

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAFRAN CABIN INC.,
Petitioner,

v.

B/E AEROSPACE, INC.,
Patent Owner.

IPR2022-00749
Patent 10,625,862 B2

Before SCOTT A. DANIELS, CARL M. DEFRANCO, and
RICHARD H. MARSCHALL, *Administrative Patent Judges*.

DANIELS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Safran Cabin Inc. (“Safran” or “Petitioner”) filed a Petition requesting *inter partes* review of claims 1–19 of U.S. Patent No. 10,325,862 (Ex. 1001, “the ’862 patent”). Paper 1 (“Pet.”). B/E Aerospace, Inc., (“B/E” or “Patent Owner”) filed a Preliminary Response to the Petition. Paper 6 (“Prelim. Resp.”).

Following our Institution Decision (Paper 10, “Inst. Dec.”), Patent Owner filed a Response. Paper 15 (“PO Resp.”). Petitioner filed a Reply. Paper 20 (“Pet. Reply”). Patent Owner filed a Sur-Reply. Paper 22 (“PO Sur-Reply”). A hearing was held on July 19. A transcript of the hearing has been entered as Paper 27. (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). For the reasons explained below, we determine that claims 1–19 are unpatentable.

A. Real Parties in Interest

Petitioner states that Safran Cabin, Inc. is the real party in interest and “[n]o other entity is controlling, directing, or funding the submission of this petition and any proceeding initiated as a result thereof.” Pet. 2. Petitioner points out that Safran Cabin, Inc. “is an indirectly-owned subsidiary of Safran S.A.,” and that Safran S.A. is also the parent company of other entities also involved in the underlying district court lawsuit, including: Safran Seats USA LLC; Safran Seats Santa Maria LLC; Zodiac Seats California LLC; MAG Aerospace Industries, LLC; Safran Cabin Bellingham, Inc.; and Northwest Aerospace Technologies, Inc. *Id.* at 2–3.

Patent Owner states that B/E Aerospace, Inc. is the patent owner and real party in interest. Paper 4, 2.

B. Related Matters

The parties indicate that the '862 patent and related U.S. Patent Nos. 8,590,838, 9,073,641, 9,365,292, 9,434,476, 9,440,742 have been asserted against Petitioner in *B/E Aerospace, Inc. v. Safran Cabin Inc.*, No. 2:19-cv-01480 in the U.S. District Court for the Central District of California. Pet. 3; Paper 4, 2. The district court litigation is currently stayed based on the Court's Order Regarding Joint Stipulation Regarding Defendants' Motion to Stay of June 14, 2022. Ex. 3001.

Petitioner states further that “[o]n March 15, 2022, Petitioner filed requests for ex parte reexamination challenging all remaining claims of the other patents asserted in the Underlying Litigation.” Pet. 3. Petitioner indicates that the related reexamination control numbers for these patents are: 8,590,838 (90/014,978); 9,073,641 (90/014,979); 9,365,292 (90/014,981); 9,434,476 (90/014,982); and 9,440,742 (90/014,980). *Id.*

We also point out that the '862 patent claims priority to a U.S. application that issued as U.S. Patent No. 8,590,838 (“the '838 patent”), which patent was the subject of Case IPR2014-00727 between Petitioner and Patent Owner. Ex. 1001, code (63). In the final written decision in that case, the Board held that claims 1, 3–7, 9, 10, 12–14, 16–19, 21, 22, 24–29, 31, and 33–37 had been proven unpatentable, and claims 8, 20, 30, and 38 had not been proven unpatentable. IPR2014-00727, Paper 65. Both sides appealed, and the Court of Appeals affirmed. *See B/E Aerospace, Inc. v. C&D Zodiac, Inc.*, 709 F. App'x 687, 2017 WL 4387223 (Fed. Cir. Oct. 3, 2017).

C. The '862 Patent (Ex. 1001)

The '862 patent, titled “Aircraft Interior Lavatory,” describes space-saving aircraft enclosures, including lavatories, closets, and galleys. Ex.

1001, code 54, 1:23–29, 2:24–34. Figure 2 of the '862 patent is reproduced below.

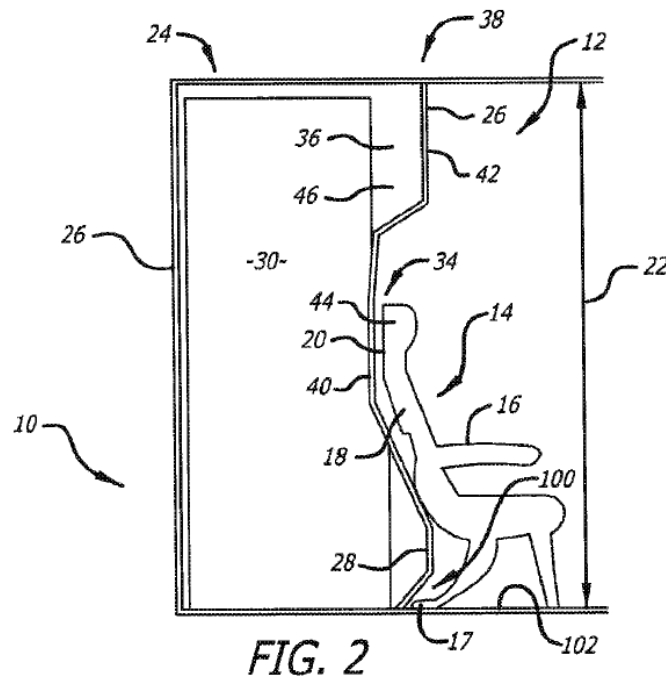


Figure 2 illustrates enclosure 10, for instance a lavatory, positioned aft of aircraft cabin 12. *Id.* at 4:29–41. Forward wall 28 of the lavatory is described as “substantially not flat in a vertical plane” and “disposed immediately aft of and adjacent to or abutting the exterior aft surface of” passenger seat 16. *Id.* at 4:38–42. In particular, the forward wall is shaped to provide recess 34, which accommodates the partially-reclined backrest of the passenger seat, as shown in Figure 2. *Id.* at 4:42–45. In addition, the forward wall is shaped to also provide lower recess 100, which accommodates “at least a portion of an aft-extending seat support 17.” *Id.* at 4:48–53.

The '862 patent contrasts the embodiment of Figure 2 with a prior art lavatory configuration having a flat forward wall shown in Figure 1 reproduced below.

FIG. 1
(Prior Art)

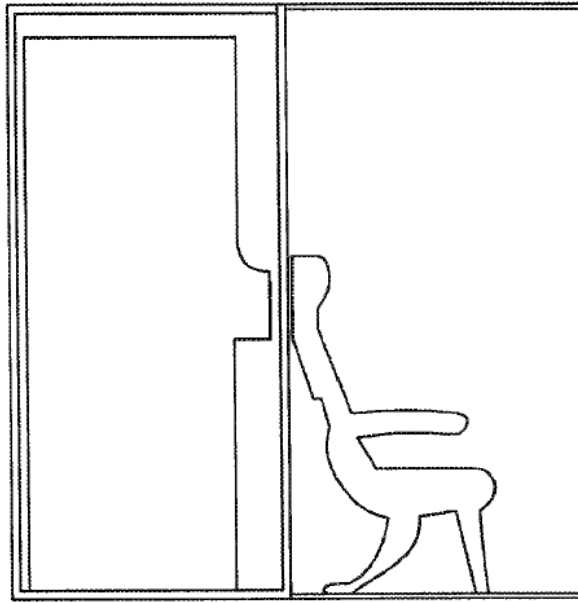


Figure 1 illustrates “a prior art installation of a lavatory immediately aft of an adjacent to an aircraft passenger seat.” Ex. 1001, 4:13–15.

D. Illustrative Claims

Claims 1, 11, 18 and 19 are independent. Each of claims 2–10 and 12–17 ultimately depend from independent claims 1 and 11, respectively. Claims 1–3 illustrate the claimed subject matter and are reproduced below:

1. [1 Pre]¹ A lavatory for a cabin of an aircraft, comprising:
 - [1a] a plurality of walls including a first wall and a second wall opposite the first wall, wherein the first wall and the second wall define a lavatory stall unit for the lavatory, the second wall comprising:
 - [1b] an upper portion;
 - [1c] a middle portion defining an upper recess below the upper portion, wherein a first distance between the upper portion of the second wall and the first wall along a first line perpendicular to the first wall is greater than a second distance between the upper recess and the first wall along a

¹ The Board added [1 Pre] – [1e] as reference to certain claim limitations.

second line perpendicular to the first wall and parallel to the first line; and

- [1d] a lower portion below the middle portion, wherein a third distance between the lower portion and the first wall along a third line perpendicular to the first wall and parallel to the first line is greater than the second distance;
 - [1e] wherein at least an area of the upper portion, an area of the middle portion, and an area of the lower portion of the second wall are accessible from an interior of the lavatory stall unit.
2. The lavatory of claim 1, wherein the lower portion comprises a lower recess;
- wherein a fourth distance between the lower recess and the first wall along a fourth line perpendicular to the first wall and parallel to the first line is less than the third distance; and
- wherein the second wall extends from a ceiling portion and a floor portion and the fourth line extends along the floor portion.
3. The lavatory of claim 2, wherein the lower recess is configured to receive a seat support of an aircraft passenger seat, the seat support configured to interface with a floor of the cabin and hold a seat bottom of the aircraft passenger seat in an elevated position.

Ex. 1001, 5:14–49.

E. Prior Art and Asserted Grounds

We instituted a trial based on all asserted claims and grounds of unpatentability as follows:²

Ground	Claim(s) Challenged	35U.S.C.§	Reference(s)/Basis
1	1–9, 11–16, 18, 19	103(a) ³	Shibata, ⁴ Betts, ⁵ Bentley ⁶
2	10, 17	103(a)	Shibata, Betts, Bentley, and Rezag ⁷

II. ANALYSIS

A. Legal Standards Concerning Patentability

A patent claim is unpatentable under 35 U.S.C. § 103 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. 35 U.S.C. § 103; *KSR Int’l Co. v. Teleflex Inc.*,

² Petitioner supports its challenge with a Declaration of Steven J. Meyers, Ph.D. (Ex. 1003). *See infra*. Patent Owner supports its opposition with a Declaration of Mr. James Brunke. (Ex. 2008). *See infra*.

³ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the application from which the ’862 patent issued has an effective filing date prior to March 16, 2013, the pre-AIA version of § 103 applies. *See* Ex. 1001, code (63).

⁴ Ex. 1009, U.S. Patent No. 4,884,767 (Dec. 5, 1989).

⁵ Ex. 1008, U.S. Patent No. 3,738,497 (Jun. 12, 1973).

⁶ Ex. 1010, U.S. Patent No. 6,742,840 B2 (Jun. 1, 2004).

⁷ Ex. 1020, U.S. Patent No. 7,318,622 B2 (Jan. 15, 2008).

550 U.S. 398, 406 (2007). “[W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *KSR*, 550 U.S. at 416 (citing *United States v. Adams*, 383 U.S. 39, 50–51 (1966)). The question of obviousness is resolved based on 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) when in evidence, objective evidence of non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).⁸

The Supreme Court has made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. To support this conclusion, however, it is not enough to show merely that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness additionally requires that a person of ordinary skill at the time of the invention “would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.” *Id.*

⁸ Patent Owner provides arguments that objective evidence of non-obviousness precludes a finding of obviousness. PO Resp. 57–59.

Accordingly, an obviousness determination generally requires a finding “that a person of ordinary skill in the art would have been motivated to combine or modify the teachings in the prior art and would have had a reasonable expectation of success in doing so.” *Univ. of Strathclyde v. Clear-Vu Lighting LLC*, 17 F.4th 155, 160 (Fed. Cir. 2021) (citing *OSI Pharms.*, 939 F.3d at 1382 (quoting *Regents of Univ. of Cal. v. Broad Inst., Inc.*, 903 F.3d 1286, 1291 (Fed. Cir. 2018))). “Whether the prior art discloses a claim limitation, whether a skilled artisan would have been motivated to modify or combine teachings in the prior art, and whether she would have had a reasonable expectation of success in doing so are questions of fact.” *Strathclyde*, 17 F.4th at 160.

In determining whether there would have been a motivation to combine prior art references to arrive at the claimed invention, it is insufficient to simply conclude the combination would have been obvious without identifying any reason why a person of skill in the art would have made the combination. *Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017). Moreover, in determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 164 (Fed. Cir. 1985) (“It is elementary that the claimed invention must be considered as a whole in deciding the question of obviousness.”); *see also Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537 (Fed. Cir. 1983) (“[T]he question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious. Consideration of differences, like each of the findings set

forth in *Graham*, is but an aid in reaching the ultimate determination of whether the claimed invention *as a whole* would have been obvious.”).

As a factfinder, we also must be aware “of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning.” *KSR*, 550 U.S. at 421. Applying these general principles, we consider the evidence and arguments of the parties.

