

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

B/E AEROSPACE, INC.,
Petitioner,

v.

MAG AEROSPACE INDUSTRIES, LLC,
Patent Owner.

IPR2014-01510
Patent 6,353,942 B1

Before JAMESON LEE, JOSIAH C. COCKS, and
PHILLIP J. KAUFFMAN, *Administrative Patent Judges*.

KAUFFMAN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

A. PROCEDURAL OVERVIEW

Petitioner, B/E Aerospace, Inc., filed a corrected Petition (Paper 22, “Pet.”) to institute an *inter partes* review of claims 13, 14, 18, 19, and 22–24 of U.S. Patent No. 6,353,942 B1 (Ex. 1001, “the ’942 patent”). The ’942 patent is titled “Modular Vacuum Toilet with Line Replaceable Units” (LRUs). Ex. 1001, (54). A significant issue in this case is the proper interpretation of an LRU as claimed.

Patent Owner, MAG Aerospace Industries, LLC., filed a timely Preliminary Response (Paper 12, “Prelim. Resp.”).

In the March 26, 2015, Decision to Institute (Paper 24, “Inst. Dec.”), we instituted trial on claims 13, 14, 18, 19, and 22–24 on the following grounds:

A. Claims 13, 14, 18, 19, and 22–24 under 35 U.S.C. § 103(a) over Gregory¹ and Kendall;²

B. Claims 13, 14, 18, 19, and 22–24 under 35 U.S.C. § 103(a) over Olin³ and Kendall;

Subsequently, Patent Owner filed a corrected Patent Owner Response (Paper 45, “PO Resp.”), and Petitioner filed a Reply (Paper 67, “Pet. Reply”).⁴

Patent Owner did not file a motion to amend.

¹ Ex. 1015, U.S. 4,041,554 (Aug. 16, 1977).

² Ex. 1014, U.S. 5,231,706 (Aug. 3, 1993).

³ Ex. 1024, U.S. 5,909,968 (June 8, 1999).

⁴ Redacted versions of these papers are at Papers 46 and 68, respectively.

Patent Owner filed a corrected motion for observation on cross-examination of Mr. Hallmark and a motion for observation on cross-examination of Dr. Dershowitz.⁵ Papers 85, 81. Petitioner filed a response to each. Papers 92, 91. This information was factored into our Decision.

Oral hearing was held on Thursday, November 19, 2015, and a transcript of the oral hearing is included in the record.⁶ Paper 101 (“Tr.”).

For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 13, 14, 18, 19, and 22–24 of the ’942 patent are unpatentable.

B. RELATED PROCEEDINGS

Patent Owner asserted the ’942 patent against Petitioner in *MAG Aerospace Industries Inc. v. B/E Aerospace Inc.*, Case No. 2:13-cv-06089-SJO-FFM (C.D. Cal.). Pet. 1; Paper 5, 1.

The parties in the case at hand are involved in two other *inter partes* proceedings: IPR2014-01511 (challenging U.S. Patent 6,536,054 B2, “the ’054 patent”), and IPR2014-01513 (challenging U.S. Patent 6,536,055 B2, “the ’055 patent”). The ’055 patent (application No. 10/061,681) is a continuation of the application that became the ’942 patent (application No. 09/713,892). *See* IPR2014-01513, Ex. 1001, (63). The ’054 patent contains

⁵ Paper 86 is a redacted version of Paper 85.

⁶ The hearing was held with the hearings for IPR2014-01511 and IPR2014-01513. Petitioner’s demonstrative exhibits are at Exhibit 1107 (redacted) and 1108 (unredacted). Patent Owner’s corrected demonstrative exhibits are at Exhibit 2070.

similar subject matter, but is not in a continuity chain leading to either the '942 patent or the '055 patent. *See* IPR2014-01511, Ex. 1001, (63).

II. PRELIMINARY MATTERS

Before addressing claim construction and patentability, we provide additional procedural details, and resolve a Motion to Exclude Evidence by each party.

A. ADDITIONAL PROCEDURAL DETAILS

On May 5, 2015, Petitioner submitted a motion to submit what would be Exhibits 1035-1045 (“the proffered evidence”) as supplemental information under 37 C.F.R. § 42.123(a), along with a motion to seal these exhibits. Papers 30, 31. Patent Owner submitted an opposition to each motion. Papers 32, 33. For a variety of reasons, we denied Petitioner’s Motion to Submit Supplemental Information and the Motion to Seal was dismissed as moot. Paper 37.

On October 2, 2015, at Petitioner’s request, a conference call was held, regarding the proffered evidence. Petitioner asserted that the proffered evidence demonstrates prior inconsistent statements by several of Patent Owner’s witnesses in the proceeding at hand, and for that reason Patent Owner must serve the proffered evidence as routine discovery. *See* Paper 61 (order); Paper 63 (transcript). We directed the parties to attempt in good faith to determine what, if any, portion of the proffered evidence demonstrated inconsistencies as alleged. Paper 61, 4.

The parties were unable to reach agreement, and the Board conducted a second call on the matter. *See* Paper 64 (order); Paper 65 (transcript).

We determined that such an order is not a matter of discovery because Petitioner already had the proffered evidence from the related litigation. Paper 64, 4. For this, and a variety of other reasons, the Board denied Petitioner's request. *Id.* Petitioner did not file a timely request for reconsideration. *See* 37 C.F.R. § 42.71(d)(1).

The proffered evidence was later filed with Petitioner's Reply. Patent Owner's Motion to exclude that information is discussed below.

B. PETITIONER'S MOTION TO EXCLUDE EVIDENCE

Petitioner moves to exclude: (1) the unpatentability opinions of Patent Owner's declarant, Mr. Anderson (Ex. 2021), and (2) "certain statements" in Patent Owner's opposition papers. Paper 76, 2–3. Patent Owner filed an Opposition to the Motion (Paper 89), and Petitioner filed a Reply to the Opposition (Paper 93). For the reasons that follow, Petitioner's motion is *denied*.

The Anderson Declaration was filed on July 14, 2015, in association with Patent Owner's Response which was filed July 13, 2015.

1. *Anderson Declaration*

a) *Objections*⁷

Petitioner identifies the following items or actions as including objections:

⁷ After May 19, 2015, objections must be filed, not just served. *See* 37 C.F.R. § 42.64(b)(1), revised 80 Fed. Reg. 28561.

- (1) e-mail correspondence dated October 2, 2015, to October 15, 2015 (filed as Ex. 1072 on October 16, 2015);
- (2) conference calls with the Board on October 2, 2015, and October 9, 2015 (Papers 63, 65, respectively);
- (3) Mr. Anderson's Deposition (Ex. 1052, filed October 16, 2015); and
- (4) Paper 47 (Petitioner's Objections to Evidence).

Paper 76, 2.

Items (1)–(3) do not properly include objections because they were not timely filed by Petitioner. *See* 37 C.F.R. § 42.64(b)(1).

The fourth item, Paper 47, was timely filed. *See* Ex. 2021; Paper 40; Paper 47. In that Paper, Petitioner objected to Exhibits 2019–2043, 2048–2053, and 2055, and included “general objections” applicable to all of these Exhibits. Paper 47, 1–2. With regard to the Anderson Declaration (Ex. 2021) in particular, Petitioner lists the Board rules and Federal Rules of Evidence as grounds for the objection, and states:

This exhibit is irrelevant, cumulative, and/or prejudicial to the issues on which IPR is progressing. This exhibit does not present underlying facts or evidence. This exhibit reflects statements made without personal knowledge. This exhibit reflects opinions for which the factual bases for those opinions have not been disclosed, and for which the expert used unreliable analysis and methods. *See* also the discussion of objections based on these rules in Section II.A above [the “general objections”], incorporated herein by reference.

Id. at 4; *see also* Paper 93 (repeating this assertion).

Petitioner's “general objections” apply to the exhibits as a whole without identifying a particular portion of an exhibit, and in fact, leave it to the reader as to whether an objection applies to a particular exhibit. *See, e.g.,* Paper 47, 1–2 (“Petitioner objects to each and every exhibit that . . .”).

We agree with Patent Owner's characterization that Petitioner submitted boilerplate objections. Paper 89, 1. Further, Petitioner's Motion is not based on an asserted objection. For example, Petitioner's Motion argues that Mr. Anderson's opinions are irrelevant because they are based upon an incorrect claim construction, but Petitioner did not object on that basis. See Paper 47, 4; Paper 76, 4–7. Petitioner's objections did not identify the grounds for the objection with sufficient particularity to allow Patent Owner to correct in the form of supplemental evidence. 37 C.F.R. § 42.64(b)(1); *see also* Paper 89, 1–5 (Patent Owner arguing Petitioner did not object with sufficient particularity).

Petitioner contends the objections have sufficient particularity. Paper 93, 1–2 (citing *Hayward Indus., Inc. v. Pentair Water Pool and Spa, Inc.*, Case IPR2013-00287 (PTAB Dec. 17, 2013) (Paper 15) (non-precedential). This citation is not persuasive because in *Hayward* no motions were filed and no determination was made so that the Board's comment was an observation and not a ruling. *Id.*

The lack of an effective objection is sufficient basis to deny Petitioner's Motion. See 37 C.F.R. §§ 42.20(c), 42.22, 42.64(c). Despite this deficiency, we consider the merits of Petitioner's Motion.

b) Relevance

Petitioner contends that Mr. Anderson's opinions are based on an incorrect claim construction, and for that reason are irrelevant under Federal Rules of Evidence (FREs) 401 and 403. Paper 76, 4–7; Paper 93, 2–4. We take this as an assertion that the evidence is inadmissible under FRE 402.

Our decision does not involve a jury. For that reason, Petitioner's citation to a jury case excluding improper claim construction is not

persuasive. *See, e.g.*, Paper 76, 4 (citing *Liquid Dynamics Corp. v. Vaughan Co., Inc.*, 449 F.3d 1209, 1224 n.2 (Fed. Cir. 2006)). Further, Petitioner’s citation to a district court case that excluded an improper claim construction from consideration on infringement is also unpersuasive. *See id.* (citing *Chicago Mercantile Exch., Inc. v. Tech. Research Grp., LLC*, 782 F. Supp. 2d 667, 673 (N.D. Ill. 2011)). In *Chicago Mercantile*, the court held that an expert’s testimony based on an improper claim construction would not be relevant at trial. *Id.* Here, in contrast, we construe the claims as part of this final decision. *See* Paper 89, 5–7 (correctly noting both that the Board’s claim construction in an institution decision is preliminary, and unlike most district court cases, the Board’s final decision addresses claim construction and patentability). Consequently, evidence regarding claim construction, such as the Anderson Declaration, remains relevant.

Further, Petitioner does not explain persuasively how the probative value of the Anderson Declaration is outweighed by any of the dangers of unfair prejudice enumerated in FRE 403. *See* Paper 76, 4–7.

c) *FRE 702/703*

Petitioner contends that the methodology of Mr. Anderson’s analysis is fundamentally unreliable and should be excluded in support of the Board’s “gatekeeping” role. Paper 76, 7–9; Paper 93, 4. Petitioner makes several contentions in support of this argument.

First, Petitioner contends that Mr. Anderson indicated that he did not write his declaration. Paper 76, 8 (quoting an unidentified portion of Mr. Anderson’s Deposition at Exhibit 1052). We agree with Patent Owner that Petitioner’s contention takes Mr. Anderson’s testimony out of context. *See* Paper 89, 10. Mr. Anderson testified that he prepared his Declaration

for these proceedings by: discussions with counsel, reviewing materials, preparing notes, and several iterations of reviewing and editing those notes to produce a product, that in turn was used by another to prepare the Declaration. Ex. 1052, 17:19–19:23.

