

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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NEARMAP US, INC.,  
Petitioner,

v.

EAGLE VIEW TECHNOLOGIES, INC.,  
Patent Owner.

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IPR2022-01009  
Patent 8,670,961 B2

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Before THOMAS L. GIANNETTI, GARTH D. BAER, and  
RUSSELL E. CASS, *Administrative Patent Judges*.

CASS, *Administrative Patent Judge*.

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

## I. INTRODUCTION

### A. *Background*

Nearmap US, Inc. (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1, 2, 7, 8, 21, 22, 24, 25, 27, and 29 (the “challenged claims”) of U.S. Patent No. 8,670,961 B2 (Ex. 1001, “the ’961 patent”). Paper 2, 1 (“Pet.”). Eagle View Technologies, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

An *inter partes* review may not be instituted unless it is determined that “the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314 (2018); *see also* 37 C.F.R. § 42.4(a) (2021) (“The Board institutes the trial on behalf of the Director.”). The reasonable likelihood standard is “a higher standard than mere notice pleading,” but “lower than the ‘preponderance’ standard to prevail in a final written decision.” *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 13 (PTAB Dec. 20, 2019) (precedential).

For the reasons provided below and based on the record before us, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing the unpatentability of at least one of the challenged claims. Patent Owner has not persuaded us that we should exercise our discretion to deny institution of trial. Accordingly, we institute an *inter partes* review on all grounds set forth in the Petition.

### B. *Real Parties in Interest*

Petitioner states that Nearmap US, Inc. is the real party in interest. Pet. 1, 67. Patent Owner states that the real parties in interest are Eagle

View Technologies, Inc. and Pictometry International Corp., which are both subsidiaries of EagleView Technology Corporation. Paper 4, 2.

*C. Related Proceedings*

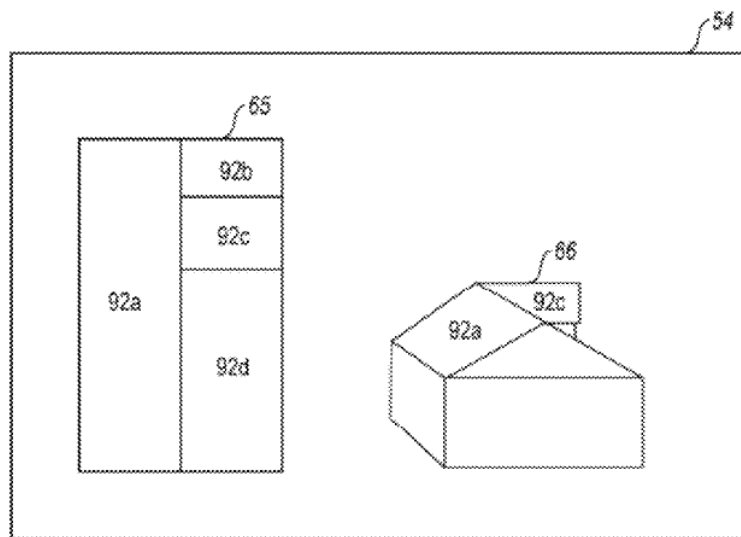
The parties state that the '961 patent is the subject of the following civil action between *Nearmap and Eagle View Technologies: Eagle View Technologies v. Nearmap US*, No. 2-21-cv-00283 (D. Utah) (“the District Court Litigation”). Pet. 68; Paper 4, 2. The parties also state that the '961 patent is the subject of the following civil actions brought by Eagle View Technologies against other parties: *Eagle View Technologies, Inc. v. GAF Materials LLC*, 2-22-cv-00215 (D. Utah), and *Eagle View Technologies, Inc. v. GAF Materials LLC*, 1-21-cv-10669 (D. New Jersey). *Id.*

*D. The '961 Patent (Ex. 1001)*

The '961 patent is directed to a “roof estimation system, which generates and provides roof estimate reports annotated with indications of the size, geometry, pitch and/or orientation of the roof sections of a building.” Ex. 1001, code (57). The system can include “a roof estimating software program and a location-linked, image file database.” *Id.* at 1:67–2:3. During use, “the physical address or location information of a building is provided to the program, which then presents aerial images of roof sections on the building at the specific address location.” *Id.* at 2:4–7. The aerial images may be produced by “[a]n overhead aircraft, a balloon, or satellite,” but also “may include images taken from a ground-based platform, such as a mobile (‘street view’) photography vehicle, a fixed position (e.g., a tower, nearby building, hilltop, etc.).” *Id.* at 2:7–10, 4:6–10. After the aerial images are received, “[a]n image analysis and calibration is then performed either manually and/or via a software program that determines the geometry,

the slopes, the pitch angles, and the outside dimensions of the roof sections.”  
*Id.* at 2:8–14.

As shown in the embodiment of Figure 3 (reproduced below), the aerial images may be stored in aerial image files 54, which “typically include at least one top plan view 65 and a perspective view 66, also called in the prior art an oblique view or oblique perspective view, of [a] building.”  
*Id.*, 4:10–15.



**Fig. 3**

In Figure 3, oblique perspective view 66 includes “[t]he roof of the building 92,” which “includes multiple planar roof sections 92a–92d.” *Id.* at 4:14–15.

In certain embodiments, the roof estimation system includes “roof modeling engine 602” that “generates a model of the roof of the specified building” and “report generation engine 603” that “generates a final roof estimate report based on a 3D model.” Ex. 1001, 7:47–50, 8:19–20, 9:56–57. The report “typically includes one or more plan (top-down) views of the 3D model, annotated with numerical values for the slope, area, and/or

lengths of the edges of at least some of the plurality of planar roof sections of the 3D model of the roof.” *Id.* at 9:5–62.

*E. Illustrative Claim*

Of challenged claims 1, 2, 7, 8, 21, 22, 24, 25, 27, and 29, claims 1, 21, 22, 24, and 29 are independent. For purposes of the issues raised at this stage of the proceeding, claim 1 is illustrative and is reproduced below.

1. [preamble] A computing system for generating a roof report, the computing system comprising:
  - [1.1] a memory; and
  - [1.2] a roof estimation module that includes a calibration module, the roof estimation module being stored on the memory and being configured, when executed, to:
    - [1.3] receive a plurality of aerial images of a building having a roof, the plurality of aerial images having been taken independent of each other, at different times and on different dates,
    - [1.4] the aerial images providing different views from each other of the roof of the building, the plurality of aerial images including at least a first aerial image that is a top plan view of the roof and a second aerial image that is an oblique perspective view of the roof”
    - [1.5] wherein at least one of the first and/or second aerial images is calibrated using calibration information received from the calibration module;”
  - [1.6] perform image analysis on at least two of the plurality of aerial images;
  - [1.7] calculate a pitch for each one of a plurality of roof sections of the roof based on the image analysis;
  - [1.8] generate a roof report that includes the pitch of each of the plurality of roof sections based on the calculated pitch; and output the roof report, wherein the roof report includes one or more top plan views of a model of the roof annotated with numerical values that indicate a

corresponding pitch, area, and length of edges of at least some of the plurality of roof sections using at least two different indicia for different types of roof properties.

Ex. 1001, 15:62–16:24 (indentation and bracketed paragraph identifiers added).

*F. Applied References*

Petitioner relies upon the following references:

R.M. Littleworth et al., *Three-Dimensional Mapping and As-Built Computer Modeling by Analytical Photogrammetry*, International Archives of Photogrammetry and Remote Sensing 29 (1992)<sup>1</sup> (Ex. 1005, “Littleworth”);

Mark Middlebrook, *AutoCAD 2005 for Dummies*, Wiley Publishing (May 13, 2004)<sup>2</sup> (Ex. 1006, “Middlebrook”); and

Linder, *Digital Photogrammetry Theory and Applications*, Springer-Verlag (2003) (Ex. 1012, “Linder”).

Pet. iii, 3. Petitioner submits declarations from Dr. David A. Forsyth and June Ann Munford. (Exs. 1003, 1019). Patent Owner submits a declaration from Chandrajit Bajaj, Ph.D. (Ex. 2001).

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<sup>1</sup> Petitioner’s identification information for Littleworth is provided here. Pet. iii. The evidence relating to the publication of Littleworth is discussed in Section II.E.1(b) below.

<sup>2</sup> Petitioner’s identification information for Middlebrook is provided here. Pet. iii. The evidence relating to the publication of Middlebrook is discussed in Section II.E.2(b) below.

*G. Asserted Grounds of Unpatentability*

Petitioner challenges the patentability of claims 1, 2, 7, 8, 21, 22, 24, 25, 27, and 29 of the '961 patent based on the following ground:

Claims Challenged	35 U.S.C. §	References/Basis
claims 1, 2, 7, 8, 21, 22, 24, 25, 27, and 29	103(a) <sup>3</sup>	Littleworth, Linden, Middlebrook

Pet. 3.

II. DISCUSSION

*A. Discretion Under 35 U.S.C. § 314(a) Based on Related District Court Proceeding*

Patent Owner asserts that institution should be denied under 35 U.S.C. § 314(a), in deference to the District Court Litigation. *See* Prelim. Resp. 42–45. Petitioner disagrees. Pet. 63–67.

Under 35 U.S.C. § 314(a), the Director has discretion to deny institution of review. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1351 (2018) (“[Section] 314(a) invests the Director with discretion on the question whether to institute review.” (emphasis omitted)); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”); *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he PTO is permitted, but never compelled, to institute an IPR proceeding.”).

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<sup>3</sup> The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. § 103 that became effective after the filing of the application that led to the '961 patent. Therefore, we apply the pre-AIA version of 35 U.S.C. § 103.

One instance when the Board considers exercising this discretion is when there is an early trial date in related litigation as part of assessing all relevant circumstances, including the merits, to balance considerations such as system efficiency, fairness, and patent quality. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv* Order”); *NHK Spring Co. v. Intri-Plex Technologies, Inc.*, IPR2018-00752, Paper 8 at 19–20 (PTAB Sept. 12, 2018) (precedential). The Board evaluates six factors when making this assessment. *See Fintiv* Order, at 5–6. Further, “the Board takes a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review.” *Id.* at 6.

On June 21, 2022, the Director issued an Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings With Parallel District Court Litigation (“Interim *Fintiv* Guidance”).<sup>4</sup> The Interim *Fintiv* Guidance provides “several clarifications” to “the PTAB’s current application of *Fintiv* to discretionary institution where there is parallel litigation” in response to comments received from stakeholders in response to a Request for Comments (RFC). Interim *Fintiv* Guidance 2.

Turning to the *Fintiv* factors, Petitioner asserts that “[t]he [c]ourt has not yet set a date for the claim construction hearing, and the scheduling order indicates that it will not set a trial date until 14 days after its claim construction ruling.” Pet. 64 (citing Ex. 1013). Patent Owner does not dispute this. Prelim. Resp. 43–44. Therefore, the district court trial will

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<sup>4</sup> The Interim *Fintiv* Guidance is available at [https://www.uspto.gov/sites/default/files/documents/interim\\_proc\\_discretionary\\_denials\\_aia\\_parallel\\_district\\_court\\_litigation\\_memo\\_20220621\\_.pdf](https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf).



likely occur after our final written decision in this proceeding, and factor 2 (timing of trial) weighs against exercising discretion to deny institution. The litigation also is in a relatively early stage because the parties appear to have recently completed exchanging infringement and invalidity contentions and no claim construction hearing has occurred. Pet. 64–66; Prelim. Resp. 44. Therefore, factor 3 (investment in the district court litigation) also weighs against exercising discretion to deny institution.

