

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

RESONANT SYSTEMS,
Patent Owner

IPR2024-00697
IPR2024-00698
Patent 8,093,767 B2¹

Record of Oral Hearing
Held: July 16, 2025

BEFORE: KARL D. EASTHOM, NORMAN H. BEAMER, and,
BRIAN D. RANGE, Administrative Patent Judges.

IPR2024-00697
IPR2024-00698
Patent 8,093,767 B2¹

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P R O C E E D I N G S

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JUDGE RANGE: Good afternoon, everyone. I am Judge Brian Range. And here with me today are Judge Karl Easthom and Judge Norman Beamer. This is the hearing for two inter partes reviews. The first inter partes review is number IPR2024-00697. The second is IPR2024-00698. Both matters concern U.S. Patent Number 8,093,767 B2. Each of the two matters is captioned Apple, Inc., Petitioner, versus Resonant Systems, Inc., d/b/a RevelHMI, Patent Owner. Let's start by having counsel make appearances. Who is appearing for Petitioner today?

MR. DEUTSCH: Thank you, Your Honor. This is Craig Deutsch with Fish & Richardson on behalf of Apple, Inc. And with me are Karl Renner and Tom Rozylowicz, both of Fish & Richardson.

JUDGE RANGE: Okay. Do you anticipate that each of you will be speaking today or just you?

MR. DEUTSCH: I anticipate -- I will do most of the speaking and Mr. Renner may also speak.

JUDGE RANGE: Okay. And who do we have appearing today for Patent Owner?

MR. RUBIN: Good afternoon, Your Honor. This is Neil Rubin from Russ August & Kabat, and I'll be the only one here representing and presenting for Resonant Systems, Patent Owner.

JUDGE RANGE: Thank you. Before we begin with the arguments, there's just a couple of administrative manners. First, we have your demonstratives. For clarity of record and so that we can follow your

1 argument, we ask that you identify what page of your demonstratives you're
2 talking about as you argue. Also, please state your name clearly before you
3 start speaking for clarity of record and to help the Court Reporter. You
4 should be able to share screens with your exhibits. Perhaps that would make
5 it easier to follow, so.

6 Second, I want to talk about timing. Each side has 75 minutes to
7 present their argument concerning both of the matters. Although there are
8 two matters at hand, we know that there's a great deal of overlapping issues,
9 and so we encourage you to be efficient. It's perfectly fine if you don't use
10 the entire 75 minutes.

11 We will begin with Petitioner's arguments regarding
12 unpatentability and Patent Owner may respond. Judge Easthom is live in
13 Virginia and he will try and keep track of time using that -- the red timer
14 above him on the WebEx. And we will try to indicate, too, if you're running
15 short on time, but also, please try and keep track a little bit yourself.
16 Petitioner, you may reserve some of your time for rebuttal. How much time
17 would you like to reserve?

18 MR. DEUTSCH: I'd like to reserve 20 minutes, Your Honor.

19 JUDGE RANGE: Okay. So that would allow 55 minutes for the
20 opening. If you go over, it'll just eat you into the rebuttal a little bit. And
21 Patent Owner, would you like to reserve time for surrebuttal? You're on
22 mute, Counsel.

23 MR. RUBIN: Thank you, Your Honor. I'll reserve 20 minutes, as
24 well.

25 JUDGE RANGE: Excellent. Does either party have other

1 questions before we begin?

2 MR. RUBIN: No, Your Honor.

3 MR. DEUTSCH: No.

4 JUDGE RANGE: Good. All right, thank you. Petitioner, you
5 may begin when you're ready.

6 MR. DEUTSCH: Thank you, Your Honors, and may it please the
7 Board. I am here to present Petitioner's side in these two IPRs, both of
8 which are directed to the '767 patent. As shown on Slide 2, the 697 petition
9 includes the grounds based on Shahoian and Cosper, and the 698 petition
10 includes grounds based on Izumi and Cosper. In each of the proceedings,
11 there's really only one issue, each regarding independent Claim 1. And as
12 you mentioned, the remaining issues regarding Claims 2 and 3 largely
13 overlap between the two proceedings.

14 And turning to Slide 4, I'd like to start with Ground 1A of the 698
15 proceeding. This is the Izumi-Cosper combination. And there, Patent
16 Owner does not contest the combination of Izumi. It doesn't contest the --
17 that Izumi-Cosper provides most limitations of independent Claim 1 with the
18 exception of a portion of element 1.5.3. And so that's the only aspect of
19 Claim 1 in dispute in the 698 proceeding.

20 Before jumping directly to 1.5.3, I wanted to start with the petition
21 and step through the analysis that was laid out there. Slide 5 shows the table
22 of contents of the 698 petition and I highlight this up front here because the
23 structure of the petition is important. The red box on Slide 5 surrounds the
24 sections of Ground 1A, which include discussion of each of the Izumi and
25 Cosper references.

1 Then the Izumi-Cosper combination, which includes discussion of
2 the structure of the resulting combination, the motivations to combine,
3 reasonable expectation of success. And then after discussing the
4 combination, the petition steps through the mapping of each claim element
5 in Section VA4. So I'd like to do just that stepping through the references,
6 the combination, and then how the combination maps to element 1.5.3.

7 So, Slide 6 shows Izumi. The Izumi reference describes a driving
8 unit that drives a linear actuator resonant system, such as for a handheld
9 shaver device. Izumi describes the driving unit includes moving element of
10 the permanent magnet and elastic body, and a controller. That controller
11 determines and provides a current waveform to a wire coil, which results in
12 magnetic forces acting on the permanent magnet and driving the moving
13 element. And that current waveform is determined by the controller.

14 Izumi also talks about a sensor that's configured to detect the
15 movement of the moving element during operation of the device. That
16 sensor is electrically connected to the controller, provides detected behavior
17 of the moving element to the controller, which in turn produces the current
18 waveform based on the detected behavior.

19 Looking at the bottom left of this slide, the last sentence of
20 paragraph 60, we see Izumi describing that the control signals are inputted
21 into the base terminals by the current waveform decider 60. Izumi does not
22 provide a lot of implementation detail on the structure of the sensor itself or
23 the controller, largely leaving those details to a POSITA's knowledge.

24 On Slide 7 is the Cosper reference. Cosper describes a feedback
25 control system for maintaining resonant oscillation of a linear actuator. Here

1 again, we have discussion of a controller, particularly that includes hardware
2 and software, which would've been understood as a microprocessor, and that
3 provides control logic to drive and maintain the moveable sub-assembly at
4 or near resonance, for example. And in Cosper, there are multiple sensors
5 that are used to monitor parameters of the moving mass, provide data to the
6 control circuits. And in particular, Cosper provides the detail of those
7 sensors, describing sensors to measure position, velocity, acceleration, other
8 data related to the moving mass. And that feedback from the sensors is input
9 to the controller, the controller processes the feedback signal, and generates
10 the drive signals, again, to maintain mechanical oscillation at a resonant
11 frequency of the system, for example.

12 The petition goes into detail on the combination of Izumi with
13 Cosper and this is on Slide 8. In particular, there are a couple things that
14 come from Cosper. We have -- a POSITA would have enhanced Izumi's
15 linear actuator with Cosper's suggestions for utilizing multiple sensors, and
16 also by using a microprocessor that receives input from those sensors and
17 that generates direction control signals to control the actuator.

18 And so out of the gate, the petition alleged a microprocessor as a
19 result of the combination between Izumi and Cosper, and it was from the
20 beginning and consistently throughout the petition and a subsequent briefing
21 that Cosper was relied on as providing that microprocessor element. Izumi
22 certainly comes very close. Arguably, gets there alone on the
23 microprocessor elements.

24 That was pointed out in places in the petition, but it makes it easy
25 to appreciate that a microprocessor would be effective in the combination.

1 And that's emphasized further on Slide 9, with additional testimony and
2 explanation from Dr. Hannaford, again, explaining that the combination with
3 Cosper results in microprocessor feature of the claim.

4 And there are several motivations that support the combination of
5 Izumi and Cosper. On Slide 10, several of these are laid out. The petition
6 explained that a microprocessor would facilitate implementation of software
7 instructions and allow the software to be executed reliably and effectively to
8 carry out the control scheme. At the time of the '767 patent, this was just
9 one of a limited number of identifiable predictable choices, that it was a
10 known, suitable option for this type of application.

11 And in the bottom box on this slide, additionally, a POSITA
12 would've been motivated to utilize the microprocessor to accommodate the
13 small form factor of the device. Izumi is a handheld shaver device. A
14 POSITA would have wanted to promote that small form factor and would've
15 recognized the benefits of a microprocessor in achieving this small form
16 factor. And this motivation remains entirely unchallenged. Nothing in the
17 record from Patent Owner contends otherwise and that's like the other
18 motivations in the combination discussed in the previous few slides.

19 Continuing on to Slide 11, the petition further demonstrated that a
20 POSITA would've had a reasonable expectation of success in combining
21 Izumi and Cosper, to combine in this way and utilize multiple sensors and a
22 microprocessor to reliably and effectively handle control and operation in
23 the system. And again, by the timeframe of the '767 patent, microprocessors
24 were commonplace, and this includes handheld consumer devices, like
25 Izumi shaver.

1 Dr. Hannaford provided testimony on this point, demonstrating a
2 reasonable expectation of success, and that was corroborated by multiple
3 references demonstrating the use of microprocessors in this way, that it was
4 known and common to use microprocessors in these types of applications.
5 A few of these references are shown on Slide 12 and these were cited
6 specifically by Dr. Hannaford and in the petition for the purpose of
7 demonstrating that this was known and in order to provide a complete record
8 on this point. So that takes us to the claim language of independent Claim 1,
9 and that element by element mapping.

10 JUDGE RANGE: Counsel, I understand your outline of issues, but
11 I'm interested in the issue of analogous art with respect to these two
12 references. Can you address that a bit?

13 MR. DEUTSCH: Yeah. So in terms of the 698 petition, the
14 petition laid out the discussion of '767, what it's about, the field of endeavor,
15 the problems that the '767 patent was addressing, and then continued with its
16 discussion of Izumi and Cosper and what those references bring to the table.
17 In 698, there isn't any contention around analogous art.

18 That wasn't challenged in the POPR, it wasn't raised in the POR, it
19 wasn't raised in surreply, and so that -- there just isn't any argument around
20 that issue here. And we think it was -- the evidence supporting
21 analogousness was laid out in the petition, in Dr. Hannaford's original
22 declaration. It does come up and I can jump ahead. We're planning to talk
23 about that in the context of the Shahoian-Cosper combination in the 697
24 proceeding. And I'd be happy to jump ahead and talk about that now.

25 JUDGE RANGE: You can go ahead, if you're going to address it

1 later when you get to that proceeding. That makes sense. That's fine.

2 MR. DEUTSCH: Okay. So I'll finish up talking about the Izumi-
3 Cospers combination and then certainly, we'll address the analogous art
4 question. So turning back to Slide 13 and element 1.5.3. We've talked about
5 the combination of Izumi and Cospers, how those references come together,
6 and when we get to the element-by-element mapping, that's what we're
7 talking about is the combination. We're no longer talking about Izumi and
8 Cospers in isolation.

