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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO. LTD., and
SAMSUNG ELECTRONICS AMERICA, INC.,

Petitioner,

v.

CELLECT, LLC,

Patent Owner.

IPR2020-00475
IPR2020-00512
Patent 9,186,052 B2

Record of Oral Hearing
Held: May 26, 2021

Before JAMESON LEE, PATRICK M. BOUCHER, and
JOHN R. KENNY, *Administrative Patent Judges.*

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The above-entitled matter came on for hearing on Wednesday, May 26, 2021, commencing at 1:00 p.m., EDT, at the U.S. Patent and Trademark Office, by video/by telephone.

P R O C E E D I N G S

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JUDGE KENNY: Good afternoon. This is the consolidated hearing for IPR 2020-00475 and IPR 2020-00512. I'm John Kenny. I'm joined by Judges Lee and Boucher. Let's have an introduction with the parties starting with counsel for Petitioner.

MR. DAVIS: Yes, Your Honor. This is Jim Davis. I'm here in our Silicon Valley office at Ropes & Gray. With me here is Ms. Carolyn Redding and my colleague Scott McKeown is also present in our D.C. office.

JUDGE KENNY: And who will be speaking today on behalf of Petitioner?

MR. DAVIS: With respect to the opening portion, Your Honor, I will be handling all of the arguments with the exception of secondary considerations which Ms. Redding will handle and we'd like and we'd like to reserve any remaining time for the rebuttal which Mr. McKeown will be handling.

JUDGE KENNY: Counsel for Patent Owner. Can you do your introductions?

MR. CAPLAN: Good afternoon, Your Honors. Jonathan Caplan, counsel for Patent Owner Cellect and with me in the room is my colleague Marcus Colucci.

JUDGE KENNY: And who will be speaking today on behalf of Patent Owner?

MR. CAPLAN: Your Honor, I will be speaking on behalf of Patent Owner.

JUDGE KENNY: All right. A few ground rules. When speaking try to introduce yourself just to make it easier for the court reporter. When referring to demonstratives, papers or exhibits please identify them specifically by slide, page number, exhibit number, et cetera, and also if you can try to, just to make it easier if you're not speaking, try to mute yourself and unmute yourself when you are speaking. Each party will have a total of 90 minutes to present argument. Petitioner, how much time would you like to reserve for rebuttal?

MR. DAVIS: Your Honor, we'd like to reserve any remaining time for rebuttal and I estimate that that will be about 45 or 30 minutes, something around that ballpark.

JUDGE KENNY: Okay. As long as it's less than half the 90 minutes allotted time, that's okay.

MR. DAVIS: Yes.

JUDGE KENNY: Okay. Petitioner, you can proceed.

MR. DAVIS: May it please the Board, and I'll be referring to Exhibit 1097 which was filed in both proceedings in Petitioner's demonstratives starting with slide 7. The false premise that pervades each and every one of Patent Owner's arguments here is that prior to the '052 patent, Patent Owner asserts that the only version of a CMOS imager was a camera-on-

a-chip that is according to Patent Owner a timing controller -- the timing control circuitry as well as the video conversion circuitry were all located on the same chip at the CMOS array.

That's why in Patent Owner's claims, and you can see here summarized the three independent claims that are being challenged, Patent Owner just simply recites a rearrangement of the components from claim to claim. In claim 1 it recites a CMOS pixel array, the timing control circuitry on a first circuit board and then video conversion circuitry on a second board that's offset and parallel to the first. In claim 2 it recites the two boards are stacked relative to one another. In claim 3 it recites that the CMOS pixel array is on a substrate that's stacked relative to a first circuit board, the timing control circuitry and a second circuit board with video conversion circuitry that's offset and parallel to the first.

According to Patent Owner, any prior art that has any of these components, the timing and control circuitry or the video conversion circuitry, off-chip or separate from the array it cannot be a CMOS imager. Instead it must be a CCD. That main false premise that pervades each and every one of their arguments is belied not only by the references themselves in each and every one of the grounds but also by Petitioner's initial exhibits to evidence submitted to support motivation to combine, expectation of success as well as Patent Owner's own admissions

and Patent Owner's own evidence.

Turning first to the references relied on in each of the grounds. On slide 8 we rely on Wakabayashi in view of Ackland with respect to claim 1. Wakabayashi discloses a solid state imager and solid state being a broader category of imagers that can either be CMOS or CCD or other variations. It discloses a particular arrangement of an imager element 27 depicted here in figure 7 on slide 8 which is stacked relative to board 29 and then a separate board 39. Wakabayashi discloses that its video processing circuitry or video conversion circuitry is located on board 29 but as Dr. Neikirk testified it would have been obvious to move that circuitry over to board 39, the larger of the two boards, to make the imager portion of the camera even smaller and easier to rotate. Ackland provides the additional teachings of a CMOS active pixel imaging array for all this timing and control circuitry which a person of ordinary skill in the art would have been motivated to apply in implementing Wakabayashi.

Turning to slide 9 which also relies on Wakabayashi as a primary reference instead of Ackland, the Petitioner in their trial grounds rely on Ricquier and Dierickx, Ricquier disclosing all of another CMOS pixel array, this time with off-chip timing and control circuitry and Dierickx provides the additional teaching of actually using active pixel sensors as opposed to passive. The only difference between the two being that you would just add an

amplifier at each individual pixel to reduce the amount of noise and to improve the image quality.

Turning to slide 10 with respect to claim 2, we rely on Swift in view of Suzuki and require Swift disclosing a CMOS imager which was mounted on board 52 as you can see here in figure 2 of Swift, a separate board 53 which has video conversion circuitry but as you can see here they're not stacked relative to one another, that board 53 is at a right angle relative to 52 but Swift itself discloses that you can relocate or reorient the boards relative to one another and rendering having a stack orientation obvious, Suzuki actually provides an express teaching of stacking the boards relative to one another and Ricquier provides the additional teach of actual array of pixels in addition to off-chip timing and control circuitry.

Patent Owner's only response to these arguments is to try to rewrite each and every one of the references. With respect to Wakabayashi and Suzuki, both of which disclose solid state imagers, again that broader class of imagers that includes both CCD and CMOS, Patent Owner tries to rewrite them as somehow being limited to CCD. With respect to Swift and Ackland and Ricquier which each disclose CMOS imagers, Patent Owner tries to rewrite them to say they must be limited to a camera-on-a-chip despite the fact that Swift and Ackland and Ricquier either the disclosed video processing circuitry or the video conversion

circuitry and the timing and control circuitry located off-chip.

JUDGE LEE: Mr. Davis.

MR. DAVIS: Yes, Your Honor.

JUDGE LEE: This is Judge Lee. I'm reading the petition, your claim chart on page 38, specifically about where the conversion circuitry is and in the table in the claim chart you say the video processor in Swift is on circuit board 53 but you don't cite to where. There's no citation to the location in Swift. Do you know where that disclosure is?

MR. DAVIS: Yes, Your Honor. Sorry, that was in the other petition. So page 38 you said?

JUDGE LEE: Page 38 of the '512 petition.

MR. DAVIS: Yes, Your Honor, and actually we do address this in our demonstratives. If we can pull up that slide. This is slide 61 of Exhibit 1097.

JUDGE LEE: Uh-huh.

MR. DAVIS: And we have excerpted there that particular passage from Swift explaining that, and this is at column 8, lines 33 to column 9, line 18 and this particular portion is cited on page 39, it's the following page of the petition here explaining that the circuit board 53 has various circuitry components mounted on it that process image signals received from the image sensor and that then converts the image sensor to a video, or the image signal rather to a video signal that is then output via the

cable that's connected to board 53 which is then routed to a display.

JUDGE LEE: Well, what if you received is already a video signal? I mean I don't see where it says it goes from something that's not a video signal to a video signal.

MR. DAVIS: Expressly in the same passage, Your Honor, it expressly states that the circuitry components process image signals. So it's the image signals that are coming in and it's the video signals that are then coming out and being routed to the display.

JUDGE LEE: Okay, but. Okay. There are other parts of Swift though that's problematic. Maybe, I don't know if you can call it page 5 of Swift and at the bottom starting at line 32. I'm not sure where it is but I felt somewhere else that it says in Swift a video processor seems to be on board 52. When I did a word search for video processor that's what came up and not the part you showed me. I'm going to word search video processor again --

JUDGE KENNY: I think it's actually cited in the petition, Jameson, I believe you'll find it.

JUDGE LEE: Okay.

JUDGE KENNY: The quote you're talking about is cited in the claim chart in the petition.

JUDGE LEE: Okay. Thank you. In claim 17 of Swift also

says the video processor is on the second chip.

MR. DAVIS: On the second chip meaning --

JUDGE LEE: No, I'm sorry. The first chip, first chip. Yes, claim 17 of Swift says an image sensor assembly, the assembly comprising a printed circuit board and mounted thereon the image sensor, a video processor, blah blah blah.

MR. DAVIS: Yes, Your Honor. It actually -- what Swift discloses at several points is really the basic principle that you can also move different components around. If you look, Your Honor, at page 9 lines 20 to 21 it says that you can actually combine boards 52 and 53. So Swift discloses several different orientations where the circuitry is located in different places and has different options.

JUDGE LEE: Oh, I see.

MR. DAVIS: (Indiscernible) relied on.

JUDGE LEE: I see. Okay. We got the page now. It's actually page 4, page 3 of Swift at the bottom. The assembly comprising a printed circuit board and mounted thereon the image sensor, a video processor … So there again the video processor is on the first circuit board.

MR. DAVIS: Yes, Your Honor. In that particular embodiment it says it's on a first circuit board and as I was pointing out in column 9 it says you can actually combine what would otherwise be on two separate circuit boards 53 and 52.

That's an alternative embodiment in Swift. So it also discloses, as was relied on in the petition, board 53 instead doing that video conversion from the image signals to a video that is then output via the cable attached to board 53.

JUDGE LEE: All right. So what you showed us in column 8 is really the embodiment you're relying on?

MR. DAVIS: Yes, Your Honor.

JUDGE LEE: Are we sure that's a separate embodiment and it's not just talking about the previous disclosures? Does it start with oh, here's another embodiment or is it like running on continuing on from previous embodiments that are clearly having the video processor on the same board?

MR. DAVIS: Your Honor --

JUDGE LEE: If it's the other way then we're not -- I'm not sure that the image signals you're receiving is pre-video. You may already be receiving a video signal and you're further processing it.

MR. DAVIS: Yes, Your Honor. Even if it's a different embodiment I think that's (indiscernible) by the fact that it starts off saying this is them talking about figure 2 where it then describes the different portions of figure 2 including the separate circuit boards 52 and 53 and then as part of that same discussion in that very next paragraph it says that you can combine 52 and 53 into the same circuit board, such that in that instance just like

in the instances you pointed out in claim 17 or earlier on in the summary of the invention you can actually have all these things on the same circuit board. So it discloses both different orientations where to locate the video processing circuitry.

JUDGE LEE: Okay. Thank you.

JUDGE KENNY: And just so the record is clear, what you're talking about is the next paragraph is on page 9, lines 20 and 21?

MR. DAVIS: Thank you, Your Honor, yes.

JUDGE KENNY: Okay.

JUDGE LEE: Okay. You can go on. Thank you.

MR. DAVIS: Thank you, Your Honor. So what Patent Owner resorts to here is trying to rewrite each and every one of the references that are relied on in the grounds, rewriting Wakabayashi and Suzuki from solid state imagers to instead it is somehow limited to CCD imagers trying to rewrite Ackland and Swift and require from CMOS imagers that have object timing control or have object data processing circuitry to instead somehow be limited to a camera-on-a-chip. Those arguments by the Patent Owner are not only belied by the references in the grounds themselves, but also by the additional undisputed evidence that was submitted throughout the course of the proceeding.

Turning to slide 11 of Exhibit 1097. The Monroe

reference, Exhibit 1007 teaches processing circuitry for its CMOS imager that is in a completely separate box from the CMOS imager depicted there in figure 3. Those teachings were never disputed by Patent Owner in these proceedings. The Stam reference, Exhibit 1043 actually discloses an imager element 106 as you can see here in figure 5 with its image array sensor with its CMOS active pixel sensor array that can actually be purchased as you can see in this excerpt here from Stam at column 4, line 66 to column 5, line 12 from a company called Photobit but then you have a separate processor and separate timing and control circuitry with a CMOS active pixel sensor array. The bottom of slide 11, Exhibit 1087, is a BYTE Magazine review article about an actually commercially available camera at the time that used a CMOS imager and yet had a separate processor on it that was not a camera-on-a-chip according to using Patent Owner's terminology but using a separate processing circuitry off-chip.

The contradictions in Patent Owner's arguments and the problems with it don't really end there either. Turning to slide 12, Patent Owner's own arguments and own evidence contradict its arguments. Here an excerpt from their Patent Owner response submitted in the '475 proceedings at pages 14 to 15 is at the top of slide 12 where Patent Owner argues that the most important advantage of CMOS active pixel sensor approach is the ability to

integrate. It's not a requirement that you integrate, it's just a capability that you could integrate these various circuitry whether it's the timing and control or the signal processing circuitry.

The next sentence even in Patent Owner's argument there that allows higher performance than conventional CMOS imagers image sensors and it concedes that the conventional way of doing this was to have all of these different components separate. That's further confirmed by Patent Owner's evidence. Exhibit 2060, a Wall Street Journal article by Johannes talks about CMOS chips and separate memory chips and the processing chips confirming that CMOS isn't limited to a camera-on-a-chip. It further talks about CMOS sensors cost less than CCDs even without integrating all of these different functionalities and circuitry on to the same chip.