B. Level of Ordinary Skill in the Art

Factors pertinent to a determination of the level of ordinary skill in the art include (1) the educational level of the inventor; (2) the type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology, and (6) educational level of workers active in the field. *Env’t'l. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.* Moreover, these factors are not exhaustive but are merely a guide to determining the level of ordinary skill in the art. *Daiichi Sankyo Co. Ltd, Inc. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007).

In determining a level of ordinary skill, we also may look to the prior art, which may reflect an appropriate skill level. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Additionally, the Supreme Court informs us that “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 421.

Petitioner proposes that a person of ordinary skill in the art at the time of the '862 patent “would have had a bachelor’s degree in mechanical engineering, industrial design, or a similar discipline, or the equivalent

experience, with at least two years of experience in the field of aircraft interior design.” Pet. 12 (citing Ex. 1003 ¶¶ 32–34).

Patent Owner does not expressly address the level of skill of the ordinary artisan in its Preliminary Response, Response, or Sur-reply. *See generally* PO Resp.; PO Sur-reply.

On this record, Petitioner’s proposed level of ordinary skill in the art is not disputed and is consistent with our review and understanding of the technology and written description in the ’862 patent and the asserted prior art references. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). For purposes of this Decision, we rely on Petitioner’s proposed level of ordinary skill in the art.

C. Claim Construction

We interpret a claim “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b) (2020). Under this standard, we construe the claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.* Furthermore, we expressly construe the claims only to the extent necessary to determine whether to institute *inter partes* review. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

Neither party proposes construction of any claim terms. *See generally* Pet.; PO Resp. In our Institution Decision, we noted that neither party proposed construction of any term, and concluded it was “unnecessary at

this stage to expressly interpret any term beyond any implicit interpretations or clarifications as to the plain and ordinary meaning reflected in our analysis below.” Inst. Dec. 14. With the record now complete, we are not apprised of any claim terms that need to be construed nor does our Decision turn on any particular claim construction or interpretation.

D. Ground 1: Claims 1–9, 11–16, 18, and 19 – Obviousness over Shibata, Betts, Bentley, and the knowledge of a Person of Ordinary Skill in the Art

1. Independent Claim 1, Dependent Claims 4, 6, 7, and 9, and Collateral Estoppel

As an initial matter, Petitioner argues that due to Federal Circuit affirmances of the Boards’ Decisions regarding claims similar to those in this proceeding, Patent Owner should be estopped “from arguing that a person of ordinary skill in the art would not modify a flat wall lavatory to include the contour shown in Betts.”⁹ Pet. 22; *see also id.*, (Petitioner arguing similarly that “Patent Owner should be precluded from arguing it would not have been obvious to apply the recessed forward wall design of Betts to other enclosures including lavatories.”). Petitioner argues that even though the claims in this case are different from those that were finally adjudicated by the Federal Circuit “it is the identity of the issues that were litigated that determines whether collateral estoppel should apply.” *Id.*

Patent Owner argues that collateral estoppel should not apply because “Petitioner failed in its Petition to analyze the factors necessary to establish that estoppel applies and failed to identify any supporting evidence.” PO Resp. 25. Patent Owner concedes with regards to claims 1, 4, 6, 7, and 9,

⁹ *B/E Aerospace, Inc. v. C & D Zodiac, Inc.*, 709 F. App’x 687 (Fed. Cir. 2017) and *B/E Aerospace, Inc. v. C&D Zodiac, Inc.*, 962 F.3d 1373 (Fed. Cir. 2020) (*cert. denied* 141 S.Ct. 1127 (2021)).

however, that “[e]ven if Petitioner could establish that collateral estoppel could apply, [Patent Owner] does not present any argument in this Response that a skilled artisan would not modify a flat-walled lavatory to include the upper contour shown in Betts.” *Id.*

In this proceeding we need not address collateral estoppel because we determine on the complete record in this proceeding that Petitioner has shown by a preponderance of the evidence that Shibata, Betts, and Bentley, as well as Shibata, Betts, and Rezag, are properly combined and, considering the level and knowledge of a person of ordinary skill in the art, teach all the limitations of the claims challenged in the Petition. Although we do not apply collateral estoppel for the reasons provided above, we note that our findings regarding the proposed combination and modification are consistent with the Federal Circuit’s decisions in the related cases. *See B/E Aerospace*, 709 F. App’x at 694 (rejecting Patent Owner’s argument that Petitioner’s combination required adding lavatory to Betts).

Also, Patent Owner does not present substantive non-obviousness arguments with respect to claims 1, 4, 6, 7, and 9.¹⁰ *See* PO Resp. 25–46. Specifically, claims 1, 4, 6, 7, and 9 include various limitations relating to *inter alia*, an “upper recess,” “a stowage space,” and relative lavatory stall “volume.” *See, e.g.*, Ex. 1001, 5:20–21 (Claim limitation 1(c) recites “a middle portion defining an upper recess below the upper portion.”). Petitioner provides a detailed showing of how the prior art meets each of the

¹⁰ Petitioner notes that Patent Owner effectively concedes that it “does not present any argument in this Response that a skilled artisan would not modify a flat-walled lavatory to include the upper contour shown in Betts.” Pet. Reply 1(citing PO Resp. 25). Petitioner thus argues “Claims 1, 4, 6–7, and 9, should be canceled.” *Id.* Patent Owner does not respond to this argument. *See generally* PO Sur-Reply.

claim elements and explains why a person of ordinary skill in the art would have combined their respective teachings. Pet. 21–26, 28–33, 36–38, and 40–45. By way of example, Petitioner argues that Shibata’s lavatory would have been modified by an ordinary skilled artisan to include an upper recess “based on Betts’ teaching of a contoured wall.” Pet. 30 (citing Ex. 1003 ¶¶ 85–87, 101). In another example, for claim 7, Dr. Smith persuasively testifies that “[a] person of ordinary skill in the art would recognize that these stowage spaces (e.g., a closet or other compartment) could be positioned on any either the forward or aft wall. The shape of these stowage spaced could be defined by the shape of the wall of the lavatory, e.g., because that wall forms a portion of the wall of the stowage space.” Ex. 1003 ¶ 95.

Although Patent Owner does not contest Petitioner’s showing as to these claims, Patent Owner’s counsel asserted during oral argument that “we are not conceding the obviousness of the upper recess. There is no statement in our briefs that say that.” Tr. 30:23–24. Patent Owner, however, does not dispute Petitioner’s showing as to the obviousness of claims 1, 4, 6, 7, and 9, and we find Petitioner and Dr. Smith’s showing persuasive. *In re NuVasive*, 842 F.3d 1376, 1379–82 (Fed. Cir. 2016) (holding patent owner waived an argument in the preliminary response by not raising the same argument in the patent owner response).

As for claims 1, 4, 6, 7, and 9, even if Patent Owner has not waived their arguments, we have considered, and on the complete record before us, accept as our own, Petitioner’s arguments and evidence set forth at pages

28–33, 36–38, 40–43 and 44–45 of the Petition.¹¹ Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 4, 6, 7, and 9 would have been obvious over Shibata, Betts, and Bentley.

We turn below to the expressly argued claims in Patent Owner’s Response.

2. Claims 2, 3, 5, 8, 11–16, 18, and 19¹²

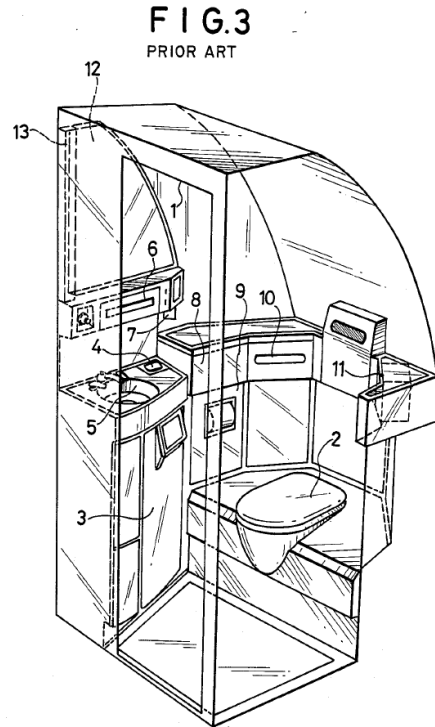
On the complete record before us, Petitioner has shown by a preponderance of the evidence that claims 2, 3, 5, 8, 11–16, 18, and 19 would have been obvious over Shibata, Betts, Bentley, and the knowledge of a person of ordinary skill in the art.

3. Shibata (Ex. 1009)

Titled “Lavatory Module for a Passenger Airplane,” Shibata describes “a lavatory module for a passenger airplane, integrally and internally equipped with lavatory equipments, such as a toilet bowl, a washstand and a toilet closet for storing lavatory conveniences and amenities.” Ex. 1009, code 54, 1:7–11. In particular, considering Figure 3 reproduced below, labeled “Prior Art,” Shibata structurally describes a lavatory “having a substantially rectangular front wall having an opening 1 formed on one side of the front wall, and a door hinged at one side thereof on the front wall so as to close the opening 1.” *Id.* at 1:24–27.

¹¹ We address the motivations to combine Shibata, Betts, Bentley, and Rezag with respect to the remaining challenged claims 2, 3, 5, 8, 11–16, 18, and 19.

¹² Patent Owner includes dependent claim 17 in headings treating ground 1, but claim 17 is instead challenged in ground 2. *See* PO Resp. 25, Pet. 5. We take this as an inadvertent error and address claim 17 with ground 2. PO Resp. 47–57.



Shibata's Figure 3 illustrates a conventional aircraft lavatory where "[a] toilet bowl 2 is provided on one side wall of the lavatory module, while a washstand 5 is provided on the back wall opposite the front wall." *Id.* at 1:39–42.

4. Betts (Ex. 1008)

Betts notes a desire to "provide more room for passengers in an aircraft or other vehicle." Ex. 1008, 1:6-7. Figure 1 of Betts is reproduced below.

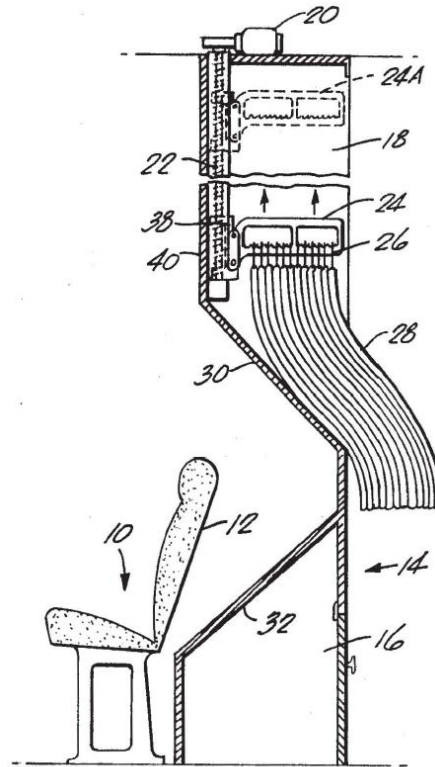


Fig. 1

Betts' Figure 1 discloses airplane passenger seat 10 having tiltable backrest 12. *Id.* at 2:8–9. Behind the seat is coat closet 14, which has luggage space 16 along the floor and overhead coat compartment 18. *Id.* at 2:9–14. Betts describes that “[t]he lower portion 30 of the coat compartment 18 slants rearwardly to provide a space for seatback 12 to be tilted rearwardly as desired by the occupant. The top 32 of storage space 16 also slants rearwardly so as not to interfere with seatback 12 when tilted.” *Id.* at 2:19–24.

5. Bentley (Ex. 1010)

Bentley is titled “Adjustable Seats” and describes a reclining and “general bucket style of seat 10.” Ex. 1010, code (54), 4:63. Figure 5 of Bentley is reproduced below.

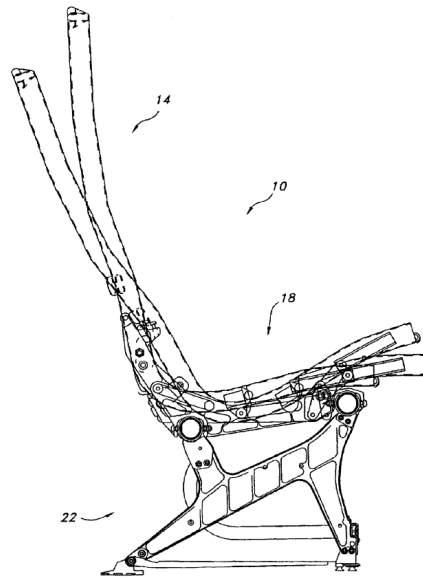


FIG 5

Bentley's Figure 5 illustrates a side elevation view of seat 10 having backrest 14 and seat bottom 18 supported by frame 22.

6. Dependent Claim 2 and Independent Claims 11, 18, and 19

Dependent claim 2 recites:

The lavatory of claim 1, wherein the lower portion comprises *a lower recess*;

wherein a fourth distance between the lower recess and the first wall along a fourth line perpendicular to the first wall and parallel to the first line is less than the third distance; and

wherein the second wall extends from a ceiling portion and a floor portion and the fourth line extends along the floor portion.