Further, because our final written decision will likely occur before trial in the District Court Litigation, the overlap in parties (factor 5) and any overlap in issues (factor 4) do not weigh in favor of exercising discretion to deny institution. We also determine that the sixth *Fintiv* factor (other circumstances) is neutral. Finally, although Patent Owner contends that the deadline to request a stay in the District Court’s Scheduling Order has passed (factor 1), we find that this factor does not outweigh the other factors favoring institution. Prelim. Resp. 42–43 (citing Ex. 2004, 4). Accordingly, after considering all the factors, we decline to exercise our discretion to deny institution.

### *B. Claim Construction*

A claim “shall be construed 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). Petitioner proposes constructions for two terms, “pitch” and “oblique perspective view.”

#### *1. “Pitch”*

Petitioner argues that the term “pitch” should be construed to mean either “pitch” or “slope.” Pet. 8. Petitioner asserts that, during prosecution, the applicant stated that “prior versions of the claims ‘use[d] the word

“pitch” while other places use the word “slope” and that “[t]hese words *have the same meaning in the context of these* claims, however to avoid confusion, the term “slope” [was] removed and replaced with the word “pitch” throughout to maintain consistency.” Pet. 8 (citing Ex. 1002, 76–77). Petitioner further argues that its construction is “supported by the ’961 patent itself which treats the terms interchangeably.” *Id.* (citing Ex. 1001, 1:52–67, 3:11–19, 4:19–30, 6:5–17, claims 1, 10, 16, 21–22, 24).

Patent Owner does not dispute Petitioner’s proposed construction of “pitch” in its Preliminary Response. *See* Prelim. Resp.

Based on the present record, we agree with Petitioner that “pitch” should be construed to encompass “pitch” and “slope.”

## 2. “Oblique perspective view”

Petitioner argues that the term “oblique perspective view” should “be construed so that it can refer to either a ‘perspective view,’ ‘an oblique view,’ or ‘an oblique perspective view.’” Pet. 9. Petitioner contends that this construction is supported by the ’961 patent’s statement that “a perspective view” is “also called in the prior art an oblique view or oblique perspective view.” *Id.* (citing Ex. 1001, 4:10–15; Ex. 1003 ¶ 19).

Patent Owner does not dispute Petitioner’s proposed construction of “oblique perspective view” in its Preliminary Response. *See* Prelim. Resp.

Based on the present record, we agree with Petitioner that “oblique perspective view” should be construed to encompass a “perspective view” and an “oblique view.”

## 3. Other terms

We determine that it is not necessary to provide an express interpretation of any other claim terms at this stage of the proceeding. *See*

*Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”).

### *C. Principles of Law*

A claim is unpatentable under 35 U.S.C. § 103 if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, objective evidence of non-obviousness.<sup>5</sup> *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we must also “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Whether a combination of prior art elements would have produced a predictable result weighs in the ultimate determination of obviousness. *Id.* at 416–417.

In an *inter partes* review, the petitioner must show with particularity why each challenged claim is unpatentable. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016); 37 C.F.R. § 42.104(b) (2020).

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<sup>5</sup> At this stage of the proceeding, Patent Owner has not presented objective evidence of non-obviousness.

The burden of persuasion never shifts to the patent owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

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

*D. Level of Ordinary Skill in the Art*

Petitioner contends that a person of ordinary skill in the art at the time of the alleged invention would have had “at least a Bachelor’s Degree in an academic area emphasizing the design of electrical, computer, or software technologies, or a similar discipline, and at least two years of experience related to computerized image analysis and three-dimensional modeling.” Pet. 6–7 (citing Ex. 1003 ¶ 16). Petitioner further asserts that “[s]uperior education could compensate for a deficiency in work experience, and vice-versa.” *Id.* at 7. Patent Owner does not address the level of ordinary skill at this stage of the proceeding. *See generally* Prelim. Resp.

For purposes of this Decision, we adopt Petitioner’s assessment of the level of ordinary skill in the art.

*E. Asserted Obviousness of Claims 1, 2, 7, 8, 21, 22, 24, 25, 27, and 29 Based on Littleworth, Linder, and Middlebrook*

Petitioner contends that claims 1, 2, 7, 8, 21, 22, 24, 25, 27, and 29 would have been obvious over Littleworth in view of Linder and Middlebrook. Pet. 3, 9–62. Patent Owner disagrees. Prelim. Resp. 7–42.

*1. Littleworth (Ex. 1005)*

*a) Overview of Littleworth*

Littleworth is a paper entitled “Three-Dimensional Mapping and as-Built Computer Modelling by Analytical Photogrammetry,” and “describes

how and why analytical photogrammetry, interfaced with a CAD system, has been used to create 3-dimensional computer models of development sites and engineering structures.” Ex. 1005, Abstract. Littleworth explains that “[w]ith the introduction of industry wide CAD packages (e.g. Microstation, Autocad) the potential for introducing analytical photogrammetric techniques to new users has greatly expanded,” but that “the accuracy achievable creating 3-dimensional computer models is restricted given the geometric restraints imposed by the CAD system.” *Id.* at 754. Littleworth states that the “Engineering Photogrammetry Unit (EPU) was launched in 1988” by City University in London “following the purchase of an Intergraph Intermap Analytic Photogrammetric Workstation (IMA).” *Id.* Littleworth provides “examples of some recent projects undertaken by EPU” to “illustrate the evolution of [a] 3-dimensional photogrammetric product” for “potential new photogrammetric users.” *Id.*

Littleworth describes a project involving the “Hatfield Aerodrome” as “one of the first projects undertaken by EPU.” Ex. 1005, 754. For this project, EPU used “several aerial photographic libraries and archives held by various organisations” in the United Kingdom, including “[s]uitable vertical aerial photography at a scale of 1:5000” for “this particular site.” *Id.* at 755. Littleworth explains that “it was necessary to adapt the approach so that the detail digitised not only represented ground features accurately but gave a good visual impression of how these features actually appear,” as shown in Figure 1, reproduced below.

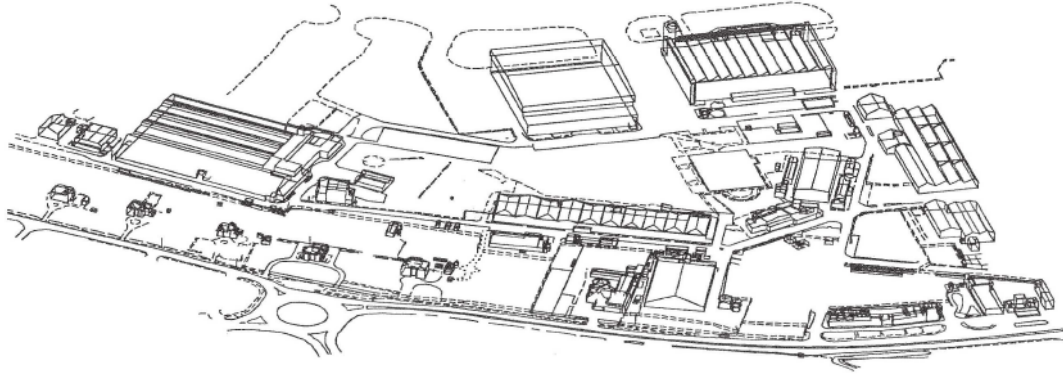


Fig.1 3-d model representing Hatfield Aerodrome.

Figure 1 of Littleworth shows a 3-d model representing Hartfield Aerodrome. Ex. 1005, 754.

Littleworth further explains that, for this project, “[r]oof detail was digitised indicating their pitch, major details on the roofs themselves, tree canopies indicating height and spread, fences and walls showing width and height.” Ex. 1005, 755. Littleworth also states that “[t]he ground surface was represented by 0.25 metre contours” which “were derived from pertinent ground detail (kerb lines, boundaries etc.), a grid of spot heights and supplementary height points on important natural changes of slope processed using a digital terrain model package” as shown in Figure 2, reproduced below.

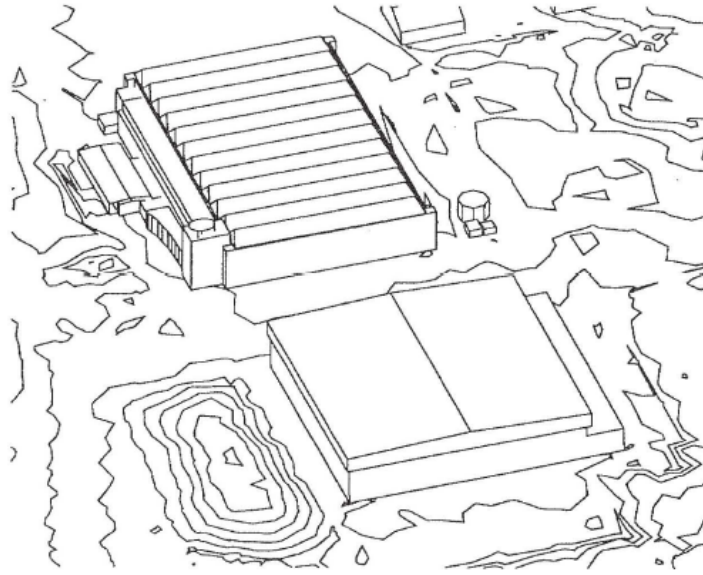


Fig. 2 3-d detail with DTM derived contours

Figure 2 shows a 3-d detail of the Hartford Aerodrome model with the ground surface represented by 0.25 meter contours. Ex. 1005, 755.

*b) Whether Littleworth Is Prior Art*

Petitioner submits the Declaration of June Munford to support its assertion that Littleworth qualifies as prior art. Pet. 2; Ex. 1019. Ms. Munford states that:

I have reviewed Exhibit NEARMAP-1005, “Three-Dimensional Mapping and As-Built Computer Modelling by Analytical Photogrammetry” by R.M Littleworth, D.M. Stirling and J.H. Chandler as published in *International Archives of Photogrammetry and Remote Sensing: ISPRS 17th Congress, Washington, D.C., 1992, Volume B5*.

Attached hereto as Appendix LITTLEWORTH01 is a true and correct copy of the MARC record for *International Archives of Photogrammetry and Remote Sensing: ISPRS 17th Congress, Washington, D.C., 1992* as held by the Rochester Institute of Technology library. I secured this record myself from the library’s public catalog. The MARC record contained within Appendix LITTLEWORTH01 accurately describes the title, author, publisher, and conference details of *International*

*Archives of Photogrammetry and Remote Sensing: ISPRS 17th Congress, Washington, D.C., 1992.* In comparing Exhibit NEARMAP-1005 to Appendix LITTLEWORTH01, it is my determination that Exhibit NEARMAP-1005 is a true and correct copy of “Three-Dimensional Mapping and As-Built Computer Modelling by Analytical Photogrammetry” as found in *International Archives of Photogrammetry and Remote Sensing: ISPRS 17th Congress, Washington, D.C., 1992.*

The 008 field of the MARC record in Appendix LITTLEWORTH01 indicates the date of record creation. The 008 field of Appendix LITTLEWORTH01 indicates the Rochester Institute of Technology library first acquired these proceedings as of December 8, 1997. Considering this information, it is my determination that *International Archives of Photogrammetry and Remote Sensing: ISPRS 17th Congress, Washington, D.C., 1992* and therefore “Three-Dimensional Mapping and As-Built Computer Modelling by Analytical Photogrammetry” was made available to the public shortly after its initial acquisition in Winter 1997, if not earlier as presented at the ISPRS 17th Congress in 1992.

