

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLIED MATERIALS, INC.,
Petitioner,

v.

OCEAN SEMICONDUCTOR LLC,
Patent Owner.

IPR2021-01340
Patent 6,725,402 B1

Before MIRIAM L. QUINN, JOHN D. HAMANN, and
DAVID COTTA, *Administrative Patent Judges*.

COTTA, Administrative Patent Judge.

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

I. INTRODUCTION

Applied Materials, Inc. (“Petitioner”)¹ filed a Petition to institute *inter partes* review of claims 1–17 of U.S. Patent No. 6,725,402 B1 (Ex. 1001, “the ’402 patent”). Paper 1 (“Pet.” or “Petition”). Ocean Semiconductor LLC (“Patent Owner”)² filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply and Patent Owner filed a Preliminary Sur-reply addressing certain matters raised in the Preliminary Response. Paper 10 (“Prelim. Reply”); Paper 11 (“Prelim. Sur-reply”).

Under 35 U.S.C. § 314(a), *inter partes* review may not be instituted unless the Petition “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” Petitioner has established a reasonable likelihood of prevailing on its assertion that the challenged claims are unpatentable based on the ground advanced here. We decline to deny the Petition on a discretionary basis as requested by Patent Owner. Thus, for reasons explained below, we institute *inter partes* review of claims 1–17 of the ’402 patent.

¹ Petitioner identifies itself, Applied Materials, Inc., as the real party-in-interest. Petitioner also identifies PDF Solutions, Inc. as a “potential real party-in-interest” with whom Petitioner “discussed this Petition and the Ground presented.” Pet. 1. Petitioner further lists a number of other “potential real parties-in-interest, none of whom had any access to this Petition.” *Id.* at 1–2.

² Patent Owner identifies itself, Ocean Semiconductor LLC, as the real party-in-interest. Paper 5, 2.

A. Related Proceedings

According to the parties, Patent Owner has asserted the '402 patent against defendants including: Analog Devices, Inc.; Infineon Tech. AG; Huawei Device USA, Inc.; MediaTek Inc.; NVIDIA Corp.; NXP USA, Inc.; Renesas Elec. Corp.; Silicon Labs. Inc.; STMicroelectronics Inc.; and Western Digital Tech., Inc. in lawsuits in district courts in the District of Massachusetts, the Eastern District of Texas, and the Western District of Texas. Pet. 2; Paper 5, 2. Petitioner indicates that it is not a party to any pending litigations involving the '402 patent. Pet. 7.

B. Asserted Ground of Unpatentability

Petitioner asserts one ground of unpatentability in this Petition (Pet. 14–15), which is provided in the table below:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–17	103(a) ³	Coronel ⁴ , Fox ⁵

Petitioner relies on the declaration of Dr. Miltiadis Hatalis, among other evidence. Ex. 1002.

³ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. § 103. Based on the filing date of the '402 patent, we apply the pre-AIA version of § 103.

⁴ Coronel et al., EP 0 932 194 A1, published July 28, 1999 (Ex. 1006, “Coronel”).

⁵ Fox et al., US 5,479,340, issued Dec. 26, 1995 (Ex. 1005, “Fox”).

C. Technology Overview & the '402 Patent

The '402 patent relates to “fault detection and control of a processing tool using an Advanced Process Control (APC) framework” in the field of semiconductor fabrication. Ex. 1001, 1:9–12. By way of background, the '402 patent explains that “[a]lthough there has been an improvement in detecting faults associated with semiconductor manufacturing processes, one problem currently encountered . . . is the delay in reporting these faults such that corrective measures can be implemented in a more expedient manner.” *Id.* at 1:29–34. The '402 patent seeks to address this problem, which can result in a number of faulty devices being produced. *Id.* at 1:34–39.

Figure 1 of the '402 patent (reproduced below) shows a system for determining fault detection based on process tool operational state data in a semiconductor fabrication process.