Second, Petitioner contends that Mr. Anderson indicated that he did not review the Petition prior to filing. Paper 76, 8 (quoting an unidentified portion of Ex. 1052). Indeed, Mr. Anderson stated at his deposition that he did not review the Petition for this case; however, Petitioner ignores that Mr. Anderson stated that he reviewed the Institution Decision. See Ex. 1052, 30:13–20. Further, Petitioner fails to explain persuasively how Mr. Anderson’s failure to review the Petition renders Mr. Anderson’s Declaration unreliable.

Third, Petitioner contends that in “concurrent litigation” Mr. Anderson offered inconsistent testimony regarding claim scope. Paper 76, 8. Even if true, Petitioner has not explained cogently how a prior inconsistency renders the Anderson Declaration inadmissible.

Petitioner’s assertions do not persuade us that the Anderson Declaration is unreliable. We note that the policy considerations for excluding expert testimony, such as those implemented by the gatekeeping framework established by the Supreme Court in *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993), are less compelling in bench proceedings such as *inter partes* reviews than in jury trials. See, e.g., *Volk v. United States*, 57 F. Supp. 2d 888, 896 n.5 (N.D. Cal. 1999); *In re Bay Area Material Handling, Inc.*, No. C 95-1163 VRW, 1995 WL 729300, at *6 (N.D. Cal. Dec. 4, 1995).

Consequently, Petitioner has not demonstrated that the Anderson Declaration (Ex. 2021) should be excluded. *See* 37 C.F.R. §§ 42.20(c), 42.22, 42.62(a), 42.64.

2. *Statement's in Patent Owner's Opposition Papers*⁸

As explained above regarding the proffered evidence, Petitioner contends that Patent Owner failed to serve that evidence as routine discovery information that is inconsistent with positions Patent Owner has taken in this proceeding. In this Motion, Petitioner argues that the allegedly inconsistent positions in the Patent Owner Response should be excluded. Paper 76, 9–11 (providing two alleged examples, and citing 37 C.F.R. § 42.51(b)(1)(iii)).

a) *Objections*

As discussed above, only Paper 47 was timely filed as objections. There, Petitioner presents objections by Exhibit and makes reference to “any reference to/reliance thereon.” *See, e.g.*, Paper 47, 2 (objecting to Exhibit 2019 and any reference to or reliance thereon). Such identification lacks specificity. More importantly, this Motion seeks to exclude portions of the Patent Owner Response based upon a failure to provide inconsistent information, but that basis was not identified as an objection. *See* Paper 47. Petitioner's objections did not identify the grounds for the objection with sufficient particularity to allow Patent Owner to correct in the form of supplemental evidence. 37 C.F.R. §42.64(b)(1); *see also* Paper 89, 1–5 (Patent Owner arguing Petitioner did not object with sufficient particularity).

⁸ Although not explicit, Petitioner is apparently referring to the Patent Owner Response.

The lack of an effective objection is sufficient basis to deny Petitioner's Motion. *See* 37 C.F.R. §§ 42.20(c), 42.22, 42.64(c). Despite this deficiency, we consider the merits of Petitioner's Motion.

b) Alleged Failure to Provide Inconsistent Information

Petitioner's request to exclude statements by Patent Owner that are inconsistent with testimony and evidence adduced during the district court litigation relates to a prior order in this case. Paper 76, 3. Specifically, during a conference call regarding Patent Owner's allegedly inconsistent statements, the Board cautioned Patent Owner that, "the solution for [presenting statements without submitting known inconsistent evidence] can be that the statement that you initially relied on could be expunged or not used in your favor." *Id.* at 9 (citing Paper 63, 32:22–33:2). Indeed, where a party advances a position in a proceeding, and that party refuses to serve on the opposition information within that Party's knowledge that is relevant, non-privileged, and inconsistent with that position, the Board may expunge or not consider that position. *See* 37 C.F.R. §§ 42.5, 42.51(b). However, this is not a situation where one party advances a position and withholds from the other party information that is inconsistent with that position. Rather, Petitioner had the information; it was obtained in the related litigation. The following additional circumstances also bear on our determination.

As explained above, we considered the proffered evidence both as supplemental information and as routine discovery. We denied Petitioner's Motion to Submit Supplemental Information because Petitioner, as the moving party, did not demonstrate the relevance to any claim subject to a ground of unpatentability for which trial was instituted. Paper 37. We

denied Petitioner's request that we order Patent Owner to serve the documents as routine discovery because Petitioner already had the documents from the related litigation. Paper 64. Petitioner did not avail themselves of the opportunity to seek reconsideration of either determination, and nothing in this record calls those determinations into doubt.

Since submittal of Petitioner's Motion to Exclude, Petitioner submitted the proffered evidence in conjunction with Petitioner's Reply in response to Patent Owner's Response. Further details are provided in the analysis of Patent Owner's Motion to Exclude that evidence.

The record now contains Petitioner's proffered evidence so that we may weigh it against Patent Owner's allegedly inconsistent statements. Consequently, given these circumstances, Petitioner has not demonstrated that certain statements in the Patent Owner Response should be excluded. *See* 37 C.F.R. §§ 42.20(c), 42.22, 42.62(a), 42.64.

C. PATENT OWNER'S MOTION TO EXCLUDE EVIDENCE

Patent Owner filed a Motion to Exclude: (1) the Dershowitz Declaration and Reply Declaration, and (2) the Hallmark Declaration and associated exhibits. Paper 82. Petitioner filed an Opposition to the Motion (Paper 90), and Patent Owner filed a Reply to the Opposition (Paper 94). For the following reasons, Patent Owner's motion is *denied*.

1. *Declaration & Reply Declaration of Dr. Dershowitz*⁹

a) *Entire Declarations*

The Dershowitz Declaration (Ex. 1020) was submitted with the Petition on September 16, 2014. Patent Owner's objections were timely served on April 9, 2015, and identified the grounds for each objection with sufficient particularity.¹⁰ See Ex. 2065, 8–10, 20; 37 C.F.R. §42.64(b)(1).

The Dershowitz Reply Declaration (Ex. 1068¹¹) was submitted with Petitioner's Reply. Patent Owner's objections were timely served, and identified the grounds for each objection with sufficient particularity. Paper 73, 19–21, 26–27; 37 C.F.R. § 42.64(b)(1).

Patent Owner contends that Dr. Dershowitz does not qualify as a person of ordinary skill in the art, and does not qualify as an expert under FRE 702. Paper 82, 4–8. Patent Owner makes a variety of assertions regarding Dr. Dershowitz's qualifications, including that he lacks hands-on experience with vacuum toilets, and that, contrary to his representations, his patents do not relate to vacuum toilets. *Id.* at 5–7.

Even accepting Patent Owner's assertions as true, we are not persuaded that Dr. Dershowitz's testimony should be excluded. To testify as an expert under FRE 702, a person need not be a person of ordinary skill in the art, but rather may be "qualified in the pertinent art." See *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1363–64 (Fed. Cir. 2008);

⁹ Here we address the objections to the Dershowitz Reply Declaration as a whole and we address paragraph 56 separately below.

¹⁰ As mentioned above, our Decision to Institute was entered on March 26, 2015.

¹¹ Exhibit 1073 is a redacted version of Exhibit 1068.

Mytee Prods., Inc. v. Harris Research, Inc., 439 F. App'x 882, 886–87 (Fed. Cir. 2011) (non-precedential) (upholding admission of the testimony of an expert who “had experience relevant to the field of the invention,” despite admission that he was not a person of ordinary skill in the art). Further, there need not be a perfect match between the expert’s qualifications and the patent at issue. *See SEB S.A. v. Montgomery Ward & Co. Inc.*, 594 F.3d 1360, 1373 (Fed. Cir. 2010).

As explained below, the challenged claims relate to vacuum toilets. We agree with Petitioner that Dr. Dershowitz is qualified to provide his opinions for this case. Paper 90, 2–5. For example, Dr. Dershowitz has a Bachelor’s, Master’s, and Doctorate Degree in Aeronautics and Astronautics, each from Massachusetts Institute of Technology. Ex. 1018, 1. Dr. Dershowitz has experience in aircraft and spacecraft systems, to include teaching as a certified flight instructor and a commercial airline license. *Id.* at 1–2. Dr. Dershowitz has numerous licenses and certifications, to include: registration as a professional Mechanical Engineer and as an Aeronautical Engineer. *Id.* at 1–2. Dr. Dershowitz’s qualifications align with the challenged subject sufficiently so that his knowledge is helpful in understanding the evidence and determining facts in issue.

Consequently, Patent Owner has not demonstrated that the entire Dershowitz Declaration (Ex. 1020) and Reply Declaration (Ex. 1068) should be excluded. *See* 37 C.F.R. §§ 42.20(c), 42.22, 42.64(c).

b) Paragraph 56 of the Dershowitz Reply Declaration

Patent Owner seeks to exclude paragraph 56 of the Dershowitz Reply Declaration (Ex. 1068). Paper 82, 8–9. According to Patent Owner, paragraph 56 is testimony by Dr. Dershowitz regarding “intent, motive, or

state of mind, or evidence by which such state of mind may be inferred” of the inventors of the ’942 patent, and such testimony by an expert is inadmissible under the relevancy provisions of FRE 402 and 403. *Id.* at 8–9 (citation omitted). Patent Owner also contends that this portion of the Reply Declaration should be excluded under FRE 702 because it simply recites the testimony of others and is not based on Dr. Dershowitz’s specialized knowledge. *Id.* at 9.

Patent Owner did not make an effective objection with regard to the paragraph at issue. Specifically, Patent Owner made general objections based on FREs 402, 403, 701, 702, and 703, but did not mention paragraph 56, nor testimony regarding state of mind. *See* Paper 73, 19–21, 26–27. Consequently, Patent Owner did not provide sufficient particularity to permit Petitioner to correct in the form of supplemental evidence. *See* 37 C.F.R. § 42.64(b)(1). The lack of an effective objection is sufficient basis to deny this portion of Patent Owner’s Motion. *See* 37 C.F.R. §§ 42.20(c), 42.22, 42.64(c). Despite this deficiency, we consider the merits of this portion of Patent Owner’s Motion.

Patent Owner contends that Dr. Dershowitz’s testimony in paragraph 56 reflects the subjective intent of the inventors. Paper 82, 8–9. We disagree with this characterization.

Paragraph 56 does not contain an explicit statement regarding the state of mind of the inventors of the ’942 patent, nor is such fairly implied. The only disclosure regarding the inventors is Dr. Dershowitz’s statement that he reviewed the testimony of the inventors in the underlying litigation and this testimony further confirms that his opinion that the challenged claims are not limited to vehicular applications is correct. Ex. 1068 ¶ 56. We agree with

Petitioner that Dr. Dershowitz may identify the basis for his opinion. *See* Paper 90, 13. Dr. Dershowitz does not identify the particular inventor testimony involved, and more importantly, Dr. Dershowitz does not explain why the inventor’s testimony confirms his opinion.

Patent Owner has not persuaded us that the paragraph at issue improperly implies the state of mind of any inventor or permits Dr. Dershowitz to simply repeat the testimony of another. Consequently, we deny Patent Owner’s Motion to Exclude paragraph 56 of Exhibit 1068 on this basis as well. *See* 37 C.F.R. §§ 42.20(c), 42.22, 42.64(c).

2. *Hallmark Declaration and Associated Exhibits*

Patent Owner seeks to exclude paragraphs 86–102 of the Hallmark Declaration (Ex. 1069¹²) and Exhibits 1057–1063. Paper 82, 9–10. This information is the proffered evidence discussed above.