Exhibit 2050 and Exhibit 2069 both talk about the ability and the capability of integrating these components but again, not a requirement and the Zarnowski reference Exhibit 2007 talks about the increased functionality offered by CMOS imagers now includes partial or complete integration of electronics, again and again confirming that CMOS imagers are not limited to a camera-on-a-chip. It might have provided that option but it certainly is not a patentable distinction to say that all these components are separate because indeed that way the

conventional way of doing things.

And even taking a step back from all of this on slide 13, Dr. Neikirk talks about this concept of rearranging elements between different components, between different circuit boards and then as cited Roustael and Crosetto references, Exhibits 1030 and 1032 again and again confirm that this is something engineers do all the time. They know that it's part of the job when they're trying to fit circuitry on to different boards inside of some type of a device, that it was well known to move that circuitry between different circuit boards, and so that backdrop that each and every one of Patent Owner's arguments with respect to the disputed limitations really fails here.

Starting first with the '475 proceeding, and this is on slide 14, Patent Owner disputes a number of different limitations. But really its arguments each and every one of those times simply comes down to the fact that it's trying to rewrite the references and ignore the express disclosures of the references under that false premise that somehow CMOS is limited to a camera-on-a-chip.

Turning to slide 15. The first limitation that is here relates to the location to the array of CMOS pixels either on a first circuit board with a planar substrate depending on which claim we're talking about, claim 1 or claim 3.

Turning to slide 16. As I mentioned before, we rely on

Wakabayashi in view of Ackland's teaching. Ackland providing an example of the solid state imagers that are taught in Wakabayashi, in particular a CMOS active pixel sensor imaging array with its timing and control circuitry and relocated as part of the same active pixel imaging system.

On slide 17 we've set forth a number of different motivations to apply these teachings that are admitted in the '052 patent itself that are in Ackland itself that Dr. Neikirk further testified to that it was cheaper to use CMOS, it was more efficient. You could mass produce them, they had lower noise. All motivations to apply Ackland's teachings.

Slide 18. Even Patent Owner's own arguments and evidence itself further supports that argument. The Wall Street Journal article 2060 we referenced before recognizes that CMOS was cheaper. Dr. Lebby, Patent Owner's expert, testified extensively in paragraphs 83 and 89 of his declaration about how it was well known that CMOS had a number of advantages that would have motivated a person of skill in the art to apply its teachings.

JUDGE LEE: I have a question here, Mr. Davis. Is the advantage of CMOS being cheaper, is that taking into consideration that of large scale innovation so that you have really almost everything on one chip and that's why it's cheaper and so if you don't implement camera-on-a-chip then it's not

necessarily cheaper?

MR. DAVIS: No, Your Honor, it's not limited to that. If we go back to slide 18 using Patent Owner's own evidence, this is Exhibit 2060 and at the top there it says CMOS sensors cost an average of less than $14, about 15 to 20 percent cheaper than CCDs and it goes on to say if additional image processing functions are crammed onto the chip, if you do have a camera-on-a-chip, then it's even cheaper. Those savings can reach 50 percent. So even without using what Patent Owner calls a camera-on-a-chip there's still significant cost savings.

JUDGE LEE: Well, it would seem that that's a pretty indisputable factor whether something is cheaper or not. Is there a difference in expert opinion on that? Does their expert say oh, no, CMOS is not cheaper? It would seem like something that the experts would not disagree over.

MR. DAVIS: I agree with you, Your Honor, that it is something the experts shouldn't disagree over but I think this is a point for the experts, you know, disagree and Dr. Lebby directly contradicts the express disclosures of the evidence that he's relying on.

JUDGE LEE: Okay. Thank you.

MR. DAVIS: Turning to slide 19. Wakabayashi again is relied on here for claim 3 but as I mentioned before, we rely on Ricquier for its teachings of particularly related to off-chip

timing and control circuitry. Ricquier itself, in addition to all the well known benefits of applying CMOS, also teaches a number of additional advantages including selective addressability that its configuration offers as well as the ability to program also different resolutions on the fly, both of which would have motivated a person of ordinary skill in the art to apply its teachings.

On slide 20, Dr. Neikirk. We have an excerpt from his testimony relying on Ricquier as well as Exhibits 1045 and 1016, the Printed Circuit Board Textbook as well as Tanuma explain that this flexibility that's offered, this is from Dr. Neikirk's '475 declaration at paragraph 170, that flexibility locates something on a chip, for example, on the back of a circuit board to make a more compact camera head is an advantage that also would have motivated a person of ordinary skill in the art to apply Ricquier's teachings.

Patent Owner's arguments in response here are really what we (audio interference) here before. It just simply tries to rewrite the Wakabayashi reference to somehow limit it to CCD even though Wakabayashi expressly discloses -- it's directed towards solid state imagers. With respect to Ricquier, Patent Owner tries to argue that that's somehow limited to a camera-on-a-chip even though that term isn't mentioned in Ricquier and Ricquier expressly discloses off-chip timing and control and the

same thing with Ackland. Patent Owner tries to again rewrite that as a camera-on-a-chip reference even though the Ackland reference again never refers to a camera-on-a-chip and instead discloses that the video processing circuitry is located separate from the active pixel sensor imaging system that has a timing and control and array.

If there aren't any further questions on that limitation, I'll move over to the next disputed limitation. This is on slide 30 and this ties in closely and is again recited in claim 3 ties in closely to what we were just discussing. Claim 3 requires object timing and control such that the timing and control is on a first circuit board and stacked relative to an array of planar substrate and again, this is on slide 31, we rely on Ricquier for those off-chip timing and control teachings. The reasons to apply Ricquier's teachings are exactly the same as what we just discussed, you would apply the array teachings for the CMOS array to element 27 and you'd apply timing and control off-chip teachings to board 29 such that they're stacked relative to one another.

On slide 32 we have an excerpt of some of the teachings that Neikirk relied on as part of the motivation to combine and expectation of success testimony that he offered that the Tanuma reference and the printed circuit board reference confirming that it was well known to locate, for example, the circuitry on the

back side of a board such that you could even make a camera head smaller as would be done when applying these teachings to Wakabayashi and Patent Owner's attempts to refute those arguments are again more of the same trying to rewrite Wakabayashi and Ricquier contrary to their express disclosures.

Slide 34 has the next limitation about the video conversion circuitry that's located on a second circuit board that's offset from and parallel to the first. With respect to both claims we rely on Wakabayashi's teachings here.

If we turn to slide 36. Wakabayashi, as Your Honors know, teaches a handheld camera with a video screen on one side and a camera that can rotate to face away from the user or face back towards the user. That camera unit, as you can see in the cross-section of the device in figure 3, is a circular portion on top. In describing the different circuitry components that are part of its overall device and those are depicted in figure 22, Wakabayashi explains that the camera circuit 102 which includes a camera signal processing circuit and generates a video signal in a television signal format. That is located on element 102 and then element 102 as you can see in figure 22 is located inside of this dotted box which Wakabayashi at column 9, lines 9 to 21 explains is part of the camera. So it's part of that circular portion that in the circuit board that it would be mounted on is board 29 kind of lighted in blue there in that cross-section.

And if we turn to slide 37. Dr. Neikirk testifies a person of ordinary skill in the art would have been motivated to instead locate that video conversion circuitry on board 39. It's a bigger board. It already has additional signal processing on it and it actually furthers Wakabayashi's own goal of trying to make that portion that rotates even smaller.

Patent Owner's only real response to this argument doesn't really refute that it would be obvious to move the circuitry from 29 to 39, instead it argues it would also be obvious to move the timing and control circuitry there too. Well, that may very well be the case that that's also another obvious modification that could be made. That's not what the trial ground is. The trial ground is just moving a video conversion circuitry, the fact that there are other obvious alternatives doesn't render the trial ground itself not obvious. Turning to slide 40. Each of the claims requires that there be an --

JUDGE KENNY: Counsel, may be we can go back to slide 39. Can you explain a little bit more to me? In other words they're saying that basically if you're going to start combining, if you're motivated to combine you're motivated to actually go to something that wouldn't fall within the scope of the claims. That's basically their argument; right?

MR. DAVIS: Their argument is that if you were going to locate the video conversion circuitry on board 39, then another

obvious alteration is to also locate the timing and control circuitry there and that's not what the trial ground is. The question is whether it would be obvious to just move the video conversion circuitry there which Patent Owner doesn't dispute the presence of another --

JUDGE KENNY: Well, but if you move both there then don't you have a problem of satisfying the claim?

MR. DAVIS: You're correct, Your Honor. If we move both timing and control and the video conversion circuitry over to board 39, that wouldn't meet the claim. But that doesn't mean that locating timing and control circuitry on board 29, as Dr. Neikirk has testified and as the prior art discloses and the video conversion circuitry on board 39, doesn't mean that that's not obvious. That's the trial ground that's being relied on.

JUDGE KENNY: Okay. But then I guess that is the question. Why would one be motivated to do precisely the modification we were talking about rather than the modification that could fall outside the scope of the claim?

MR. DAVIS: I think as the Federal Circuit has directed in -- this is two case cites that we have here on slide 39 from Mouttet as well as Fulton that simply because there are other alternatives, other obvious modifications, it doesn't render the proposed modification nonobvious. So the fact that you could also timing and control circuitry over to board 39 as opposed to

board 29 doesn't mean that just moving the video conversion circuitry over to board 39 wouldn't be obvious.

JUDGE KENNY: But is there a reason why somebody would want to just move one of them, in other words --

MR. DAVIS: Sorry, Your Honor. Go ahead.

JUDGE KENNY: No, that is the question. I mean is there -- I mean because I, there are different situations where you could have like chemical bases where they're just two different chemicals and you can point to one that may be better than something else here. But we're talking now about the motivation that's actually getting us to the alternative you're talking to and the question just basically is there a reason why somebody would want to make just that modification and not, you know, go all the way so to speak?

MR. DAVIS: Yes, Your Honor. I think there was a couple of additional pieces that are in the record here as to why that would be. Wakabayashi already discloses similar processing circuitry that's associated with the imager on board 39. So that's a tie in to move the conversion circuitry over there to mean so that you have all the processing done in one place on one board. Timing and control circuitry isn't the same processor, it's something separate. It's tied in to and needs to be fed back into the actual array itself. That's one reason why these are two different types of circuits and you would locate the timing and

control with the array off-chip but right next to it on the other side of the board and the processing circuitry which later sees (phonetic) the output separately on board 39.

The next limitation that's in dispute was on slide 40. This is the requirement that you have an amplifier with each individual pixel. That arrangement as the '052 patent itself recognizes was well known is what's called an active pixel imaging system as opposed to a passive one and the patent itself makes clear at column 2, lines 22 to 25, the only real difference there is that you're putting a pixel at each individual, excuse me, including an amplifier rather at each individual pixel and that's precisely what the Dierickx reference teaches.

This is on slide 41. Ricquier itself is a passive pixel imaging system. Dierickx just provides the additional teaching and the advantages of having an amplifier at each individual pixel that lowers noise, increases image quality. Dierickx itself is really directed at that time of using the active pixel imaging systems in order to improve image quality and use active pixel sensor imaging systems even where you're requiring high quality images. Dierickx discusses that, for example, at paragraph 19.

Patent Owner's only response to this is that Dierickx is somehow not compatible with Ricquier because they're two different systems, that really it ignores what the trial ground itself is which is just simply applying teaching which the '052

patent itself recognizes was well known, of using an amplifier at each individual pixel which would have rendered that limitation obvious.

And the last limitation that's in dispute in claims 1 and 3 relates to the size of the imager. This is on slide 44. It requires that the largest dimension of the image sensor along with the first planes between 2 and 12 millimeters. Patent Owner actually does not dispute this limitation for purposes of claim 3, it's really just with respect to claim 1. Claim 3 Dierickx itself discloses that the image sensor has measurements of 6.3 by 5.7 millimeters falling directly within the recited range. But even just taking a step back from that, as the Federal Circuit has rendered in In re Woodruff just simply claiming a particular size range isn't necessarily a patentable distinction. It has to be somehow critical and result in achieving unexpected results that are different from the prior art range. Patent Owner's only argument here is well, we just claim something small so it can be small, for example, you can fit it in an endoscope or something else. That's not a patentable distinction, just claiming a particular dimension for the image sensor. That was what Dr. Neikirk -- sorry, Your Honor.

JUDGE KENNY: Go ahead. No, go ahead.

MR. DAVIS: Nevertheless, Dr. Neikirk has testified that it would have been well known to have image sensors of that size.

As Dierickx itself for example demonstrates for CMOS image sensors and we also apply the teachings, this is on slide 46, of Suzuki which expressly discloses solid state imagers, again that broader class of all imagers that have sizes with a maximum diameter of 10 millimeters, so again falling right in that range.

Additionally Dr. Neikirk cites to a number of other CMOS imagers including Dierickx, Mendis, Dickinson, all of which disclose CMOS imagers of the size demonstrating a reasonable expectation of success. If there aren't any further questions on claim 1 and 3, I'll turn to claim 2.

On slide 48, again we have summarized the various limitations that are in dispute but again Patent Owner's arguments really fall down for pretty much the same reasons. Slide 49 highlights the first limitation in dispute, again it's the CMOS array on a first circuit board.

On slide 50 we again summarize the ground there that's being relied on, Swift in view of Ricquier. Swift is actually teaching an active pixel sensor imager that's mounted on top of board 52 as disclosed there in the cross-section of figure 2. That in and of itself would really meet the limitation so it doesn't expressly say it has an array although that would have been understood. Ricquier provides a teaching of an array to the extent that's required, and it would have been obvious to apply Ricquier's teachings for really much the same reasons we've

already discussed.

Patent Owner's, again, arguments here in response are just attempts to rewrite the references. It tries to rewrite Ricquier in the same manner as before by somehow saying it's limited to a camera-on-a-chip. We're arguing that it's somehow just limited to proof of concept which Ricquier never states and Patent Owner also tries to rewrite the Swift reference saying it too is limited either to a camera-on-a-chip or it's CCD because the video conversion circuitry is off-chip. Again, improperly trying to rewrite the express disclosures of Swift itself.

