UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte XUEJUN SHENG and WAYNE CATALFANO

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Appeal 2018-006974
Application 13/787,570
Technology Center 2100

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Before MARC S. HOFF, JAMES R. HUGHES, and
BETH Z. SHAW, *Administrative Patent Judges.*

HUGHES, *Administrative Patent Judge.*

DECISION ON REQUEST FOR REHEARING

Pursuant to 37 C.F.R. § 41.52, Appellant[1] filed a Request for
Rehearing[2] (Req. Reh'g) alleging a misapprehension or oversight by this
Board in a Decision on Appeal mailed September 30, 2019. In that
Decision, the Board affirmed the Examiner's rejection of claims 1, 5–9, 13–
17, and 21–33 under 35 U.S.C. § 101.

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[1] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R.
§ 1.42(a). Appellant identifies the real party in interest Autodesk, Inc. *See*
Appeal Br. 1.
[2] We refer to Appellant's Request for Rehearing ("Req. Reh'g") filed
November 27, 2019 and our Decision on Appeal ("Decision" or "Dec.")
mailed Sept. 30, 2019. We also refer to Appellant's Specification ("Spec.")
filed Mar. 6, 2013; Appeal Brief ("Appeal Br.") filed Jan. 18, 2018; and
Reply Brief ("Reply Br.") filed June 22, 2018. Additionally, we refer to the
Examiner's Final Office Action ("Final Act.") mailed June 19, 2017; and
Answer ("Ans.") mailed Apr. 25, 2018.

We have reconsidered our Decision. After reviewing the Appellant's contentions set forth in the Request for Rehearing, we are persuaded that the recent *Gemalto*[3] precedential opinion of the Federal Circuit necessitates a different outcome. Therefore, we grant the request to reconsider and modify our Decision.

CLAIMED SUBJECT MATTER

The invention "relates to computer-aided design (CAD) applications and, in particular, to computing boundary constraints for patching arbitrary curve networks." Spec. 1:4–5; *see* Spec. 1:28–3:7; Abstract. Claim 1 is independent. Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1.   A method implemented by a computer-aided design (CAD) system comprising one or more computers, the method comprising:
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> receiving a model representing a three-dimensional object in the CAD system, the model including a plurality of edges of a curve network, wherein the curve network includes one or more closed loops of edges, and wherein each respective closed loop of edges in the curve network represents a respective face of the object;
>
> determining, by the CAD system for a first end point of a particular edge of a face of the model, a first vector of a first adjacent edge of the face, wherein the first adjacent edge meets the particular edge at the first end point, and wherein the first vector represents an orientation of the first adjacent edge where the first adjacent edge meets the first end point of the particular edge;

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[3] *Koninklijke KPN NV v. Gemalto M2M GmbH*, 942 F.3d 1143 (Fed. Cir. 2019) ("*Gemalto*").

determining, by the CAD system for a second end point of the particular edge of the face of the model, a second vector of a second adjacent edge of the face, wherein the second adjacent edge meets the particular edge at the second end point, and wherein the second vector represents an orientation of the second adjacent edge where the second adjacent edge meets the second end point of the particular edge;

generating, by the CAD system, a first derivative field including sweeping the first vector of the first adjacent edge along the particular edge between the first end point and the second end point;

generating, by the CAD system, a second derivative field including sweeping the second vector of the second adjacent edge along the particular edge between the first end point and the second end point; and

generating, by the CAD system, boundary continuity constraints for the particular edge of the face by applying a blending function to respective components of the first derivative field and the second derivative field to generate a blended derivative field defining the boundary continuity constraints for the particular edge.

Appeal Br. 20–21 (Claims App.).

PRINCIPLES OF LAW

Requests for rehearing must comply with 37 C.F.R. § 41.52(a)(1), and "must state with particularity the points believed to have been misapprehended or overlooked by the Board." Arguments not raised in the briefs before the Board and evidence not previously relied on in the briefs also are not permitted in a request for rehearing except in limited circumstances set forth in 37 C.F.R. §§ 41.52(a)(2) through (a)(4). Under these limited circumstances, Appellant may present a new argument based on a recent relevant decision of either the Board or a federal court; new arguments responding to a new ground of rejection designated as such under

§ 41.50(b) and new arguments that the Board decision contains an undesignated new ground of rejection also are permitted. A Request for Rehearing is not an opportunity to rehash arguments raised in the Appeal Brief. Mere disagreement with the Board's Decision is not a proper basis for rehearing.

