In the United States Court of Federal Claims

No. 96-166 C

(Originally Filed: December 16, 2010)
(Released for Publication: January 24, 2011) [1]

ZOLTEK CORPORATION, Plaintiff, v. **THE UNITED STATES**, Defendant, and **LOCKHEED MARTIN CORPORATION**, Third-Party Defendant.	Patent infringement; patent invalidity; admissibility of expert testimony; motion for summary judgment; obviousness of patent claims; *Graham* factual inquiries; reason to combine prior art references; reasonable expectation of success; secondary indicia

Martin M. Green, Green Jacobson, P.C., Clayton, MO, with whom were *Joe D. Jacobson*, of Counsel, and *Phillip C. Boyd*, of Counsel, for Plaintiff.

Gary L. Hausken, Commercial Litigation Branch, Civil Division, United States Department of Justice, Washington, DC, with whom were *Tony West*, Assistant Attorney General, *John Fargo*, Director, and *David M. Ruddy*, of Counsel, for Defendant.

Richard T. Ruzich, Duane Morris LLP, Chicago, IL, for Third-Party Defendant.

[1] This opinion was originally issued under seal on December 16, 2010, pending a determination among the parties whether to propose redactions of proprietary or other confidential information. The parties have advised the Court that they have no redactions to propose.

OPINION AND ORDER

DAMICH, Judge.

In this patent infringement suit, Zoltek Corporation ("Zoltek") alleges that the Government, through the Department of the Air Force, caused the manufacture of carbon fiber sheet or mat products that infringe United States Patent No. Reissue 34,162 ("the '162 patent" or "the Patent"), belonging to Zoltek. The case is now before the Court on the Government's Motion for Summary Judgment, along with cross-motions to strike expert testimony and reports. In its Motion for Summary Judgment, the Government argues that the '162 patent's method claims are invalid due to obviousness. The Government has also moved to strike the testimony of one of Zoltek's experts, Zsolt Rumy. On its part, Zoltek has moved to strike the Government's expert testimony of Dr. Brian Sullivan and his expert report.

The motions to strike expert testimony are denied because the Court finds that the experts are qualified in the relevant art and that their reports, where applicable, provide reliable and relevant information to aid the Court in determining patent infringement and invalidity. The Government's motion for summary judgment is denied because there are genuine issues of material fact as to the factual inquiries underlying a legal determination of obviousness of the Patent**,** and there are legal arguments insufficiently developed and/or unjoined by the parties in their briefs.

I. BACKGROUND

The factual background of this suit is set out at length in several prior Opinions. *Zoltek Corp. v. United States*, 86 Fed. Cl. 738, 739-42 (2009); 85 Fed. Cl. 409, 411 (2009); 71 Fed. Cl. 160, 161-64 (2006); 61 Fed. Cl. 12, 14-15 (2006); 58 Fed. Cl. 688, 689-91 (2003); 51 Fed. Cl. 829, 830-32 (2002); 48 Fed. Cl. 290, 292 (2000). A brief overview is provided in this section and additional information on the Patent relevant to the issue of obviousness, now before this Court, is included *infra* Section III.A.

The '162 patent describes a process for manufacturing carbon fiber sheet products with controlled surface electrical resistivity. *Zoltek Corp. v. United States*, 48 Fed. Cl. 290, 292 (2000). Under this process, a manufacturer can determine the level of surface electrical resistivity necessary for a particular application, and then create carbon fibers with that preselected level of resistivity by partially carbonizing a fiber starting material for a certain period of time at a given temperature between 370 and 1300 degrees Centigrade. *Id.* at 293. The fibers are then incorporated into a sheet product which takes on the resistive properties of the constituent fibers. *Id.* at 296. As this Court noted in its claim construction decision, "[t]he essence of the invention is the relation between the partial carbonization of the single carbon fiber and the electrical resistivity of the sheet product which incorporates the partially carbonized single fibers." *Id.*

Zoltek alleges that a process used by or for the Government to produce silicon carbide fiber mats[2] and preimpregnated materials[3] incorporated into certain aircraft infringes the '162 patent and seeks compensation under 28 U.S.C. § 1498(a). *Zoltek Corp. v. United States*, 51 Fed. Cl. 829, 831 (2002). In September 2007, the Government moved for summary judgment that the '162 patent is invalid as obvious under 35 U.S.C. § 103(a). Following a determination that summary judgment was not precluded by the Government's invocation of the state secrets privilege, *Zoltek Corp. v. United States*, 86 Fed. Cl. 738, 739 (2009), briefing resumed regarding the Motion for Summary Judgment and the Court will now decide the Motion on its merits. The Court will first address each party's motion to strike an expert's testimony, and where applicable, the expert's report.