And the next limitation in dispute is the location of the timing and control circuitry on the first circuit board. This is on slide 56, where we rely again on Swift and Ricquier, Ricquier providing the express teaching of timing and control circuitry that a person of ordinary skill in the art would have been motivated to apply to Swift. Swift is silent on where its timing and control circuitry is located and Ricquier's teachings would locate that timing and control circuitry on the first circuit board.

Again, Patent Owner's arguments in response are pretty much the same thing. Trying to rewrite the references, both Swift and Ricquier, and mischaracterizing Dierickx's express teachings.

JUDGE LEE: Mr. Davis, I have a follow-up question on Swift. You mentioned earlier about column 8 of Swift says the

video processing circuitry is on the first -- on the second board; right?

MR. DAVIS: Yes, Your Honor.

JUDGE LEE: Do we know that that is -- I forgot what slide that was. Maybe that was slide 19, but it doesn't really say from column 8 where you quoted that what's the output. Does it really go from pre-video to post-video?

MR. DAVIS: Yes, Your Honor. I believe that, so there's two or three different disclosures and actually the Institution decision on this really connects all of these different disclosures together in the same way that the petition does. But if you're looking at slide 61, for example, it talks about how that passage in column 8, line 33 to column 9, line 18 you have the processing of the image signals that is done on board 53, a cable 55 is connected to the printed circuit board 53 and if you just turn two slides later slide 63, this has another quote from Swift. The bottom of the two quotes column 15, lines 13 to 14 explains the camera 152 which is the whole camera and the monitor which is the video monitor are connected by that same cabling system that connects directly to board 53. I can provide a citation, Your Honor, to the Institution decision that similarly lays out that same connection. This might take me a second to find where that is.

If you'll permit me, Your Honor, I can find it while Ms.

Redding addresses secondary considerations, and provide that before we close our opening.

JUDGE LEE: Okay.

JUDGE KENNY: That's fine, but counsel it would probably be better to look at the primary references themselves. I think the passage we're talking about is on page 9 of Swift; right? Exhibit 1005.

MR. DAVIS: Yes, Your Honor.

JUDGE KENNY: Okay. So, you know, maybe you can address Judge Lee's question looking, you know, at the passage there.

MR. DAVIS: Your Honor, I apologize. I believe I was with respect to that same excerpt. See it at the bottom -- see there's a disclosure of cable 55 being connected to the printed circuit board at column 9, lines 14 to 15 and then there's a separate disclosure at column 15, lines 13 to 14 where it explains that that cabling system is what connects the camera 152 and the monitor 154 and there's a figure of this, figure 6 I believe it is, that discloses at the very last page of Swift how each of these, you know, you see the cable coming out of the camera 152 and that cabling system that is just routed also to a monitor such that the image sensor, the image signal rather that was converted on board 53 is now a video signal and that is what's being routed out to the monitor.

JUDGE LEE: Okay. So in short because you can view it on the monitor it's a video signal?

MR. DAVIS: Yes, Your Honor.

JUDGE LEE: Okay.

JUDGE KENNY: And I don't mean to discourage you from getting the cite to the Institution decision. That still could be helpful.

MR. DAVIS: Thank you, Your Honor. I appreciate that, Your Honor. I will grab that and provide it to the Board. Thank you. I believe, Your Honor, that we were -- I apologize if I'm retreading ground here. I believe we were talking about the limitation on slide 56 requiring that the timing and control circuitry, I'm sorry, we did cover that. That was Ricquier provides the teaching of the timing and control circuitry being on board 52 when you apply its teachings of object timing and control circuitry and Patent Owner's arguments really are the same. They are trying to rewrite the Ricquier reference.

And as we were talking about on slide 61 with respect to the requiring that the second circuit board, board 53, in Swift has to have the video conversion circuitry that's again because of the cabling connection and the disclosure of the processing and image signals on board 53 and is then outputted directly to a monitor through the cabling system such that it is a video signal that's coming out from board 53.

On slide 62 with respect to the requirement that the two boards, the first and second circuit boards have to be stacked relative to one another, Swift itself teaches that those boards could be oriented in different manners. That's at column 18, lines 25 to 33 but to the extent further disclosure is required Suzuki itself also provides that well known concept of stacking boards relative to one another. That's on slide 62 citing Suzuki's figure 2 and column 3 divides 15 to 25 showing how stacking boards relative to one another was another well known way to orient them, in fact made them more stable and secure by doing so.

JUDGE LEE: Can I ask you this? We don't really know why there's an advantage to having separate boards in Wakabayashi; right? Because we don't need to know because Wakabayashi just says to do that. I was just curious, if Wakabayashi did say that what would be the reason to have it on two boards?

MR. DAVIS: Wakabayashi has two -- there's the rotating component that Wakabayashi has, that's the camera, and then you have the rest of the device which supports the screen and everything else. So they plainly have two different boards, the board that's going to be in the camera portion that rotates and a board that's in the rest of the device. You're right though, Your Honor, we don't need a motivation here because Wakabayashi

expressly teaches having two separate boards.

JUDGE LEE: Yes. The rotation doesn't really require your processing circuitry to be on either board; right? It's still going to rotate regardless of where the processing circuitry is. Not that you need a motivation because it says to do so, but I was just curious if it didn't say to have two boards is there any reason to have the processing circuitry on a second board?

MR. DAVIS: Your Honor, I think that -- well, I think this simply goes back to the point that Dr. Neikirk was making and that's really repeated throughout the art here that it was just well known to move, and this is on slide 13 where we cite to the Ricquier, Cotton and Roustael references Exhibits 1003 to 1032 and this idea of just moving circuitry between different circuit boards using different boards, using one board, those are all in the words of those references just design choices that were well known in the art. You simply were provoking (phonetic) different chips and different boards depending on how you needed to fit them into the particular device. So something that was well known within the art and well within the skill of a person of skill in the art.

JUDGE KENNY: Well, let me follow up on Judge Lee's question. I mean wouldn't the size of the rotating element depend on how much you put on it?

MR. DAVIS: Yes, Your Honor. I think that's another

additional motivation to move some of the circuitry off of what is disclosed in Wakabayash as being on -- in a camera and you can move it off the camera to the rest of the device to a separate circuit board, such that you can make that rotating portion smaller and easier to rotate, for example with your thumb, as you're using the device.

JUDGE LEE: Okay. Thank you.

MR. DAVIS: I think this last limitation that's in dispute here is slide 65. Again the size of the image sensor which, as we've discussed previously with respect to claim 1 would have been obvious for exactly the same reasons, this is on slide 66. Suzuki provides the express teachings of a solid state imager of the size and Dr. Neikirk provides testimony and additional evidence showing that that was well within the ability of a person of skill in the art to create an imager of that size that was CMOS and cites to a number of different examples of that in his declaration and including Dierickx, Mendis and other references. Again, demonstrates that limitation is not a patentable distinction and would have been obvious.

The Larson reference, which was used as a back-up ground, relates to something the Board shouldn't need to reach (phonetic). That back-up ground was included to the extent Patent Owner argued that the monitor or the display needed to be part of the same overall housing and to the extent Swift didn't

disclose that, that's not a disputed limitation for the Swift reference ground, primary ground, so the Larson ground kind of just further proves that and further renders it obvious really isn't in dispute.

If there aren't any further questions, I'll pass the podium to my colleague, Ms. Redding.

MS. REDDING: May it please the Board, Carolyn Redding for Petitioner Samsung. I'll start at slide 72. Patent Owner argues that there are secondary considerations of nonobviousness including long felt need, unexpected results, industry praise and commercial success but all of these arguments lack any nexus to the challenged claims. What you'll see is the Patent Owner's arguments are directed to CMOS technology generally which Patent Owner did not invent or endoscopes in medical imaging applications which are not claimed.

Turning to slide 73. Patent Owner alleges that the patents were licensed, or that the patent was licensed. But Patent Owner's evidence only contains generic statements that (audio interference) licenses technology. Patent Owner has provided no evidence that the '052 patent was licensed nor to whom it was licensed and in what context. There is no nexus between Patent Owner's allegations of licensing and its claims.

Turning to slide 74. Patent Owner argues that industry publications recognize Patent Owner's reduced area imaging

device as incorporated into an endoscope addressed a long felt need for a smaller imaging device in endoscopes. But, again, evidence of addressing a need for endoscopes has no nexus with the challenged claims which do not recite an endoscope. Further, the article of the Patent Owner cites for the alleged praise credits the development of CMOS sensor generally and Patent Owner admits it did not invent CMOS image sensors.

Turning to slide 75. Patent Owner argues that there was industry skepticism as to the capability to use CMOS technology in medical imaging applications based on a self-serving statement of the named inventor. But again, skepticism with respect to using CMOS technology in medical imaging applications has no nexus to the challenged claim which does not have any specific limitations to medical imaging applications.

And then turning to slide 76. Patent Owner argues unexpected results that CMOS was unexpectedly more resistant to electromagnetic interference. Patent Owner relies on a self-serving statement of the named inventor stating that these results were observed when removing the processing circuitry from the same circuit board or plating (phonetic) as the pixel array and then placing the processing circuitry in either a remote box unit or on another circuit board adjacent and spaced from the pixel array, and that's Exhibit 1003, pages 85 to 86 which is paragraph 12 of the Adair declaration.

As Petitioner has shown, it was already known in the art to locate processing circuitry away from the image sensor as shown by Stam at Exhibit 1043, Swift and Monroe. Further, Patent Owner's own expert admits that CMOS image sensor had unique advantages including increased resistance to radio frequency interference and electromagnetic interference and that's the Lebby declaration, Exhibit 2088, paragraph 83 in the '475 proceeding and paragraph 73 in the '512 proceeding.

In sum, Patent Owner's allegations of secondary considerations lack any nexus to the challenged claims and even if credited, do not overcome Petitioner's compelling case of obviousness. If there aren't any questions, I think Mr. Davis has a few points.

MR. DAVIS: Thank you, Your Honor, for your patience and that is page 30 of the Institution decision, the only full paragraph on that page.

JUDGE KENNY: And sorry, just so the record is clear. This was back relating to which limitation again?

MR. DAVIS: This is relating to the location of the video conversion software on board 53, there's just an express discussion of that in the Institution decision at page 30.

JUDGE KENNY: Thank you. Is Petitioner done with its opening at this point?

MR. DAVIS: Yes, Your Honor.

JUDGE KENNY: Okay. Mr. Caplan.

MR. CAPLAN: Thank you, Your Honor. May it please the Board. We submitted demonstratives that's Exhibit 2105 which I'll be referring to.

JUDGE KENNY: Actually, sir, just before you start.

MR. CAPLAN: Sure.

JUDGE KENNY: Do you want to reserve an express amount of time for rebuttal or do you also want to just have whatever you have remaining as your rebuttal?

MR. CAPLAN: Yes. I think it will be whatever is remaining but we'll use more than half I would expect, similar to Petitioner.

JUDGE KENNY: Okay.

MR. CAPLAN: (Indiscernible.)

JUDGE KENNY: All right. Go ahead.

MR. CAPLAN: Thank you. So I'll start with page 3 of Exhibit 2105 which is the introduction to technology background and the description of the state of the art, and the reason I want to go over that is to kind of go over a couple of points with the Board and also I believe this will address some of the comments that counsel made for Petitioner in their opening comments.

One important point here is that one of the things that comes up is the term camera-on-a-chip is an important concept in what a person of ordinary skill would have understood at the

time of the invention is important. So we just want to take a couple of moments to just go over for the Board some of the technology issues and what's the focus of the invention of the '052 patent and particularly as relates to this camera-on-a-chip concept.

So on page 4 or slide 4 just have a brief overview of the history of the CCD and CMOS and generally image sensor development over a period of years and the point here is that, as the Board I think understands, solid state imager -- which is a term that's used in Wakabayashi and I'm sure we'll talk about it -- covers a number of different technologies that were developed over time and while they all fall under the general description solid state imager as they're used in the art each of them has a particular technology that they would use to the way that they're built and the way they operate, and those technologies are not interchangeable and they don't really mix and match. In other words, you walk and will talk with us you wouldn't combine a CCD imager with the CMOS imagery and certain variations of CMOS imagers. And so I just want to point out and we have citations to our brief as well as to Dr. Lebby's declaration, we go through some of the history and some of the operation of these features but what you can see is we have passive pixel, metal oxide semiconductors early on. Then we have the CCD development and then CMOS development which itself has a

couple of aspects to it. The passive pixel which is the Ricquier reference and then Dr. Fossum's work with the active pixel sensors over time. So it's been an evolution, each are a little different.

So on page 5 just some notes on the charge couple device, the CCD image sensor characteristics. This is, as we're going to talk about, a person skilled in the art at the time of the invention would have understood CCD was a dominant technology that was implemented a couple of points we wanted to make about how it works, one thing is that the CCD structure had its own fabrication process. It was different than the CMOS fabrication process. One of the distinguishing features about CCD was it had destructive readout. Sometimes it's referred to as a bucket brigade. We showed an illustration and that illustration, just so hopefully it's clear, you have a series of those buckets. The raindrops are reflecting photons dropping down which would be an incident (phonetic) image. In order for a pixel array to be read out each of those buckets has to be sifted (phonetic) throughout the whole array, ultimately read out and the bucket would be empty and the amount in the bucket which would be the energy that would be stored is then recorded. But you have to read out and it's a destructive read out. In other words, when you empty that bucket you've destroyed the content of that pixel at that point. So it's the destructive read out and because of the

unique requirements of the CCD structure, it was characterized by having an off-chip structure. In other words, the CCD pixel array was on one chip and other circuitry while it was timing control image processing was off-chip. There's a lot of evidence of record which I'll allude to but we just want to make sure that that's clear so when we talk about the difference between CCD and CMOS or we make reference to off-chip architecture this is why Patent Owner has been talking about it and it's also identified in the patent itself, in the '052.