9 And I know that Your Honors know this because you said it in the
10 institution decision, but I emphasize it here because the Patent Owner
11 briefing seems to look at it differently. Their arguments have been oriented
12 towards Izumi alone, and so they're just inapposite to the petition's analysis.

13 Looking at Claim 1, the microprocessor is recited multiple times.
14 There's three recitations of it before we even get to element 1.5.3 and the
15 petition likewise addressed it throughout that analysis when addressing the
16 microprocessor elements. And we see that if we turn to Slide 14. In element
17 1.5.1, the petition explains -- and this is in the top left box of the screen --
18 that Izumi expressly indicates that the controller determines the shape and
19 phase of the current waveform necessary for the intended motion of the
20 moving elements. Izumi refers to the current waveform decider that makes
21 this determination and the petition's analysis continued that in the
22 combination. This is carried out by a microprocessor in accordance with
23 Izumi and Cospers' suggestions.

24 And so again, if we turn back to Slide 8, as we talked about a
25 minute ago, that's the combination that we're talking about, Izumi's linear

1 actuator that utilizes sensor feedback from multiple sensors in accordance
2 with Cospers suggestions and use of a microprocessor as a controller.

3 And so turning back to Slide 14, this same reliance continues in the
4 element 1.5.3 analysis, which specifically references the combination and
5 the microprocessor, and so I'll read that sentence. "In the combination, the
6 switch receives the control signals (e.g. S1-S4) from the microprocessor."
7 And the presence and the function of the microprocessor in the combination
8 was further explained by Dr. Hannaford on Slide 15, for example, in his
9 analysis. He likewise explained that the direction control signal is received
10 from the microprocessor in the combination.

11 And then in the bottom excerpt, this is from discussion of the
12 further combination with Rossi in Ground 1C, the combination likewise
13 operates with a direction control signal from the microprocessor in
14 accordance with Izumi-Cosper's feedback control. And so here again, the
15 petition's mapping is consistent leading up to the discussion of Claim 1, in
16 the Claim 1 analysis, and then it remains consistent in the subsequent
17 analysis shown here.

18 And so turning to Slide 16, I think the parties seem to be speaking
19 past one another a little bit on this issue where again, the combination of
20 Izumi and Cosper provides a microprocessor and as set forth in the
21 combination section, hasn't been discussing that the direction control signal
22 is received by the switch from the microprocessor.

23 And what Patent Owner is criticizing is something other than that
24 because in the briefing, Patent Owner hasn't acknowledged the combination,
25 hasn't contended with it, and so we see that on the left side of Slide 16, for

1 example, indicating that the petition is relying on Izumi as teaching this
2 feature. And Patent Owner anchors its argument here on the idea that the
3 paragraphs under the element 1.5.3 heading don't expressly include a citation
4 to Cosper, but reading that section, Patent Owner's theory just doesn't hold
5 because as we looked at a moment ago, the mapping in the petition expressly
6 refers to the combination, the microprocessor, referring to the combination's
7 microprocessor and its configuration that we discussed above.

8 There is one more kind of specific argument that Patent Owner
9 raises related to Izumi's discussion of a CPU that I'd like to briefly address.
10 Patent Owner questions the use of a microprocessor to provide the direction
11 signal to the switch, and they base this argument on paragraph 63 of Izumi to
12 back up their argument, but Patent Owner's argument fails because
13 paragraph 63 just doesn't say what Patent Owner says it means.

14 And so on Slide 18, paragraph 63 of Izumi is shown at the bottom
15 left of the slide and what that text says is it can be difficult to perform
16 complicated control at every half cycle or one cycle due to a constraint, such
17 as CPU speed, RAM capacity, et cetera. And so what it seems to be saying
18 is don't ever complicate things if a CPU is constrained in that way.

19 Paragraph 63 of Izumi is not talking about PWM control as if
20 Izumi's system is predicated on an analog circuit, and it's not saying to use
21 an analog circuit. And so the idea that a POSITA would walk away from a
22 microprocessor, based on paragraph 3, is just not supported. And this is
23 something that's further explained by Dr. Hannaford on the top right, for
24 example.

25 JUDGE EASTHOM: For clarity of record, paragraph 63.

1 MR. DEUTSCH: Thank you.

2 JUDGE EASTHOM: You said paragraph 3. Yeah.

3 MR. DEUTSCH: Yeah, it's paragraph 63 of Izumi. Dr. Hannaford
4 further expanded on this paragraph and his analysis of Izumi in view of this
5 paragraph, indicating that PWM control is not indicative of the structure for
6 implementing that control technique. Nothing in Izumi indicates that even if
7 you are using PWM control, that it couldn't be carried out or wouldn't be
8 carried out on a processor -- on a microprocessor.

9 And we can look at further testimony from both experts on this
10 point on Slide 19, and there on the top left, we have testimony from Dr.
11 Goossen; at the bottom is Dr. Hannaford; and again, the top right is the
12 language of paragraph 63 of Izumi. And Dr. Goossen's testimony here, I
13 think highlights that paragraph 63 is not teaching away from using a
14 microprocessor or prohibiting the use of a microprocessor. He
15 acknowledged that. The analysis he performed was that the control could be
16 done with analog methods, not an analysis of whether PWM control would
17 prohibit the use of a CPU or couldn't be carried out with a CPU. He
18 indicated he hadn't actually performed that analysis.

19 And then at the bottom is further testimony from Dr. Hannaford
20 from paragraph 17 of his reply where he, again, explained that nothing in
21 Izumi describes the use of a CPU as inherently complicated or complex or
22 otherwise undesirable. And so to the extent that Patent Owner is raising a
23 teaching away type argument, paragraph 63 just doesn't meet the high
24 threshold. And again, the evidence confirms that Izumi is talking about
25 control methodologies, not whether those methodologies are implemented as

1 a processor or an analog circuit.

2 And on 20, we see in more detail from Dr. Hannaford, and this is
3 from his original declaration, and I think it's notable and telling that Dr.
4 Hannaford acknowledged paragraph 63 in his original declaration. He didn't
5 find paragraph 63 to weigh against the combination, and he specifically
6 explained how the combination would facilitate freeing up resources for the
7 CPU and in doing so, how the combination would further enhance Izumi's
8 operation.

9 And I think it's even more telling that, despite this being in the
10 original declaration, Patent Owner never addressed this. They didn't address
11 it in their briefing, they deposed Dr. Hannaford twice, didn't challenge him
12 on this point, which remains unrebutted.

13 And so as a result and what we have is Dr. Hannaford analyzed
14 Izumi-Cosper, set forth motivations as to why they would've been combined,
15 all while acknowledged and addressing this paragraph 63 of Izumi. And on
16 the other side, Patent Owner just hasn't engaged with the motivations set
17 forth in the petition, considered those reasons in favor of the combination in
18 view of their purported deficiency that they raised based on this paragraph.

19 On Slide 21, there's one more point briefly before moving on to the
20 other issues today. Now, I wanted to mention that additional secondary
21 references provide further teachings that bolster the (INDISCERNIBLE -
22 TECHNICAL DIFFICULTY). In particular, this includes the Ibuki
23 reference in Grounds 1C and 1D. Ibuki describes a CPU that executes a
24 program stored in the ROM, processing signals from various inputs
25 generating control outputs, and it does so particularly in a shaver device, just

1 like Izumi.

2 And so it's yet further evidence in these combinations of how the
3 combination would come together to use a microprocessor, which again, is a
4 known option effective to receive feedback sensor data and determine an
5 output appropriate direction control signals, along with the other operations
6 of Izumi's controller. And so again --

7 JUDGE EASTHOM: Counsel, Izumi's controller, it's not
8 operating in PWM, obviously, I guess, or its microprocessor. You're using it
9 to suggest that it sends out the signals to control the resonant frequency; in
10 other words, it's controlling the oscillation by analyzing the feedback of the
11 frequency? Is that -- and then sending an appropriate signal to the driver; is
12 that how you're setting up the combination?

13 MR. DEUTSCH: Yeah, I think that's right, Your Honor, and this
14 is something -- flow is originally, of course, from Izumi and its discussion of
15 controller 6 and its current waveform decider within that controller, which
16 is -- and taking inputs from sensor 7 and then making a determination about
17 the appropriate output to control oscillation in the system. And Cosper adds
18 to that by providing more expressed discussion of the use of a
19 microprocessor in that feedback control based on multiple sensor inputs.

20 JUDGE EASTHOM: And then Rossi provides the motivation for
21 the D signal? Is that -- for the flip the inverter?

22 MR. DEUTSCH: Yeah. Rossi really comes in, in Claim 2,
23 particularly on the switch structure for particular implementation of an H
24 bridge switch. And so for Ground 1A, Rossi is not included. It's just Izumi
25 and Cosper and then we have Rossi for that component.

1 JUDGE EASTHOM: Oh, okay.

2 MR. DEUTSCH: Are there any other questions on the Izumi-
3 Cosper combinations or how those references come together?

4 JUDGE RANGE: It's Judge Range. You can --

5 JUDGE EASTHOM: I don't think I --

6 JUDGE RANGE: You can go forward.

7 JUDGE EASTHOM: Yeah.

8 MR. DEUTSCH: All right, thank you. So with that, I will turn to
9 the Shahoian and Cosper combination. This is laid out in the 697 petition.
10 It's a new combination, slightly different in terms of how these references
11 come together, the motivations for why they come together. Here --

12 JUDGE EASTHOM: Counsel, can I --

13 MR. DEUTSCH: Yes.

14 JUDGE EASTHOM: Sorry. Can I ask you one more question
15 about the 698? I might be getting these confused, but that's the -- your
16 friends are arguing the accelerometer is not disclosed, or is that -- am I
17 confusing that with the 697?

18 MR. DEUTSCH: That's right. So in Claim 3, Claim 3 recites a
19 vibration sensor in addition to the sensors that are recited in Claim 1. And
20 that is something that comes based on Cosper's discussion, and it actually is
21 relevant across both proceedings in the dependent Claim 3 analysis.

22 JUDGE EASTHOM: Okay. Can you address their argument that
23 it's a generic teaching, I think is what they're saying? There's nothing
24 specific about -- or there's no real accelerometer from what I understand is
25 what they're saying. Is that -- maybe you can help me out.

1 MR. DEUTSCH: Yeah, yeah. I can speak to that. So if we jump
2 ahead towards the end of the slides, Slide 46 -- or I'm sorry, Slide 42. We
3 see the claim language of Claim 3, "wherein the linear resonant vibration
4 module further includes a vibration sensor", and again, that's in addition to
5 the sensors recited in Claim 1.

6 The petition points to Cosper's teachings of multiple sensors,
7 particularly position, velocity, and acceleration. And in the mapping of
8 Claim 3 -- Claim 3.1 -- we had pointed to this passage of Cosper as
9 providing that third sensor that detects acceleration and particularly
10 describing it as an accelerometer. And as I understand it, Patent Owner
11 takes the position that Cosper does not necessarily disclose an accelerometer
12 because they use the language "may detect acceleration." And I think even
13 if that's the case, a POSITA would've found an accelerometer to be obvious
14 from Cosper's description here on the page.