Ex. 1019 ¶¶ 6–8 (paragraph numbers omitted).

Patent Owner argues that Littleworth “does not include any information regarding its publication or a publication date,” and argues that there is “no identifiable information from Littleworth regarding if, when, where, or how it may have ever been published.” Prelim. Resp. 35–36. Patent Owner also asserts that “the Munford Declaration never explains the basis for the testimony that Littleworth was part of *International Archives of Photogrammetry*—nor does the Munford Declaration provide any evidence supporting that assumption.” *Id.* at 36 (citing Ex. 1019 ¶ 6). According to Patent Owner, “there is nothing in the MARC record to indicate that *International Archives of Photogrammetry* included any version of Littleworth, let alone the particular version of Littleworth provided by Petitioner as NEARMAP-1005.” *Id.* at 38. Thus, Patent Owner contends,



“it is impossible for Munford to know—based on reviewing only NEARMAP-1005—whether any paper that may have been published in *International Archives of Photogrammetry* is the same as NEARMAP-1005.” *Id.* at 37.

Patent Owner also disputes Ms. Munford’s testimony that “[t]he 008 field of Appendix LITTLEWORTH01 indicates the Rochester Institute of Technology library first acquired these proceedings as of December 8, 1997.” Prelim. Resp. 38. Patent Owner asserts that “the content in field 040” of the MARC record “undermines the conclusions in the Munford Declaration by demonstrating that” this MARC record was “likely *not* created” by the Rochester Institute of Technology library. *Id.* at 39. Patent Owner argues that “[f]ield 040 in a MARC record represents the ‘MARC code for or the name of the organization(s) that created the original bibliographic record, assigned MARC content designation and transcribed the record into machine-readable form, or modified (except for the addition of holdings symbols) an existing MARC record.’” *Id.* at 40 (citing Ex. 2005, 1). “Specifically,” according to Patent Owner, “subfield ‘\$a’ of field 040 represents the ‘[o]riginal cataloging agency,’ i.e., ‘*the organization that created the original record.*’” *Id.* Patent Owner asserts that field 40, subfield \$a of LITTLEWORTH 1 does not include the letters “NRRI” which (according to Patent Owner) is “the MARC code for the Rochester Institute of Technology library.” *Id.* at 41. Thus, Patent Owner argues, “the date in field 008 (the creation date of the record) does not reflect when Rochester Institute of Technology library acquired Littleworth.” *Id.*

At the institution stage, the relevant issue is whether the record includes “evidence sufficient to establish a reasonable likelihood that the

reference was publicly accessible before the critical date of the challenged patent and therefore that there is a reasonable likelihood that it qualifies as a printed publication.” *Hulu*, Paper 29 at 13. As *Hulu* explains, the reasonable likelihood standard is “a higher standard than mere notice pleading,” but “lower than the ‘preponderance’ standard to prevail in a final written decision.” *Id.* *Hulu* additionally observes that, after institution, certain limited opportunities are available for a petitioner to present new evidence in support of its position, including in a motion to file supplemental information under 37 C.F.R. § 42.123. *Hulu* at 14–16.

Based on the present record, we find that there is a reasonable likelihood that Littleworth was publicly accessible before the critical date of the ’961 patent. Petitioner introduces the testimony of Ms. Munford that “I have reviewed Exhibit NEARMAP-1005, “Three-Dimensional Mapping and As-Built Computer Modelling by Analytical Photogrammetry” by R.M Littleworth, D.M. Stirling and J.H. Chandler as published in *International Archives of Photogrammetry and Remote Sensing: ISPRS 17th Congress, Washington, D.C., 1992, Volume B5.*” Ex. 1019 ¶ 6. This statement suggests that Ms. Munford reviewed information indicating that Exhibit NEARMAP-1005 was published in the *International Archives of Photogrammetry and Remote Sensing: ISPRS 17th Congress, Washington, D.C., 1992, Volume B5*, and is sufficient for purposes of institution.

As for Patent Owner’s argument that the 008 field does not show the date when Littleworth was cataloged by the Rochester Institute of Technology library, Petitioner introduces testimony from Ms. Munford that “the 008 field of the MARC record is reserved for denoting the date of creation of the library record itself.” Ex. 1019 ¶ 4. Ms. Munford further

testifies that because the date of creation “typically occurs during the process of preparing materials for public access, it is my experience that an item’s MARC record indicates the date of an item’s public availability.” *Id.*

Additionally, Ms. Munford states that because the 008 field “is the only date reflecting the inclusion of said materials within the library’s collection, it is my experience that an item’s 008 field accurately indicates the date of an item’s public availability.” *Id.* ¶ 5. Patent Owner does not introduce any expert testimony to the contrary, but rather relies on attorney argument about the nature of the 008 and 040 fields of a MARC record. Prelim. Resp. 38–42. Based on the present record, we determine that the testimony of Ms. Munford provides sufficient evidence for purposes of institution that the 008 field of the MARC record for Littleworth indicates the date that Littleworth was cataloged and made publicly available.

## 2. *Linder (Ex. 1012)*

### a) *Overview of Linder*

Linder is a textbook entitled “Digital Photogrammetry Theory and Applications” by Wilfried Linder. Ex. 1012. Linder states that “photogrammetry can be defined as the ‘science of measuring in photos,’ and is a part of the field of remote sensing (RS).” *Id.* at 1.<sup>6</sup> According to Linder, “Photogrammetry provides methods to give you . . . quantitative data,” such as the dimensions of a house that no longer exists from historic photos of the house. *Id.* As Linder explains, “[i]f you would like to determine distances, areas, or anything else, the basic task is to get object (terrain) co-ordinates of any point in the photo from which you can then

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<sup>6</sup> The citations to Linder refer to the actual pages of the book, not to the page numbers added by Petitioner.

calculate geometric data.” *Id.* Additionally, according to Linder, the principle of “stereoscopic viewing” is “used to get three-dimensional information in photogrammetry,” since with “two (or more) photos from the same object but taken from different positions” one can “easily calculate the three-dimensional co-ordinates of any point which is represented in both photos.” *Id.* at 1–2. Linder defines “the main task of photogrammetry” as “[f]or any object point represented in at least two photos . . . calculat[ing] the three-dimensional object (terrain) co-ordinates.” *Id.* at 2.

*b) Whether Linder Is Prior Art*

Petitioner relies on the Declaration of June Munford to support its assertion that Linder qualifies as prior art. Pet. 2; Ex. 1019. Ms. Munford states that:

I have reviewed Exhibit NEARMAP-1012, *Digital Photogrammetry: Theory and Applications* by Wilifried Linder.

Attached hereto as Appendix LINDER01 is a true and correct copy of the MARC record for *Digital Photogrammetry: Theory and Applications* as held by the Penn State University library. I secured this record myself from the library’s public catalog. The MARC record contained within Appendix LINDER01 accurately describes the title, author, publisher, and ISBN number of *Digital Photogrammetry: Theory and Applications*. In comparing Exhibit NEARMAP-1012 to Appendix LINDER01, it is my determination that Exhibit NEARMAP-1012 is a true and correct copy of *Digital Photogrammetry: Theory and Applications* by Wilifried Linder.

The 008 field of the MARC record in Appendix LINDER01 indicates the date of record creation. The 008 field of Appendix LINDER01 indicates Penn State University library first acquired this book as of March 10, 2003. Considering this information, it is my determination that *Digital Photogrammetry: Theory and Applications* was made available to the public shortly after its initial acquisition in March 2003.

Ex. 1019 ¶¶ 12–14 (paragraph numbers omitted).

Patent Owner makes a similar argument concerning Linder’s 008 field as it does for Littleworth. Specifically, Patent Owner argues that subfield \$a of field 040 for Linder “represents the ‘[o]riginal cataloging agency,’ i.e., ‘*the organization that created the original record*,’” and that this field for LINDER includes the letters “DLC” which “refers to the Library of Congress—not Penn State University,” whose libraries “have MARC codes beginning with ‘PSt.’” Prelim. Resp. 40 (citing Ex. 2005, 1; Ex. 2006, 1; Ex. 2007). Thus, Patent Owner asserts, “this particular MARC record appears to have been created by the Library of Congress,” and “the date in field 008 (the creation date of the record) does not necessarily reflect when a Penn State University library acquired Linder.” *Id.*

As noted above in Section II.E.2(b), Petitioner submits the declaration testimony of Ms. Munford that the 008 field of a MARC record accurately indicates the date of an item’s public availability, and Patent Owner’s argument at this stage is limited to attorney argument about the 008 and 040 fields of a MARC record. Ex. 1019 ¶¶ 4–5; Prelim. Resp. 38–42. As with Littleworth, we determine that the testimony of Ms. Munford provides sufficient evidence for purposes of institution that the 008 field of the MARC record for Linder indicates the date that Linder was cataloged and made publicly available.

### 3. *Middlebrook* (Ex. 1006)

Middlebrook is a book entitled “AutoCAD 2005 for Dummies.” Ex. 1006, cover. Middlebrook describes the use of “dimensions” in AutoCAD, which “are special text labels with attached lines that together

indicate unambiguously the size of something” in an object. Ex. 1006, 229.<sup>7</sup> Middlebrook explains that “as you edit an object—by stretching it for example—AutoCAD automatically updates the measurement displayed in the dimension text label to indicate the object’s new size.” *Id.* Middlebrook states that the “most common types” of dimensions are shown in Figure 10-3, reproduced below.

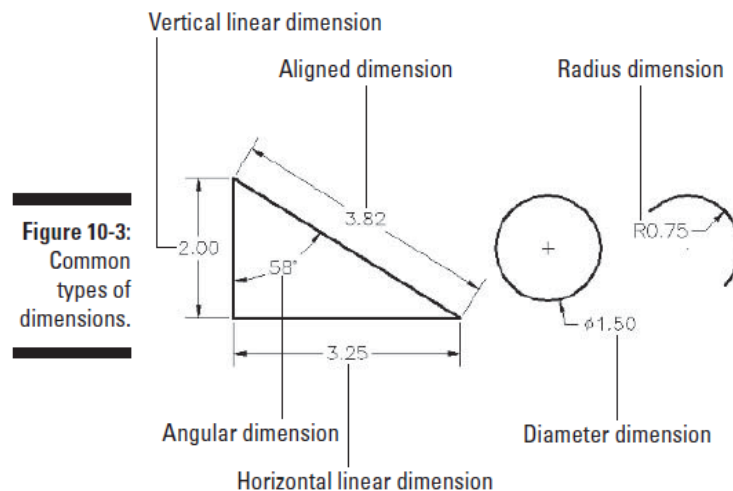


Figure 10-3 of Middlebrook illustrates common types of dimensions used in AutoCAD. Ex. 2006, 253–254.

