

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CANON INC.

Petitioner

v.

OPTIMUM IMAGING TECHNOLOGY, LLC

Patent Owner

IPR2020-01321

Patent No. 7,612,805

Issue Date: Nov. 3, 2009

Title: Digital Imaging System and Methods for Selective Image Filtration

**PETITION FOR *INTER PARTES* REVIEW UNDER 35 U.S.C. §§ 311–319
AND 37 C.F.R. §§ 42.100 *et seq.***

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EXHIBIT LIST

Exhibit	Title
1001	U.S. Patent No. 7,612,805
1002	Declaration of Leonard Laub
1003	Complaint, <i>Optimum Imaging Technologies, LLC v. Canon Inc.</i> , No. 2:19-cv-246-JRG (E.D. Tex. July 8, 2019), D.I. 1
1004	Claim Construction Memorandum Opinion and Order, No. 2:19-cv-00246-JRG (E.D. Tex. June 11, 2020), D.I. No. 88.
1005	Plaintiff’s Patent Local Rule 3-1 and 3-2 Disclosures, No. 2:19-cv-00246-JRG (E.D. Tex. Oct. 1, 2019)
1006	U.S. Pat. App. No. 2002/0135688 (“Niikawa”)
1007	U.S. Pat. App. No. 2005/0280877 (“Watanabe”)
1008	JOHN C. RUSS, THE IMAGE PROCESSING HANDBOOK (CRC Press, 4th ed. 2002) (“Russ”)
1009	<Reserved>
1010	U.S. Pat. App. No. 2005/0089241 (“Kawanishi”)
1011	A certified translation of JP2004-328506 (“Kita”)
1012	U.S. Patent No. 7,245,319 (“Enomoto”)
1013	A certified translation of JPH11-313250 (“Yamagata”)
1014	U.S. Pat. No. 5,905,530 (“Yokota”)
1015	A certified translation of JP2002-190979 (“Kuniba”)
1016	<Reserved>
1017	U.S. Pat. App. No. 2004/0150732 (“Yamanaka II”)

Exhibit	Title
1018	GUAN et al., <i>Digital Image Correcting Method for Digital Camera</i> (December 2005) (“Ricoh”)
1019	Declaration of Kiyoto Nagai, (July 15, 2020)
1020	<i>Ricoh Technical Report No. 31</i> , RICOH (Apr. 20, 2006), https://web.archive.org/web/20060420051054/http://www.ricoh.co.jp/about/business_overview/report/31/
1021	U.S. Pat. No. 7,738,015 (“Steinberg I”)
1022	U.S. Pat. No. 7,590,305 (“Steinberg II”)
1023	A certified translation of JP2000-184247 (“Imai”)
1024	GONZALEZ & WOODS, <i>DIGITAL IMAGE PROCESSING</i> , (Prentice Hall, 2d ed. 2002) (“Gonzalez”)
1025	U.S. Pat. No. 5,414,782 (“Carasso”)
1026	U.S. Pat. No. 4,903,204 (“Dobbins”)
1027	A certified translation of JP2006-72660 (“Yamazaki”)
1028	U.S. Pat. No. 7,609,297 (“Master”)
1029	U.S. Pat. App. No. 2007/0080280 (“Havens”)
1030	The U.S. National Stage Version of WO2005/093653 (US2007/0171288) (“Inoue”)
1031	U.S. Pat. No. 7,936,392 (“Ng”)
1032	U.S. Pat. App. No. 2003/0095197 (“Wheeler”)
1033	A Japanese Patent Office Machine Translation of JP,05-323444A (“Masabumi”)

Exhibit	Title
1034	A Japanese Patent Office Machine Translation of JP,2000-224611A (“Takeuchi”)
1035	<Reserved>
1036	The image processing handbook, Library of Congress Catalog, <i>available at</i> https://lccn.loc.gov/2002073595
1037	USPTO File History for the ‘805 Patent
1038	<Reserved>
1039	<Reserved>
1040	Canon Powershot SD300 Powershot SD200 Camera User Guide (Canon Inc. 2004)
1041	Kodak EasyShare V570 dual lens digital camera User’s Guide (Eastman Kodak Co. 2005)
1042	The Nikon Guide to Digital Photography with the CoolPix 7900 5900 Digital Camera (Nikon Corp. 2005)
1043	Digital Camera E-1 Reference Manual (Olympus Corp. 2003)
1044	Taylor & Francis Grp. Customer Serv., Publication Confirmation

I. MANDATORY NOTICES

A. REAL PARTY-IN-INTEREST UNDER 37 C.F.R. § 42.8(B)(1)

Pursuant to 37 C.F.R. § 42.8(b)(1), Petitioner certifies that Canon Inc. is the real party-in-interest.

B. RELATED MATTERS UNDER 37 C.F.R. § 42.8(B)(2)

Pursuant to 37 C.F.R. § 42.8(b)(2), U.S. Patent No. 7,612,805 is currently involved in the following proceeding: *Optimum Imaging Technologies, LLC v. Canon Inc.*, No. 2:19-cv-246-JRG (E.D. Tex. July 8, 2019).

C. LEAD AND BACKUP COUNSEL AND SERVICE INFORMATION UNDER 37 C.F.R. §§ 42.8(B)(3)-(4)

Petitioner hereby designates lead and backup counsel as follows:

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Service information for lead and backup counsel is provided in the designation of lead and backup counsel, above. Petitioner consents to electronic service by email at the email addresses provided above.

D. PAYMENT OF FEES UNDER 37 C.F.R. §§ 42.15(A) & 42.103

The required fees are submitted herewith in accordance with 37 C.F.R. §§ 42.103(a) and 37 C.F.R. §§ 42.15(a). If additional fees are due during the proceeding, the Office is authorized to charge such fees to Deposit Account No. 22-0261. Any overpayment or refund of fees may also be deposited in this Deposit Account.

II. INTRODUCTION

Canon Inc. (“Petitioner”) requests *inter partes* review (“IPR”) pursuant to 35 U.S.C. §§ 311-319 and 37 C.F.R. §§ 42.100 *et seq.* of claims 1–3, 9, 18–20 and 24 (the “Challenged Claims”) of U.S. Patent No. 7,612,805 (Ex. 1001), which issued on November 3, 2009, to Neal Solomon. On June 25, 2019, the patent was assigned to Optimum Imaging Technologies (“Patent Owner”).

The ’805 patent relates to systems for correcting optical lens aberrations in a digital imaging system. The system corrects for aberrations by using correction data stored in a database. The claims primarily describe the system in functional

terms, describing processes and elements that are well-known by a person of ordinary skill in the art (“POSA”).

The correction of optical aberrations in lens systems through the use of stored algorithms represents a simple implementation of common filtration techniques on common hardware to achieve an expected result. Indeed, using digital filtration methods to correct for lens aberrations was well known at the time. As established below, each claim elements can be readily found in the art.

Petitioner has demonstrated that each of the challenged claims is unpatentable over the asserted grounds. Petitioner respectfully requests the Board institute trial.

III. GROUNDS FOR STANDING

The ’805 patent is available for IPR and Petitioner is not barred or estopped from requesting IPR of the ’805 patent. This Petition is being filed within one year of the Petitioner being served with a complaint alleging infringement of the ’805 patent (Ex. 1001).

IV. DISCRETIONARY DENIAL IS NOT APPROPRIATE

The Board has discretion to deny institution where a counterpart litigation will be resolved prior to resolution of the IPR and “the petitioner has raised the same invalidity challenges.” *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 2 (PTAB Mar. 20, 2020) (precedential); *NHK Spring Co. Ltd. v. Intrix-Plex*

Technologies, Inc., IPR2018-00752, Paper 8, (PTAB Sep. 12, 2018) (precedential) (noting inefficiencies where the petitioner “relies on the same prior art ... and arguments in its district court invalidity contentions”). Such discretionary denial is not be appropriate here.

First, while jury selection in the district court trial currently is scheduled for November 2020, that trial will not resolve the issues before the Board here inasmuch as neither the same nor similar invalidity challenges are at issue. The primary references applied in this Petition, along with the secondary references Russ and Kawanishi, are not at issue in the litigation. In fact, the primary references were only uncovered by Petitioner in the last 2 months (which is why the Petition was not filed earlier). Therefore, the primary driver behind *Fintiv* and *NHK Spring*—avoiding the inefficiency of considering issues that will be resolved by the parallel proceeding—is not a concern here. *Fintiv*, IPR2020-00019, Paper 11 at 6-9 (tying the option of a stay to the question of timing of a decision on “the same or substantially similar issues to those presented in the petition”), 12-13 (addressing the overlap of issues). For this reason alone, discretionary denial is not warranted.

Second, other *Fintiv* factors weigh against denial. In particular, there has been no investment in the parallel proceeding with respect to the prior art issues

involved here. *Fintiv*, IPR2020-00019, Paper 11 at 9-12. Also, the merits weigh in favor of institution given the strength of the grounds presented and developed below. *Fintiv*, IPR2020-00019, Paper 11 at 14-16.

Third, policy considerations support institution. In this case, even if Petitioner had filed its petition on *the very day* it was sued (in July 2019), it would have been unable to complete an IPR prior to the currently scheduled start of trial (in November 2020). Using such a circumstance as a bar to institution undermines the Congressional intent of the IPR proceeding and would bar the use of IPRs for defendants sued in jurisdictions that set early trial dates.

V. OVERVIEW

A. STATE OF THE ART

Optimizing images has been a longtime pursuit in photography across various lens types. Ex. 1001 at 1:36–48. As photography advanced, automated mechanisms were invented to correct issues such as blurring. These automated processing means advanced further as microprocessors and sensors improved. Ex. 1001 at 2:27–30. The '805 patent acknowledges that prior to the filing date it was known to “use [] software that automatically corrects” image issues, particularly for issues caused by imperfect imaging systems. Ex. 1001 at 2:56–61; 6:32-42 (discussing post-production software programs that can emulate filters).

The '805 patent simply claims systems and methods that store information for correcting optical aberrations in a database, in some cases along with implementing known special effects (such as image softening). These features were well-known in the field.

B. CORRECTION OF ABERRATIONS

i. Known types of aberrations and manners of correction

Aberration correction has been around as long as photography itself. The specification of the '805 patent identifies the various aberrations such as barrel, pin cushion and so on. Ex. 1001 at 3:39-44. These aberrations arise from the physical design of the lens and their solutions have long been known. Ex. 1012 at 2:10-14; Ex. 1013 at [0003] (Seidel aberrations); Ex. 1014 at 1:32-38 (barrel and pincushion); Ex. 1015 at [0044] (vignetting); Ex. 1017 at [0012] (chromatic) Ex. 1002 at ¶¶ 35-59. In digital systems, lens imperfections have been corrected using digital filters—essentially algorithms that adjust image data to remedy the aberration arising from the physical lens. Ex. 1017 at [0066] (“[F]ilter computation is performed by using a filter[,] . . . by convolution computation or the like in order to simultaneously perform the color interpolating process and the chromatic aberration correcting process.”), [0058] (“[D]etermines an image filter . . . applied when the color interpolating process and chromatic aberration correcting process

are performed in the image processing unit.”); Ex. 1012 at 4:51-5:13; Ex. 1002 at ¶¶ 34-59. Thusly, an imperfect physical lens can be corrected by digital means.