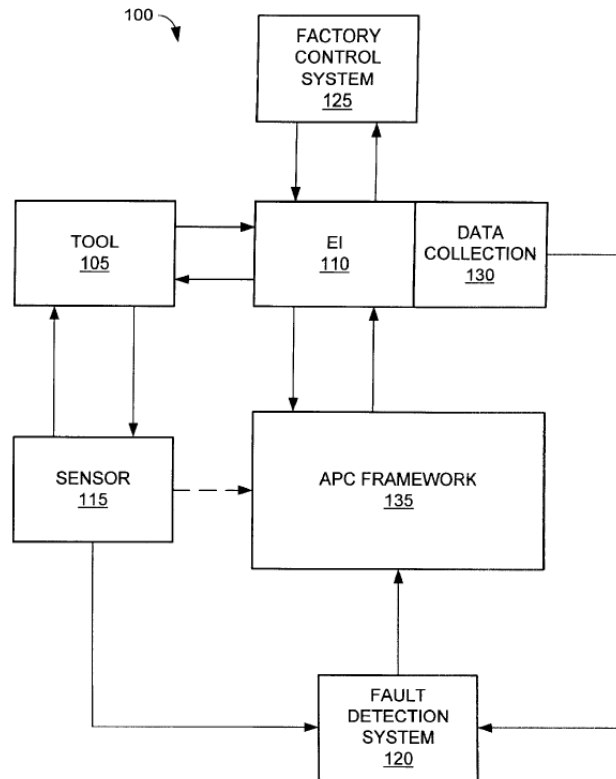


Figure 1

As shown above, the system in Figure 1 includes processing tool 105, which “is in the form of semiconductor fabrication equipment used to produce a processing piece, such as a silicon wafer.” *Id.* at 2:45–48. Equipment interface 110 retrieves tool state data from tool 105, such as temperature, pressure, and gas flow, and “communicates this data to a fault detection system 120 via the data collection unit 130 to determine whether the tool 105 is experiencing a faulty operation.” *Id.* at 2:58–65. More specifically, the tool state data received by equipment interface 110 is collected by data collection unit 130, converted into a tool data file, and forwarded to fault detection system 120 for near real-time analysis. *Id.* at 3:28–34. Fault

detection system 120 “sends the results of potential faults and/or proper operation of the tool 105 in the form of tool ‘health’ data to the Advanced Process Control (APC) framework 135.” *Id.* at 4:19–24. APC 135 “may send control signals to the equipment interface 110 to control the processing tool 105 based upon the tool health data results forwarded from the fault detection system 120.” *Id.* at 4:24–28.

D. Challenged Claims

The ’402 patent includes seventeen claims, each of which is challenged here. Pet. 14–15. Claims 1, 8, and 15 are independent. Claim 1 is illustrative of the challenged claims and reads as follows:

1. A method comprising:

receiving at a first interface operational state data of a processing tool related to the manufacture of a processing piece;

sending the state data from the first interface to a fault detection unit, wherein the act of sending comprises:

sending the state data from the first interface to a data collection unit;

accumulating the state data at the data collection unit;

translating the state data from a first communications protocol to a second communications protocol compatible with the fault detection unit; and

sending the translated state data from the data collection unit to the fault detection unit;

determining if a fault condition exists with the processing tool based upon the state data received by the fault detection unit;

performing a predetermined action on the processing tool in response to the presence of a fault condition; and

sending an alarm signal indicative of the fault condition to an advanced process control framework from the fault detection unit providing that a fault condition of the processing tool was determined by the fault detection unit,

wherein performing a predetermined action further comprises sending a signal by the framework to the first interface reflective of the predetermined action.

Ex. 1001, 7:10–38.

II. DISCRETION UNDER 35 U.S.C. § 314(a)

Patent Owner contends the Board should exercise its discretion under 35 U.S.C. § 314(a) and deny institution in light of the advanced stage of the parallel district court proceedings involving the '402 patent. Prelim. Resp. 7–33; Prelim. Sur-reply 1–5. Petitioner contends that Petitioner is not a party to any of the parallel district court proceedings involving the '402 patent, and resolution of those parallel proceedings would not resolve the dispute between Petitioner and Patent Owner with respect to the present proceeding. Pet. 7–12; Prelim. Reply 1–5. In assessing whether to exercise such discretion, the Board weighs six non-exclusive factors, known as the *Fintiv* factors. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 6 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). Recognizing that “there is some overlap among these factors” and that “[s]ome facts may be relevant to more than one factor,” the Board “takes a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review.” *Id.*

We have considered Patent Owner’s arguments in light of the *Fintiv* factors, together with Petitioner’s opposition, and we decline to exercise our

discretion to deny the Petition as explained further below. An analysis of each of the *Fintiv* factors follows.

A. Factor 1: Whether a Stay Exists or Is Likely to Be Granted if a Proceeding Is Instituted

The '402 patent is asserted in various district court proceedings. For instance, Patent Owner filed seven lawsuits in the Western District of Texas ("WDTex litigation"). Prelim. Resp. 9. Patent Owner also filed one lawsuit in the Eastern District of Texas (*id.* at 10 ("EDTex litigation")) and two lawsuits in the Massachusetts District Court (Exs. 1026, 1027 ("Massachusetts litigation")). The WDTex and the EDTex litigations have not been stayed. Reply 1 (identifying only the Massachusetts litigation as stayed). Nevertheless, Petitioner is not a party to any of these district court cases. Pet. 7.

Patent Owner urges us to find that Petitioner, as a non-party, "cannot file any stay motion" in any of the underlying district court litigation and, in any event, a stay is unlikely to be granted. Prelim. Resp. 10–14. Therefore, according to Patent Owner, this factor should favor the exercise of discretion. *Id.* In the alternative, Patent Owner argues that this factor is neutral. Prelim. Sur-reply 1. We agree that this factor is neutral because the WDTex and EDTex litigations have not been stayed.

B. Factor 2: Proximity of the Court's Trial Date to the Board's Projected Statutory Deadline

The projected statutory deadline for this proceeding would be, at the latest, February 2023. Patent Owner asserts that the jury trial in the WDTex litigation is set for December 7, 2022, and that the final pretrial conference

in the EDTex litigation is set for August 15, 2022, “with [a] trial to begin shortly thereafter, likely at the end of August or in September.” Prelim. Resp. 8, 12. These deadlines set the trial dates in district court to fall somewhere between *two and five months* before the projected statutory deadline. Petitioner argues that the trial dates are more fluid than what they appear and that other Board cases have held that where a petitioner is a non-party to the litigation, this factor weighs against the exercise of discretion. Prelim. Reply 1–2 (citing *Bose v. Koss*, IPR2021-00680, Paper 15 at 15 (Oct. 13, 2021 (“*Bose*”))).