Middlebrook states that each drawing includes a “paper space,” which “is a separate space in each drawing for composing a printed version of that drawing.” Ex. 1006, 62. First, Middlebrook explains, “[y]ou create the drawing itself, called the *model*, in *model* space,” and then “can create one or more plottable views,” each of which “is called a *layout*.” *Id.* Middlebrook also states that a “paper space layout” includes one or more “viewports, each showing the 3D model from a different perspective.” *Id.* at 65. A user can “[d]efine the arrangement of viewports that AutoCAD

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<sup>7</sup> The citations to Middlebrook refer to the actual pages of the book, not to the page numbers added by Petitioner.

should create.” *Id.* Figure 8-1 from Middlebrook shows a layout including multiple viewports showing different views of a three-dimensional model:

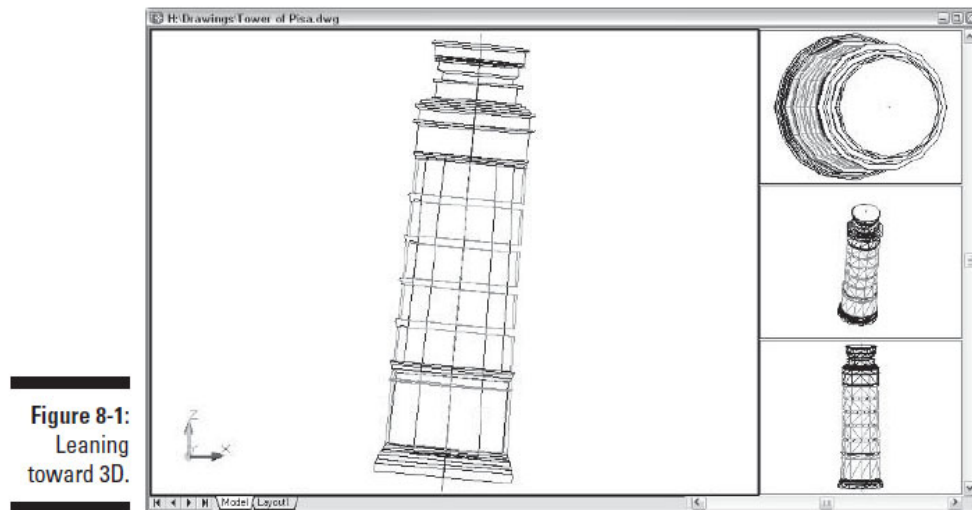


Figure 8-1 of Middlebrook shows a layout with multiple viewports showing different views of a three dimensional model. Ex. 1006, 180.

4. *Proposed Combination of Littleworth, Linder, and Middlebrook*  
a) *Petitioner’s Proposed Combination*

Petitioner argues that, as previously discussed, “Littleworth discloses generating a three-dimensional model based on a ‘vertical aerial’ image and an ‘oblique’ aerial image.” Pet. 15. Petitioner argues that Linder “teaches using computer hardware and software modules to implement a digital photogrammetry system,” which generates “three-dimensional coordinates of any point represented by two photographs” and “calibrat[es] and correlat[es] a first image and a second image based on a particular object point *P* that is shared between the first and second images.” Pet. 15.

In Petitioner’s proposed combination, “the system of Littleworth is implemented using computer hardware and software modules, such as those described by Linder.” Pet 15 (citing Ex. 1005, Abstract; Ex. 1012, 13–15, 79–82; Ex. 1003 ¶ 31). Additionally, the combination modifies Littleworth

“to calibrate at least one aerial image and to correlate at least one of the ‘vertical aerial’ images and at least one ‘oblique’ aerial image in order to generate three-dimensional coordinates, as described by Linder.” *Id.* at 15–16 (citing Ex. 1005, 754, Ex. 1012, 32, 41, 46–50, 65–69, Fig. 15, Fig. 17; Ex. 1003 ¶ 32). “The system then generates the three-dimensional model based on the generated three-dimensional coordinates, as taught by Linder.” *Id.* at 16. Petitioner further modifies the combined system of Littleworth–Linder “based on the teachings of Middlebrook, to generate and output a printed report that includes one or more annotated views of the three-dimensional model.” *Id.* (citing Ex. 1005, 754–756, Fig. 3, Fig. 5; Ex. 1012, 1, 3, 6, 20–23, 52, 53, Fig. 4; Ex. 1006, 179–187, 232–239, 267–273; Ex. 1003 ¶ 33).

*b) Reasons to Combine Littleworth, Linder, and Middlebrook*

Petitioner argues that one of ordinary skill would have been motivated to modify Littleworth’s three-dimensional model generation system “to correlate the aerial images using identified control points based on the teachings of Linder.” Pet. 16. According to Petitioner, “[b]oth Littleworth and Linder describe using photogrammetry techniques to generate three-dimensional models based on aerial photograms.” *Id.* (citing Ex. 1005, 754–756; Ex. 1012, 1–3; Ex. 1003 ¶ 34). Petitioner asserts that “Littleworth teaches that images are ‘studied and suitable control points [are] selected’ as part of generating a three-dimensional model,” but “does not describe in detail how these selected control points within the images are used to generate the model.” *Id.* at 16–17 (citing Ex. 1005, 756; Ex. 1003 ¶ 34). However, according to Petitioner, “Linder describes that images are correlated based on control points within the images as part of generating a



three-dimensional model.” *Id.* at 17. Thus, Petitioner asserts, one of ordinary skill “would have been motivated to correlate the images described in Littleworth based on the selected control points in order to allow the images to be utilized in the three-dimensional model generation process, as taught by Linder.” *Id.* (citing Ex. 1012, 32, 41, 46–50, 65–69, Fig. 15, Fig. 17; Ex. 1003 ¶ 34). Additionally, Petitioner contends, one of ordinary skill “would have been motivated to modify Littleworth’s system to correlate its aerial images in order to enable a user to ‘digitise points, lines and areas for map production or calculate distances, areas, volumes, slopes and much more,’ as taught by Linder.” *Id.* (citing Ex. 1012, 3; Ex. 1003 ¶ 34).

Petitioner also argues that one of ordinary skill would have been motivated to modify the Littleworth-Linder combination “based on the teachings of Middlebrook, to print different views of a three-dimensional model generated by the system including numerical annotations indicating various features of the model.” Pet. 17 (citing Ex. 1003 ¶ 35; Ex. 1006, 62–65, 229, Fig. 10-3). According to Petitioner, a printed version “is convenient and preferred by many users,” and “does not require a computer or compatible software to view, thereby allowing the results to be shared with a wider audience.” *Id.* at 17–18 (citing Ex. 1003 ¶ 35; Ex. 1006, 288, 230–231). Further, Petitioner contends, “the addition of numerical annotations to the views of the three-dimensional model is beneficial because it enables information about the model (e.g., the dimensions of various components) to be communicated to individuals who may not have access to a computer to inspect the three-dimensional model.” *Id.* at 18 (citing Ex. 1003 ¶ 35; Ex. 1006, 230–31). Petitioner also notes that “Littleworth specifically lists

‘AutoCAD’ (*i.e.*, the system described in Middlebrook) as a CAD system used in ‘analytical photogrammetry’ projects like those described in Littleworth.” *Id.* (citing Ex. 1005, 754).

*c) Preliminary Conclusions on Motivation to Combine*

Based on the present record, we determine that Petitioner has sufficiently shown that one of ordinary skill would have combined Littleworth, Linder, and Middlebrook for purposes of institution. Specifically, we determine that Petitioner has made a sufficient showing that one of ordinary skill would have been motivated to modify Littleworth’s three-dimensional model generation system to correlate the aerial images using identified control points based Linder’s teachings, and to modify the Littleworth-Linder combination based on Middlebrook’s teachings to print different views of a three-dimensional model generated by the system, including numerical annotations indicating various features of the model. Pet. 16–18; Ex. 1003 ¶¶ 34–35; Ex. 1005, 754–756; Ex. 1006, 62–65, 229–231, 288, Fig. 10-3; Ex. 1012, 1–3, 32, 41, 46–50, 65–69, Fig. 15, Fig. 17.

In its Preliminary Response, Patent Owner does not specifically argue that one of ordinary skill would not have been motivated to combine these references. Prelim. Resp. 7–34. Patent Owner does argue that, although “the Petition spends multiple pages analyzing why a [person of ordinary skill in the art] allegedly would have modified Littleworth to include Linder’s teachings related to *correlation*, the Petition does not explain how or why a [person of ordinary skill in the art] would have modified Littleworth ‘to *calibrate* at least one aerial image . . . as described by Linder,’ as Petitioner proposes in its combination.” Prelim. Resp. 23–24 (citing Pet. 15; Ex. 2001 ¶¶ 69–70). We will discuss Patent Owner’s argument about “calibrat[ing] at

least one aerial image” below in our discussion of claim element 1.5, which includes that limitation. *See* § II.E.5(f), *supra*.

5. *Analysis of Independent Claim 1*

a) *1[preamble]: “A computing system for generating a roof report, the computing system comprising:”*

Petitioner argues that, to the extent the preamble is limiting, the Littleworth-Linder-Middlebrook combination renders it obvious. Pet. 20. Petitioner asserts that “Littleworth teaches using a computer-aided design or ‘CAD’ system to ‘creat[e] three-dimensional computer models of development sites and engineering structures’ from a set of aerial photographs,” including “a created model of a structure” that “includes ‘roof detail[s]’ of the structure.” *Id.* at 20–21 (citing Ex. 1005, Abstract, 755, 756, Fig. 2, Fig. 5). “Also in the combination,” Petitioner contends, “Middlebrook teaches generating annotated views of three-dimensional models that are ‘presentable, usable, printable, and sharable’ as a report.” *Id.* at 21 (citing Ex. 1006, 1, 267–274, Figs. 12-3, 12-4). Petitioner further argues that, “in the combination, multiple, annotated views of the three-dimensional model described in Littleworth, which includes a roof, are included in a printed report (*i.e.*, a roof report).” *Id.* (citing Ex. 1003 ¶ 38; Ex. 1005, 754–756, Fig. 3, Fig. 5; Ex. 1006, 179–187, 232–239, 267–273).

Patent Owner does not present arguments regarding the preamble. *See* Prelim. Resp.

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding the preamble.<sup>8</sup>

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<sup>8</sup> Because we are persuaded that Petitioner has shown that the preamble would have been obvious based on the Littleworth-Linder-Middlebrook

b) [1.1]: “a memory; and”

Petitioner argues that “[i]n the combination, Linder teaches that its system includes “an adequate PC . . . supplied with sufficient *main memory (RAM)*, *storage capacity (hard disk)* and high resolution graphics.” Pet. 21 (citing Ex. 1012, 13). Petitioner asserts that one of ordinary skill “would have understood each of the RAM and the hard disk described in Linder to be ‘a memory.’” *Id.* (citing Ex. 1003 ¶ 38).

Patent Owner does not present arguments regarding limitation [1.1].  
*See* Prelim. Resp.