15 On the next slide, or Slide 44, Dr. Hannaford explains this that a
16 POSITA would have recognized that Cosper discloses an accelerometer
17 through its expressed description of a sensor that detects acceleration. And
18 again, the POSITA that we're talking about here is a POSITA would've had a
19 degree in mechanical engineering, electrical engineering, physics, related
20 technical field, two to three years of experience. And so reading this
21 passage of Cosper, that would've been an obvious and apparent solution to
22 use an accelerometer to sense acceleration.

23 And I think the -- just going back briefly to the claim language
24 which calls out a vibration sensor, what we have here -- we have discussion
25 of an accelerometer, discussion of a sensor that detects acceleration. Either

1 way, we meet the claim language, which recites a vibration sensor in a more
2 generic way, in addition to the other two sensors that are already recited in
3 Claim 1.

4 JUDGE EASTHOM: Thank you.

5 MR. DEUTSCH: So I'll, I guess, turn back to showing you
6 Cosper, again, unless there's any other questions I can answer at this time.
7 And so in the Shahoian and Cosper combination, here, there's no dispute that
8 Shahoian and Cosper provide all limitations of Claim 1. And so it's the
9 motivation to combine that I'll focus on here. And again, like the other
10 combination, I can start with the combination itself, the motivations that
11 support it, reasonable expectation of success, and of course, why the
12 references are analogous.

13 Turning to Slide 23, here again, Shahoian provides most elements
14 of Claim 1. It's combined with Cosper to include feedback control, again,
15 using multiple sensors, such as sensors that detect position, velocity,
16 acceleration, and in the combination, the sensors detect movement of the
17 mass during operation, communicate detected sensor signals to the
18 microprocessor, which in turn adjusts the control signal to drive the actuator
19 thereby facilitating vibration according to desired characteristics.

20 And so what I would point out, Your Honors, is that what the
21 petition includes here through the proposed combination with Cosper is
22 highlighted in the middle of this excerpt. In the resulting system, Shahoian's
23 module that provides haptic feedback would've included multiple sensors in
24 accordance with Cosper, and so this is the combination that we're talking
25 about that's laid out on these pages of the petition.

1 And any suggestion from Patent Owner that the combination is
2 more rigid or bringing in particular details of Cosper is just something
3 different than the petition's combination. And so what we're not doing in the
4 petition is bodily incorporation of specific examples of Cosper into
5 Shahoian. Cosper provides teachings of multiple sensors in feedback control
6 and an oscillating system, and a POSITA would've been motivated to avail
7 Shahoian of those features and associated benefits. And those motivations
8 are laid out on Slides 24 and 25. There's multiple that were included in the
9 petition.

10 On Slide 24, for example, a POSITA would've been motivated to
11 enhance the haptic performance of Shahoian's linear actuator. Again,
12 Shahoian describes that a drive waveform is used to cause the actuator to
13 produce specific vibration output, and Cosper teaches using continuous
14 feedback control from multiple sensors, which a POSITA would have been
15 motivated to utilize to enhance Shahoian's existing haptic performance.

16 Slide 25 has additional motivations and spells that out in further
17 detail. So if you step through those boxes, as shown on the top left box, a
18 POSITA would've been motivated to achieve the benefit of monitoring the
19 real-time movement with a high level of resolution and detail using multiple
20 sensors in accordance with Cosper.

21 And in doing so, continuing on to the second box, would've
22 facilitated vibration output that is less susceptible to external forces in the
23 system, promoting vibration according to particular parameters. Again,
24 enhancing Shahoian's objectives here. The third box, promoting consistent
25 haptic output, that elicits a particular sensation for the user. And then as

1 shown in the bottom box, ultimately the combination would've amounted to
2 a common application of a known technique of feedback input from more
3 than one sensor to a known linear actuator system.

4 Dr. Hannaford in the petition further demonstrated reasonable
5 expectation of success. Dr. Hannaford had noted that the combination
6 wouldn't have significantly altered or hindered the functions performed by
7 Shahoian's module. The modifications would have accordingly been
8 straightforward, and the structure is similar. Cosper specifically describes
9 use in systems having a linearly moving mass and a bias, just like Shahoian.
10 And this similarity is further demonstrated by Shahoian and Cosper's
11 teachings, which some of which are shown on Slide 27 side by side.

12 And in particular, Cosper provides descriptions of the applicability
13 of its teachings to a system that has structure and figuration just like that of
14 Shahoian. So we have Cosper describing oscillation of a movable sub-
15 assembly, including a mass and a bias, as shown in Figure 1 at the bottom
16 right of Slide 27. And this is just like Shahoian's structure, which also
17 describes a linear actuator, it includes a mass and a bias. In particular,
18 Shahoian describes it as a magnet head and flexures. And in both of these
19 systems, we have a controller that generates outputs to control oscillation of
20 the movable mass.

21 And further, Shahoian already has a local microprocessor that
22 executes software infrastructures, again, like Cosper. And so especially in
23 view of this overlap, a POSITA would've predictably looked to Cosper to
24 implement enhanced monitoring and control of its oscillation when
25 implementing a system in accordance with Shahoian.

1 And I think paragraph 12 of Cosper punctuates this nicely.
2 Paragraph 12 is not on Slide 27. It's on Slide 31 down below, but there, we
3 see Cosper expressly indicating that any appropriate subassembly may be
4 used with the systems and methods described herein, signaling kind of the
5 broad applicability of Cosper.

6 Patent Owner in the Patent Owner response and in the surreply,
7 never contested the motivations. Patent Owner didn't say the motivations
8 that were laid out in the petition were wrong, didn't say that they would've
9 motivated a POSITA. And so when looking at motivation to combine,
10 Patent Owner contends something that just isn't legally required.

11 As an example of that, at page 14 of the response, for example,
12 they talk about Cosper's description of low bandwidth -- a low bandwidth
13 system that's maintained at resonance as undermining motivation, but they're
14 talking about motivation for something that amounts to bodily incorporation
15 of Cosper, which the petition doesn't allege. And so we think as a matter of
16 law, that that resolves the dispute. What they've alleged just doesn't confront
17 the motivations in the petition.

18 And so turning to Slide 28, I'll turn to the question of analogous art
19 with respect to Shahoian and Cosper, and this is something -- and if you flip
20 ahead to Slide 30, Slides 30 through 33 talk about each of Shahoian and
21 Cosper and how they're both in the field of endeavor, and also, reasonably
22 pertinent to the problems that the '767 patent was concerned with.

23 So I'll start with Shahoian, Slide 30. On the left, we see discussion
24 of the technical field paragraph in the '767 patent, and on the right, it's
25 Shahoian. And so in that top left box, in the technical field, we see a

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1 description of that field from the '767 patent, followed by a specific example
2 of what falls into that field. And so that passage starts out, the present
3 invention is related to vibration generating devices. So that is a description
4 of the field that I think is appropriate. And what follows, the highlighted
5 language, is an example -- one example of something that, in particular, falls
6 into that field. And we know this to be the case, but the field isn't limited to
7 the very specifics that are highlighted there.

8 Just by continuing to read the '767 patent, which describes a whole
9 range of things, and so as an example of that, at Column 7, lines 9 to 13 of
10 the '767 patent, the text provides one of those examples where it's
11 particularly driving the oscillation to be as close as possible to the resonant
12 frequency. And so in that passage, the '767 patent describes in the default
13 mode, the LRBM uses continuous feedback control to optimize the
14 vibrational force produced by the LRBM by continuously seeking to operate
15 the LRBM at a frequency as close as possible to the resonant frequency of
16 the LRBM.

17 And so there's a number of things that the '767 patent describe, all
18 under the field of endeavor of vibration generating devices that is referenced
19 broadly in the technical field discussion. And just to be clear and with
20 respect to Shahoian, there's really no debate that Shahoian is in the same
21 field of endeavor. I think there's no disagreement between the parties on
22 that. That's something that Patent Owner has acknowledged at page 2 of
23 their surreply.

24 And then on Slide 31, same thing with respect to Cosper. Cosper
25 generally relates to systems and methods for control of a mass and bias,

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1 including oscillating mechanical systems that operate in an oscillatory mode
2 at or near the mechanical resonant frequency. And again, the paragraph 12
3 language that we talked about, broadly indicating that any appropriate sub-
4 assembly may be used with the systems and methods described herein.

5 And so here again, we have overlap in the field. So much overlap
6 that the language of Cosper aligns precisely with the example that we just
7 discussed in Column 7 of the '767 patent. And so it's hard to see how that
8 would be excluded from the field of endeavor.

9 JUDGE RANGE: Where is that precise alignment that you're
10 talking about? Which slide?

11 MR. DEUTSCH: The language from Cosper?

12 JUDGE RANGE: Mm-hmm.

13 MR. DEUTSCH: Yeah. I mean, it might be easiest to turn to
14 Slide 11 of Patent Owner's demonstratives and we see language from Cosper
15 at paragraph 3, application generally relates to systems and methods for
16 control of a mass and bias. And then it continues to give a particular
17 example that operate in an oscillatory mode at or near their mechanical
18 resonant frequency. And so that's the language that I'm referring to.

19 JUDGE RANGE: That's the one in Column 7, you said, of --

20 MR. DEUTSCH: Yeah.

21 JUDGE RANGE: -- the --

22 MR. DEUTSCH: Yeah. So if you flip from there to Column 7
23 starting at line 9 of the '767 patent at the very end of line 9, the sentence
24 beginning "in the", and so that sentence in '767 says, "In the default mode,
25 the LRBM uses continuous feedback control of the optimized vibration of

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1 force produced by the LRBM by continuously seeking to operate the LRBM
2 at a frequency as close as possible to the resonant frequency for the LRBM."
3 And so in both of those cases, it's we see example operation where the '767
4 patent is driving at a frequency as close as possible to the resonant
5 frequency, just like that example in Cosper, operate an oscillatory mode at or
6 near their mechanical resonant frequency.

7 JUDGE RANGE: Thank you.

8 MR. DEUTSCH: And both of the references are analogous based
9 on the second prong, in addition. Not that we need the second prong, but
10 they're also reasonably pertinent to the problems that are discussed by the
11 '767 patents. And so briefly, on Slide 32, Shahoian talks about problems of
12 prior art that it perceives to be related to shortcomings of particular
13 vibrations, and it also talks about example embodiments that provide linear
14 oscillation directly relevant to overcoming the shortcomings of unbalanced
15 rotary motors.

16 And these are the problems that the '767 patent specifically laid
17 out, which are listed on the left side of Slide 32, where the '767 patent is
18 talking about objectives of more efficient and capable vibration generating
19 units, avoiding distractive unbalanced forces, problems with elliptical
20 vibration modes, and only being able to access limited portions of frequency
21 space. And so these are things that Shahoian specifically is relevant to, and
22 likewise, Cosper.

23 So Cosper -- turning to Slide 33 -- addresses several of these
24 problems. Specifically, providing feedback control techniques that promote
25 efficient oscillation that provide vibration modes beyond elliptical vibration,

1 including linear oscillation. Cosper, as we've been discussing, describes
2 sensor techniques from monitoring oscillation of the movable mass and
3 feedback control to promote oscillation, according to the particular
4 characteristics. Again, facilitating enhanced vibration output and promoting
5 efficient operation.