We recognize that the panel in *Bose* took notice of the fact that when a Petitioner is not a party to the litigation, this factor weighs strongly against exercising discretion. But here we have departure from the facts in *Bose*, where the petitioner was not a defendant, because Petitioner has asserted that some of the defendants in the underlying litigation are “potential additional real parties-in-interest.” Petitioner contends, however, that these real parties-in-interest “did not fund, control, or participate in the drafting or filing of [the] Petition” and were identified as real-parties-in-interest “in an abundance of caution.” Pet. 1–2. Acknowledging the nature of Petitioner as a non-party to the litigation and the identification of the defendants as potential real parties-in-interest, and balancing this with the proximity of the trial dates to the statutory deadline by a matter of two to five months, we consider that this factor weighs marginally in favor of exercising discretion.

C. Factor 3: Investment in the Parallel Proceeding by the Court and Parties

Patent Owner argues that an “[i]mmense [i]vestment” has been made by the courts and the parties in the WDTex and EDTex litigations. Prelim. Resp. 19–25. In particular, Patent Owner points out that a subject-matter eligibility motion is pending and a Markman order has issued in WDTex litigation. *Id.*; Prelim. Sur-reply 3. In all pending district court matters, final infringement and invalidity contentions have been exchanged. Prelim. Resp. 20–22; Prelim. Sur-reply 3. However, expert and fact discovery is ongoing. Prelim. Resp. 20–22.

Petitioner, on the other hand, argues that it filed the Petition before the invalidity contentions deadline in any of the parallel litigations. Pet. 10. Petitioner also points out that the work expended thus far is unrelated to the unpatentability issues raised in the Petition because neither the Petition nor the Preliminary Response raises claim construction issues, and most of the motions have been largely pleading-related, not addressing the obviousness allegations presented in the Petition. Prelim. Reply 2–3. Thus, Petitioner argues that this factor weighs against exercising discretion. Pet. 9–10. We agree with Petitioner. In particular, we acknowledge Petitioner’s diligence in filing the Petition before any of the invalidity contentions deadlines. We also acknowledge that the resources and effort expended by the district courts in the pending litigations thus far have not been shown to have substantial relation to the unpatentability issues presented in the Petition. Accordingly, we determine that this factor weighs slightly against exercising our discretion.

D. Factor 4: Overlap Between Issues Raised in the Petition and in the Parallel Proceeding

Patent Owner argues there is “complete” overlap between issues raised in the Petition and in the pending litigations while Petitioner argues that there is no substantial overlap. Prelim. Resp. 25–30; Prelim. Reply 3; Prelim. Sur-reply 4. We agree with Petitioner that there is no substantial overlap.

This proceeding involves all of the claims of the ’402 patent (claims 1–17), while the underlying litigation involves a subset of these claims (claims 1–7). Prelim. Reply 3. The ground asserted here also does not seem to “completely” overlap with the district court invalidity contentions. To start, Petitioner asserts that the claims are invalid over Coronel and Fox. The invalidity contentions, although identifying Coronel and Fox, also mention 19 other references, many of which are asserted as anticipatory or primary references in a variety of invalidity theories. Prelim. Reply 3 (citing Ex. 2029, 46–68, 244–45, 249–56; Ex. 2030, 44–67, 160, 162–69). According to Petitioner, “Fox is never cited as the sole secondary reference, and the specific combination of Coronel and Fox is not included.” *Id.* Considering that breadth of the defendants’ invalidity contentions in the EDTex and WDTex Litigations, and the fact that Petitioner is a non-party to the litigation, we find that even if the combination of Coronel and Fox was specifically identified in the invalidity contentions, there is no evidence that Petitioner will have any control over whether or how that combination would be presented to the jury. Accordingly, we determine that this factor weighs marginally against exercising discretion.

E. Factor 5: Whether the Petitioner and the Defendant in the Parallel Proceeding Are the Same Party

Petitioner here is not a party to the litigation. Prelim. Reply 4. But, Patent Owner argues, Petitioner has identified some of the defendants as “potential” real-parties-in-interest (“RPIs”) and, under *Fintiv*, Petitioner should have explained the need for duplication of resources. Prelim. Resp. 30–31; Prelim. Sur-reply 4–5 (arguing that under *Fintiv* this factor weighs in favor of denial even where a petitioner is not a defendant in a co-pending action). We do not agree with Patent Owner.

Fintiv explains that an unrelated petitioner should address the co-pending litigation to discuss why the issues here would not be duplicative. *Fintiv*, at 14. Petitioner has explained that there was no substantial overlap and that it diligently filed its Petition before any invalidity contentions were exchanged in district court. Pet. 10–11; Prelim. Reply 3. This explanation and the surrounding circumstances paint the picture of a non-party to the litigation diligently filing a Petition without having control over what argument may be raised by the parties in the litigation. *Id.* Notably, there is no evidence that the defendants in the underlying litigation have any control over the IPR or how the prior art is presented here such that we could view Petitioner as an agent for the defendants. Accordingly, this factor weighs against exercising discretion.