A study conducted by Ricoh confirmed methods “wherein image processing is used to correct image distortion, peripheral shading, and the like” through software processing in a digital camera. Ex. 1018 at p. 103; Ex. 1019; Ex. 1020. Those methods, like others discussed herein, rely upon “shooting conditions that are required to make such corrections.” Ex. 1018 at p. 105. The corrections are determined based on the details of the specific lens being used and the conditions under which the image is to be captured (such as focal length), which information is stored in a memory. Ex. 1018 at p. 105-10 (identifying and correcting peripheral shading, i.e., vignetting and chromatic aberration). The references relied upon herein use similar methods of correction.

With respect to lens specifics, “[l]enses are broadly classified into two types, [] single-focus lenses and zoom lenses.” Ex. 1030 at [0071]. The difference between the two types is that zoom lenses change focal lengths and fixed focal length lenses do not. Ex. 1030 at [0071]. In addition to corrections being different depending on the specific lens at issue, the correction (e.g., specific digital filter) may differ depending on the focal length. Ex. 1014 at 7:27-32; Ex. 1015 at [0007], [0024] (“[C]alculates a brightness distribution . . . based on lens aperture data” (including focal length data stored in a table); Ex. 1013 at [0014]-[0015] (detecting

a zoom position and obtaining correction data stored in memory to apply). Thus, zoom lens may have different correction values for each different zoom setting.

Ex. 1002 ¶¶ at 47-55.

ii. Selection of correction procedures for lens aberrations

The claims recite the storage of correction values (used in the algorithmic correction) for specific optical aberrations. Notably, a camera may be capable of receiving-interchangeable lenses. Each new lens may have its own aberration issues. Ex. 1002 at ¶¶ 48, 55-57. It has been known to store correction values for different lenses and for different capture setting for each different lens. For example, Watanabe discloses storing aberration correction data corresponding to the type of lens and the focal length settings. Ex. 1007 at [0049]; Ex. 1015 at [0032]; Ex. 1011 at [0060] (“[T]he MTF correcting filter . . . is selected and determined through referencing a table that is determined in advance using the zoom value, the defocusing value, and the iris value as keys.”); Ex. 1017 at [0164] (obtaining information “indicative of optical characteristics of an image capturing optical system as the image capturing apparatus . . . registered in a storing unit.”); Ex. 1022 at 4:50-5:4. Similarly, Niikawa stores correction tables for different parameters such as focal length. Ex. 1006 at [0084], [0130] [0168]; [0108], [0123].

The prior art taught various ways of storing aberration correction information, including in the lens itself, in the memory of the camera body, and in

storage devices connected to the camera. Ex. 1023 at (0005), Ex. 1006 at [0083]-[0085], Ex. 1007 at [0046]-[0047]. Regardless of the storage location, it was “necessary to . . . hold correction values corresponding to all interchangeable lenses in advance.” Ex. 1023 at (0008); Ex. 1007 at [0047]; Ex. 1006 at [0083]-[0085].

C. APPLICATION OF THE FAST FOURIER TRANSFORM

In addition to the correction of optical aberrations, claims of the ’805 patent recite the execution of a user-specified special effect. Such effects have long been used in digital image processing, and examples include image softening, sepia effects, color saturation adjustment, and the like. Ex. 1002 at ¶¶ 60-63; Ex. 1041 at p. 28 (teaching a sepia mode that can be selected and applied by a user). The ’805 patent claims that the mechanism for implementing the special effect is a fast Fourier transform.

As discussed above, digital systems may manipulate image data (whether for aberration correction or a special effect) through digitally implemented algorithms. A popular manner of making such changes used Fourier transforms (which have been known since 1822) with “fast” Fourier transforms gaining in popularity in the 1950s. Ex. 1024 at p. 148. Implementing a Fourier transform has long been a simple task. *Id.* at p. 158 (“Filtering in the frequency domain is straightforward.”);

213 (“Virtually all comprehensive signal and image processing software packages have generalized implementations of the FFT.”); Ex. 1002 at ¶¶ 64-72.

Fast Fourier transforms have been used to sharpen images in digital image processing. Ex. 1008 at p. 318-19; Ex. at 1025 Abstract, 9:4-16; Ex. 1026 at 5:37-42. Fast Fourier transforms are also used to soften images. Ex. 1008 at p. 301, 304-08; Ex. 1024 at p. 167-80. Softening may be an enhancement function in addition to a correction function. Ex. 1024 at 179 (describing low-pass filters for cosmetic processing of images of the human face); Ex. 1027 at [0034]-[0035], [0055] (enhancing blur).

Fast Fourier transforms also have been used to convert color data into its frequency domain to filter the color components individually to improve images or adjust color saturation. Ex. 1008 at p. 308-09. Ex. 1002 at ¶ 71.

D. THE MANNER OF PROCESSING

The claims also recite that the digital adjustments are carried out using a microprocessor, digital signal processor (“DSP”), software and application specific integrated circuit (“ASIC”). These conventional elements have long been used in digital image processing. Ex. 1028 at 1:67-2:4. (“Conventional digital image processing, however, utilizes conventional processing technology, such as digital signal processors (‘DSPs’), microprocessors, or application-specific integrated circuits (ASICs).”); Ex. 1013 at [0005]; Ex. 1029 at [0045]; Ex. 1021 at 4:8-14

(disclosing a microprocessor, DSP, and ASIC); Ex. 1031 at 23:59-24:2 (disclosing a microprocessor, ASIC, and DSP). It has also long been known that software is used to execute operations on processing hardware. Ex. 1021 at 4:8–14; Ex. 1032 at [0047] (“ordinarily be implemented as a software program”); Ex. 1002 at ¶¶ 73-78.

In addition to being ubiquitous, these components were also known to be interchangeable, as the ’805 patent admits. Ex. 1001 at 17:37-39. Indeed, Havens, cited by the Examiner in the prosecution history, confirmed that it was well known to adjust the division of processing labor between, e.g., microprocessors and ASICs. Ex. 1029 at [0047]; Ex. 1037 at OITCAN-00000185-89-08; Ex. 1028 at 14:21-39. Thus, whether the particular function was performed by, e.g., and ASIC or microprocessor was a design choice. Ex. 1002 at ¶¶ 73-78.

VI. THE ’805 PATENT

A. THE CHALLENGED CLAIMS

Claims 1–3, 9, 18–20 and 24 are challenged in this petition. Exemplary independent claim 1 reads:

1. A digital imaging system for image filtration comprising:
a digital camera mechanism, an optical lens mechanism, a digital sensor, a microprocessor, a digital signal processor, an application specific integrated circuit, system software, a database management system and a memory storage sub-system;

wherein the optical lens mechanism is a fixed focal length;

wherein the aberrations from the optical lens mechanism are corrected by applying digital filtration by using the application specific integrated circuit and the digital signal processor;

wherein the microprocessor is used to provide digital and optical data to the digital signal processor;

wherein the system software is organized to identify specific optical aberrations and to access the database to identify specific corrections to the aberrations;

wherein the system software forwards the data from the digital sensor to the digital processor;

wherein the digital signal processor selects a specific procedure to optimize the image and corrects the aberrations;

wherein the data are forwarded from the digital sensor to the digital signal processor by an application specific integrated circuit;

wherein the digital signal processor applies a fast Fourier transform to a data file in order to satisfy a user specified special effects function;

wherein the digital signal processor modifies the data file by applying the special effects function; and

wherein the modified data file consisting of the digital data optimized from the aberrations that are corrected from the original optical image is stored in memory.

Exemplary independent claim 9 reads:

9. A digital imaging system for image filtration comprising:

a digital camera mechanism, an optical lens mechanism, a digital sensor, a microprocessor, a digital signal processor, an application specific integrated circuit, system software, a database management system and a memory storage sub-system;

wherein the aberrations from the optical lens mechanism are corrected by applying digital filtration by using the application specific integrated circuit and the digital signal processor;

wherein the microprocessor is used to provide digital and optical data to the digital signal processor;

wherein the system software is organized to identify specific optical aberrations and to access the database to identify specific corrections to the aberrations;

wherein the system software forwards the data from the digital sensor to the digital processor;

wherein the digital signal processor selects a specific procedure to optimize the image and corrects the aberrations;

wherein the lens type is a zoom lens;

wherein the lens focal length alternates from specific fixed focal length lens settings in a succession of steps;

wherein optical aberrations are corrected with digital filtration to modify multiple images from different focal lengths in a succession of data files; and

wherein the modified data file consisting of the digital data optimized from the aberrations that are corrected from the original optical image is stored in memory.

B. PROSECUTION HISTORY

In the initial Office Action, the Examiner rejected some of the originally filed claims, but indicated that some dependent claims were allowable. Ex. 1037 at OITCAN-00000189-92. Rather than make any challenge to the merits of the rejections, the applicant simply cancelled the rejected claims and rewrote dependent claims indicated as allowable in independent form. Ex. 1037 at OITCAN-00000205-213.

For instance, original dependent claim 3, which generally recited the use of a fast Fourier transform to satisfy a user-specified special effects function, was rewritten into independent form and became claim 1 of the '805 patent. Ex. 1037 at OITCAN-00000205-213. Similarly, original dependent claim 7, which generally recited that a zoom lens alternated from specific fixed focal length settings in a succession of steps, and that aberrations were corrected to modify images from the different focal lengths, was rewritten into independent form and became claim 9 of the '805 patent. Ex. 1037 at OITCAN-00000205-213.

Thus, the Examiner did not apply specific prior art against the features of those dependent claims during prosecution. The sections that follow establish that existing prior art did teach those, and in fact all, features of the claims.

For at least those reasons, the prior art and arguments raised herein are not the same as those considered by the Examiner during prosecution.

C. CONSTRUCTION OF THE CHALLENGED CLAIMS

The PTO applies the *Philips* standard to construe claims. Under *Philips*, the “words of a claim are generally given their ordinary and customary meaning,” which is “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, *i.e.*, as of the effective filing date of the

patent application.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005).