Ex. 1001 at 5:36–44 (emphasis added). Independent claim 11 similarly recites, amongst other limitations, “a lower portion defining *a lower recess* extending toward the interior.” *Id.* at 6:35–48 (emphasis added).

Independent claim 18 recites, amongst other limitations, “wherein the lower portion defines *an aft - extending second recess* configured to enable positioning of the seat support aft of the vertical plane.” *Id.* at 7:9–8:8

(emphasis added). Independent claim 19 recites, amongst other limitations, a limitation substantially identical to that of claim 18. *Id.* at 8:9–25.

(a) Petitioner’s Arguments

Petitioner acknowledges that neither Shibata, Betts, nor Bentley, expressly discloses the “lower recess” recited in dependent claim 2 and independent claim 11, also referred to as the “second recess” in independent claims 18 and 19. However, Petitioner argues that in addition to the upper recess, the ordinary skilled artisan “would recognize that the flat wall lavatory shown in Shibata could be modified to include a lower portion defining a lower recess.” Pet. 33 (citing Ex. 1003 ¶ 87). Petitioner provides certain evidence, in the way of additional prior art references, to support its contention that “many prior art structures included a lower recess to accommodate the aft extending seat support.” Ex. 1003 ¶ 57 (cited at Pet. 35). Petitioner’s declarant, Dr. Meyers, submits “three examples of enclosure units with a floor-level recess to allow seat supports to be positioned further aft in the cabin.” *Id.* ¶ 58 (citing Ex. 1016; Ex. 1017); *see also* Pet. Reply 11–12 (citing Ex. 1003 ¶¶ 54–58, 91). According to Dr. Meyers, similar to Betts’ upper recess for receiving a seat back 12 “the same logic applies to include a lower recess that receives a portion of the aft-extending seat support.” Ex. 1003 ¶ 87.

Petitioner relies on Bentley for “a seat with an aft-extending seat support” as recited in claim 3. Pet. 35. Petitioner argues that the ordinary skilled artisan “a person of ordinary skill in the art would recognize that the seat support is configured to interface with a floor of the cabin and hold a seat bottom of the aircraft passenger seat in an elevated position. *Id.* at 36 (citing Ex. 1003 ¶ 92). According to Dr. Meyers, aft-extending seat supports on an aircraft seat were well-known in the art and “Bentley shows a seat

with an aft-extending seat support. When such a seat is moved further aft, the aft-extending seat support of the aircraft passenger seat will eventually move into the lower recess.” Ex. 1003 ¶ 91.

(b) Patent Owner’s Arguments

Patent Owner makes four specific arguments as to ground 1:

(1) Shibata teaches away from further narrowing its lavatory to include a lower recess; (2) the conventional approach to lavatory design specified the lavatory footprint and prohibited modifying this footprint in the manner Petitioner proposes; (3) Dr. Meyers’s argument that a skilled artisan would have moved a seat support closer to the lavatory and further altered or moved the lavatory wall to add a lower recess conflicts with all the record evidence, including Betts; and (4) Petitioner’s additional arguments are similarly deficient because they are speculative, focusing only on what “could” have been done as opposed to what a skilled artisan “would” have found obvious.

PO Resp. 25–26.

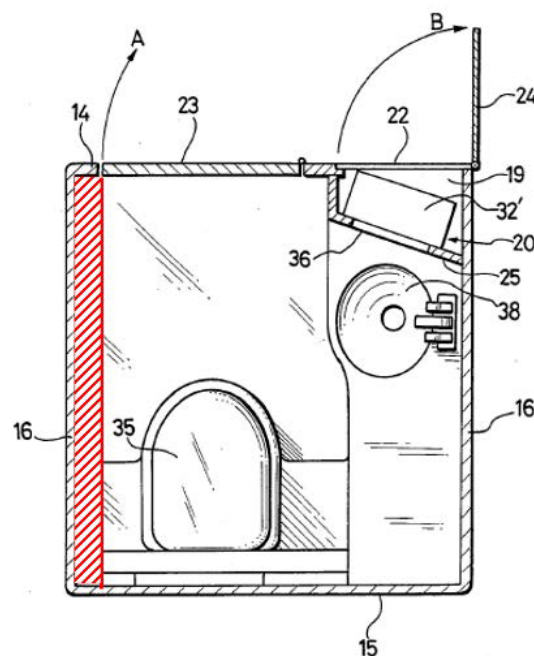
We address each of Patent Owner’s arguments in turn.

(c) Whether Shibata teaches away

Patent Owner disputes Petitioner’s assertions as to claims 2 and 3, and the corresponding portions of independent claims 11, 18, and 19, on the basis that “Shibata teaches away from narrowing the interior width of the lavatory, which would have reduced passenger comfort.” PO Resp. 26 (citing Ex. 2008 ¶¶ 84–87). Patent Owner’s argument, and Mr. Brunke’s testimony, are largely based on the statement in Shibata that “the passengers can easily find the amenity dispensing openings 36 for the desired amenities, and hence the least necessary motions are required for taking out, using and disposing of the amenities, so that the passengers are able to use the *narrow lavatory comfortably*.” *Id.* at 27 (emphasis added and omitted); *see also* Ex. 2008 ¶¶ 84–87. Patent Owner includes an annotated version of Shibata’s top

view drawing in Figure 2, shown below, which includes Patent Owner’s red cross-hatched section on the left-hand wall, which Patent Owner asserts shows that a lower recess added to Shibata “would further reduce the amount of usable space, including the space at a customer’s feet, impeding the customer’s ability to comfortably use and maneuver around the lavatory.” PO Resp. 28 (citing Ex. 2008 ¶ 86; Ex. 2009, 194:17–200:16).

FIG. 2



Patent Owner’s annotated version of Shibata Fig. 2 with red cross-hatching represents a proposed “lower recess” modification to Shibata “intruding into the lavatory at the level of a customer’s feet.” *Id.*.

Petitioner responds that “there is . . . no reason that a lower recess would create a tripping hazard.” Pet. Reply 4. Petitioner argues that the description of a “narrow” lavatory in Shibata, “is irrelevant to narrowing the lavatory, and instead describes advantages of putting amenities in a single vertical row.” *Id.* at 5 (citing Ex. 1009, 4:18–25).

With respect to teaching away, Patent Owner’s expert, Mr. Brunke testifies that “Shibata’s focus is passenger comfort.” Ex. 2008 ¶ 85. Mr. Brunke testifies that “Shibata also discloses that ‘an object of the present invention’ is to ‘facilitate[e] [sic] passengers’ actions to gain access to the amenities,[’] which ‘improves the accessibility of the lavatory module remarkably.’” *Id.* (citing Ex. 1009 at 2:2–9, 3:64–4:1). Mr. Brunke further testifies that, “Shibata expressly discloses its lavatory is ‘narrow.’” *Id.* ¶ 86 (citing Ex. 1009, 4:18–25.)

Considering all the arguments and evidence before us, including the testimony of Dr. Meyers and Mr. Brunke, Petitioner has the better arguments and persuasive evidence here.

Shibata describes that in “conventional lavatory modules, both the dispensing openings through which passengers take out the amenities, and the service openings through which a serviceman replenishes or changes the stock of amenities are provided inside the lavatory module.” Ex. 1009 at 1:51–55. Shibata identifies the need for “the replenishing task to be completed in a reduced time.” *Id.* at 1:63–67. To address this need, Shibata describes that

it is an object of the present invention to provide a lavatory module for a[n] airplane, *enabling a serviceman to carry out a task for replenishing and changing the stock of amenities from outside the lavatory module in a reduced time*, facilitating the work for achieving the task, and facilitating passengers’ actions to gain access to the amenities.

Id. at 2:1–9 (emphasis added). Shibata further describes that

[s]ince the amenity storage compartments 20a are in a *single vertical row at a single position in the lavatory module*, the passengers can easily find the amenity dispensing openings 36 for the desired amenities, and hence the *least necessary motions are required* for taking out, using and disposing of the amenities,

so that the passengers are able to use the narrow lavatory comfortably.

Id. at 4:18–25 (emphasis added).

Rather than being specifically focused on passenger comfort in a “narrow” lavatory, as Patent Owner suggests, Shibata is focused on amenity replenishment from outside the lavatory to save time, and concentrated compartment placement within the lavatory to *reduce passenger motions* within the lavatory. Shibata is mainly directed to an efficient lavatory structure for use by the passenger and serviceman, not necessarily to passenger comfort. Even assuming that efficiency of movement provides some manner of passenger comfort, Mr. Brunke does not explain persuasively why such efficiency/comfort in obtaining amenities would be adversely impacted by an upper and lower recess that made portions of the lavatory narrower.

For instance, Mr. Brunke testifies that making Shibata narrower by adding a curved wall “would further reduce the amount of usable space at a customer’s feet, impeding the customer’s ability to comfortably use and maneuver around the lavatory.” Ex. 2008 ¶ 86. Mr. Brunke explains that a lower recess “would create a potential tripping hazard by intruding into the lavatory at the level of a customer’s feet.” *Id.* The problem with this rationale is that neither Patent Owner nor Mr. Brunke explain why a person of ordinary skill in the art would not be able to design a lavatory that incorporates a curved wall and yet still provides sufficient room for a passenger to efficiently, even comfortably, use the lavatory, including a “narrow” lavatory. The red cross-hatching annotations in Patent Owner’s Figure 2, above, apparently showing the intrusion into the lavatory by the curved wall, may not have to be that intrusive. For example, as Petitioner

points out, there is no minimum size for the lower recess recited in the claims, and the intrusion by use of a “mouse hole” may be very minimal, and would not create the tripping hazard that Mr. Brunke describes with respect to annotated Figure 2. Pet. Reply 4–5. Or, as Dr. Meyers testifies, the curved wall could be integrated with the sink side of the lavatory and “depends on which side of the plane its mounted.” See Ex. 2009, 191:10–21 (Dr. Meyers explaining that “the curved wall is the wall that, depending on the plane being on the left or right side, the curved wall is on the sink bowl side, if you will.”).

We further do not agree that Shibata teaches away from “narrowing the interior width of the lavatory.” PO Resp. 26. Patent Owner has not identified where Shibata actually criticizes, discredits, or otherwise discourages a “lower recess,” or even “narrowing” a lavatory. See *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004); *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (“A reference does not teach away, however, if it merely expresses a general preference for an alternative invention but does not ‘criticize, discredit, or otherwise discourage’ investigation into the invention claimed.”) (*citing Fulton*). Although we would all probably appreciate larger lavatories on an aircraft, a plain reading of Shibata simply describes that the lavatory is “narrow,” rather than actually teaching away from a curved wall.

Dr. Meyers was questioned about this issue during his deposition. Although Dr. Meyers conceded that with Betts’ curved wall “you would have a reduction of interior volume in the lavatory, and an increase in the passenger side.” he did not concede that a curved wall would not have been considered by an ordinary skilled artisan. Ex. 2009, 188:20–189:7. And,

when questioned about specific dimensions of the recesses, Dr. Meyers explained that it could still be made to work:

Q: . . . I'm going to be pushing the sink and cabinet, or reconfiguring it, so that I'm shoving the cabinet and sink eight inches closes to the commode. I'm going to be interfering with use of lavatory as a lavatory, correct?

. . .

A: Incorrect. Incorrect. It's absolutely -- and I'm not here to design it for you, but the two pieces can absolutely be worked out and configured, so that you've got usable lavatory space with a curved wall. I disagree with your hypothetical.

Id. at 202:24–203:10. We credit Dr. Meyers' testimony because the claims do not specify any particular dimensions and although Dr. Meyers agrees that a lavatory user's interior space could be affected by a curved wall, we credit Dr. Meyers' explanation that a person of ordinary skill in the art could work out how to arrange the lavatory to provide sufficient room for a passenger with a curved wall. *Id.* Although Mr. Brunke testifies that modifying Shibata to include a curved wall "conflicts with Shibata's teaching that lavatory modifications are made 'so that the passengers are able to use the narrow lavatory comfortably,'" Dr. Meyers' testimony as to the ability to design a usable lavatory space with a curved wall is essentially un rebutted. Ex. 2008 ¶ 87.

Considering all the evidence and testimony before us, we are not persuaded that Shibata teaches away from adding a curved wall, even if doing so potentially impacts the interior space of the lavatory. Teaching away requires a reference to actually criticize, discredit, or otherwise discourage investigation into the claimed solution. *See In re Fulton*, 391 F.3d at 1201 (prior art does not teach away from claimed subject matter merely by disclosing a different solution to a similar problem unless the

prior art also criticizes, discredits, or otherwise discourages the solution claimed).

Overall, we are persuaded that Shibata's disclosure of a "narrow" lavatory does not, without more, teach away from adding either or both an upper and lower recesses as Petitioner argues.