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation.

c) [1.2]: “a roof estimation module that includes a calibration module, the roof estimation module being stored on the memory and being configured, when executed, to:”

Petitioner argues that “[i]n the combination, Linder describes that its CAD system includes a ‘hard disk,’ which is a memory.” Pet. 22 (citing Ex. 1012, 13). Petitioner asserts that, “[i]n a chapter entitled ‘Installation,’ Linder teaches installing a ‘digital photogrammetric software package’ to the ‘hard disk’ of the PC from a CD-ROM. *Id.* (citing Ex. 1012, 14-15). Petitioner contends that Linder “further describes that its software system ‘is subdivided into several *modules* to ensure . . . flexible handling.” *Id.* (citing Ex. 1012, 63, 79). According to Petitioner, it would have been obvious to a person of ordinary skill “to subdivide the combined software system of Littleworth, Linder, and Middlebrook into different modules in order to group related functionality, such as the roof estimation and

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combination, we need not decide whether the preamble is limiting for purposes of this Decision.

calibration functionality . . . because such subdivision was well-known and widely used in” the prior art. *Id.* (citing Ex. 1003 ¶ 40; Ex. 1005, 79; Ex. 1008, 8:20–24, 12:15–25). “Accordingly,” Petitioner contends, “the combination of Littleworth, Linder, and Middlebrook renders this limitation obvious.” *Id.*

Patent Owner argues that “Petitioner never identifies a ‘calibration module’ in any of the references,” and therefore also fails to disclose calibration information “received from the calibration module.” Prelim. Resp. 17–18 (emphasis omitted).

Based on the present record, we determined that Petitioner has made a sufficient showing for limitation [1.2]. With respect to the “calibration module,” we note that Petitioner has introduced testimony from Dr. Forsyth that, based on Linder’s teaching that its software system “is subdivided into several modules to ensure . . . flexible handling,” one of ordinary skill would have found it obvious “to subdivide the combined software system of Littleworth, Linder, and Middlebrook into different modules in order to group related functionality, such as the roof estimation and calibration functionality [elsewhere described], because such subdivision was well-known and widely used in” the prior art. Ex. 1003 ¶¶ 40, 46. Patent Owner does not point to any particular significance of or details required by a “module,” or any information to suggest that a “module” is anything more than simply an arbitrary designation of particular software functionality. *See* Prelim. Resp. 17–18. Based on the present record, and for purposes of institution, we find that Dr. Forsyth’s testimony, in combination with Linder’s disclosure, sufficiently supports Petitioner’s argument that one of

ordinary skill would have found it obvious to provide the calibration functionality in a “calibration module” as claimed in limitation [1.2].

- d) [1.3]: “receive a plurality of aerial images of a building having a roof, the plurality of aerial images having been taken independent of each other, at different times and on different dates,”

Petitioner argues that, “[i]n the combination, Littleworth describes receiving a plurality of aerial images of a building having a roof,” including “receiving ‘vertical aerial photography’ of a building having a roof, and aerial ‘oblique photography’ of the same building.” Pet. 23 (citing Ex. 1005, 755, 756, Fig. 3). “In addition,” according to Petitioner, “Littleworth describes that that ‘vertical aerial photography’ was ‘3 years old,’ and ‘[i]t was decided to supplement the vertical photography with oblique photography (Fig. 3) taken from the roof of a conveniently situated building on the site.’” *Id.* “Because the ‘vertical aerial’ images were taken 3 years before the ‘oblique’ images,” Petitioner contends, a person of ordinary skill “would have understood or at least found it obvious that the ‘vertical aerial photography’ and the ‘oblique photography’ were ‘taken independent of each other, at different times and on different dates.’” *Id.* (citing Ex. 1003 ¶ 42; Ex. 1005, 755, 756, Fig. 3; Ex. 1001, claim 1; Ex. 1008, code (57), 1:17–2:60, 18:3–28, Fig. 1).

According to Petitioner, “Littleworth explains that ‘it was important that recent photography be used [to supplement the vertical aerial images] to get the most from the photogrammetric work and reduce the amount of field completion required.’” *Id.* (citing Ex. 1005, 756). “In addition,” Petitioner argues, “Littleworth teaches that the aerial images were obtained independently from different sources (e.g., ‘several aerial photographic

libraries and archives’ and a ‘UMK 10/1318’ camera).” *Id.* at 23–24 (citing Ex. 1005, 755-56; Ex. 1003 ¶ 42). “Accordingly,” Petitioner contends, “the combination of Littleworth, Linder, and Middlebrook renders this limitation obvious.” *Id.* at 24.

Patent Owner does not present arguments regarding limitation [1.3].  
*See* Prelim. Resp.

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation.

- e) [1.4]: “*the aerial images providing different views from each other of the roof of the building, the plurality of aerial images including at least a first aerial image that is a top plan view of the roof and a second aerial image that is an oblique perspective view of the roof*”

Petitioner argues that “Littleworth describes receiving a plurality of aerial images of a building having a roof,” including “receiving ‘**vertical** aerial photography’ (*i.e.*, a top plan view) of a building having a roof, and aerial ‘oblique photography’ (*i.e.*, an oblique perspective view) of the same building.” Pet. 24 (citing Ex. 1005, 755, 756, Fig. 3; Ex. 1003 ¶ 44). “Also in the combination,” Petitioner asserts, “Linder teaches that a ‘vertical image[] is taken ‘camera looking down’ on a subject, thereby producing a top plan view in the resulting image.” *Id.* (citing Ex. 1012, 111; Ex. 1003 ¶ 44). Petitioner also argues that Littleworth provides an example of “oblique photography” in Figure 3. *Id.* at 24–25 (citing Ex. 1005, Fig. 3); *see* Ex. 1005, 756 (“It was decided to supplement the vertical photography with oblique photography (Fig. 3) taken from the roof of a conveniently situated building on the site.”). “Accordingly,” Petitioner contends, “the combination of Littleworth, Linder, and Middlebrook renders this limitation obvious.” Pet. 25.

Patent Owner argues that “[t]he Petition fails to show that Littleworth necessarily discloses a ‘top plan view’ of a roof.” Prelim. Resp. 18. Patent Owner asserts that “none of the aerial images shown in Littleworth are a top plan view of a roof,” and thus “there is no explicit disclosure by Littleworth of using aerial images showing a top plan view of a roof.” *Id.* at 19 (citing Ex. 2001 ¶ 51). Patent Owner also contends that “Petitioner does not explain why Littleworth’s reference to ‘vertical aerial photography’ *necessarily* includes an aerial image having a ‘top plan view’ of a roof.” *Id.* (citing Ex. 2001 ¶ 52). According to Patent Owner, Littleworth’s Figure 1 (showing a 3-D model of the Hartfield Aerodrome) only shows the sides and facades of buildings and therefore “could *not* have been created using aerial images that only show top plan views,” because “a ‘top plan view’ does not provide any information regarding the side of a building.” *Id.* at 20–21 (citing Ex. 1005, Fig. 1; Ex. 2001 ¶ 53).

Thus, Patent Owner argues, one of ordinary skill “would have understood that Littleworth’s Figure 1 for the Hatfield Aerodrome could have been created using *entirely* aerial photographic images that contain *only* oblique views,” and thus “could have been created without ever needing or using any aerial images that show a top plan view of a roof.” *Id.* at 22 (citing Ex. 2001 ¶ 55). “Accordingly,” Patent Owner contends, “it is not *necessarily* true that Littleworth’s ‘vertical aerial images,’” would “include a ‘top plan view’” as required by claim 1. *Id.* (citing Ex. 2001 ¶ 56).

Based on the present record, we determine that Petitioner has made a sufficient showing for limitation [1.4]. With regard to Patent Owner’s argument that Petitioner does not show that Littleworth necessarily discloses



a “top plan view” of a roof, we do not understand Petitioner to be relying on inherency, but rather to argue that one of ordinary skill would have understood that Littleworth’s “vertical aerial photography” would include a top plan view of a roof. Pet. 24. Moreover, Petitioner submits the testimony of Dr. Forsyth that “Littleworth teaches receiving ‘**vertical** aerial photography’” of a building which is “a top plan view,” which is distinct from “aerial ‘oblique photography’” which is “an oblique perspective view” of “the same building.” Ex. 1003 ¶ 44. Additionally, Patent Owner does not address Petitioner’s argument that “Linder teaches that a ‘vertical image[] is taken ‘camera looking down’ on a subject, thereby producing a top plan view in the resulting image.” Pet. 24; Ex. 1003 ¶ 44.

Based on the present record, and for purposes of institution, we find that Dr. Forsyth’s testimony, in combination with the disclosure of the references, sufficiently supports Petitioner’s argument that one of ordinary skill would have found limitation [1.4] to be obvious based on the Littleworth-Linder-Middlebrook combination.

f) [1.5]: “*wherein at least one of the first and/or second aerial images is calibrated using calibration information received from the calibration module*”

Petitioner argues that, “[i]n the combination, Littleworth describes scale information (*i.e.*, calibration information) supplied with the aerial images.” Pet. 26 (citing Ex. 1005, 755 (“vertical aerial photography at a scale of 1:5000 was located”); Ex. 1003 ¶ 47). Petitioner also asserts that “Linder describes that its CAD system stores information from ‘**calibration certificate[s]**’ or the ‘camera manual[s]’ associated with different cameras,” and that “[a] calibration certificate includes information used to calibrate images taken with the associated camera, including ‘number of columns and

rows of the sensor, position of the image principal point in x and y in [mm] . . . focal length in [mm] . . . , [and] the pixel size in columns and rows in [μm].” *Id.* (citing Ex. 1012, at 127; Ex. 1003 ¶ 48). “This information,” according to Petitioner, “may be combined with additional information supplied by an image database, such as altitude data of the image capture, in order to generate calibration information, such as scale information, for the aerial images.” *Id.* (citing Ex. 1012, 8). “Accordingly,” Petitioner contends, “the combination of Littleworth, Linder, and Middlebrook renders this limitation obvious.” *Id.*

Petitioner also argues that, as it did for limitation [1.2], that it would have been obvious “to subdivide the combined software system of Littleworth, Linder, and Middlebrook into different modules in order to group related functionality, such as the calibration functionality.” Pet. 25; *see* § II.E.5(c), *supra*.

Patent Owner argues that “Petitioner does not explain why a [person of ordinary skill in the art] would have modified Littleworth to include the purported calibration techniques from Linder.” Prelim. Resp. 23 (citing Ex. 2008 ¶ 68). Patent Owner asserts that the Petition “spends multiple pages analyzing why a [person of ordinary skill in the art] allegedly would have modified Littleworth to include Linder’s teachings related to *correlation*,” but “the Petition does not explain how or why [a person of ordinary skill] would have modified Littleworth ‘to *calibrate* at least one aerial image . . . as described by Linder.” *Id.* at 23–24 (citing Pet. 15; Ex. 2001 ¶¶ 69–70). Patent Owner also contends that Petitioner fails to articulate why a person of ordinary skill “would have had a reasonable

expectation of success in modifying Littleworth ‘to calibrate at least one aerial image . . . as described by Linder.’ *Id.* at 24–25 (citing Pet. 15).