6 And that's something you see elsewhere and throughout Cosper.
7 An example is paragraph 5, again, of Cosper, speaking to issues of
8 efficiency. This is a paragraph that was cited in paragraph 82 of Dr.
9 Hannaford's original declaration. And we think there's really no dispute
10 here. There can be no reasonable dispute that all of these references are
11 analogous on both, by virtue of being in the same field of endeavor, being
12 reasonably pertinent to the problems at issue.

13 And on that point, I should be clear that the evidence here that
14 we've been talking about on Slides 30 to 33, that demonstrate Shahoian and
15 Cosper are analogous, those citations come from our original briefing, from
16 Dr. Hannaford's first declaration. And so if we go back to his declaration,
17 Exhibit 1003, he walked through the '767 patent and specifically, at
18 paragraph 58, listing the '767, Column 1 discussion about the technical field,
19 along with other descriptions about what the patent is about, i.e., talked
20 about the problems of the '767 patent or what the problems were perceived
21 to be by the '767 patent.

22 And at paragraph 59, for example, of Exhibit 1003, he steps
23 through these problems -- 1, 2, 3, 4. And then of course, this discussion of
24 the field and the problems with the '767 patent is followed by discussion of
25 Shahoian, beginning at paragraph 72, discussion of Cosper, beginning at

1 paragraph 81, which lays out the teachings of these reference that, again,
2 speak to their analogousness. And as we've talked about with Cosper, for
3 example, that include teachings relevant to Cosper's efficiency, paragraph 5
4 of Cosper at paragraph 82, additional discussion of paragraph 84, its linear
5 operation.

6 JUDGE RANGE: Counsel, you have about eight minutes left
7 before you start cutting into your rebuttal. Just FYI.

8 MR. DEUTSCH: Okay, thank you. So I guess with that in mind,
9 I'll turn briefly to Slide 29. Slide 29 shows the Patent Owner's response. In
10 the Patent Owner's response, Patent Owner was talking about the references
11 in comparison to one another -- are Shahoian and Cosper like one another.

12 And so as we talked about earlier on Slide 27, a POSITA would've
13 found them relevant to one another. They are combinable. There's
14 motivations that would've led a POSITA to the combination. These
15 motivations remain unchallenged. And so it's for the first time in their
16 surreply that came in last week that Patent Owner argues Shahoian and
17 Cosper aren't analogous to the '767 patent.

18 And so that's the first time that this -- any allegation on that front
19 comes into the record or that we are seeing it. And so as a result, that
20 lateness leaves the record without a response or evidence from the Petitioner
21 specifically addressing the arguments they made in the surreply for the first
22 time. And so from that timing issue and not raising that allegation in the
23 POPR, the POR, for example, there's prejudice that's created for Petitioner.

24 And I think we can see an example of that prejudice with the
25 discussion we had a moment ago regarding Column 7 of the '767 patent,

1 which gives an example of maintaining resonance at oscillation and that's an
2 example of Patent Owner's failure to address examples set forth in the record
3 that demonstrate analogousness as between these references. And then in
4 both of those cases, the mass is being held and operated at its resonant
5 frequency. Patent Owner never addressed this, yet in the surreply, they raise
6 for the first time this theory that the references aren't analogous to the '767
7 patent.

8 So I'll continue on if there's no further questions. There is one
9 related argument that Patent Owner makes about Shahoian text. I'll make
10 that briefly and then I'll briefly step through a few of the remaining issues.

11 And that is on Slide 34, you can see two things. Patent Owner's
12 argument and then the referenced portion of Shahoian, and this is the only
13 referenced portion of Shahoian that they rely on for this particular argument.
14 And that's important because I think what you'll see is an incongruity
15 between the two.

16 So first, starting with the Patent Owner excerpt, you'll see the
17 highlighted language, that includes the "must be" language. And so reading
18 the full passage, Patent Owner says that when Shahoian mentions the gain
19 due to operating near resonance, it describes it as an effect that must be
20 counteracted in order to achieve the desired flat frequency response, not a
21 desirable effect to take advantage of.

22 But below is the actual language of Shahoian, with highlighted
23 language that's permissive, "if desired", "can be." And so I'll read that to
24 provide full context, so bear with me. But starting at the beginning of the
25 paragraph, the Shahoian indicates that the linear actuator 100 provides the

1 greater magnitude of vibrations at higher frequency (assuming the waveform
2 magnitude is held constant). And this gain of higher frequencies is due
3 primarily to the vibration occurring at the resonant frequency of a
4 mechanical system, including actuator foam, housing, et cetera, and if
5 desired, can be compensated for -- in other embodiments to obtain a more
6 flat response by providing compensating frequencies that will provide the
7 desired response.

8 And so this paragraph of Shahoian acknowledges known behavior
9 of a greater magnitude of vibrations at high frequencies due to the vibration
10 of the resonant frequency, and notes the option, if desired, it can be
11 compensated if a flat response is desired. And so Patent Owner makes this
12 argument that relies on Shahoian as teaching it's necessary to counteract gain
13 at resonance. That fits Patent Owner's narrative, but it's just not aligned with
14 the actual text.

15 And so lastly on this point -- not that we need it in view of the
16 actual text of Shahoian -- but Hannaford confirms this both, in his
17 declaration and in his cross-exam, and this is, again, Slide 35. He was asked
18 about this in his first deposition, and he answered the questions exactly the
19 way you'd expect from the text and correctly noting the permissive
20 description of Shahoian. So ultimately, Patent Owner's argument here is just
21 contradicted by the text of the reference itself.

22 And I know we're short on time. If there's no further questions, I
23 will step through Claim 2 very briefly. We talked about the vibration sensor
24 in Claim 3, and if there's no questions on the other aspects of Claim 3, I'll
25 just simply talk about Claim 2 briefly.

1 So on Slide 37, we see a portion of Claim 2 and the language at
2 issue here is recitation of a second switch of the pair controlled by internal
3 signal d bar. The petition set forth how this limitation is satisfied based on
4 the combinations with Rossi, and there's really two issues with this argument
5 that Patent Owner raises. First, Claim 2 just isn't limited in a way that Patent
6 Owner suggests, and then two, even if it were, the prior art discloses the
7 same signal controlling both second switches of the pair.

8 And so briefly on the first issue, stepping through the language, we
9 see a directional signal splitter/inverter, and the claim recites "a", which can
10 be one or more. And then it continues that that directional signal
11 splitter/inverter generates two things -- generates two complimentary
12 internal signals, d and d bar. And so we have a structure that generates these
13 two things. It's not limited to only one splitter/inverter.

14 And then continuing on, we have two pairs of solid-state switches,
15 a second switch of the pair controlled by internal signal d bar. And notably
16 here, the language omits "the" before internal signal d and internal signal d
17 bar. And so it simply doesn't say that they're having a single splitter/inverter
18 that generates all the internal signal d bar, for example.

19 JUDGE RANGE: Sorry. So when you say that the omission of
20 the word "the" before, that second recitation, internal signal d bar indicates
21 that it's not necessarily the same d bar signal that came from the previously
22 recited "a" directional signal splitter/inverter?

23 MR. DEUTSCH: Yeah. I think -- I just don't know how we could
24 read that same without having "the" as it would be read if "the" was present.
25 And so I think it's telling that "the" is used consistently elsewhere

1 throughout the claim, including with respect to signals. Below, we see the
2 reference to "the d" and that's --

3 JUDGE RANGE: So you would say it would have to be the same
4 signal, but necessarily coming from the same -- exactly the same
5 splitter/inverter?

6 MR. DEUTSCH: Yeah. I think -- right. There's just nothing that
7 limits it to a single splitter/inverter, and I mean, just thinking through how
8 this claim reads, it would still read -- and with respect to the internal signal d
9 and internal signal d bar, it would still read the same if you changed the
10 order and had two pairs of solid state switches above. So that's the issue
11 there. And so exactly right. I think there's not a way to square a reading of
12 the same without "the" as with "the". The author left it open, so we read the
13 claim for what it said.

14 Importantly, on the second point, we have prior art that
15 consistently labels the same thing as inputs to these second switches, and so
16 we see that on Slide 38. In one bar for S12 and SW3 in contrast to N1, and
17 so a POSITA reading that knows what that means, when there's common
18 nomenclature. It's the same thing. We have N1, that means something. It's
19 N1 bar, it's the inverse of N1. And again, we know who a POSITA is and
20 this is within their understanding and consistent with the conventional use of
21 this type of nomenclature. So I'll pause there, knowing that we're running
22 towards the end of the time, unless there's any other questions.

23 JUDGE RANGE: That's fine. Thank you. You'll have 17 minutes
24 left for your rebuttal.

25 MR. DEUTSCH: Thank you, Your Honors.

1 JUDGE RANGE: Is Patent Owner ready to proceed with the
2 response?

3 MR. RUBIN: Yes, I am, Your Honor.

4 JUDGE EASTHOM: Give me one second, please. I'll set this
5 clock. Okay, I'm ready. Thanks. Whenever you're ready.

6 MR. RUBIN: Good afternoon, Your Honors. I'm sorry?

7 JUDGE EASTHOM: I'm sorry. I mean, whenever you're ready.

8 MR. RUBIN: All right.

9 JUDGE EASTHOM: Please proceed. Thank you.

10 MR. RUBIN: All right. Good afternoon, Your Honors. Neil
11 Rubin for the Patent Owner, Resonant Systems. May it please the Board.
12 You should be able to see my demonstratives that I'm sharing with you. Is
13 that right?

14 JUDGE RANGE: I see them. That's helpful. Thank you.

15 MR. RUBIN: All right.

16 JUDGE RANGE: Even though you're sharing, try to mention the
17 slide numbers for the record. Thanks.

18 MR. RUBIN: I will do, Your Honor. So unless the Board would
19 prefer otherwise, I'll address the issues in order that are in our slides, which
20 are slightly different than the order that Counsel for Apple addressed them.
21 Just briefly touch on claim construction. Apple didn't raise any claim
22 construction issues, either in their reply or today. The Board did construe a
23 number of terms for the purposes of the institution decision, and we think
24 that the Board should adopt those in the final written decision, to the extent
25 that it feels that any terms need to be construed.

1 JUDGE RANGE: This is Judge Range. I have the impression that
2 none of the disputed issues really hang on these claim constructions.

3 MR. RUBIN: At least not on any dispute concerning the claim
4 constructions.

5 JUDGE RANGE: Okay.

6 MR. RUBIN: Yeah. I think that's right, Your Honor. Turning to
7 the '697 patent and the motivation to combine Shahoian and Cosper, this
8 applies to all grounds. And right now, I'm showing on the screen Slide 9,
9 which is an introduction to that section.

10 Turning to Slide 10, here we see the technical field section of the
11 '767 patent, which Apple identified in their reply as the technical, but that is
12 the field of endeavor for the '767 patent. Earlier today, Apple pointed to
13 some language in Column 7 of the patent, which they hadn't previously
14 identified, either in their petition or the reply or in any of Dr. Hannaford's
15 opinions that Counsel went over. And so this is a new position that they're
16 taking as to what the field of endeavor is.