While Petitioner believes many of the claims are indefinite, Petitioner acknowledges that indefiniteness cannot be raised in IPRs and relies on the Markman Order issued in the district court litigation. Ex. 1004. Provided below are claim terms of note as construed in the Markman Order.

i. “using the application specific integrated circuit and the digital signal processor”

The district court construed the term “using the application specific integrated circuit and the digital signal processor” to have its plain meaning. Ex. 1004 at pp. 37-39. In doing so the court stated that “the claims include only the requirement that each play a role, and the details of how responsibilities are assigned are not part of the claim limitation.” Ex. 1004 at p. 38.

ii. “wherein the microprocessor is used to provide digital and optical data to the digital signal processor”

The court also construed the term “wherein the microprocessor is used to provide digital and optical data to the digital signal processor.”

According to the Markman order, there are varying pathways between the digital sensor and the digital signal processor, with one clear pathway between the digital sensor and the DSP via an ASIC. Ex. 1004 at p. 42.

iii. “a color enhancing function”

In the Markman Order, the court construed “a color enhancing function” to mean “color changes to an image.” Ex. 1004 at p. 8.

D. PERSON OF ORDINARY SKILL IN THE ART

Petitioner submits that a POSA would have (i) a Bachelor of Science degree in electrical engineering, or a related field (which includes physics in the case of digital cameras), with approximately two to three years of experience or research related to digital image and/or video processing, or (ii) equivalent training and work experience in electrical engineering and digital camera system design. Ex. 1002 at ¶¶ 20-23.

E. IDENTIFICATION OF THE CHALLENGE (37 C.F.R. § 42.104(B))

Petitioner requests an Order cancelling the Challenged Claims as unpatentable under 35 U.S.C § 103.

i. Claims for Which Inter Partes Review is Requested

IPR is requested for claims 1–3, 9, 18–20 and 24 of the ’805 patent.

ii. The Prior Art and Specific Grounds on Which the Challenge is Based

Ground	Claims	Basis for Unpatentability
1	9 and 24 ¹	Obvious (§ 103) over U.S. Pat. App. Publ. No. 2002/0135688 (“Niikawa”) (Ex. 1006)

¹ Petitioner begins with claims 9 and 24 because they are the broadest independent claims of the Challenged Claims.

2	9 and 24	Obvious (§ 103) over Niikawa in view of U.S. Pat. Appl. Publ. No. US 2005/0089241 (“Kawanishi”) (Ex. 1010)
3	1-3 and 18-20	Obvious (§ 103) over Niikawa in view of The Image Processing Handbook (Fourth Edition) (“Russ”) (Ex. 1008)
4	9 and 24	Obvious (§ 103) over U.S. Pat. Appl. Publ. No. US 2005/0280877 (“Watanabe”) (Ex. 1007)
5	1-3 and 18-20	Obvious (§ 103) over Watanabe in view of Russ

The claims are unpatentable for the reasons detailed below.

F. NIIKAWA GROUNDS

i. Ground 1: Obviousness of Claims 9 and 24 over U.S. Pat. Appl. Publ. No. 2002/0135688 (“Niikawa”)

Niikawa is a published U.S. patent application (published on September 26, 2002). It is prior art under 35 U.S.C. § 102(b) (pre-AIA).²

Niikawa describes a digital camera and correction methods for the same. Ex. 1006 at Abstract. Like the ’805 patent, Niikawa stores aberration correction information for various lenses.

Niikawa describes known methods for correcting blurring and shading problems. Ex. 1006 at [0005]-[0012]. It is an object of Niikawa to improve solutions to shading aberrations. Ex. 1006 at [0023]. To correct images, Niikawa describes storing aberration information for different lenses, as well as different

² While the ’805 patent claims a priority date of July 11, 2006, Petitioner does not believe it is entitled to a priority date earlier than July 6, 2007. Nevertheless, the prior art asserted herein applies under either date.

focal lengths, such that, when a lens is mounted on the camera, the camera can use its processing power and stored correction options to digitally correct image data to account for lens aberrations, in particular. Ex. 1006 at [0083]-[0084], [0205]-[0206], Ex. 1002 at ¶¶ 58-59, 79-81. This allows the camera system to improve image quality across various lenses. *Id.* at [0058], [0101], [0066] (detachable lens).

The primary aberration correction handled in Niikawa is that of shading in an image. Specifically, shading correction circuit 123 uses correction data stored in tables for various optics systems to “correct[] a shading due to optical system.” *Id.* at [0082]. Ex. 1002 at ¶¶ 79-81, 119-121.

Of note, the claims recite a microprocessor, a DSP, an ASIC, and software to perform the various functions. The ’805 patent is imprecise in its use of, at least, the term DSP. In one instance, it identifies the same as being element 195, which is later referred to as an ASIC. Ex. 1001 at 29:64-30:3. Elsewhere, the DSP is referred to as element 220 of Fig. 2, despite that portion of Fig. 2 referring to functional steps. Ex. 1001 at 30:23-27, Fig. 2 (“Digital Signal Processing”). Elsewhere the DSP is referred to as the chipset of the camera. Ex. 1001 at 30:62-67, Fig. 7 (“DSP Chip”).

In addition, the ’805 patent states that functions performed by an ASIC and microprocessor may be interchanged without effect. Ex. 1001 at 30:1-3, 19:49-52.

A POSA would have understood that a camera may have processors and ASICs with various functional components for performing image processing, and that the same can be addressed using dedicated hardware as well as a combination of hardware and software. Ex. 1002 at ¶¶ 73-78, 163. The Examiner noted during prosecution that any recited division of labor in this regard was not a patentable feature. Ex. 1037 at OITCAN-00000186-89; *see* Ex. 1004 at p. 38.

Thus, while Niikawa may not expressly use the term application specific integrated circuit, it would have been obvious that any one of a number of image processing functions could have been implemented using an ASIC. Ex. 1002 at ¶¶ 73-78, 86-87, 102-03. For these reasons, the Petition relies on performance of the recited functions by Niikawa's processors and circuitry, with the understanding that a POSA would have understood that the division of labor among those different components, and structure thereof, could be altered as a matter of design preference. Ex. 1002 at ¶¶ 73-78, 87.

With that understanding, Niikawa describes a microprocessor, at least, in that it describes a general controller 150. Ex. 1006 at [0081], [0095]; Ex. 1002 at ¶¶ 73-78, 87, 97-98. Niikawa also describes a digital signal processor in the form of, at least, shading correction circuit 123 for performing corrections in combination with the special imaging controller 158 and image synthesizer 159 for performing special effect functions. Ex. 1006 at [0082], [0103]-[0104], [0237]; Ex.

1002 at ¶¶ 73-81, 87, 99-101. These elements perform the correction and enhancement of the digital image data. With respect to the claimed ASIC, Niikawa describes, at least, signal processing circuit 121 and the A/D conversion circuit 122 in combination with related functionality of signal processor 120 and general controller 150. Ex. 1006 at [0079]-[0082], [0095]. A POSA readily would appreciate that certain claim functions can be performed by different ones of these elements (e.g. the ASIC may be considered a combination of portions of elements 121-123) and that it would be obvious to provide the hardware in the form of a dedicated ASIC as needed, without substantively changing Niikawa's operation. Ex. 1002 at ¶¶ 73-78, 87.

Niikawa describes a mathematical correction of digital image data using correction coefficients that modify that digital image data, which a POSA would understand as "digital filtration." Ex. 1002 at ¶¶ 44-46, 88; Ex. 1001 at 8:30-33 (explaining that digital filtration is used to correct aberrations); Ex. 1006 at [0082], FIG. 6, [0107]-[0110].

The claims recite a zoom lens that is capable of alternating from specific fixed focal length lens settings in a succession of steps. A POSA would understand that the function of a zoom lens is to change focal lengths such that images can be photographed at different magnifications. Ex. 1002 at ¶¶ 53-58, 126. Indeed, to move from a far tele end of zooming, to a wide end of zooming, the zoom lens

would successively move through each zoom setting/position. Ex. 1006 at [0072] (“[Z]oom lens 300 continuously moves to the wide side” and “continuously moves to the tele side”). This is the interpretation of the claim language Patent Owner has adopted in the counterpart litigation. Ex. 1005 at Appendix B, Exhibit 1 p. 118-19 (basing infringement on lenses with “a range of different focal lengths in a single unit . . . called zoom lenses”); p. 239 (“Zoom lenses allow for the user to alternate between different focal lengths by turning a movable ring on a zoom lens and/or by using a control on the camera.”). A user would be able to capture images at each successive zoom setting through normal operation of the camera. Ex. 1002 at ¶¶ 127-30. Niikawa describes such a conventional zoom operation, and the capture of images using such a zoom lens. Ex. 1006 at [0067] (describing the zoom motor for changing the zoom ratio of the zoom lens), [0089]-[0090] (explaining the process of zooming during capture).

A user can capture images at different zoom settings in Niikawa. Ex. 1002 at ¶¶ 127-30. The system in Niikawa can perform correction for each of those images captured at a different zoom setting. Further, Niikawa describes that each such successively captured image may be corrected in accordance with the specific zoom setting used (i.e., a different correction for each focal length). Ex. 1006 at [0145], [0151]-[0157]. Figure 8 shows sequential data files in this regard. Ex. 1006 at [0101]-[0102], FIG. 8.

The application of Niikawa to claims 9 and 24 is detailed below.

Claim Clause	Niikawa Grounds
9. A digital imaging system for image filtration comprising:	Niikawa discloses a digital imaging system for image filtration. Ex. 1006 at [0065] (“[C]onfigurations of an appearance of a digital camera 1 which is an image processing apparatus according to the first preferred embodiment of the present invention.”), [0075] (describing a digital camera), [0082] (describing shading correction). Ex. 1002 at ¶ 88.
a digital camera mechanism,	Niikawa discloses a digital camera. Ex. 1006 at [0065] (“[A] digital camera 1”), [0075] (describing a digital camera). Ex. 1002 at ¶ 89.
an optical lens mechanism,	Niikawa teaches an optical lens mechanism. Ex. 1006 at [0066] (“[A]n imaging lens 3”), [0076]. Ex. 1002 at ¶¶ 90-92.
a digital sensor,	Niikawa discloses a digital sensor in the form of a CCD. Ex. 1006 at [0067] (“Also, behind the image pickup device . . . is provided a color image pickup device 303. . . The color image pickup device (hereinafter referred to as ‘CCD’).”), [0077]. Ex. 1002 at ¶¶ 93-96.
a microprocessor,	A microprocessor is disclosed as a general controller, i.e., microcomputer, in Niikawa. Ex. 1006 at [0082], [0095] (“The general controller 150 is implemented by a microcomputer and performs centralized control of the exposure function and playback function.”). Ex. 1002 at ¶¶ 97-98.
a digital signal processor,	Niikawa’s DSP includes shading correction circuit 123 for performing corrections in combination with the special

Claim Clause	Niikawa Grounds
	imaging controller 158 and image synthesizer 159 for performing special effect functions. Ex. 1006 at [0082] (“The shading correction circuit 123 corrects a shading due to optical system with respect to the image data that has been subjected to A/D conversion.”), [0103] (the special image controller performs gradation control), [0104], [0237] (the image synthesizer performs image synthesis which may be used to produce a desirably blurred image). Ex. 1002 at ¶¶ 99-101.
an application specific integrated circuit,	Niikawa discloses signal processing circuit 121 and A/D conversion circuit 122 in combination with related functionality of signal processor 120 and general controller 150. Ex. 1006 at [0080] (“The signal processing circuit 121 is designed to execute analogue signal processing . . . and serves to reduce sampling noise.”), [0081] (“The A/D conversion circuit 122 is designed to convert an image signal which is an analogue signal outputted from the signal processing circuit 121 to image data which is a digital signal.”), [0095] (the general controller is responsible for “centralized control”). Ex. 1002 at ¶¶ 102-03.
system software,	Niikawa discloses software. Ex. 1006 at [0096] (disclosing “processing programs for executing a variety of concrete processings”); [0127] (“[S]hading correction is executed by software.”). Ex. 1002 at ¶¶ 104-06.
a database management system and	Niikawa discloses a database management system as a correction table. Ex. 1006 at [0082]-[0086], [0108], [0130], [0138] (teaching that the correction table stores correction coefficients). Ex. 1002 at ¶¶ 107-11.
a memory storage sub-system;	After correction, the images are stored in memory card 8. Ex. 1006 at [0100]-[0101], [0121]; [0087], FIG. 1.