F. Factor 6: Other Circumstances that Impact the Board’s Exercise of Discretion, Including the Merits

Patent Owner contends that the merits of the case are particularly weak and challenges institution on substantive grounds. Prelim. Resp. 32,

34–45; Prelim. Sur-reply 5. Petitioner asserts that the merits warrant institution and that it has no other forum in which to present these arguments. Pet. 12. Patent Owner responds that Petitioner has no “due process” right because it is free to litigate the ’402 patent claims’ validity in its own district court case. Prelim. Resp. 26 (citing *Mylan Labs. Ltd. v. Janssen Pharmaceutica, N.V.*, 989 F.3d 1375, 1383 (Fed. Cir. 2021)).

As discussed below, we were not persuaded by Patent Owner’s arguments that the merits of the Petition are weak. Patent Owner’s argument that Petitioner may challenge validity in a district court case of its own as an alternative to requesting an IPR does not impact our analysis because the *Fintiv* factors do not assume a preference for any particular jurisdiction for determining a challenge of validity. Rather, Petitioner’s choice of forum is a litigation decision that falls entirely within Petitioner’s prerogative.

Consequently, noting that we have found that at least one claim in the Petition meets the reasonable likelihood of prevailing and that Patent Owner’s arguments to the contrary were unpersuasive, we determine that factor six is neutral.

G. Balancing the Fintiv Factors

We have considered the circumstances before us in light of the *Fintiv* factors. Except for the second factor, the proximity of trial dates, all other factors are either neutral or weigh against exercising discretion. Altogether, balancing the factors, we decline to invoke our authority to deny the Petition on a discretionary basis under § 314(a).

III. ANALYSIS

A. Principles of Law

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)).

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which that subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations of nonobviousness when presented. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Person of Ordinary Skill in the Art (“POSA”)

In determining the level of skill in the art, we consider the problems encountered in the art, the art’s solutions to those problems, the rapidity with which innovations are made, the sophistication of the technology, and the

educational level of active workers in the field. *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986).

Petitioner contends:

A POSA would have at least a B.S. in mechanical engineering, electrical engineering, materials science engineering, or a related field, and four years of experience working with semiconductor fabrication processes and measurement techniques.

Pet. 18 (citing Ex. 1002 ¶ 29). Patent Owner does not dispute Petitioner's proposed level of skill in the art, for purposes of the Preliminary Response. Prelim. Resp. 34.

On the current record, Petitioner's proposal appears to be generally consistent with the level of skill reflected in the specification and in the cited prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining that specific findings regarding ordinary skill level are not required "where the prior art itself reflects an appropriate level and a need for testimony is not shown") (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)). Accordingly, we adopt Petitioner's proposed definition of the POSA level for purposes of this Decision.

C. Claim Construction

We interpret a claim "using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." 37 C.F.R. § 42.100(b) (2020). Under this standard, we construe the claim "in accordance with the ordinary and customary meaning of such

claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.*

Petitioner does not identify any claim terms that require construction. Pet. 15. Patent Owner does not dispute Petitioner’s assertion that no claim terms require construction, for purposes of the Preliminary Response. Prelim. Resp. 34.

We do not find it necessary to construe the claims at this stage of the proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))); *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy’”).

D. Overview of the Asserted Prior Art

1. Coronel (Exhibit 1006)

Coronel relates to a “[m]ethod and system for real-time in-situ interactive supervision of a step performed in a tool during [a] semiconductor wafer fabrication process.” Ex. 1006, code (57). In particular, Coronel describes monitoring process parameters in an end-point controller and comparing them with data in a database to identify process deviations. *Id.* ¶ 1. “If a process deviation is detected, an alert code is flagged to signal an alarm and the adequate action is immediately taken.” *Id.*

Figure 7 of Coronel (reproduced below) is a schematic showing an improved system for processing semiconductor wafers.