17 Counsel argued that they should be able to do that because they
18 were prejudiced in the way that we had presented our arguments in the
19 Patent Owner's response. I will point out that the Patent Owner's response
20 clearly makes the argument that the references are not analogous art. On
21 pages 5 and 6, we point to case law, including the Federal Circuit case,
22 Corephotonics v. Apple, that lays out the test for analogous art, and that the
23 art needs to be analogous to the claims.

24 Well, he said that they were not analogous art, that Shahoian and
25 Cosper were not, and made the argument that they couldn't be because they

1 were both -- they were each respectively directed to different fields of
2 endeavor from one another. And the reply to those four pages, pages 2
3 through 6, to addressing analogous art and calls out what Apple contends the
4 field of endeavor is. So it's hard to see how Apple's prejudiced by us making
5 arguments in surreply about an issue that they, themselves, devoted four
6 pages to in their reply, and us in our surreply pointing out that Cosper is not
7 within the field of endeavor that they themselves identified in their reply as
8 the field of endeavor for the '767 patent.

9 I'll also point out that regardless of what the Board had determined
10 the field of endeavor is for the '767 patent, we also have the argument that
11 there's no motivation to combine Cosper with Shahoian or for similar
12 reasons having to do with the fundamental difference and the problems that
13 they're addressed to. And that's not affected -- that argument, the motivation
14 to combine argument -- is not affected by adopting a different field of
15 endeavor.

16 JUDGE EASTHOM: Mr. Rubin, can you help me out? I'm
17 looking on pages 5 to 6 of your response in the '698 and I see where you cite
18 the case law for the two tests --

19 MR. RUBIN: Uh-huh.

20 JUDGE EASTHOM: -- for the analogous art.

21 MR. RUBIN: Yeah.

22 JUDGE EASTHOM: Oh, do you -- I just didn't see where you
23 said something wasn't analogous in the petition. Maybe I'm -- I'm probably
24 missing it. Can you tell me what page that's on?

25 MR. RUBIN: Yeah. So in the POR, we say that Shahoian and

1 Cosper are not analogous art on page 9, and again, on page 15.

2 JUDGE EASTHOM: Okay, thank you.

3 MR. RUBIN: All right. Turning to our next slide --

4 JUDGE EASTHOM: Page 9? Wait, I'm sorry. I'm looking at
5 page 9. And then what's the other page?

6 MR. RUBIN: 15. And in both cases, this is Paper 14 of the 697
7 IPR.

8 JUDGE EASTHOM: Oh, I thought you were talking about the
9 698. I'm sorry. My mistake. Thank you.

10 MR. RUBIN: Yeah. Perhaps my fault for addressing the IPRs in
11 the reverse order that Apple did.

12 JUDGE EASTHOM: No, that's -- I should've caught that. Thank
13 you.

14 MR. RUBIN: All right. Turning to Slide 11. So this is Cosper's
15 field of endeavor, according to Apple, and the highlighted text in Cosper
16 makes it clear that it's directed to operating in an oscillatory mode, at or near
17 the mechanical resonant frequency. My friend this afternoon argued, I think,
18 that the highlighted text was just an example of one possible embodiment.
19 And I think he may have been pointing to the language saying -- or the word
20 "including." Including is part of the phrase including oscillating mechanical
21 systems.

22 So to the extent that there's some sort of non-limiting embodiment
23 being pointed to here, I think that would be the oscillating mechanical
24 systems. I think that everything in Cosper, though, is clearly directed to
25 oscillation at or near the mechanical resonant frequency, and tracking that

1 frequency, if there's a shift between the electronic oscillation frequency and
2 the mechanical resonant frequency of the system. And this is important in
3 Cosper's system because it's an illumination system, at least in the
4 embodiments, where you're trying to produce relatively large oscillations
5 with low power input.

6 The reply also pointed to Aldrich as providing a motivation to
7 combine and the grounds that involved that reference. Like Cosper, Aldrich
8 is directed to systems that are at or near that resonant frequency and it
9 provides "fine resonant tracking."

10 Now, just to understand some of the statements in the art about the
11 systems that operate at or near a resonance versus those are operating over a
12 broad range of frequencies, we have this quote from Dr. Hannaford, Apple's
13 expert, during his deposition, confirming that for resonant systems, you've
14 got this quality factor, Q. And a high-quality factor corresponds to a low
15 bandwidth, corresponds to a system that upgrades and resonates to a high
16 degree, but only over a very narrow band of frequencies, in contrast to a
17 system with low Q, which has a system with high bandwidth operating over
18 a wider range of frequencies.

19 Shahoian is clearly directed to the latter to high bandwidth, low Q,
20 and it expressly says in the quoted text here on Slide 14 -- and I show the
21 testimony I was pointing to from Dr. Hannaford was on Slide 13. Now on
22 Slide 14, we've got some language from the Shahoian reference itself,
23 clearly saying that it's directed to high bandwidth vibration, and being able
24 to adjust the frequency independently from the amplitude, which is
25 something that you wouldn't be able to do in a low bandwidth, high Q

1 system, where the amplitude would be very dependent on the frequency.

2 JUDGE RANGE: And Counsel, this is Judge Range. How would
3 you respond to Petitioner's argument that essentially your argument here is
4 bodily incorporation, and that they're not -- their combination doesn't require
5 putting the bandwidth from one reference -- from Cosper into Shahoian?

6 MR. RUBIN: Well, I don't think we've made any arguments that
7 depend on bodily incorporation. Certainly, I don't think it would make any
8 sense at all to bodily incorporate the illumination system from Cosper into
9 Shahoian. I'm sorry, Your Honor.

10 JUDGE RANGE: Another way to frame the question is if it's the
11 case that Petitioner is just using Cosper for implementing the different kinds
12 of sensors for various reasons, how would this bandwidth factor issue affect
13 that, if at all?

14 MR. RUBIN: Sure. So it comes down to whether there's a
15 motivation to use the teachings of Cosper to modify Shahoian. And to the
16 extent that Cosper teaches these to multiple sensors and it does always say
17 one or more sensors, and to the extent that those sensors would meet the
18 limitations of the claims, which that's a separate question, Cosper is directed
19 to a problem of tracking drift between the electrical and mechanical
20 resonance frequencies. And so it needs to actually be -- in order to
21 determine whether there is a drift, needs to be able to measure the behavior
22 of the mechanical system. And so while that may -- so the set of sensors or
23 the way of using sensors taught in Cosper, to solve that problem, wouldn't
24 necessarily be relevant to high bandwidth --

25 JUDGE RANGE: Thank you.

1 MR. RUBIN: -- a system that's not -- that doesn't need to track
2 direction resonance.

3 JUDGE RANGE: Okay, thank you. That answers the question.

4 JUDGE EASTHOM: I don't understand that, I guess, physically.
5 Why wouldn't it be applicable to adjust a frequency as Shahoian is doing? I
6 don't -- you can adjust the frequency by using those same measurements,
7 right? Isn't, in fact, that's kind of what you're doing in the patent and in
8 Shahoian?

9 MR. RUBIN: So I'm not sure that in Shahoian there's a need to
10 measure the amplitude in order to make adjustments to the frequency as
11 there is in Cosper.

12 JUDGE EASTHOM: Oh, I see. I think I see what you're saying.
13 It's the independence.

14 MR. RUBIN: All right. Moving on to Slide 15. Here's more
15 evidence in Shahoian that it's directed to a broad or high bandwidth on --

16 JUDGE EASTHOM: And high bandwidth --

17 MR. RUBIN: (CROSSTALK) --

18 JUDGE EASTHOM: -- again -- sorry. Can you explain that
19 again? In the high bandwidth, for example, in Shahoian, that's referring to
20 the fact that Shahoian can oscillate at a broad range of frequencies or --

21 MR. RUBIN: That's right.

22 JUDGE EASTHOM: -- what's the high bandwidth again? I'm --

23 MR. RUBIN: That's right.

24 JUDGE EASTHOM: Okay.

25 MR. RUBIN: It functions -- and I believe it's referring to

1 potentially oscillating a super position of frequencies at the same time, but in
2 any event, it is able to operate at frequencies away from the resonant
3 frequency. So, yeah. I mean, that's what it refers to when it's saying there's
4 a high bandwidth vibration.

5 And this language from Shahoian here on Slide 15, Patent Owner
6 points to the language here that it can be compensated. That is that the
7 higher gain at or near the resonance can be compensated for in Shahoian, but
8 certainly, there's no suggestion in Shahoian that you are specifically trying to
9 make use of resonance and stay at the resonant frequency, as in Cosper, here
10 and in the other portions of Shahoian we quote from the -- it's clear that it's
11 direct it's operating at a range of different frequencies.

12 Turning to Slide 17. Cosper repeatedly and consistently talks
13 about operating at or near resonance. Here on Slide 18, here we have Patent
14 Owner's expert, Dr. Goossen's opinions in his declaration, and as he
15 explains, his are directed to different fields of endeavor. That is Shahoian
16 and then Cosper. And the Cosper teachings that are specific to the high Q
17 system or, quote, "even relatively small variations in frequency" -- I'm
18 sorry -- "at even relatively small variations in frequency from resonance
19 must be avoided," these are not pertinent the problem Shahoian is involved
20 with and there being no motivation to combine. Turning to Slide 19 --

21 JUDGE EASTHOM: It doesn't have to be pertinent to anything in
22 Shahoian, right? The motivation. That's sort of mixing two theories
23 together in there.

24 MR. RUBIN: It's true. He's addressing two separate label theories
25 here, the analogous art --

1 JUDGE EASTHOM: And then --

2 MR. RUBIN: -- and the motivation to combine.

3 JUDGE EASTHOM: Okay. So I'm just trying to figure out what
4 his position is here, but I guess he shouldn't probably be opining on these
5 legal theories.

6 MR. RUBIN: That may be.

7 JUDGE EASTHOM: Okay.

8 MR. RUBIN: I think clearly on a technical side on Slide 19, he
9 explains that even when operating in the vicinity of resonance, there's no
10 particular importance in Shahoian to maintaining the oscillation, specifically
11 a resonance. In contrast to Cosper, as Cosper teaches, because the gain in
12 Shahoian's low Q, high bandwidth system. I'm sorry. Let me say that again
13 and I'll just read what he says, quote, "Even when operating in the vicinity of
14 resonance, there's no particular importance in Shahoian to maintain any
15 oscillation, specifically at resonance, as Cosper teaches because the gain in
16 Shahoian's low Q, high bandwidth system is not highly sensitive to small
17 variations in frequency."

18 And as Dr. Goossen explains, the same is true for all duration
19 combinations that use that, that the person of skill in the art would not have
20 been motivated to apply fine resonance tracking to the system in Shahoian,
21 which is not concerned with staying at resonance.

22 I'll turn to the other IPR, the 698 IPR, where we argue a failure to
23 satisfy limitation 1.5.3 and this applies to all grounds. So this element
24 requires a switch that receives a directional signal d from the processor. The
25 disclosure in Izumi that the Petitioner relies upon is that the switch is the

1 alternating voltage output, part 61, and here I'm on Slide 22, where we see
2 the language of 1.5.3 and quoted language from Izumi.

3 So in the petition, the switch is the alternating voltage output, part
4 61, and the switching elements within that receive an input to their base
5 terminals by the current waveform, decider 60. And so that signal, that
6 claim directional signal d from the processor, would be this arrow going
7 from block 60 to 61 in Izumi, Figure 2. So the question is whether that
8 arrow is coming from a processor or not and whether Izumi or the other art,
9 in combination with it, teaches that.