(d) Whether the "conventional approach to lavatory design" would eliminate the motivation to modify Shibata to include a "lower recess"

Patent Owner contends that the "skilled artisan would have understood that the airframer specifies the footprint of the lavatory in the cabin," and would have understood this leads to a "prohibition against altering this specification for the lavatory footprint," as Petitioner proposes. PO Resp. 29 (citing Ex. 2008 ¶ 88). Patent Owner further contends "Petitioner's proposed modification of adding a lower recess to Shibata's lavatory would have conflicted with these design constraints because 'the lavatory footprint would necessarily need to be changed to be able to accommodate moving the seat support further aft.'" PO Sur-reply 14 (citing Ex. 2008 ¶ 91 ("Because seat supports connect to the floor of the airplane interior, the lavatory footprint would necessarily need to be changed to be able to accommodate moving the seat support further aft"))).

Petitioner argues that despite such design constraints it was well known that the width of a lavatory could be changed to provide curved lavatory walls. Pet. Reply 8. Petitioner points, for example, to the drawings reproduced below in prior art examples U.S. 7,284,287 to Cooper, and U.S. Pub. No. 2009/0050738 to Breuer.

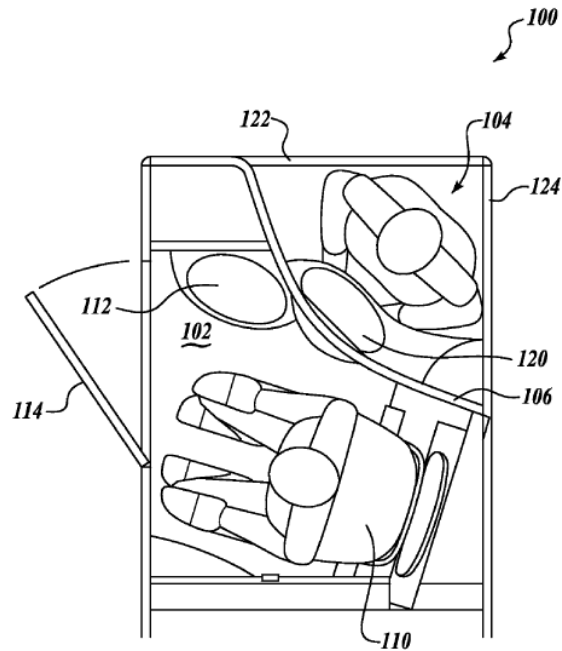


Figure 1 from Copper illustrates curved wall 106 between a two users of lavatory 100. Ex. 1028, Fig. 1.

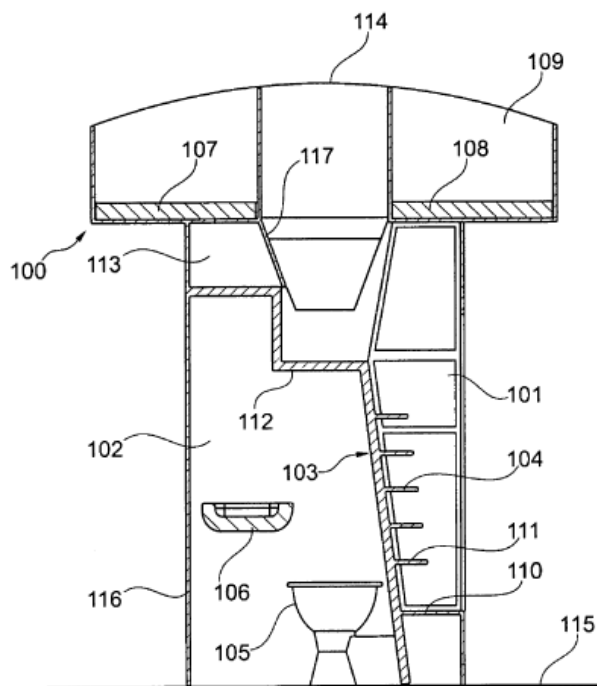


Figure 1 from Breuer illustrates inclined wall divider 103. Indeed, Breuer describes “[i]n the region of the on-board lavatory this distance is adequate to permit comfortable sitting. Ex. 1029 ¶ 54.

Petitioner further argues that “[t]he claims do not require that the lower recess be a particular size and thus do not require modifying any specific connection, or even the lavatory footprint.” Pet. Reply 9. Again, we find Petitioner’s arguments and evidence more persuasive.

Neither Patent Owner nor Mr. Brunke explain satisfactorily why the footprint of a lavatory with a curved wall cannot be the same or similar as for a flat wall. *See* PO Resp. 2 (Patent Owner arguing that “[t]he conventional approach to lavatory design prohibited modifying a lavatory’s footprint”). In other words, Patent Owner does not explain why an ordinary skilled artisan could not have maintained Shibata’s footprint, or any footprint specified by an airframer, while modifying Shibata to include a curved wall. We appreciate, as Mr. Brunke testifies, that it may be true that “when designing an aircraft lavatory, a skilled artisan would have understood that the lavatory footprint was a fixed design constraint that could not be modified.” Ex. 2008 ¶ 90. But he does not explain persuasively why, for example, a specified footprint including the floor and ceiling of the aircraft lavatory could not be met by a lavatory with a curved wall.

Mr. Brunke testifies that “[b]ecause seat supports connect to the floor of the airplane interior, the lavatory footprint would necessarily need to be changed to be able to accommodate moving the seat support further aft.” Yet this does not explain why the footprint has to “necessarily” change. We also do not find this argument persuasive because no matter what footprint a lavatory has, or is required by an aircraft manufacturer, if the lavatory has a

recess to accommodate the rear legs of a seat, such as a mousehole, this enables the seat to be positioned further aft while the footprint remains the same. Pet. Reply 4–5. And, to the extent Mr. Brunke testifies that such a curved wall design “would have required aircraft designers to reconfigure other aspects of the aircraft, such as electrical, water, waste, ventilation, and fire suppression connections” this testimony is unsupported by any evidence that a curved wall, including an upper and a lower recess, would have affected any of the mechanical or electrical connections occurring between the aircraft and the lavatory. Mr. Brunke provides no basis for reaching this conclusion, no citation to any evidence or disclosure of actual manufacturing constraints or complications in connecting water, electrical or fire suppression devices based on a lower recess, or even an upper recess for that matter. Without adequate supporting evidence, we cannot credit Mr. Brunke’s testimony on this point with respect to lavatory design in light of the teachings in Shibata and Betts. *Elbit Sys. Of America, LLC v. Thales Visionix, Inc.*, 881 F.3d 1354, 1358 (Fed. Cir. 2018) (“The PTAB [i]s entitled to weigh the credibility of the witnesses.”; *quoting Trs. of Columbia Univ. v. Illumina, Inc.*, 620 F. App’x 916, 922 (Fed. Cir. 2015)).

We acknowledge Patent Owner’s argument that the curved *lavatory* wall in the ’862 patent may have been new compared to flat *lavatory* walls. Yet as shown in the figures above curved and slanted walls in aircraft design, including in aircraft lavatory design, were well-known. Ex. 1028; Ex. 1029. Considering the evidence as a whole, we do not agree that introducing a lower recess in the combination of Shibata and Betts as proposed by Petitioner would require the lavatory footprint to be changed to be able to accommodate moving the seat support aft. *See* PO Sur-reply 14. Moreover, the lower recess is not required by the claims to be any particular

size and we are not persuaded, nor have we been apprised of any compelling evidence, that introducing a lower recess mandates a change in the overall footprint of the lavatory.

(e) Whether Petitioner and Dr. Meyers have provided an articulated reasoning and evidentiary underpinnings to combine Shibata and Betts

According to Patent Owner, Dr. Meyers' testimony and evidence as to the combination of Shibata, Betts and the knowledge of an ordinary artisan, "lack factual support and contradict the prior art." PO Resp. 31.

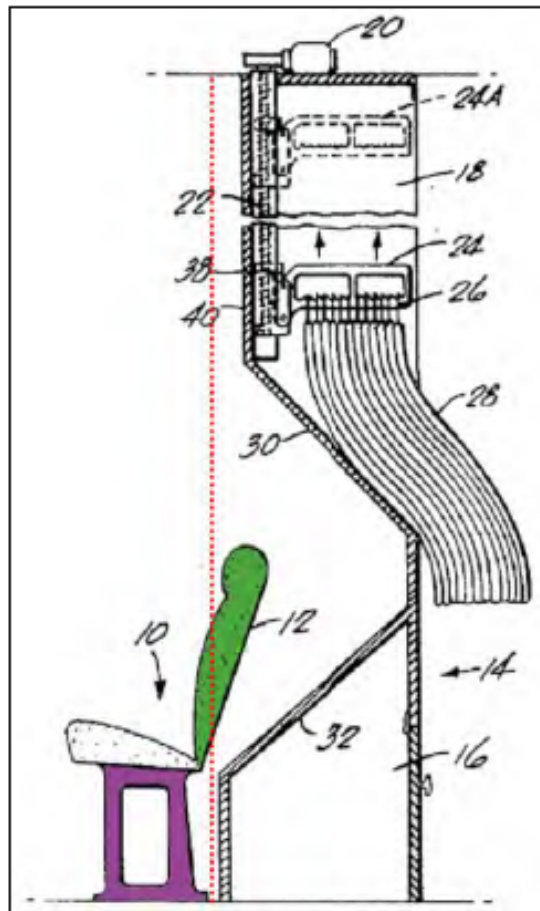
Specifically, Patent Owner argues that Petitioner and Dr. Meyers have failed to provide an articulated reasoning and rational underpinnings to support a conclusion of obviousness. *See id.* at 33 (Patent Owner arguing that "Dr. Meyers has not provided any 'articulated reasoning' or 'rational underpinning' to support his conclusory opinions, these opinions should be given little to no weight.") (citing 37 C.F.R. § 42.65(a)).

As a starting point, Patent Owner argues that "Petitioner has not established that collateral estoppel should apply here because Petitioner failed to prove the four requisite elements of estoppel."¹³ *Id.* at 32 (citing Ex. 2008 ¶¶ 93–97; *VirnetX Inc. v. Apple, Inc.*, 909 F.3d 1375, 1377 (Fed. Cir. 2018)). As discussed above, we need not reach the collateral estoppel issue because Petitioner has provided appropriate reasoning and evidentiary underpinnings to support its contention that "a person of ordinary skill in the art would be motivated to modify a flat forward facing wall of a lavatory to

¹³ Petitioner asserts "the Federal Circuit has already confirmed that it would be obvious to modify a flat walled lavatory based on Betts to include both an upper recess and a lower recess." *Id.* at 34 (citing *B/E Aerospace*, 962 F.3d at 1379).

include a recess to allow a passenger seat to be positioned further aft in the aircraft cabin.” Pet. 35 (citing Ex. 1003 ¶¶ 57–65).

Patent Owner mainly argues that neither Shibata nor Betts disclose “a lower recess” as claimed, and that “a skilled artisan would have recognized that adding a lower recess and moving a passenger seat further aft would have undermined Betts’s teachings.” PO Resp. 33. Patent Owner provides the following annotated Figure 1 from Betts which we reproduce below.



Betts Figure 1, as annotated by Patent Owner, illustrating the arrangement of seat 10 and seatback 12 (green) relative to closet 14. Considering annotated Figure 1, Patent Owner argues that

[a] skilled artisan would have recognized that moving a seat further aft would reduce the space between the seat support and

the wall portion behind the seat back and cause an undesirable space reduction in Betts's luggage storage space 16. (*Id.*) Moving a seat further aft would also interfere with the seat's ability to fully recline because a seat moved further aft would hit the wall before reaching its maximum reclining position.

Id. at 34–35. In essence, Patent Owner's position is that moving Betts's seat 10 aft would result in seatback 12 not being able to fully recline and reduces the luggage storage space 16. *Id.* at 35. Mr. Brunke testifies that "[b]ecause Betts teaches away from interfering with the seat's ability to recline, it directly conflicts with Dr. Meyers's unsupported assertion that a skilled artisan would have been motivated to move the seat support further aft into a lower recess." Ex. 2008 ¶ 96.

We do not find Patent Owner's and Mr. Brunke's arguments and testimony compelling. Petitioner is mainly relying on Betts to show that "[t]he contoured forward facing wall shown in Betts advantageously provides additional space to locate a seat further aft in an aircraft." Pet. 23. Dr. Meyer's testimony is that "the seat shown in Betts could not be located in the position in which it is shown if the forward wall were flat. Thus, this curved forward wall makes more efficient use of the valuable space in the aircraft passenger cabin than would be available with a flat forward wall." Ex. 1003 ¶ 55.