Claim Clause	Niikawa Grounds
	Ex. 1002 at ¶ 112.
wherein the aberrations from the optical lens mechanism are corrected by applying digital filtration by using the application specific integrated circuit and the digital signal processor;	Shading aberrations are corrected by the shading correction circuit 123 (DSP) after the image has undergone gain control, noise reduction, and conversion in the signal processing circuit 121 and the A/D conversion circuit 122 (ASIC). Ex. 1006 at [0080]-[0082] (“The shading correction circuit 123 corrects a shading due to optical system with respect to the image data that has been subjected to A/D conversion. The shading correction circuit has a multiplier 123a as shown in FIG. 6, and receives a timing control signal inputted from the timing control circuit 112 and performs multiplication of image data converted in the A/D conversion circuit 122 and a correction table inputted from the general controller 150.”); [0107]-[0110]. Ex. 1002 at ¶¶ 113-15.
wherein the microprocessor is used to provide digital and optical data to the digital signal processor;	Data is provided from the CCD 303 (sensor) to the signal processor 120 which contains the shading correction circuit 123 (DSP). Ex. 1006 at [0077] (“The CCD 303 receives the light of the subject light source . . . and outputs the image signal to a signal processor 120 by using a readout control signal inputted from the timing generator.”), [0079]; [0107]-[0108] (using optical data for aberration correction). The general controller 150 (microprocessor) is used to provide the data to the DSP because it performs centralized control of the camera, including exposure and providing ROM and RAM for processing. Ex. 1006 at [0095]-[0096]. Ex. 1002 at ¶¶ 116-18.
wherein the system software is organized to identify specific optical aberrations and to access the database to identify	Niikawa teaches performing its shading correction using software. Ex. 1006 at [0096], [0127]. The software corrects shading by accessing the correction tables corresponding to the focal length at imaging. Ex. 1006 at [0083]-[0085]. The focal length dictates the nature of the aberration to be corrected. Ex. 1006 at [0205] (“[T]he

Claim Clause	Niikawa Grounds
specific corrections to the aberrations;	camera type, focal length and f-number were used as correction table selection conditions, however, also the type of imaging lens used at the time of exposure may be set as well.”) The software then accesses the correction table to select corrections corresponding to the specific focal length at capture. Ex. 1006 at [0083]-[0085], [0130] [0168]; [0108], [0123]. Ex. 1002 at ¶¶ 119-121.
wherein the system software forwards the data from the digital sensor to the digital processor;	Data is provided from the CCD 303 to the signal processor 120 which contains the shading correction circuit 123. Ex. 1006 at [0077], [0079]; [0107]-[0108]. A POSA would understand that software is, or could be, used to provide the data to the DSP, inasmuch as the signal processor is controlled by software. Ex. 1006 at [0096] (“The general controller 150 has a ROM 151 which stores processing programs”), [0127] (“[S]hading correction is executed by software.”). Ex. 1002 at ¶¶ 122-23.
wherein the digital signal processor selects a specific procedure to optimize the image and corrects the aberrations;	The shading correction circuit 123 corrects shading by selecting a solution which corresponds to the optical conditions at capture for that particular lens system. Ex. 1006 at [0108], [0084]. Ex. 1002 at ¶¶ 124-25.
wherein the lens type is a zoom lens;	Niikawa discloses a zoom lens. Ex. 1006 at [0067] (“[T]he imaging lens which is a zoom lens.”), [0076]. Ex. 1002 at ¶ 126.
wherein the lens focal length alternates from specific fixed focal length lens settings in a succession of steps;	Niikawa is capable of changing (and detecting the amount of) zoom, which corresponds to changes in focal length. Ex. 1006 at [0067], [0089]-[0090]. A POSA would further understand that zoom lenses move through a succession of focal lengths as a zooming function is performed. Ex. 1002 at ¶¶ 127-30.

Claim Clause	Niikawa Grounds
wherein optical aberrations are corrected with digital filtration to modify multiple images from different focal lengths in a succession of data files; and	Niikawa describes capturing and correcting multiple, sequential images. Ex. 1006 at [0067], [0089]-[0090] (teaching the process of zooming and capturing images), [0107]-[0110] (correcting aberrations of captured images based on characteristics such as focal length); FIG. 8 (showing sequential data files), [0101]-[0102]. The shading correction corresponds to focal length. Ex. 1006 at [0108]. Ex. 1002 at ¶¶ 131-34.
wherein the modified data file consisting of the digital data optimized from the aberrations that are corrected from the original optical image is stored in memory.”	The corrected image is stored in memory. Ex. 1006 at [0109], [0121], FIG. 9. Ex. 1002 at ¶¶ 135-36.
24. A method of image filtration comprising:	Claim 24 is a method claim that corresponds generally to claim 9. For the elements in claim 24 that are substantially similar to those in claim 9, reference will be made to claim 9. Ex. 1002 at ¶¶ 137-39.
a digital camera mechanism,	See claim 9 above. Ex. 1002 at ¶ 140.
an optical lens mechanism,	See claim 9 above. Ex. 1002 at ¶ 141.
a digital sensor,	See claim 9 above. Ex. 1002 at ¶ 142.
a microprocessor,	See claim 9 above. Ex. 1002 at ¶ 143.

Claim Clause	Niikawa Grounds
a digital signal processor,	See claim 9 above. Ex. 1002 at ¶ 144.
an application specific integrated circuit,	See claim 9 above. Ex. 1002 at ¶ 145.
system software,	See claim 9 above. Ex. 1002 at ¶ 146.
a database management system and	See claim 9 above. Ex. 1002 at ¶ 147.
a memory storage sub-system;	See claim 9 above. Ex. 1002 at ¶ 148.
wherein the aberrations from the optical lens mechanism are corrected by applying digital filtration by using the application specific integrated circuit and digital signal processor, the method consisting of;	See claim 9 above. Ex. 1002 at ¶ 149.
alternating the lens focal length of a zoom lens from specific fixed focal length lens settings in a succession of steps;	See claim 9 above. Ex. 1002 at ¶ 150.
creating data files corresponding to	In Niikawa, image files are sequentially stored in the order of being captured. Ex. 1006 at [0101]. When they are stored, they contain information such as the focal length

Claim Clause	Niikawa Grounds
each focal length lens setting;	at capture, indicating that the files created correspond to each different focal length. Ex. 1006 at [0101]. Ex. 1002 at ¶ 151.
forwarding the data from a digital sensor to the digital signal processor;	See claim 9 above. Ex. 1002 at ¶ 152.
providing digital and optical data to a digital signal processor;	See claim 9 above. Ex. 1002 at ¶ 153.
identifying specific optical aberrations and accessing a database to identify specific corrections to the aberrations;	See claim 9 above. Ex. 1002 at ¶ 154.
selecting a specific procedure from the database using the microprocessor to optimize the image and correct the aberrations;	The general controller 150 (microprocessor) executes the various processing programs. Ex. 1006 at [0096]. The general controller 150 performs selection of a correction table according to optical conditions and uses the correction values therein to correct the aberrations. Ex. 1006 at [0083]-[0084]. Ex. 1002 at ¶ 155.
applying digital filtration by using the application specific integrated circuit and digital signal processor to correct digital or optical aberrations;	See claim 9 above. Ex. 1002 at ¶ 156.
correcting optical aberrations with digital filtration to	See claim 9 above. Ex. 1002 at ¶ 157.

Claim Clause	Niikawa Grounds
modify multiple images from different focal lengths in a succession of data files; and	
storing the modified data files in memory.	See claim 9 above. Ex. 1002 at ¶ 158.

ii. Ground 2: Obviousness of Claims 9 and 24 over Niikawa in view of U.S. Pat. Appl. Publ. No. US 2005/0089241 (“Kawanishi”)

As discussed above, claims 9 and 24 recite, generally, that the zoom lens alternates focal lengths in a succession of steps and that the optical aberrations are corrected in multiple images in a succession of data files. To the extent that Patent Owner changes its position on the meaning of this claim limitation (currently, that the same just requires that a user may take images at different zoom settings, and each image is corrected), and asserts that this claim requires that aberrations must be continuously corrected as the zoom lens continuously changes focal length, Kawanishi (in combination with Niikawa) renders these claims obvious.

Kawanishi is a published U.S. patent application (published on April 28, 2005). It is prior art under 35 U.S.C. § 102(b) (pre-AIA). Kawanishi is a digital camera which corrects aberrations using stored correction values. Ex. 1010 at FIG.

3, [0048], [0055], [0058]-[0064]. Kawanishi teaches correcting aberrations in real time. Ex. 1010 at [0010], [0055], [0067]-[0069]. Kawanishi stores a correction value for the zoom wide end and the zoom tele end. Ex. 1010 [0049], [0100]-[0102]. These correction values are stored in look-up tables, just like in Niikawa, discussed above. Ex. 1010 at [0048]. During operation the zoom position at capture is measured in relation to the maximum zoom wide end and maximum zoom tele end. Ex. 1010 at [0102]-[0105]. A correction value is then determined based on the current zoom position in relation to the maximum zoom wide end and maximum zoom tele-end by using a ratio to calculate the correction for that intervening capture position. Ex. 1010 at [0102]-[0105]. The ratio correlates the correction values for the maximum zoom wide end and zoom tele ends with the current zoom position. Ex. 1010 at [0102]-[0105]; Ex. 1002 at ¶¶ 161-62.

