

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN TUOZHU TECHNOLOGY CO., LTD.,
Petitioner,

v.

STRATASYS, INC.,
Patent Owner.

Case IPR2025-00311
Patent 8,562,324

**PETITIONER'S REPLY TO
PATENT OWNER'S RESPONSE TO PETITION**

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EXHIBITS

EX1001	U.S. Patent No. 8,562,324 to Pettis (“the ’324 Patent”)
EX1002	Excerpts from the Prosecution History of the ’324 Patent (“the Prosecution History”)
EX1003	Declaration of Dr. Andrew Wolfe
EX1004	U.S. Patent No. 6,580,959 to Mazumder (“Mazumder”)
EX1005	U.S. Patent Pub. No. 2010/0063615 to Mori et al. (“Mori”)
EX1006	U.S. Patent Pub. No. 2009/0015668 to Tian et al. (“Tian”)
EX1007	Japanese Patent Publication Number JP2000218708
EX1008	Certified English Translation of Japanese Patent Publication Number JP2000218708 (“Hull”)
EX1009	U.S. Patent No. 5,278,479 to Seki et al. (“Seki”)
EX1010	U.S. Patent Pub. No. 2006/0171452 to Waehner (“Waehner”)
EX1011	Lan, <i>Web-based Rapid Prototyping and Manufacturing Systems: A Review</i> , Computers in Industry (December 2009) (“Lan”)
EX1012	U.S. Patent Pub. No. 2004/0207662 to Anderson et al. (“Anderson”)
EX1013	Tay et al., <i>Distributed Rapid Prototyping – A Framework for Internet Prototyping and Manufacturing</i> , Integrated Manufacturing Systems (November 2001) (“Tay”)

- EX1014 Henke et al., *Rapid Prototyping Modules for Remote Engineering Applications*, International Journal of Online Engineering, Vol. 4, Issue 1 (July 2008), available at <https://online-journals.org/index.php/i-joe/article/view/532/513> (“Henke”) (also available at <https://core.ac.uk/download/pdf/224750644.pdf>).
- EX1015 U.S. Patent Pub. No. 2006/0054039 to Kritchman et al. (“Kritchman”)
- EX1016 Exhibit J of Infringement Contentions from *Stratasys, Inc., v. Shenzhen Touzhu Technology Co., Ltd., et al.*, Case Nos. 2:24-cv-00644-JRG and 2:24-cv-00645-JRG (E.D. Tex. Nov. 14, 2024).
- EX1017 Declaration of June Munford
- EX1018 December 18, 2024 stipulation sent by Petitioner’s counsel to Patent Owner’s counsel
- EX1019 Docket Control Order (Document 34), *Stratasys, Inc. v. Shenzhen Tuoazhu Technology Co. Ltd. et al*, 2-24-cv-00645 (EDTX)
- EX1020 April 8, 2025 Sotera Stipulation
- EX1021 June 17, 2025 Stipulation
- EX1022 Second Declaration of Dr. Andrew Wolfe
- EX1023 Plaintiff’s Opening Claim Construction Brief *Stratasys, Inc. v. Shenzhen Tuoazhu Technology Co. Ltd. et al*, 2-24-cv-00644, -00645 (EDTX)
- EX1024 Definition of “dynamic” from Dictionary of Computer Science revised edition, Market House Books Ltd. (2001)

EX1025	Definition of “dynamic” from Dictionary of Science and Technology second edition, A&C Black Publishers (2007)
EX1026	Definition of “dynamic” from Colins Dictionary, HarberCollins (2009)
EX1027	Transcript of November 19, 2025 deposition of Dr. Denis R. Cormier
EX1028	U.S. Patent No. 6,748,543 to Vilhuber
EX1029	U.S. Patent Pub. No. 2007/0050634 to Makimoto et al.
EX1030	U.S. Patent Pub. No. 2008/0162930 to Finney et al.
EX1031	U.S. Patent Pub. No. 2009/0070477 to Baum et al.
EX1032	U.S. Patent Pub. No. 2010/0125894 to Yasrebi et al.

I. INTRODUCTION

Patent Owner Stratasys (“PO”) attempts to distinguish the prior art grounds advanced in the Petition by improperly importing a “simultaneous” presentation requirement not recited by the claims themselves. But even if PO’s claim constructions were applied, the POR neglects that the prior art combinations here would nevertheless provide such a user interface option. PO’s strawman attacks against the references in isolation (rather than addressing the predictable result of each combination) are not enough. Worse yet, its attempt to excise some secondary references from the Federal Circuit’s broad category of “analogous art” ignores precedent and invites legal error.

II. CLAIM CONSTRUCTION

A. Elements [1.d], [19.d]

Stratasys seeks to improperly inject unclaimed limitations into Elements [1.d] and [19.d], seeking to import a “simultaneously” requirement for presenting the video camera image (“image”) and two-dimensional projection (“projection”). The Institution Decision preliminarily (and correctly) noted this fact. *See* Paper 9, 24-25. Undaunted by the Board’s astute analysis, PO continues to demand a construction that rigidly limits the claim scope to “simultaneously” presenting the image and projection. EX1022, ¶7; POR, 37 (contending the claims require

presenting “at the same time”), 38 (same), 67 (same), 39 (“...presented together”); *see also* POR, 12, 16, 43 (excluding presentation “at different times”), 66 (same).

The plain language of the claims does not state that the image and the projection are required to be displayed simultaneously, only that each is “present[ed] in the user interface.” EX1022, ¶¶6, 8. The Board already alerted PO to this fact. Paper 9, 24 (“plain language of the claim does not recite” this requirement). Critically here, PO had an opportunity to amend the claims after the Board’s analysis so as to explicitly recite such features, but PO waived it. The law forbids PO’s attempt to “nullify” the amendment process. *CUPP Computing AS v. Trend Micro Inc.*, 53 F.4th 1376, 1383-84 (Fed. Cir. 2022). PO’s expert confirmed that changing or adding new information to a user interface does not create a new, different user interface and therefore the claim recitation of “present in the user interface” does not require simultaneous presentation. EX1027, 19:1-20:3, 33:16-34:2.

There is also no portion of the specification that would mandate importation to rewrite the claims. *SuperGuide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870, 874-875 (Fed. Cir. 2004). (“not a substitute for, nor can it be used to rewrite, the chosen claim language”). Rather, the specification states that “the visualization area 510 may display a current tool path...may also ***or instead*** show a simulated print object...[or] may also ***or instead*** show an image of a working volume of a

three-dimensional printer.”¹ EX1001, 22:43-53. The specification describes that the user interface may be “any other suitable interface for conveying visual information such as a video image **and/or** model projection.” *Id.*, 24:47-55. As such, the preferred embodiment contemplates displaying the image and projection at the same or different times. EX1022, ¶¶9-13.

