

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

OLYMPUS CORPORATION, OM DIGITAL SOLUTIONS
CORPORATION, FUJIFILM CORPORATION, FUJIFILM NORTH
AMERICA CORPORATION, NIKON CORPORATION, PANASONIC
ENTERTAINMENT & COMMUNICATIONS CO., LTD.,
Petitioner,

v.

OPTIMUM IMAGING TECHNOLOGIES, LLC,
Patent Owner.

IPR2024-01220
Patent 10,873,685 B2

Before JOHN F. HORVATH, GARTH D. BAER, and RUSSELL E. CASS,
Administrative Patent Judges.

HORVATH, *Administrative Patent Judge.*

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

I. INTRODUCTION

A. Background and Summary

Olympus Corporation, OM Digital Solutions Corporation, FUJIFILM Corporation, FUJIFILM North America Corporation, Nikon Corporation, Panasonic Entertainment & Communication Co., Ltd. (collectively, “Petitioner”) filed a Petition requesting *inter partes* review of claims 1–30 (“the challenged claims”) of U.S. Patent No. 10,873,685 B2 (Ex. 1001, “the ’685 patent”). Paper 1 (“Pet.”), 1–2. Optimum Imaging Technologies, LLC (“Patent Owner”) filed a Preliminary Response. Paper 10 (“Prelim. Resp.”). We have jurisdiction and authority under 35 U.S.C. §§ 6, 314 and 37 C.F.R. § 42.4.

Upon consideration of the Petition and Preliminary Response, we are persuaded that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing the unpatentability of at least one challenged claim of the ’685 patent. Accordingly, we institute *inter partes* review of all challenged claims on all grounds raised.

B. Real Parties-in-Interest

Petitioner, collectively, certifies that “they are the only real parties-in-interest.” Pet. 79. Patent Owner identifies itself as the real party-in-interest. Paper 8, 1; Paper 9, 1.

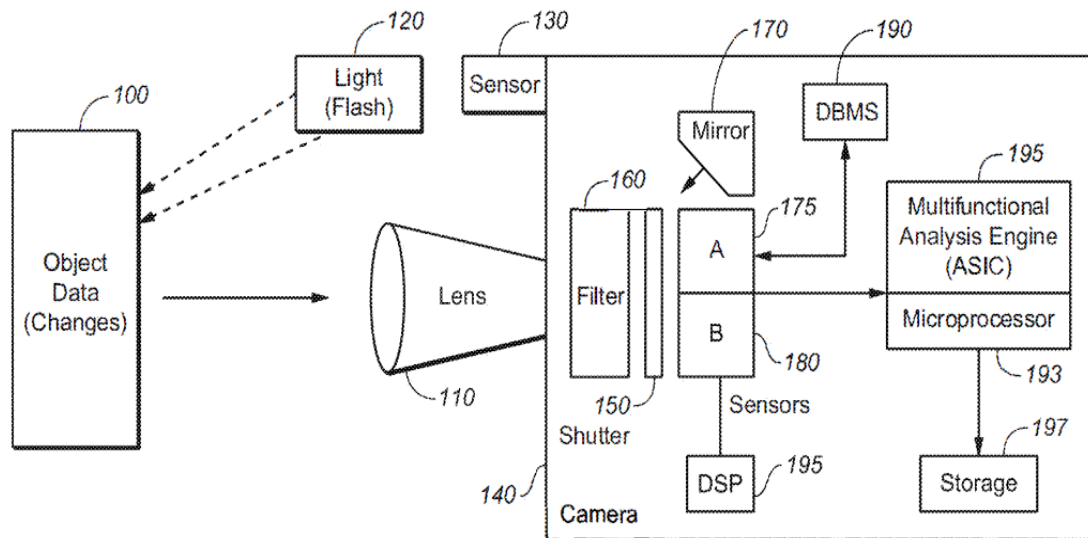
C. Related Matters

Petitioner and Patent Owner identify numerous related patents, patent applications, *inter partes* reviews, and district court proceedings that can affect or be affected by this proceeding, including *Optimum Imaging Techs., LLC v. Olympus Corp.*, 4:23-cv-00924 (EDTX). See Pet. 79–81; Paper 8, 1–3; Paper 9, 1–3.

D. The '685 Patent

The '685 patent is directed toward an apparatus for “optical image collection, electronic organization and optimization of digital data using integrated circuits and software” with applications in “still and video photography” as well as in “copying and scanning technologies.” Ex. 1001, 1:27–33. The apparatus provides “electronic methods to optimize optical processing, the digital capture of light and post-capture image organization.” *Id.* at 1:18–21.

Figure 1 of the patent is reproduced below.



The figure “illustrates the overall structure of the system.” *Id.* at 31:26.

Digital camera 140 includes, *inter alia*, lens 110, sensors 175/180, DBMS 190,¹ digital signal processor (DSP) 195, microprocessor 193, ASIC (application specific integrated circuit) 195, and storage 197. *Id.* at 31:32–45, Fig. 1. Light from object 100 is focused by lens 110 onto at least one of

¹ Although Figure 1 identifies element 190 as a DBMS or database management system, the patent identifies element 190 as a database. *See* Ex. 1001, 31:39–40.

the sensors 175/180. *Id.* at 31:33–35. The sensors are connected to ASIC 195 and/or microprocessor 193, which “process the [recorded] image and controls the camera.” *Id.* at 31:40–43. “The digital image data is passed from the digital sensor to either the ASIC or microprocessor and then stored in memory.” *Id.* at 31:43–45.