Each of these exhibits was filed on October 16, 2015, in association with Petitioner’s Reply (Paper 67). Patent Owner timely filed objections to these Exhibits and identified the grounds for each objection with sufficient particularity. Paper 73 (filed Oct. 19, 2015), 7–16, 21–22; 37 C.F.R. § 42.64(b)(1).

In the evidence at issue, Mr. Hallmark states that he is an expert in aircraft maintenance and repair. Ex. 1069 ¶ 4. The paragraphs at issue are titled “VIII. Review of Service Documentation.” *Id.* at i, 29, ¶¶ 86–102. Mr. Hallmark explains that Service Bulletins (“SB’s”) are documents provided by a component manufacturer, such as Patent Owner, describing maintenance or a particular service task to be performed on a specific

¹² A redacted version is filed as Exhibit 1074.

component. *Id.* ¶ 87. Mr. Hallmark discusses the content of the SB's at Exhibits 1058–1063. Exhibit 1057 is an SB index.

a) Relevance

As discussed above, Patent Owner acknowledges that the SB's found at Exhibits 1057–1063 are the same documents that were denied entry as supplemental information. *See* Paper 82, 10. According to Patent Owner, these exhibits are confidential internal documents and therefore do not relate to any of the prior art at issue nor are they part of the knowledge of one of ordinary skill in the art. Thus, Patent Owner reasons, these documents are irrelevant under FRE 402 and 403. *Id.* at 10–11. Regarding Mr. Hallmark's Declaration, Patent Owner contends that Mr. Hallmark did not perform repairs before the priority date, but did so in 2014 for the District Court litigation. *Id.* at 12. Patent Owner also contends that Mr. Hallmark did such repairs in an office setting rather than on the aircraft. *Id.* Patent Owner concludes that for these reasons, Mr. Hallmark's testimony in paragraphs 86–102 is not relevant under FRE 402 or 403. *Id.*

Petitioner counters that Exhibits 1057–1063 are relevant to Patent Owner's secondary considerations arguments put forth in Patent Owner's Response. Paper 90, 13–14. Patent Owner responds by repeating that the Exhibits at issue are not publications because they are confidential documents, and therefore are not prior art. Paper 94, 4–5. Patent Owner does not address Petitioner's contention that the Exhibits are in response to and relevant regarding Patent Owner's secondary considerations argument. Patent Owner's silence is significant, because Patent Owner, as the moving party, has the burden of proof on its motion. *See* 37 C.F.R. § 42.20(c).

In the Patent Owner Response, Patent Owner contends that the nonobviousness of the claimed methods is demonstrated by the secondary considerations of long-felt and unmet need, industry praise, and commercial success. PO Resp. 52–53. A key factual basis of these assertions is the contention that:

At the time of the invention of the ‘942 Patent, vacuum toilets, particularly on aircraft, did not include a toilet bowl, rinse valve, discharge valve, and/or FCU that could be replaced in the field while the toilet assembly remained installed.

PO Resp. 53 (citing Anderson Decl., Ex. 2021 ¶ 18; Jones Decl., Ex. 2022 ¶ 25).

The Hallmark Declaration and the SB’s at issue contain evidence that has a tendency to make Patent Owner’s contention less probable than it would be without the evidence, and that fact is of consequence in this action because we must consider the secondary considerations in our obviousness analysis. *See* FRE 401. For example, Mr. Hallmark states that Patent Owner’s SB 79000XX-38-01, dated March 3, 1992 (Ex. 1061), provides guidance for replacing rinse valves on toilets “in service” (installed on the aircraft). Ex. 1069 ¶ 92. Indeed, SB 79000XX-38-01, describes a rinse valve modification for ENVIROVAC toilets used onboard Boeing 767 aircraft that involves replacing the rinse valve. Ex. 1061, 1–2. The SB instructions for removing and replacing the rinse valve include shutting off the aircraft water supply to the toilet assembly (step 1), removing and replacing the rinse valve (step 6), and turning on the aircraft water supply (step 11). *Id.* at 5–6. These steps suggest that the toilet is in the aircraft during the rinse valve replacement process.

Patent Owner does not explain cogently how the probative value of the evidence at issue is outweighed by one of the dangers of unfair prejudice enumerated in FRE 403. *See* Paper 82, 9–10; Paper 94, 4–5.

In light of this, the evidence at issue is relevant to our analysis of secondary considerations and responds to arguments raised in the Patent Owner Response. *See* FRE 401, 402; 37 C.F.R. § 42.23(a).

Patent Owner has not demonstrated that the evidence at issue should be excluded based on relevancy concerns.

b) Qualifications as an Expert

Paper Owner contends that paragraphs 106–115¹³ of the Hallmark Declaration should be excluded because Mr. Hallmark lacks experience with the design of waste water systems and vacuum toilets. Paper 82, 12–13.

Even accepting Patent Owner’s assertions as true, we are not persuaded that the Hallmark Declaration should be excluded. As explained above, to testify as an expert under FRE 702, a person need not be a person of ordinary skill in the art, but rather may be “qualified in the pertinent art,” and there need not be a perfect match between the expert’s qualifications and the patent at issue. Mr. Hallmark’s qualifications align with the challenged subject sufficiently so that his knowledge would be helpful to understanding the evidence and determining a fact in issue. For example, we note that Mr. Hallmark has nearly 30 years of experience as a line maintenance technician, manager, director, and consultant. Paper 90, 5 (citing Ex. 1069 ¶¶ 3–14).

¹³ These paragraphs are found in Section X, pp. 40–45.

Patent Owner has not demonstrated that the evidence at issue should be excluded. *See* 37 C.F.R. §§ 42.20(c), 42.22, 42.62(a), 42.64.

D. ASSIGNOR ESTOPPEL

Patent Owner contends that the doctrine of assignor estoppel prevents Petitioner from seeking *inter partes* review of the '942 patent because Mr. Pondelick, an inventor and assignor of the '942 patent, is in privity with Petitioner. PO Resp. 6–7, 57–60. Patent Owner acknowledges that the Board has not applied assignor estoppel to *inter partes* reviews. *Id.* at 7.

As explained in our Decision to Institute, the Board has consistently maintained that assignor estoppel is not applicable to *inter partes* reviews. Inst. Dec. 14–15 (citing *Athena Automation Ltd. v. Husky Injection Molding Sys. Ltd.*, Case IPR2013-00290, slip op. at 12–13 (PTAB Oct. 25, 2013) (Paper 18));¹⁴ *Redline Detection, LLC, v. Star Envirotech, Inc.*, Case IPR2013-00106, slip op. at 12–13 (PTAB June 30, 2014) (Paper 66); *Synopsys, Inc. v. Mentor Graphics Corp.*, Case IPR2012-00042, slip op. 16–17 (PTAB Feb. 19, 2014) (Paper 60)). We agree with, and adopt, the logic of these cases. Because we are not persuaded that assignor estoppel, an equitable doctrine, provides an exception to the statutory mandate that any person who is not the owner of a patent may file a petition for an *inter partes* review, we decline to dismiss this *inter partes* review based on the doctrine of assignor estoppel.

¹⁴ *See also* the associated Final Written Decision in related case *Athena Automation Ltd. v. Husky Injection Molding Sys. Ltd.*, IPR2013-00167, slip op. at 6 (PTAB July 23, 2014) (Paper 51).

III. CLAIM CONSTRUCTION

A. INTRODUCTION TO THE SUBJECT MATTER

The Specification describes a modular vacuum toilet and a method of servicing such toilet. *Id.* at 2:50–3:65, Figs. 1, 2. Modular vacuum toilet 10 shown in Figure 1A is reproduced below:

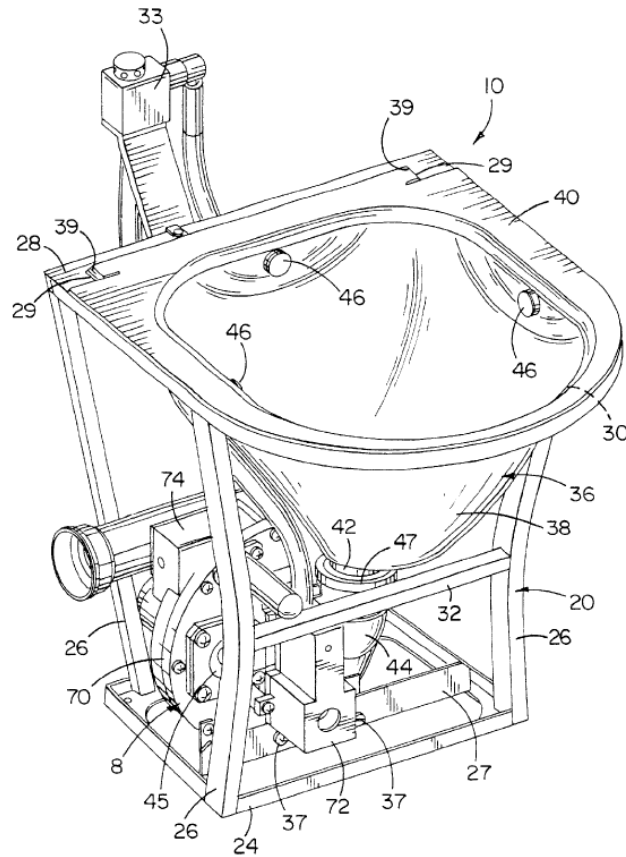


FIG. 1A

Figure 1A is a front perspective view of a modular vacuum toilet of the '942 patent. *Id.* at 4:5–7. Modular vacuum toilet 10 generally includes frame 20, bowl 36, and valve set 8. *Id.* at 4:29–30, Figs. 1A, 1B.

Frame 20 supports the components of vacuum toilet 10. *Id.* at 4:36-37, Figs 1A, 1B. Top member 28 of frame 20 defines opening 30, and includes two slots 29 near the rear thereof. *Id.* at 4:42-43.

Bowl 36 is a receptacle for receiving waste material having a sidewall 38 sized for insertion into opening 30 of frame 20. *Id.* at 4:53-56. Bowl 36 includes out-turned flange 40 about an upper edge of the sidewall. *Id.* Flange 40 includes tabs 39 sized for insertion through slots 29 in top frame member 28. *Id.* at 3:56-58; Fig. 3. Bowl 36 includes outlet 42 in fluid communication with discharge valve 70. *Id.* at 4:58-62. Valve set 8 is comprised of four sub-components: discharge valve 70, rinse valve 72, flush control unit (FCU) 74, and actuator 76. *Id.* at 5:51-53, Fig. 4.

B. ILLUSTRATIVE CLAIM

Each of the challenged claims depends, directly or indirectly, from independent claim 13, which follows (emphasis added):

13. A method of servicing a vacuum toilet having a waste receptacle for receiving waste defining an outlet and having a *rinse fluid dispenser* associated therewith, a stationary frame support having a top with an opening therethrough, the waste receptacle including a sidewall sized for insertion into the opening and having an out-turned flange supported by the top of the support structure, a discharge valve having an inlet in fluid communication with the receptacle outlet, an outlet in fluid communication with a sewer line placeable under partial vacuum pressure, and a moveable discharge valve member disposed between the discharge valve inlet and the discharge valve outlet, a rinse fluid valve having an inlet in fluid communication with a source of rinse fluid, an outlet in fluid communication with the rinse fluid dispenser, and a moveable rinse fluid valve member disposed between the rinse fluid valve inlet and the rinse fluid valve outlet, and a flush control unit adapted to control actuation

of the discharge valve member and rinse fluid valve member, *in which at least one of the discharge valve, rinse fluid valve, flush control unit, and waste receptacle is a line replaceable unit*, the method comprising:

removing the faulty line replaceable unit from the toilet;
and
installing a new line replaceable unit into the toilet.