JUDGE LEE: It's Judge Lee. That's a very interesting picture there but so is each bucket emptied before you pour in the charge from the next bucket? You empty the other bucket, you empty it and then you pour the next one into this one; right? Then you have to empty it again before you pour in the next one, okay. So you can't just pour it in when it's got something in it?

MR. CAPLAN: Correct. And my understanding, and this is explained in Dr. Lebby's declaration in our papers is that if you were looking at this figure on slide 5, the series of buckets, the charge, the amount in each bucket has to be moved to the next pixel and that's why the CCDs are understood to require a fair amount of power to generate heat because you have to move the charge that's stored the energy that comes in to any one pixel through the whole array and so --

JUDGE LEE: And in order.

MR. CAPLAN: You understanding's correct.

JUDGE LEE: First ones first?

MR. CAPLAN: Correct, correct. So on slide 6 a brief overview of the CMOS image sensor characteristics, that's complimentary metal oxide semiconductor, and what we want to highlight here is that, one thing is that the design of the CMOS pixel array -- particularly the active pixel which we'll talk about it -- but it has a non-destructive readout. So that means that each pixel can be read out and the active pixel that was mentioned by counsel has an amplifier at each pixel site and you can read out each pixel. They're addressable and you don't destroy or get rid of the content of that pixel and that's why when CMOS was developed or particularly the active pixel sensor developed really initially by Dr. Fossum, which is also cited and described in the '052 patent, that's one of the reasons that it can be made with CMOS and that was what led to everything being on-chip in this on-chip integration.

I would just respectfully submit that part of the different points of view between Petitioner and Patent Owner is that Patent Owner is not trying to rewrite any of these references but I think it is important that the references be understood from the perspective of a person of ordinary skill in the art with what was happening at the time, and that's the context giving rise to it and one of the benefits of the CMOS camera-on-a-chip technology

was that there was significant cost savings and particularly because you could get a lot of things on to the chip and didn't have to have that off-chip architecture.

Another thing that came up and there was some comments, and it's in the briefing and we address this is in our papers, was a comment about the size and the 2 to 12 millimeter limitation really doesn't matter. You can't get a patent on something that small. I'll address this a little further when we talk about some of the other references, but the point here is at the time of the invention the state of CCD pixel development was different than CMOS pixel development. So for a given size of an image sensor if you had a CCD pixel array versus a CMOS pixel array you would have a different number of pixels in there because you could fit more CCD pixels in the given space at a time than you could CMOS and that would go directly to image quality, and so that's one of the reasons that a person skilled in the art would look at the technology and the size and that is actually, in this case, size does matter and Dr. Lebby testified about it and I will highlight that again but I just wanted to point that out.

JUDGE BOUCHER: This is Patrick Boucher. I just have a brief question. I want to make sure I understand this right. I think that Petitioner made the point that conventional CMOS image sensors were not necessarily on a chip and you're telling us that CCD sensors necessarily were off-chip. Is that accurate?

MR. CAPLAN: Certainly it's our understanding and we put in our papers and Dr. Lebby's testified that rising CCD image sensors at that time had an off-chip architecture. The CMOS image sensors, the pixel arrays were being developed but there was an image with image quality. We're going to talk about the Ricquier reference, but as an example that was a bench test set up. It was used for a machine vision application and it was intended to look at kind of a limited number of pixels for an industrial application. The image quality wasn't particularly good, so the evidence of record does not have consumer cameras with a CMOS image sensor with off-chip circuitry. That's not what the evidence of record is. But what the evidence of record does have is that as the CMOS active pixels technology was developed, and really from its inception, starting with the Swift patent which itself refers to Dr. Fossum's article -- an article on Dr. Fossum's active pixel CMOS camera -- that article which we can look at actually says it's all about on-chip integration and that's why we've been saying our position is and we've testified that a person of skill in the art would understand that the CMOS active pixel device, which is what's claimed here because we talk about a CMOS pixel with an amplifier, would be understood to be that on-chip integration. That was what the industry was doing because once they got to the point where they could get the amplification on the device and it's all CMOS, that was the

motivation to do it and in fact again it's in our papers and we'll get to it. Dr. Ackland wrote an article at the same time he filed for his patent which is asserted on one of the grounds here and he made the point that the point of using CMOS active pixel sensors was that on-chip integration. So the evidence of record doesn't show CMOS active pixel sensors off-chip.

There's been reference to Stam and Swift and Monroe, Swift we're going to talk about. Our position is that a person of skill would understand it a particular way but the Monroe patent we did address, I think it was said that we didn't address it. We do address it in our papers and we made the point that, 1) those are background references that were cited in this proceeding, well not Swift but Monroe, for example, was just in a string cite and that the Monroe reference doesn't have details about the implementation of the circuitry for it. For example it doesn't say in Monroe if it's an active pixel or if it's camera-on-a-chip, it just talks about -- it just mentions the word CMOS and that's a passive pixel like Ricquier and other technologies that were being developed.

So the evidence of record, Your Honor, doesn't show that in fact it was known in the art that CMOS pixel arrays, CMOS image sensors with off-chip circuitry were well known and in fact their grounds don't rely on that. When you look at Wakabayashi and Swift as the primary references and neither of

those are express CMOS image sensors with off-chip circuitry and it begs the question if it was so well established, that would be the primary reference. But each of these references requires some interpretation that maybe it could have been modified but that's not what the record shows, Your Honor.

JUDGE BOUCHER: Okay. Thank you.

MR. CAPLAN: I hope that answered your question.

JUDGE KENNY: To follow up on that. If it was very clear that everybody knew the advantages were to go on-chip, why did Mr. Adair, you know, why did he go with this off-chip design at the time?

MR. CAPLAN: So, Your Honor, I appreciate you asking about that. So at the time, and I believe it's in his declaration, he was working with his father, was working on these medical devices that came up and the Adairs were acutely aware of the CMOS development but really the development of the CMOS active pixel sensor was a watershed moment for the industry and the inventors in particular and they were focused on that and they tried to take advantage of that in the devices they were working on and that's described in their patent in terms of the background. But what they realized was that as good an improvement as it was, it still for some of the applications, the industrial applications that they wanted to have in terms of getting the image sensor itself even smaller and the patent talks

about it can be as small as 1 millimeter, I think preferably 4 to 8, but to get it small enough that they wanted to try separating out that functionality to see if they could further reduce the profile because of the places they were trying to get to and that was the motivation and in fact that's part of the invention story that they went against the grain and that's why we've been talking about the camera-on-a-chip because that was not what the industry was doing at the time. But the reason for it, Your Honor, was to try further manipulate the profile (audio interference) smallest the camera-on-a-chip was getting at that point. They tried to further modify it and separate out that functionality.

JUDGE KENNY: Okay. Well let's address that issue we talked about with Petitioner's counsel and Wakabayashi. There you have a rotating camera. Wouldn't there be an incentive in order to make that rotating camera as small as possible to consider separating the functionality across, you know, taking some of the -- using the off-chip design to make that rotational camera smaller?

MR. CAPLAN: So, Your Honor, and I appreciate that question as well and the response is the issue with Wakabayashi is that Wakabayashi itself shows something to a person skilled in the art. Wakabayashi, it's a solid state imager, but it shows this off-chip design and so one issue is how would a person skilled in the art in 1995 which I believe is when Wakabayashi was filed,

understand that and as Dr. Lebby testified and our papers talk about, that is the classic hallmarks of a CCD device with the off-chip design and that was Wakabayashi's attempt to make it small and to make their design work with the rotating camera.

Now I would submit, Your Honor, if the concern at that time was to make it even smaller, it would have been not to have separating more circuitry and more boards, it would have gone to one board just the camera-on-a-chip and I think Your Honor asked that question to counsel at the opening, that that will be the step to go and this is why in our papers we've on occasion made the point that it looks like hindsight analysis that the Petitioner is not taking the point of view of a person skilled in the art of how would they understand a reference.

Wakabayashi is showing something. Is it not a blank canvas for an invitation to design each component how you would like it to be and we'll talk about this even further when we start combining with other references. But Wakabayashi itself shows particular structure. It shows off-chip circuitry. It shows -- Dr. Lebby testified that there's a heat sink and it has all the hallmarks of a CCD device as understood by a person skilled in the art at the time. We're not trying to credit Wakabayashi with technical features it doesn't have. Patent Owner's position is that a person of skill in the art looking at Wakabayashi, Wakabayashi has a certain understanding about it and then the question is how

would you modify it?

The other point that I'll make there is that this converter circuit which is also central, I believe it's mentioned in the abstract, having this converter circuit is another indicator that in fact Wakabayashi really understood as a CCD device because you have this destructive readout. So when that image is read out, you have it and you can't go back and then flip it electronically because it's gone, as Judge Lee pointed out. That image information is gone. So that's why they have this other circuitry to then further manipulate the image. Dr. Lebby also testified that you wouldn't need that with the CMOS device where it's addressed where you could do that manipulation.

So, Your Honor, your question is why wouldn't you modify it to make it smaller? We would submit if you were going to take Wakabayashi and modify it, you would just change it in a very significant way which is one of the problems that Petitioner's combination with Ackland is you're starting to change the overall operation of it.

JUDGE KENNY: Okay. I get your argument that Wakabayashi is pointed towards CCD. I mean I'm saying I understand that's your argument. But I'm also trying to deal with assuming -- obviously the other side argues differently -- and assuming one of ordinary skill in the art was looking at Wakabayashi and trying to implement it with CMOS wouldn't

they be considering an off-chip design in order to make the camera smaller, the rotating camera smaller?

MR. CAPLAN: So, Your Honor, my answer is no, that's not what a person would do. In Exhibit 1048 which I believe is the article about Dr. Fossum's technology which is really central to this industry and Dr. Fossum is cited in our patent, and this is in Dr. Lebby's, this is the '512 declaration at paragraph 118 and I'm just going to reread the quote. It says,

"Yet on-chip integration is a key to achieving future camera miniaturization."

And that's in our surreply, it looks like page 14. But Dr. Lebby testified about it and I submit that's what a person skilled in the art would understand. So at the time if they were going to, if a person skilled in the art wanted to take Wakabayashi and make it smaller, further divvying up circuitry on traditional boards would not be how they would do it. That wouldn't be cost savings. That wouldn't be more efficient.

JUDGE KENNY: What if they wanted not to make the overall device smaller but literally the rotating element? Why wouldn't the off-chip design be good for making the rotating element smaller?

MR. CAPLAN: Well, Your Honor, Wakabayshi had the off-chip design. So that was their attempt and I think if you have the off-chip design that's a great question, is what's the

motivation and I think we've tried to make this point in our papers. What would motivate a person skilled in the art at the time to further modify Wakabayashi with more off-chip circuitry. That was their attempt at it and if the rotating camera had or the rotating camera sensor was fine, but they had this other circuitry which was very important to the overall operation which is another reason we say that the combination to do something to Wakabayashi to eliminate that need, you would be changing the principle of operation which is one of the problems with the combination of Ackland, that Ackland is a form of CMOS camera-on-a-chip that's a CMOS active pixel sensor. You're free to use that, you would have an image which you could read out, a non-destructive image. You wouldn't have to do that manipulation. You wouldn't need all that circuitry and you'd have to be very glib with the references to just start fundamentally changing the way they work and say that a person skilled in the art at the time would be motivated to do it.

Plus, and I'm kind of jumping ahead and you'll see slides on it, but the cost savings was documented and it's a lot of evidence of record. Not just Dr. Lebby, but the real benefit was from getting everything on-chip and in fact we're going to get to the Lebby exhibit in a moment but Dr. Ackland was quoted in an article talking about the real benefits come from getting everything on the chip, not just having the CMOS image sensor

but that camera-on-a-chip design.

JUDGE LEE: This is Judge Lee. You keep referring to modification of Wakabayashi. I don't see any modification. The reference says to use a solid state imager and a CMOS imager is a solid state imager, so when you use a CMOS imager it's actually in accordance with what Wakabayashi says and whatever you need to do to make that happen is already contemplated by Wakabayashi. So where's the modification? You like to use the word modification so it sounds like Petitioner is doing something extraordinary but the fact is the reference says to use a solid state imager and CMOS imager is a solid state imager so it's straight according to Wakabayashi with no modification.

MR. CAPLAN: Hello? Hello?

JUDGE LEE: I can still hear you.

MR. CAPLAN: I'm sorry everybody. My screen went blank. I'm sorry, was I gone or I apologize, Your Honor?

JUDGE LEE: Your image was gone for a second but you're -- now you're back.

MR. CAPLAN: Okay, okay. Sorry, I don't know what happened. Your question was why -- Your Honor said why I'm saying it's a modification with Wakabayashi?

JUDGE LEE: Yes, because I don't understand. The CMOS imager is a solid state imager. Wakabayashi says to use a solid state imager so that's almost like writing the manual. Hey, step

A, do this. Step B, do that. There's no modification. To the extent there is any modification it's already taught by Wakabayashi. It's what it says to do.