II. THE PARTIES' MOTIONS CHALLENGING ONE ANOTHER'S EXPERTS

The admissibility of expert testimony is governed by Federal Rule of Evidence 702, which states:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Fed. R. Evid. 702. The Rule 702 inquiry is "a flexible one," *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 594 (1993), left to the sound discretion of the trial court. *See Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1360 (Fed. Cir. 2008) (quoting *Acoustical Design, Inc. v. Control Elecs. Co.*, 932 F.2d 939, 942 (Fed. Cir. 1991)); *see also* Fed. R. Evid. 104(a) ("Preliminary questions concerning the qualification of a person to be a witness . . . shall be determined by the court."). The party attempting to introduce the expert's testimony into evidence ("the proponent") has the burden of proving that individual's qualifications under Rule 702 by a preponderance of the evidence. *See* Fed. R. Evid. 702, Advisory Committee Notes for 2000 Amendments (citing *Bourjaily v. United States*, 483 U.S. 171, 175, 178-79 (1987)).

While the court may require that an expert witness be "a member of a particular profession," in order for her to be deemed qualified, generally it is not necessary for an individual to be "a specialist in a particular branch of a discipline or profession." Kenneth S. Broun, 1 McCormick on Evidence § 13 (6th ed. 2006). Accordingly, "[i]f an expert is qualified to testify about a subject generally and has had training in the subject matter at issue, then the expert may offer an opinion." *Raytheon Co. v. United States*, No. 05-448, 2009 WL 1373959, at

[2] "A mat is a fibrous reinforcing material comprised of chopped or swirled filaments bound in order to maintain form. Mat products are typically available in blankets of various weights and sizes." *Zoltek Corp. v. United States*, 51 Fed. Cl. 829, 831 n.1 (2002).

[3] A preimpregnated material ("prepreg") is "a material typically used in the manufacture of high performance composites." *Id.* at 831 n.2.

*1 (Fed. Cl. May 13, 2009) (citing *Pineda v. Ford Motor Co.*, 520 F.3d 237, 245 (3d Cir. 2008)); *see also Holbrook v. Lykes Bros. S.S. Co.*, 80 F.3d 777, 782 (2d Cir. 1996) (noting a "liberal approach to admitting expert testimony" and holding that such testimony may be admissible even where the individual is not the best qualified professional available); *In re Paoli R.R. Yard PCB Litig.*, 916 F.2d 829, 855 (3d Cir. 1990) ("insistence on a certain kind of degree or background is inconsistent with our jurisprudence in this area. The language of Rule 702 and the accompanying advisory notes make clear that various kinds of 'knowledge, skill, experience, training, or education' qualify an expert as such."); *Dairyland Power Coop. v. United States*, No. 04-106, 2008 WL 5122339, at *10 (Fed. Cl. June 20, 2008) ("An expert need only be qualified and need not be the best and the brightest for the testimony to be admissible."). Challenges to "the extent of an expert's specialized knowledge in a field" will ordinarily be relevant only to "the weight of the expert's testimony, not to its admissibility." *Raytheon*, 2009 WL 1373959 at *1 (citing *DaSilva v. Am. Brands, Inc.*, 845 F.2d 356, 361 (1st Cir.1988); *Pineda*, 520 F.3d at 245-46).

In addition to ensuring that an expert is qualified under Rule 702, the Court must also ensure that the expert's testimony is reliable and relevant. *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 141 (1999) (the role of the court is to act as a "gatekeeper," in order to "ensur[e] that an expert's testimony both rests on a reliable foundation and is relevant" to the proceedings); *see also Daubert*, 509 U.S. at 597; *Dairyland*, 2008 WL 5122339 at *10; *Banks v. United States*, 78 Fed. Cl. 603, 618 (2007). In this case, neither party questions the relevance of the expert testimony in question.

