

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MERCEDES-BENZ USA, LLC,

Petitioner,

v.

DAEDALUS PRIME LLC,

Patent Owner.

Case No.: IPR2023-01333

U.S. Patent No. 10,049,080

PATENT OWNER'S SUR-REPLY

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I. SUMMARY

Forced to confine its argument to allege that in Sutardja it is the hardware controlled by the core switching module that should be read as the power management hardware controlled by the operating system recited in claim 1 of the '080 patent, Petitioner's case for unpatentability is unwinnable. Sutardja explains that after switching from one core to another, the core switching module "*returns control to the kernel module 220.*" The fact that control must be *returned* to the kernel—that is, the operating system—after switching from one core to another means the operating system was not in control of that switching; i.e., not in control of the subject hardware.

As to Mathieson, Petitioner concedes that Mathieson teaches a controller that operates transparently to the operating system, but attempts to section the operating system into layers and argues, "because operating systems have many layers, it is not inconsistent for [a] 'controller' to both be *part of* a low level of the operating system and operate 'transparently to' a higher level of the operating system." This argument is inconsistent with both Mathieson itself and Petitioner's own expert's testimony on the subject. Mathieson teaches a controller that transfers processor state from one set of cores to the other set of cores *transparently to the operating*

system, not merely some layer thereof. Dr. Horst recognized that this must mean the controller is operating below the operating system, not as part of it. And, notwithstanding Petitioner’s attempt to mischaracterize it, Dr. Brogioli’s testimony on this subject did not endorse a different reading of Mathieson. Accordingly, independent claims 1, 9, and 17 are not unpatentable in view of Mathieson-Sutardja.

II. CLAIM CONSTRUCTION AND LEVEL OF ORDINARY SKILL IN THE ART

Petitioner’s Reply reflects a basic and fundamental misunderstanding of the concept of a person of ordinary skill in the art (“POSITA”). According to Petitioner, “One with greater than ‘ordinary’ skill necessarily meets the definition of a POSITA; the POSITA definition is a floor, not a ceiling.” Pet. Reply at 2. This is *not* how the level of ordinary skill for purposes of the obviousness analysis is to be understood.

Panels of this Board regularly recognize that proposed definitions of a POSITA that recite “at least” certain education, knowledge, and/or levels of skill are improper because they encompass more than just persons of “ordinary” skill. *See, e.g., Microsoft Corp. v. D3D Technologies, Inc.*, IPR2021-00647, Paper 32, slip op. at 7-8 (PTAB Aug. 3, 2022) (deleting the qualifier “at least” from a proposed definition of a POSITA “to keep

the articulation from extending to the realm of an expert”); *Samsung Electronics Co., Ltd. v. GUI Global Products Ltd.*, IPR2021-00335, Paper 26, slip op. at 9-10 (PTAB Jun. 29, 2022) (deleting the phrase “at least” in the definition of a POSITA’s level of education “to avoid ambiguity in the definition of the level of skill”).

Policing the definition of a POSITA in this fashion is important because the POSITA is the “prism or lens through which a judge or jury views the . . . invention.” *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999). Indeed, the POSITA’s vantage point is considered so foundational that virtually every patent textbook and judicial opinion emphasizes that doctrinal outcomes in patent cases are tied to this perspective. *See, e.g., Env’t Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 697 (Fed. Cir. 1983) (emphasizing the importance of specifying the correct level of skill in the art, and differentiating the skill level of an ordinary artisan from that of “the judge,” “a layman,” “those skilled in remote arts,” or “geniuses in the art at hand.”). By definition, certain individuals, including those of exceptional skill and/or knowledge are *not* POSITAs. In *KSR*, the Supreme Court characterized the PHOSITA in realistic terms: as a member of a technological community that is subject to market pressures, as a person who can implement *predictable* variations of pre-existing

technology, and as a person of *ordinary* creativity. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 419-421 (2007). Someone with beyond the ordinary level of skill, whether by education or experience or both, cannot be equated with the POSITA contemplated by § 103 because that individual is, by his/her very nature, *unordinary*. See, e.g., *Abington Textile Machinery Works v. Carding Specialists (Canada) Ltd.*, 249 F. Supp. 823, 829 (D.D.C. 1965).