MR. CAPLAN: Your Honor, so I think my initial answer to that is that Wakabayashi would be understood by a person skilled in the art to have this off-chip design and so at the time that would be, even though it's a solid state imager -- that was my point earlier with the development of the technology -- that doesn't mean that every type, every flavor of solid state imager would work there or what was intended rather, it's how a person of skill in the art would understand it. So our view was that you would either have a CCD design which is what we believe it is and you wouldn't make that combination and if you were going to use CMOS at the time, the CMOS would be the camera-on-a-chip design. That's what was being used at the time and that's what a person skilled in the art would have understood the CMOS implementation under your view, Your Honor, under that alternative view. If it could be CMOS well then it would be camera-on-a-chip and then you would still have to do the deconstruction, the de-integrating of that processing function to do it because you would have a bit of a conflict there because you have Wakabayashi with this off-chip structure and then you would have Ackland which we submit is the CMOS camera-on-a-chip and so those don't line up exactly and you would, we submit

as I was saying to Judge Kenny you would use the camera-on-a-chip if you were concerned about all the things that you would purport to be concerned about. A person wouldn't make that particular change to what -- a person of skill would understand the CMOS flavor to be at that moment because it would have been camera-on-a-chip.

JUDGE LEE: Okay, okay. I think I understand now. So to buy into your argument I first have to agree with you that despite the fact Wakabayashi says to use a solid state imager, I am to ignore that and say hey, a POSITA would see the language and say no, no, no, he can't possibly mean that. What he really means is a CCD. So never mind what it says, I'm going to understand it as a CCD. Only if I agree with you on that, then there's a modification because otherwise if I disagree with your initial premise then there is no modification.

MR. CAPLAN: Yes. I would respectfully disagree with the kind of one nuance of how you were putting it which is that the term solid state imager existed a long time ago. It goes back probably into the '60s before Ackland even existed. So that term itself doesn't connote every flavor and so as I said, a think a person of skill -- you wouldn't have to ignore the term, I think a person of skill would understand it in context to be if it wasn't CCD which is we believe the structure that was shown and that would be consistent for the reason that we put out in our papers,

but if it wasn't that, if it was going to be CMOS at the time particularly CMOS active pixels which are what the claims require, it would have been the camera-on-a-chip and the evidence of that --

JUDGE LEE: You're mixing too many things together. You don't disagree that CMOS imager is a solid state imager at the time of the invention; right? You never uttered that.

MR. CAPLAN: It would be, yes.

JUDGE LEE: Okay. So --

MR. CAPLAN: That term is a --

JUDGE LEE: -- so the term changes. Maybe, you know, ten years from now there's another form of solid state, who knows. But at the time of the invention CMOS imager is a solid state imager and yet you want us to read Wakabayashi which says use a solid state imager to understand it as not saying that but severely limit it to just saying use a CCD. So if I agree with you, then there would be a modification. But if I disagree with your premise that I think it already tells people to use a solid state imager, whatever type it is, then there is no modification.

MR. CAPLAN: So okay, Your Honor, I'm following your logic and I would just add to it that the parties do agree that Wakabayashi itself doesn't give details, it just says solid state imager which is why Petitioner goes to Ackland to give additional color on to that term and that's where I would submit

that we're not kind of reading too much into it. That's actually what if Ackland reflects what the CMOS active pixel sensor technology was doing at the time which was similar to -- which is what Dr. Fossum was working on in our patents and that was the camera-on-a-chip. That's the linkage and I think there --

JUDGE LEE: I just need a simple answer. Is that right? It depends on whether I agree with your premise to say whether there's a modification or not.

MR. CAPLAN: I agree with that, Your Honor.

JUDGE LEE: All right.

MR. CAPLAN: Okay. On page 8 of our slides I'll get into some of the additional evidence of record but just the point, and this is kind of all in our background, that CCDs were the dominant technology in the market in 1997 and even later and we'll get into that.

On slide 10, a little overview on the '052 patent. We've covered a lot of it which is that this is an innovation -- the '052 claims, an innovation over the camera-on-a-chip design. This is a 1995 article that we cited here. It's cited throughout our papers. But we also wanted to include it here because this camera-on-a-chip concept does reflect what a person skilled in the art would understand at the time and so I think that's an important background.

I think this came up a little bit already but on page 12 it

was going against, Judge Kenny asked me about this, the '052 was going against conventional wisdom which was pushing the CMOS active pixels on to the on-chip camera-on-a-chip design. There's an excerpt here from the patent itself which makes that point, that the camera-on-a-chip was dominant, that was the part of what led to the invention. The inventors were working on it but then it was a further tinker with that and that's what's claimed and we get into that, that limitation about the image processing circuit being separated.

JUDGE LEE: So yes. I want to talk to you about the camera-on-a-chip concept. I'm sure it was great when CMOS came along and made camera-on-a-chip possible and that's why everyone will want to do it, everyone gets excited. It kind of -- it dominates the market and that's what the buzz is about but that doesn't mean the whole world became camera-on-a-chip and we pretend the rest doesn't exist. It's like if I invent a rocket engine that takes me three times higher than previously possible, that doesn't mean I can no longer put that rocket engine on a regular plane and not go as high. You know, it's like before you had camera-on-a-chip you had camera-not-on-a-chip so when you have the ability to put camera-on-a-chip why is it an invention to say well, I'm not going to put camera-on-a-chip?

MR. CAPLAN: So my answer, Your Honor, is that before the CMOS active pixel sensor camera-on-a-chip really hit the

scene and became the de facto standard of what everyone was doing, the dominant technology was the CCD technology. As I think I indicated before, the evidence of record and including the references that they were asserting here don't, you know, they're not spot on with what you're talking about which is a CMOS pixel array with off-chip everything else and so the art was that the CCD and then we really ran into the CMOS camera-on-a-chip, but that's what the evidence of record here is and there was a lot of work being done and I think it was because of image quality problems that even though the CMOS pixel arrays were being developed and there were articles talking about them, those were talking really about the CMOS pixel arrays and developing them. But it was really that active pixel sensor which really got it going and so when we talk about the evidence of record here, that's what we have. So it was CCD and then we shifted to the CMOS camera-on-a-chip and that's what we're looking at in terms of --

JUDGE LEE: Why is it an invention to not have camera-on-a-chip?

MR. CAPLAN: Why is it --

JUDGE LEE: Even though you can. I mean CMOS made it possible. So one day someone says well, I'm not going to. I'm going to use CMOS but I'm not going to put it all on one chip. Why is that a big deal, because we always had camera-not-on-a-

chip?

MR. CAPLAN: Well, when you say there was a camera-not-on-a-chip I think what there was the CCD camera not-on-the-chip and that's a difference. That was the chip that the CCD had its own set of issues with it. It required the off-chip. It was fairly well developed. It gave off a little heat but it was different so we didn't --

JUDGE LEE: Right. Same thing. But you're saying it's not obvious to put the CMOS imager not on a chip just because you can put it on a chip? I mean you really lost me there.

MR. CAPLAN: No, Your Honor. I apologize for that. But I'm saying I think the history of the CMOS active pixel sensors once they got that going because the CMOS was a widely used fabrication process. It led to everything going on a chip, like that's how it was done. People wouldn't, as I understand the art and as Dr. Lebby has testified, they weren't using CMOS active pixels as all these off-chip circuits because that was the way to use the CMOS active pixel sensors with the CMOS. That was the benefit, that was the cost savings, that's what everyone drove and it was contrary to accepted wisdom at that point to then go -- to take that new innovation in the imager space and go back to something which I don't believe was done with respect to the CMOS route (phonetic).

JUDGE LEE: Well, you say contrary to accepted wisdom.

Maybe you can't make money by selling a commercial camera like that but why is it contrary to accepted wisdom technologically? I mean, if you're an engineer and you realize if I can put it on a chip I can also not put it on a chip.

MR. CAPLAN: Well, Your Honor, I'm not the technical expert but --

JUDGE LEE: I mean, what's the technical obstacle for why not to put on a chip?

MR. CAPLAN: Well, there's a lot of reasons to put it on-chip which is the reason that it was done that it was cheaper to make and you got better performance, you got less lag (phonetic), everything was together. To take a new technology which is designed to be integrated and work on-chip and just start separating out, now makes it more burdensome to manufacture and design and interconnect. I think it doesn't help with performance. It gives you more areas which you can have problems between things that they couldn't (audio interference) separated, so performance isn't helped. Probably power goes up because it would be one of the benefits of pick over CCD was the use of a lower voltage.

So I think there are a lot of reasons technically and Dr. Lebby does talk, and I can get the cite for that in our papers, but he talks about the benefits of the on-chip integration and the answer to your question is that why wouldn't you do it is because

you would lose those benefits and it wouldn't be obvious to take something that's working well, that's faster, better, less expensive, more efficient to manufacture and then just start breaking it up.

In essence, that very much leads into what at times we've said is a hindsight analysis here to try and say well, you could do it. Our claims say that and so you could do it, and we've previously with the case law from the Federal Circuit, you know, could isn't would which is one of the reasons I've spent time trying to convey to the Board in the view of a person of ordinary skill in the art is how they would look at these references because I think that goes to your question, Your Honor. Why wouldn't they do it, and I don't think an engineer would go backwards to do something that has less image quality which CMOS had at the time, would require more power, would be more complicated and would have more problems in general than doing it all on-chip. That that would --

JUDGE LEE: I actually agree with you, you know, except we don't have the same situation. Here we have an actual reference that says to use a solid state imager. If we didn't have that teaching, I'd probably agree with you you wouldn't just put it on different chips just because you can. But the fact is that we have a reference that says to use a solid state imager and CMOS imager is a solid state imager. There's a world of difference

between a situation where you don't have any reference saying anything and you just willy-nilly want to do something because you want to — like hey, everybody wants to put it on a chip but I want to put it off-chip. I've got to have a reason for it and if everything is negative for doing that then there's no reason. But here you have a different situation. The reference is saying it's off-chip and besides that use a solid state imager. There's a world of difference to leave (phonetic) it to.

MR. CAPLAN: Your Honor, I don't want to argue, I just want to make kind of my final attempt on this point. I agree the term solid state imager exists and it's said in Wakabayashi. That term was used when Wakabayashi was filed. I don't think -- well, there's more in Wakabayashi than just the term solid state imager. That's really my point. That it's used in a context. It shows figures, it shows structure and so the question is, Your Honor, in my view how would a person skilled in the art understand it and the fact that look, as you pointed out, we could have somebody develop a solid state imager with a completely different design years from now and it would still (audio interference) but it wasn't contemplated. A person skilled in the art at the time wouldn't understand it that way and that's the position that we've taken, that the context and the view of a person skilled in the art is influenced not just by that term solid state imager, it's the rest of Wakabayashi including the off-chip

design, the inverter circuitry, you know, things that are all signals. The heat that would be kicked off, all signals and that's what Dr. Lebby testified about as to why his view that's how a person of skill in the art would understand it.

JUDGE LEE: Yes. So everything boils down to that one question it seems like, you know, and are you saying that in five years from now someone came up with a new type of solid state imager that it wouldn't infringe because at the time of the invention that type of solid state imager wasn't the focus of anyone?

MR. CAPLAN: Well, it would depend how that new technology worked. As you know, Your Honor, you can get claims which over a broad class of implementation but my issue here is that the implementation Wakabayashi is describing is tied to a CCD device with all its, you know, with what comes along with that and it doesn't reach to that. And, you know, Your Honor this is -- I'm not going way back in time but there were a number of CCD references that were cited and overcome during the prosecution history. In the off-chip structure, CCDs have been out there for a long time so I don't think that's new and yes, I don't have more to say on this point than that, Your Honor. That that's how a person of skill in the art would understand it, that's the Patent Owner's position on it --

JUDGE LEE: Okay. Thank you.

MR. CAPLAN: -- Your Honor, not just because of that one term.

JUDGE LEE: Thank you.

MR. CAPLAN: Okay?

JUDGE LEE: Uh-huh.

MR. CAPLAN: Yes. On slides 13 and 14 we just have the claim and on slide 14 there's this limitation. I think I've mentioned it but I just want to -- and this again goes to the same point, Judge Lee, that you talked about which is size does matter because at the time the CCD pixels were more than pixels and form (phonetic) fill factors were different than the CMOS pixel array so for a given size you would have different image problems. So that's -- it's an important issue which we did brief in our papers. At this point --

JUDGE KENNY: Counsel, let me ask you that. There is no limitation in the claim about per se image quality; right? I mean in other words it doesn't --

MR.CAPLAN: Right.

JUDGE KENNY: -- have to be a high resolution image or anything else, so why does then -- can you tie that, then go back to the dimension limitation why would the image quality be important for that dimension limitation?

MR. CAPLAN: Sure. Absolutely, Your Honor. So my answer is that the image quality issue goes to what a person of

skill in the art understands and how they look at the art. So, for example, there seems to be agreement that Wakabayashi is a consumer video camera at the time. So it has an expectation it operates, you can see, you can take and you can view consumer video at an acceptable level of quality.

In contrast, the Ricquier reference is a machine vision application which has a different, you know, offers a very different level of image quality for a different purpose and it wouldn't be used, and a person skilled in the art -- and again, Dr. Lebby, we briefed it, Dr. Lebby testified about this -- wouldn't look at those references to combine them. So even though that particular quality issue isn't a claim limitation, that issue does go to a person of skill in the art and how they understand the reference which, as I've said, I think is an important issue in this proceeding because that really, I think as Judge Lee pointed out, goes to how a person looks at these references and what they understand.

JUDGE KENNY: And so I understand it correctly, the argument is that basically 2 to 12 millimeters would be too small a dimension to get a quality image with a CCD imager? Is that the point?

MR. CAPLAN: That's correct. You wouldn't, yes, and you couldn't, yes -- it wasn't obvious at that time to take a CCD to CMOS at that time, it wasn't obvious at that time. That is

something that the inventors --

JUDGE KENNY: Okay. But the claim already recites CMOS pixels.

MR. CAPLAN: Yes.

JUDGE KENNY: So would that be in, I mean is that -- I mean the claim wouldn't be satisfied if it was a CCD anyway so how does that limitation have an impact on our analysis here. I mean in other words it's already something we already agree that the modification is the CMOS. Why would the image quality be an impact for the 2 to 12 millimeters limitation?