The issue of reliability pertains to the question of whether the expert's "reasoning or [the] methodology underlying the testimony is scientifically valid . . . [and] whether that reasoning or methodology properly can be applied to the facts in issue." *Daubert*, 509 U.S. at 592-93. The Supreme Court in *Daubert* set out a five-factor, non-dispositive, "flexible" test to aid in this assessment: trial courts should consider (1) whether the theory or technique can be or has been tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the known or potential rate of error of a given scientific technique; (4) the existence and maintenance of standards controlling the operation of a given scientific technique; and (5) general acceptance within the scientific community. *Id.* at 593-94. In this "flexible" analysis, the goal is to ensure "the scientific validity and thus the evidentiary relevance and reliability of the principles that underlie a proposed submission." *Id.* at 594-95. This analysis need not determine that the expert testimony represents incontrovertible, iron-clad proof of the position asserted, but merely that the contentions rest on "good grounds." *See Liquid Dynamics v. Vaughn Co., Inc.*, 449 F.3d 1209, 1221 (Fed. Cir. 2006) (quoting *In re TMI Litig.*, 193 F.3d 613, 692 (3d Cir. 1999)). Once the court is satisfied that such grounds exist, the expert's testimony should be admitted into evidence and "tested by the adversary process." *Id.*

A. Zoltek's Motion to Strike the Declaration of the Government's Expert, Dr. Brian Sullivan, is Denied[4]

Zoltek moves to strike the declaration of Dr. Sullivan on the grounds that Dr. Sullivan is not a qualified expert, that his report is unreliable, and that it does not comply with Rule 26 of the Rules of the United States Court of Federal Claims ("RCFC").

The Court finds that Dr. Sullivan is qualified to serve as an expert here. As the Government highlights, Dr. Sullivan has extensive education and professional experience in the areas of carbon fiber and carbon composite materials.[5] Def.'s Opp'n Expert Test. 4-5. Zoltek argues, however, that this background is insufficient to qualify Dr. Sullivan to testify as an expert in the present case "given the absence of any work involving the electrical properties of carbon fibers." Pl.'s Reply Expert Test. 3. This argument mirrors one rejected in *Raytheon Co. v. United States*, No. 05-448, 2009 WL 1373959, at *1, (Fed. Cl. May 13, 2009), where the plaintiff sought to disqualify the Government's actuarial expert on the grounds that he admittedly was not an expert in the particular actuarial technique ("cost accounting standards") at issue and "had no hands-on experience in applying" that technique. *Id.* The *Raytheon* court was not persuaded by that argument, noting that "[i]f an expert is qualified to testify about a subject generally and has had training in the subject matter at issue, then the expert may offer an opinion. *Id.* (citing *Pineda*, 520 F.3d at 245). The same result is appropriate here. Regardless of Dr. Sullivan's experience with electrical properties of carbon fibers, his substantial experience with carbon fibers establishes his qualification to serve as an expert in this case.

As for its reliability, Dr. Sullivan's testimony exhibits several of the criteria identified in *Daubert.* As one example, Figure 41 of Dr. Sullivan's report plots a "Comparison between calculated and measured surface resistivity of 0.5 oz/yd^2 carbon fiber sheet product as a function of single carbon filament heat treatment temperature." Def.'s Mot. Summ. J. Claims 1-22 and 33-38 of Patent No. Re 34,162 Obvious ("Def.'s MSJ") Ex. 2 A65. This graph demonstrates that the methodology described in the report, a calculation of the electrical surface resistivity of the carbon fiber sheet product, can be and has been subjected to scientific testing, the results of which are indicated in Figure 41, thereby satisfying the first *Daubert* factor. 509 U.S. at 593. In addition, the entire report is extensively footnoted with citations and references to scholarly

[4] The relevant filings in the case docket are: (1) Plaintiff's Motion to Strike the Government's Expert Dr. Brian Sullivan and His Expert Report ("Pl.'s Mot. Expert Test."); (2) Plaintiff's Brief in Support of its Motion to Strike the Government's Expert Dr. Brian Sullivan and His Expert Report ("Pl.'s Br. Mot. Expert Test."); (3) Opposition to Plaintiff's Motion to Strike the Government's Expert Dr. Brian Sullivan Ph.D. and His Expert Report ("Def.'s Opp'n Expert Test."); and (4) Plaintiff's Response to the Government's Opposition to Motion to Strike Expert Witness Sullivan and His Expert Report ("Pl.'s Reply Expert Test").