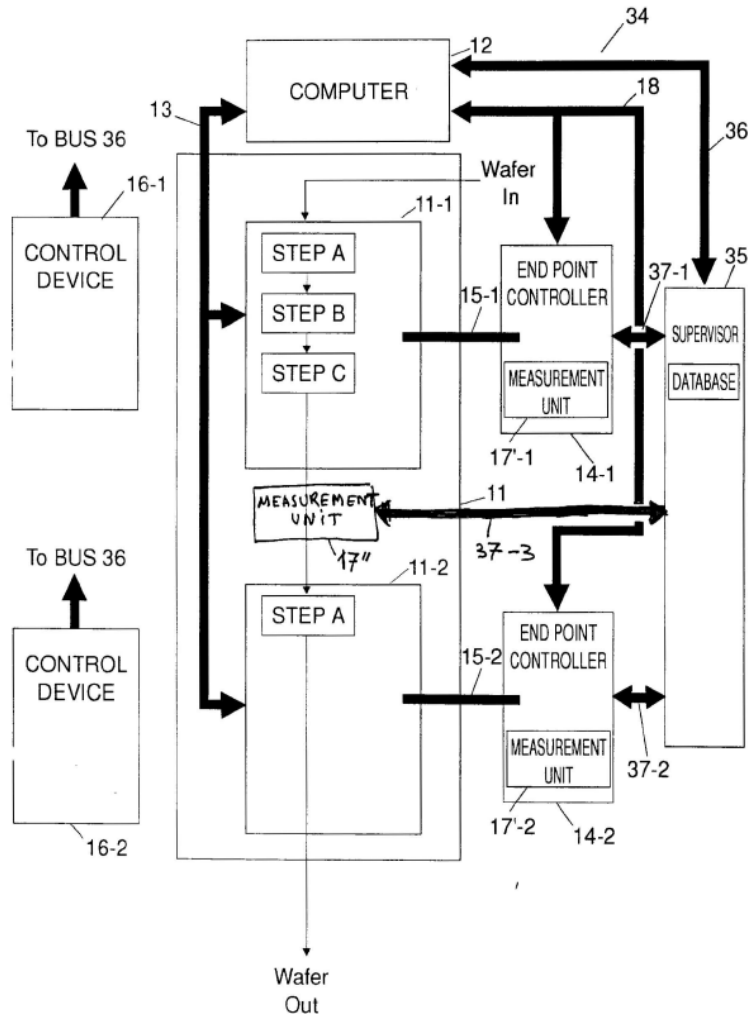


FIG.7

Figure 7 depicts a system with a measurement unit “internally mounted in an EPD [end-point detection] controller and/or in tool 11.” *Id.* ¶ 43. In one alternative, measurement unit 17’ “performs an indirect measurement (e.g. an etch rate) through the tool view-port.” *Id.* In another alternative, measurement unit 17” “performs direct measurement (e.g. a thickness) on the wafer before it enters in any of the chambers composing the multi-

chamber tool 11.” *Id.* “Measurement results are transmitted in real-time to supervisor 35,” which has “both computing and data storage capabilities.” *Id.* Supervisor 35 is connected to computer 12, where computer 12 “has the role of controlling the physical process parameters of tool 11 during the wafer processing while supervisor 35 is mainly interested by what happens to the wafer itself.” *Id.*

Figure 15 of Coronel (reproduced below) is a process flow for a wafer fabrication process.

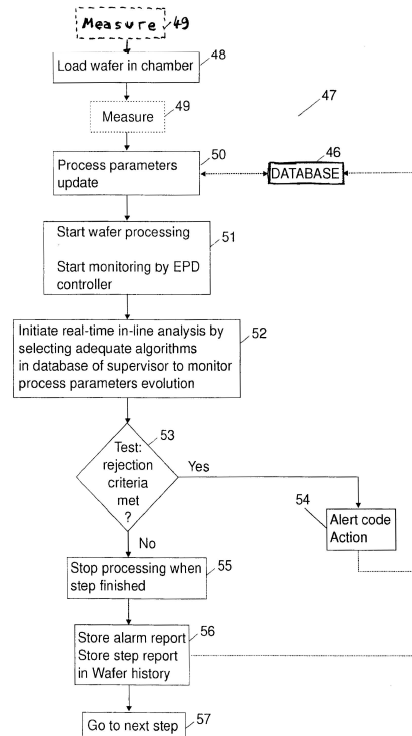


FIG.15

The process flow in Figure 15 begins at step 48 with loading a wafer into a tool chamber. *Id.* ¶ 53. Computer 12 downloads batch and process names, and, upon each wafer change, a wafer ID. *Id.* A measurement is performed by measurement unit 17’ or 17” at step 49, although this measurement could also be performed prior to loading the wafer. *Id.* At step 50, supervisor 35

stores the measurement in database 46 for immediate or subsequent use. *Id.* “Supervisor 35 may either use the measurement result or instead retrieve corresponding measurement data that were previously stored in database 46 to up-date (i.e. to change one or several process parameters for the said processing step (box 50).” *Id.* Wafer processing is initiated and the EPD controller is activated at step 51, and at step 52, “supervisor 35 starts the analysis of the selected process parameters by applying the adequate algorithms stored in the database to analyze the corresponding signals generated by the EPD controller according to the analysis rules stored in the database.” *Id.* At step 53, supervisor 35 tests whether any rejection criteria is met, and “[i]f an anomaly (i.e. a deviation) is detected, supervisor 35 provides an alert code to the computer 12, so that the adequate action can be immediately taken (step 54).” *Id.* Otherwise, “the step in consideration is continued until the end (step 55).” *Id.* “The alert code and the action to be taken constitute the so-called ‘alarm report’ (step 56).” *Id.*

2. Fox (Exhibit 1005)

Fox relates “to a technique of utilizing multivariate analysis for monitoring and controlling a plasma process” in semiconductor processing equipment. Ex. 1005, 1:9–12. In particular, Fox uses a “Hotelling’s T^2 analysis” (“a statistical method well known in the prior art” (*id.* at 4:7–9)) in which “[e]leven components of the RF spectra are measured and converted as input variables to the T^2 calculation” and “[a] software routine provides the necessary calculations to solve for Hotelling’s T^2 value.” *Id.* at 1:46–51.

Fox then uses the T^2 output “to determine if the plasma process is within an acceptable tolerance.” *Id.* at 1:52–53.

Figure 1 of Fox (reproduced below) is a block diagram showing equipment that can provide a multivariate analysis based on Hotelling’s T^2 analysis to control a plasma process.