ANALYSIS

In the Request for Rehearing received September 30, 2019, Appellant contends the Board's Decision is not consistent with a recent precedential opinion of the Federal Circuit, and the Board misapprehended or overlooked certain arguments presented by Appellant. *See* Req. Reh'g 1–6. Specifically, Appellant contends that the Board's analysis "is inconsistent with" *Gemalto* because *Gemalto* "makes clear that a claim is eligible so long as it specifies <u>how</u> the technological improvement is achieved" and "the claims on appeal . . . capture the 'specific asserted improvement' by reciting *how* to generate continuity constraints in an improved way." Req. Reh'g 2 (quoting *Gemalto*, 942 F.3d at 1153). Appellant also contends that "[l]ike the process in [*Gemalto*], the claims of the present application recite a specific process that improves the relevant technology" and, according to *Gemalto*, the instant claims need not necessarily recite how the particular process (i.e., tool) is applied in the overall system. Req. Reh'g 3. Appellant further contends that the Board failed to address one of Appellant's arguments—that "the ordered combination of features" (i.e., the combination of features as a whole), which "generate boundary continuity constraints" is "unconventional in the art." Req. Reh'g 4; *see* Req. Reh'g 3–6. We have carefully reviewed the Decision in light of Appellant's allegations of error. We reconsider our decision in light of Appellant's Request for Rehearing

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and revise our Decision to reverse the Examiner's rejection of claims 1, 5–9,
13–17, and 21–33 under 35 U.S.C. § 101. Our reasoning follows.

Inconsistency with Gemalto

Appellant contends the Board's reasoning for affirming the
Examiner's rejection—that Appellant's "claims recite mathematical
concepts and calculations," but do not recite a "technological solution" or
explain "in the Specification" such a technological solution—is inconsistent
with *Gemalto*. Req. Reh'g 2 (quoting Dec. 17). Appellant explains that
Gemalto "makes clear that a claim is eligible so long as it specifies <u>how</u> the
technological improvement is achieved." Req. Reh'g 2 (citing *Gemalto*, 942
F.3d at 1153). Appellant further asserts that "the claims on appeal . . .
capture the 'specific asserted improvement' by reciting *how* to generate
continuity constraints in an improved way—namely, without having to solve
a global system of the curve network." Req. Reh'g 2 (quoting *Gemalto*, 942
F.3d at 1153).

> The Federal Circuit in *Gemalto* determined
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> that appealed claims 2–4 of the '662 patent are patent-eligible
> because they are directed to a non-abstract improvement in an
> existing technological process (i.e., error checking in data
> transmissions). By requiring that the permutation applied to
> original data be modified "in time," claim 2, which is
> incorporated into all appealed claims, recites a specific
> implementation of varying the way check data is generated that
> improves the ability of prior art error detection systems to detect
> systematic errors.

Gemalto, 942 F.3d at 1150. In particular, the Federal Circuit determined
that the "appealed claims require . . . 'vary[ing] original data,'" which is
provided to "the 'generating device' . . . to 'generate check data,'" where
"claim 1 specifies how the original data is varied by the varying device: by

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including a 'permutating device configur[e]d to perform a permutation' on the bits in each block making up 'said original data.'" *Gemalto*, 942 F.3d at 1151 (quoting claim 1 of the '662 patent). The Federal Circuit further concluded claim 2 of the '662 patent required that "the permutation applied to original data be modified 'in time,'" which "recites a specific implementation of varying the way check data is generated that improves the ability of prior art error detection systems to detect systematic errors." *Gemalto*, 942 F.3d at 1150 (quoting claim 2 of the '662 patent). That is, the claims recited a specific process—permutating data (rearranging data) and modifying the permutations in time—that improved an existing technology (error checking). In other words, the claim recites rearranging at least some bits of data in a block of data and then modifying the rearrangement in a time-dependent manner. *See Gemalto*, 942 F.3d at 1147–48 (quoting claim 1 and claim 2 of the '662 patent).