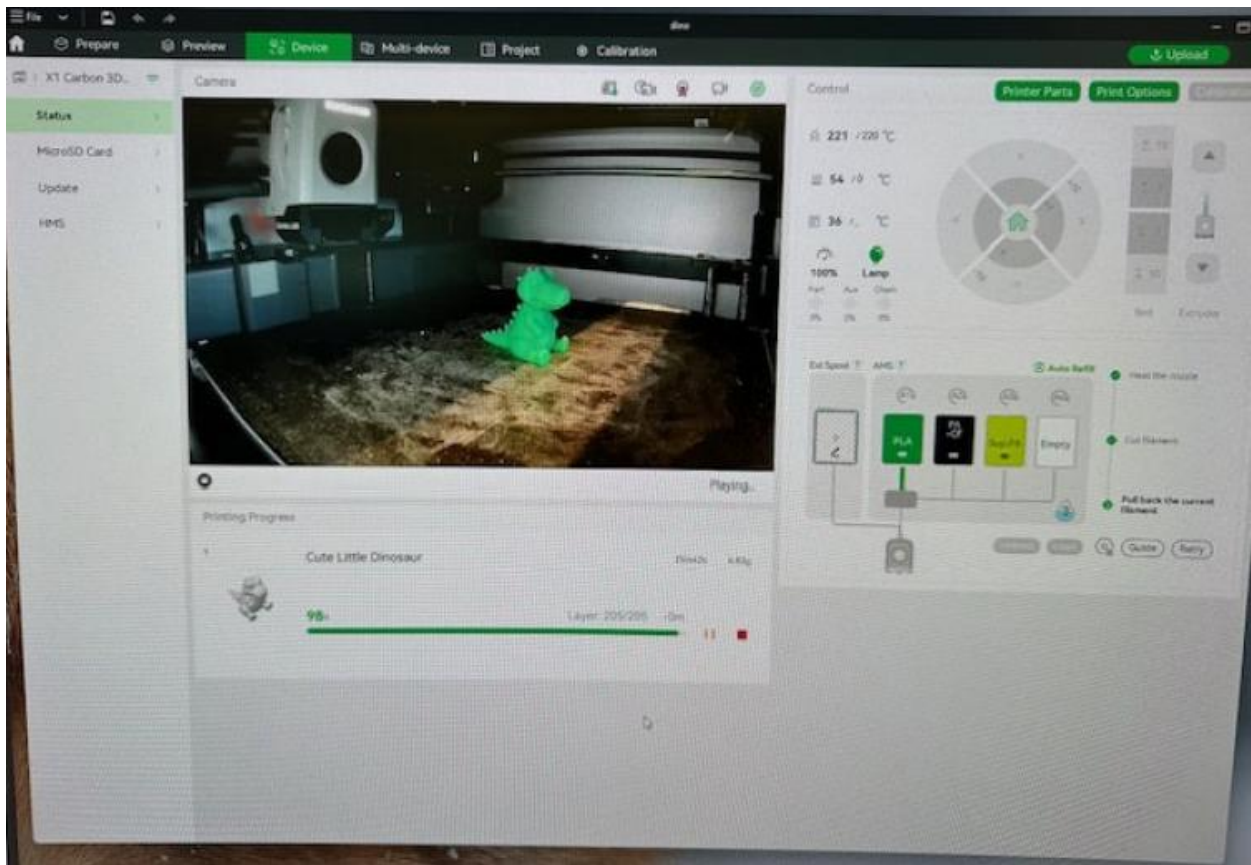
Indeed, the specification is clear that the same user interface is dynamically updated with new information. For example, the ’324 patent describes information presented during fabrication and the later presented information shown “upon completion of the objection” as being “presented” in the same user interface. EX1001, FIG. 7, 24:47-52, 25:6-10. This interpretation is confirmed by claims 20-21 which recite in part “transmitting status information over the data network **upon completion of the object**” and “wherein the status information includes **data presented through the user interface.**” *Id.*, cls. 20-21. That is, this status information is presented in “**the user interface**” after completion of the object yet is still presented in the same user interface. EX1022, ¶13.

During prosecution, the applicant argued that the claims distinguished over the cited Taminger reference for failing to disclose a user interface having “both an image from a camera and a two-dimensional rendering of a model **from the point**

¹ All emphasis added unless otherwise noted.

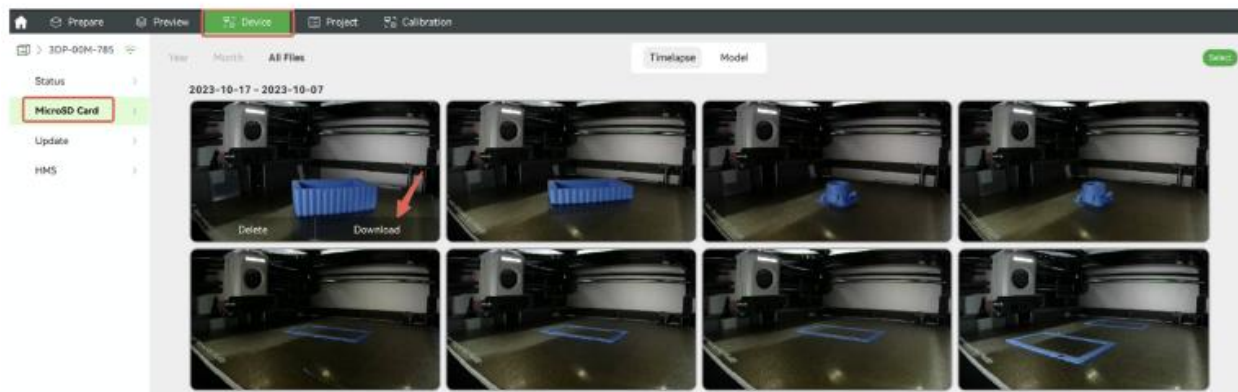
of view of the camera” not due to a lack of image and projection being displayed simultaneously. EX1002, 160; EX1027, 48:21-49:3. The applicant argued that presenting both the image and the projection in the user interface would “permit side-by-side comparison of model and results by a remote user.” POR, 18; EX1002, 161. However, there is no assertion by the applicant in the prosecution history that the image and projection are displayed simultaneously and there is no clear disclaimer of an interface that presents the image and projection at different times. Even more importantly, the applicant did not amend the claims to require such a feature either during prosecution or in the present proceeding. EX1002, 156-162; EX1022, ¶¶14-15. Notably, the Examiner did not state or suggest that concurrent display of the image and projection was indicated by the claims or is a reason the claims were allowed. EX1002, 174.

Finally, PO’s assertions that the claims require simultaneous display of the image and projection are in direct conflict with PO’s assertions in the District Court that a “two-dimensional projection of the three-dimensional model is a video image from the video camera” and “an image of the build volume from the video camera is a time lapse” even though the video images from the video camera and the “time-lapse video files” are not displayed at the same time. EX1016, 46.



EX1016, 43 (image of video camera displayed separate from time-lapse).

In Bambu Studio, you can also download time-lapse video files from the "Device" - "MicroSD Card" page:



EX1016, 53 (time-lapse images displayed separate from video camera images).

III. MORI AND HENKE ARE ANALOGOUS ART TO THE '324 PATENT

A. Legal Standard for Analogous Art

“A petitioner is not required to anticipate and raise analogous art arguments in its petition” and thus Petitioner, below, properly addresses both “field of endeavor” and “reasonably pertinent” arguments here in “its reply.” *Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1009 (Fed. Cir. 2023); *Apple Inc. v. Andrea Elecs. Corp.*, 949 F.3d 697, 705-07 (Fed. Cir. 2020).

Analogousness should be construed broadly. *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010). A patent’s field of endeavor is “not limited to the specific point of novelty, the narrowest possible conception of the field, or the particular focus within a given field.” *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1001 (Fed. Cir. 2016). As the Federal Circuit has recognized, “[c]ourts generally take an expansive view of what constitutes analogous art” and thus a reference is “analogous art where the references share[] a general field of endeavor.” *Netflix, Inc. v. DivX, LLC*, 80 F.4th 1352, 1359 (Fed. Cir., 2023); *see also Unwired Planet*, 841 F.3d, 1001 (finding a reference “focusing on graphical user interfaces” as falling within the same “broader field of interface design” as “interfaces for location-based services.”); *In re Mettke*, 570 F.3d 1356, 1359 (Fed. Cir. 2009) (field of endeavor not limited to “providing access to the Internet.”).

With respect to the “reasonably pertinent” test, the “particular problem with which the inventor is involved” cannot be so narrowly defined that only references from the same field of endeavor as the invention would qualify as prior art. *Donner Tech., LLC v. Pro Stage Gear, LLC.*, 979 F.3d 1353 (Fed. Cir. 2020).

B. Mori is analogous art to the '324 Patent

Mori is both within the same field of endeavor and reasonably pertinent to the problems addressed by the '324 Patent and thus is analogous art. The field of endeavor of the '324 Patent can be defined as rapid prototyping or rapid fabrication. The '324 Patent expressly states that it “relates to ***three-dimensional fabrication***” and “rapid prototyping from computer models” and that “the principles of the invention may be adapted to ***a wide variety of three-dimensional fabrication processes***” with “additive fabrication” being just one example of a three-dimensional fabrication process toward which the '324 Patent is directed. EX1001, 1:14-18, 1:66-2:5. The '324 specification repeatedly specifies that its disclosures are applicable to “a three-dimensional printer ***or other fabrication resource***.” *Id.*, 22:50-53, 8:28-31 (describing applicability to “three-dimensional printers ***or other fabrication or prototyping devices***.”). Abstract, 2:6-8, 11:55-60, 14:33-42, 14:49-54.

Mori is directly in the broad field of endeavor of rapid fabrication. Mori describes a “machine tool” where “workpieces are machined in an internal area.”