By including individuals with more than just two years of experience in “the research, design, development, or testing of electronic circuits or components or software for controlling electronic circuits or components, or the equivalent,” Petitioner’s definition of a POSITA necessarily includes persons with more than *ordinary skill* in the art and Petitioner admits as much. Pet. Reply at 2. To that end, Petitioner’s definition of a POSITA is improper and it should not be accepted by Board in its proffered form. Moreover, because Dr. Horst used this improper definition in his analyses, Ex. 1034 at ¶ 31; Ex. 2002 at 12:11 – 13:18, the Board should accord little weight to his opinions. Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019) (“Consol. TPG”) at p. 35 (“The Board has broad discretion to assign weight to be accorded expert testimony.”).

In its Reply, Petitioner also contends that “‘operating system’ does

not require construction.” Pet. Reply at 2. Not so. Constructions are required when necessary to resolve any asserted ground in a petition. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). The Petition alleges unpatentability in view of Sutardja, Pet at 5-6, but, as demonstrated in Patent Owner’s Response, “Sutardja does not teach or suggest *an operating system* executing on a multi-core processor to monitor a demand for the multi-core processor and *control* power management hardware based on the demand, as required by all of the challenged claims.” POR at 21 (emphasis added). To understand why, one must first understand what an *operating system* is (and is not). Hence, the term “operating system” requires construction.

The Reply also states, “the term should be understood in accordance with its plain meaning.” Pet. Reply at 2. But, just as the Petition offered no understanding of what that “plain meaning” is, so too is the Reply devoid of any help in this regard. “Properly viewed, the ‘ordinary meaning’ of a claim term is its meaning to the ordinary artisan after reading the entire patent.” *Aylus Networks, Inc. v. Apple Inc.*, 856 F.3d 1353, 1358 (Fed. Cir. 2017). Merely stating, as Petitioner does, a claim term should have its “plain and ordinary meaning” without explain that meaning in the context of the patent is therefore inadequate. Dr. Brogioli explained that in the context of the

'080 patent, an "operating system" is, "The software that controls the allocation and usage of hardware resources such as memory, central processing unit (CPU) time, disk space, and peripheral devices." Ex. 2006 at ¶ 40. Accordingly, the Board should adopt this construction.

III. SUTARDJA WAS CONSIDERED DURING PROSECUTION OF THE '080 PATENT

The Reply contradicts itself by first arguing that Sutardja was not considered by the examiner during prosecution of the application that became the '080 patent, and then pointing out that Sutardja was used to reject specific claims of that application. Pet. Reply at 3. The fact that Sutardja was used in connection with substantive rejections of claims during prosecution demonstrates that Sutardja was, in fact, considered by the Examiner. *See* Ex. 1004 at 71-72 (discussing Sutardja '324, the parent application of Sutardja '748).

IV. SUTARDJA DOES NOT DISCLOSE AN OPERATING SYSTEM THAT *CONTROLS* POWER MANAGEMENT HARDWARE

Recognizing the inconsistencies in its petition, Petitioner has now settled on alleging, "Sutardja's 'power management hardware' is the 'hardware controlled by the core switching module,' i.e. the 'hypervisor' in

which the ‘core switching module’ can be integrated.” Pet. Reply at 3. This admission is fatal to Petitioner’s case.

As explained in Patent Owner’s Response, in Sutardja it is the core switching module, **not** the operating system, that controls the underlying hardware. Ex. 1007 at [0253]. Petitioner’s Reply admits as much. Indeed, Sutardja emphasizes that, after effecting the switching from one core to another, the core switching module “**returns control to the kernel module 220 . . .**” *Id.* Control is **returned** to the kernel—that is, the operating system—because it was the core switching module, **not** the kernel—i.e., **not** the operating system—that was in control of the transition from one core to the other. Ex. 2006 at ¶ 52. Even Dr. Horst acknowledged this to be the case. Ex. 2002 at 28:22 – 29:5.