C. LINE REPLACEABLE UNIT (LRU)

Claim 13 is directed to a method of servicing a vacuum toilet in which at least one of the discharge valve, rinse fluid valve, flush control unit (FCU), and waste receptacle is an LRU.

1. *Introduction*

In the Petition, Petitioner advocated that the broadest reasonable interpretation of an LRU as claimed should encompass both the District Court's claim construction (Ex. 1012) and the construction proffered by Patent Owner in that litigation (Ex. 1010). Pet. 6–8. Patent Owner did not disagree with Petitioner's interpretation. Prelim. Resp. 5. In the Decision to Institute, after considering these contentions, we preliminarily construed an LRU as claimed to be a component or group of components, less than the whole vacuum toilet, that may be removed and replaced at the installation site of the toilet, and the toilet may or may not be uninstalled during this process. Inst. Dec. 7–11.

Petitioner agrees with our claim construction in the Institution Decision. Pet. Reply 1. Patent Owner disagrees, and contends that an LRU as claimed is:

a component or modular group of components of the vacuum toilet assembly designed to be quickly and easily replaced at the installation site of the toilet while the toilet remains installed, so

that the vehicle on which the toilet is installed need not be removed from service.

PO Resp. 21–22. Patent Owner contends that the Board’s construction is divorced from the specification and unreasonably broad. *Id.* at 11–17.

Patent Owner elaborates that the Board’s interpretation omits three requirements of claim 13: (1) a limitation in terms of time or difficulty of removal of a component, (2) a requirement that the toilet remains installed during replacement of the LRU, and (3) a requirement that the LRU is removed and replaced without removing the vehicle in which the toilet is installed from revenue service. PO Resp. 11–12.

2. *Claim Language*

We begin by considering the language of the claims themselves, and then, as we must, we consider that language in view of the specification, all as would be understood by a person of ordinary skill in the art.

Claim 13 is directed to a method of servicing a vacuum toilet having a specified configuration including that at least one of the discharge valve, rinse fluid valve, flush control unit, and waste receptacle is an LRU. The method includes two steps: one, removing the faulty LRU from the toilet, and two, installing a new LRU into the toilet.

Claim 13 requires removing and replacing an LRU. Claim 13 does not recite any time or difficulty aspect of these steps. Claim 13 does not recite that the toilet remains installed during the steps. Claim 13 does not recite that the vehicle containing the toilet remains in revenue service. In fact, the term “revenue service” is not found in the ’942 patent.

Consequently, Patent Owner’s interpretation is not supported by the language of claim 13. *See Arlington Indus., Inc. v. Bridgeport Fittings, Inc.*, 632 F.3d 1246, 1256 (Fed. Cir. 2011) (“the name of the game is the claim”)

(quoting Giles S. Rich, *The Extent of the Protection and Interpretation of Claims—American Perspectives*, 21 Int’l Rev. Indus. Prop. & Copyright L. 497, 499, 501 (1990)).

3. Specification

As background, the Specification describes that “[a]ccording to general practice in the airline industry, each sub-system includes one or more components which must be replaced in the event of failure, such replacement components being commonly referred to as line replaceable units (LRUs).” Ex. 1001, 1:39–43. Prior to the ’942 patent, the entire toilet was defined as an LRU, so that an entire replacement toilet was swapped in for the faulty toilet, and the faulty toilet was given a “bench test” to determine which components had failed, following which the faulty components were repaired or replaced so that the toilet may be reused on another aircraft. *Id.* at 1:39–53. A consequence of this maintenance approach was that airlines had to stock one or more replacement toilets so that a replacement toilet was ready to be swapped in for a faulty toilet. *Id.* at 1:45–48, 2:33–44.

In light of the Specification of the ’942 patent, a person of ordinary skill in the art would recognize that an LRU as claimed incorporates two concepts: one, where the replacement occurs, and two, that the component replaced is something less than the entire toilet.

Regarding where the unit is replaced, as discussed above, in the prior art the entire toilet was the line replaceable unit so that the entire faulty toilet was removed and replaced on the line (at the aircraft) and components were removed and replaced off the line. *See id.* at 1:35–53 (referring to a “bench test” of the faulty toilet, suggesting repair was in a maintenance facility

containing a bench). Consequently, an LRU is line replaceable in that it is replaced on the line rather than elsewhere.

Regarding the replaced component being something less than the entire toilet, the Specification describes that modular vacuum toilet 10 differs from conventional toilets in that “[i]nstead of defining the entire toilet as an LRU, the toilet **10** defines individual components or groups of components as LRUs.” *Id.* at 9:54-56. Accordingly, an LRU is a component or group of components less than the entire toilet.

Given this, the Specification describes an LRU as a component or group of components, less than the entire toilet, that may be removed and replaced at the installation site of the toilet.

In parity with claim 13, the Specification describes the claimed method as “removing the faulty line replaceable unit from the toilet, and installing a new line replaceable unit into the toilet.” Ex. 1001, 3:52-54. The Specification does not state that the toilet remains installed during this process, nor does the Specification state that the aircraft remains in revenue status.

Our analysis to this point suggests that an LRU as claimed is a component or group of components, less than the whole vacuum toilet, that may be removed and replaced at the installation site of the toilet, and the toilet may or may not be uninstalled during this process. We analyze this interpretation in light of Patent Owner’s argument and evidence.

4. Patent Owner Arguments

As stated above, Patent Owner argues that the Board’s interpretation omits three requirements of claim 13. PO Resp. 11-12. We analyze these contentions in turn.

a) *Time or Difficulty of Removal of an LRU*

Patent Owner contends that claim 13 requires that an LRU as claimed is quickly and easily replaced. PO Resp. 11–15. For the reasons that follow, this contention is not persuasive.

First, as explained above, there is no support in the language of claim 13 for such an interpretation. Independent method claim 13 recites two steps: removing and replacing the LRU. Claim 13 does not recite that such steps must be completed quickly or easily.

Second, Patent Owner contends that the '942 patent “stresses” that the claimed LRUs can be “quickly and easily replaced in the field.” *Id.* at 12 (citing for support to Ex. 1001, 1:28–41, 54–56, 58–67, 2:11–36, 49–51, 9:57–65). Indeed, the '942 patent stresses that the claimed LRU's may be quickly and easily replaced as compared to the prior method of replacing the entire faulty toilet and repairing components of the faulty toilet at a site other than the installation site. *See, e.g.*, Ex. 1001, 9:28–29, 54–61 (contrasting the claimed toilet to conventional toilets, and stating that LRUs, such as valve set 8, are individual components or groups of components that can be “quickly removed” or “quickly and easily removed”); *see also id.* at 1:28–41, 54–56, 58–67, 2:11–36, 49–51 (highlighting that repair of conventional toilets was difficult, time consuming, and complicated).

A person of ordinary skill in the art would understand that the '942 patent does not describe that an LRU may be quickly and easily replaced. Rather, the '942 patent describes that a toilet that includes an LRU is quicker and easier to maintain than a toilet without an LRU. Specifically, a toilet that includes an LRU may be returned to a serviceable condition by replacing less than the entire toilet and doing such replacement on the line.

In contrast, a faulty toilet without an LRU must be replaced with an entire serviceable toilet (creating the need for stock toilets) and then the faulty toilet must be repaired at a location other than on the line.

Further, stressing a benefit of a claimed apparatus or method in the Specification does not incorporate that benefit into the claims. None of the identified disclosures rise to the level of a lexicographical definition. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994)

Nor do any of these disclosures rise to the level of clear disavowal. *See Epistar Corp. v. Int’l Trade Comm’n*, 566 F.3d 1321, 1335 (Fed. Cir. 2009) (mere criticism of a particular embodiment encompassed in the plain meaning of a claim term is not sufficient to rise to the level of clear disavowal).

Accepting Patent Owner’s interpretation that claim 13 requires quick and easy replacement of the LRU would cast serious doubt on the scope of claim 13. The terms “quickly” and “easily” are terms of degree, and the ’942 patent does not identify an objective standard for these terms. *See Seattle Box Co., Inc. v. Indus. Crating & Packing, Inc.*, 731 F.2d 818, 826 (Fed. Cir. 1984) (when a term of degree is used it is necessary to determine whether there is some standard for measuring that degree); *see also Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1350 (Fed. Cir. 2005) (“Some objective standard must be provided in order to allow the public to determine the scope of the claimed invention.”), *abrogated on other grounds by Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120 (2014). We made this point in our Institution Decision, and subsequently, Patent Owner did not identify any such standard in the ’942 patent. *See* Inst. Dec. 11; PO Resp. 11–22.

b) Installation of the Toilet

Patent Owner contends that the Board's interpretation is incorrect in that it does not require that the toilet remains installed during replacement of the LRU. PO Resp. 11–12. Patent Owner presents several contentions in support of this argument.

First, Patent Owner notes that during examination of what became the '942 patent, the title was changed from “Modular Vacuum Toilet” to “Modular Vacuum Toilet with Line Replaceable Units.”¹⁵ PO Resp. 12 n.2. According to Patent Owner, this change suggests that the toilet remains installed during replacement of the LRU. *Id.* The title change reflects that the claimed toilet includes LRUs. The title change is silent regarding whether the toilet remains installed during removal and replacement of an LRU.

Second, Patent Owner asserts that the '942 patent unambiguously requires that the toilet remain installed during replacement of the LRU because the patent includes a preferred embodiment of the toilet bowl that includes manual release tabs, and a preferred embodiment of the valve set includes hand-manipulated fasteners, such as knurled screws. PO Resp. 15 (citing Ex. 1001, 4:53–5:15, 5:48–52; Figs. 1–4). Claim 13 does not require that the toilet bowl be manually releasable because the embodiment that includes a toilet bowl having manual release tabs is found in dependent claim 16. Similarly, the valve set of claim 13 is not required to include knurled screws because the embodiment that includes a valve set having knurled screws is found in dependent claim 26. Consequently, Patent

¹⁵ Although the challenged claims are all method claims, the '942 patent includes apparatus claims, such as independent claim 1.

Owner's argument is not commensurate in scope with claim 13. More importantly, removal of an LRU without the use of tools is an independent issue from whether the toilet remains installed during that process.

Somewhat relatedly, Patent Owner contends that the '942 patent describes that the toilet remains installed during replacement of valve set 8, and our Institution Decision incorrectly determined otherwise. *See* PO Resp. 15–16 (citing Inst. Dec. 10). Patent Owner emphasizes that the '942 patent describes that “‘the valve set 8’ – like the toilet bowl [36] – ‘may be separately removed from the toilet,’ while the toilet assembly remains installed.” *Id.* at 16 (quoting Ex. 1001, 9:58–60). That is, Patent Owner interprets the disclosure that the valve set 8 may be “separately removed from the toilet,” means that the toilet remains installed while valve set 8 is removed and replaced.

The '942 patent does not explicitly state that the toilet remains installed during replacement of bowl 36 or valve set 8. Rather, the Specification describes that bowl 36, and similarly valve set 8, may be “independently removed from the toilet 10 and replaced.” Ex. 1001, 9:54–61. The meaning of removing and replacing these components independent of the toilet must be understood in view of the entire disclosure.

The Specification describes that in the prior art, the entire toilet was removed from the aircraft, and serviced elsewhere. *Id.* at 1:35–53. Consequently, when the Specification describes that bowl 36 is an LRU, and as a result, the entire toilet need not be removed and serviced, a person of ordinary skill in the art would understand that bowl 36 may be removed and replaced without the need for removing toilet 10 from the aircraft for maintenance elsewhere. *Id.* at 5:33–44.