In other words, Betts is relied on by Petitioner and Dr. Meyers simply to show that a person of ordinary skill in the art would have recognized that "[i]ncluding the curved wall of Betts in [Shibata's] lavatory would achieve the same benefit, allowing the row of seats placed immediately in front of that curved wall to be placed further aft." *Id.* ¶ 56. The reason to use Betts' curved wall, i.e., to allow seats positioned further aft, has been readily established by Petitioner. And, Dr. Meyers testimony that efficient use of

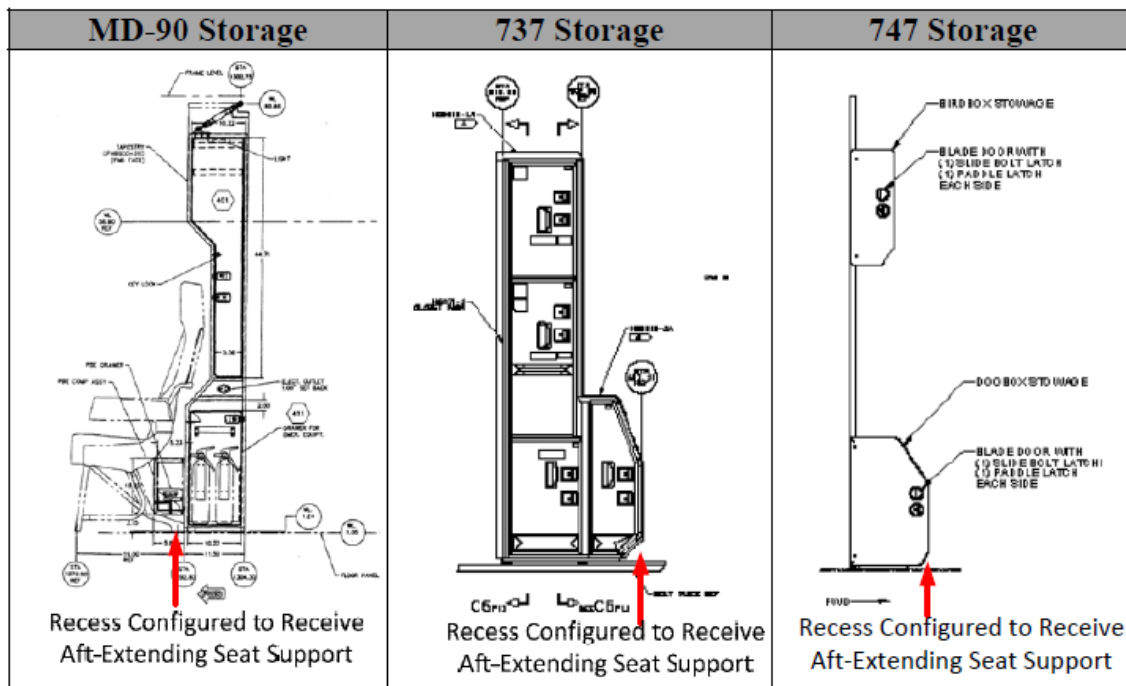
space is a consideration for a person of ordinary skill in the art in aircraft design is unrebutted. *See* Ex. 1003 ¶ 54 (Dr. Meyers testifying that “[a] primary goal of the design of interiors of commercial aircraft is efficient use of valuable passenger cabin space.”).

Petitioner submits convincing argument based on the testimony of Dr. Meyers, that designers of airplane interiors were concerned about adding space to the cabin and that the Betts contoured wall increased interior space. Pet. 23 (citing Ex. 1003 ¶ 54). Betts itself backs up this testimony by stating that one of the goals of its design is “to provide more passenger room.” Ex. 1008, Abstract. We also agree with Petitioner’s assertion that Figure 1 of Betts depicts a passenger seat further aft in the cabin than it could have been if the wall were flat with no recess and merely extended up from the bottom portion of the wall. *See id.* at Fig. 1; Pet. 23. Betts therefore depicts how the contoured wall and recess provide more passenger space when compared to a flat, vertical wall, and Betts discusses the ability of its design to save space. As such, Betts adequately supports the proposed modification of Shibata’s flat forward wall to be a curved contoured wall.

Turning specifically to the issue of the lower recess, we acknowledge that neither Shibata, Betts, or Bentley expressly disclose a lower recess. However, we point out that Petitioner did not merely rely on the Federal Circuit’s affirmance of the Board’s decision in *B/E Aerospace, Inc. v. C&D Zodiac, Inc.*, 962 F.3d 1373, (Fed. Cir. 2020), but also explained that a person of ordinary skill in the art would also have considered both an upper recess as expressly disclosed by Betts, and a lower recess because “multiple different types of prior art enclosures include one or more recesses to enable seats to be positioned further aft in a cabin. Pet. 25 (citing Ex. 1003 ¶¶ 57–61).

Dr. Meyers provided, by way of background, prior art evidence of efficient space saving aircraft seat and wall arrangements having a lower recess into which the feet of an aircraft seat extend. Ex. 1003 ¶ 58.

Although not relied upon for the specific invalidity challenges, Dr. Meyers testifies that “[t]he images of the MD-90 Storage, 737 Storage, and 747 Storage enclosure units are three examples of enclosure units with a floor-level recess to allow seat supports to be positioned further aft in the cabin.”¹⁴ *Id.* We reproduce Dr. Meyers’ chart showing these prior art arrangements below.



Considering the MD-90 Storage, 737 Storage, and 747 Storage enclosure units shown here, each of which is said to have a recess configured to receive aft-extending seat support, Dr. Meyers explains that “[t]he use of

¹⁴ Ex. 1016, a declaration by Scott Savian, Executive Vice President at C&D Zodiac, states “C&D also offered S4 [MD-90] enclosures for sale to SAS on August 23, 2001.” Ex. 1016 ¶ 15.

enclosures with curved walls is common throughout the industry. In fact, many prior art structures included a lower recess to accommodate the aft extending seat support.” *Id.* ¶ 57. Based on the complete evidence in this proceeding, we credit Dr. Meyers’ testimony that “these designs inform my opinion by confirming that lower recesses were a well-known solution to provide space for seat supports where a recess for a seat back in the forward wall of the enclosure unit permitted the seat to be located further aft.” *Id.* ¶ 58.

Petitioner also submitted declarations from third parties familiar with aircraft interior design that show recesses designed to receive passenger seat legs, and the dates that the designs were in public use or on sale. *See* Ex. 1016, 5–7, 62 (corresponding to MD-90 Storage); Ex. 1017 ¶¶ 8–11 (corresponding to 737 Storage), ¶¶ 17–20 (corresponding to 747 Storage). We find these supporting declarations and evidence credible, and determine that Petitioner has established that it would have been obvious to a person of ordinary skill in the art to further modify the Shibata-Betts combination to include the claimed “second recess” to receive passenger seat supports.

Patent Owner’s argument is in part a bodily incorporation of Betts’ seat 10 and storage space 16 into Petitioner’s combination. In our view, Petitioner’s analysis better comports with the “expansive and flexible approach” to obviousness set forth by the Supreme Court in *KSR*. “The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.” *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Our inquiry is, therefore, not “whether the references could be physically combined but whether the claimed inventions are rendered obvious by the teachings of the prior art as a whole.” *In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (en banc).

On the complete record, Petitioner and Dr. Meyers have the better arguments and evidence. Dr. Meyers testified that a “person of ordinary skill in the art would also apply a second lower recess to the forward wall in order to accommodate the aft-extending seat support.” Ex. 1003 ¶ 87. Dr. Meyers explains, the “modification to the prior art flat-wall lavatory described in Shibata is obvious in view of Betts disclosure of a curved forward wall.” *Id.* ¶ 88. He further testifies, “a person of ordinary skill in the art would recognize that the seat shown in Figure 1 of Betts could easily be replaced by the prior art seat shown in Bentley, which includes aft-extending seat supports.” *Id.* ¶ 90. As Dr. Meyers explains persuasively, “Bentley shows a seat with an aft-extending seat support. When such a seat is moved further aft, the aft-extending seat support of the aircraft passenger seat will eventually move into the lower recess.” *Id.* ¶ 91.

Mr. Brunke responds that “Dr. Meyers did not identify any underlying facts or data to support his opinion.” Ex. 2008 ¶ 94. Mr. Brunke states that “[m]oving a seat further aft would . . . interfere with the seat’s ability to fully recline because it will hit the wall before reaching its maximum reclining position.” *Id.* ¶ 96. However, considering the testimony of both experts, we credit Dr. Meyers’ statements of what the ordinary skilled artisan would have been able to do to move a seat aft, because “a person of ordinary skill is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 421. In our view, the ordinary skilled artisan, knowing the prior art, and having the necessary level of skill in the art would have understood how to design upper and lower recesses in a lavatory wall to permit a seat to move further back without impeding the seat back ability to recline.

Having considered all the evidence and arguments on the complete record before us we credit Dr. Meyers’ testimony and evidence. Overall, we

determine that Petitioner has established that it would have been obvious to further modify the Shibata and Betts combination to include the claimed “lower recess” in the curved wall to receive passenger seat supports such as taught by Bentley. It is well-settled that “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” *KSR*, 550 U.S. at 401.

(f) Additional Arguments

Patent Owner makes the following additional arguments:

Petitioner’s assertion that Shibata “**could**” be modified based on Betts’s teachings cannot support a finding that the challenged claims are invalid under Grounds 1 and 2 because “obviousness concerns whether a skilled artisan not only could have made but **would** have been motivated to make the combinations or modifications of prior art to arrive at the claimed invention.”

PO Resp. 38 (citing Pet. 33; *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (emphases in original omitted, emphasis added).

Patent Owner further asserts that “the Petition fails to discuss or cite paragraph 62 of Dr. Meyers’s declaration and is, instead, limited to speculation that Shibata ‘could’ be modified based on Betts’s teachings.”

PO Sur-reply 10.

Petitioner responds that the Petition “was not limited to what a POSITA ‘could’ have done.” Pet. Reply 15. Petitioner cites to other arguments and explanations in the Petition including, “[c]ombining different types of enclosures and employing different types and designs of recesses would have been obvious to one of skill in the art.” *Id.* (quoting Ex. 1003 ¶ 56).

We disagree with Patent Owner, because at least from a purely contextual standpoint the Petition and Dr. Meyers' declaration are not limited to using "could" when addressing the combination of Shibata with Betts. For example, the Petition argues "[i]t would have been obvious to one of ordinary skill in the art to modify a prior art flat wall lavatory, as shown in Shibata, to include a contoured forward wall like the wall shown in Betts." Pet. 21. And, Petitioner asserts, "a primary motivation of one of ordinary skill in the art of aircraft interior design would have been to make efficient use of space in the aircraft interior cabin. *Id.* at 23 (citing Ex. 1003 ¶ 54). Dr. Meyers explains a "primary goal of the design of interiors of commercial aircraft is efficient use of valuable passenger cabin space." Ex. 1003 ¶ 54. Dr. Meyers further explains:

In an aircraft, as you move a row of seats further aft, the first thing that would make contact with a flat wall is the top of the back of the seat. For this reason, Betts includes a recess to receive that portion of the seat back. Including the curved wall of Betts in a lavatory would achieve the same benefit, allowing the row of seats placed immediately in front of that curved wall to be placed further aft. A person of ordinary skill in the art *would have been motivated* to apply the curved wall of Betts to a lavatory to achieve that same benefit.

Id. ¶ 56 (emphasis added). Dr. Meyers includes in his analysis several "prior art structures [which] included a lower recess to accommodate the aft extending seat support," including the "MD-90 Storage," "737 Storage," and "747 Storage." *Id.* ¶¶ 57–61. Dr. Meyers concludes that

[a] person of ordinary skill in the art *would be motivated* to modify a flat wall lavatory or a flat wall lavatory modified as discussed above to include a recess in the lower part of the wall. This modification provides for the predictable result of more efficient use of space, allowing, in conjunction with other

changes in a cabin, for more seats in the cabin by moving the aftmost row further aft in the cabin.

Id. ¶ 62 (emphasis added).

Mr. Brunke does not directly dispute the motivation that an ordinary artisan would have desired to use seating space on an aircraft efficiently. *See* Ex. 2008 ¶ 51 (“[F]ollowing deregulation, the design culture in the aircraft industry focused on adding seats to existing aircraft to increase revenue. Seats can be added in a number of ways . . . other structures or monuments in the passenger cabin can be modified to make more space for seats.”). We find Petitioner’s and Dr. Meyer’s well-explained motivations and reasoning persuasive as to a reason to combine Shibata and Betts generally consistent with Mr. Brunke’s testimony. In this case, Petitioner and Dr. Meyers have provided articulated reasoning with rational underpinning to support the legal conclusion of obviousness based on Shibata, Betts, and Bentley.

Patent Owner next argues “Petitioner’s contention that lower recesses were known in the prior art is irrelevant because even were it true—and it is not—Petitioner has not identified any evidentiary support, let alone any ‘articulated reasoning’ or ‘rational underpinning’ to modify Shibata’s flat lavatory wall to include the lower recess recited in claims 2, 11, 18, and 19.” PO Resp. 38.