MR. CAPLAN: Because you couldn't take, for example they use Suzuki as something for the dimension reference for the dimensions, and our point there is that given the size of Suzuki it wasn't obvious at the time that you could take a CMOS imager down to that size. That was part of the invention, it's claimed as part of the invention. But kind of what the art understood and I can probably just cite you for that, but what the art understood at the time was that the CMOS image sensor wasn't down to that size to be used as a reduced area imaging device (indiscernible.)

JUDGE KENNY: Okay. So this is not just a problem --this is not just a problem with CCD imagers is what you're telling me, this also would have been a problem with CMOS imagers generally given 2 to 12 millimeters and producing a quality image?

MR. CAPLAN: Yes. If you want -- yes, right. You would use CCD to get that size, not you wouldn't have used CMOS and that's why it wasn't obvious. Hopefully that's clear.

JUDGE KENNY: And the reason the inventor was able to get -- the reason the inventor was able to get down to it, at least as expressed in the patent, is because he used the off-chip design with the CMOS?

MR. CAPLAN: Well, that was part of it, that was part of it. The other part they were either working (indiscernible) to get it to work but that's not claimed.

JUDGE KENNY: Okay. But I mean in terms of what's disclosed in the patent I mean you've got the off-chip design, is there anything else that you're aware that they attribute to this? To the facts of getting down to -- being able to get down to the 2 to 12 millimeters and have a good image?

MR. CAPLAN: Yes. Right. CCD was better at the time. CMOS wasn't. So claiming that a CMOS sensor at that size wasn't obvious at the time, that was our point.

JUDGE KENNY: And the reason the inventor was able to do it was using the CMOS and the off-chip arrangement?

MR. CAPLAN: That was part of it, yes. Yes, Your Honor. I mean there was other things they were doing not necessarily claimed in terms of their work with vendors, but yes, that is (indiscernible.)

JUDGE KENNY: Well, but I mean in terms of what's disclosed in the patent itself?

MR. CAPLAN: Correct. The off-chip, that's -- I mean the separation.

JUDGE KENNY: Okay.

MR. CAPLAN: Okay? At this point I want to move on to a couple of other things. I wanted to skip over to slides 30 to 38 and I just want to remind, you know, the Board had mentioned a few times that we have a number of pieces of record evidence and I'm just going to flip to them because I want to get to the '512 as well. But on slide 30 again references. These are evidence of record, haven't been challenged, that CMOS couldn't compete with CCD image quality at the time. I'm not going to read each of these to you but I just want to kind of highlight for the Board and of course I'll take any questions. Slide 31.

JUDGE KENNY: Well, let me ask you as you go through it because I think one question is obviously, you know, we're not limited to merely what would be commercially acceptable. I mean obviously a lot of patents are written before you get to where it's actually functional and commercialized. So maybe as you go through these you can also tell me, address the issues. I mean is this just directed to whether things have reached commercialization stage or does it -- does this evidence indicate more than that?

MR. CAPLAN: Your Honor, this is directed to what a person of skill in the art would understand at the time of the invention, in particular differences between CCD and CMOS technologies. So, for example, on slide 30 an article from 1997 talking about in general CMOS was not competing with CCD in terms of image quality. So as I've said in the past you wouldn't mix and match those technologies. We just wanted to make clear to the Board that those are just kind of statements that we're making up. Dr. Lebby has testified about it. This is an example of record evidence.

Similarly slide 31, a 1993 article about you can't mix and match CCD and CMOS and so I think, as I was talking to Judge Lee before, you would go one direction or the other and that'll come up when we talk about Swift. But you wouldn't mix the CCD and CMOS technologies.

Slide 32. This was mentioned early on. Exhibit 2004, this is the article that's cited in the Swift reference about the Fossum CMOS APS and the point I wanted to make here we submit reflects the understanding of a person of skill in the art that on-chip integration is the key to achieving future camera miniaturization. If you want to get smaller you go on-chip and maybe that's something else I should have mentioned to Judge Lee as to why it wouldn't be obvious just to take the newer CMOS technology and use it off-chip because that wouldn't get

you all the benefits in terms of small size.

Slide 33. A Business Week article about Dr. Fossum's work and also reflects the understanding of a person of skill in the art and this talks about how the CCD pixels are smaller than the CMOS pixels and the CCD had better image quality at the time. So you wouldn't be inclined to stick CMOS into a CCD at the time necessarily. That wasn't obvious, and I should also make the point that these articles and they're all cited so you can look at them, but these are from trade journals and scientific publications. These aren't just commercialization, I mean there is a Newsweek article but it's about Dr. Fossum and Dr. Ackland.

Exhibit 2039 as well. I had mentioned this, this is where Dr. Ackland is quoted himself saying that the real benefit and the cost savings comes from taking the CMOS camera-on-a-chip and putting everything on-chip, that that's how you get the cost savings and it's highlighted in the second column about getting it down -- the whole kit and caboodle down to $20 versus then up to 140.

Slide 35. I think we hit that already in terms of the cost savings. This was I think a Wall Street Journal article which made the same point about camera-on-a-chip and that the motivation, so again that's one of the reasons it wasn't obvious to take the camera-on-a-chip design and start deconstructing it. It was already -- the off-chip was CCD which was better image

quality at the time but the CMOS APS was a new animal.

Again, slide 36 is just another 1995 article, The benefit of the active pixel CMOS from using camera-on-a-chip and it also makes the point that CCU wasn't suited for integration.

This is on slide 37 an article Exhibit 2036. It's a trade publication and one of the points here is it just reflects the understanding of a person skilled in the art at the time and the world of CCDs versus CMOS and in particular at the bottom area talks about the role of surveillance and security devices using CCD cameras which is one of the reasons that we gave an alternative understanding of Swift which was a security camera. Swift, which I'll talk to in a sec, talks about the CMOS but it also would be understood as having an option as a CCD reference.

So in terms of kind of flipping back, I'll briefly go over the '475 points but I feel like we've covered pretty much in terms of Wakabayashi and Ackland. So unless there's questions about that I'm going to move on and talk a little bit about the Ackland patent in particular. I think we, I'm not sure if we really went into it too much, but one of the things here is that the Ackland patent is really directed to the single polysilicon versus double polysilicon layer. It shows the timing and control on there and the image processing functionality is described is not shown. Dr. Lebby testified that given at the time this was understood by

a person of skill in the art as being on-chip but to the extent there's a question about that, we also cited Exhibit 2050 which is an article by Dr. Ackland on the same technology at the same time which is all about camera-on-a-chip and we would submit that to the extent not shown in the Ackland patent it means not shown, and if there is a question as to what not shown means Dr. Ackland himself makes it, you know, explains how a person skilled in the art would understand it he was talking about camera-on-a-chip and so when we're talking about -- again, Judge Lee was asking me about Wakabayashi, you know, implemented with the solid state imager and Petitioner suggests to use Ackland, well that's what they would use. We submit they would use the Ackland camera-on-a-chip.

On slide 22. Just an excerpt from Dr. Ackland's article talking about the most important advantage from the CMOS. APS is in fact the ability to integrate all the functionality on-chip. So that's what I wanted to say about the Ackland reference.

I think we talked about this a little bit but the Suzuki reference is also cited in the combination for the '475 grounds on claim 1. This Suzuki is in the '475, we have the Patent Owner response at 50 and 51 and Dr. Lebby's declaration at 145 to 147 explains that Suzuki is a relatively large size and it wouldn't be obvious to combine that with the Wakabayashi reference at that

time for the CMOS and in fact it's consistent with the evidence of record that CCD was better at the time. So a CCD pixel array would have been better at the time. It wasn't obvious to go with CMOS at the time, especially in that size range.

I'm going to move on to slide 23 which is the Ricquier. Dr. Lebby addresses this in paragraphs 110 to 114 but the key point is that Ricquier reference is a passive pixel CMOS device. The claims talk about active pixel so it had a machine vision application and it was intended also I think to be used in camera-on-a-chip or for on-chip integration. It actually says that. It was a test bench set-up. They were trying to test out technology for this machine vision with limited functionality and one of the things it also had was a very limited timing and control functionality because it was a special purpose test device but importantly it was intended to be used on-chip.

Slide 24. On Dierickx, that is an active pixel. That's not an insignificant difference. That was a very big shift in the industry going from passive pixels to active. Gave rise to a whole host of technologies that we've talked about and so to combine as Petitioners do on grounds 3 and 7 for the '475 to combine an passive and active we submit that person skilled in the art wouldn't do it and in fact as I just mentioned about Ricquier having a very kind of simplified timing and control, Dierickx has the opposite of timing and control. It was trying to

deal with fixed pattern noise for active pixel sensors and another reason that those references wouldn't be combined, again, from the perspective of a person of ordinary skill in the art and that would be in the Lebby declaration, paragraphs 149 to 162.

I just want to briefly hit slide 25. This concept about it was well known in the art to have CMOS with off-chip, to the extent they cited references, a string cite. You know, I think maybe it was Monroe and Stam, that background and the string cites don't establish CMOS active pixel sensor camera-on-a-chip sensors with off-chip circuitry. The Ariosa case makes clear you're not supposed to have background information that's kind of essential to your ground and the evidence of record, as I've been over, shows what was happening in the field at the time.

Slide 27. Petitioner's positions we don't think have been consistent and just as an example when we look at Wakabayashi when it comes to the pixel array or timing and control, it could be anything that could be a solid state imager. But when we look at Ackland when we talk about where is the image processing circuit which it says not shown that they view, you know, has to be off-chip which we think is not right and what it fails to account for is a view of a person of ordinary skill in the art and maybe the evidence of record which is why I wanted to highlight that.

And you heard Petitioner talking about making

combinations and picking and choosing, and Judge Kenny you had asked some questions about this. You know, could have versus would have and on slide 28 is really I think what that is setting up. It's not could it have been done, it's would a person of skill in the art have made those changes and we submit for the reasons in our papers that they wouldn't have made those combinations.

On slide 29, we've really talked about already in terms of Wakabayashi and Ackland and I think we've kind of covered the Wakabayashi, Ackland and Suzuki as well and I think that covers actually the combination of Ricquier and Tenderes (phonetic).

So if there's no questions on that I'd like to with the time I have left talk about the '512 and in particular the Swift reference which I know came up before and on slide 42 we just highlight the claim. So we have the first circuit board and first plane which has the CMOS and the timing and control and a second circuit board and a second plane (audio interference) conversion circuitry is on that second board plane is stacked with respect to the first board and parallel, and then we also have the size limitation in claim 2.

Now, the Swift reference Exhibit 1005, and I'm on page 44, it clearly says and makes reference to the active pixel sensor technology of Dr. Fossum. As we've said and we think the evidence of record shows that's the camera-on-a-chip and that's

how it would be understood by a person skilled in the art and to the extent there's questions about how would somebody understand the spec and the different embodiments, there are kind of two aspects to that. One is that either it's camera-on-a-chip and to the extent there's additional processing circuitry for the images that could be a variety of different post-processing things that are done and known in the art and Dr. Lebby testified about that. But given that it cites expressly to the Fossum article which talks about on-chip integration with his CMOS active pixel sensor that's how a person of skill in the art would understand it.

Alternatively, given the structure of the perpendicular boards and the separate board for the signal processing and given the time of Swift which was in 1994, alternatively a person of skill in the art would understand that to be describing a CCD device which was the dominant structure at the time. So those were two options. What isn't an option to a person of skill in the art is to have the Fossum active pixel sensor camera-on-a-chip design which is expressly referenced to, and de-integrate that further because that is a hindsight analysis to get to our claim but that's one thing that's not -- a person of skill in the art would not get from these two references.

We also showed on slide 44 that when we talked about the Fossum and this Exhibit 2039 is an excerpt from an article about

Dr. Fossum's work and his device and it says the chip does its own conversion from analog to digital for output on computer monitors and disk storage. That is on-chip image processing. That's how a person of skill in the art would understand that reference in Swift to Fossum, and so to take that understanding and de-integrate the image processing piece we submit is not taught or suggested in Swift and to Judge Lee's question before, a person of skill it wouldn't be obvious just to go and start taking it apart because you would start losing the benefits from that integration that we talked about, better performance, the lower cost and all those benefits.

Slide 45 has some cites to our papers and Dr. Lebby about Swift's multiboard system being consistent with a CCD imager structure, you know, in addition to the other embodiment where it's clearly talking about Dr. Fossum's CMOS camera-on-a-chip. Ground 6 talking about --

JUDGE KENNY: Sorry counsel. Going back to slide --

MR. CAPLAN: Sure.

JUDGE KENNY: Sorry counsel. Going back to slide 45 because we did ask Petitioner's counsel questions about the very passage you're quoting right there and about the image signals and the pre-video to post-video. I take it from Petitioner's point of view the fact that it's referring to processing imaged signals rather than processing video signals is an indication that what's

going on there is the video conversion, the claimed video conversion and the fact that well, the combination that's referring to the input is being image signals and then the fact that it's referring to a cable coming out from that board being connected to ultimately a monitor to Petitioner shows that it has the pre- to post- processing that's in the claims. So what's your thoughts on that?

MR. CAPLAN: So my thought is that I think when counsel, when you were asking about this and was being discussed, counsel made reference I believe to figure 6 to justify their view that it was pre- to post- processing because there was a connection I believe from -- I'm looking at figure 6 in Exhibit 1005 which is on page 32. I believe there was a statement made, I'm not quoting it, but to the effect of there was cabling from 152 to the monitor so that proved the point and so my initial comment was that what figure 6 shows is the down run (phonetic) from the overall device to a monitor. It doesn't show a connection from a circuit board and what processing's going on with that and there's a lot of different processing that goes on, post-processing white balance and other things that can be done to image signals even once they are processed. Dr. Lebby testified about it. We included some cites here. But that does not show that in fact it was pre- to post-video processing or conversion being done on that particular board and we would

submit -- I'm sorry.