Also relatedly, Patent Owner emphasizes that only piping connections between valve set 8 and the drain, sewer, and rinse water piping need be undone to remove valve set 8, illustrating that the toilet remains installed during the process of replacing valve set 8. PO Resp. 15–16 (citing Ex. 1001, 9:38–53). In other words, Patent Owner contends that the specified piping connections are the only thing attaching valve set 8. Not so. Valve set 8 is also attached by fasteners, such as knurled screws 37. Ex. 1001, 5:49–51; Fig. 1; *see also* Tr. 97–98 (Patent Owner acknowledging that the knurled¹⁶ screws must be removed to remove valve set 8). More importantly, Patent Owner’s focus on how valve set 8 is attached to the toilet is misplaced. The proper inquiry is whether the toilet remains installed during removal of valve set 8, and as explained above, the Specification does not describe that the toilet remains installed. Rather, the Specification describes that the toilet need not be taken elsewhere for replacement of the LRU (e.g., valve set 8).

c) Understanding of a Person of Ordinary Skill in the Art

Patent Owner provides evidence in support of how a person of ordinary skill in the art would have understood the term LRU. This evidence relates to all three of the limitations Patent Owner contends are missing from our interpretation.

Mr. Anderson contends that an LRU is

a modular component of a vacuum toilet, as opposed to the entire toilet assembly, that is designed or intended by the toilet manufacturer to be quickly and easily replaced in the field

¹⁶ The Transcript mistakenly refers to the knurled screws as “neural screws.”

without removing the vehicle such as aircraft from revenue service.

Ex. 2021 ¶ 16 (cited at PO Resp. 19). Mr. Anderson adds that the toilet remains installed during replacement of the LRU. *Id.* ¶ 17 (citing Ex. 1001, 9:55–60).

Mr. Jones contends that his understanding of an LRU is a single module that is designed to be replaced “on the line” or in other words, while the aircraft is still in the field and in revenue making status (i.e. revenue service), as opposed to being in a repair shop.

Ex. 2022 ¶ 21 (cited at PO Resp. 20). Mr. Jones goes on to state that the Federal Aviation Administration (FAA) defines LRU as something “that can be replaced by line maintenance personnel without removing the aircraft from service for an extended period.” *Id.* (citing Ex. 2049, Appendix A, 32¹⁷).

Mr. Meyers states that an LRU is a component or system that has been designed in such a manner that the parts that most commonly fail can be quickly removed and replaced on the vehicle. This allows the vehicle to be returned to scheduled service without undue delay for maintenance.

Ex. 2024 ¶ 16¹⁸ (citing Ex. 2048; cited at PO Resp. 20).

For the reasons that follow, Patent Owner’s evidence does not provide persuasive support for including any of the three limitations Patent Owner seeks to read into claim 13. Regarding whether removing and replacing the LRU must be quick and easy, the evidence provides three interpretations: it

¹⁷ Page 32 of Appendix A is page 67 of the Exhibit.

¹⁸ Exhibit 2024 includes both a redacted and an unredacted version of the Meyers Declaration.

must be quick and easy (Mr. Anderson), it must be quick (Mr. Meyers), and it need not be quick or easy (Mr. Jones and the FAA do not include a requirement that it be quick or easy).

Regarding whether the toilet must remain installed during removal and replacement of the LRU, Mr. Anderson states that the toilet must remain installed, while Mr. Jones, the FAA, and Mr. Meyers do not mention such a requirement.

Patent Owner's only evidence that a person of ordinary skill in the art would have understood an LRU to require that the toilet must remain installed during replacement of the LRU is Mr. Anderson. Mr. Anderson cites to the '942 patent. Ex. 2021 ¶ 17 (citing Ex. 1001, 9:55–60). However, as explained above, such a limitation is not imported into claim 13 because the language of claim 13 is broader than this example in the Specification. Consequently, Patent Owner provides no persuasive evidence that the toilet must remain installed during replacement of the LRU.

Regarding revenue service, Mr. Anderson and Mr. Jones contend that the aircraft is not removed from revenue service, the FAA definition states the aircraft is not removed for “an extended period,”¹⁹ and Mr. Meyers provides yet a third meaning, asserting that the aircraft is returned to service “without undue delay.” This is particularly troubling with regard to Mr. Jones because Mr. Jones states that FAA regulations apply to revenue service of commercial airlines, yet Mr. Jones contends the aircraft may not be removed from service while the FAA states it may not be removed for an extended period. *Compare* Ex. 2022 ¶ 22, *with* Ex. 2049, Appendix A, 32.

¹⁹ This definition implies that the aircraft may be removed from service for something less than an extended period.

Accepting Patent Owner’s interpretation that claim 13 requires the LRU to be removed and replaced without removing the aircraft from revenue status would cast serious doubt on the scope of claim 13. Patent Owner contends that the requirement to remove and replace the LRU without removing the vehicle on which the toilet is installed from revenue service means removing and replacing the LRU during the typical turn time of an aircraft. Paper 101, 59:16–21, 62:5–12; *see also* Ex. 2022 ¶ 24 (“‘Flight turn,’ refers to the short period of time when an aircraft arrives at a gate in an airport terminal to offload and load passengers and cargo and perform the reverse operation – loading new passengers and additional cargo before being pushed from the gate and returning to the air.”). However, turn time varies by airline, and consequently the time to complete a repair while in revenue status would vary as well. *Id.* Thus, if we accept Patent Owner’s claim construction, the time permitted to remove and replace the LRU would be unclear.

d) Summary of Patent Owner’s Arguments

The three limitations that Patent Owner seeks to read into claim 13 find no support in the language of claim 13. None of the disclosures of the ’942 patent rise to the level of a lexicographical definition, and there has not been disavowal of claim scope. Patent Owner’s extrinsic evidence is inconsistent and otherwise not persuasive. Further, the limitations Patent Owner seeks to add would likely would cast serious doubt on the proper scope of the claims. Patent Owner has not persuaded us that our claim interpretation is incorrect.

5. *Conclusion*

An LRU is a component or group of components, less than the entire vacuum toilet, that may be removed and replaced at the installation site of the toilet, and the toilet may or may not be uninstalled during this process.

D. RINSE FLUID DISPENSER

Claim 13 is directed to a method of servicing a vacuum toilet having a “rinse fluid dispenser” associated therewith.

In the Decision to Institute we determined that a rinse fluid dispenser as claimed may take the form of nozzles, (e.g., nozzles 46) or known substitutes such as spray rings. *See* Inst. Dec. 12; Pet. 8; Ex. 1001, 5:23-25. Neither party contests this interpretation, and we adopt it here.

IV. PATENTABILITY

A. INTRODUCTION

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art;

(3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.²⁰ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

We consider Patent Owner to have admitted those aspects of these grounds of unpatentability that are uncontested by Patent Owner and are material facts. See 37 C.F.R. § 42.23(a) (in an opposition, any material fact not specifically denied may be considered admitted), § 42.120(a) (the patent owner response is an opposition).

B. OBVIOUSNESS OVER GREGORY AND KENDALL
CLAIMS 13, 14, 18, 19, AND 22–24

1. *Claim 13*

a) *Ground of Unpatentability*

Gregory discloses a vacuum toilet (vacuum flushing water closet) having (1) a waste receptacle for receiving waste (bowl 10) defining an outlet (spout/outlet neck 25) and having a rinse fluid dispenser (spray ring 12) associated therewith, (2) a support structure in the form of a stationary frame support having a top with an opening therethrough, the waste receptacle including a sidewall sized for insertion into the opening and having an out-turned flange supported by the top of the support structure, (3) a discharge valve (discharge sewage valve 13) having an inlet in fluid communication with the receptacle outlet, an outlet in fluid communication with a sewer line placeable under partial vacuum pressure, and a moveable discharge valve member (valve head 65) disposed between the discharge valve inlet and the discharge valve outlet, (4) a rinse fluid valve (flushing

²⁰ The level of ordinary skill in the art was discussed earlier. Patent Owner does not present evidence of secondary considerations.

water flow valve 18) having an inlet in fluid communication with a source of rinse fluid, an outlet in fluid communication with the rinse fluid dispenser, and a moveable rinse fluid valve member disposed between the rinse fluid valve inlet and the rinse fluid valve outlet, and (5) a flush control unit (vacuum gravity timer 16) adapted to control actuation of the discharge valve member and rinse fluid valve member.²¹ Pet. 25–32; Ex. 1020 ¶¶ 220–226.

Kendall (Ex. 1014) discloses a toilet assembly that includes a waste receptacle (basin 1) having flanges 3 for securing to a frame (cradle like support means 30). Pet. 25–26, 28, 31–32; Ex. 1014, 4:21–25, 5:10–17, 21–25, Fig. 1; Ex. 1020 ¶¶ 95–97, 191. Kendall’s frame includes at least two vertical supports (spaced apart support walls 32A, 32B) and a top member (top section 33) that defines an opening and includes a receptacle engaging portion (pins 33A or attachment bolts). Pet. 25–26, 28, 31–32; Ex. 1014, 5:10–15, 5:66–6:9, Fig. 1; Ex. 1020 ¶¶ 198–227.

Petitioner contends that Gregory’s bowl is not detachable, but that it would have been obvious to modify Gregory’s vacuum toilet assembly so that the waste receptacle is detachable (and corresponds to an LRU) as taught by Kendall. Pet. 25–26; Ex. 1020 ¶¶ 194–196. Petitioner contends, and we agree, that when so modified, the waste receptacle (bowl 10) and FCU (vacuum gravity timer 16) each constitute an LRU as claimed, and the combined device could be serviced by removing and replacing an LRU.²² Pet. 26, 31–32; Ex. 1020 ¶¶ 198–227.

²¹ Parentheticals are Gregory’s nomenclature.

²² Although claim 13 only requires one LRU, Petitioner addresses two LRUs for dependent claim 14.

Petitioner reasons that Gregory's waste receptacle is seated in a snap relationship, suggesting the desirability of a removable waste receptacle such as in Kendall. Pet. 26; Ex. 1015, 5:36–39; Fig. 2. Petitioner adds that a person of ordinary skill in the art would have modified Gregory to improve support and stability of the waste receptacle and utilize an existing well known design technique. Pet. 26. Further, according to Petitioner, the designs are compatible and replacing a bowl as opposed to the whole toilet would be more convenient and less expensive. *Id.* at 26–27; Ex. 1020 ¶ 223.

We evaluate this ground of unpatentability further by analyzing Patent Owner's contentions and evidence of secondary considerations.

b) Gregory's bowl is an LRU

Patent Owner contends that Gregory's toilet bowl (bowl 10) is not an LRU because it is welded to other toilet components. PO Resp. 27. Specifically, the flange integrated to the upper wall of the bowl is welded to a wall of the toilet rim which in turn is welded or otherwise permanently attached to a "shroud-retaining bracket" that attaches the bowl to the outer shroud or shell. *Id.* (citing Ex. 1015, 4:4–10, 13–31; Ex. 2021 ¶ 26). For the reasons that follow, this contention is contradicted by the reference.

As an initial matter, Mr. Anderson's opinion is contrary to the express disclosure of Gregory. Gregory's bowl 10 is not welded or otherwise permanently attached to shroud 19; rather, bowl 10 is "releasably seated" in the peripheral channel formed by bracket 33 and rim wall portion 32 of bowl 10. Ex. 1015, 4:32–35; Fig. 3. Specifically, bowl 10 includes a rim 27 around the perimeter. Rim 27 includes an outer peripheral wall 31 with an inwardly folded lower end 32. Seated on lower end 32 and attached by welding or other suitable means is shroud retaining bracket 33 that extends

around the inner periphery of rim 27. The peripheral channel formed by bracket 33 and rim wall portion 32 is releasably seated on shroud 19. Ex. 1015, 4:4–35, Figs 1–3; Pet. 25–28; Pet. Reply 11–12; Anderson Deposition, Ex. 1052, 34:3–36:8; Hallmark Decl., Ex. 1069 ¶ 106 (interpreting Gregory in the same way).