The patent explains that every optical “lens with a unique optical formula will have specific aberrations, the corrections for which will be accessible in a database.” *Id.* at 11:24–26. Thus, when taking a picture, the camera “identifies a specific lens and refers to a database that matches the lens type with [its] specific aberrations.” *Id.* at 10:60–62. “After a specific lens type is identified (500) and a database is referenced (510), the lens type is matched with the specific optical aberrations (520)” and the DSP acts as a “digital filter [that] applies a correction to specific optical aberrations (530).” *Id.* at 32:21–25, Fig. 5. The digital filter “employ[s] the DSP hardware as well as specific software.” *Id.* at 32:45–47.

This sequence of lens aberration correction steps is shown in Figure 7, which is reproduced below.

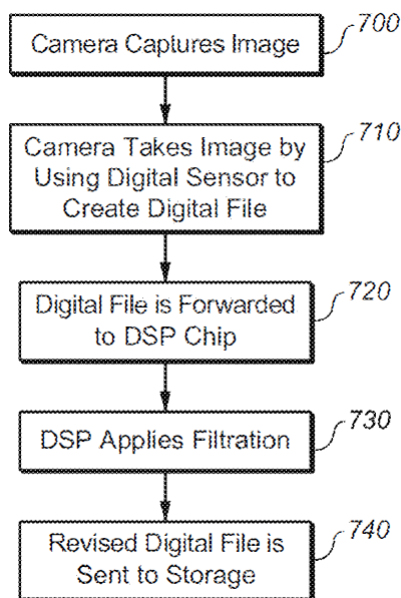


Figure 7 “is a flow chart of the process of digital image capture, processing, and storage.” *Id.* at 30:33–34. The camera “uses a digital sensor to create a digital file (710), the digital file is forwarded to the digital signal processor . . . (720),” which “applies the filtration (730) to correct the optical aberrations from the lenses,” and “[t]he revised digital file is then sent to storage (740).” *Id.* at 32:39–44.

E. Illustrative Claim

Claims 1, 6, and 14 are independent, and claims 2–5, 7–13, and 15–30 depend directly or indirectly from them. Ex. 1001, 38:36–42:21. Claim 1, which is illustrative of the challenged claims, is reproduced below.

1. A digital imaging system for correcting optical images aberrations in a digital video, comprising:

a digital video camera including in-camera software, an optical lens mechanism, at least one digital sensor for capturing the digital video, an integrated circuit including;

a digital signal processor configured to access a database management system including a plurality of optical image aberration corrections, and

a memory storage sub-system;

wherein the optical lens mechanism is a zoom lens or a fixed focal length lens;

wherein the integrated circuit uses the in-camera software to identify at least one optical image aberration and

to correct the at least one optical image aberration in at least one frame of the digital video using at least one of the plurality of optical image aberration corrections in the database;

wherein the video is captured by the at least one digital sensor and is forwarded to the digital signal processor;

wherein the video image file with the at least one optical image aberration is corrected by applying digital filtration using the digital signal processor; and

wherein the corrected video consisting of the digital data optimized from the at least one optical image aberration that are corrected from the original video image is stored in the memory storage sub-system.

Id. at 38:36–61.

F. Evidence

Reference		Effective Date	Exhibit
Iwasawa	JP 2000-041179 A	Feb. 8, 2000	1005
Enomoto	US 7,245,319 B1	June 11, 1999	1006
Ito	JP H6-113309 A	Apr. 22, 1994	1007
Prilutsky	US 2005/0140801 A1	June 30, 2005	1008
Miyazawa	US 6,791,608 B1	Sept. 14, 2004	1009
Matsutani	JP 2004-266768 A	Sept. 24, 2004	1010

Petitioner also relies upon the Declaration of Dr. Robert L. Stevenson.

Ex. 1003.

G. Asserted Grounds

Petitioner asserts the challenged claims are unpatentable on the following grounds:

Ground	Claims	35 U.S.C. §	References
1	1, 3, 6, 11–14, 17, 19	103	Iwasawa
2	1–3, 5–7, 10–15, 17–19, 23, 24, 27, 28, 30	103	Iwasawa, Enomoto
3	4, 8, 9, 16	103	Iwasawa, Ito
4	4, 8, 9, 16	103	Iwasawa, Enomoto, Ito
5	20	103	Iwasawa, Prilutsky
6	20	103	Iwasawa, Enomoto, Prilutsky
7	21	103	Iwasawa, Miyazawa
8	21	103	Iwasawa, Enomoto, Miyazawa
9	22, 25, 26, 29	103	Iwasawa, Matsutani
10	22, 25, 26, 29	103	Iwasawa, Enomoto, Matsutani

II. ANALYSIS

A. Discretionary Denial

We have discretion to deny any petition for *inter partes* review. *See SAS Inst. Inc. v. Iancu*, 584 U.S. 357, 366 (2018) (“[Section] 314(a) invests the Director with discretion on the question whether to institute review” (emphasis omitted)); *Cuozzo Speed Techs., LLC v. Lee*, 579 U.S. 261, 273 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”). In exercising that discretion, the Board may consider “events in other proceedings related to the same patent,” including related district court proceedings and *inter partes* review proceedings. Consolidated Trial Practice Guide November 2019² at 58.

1. Denial Due to Related District Court Cases

Patent Owner requests we deny institution due to the pendency of related district court proceedings for each of the parties collectively identified above as Petitioner. Prelim. Resp. 1–2.