[5] Dr. Sullivan received a B.E. from Villanova University (Department of Civil Engineering) in 1974; a M.S. from the University of Pennsylvania (Department of Civil and Urban Engineering) in 1975; and a Ph.D. from the University of Pennsylvania in Mechanical Engineering and Applied Mechanics in 1979. In addition, Dr. Sullivan took graduate courses in textile engineering at Philadelphia University in 2000. Since receiving his doctorate, Dr. Sullivan has served as an Adjunct Professor in Villanova University's Department of Mechanical Engineering. Dr. Sullivan's work experience in the areas of carbon fibers and/or carbon composite materials includes serving as Director and Co-Owner of Materials Research and Design, Inc. and as principal engineer and program manager on multiple aerospace vehicle programs. Dr. Sullivan's work has been published extensively. *See* Resume of Brian J. Sullivan, Def.'s MSJ Ex. 2 A79-90.

works, suggesting, at least in a cursory fashion, the general acceptance of the methodology described in the report (the fifth *Daubert* factor). This is not to say that some of Zoltek's objections to the report may not be well founded, but merely that the report meets the requisite threshold level of scientific rigor beyond which its merits are properly tested by the adversarial process.

Finally, the Court finds no merit in Zoltek's argument that Dr. Sullivan's report fails to comply with the Rules of the United States Court of Federal Claims ("RCFC"). Zoltek argues that the report fails to comply with the disclosure requirements outlined in RCFC 26(a)(2)(B). RCFC 26, which requires that expert testimony be accompanied by a written report including, inter alia, "a complete statement of all opinions the witness will express and the basis and reasons for them; [and] the data or other information considered by the witness" as a basis for forming the opinions expressed. RCFC 26(a)(2)(B). The intent of the rule is as follows:

> Paragraph (2)(B) requires that persons retained or specially employed to provide expert testimony . . . must prepare a detailed and complete written report, stating the testimony the witness is expected to present during direct examination, together with the reasons therefor. The information disclosed under the former rule in answering interrogatories about the "substance" of expert testimony was frequently so sketchy and vague that it rarely dispensed with the need to depose the expert and often was even of little help in preparing for a deposition of the witness . . . [Under the revised rule, t]he report is to disclose the data and other information considered by the expert and any exhibits or charts that summarize or support the expert's opinions.

Fed. R. Civ. P. 26, Advisory Committee Notes, 1993 Amendments, reprinted in West, Federal Judicial Procedure and Rules, at 161 (2005) (quoted in part in *Sparton Corp. v. United States*, 77 Fed. Cl. 1, 4 (2007)).[6]

If a party fails to comply with the disclosures mandated by the rule, "the party is not allowed to use that information or witness to supply evidence on a motion, at a hearing, or at a trial, unless the failure was substantially justified or is harmless." RCFC 37(c)(1). A mere venial failure to disclose each and every source or authority, however, normally is insufficient to trigger the sanctions contained in Rule 37, absent some showing by the opposing party of harm or prejudice. *See, e.g.*, *Sparton*, 77 Fed. Cl. at 5 (holding that an expert report which "does not provide much depth . . . and does not offer any supporting documents or cases," nonetheless complied with Rule 26 given that it was "not so sketchy and vague that it would be of little help to Defendant in preparing for [the expert's] deposition," and "Defendant has not been prejudiced by the deficiencies in the report"); *Banks*, 75 Fed. Cl. at 298 (denying a motion to strike an expert report absent a showing of prejudice); *Alost v. United States*, 73 Fed. Cl. 480, 504 (2006) (declining to exclude an expert report where failure to comply with Rule 26 was harmless).