EX1005, [0005], [0044], [0002], Abstract (describing fabricating a “workpiece of [a] three-dimensional model.”); EX1003, ¶¶52-57, 88. Such machining fabricates objects from the same types of CAD models used in 3D printing. EX1027, 26:1-16. Thus, although it is true that Mori teaches a destructive machining tool type rapid fabrication apparatus, it falls within the same field of endeavor of the ’324 patent of rapid fabrication. EX1022, ¶¶16-18. Differences in processing methods do not affect field identity. Even PO admits that Mori and the ’324 Patent “both relate to three-dimensional fabrication.” POR, 31; EX1027, 30:19-32:7 (PO’s expert agreeing that “machining is a type of three-dimensional fabrication”), 54:16-21.

Mori is also reasonably pertinent to the problem addressed by the ’324 Patent of monitoring an automated process. EX1001, 8:49-51, 12:47-51, 14:63-15:5 (“The web-based user interface may permit video monitoring....”); EX1022, ¶¶19-20. Mori is reasonably pertinent to this problem because it describes a “machining status monitoring apparatus” that provides images of “the tool and workpiece” and “virtual two-dimensional image data” of the tool and workpiece. EX1005, Abstract, [0043], [0049]-[0050], [0059]-[0065].

C. Henke is analogous art to the ’324 Patent

Henke falls within the same general field of endeavor of the ’324 Patent of “rapid prototyping from computer models.” EX1001, 1:14-18, 8:28-31 (...*other*

fabrication or prototyping devices.”); EX1014, Title, 2 (“Rapid Prototyping modules into a Remote Lab system.”); EX1027, 30:6-18 (additive manufacturing can be referred to as “rapid prototyping”). Similar to the “fabrication or prototyping devices” toward which the ’324 Patent is directed, Henke is directed toward the same field of endeavor of “Web-based access to control electro-mechanical” prototyping devices. EX1001, 8:28-31; EX1014, 2; EX1022, ¶¶21-22.

Henke is also reasonably pertinent to the problems addressed by the ’324 Patent of remote control and monitoring of an automated process. EX1001, 8:3-6 (“...control by a remote computer”), 8:49-51, 12:47-51, 14:63-15:5 (“The web-based...video monitoring”); EX1022, ¶¶23-24. Henke describes a remote interface to “handle laboratory procedure...and watch the laboratory procedure by supervising the model and environmental variables inside an I/O monitor or by observing the hardware model directly via a Web-Cam” which are ***both*** shown in Figure 8 and thus is reasonably pertinent to the problem addressed by the ’324 Patent. EX1014, 5. PO’s expert confirmed that students studying 3D printing would have also learned about remote operation and monitoring of networked machines in general. EX1027, 20:1-22:18.

“[A] reference can be analogous art with respect to a patent even if there are significant differences.” *Donner Tech., LLC v. Pro Stage Gear, LLC*, 979 F.3d 1353, 1361 (Fed. Cir., 2020); *Scientific Plastic Prods., Inc. v. Biotage AB*, 766

F.3d 1355, 1360 (Fed. Cir. 2014) (affirming Board application of bottle caps to chromatography cartridges because fluid-tight seal was the problem); *Paulsen*, 30 F.3d 1475, 1481 (Fed. Cir. 1994). Here, although Henke relates to a different type of rapid prototyping automated process, its teachings regarding remote monitoring and control of automated processes are directly pertinent to the problems addressed by the '324 Patent. EX1022, ¶24; EX1003, ¶¶78, 203-208.

IV. GROUND 1A RENDERS OBVIOUS CLAIMS 1, 3, 5-7, 9-10, 19-22

A. Ground 1A Provides Claims 1 and 19

PO's only argument with respect to the Ground 1A analysis of independent Claims 1 and 19 is that the Mazumder-Mori combination allegedly fails to provide that the user interface presents "an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera." POR, 34-46.

There is no dispute between the parties that Mazumder's "camera 65 records the laser-aided DMD process" and the local computer transmits the images "to the remote computer 95 to be displayed" as part of the user interface in the combination. EX1004, 6:36-48, 8:14-17, 8:51-54. There is also no dispute that Mori discloses "display[ing] the actual image data output from any one of the actual CCD cameras...the virtual image data...or the sectional image data" and "switches the image to be displayed between the actual image data, the virtual

image data and the sectional image data.” EX1005, [0070]. There is also no dispute that Mori’s virtual images “are respectively arranged at the **same positions** and in the **same orientations** as the actual CCD cameras.” *Id.*, [0061]-[0062]. Therefore, because the claims do not require simultaneous display of the image and projection (*see* § II, *supra*), the Mazumder-Mori combination provides elements [1.d] and [19.d]. EX1022, ¶¶25-26.

Even if the claims did require simultaneous display of the image and projection, the Mazumder-Mori combination provides such functionality. EX1022, ¶¶27-28. As a first example, as described in the Petition, the user interface at Mazumder’s remote computer 95 displays images from the camera at the 3D printer “on the remote computer monitor as streaming video.” EX1004, 6:36-48, 8:14-17, 8:51-54. The Petition proposed modifying Mazumder by adding Mori’s functionality for displaying virtual images of the object generated from stored model data shown from the perspective of one or more virtual cameras to Mazumder’s user interface, which already includes a display of images from the camera. Pet., 10-13. The Petition identified multiple benefits that would have predictably resulted from the proposed combination. *Id.* PO acknowledged that the Petition identified “benefits of two types of imaging” yet did not allege any flaws in these articulated benefits. POR, 35. As such, the proposed Mazumder-Mori combination, in which Mori’s virtual images of the object generated from model

data from the same perspective as the actual camera are added to Mazumder's user interface, which already displays images from the camera, would have included displaying the images from the camera and the virtual images derived from the model at the same time. EX1003, ¶¶84-88, 109-112; EX1022, ¶¶27-28. PO's arguments addressing Mori's disclosures in isolation, rather than the proposed combination, improperly "attack[] references individually." *In re Merck*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).

As a second example, the Petition plainly lays out why it would have been obvious and beneficial to modify Mori's teachings of displaying camera images and virtual images of the model at different times to display the actual images and virtual images at the same time. Pet., 23-24; EX1003, ¶113; EX1022, ¶29. Such an implementation in the Mazumder-Mori system would have allowed "the remote user to more easily visually compare the actual image and virtual image to quickly identify any defects or problems with the fabrication process" which is "consistent with both Mazumder's goals and Mori's suggested benefits." Pet., 11, 23-24, EX1003, ¶¶85, 113; EX1004, 2:34-42.

Turning to the POR, PO's assertion that "Mazumder teaches that sensor data, such as optical and acoustic emission sensors, (**and not video images**) are used to determine the need for corrective measures" (POR, 45), is demonstrably false. Mazumder expressly describes "image and video observation of the laser-

aided direct material deposition process” including “***detailed and accurate view[s]***” that allows “the designer [to] ***perceive[] a defect, an abnormality or some other undesirable characteristic***” of the fabrication process. EX1004, 2:27-42. As such, counter to PO’s assertion, Mazumder expressly describes video images of the fabrication process aid in defect detection. *Id.* PO has not disputed the Petition’s explanation that adding Mori’s virtual images of the fabrication process to Mazumder’s user interface would aid in such defect detection. Pet., 11, 23-24, EX1003, ¶¶85, 113.

Finally, PO has repeatedly asserted in the District Court that displaying of different images of the build volume from the same camera at different points in time satisfies this claim element. EX1003, ¶114. For example, PO asserts that a “two-dimensional projection of the three-dimensional model is a video image from the video camera” and “an image of the build volume from the video camera is a time lapse” of images from the same camera displayed at a different time. EX1016, 46, 43 (image of video camera displayed separate from time-lapse), 53 (time-lapse images from the same camera displayed separate from video camera images). In recent filings, PO continues to insist that the “two-dimensional projection of the three-dimensional model” can simply be images from “a video camera.” EX1023, 14. To be clear, the “time lapse” that Stratasyss identifies at the District Court as satisfying “a two-dimensional projection of the three-dimensional model”

(EX1016, 46) are the same images as the video images from the video camera, and as such, PO's assertion in this forum that "there is no allegation that presenting the same image(s) or video satisfies presenting both an image and a 2-D projection" (POR, 36) is simply not true. PO's expert confirmed that two different images from the same camera would satisfy this element. EX1027, 60:2-61:23. As such, as articulated in the Petition, Mazumder's disclosure of displaying streaming video images (which would include displaying different images over time) and Mazumder's disclosure of displaying both "**image and video** observation" satisfy this element under PO's broad District Court interpretation. Pet., 22; EX1004, 6:36-43, 2:27-30, 8:14-17; EX1003, ¶114.