The Board considers and balances several factors affecting system efficiency, fairness, and patent quality when deciding whether to institute review in light of related district court proceedings. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 5–6 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). The Director has provided guidance on applying the *Fintiv* factors. *Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation* (June 21, 2022).³ (“*Fintiv Memo*”). Per that guidance, “the PTAB will not discretionarily

² Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

³ Available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB.”

Id. at 3.

Petitioner has provided such a stipulation to Patent Owner. Pet. 79 (citing Ex. 1025); *see also* Ex. 1025, 1 (Petitioner promising that if we institute “an IPR based on the grounds identified [above], then it will (i) not pursue the grounds identified [above] in the respective District Court Case, and (ii) not pursue any other ground that reasonably could have been raised during the IPR . . . in the respective District Court Case.”).

In view of Petitioner’s stipulation and the Director’s guidance, we deny Patent Owner’s request for discretionary denial due to the related district court cases. *See* Ex. 1025, 1; Fintiv Memo 3.

2. Denial Due to Related Inter Partes Reviews

Patent Owner also requests discretionary denial in view of a related *inter partes* review: *Sony Corp. v. Optimum Imaging Techs. LLC*, IPR2024-00923, Paper 11 at 1 (PTAB Nov. 18, 2004) (granting review of claims 1–19 and 22–30 of the ’685 patent). Prelim. Resp. 2–3.

The Board considers and weighs several factors when deciding whether to institute review in light of a previously filed *inter partes* review challenging the same patent. *See Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 15–16 (PTAB Sept. 6, 2017) (precedential). Principal among them is the first factor: “whether the same petitioner previously filed a petition directed to the same claims of the same patent.” *Id.* at 16. This factor has been extended to consider not only whether the same petitioner previously filed a related petition, but whether others having “a significant relationship” with the petitioner previously filed

a related petition. *See Valve Corp. v. Elec. Scripting Prods., Inc.*, IPR2019-00062, Paper 11 at 9–10 (PTAB Apr. 2, 2019) (precedential). The Director has found that when two petitions challenge the same patent and “the first and second petitioners are neither the same party, nor possess a significant relationship under *Valve*, *General Plastic* factor one *necessarily outweighs* the other *General Plastic* factors.” *Videndum Prod. v. Rotolight*, IPR2023-01218, Paper 12 at 5–6 (PTAB Apr. 19, 2024) (emphasis added).

Petitioner here is not the same petitioner (Sony) that previously filed a petition in IPR2024-00923. Moreover, the entities that constitute Petitioner contend that they “lack any legally significant relationship” with Sony.

Pet. 77. Petitioner further contends that discretionary denial is not warranted under *General Plastic* factor six because “this Petition raises references not cited to in the Sony IPR.” *Id.* at 78. Patent Owner does not dispute any of these contentions. Prelim. Resp. 2–3.

Because the entities that comprise Petitioner and Sony are neither the same party nor significantly related parties under *Valve*, and because the entities that comprise Petitioner and Sony have individual rights to defend themselves from allegations of patent infringement by challenging the validity of the ’685 patent here and in district court, we deny Patent Owner’s request for discretionary denial due to the petition filed in IPR2024-00923. *See Videndum*, Paper 12 at 5–6; 35 U.S.C. §§ 282(b)(2), 311, 315.

B. Level of Ordinary Skill in the Art

Petitioner identifies a person of ordinary skill in the art (“POSITA”) at the time of the invention as someone that would have had “a bachelor’s degree in electrical engineering, physics, or a related field, with at least two years of industry experience and/or research, both concerning digital camera system design and image processing.” Pet. 4 (citing Ex. 1003 ¶ 54). Patent

Owner disputes this, arguing a district court construing similar terms in related patents found a POSITA would have had “an electrical engineering degree and three years of relevant experience” and that this definition “should be adopted for purposes of determining institution.” Prelim. Resp. 6 (quoting Ex. 2001, 6).

“[T]he level of skill in the art is a prism or lens through which a judge, jury, or the Board views the prior art and the claimed invention.” *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The Board may consider such factors as the types of problems encountered in the art, prior art solutions to those problems, the rapidity with which innovations are made, the sophistication of the technology, and the educational level of workers in the field when determining the level of skill in the art. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995).

As noted above, the ’685 patent describes a system for digital optical image collection, processing, and organization, which applies to “any imaging system that includes interactions between optics, digital image sensors, post-capture integrated circuits and digital storage components.” Ex. 1001, 1:18–31. Artisans and inventors in such fields are not limited to electrical engineers. They include physicists and others with sufficient knowledge of the physics of optical, electronic, and opto-electronic devices. Indeed, many of the pioneering inventions needed to understand the operation of a digital camera were made by physicists, including the inventions of the transistor,⁴ the integrated circuit (IC),⁵ the digital

⁴ Julius Edgar Lilienfeld (field-effect transistor) John Bardeen, Walter Brattain, William Shockley (point-contact transistor), William Shockley (bipolar transistor).

⁵ Robert Noyce (monolithic integrated circuit)

computer,⁶ and the charge-coupled device (CCD).⁷ For at least these reasons, we find Petitioner’s assessment of the level of skill in the art to be reasonable and commensurate with the problems and solutions disclosed in the prior art. *GPAC Inc.*, 57 F.3d at 1579.

Accordingly, at this stage of the proceeding, we adopt as our own Petitioner’s description of a person skilled in the art.