Based on the present record, we determined that Petitioner has made a sufficient showing for limitation [1.5]. With respect to Patent Owner’s argument that the Petition does not explain why one of ordinary skill would have modified Littleworth to include Linder’s calibration techniques, we note that Petitioner has argued and introduced testimony from Dr. Forsyth that Littleworth itself discloses calibration of aerial images. *See* Pet. 26; Ex. 1003 ¶ 47. Specifically, Dr. Forsyth testifies that “[i]n the combination, Littleworth describes scale information (*i.e.*, calibration information) supplied with the aerial images,” and references Littleworth’s disclosure that “vertical aerial photography at ***a scale of 1:5000*** was located.” Ex. 1003 ¶ 47 (citing Ex. 1005, 755). Patent Owner does not address this argument or testimony.

With respect to Patent Owner’s argument that there is no motivation to combine Littleworth with Linder’s calibration techniques, Dr. Forsyth testifies that Linder describes the “calibration certificates” as part of Linder’s CAD system, and notes that Littleworth also describes the use of a CAD system (like AutoCAD) in its analytical photogrammetry projects. Ex. 1003 ¶¶ 48. Dr. Forsyth also states that because of the similarities between the systems, one of ordinary skill “would have found it obvious to modify Littleworth’s CAD system based on the teachings of Linder” because “doing so entails the use of known solutions to improve similar systems and methods in the same way.” *Id.* ¶ 36. Additionally, Dr. Forsyth testifies that “applying the teachings of Linder” to “augment Littleworth’s CAD system would have led to predictable results without significantly

altering or hindering the functions performed by Littleworth's system," and one of ordinary skill "would have had a reasonable expectation of success modifying Littleworth based on Linder." *Id.* ¶¶ 36–37.

Based on the present record, and for purposes of institution, we find that Dr. Forsyth's testimony, in combination with the disclosure of Littleworth and Linder, sufficiently supports Petitioner's argument that one of ordinary skill would have found limitation [1.5] to be obvious based on the combination of Littleworth and Linder.

g) [1.6]: "*perform image analysis on at least two of the plurality of aerial images;*"

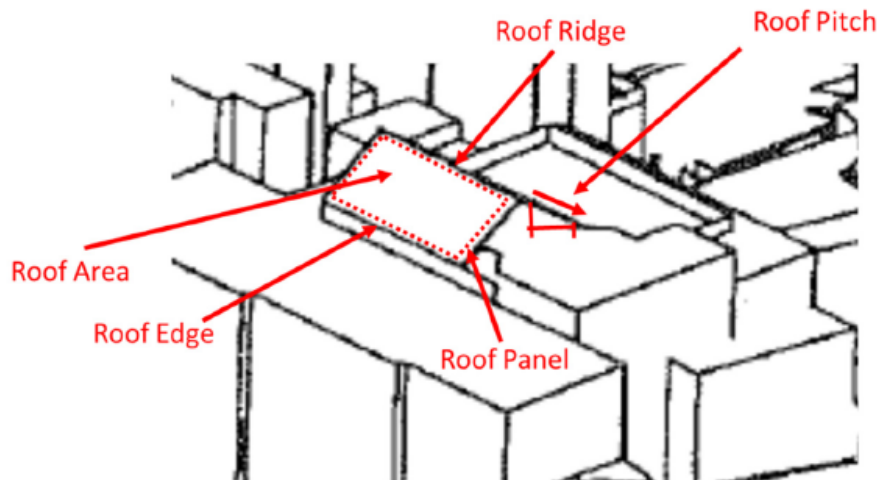
Petitioner argues that in the Littleworth-Linder-Middlebrook combination, "Linder describes performing image analysis including correlating multiple aerial images (*e.g.*, the 'vertical aerial' and 'oblique' images from Littleworth)." Pet. 26–27 (citing Ex. 1005, 754; Ex. 1012, 32, 41, 46–50, 65–69, Fig. 15, Fig. 17; Ex. 1003 ¶ 49; Ex. 1024, 1). "For example," Petitioner asserts, "Linder explains that '[t]he programme carries out *an image matching algorithm*' using 'control points' appearing in both images." *Id.* at 27 (citing Ex. 1012, 40–41, 100–102). According to Petitioner, Linder also "explains that during this image matching process 'the programme compare[s] parts of *two different images showing the same object from different positions*,'" and then "*correlate[s] both images* in well-known positions taken for example from the control point file." *Id.* (citing Ex. 1012, 46–50). Petitioner contends that one of ordinary skill "would understand the image correlation described in Linder to be image analysis." *Id.* (citing Ex. 1003 ¶ 50; Ex. 1012, 32, 41, 46–50, 65–69, Fig. 15, Fig. 17).

Patent Owner does not present arguments regarding limitation [1.6].  
*See Prelim. Resp.*

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation.

*h) [1.7]: “calculate a pitch for each one of a plurality of roof sections of the roof based on the image analysis;”*

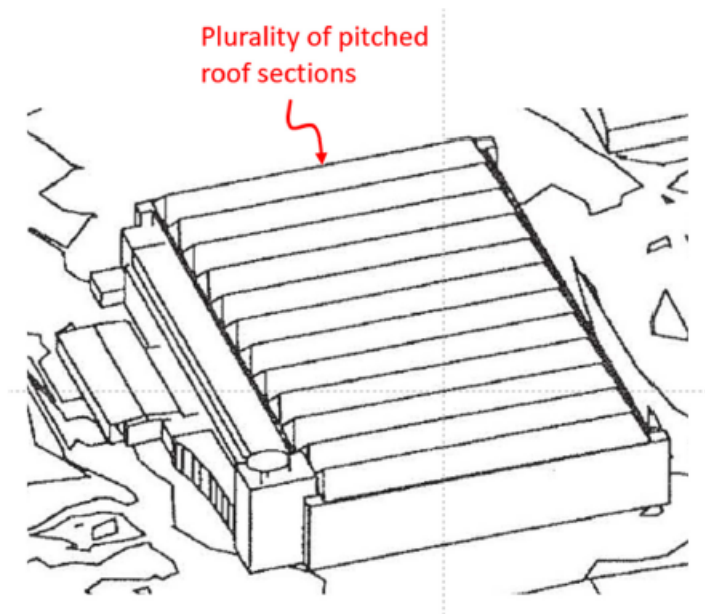
Petitioner argues that in the Littleworth-Linder-Middlebrook combination, “Littleworth teaches determining (or calculating) roof details including roof ‘pitch’ for a plurality of roof sections of a building’s roof, as evidenced by Littleworth’s three-dimensional model including angled sections modeling a building’s pitched roof.” Pet. 27 (citing Ex. 1005, 755, Figs. 1–2, 5). “For example,” Petitioner asserts, “Littleworth shows a three-dimensional model of a building including a pitched roof having two sections” in Figure 5, reproduced below with Petitioner’s annotations included in red. *Id.* at 27–28.



Petitioner’s annotated version of a portion of Figure 5 of Littleworth showing different parts of a pitched roof annotated in red. Pet. 28 (citing Ex. 1005, 754).

Petitioner argues that “[t]he inclusion of a pitched roof in Littleworth’s three-dimensional model of the roof indicates that Littleworth’s system made a determination of the pitch of the roof shown in the aerial images from which the model was generated.” Pet. 28 (citing Ex. 1003 ¶ 52; Ex 1005, 755 (“Roof detail was digitised indicating their pitch [and] major details on the roofs themselves.”), Figs. 1–2, 5).

Petitioner argues that “Littleworth provides multiple additional examples of three-dimensional models of pitched roofs having multiple roof sections, such as the model shown in the following detail from FIG. 2,” which is reproduced below with Petitioner’s annotations. Pet. 28.



Petitioner’s annotated version of a portion of Figure 2 of Littleworth showing a plurality of pitched roof sections. Pet. 28–29 (citing Ex. 1005, 755).

Petitioner argues that, as shown in the annotated portion of Figure 2 above, “the roof of the modeled structure includes 12 different pitched portions, each having 2 roof sections.” Pet. 29 (citing Ex. 1005, Fig. 2; Ex. 1003 ¶ 54). “Again,” Petitioner asserts, “because Littleworth teaches that its

three-dimensional models are generated based on aerial images, the inclusion of these pitched roof sections in the three-dimensional model of FIG. 2 indicates that the system calculated the pitch of each roof section.” *Id.* (citing Ex. 1003 ¶ 54; Ex. 1005, 755 (“Roof detail was digitised indicating their *pitch* [and] major details on the roofs themselves.”), Figs. 1–2, 5).

Patent Owner argues that Petitioner fails to demonstrate that the references necessarily calculate a pitch based on the image analysis. Prelim. Resp. 8–17. As to Littleworth, Patent Owner asserts that “Petitioner appears to rely on what it believes is an inherent disclosure in Littleworth that creating a three-dimensional model of a roof necessarily requires the system to calculate or determine the pitch of each roof section shown in the model,” but “Petitioner has not explained why that must be true.” *Id.* at 9. According to Patent Owner, Littleworth’s statement that “[r]oof detail was digitised indicating their pitch” “merely indicates that an angled roof is generally shown in the visualized model,” but “depicting an angled roof *visually* in a 3D rendering is not the same as calculating or determining a numerical pitch value of a roof.” *Id.* at 10 (citing Ex. 2001 ¶ 43).

With respect to Littleworth’s statement that digitized features “act as a background template from which shapes representing roofs and walls are interpolated,” Patent Owner argues that “interpolation” here “generally refers to the process of filling in gaps in shapes” and “where information is not otherwise available to accurately reflect the content of gaps in a computed image.” Prelim. Resp. 10 (citing Ex. 2001 ¶ 41; Ex. 1012, 53). Thus, Patent Owner contends, “the interpolated roof sections in Littleworth do not necessarily reflect a calculation or determination of the pitch of those

roof sections.” *Id.* at 10–11 (citing Ex. 2001 ¶ 41). Patent Owner further argues that the “degree of expected inaccuracy” in Littleworth’s model “would significantly alter the pitch calculation or determination of a given roof section,” and thus “shows that the model is *not* calculating or determining the pitch of the roof sections.” *Id.* at 11 (citing Ex. 2001 ¶ 42).

Based on the present record, we determine that Petitioner has made a sufficient showing for limitation [1.7] for purposes of institution. In particular, Littleworth states that “[r]oof detail was digitized indicating their ***pitch*** [and] major details on the roofs themselves,” and Petitioner has introduced testimony from Dr. Forsyth that “[t]he inclusion of a pitched roof in Littleworth’s three-dimensional model of the roof indicates that Littleworth’s system made a determination of the pitch of the roof shown in the aerial images from which the model was generated.” Ex. 1005, 755; Ex. 1003 ¶¶ 52, 54.

As for Patent Owner’s argument that Petitioner does not show that Littleworth inherently discloses determining a pitch, we do not understand Petitioner to be relying on inherency, but rather to argue that one of ordinary skill would have understood from Littleworth’s statement that roof detail was digitized “indicating their pitch” that Littleworth’s system calculates the pitch in order to create and display the model. *Id.* Additionally, although Patent Owner and Dr. Bajaj state that “the interpolated roof sections in Littleworth do not necessarily reflect a calculation or determination of the pitch of [Littleworth’s digitized] roof sections,” neither Patent Owner nor Dr. Bajaj specifically explains why interpolation to model and display a pitch does not involve a calculation, or how Littleworth’s system could model and display a pitch without calculating it. Prelim. Resp. at 10–11



(citing Ex. 2001 ¶ 41). With respect to Patent Owner’s argument that the “degree of expected inaccuracy” in Littleworth’s model “would significantly alter the pitch calculation or determination of a given roof section,” we do not see anything in claim 1 that requires any particular accuracy of the pitch calculation.