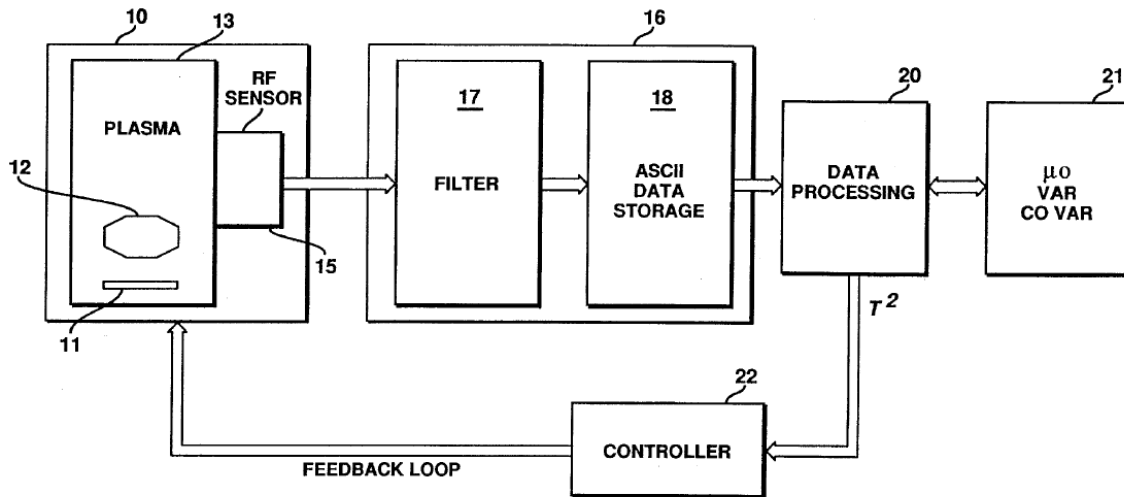


FIGURE 1

Figure 1 depicts plasma processing equipment, or tool, 10 in which wafer 11 is processed in reaction chamber 13. *Id.* at 2:35–37. In an embodiment, “tool 10 is a plasma etcher in which the plasma 12 in chamber 13 is utilized to etch one or more layers of wafer 11.” *Id.* at 2:39–41. A radio frequency (RF) sensor 15 measures RF properties in chamber 13. *Id.* at 2:50–52. Filter 17 separates raw data from sensor 15 into eleven components, which are stored in data storage memory 18. *Id.* at 2:67–32. Block 20 in Figure 1 includes a software program with the algorithm for calculating T^2 , and memory 21 stores certain values needed for the T^2 calculation. *Id.* at 5:52–57. After calculating T^2 based on the input values from memory 18, block

20 outputs this value to controller block 22, which “in essence, determines the value of the T^2 which is acceptable for a given process being run in tool 10.” *Id.* at 5:57–63. In particular, Fox describes that an acceptable range of values are determined by an upper control limit (UCL) and a lower control limit (LCL), where “[t]he ideal Hotelling’s T^2 values for a process are determined by running a number of samples and developing a baseline for that particular process.” *Id.* at 5:65–6:11. “The parameter(s) which are used to measure the test wafers to develop the T^2 values [are] a design choice,” and can include, for example, the “film thickness of the semiconductor layer being etched.” *Id.* at 6:29–33. “Once the baseline numbers have been stored in memory 18, the system is set up to control the ongoing process of a production wafer.” *Id.* at 7:5–7. During wafer processing, “[i]f the T^2 value is within the acceptable UCL/LCL range for the given ongoing process, the controller 22 allows the process to continue”; otherwise, “an out of tolerance signal is generated.” *Id.* at 7:13–17.

E. Obviousness over Coronel and Fox

Petitioner asserts that claims 1–17 are unpatentable as obvious over Coronel and Fox. Pet. 31–63. We provided an overview of the prior art above. Petitioner shows, based on this preliminary record, where each of the limitations of the challenged claims is disclosed in Coronel and Fox. *Id.* Petitioner’s assertions above are backed by the cited prior art and by the testimony of its declarant, Dr. Hatalis. *Id.*; *see also* Ex. 1003 ¶¶ 66–129. On this preliminary record, we determine that Petitioner’s arguments and evidence are sufficient for purposes of institution. We focus our discussion

on Patent Owner's arguments to provide guidance to the parties. Prelim. Resp. 34–45.

1. Patent Owner's argument that there is no motivation to combine Coronel with Fox

Patent Owner argues that there is no motivation to combine Coronel with Fox. Prelim. Resp. 34–36. More specifically, Patent Owner argues that “[a] POSITA would not be motivated to combine Coronel with Fox because Coronel already has the means by which to store and process data through its own computer memory; namely, Coronel discloses at least three such components, making the combination using Fox entirely redundant and unnecessary.” *Id.* at 35.

On the present record, we do not find Patent Owner's argument persuasive because Petitioner does not propose to add Fox's computer and data processing equipment to Coronol's system. Rather, Petitioner contends that it would have been obvious to implement Fox's teachings regarding multivariate T^2 analysis in Coronel's computer. Petitioner explains:

A POSA thus would have been motivated to adopt the teachings of Fox of using the data storage memory, data processing, and memory components in the computer or supervisor of Coronel to calculate a T^2 value for the operational state data received from each tool in the system for use in fault detection by the Coronel system. (Ex. 1002, ¶ 81.) By converting operational state data into the multivariate T^2 value in view of the teachings of Fox, a POSA would have further advanced the teachings of Coronel to improve the system's ability to detect various tool state deviations during wafer processing.