[6] RCFC 26 is "substantially identical" to Fed. R. Civ. P. 26 and should be interpreted accordingly. *Gruber ex rel. Gruber v. Sec'y of Health and Human Servs.*, 91 Fed. Cl. 773, 794 (2010) (quoting *Sparton Corp. v. United States*, 77 Fed. Cl. 1, 4 n.4 (2007)).

Zoltek asserts that Sullivan's testimony does not comply with the disclosure requirements of RCFC 26(a)(2)(B) because the report does not disclose the equations Dr. Sullivan allegedly relied upon from two references.[7] Pl.'s Br. Mot. Expert Test. 9. Consequently, Zoltek argues, the report must be excluded under RCFC 37(c)(1). However, RCFC 26(a)(2)(B) requires only that an expert witness provide "a complete statement of all opinions the witness will express and the basis and reasons for them; [and] the data or other information considered by the witness." The Advisory Committee notes to the 1993 revision to the rule reiterate that the report need only disclose "the data and other information considered by the expert." Fed. R. Civ. P. 26, Advisory Committee Notes. By citing to the scholarly works containing the equations he relied on, thereby providing Zoltek with the data and information he considered while preparing his report, Sullivan has complied with the letter of the rule. Def.'s MSJ Ex. 2 A78. The testimony is not "sketchy" or "vague" in the manner that the rule was intended to forbid, Fed. R. Civ. P. 26, Advisory Committee Notes; indeed, the Rosen cite (though not the Hashin one) lists the page numbers where the referenced equation can be located. Def.'s MSJ Ex. 2 A78. The report adequately lists the supporting documents, but merely fails to go the extra step of listing the equations detailed therein. Failure to take that additional step is insufficient to constitute non-compliance with the rule.

Even if the report's failure to list the equations at issue were to constitute non-compliance with RCFC 26(a)(2)(B), Zoltek's argument to exclude the report under RCFC 37(c)(1) is unavailing absent some showing of harm or prejudice resulting from the omission. *See Banks*, 75 Fed. Cl. at 298; *Alost*, 73 Fed. Cl. at 504. Zoltek, fatally, advances no claims of harm or prejudice, and fails to even address the issue. *See generally* Pl.'s Mot. Expert Test.; Pl.'s Reply Expert Test. Indeed, the Government asserts, and Zoltek does not challenge, that the equations at issue were used in Zoltek's own expert report—and therefore available and known to them—undercutting any potential harm or prejudice resulting from the omission of the equations in Sullivan's report. *See* Def.'s Opp'n Expert Test. 11; *see generally* Pl.'s Reply Expert Test. Dr. Sullivan is qualified as an expert and his expert report is reliable and consistent with the RCFC 26. Zoltek's Motion to Strike the Government's Expert Dr. Sullivan and His Expert Report is denied.

B. The Government's Motion to Preclude Expert Testimony by Zsolt Rumy Is Denied[8]

The Government argues in like manner that Mr. Zsolt Rumy is not qualified as an expert and that his testimony is unreliable. Def.'s Reply Expert Test. 1. The Court finds that Mr. Zsolt

[7] Zoltek also objects to Sullivan's use of a textbook, R.M. Christensen, *Mechanics of Composite Materials* (1979), during his deposition to identify the equations at issue. Pl.'s Br. Mot. Expert Test. 9. This book merely represents an independent, additional source detailing the equations sought by Zoltek, not source materials necessarily relied upon by Dr. Sullivan in the preparation of his report. As a result, Sullivan was not obliged to include the book among the citations in his report, and this objection lacks merit.

[8] The relevant filings in the case docket are: (1) Motion to Preclude Expert Testimony by Zsolt Rumy ("Def.'s Mot. Expert Test."); (2) Zoltek's Response to Defendant's Motion to Strike Expert Testimony of Zsolt Rumy ("Pl.'s Opp'n Mot. Expert Test."); and (3) Reply of the United States with Respect to its Motion to Preclude Expert Testimony by Zsolt Rumy ("Def.'s Reply Expert Test.").

Rumy is qualified to serve as an expert here and that his testimony would meet the reliability standard of Federal Rule of Evidence 702.