JUDGE KENNY: Go ahead. Go ahead.

MR. CAPLAN: Yes. No, I was going to say that we submit that either it's camera-on-a-chip so it's happening on the board -- on the chip, the image processor chip, the Fossum chip -- or it was a CCD implementation and it wasn't a CMOS processor because even for the disclosure in Swift it says it's preferably a Fossum CMOS APS, it's not limited to that. So if it's not the Fossum camera-on-a-chip Dr. Lebby's testified for reasons he's set forth that in fact that would be a CCD reference.

JUDGE KENNY: I'm looking at page 9 of Exhibit 1005 of Swift basically because this is one we discussed with Petitioner's counsel and Petitioner basically said that there were two embodiments. Sorry, I'll give you time to find it.

MR. CAPLAN: Yes.

JUDGE KENNY: But I just wanted --

MR. CAPLAN: I'm looking at --

JUDGE KENNY: Sorry. Because I asked Petitioner's counsel about it and I got their view on it, I wanted to make sure you had an opportunity to address it. You know, the part that we've been talking about with the video processing is or the processing is described here. You know, looking at page 9 you have at around line 7 various circuitry components are mounted on the circuit board to process signals and talks about circuit

board 53 and then Petitioner's counsel pointed to lines 20 to 21 saying well, there's two embodiments, one in which the processing can occur on circuit board 53 and another where it would all just be combined into a single circuit board, so I don't know if you had any comments on that interpretation by Petitioner and also I mean the other interpretation that the word -- I believe is their view that the word image signals applies pre-video.

MR. CAPLAN: On the latter point the image signals I don't think that is particularly -- I'm just looking to check Dr. Lebby's declaration on that particular point. I'll just take a second to look at that.

JUDGE KENNY: Okay.

MR. CAPLAN: Just want to check on my time. I'm probably approaching an hour I would imagine.

JUDGE KENNY: Actually you're slightly over an hour. There were a lot of questions so, you know, you have time to (indiscernible.)

MR. CAPLAN: I just wanted to --

JUDGE KENNY: Yes. You started at 10:58 and it's right now 12:05.

MR. CAPLAN: Okay. So I'll wrap things up. I haven't checked it but as I look at it here I don't see anything which gets to the detail about the -- and to your former question about the

image signals, to process image signals. That doesn't suggest pre- or post- signals of the image, it could be pre-video or post-video. I think in the art it's understood there's a lot of processing that goes on pre- to post- and then additional processing.

JUDGE KENNY: But the references also -- and the reason we ask is that the reference uses both the term image signals in this particular location and other parts of the reference used the word video signals. So, I mean, it's the Petitioner's, you know, Petitioner has like in the papers identified image signals or at least they've interpreted as pre-video so it's just something I'm trying to get your position on.

MR. CAPLAN: Yes. I'm just taking a quick look here. So, and I'm just taking a look at Dr. Lebby and what he testified, I'm looking at his declaration. This is paragraphs 122 to 125 of Dr. Lebby's declaration in the '512 and I think we do address it. Yes, I think what Dr. Lebby said was that that portion that we're talking about is really about the camera outputting the signal that can be viewed on a monitor and it's not directed to the particular circuitry and there are a lot of different things that could be done. There's the gain control and color (phonetic) balance and other sorts of features and I think our position, what Patent Owner has put in and what Dr. Lebby testified about is that it's more general the description here is output from the camera is

not drilled down to the level of what circuitry is on the board performing particular functions. It's a much more generalized description which is consistent with Dr. Lebby and Patent Owner's position that either it's the CMOS camera-on-a-chip or it would be a CCD device which was dominant at the time when you would have off-chip circuitry. But it's not describing what's claimed which is that CMOS active pixel sensor with the image processing de-integrated. That is not suggested in that part of Swift. Okay. Does that --

Okay. On page 546 talking about the Ricquier reference which we talked about and I've described in our point here. Again, from the perception of a person of ordinary skill in the art combining CMOS active pixel which in what embodiment that's what Swift is describing with a passive pixel design of Ricquier and it's getting us to my point about what a person of ordinary skill in the art would do. It seems like from a different point of view they find (indiscernible) features to say they could go together so therefore it would be obvious it's just a design choice. In fact, we don't think that's the right -- that's not what the law says. It's how it would be understood by a person of skill in the art and you wouldn't go backwards in technology with the passive pixel technology to combine that with a CMOS active pixel. Those are very different and certainly if the Swift reference in the CCD embodiment you wouldn't combine it or

modify it with the passive pixel CMOS because, as you saw from the evidence of record, you wouldn't mix and match those technologies.

Slide 47. Getting into Suzuki. It's understood to be a CCD device. Dr. Lebby testified about that. But it's got an off-chip design and so to the extent Swift is a CCD embodiment it already has an off-chip design so it's not really adding anything and the arrangement in fact is different in Suzuki than in Swift and in Swift the two boards that they are talking about are perpendicular. In Suzuki they are parallel, so you'd have to change that structure but to the extent that Suzuki is used for a size aspect as well, there's nothing to suggest that even if you were to change the orientation of the Swift boards you would change the size as well and there's nothing about the Ricquier reference which would suggest making it smaller. I think that was a point that was made that Ricquier has nothing to do with size and the fact that Ricquier has this bench (phonetic) for a prototype set-up with off-chip control circuitry as they were trying to figure out even though it was intended to be on-chip, that doesn't go to size and I believe Dr. Neikirk and we cited to it testified that in fact there was nothing mentioned in Ricquier about size. You can't look, and a person skilled in the art would not look to the Ricquier reference to get a motivation to make Swift even smaller and Swift was much larger than Suzuki and

Ricquier. In fact, when it talks about size it's down to even I think under 2 millimeters, so it's much smaller. So to land in this 2 to 12 millimeter range is not suggested by Suzuki or Ricquier.

And my last point here is that combining Swift and Ricquier and Suzuki is problematic just in the terms of the different technologies that they are involved in and a person of skill in the art wouldn't take the CMOS active pixel of Swift and combine it with the passive pixel of Ricquier and then further modify that with features from an off-chip design of Suzuki and even if Swift was the CCD embodiment, it wouldn't modify a CCD embodiment with a passive pixel embodiment of Ricquier with another CCD reference.

Larson I don't think we have to address. It's a CCD reference which is a non-starter that you wouldn't combine all those technologies. I think I've already covered slide 49. Slide 50 I just want to make the point here on slide 50 that we made the point that the Swift reference really does align with the camera-on-a-chip technology of Dr. Fossum. This is an illustration of figure 7. I talked about this. It has the same layout that you would find with the camera-on-a-chip. Swift shows that with the image sensor area in red and the rest of the on-chip circuitry in blue. It very much lines up with the Fossum but again, no motivation to separate out the image processing

functionality.

Slide 51 is, and really just a summary of what we've talked about. The main thing I want to talk about here is the design choices because there were some comments made by Petitioner that everything's just a design choice, that you can put things, you know, circuitry on other sides of boards, you can move them around and the fact is each of these references has a particular design for a particular purpose. We cited in fact Petitioner's own reference talking about circuit design which talks about it actually is an important choice to make. So you can't take a glib approach to everything's up for grabs. You just kind of start one place and you can modify as you like. Each of these references has particular disclosure. It's understood by a person of skill in the art and through that perspective, the design choice argument is not enough and the combinations here of Swift with Ricquier and Suzuki don't really -- don't work.

The last thing I'll just get to very briefly is commercial, the secondary considerations and the point I just want to make here is to slide 54 in terms of the unexpected results and a reference to a declaration during prosecution. My point, and we explained this in our briefs and it's shown here, that the arguments that were made at the time which we're using here were tied to the claim language and it's the same core claim language today as it was then. We think at the time we talked about remote control

box or remoting. The claim language at issue here with the separate board and the plane with the image processing circuit from the other board where the timing and control and pixel array is, that common feature then is to now and so it is tied to the claims.

And on the commercial success and licensing, in our brief we did cite the various licensees. It's a portfolio license but, you know, we'll stand on our papers on the rest of that. So unless you have other questions, that concludes my initial comments.

JUDGE KENNY: Well, let's do address some of the secondary considerations because counsel, Petitioner, one of the points they made was they referred to the Adair declaration as, you know, a self-serving declaration. What do you have to say to that?

MR. CAPLAN: My initial response is the patent application was written by the Adairs so they describe it so I don't know -- I don't think it's per se, it's not my understanding of the law that per se, you know, that a per se declaration by an inventor is self-centered or it's not relevant. This was describing what happened at the time of what they observed. In addition, we also cited to I believe a second brief by Dr. Baird who made similar points about some of the benefits of the invention at the time. So there were two declarations that were submitted, I think they're both cited in our papers. But (audio interference) Your

Honor, the fact that it was from Mr. Adair at the time it was contemporaneous and none challenged the (audio interference). That was their observation.

JUDGE KENNY: It seems that they are challenging the merits of what he's saying and so I mean Mr. Adair now has not been subject to cross-examination on any of these (audio interference); correct?

MR. CAPLAN: Correct.

JUDGE KENNY: And so what about -- I mean I think that just one of their arguments was that it's conclusory and, you know, obviously self-serving. Obviously, this is not ex parte prosecution. We don't have to necessarily credit declarations or, you know, we can certainly look at what weight to provide to them so what about that we should give very little weight to what's being said here, being cited because, you know, it's conclusory and there's a strong interest from the person to get the patent?

MR. CAPLAN: Well, Your Honor, I think we only have an excerpt of it here. I could look at the whole declaration. I think it's a pretty factual recitation of Mr. Adair's kind of understanding at the time and his experience in particular with the development of these products and this technology that's reflected in the claims and I think that sort of kind of critique would be probably better taken if it was something that was done

today long after the fact. This was at the beginning of prosecution, it was contemporaneous. There was no -- I don't know if they had a sense of there was going to be litigation and this level of scrutiny at the time but there's no indication, you know, I would take it for what it says. I think he signed it that it was accurate to the best of his understanding and Dr. Lebby has looked at them and he's also cited to these as part of his overall evaluation.

JUDGE KENNY: Has Dr. Lebby provided any claim chart showing a specific comparison between the claims and what's being reported here to establish some kind of a nexus between this commercial, you know, these secondary considerations and the claimed invention? Or has Patent Owner as a whole done it either?

MR. CAPLAN: No, that we haven't done. That's what I said at the outset that within this -- well, just talking about this declaration it was tied to the claims and the claim feature at the time which we submit is a consistent feature in the claims as they exist now. So beyond that no, there was no further mapping and the licensing was just a factual matter. We identified the parties in our paper but that was a portfolio license so there's not more on that.

JUDGE KENNY: Okay.

MR. CAPLAN: So with that I'll reserve whatever's left.

JUDGE KENNY: Okay. Thank you. Just one moment, please. Sorry, I meant that you -- you can finish. I was just trying to eliminate a distraction from outside of the room, from outside of the full space. Counsel for Petitioner, are you ready?

MR. MCKEOWN: Yes, I am, Your Honor. Good afternoon. Scott McKeown of Ropes & Gray for Petitioner Samsung. I'm not sure how much time I have left but I don't plan on using all of it so we'll see if we can finish up here in about ten minutes and then any questions of course that you have I'm happy to answer.

The one issue that always stood out to me on this record and Judge Kenny, I think you sort of clued into this is this confusion of market data with what was going on relative to those skilled in the art developing, you know, these types of image devices. A person of skill in the art in this matter is not a consumer. A person of skill in the art is an engineer that was working in this field as defined in the papers and it just seems to me that the Patent Owner's been confusing these concepts for the very reason that their patent should be cancelled which is they didn't invent anything. They started buying things on the market such as sensors and in that secondary consideration declaration that you were just discussing that's made clear. They say the unexpected result was finding a vendor that could get them the sensor that they needed and the sensor that they needed being

one that, as they pointed out in their argument, was small enough. That was the problem that they were trying to solve was they needed a small sensor and lo and behold there was this development in the art and they cite it in column 2 of their patent.

Mr. Fossum came along and invented this pixel that they bought on the market and then they put it in their endoscope and they've emphasized over and over that well, the market trend was a certain way or the predominant technology as of what was being sold at the time, but that doesn't matter to this obviousness inquiry and we've heard over and over that size does matter. Well, perhaps in some things but not in patentability, at least not when there's nothing more but we miniaturize something or we rearrange the parts or we made something separable. You can dress it up as de-integration but at bottom, you're talking about textbook obviousness, you know, making something smaller, rearranging parts, making something separable and we've pointed this out in our papers and cited to the relevant cases but this is all on the same page of the MPEP 2144. You could find making things smaller, making things separable --

JUDGE KENNY: Well counsel, there are patents that are upheld because of dimension limitations; correct?

MR. MCKEOWN: There certainly are but as I said you need something more and there is no something more here. You

know, the something more would have been well, we took that semiconductor and we re-engineered it and we moved around the P-wells, we moved around the N-wells, we were able to reduce the size of the semiconductor therefore size in that context is an invention. Not that well, we picked up this sensor and what we realized is that it wasn't as sensitive as the CCD so in order to grow the pixel footprint we took some circuits off the board and by the way, you know, that was going on I think the exact words of Patent Owner was, you know, in a CCD implementation that was going on for a long time, separating circuits.

So when the next iteration of technology came along and you go back to what was done for decades, how's that an invention? I mean wouldn't that be the first thing that you would do? Well, I need more resolution and there's some circuitry on here that I could move so I'm going to move it and we have, again, getting back to what's actually in the record. We're not talking about what was for sale, we're talking about the grounds here. We have express teachings to do exactly that and as Mr. Davis pointed out earlier, the argument here is well, sure the references say that but let me tell you what they really intended or let me tell you what they should say.