We do not agree with Patent Owner. Again, Dr. Meyers testifies persuasively that it was well within the level of ordinary skill in the art to understand that a lower recess, as well as an upper recess as taught by Betts, could be formed in a wall to allow for a passenger seat to be moved further aft. Dr. Meyers explained that in addition to the upper recess for the seat back disclosed by Betts, relevant background prior art of MD-90 Storage,

737 Storage, and 747 Storage “confirm[s] that lower recesses were a well-known solution to provide space for seat supports where a recess for a seat back in the forward wall of the enclosure unit permitted the seat to be located further aft.” Ex. 1003 ¶ 58; *see Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (The Federal Circuit explaining that the Board must “account for critical background information that could easily explain why an ordinarily skilled artisan would have been motivated to combine or modify the cited references to arrive at the claimed inventions. As *KSR* established, the knowledge of such an artisan is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious.”)

As we discussed above, we are persuaded that Petitioner and Dr. Meyers have provided appropriate articulated reasoning and supporting evidence that “[a] person of ordinary skill in the art would understand that when such a seat [in Bentley] is moved further aft, the aft-extending seat support of the aircraft passenger seat will eventually move into the lower recess.” Pet. 35 (citing Ex. 1003 ¶¶ 57–65).

(g) Conclusion as to claims 2, 18, and 19, and partially with respect to claim 11

Based on the complete record before us and for the reasons expressed above, we are persuaded that Petitioner has shown a preponderance of evidence that claims 2, 18, and 19 would have been obvious in view of Shibata, Betts, Bentley, and the knowledge of a person of ordinary skill in the art.

We are also persuaded that the limitation of a “lower recess” in claim 11 would have been obvious in view of Shibata, Betts, Bentley, and the knowledge of a person of ordinary skill in the art. We do not draw a

conclusion here, however, as to claim 11 which also contains the limitation of “a single piece wall structure” discussed in detail below.

7. Relational dimensions of claim 14

Dependent claim 14 depends, ultimately, from independent claim 11 and recites the further limitation of

a first distance between the first wall and the second wall at a top of the lavatory is greater than a second distance between the first wall and the second wall at a bottom of the lavatory.

Ex. 1001, 6:62–65. Basically, this claim requires that the lavatory be wider at the top, than the bottom. Petitioner argues that in the Shibata-Betts combination, and considering the knowledge of a person of ordinary skill in the art with respect to an upper and a lower recess, “the distance between the first wall and the second wall at a top of the lavatory, i.e., where there is no recess, is greater than a second distance between the first wall and the second wall at a bottom of the lavatory where the lower recess is located.” Pet. 50 (citing Ex. 1003 ¶ 88).

Referencing Betts’ Figure 1, Patent Owner argues that Petitioner “incorrectly assumes that the dimensions of an airplane monument (e.g., a lavatory) is the same at the top and at the bottom.” PO Resp. 41. Patent Owner argues and that adding a lower recess to Betts, whose lower portion of wall beneath a first recess is further forward than the wall above the recess, would not necessarily meet the claim requirements that the lavatory is wider at the top, than the bottom. *Id.* at 41–42 (citing Ex. 2008 ¶ 101).

This argument bodily incorporates the specific wall illustrated in Betts and does not account for the knowledge and level of ordinary skill in the art or that Petitioner relies on the single wall of Shibata as the primary reference. Petitioner simply pointed out that “[t]he primary reference,

Shibata, shows a lavatory with a flat forward-facing wall and, as such, the forward-facing wall has the same dimensions at the top as the bottom.” Pet.

Reply 15. Given Shibata’s dimensions, Dr. Meyers testified that

this lower recess in the second wall would mean that the distance between the first wall and the second wall at a top of the lavatory, i.e., where there is no recess, is greater than a second distance between the first wall and the second wall at a bottom of the lavatory where the lower recess is located.

Ex. 1003 ¶ 101 (claim chart, claim 14).

Patent Owner responds that “[n]owhere in its Petition did Petitioner contend that the features of claim 14 were met based on a comparison of the top and bottom dimensions of Shibata’s wall.” PO Sur-reply 17 (citing Pet. 50). However, in the Petition, Petitioner expressly cited to the testimony of Dr. Meyers. *See* Pet. 50 (citing Ex. 1003 ¶ 88). Dr. Meyers specifically testifies with respect to claim 14 that “this modification to the *prior art flat-wall lavatory* described in Shibata is obvious in view of Betts disclosure of a curved forward wall.” Ex. 1003 ¶ 88. Petitioner’s argument and Dr. Meyers testimony does not include the more forward extending lower wall shown in Betts’ Figure 2.

In light of the knowledge and skill of an ordinary artisan, Patent Owner’s arguments do not undermine Petitioner’s showing that the relational claiming of the top and bottom of the lavatory lacks novelty and would have been obvious. Indeed, even if we assume that Betts’ lower wall is fully incorporated into Shibata, Patent Owner does not explain why a person of ordinary skill in the art would not have been able to design and position the lower recess so as to extend aft to a point where the lavatory has a narrower width at the bottom as compared to the top.

Based on the complete record before us and for the reasons expressed above, we are persuaded that Petitioner has shown a preponderance of evidence that claim 14 (contingent as it is upon independent claim 11) would have been obvious in view of Shibata, Betts, Bentley and the knowledge of a Person of ordinary skill in the art.

8. Single piece wall structure of claims 5, 8, and 11

Claims 5 and 8 recite “wherein the second wall is a single piece from the ceiling portion to the floor portion.” As discussed above, claim 11 recites a similar limitation. Ex. 1001, 5:34–6:48.

Petitioner argues that “Shibata further discloses the second wall being a single piece wall structure continuous between a floor portion and a ceiling portion.” Pet. 39 (citing Ex. 1003 ¶¶ 80–81). Petitioner further argues that “there is no indication that there is a break in the wall structure in the second wall above in Shibata Figure 2,” and asserts a “single piece wall structure . . . is a standard construction technique in the industry.” *Id.* Dr. Meyers testifies that “[r]eviewing this figure as a person of ordinary skill in the art, it is clear that the second wall is a single piece wall structure continuous between a floor portion and a ceiling portion,” and “[m]y opinion is further confirmed by the wall in Figure 1 of the ’862 Patent, which is admitted to be prior art, showing the exact same structure.” Ex. 1003 ¶ 81.

Patent Owner argues that “Shibata is silent as to whether its wall has a ‘break,’” and that “Petitioner’s unsupported assertion regarding a wall construction technique *currently* used in the industry does not satisfy Petitioner’s burden of affirmatively establishing that Shibata discloses a ‘single piece’ wall structure or that the Shibata-Betts combination would have included a ‘single piece’ wall structure.” PO Resp. 45 (emphasis in original).

Patent Owner’s argument that Shibata is “silent” as to a break in the wall is not persuasive because this infers that Shibata actually reveals or teaches a break. It is true, that Shibata does not expressly describe that its wall is one-piece, i.e. a single piece. *See generally* Ex. 1009. We have Considered Shibata’s drawings and specification, and we agree that Shibata is silent as to the wall being either a single piece or having a break, but one could also gather from such silence that the wall is a single piece.

Petitioner’s stronger position is that Dr. Meyers provides unrebutted testimony that Shibata would have been understood by an ordinary artisan as disclosing a one-piece wall. Pet. 39, citing Ex. 1003 ¶ 81; Ex. 2009 at 146:1–6. Pet. Reply 18. And, Dr. Meyers explained consistently in his deposition that Betts also discloses a one-piece wall

Q. And the wall that Betts is disclosing is not a one-piece wall. It has a buttress portion, 16, correct?

A. I disagree. The wall portion that’s identified is drawn continuously of uniform thickness, and of one piece. And if you’re discussing 16 is, what looks to be a door, but it’s on the inside, but the wall that faces the passenger compartment is a single piece continuous surface.

Ex. 2009, 145:23–146:6. Dr. Meyers testifies that lavatory walls made of a single piece were known in the art. Ex. 1003 ¶ 80. Dr. Meyers explained that this is shown by considering Figure 1 in the ’862 patent, labeled “Prior Art” which shows a single piece wall similar to the curved wall in Figure 2 both of which we reproduce below.

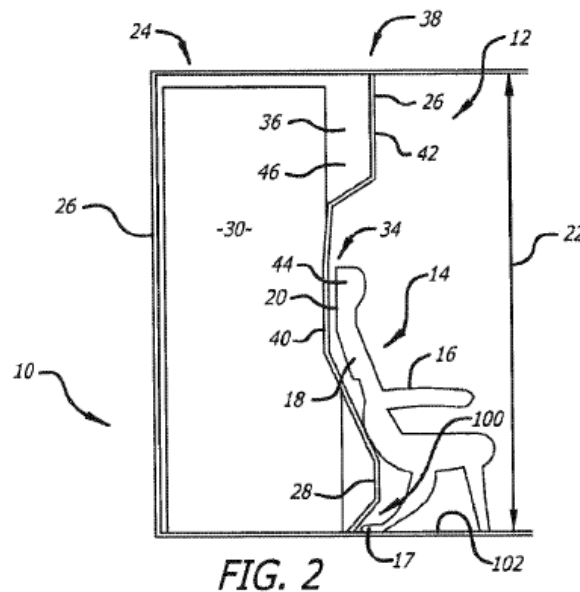
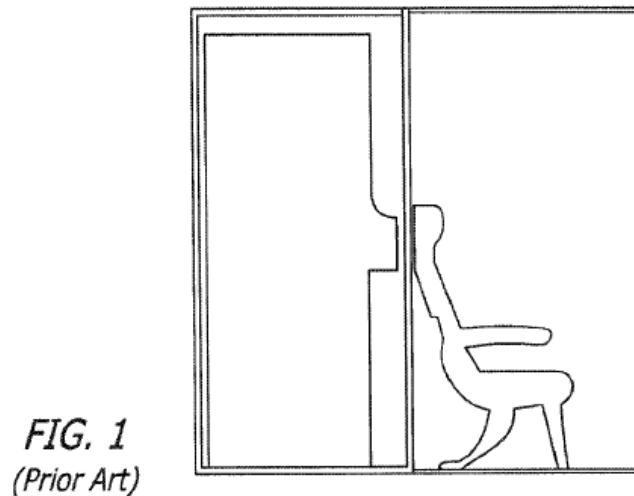


Figure 1 of the '862 patent showing a schematic diagram of a “Prior Art” flat-walled lavatory in comparison to Figure 2 illustrating a curved wall lavatory. If Figure 2 illustrates a continuous single piece wall, as Patent Owner claims, then Figure 1 must also be understood as a single piece wall.¹⁵ We credit Dr. Meyers’ testimony in this regard, which is unrebutted,

¹⁵ The '862 contains no written explanation or description of the claimed curved wall lavatory being a “single piece.” *See generally* Ex. 1001. “Single piece” is found only in claims 5, 8, and 11. The only disclosure of a

that a person of ordinary skill in the art would have understood that “this is a standard construction technique in the industry, i.e., it is common that a lavatory wall will be a single piece.” Ex. 1003 ¶ 81.

Based on the complete record before us and for the reasons expressed above, we are persuaded that Petitioner has shown a preponderance of evidence that claims 5, 8, and 11 would have been obvious in view of Shibata, Betts, Bentley and the knowledge of a person of ordinary skill in the art.

9. Dependent claim 3

Dependent claim 3 recites:

The lavatory of claim 2, wherein the lower recess is configured to receive a seat support of an aircraft passenger seat, the seat support configured to interface with a floor of the cabin and hold a seat bottom of the aircraft passenger seat in an elevated position.

Ex. 1001, 5:45–49.

Petitioner argues “a person of ordinary skill in the art would be motivated to modify a flat forward facing wall of a lavatory to include a recess to allow a passenger seat to be positioned further aft in the aircraft cabin.” Pet. 35 (citing Ex. 1003 ¶¶ 57–65). Petitioner’s expert, Dr. Meyers, testifies that “many prior art structures included a lower recess to accommodate the aft extending seat support.” Ex. 1003 ¶ 57). Dr. Meyers provides prior art evidence, including drawings of “three examples of enclosure units with a floor-level recess to allow seat supports to be positioned further aft in the cabin.” *Id.* ¶ 58. The drawings are further collaborated by declaration evidence of the origins, sales information, and

single piece wall would be Figure 2, which, like Figure 1, shows an unbroken “second wall.”

use of the pictured enclosure units. *Id.* ¶¶ 59–61 (citing Ex. 1016; Ex. 1017). As Dr. Meyer’s persuasively testifies “[w]hen such a seat is moved further aft, the aft-extending seat support of the aircraft passenger seat will eventually move into the lower recess.” *Id.* ¶ 91.

Patent Owner does not present substantive non-obviousness arguments with respect to claim 3. *See* PO Resp. 25–46. As for claim 3, we have considered, and on the complete record before us, accept as our own, Petitioner’s arguments and evidence set forth at pages 34–36 of the Petition. Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 3 would have been obvious over Shibata, Betts, and Bentley.