As discussed above, Niikawa describes storing aberration information for different lenses, as well as different focal lengths, such that, when a lens is mounted on the camera, the camera digitally correct image data to account for lens aberrations. Ex. 1006 at [0083]-[0084]. A POSA would look to combine Kawanishi with Niikawa because Kawanishi also describes perform the same type of correction using stored correction values. Ex. 1002 at ¶¶ 82-83, 159-62. Moreover, Kawanishi provides a way to store fewer correction values, using only the far ends of the zoom operation, and then calculate the correction values for

intervening zoom positions in real-time. Ex. 1010 at [0069]. Thus, Kawanishi enables the correction of more zoom setting options with less required memory. Ex. 1002 at ¶¶ 161-62. Specifically, for a continuous, versus a stepped, zoom operation, the correction value would be more precisely determined at each small zoom adjustment. A POSA would have a reasonable expectation of success combining these references, given their similarities. *Compare* Ex. 1006 at [0083]-[0085] *with* Ex. 1010 at [0102]-[0105]; Ex. 1002 at ¶¶ 161-62.

iii. Ground 3: Obviousness of Claims 1-3 and 18-20 over Niikawa in view of The Image Processing Handbook (Fourth Edition) (“Russ”)

Independent claims 1 and 18 recite many of the same features as claims independent claims 9 and 24 discussed above. Notably, the claims at issue here recite a fixed focal length lens (as opposed to a zoom lens) and the use of a fast Fourier transform to implement a user-specified special effect.

As with each of the claims above, Niikawa renders the claims in Ground 3 obvious, in this case in combination with JOHN C. RUSS, THE IMAGE PROCESSING HANDBOOK (CRC Press, 4th ed. 2002) (“Russ”), which published in 2002. Ex. 1008; Ex. 1036 (LC Classification showing a 2002 publication); Ex. 1044 (publisher confirmation of a publication date of July 26, 2002). Russ qualifies as prior art under 35 U.S.C. § 102(b) (pre-AIA).

While Niikawa describes a camera that uses interchangeable lens, it does not explicitly describe a fixed focal length lens. Ex. 1006 at [0066] (“[A]n imaging lens 3 which is detachably attached to the camera main body”). A POSA would have understood that there are two classes of lenses, zoom and fixed focal length. Ex. 1002 at ¶¶ 53-59, 190. A POSA would have understood that a digital camera, such as the one described in Niikawa, would have been expected to receive either type of lens. The POSA also would have understood that the correction process would not have materially differed for either type. Ex. 1002 at ¶¶ 47-59, 190. Indeed, the only difference is that correction information is provided per focal length. Thus, a fixed focal length lens would typically have fewer corrections options because the corrections would be for a single focal length, while a zoom lens would have one or more correction options for each zoom position (i.e., each different focal length). Ex. 1002 at ¶¶ 47-59, 190.

In that regard, Niikawa describes correction tables containing information corresponding to optical conditions such as focal length. Ex. 1006 at [0084]. Niikawa uses the correction tables to correct the captured image, so as to account for lens aberrations. Ex. 1006 at [0084]-[0086], [0205] (“[T]he camera type, focal length and f-number were used as correction table selection conditions, however, also the type of imaging lens used at the time of exposure may be set as well.”). In addition to image data modifications related to optical aberration of the lens,

Niikawa also performs more general color adjustments, including “white balance” and color separation, as well as other image modifications. Ex. 1006 at [0067], [0077], [0086]. These processes are well-known user adjustments that would be executed through Niikawa’s user interface. Ex. 1006 at [0074], [0152]. For instance, through Niikawa’s user interface, the user can adjust exposure modes. Ex. 1006 at [0074]. Also, a user may activate a gradation control processing mode and move a cursor on the camera’s display panel to give a direction for that gradation control process. Ex. 1006 at [0074], [0152], [0156]. Niikawa also describes that with “such a process [it] is also possible . . . to obtain a desirable blurred synthesized image” (i.e., a softening effect). Ex. 1006 at [0237]. These various effects are user controlled. Ex. 1002 at ¶¶ 60-63, 175-177.

While Niikawa does not delve into the details of executing such image processing options, or conventional alternatives, a POSA would understand how to employ these and other conventional image processing methods. Ex. 1002 at ¶¶ 164-77. In that regard, Russ describes conventional manners of processing image data and executing special effects, particularly in the frequency domain. Ex. 1002 at ¶¶ 64-72, 84, 164-77. For instance, while Niikawa does not mention Fourier transforms, Russ teaches how images are processed using the same. Ex. 1008 at p. 278 (“Although many different types of image transforms can be used, the best

known (at least, the one with the most recognizable name) is the Fourier transform.”).

Russ “presents an extensive collection of image processing tools, so that the user of computer-based systems can both understand those methods provided in packaged software, and program those additions that may be needed for particular applications.” Ex. 1008 at “Introduction.” Russ is relevant to digital cameras because it sets forth standard operations of image processing used in, for example, digital cameras. Ex. 1008 at p. 8-13, 36-50. In particular, Russ describes known image processing techniques for image correction, including applying filters, neighborhood averaging and ranking, rank leveling, and the Fourier transform. Ex. 1002 at ¶¶ 64-72, 84, 164-77. Russ dedicates an entire chapter to processing images in the frequency space using the Fourier transform. Russ describes using the fast Fourier transform to apply various filters to adjust images to correct blurring and the like. Ex. 1008 at p. 297-306. In addition to aberration correction, Russ provides ways to enhance images (i.e., apply special effects). Ex. 1008 at p. 207, 243, 286, 277. A POSA would be motivated to use a fast Fourier transform because it was widely known to be a powerful and efficient tool in image processing. Ex. 1008 at p. 278; Ex. 1002 at ¶¶ 64-72, 164-77.

As discussed above, Niikawa describes performing color adjustments and softening adjustments to digitally enhance the images. Ex. 1006 at [0067], [0077],

[0086], [0237]. A POSA would have understood Russ to be explaining the specific mechanism for executing the color processing and softening called for in Niikawa. In Niikawa, a POSA would understand that conventional image processing methods could be used, including the options described in Russ, to achieve the listed effects. Ex. 1002 at ¶¶ 164-77.

Given that Russ forms a handbook for executing the image processing called for in Niikawa, a POSA would have had a reasonable expectation of success combining these references. Ex. 1002 at ¶¶ 174-77.

Where the claim element has already been addressed in the claim chart above, the explanation is not repeated.

Claim Clause	Niikawa Grounds
1. A digital imaging system for image filtration comprising:	Claim 1 recites many of the same elements as claim 9. For the elements in claim 1 that are largely the same as those in claim 9, reference will be made to claim 9. For those elements, the arguments for claim 9 will also render the corresponding element for claim 1 invalid. See claim 9 above. Ex. 1002 at ¶¶ 178-80.
a digital camera mechanism,	See claim 9 above. Ex. 1002 at ¶ 181.
an optical lens mechanism,	See claim 9 above. Ex. 1002 at ¶ 182.
a digital sensor,	See claim 9 above.

Claim Clause	Niikawa Grounds
	Ex. 1002 at ¶ 183.
a microprocessor,	See claim 9 above. Ex. 1002 at ¶ 184.
a digital signal processor,	See claim 9 above. Ex. 1002 at ¶ 185.
an application specific integrated circuit,	See claim 9 above. Ex. 1002 at ¶ 186.
system software,	See claim 9 above. Ex. 1002 at ¶ 187.
a database management system and	See claim 9 above. Ex. 1002 at ¶ 188.
a memory storage sub-system;	See claim 9 above. Ex. 1002 at ¶ 189.
wherein the optical lens mechanism is a fixed focal length;	Niikawa discloses a detachable imaging lens. Ex. 1006 at [0066]. This suggests interchanging the lens, including a zoom lens or a fixed focal length lens. Ex. 1002 at ¶ 190.
wherein the aberrations from the optical lens mechanism are corrected by applying digital filtration by using the application specific integrated circuit and the digital signal processor;	See claim 9 above. Ex. 1002 at ¶ 191.
wherein the microprocessor is used to provide	See claim 9 above. Ex. 1002 at ¶ 192.

Claim Clause	Niikawa Grounds
digital and optical data to the digital signal processor;	
wherein the system software is organized to identify specific optical aberrations and to access the database to identify specific corrections to the aberrations;	See claim 9 above. Ex. 1002 at ¶ 193.
wherein the system software forwards the data from the digital sensor to the digital processor;	See claim 9 above. Ex. 1002 at ¶ 194.
wherein the digital signal processor selects a specific procedure to optimize the image and corrects the aberrations;	See claim 9 above. Ex. 1002 at ¶ 195.
wherein the data are forwarded from the digital sensor to the digital signal processor by an application specific integrated circuit;	The image captured by the CCD 303 (digital sensor) is subject to processing by the signal processing circuit 121 and A/D conversion circuit 122 (both may be portions of the ASIC). Ex. 1006 at [0107]. Then, the shading correction circuit 123 (DSP) performs processing on image data received from the signal processing circuit 121 and A/D conversion circuit 122 (ASIC). Ex. 1006 at [0108]. Ex. 1002 at ¶ 196.
wherein the digital signal processor applies a fast Fourier transform to a data	Niikawa also teaches user input to modify images to achieve a desired special effect. Ex. 1006 at [0237] (“[S]uch a process is also possible . . . to obtain a desirable blurred synthesized image.”), [0074] (explaining that a

Claim Clause	Niikawa Grounds
file in order to satisfy a user specified special effects function;	user can activate a gradation control processing mode which “refers to a mode intended for obtaining a synthesized image with substantially widened range), [0152] (the user moves a cursor on the camera’s display panel so as to give a direction for the gradation control process), [0156] (same); [0072], [0092], [0111], [0117]-[0118]. Russ teaches how to execute user applied special effects, including through a fast Fourier transform. Ex. 1008 at p. “Introduction” (providing image processing tools “so that the user of computer-based systems can ... understand those methods provided in packaged software.”), 277 (“applying computer methods to images for purposes of enhancement”), 312 (“The . . . filter can be constructed either manually or automatically.”), 305 (“The transform of this image is then processed by smoothing and leveling, and then thresholded to locate the peaks. The inverse of this mask is then smoothed and multiplied by the frequency transform of the original image to produce the filtered result.”), 334 (“Thresholds may be set interactively by a user watching the image and using a colored overlay to show the result of turning a knob or otherwise adjusting the settings. . . . [T]he user may adjust virtual sliders or mark a region on a histogram to select the range of brightness values.”). Ex. 1002 at ¶¶ 197-98.
wherein the digital signal processor modifies the data file by applying the special effects function; and	Niikawa teaches that its system can be used to obtain a desired special effect. Ex. 1006 at [0237] (“[Such a process is also possible . . . to obtain a desirably blurred synthesized image.”). The image synthesizer is responsible for image synthesis so it would be understood that the image synthesizer, at least, disclosed in Niikawa could be used to carry out a fast Fourier transform. Ex. 1006 at [0104] (explaining that the image synthesizer is implemented by the processing programs of the general