10 Now, there was a lot of evidence that was pointed to by Apple's
11 Counsel that mentions a CPU or a processor, so Cosper itself has a reference
12 to a CPU. Ibuki, Shahoian, Kraus, and Gregorio mention the CPU or
13 processor. And we're not disputing that the POSITA, at the relevant time,
14 was aware of CPUs or processors. Again, the question here is whether the
15 combination presented in the petition, the directional signal d comes from
16 the processor, as opposed to some other component present in the current
17 waveform decider.

18 Now, there is an argument that was made in Slide 9 of Apple's
19 slides today, pointing to opinions of Dr. Hannaford that we allegedly never
20 addressed in the Patent Owner response or in the surreply. Particularly, I
21 think the suggestion is that Cosper itself teaches outputs from a
22 microprocessor. That would be a directional signal.

23 I will note that if you look at Slide 9, the second box there is a
24 quote from Dr. Hannaford's paragraph 112 and the statements there about
25 the -- that are pointing to Cosper and arguing that the microprocessor in

1 Cosper generates control signals, I don't see those statements reflected
2 anywhere in the petition or in the reply. The only citation of that paragraph
3 112 in the petition is a citation to -- I think it's 14 -- a string of 14 paragraphs
4 on page 15 of the petition. So I don't think, at this point of the hearing, they
5 can be pointing to an opinion that was buried in a 184-page declaration and
6 not actually reflected in the petition.

7 And I think that if you fairly look at the petition and ask what is
8 the petition pointing to as a directional signal d, it is Izumi that they're
9 pointing to. So the question is in Izumi, whether that signal that they're
10 pointing to is a signal that's coming from the processor, as opposed to
11 something else.

12 Turning to Slide 24. So this is quoting paragraph 63 from Izumi,
13 which is this sole mention in Izumi of a processor or CPU and that's in the --
14 specifically, it refers to CPU speed and ROM capacity, and it points to --
15 that is this paragraph points to the difficulty of performing complicated
16 control at every half cycle or cycle of a moving element, so the difficulty of
17 providing the directional signal directly from the CPU. And that's what the
18 first highlighted portion of this paragraph is identifying as a problem.

19 And then the next sentence says, so the controller may control a
20 ratio of the on time to the off time. So rather than directly controlling the
21 direction, it can control a ratio of those times. And then in the second
22 highlighted section, quote, "That is, the controller may use the so-called
23 PWM control method." And in this case, the controller 6, conform an
24 intended current waveform without using a complex control system.

25 JUDGE RANGE: Counsel, how would you respond to someone

1 reading that paragraph as thinking that -- when the last sentence refers to the
2 controller. That's a reference back to the control device referenced in the
3 previously yellow highlighted part of the paragraph.

4 MR. RUBIN: So turning back to Slide 23, the controller 6 is
5 correctly identified in Figure 2 of Izumi as containing the current waveform
6 decider and the alternating voltage output part. So I think it's clear that the
7 intended current waveform being referred to in paragraph 63 is the output of
8 that entire block going to the coil.

9 JUDGE RANGE: Its output is block 6?

10 MR. RUBIN: Yeah, so I mean --

11 JUDGE RANGE: Block 6 is the controller?

12 MR. RUBIN: That's right, which clearly, block 6 as a whole
13 contains more than just the current waveform decider. The alternating
14 voltage output part, I think, would certainly not be part of a CPU. It would
15 have analog components. Does that answer your question, Your Honor?

16 JUDGE RANGE: Yeah, I guess. I guess what I was thinking is
17 that the first highlight of that paragraph suggests that the control device has
18 CPU speed, meaning the control device must have a CPU if it has CPU
19 speed. And so if the controller and the control device are just the same
20 thing, then it'd be talking about something happening at CPU using the
21 PWM method.

22 MR. RUBIN: So I agree that there's at least a suggestion here that
23 a CPU would be involved. I mean, it mentions the word CPU or it literally
24 contains the word CPU and refers to ROM capacity. So we're not arguing
25 that a person of skill in the art reading this paragraph wouldn't think of using

1 a CPU in some way, but it talks about the solution to limitations of CPU
2 speed and so on, being the control. Not directly of the direction and flipping
3 that every half cycle or cycle of the moving element, but instead, to control
4 the ratio. And so what somebody would -- what a person of skill in the art
5 would understand is that the output of the CPU would be the ratio, not the
6 directional control, or not the -- I'm sorry -- not the directional signal itself.

7 JUDGE RANGE: Okay. I think I follow. Thank you.

8 MR. RUBIN: Yeah.

9 JUDGE EASTHOM: I'm having trouble. I don't understand why
10 you would have to flip the signal d when you change the direction, for
11 example, in an h bridge, to change the direction of the main current going
12 through the coil. It doesn't seem like -- I mean, if a microprocessor speed --
13 I don't know what speed you're talking about, or the claim doesn't really call
14 for any set frequency, but I just don't understand how that would sort of be
15 detracting from sending a signal d to a bridge or something like that. Why
16 would you have to do it every cycle in the CPU? That's my question, I
17 guess.

18 MR. RUBIN: Well, I guess it's a question whether we should
19 believe what Izumi is saying here or whether we or the Petitioner are
20 misinterpreting what is being stated.

21 JUDGE EASTHOM: No, I'm -- well, maybe I'm not asking it the
22 right way, and I appreciate your response because my question was a little
23 open-ended, but the CPU speed and sending a signal such as d out every
24 cycle of the CPU, how is that relevant to -- I mean, Izumi is not saying you
25 have to send a signal out every cycle of the CPU. It's saying that might be

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1 bad, but in terms of meeting this claim or in terms of how Petitioner is trying
2 to address the claim, does d have to be sent out every cycle of the CPU? I
3 just don't see how the cycle of the CPU is relevant to the time -- the
4 frequency that you want to change d.

5 MR. RUBIN: Sure. So on Slide 24, quoting paragraph 63 of
6 Izumi, I think the -- whether it refers to every half cycle or one cycle, it's
7 referring to cycles of the moving element.

8 JUDGE EASTHOM: Oh, right.

9 MR. RUBIN: Several cycles of --

10 JUDGE EASTHOM: Okay.

11 MR. RUBIN: -- the CPU. So, I mean, I guess you --

12 JUDGE EASTHOM: Oh, I see. Yeah.

13 MR. RUBIN: Yeah.

14 JUDGE EASTHOM: Sorry. I keep interrupting you. Go ahead.

15 MR. RUBIN: No, not at all, Your Honor. So at least the problem
16 that Izumi is identifying is at the desired frequency of the moving element
17 that the CPU would have difficulty -- or CPU -- yeah, the CPU would have
18 difficulty determining when to make that switch in direction every half cycle
19 or every cycle.

20 JUDGE EASTHOM: Okay, thank you.

21 MR. RUBIN: And so here on Slide 26, we have testimony from
22 Dr. Goossen saying that a POSITA would understand the pulse with
23 modulation may be performed outside of the CPU by an analog circuit, and
24 he cites to a data sheet from Texas Instruments on Slide 27 with a known
25 example of pulse with modulation circuit.

1 Let's skip ahead to Slide 29. So in the reply, Apple points to Ibuki
2 and to Aldrich as supposedly providing motivation to have direct output
3 from the CPU of the directional signal d, for the grounds in which those
4 references form apart. So here on Slide 29, this is a portion of Ibuki that's
5 cited in the reply and it just speaks generically of a controller outputting a
6 control signal to the driving unit to control the operation of the driving unit.
7 There's no teaching that that's a directional signal d.

8 Turning to Slide 30, in Aldrich, if anything, this is a clear example
9 of the directional signal coming from analog circuitry outside the processor.
10 So here we have the hill-climbing controller from figure -- on page 3 of
11 Aldrich, and there's the signal from the processor and that signal is an input
12 to the sine-wave generator, which is the thing that's producing a directional
13 signal that causes the oscillating movement.

14 All right. Now I'd like to move on to the Claim 2 arguments. This
15 is starting on Slide 31. We argue that for both of the IPRs, there's a failure
16 to satisfy limitations 2.3 and 2.4, and thus, a failure of the grounds for
17 Claims 2 through 5. On Slide 32, we see the relevant claim language from
18 Claim 2, which clearly calls out two complimentary internal signals, d and d
19 inverse. So d inverse is one signal -- one internal signal -- and then in
20 limitation 2.4, it says that there are two pairs of solid state switches and the
21 second switch of the pair -- I think that's referring to the second switch of
22 each pair -- is controlled by internal signal d inverse.

23 Turning to Slide 33. These are the figures from the Rossi
24 reference that the Petitioner's pointed to as allegedly satisfying these
25 limitations. Now, the only figure that's actually excerpted in the petitions is

1 Figure 6, which has the two inverters shown on the right-hand side here of
2 Slide 33. There are also citations to Figure 4, although I don't think the
3 figure is actually reproduced. And that figure is silent as to how the inverse
4 signals or inverse signal is produced.

5 Turning to Slide 34, though, the petition is clear that in the
6 combination that they're pointing to, they're relying specifically on the Rossi
7 embodiment where there's an inverter I that inverts each split of the driving
8 signal IN. So there's the splitting and then there's the inverting, and the
9 inverting generates two separate signals. The IN1 signal going into switch 2
10 and the IN signal going into switch 3.

11 And so to point to the Figure 1 embodiment for the first time on
12 reply, that's an impermissible new theory. Here we see a number of Federal
13 Circuit cases on that point. I'm sure the Board is well aware of this case law,
14 but the petition pointed to these embodiments where there's a split and then
15 there are two inverters. Now in the reply, they're trying to point to a
16 different embodiment where there's a single inverter and split after that.
17 And so this is a meaningfully distinct contention that should not be
18 considered.

19 JUDGE RANGE: Isn't there also some --

20 MR. RUBIN: (CROSSTALK) --

21 JUDGE RANGE: Excuse me. This is Judge Range. Isn't there
22 also some case law that suggests that Petitioner can adapt the theory in the
23 position somewhat based on a claim construction issue raised by Patent
24 Owner in their response?

25 MR. RUBIN: Well, I think there is case law, at the very least --

1 JUDGE RANGE: All right.

2 MR. RUBIN: -- that suggests if the Board adopts the claim
3 construction, that the Petitioner was not on notice of, that the Petitioner
4 should be given an opportunity to respond to that claim construction. Here, I
5 think the language of the claim is pretty clear on its face. Neither -- I don't
6 think Apple has framed this as a matter of claim construction and neither
7 have we.

8 JUDGE RANGE: Well, I mean, Petitioner argued both, right?
9 Like they argue -- and maybe you can address that. They argue that the
10 claim doesn't require two inverters. Wait, let me say it another way. The
11 claim doesn't forbid two inverters, is what they're saying. In other words,
12 the claim requires one inverter, and you could have a second inverter, so
13 long as that second inverter also just created the d bar signal.