Further, Mr. Anderson’s opinion is based in part on the interpretation that Gregory’s lug nuts and tie rods would impede maintenance; however, this portion of Gregory is not part of the ground of unpatentability. See Pet. 25–26, 28 (replacing Gregory’s tie rods with Kendall’s support structure).

Patent Owner also contends that Gregory’s bowl is not an LRU as claimed because removal of the lock nuts on the tie rods would have removed the vehicle from revenue service. PO Resp. 28–29. This argument is not commensurate in scope with the claim because remaining in revenue service is not a requirement of claim 13, and this argument is inapposite because Petitioner proposes to replace Gregory’s tie rods with Kendall’s support structure. See Pet. 25–26, 28.

c) Gregory’s Vacuum Gravity Timer is an LRU

Petitioner contends that Gregory’s vacuum gravity timer 16 is releasably mounted on the toilet assembly and corresponds to a FCU that is an LRU as claimed. Pet. 25; Ex. 1015, 6:25–27, Fig. 2. Indeed, Gregory’s vacuum gravity timer 16 is releasably mounted to mounting plate 72 of the toilet assembly by suitable machine screws 71. See Ex. 1015, 6:25–27, Figs. 1, 2; Pet. 25; Ex. 1020 ¶ 190.

Patent Owner argues that Gregory’s vacuum gravity timer 16 is not an LRU as claimed because the machine screws holding it in place are inaccessible so that removing the timer 16 would be difficult and time

consuming, and necessitate both uninstalling the toilet and removing the vehicle on which the toilet is installed from revenue service. PO Resp. 30–31 (citing Ex. 1015, 6:21–29, Fig 3;²³ Ex. 2021 ¶ 15).

The portion of the Anderson Declaration cited by Patent Owner pertains to the interpretation of an LRU as claimed and sheds no light on the accessibility to Gregory’s timer 16. Consequently, Patent Owner’s only supporting evidence is the reference itself.

We disagree with Patent Owner’s characterization of the reference. The cited portion of Gregory does not describe machine screws 71 as inaccessible. See PO Resp. 30 (citing Ex. 1015, 6:21–29). To the contrary, we are persuaded by Petitioner’s evidence that machine screws 71 were accessible and could be quickly and easily removed by a line mechanic with common hand tools. Pet. Reply 14; Ex. 1069 ¶ 111.

Further, Patent Owner’s contention is unpersuasive because claim 13 does not require: that replacing the LRU be quick and easy, that the toilet remain installed during replacement of the LRU, or that the vehicle on which the toilet is installed remain in revenue service.

d) Kendall is Analogous Art

Patent Owner contends that a person of ordinary skill in the art would not have considered Kendall because Kendall’s toilet differs from a vacuum toilet in several respects, including that it: is not used in vehicles, has a different structure, and does not have precision components or exacting weight and dimension requirements. PO Resp. 31–33, 37.

²³ Figure 3 is a rear view and provides a poor view of timer 16 which is mounted in the front half of the toilet. Figures 1 and 2 provide a better view. See Ex. 1015, 2:26–36; Figs. 1–3

A reference qualifies as prior art for an obviousness determination under § 103 only when it is analogous to the claimed invention. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004); *In re Clay*, 966 F.2d 656, 658 (Fed. Cir. 1992). A reference is considered analogous prior art: (1) if the reference is from the same field of endeavor as the claimed subjected matter, regardless of the problem addressed, or (2) if “the reference still is reasonably pertinent to the particular problem with which the inventor is involved,” even though the reference is not within the field of the inventor’s endeavor. *Bigio*, 381 F.3d at 1325.

Petitioner points out, and we agree, that Kendall relates to the problem faced by Patent Owner in that Kendall discloses the ability to repair components in place, and ease of access for repairs, concepts applicable to LRUs. See Pet. Reply 15; Ex. 1014, 2:36–41, 3:53–56; Ex. 1052, 70:14–71:6; 1068 ¶ 75; Ex. 1001, 1:35–53; see also Ex. 1001, 1:10–11 (describing that vacuum toilets have both vehicle and stationary applications). Consequently, Kendall logically would have commended itself to the problem facing the inventor of the ’942 patent. See *Scientific Plastic Products, Inc. v. Biotage AB*, 766 F.3d 1355 (Fed. Cir. 2014); see also *In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1379–80 (Fed. Cir. 2007) (holding that a reference may be reasonably pertinent as analogous art where the matter it deals with logically would have commended itself to the inventor’s attention).

e) Obviousness

As stated above, Petitioner contends that it would have been obvious to modify Gregory’s vacuum toilet assembly so that the waste receptacle is detachable in order to improve support and stability of the waste receptacle

and utilize an existing well known design technique, and because both designs are compatible. Pet. 25–26 (citing Ex. 1020 ¶¶ 194–196). Petitioner adds that replacing a bowl as opposed to the whole toilet would be more convenient and less expensive. Pet. 27 (Ex. 1020 ¶ 223).

Patent Owner argues that it would not have been obvious to combine Gregory and Kendall as proposed by Petitioner because removal of Gregory’s toilet bowl would have been difficult and time consuming, and would have necessitated uninstalling the toilet assembly and removing the vehicle from revenue service. PO Resp. 34–35. This argument is unpersuasive because it is not commensurate in scope with claim 13.

Similarly, Patent Owner contends that even if combined, Gregory and Kendall do not produce an LRU as claimed because Kendall’s support does not facilitate replacement at the site the toilet is installed without uninstalling the toilet and removing it from revenue service. PO Resp. 35–37. This contention is also not commensurate in scope with claim 13. Further, claim 13 requires at least one LRU and even if the bowl of the combined device is not an LRU, Patent Owner has done nothing to counter Petitioner’s assertion that Gregory’s FCU (vacuum gravity timer 16) is an LRU as claimed.

Patent Owner presents several arguments relating to the reason for combining the references. First, Patent Owner contends that Gregory does not contain a suggestion to substitute Kendall’s frame and flange structure for Gregory’s. PO Resp. 34. This is unpersuasive because such a strict application of the teaching, suggestion, or motivation test has been discredited by the Supreme Court. *See KSR*, 550 U.S. at 418.

Second, Patent Owner argues that a person of ordinary skill in the art would not have been motivated to import Kendall’s interior structural frame

into Gregory's vacuum toilet because Gregory sought to create a shock-proof toilet and Kendall simply disclosed a household toilet having an easily substitutable cosmetic outer shell. PO Resp. 37. In support of this argument, Patent Owner characterizes Gregory's bowl as fastened in place by welded flanges. *Id.* Similarly, Patent Owner argues that Kendall removes all load from the outer shell, while in contrast, Gregory stresses secure interconnection and impact-resistance of toilet parts, and these differences would have led a person of ordinary skill in the art away from combining them.²⁴ PO Resp. 39.

This argument is unpersuasive because it is not based on a reasonable characterization of the references as whole. As explained above, Gregory's bowl 10 is not welded or otherwise permanently attached to shroud 19, but is "releasably seated" in the peripheral channel formed by bracket 33 and rim wall portion 32 of bowl 10. Further, creating a shock proof toilet was not Gregory's sole objective. For example, Gregory sought to create a toilet that is simple, compact, light in weight, and economical. Ex. 1015, 1:22–25. Nor was Kendall's sole objective to create a cosmetic outer shell. Kendall intended the outer shell to be removable for servicing. Ex. 1014, 3:9–11. Further, Patent Owner does not explain cogently why the characteristics that Kendall removes load from the outer shell and that Gregory stresses secure connections would have led a person of ordinary skill away from the claimed subject matter.

Third, Patent Owner contends that the goal of having a simple and compact design is shared by many references, and is not, in itself, a

²⁴ Although not explicitly labeled as such, this appears to be a "teaching away" argument.

sufficient rationale. PO Resp. 38. Petitioner does not provide that reasoning as the entire rationale; rather, as detailed above, providing a simple, compact design is one of several reasons for combining the references proffered by Petitioner.

Patent Owner contends that Dr. Dershowitz's opinion that the similar structure of Gregory and Kendall was a reason to combine is deficient because they are entirely different toilets. PO Resp. 38–39. There are differences between Gregory's toilet and Kendall's toilet. There are also similarities. *See* Pet Reply 17 (noting that the references both relate generally to toilets, have many of the same basic components, face the same problems of long term use and the corrosive and potentially hazardous nature of human waste). The fact that the references differ, without more, does not demonstrate the nonobviousness of the claimed subject matter.

f) Secondary Considerations

Patent Owner contends that the nonobviousness of the claimed methods is demonstrated by secondary considerations, namely, that the claimed methods (1) satisfied a long-felt and unmet need for improved methods of servicing vacuum toilets, (2) received industry praise, and (3) were commercially successful. PO Resp. 52–53.

(1) Satisfaction of Long-felt Need

Patent Owner contends that “[a]t the time of the invention of the ‘942 Patent, vacuum toilets, particularly on aircraft, did not include a toilet bowl, rinse valve, discharge valve, and/or FCU that could be replaced in the field while the toilet assembly remained installed.” PO Resp. 53 (citing Anderson Decl., Ex. 2021 ¶ 18; Jones Decl., Ex. 2022 ¶ 25). Patent Owner elaborates that in the prior art, the entire toilet was uninstalled and removed from the

aircraft, removing the aircraft from revenue service. *Id.* at 54. Patent Owner contends that the claimed methods “finally made it possible for maintenance persons and airlines to service vacuum toilets without requiring that the aircraft be removed from revenue service.” *Id.*

This evidence is deficient in at least three respects. First, it states only that there was a need *at the time* of the invention. It does not allege, let alone show, that an art recognized problem existed for a long period of time without solution.²⁵ See *Newell Cos. v. Kenney Mfg. Co.*, 864 F. 2d 757, 768 (Fed. Cir. 1988).

Second, this evidence does not address the extent of the problem, or attempts by others to solve the problem. See *In re Allen*, 324 F.2d 993, 997 (CCPA 1963) (an allegation of failure by others is not evidence of nonobviousness unless it is shown that widespread efforts of skilled workers having knowledge of the prior art had failed to find a solution to the problem).

Third, this evidence lacks nexus to the claimed subject matter in that the claims do not require that aircraft on which the toilet is installed to remain in revenue service during replacement of an LRU. See *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 305 n.42 (Fed. Cir. 1985).

²⁵ Similarly, the '942 patent states that, at the time, there was a need for a vacuum toilet that is easier to maintain and reduces the number of stock parts required (Ex. 1001, 2:45-47), and the '942 patent does not address how long this need existed.

(2) *Industry Praise*

Patent Owner contends that praise specifically related to features of the patented invention is probative of the nonobviousness of an invention. PO Resp. 54–55 (citing *Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1352 (Fed. Cir. 2010)). Patent Owner identifies two sources of praise: one, an April 2015 story on Skift, a travel and airline industry website, and two, praise from Petitioner, as a competitor.

The Skift article is titled, “The Airline Toilet That is Set to Revolutionize In-Flight Relief.” Ex. 2025, 1. The article describes that traditional toilets had to be replaced as an entire unit, and had a right or left hand pipe version so that airlines had to stock both versions of the toilet. *Id.* at 2; *see also* Ex. 1001, 2:35–37. The Revolution toilet includes a number of interchangeable sub-assembly parts, and a reversible pipe, permitting airlines to stock sub-assemblies rather than entire toilets, and to quickly replace faulty parts. Ex. 2025, 2. The article goes on to state that “[t]he very best part” of the Revolution toilet is that the bowl is made of a new composite that is lighter and yet has the lubricity of Teflon. *Id.* at 3.