B. Ground 1A Provides Claim 5

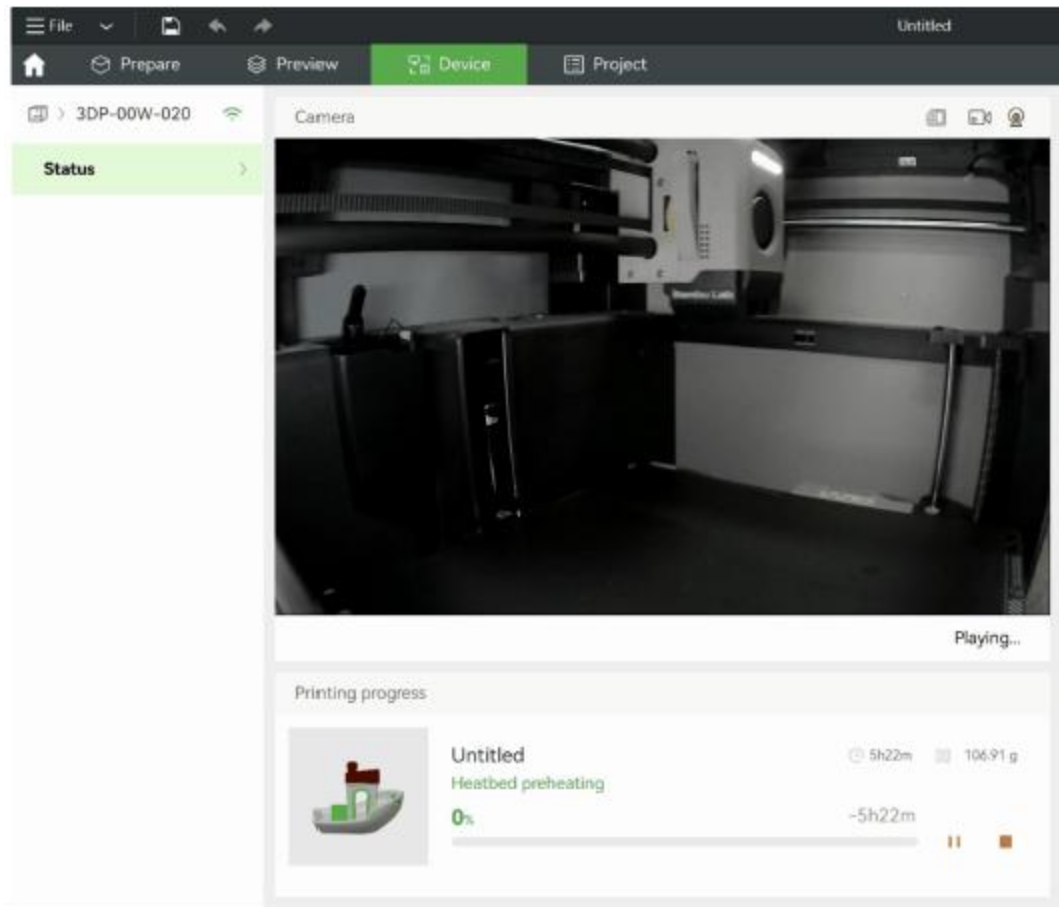
Mori could not be more clear that the "model data" includes "model data of the...workpiece W" and that "the model data of the entire machine tool... is **updated** by the model data updating section 17 **synchronously with the actual operations**" of the fabrication system. EX1005, [0061], [0078]; Pet., 25-26; EX1003, ¶¶118-119; EX1022, ¶¶30-32. Mori continues that "virtual image data of the tool T, **workpiece W** and a part of the table 56 are generated" based on "the **model data updated by** the model data updating section." EX1005, [0079]. Therefore, applying Mori's teachings to Mazumder (which describes an additive

fabrication process), the virtual image is dynamically updated to correspond to a state of the physical completion of the product. EX1003, ¶¶118, 88 (“these modifications would have been within the predictable and ordinary level of skill of a POSITA”). A showing of obviousness does not require every implementation detail of a proposed combination to be expressly described to render the claims obvious. *Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1332 (Fed. Cir. 2009); *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”). The record is clear that a POSITA would have the knowledge and ability to apply Mori’s suggestions to Mazumder’s system, including to update the model data synchronically with the actual operations of the resulting rapid fabrication system. EX1022, ¶¶33-34; EX1003, ¶¶118, 88. This is demonstrated, for example, by Anderson, which provides an example of the knowledge of a POSITA regarding how to update a virtual representation of an object being fabricated with actual operation of the system in an additive rapid fabrication system. EX1012, [0015], [0021], [0025], FIGs. 1, 2A; EX1022, ¶¶33-34; EX1027, 13:24-14:11, 16:6-17:15.

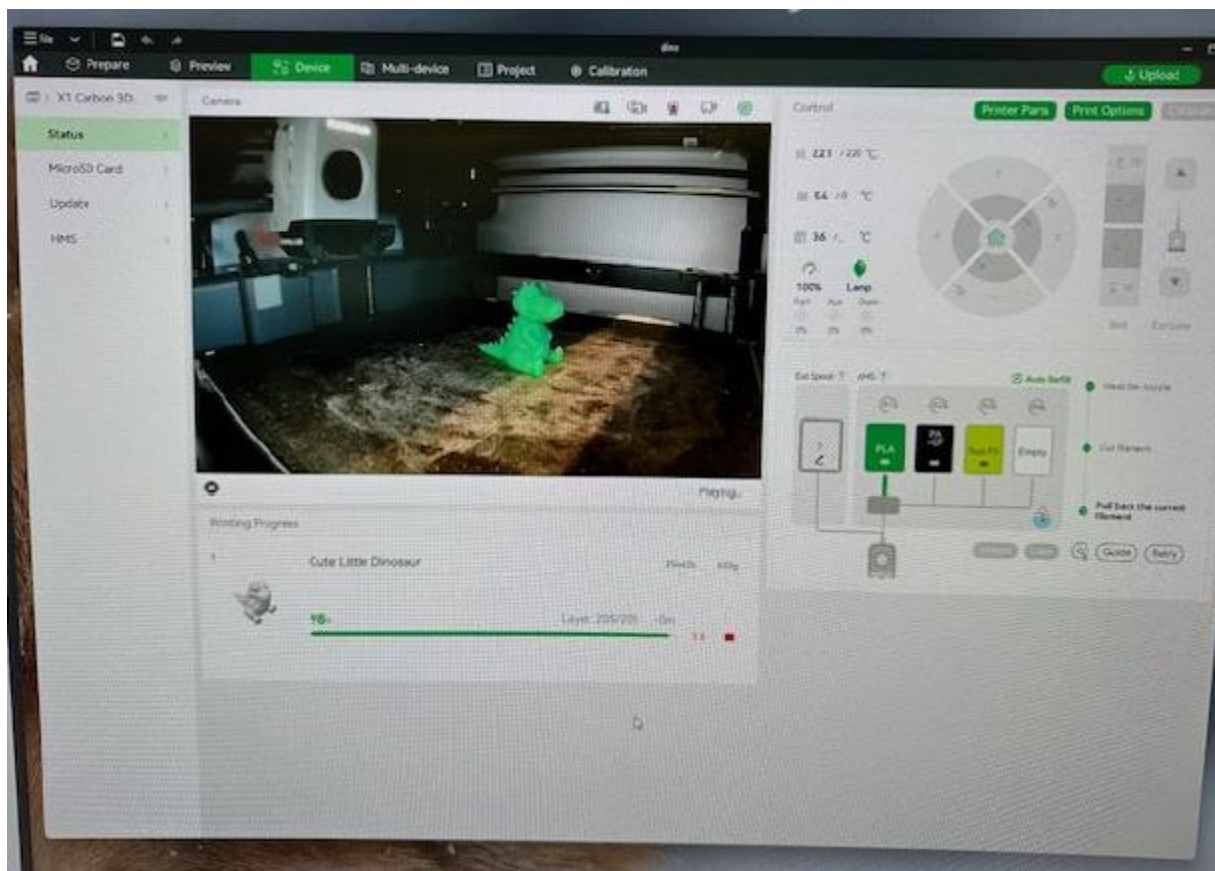
C. Ground 1A Provides Claim 6

As identified in the Petition, PO has expressed in District Court filings that this claim is satisfied when images of the build volume from the same camera are