But at the same time, Patent Owner uses the same words in its own patent. When you talk about semiconductor imaging, it's right in column 1 of their patent. They use the same terminology

and when they read it in a piece of prior art, well it has to be interpreted to mean something else in the case of Wakabayashi and others. It must be CCD despite the fact that it states the exact opposite and points to some of the very same disclosures that are incorporated into these references.

So, again at bottom we're talking about a rearrangement of parts and making something smaller without that something more that would earn you a patent on miniaturization. We don't have that. The Patent Owner told us. They said the problem that they were solving was making something small. That's simply not a patentable distinction.

JUDGE LEE: It's Judge Lee. I want to clarify something. I talked a bit about this to opposing counsel earlier. There's no modification; right? It's not like well, let's make it smaller and what do we do? I mean both main references teach central location of the processing circuitry. Both Swift does that according to you and Wakabayashi does that according to you. So if you were right on that, it's not here or there to modify either reference to make anything smaller because you just do what the reference says and you already have separate processing circuitry.

MR. MCKEOWN: That's correct, Your Honor. I think in the case of claim 2 the argument is the removing or should say moving, but the premise is that well, you know, there was this

light switch that was flipped. We went from CCD to full camera-on-a-chip overnight. There was nothing in between and that's just not true. We know that from their own patent column 2 they were saying slight evolution and there was even hybrid CCD CMOS so there was this gradual implementation of this technology and putting that circuitry some place else because you needed more space is just a basic engineering consideration.

It's something engineers do every day and there was some comments earlier about well, why would take particular circuitry and move it off of the sensor and put it someplace else and I think the answer there again is it's an engineering consideration; right? Like when we're talking about the Swift reference, if I'm an engineer I can buy a sensor, a generic sensor, with timing and control circuitry on it and so my second board is doing all of the things that Patent Owner admits is known in the art whether it's white balance or NTSC encoding or PAL encoding.

If I'm selling these devices in different markets, maybe I want that sensor that's going to work in all of them and I can switch out that second board as I need to. That's going to depend on your vendor. It's going to depend on all the things that you consider when you're designing a product and we know from Swift as well it had specific British Telecom connectors they discussed, they talking about connecting this to your domestic television. The reason that there isn't a lot of detail in there

about the video processing is because this was written for someone of skill in the art and Patent Owner admits well, everybody knows you've got to do white balance and all of these things. So of course those details aren't there. That was not the invention Swift was focusing on so that is left to a person of ordinary skill in the art, so when you teach an image sensor that is providing an image signal to a second board and then that second board provides that signal to a video monitor which is described in Swift as a domestic TV or British Telecom having certain connectors, obviously there's going to be processing that's done there and one of skill in the art reading this instantly recognizes that. Why isn't it described? Because it's going to vary depending upon that television, that monitor, that market and you just don't need to go into that kind of detail. So that's why it's not there. It's no great mystery.

JUDGE KENNY: Well, can I ask you that, counselor? Is it your argument that the pre-video to video -- I thought Petitioner's argument was that the circuit board at issue one of ordinary skill in the art would recognize had the pre-video post-video conversion because of the use of the word image signal. But it sounds like your argument now is that one of ordinary skill in the art could place it anywhere and so it doesn't -- I'm just trying to understand are you saying that the reference actually teaches to one of ordinary skill in the art putting it at

the printed circuit board 53 or are you simply saying one of ordinary skill in the art would know it to be multiple places and doesn't, you know, could be done anywhere?

MR. MCKEOWN: Well, I think the most (audio interference) putting it on the second board and I think that is (audio interference) argument.

JUDGE KENNY: Okay. But beyond that, are you saying that the reference actually teaches that?

MR. MCKEOWN: Yes.

JUDGE KENNY: I mean --

MR. MCKEOWN: (Indiscernible.)

JUDGE KENNY: -- and why does it teach it that? Why does it teach that?

MR. MCKEOWN: Because in the Swift reference there's a consistent use of image sensor, image signal, so what you're getting is the raw dump (phonetic) off the sensor and obviously you're not including all of the different processing on that chip. You need to do other things to get it to the video monitor and certainly you wouldn't want to cram all of that in one spot where you're worried about the size limitations and space of the housing. So --

JUDGE KENNY: Okay. But we're talking about the actual text. I mean maybe we can turn to your slide 61 where you have the quote.

MR. MCKEOWN: Sure.

JUDGE KENNY: Or to the Swift reference itself. I mean what I had understood the Petitioner's position was that the actual text taught it. What I started hearing from you seemed to be it doesn't matter, it just could be there and I want to make sure I understand this position by Petitioner clearly. So I mean, you know --

MR. MCKEOWN: Certainly --

JUDGE KENNY: -- okay. Go ahead.

MR. MCKEOWN: -- no certainly the text teaches it for the reasons that we pointed out in the petition. What I was elaborating on --

JUDGE KENNY: Okay. But why don't you go through that right now since this has come up.

MR. MCKEOWN: Okay. Sure. So we've got, and I'm looking at page 9 looks about line 7 when it talks about various circuitry components are mounted to the circuit board 53 to provide power to the image sensor process image signals received therefrom, so we're getting the raw image signals from the sensor and then this, as we've discussed earlier today, this board 53 then in turn feeds the video monitor.

So to one of skill in the art when you're receiving image signals from an image sensor and then you're providing them to a domestic television that's described in Swift there is image

processing that has to be done to get from point A to B in addition to the fact that the text plainly teaches processing this image signal. So that's --

JUDGE KENNY: Okay. But --

MR. MCKEOWN: -- elaborated on that processing.

JUDGE KENNY: Sure. But the claim is directed to particularly pre-video to video and there's no question that it expressly says it processes image signals. So, again, just getting -- I mean obviously Patent Owner's, Mr. Caplan, Patent Owner's counsel, you know, disputed your interpretation on this so, and maybe you can just go through it each step here. I take it from what you're saying the fact it's image signals is indicating that it's pre-video?

MR. MCKEOWN: That's correct.

JUDGE KENNY: And then the fact that it's ultimately going to a monitor -- by the time it gets to the monitor it's a video; right? That's the position?

MR. MCKEOWN: Right.

JUDGE KENNY: So now there was a, and so we have the comment of a cable was connected, you know, and passes through, you know, the cable comes and I think Mr. Caplan raised the issue well -- at least, and I don't want to speak for him -- but it seemed like he was raising it there was a disconnect between what was described here as cable 55 and the cable that

ultimately went to the monitor. Maybe you can address that.

MR. MCKEOWN: Well, let me look at, I believe it's figure 6.

MR. DAVIS: Your Honor. I apologize for speaking but I do have the citation that I think you are looking for on this. May I just provide that?

JUDGE KENNY: That's fine but I want an explanation, not just a citation.

MR. DAVIS: Yes.

JUDGE KENNY: So please feel free to throw in the citation.

MR. DAVIS: Okay. Happy to do it, Your Honor. On page 17 to 18 of Swift at the very bottom, line 34 of page 17 which carries over on to line 3 of page 18 explains that the monitor might be a domestic television set and it says,

"With the video signals provided from the camera 152 as either video or HF signals giving an image from the camera 152 may be slanted and pointed at television at will."

So when the signal is fed into board 53 it was an image signal. When it came out the cable to the monitor it was a video signal. I think Your Honor had alluded to that same terminology in questions of Patent Owner's counsel that what Swift discloses is moving from a video signal of board 53, there's processing on board 53 and we have a, sorry, image signal coming before board

53, processing on board 53 and a video signal coming out. So the conversion between image and video is on board 53.

JUDGE KENNY: Okay. So what you're saying is this cable 55 that we're, make sure I've got the number correct, we hear we have the description of cable 55 here on page 9. The processing quote we've been looking at for cable 55 is coming out and I think, like I said, Patent Owner's counsel raised the issue does -- that doesn't expressly say cable 55 goes to a monitor?

MR. DAVIS: It does. It is when you read the rest of Swift which says that coming out of the camera as a whole, which the cable next to the camera as a whole and particularly as disclosed on page 9, it connects to board 53.

JUDGE KENNY: Right.

MR. DAVIS: That cable then has to be referred to in pages 17 to 18 then connects up directly to a monitor and is carrying video signals.

JUDGE KENNY: Okay. I take it it describes it in the form of some other connector or some other number, not the actual cable. It doesn't describe it as 55 itself; right?

MR. DAVIS: That part of the discussion, Your Honor, it's talking about the system at a higher level of view. We do not exactly how the cable connects up to the particular board.

JUDGE KENNY: Okay.

JUDGE LEE: Why then, Mr. Davis, in the text you just cited to us at the bottom of 17 and top of 18, why does it talk about video signal provided from the camera because I thought we all understood that the raw image from the camera is not yet a video signal and yet that text you just pointed us to referred to video signals provided from the camera?

MR. DAVIS: If you look at figure 6 that we referenced before, camera in that -- when it was referring to element 152 -- is the whole thing.

JUDGE LEE: Okay.

MR. DAVIS: It's not just, yes, so it's just that whole box and the cable connects to it and in particular connects up to board 53. It isn't just talking about the imager, if you will.

JUDGE LEE: Okay.

MR. MCKEOWN: Thank you, Jim. Well, these were the most worthy issues that were discussed that I responded to so unless there's any other questions, I'm happy to cede the remainder of my time. All right. Thank you very much.

JUDGE KENNY: Thank you. Mr. Caplan.

MR. CAPLAN: Thank you, Your Honor. A couple of points here. One, when following with the discussion in the rebuttal there was a comment about how is we just put Fossum's camera-on-a-chip into products and how can that be an invention? But I think our papers are clear, that's not what the

invention of the '052 patent is about. It didn't just take the Fossum camera-on-a-chip and stick it into a device and try to make the exact same thing smaller. That's not what we've been talking about and in fact the patent is pretty clear, is very clear in the spec, that the camera-on-a-chip was the development. We had it on a slide, let's see, it was on slide 12 of Exhibit 2105 where we just excerpted some language from the spec at column 3 of the '052 patent. But there was a further change to what we've been calling the Fossum camera-on-a-chip. So it wasn't just taking something that worked that somebody else did making it smaller and sticking it in. In fact, I think counsel referred to it as the next iteration of the technology. That's a more accurate description and the next iteration was taking the camera-on-a-chip technology which in itself was an innovation with the CMOS that we talked about, the CMOS fabrication of the CMOS active pixel sensor imager, but then pulling out, separating out some of that functionality, so that next iteration I would submit is actually a further innovation. It wasn't just repackaging the exact same thing and making it smaller.

So I would agree that just taking somebody else's work and making it smaller, unless there was some trick in making it smaller, in and of itself wouldn't be patentable. But that's not what the claims here are directed to because the Fossum camera-on-a-chip didn't have the image processing circuitry separate on

a different plane or different board from the CMOS pixel array or the timing and control circuitry. So that I just want to make sure at least our Patent Owner's position is clear on that.

And in the same vein, it's not just a rearrangement of parts because it's actually a different structural layout and to the extent every invention is a combination of known parts, that's still true but that's different than what's going on here because it was a change in the circuitry. So that was one point.

In connection with the Swift reference and I know there was just some discussion about what Swift shows, again I would just remind the Board on Dr. Lebby's declaration in the 512 patent in paragraphs 122 to 125 he addressed Swift in particular on this aspect and I just to make clear the Patent Owner's view which we briefed and is in here, but similar to what I said before is that the Swift reference doesn't describe at the level Petitioner is talking about in terms of kind of what particular processing functionality is performed within each board or each circuit on the board and that's really the issue, and in fact when you look a Exhibit 1060 which is the Fossum article that's incorporated in Swift that talks about the video processing, that pre- to post-video conversion is done on-chip.

So that would be happening on-chip and that was the point that Dr. Lebby laid out and I just wanted to kind of reiterate that, and I think somebody already made the comment that in this

reference to page 17 of Exhibit 1005, the statement at the bottom about the video signal is provided from the camera 152. That is a very general statement. Consistent with what we said before, I don't think that does not show kind of the details on the circuitry conversion those details. It does happen somewhere between the camera overall, the device and the monitor but where it's happening isn't shown there and as Dr. Lebby explained, it's either the camera-on-a-chip where it's happening on-chip or it's a CCD device which obviously lacks the CMOS feature, so that wouldn't be relevant. So I just wanted to say that.

I also wanted to comment on the comment that counsel made about moving circuitry around, that it was known, it's just you know, every engineer would look at this and you could just move things around. As I tried to explain before, moving circuitry around you have an impact on performance of any circuit, separating circuitry would increase power requirements, it can introduce lag and noise and synchronization, all things that Dr. Lebby has identified in his declaration and in our briefs as well but you just can't move things willy-nilly around. That's not what the standard for obviousness is, as the Board knows. You have to look at what a person of skill in the art would understand these reference to be teaching and kind of a related point when you hear the description of the invention and the kind of relative minimal nature of the invention, again as I point out

the references they are moving on don't reflect that necessarily. They are not alleging 102 references, so I would submit that it's a little bit more than what's they're suggesting to the Board.

And the last point I wanted to make is the Wakabayashi reference, there was a question about any modification. In fact, the Petitioner did argue that the image processor would be moved, it would be a modification of the Wakabayashi reference moving the image processor from board 29 to 39. That's on pages 24 to 25 of their petition. So I just wanted to make the record complete there the fact that it would be either by the Petitioner's analysis there would be some modification in order to use the Wakabayashi reference. Absent any other questions from the Board, I don't have anything further, Your Honor.

JUDGE KENNY: All right. Thank you very much for being here today. The case is submitted.

MR. CAPLAN: Thank you.

(Whereupon, at 3:46 p.m., the oral hearing was concluded.)

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