Patent Owner states, but provides no evidence, that the Revolution toilet is the toilet of the ’942 patent. *See* PO Resp. 54–55; *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) (attorney’s arguments do not take the place of evidence). The article provides some praise that can be tied to claimed features, like the ability to stock sub-assemblies rather than entire toilets. However, other praise is not tied to claimed features (e.g., the reversible pipe). Further, the praise for claimed features should be considered in the context that the article explicitly describes the bowl’s composition, an unclaimed feature, as the very best part of the toilet.

According to Patent Owner, Petitioner developed a vacuum toilet that includes modular LRU's based on the invention from Patent Owner and Patent Owner's predecessor, Evac, and therefore the praise for Petitioner's toilets, is actually praise for the claimed subject matter. PO Resp. 55–56; Meyers Decl., Ex. 2024 ¶¶ 17–18. For the reasons that follow, this evidence does not demonstrate effectively praise for the claimed subject matter. The portion of Exhibit 2019 cited by Mr. Meyers contains no reference to the Environmax/Emax toilet.²⁶ The portion of Exhibit 2020 cited by Mr. Meyers includes the following statements:

2001-Envirovac Begins Development of Advanced Technology toilet – E-max

2007-B/E [Petitioner] Enters Market; resurrects Advanced Technology²⁷

In this context, Petitioner's use of the phrase "Advanced Technology" seems to be the name of the toilet rather than a comment that the technology of the toilet is advanced.

This evidence also does not demonstrate effectively a nexus to the claimed subject matter. For example, Mr. Meyers simply refers to LRUs in general, while the claimed subject matter covers LRUs in the form of a discharge valve, rinse fluid valve, flush control unit, and waste receptacle.

²⁶ See Ex. 2019, page labeled "BE-MAG-001-00004725" and labeled "Page 6." Perhaps a different page reference was intended; however, after a reasonable search we were unable to locate any information matching what is asserted.

²⁷ See Ex. 2020, page labeled "BE-MAG-001-00103175," and labeled "Page 3."

See Ex. 2024 ¶ 17. From this information, Patent Owner has not established persuasively that Petitioner's LRUs are in fact LRU's as claimed.

Although Patent Owner has identified some praise of the claimed subject matter, Patent Owner has not effectively shown that the praise specifically relates to features of the patented invention. See *Power-One*, 599 F.3d at 1352.

(3) *Commercial Success*

Patent Owner contends that the commercial success of the Revolution™ toilet is further evidence of the nonobviousness of the claimed subject matter. PO Resp. 56–57. Patent Owner provides evidence that 103 units were sold in 2014. *Id.* at 56; Conrad Decl., Ex. 2055 ¶¶ 1, 5. Patent Owner also provides projections of sales, to include projections of market share. PO Resp. 56. According to Mr. Conrad, “[s]ales of the Revolution™ toilet are driven in large part by the very high reliability and simplicity of maintenance of the toilet which is a function of the design and how easily and quickly the modular components of the Revolution™ toilet can be replaced ‘on wing.’” Ex. 2055 ¶ 7; PO Resp. 57. Patent Owner provides evidence that Petitioner's toilets that include the claimed LRUs moved Petitioner's market share for water and waste systems from zero percent in 2008 to a projected four percent by the year 2020, growth that Mr. Conrad contends the aircraft supplier industry would consider “astounding.” PO Resp. 57; Ex. 2055 ¶ 9.

This evidence is unpersuasive for several reasons. First, Patent Owner has not provided persuasive evidence of actual market share. Without actual market share information, the 103 units sold in 2014 cannot be put in perspective. See *In re Applied Materials, Inc.*, 692 F.3d 1289, 1299 (Fed.

Cir. 2012) (even the number of units sold, without market share information, is only weak evidence, if any, of commercial success). The projections of Patent Owner's sales and Petitioner's sales are only estimates of future activity and do not persuasively show the actual commercial success of the claimed subject matter. Further, the projections regarding sales of Petitioner's toilets speak in terms of the "water and waste systems market for commercial aircraft" and it is unclear what portion of this market is attributable to vacuum toilets. *See* Ex. 2055 ¶ 9.

Second, Patent Owner provides evidence of sales of Revolution™ toilets and Petitioner's toilets, but in both cases, Patent Owner does not explain persuasively how the sales are tied to claimed features. *See* PO Resp. 56–57; Ex. 2055 ¶¶ 5, 6, 9; Ex. 2024 ¶¶ 18–19. That is, Patent Owner has not shown that either the Revolution™ toilet or Petitioner's toilet(s) include claimed features, and for that reason we do not presume success of these products is due to the invention of the '942 patent. *See PPC Broadband, Inc. v. Corning Optical Communications RF, LLC*, No. 2015–1361, 2016 WL 692368, at *8 (Fed. Cir. Feb. 22, 2016). In fact, Patent Owner's evidence attributes sales to unclaimed features (e.g., reliability, simplicity of maintenance, and the ease and speed with which modular components may be replaced "on wing"). *See* Ex. 2055 ¶ 7; *Applied Materials*, 692 F.3d at 1299–1300 (sales must be a direct result of the unique characteristics of the invention, and not a result of economic and commercial factors unrelated to the quality of the patented subject matter). Because Patent Owner's evidence does not show that either the Revolution toilets or Petitioner's toilets are the toilets disclosed in the '942 patent, we do not

presume the commercial success is of these products is due to the patented invention.

(4) *Summary of Secondary Considerations*

Patent Owner provides some evidence of a need at the time of invention, but does not persuasively show that the need was long-felt. This weak evidence of need is further undermined by the absence of a nexus to the claimed subject matter. Patent Owner shows some praise for the Revolution toilet and praise by Petitioner of Petitioner's toilets, but this evidence is not persuasive because of a lack of nexus to the claimed subject matter. Patent Owner's evidence of commercial success does not demonstrate persuasively market share, and is not tied to claimed features.

g) *Conclusion for claim 13*

We have considered the entirety of the evidence, to include the evidence of secondary considerations. The weak evidence of secondary considerations does not outweigh the strong case for obviousness of claim 13 based on our analysis of the prior art. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 13 is unpatentable for obviousness under 35 U.S.C. § 103(a) over Gregory and Kendall.

As mentioned in our analysis of Patent Owner's Motion to Exclude Evidence, a key factual basis of Patent Owner's secondary considerations is the contention that at the time of the invention of the '942 Patent, vacuum toilets, particularly on aircraft, did not include a toilet bowl, rinse valve, discharge valve, and/or FCU that could be replaced in the field while the toilet assembly remained installed. *See, e.g.*, PO Resp. 53.

Petitioner has provided persuasive evidence that Patent Owner's contention is not true. For example, Petitioner provides copies of Patent Owner's SBs that indicate that, prior to the time of the '942 invention, it was possible to remove and replace components of a vacuum toilet installed in an aircraft, such as a rinse valve, without removing the toilet from the aircraft. *See* Ex. 1069 ¶ 92; Ex. 1061, 1–2. This evidence undermines Patent Owner's secondary considerations. We emphasize that even without Petitioner's evidence, Patent Owner's secondary considerations did not alter our conclusion of obvious.

2. *Claims 14, 18, 19, 22–24*

Patent Owner only argues for independent claim 13 and provides no additional arguments for dependent claims 14, 18, 19, and 22–24.²⁸

Claim 14 depends from claim 13 and recites “the waste receptacle is the line replaceable unit.” As explained above, the waste receptacle of the proposed combination is an LRU as claimed. *See* Pet. 32.

Claim 18 depends from claim 13 and recites, “in which a rinse fluid pipe communicates between the rinse fluid valve outlet and the rinse fluid dispenser, wherein the rinse fluid pipe is releasably attached to the rinse fluid dispenser with a coupling.” Gregory discloses that rinse fluid (flushing water) is “supplied to the spray ring 12 from a conduit or hose . . . connected to the outlet end of the flushing water supply valve 18.” Pet. 32; Ex. 1015, 5:66–6:1, Figs 1, 2.

²⁸ Consequently, Patent Owner has admitted the material facts of the ground of unpatentability regarding these claims. *See* 37 C.F.R. §§ 42.23(a), 42.120(a).

Claim 19 depends from claim 18 and recites, “in which the coupling is manually releasable.” Gregory’s spray ring 12 is described as “detachably mounted,” and “releasably snapped into place,” and consequently is manually releasable as claimed. Pet. 33; Ex. 1015, 2:1–7, 4:54–58; Ex. 1020 ¶ 235.

Claim 22 depends from claim 13 and recites, “in which a rinse fluid line communicates between the rinse fluid valve inlet and the source of rinse fluid, wherein the rinse fluid valve inlet is releasably connected to the rinse fluid line with a coupling.” Claim 23 depends from claim 13 and recites, “in which the coupling is manually releasable.”

We agree with Dr. Dershowitz’s explanation that Gregory’s flushing water flow valve 18 is connected to a source of rinse fluid because it is operatively attached to a flushing water supply line 227 and directs water to spray ring 12. Pet. 33; Ex. 1015, 3:40–52, 5:13–23, Figs. 2, 3; Ex. 1020 ¶ 239. Further, inlet fitting 49 is connected in “any suitable manner” which would have included a manually releasable coupling as depicted in Figure 2. Pet. 33; Ex. 1015, 5:18–23, Fig. 2; Ex. 1020 ¶ 239.

Claim 24 depends from claim 13 and recites, “in which a discharge pipe communicates between the discharge valve outlet and the sewer line, wherein the discharge pipe is adapted for releasable connection to the sewer line.” We agree with Dr. Dershowitz’s explanation that Gregory discloses a discharge pipe such as outlet pipe 61 illustrated in Figs. 2 and 15 exiting the discharge valve 13 in a lateral direction, and ordinarily such a connection would be releasable. *See* Ex. 1020 ¶ 243; Pet. 34; Ex. 1015, 5:39–48.

Patent Owner’s weak evidence of secondary considerations does not outweigh the strong case for obviousness of these claims based on our

analysis of the prior art. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 14, 18, 19, and 22–24 are unpatentable for obviousness under 35 U.S.C. § 103(a) over Gregory and Kendall.

C. OBVIOUSNESS OVER OLIN AND KENDALL
CLAIMS 13, 14, 18, 19, AND 22–24

Petitioner contends that Olin (Ex. 1024) discloses a vacuum toilet that includes a discharge valve (sewer valve 4), rinse fluid valve (water dosing device 5), and FCU (flush control unit 6) that are readily accessible when the shroud is taken away so that the components may be removed or serviced in place, and thus, these components correspond to LRUs.²⁹ Pet. 50–60.

Petitioner proposes to modify Olin's floor mounted toilet to incorporate a floor mounted support structure that cradles the bowl, such as disclosed by Kendall (Ex. 1014). Pet. 51 (referencing the discussion of Kendall with regard to the ground of unpatentability based on obviousness over Gregory and Kendall).

Petitioner asserts that when so modified, the discharge valve (sewer valve 4), rinse fluid valve (water dosing device 5), FCU (flush control unit 6), and waste receptacle, each correspond to an LRU as claimed, and the toilet may be serviced by removing and replacing an LRU.³⁰ *Id.* at 50–51, 56.

²⁹ Parentheticals are Olin's nomenclature.

³⁰ Although claim 13 only requires one LRU, Petitioner addresses two LRUs for dependent claim 14.

Petitioner reasons that Olin’s disclosure that the toilet may be floor mounted rather than wall mounted is an express suggestion to incorporate a structure such as Kendall’s. *Id.*; Ex. 1020 ¶¶ 358, 363, 365–366 (providing details of how Kendall discloses a structure that provides the means to carry out Olin’s suggestion). Petitioner also reasons that the modification will provide a bowl that is replaceable in the field. *Id.*

We evaluate this ground of unpatentability further by analyzing Patent Owner’s contentions and evidence of secondary considerations.