C. Claim Construction

In *inter partes* reviews, we interpret a claim “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). Under this standard, a claim is construed “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.* However, only claim terms which are in controversy need to be construed and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

Petitioner and Patent Owner agree that all terms are to be construed to have their plain and ordinary meanings and no terms require express construction at this stage of the proceeding to resolve their dispute. *See* Pet. 4; Prelim. Resp. 6–7. For the reasons discussed below, we preliminarily construe the term “database” to have its plain and ordinary meaning, which does not exclude fixed or non-updatable databases.

⁶ John Atanasoff and Clifford Berry (electronic digital computer)

⁷ George Smith and Willard Boyle (charge-coupled device)

1. Database

As discussed below, Petitioner’s obviousness contentions rely upon combining two embodiments of Iwasawa, one storing pre-computed correction data in read-only memory (ROM) and the other storing CPU computed correction data in random access memory (RAM). Pet. 5–12. Patent Owner argues, in part, that a person skilled in the art would not have combined these embodiments because Iwasawa’s ROMs are not updateable and the ’685 patent touts the advantages of updateable databases. Prelim. Resp. 15–16. Patent Owner further argues the claims require an updateable database because it had argued in the Sony IPR that “the claimed ‘database’ in the ’685 Patent is updateable which amounts to prosecution history disclaimer.” *Id.* at 16 n.7 (citing *CUPP Computing AS v. Trend Micro Inc.*, 53 F.4th 1376, 1383 (Fed. Cir. 2022)).

We disagree at this stage of the proceeding that the term “database” means an updateable database. First, as we explained in the Sony IPR, the claims recite a “database” not an “updateable database” and it is improper to read embodiments from the Specification into the claims. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir.). Second, the “updateable database” argument Patent Owner advanced in the Sony IPR does not rise to the level of a prosecution history disclaimer because in the Sony IPR we neither (a) adopted that construction in our institution decision, (b) issued a final written decision adopting that construction, or (c) determined that the ’339 patent’s claims are patentable *because* they require an updateable database. *See Aylus Networks, Inc. v. Apple Inc.*, 856 F.3d 1353, 1360 (Fed. Cir. 2017) (extending the prosecution history disclaimer doctrine to statements made in *concluded* IPR proceedings to “ensure that claims are not argued one way in order to maintain their patentability and in a different way

against accused infringers”); *see also Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985) (finding the prosecution history “limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution *in order to obtain claim allowance*”) (emphasis added); *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576 (Fed. Cir. 1995) (“Claims may not be construed one way *in order to obtain their allowance* and in a different way against accused infringers.”) (emphasis added).

Accordingly, we preliminarily construe the term “database” to have its plain and ordinary meaning, which does not require updatable databases and does not exclude fixed or non-updateable databases.

D. Obviousness over Iwasawa

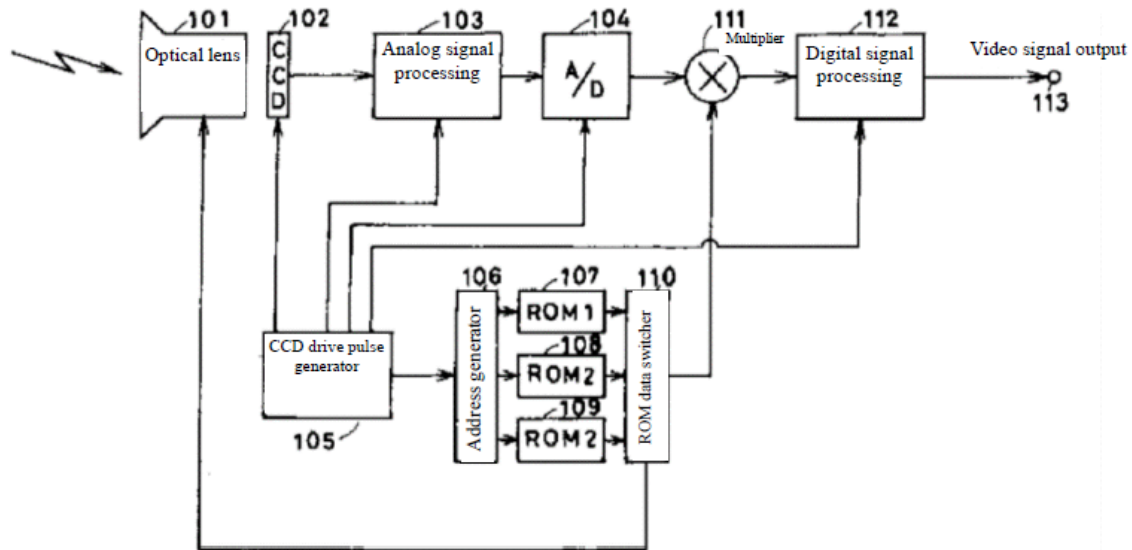
Petitioner contends claims 1, 3, 6, 11–14, 17, and 19 would have been obvious over Iwasawa. Pet. 5–45. Patent Owner disputes this. Prelim. Resp. 7–22. At this stage of the proceeding, we find Petitioner demonstrates a reasonable likelihood of showing at least one of the challenged claims is obvious over Iwasawa for the reasons discussed below.

1. Iwasawa

Iwasawa discloses “an image input device . . . such as an electronic still camera or a video camera” and “a shading correction method . . . for correcting the shading characteristics of the lens.” Ex. 1005 ¶ 1. The shading (vignetting) correction fixes “the shading characteristic wherein the signal level decreases as the distance increases from the center with respect to the imaging signal level near the center of the optical lens.” *Id.* ¶ 17; *see, e.g.*, Ex. 1001, 32:5–6 (“In vignetting, the lens . . . makes the edges of the image significantly darker as the light falls off.”). Iwasawa discloses two embodiments for performing shading correction, one (Figure 1) that looks-

up the correction coefficients from read-only memory (ROM) and another (Figure 2) that uses a CPU (central processing unit) to calculate the correction coefficients. Ex. 1005 ¶¶ 15, 16, 19, Figs. 1, 2.