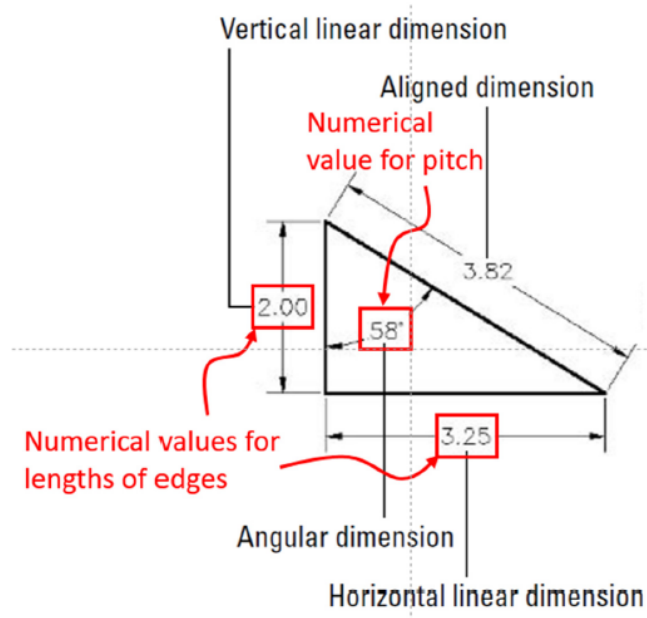
Based on the present record, and for purposes of institution, we find that Dr. Forsyth’s testimony, in combination with the disclosure of the references, sufficiently supports Petitioner’s argument that one of ordinary skill would have found limitation [1.7] to be obvious based on the Littleworth-Linder-Middlebrook combination.

- i) [1.8]: “*generate a roof report that includes the pitch of each of the plurality of roof sections based on the calculated pitch; and output the roof report, wherein the roof report includes one or more top plan views of a model of the roof annotated with numerical values that indicate a corresponding pitch, area, and length of edges of at least some of the plurality of roof sections using at least two different indicia for different types of roof properties.*”

Petitioner argues that the Littleworth-Linder-Middlebrook combination renders this limitation obvious. Pet. 31–32. “In the combination,” Petitioner asserts, “Middlebrook describes annotating a view of a model, such as the roof model described in Littleworth, with different dimension measurements for structures represented in the model.” *Id.* at 32 citing Ex. 1006, 229; Ex. 1003 ¶ 57). Petitioner points to Middlebrook’s disclosure that “[i]n drafting —either CAD or manual drafting — ***dimensions are special text labels*** with attached lines that together ***indicate unambiguously the size of something***” and that, “as you edit an object — by stretching it for example—AutoCAD automatically updates the

measurement displayed in the dimension text label to indicate the object's new size.” *Id.* (citing Ex. 1006, 230; Ex. 1022, 71–76, Figs. 33–37).

Petitioner also argues that “Middlebrook teaches annotating several different properties using these techniques.” Pet. 32. As an example, Petitioner includes an annotated version of Middlebrook’s FIG. 10-3 showing “a view of a model annotated with numerical values for lengths of edges and for pitch,” as reproduced below. Pet. 32–33.



Petitioner’s annotated version of Middlebrook’s Figure 10-3 showing a view of a model annotated with numerical values for lengths of edges and pitch.

Pet. 32–33 (citing Ex. 1006, 232–233, Fig. 10-3; Ex. 1003 ¶ 58).

According to Petitioner, “Middlebrook describes several other types of annotations indicating different dimensions and properties in views of three-dimensional models.” Pet. 33 (citing Ex. 1006, Fig. 10-5 (annotating edge lengths and angles of a model having an irregular shape), Fig. 10-10 (annotating edge length, pitch angle, circle radius, and circle diameter)).

Petitioner argues that one of ordinary skill “would have understood that annotated numerical values for the dimensions of each roof section

indicate the area for the respective roof section as they could have been used to calculate the area of that roof section.” Pet. 33 (citing Ex. 1003 ¶ 60; Ex. 1012, 1, 3; Ex. 1021, Fig. 16). “For example,” Petitioner asserts, “the annotated numerical values of the edges of a square or rectangular roof section would have indicated the area of the section to a [person of ordinary skill], who would have been capable of multiplying the length and width of the roof section (shown by the numerical values) mentally to determine the area of the roof section.” *Id.* 34 (citing Ex. 1003 ¶ 60; Ex. 1010, 3:7-26). “Moreover,” according to Petitioner, a person of ordinary skill “would have understood that CAD applications offered well-known built-in visualization tools and basic quantity calculation features for calculating roof areas, and that it would have been obvious to annotate a model with such calculations particularly.” *Id.* (citing Ex. 1003 ¶ 60; Ex. 1006, 42; Ex. 1010, 3:7–26). Additionally, Petitioner argues, it “would have been obvious to display the area of different roof sections on a roof model or view of a roof model because a [person of ordinary skill] would have understood surface area to be an important characteristic of many modeled objects, and especially of roofs.” *Id.* (citing Ex. 1003 ¶ 60; Ex. 1025, 1–6; Ex. 1026, 1–4, Figs. 2–3, 5; Ex. 1010, 3:7–26).

“Additionally or alternatively,” Petitioner argues, “Linder explains that ‘the basic task [of image analysis] is to get object (terrain) co-ordinates of any point in the photo from which you can then *calculate geometric data*’ such as ‘distances, *areas*, volumes, slopes[,] and much more.’” Pet. 34–35 (citing Ex. 1012, 1, 3). According to Petitioner, it would have been obvious to a person of ordinary skill “to use Linder’s teachings for calculating areas of objects to determine ‘[r]oof detail’ of a roof or building object, such as the

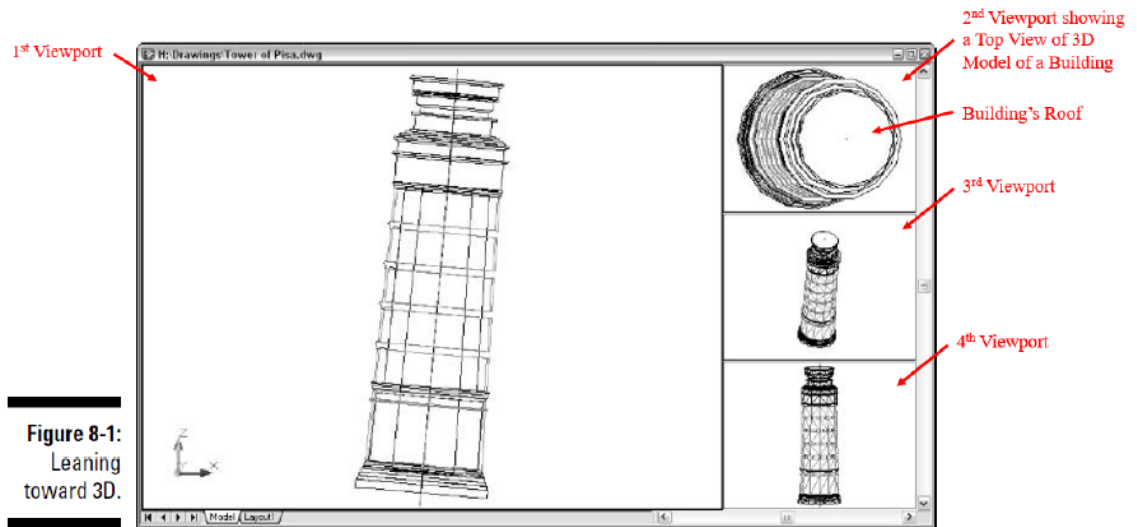
area of each roof section of a roof having . . . multiple roof sections, such as the roofs shown in FIGS. 2 and 5 of Littleworth.” *Id.* at 35 (citing Ex. 1003 ¶ 61; Ex. 1012, 1, 3; Ex. 1005, 755; Ex. 1006, 58, Fig. 8-8; Ex. 1021, 56-59, Fig. 16). “Indeed,” Petitioner asserts, one of ordinary skill “would have been motivated to use Linder’s teachings to determine the roof area of each of a plurality of roof portions for the reasons [previously discussed] and because the roof area of each roof portion would be an important metric for calculating forces on the building.” *Id.* (citing Ex. 1003 ¶ 61; Ex. 1005, 755, Ex. 1021 56–59, Fig. 16; Ex. 1025; Ex. 1026, 1–4 Figs. 2–3, 5; Ex. 1010, 3:7–26).

“Furthermore,” according to Petitioner, “in the combination, Middlebrook teaches that [the] AutoCAD program calculates geometry data for objects represented in a 3D model, including surface area of the objects.” Pet. 35 (citing Ex. 1006, 58, Fig. 8-8). “For example,” Petitioner contends, “the AutoCAD program calculates the geometry for a first object in a 3D model containing three objects when the first object is selected.” *Id.* (citing Ex. 1006, 58, Fig. 8-8). According to Petitioner, it would have been obvious to a person of ordinary skill “to apply this AutoCAD functionality to a roof object representing a roof section in the 3D model shown in Littleworth to determine the surface area of the roof sections, and a [person of ordinary skill] would have been motivated to do so for the reasons” previously discussed. *Id.* at 35–36 (citing Ex. 1003 ¶ 62; Ex. 1021, 56–59, Fig. 16).

“Also in the combination,” Petitioner argues, “Middlebrook provides that the annotations for a view of a model include a variety of indicia in addition to the numerical values.” Pet. 36–37. “For example,” Petitioner asserts, Middlebrook discloses that the numerical value annotations (e.g.,

“[d]imension text”) on a view of a model are accompanied by different indicia for different type of structural properties. *Id.* at 37 (citing Ex. 1006, 231-42, Figs. 10-2, 10-3, 10-6). For example, “‘linear dimension measures’ for the edges of a roof section are accompanied by ‘extension line’ indicia and straight ‘dimension line’ indicia with ‘dimension arrowheads.’” *Id.* (citing Ex. 1006, 231-232, Figs. 10-2, 10-3). “In contrast,” according to Petitioner, in Middlebrook “‘angular dimension . . . measurement[s]’ for the pitch of the roof sections are accompanied by different indicia in the form of a ‘dimension line [that] appears as an arc’ with ‘dimension arrowheads’ and no extension line indicia.” *Id.* (citing Ex. 1006, 232-33, Fig. 10-3).