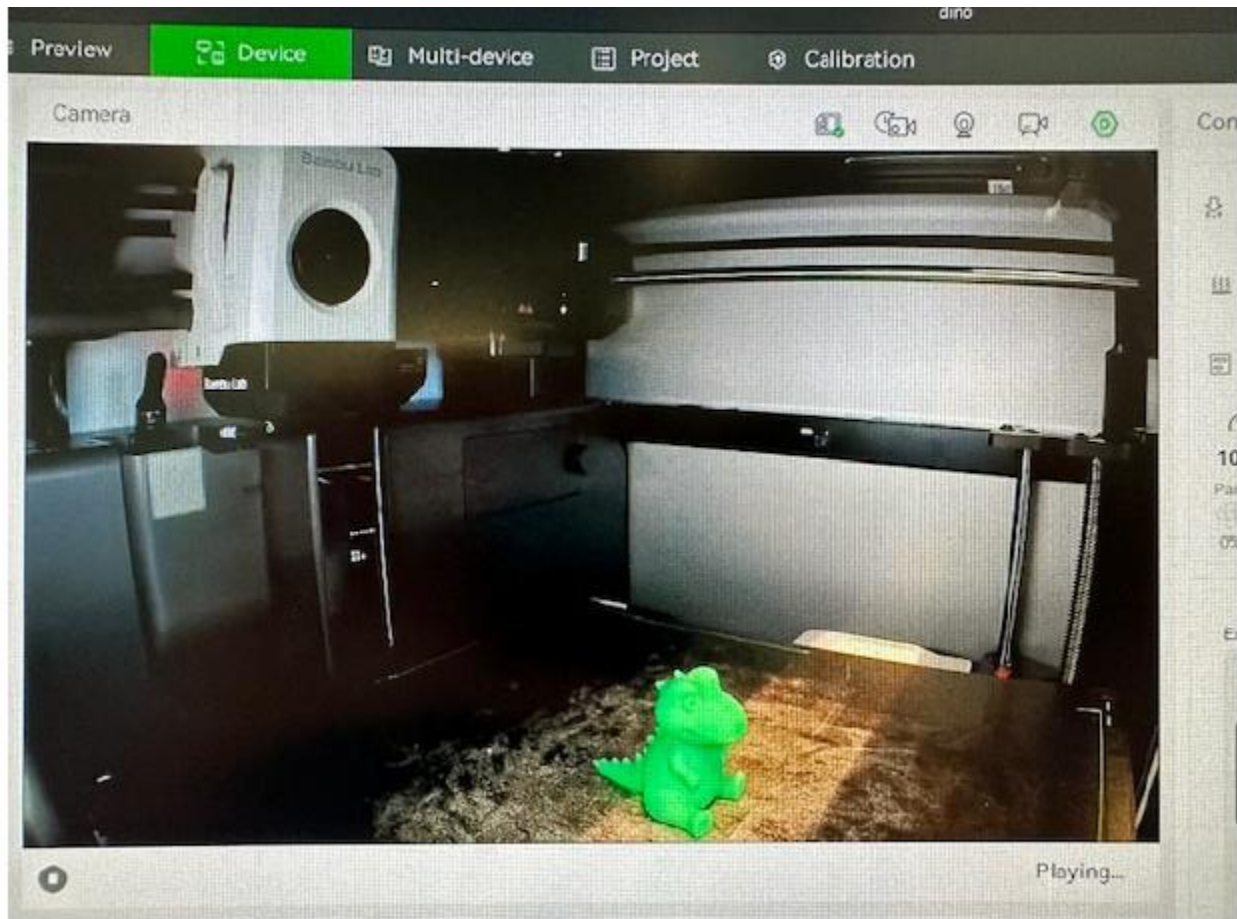
displayed at different times. Pet., 26. Specifically, in addressing Claim 6, PO asserts that “the two-dimensional projection *is a video image from the video camera.*” EX1016, 91. PO then identifies different pictures of the build volume displayed at different times by the user interface as satisfying this claim element.



EX1016, 102.



EX1016, 103.



EX1016, 104.

Note that earlier in the infringement contentions, PO identifies these same images as providing “an image of the build volume from the video camera (e.g., camera view).” EX1016, 41-44. As such, Mazumer-Mori provides Claim 6 in the same manner as alleged by PO. EX1003, ¶¶120-122.

Turning to the claim language itself, Claim 6 requires that “the two-dimensional projection is a video image from *the* video camera.” The term, “*the* video camera” receives antecedent basis from Claim 1 and therefore Claim 6

requires that the “image of the build volume” and “the two-dimensional projection” be images from the **same** camera. As such, Mazumder’s disclosure of presenting sequential video images from the same video camera satisfies Claim 6. EX1004, 6:36-48, 8:13-17, 8:51-54, Abstract.

Turning to the ’324 Patent specification, the ’324 Patent describes that “[t]he video camera may generally capture **images**” (plural images) and that “[t]he visualization area 510 may also or instead show an image of a working volume of a three-dimensional printer or other fabrication resource captured during execution of the print job. This may, for example, include a digital still image (which may be updated periodically) **or** a video image captured from a video camera at the three-dimensional printer.” EX1001, 6:22-24, 22:50-55. That is, the ’324 Patent describes displaying either periodically updated still images or video images but not both simultaneously. In another disclosure, the ’324 Patent describes “the user interface presents an image of the build volume from the camera” and that “[t]his may be any of the user interfaces described above, or any other suitable interface for conveying visual information such as a **video image and/or model projection**.” *Id.*, 24:47-55.

The ’324 Patent continues “the status information may include a digital image from the video camera.” *Id.*, 25:8-13. Once again, there is no disclosure in the ’324 Patent of multiple images from the same video camera being displayed

simultaneously. As such, Mazumder's disclosure of displaying "visual **images**" (plural images) as, for example "streaming video," as part of the user interface at the remote computer provides Claim 6 in at least as much detail as the support for this claim in the '324 Patent specification itself. EX1004, 6:36-53, 8:13-17 ("a **video** or television camera recording the fabrication process and transmitting the **images** to be viewed on a screen display situated at the remote computer system."), 8:51-54 ("sending the **images** to a display"), Abstract.

To the extent that PO is asserting that claim 6 requires displaying both video and still images from the camera, Mazumder describes displaying both "***image and video*** observation of the laser-aided direct material deposition process." EX1004, 2:27-30; EX1027, 49:10-50:17 (PO's expert confirming that Mazumder's system provides both video and still images). To the extent that PO argues that Claim 6 is not met due to Mazumder displaying a single video image rather than multiple video images from the same camera simultaneously, mere duplication of features does not have patentable significance. *See In re Harza*, 274 F.2d 669 (CCPA 1960).

V. GROUND 1C PROVIDES CLAIM 8

PO's arguments regarding Claim 8 demonstrate a fundamental misunderstanding of the proposed combination and improperly attack the references in isolation. Rather than bodily incorporating Hull's system into that of

Mazumder-Mori (as PO appears to assert), the Petition properly relies on Hull “for all that it teaches.” *Smith & Nephew, Inc. v. Rea*, 721 F.3d 1371, 1378 (Fed. Cir. 2013); Pet., 33-34; EX1003, ¶¶149-155. Hull’s teachings regarding requiring credential-based access to a remote computing device in a networked three-dimensional printing system are not limited to the specific “Slice Computer” or “Process Computer” of Hull’s system but rather are more broadly and properly applicable to networked computing systems in general. EX1003, ¶¶149-153; EX1022, ¶¶35-38. To be clear, even if PO’s counterintuitive assertion that Hull’s “remote user” is actually a local user were true (POR, 51-52), that distinction is immaterial as it improperly attacks Hull in isolation. The specific nature of the computer being accessed remotely in the networked system “is not a distinction on which validity turns.” *Smith & Nephew*, 721 F.3d at 1378. Petitioner relies on Hull’s teaching of requiring credential-based access for a remote user to access a remote computer at a different location in a networked three-dimensional printing system and as such, when properly applied to the Mazumder-Mori combination, the resulting system would have required the user located at remote computer 95 to enter credentials to access the local computer 70 over the communication system 75. EX1004, FIG. 1, 3:36-39, 4:18-23; EX1008, [0157], [0140], [0143]; EX1003, ¶¶61-62, 155; EX1022, ¶36. As Hull describes, the “REMOTE USER” function is a credential-based routine that allows a user to “remotely operate the Slice

Computer from the Control Computer” and as such, Hull’s relevant teachings are directly applicable to remote access of computers in a networked environment in general. EX1008, [0499], [0147]; EX1022, ¶¶36-38 (“requiring credentials to access a remotely located computer over a network was hardly new...”). PO’s attempt to “restrict [Hull]’s teachings to the particular way it implements” credential-based remote access in a networked environment “would improperly fail to read these references for all that they disclose.” *Alivacor, Inc. v. Apple Inc.*, 130 F.4th 1006, 1015 (Fed. Cir., 2025).