1. *Claim 13*

a) *Olin’s Waste Receptacle is an LRU*³¹

Patent Owner argues that “Olin is not designed as an LRU that is capable of replacement without uninstalling the entire toilet and removing the vehicle from revenue service.” PO Resp. 41. Petitioner proposes to modify Olin’s bowl to be supported as disclosed by Kendall. Pet. 50–53 (Olin as modified includes an out-turned flange 3 as taught by Kendall, supported by a structure as taught by Kendall). Consequently, Patent Owner’s argument attacks Olin individually rather than addressing the combination as proposed by Petitioner. *See, e.g., In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references)).

Patent Owner argues that Olin teaches away “from a toilet bowl that can be replaced in the field, while the toilet assembly remains installed and while the vehicle remains in revenue service” because it is firmly locked in

³¹ We reiterate that claim 13 only requires one LRU (i.e. at least one of the discharge valve, rinse fluid valve, flush control unit, and waste receptacle).

place. PO Resp. 41–42. Patent Owner’s comments are directed to Olin’s wall mounted embodiment; however, such comments are misplaced because Petitioner relies upon Olin’s floor mounted embodiment. *See* Pet. 51;³² Inst. Dec. 21. Further, Patent Owner does not identify, nor do we discern, any disclosure in Olin that criticizes, discredits, or otherwise discourages configuring a toilet bowl to be replaceable in the field. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). To the contrary, Olin discloses that the discharge valve (sewer valve 4), rinse fluid valve (water dosing device 5), and FCU (flush control unit 6) are all readily accessible and may be removed or serviced in place, suggesting the desirability of replacement in the field. *See* Ex. 1024, 4:42–46; Fig. 4; Pet. 51; Pet. Reply 19.

According to Patent Owner, Olin’s toilet bowl is not an LRU because removing it would be overly complicated and time consuming, and would necessitate removing the toilet from its installation site and taking the vehicle it is installed in out of revenue service. PO Resp. 42–44. This assertion is not commensurate in scope with claim 13 because claim 13 does not require that removal and replacement of the LRU is easy or quick, is accomplished while the toilet remains installed, or that the vehicle on which the toilet is installed remains in revenue service.

b) Olin’s Discharge Valve, Rinse Fluid Valve, & FCU are an LRU

Patent Owner argues that none of Olin’s discharge valve (sewer valve 4), rinse fluid valve (water dosing device 5), and FCU (flush control unit 6) are an LRU as claimed. PO Resp. 44–46. In support, Patent Owner asserts

³² The Petition cites to column 4 lines 30–40 of Exhibit 1024, but the disclosure is actually at column 3.

that the configuration of Olin is such that these devices cannot be replaced without uninstalling the toilet and removing the vehicle on which the toilet is installed from revenue service. *Id.* at 45–46. This argument is unpersuasive for several reasons.

First, some of Patent Owner’s evaluation is unresponsive because it relates to Olin’s wall mounted embodiment rather than the combination of Olin’s floor mounted toilet and Kendall’s support structure. *See* PO Resp. 45 (referring to caulk between the shell and the wall). Second, Patent Owner’s contention is contradicted by the reference, which, as discussed above, discloses that the devices at issue are all readily accessible and may be removed or serviced in place. *See* Ex. 1024, 4:42–46; Fig. 4; Pet. 51; Pet. Reply 19. Third, Patent Owner’s assertions are not commensurate in scope with claim 13 because claim 13 does not require that the toilet remain installed while the LRU is replaced, nor does it require that the vehicle on which the toilet is installed remain in revenue service.

c) Kendall is Analogous Art

Patent Owner repeats the argument that a person of ordinary skill in the art would not have considered Kendall. PO Resp. 46; *see also* Ex. 2021 ¶ 41 (arguing it would not have made sense to consider Kendall’s toilet). This contention is unpersuasive for the reasons discussed above.

d) Obviousness

As detailed above, Petitioner proposes to modify Olin so that the toilet bowl is supported as disclosed by Kendall. According to Petitioner a person of ordinary skill in the art would have done this because Olin expressly discloses that the toilet may be floor mounted and because it provides a bowl that is replaceable in the field.

Patent Owner argues that a person of ordinary skill in the art would not have made the proposed combination because it would be complicated and difficult to remove and replace Olin's bowl, and because Kendall's support structure is fundamentally incompatible with Olin's toilet and vacuum toilets generally. PO Resp. 46–47 (citing Anderson Decl., Ex. 2021 ¶¶ 34, 40–41). Mr. Anderson states that replacing a toilet bowl such as Kendall's would be difficult. Ex. 2021 ¶ 34. Mr. Anderson also states that: there is “no similarity” between Olin's toilet and Kendall's, Olin's bowl is already secured, Olin's toilet carries load in the shell and Kendall does not, and Kendall's structure would have added size, weight, and complexity and made accessing internal components more difficult. *Id.* ¶ 40.

Patent Owner's argument is not commensurate in scope in that it relates to the difficulty of changing components.

The fact that the references differ, without more, does not demonstrate the nonobviousness of the claimed subject matter. Further, we are persuaded by Petitioner that there similarities between Olin's and Kendall's toilets. Pet. Reply 20–21. For example, Olin's discharge valve (sewer valve 4), rinse fluid valve (water dosing device 5), and FCU (flush control unit 6) are designed to be accessible for service and Kendall's shell is removable to facilitate service access. *Id.* Further, Petitioner explains that the references both relate generally to toilets, have many of the same basic components, and face the same problems of long term use and the corrosive and potentially hazardous nature of human waste. *Id.* at 20 (referring to Pet. Reply 19); *see also* Pet. 51 (citing Ex. 1020 ¶¶ 348, 357, 383 and explaining that Olin and Kendall both include shells that facilitate maintenance); Ex. 1001, 1:5–6, 10–11 (describing that the claimed vacuum toilet generally

relates to toilets, and that vacuum toilets have both vehicle and stationary applications).

Patent Owner identifies some potential drawbacks of the proposed modification (e.g., added weight), but fails to weigh the alleged drawbacks against the benefits identified by Petitioner (i.e., providing a floor mountable toilet with a bowl that can be replaced in the field). *See Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (“[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”); *Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) (“The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one another.”).

e) Conclusion for claim 13

Patent Owner’s weak evidence of secondary considerations does not outweigh the strong case for obviousness of claim 13. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 13 is unpatentable for obviousness under 35 U.S.C. § 103(a) over Olin and Kendall.

2. Claims 14, 18, 19, 22–24³³

Regarding claim 14, as discussed above, Olin and Kendall disclose a waste receptacle that is an LRU as claimed. *See* Pet. 58.

³³ Patent Owner provides no additional arguments for the dependent claims and therefore has admitted the material facts of this ground unpatentability for these claims. *See* 37 C.F.R. §§ 42.23(a), 42.120(a).

Regarding claims 18 and 19, we agree with Dr. Dershowitz's explanation that Olin discloses a rinse fluid pipe (flexible hose) that communicates between the rinse fluid valve (dosing device 5) outlet and the rinse fluid dispenser (nozzles 15), wherein the rinse fluid pipe is releasably attached to the rinse fluid dispenser with a manually releasable coupling. Ex. 1020 ¶¶ 395–397, 399; Pet. 59; Ex. 1024, 4:41–50, Fig. 4.

Regarding claims 22 and 23, we agree with Dr. Dershowitz's explanation that Olin discloses a rinse fluid line that communicates between the rinse fluid valve (dosing device 5) inlet and the source of rinse fluid, wherein the rinse fluid valve inlet is releasably connected to the rinse fluid line with a manually releasable coupling. Ex. 1020 ¶ 401; Pet 59; Ex. 1024, 4:41–46; Figs. 1–4.

Regarding claim 24 we agree with Dr. Dershowitz's explanation that Olin discloses a discharge pipe (short pipe 7 in Figs. 1–3) that communicates between the discharge valve outlet (sewer valve 4) and the sewer line, wherein the discharge pipe is adapted for releasable connection to the sewer line. See Ex. 1020 ¶ 405; Pet. 60; Ex. 1024, 4:25–48, Figs. 1–3.

On this record, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 14, 18, 19, and 22–24 are unpatentable for obviousness under 35 U.S.C. § 103(a) over Olin and Kendall.

V. MOTIONS TO SEAL

Patent Owner filed two Motions to Seal (Papers 39 and 87), and Petitioner also filed two Motions to Seal (Papers 66 and 95). There is a strong public policy in favor of making information filed in an *inter partes*

review open to the public, especially because the proceeding determines the patentability of claims in an issued patent and, therefore, affects the rights of the public. *See Garmin International v. Garmin Speed Technologies, LLC*, Case IPR2012-00001 (PTAB Mar. 14, 2013) (Paper 34). Under 35 U.S.C. § 316(a)(1) and 37 C.F.R. § 42.14, the default rule is that all papers filed in an *inter partes* review are open and available for access by the public; a party, however, may file a concurrent motion to seal and the information at issue is sealed pending the outcome of the motion. It is, however, only “confidential information” that is protected from disclosure. 35 U.S.C. § 316(a)(7); *see* Trial Practice Guide, 77 Fed. Reg. at 48,760. The standard for granting a motion to seal is “for good cause.” 37 C.F.R. § 42.54(a). The party moving to seal bears the burden of proof in showing entitlement to the requested relief, and must explain why the information sought to be sealed constitutes confidential information. 37 C.F.R. § 42.20(c).

In reviewing the underlying documents that are sought to be sealed, we conclude that they may contain confidential information. Accordingly, we are persuaded that good cause exists to have some of the documents remain under seal. In that respect, the Motions to Seal (Papers 39, 66, 87, and 95) are granted, except for information that is discussed in or relied on by this decision. With regard to such information, pertinent to substantive patentability analysis leading to the determination that claims 13, 14, 18, 19, and 22–24 are unpatentable, we discern no reason to shield them from the public. The parties have shown no good cause to seal such information.

The Office Patent Trial Practice Guide provides:

Expungement of Confidential Information: Confidential information that is subject to a protective order ordinarily would become public 45 days after denial of a petition to institute a trial

or 45 days after final judgment in a trial. There is an expectation that information will be made public where the existence of the information is referred to in a decision to grant or deny a request to institute a review or is identified in a final written decision following a trial. A party seeking to maintain the confidentiality of information, however, may file a motion to expunge the information from the record prior to the information becoming public. § 42.56. The rule balances the needs of the parties to submit confidential information with the public interest in maintaining a complete and understandable file history for public notice purposes. The rule encourages parties to redact sensitive information, where possible, rather than seeking to seal entire documents.

77 Fed. Reg. 48756, 48766 (Aug. 14, 2012).

Consequently, 45 days from entry of this decision, all information subject to a protective order will be made public by default. In the interim, a party seeking to maintain confidentiality of information that was not relied upon in this decision, may file a motion to expunge that information. *See* 37 C.F.R. § 42.56.

VI. ORDER

For the reasons given, it is:

ORDERED that claims 13, 14, 18, 19, and 22–24 of U.S. Patent No. 6,353,942 B1 have been shown by a preponderance of the evidence to be unpatentable over Gregory and Kendall;

ORDERED that claims 13, 14, 18, 19, and 22–24 of U.S. Patent No. 6,353,942 B1 have been shown by a preponderance of the evidence to be unpatentable over Olin and Kendall;

FURTHER ORDERED that Patent Owner's Motion to Exclude is denied;

FURTHER ORDERED that Petitioner's Motion to Exclude is denied;

FURTHER ORDER that the Motions to Seal are granted-in-part and denied-in-part as noted herein; and

FURTHER ORDERED that, because this is a Final Written Decision, 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.

IPR2014-01510
Patent 6,353,942 B1

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