E. Ground 2: Claims 10 and 17

Claim 10 depends directly from claim 1 and recites “wherein the second wall is configured to accept loads from an aircraft passenger seat.” Ex. 1001, 6:33–34. Claim 17 depends ultimately from independent claim 11 adding “wherein the second wall is configured to accept loads from an aircraft passenger seat *or adjacent structures*.” *Id.* at 7:6–8 (emphasis added). Because these limitations are essentially the same, we address both claims 10 and 17 together

Petitioner argues that a “person of ordinary skill in the art would recognize that a curved wall created by modifying Shibata in view of Betts and Bentley could be configured to accept loads from an aircraft passenger seat or adjacent structures.” Pet. 55 (citing Ex. 1003 ¶¶ 96–101). In support, Petitioner asserts evidence that aircraft walls and monuments

typically accept loads in the form of FAA guidelines¹⁶, a FAA directive¹⁷, and Rezag, the additional reference included in Ground 2. *Id.* at 55–57.

Petitioner points to “FAA guidelines for wall-mounted seats and for seats mounted to a lavatory.” Ex. 1018, 40. Considering FAA AC No, 25.562-1B, Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes (Jan. 10, 2006), (“FAA guidelines”), Petitioner asserts that these FAA guidelines describe the necessity for testing “[s]eats mounted to a structure, such as a structural bulkhead, galley or lavatory, where no integral structural members are used for attachment.” Pet. 55 (quoting Ex. 1018, 40). In view of the guidelines and testing of such seats, Petitioner argues that “[a] person of ordinary skill in the art would recognize that the wall accepts at least some, if not all, of the load from the seat that is mounted to the wall. *Id.* (citing Ex. 1003 ¶¶ 68–69). Petitioner also asserts that the Federal Register includes FAA airworthiness directives “requir[ing] repetitive inspections for corrosion in the inside and outside lower walls of each type A, D, E, and F lavatory wall that has at least one wall-mounted cabin attendant seat, and related investigative and corrective actions if necessary.” *Id.* at 56 (quoting Ex. 1019).

In addition, Petitioner argues that “Rezag[] makes clear that at least part of the load of a seat may be supported by a wall of a monument within an aircraft.” *Id.* (citing Ex. 1020, 12:63–13:4). Petitioner argues that “Rezag describes the need for optimizing space in a cabin,” and that the ordinary artisan “would understand that saving weight is a universal design

¹⁶ For example, FAA AC No, 25.562-1B, Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes (2006) (Ex. 1018).

¹⁷ Fed. Reg. Vol. 71, No. 92 27595-27598 (May 12, 2006) (Ex. 1019).

goal in aircraft.” Pet. 26–27 (citing Ex. 1003 ¶ 66; Ex. 1020, 1:40–44). Therefore, Petitioner asserts, “one of ordinary skill in the art would have thus been motivated to combine the passenger seat in Betts with the reclining mechanism in Rezag so that the seat in Betts could share loads with the Betts closet and thus reduce the weight of the seat.” *Id.* at 27. Petitioner also asserts “the use of an adjacent structure to support some or all of the weight of an adjacent seat is well-known in the art.” *Id.* (citing Ex. 1003 ¶¶ 67–70, Exs. 1018, 1019, 1022).

Patent Owner makes several arguments, initially that “Petitioner’s purported motivation to combine Rezag and the Shibata-Betts combination lacks adequate factual support and ignores that the resulting combination does not teach the claimed load-sharing feature.” PO Resp. 47. After assessing Petitioner’s evidence in the FAA guidelines, we address Patent Owner’s specific arguments below.

1. FAA guidelines and airworthiness directives

As an initial matter, we find Petitioner’s references to the FAA guidelines and airworthiness directives persuasive as to the knowledge and level of ordinary skill in the art. Dr. Meyers testifies that “[h]aving an adjacent structure supporting some or all of the weight of a seat is well-known and is confirmed by the well-known practice of mounting a flight attendant seat directly to a bulkhead or wall of an enclosure, such as a closet, galley, or lavatory.” Ex. 1003 ¶ 68 (citing Ex. 1021). Besides pointing to prior art patents, specifically U.S. Patent No. 6,079,669 to Hanay, (Ex. 1021), disclosing a flight attendant seat mounted to a lavatory, Dr. Meyers explains that FAA guidelines require that “[s]eats mounted to a structure, such as a structural bulkhead, galley or lavatory, where no integral structural

members are used for attachment should be tested with the seat attached to segments of the mounting surface.” *Id.* ¶ 69 (quoting Ex. 1018, 40).

Exhibit 1018 is FAA AC No. 25.562-1B, Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes (Jan. 10, 2006), (“FAA advisory circular”) which “provides information and guidance regarding acceptable means of compliance with the requirements of 14 CFR part 25 applicable to dynamic testing of seats.” Ex. 1018, 1. This document explains the difference between seats mounted to the floor of an aircraft (*id.* at 39), as well as seats that are wall-mounted to the aircraft. *See id.* at 40 (“Seats that are wall mounted must be evaluated individually.”). The FAA advisory circular “describes[] two basic types of dynamic test procedures (*see* Figure 3-1): a test where the predominant impact vector is vertical and a test where the dominant impact vector is horizontal.” *Id.* at 3. As pointed out by Dr. Meyers, the FAA advisory circular states that wall-mounted seats mounted to aircraft non-structural monuments “such as a structural bulkhead, galley or lavatory, where no integral structural members are used for attachment should be tested with the seat attached to segments of the mounting surface.” Ex. 1003 ¶ 69 (quoting Ex. 1018, 40)

We find Dr. Meyers’ testimony and the supporting evidence of FAA guidelines and FAA advisory circular to be persuasive that aircraft structures such as lavatory walls were well known to be able to support loads and, indeed as shown by the FAA guidelines, there was industry wide mandated seat testing for such wall-mounted arrangements. *See id.* (Dr. Meyers explaining that “[t]hese guidelines contemplate exactly the proposed modification here, i.e., placing the seat in Betts in direct contact with the aft-wall, and confirm my opinion that such a modification would be obvious.”).

We next turn to Patent Owner's specific arguments with respect to Rezag.

1. Whether Rezag's integrated assembly shares a load through only the floor of the aircraft

Patent Owner argues that in Rezag, "loads shared internally between components are transmitted through the frame and to the floor of the aircraft via the anchoring points on the rails," but "are not shared through any other means," such as a wall. PO Resp. 51 (citing Ex. 2008 ¶ 107). Patent Owner asserts that "Rezag's integrated assembly" (which Mr. Brunke defines as the luggage compartment 54 and the passenger seat unit together) "is mounted within the aircraft by attaching the frame 14 to anchoring points on the floor of the aircraft." *Id.* at 50 (citing Ex. 2008 ¶ 106); *id.* at 51 (citing Ex. 1020,6:58–60). According to Patent Owner, "any loads shared internally between components are transmitted through the frame and to the floor of the aircraft via the anchoring points on the rails." *Id.* at 51 (citing Ex. 2008 ¶ 107). We reproduce below Rezag's Figures 13a–c illustrating a sitting portion 2 of a seat, and seat back 4, reclining in conjunction with a supporting luggage compartment 54.

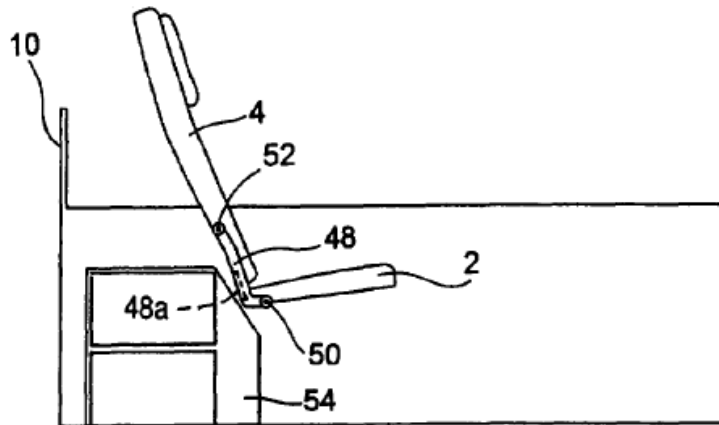


Fig.13a

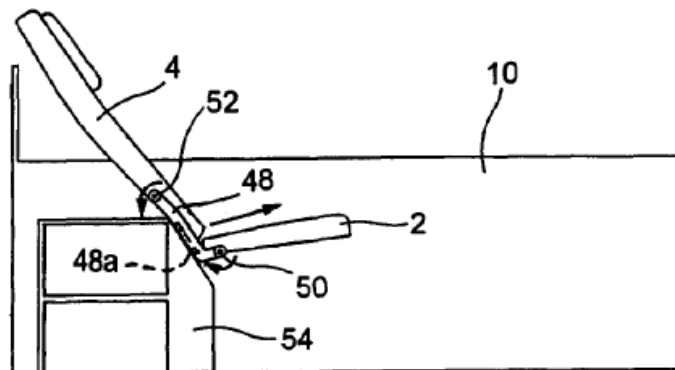


Fig.13b

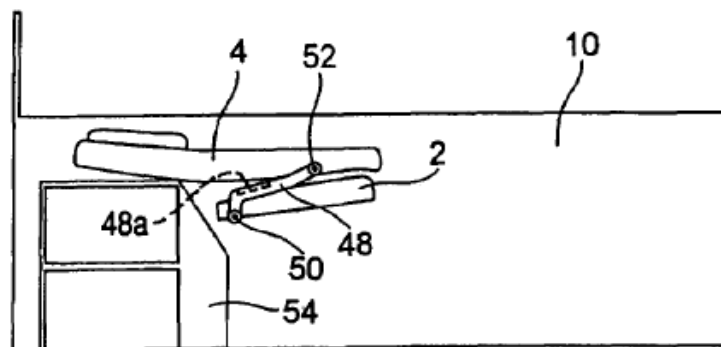


Fig.13c

Figures 13a–c show Rezag’s reclining seat back 4 as it reclines from an upright position in Figures 13a–b to a fully reclined (horizontal) position in Figure 13c. Rezag explains that for the embodiment “as illustrated in FIGS.

13b and 13c, this luggage compartment 54 also can serve as a support for the back 4 of the illustrated armchair.” Ex. 1020, 12:63–65. Rezag further describes that

[i]n the embodiment depicted, the luggage compartment 54 has a cut-off corner in its upper portion on the armchair side. The slant of this cut-off corner corresponds to the slant of the back in its seated position tilted toward the rear (FIG. 13b). The bottom of the back 4 thus *can come to rest* against this slanted corner which also serves as a stop for the levers 48. In FIG. 13c, the back 4 is in more or less horizontal position *and it comes to rest* on the upper portion of the luggage compartment 54.

Id. at 12:63–13:6 (emphasis added).

Patent Owner acknowledges that “the top portion of the luggage compartment is configured to support the seat when the seat is tilted (Rezag, Fig. 13b) or reclined (Rezag, Fig. 13c).” PO Resp 50 (citing Ex. 2008 ¶ 106). Patent Owner argues that where luggage compartment 54 and frame 14 are an integrated assembly “loads shared internally between components are transmitted through the frame and to the floor of the aircraft via the anchoring points on the rails.” *Id.* at 51 (citing Ex. 2008 ¶ 107).

We agree to an extent with Patent Owner’s argument, that is—that Rezag does not expressly disclose a lavatory wall accepting or supporting any load from the reclining seat back 4. However, this is not an accurate explanation of Petitioner’s arguments or position. Petitioner argues that “Rezag[] makes clear that at least part of the load of a seat may be supported by a wall of a monument within an aircraft. Pet. 56 (citing Ex. 1020, 12:63–13:4). Dr. Meyers explains that Rezag’s “disclosure teaches a configuration where loads from the seat and occupant may be supported by surrounding structure; the seat comes to rest against the luggage compartment, confirms that in Rezag the luggage compartment accepts at least some of the loads

from the seat that reclines into it.” Ex. 1003 ¶ 98. Even though Rezag does not explicitly disclose a lavatory wall accepting a load, we are persuaded that a person of ordinary skill in the art, understanding that aircraft bulkhead and lavatory walls were capable of supporting loads, for example from an attendant’s seat, would have also understood that these same monuments can support the load from a reclining chair back 4 as disclosed in Rezag. We are not apprised of any rebuttal argument from Mr. Brunke that a lavatory wall could not be constructed to accept some load from a seat. Mr. Brunke testifies mainly that Rezag’s integrated reclining chair transmits loads to the aircraft floor and “[i]n my opinion, loads are not shared through any wall, let alone a lavatory wall.” Ex. 2008 ¶ 107.

Given Rezag, including the additional prior art of FAA guidelines and advisory circular, as well as the knowledge and level of skill in the art, it is not a significant leap for an ordinary skilled artisan to appreciate that monument walls, such as lavatories, bulkheads, and luggage compartments would have been manufactured in a way that permitted them to support certain loads from a reclining seat back. Although we agree that Rezag does not expressly disclose *a lavatory wall* supporting chair back 4, for purposes of this Decision, we are persuaded that one of skill in the art would design and fabricate an aircraft lavatory wall to support some portion of load from a seat back in a reclining posture. In determining whether an invention would have been obvious to a person of ordinary skill, we recognize that “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 420.