The Reply also seeks to recharacterize the petition’s discussion of hypervisors as one involving “software hypervisors” and “hardware hypervisors.” Pet. Reply at 4-5. Indeed, the Reply attempts to reframe the petition as alleging that Sutardja’s hypervisor is the recited “hardware” in claim 1. *Id.* at 5. The Board should reject this attempt.

First, there are no such things as “hardware hypervisors.” Hypervisors are “software that does server virtualization.” Ex. 1028 at 54. This software can **run** “directly on the hardware”—a so-called bare metal

hypervisor—or it can *run* as an application on an operating system—a hosted hypervisor. *Id.* at 54-55; *and see* Ex. 1034 at ¶ 117. In either case, the hypervisor *runs* on something, a characteristic of software, not hardware. *See* Ex. 2002 at 20:13 – 21:14; 22:13 – 23:12.

Second, the Reply goes to great lengths to emphasize that it is the hardware controlled by the core switching module (whether operating alone or as part of the hypervisor) that is the claimed hardware, and nowhere did the petition allege that Sutardja’s hypervisor is hardware. *See* Pet. at 33-34 (“A POSITA would have understood that the hardware *on which the disclosed hypervisor is installed* corresponds to the claimed power management hardware.”) (emphasis added). Alleging now that the hypervisor itself is hardware is a new argument that should not be entertained. *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1370 (Fed. Cir. 2016).

Finally, the Reply seeks to distract the Board’s attention by arguing that “the distinction between hardware and software is not as defined as Patent Owner insists.” Pet. Reply at 4-5. The Reply would have the Board step through the looking glass and treat software as hardware, but no person of ordinary skill in the art would do so. At deposition, Dr. Brogioli explained, “hardware is chips . . . physical components of a computer,

things like DRAM, interconnects, things like that.” Ex. 1038 at 9:18-24. Software, on the other hand, is “typically what engineers write or programmers write in a programming language, and then we take those languages and compile them down through a complicated process to bits and bytes that run, for example, on a microprocessor.” *Id.* at 13:22-14:3.

Even Petitioner cannot seriously believe that there is no distinction between hardware and software. The Reply notes, “*Every time* the ’080 Patent mentions ‘hardware,’ it discloses ‘software’ or ‘firmware’ as an alternative means to accomplish the same function.” Pet. Reply at 5 (emphasis in original). The fact that software and firmware as disclosed as *alternatives* to hardware is a signal to the reader that they are **not** the same. While certain functionality may be achieved through the use of one or the other, hardware and software are distinct from one another and the fact the Reply itself recognizes the distinction is an indication that Petitioner’s attempt to conflate the two is nothing but a red herring.

Insofar as the Reply alleges that Patent Owner failed to support its argument that Sutardja’s disclosure of an operating system making a system call to the hypervisor module or the core switching module “does not equate to ‘control’” of these modules, Pet. Reply at 5-6, Petitioner has conveniently (or perhaps deliberately) overlooked Dr. Brogioli’s testimony

on these issues. In his declaration, Dr. Brogioli states, “A person of ordinary skill in the art [] would understand that it is the core switching module, not the operating system (kernel and PMS module), that controls the hardware and makes the switch from one core to another. Indeed, Sutardja specifies that the core switching module takes control, makes the transition from one core to another, and then returns control to the operating system (kernel).” Ex. 2006 at ¶ 52. The *evidence* Petitioner seeks was thus concisely explained based on the very disclosure of the cited reference. By recognizing that the core switching module must ***return control to the kernel module***, Ex. 1007 at [0253], Dr. Brogioli confirmed that a POSITA would recognize it is the core switching module that had control over the switching between cores in the first place. The system call made by the kernel did not “effect the transition” as the Reply alleges. Pet. Reply at 6. Rather, the calls resulted in the core switching module taking control to make the transition between cores and then returning control to the kernel. The kernel—that is, the operating system—did not and was not in control of the process. Ex. 1038 at 81:11 – 84:2 (Dr. Brogioli explaining that “it's not that system call that's performing the operation.”); *id.* at 87:21-25 (“In this scenario the system call is to have the core switching module here control hardware and make a switch from one core to another. That's

the architecture and design of the solution that Sutardja is talking about.”).