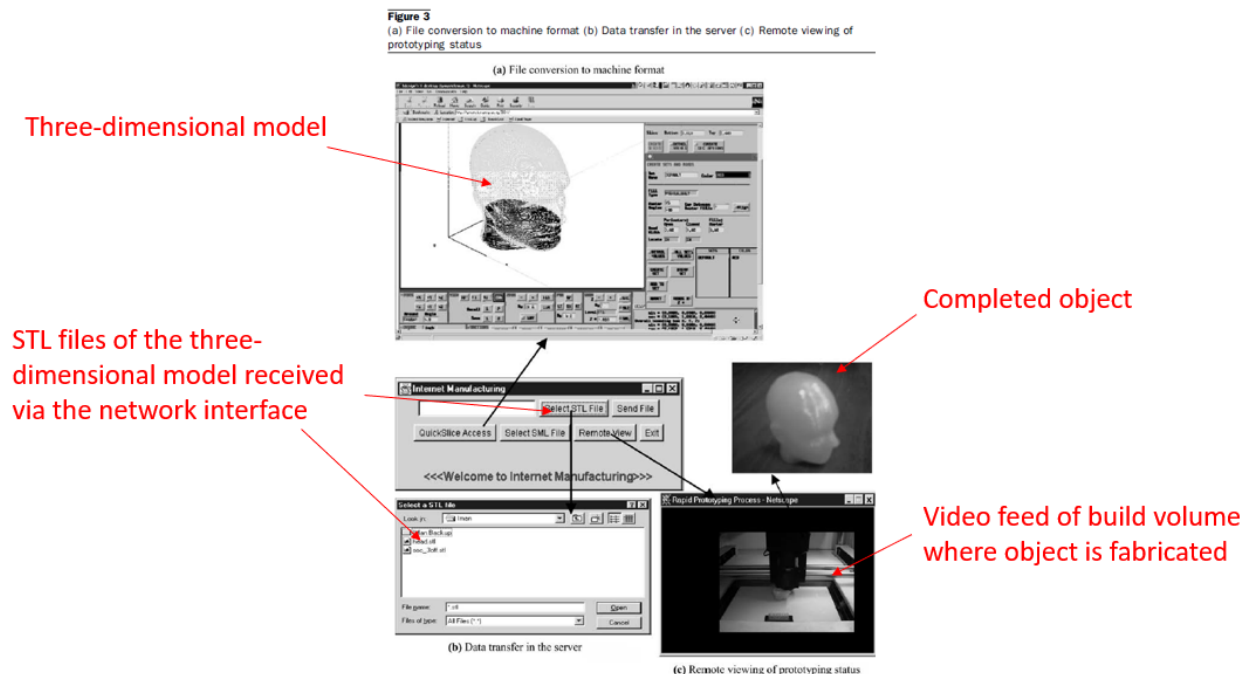
As discussed in the Petition, Mazumder provides that the user interface is generated and provided by the local site in the Mazumder-Mori-Hull combination and therefore requiring credential-based access to remotely access the local computer 70 at the local site includes requiring the credential-based access to access the user interface provided by the local site. Pet., 20-21; EX1004, 6:36-55, 8:14-17; 7:36-38, 8:18-20; EX1003, ¶¶155, 105-108. The addition of Hull’s teaching regarding credential-based access for a remote computer in a networked environment is no “more than the predictable use of prior art elements according to their established functions” and PO has not even attempted to dispute the predictable benefits articulated in the Petition. *KSR*, 550 U.S. at 417 (2007).

VI. GROUND 2A RENDERS OBVIOUS CLAIMS 1, 3, 5-7, 9-10, 19-22

A. Ground 2A Provides Claims 1 and 19

Similar to its Ground 1A arguments, PO's only argument with respect to the Ground 2A analysis of independent Claims 1 and 19 is that the Kritchman-Tay-Henke combination allegedly fails to provide "an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera." POR, 66-73.

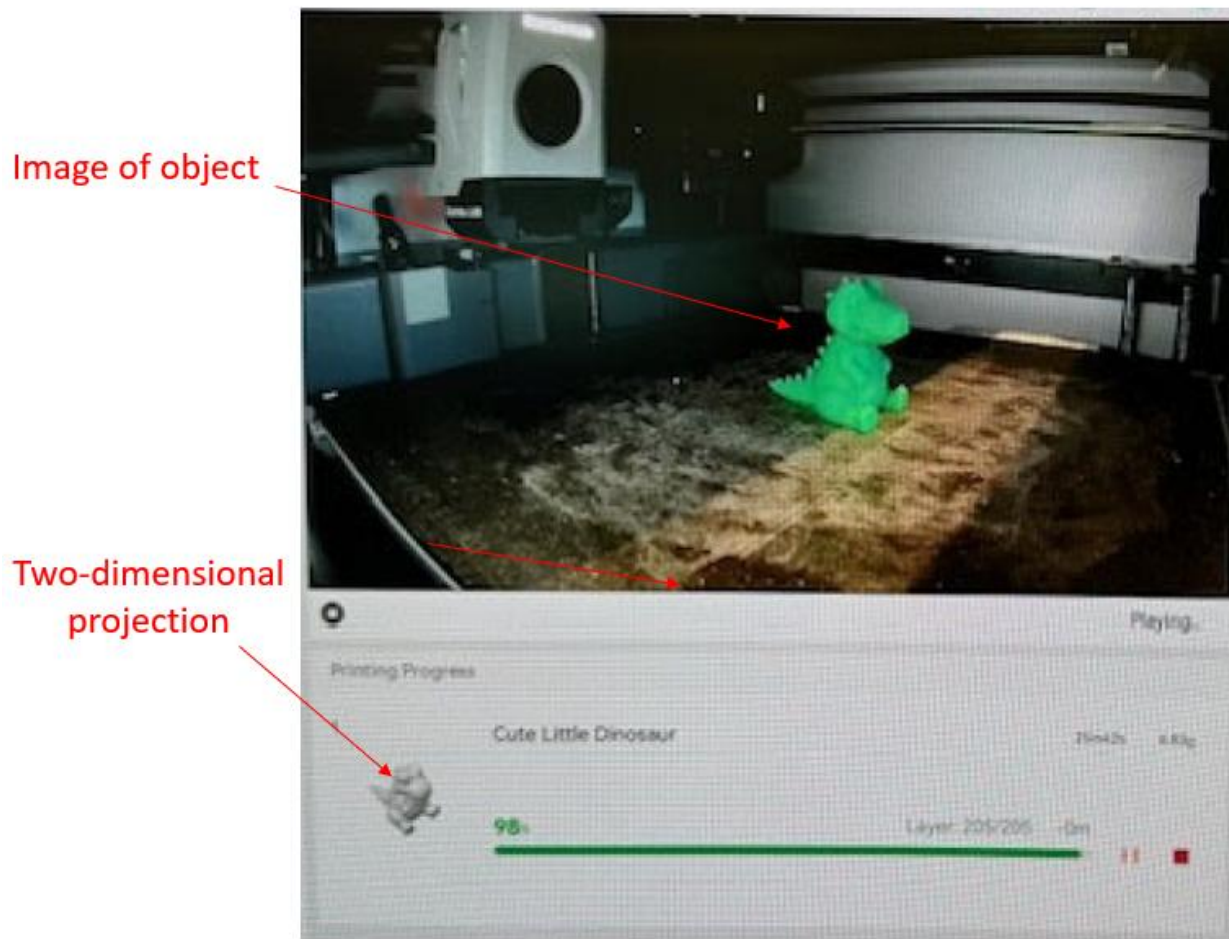
The Petition identifies multiple ways that the Kritchman-Tay-Henke combination provides these recitations of Elements [1.d] and [19.d]. Pet., 71-73. Under the first reading, Tay shows in Figure 3 that the user interface presents the view of the build volume and the two-dimensional projection from the same point of view. EX1003, ¶¶225-226; EX1022, ¶¶39-44.