> Therefore, the Federal Circuit concluded the claims of the '662 patent
>
> specifically recite how this permutation is used (i.e., modifying the permutation applied to different data blocks), and this specific implementation is a key insight to enabling prior art error detection systems to catch previously undetectable systematic errors . . . [and, thus], we conclude that the appealed claims are not directed to an abstract idea because they sufficiently capture the specific asserted improvement in detecting systematic errors contributed by the inventors of the '662 patent.

Gemalto, 942 F.3d at 1153.

The Federal Circuit cautioned that to be patent eligible, claims must "sufficiently capture the inventors' asserted technical contribution to the prior art by reciting how the solution specifically improves the function of prior art" (*Gemalto*, 942 F.3d at 1151) and cannot merely recite abstract data manipulation. *See Gemalto*, 942 F.3d at 1151–53. In particular, *Gemalto*

analyzed several cases involving abstract data manipulation[4] and determined that

> [w]hile the claims in those cases were arguably related to advances in computer technology, none were limited to a specific improvement in computer functionality. Absent sufficient recitation of *how* the purported invention improved the functionality of a computer, the "improvement" captured by those claims was recited at such a level of result-oriented generality that those claims amounted to a mere implementation of an abstract idea on a computer, not the specific way to improve the functionality of a computer

(*Gemalto*, 942 F.3d at 1152).

Here, Appellant's claim 1 (and the other pending claims) recites performing a mathematical calculation—"generating . . . boundary continuity constraints for the particular edge of the face by applying a blending function to respective components of the first derivative field and the second derivative field to generate a blended derivative field defining the boundary continuity constraints for the particular edge" (claim 1 (Appeal Br. 20–21 (Claims App.))). *See* Dec. 10–12.

The recitation of applying a blending function to derivative fields to generate boundary continuity constraints that define an edge of a curve network for a three-dimensional object model in the CAD system specifically recites how the constraints are calculated and used. This specific implementation enables the CAD system to "generate continuity constraints in an improved way" "without having to solve a global system of

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[4] *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322, 1324 (Fed. Cir. 2017); *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1347–48, 1350–51 (Fed. Cir. 2014).

the curve network." Req. Reh'g 2. Thus, we are constrained by the Federal Circuit's reasoning in *Gemalto* to conclude that the appealed claims are not directed to an abstract idea because they sufficiently capture the specific asserted improvement in the prior art CAD system—calculating "[c]ontinuity constraints for each surface patch . . . independently using the curve network's local geometric information," which allows "features in [the] curve network [to] be constructed without having to solve a global system of the curve network" (Spec. 2:31–3:4). *See* Spec. 4:23–10:15.

Because we revise our Decision to reverse the Examiner's rejection of claims 1, 5–9, 13–17, and 21–33 under 35 U.S.C. § 101, we do not address Appellant's other contentions of error—that Appellant's claims "do[] not necessarily need to recite how [the particular process] is applied in the overall system" (Req. Reh'g 3 (emphasis omitted)), and that the Board did not address Appellant's arguments concerning "the ordered combination of features" being "unconventional in the art" (Req. Reh'g 4). Appellant has established that the Federal Circuit's recent *Gemalto* opinion is relevant to our Decision, that the appealed claims sufficiently capture the specific asserted improvement in the prior art CAD system and, accordingly, our Decision is not consistent with the reasoning in *Gemalto*. Therefore, *Gemalto* necessitates we revise our Decision and reverse the Examiner's rejection of claims 1, 5–9, 13–17, and 21–33 under 35 U.S.C. § 101.

CONCLUSION

For the reasons discussed above, we find Appellant's arguments persuasive that *Gemalto* necessitates we revise our Decision and reverse the Examiner's decision rejecting claims 1, 5–9, 13–17, and 21–33 under 35 U.S.C. § 101.

In view of the foregoing discussion, we grant Appellant's Request for Rehearing. We revise our Decision and reverse the Examiner's decision rejecting claims 1, 5–9, 13–17, and 21–33 under 35 U.S.C. § 101.

DECISION SUMMARY

Outcome of Decision on Rehearing:

Claims	35 U.S.C. §	Reference(s)/ Basis	Denied	Granted
1, 5–9, 13–17, 21–33	101	Eligibility		1, 5–9, 13–17, 21–33

Final Outcome of Appeal after Rehearing:

Claims	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1, 5–9, 13–17, 21–33	101	Eligibility		1, 5–9, 13–17, 21–33

REQUEST FOR REHEARING – GRANTED