Claim Clause	Niikawa Grounds
	controller). Niikawa performs image processing, and thus would apply the image enhancement described in Russ. Ex. 1006 at [0107]-[0108]; [0097], [0111], [0117]-[0118], [0237]; Ex. 1008 at p. “Introduction”, 301. Ex. 1002 at ¶ 199.
wherein the modified data file consisting of the digital data optimized from the aberrations that are corrected from the original optical image is stored in memory.	The corrected image is stored in memory. Ex. 1006 at [0109], [0121]. Ex. 1002 at ¶ 200.
2. The system of claim 1:	
wherein the special effects function is a color enhancing function.	Niikawa allows for user implementation to obtain a desired special effect. Ex. 1006 at [0237]; [0074], [0152], [0156]. One of the special effects taught in Russ is color enhancement. Russ teaches that FFT is used on images to adjust color features. Ex. 1008 at p. 277 (“applying computer methods to images for purposes of enhancement”), 308-09 (“A top hat filter was applied to the Fourier transform power spectrum from each channel to select the noise peaks, which were then removed. Recombining the resultant color channel images produces the result shown.”), 334 (“Thresholds may be set interactively by a user watching the image and using a colored overlay to show the result of turning a knob or otherwise adjusting the settings. . . . [T]he user may adjust virtual sliders or mark a region on a histogram to select the range of brightness values.”). Ex. 1002 at ¶¶ 201-03.

Claim Clause	Niikawa Grounds
3. The system of claim 1:	
wherein the special effects function is a diffusion function of soft effect.	Niikawa explains that its embodiment can also be used to “obtain a desirably blurred synthesized image.” Ex. 1006 at [0237]. This is a soft effect. Russ also teaches that FFT is used to soften image features, particularly using a low-pass filter. Ex. 1008 at p. 301-03 (“Butterworth low-pass filters with radii of 10 and 25 pixels in the frequency-domain image smooths the noise with some blurring of the high-frequency detail.”), 286 (explaining that removing unwanted information in the frequency domain naturally leads to visually smooth filtering). Ex. 1002 at ¶¶ 204-05.
18. A method of image filtration which comprises:	Claim 18 is a method claim that corresponds generally to claim 1. For the elements in claim 18 that are substantially similar to those in claim 1, reference will be made to claim 1. Ex. 1002 at ¶¶ 206-08.
a digital camera mechanism,	See claim 1 above. Ex. 1002 at ¶ 209.
an optical lens mechanism,	See claim 1 above. Ex. 1002 at ¶ 210.
a digital sensor,	See claim 1 above. Ex. 1002 at ¶ 211.
a microprocessor,	See claim 1 above. Ex. 1002 at ¶ 212.
a digital signal processor,	See claim 1 above. Ex. 1002 at ¶ 213.
an application specific integrated circuit,	See claim 1 above. Ex. 1002 at ¶ 214.

Claim Clause	Niikawa Grounds
system software,	See claim 1 above. Ex. 1002 at ¶ 215.
a database management system and	See claim 1 above. Ex. 1002 at ¶ 216.
a memory storage sub-system;	See claim 1 above. Ex. 1002 at ¶ 217.
wherein the aberrations from the optical lens mechanism are corrected by applying digital filtration by using the application specific integrated circuit and the digital signal processor, the method consisting of;	See claim 1 above. Ex. 1002 at ¶ 218.
forwarding the data from a digital sensor to a digital signal processor by an application specific integrated circuit;	See claim 1 above. Ex. 1002 at ¶ 219.
providing digital and optical data to the digital signal processor;	Claim 1 requires that a microprocessor provide digital and optical data to the digital signal processor. However, here, that same limitation is not required. Thus, the arguments for claim 1 apply equally to this broader limitation. See claim 1 above. Ex. 1002 at ¶ 220.
identifying specific optical aberrations and accessing a	See claim 1 above. Ex. 1002 at ¶ 221.

Claim Clause	Niikawa Grounds
database to identify specific corrections to the aberrations:	
selecting a specific procedure from the database using the microprocessor to optimize the image and correct the aberrations:	The general controller 150 (microprocessor) executes the various processing programs to modify the image data. Ex. 1006 at [0096]. The general controller 150 performs selection of a stored correction table and uses the correction values therein to correct the aberrations and optimize the image. Ex. 1006 at [0083]-[0084]. Ex. 1002 at ¶ 222.
applying digital filtration by using the application specific integrated circuit and digital signal processor to correct digital or optical aberrations:	See claim 1 above. Ex. 1002 at ¶ 223.
applying a fast Fourier transform to a data file in order to satisfy a user specified special effects function;	See claim 1 above. Ex. 1002 at ¶ 224.
modifying the data file by applying the special effects function using the digital signal processor; and	See claim 1 above. Ex. 1002 at ¶ 225.
storing the data file in memory.	See claim 1 above. Ex. 1002 at ¶ 226.
19. The method of claim 18 further comprising the step of:	Claim 19 is a method claim that corresponds generally to claim 2. For the elements in claim 19 that are substantially similar to those in claim 2, reference will be made to claim 2.

Claim Clause	Niikawa Grounds
	Ex. 1002 at ¶ 227.
applying the special effects function as a color enhancing function.	See claim 2 above. Ex. 1002 at ¶ 228.
20. The method of claim 18 further comprising the step of:	Claim 20 recites many of the same elements as claim 3, the main difference being that claim 20 is written as a method claim. For the elements in claim 20 that are largely the same as those in claim 3, reference will be made to claim 3. For those elements, the arguments for claim 3 will also render the corresponding element for claim 20 invalid. See claim 3 above. Ex. 1002 at ¶ 229.
applying the special effects function as a diffusion function of soft effect.	See claim 3 above. Ex. 1002 at ¶ 230.

G. WATANABE GROUNDS

i. Ground 4: Obviousness of claims 9 and 24 over U.S. Patent Appl. Publ. No. 2005/0280877 (“Watanabe”)

Watanabe published December 22, 2005. Watanabe qualifies as prior art under, at least, 35 U.S.C. § 102(e) and 102(a) (pre-AIA).

Watanabe describes an image processing system for executing, e.g., a distortion aberration correction or peripheral light intensity correction. Ex. 1007 at [0002]. As Watanabe explains, different interchangeable lenses have various distortion and degradation of light intensity of a peripheral portion (vignetting),

which require their own specific corrections. Ex. 1007 at [0006], [0047]. In particular, both distortion aberration correction and peripheral light intensity correction are performed. Ex. 1007 at [0037]-[0039], [0046]-[0047]. Watanabe uses a look-up table to select the proper correction option, based on lens type, focal point and zoom position, for example. Ex. 1007 at [0006], [0047]. The relevant correction data is stored ahead of time in the internal memory and table. Ex. 1007 at [0039], [0046]-[0047]; Ex. 1002 at ¶¶ 47, 55-59, 85.

Watanabe digitally captures an image and then performs aberration correction through various processors and circuits. Ex. 1007 at [0046]-[0047], [0058]-[0059].

Of note, the claims recite a microprocessor, a DSP, an ASIC, and software to perform the various functions.. As discussed above the '805 patent is imprecise in its use of those terms. *See* Sec. V.f.i, above. As also established above, the Examiner determined that such division of labor was not inventive, and the patent itself admits the same. Ex. 1001 at 30:57-59 (“[T]hat the presence or absence of specific elements of this mechanism is not required for the correct functioning of this system.”); Ex. 1037 at OITCAN-00000187-89.

A POSA would have understood that a camera may have a processor with various functional components for performing the various needs of image

processing, and that the same can be addressed using dedicated hardware as well as a combination of hardware and software, as needed. Ex. 1002 at ¶¶ 73-78, 232.

Watanabe includes a microprocessor at least in that it describes a CPU 57. Ex. 1007 at [0059] (“[T]he CPU 57 also constitutes an image processing device.”).

Watanabe also describes a DSP in the form of, at least, a digital signal processing circuit 56. Ex. 1007 at [0038] (“[T]he digital signal processing circuit 56 sorts out the image data inputted from the A/D converter 55 into color-difference data and brightness data, and executes various processes, correction and a data process for image compressing/extracting.”). A POSA would understand that to the extent the digital processing circuit provides adjustment of digital images for correction, the same or similar circuitry in Watanabe would perform the operation for special effects, as both operations are ultimately modifying digital image data. Similarly, with respect to the claimed ASIC, Watanabe describes, at least, the CDS circuit 54 and A/D converter 55. A POSA would nevertheless appreciate that certain functions as claimed can be performed by different ones of these elements (e.g., the DSP may be considered a combination of DSP circuit 56 and CPU 57) and that it would be obvious to provide the hardware in the form of a dedicated ASIC as needed, without substantively changing Watanabe’s system or operation. Ex. 1002 at ¶¶ 73-78, 232.

Finally, Watanabe teaches that its correction data is stored in an internal memory and a table. Ex. 1007 at [0039], [0047]. Because Watanabe stores aberration and correction information, a POSA would understand that the internal memory and a table can both function as a database for storing correction information and aberration information. Ex. 1002 at ¶¶ 73-78, 249-53, 232.

Claim Clause	Watanabe Grounds
9. A digital imaging system for image filtration comprising:	Watanabe discloses a digital imaging system for image filtration. Ex. 1007 at [0002] (“Particularly, the present invention relates to an image recording apparatus and an image processing system capable of automatically and simply executing an image process such as distortion aberration correction or peripheral light intensity correction.”). Ex. 1002 at ¶¶ 231-34.
a digital camera mechanism,	Watanabe discloses a digital camera. Ex. 1007 at [0035] (“[A] digital camera 100.”). Ex. 1002 at ¶ 235.
an optical lens mechanism,	Watanabe teaches an optical lens. Ex. 1007 at [0035] (disclosing a “lens 50”), [0036]. Ex. 1002 at ¶¶ 236-37.
a digital sensor,	Watanabe discloses a digital sensor. Ex. 1007 at [0035], [0037] (“The CCD 53 is a circuit for converting an image inputted through the lens unit to electrical signals.”). Ex. 1002 at ¶¶ 238-41.

