.S.C. § 103(a) as obvious over the combination of Liu, Gwon, and Lau;

Claim 4 under 35 U.S.C. § 103(a) as obvious over the combination of Liu, Gwon, and IETF; and

Claim 7 under 35 U.S.C. § 103(a) as obvious over the combination of Liu and Lau.

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 commencing on the entry date of this Decision.

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