Figure 1 of Iwasawa is reproduced below.

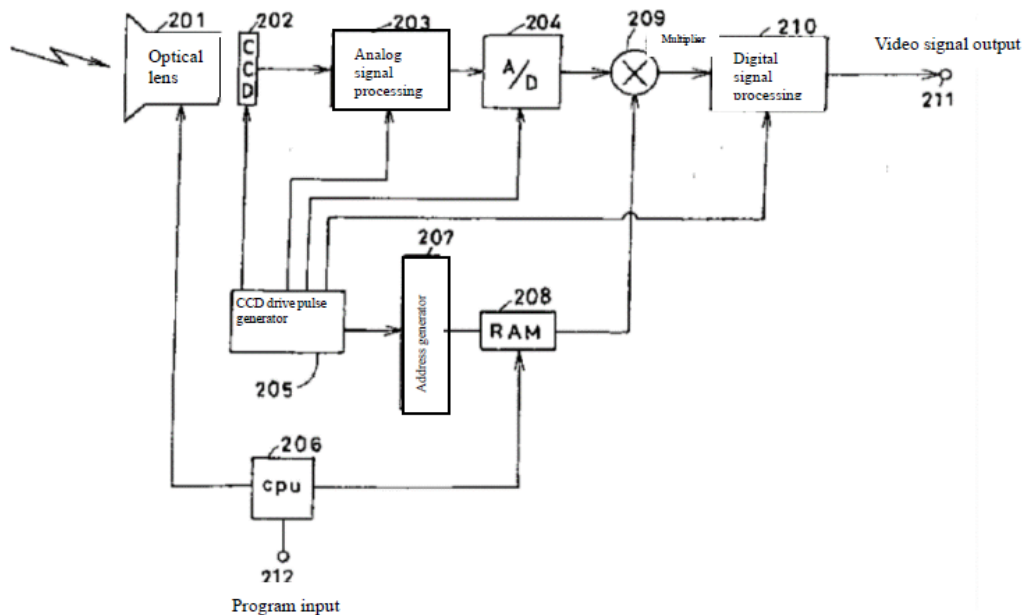


The Figure above is “a block diagram illustrating an image input device of the first embodiment of [Iwasawa’s] invention.” *Id.* ¶ 30. The Figure illustrates a still or video camera having lens 101, charge-coupled device (CCD) 102, analog-to-digital converter (A/D) 104, multiplier 111, digital signal processor (DSP) 112, CCD drive pulse generator 105, address generator 106, ROMs 107–109, and ROM data switcher 110.

CCD drive pulse generator 105 generates a drive signal to read out an imaging signal from CCD 102 and to generate a corresponding address from address generator 106. *Id.* ¶¶ 15, 16. The CCD image signal is converted to a digital signal by A/D converter 104. *Id.* ¶ 15. The address generated by address generator 106 selects shading correction data “from a ROM 107, a ROM 108, and a ROM 109.” *Id.* ¶ 16. Lens 101 outputs “one or more control signals of an aperture value, a zoom position, and a lens type,” and

ROM data switcher 110 “select[s] the optimal shading correction data using the control signal from the optical lens 101” and sends it to multiplier 111. *Id.* ¶¶ 15, 16. Multiplier 111 multiplies the digital image signal from A/D converter 104 by the selected shading correction data, and outputs a shading-corrected signal to DSP 112, which outputs video signal 113. *Id.*

Figure 2 of Iwasawa is reproduced below.