14 JUDGE BEAMER: Counsel, this is Judge Beamer. I have some
15 difficulty imagining that anyone with even rudimentary electrical
16 understanding would think that the d bar signals -- there are two different d
17 bar signals labeled on Figure 6, but they're the same signal, the d bar signals.
18 The presence or absence of one or two inverters is a low level
19 implementation detail, but the claim -- the whole point of the claim is
20 there's -- all you need is a d bar and that's what you have.

21 MR. RUBIN: So, sir, I'm not going to argue that this is a profound
22 distinction or that this is a -- or that if the argument that Your Honor has
23 presented was laid out in the petition, that we would be arguing against it.
24 But I will note that the statute and the Federal Circuit case law makes clear
25 that the burden is on Petitioner to lay out arguments of this sort in the

1 petition.

2 JUDGE EASTHOM: Let me ask you this. What about -- what is a
3 splitter/inverter? Is that in the spec? Because it seems to me when you call
4 it a splitter/inverter, why can't there be two NAND gates, I mean, that satisfy
5 that term, because they would then be splitting something and they would
6 also be inverting it together as a pair.

7 MR. RUBIN: So that answer as to what a splitter/inverter is in the
8 '767 patent would be Figures 5A and 5B, which show in the upper left-hand
9 corner of each, the signal being split and then one of those two split signals
10 being inverted. I don't think the specification uses the phrase
11 splitter/inverter, so I think that the figures are the written description for that.
12 I'm not arguing that the claim should be limited to the figure, but I think that
13 that's --

14 JUDGE EASTHOM: Well, that's why --

15 MR. RUBIN: If that --

16 JUDGE EASTHOM: -- it seems like you just -- when you say you
17 can have a splitter before the inverter, so you're already saying the inverter
18 isn't the only thing that satisfies the claim by itself, so it seems like that
19 splitter/inverter sort of opens up the term a little bit. Even if you don't --
20 even if you set aside the patent parlance that Petitioner is arguing about, a
21 directional A could mean one or more, it seems like that sort of supports
22 what Petitioner is trying to argue, I think, especially since the spec doesn't
23 really define what a splitter/inverter is, but I don't know. I was just curious.
24 I haven't really thought about it much more than that. I'm curious as to what
25 you thought about it.

1 MR. RUBIN: So, Your Honor, I'm trying to grasp exactly what
2 the question is. It may be --

3 JUDGE EASTHOM: I think you already answered it. I won't -- I
4 was just thinking a splitter/inverter, I was wondering why is it limited to a
5 single NAND gate, which you seem to be arguing. I could see how maybe
6 you could say an inverter is, but a splitter/inverter, that could be two NAND
7 gates, it seems like.

8 JUDGE RANGE: Counsel, just FYI, you've got about five
9 minutes before you will be cutting into your rebuttal time.

10 MR. RUBIN: Okay. I guess I'll move on to the remaining
11 argument for Claim 3. So it starts on Slide 36. Slide 37, we see language
12 from Claims 1 and 3. So Claim 1 requires signals from sensors and then
13 Claim 3 further requires a vibration sensor. And so the Petitioners, I think
14 it's fair to say, here were rather terse in identifying what they're pointing to
15 here. The 697 petition doesn't say what reference allegedly contains an
16 accelerometer. The 698 points to Cosper.

17 But when we look to Cosper, it doesn't specifically identify an
18 accelerometer. It points to, quote, "one or more sensors that may detect
19 position velocity, acceleration, et cetera." It's not clear whether these have
20 to be distinct sensors or whether any one of them has to specifically be an
21 accelerometer. In particular, whether there has to be a vibration sensor that's
22 distinct from the sensors that are already present in Claim 1.

23 I will say that some of the evidence on this point pointed to in their
24 reply is of a questionable relevance. Here on Slide 41, we have a dictionary
25 definition from a civil engineering dictionary about an accelerometer being

1 used to measure the response of the ground or a structure to an earthquake.
2 On Slide 42, we have the Collins Dictionary of Electronics. This is more
3 pertinent, but according to this definition, an accelerometer is a device that
4 measures the acceleration applied to the device itself, as opposed to
5 something that just measures or can be used to infer accelerations occurring
6 external to the device.

7 And here we have Dr. Hannaford during his deposition testimony
8 talking about how an optical sensor, which is an example of the sensor that's
9 described in Cosper, you could determine actually by using the same sensor,
10 both velocity and acceleration, by bouncing a light off the object. And then
11 on Slide 44, he talks about how you could determine the Doppler shift, and
12 from that, the velocity, and looking at the change in velocity versus time of
13 acceleration. So --

14 JUDGE RANGE: Counsel, this is Judge Range. I was just
15 looking at Cosper, paragraph 50, and it talks about, "one or more sensors 14
16 may detect... acceleration, et cetera, for the sub-assembly." And I think the
17 sub-assembly is part of the device. It's talking about measuring acceleration
18 as part of the device.

19 MR. RUBIN: Right, but I don't think it's saying that the -- so the
20 device has -- sorry, let me pull up Cosper here.

21 JUDGE RANGE: Yeah. It's Cosper, paragraph 50. Like I
22 understand your argument that in theory, you can have an accelerometer that
23 I'm standing on the street and I shoot a laser at a car that's passing by and I
24 measure its acceleration, and that would be something different than what
25 we are talking about. But I think in the context of paragraph 50, that's --

1 Cospir seems to be interested in a sensor directed to acceleration for the sub-
2 assembly.

3 MR. RUBIN: But that doesn't necessarily mean that the sensor
4 itself is being accelerated, right? So I think if you look at Figure 1 of
5 Cospir -- yeah, I don't know that we're meant to think that all of those
6 components are moving with the mass, as opposed to taking externals of the
7 mass and observing its motion.

8 JUDGE EASTHOM: But Claim 3 doesn't require measuring the
9 mass, does it? It says it's attached to the module.

10 MR. RUBIN: Sure. So this is relevant in the context of the
11 Petitioner's argument that there's an accelerometer taught by Cospir.
12 Separately, though, even setting that aside -- even saying that, well, anything
13 that's measuring an acceleration is an accelerometer, and Cospir teaches
14 that. There's no teaching in Cospir that you need the separate vibration
15 sensor, in addition to the sensors taught in -- or required in Claim 1 of the
16 patent.

17 JUDGE EASTHOM: Well, what does the vibration sensor do in
18 Claim 3 -- or in your patent?

19 MR. RUBIN: So it's used by the -- or its output is used by the
20 control program to adjust the frequency in which the control program
21 changes the voltage state of the directional signal d. That's from Claim 3.

22 JUDGE EASTHOM: Right. Then how does it do that? I mean,
23 what is it sensing? How does it transfer any sensing of vibration to do that?

24 MR. RUBIN: Are you asking in the claims or in the preferred
25 embodiment?

1 JUDGE EASTHOM: I'm asking physically, how does it do it?
2 Why wouldn't an accelerometer do it, is what I'm trying to get at, but I'm
3 trying to figure out how you do it or what you do with it first.

4 JUDGE RANGE: And Counsel, I don't want to interrupt Judge
5 Easthom's flow of questions, but we're starting to eat into the rebuttal time a
6 little bit.

7 MR. RUBIN: So there's teaching -- sorry, bear with me. So the
8 specification of the '767 patent does give an accelerometer as an example
9 and it talks more generally about -- this is at the top of Column 6. So
10 starting at line 7, the CPU receives input from one or more electric
11 mechanical sensors that generate a signal corresponding to the strength of
12 vibration, currently being produced by the linearly oscillating mass. And
13 then there's -- so I think that's where the specification refers to the vibration
14 sensor, and then there's a more detailed algorithm in Figure 7A, 7B, 7C that
15 makes use of that.

16 JUDGE RANGE: Okay, thank you. I appreciate that.

17 MR. RUBIN: Yeah. Okay. So unless there are further questions,
18 I'll reserve the rest of my time.

19 JUDGE RANGE: Thank you, Counsel. So you'll have 15 minutes
20 for rebuttal. Let's go off the record for a moment. We'd like to take like a
21 five-minute break before we do the rebuttals. So if we can reconvene at
22 about 3:10 Eastern, that'd be perfect.

23 (Whereupon, the above-entitled matter went off the record at 3:04
24 p.m. and resumed at 3:10 p.m.)

25 JUDGE RANGE: Let's go on the record. Petitioner, you have 17

1 minutes for your rebuttal, and you may begin with that when you're ready.

2 MR. DEUTSCH: Thank you, Your Honor. With this last 17
3 minutes, what I plan to do -- I have a couple points to touch on regarding
4 Claim 1 with Izumi and Shahoian, and then just I wanted to touch on Claim
5 2 briefly, and then lastly, talk about the analogous art with respect to
6 Shahoian and Cosper.

7 So starting with Izumi, we've talked about the directional control
8 signal from the microprocessor, received by the switch from the
9 microprocessor, how that flows from the combination of Izumi and Cosper.
10 That's laid out in the petition. And I just wanted to touch on how that works
11 in the combination as it's laid out. Slide 6 of Petitioner's demonstratives
12 show Figure 2 of Izumi, which shows the controller 6 current waveform
13 decider 60. Izumi has discussion about what that current waveform decider
14 does to generate a direction control signal that then is output to the h bridge
15 switch.

16 And so Izumi's teachings remain relevant and in the combination,
17 that's being included on the microprocessor, and that's something that was
18 laid out in various places in the petition and Dr. Hannaford's declaration,
19 such that in that figure, what's going from the current waveform decider is
20 part of the microprocessor and that's being received by the switch. And so
21 we see that in a number of places that we talked about earlier stepping
22 through Dr. Hannaford's declaration. For example, at paragraph 112, it talks
23 about the control scheme in the combination, operating in accordance with
24 Izumi and a microprocessor is programmed with those instructions for
25 carrying out the control scheme, which are the things that the current

1 waveform decider does.

2 And that's something, again, even within the 1.5.3 discussion, we
3 see that emphasized again with a citation Izumi's teachings around the
4 control signals that are used and coming from that current waveform
5 decider, which again, in the combination, is implemented as part of the
6 microprocessor or CPU.

7 On Shahoian, we talked about the combination of Shahoian and
8 Cosper and how it relates between Shahoian's teachings around various
9 frequencies and outputs, in Cosper's teachings around its feedback control
10 using multiple sensors, and those are things that whatever frequency we're
11 operating at, Cosper is going to help you get it more effectively, more
12 precisely, using its multiple sensors and its suggestions around its feedback
13 control.

14 And so those are benefits that would've been apparent to a
15 POSITA based on the teachings of the two references and something that,
16 again -- these were things that were laid out in the petition in terms of
17 enhancing the precision of Shahoian's output, enhancing the resistance to
18 external forces that might impact the desired output that Shahoian is after.
19 All of those things are going to be benefits that flow from this combination
20 that would've been recognized by a POSITA.

21 And just to emphasize that further, one of the things that Patent
22 Owner mentioned was Cosper talking about drift between electrical and
23 mechanical frequencies. That's something that was discussed in paragraph 7
24 of Cosper, which is again, something, you know, that discussion is part of
25 Cosper's teachings that motivate the combination and signal to a POSITA in

1 both the precision benefits that would be achieved, the efficiency that
2 Cosper is after, all which fall into those motivations that were laid out in the
3 petition, but again remain uncontested in the briefing.