Claim Clause	Watanabe Grounds
a microprocessor,	Watanabe describes a CPU. Ex. 1007 at [0035], [0042] (“[T]he CPU controls operation of each part of the digital still camera.”). Ex. 1002 at ¶ 242.
a digital signal processor,	The digital signal processor is Watanabe’s digital signal processing circuit 56, in combination with CPU 57. Ex. 1007 at [0038] (“In addition, the digital signal processing circuit 56 sorts out the image data inputted from the A/D converter 55 into color-difference data and brightness data, and executes various processes, correction and a data process for image compressing/extracting.”), [0059] (“[T]he CPU 57 also constitutes an image processing device.”). Ex. 1002 at ¶¶ 243-44.
an application specific integrated circuit,	Watanabe discloses CDS circuit 54 and A/D converter 55. Ex. 1007 at [0035], [0038]. As discussed above, the functionality of the CDS circuit 54 ([0035], [0037]), the A/D converter 55 ([0035], [0038]), and/or digital signal processing circuit 56 may be implemented as an ASIC. Ex. 1002 at ¶¶ 245-46.
system software,	Watanabe teaches software and a program. Ex. 1007 at [0035], [0039], [0042], [0062], [0085]; FIG. 3, [0071] (discussing an image processing program). Ex. 1002 at ¶¶ 247-48.
a database management system and	Watanabe comprises a database management system as internal memory 69 and tables 70. Ex. 1007 at [0039], [0047]. Ex. 1002 at ¶¶ 249-53.

Claim Clause	Watanabe Grounds
a memory storage sub-system;	Watanabe discloses a memory card 60 and a memory card interface 60a. Ex. 1007 at [0035]. Ex. 1002 at ¶¶ 254.
wherein the aberrations from the optical lens mechanism are corrected by applying digital filtration by using the application specific integrated circuit and the digital signal processor;	CDS circuit 54 and A/D converter 55 (ASIC) provide image data to the digital signal processing circuit 56 (DSP). Ex. 1007 at [0037]-[0038]; Figs. 1A-1B. The digital signal processing circuit 56 (DSP) corrects aberrations caused by the lens system. Ex. 1007 at [0049] (“distortion aberration correction process”), [0038] (“In addition, the digital signal processing circuit 56 sorts out the image data inputted from the A/D converter 55 into color-difference data and brightness data, and executes various processes, correction and a data process for image compressing/extracting.”). Ex. 1002 at ¶ 255.
wherein the microprocessor is used to provide digital and optical data to the digital signal processor;	The image data is provided to digital signal processing circuit 56 (DSP). Ex. 1007 at [0037]-[0038]. “CPU 57 controls operation of each part of the digital still camera.” Ex. 1007 at [0042]. This includes the recording of image data, the connecting of data, and the correction of data. <i>Id.</i>; see[0061] (“[T]he process information and image data are transferred to the image processing program side (Step 203).”). Ex. 1002 at ¶¶ 256-58.
wherein the system software is organized to identify specific optical aberrations and to access the database to identify specific corrections to the aberrations;	The operations of the camera, including “a correction process on image data,” are controlled by “a control program stored in a ROM” Ex. 1007 at [0042]; [0071] (discussing the image processing program). The correction process is executed by identifying specific correction values from tables 70, which values are specific to the aberrations for a particular lens and at a particular focal length, for example. <i>Id.</i>

Claim Clause	Watanabe Grounds
	Ex. 1002 at ¶¶ 259-263.
wherein the system software forwards the data from the digital sensor to the digital processor;	Under the control of the stored programming, the image captured by the CCD (digital sensor) is processed by CDS circuit 54 and A/D converter 55 and then is provided to the digital signal processing circuit 56 (DSP). Ex. 1007 at [0037]-[0038], [0085]; FIG. 1b, [0071], (discussing the processing program 71 which is under control of the CPU), [0039] (explaining that the CPU stores all software programs, one of which is the processing program), [0042]. Ex. 1002 at ¶¶ 264-65.
wherein the digital signal processor selects a specific procedure to optimize the image and corrects the aberrations;	Data such as information relative to distortion aberration, distortion correction values and lens type are used to select a specific image correction process from tables 70. Ex. 1007 at [0047], [0071]. Ex. 1002 at ¶¶ 266-67.
wherein the lens type is a zoom lens;	Watanabe teaches an optical lens. Ex. 1007 at [0035] (disclosing a “lens 50”), [0036]. Watanabe also teaches that the correction process considers zoom level and that the user interface has a zoom key, indicating a zoom lens. Ex. 1007 at [0041] (disclosing “a zoom key”), [0047] (storing zoom information), [0048] (executing correction based on zoom). Ex. 1002 at ¶¶ 268-69.
wherein the lens focal length alternates from specific fixed focal length lens settings	A POSA would understand that a zoom lens alternates among specific focal lengths in a succession of steps as zooming is performed. Ex. 1007 at [0041] (disclosing “a zoom key” for performing zooming), [0047] (storing zoom information), [0048] (executing correction based on

Claim Clause	Watanabe Grounds
in a succession of steps;	zoom). Watanabe controls and accounts for such zoom “positions.” Ex. 1007 at [0047]. Ex. 1002 at ¶¶ 270-74.
wherein optical aberrations are corrected with digital filtration to modify multiple images from different focal lengths in a succession of data files; and	Optical aberrations in Watanabe are corrected for each successive zoom position. Ex. 1007 at [0047] (“[I]nformation of a lens type, a focusing point and a zoom position are added to the data 1, data 2 and data 3 respectively.”), [0048] (executing correction based on zoom). This shows that multiple images taken at multiple different focal lengths are corrected. Ex. 1007 at [0063] (suggesting that the system corrects one image at a time, and when finished, stores that file), [0047] (showing that data files are created including distortion aberration correction values in accordance with zoom position), FIG. 3. It would also have been obvious to modify images in a succession of files as it was known in the art to store images in a succession of files to be later processed. Ex. 1007 at [0039]. Ex. 1002 at ¶¶ 275-77.
wherein the modified data file consisting of the digital data optimized from the aberrations that are corrected from the original optical image is stored in memory.	After correction, the images are stored in memory. Ex. 1007 at [0039], [0058]. Ex. 1002 at ¶ 278.
24. A method of image filtration comprising:	Claim 24 is a method claim that corresponds generally to claim 9. For the elements in claim 24 that are substantially similar those in claim 9, reference will be made to claim 9. Ex. 1002 at ¶¶ 279-81.

Claim Clause	Watanabe Grounds
a digital camera mechanism,	See claim 9 above. Ex. 1002 at ¶ 282.
an optical lens mechanism,	See claim 9 above. Ex. 1002 at ¶ 283.
a digital sensor,	See claim 9 above. Ex. 1002 at ¶ 284.
a microprocessor,	See claim 9 above. Ex. 1002 at ¶ 285.
a digital signal processor,	See claim 9 above. Ex. 1002 at ¶ 286.
an application specific integrated circuit,	See claim 9 above. Ex. 1002 at ¶ 287.
system software,	See claim 9 above. Ex. 1002 at ¶ 288.
a database management system and	See claim 9 above. Ex. 1002 at ¶ 289.
a memory storage sub-system;	See claim 9 above. Ex. 1002 at ¶ 290.
wherein the aberrations from the optical lens	See claim 9 above. Ex. 1002 at ¶ 291.

Claim Clause	Watanabe Grounds
mechanism are corrected by applying digital filtration by using the application specific integrated circuit and digital signal processor, the method consisting of;	
alternating the lens focal length of a zoom lens from specific fixed focal length lens settings in a succession of steps;	See claim 9 above. Ex. 1002 at ¶ 292.
creating data files corresponding to each focal length lens setting;	Watanabe creates data files corresponding to different focal length settings. Ex. 1007 at [0047]. Ex. 1002 at ¶ 293.
forwarding the data from a digital sensor to the digital signal processor;	See claim 9 above. Ex. 1002 at ¶ 294.
providing digital and optical data to a digital signal processor;	See claim 9 above. Ex. 1002 at ¶ 295.
identifying specific optical aberrations and accessing a database to identify specific corrections to the aberrations;	See claim 9 above. Ex. 1002 at ¶ 296.
selecting a specific procedure from the	Data such as information relative to distortion aberration, distortion correction values and lens type are used to select

Claim Clause	Watanabe Grounds
database using the microprocessor to optimize the image and correct the aberrations;	a specific image correction process from tables 70. Ex. 1007 at [0047]. Ex. 1002 at ¶ 297.
applying digital filtration by using the application specific integrated circuit and digital signal processor to correct digital or optical aberrations;	See claim 9 above. Ex. 1002 at ¶ 298.
correcting optical aberrations with digital filtration to modify multiple images from different focal lengths in a succession of data files; and	See claim 9 above. Ex. 1002 at ¶ 299.
storing the modified data files in memory.	See claim 9 above. Ex. 1002 at ¶ 300.

ii. Ground 5: Obviousness of claims 1-3, 18-20 over Watanabe in view of Russ

While Watanabe describes a camera with an optical lens mechanism, it does not explicitly describe a fixed focal length lens. Ex. 1007 at [0036]. Figure 3 shows that the lens type is saved in the process information. Ex. 1007 at FIG. 3. This would suggest to a POSA that the lens mechanism is interchangeable. Ex. 1002 at

¶¶ 53-59, 320. A POSA would have understood that there are two classes of lenses, zoom and fixed focal length. Ex. 1002 at ¶¶ 53-59. A POSA would have understood that digital cameras, such as the one described in Watanabe, would have been expected to receive either type of lens. The POSA also would have understood that the correction process would not have materially differed for either type. Ex. 1002 at ¶¶ 53-59. The only difference is that correction information is provided per focal length. Thus, a fixed focal length lens would typically have a single (or a few) focal length-related correction option, while a zoom lens would have correction operations for each possible zoom setting (i.e., each different focal length). Ex. 1002 at ¶¶ 53-59.

Watanabe and Russ have been described in detail above. Watanabe performs various image processing after sorting image data into color-difference data and brightness data. Ex. 1007 at [0038]. Special effects have long been used in digital cameras, examples include image softening, sepia effects, color saturation adjustment, and the like. A POSA would look to combine Watanabe with Russ because Russ provides specific mechanisms for making the adjustments called for in Watanabe. A POSA would understand that any conventional image processing methods could be used, including those described in Russ. Ex. 1002 at ¶¶ 64-72, 84, 164-72, 301-07. For instance, while Watanabe does not mention using Fourier transforms, Russ teaches how images are processed using the same. Ex. 1008 at p.

278 (“Although many different types of image transforms can be used, the best known ... is the Fourier transform.”).

Given that Russ is a handbook for executing image processing, and Watanabe performs multiple types of image processing, a POSA would have had a reasonable expectation of success combining these references. Ex. 1002 at ¶¶ 301-07.