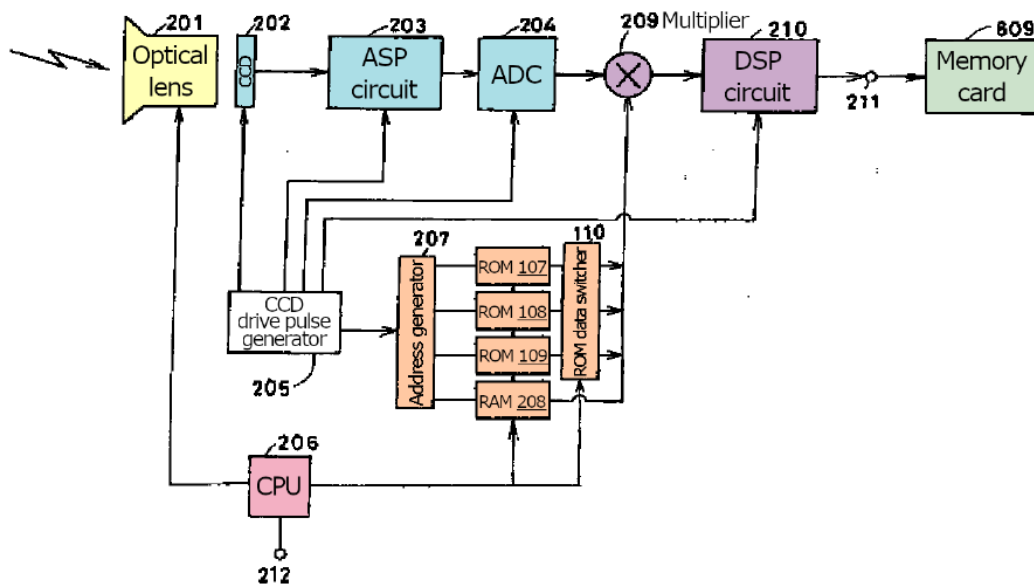


The Figure above is “a block diagram illustrating an image input device of the second embodiment” of Iwasawa’s invention. *Id.* ¶ 30. The Figure illustrates a still or video camera that “differs from the first embodiment described above in that, instead of the ROMs 107 to 109 and the ROM data switcher 110, the device is provided with a RAM 208 . . . and a CPU 206.” *Id.* ¶ 19. CPU 206 “has a program for calculating shading correction data in response to a control signal from the optical lens 201.” *Id.* The program can be “input . . . from the outside” and “updated when a different type of optical lens is adopted,” thereby allowing CPU 206 to “freely switch the program for calculating shading correction data.” *Id.* ¶¶ 19, 21. Once calculated,

CPU 206 can “store[] the shading correction data corresponding to one or more conditions of the aperture value, the zoom position, and the lens type of the optical lens in the RAM 208.” *Id.* ¶ 20. As in the first embodiment, the image signal from CCD 202 is converted to a digital signal in A/D converter 204 and multiplied by shading correction data stored in RAM 208 by multiplier 209. *Id.* ¶¶ 21, 22. The corrected image signal is then further processed by DSP 210 into video signal 211. *Id.*, Fig. 2.

2. Combining Iwasawa’s Embodiments

Petitioner contends a person skilled in the art would have found it obvious to combine Iwasawa’s first and second embodiments. Pet. 5–12. In particular, Petitioner contends such a person would have found it obvious to modify Iwasawa’s Figure 2 embodiment to include Figure 1’s ROMs 107–109 and ROM data switcher 110 as well as Figure 6’s memory card 609. *Id.* at 5–6. Petitioner’s proposed modification is illustrated in the Figure below.



The Figure above is a block diagram illustrating Petitioner’s proposed combination of elements from Iwasawa’s Figures 1, 2, and 6.

Petitioner argues a person skilled in the art would have combined elements from Figures 1 and 2 to allow “storing correction data for a manufacturer’s existing lens types (*e.g.*, in the ROMs or RAM) while also allowing for additional lens types to be added and supported by the system (*e.g.*, through uploading new correction programs).” *Id.* at 8 (citing Ex. 1003 ¶¶ 76–77). Petitioner further argues such a person would have found this advantageous because “prestored correction data allowed for fast access to corrections for known lenses” and CPU calculated correction data allowed for “flexible handling . . . when a different type of optical lens is adopted.” *Id.* at 8–9 (quoting Ex. 1005 ¶ 21; citing Ex. 1003 ¶¶ 78–79). Lastly, Petitioner argues a skilled artisan would have made the combination because it was “of prior art elements (combining ROMs 107–109 with Figure 2’s [camera]) according to known methods . . . to yield predictable results (pre-stored correction data).” *Id.* at 9 (citing Ex. 1003 ¶ 81).

Petitioner further argues a person skilled in the art would have added Figure 6’s memory card 609 to the combination. Pet. 10 (citing Ex. 1003 ¶¶ 85–93). Petitioner argues a skilled artisan would have known that the DSP-generated video would have needed to be stored and conventional digital video cameras stored video in memory. *Id.* at 10–11 (citing Ex. 1005 ¶ 2). Petitioner further argues a person skilled in the art would have found it obvious to add memory card 609 to Iwasawa’s Figure 2 embodiment because doing so combined “prior art elements . . . according to known methods . . . to yield predictable results.” *Id.* at 12 (citing Ex. 1003 ¶ 90).

Patent Owner disputes these contentions for several reasons. Prelim. Resp. 14–22. First, Patent Owner argues a POSITA would not have added ROMs 107–109 to Iwasawa’s Figure 2 embodiment because that embodiment already has RAM and adding ROM would have “been an

inefficient use of limited real-estate in the camera,” “limited power/battery life,” and “result[ed] in larger circuit size, more circuits, and higher costs.” *Id.* at 14–15. Next, Patent Owner argues a POSITA would not have added ROM because it is “not updateable.” *Id.* at 16. Patent Owner further argues a POSITA would not have stored correction data for known lenses in RAM because RAM is volatile and the data would have to be recalculated every time the camera was turned on. *Id.* at 17–18. Patent Owner also argues a POSITA would not have added ROM data switcher 110 to Iwasawa’s Figure 2 embodiment because CPU 206 already knows how to retrieve correction data from RAM 208. *Id.* at 18–19. Finally, Patent Owner argues there would have been no need to modify Iwasawa’s Figure 2 embodiment to store correction data for new and existing lenses because CPU 206 can already calculate correction data for them by accessing needed external correction programs. *Id.* at 20–21 (citing Ex. 1005 ¶ 19).

At this stage of the proceeding, upon consideration of the evidence and argument presented, we preliminarily find Petitioner has articulated sufficient reasoning with a rational underpinning to modify Iwasawa’s Figure 2 embodiment with elements from Figures 1 and 6. Iwasawa discloses correction data can either be precalculated and stored in ROM or calculated and stored in RAM. Storing pre-calculated correction data for known lenses in ROM would be faster than calculating such data at execution time and storing it in RAM, but calculating the correction data at execution time and storing it in RAM would be useful for performing new corrections for new lenses or updating the corrections for known lenses. Moreover, the combination is one of familiar elements according to known methods to achieve predictable results. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

Patent Owner's various arguments against the combination do not dissuade us from this finding at this stage of the proceeding. As discussed above, we do not find the claims require an updateable database and, therefore, do not agree with Patent Owner's argument against the combination because Iwasawa's ROM is not "updateable." We also disagree with Patent Owner's economic arguments against the combination (larger circuit size, higher costs, etc.) because, even if true,

the fact that the two disclosed [embodiments] would not be combined by businessmen for economic reasons is not the same as saying that it could not be done because skilled persons in the art felt that there was some technological incompatibility that prevented their combination. Only the latter fact is telling on the issue of nonobviousness.

