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District Court Granted Judgment on the Pleadings Because the Patents Recited Patent-Ineligible Mathematical Techniques Executed in an Aircraft Flight Control System

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Plaintiff Wisk Aero sued Archer Aviation for infringing U.S. Patent Nos. 10,370,099 and 11,034,441. The patents are directed to an "online optimization-based flight control system." Claim 1 of the '099 patent recites a method of controlling flight of an aircraft by receiving inputs associated with a set of "forces and moments" (movements the aircraft can make), and computing an "optimal mix of actuators" and associated parameters by "minimizing a weighted set of costs," including costs from errors if a rotor fails. Claim 1 of the '441 patent recites an aircraft in which a flight controller and sensors perform a calculation to determine the "solution space" of all possible solutions to the algorithm and then selects the best from among them after excluding solutions that do not factor in that an error has occurred.

The court analyzed eligibility using the Supreme Court's two-step *Alice* framework. In step one, a court determines whether the claims are "directed to a patent-ineligible concept," such as an abstract idea. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 217 (2014). If they are, the court proceeds to step two and considers "the elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." *Id.*

The '099 Patent

Addressing *Alice* step one for the '099 patent, the court found that the focus of the claimed advance over the prior art is the minimization of the weighted set of costs, including costs of

errors. The claimed method receives inputs and computes an "optimal mix" of actuators and parameters. According to the court, this advance is simply a mathematical technique that could be performed in the human mind or, in Wisk's framing, an improvement to such a technique. The court noted that the Supreme Court and Federal Circuit have repeatedly held that mathematical techniques are not patentable.

The court found that the claims were similar to claims invalidated in *In re Board of Trustees of Leland Stanford Junior University*, 991 F.3d 1245 (Fed. Cir. 2021). In *Stanford*, the claims recited a method that received information and employed a mathematical technique to compute parameters. Wisk argued that the claims "recite the novel solution of including error as a weighted cost in a cost function." The court determined, however, that including a new mathematical step in a computational technique is patent-ineligible subject matter—it does not matter that the mathematical technique was better than previous ones.

Wisk also relied on *Thales Visionix Inc. v. United States*, 850 F.3d 1343 (Fed. Cir. 2017), in which the asserted claims utilize mathematical equations. The court distinguished *Thales* because the Federal Circuit found that the claims focused on the "particular arrangement of sensors" and that the advance over the prior art was the placement of sensors in combination with the equation, not the underlying mathematical technique alone. In contrast, Wisk does not contend that the point of novelty is the actuators or another aspect of the technology. Rather, the focus of the claims over the prior art is minimizing the weighted costs, which is ineligible.

Addressing *Alice* step two, the court decided that "each mathematical technique is … carried out solely by generic components performing their conventional functions," and that the claims are "entirely ends-oriented and use only functional language." The court further reasoned that claim 1 recites that it "receives" information and "computes" in a particular way, but does not explain any technical requirements of how these steps occur. Wisk argued that the inventive step is "taking the … error[] between the requested force or moment and the calculated achievable force or moment and factoring that error into the analysis as a cost to be minimized." The court agreed, but found that this is "nothing more than a mathematical step."

The '441 Patent

Addressing *Alice* step one for the '441 patent, the court found that the claimed advance over the prior art is "a flight controller" that is configured to (1) "receive flight control inputs"

corresponding to a set of forces and moments; (2) "monitor" sensor data to determine whether any of the lift fans has a failure induced reduced capacity; (3) if there is such a failure, determine a "solution space"; and (4) "determine" a combination of actuators and associated parameters to apply the set of forces and moments to the aircraft to an extent practicable. The court decided that the claim is directed to an abstract mathematical technique—i.e., the use of a solution space that takes into account that a lift fan has failed. The court noted that modeling a solution space is the result of a mathematical technique that can be performed in the human mind.

Addressing *Alice* step two, the court recognized that the '441 patent recites a physical device —an aircraft and its component flight controller. Citing *Yu v. Apple Inc.*, 1 F.4th 1040 (Fed. Cir. 2021), however, the court found that "the analysis focuses on the **advance** over the prior art." The court explained that the point of novelty is selecting an optimal solution from a "solution space," not the claimed physical components themselves. The court further found that, like in the '099 patent, the claims are entirely ends-oriented and use only functional language.

Wisk argued that what "adds significantly to the mere concept of computing a set of outputs" is that the claims are directed to a specific application. The court concluded, however, that "merely reciting an 'aircraft' and 'flight controller' without more are generic and conventional components that are there only to perform the abstract idea without adding anything substantial." Quoting *Alice*, the court further reasoned that "the prohibition against patenting abstract ideas cannot be circumvented by attempting to limit the use of the idea to a particular technological environment."

Practice Tip: Patent Owners should avoid describing and claiming the advance over the prior art in purely functional terms, in a result-oriented way that amounts to encompassing the abstract solution no matter how implemented. Instead, Patent Owners should describe and claim technical details for tangible components in the claimed system, showing that such components are technologically innovative and not generic. For computer-implemented inventions, this may include a specific set of computer digital structures to solve a specific computer problem.

Wisk Aero LLC v. Archer Aviation Inc., No. 3:21-cv-02450 (N.D. Cal.).

Categories

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