2. Motivation to combine Rezag with Shibata-Betts

Patent Owner argues that Petitioner contends only that a person of ordinary skill in the art “could have,” combined Rezag with Shibata and

Betts, and has not proven “—by a preponderance of the evidence—that a skilled artisan *would* have been motivated to make that combination. PO Resp. 52 (citing *Belden*, 805 F.3d at 1073). Patent Owner further argues that Petitioner’s motivation of weight savings, as a reason to combine Rezag with Shabata and Betts, would not reduce weight as “Rezag does not disclose that its reclining mechanism (or load sharing) reduces the weight of the seat.” *Id.*

We disagree with Patent Owner. Rezag explicitly discloses weight savings by its reclining seat. Ex 1020, 13:28–32. As Petitioner points out, Rezag teaches sharing the load of the seat with the wall or an adjacent monument resulting in “very appreciable savings in weight in comparison with known aircraft seats which can be converted into beds.” Pet. 26–27 (citing Ex. 1020, 13:29–31); *see also* Pet. Reply 22. Rezag explicitly describes that “[a]ll these embodiments make it possible to have a seat convertible into a bed in simple manner. They can be implemented making very appreciable savings in weight in comparison with known aircraft seats which can be converted into beds.” Ex 1020, 13:28–32.

On the complete record now before us Dr. Meyers’ testimony is un rebutted that “a person of ordinary skill in the art would understand that saving weight is a universal design goal in aircraft, including commercial aircraft.” Ex. 1003 ¶ 67. Given such a design goal, and considering the express teaching of weight savings in Rezag, Dr. Meyers testifies persuasively that “modify[ing] the passenger seat shown in Figure 1 of Betts to include the reclining mechanism in Rezag . . . would enable the seat in Betts to share loads with the curved forward wall of the closet positioned immediately aft of the seat in Betts Figure 1.” *Id.* Based on the full record in this proceeding, Petitioner and Dr. Meyers have provided compelling

articulated reasoning and evidentiary underpinnings to support the combination of Shibata, Betts, and Rezag.

3. Whether Shibata, Betts, and Rezag teach “load sharing”

Patent Owner asserts “[n]one of Petitioner’s evidence teaches load sharing between a passenger seat and a contoured lavatory wall.” PO Resp. 53. Again, we agree with Patent Owner to the extent that Rezag does not expressly teach load sharing with an adjacent *lavatory wall*. On the other hand, for at least the reasons described above with respect to motivation to combine, we are persuaded that Petitioner has shown a preponderance of evidence that an ordinary skilled artisan would have considered load sharing as taught by Rezag for the curved wall structure of Betts as applied to Shibata’s lavatory in order to permit a seat to be moved further aft and reclined in such a manner as to rest against the curved wall.

Objecting to Petitioner’s references to the FAA guidelines, Patent Owner also argues that “a wall may accept loads from a seat that is *mounted* to that wall is irrelevant because the passenger seat in the proposed Shibata-Betts-Rezag combination is not wall-mounted.” *Id.* (emphasis in original). We disagree that the FAA guidelines are irrelevant. The test procedures in the FAA guidelines clearly show that a person of ordinary skill in the art understood that aircraft monuments, including bulkhead wall and lavatory walls, can support specific loads, even if the monument structures are not part of the actual airframe structure of the aircraft. We appreciate that the method of contact with the wall is different, but Patent Owner has not explained why a load on aircraft interior wall would significantly differ between a mounted seat, or a reclined seat back in contact with the wall. In addition, the claims do not require the lavatory wall to support any specific amount of load, and the FAA guidelines generally support Petitioner’s

position that lavatory walls can support *some* loads, even if all walls need not support a flight attendant seat as Patent Owner suggests.

We credit Dr. Meyers, who has persuasively established that an aircraft lavatory wall would have been capable of carrying the load of a reclining seat. For example, Dr. Meyers testifies “[h]aving an adjacent structure supporting some or all of the weight of a seat is well-known and is confirmed by the well-known practice of mounting a flight attendant seat directly to a bulkhead or wall of an enclosure, such as a closet, galley, or lavatory.” Ex. 1003 ¶ 68. Dr. Meyers specifically cites to U.S. Patent No. 6,079,669, to Haney, showing “a folding flight attendant seat mounted to a lavatory.” *Id.* Dr. Meyers additionally testifies that “there are specific FAA guidelines for wall-mounted seats and for seats mounted to a lavatory.” *Id.* ¶ 69 (citing Ex. 1018, 40); *see also id.* ¶ 70 (citing Ex. 1019). Having considered all the evidence before us, we find Dr. Meyers’ testimony and supporting evidence persuasive that a person of ordinary skill in the art would have understood that a lavatory wall would have been configured and tested to support reclining an aircraft seat as in Rezag to be in direct contact with Betts’s curved wall, as it would have been incorporated into Shibata’s lavatory as modified by Betts.

4. Conclusion on Ground 2

We are persuaded that Petitioner has shown a preponderance of evidence that Shibata, Betts, and Rezag disclose “wherein the second wall is configured to accept loads from an aircraft passenger seat [*or adjacent structures*]” as called for in dependent claims 10 and 17.

F. Secondary Considerations

We evaluate and weigh objective evidence of nonobviousness (alternatively, “secondary considerations”) in determining whether any challenged claim is unpatentable as obvious.

In order to accord substantial weight to secondary considerations in an obviousness analysis, “the evidence of secondary considerations must have a ‘nexus’ to the claims, i.e., there must be ‘a legally and factually sufficient connection’ between the evidence and the patented invention.” *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019) (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988)). “The patentee bears the burden of showing that a nexus exists.” *WMS Gaming Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999). “To determine whether the patentee has met that burden, we consider the correspondence between the objective evidence and the claim scope.” *Henny Penny*, 938 F.3d at 1332.

Fox Factory, Inc. v. SRAM, LLC, 944 F.3d 1366, 1373 (Fed. Cir. 2019).

1. Nexus

[P]resuming nexus is appropriate “when the patentee shows that the asserted objective evidence is tied to a specific product and that product ‘embodies the claimed features, and is coextensive with them.’” *Fox Factory*, 944 F.3d at 1373 (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018) (quoting *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000))). “Whether a product is coextensive with the patented invention, and therefore whether a presumption of nexus is appropriate in a given case, is a question of fact.” *Id.*

[T]he degree of correspondence between a product and a patent claim falls along a spectrum. At one end of the spectrum lies perfect or near perfect correspondence. At the other end lies no or very little correspondence, such as where “the patented

invention is only a component of a commercially successful machine or process.” *Id.* Although we do not require the patentee to prove perfect correspondence to meet the coextensiveness requirement, what we do require is that the patentee demonstrate that the product is essentially the claimed invention. *See id.*

Id. at 1374 (quoting and citing *Demaco*, 851 F.2d at 1392). Patent Owner bears the burden of proving that its objective evidence of nonobviousness is attributable to the combination of features that is claimed rather than “prior art features in isolation or unclaimed features.” *Id.* at 1378.

Patent Owner does not provide an analysis demonstrating that its products are coextensive (or nearly coextensive) with the challenged claims. PO Resp. 57–59. We, therefore, find that a presumption of nexus is inappropriate. Accordingly, on the facts and evidence before us we do not presume nexus. However,

[a] finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations. *See In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996). To the contrary, the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the “direct result of the unique characteristics of the claimed invention.” *Id.*

Fox Factory, 944 F.3d at 1373–74. Even if PO established such a nexus, we find the objective indicia evidence lacking for the reasons below.

2. Failure of others to recognize and solve the problem

Patent Owner does not specifically argue conventional factors of long-felt need, copying and praise, failure of others and commercial success. *See Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1052 (Fed. Cir. 2016) (Secondary considerations “include: commercial success enjoyed by devices practicing the patented invention, industry praise for the patented invention, copying by others, and the existence of a long-felt but unsatisfied need for the invention.”). Patent Owner argues that the “twenty-one-year time gap

between the existence of the elements Petitioner identified in the prior art and the '862 patent's priority date demonstrates that no skilled artisan recognized the problem that B/E recognized and solved: that conventional flat-walled lavatories prevented seats from being moved further aft." PO Resp. 57 (citing *Nike, Inc. v. Adidas AG*, 812 F.3d 1326, 1338 (Fed. Cir. 2016), overruled on other grounds by *Aqua Prod., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017)). Patent Owner argues specifically that "[h]ere twenty-one years passed between Shibata's issuance and the priority date of the '862 patent." *Id.* at 58 (citing Ex. 2009, 127:22-128:2.) On this basis alone, Patent Owner contends this time gap shows the prior art failed to recognize the problem that B/E solved, which shows the non-obviousness of the '862 patent. *Id.* at 57.

Petitioner argues that simply the simple passage of time is insufficient evidence of non-obviousness. Pet. Reply 24 (citing *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) ("Absent a showing of long-felt need or the failure of others, the mere passage of time without the claimed invention is not evidence of nonobviousness")). Importantly, Petitioner asserts, there was no long-felt need. *Id.* (citing Ex. 1027, 171:9–12, Ex. 1030, 42:24–43:5).

We find Patent Owner's time gap argument pertains more closely to a reason to combine rather than objective indicia of non-obviousness. In *Nike*, the case relied upon by Patent Owner, the Federal Circuit explained that the argument was whether "the age of these references and the passage of time between their public availability and the inventions recited in the proposed substitute claims should have precluded the Board from finding *a reason to combine* the references." *Nike*, 812 F.3d at 1337 (emphasis added). The Federal Circuit went on to explain that it is "established precedent that '[t]he

mere age of the references is not persuasive of the unobviousness of the combination of their teachings, absent evidence that, notwithstanding knowledge of the references, the art tried and failed to solve the problem.” *Id.* at 812 F.3d 1338; *see also Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed.Cir.2004) (“Absent a showing of long-felt need or the failure of others, the mere passage of time without the claimed invention is not evidence of nonobviousness.”).

In this case, Patent Owner has not presented persuasive, or really any, evidence of long-felt need or failure of others. Patent Owner mainly argues that “[t]he prior art utterly failed to even recognize the problem, much less to solve it.” PO Resp. 59. But even if there is some credence to the time gap argument, either as objective indicia of non-obviousness or as a lever against the combination of Shibata, Betts, Bentley, or Rezag, this argument is simply not consistent with a complete picture of all the prior art and the level of skill and knowledge of an ordinary skilled artisan. Dr. Meyers presented persuasive evidence, including images of the MD-90 Storage (S-4 enclosure), 737 Storage, and 747 Storage as discussed above, as well as supporting declaration evidence indicating that floor-level recesses in aircraft walls and monuments for seat supports were known in the art *between* Shibata and the 2010 filing dates of the provisional applications to which the ’862 patent claims priority. Ex. 1003 ¶ 58; Ex 1001 code (60). Additional declaration evidence presented by Petitioner indicates that these designs were offered for sale in 2003, 2004, and 2009. *See, e.g.*, Ex. 1017 (Offer letter from Gary Chris, VP of Corporate Accounts for Heath Tecna to Qantas Airways for B747-400 (747 Storage) dated December 14, 2009); *see also* Ex. 1016 ¶ 14 (Scott Savian testifying that “C&D shipped S4

enclosures to SAS from its California facilities in September and October 2004.”).

Based on the entire record, we conclude that Patent Owner fails to establish that the prior art as a whole clearly shows a lack of understanding that a recess could be formed in a monument to accommodate the aft-movement of a passenger seat prior to the asserted priority date of the ’862 patent. Indeed, the background prior art for example of the MD-90 Storage illustrates that it was known at least by 2004 to provide a curved wall allowing a passenger seat to be moved further aft. Accordingly, we find Patent Owner’s argument unpersuasive that the claimed invention addressed an issue or problem that was unrecognized or unsolved. We agree with Petitioner that Patent Owner “shows no failure to solve the problem nor lack of technical know-how” and we discern no logical or persuasive evidentiary support that the time gap between Shibata and the ’862 patent priority date weighs against a finding of obviousness. Pet. Reply 25.

Based on the record before us, Petitioner has shown sufficiently that the claim limitations at issue would have been obvious over Shibata, Betts, and either Bentley or Rezag, as we see no reason why the proposed modification is more than the predictable use of prior art elements according to their established functions as would have been understood by a person of ordinary skill in the art. Even if we were to give some weight to Patent Owner’s time gap argument with respect to its purported objective indicia of non-obviousness, because we view the time gap evidence as weak for the reasons discussed above, it would not outweigh the strong evidence of obviousness shown by Petitioner in this proceeding.

III. CONCLUSION¹⁸

For the reasons discussed above, we determine Petitioner meets its burden of establishing, by a preponderance of the evidence, that the challenged claims are unpatentable, as summarized in the following table:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–9, 11–16, 18, 19	103(a)	Shibata, Betts, Bentley	1–9, 11–16, 18, 19	
10, 17	103(a)	Shibata, Betts, Bentley, and Rezag	10, 17	
Overall Outcome			1–19	

IV. ORDER

For the reasons given, it is

ORDERED that, based on a preponderance of the evidence, claims 1–19 of U.S. Patent 10,625,862 B2 have been shown to be unpatentable; and

¹⁸ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

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

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