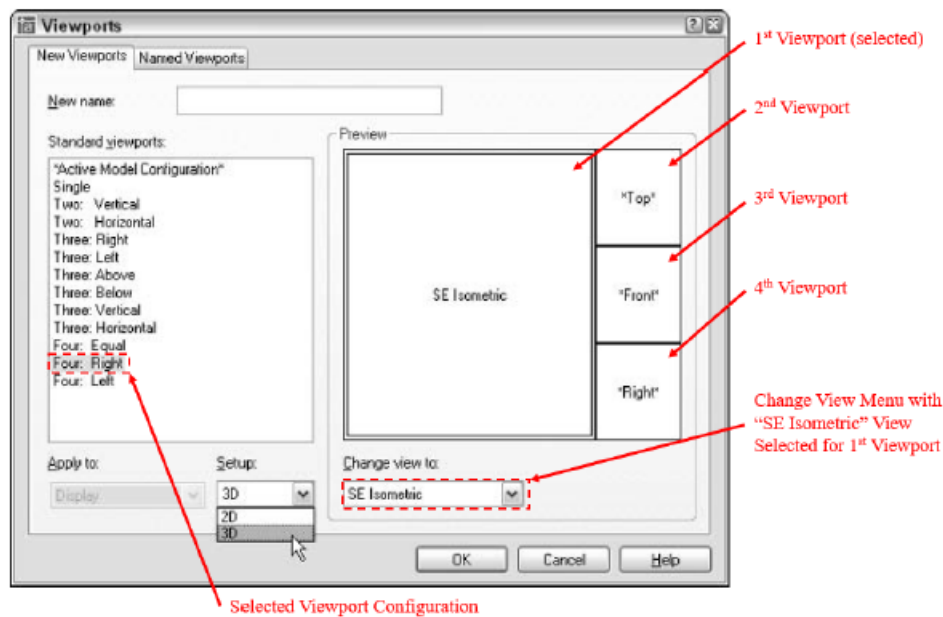
Petitioner also argues that, “in the combination, Littleworth’s CAD system is modified to include features for generating and outputting a printed document including multiple annotated views of its roof model (i.e., a roof report) based on the teachings of Middlebrook,” as it previously discussed when describing the proposed combination. Pet. 39 (citing Pet. 15–20). “For example,” Petitioner asserts, “in the combination, Middlebrook teaches AutoCAD features for presenting multiple viewports, each containing a view of a three-dimensional model,” as shown in Petitioner’s annotated Fig. 8-1, reproduced below. *Id.*



Petitioner's annotated version of Middlebrook's Figure 8-1 showing multiple viewports each containing a view of a three-dimensional model. Pet. 40 (citing Ex. 1006, 65, Fig. 8-1).

According to Petitioner, "Middlebrook explains that these 'paper space layout viewport[s] [are] window[s] into model space' and that '**3D models often benefit from multiple viewports.**'" *Id.* at 39–40 (citing Ex. 1006, 65).

Petitioner argues that, "[i]n the combination, Middlebrook explains that a user can use the dialog box shown in FIG. 8-2" to "select from among several viewport configurations and options to specify which view of the model is shown in each of the viewports." Pet. 40 (citing Ex. 1006, 184–187, Figs. 8-2, 8-3). Petitioner's annotated version of Middlebrook's Figure 8-2 is reproduced below.



Petitioner’s annotated version of Middlebrook’s Figure 8-2 showing a dialog box allowing the user to select from among several viewport configurations and to specify which view of the model is shown in each viewport. Pet. 41 (citing Ex. 1006, Fig. 8-2).

“For example,” Petitioner argues, “a user can select a viewport in the ‘Preview’ area of the dialog box and then select the ‘Change view to:’ menu to change the model view of that particular viewport.” Pet. 40 (citing Ex. 1006, 184–186, Fig. 8-2). “Additionally or alternatively,” Petitioner argues, “the user can use the ‘View’ menu to access the ‘3D Views submenu’” to “change the model view shown in any particular viewport.” *Id.* (citing Ex. 1006, 185-187, Fig. 8-3). “With these options,” according to Petitioner, “a user is able to specify that a ‘Top’ view or ‘plan view, which is *a top-down view of either the world coordinate system or a user coordinate system,*’ of the 3D model be displayed in one or more of the viewports so that one or more separate top plan views of the 3D model are displayed.” *Id.* at 40–41 (citing Ex. 1006, 184-187, Figs. 8-2, 8-3; Ex. 1003 ¶ 66; Ex. 1023, 1, 4, 6, Fig. 8).

Petitioner also argues that “Middlebrook explains that ‘X-Y plane (the set of points where  $Z = 0$ ) is the construction plane in which you create 2D objects’” and is “‘also important for creating 3D objects, because many commands operate with respect to the X-Y plane.’” Pet. 42 (citing Ex. 1006, 190). “When a user selects a top view or plan view of the 3D model,” according to Petitioner, “the model will be oriented with the X-Y plane of the world coordinate system, permitting the use of the dimensioning features described above.” *Id.* (citing Ex. 1003 ¶ 67; Ex. 1006, 186, 190).

Petitioner argues that “Middlebrook further provides that after a view of a model is annotated, a report that includes the annotated view of the model is generated and outputted in response to a ‘[c]lick [of the] OK’ button in the ‘Plot dialog box’ which ‘create[s] the plot’ of the model.” Pet. 42–43 (citing Ex. 1006, 272–273, Figs. 12-2, 12-3, 12-4). “When AutoCAD finishes generating and sending the plot,” Petitioner asserts, “it displays a ‘Plot and Publish Job Complete’ balloon notification from the status bar.” *Id.* at 43 (citing Ex. 1006, 273). Petitioner also points to Middlebrook’s statement that “AutoCAD and most CAD users make no distinction between plotting and printing.” *Id.* (citing Ex. 1006, 268).

Patent Owner does not present arguments regarding limitation [1.8].  
*See Prelim. Resp.*

We determine that, on the record before us, Petitioner’s cited evidence sufficiently supports its contentions regarding this limitation.

*j) Summary for Claim 1*

For the foregoing reasons, Petitioner’s cited evidence and reasoning demonstrates a reasonable likelihood that Petitioner would prevail in its contentions regarding claim 1.



*6. Dependent Claims 2, 7, and 8*

Petitioner contends that dependent claims 2, 7, and 8 are unpatentable over the Littleworth-Linder-Middlebrook combination. Pet. 44–50. Patent Owner does not separately address these claims. *See* Prelim. Resp. Based on the evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood that claims 2, 7, and 8 are unpatentable over the Littleworth-Linder-Middlebrook combination.

*7. Independent Claims 21 and 22*

Petitioner contends that independent claims 21 and 22 are unpatentable over the Littleworth-Linder-Middlebrook combination, relying on many of the same arguments it made for claim 1. Pet. 50–59. Patent Owner argues that Petitioner fails to establish that these claims are unpatentable. Prelim. Resp. 25–34. Because we find that the Petition has established a reasonable likelihood of unpatentability with respect to claims 1, 2, 7, and 8, we need not determine whether it also establishes a reasonable likelihood of unpatentability for claims 21 and 22. *See* 35 U.S.C. § 314. However, to provide guidance to the parties, we address Patent Owner’s arguments concerning claims 21 and 22 below.

First, Patent Owner argues that the Petition fails to address the claim language in elements 21 and 22 that requires “performing . . . image analysis on the plurality of aerial images based on [a] correlation” between a “first aerial image” and a “second aerial image.” Prelim. Resp. 28. Petitioner refers back to claim 1.6 for this limitation of claims 21 and 22. Pet. 52–53. When discussing limitation 1.6, the Petition argues that “Linder describes performing image analysis including correlating multiple aerial images,” and that one of ordinary skill “would understand the image correlation described

in Linder to be image analysis.” Pet. 26–27. However, the Petition does not appear to point to an “image analysis” separate from the correlation of multiple aerial images. *Id.* The parties may address this issue further during the trial.

Second, Patent Owner argues that claims 21 and 22 require correlating a first aerial image which is a “top plan view” of the roof and a second aerial image that is an “oblique perspective view of the roof. Prelim. Resp. 28–29. Patent Owner argues that Petitioner refers back to its analysis of claim element 1.6, which contends that “Linder describes performing image analysis including correlating multiple aerial images (*e.g.*, the ‘vertical aerial’ and ‘oblique’ images from Littleworth).” *Id.* at 29 (citing Pet. 26). According to Patent Owner, this analysis is flawed “because Linder does not disclose a correlation between a top plan view and an oblique perspective view image,” and the cited portions of Linder merely “describe the general process for identifying control points used to correlate two aerial images” having “the same view, but taken from slightly different positions.” *Id.* at 29–30 (citing Ex. 2001 ¶ 64). Patent Owner also points to Linder’s statement that there may be “a lot of problems” with “compar[ing] parts of two *different* images showing the *same* object from *different* positions.” *Id.* at 32–33 (citing Ex. 1012, 49; Ex. 2001 ¶ 66).

In response to Patent Owner’s argument, we note that Petitioner relies on Linder’s general disclosure of photogrammetry as “calculat[ing] the three-dimensional object (terrain) coordinates” for “any object point represented in at least two photos,” and then “digitiz[ing] points, lines, and areas for map production or calculate distances, areas, volumes, slopes, and . . . more.” Pet. 11–12; Ex. 1012, 2–3; Ex. 1003 ¶ 23. Linder further

states that “[i]f we have two (or more) photos from the same object but taken from different positions, we may easily calculate the three-dimensional coordinates of any point which is represented in both photos.” Ex. 1012, 1–2. Patent Owner’s argument relies on the example, in Linder’s Figures 15 and 17 where photos are taken from “slightly different” camera positions, but these are merely examples, and Patent Owner does not explain why they limit Linder’s general disclosure of using two different positions, which may include a top plan view and an oblique view, to calculate three dimensional object coordinates. Prelim. Resp. 29–33; Ex. 1012, 41, 47–48. With respect to Patent Owner’s reliance on Linder’s statement that “there may occur a lot of problems” in comparing different images showing the same object from different positions, neither party explains with specificity whether comparing objects from a top plan view and oblique view would or would not have been within the level of ordinary skill in the art. The parties may address this issue further during the trial.

Third, Patent Owner argues that the Petition never address claim 22’s limitation of “determining pitch, by the at least one processor of the roof estimation machine, for each one of a plurality of roof sections of the roof based on the image analysis.” Prelim. Resp 33. Patent Owner is correct that the Petition’s discussion of claim 22 omits a reference to this limitation. Pet. 53; *see* Ex. 1001, 19:34–36.

8. *Claims 24, 25, 27, and 29*

Petitioner contends that independent claims 24 and 29 are unpatentable over the Littleworth-Linder-Middlebrook combination, relying on many of the same arguments as for claim 1. Pet. 59–62. Petitioner also argues that dependent claims 25 and 27 are unpatentable over the same

combination. *Id.* at 60. Patent Owner does not separately address these claims. *See* Prelim. Resp. Based on the evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood that claims 24, 25, 27, and 29 are unpatentable over the Littleworth-Linder-Middlebrook combination.

### III. CONCLUSION

After considering the evidence and arguments presented in the current record, we determine that Petitioner has demonstrated a reasonable likelihood of success in proving that at least one of the challenged claims of the '961 patent is unpatentable. Patent Owner has not persuaded us to exercise our discretion to deny institution of trial. We therefore institute trial on all challenged claims and grounds raised in the Petition.

At this stage of the proceeding, we have not made a final determination as to the patentability of any challenged claim or as to the construction of any claim term. Any final determination will be based on the record developed during trial. We place Patent Owner on express notice that any argument not asserted in a timely-filed Response to the Petition, or in another manner permitted during trial, shall be deemed waived, even if that argument was presented in the Preliminary Response.

### IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1, 2, 7, 8, 21, 22, 24, 25, 27, and 29 of the '961 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '961 patent shall commence

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on the entry date of this Order, and notice is hereby given of the institution  
of a trial.

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