Claim Clause	Watanabe Grounds
1. A digital imaging system for image filtration comprising:	Claim 1 corresponds generally to claim 9. For the elements in claim 1 that are substantially similar to those in claim 9, reference will be made to claim 9. Ex. 1002 at ¶¶ 308-10.
a digital camera mechanism,	See claim 9 above. Ex. 1002 at ¶ 311.
an optical lens mechanism,	See claim 9 above. Ex. 1002 at ¶ 312.
a digital sensor,	See claim 9 above. Ex. 1002 at ¶ 313.
a microprocessor,	See claim 9 above. Ex. 1002 at ¶ 314.
a digital signal processor,	See claim 9 above. Ex. 1002 at ¶ 315.

Claim Clause	Watanabe Grounds
an application specific integrated circuit,	See claim 9 above. Ex. 1002 at ¶ 316.
system software,	See claim 9 above. Ex. 1002 at ¶ 317.
a database management system and	See claim 9 above. Ex. 1002 at ¶ 318.
a memory storage sub-system;	See claim 9 above. Ex. 1002 at ¶ 319.
wherein the optical lens mechanism is a fixed focal length;	Watanabe teaches an optical lens mechanism. Ex. 1007 at [0036]. FIG. 3 shows that the lens type is saved in the process information. Ex. 1007 at FIG. 3. This suggests to a POSA that the lens is interchangeable and can accept a fixed focal length lens. Ex. 1002 at ¶ 320.
wherein the aberrations from the optical lens mechanism are corrected by applying digital filtration by using the application specific integrated circuit and the digital signal processor;	See claim 9 above. Ex. 1002 at ¶ 321.
wherein the microprocessor is used to provide	See claim 9 above. Ex. 1002 at ¶ 322.

Claim Clause	Watanabe Grounds
digital and optical data to the digital signal processor;	
wherein the system software is organized to identify specific optical aberrations and to access the database to identify specific corrections to the aberrations;	See claim 9 above. Ex. 1002 at ¶ 323.
wherein the system software forwards the data from the digital sensor to the digital processor;	See claim 9 above. Ex. 1002 at ¶ 324.
wherein the digital signal processor selects a specific procedure to optimize the image and corrects the aberrations;	See claim 9 above. Ex. 1002 at ¶ 325.
wherein the data are forwarded from the digital sensor to the digital signal processor by an application specific integrated circuit;	The image data formed on the CCD (sensor) is forwarded to the CDS circuit and the A/D converter (the functionality of both may be implemented as an ASIC). Ex. 1007 at FIG. 1, [0037]-[0038]. The digital signal processing circuit (DSP) then receives the data from the A/D converter. Ex. 1007 at [0038]. Ex. 1002 at ¶ 326.
wherein the digital signal processor applies a fast Fourier transform to a data file in order to satisfy a user specified	Watanabe teaches that its processes can be implemented by a user. Ex. 1007 at [0041] (explaining that the camera has buttons for selecting functions, configuring settings, carrying out a function by operation, and “other functions according to each operation mode”); [0083] (teaching that the photographer can select desired entry contents from

Claim Clause	Watanabe Grounds
special effects function;	the display). In Watanabe, “the digital signal processing circuit 56 sorts out image data inputted from the A/D converter 55 into color-difference data and brightness data and executes various processing.” Ex. 1007 at [0038]. Russ also teaches how user applied special effects may be executed through a fast Fourier transform. Ex. 1008 at “Introduction” (providing image processing tools “so that the user of computer-based systems can ... understand those methods provided in packaged software.”), 277 (“applying computer methods to images for purposes of enhancement”), 312 (“The . . . filter can be constructed either manually or automatically.”), 305 (“The transform of this image is then processed by smoothing and leveling, and then thresholded to locate the peaks. The inverse of this mask is then smoothed and multiplied by the frequency transform of the original image to produce the filtered result.”), 334 (“Thresholds may be set interactively by a user watching the image and using a colored overlay to show the result of turning a knob or otherwise adjusting the settings. . . . [T]he user may adjust virtual sliders or mark a region on a histogram to select the range of brightness values.”). Ex. 1002 at ¶¶ 327-28.
wherein the digital signal processor modifies the data file by applying the special effects function; and	In Watanabe, “the digital signal processing circuit 56 sorts out image data inputted from the A/D converter 55 into color-difference data and brightness data and executes various processing.” Ex. 1007 at [0038]. A special effects functions would be applied in the digital signal processing circuit 56 as well. Ex. 1002 at ¶ 329.
wherein the modified data file consisting of the digital data	After correction, the images are stored in memory. Ex. 1007 at [0039], [0058]

Claim Clause	Watanabe Grounds
optimized from the aberrations that are corrected from the original optical image is stored in memory.	Ex. 1002 at ¶ 330.
2. The system of claim 1:	
wherein the special effects function is a color enhancing function.	In Watanabe, “the digital signal processing circuit 56 sorts out image data inputted from the A/D converter 55 into color-difference data and brightness data and executes various processes.” Ex. 1007 at [0038]. A POSA would understand that Watanabe would also be capable of implementing user selected color enhancing special effects. Ex. 1007 at [0041] (explaining that the camera has series of buttons for selecting a function, configuring settings, displaying guidance on a screen, carrying out a function by operation, and “other functions according to each operation mode”); [0083] (teaching that the photographer can select desired entry contents from the display). Russ carries out color enhancement. Russ teaches that FFT is used on images to adjust color features. Ex. 1008 at p. 277 (“applying computer methods to images for purposes of enhancement”), 308-09 (“[C]olored halftone prints are typically made using cyan, magenta, yellow, and black inks, with each color having a halftone screen oriented at a different angle. The procedure required is to separate the color channels, process each one, and then recombine them ... A top hat filter was applied to the Fourier transform power spectrum from each channel to select the noise peaks, which were then removed. Recombining the resultant color channel images produces the result shown.”), 305 (“The transform of this image is then processed by smoothing and leveling, and then thresholded to locate the peaks. The inverse of this mask is then smoothed and multiplied by the frequency

Claim Clause	Watanabe Grounds
	transform of the original image to produce the filtered result.”), 334 (“Thresholds may be set interactively by a user watching the image and using a colored overlay to show the result of turning a knob or otherwise adjusting the settings. . . . [T]he user may adjust virtual sliders or mark a region on a histogram to select the range of brightness values.”). Ex. 1002 at ¶¶ 331-333.
3. The system of claim 1:	
wherein the special effects function is a diffusion function of soft effect.	Watanabe performs “various processing.” Ex. 1007 at [0038]. Russ teaches that FFT is used to soften image features, particularly using a low-pass filter. Ex. 1008 at p. 301-03 (“Butterworth low-pass filters with radii of 10 and 25 pixels in the frequency-domain image smooths the noise with some blurring of the high-frequency detail.”), 286 (explaining that removing unwanted information in the frequency domain naturally leads to visually smooth filtering). Ex. 1002 at ¶¶ 334-37.
18. A method of image filtration which comprises:	Claim 18 recites corresponds generally to claim 1. For the elements in claim 18 that are substantially similar to those in claim 1, reference will be made to claim 1. Ex. 1002 at ¶¶ 338-40.
a digital camera mechanism,	See claim 1 above. Ex. 1002 at ¶ 341.
an optical lens mechanism,	See claim 1 above. Ex. 1002 at ¶ 342.

Claim Clause	Watanabe Grounds
a digital sensor,	See claim 1 above. Ex. 1002 at ¶ 343.
a microprocessor,	See claim 1 above. Ex. 1002 at ¶ 344.
a digital signal processor,	See claim 1 above. Ex. 1002 at ¶ 345.
an application specific integrated circuit,	See claim 1 above. Ex. 1002 at ¶ 346.
system software,	See claim 1 above. Ex. 1002 at ¶ 347.
a database management system and	See claim 1 above. Ex. 1002 at ¶ 348.
a memory storage sub-system;	See claim 1 above. Ex. 1002 at ¶ 349.
wherein the aberrations from the optical lens mechanism are corrected by applying digital filtration by using the application specific integrated circuit and the digital	See claim 1 above. Ex. 1002 at ¶ 350.

Claim Clause	Watanabe Grounds
signal processor, the method consisting of;	
forwarding the data from a digital sensor to a digital signal processor by an application specific integrated circuit;	See claim 1 above. Ex. 1002 at ¶ 351.
providing digital and optical data to the digital signal processor;	Claim 1 requires that a microprocessor provide digital and optical data to the digital signal processor. However, here, that same limitation is not required. Thus, the arguments for claim 1 apply equally to this broader limitation. See claim 1 above. Ex. 1002 at ¶ 352.
identifying specific optical aberrations and accessing a database to identify specific corrections to the aberrations:	See claim 1 above. Ex. 1002 at ¶ 353.
selecting a specific procedure from the database using the microprocessor to optimize the image and correct the aberrations:	The microprocessor in Watanabe is disclosed as a CPU which controls all parts of the digital camera. Ex. 1007 at [0035], [0042]. In addition to overall control, the CPU functions as an image processing device. Ex. 1007 at [0059]. For correction, data such as information relative to distortion aberration, distortion correction values and lens type are used to select an image process from tables 70. Ex. 1007 at [0047]. Based on the CPU's control, it would be used to optimize and correct the images. Ex. 1002 at ¶ 354.
applying digital filtration by using the application specific integrated	See claim 1 above. Ex. 1002 at ¶ 355.

Claim Clause	Watanabe Grounds
circuit and digital signal processor to correct digital or optical aberrations:	
applying a fast Fourier transform to a data file in order to satisfy a user specified special effects function;	See claim 1 above. Ex. 1002 at ¶ 356.
modifying the data file by applying the special effects function using the digital signal processor; and	See claim 1 above. Ex. 1002 at ¶ 357.
storing the data file in memory.	See claim 1 above. Ex. 1002 at ¶ 358.
19. The method of claim 18 further comprising the step of:	Claim 19 in a method claim that corresponds generally to claim 2. For the elements in claim 19 that are substantially similar to claim 2, reference will be made to claim 2.
applying the special effects function as a color enhancing function.	See claim 2 above. Ex. 1002 at ¶¶ 359-60.
20. The method of claim 18 further comprising the step of:	Claim 20 in a method claim that corresponds generally to claim 3. For the elements in claim 20 that are substantially similar to claim 3, reference will be made to claim 3.
applying the special effects function as a diffusion function of soft effect.	See Claim 3 above. Ex. 1002 at ¶¶ 361-62.

VII. CONCLUSION

As demonstrated above, a reasonable likelihood exists that the Challenged Claims are unpatentable. Accordingly, Petitioner respectfully requests *inter partes* review of the Challenged Claims.

Date: July 20, 2020

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), I hereby certify that the foregoing Petition for *Inter Partes* Review contains 13,978 words as measured by the word processing software used to prepare the document, in compliance with 37 C.F.R. § 42.24(a).

DATED: July 20, 2020

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that true and correct copies of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 7,612,805 and accompanying exhibits were served on July 20, 2020 via USPS EXPRESS MAIL to the following address:

Correspondence Address of Record for U.S. Patent No. 7,612,805

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