4 Very briefly, I just wanted to punctuate a point with respect to
5 Claim 2. There, we were looking at Rossi's figures, particularly the inputs to
6 the second switches, SW2, SW3, which again, shows the same inputs to both
7 of those in one bar. And I think I heard a comment that we don't really
8 know what those are, but we do. There's the label that's the same and that is
9 used consistently throughout Figure 4, similar in the other figures, and we
10 can see in those figures where those signals are coming and going from, and
11 just further confirming what a POSITA would know, which is they're the
12 same signals.

13 So with that, let's talk about non-analogous arts, if there are no
14 other questions on those topics. So during Patent Owner's presentation,
15 there was a question about where in the 697 Patent Owner response
16 analogous art was discussed with respect to the '767 patent, and there were
17 two pages that were given, page 9 and page 15. And I wanted to turn briefly
18 to both of those pages, and so we can start with page 9 of the Patent Owner
19 response in 697. And this is actually also reproduced on Slide 29 of
20 Petitioner's demonstratives.

21 I'm looking at Slide 29. It's also page 9 of the POR. And so what
22 we see here is the motivation to combine heading; each ground of the 697
23 IPR requires combining Shahoian with Cosper, in some cases with
24 additional references. The second sentence; Cosper is from a different field
25 of endeavor than Shahoian and is not pertinent to the problems being

1 addressed in Shahoian. And in the following sentence; for these reasons,
2 Shahoian and Cosper are not analogous art that could be combined to
3 demonstrate obviousness.

4 And so Patent Owner pointed to that language in that third
5 sentence, Shahoian and Cosper are not analogous art -- and I see those words
6 are on the page, but when we read it in context with the preface for these
7 reasons and the proceeding sentence talking about the comparison between
8 Cosper and Shahoian. And what's missing in this paragraph and missing
9 everywhere else in the discussion of the POR is any kind of analysis or
10 comparison with respect to the '767 patent, and that's what matters for
11 purposes of making a determination around analogous art. And so when
12 they use that phrase "not analogous art", it's something that's being used
13 colloquially to describe, again, this comparison between Cosper and
14 Shahoian. Not the required discussion between the patents and the '767
15 patent.

16 The other page that was discussed is page 15 and you see the same
17 thing in that paragraph at the middle of the page. It says, "For these reasons,
18 each ground of the 697 IPR involves combining references that are not
19 analogous." If we look at the proceeding discussion, again, it's comparison
20 of the references. What's not there is any kind of comparison within the
21 required framework with respect to the patent itself, and so that's something
22 that's just not in the POR. It doesn't come in until the surreply for the very
23 first time.

24 And so just to emphasize why is that problematic, and the issue is
25 that there are things in the record that are contrary to Patent Owner's non-

1 analogous argument that they raise for the first time in surreply -- the things
2 that are in the record that are contrary to Patent Owner's theory. And so
3 Petitioner just hasn't had a chance to respond to that since they've raised that
4 at this late stage in the surreply. So that's where the prejudice comes in.
5 And I think we have about seven minutes, and if it's okay with Your Honors,
6 Mr. Renner will say a few words about non-analogous art.

7 JUDGE RANGE: Counsel, just a question. So you're identifying
8 this prejudice, like what would you have us do about that?

9 MR. DEUTSCH: Well, I think the -- there's a few options, given
10 the lateness of it. One avenue is to strike that from the record, given the
11 lateness, given that we haven't had a chance to reply to it. And so that was
12 what we've been discussing. I know it's kind of a major consideration, but
13 given the circumstances and how it's raised, that's something that we're
14 considering. So I'll turn it over to Mr. Renner.

15 MR. RENNER: Good afternoon, Your Honors. May it please the
16 Board. Your question is timely, Judge Range, and it's exactly what I had
17 planned to come up and to speak to. To reiterate what we believe to be a
18 rather unusual circumstance. There are plenty of cases that we've been
19 involved with and I'm sure you have, as well, that there's an answer or a
20 clarification or some natural, I'll call it, evolution of argument. That's not
21 what we're talking about here.

22 Here, we have never alleged before anything to suggest a
23 comparison or a relative satirized between the prior art, Cosper, for instance,
24 and the '767. The analogousness as between those two and the manner of
25 analogousness was first raised -- the first utterance of that being in the

1 surreply only eight days ago. And so to the question that you had asked, we
2 thought of reaching out and asking for authorization to file a motion to
3 strike. Seven days was yesterday. It should be seven days, as opposed to
4 more permissive, that is as opposed to must be.

5 We thought with the hearing today, we would discuss the issue,
6 socialize the issue, hear from Patent Owner's Counsel, as well. But we don't
7 see justification for the late entry of this and had it been entered on time, we
8 would've been able to give Your Honors in the record what my colleague is
9 mentioning, which is an indication of the various issues that we see with the
10 way that they framed the argument, and we just don't have the opportunity to
11 do that by way of argument or evidence.

12 So we're still considering whether to file the motion. We certainly
13 are open to any input that Your Honors may have on the issue. It's an
14 unusual circumstance for us, to be completely honest with you. One way or
15 the other, we think there's a range of options, as my colleague had
16 mentioned. One would be to disregard the argument, of course. Another
17 would be to strike it from the record, just to clean the record up.

18 But a third, I guess, could be further briefing evidence as if it had
19 been filed in the Patent Owner's reply, which would've put a response --
20 which would've put us in a position to take on the issues and to -- and that is,
21 again, not just the issue of analogousness itself as a matter of law, but the
22 manner in which it's been argued at this point for the first time eight days
23 ago. So, happy to take questions on that. Apologies for having to frame it
24 and hope you all indulge the conversation.

25 JUDGE RANGE: Thank you.

1 JUDGE EASTHOM: Mr. Renner, would you consider, if we
2 agree -- if Patent Owner agrees that your response here, your colleague's
3 response here is -- if we take into context what you said at the transcript and
4 the cites you made, would that be just about as good as a brief for you or
5 not?

6 MR. RENNER: Thank you, Your Honor. We really didn't go
7 through chapter and verse and try to figure out what the full scope of maybe
8 the problems were. What I had asked the team to do and worked with them
9 to do is identify an instance, so I'm sorry to say, I don't think that'd be a
10 full -- that wouldn't be akin to what we would've done had it been provided
11 on time. I think we'd frankly ask for more to make sure there was no
12 prejudice.

13 And mind you that -- I don't want to get too lost down this path.
14 The reality is we believe that there is a pretty clear case of analogousness
15 here and the record reflects that. So that weight on us, in terms of even
16 raising the issue in this context, we think that the field is very broad, if you
17 look at it appropriately, and as my colleague has pointed out, that these
18 references are within that field and that there's common problems being
19 addressed by the references.

20 So the boxes are checked and yet, we have a characterization of
21 that form of law is applied to the -- these facts applied that we haven't been
22 able to, in full manner, address. So Judge Easthom, I really appreciate the
23 question. I just don't know that that actually puts our client in a position it
24 would've been in had the argument not been put in late.

25 JUDGE EASTHOM: Okay. I appreciate that. Thank you.

1 JUDGE RANGE: I was just conferring with my colleagues about
2 this and so, I think what we're inclined to do -- I don't want to create a lot of
3 extra briefing and work for everyone on this. I think we can disregard
4 arguments in the surreply, to the extent we think they're inappropriate, where
5 the issue has been flagged. And if we think we need briefing later, we can
6 let you all know.

7 MR. RENNER: Thank you, Your Honor. We appreciate that.
8 With that, any other questions for us? We have just a little bit of time and
9 we're certainly happy to take on any questions that Your Honors may have
10 about the record or any of the arguments presented.

11 JUDGE RANGE: No further questions here. Thank you.

12 MR. RENNER: Yes, and thanks for the indulgence on the
13 technology issues today. We'll rest then. Thank you.

14 JUDGE RANGE: Thank you. Okay. Counsel for Patent Owner, I
15 think you have 15 minutes for surrebuttal, and feel free to address that
16 briefing issue, to the extent you want to.

17 MR. RUBIN: Thank you, Your Honor. I think I'll start with that
18 issue and with the analogous art issue generally. So we don't agree that
19 there was a late raised argument, and I don't agree that there's any prejudice
20 here. The Patent Owner's response, as I pointed out earlier today, sets forth
21 what the legal test is for analogous art and it says that that isn't satisfied. It
22 says that the references are not analogous art.

23 And now, I suppose that we don't -- we didn't identify in the Patent
24 Owner's response a specific field of endeavor for the '767 patent. We do
25 focus on the fields of endeavor of the two -- or more than two prior art

1 references being combined, but we clearly placed Apple on notice that
2 there's the issue and that under the legal test set forth in Apple v.
3 Corephotonics, in particular, that the references are not analogous art.

4 And the reply clearly recognized that this was an issue and devoted
5 four pages to addressing it. In particular, on pages 3 through 6, arguing that,
6 quote, "to be clear," both Shahoian and Cosper are analogous art to the '767
7 patent, identifying what Apple contends as the field of endeavor of the '767
8 patent and arguing that each of the prior art references is within that field of
9 endeavor. And then I think there's also -- the field of endeavor is also
10 addressed with respect to Aldrich later in the reply. But certainly, the three
11 solid pages of reply to this issue.

12 And then our surreply addresses Apple's argument squarely. It
13 points out how Apple's argument for analogousness fails, saying that the --
14 pointing to the field of endeavor that Apple identified for the '767 patent,
15 and then arguing that Cosper, in particular, doesn't fit in that field of
16 endeavor. So I guess it's not clear how Apple could've been more on notice
17 that this was an issue or given more opportunity to present their argument on
18 field of endeavor and analogous than they were.

19 I guess turning to the Izumi combination arguments, it is
20 noteworthy that Counsel, again, pointed to paragraph 112 of the Hannaford
21 declaration, which -- as I pointed out and I don't think Apple disputes -- was
22 not -- the arguments set forth in that paragraph of the declaration don't
23 appear in any of Apple's briefing. So to the extent that Apple is trying to
24 incorporate by reference 160 some pages of expert declaration and to rely on
25 that incorporation by reference, that's improper.

1 I also heard arguments about the -- as they're saying -- well, I
2 guess regardless what Izumi says about the CPU, in a combination we're
3 pointing to, it is the CPU that's providing the output. And I mean, I guess
4 any Petitioner could say, well it doesn't matter what the prior art says. My
5 combination is such and such, but that's -- it's not I think a proper argument
6 for obviousness, I think we should look at what the references that are relied
7 on actually disclose.

8 And also, I think we need to look at the structure of the argument
9 presented in the petition. The argument in the petition was that this
10 limitation is met because Izumi meets it and our position, as spelled out
11 today and in our briefing, is that Izumi doesn't meet it. In fact, Izumi teaches
12 a different way of addressing its problems, so I don't think it's an answer to
13 just say pay no attention to the man behind the curtain, our combination is a
14 CPU or processor. And so with that, unless the Board has further questions,
15 I would ask that the Board reject the challenges in these IPRs and confirm
16 the patentability of the '767 patent claims.

17 JUDGE RANGE: Thank you, Counsel. I have no further
18 questions. No one else? Okay. We can go off. Thank you for your time.
19 We can go off the record.

20 (Whereupon, the above-entitled matter went off the record at 3:46
21 p.m.)

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