Orthopedic Equip. Co. v. United States, 702 F.2d 1005, 1013 (Fed. Cir. 1983). We are also not dissuaded by Patent Owner's argument that a POSITA would not have stored correction data for known lenses in RAM because Petitioner contends such data would be stored in ROM. *Compare* Pet. 8 *with* Prelim. Resp. 17–18. Storing precalculated correction data in ROM would be faster than calculating it in CPU 206 and storing it in RAM. Finally, we are not dissuaded by Patent Owner's argument that a POSITA would not have incorporated ROM data switcher 110 into the proposed combination because Petitioner contends the combination need not include ROM data switcher 110. *Compare* Pet. 7 *with* Prelim. Resp. 18–19.

3. *Claim 1*

a) *digital imaging system/video camera*

Claim 1 recites a digital imaging system for correcting optical image aberrations in a digital video, comprising a digital video camera including in-camera software. Ex. 1001, 38:36–38.

Petitioner contends the digital camera in Iwasawa's modified Figure 2 embodiment⁸ is a digital video camera having software for correcting vignetting, an optical image aberration. Pet. 13–17 (citing Ex. 1005 ¶¶ 1, 4, 7, 16, 19–21, 24. Figs. 1, 2). Patent Owner does not dispute this contention, with which we preliminarily agree. Prelim. Resp. 7–22.

b) optical lens mechanism

Claim 1 further requires the digital imaging system to include an optical lens mechanism, wherein the optical lens mechanism is a zoom lens or a fixed focal length lens. Ex. 1001, 38:36–39, 38:45–46. Petitioner contends a person skilled in the art would have recognized that Iwasawa's lens 201, which is “capable of outputting one or more control signals of an aperture value, a zoom position, and a lens type,” is an optical lens mechanism. Pet. 17–18 (quoting/citing Ex. 1005 ¶¶ 15, 21, Figs. 1, 2; citing Ex. 1003 ¶ 111). Petitioner further contends a POSITA would have known lens 201 is a zoom lens because Iwasawa teaches performing shading correction as a function of “the aperture value, the zoom position, and the lens type,” and “an optical lens capable of changing a zoom position is a zoom lens.” *Id.* at 24 (quoting Ex. 1005 ¶¶ 8, 12; Ex. 1003 ¶ 129). Patent Owner does not dispute these contentions, with which we preliminarily agree. Prelim. Resp. 7–22.

c) digital sensor

Claim 1 further requires the digital imaging system to include at least one digital sensor for capturing the digital video. Ex. 1001, 38:36–40. Petitioner contends Iwasawa's CCD 202 is a digital sensor for capturing

⁸ For ease of description, we hereafter refer to Iwasawa's modified Figure 2 embodiment as “Iwasawa.”

digital video and that a skilled artisan would understand that collectively CCD 202, ASP 203, and A/D converter 204 output a digital signal to capture digital video. Pet. 18–19 (quoting/citing Ex. 1005 ¶¶ 15, 21, Figs. 1, 2; citing Ex. 1003 ¶ 113). Patent Owner does not dispute these contentions, with which we preliminarily agree. Prelim. Resp. 7–22.

d) integrated circuit

Claim 1 further requires the digital imaging system to include an integrated circuit including a digital signal processor configured to access a database management system including a plurality of optical image aberration corrections. Ex. 1001, 38:36–43.

Petitioner identifies Iwasawa’s multiplier 209 and DSP 210 as the digital signal processor required by claim 1 because they “collectively correct digital input data and output an encoded output video signal.” Pet. 19–20 (citing Ex. 1005 ¶¶ 15, 21; Ex. 1003 ¶ 115). Petitioner contends it would have been “an obvious design choice to implement Iwasawa’s multiplier 209, DSP 210, and CPU 206 on an integrated circuit” because doing so “was routine and straightforward in this time period.” *Id.* at 20 (citing Ex. 1003 ¶ 117). Petitioner identifies ROMs 107–109 and/or RAM 208 as devices that store an organized collection of data, i.e., as databases. *Id.* at 20–21 (citing Ex. 1003 ¶ 120). Petitioner identifies CPU 206, “alone or in conjunction with ROM data switcher 110,” as a “database management system for accessing the database of RAM 208 and/or ROMs 107–109.” *Id.* at 21 (citing Ex. 1003 ¶ 121). Patent Owner does not dispute these contentions. Prelim. Resp. 7–22.

At this stage of the proceeding, we find Petitioner’s contentions are sufficient to demonstrate a reasonable likelihood of success in showing Iwasawa teaches an IC *configured to access a DBMS*. We note, as we did in

the Sony IPR, that the Specification contains neither the phrase “database management system” nor its acronym DBMS. The DBMS acronym does appear in Figure 1 (element 190) and Figure 35 (steps 3510 and 3520).