Pet. 40; *see also id.* at 39 (“Applying the techniques in Fox to improve the system in Coronel would have yielded the predictable result of utilizing the Coronel computer, which already receives process parameter data from the tools (including RF parameters) via data bus 13, to store the data and apply Hotelling’s T2 multivariate technique.”); 37 (“[B]ecause the techniques in Fox are implemented through a computer, they are readily adapted to the Coronel computer, database, and supervisor.”).

Moreover, on this record, Petitioner articulates sufficient reason to apply the teachings of Fox to Coronel. For example, Petitioner, relying on the testimony of Dr. Hatalis, contends that the POSA would have been motivated to apply Fox’s methodologies to Coronel “to improve process yield and remain competitive in an industry where profits are driven by reducing manufacturing defects.” Pet. 34 (citing Ex. 1002 ¶ 71). Petitioner also explains, with reference to Fox and to the testimony of Dr. Hatalis that “[m]ultivariate analysis of the RF measurement is particularly effective because it can indicate the process is out of acceptable range even when individual components are within range, and vice versa.” *Id.* at 36 (citing Ex. 1005, 3:45–67, 4:28–40; Ex. 1002 ¶ 74).

Accordingly, we are not persuaded that the fact that Coronel already has a computer deprives the POSA of reason to combine the teachings of Coronel and Fox.

2. Patent Owner's argument that the cited art does not teach or suggest sending the state data from the first interface to a data collection unit.

Patent Owner argues that the combination of Coronel and Fox does not teach “sending the state data from the first interface to a data collection unit,” as recited in claim 1. Prelim Resp. 37–39. Patent Owner explains:

Coronel's computer 12 does not gather or transmit process data to the supervisor and thus does not act as the first interface. In the system of Coronel, a different unit, the End Point Detection (“EPD”) controller, is responsible for performing measurements on a given process step (*Id.* at 18:13-18, 18:34-37.) The information generated by the EPD controller is then analyzed by the supervisor directly, ***bypassing the computer.***

Id. at 38. Thus, according to Patent Owner, “Coronel's computer 12 . . . cannot constitute as the claimed first interface because it does not play a role in transmitting process data to a fault detection unit.” *Id.*

On the present record, we do not find Patent Owner's arguments persuasive. As an initial matter, Patent Owner's arguments focus on Coronel in isolation without reference to how Petitioner contends Fox's teachings would be implemented in Coronel's computer. *See, e.g.*, Ex. 1002 ¶ 87 (testimony of Dr. Hatalis on following the teachings of Fox in Coronel's computer). Moreover, Coronel teaches that its computer “downloads the physical process parameters” including, for example, “gas flows, pressures, RF powers, temperatures and the like.” Ex. 1006, 2:42–46; *see also id.* 3:49–53 (“computer 12 checks all different physical process

parameters”).⁶ Coronel further teaches that its computer is connected to a supervisor via a bidirectional data bus. *Id.* at 13:24–26. In Coronel’s system the “computer 12 has the role of controlling the process parameters of tool 11 during the wafer processing while supervisor 35 is mainly interested by what happens to the wafer itself.” *Id.* at 13:41–45. Thus, on the present record, we are not persuaded by Patent Owner’s contention that “Coronel’s computer 12 does not gather or transmit process data to the supervisor and thus does not act as the first interface.” Prelim. Resp. 38.

We recognize that in the process flow depicted in Figure 15 and described in the text cited by Patent Owner, an “internal measurement unit . . . lodged in the EPD controller” performs a measurement and provides information directly to supervisor 35. Ex. 1006, 18:13–43; Fig. 15. On the present record, however, this does not persuade us that Coronel’s computer does not gather data or transmit data to the supervisor, because the portions of Coronel that we cited above say that Coronel’s computer does just that. In this regard, we note the possibility that both the EPD controller and Coronel’s computer may provide data to the supervisor. *See, e.g., id.* at 13:24–29 (describing the supervisor 35 as being connected to both the computer 12 and EPD controllers 14-1, and 14-2 by bidirectional data busses 36, 37-1, 37-2, and 37-3), 18:35–37 (explaining that “the EPD controller

⁶ Paragraphs 6 and 8 of Coronel describe a prior art systems, however, the description of the computer in those systems applies to Coronel’s system. Ex. 1006, 12:53–56 (teaching that identical elements in the “new system . . . shown in Fig.” “bear the same numeral” as those depicted in the “system of the prior art depicted in Fig. 2”).

(and/or any control device) that monitors this particular step [step 51 in Figure 15] is activated”).

3. Patent Owner’s argument that Coronel and Fox do not teach or suggest “translating the state data from a first communications protocol to a second communication protocol compatible with the fault detection unit”

Patent Owner argues that Coronel teaches a SEC II protocol “specifically designed for integrated circuit manufacturing” and Fox teaches the use of ASCII, “a different communications protocol.” Prelim. Resp. 39–40. Patent Owner argues that “Petitioner has not shown the translation of one communications protocol to another in either Coronel or Fox” and that “the addition of the ASCII protocol to Coronel would . . . render the supervisor 35 inoperable, as the data bus 36 is compatible with only SECS II and not with ASCII.” *Id.* at 40. Finally, Patent Owner contends that “the use of single protocol in the Fox and Coronel systems teaches away from translation of multiple protocols.” *Id.* at 41.