EX1013, 4-5.

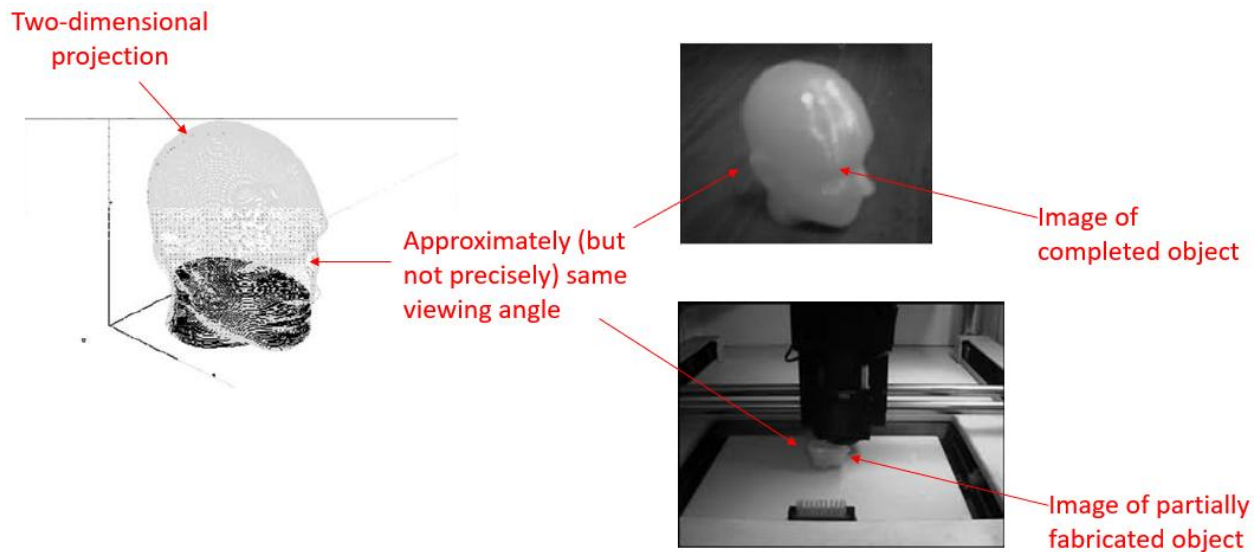
Elements [1.d] and [19.d] do not require simultaneous display of the image and projection (*see* § II, *supra*), and therefore this disclosure of Tay provides the challenged claim recitations.

PO asserts that Tay's two-dimensional projection and image of the build volume are not "from the same point of view." POR, 67-69. However, comparison of Figure 3 of Tay (above) to PO's infringement contentions reveals that the angle of the two-dimensional projection and the images of the actual object in Tay are more closely aligned than the projection and image that PO identifies for purposes of alleged infringement:



EX1016, 43, 39 (claim language allegedly satisfied by this example). PO's infringement contentions assert that the image and two-dimensional projection are from the same "point of view" even though the two are clearly not from exactly the same angle. The actual image of the object shows substantially a side-view of the object and the projection shows a more top down view. *Id.*; EX1022, ¶¶41-43.

Tay's FIG. 3 shows the image and the projection having a much closer alignment:



EX1013, 5; EX1022, ¶¶41-43. Tay (when applied to Kritchman) at the very least renders this element obvious in view of the infringement contentions. *Id.*; EX1003, ¶¶223-224, 226.

To the extent that PO now abandons its infringement theory and Elements [1.d] and [19.d] are interpreted to require that the view of the image and view of the projecting be exactly the same, the Petition provides an additional explanation of how the Kritchman-Tay-Henke combination provides this element, relying on Henke's disclosure that camera images of the real-world device and the simulation of the model be depicted from the same angle: a direct front-on view:

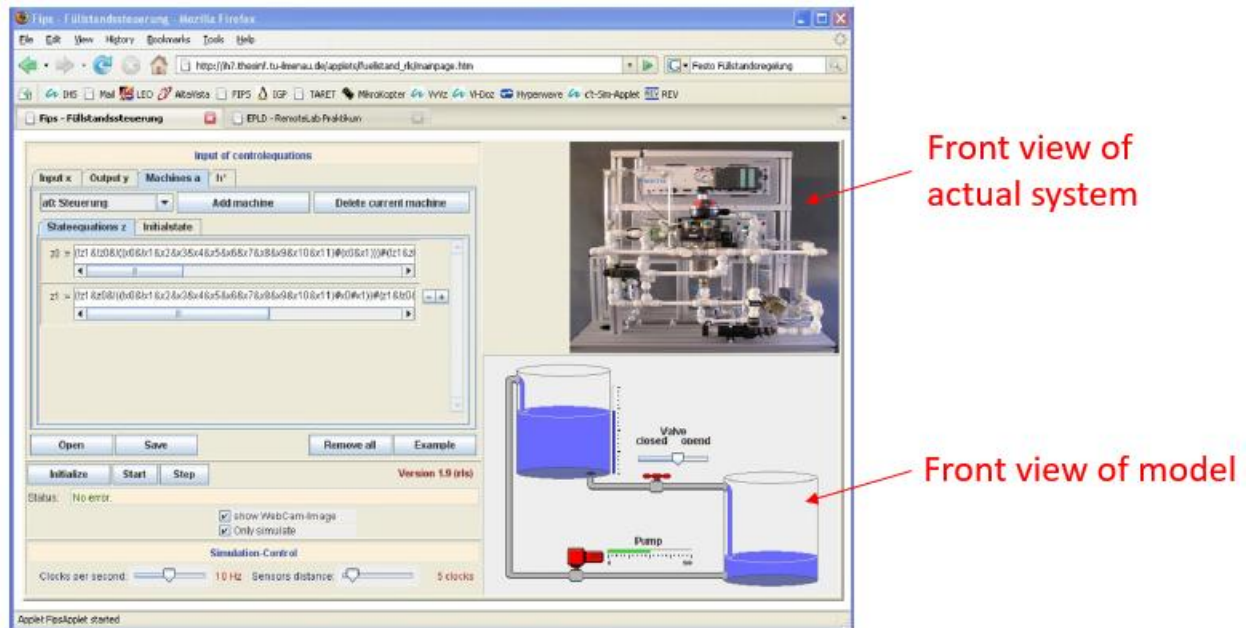


Figure 8. Online control of the Water level control - with Internet connectivity to the Remote Lab

EX1014, 5; Pet., 72-74. Although not required by the claims, Henke's Figure 8 (above) also shows the image of the actual system and virtual view of the model displayed simultaneously. When these teachings are applied to the Kritchman-Tay combination, it would have resulted in the images of the build volume and image of the model (both already disclosed by Tay) being displayed from the same angle simultaneously. EX1003, ¶¶227, 205-208; EX1022, ¶¶45-46 .

While it is true that Henke primarily discusses an example system for controlling water levels, Henke is also clear that its disclosures are relevant to “various electro-mechanical models” to allow for “Rapid Prototyping” without requiring designers to travel. EX1014, 2, 7 (“...we present here exemplarily.”); EX1027, 53:20-54:7. The Petition simply relies on Henke for “for all that it

teaches” including displaying images of an electro-mechanical system in a network prototyping environment and images of a model of that environment from the same angle at the same time. *Smith & Nephew*, 721 F.3d at 1378. PO’s arguments with respect to the specific example shown in Figure 8 of Henke in isolation, rather than the application of Henke to Kritchman and Tay (POR, 70-71), improperly “attacks references individually.” *Merck*, 800 F.2d at 1097.

B. Ground 2A Provides Claims 3 and 5

PO’s assertion that Henke’s hardware view “is not operating or functional in contrast to his simulation” has no support in the record and is directly refuted by the clear disclosures of Henke itself. Henke clearly discloses that “[t]he physical behaviour of the actual model, and its environment as well, will be emulated (e.g. as simulation model)” and that “[s]imulation and visual prototyping help to find functional errors.” EX1014, 3. Henke continues that not only is the design simulated using a virtual model, it is also “tested on real electro-mechanical models.” *Id.* The user interface displays both a “Visual model of the Water level control task” and a “Hardware model of the water level control unit.” *Id.*

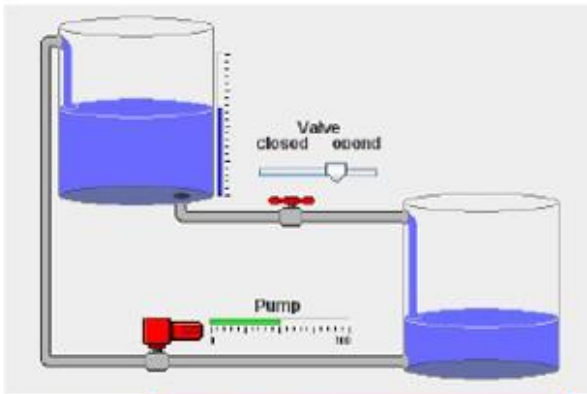


Figure 2. Visual model of the Water level control task



Figure 3. Hardware model of the Water level control unit

EX1014, 3.