V. MATHIESON IN VIEW OF SUTRADJA DOES NOT DISCLOSE THE ELEMENTS OF CLAIM 1

A. Mathieson’s Controller Does Not Correspond to the Claimed Operating System

The Reply alleges that, “because operating systems have many layers, it is not inconsistent for [a] ‘controller’ to both be *part of* a low level of the operating system and operate ‘transparently to’ a higher level of the operating system.” Pet. Reply at 7. But this is inconsistent with Petitioner’s own expert’s testimony that for a process to be “transparent to an operating system” (and not merely a layer of an operating system) that process must run below the operating system. Ex. 2002 at 31:16 – 32:1.

Undaunted, Petitioner seeks to characterize Mathieson as teaching something it does not. Forced to admit that “Mathieson states that the ‘controller’ functions ‘transparently to *higher level software*, such as the operating system,’” Pet. Reply at 8, Petitioner tries to dice the operating system into layers and have Mathieson’s controller be not too high and not too low within that structure in order to still be “both part of the kernel of the operating system and operating transparently to the operating system’s higher layers.” *Id.* But this Goldilocks-like controller is nowhere disclosed

in Mathieson and nor did Dr. Brogioli lend support to such a theory during his deposition.

First, Dr. Brogioli did not testify that Mathieson's phrase, "higher level software, such as the operating system" refers to a level *within* the operating system that is higher than the kernel. In fact, Dr. Brogioli stated that the phrase means, "In this context it would be something that, for instance, the operating system isn't aware of, is an example, where the operating system itself isn't effecting the transition itself." Ex. 1038 at 91:5-8. By referring to "higher level" Mathieson was referring to "something like software running on top of an operating system." *Id.* at 91:19-20. Petitioner's attempt to recast this testimony as referring to layers of an operating system is both wrong and insincere.

Second, Mathieson is clear: the controller transfers processor state from one set of cores to the other set of cores *transparently* to **the** operating system. Ex. 1005 at [0043]. Even Dr. Horst recognizes that this must mean the operating system is not aware of the process being performed and that the controller is operating below the operating system. Ex. 2002 at 31:16 – 32:1. Consequently, Mathieson's controller does **not** perform the functions of an operating system and the requirements of independent claims 1, 9, and 17 are not met by Petitioner's Mathieson-Sutardja combination.

B. Mathieson Does Not Disclose Power Consumption Based on Both Frequency and Voltage

The Reply alleges that, “When Mathieson’s cores consume less power for the same ‘operating frequency,’ they also, necessarily, consume less power for the same ‘supply voltage.’” Pet. Reply at 9. But nowhere does Mathieson make this contention. Instead, Mathieson indicates that voltage and frequency may be controlled independently of one another. *See, e.g.,* Ex. 1005 at [0030] (discussing the alternatives of clock gating and power gating). As Dr. Brogioli stated in his declaration, Mathieson’s Fig. 6 does not illustrate curves that represent power consumed as a function of applied supply voltage. Ex. 2006 at ¶¶ 62-63.

VI. CONCLUSION

For at least the foregoing reasons and those in the Patent Owner’s Response, the Board should find that Petition has failed to prove the unpatentability of any of the challenged claims.

Respectfully submitted,

Dated: September 25, 2024

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WORD-COUNT CERTIFICATE

I certify that the foregoing document complies with the type-volume limitation of 37 C.F.R. § 42.24(a) and (b) and contains 2,797 words (including words in drawings created by the Patent Owner or as annotations added by the Patent Owner to images reproduced in this document) based on the word count indicated by Microsoft® Word for Mac v. 16.84, excluding those portions exempted by the rule.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing:

PATENT OWNER'S SUR-REPLY

and its accompanying exhibits were served on September 25, 2024, by filing this document through the P-TACTS System as well as by delivering a copy via email directed to the attorneys of record for the Petitioner at the following addresses:

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The parties have agreed to electronic service in this proceeding.

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