Ex. 1001, Figs. 1, 35. However, only element 190 is part of a digital video camera, as step 3510 refers to an “External Computer DBMS” and step 3520 refers to a “DBMS in [a] Distributed Network.” *Id.* Moreover, the Specification refers to each of these elements as a “database” rather than a DBMS. *Id.* at 31:39–40 (referring to “database (190)”), 38:15–18 (referring to “an external computer database (3510)” and “the database of a distributed network (3520)”). Thus, we preliminarily construe claim 1 to require an IC configured to access a database rather than an IC configured to access an actual database management system. This construction provides an antecedent basis to “the database” recited in a later limitation, which requires the IC to use software to identify and correct an optical image aberration “using at least one of the plurality of optical image aberration corrections in the database.” *Id.* at 38:47–52. The parties may further address this construction during the trial.

e) memory-storage sub-system

Claim 1 further requires the digital video camera to include a memory storage sub-system. Ex. 1001, 38:38–44. Petitioner contends Iwasawa, modified to include memory card 609 for the reasons explained in § II.D.2, *supra*, teaches this limitation. Pet. 22–23 (citing Ex. 1005, Figs. 1, 2, 6; Ex. 1003 ¶¶ 124–125).⁹ Patent Owner does not dispute these contentions, with which we preliminarily agree. *See* Prelim. Resp. 7–22.

⁹ Petitioner literally cites paragraphs 105–125 of Dr. Stevenson’s declaration, but only paragraphs 124 and 125 discuss the memory storage system limitation. We correct that typographical error here.

f) identify and correct optical image aberration

Claim 1 further requires the IC to use “in-camera software to identify at least one optical image aberration and to correct the at least one optical image aberration in at least one frame of the digital video using at least one of the plurality of optical image aberration corrections in the database.” Ex. 1001, 38:47–52.

Petitioner contends Iwasawa teaches this limitation because “CPU 206 receives a control signal from optical lens 201 indicating aperture, zoom, and [lens] type and identifies the appropriate correction data” stored in RAM 208 and/or ROMs 107–109 (a database). Pet. 24–25 (citing Ex. 1005 ¶ 19). Petitioner further contends multiplier 209 receives and uses the correction data to correct for vignetting in each frame of the digital image signal. *Id.* at 24–25 (citing Ex. 1005 ¶¶ 16, 19, 21; Ex. 1003 ¶¶ 136, 138). Patent Owner does not dispute these contentions, with which we preliminarily agree. *See* Prelim. Resp. 7–22.

g) video capture and forwarding

Claim 1 further requires the digital video to be “captured by the at least one digital sensor and [to be] forwarded to the digital signal processor.” Ex. 1001, 38:53–54. Petitioner contends Iwasawa teaches this limitation because the imaging signal captured by CCD 202 and converted to a digital signal by A/D converter 204 is forwarded to multiplier 209 and DSP 210. Pet. 26 (citing Ex. 1005 ¶ 21). Patent Owner does not dispute these contentions, with which we preliminarily agree. *See* Prelim. Resp. 7–22.

h) digital filtration

Claim 1 further requires the digital “video image file with the at least one optical image aberration [to be] corrected by applying a digital filtration using the digital signal processor.” Ex. 1001, 38:55–57.

Petitioner contends Iwasawa teaches this limitation because multiplier 209 “applies shading correction to the digital image signal generated by CCD 202 and A/D converter 204 to correct [vignetting] aberrations” and the ’685 patent identifies correcting vignetting aberrations as a form of “digital filtration.” Pet. 27 (citing Ex. 1005 ¶ 20; Ex. 1001, 9:55–10:37). Patent Owner does not dispute these contentions, with which we preliminarily agree. *See* Prelim. Resp. 7–22.

i) video storage

Lastly, claim 1 requires the “corrected video consisting of the digital data optimized from the at least one optical image aberration that are corrected from the original video image [to be] stored in the memory storage sub-system.” Ex. 1001, 38:58–61. Petitioner contends Iwasawa teaches this limitation because memory card 609 “provides for storage of the corrected image signal in the memory storage sub-system, *e.g.*, storage of output video signal 211.” Pet. 29–30 (citing Ex. 1005 ¶ 16, Figs. 1, 2; Ex. 1003 ¶¶ 150–153). Patent Owner does not dispute this contention, with which we preliminarily agree. Prelim. Resp. 7–22.

j) Conclusion regarding claim 1

For the reasons discussed above, we find at this stage of the proceeding that Petitioner demonstrates a reasonable likelihood of showing the modification of Iwasawa’s Figure 2 embodiment teaches or suggests all of the limitations recited in claim 1 and that Petitioner articulates sufficient reasoning with rational underpinning to modify that embodiment as discussed in § II.D.2, *supra*. According, we find Petitioner demonstrates a reasonable likelihood of showing claim 1 is unpatentable as obvious over Iwasawa.

E. Remaining Challenges

Because we find Petitioner has demonstrated a reasonable likelihood of showing at least one challenged claim is unpatentable as obvious over Iwasawa, we need not review all of Petitioner’s challenges. *See* 35 U.S.C. § 314(a) (“The Director may not authorize an inter partes review to be instituted unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”).

III. CONCLUSION

We have reviewed the Petition and Patent Owner’s Preliminary Response, and have considered all of the evidence and arguments presented by Petitioner and Patent Owner. We find, at this stage of the proceeding, Petitioner has demonstrated a reasonable likelihood of showing at least one claim of the ’685 patent is unpatentable. Accordingly, we institute *inter partes* review of all claims on all grounds raised in the Petition.

The Board has not yet made a final determination with respect to any claim construction issue, priority issue, or the patentability of any challenged claim.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314, an *inter partes* review is instituted on all challenged claims on all grounds; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial commencing on the entry date of this Decision.

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