For the reasons discussed in Section III.E.1, we find that on the current record, Petitioner has articulated sufficient reason why the POSA would seek to apply the teachings of Fox to Coronel. The current record also supports that a POSA seeking to apply the teachings of Fox to Coronel would recognize that transmitting data from the computer to the supervisor using Coronel’s bidirectional data bus would require “translat[ing] the data from ASCII format or T₂ values from numeric data to the SECS II communications protocol.” Ex. 1002 ¶ 90 (presently unrebutted testimony of Dr. Hatalis). The present record further supports that it was “well-known

in the art how to transmit data in ASCII format or as numeric data via the SECS II communications protocol.” *Id.* (citing Ex. 1018, 172). Patent Owner’s argument that this would render Coronel inoperable may have merit, but, at this point in the proceeding, we credit the presently unrebutted testimony of Dr. Hatalis over Patent Owner’s attorney argument. *See Johnston v. IVAC Corp.*, 885 F.2d 1574, 1581 (Fed. Cir. 1989) (“Attorneys’ argument is no substitute for evidence.”); *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974).

As to Patent Owner’s argument that the use of a single protocol in Coronel and Fox teaches away from translation between protocols, Patent Owner does not identify any specific teaching in Coronel or Fox which discourages translation between protocols. Accordingly, the present record does not support that Coronel or Fox teaches away from translation. *See, DyStar Textilfarben GmbH & Co. Deutsch/and Kg v. CH Patrick Co.*, 464 F.3d 1356, 1364 (Fed. Cir. 2006) (“[M]ere failure to discuss immediate use of his leuco indigo solution for dyeing is not the same thing as Brochet stating in his article that ... his leuco indigo solution may only be concentrated in paste form. We will not read into a reference a teaching away from a process where no such language exists.”)

4. Patent Owner’s argument that Coronel and Fox do not disclose “sending the translated state data from the data collection unit to the fault detection unit”

Patent Owner argues that Petitioner incorrectly “identifies the ‘data collection unit’ of claim 1 as ‘data storage memory in the Coronel computer.’” Prelim. Resp. 42. According to Patent Owner “Coronel

actually discloses a separate unit for the collection of process data that is separate from the computer.” *Id.* More specifically, Patent Owner argues that Coronel’s “supervisor 35 stores the measurement result in data base 46 either for immediate or subsequent exploitation.” *Id.* (citing Ex. 1006, 18:22–25). Thus, according to Patent Owner, the cited art does not disclose “sending the translated data from the data collection unit to the fault detection unit,” as required by claim 1. On the present record, we do not find this argument persuasive.

As an initial matter, Patent Owner’s arguments focus on Coronel in isolation without regard to how Petitioner contends Fox’s teachings would be implemented in Coronel’s computer. *See, e.g.*, Ex. 1002 ¶ 87 (testimony of Dr. Hatalis on following the teachings of Fox in Coronel’s computer, explaining that Fox teaches that the data collection unit can be a memory storage device including a part of a hard disk in a personal computer). Moreover, the portion of Coronel cited by Patent Owner teaches that “[u]pon receipt of the measurement results, the supervisor stores the measurement result in a database 46 either for immediate or subsequent exploitation.” Ex. 1006, 18:22–25. On the present record, this does not persuade us that Coronel’s computer fails to act as a “data collection unit” because, as discussed above, the current evidence supports that Coronel’s computer collects data regarding various physical process parameters, and because Patent Owner does not direct us to persuasive evidence that the existence of database 46 precludes the computer from acting as a data collection unit.

5. Patent Owner's argument that Coronel and Fox do not disclose "sending a signal by the framework to the first interface reflective of the predetermined action"

Patent Owner argues that the proposed combination does not teach "sending a signal by the framework to the first interface reflective of the predetermined action," as recited in claim 1. Prelim. Resp. 42–43. According to Patent Owner, Petitioner's proof is deficient because "Petitioner identifies computer 12 of Coronel as both the APC framework and the first interface" and it is "simply illogical that the computer 12 of Coronel would send a signal *to itself* reflective of information that it already possesses." *Id.* at 42. Patent Owner further argues that "[n]othing in Coronel indicates that the computer 12 is divided into different portions." *Id.* We do not find this argument persuasive because we do not find it illogical that a computer would have different portions (for example, programs residing in memory) that interact with each other. As to Patent Owner's argument that Coronel does not indicate that its computer is divided into separate portions, for purposes of institution, Dr. Hatalis's presently un rebutted testimony—that the POSA would recognize that a portion of Coronel's computer acts as an APC and a portion of the computer acts as a first interface—is sufficient. *See, e.g.*, Ex. 1002 ¶¶ 56, 86, 101.

6. Conclusion

For the reasons discussed above, we find that the record sufficiently supports Petitioner's contention that Coronel and Fox render obvious claims 1–17 of the '402 patent.

IV. CONCLUSION

On this preliminary record, Petitioner has established a reasonable likelihood of prevailing in showing that at least one of the challenged claims is unpatentable based on the grounds advanced in the Petition.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *granted*, and we institute *inter partes* review of claims 1–17 based on the grounds asserted in this Petition;

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

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