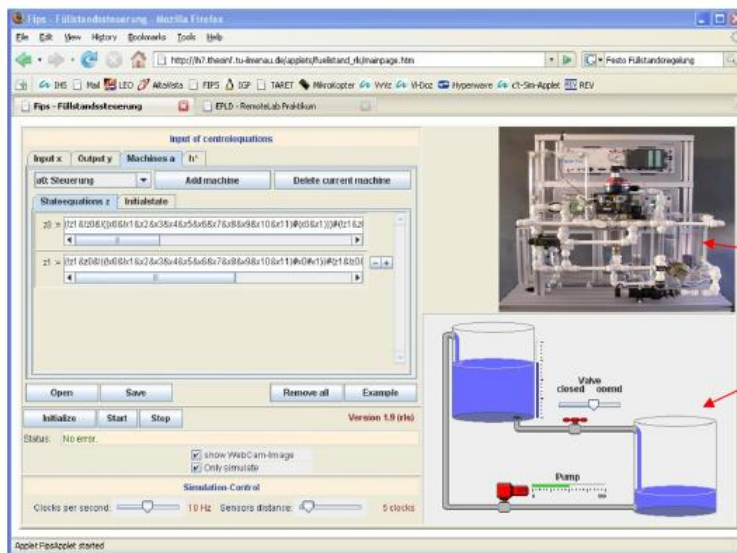


Figure 8. Online control of the Water level control - with Internet connectivity to the Remote Lab

Hardware model and virtual model displayed simultaneously

EX1014, 5.

Henke discloses “step by step and *parallel execution* of these prototypes” (the visual prototype and hardware model) to allow the user to “*watch* the laboratory procedure by *supervising the model* and...*directly via a Web-Cam.*” *Id.*, 3, 5-6. As such, Henke demonstrates that the model is updated based on

operation of the real-world device and when this teaching is applied to Kritchman-Tay it provides claims 3 and 5. EX1022, ¶¶47-48; EX1003, ¶¶229-235.

C. Ground 2A Provides Claim 6

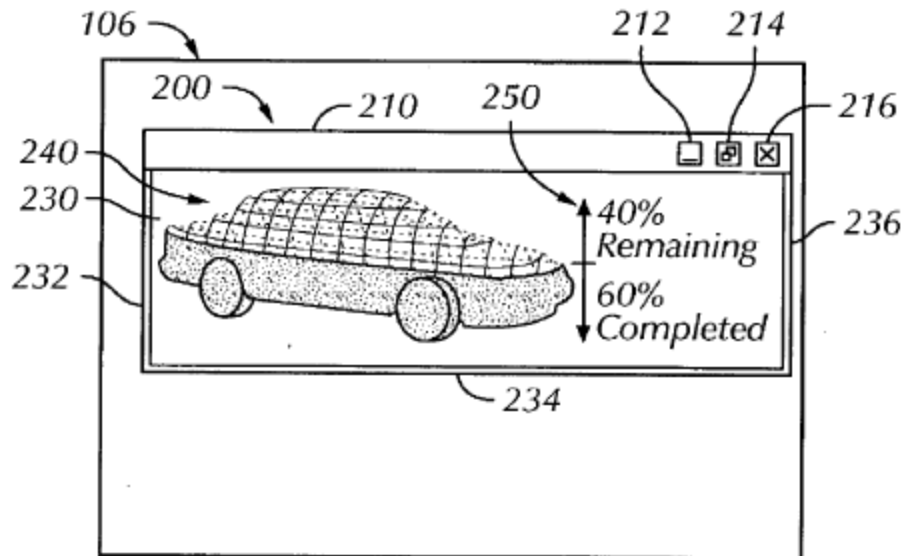
As discussed at § II, *supra*, PO's District Court filings assert that this claim is satisfied when images of the build volume from the same camera are displayed at different times. Pet., 26, 78; EX1016, 91, 102-104, 41-44. As such, Kritchman-Tay-Henke provides Claim 6 in the same manner as alleged by PO. EX1003, ¶¶236-237.

As addressed at § II, the '324 Patent specification describes displaying either periodically updated still images or video images but not both simultaneously. EX1001, 6:22-24, 22:50-55, 24:47-55, 25:8-13. As such, Tay's disclosures of displaying sequential video images of the build volume via a WebCam (different images at different times) provides Claim 6 in at least as much detail as the support for this claim in the '324 Patent specification itself. EX1013, 2-5.

VII. GROUND 2G PROVIDES CLAIM 5

PO has not disputed any of the reasons articulated in the Petition that would have motivated a POSITA to apply Anderson to Kritchman-Tay-Henke to provide the recitations of claim 5. Pet., 93-94. Anderson also clearly discloses that the system tracks "progress information" including "the number of passes completed by the printhead" and based on this information updates the displayed model "to

show the completed portion as a filled-in (e.g., solid colored) area.” EX1012, [0018].



EX1012, FIG. 2A, [0018]-[0020].

Anderson is clear that these depictions in the user interface provide “a visual representation of progress of the three-dimensional object(s) fabrication task” to provide “monitoring of the build progress,” indicating that the model is updated dynamically to correspond to a state of the physical completion of the object.

EX1012, [0027]-[0028]; EX1003, ¶¶294-303; EX1022, ¶¶49-52. Indeed,

Anderson discloses that this visualization provides “a **real time** indication of job progress.” EX1012, [0005], [0018]. PO identifies no portions of the ’324 Patent specification or file history that would require such a narrow reading of claim 5 so

as to exclude a “real time indication” of the three-dimensional print job completion as each layer is printed. Additionally, PO’s arguments are counter to the plain and ordinary meaning of the word “dynamic” which only requires that the two-dimensional projection be “changing or capable of being changed over a period of time” while the “program is running.” EX1024; *see also* EX1025; EX1026.

Anderson thus plainly demonstrates that the model is dynamically updated corresponding to a state of physical completion of the object. EX1003, ¶¶294-303; EX1022, ¶¶49-52.

VIII. GROUND 2C PROVIDES CLAIM 8

As explained in § V, *supra*, Hull’s teachings regarding credential-based access to a remote computing device in a networked three-dimensional printing system are not limited to the specific “Slice Computer” or “Process Computer” of Hull’s system but rather are more broadly and properly applicable to networked computing systems in general. EX1003, ¶¶149-153, 260-266; EX1022, ¶¶53-57.

The specific nature of the computer being accessed remotely in the networked system “is not a distinction on which validity turns.” *Smith & Nephew*, 721 F.3d at 1378. Petitioner relies on Hull’s teaching of requiring credential-based access for a remote user to access a remote computer at a different location in a networked three-dimensional printing system and as such, when properly applied to the Kritchman-Tay-Henke combination, the resulting system would have required the

user located at the remote client device to enter credentials to access the computer at the fabrication site over the communication network. EX1013, 2-5; EX1008, [0157], [0140], [0143]; EX1003, ¶¶61-62, 266; EX1022, ¶¶53-57. PO's attempt to "restrict [Hull]'s teachings to the particular way it implements" credential-based remote access in a networked environment "would improperly fail to read these references for all that they disclose." *Alivecor*, 130 F.4th at 1015.

IX. CONCLUSION

For the reasons discussed above and in the Petition, Petitioner submits that all the Challenged Claims are unpatentable.

Respectfully submitted,

Dated: December 17, 2025

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CERTIFICATION UNDER 37 CFR §42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petitioner's Reply to Patent Owner's Response totals 5,596 words, which is less than the 5,600 allowed under 37 CFR § 42.24(c)(4).

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e)(4), the undersigned certifies that on December 17, 2025, a complete and entire copy of this Petitioner's Reply to Patent Owner's Response to Petition and accompanying exhibits were provided by email, to the Patent Owner, by serving the email correspondence address of record as follows:

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