Mr. Rumy obtained a degree in chemical engineering from the University of Minnesota in 1966. Def.'s Mot. Expert Test. A1. In 1975, he founded Zoltek, where he continues to serve as Chief Executive Officer. *Id.*; Def.'s Mot. Expert Test. 2. Zoltek has been in the specialty-carbon-fibers business at least since 1988, when it purchased Stackpole Fibers, a specialty carbon fiber manufacturer. Def.'s Mot. Expert Test. A1. It appears to the Court that over the course of his career Mr. Rumy has developed the type of "specialized knowledge" that may assist the Court in "understand[ing] the evidence or [] determin[ing] a fact in issue. Fed. R. Evid. 702.

The Government attacks Mr. Rumy's reliability, arguing that his opinions are biased. The Government points out that Mr. Rumy receives substantial annual compensation from Zoltek and owns more than 17% of the company's outstanding stock. Def.'s Mot. Expert Test. 3. However, the Government does not direct the Court to any legal precedent supporting the notion that Mr. Rumy should not be allowed to testify as an expert simply because he has an interest in the outcome of this case. While financial interests may certainly factor into the credibility afforded to any witness, the Court does not believe that Mr. Rumy's financial interest in Zoltek renders him ineligible to serve as an expert witness in the company's case.

The Government goes on to complain that Mr. Rumy has not provided sufficient detail about his knowledge of the carbon fiber industry. *E.g.*, Def.'s Reply Expert Test. 8 ("Mr. Rumy never identifies where he *gained any knowledge* of the carbon fiber arts prior to his arrival on the scene in 1988."). The Court does not find persuasive the Government's arguments that Mr. Rumy's testimony is not reliable because, in the Government's words, "Mr. Rumy has not identified any source for the knowledge that he applied." *Id.* It is clear to the Court that Mr. Rumy is offered as an expert based on the knowledge he has accumulated over many years working in the industry. While the Court may take into account Mr. Rumy's financial interests and the extent to which his testimony is supported by verifiable citations, the Government's arguments do not provide a basis for the Court to exclude Mr. Rumy's expert testimony entirely. Accordingly, the Court denies the Government's Motion to Preclude Expert Testimony by Zsolt Rumy.

III. THE GOVERNMENT'S MOTION FOR SUMMARY JUDGMENT BASED ON OBVIOUSNESS[9]

The Court next addresses the Government's Motion for Summary Judgment on the basis that the claimed invention is obvious. The Court first reviews the Patent's claimed invention and prior art references relevant to the parties' arguments.

[9] The relevant filings in the case docket are: (1) Defendant's Motion for Summary Judgment that Claims 1-22 and 33-38 of Patent No. Re 34,162 Are Obvious ("Def.'s MSJ"); (2) Zoltek's Memorandum in Opposition to Defendant's Motion for Summary Judgment that Claims 1-22 and 33-38 of Zoltek's U.S. Patent Number Re: 34,162 Are Obvious ("Pl.'s Opp'n MSJ"); (3) United States' Reply to Plaintiff's Opposition to its Motion for Summary Judgment that Claims 1-22 and 33-38 of Patent No. Re 34,162 Are Invalid for Obviousness ("Def.'s Reply MSJ").

A. Background of the ’162 Patent

1. Claimed Invention

The ’162 patent discloses methods for manufacturing controlled surface resistance carbon fiber sheet products. As this Court has previously stated: “The essence of the invention is the relation between the partial carbonization of the single carbon fiber and the electrical resistivity of the sheet product which incorporates the partially carbonized single fibers.” *Zoltek v. United States*, 48 Fed. Cl. 290, 296 (2000). The Government’s obviousness argument is directed at the related method claims (claims 1 through 22 and 33 through 38).[10]

2. Prior Art References

The parties’ arguments make use of prior art references, some of which were before the examiner and some of which were not. Those which were before the examiner include:

(1) “Otani” reference: A publication by Sugio Otani, “On the Carbon Fiber From the Molten Pyrolysis Products,” that “disclosed the preparation of carbon fiber products by pre-oxidation heat treatment of a polyvinylchloride pitch (PVC pitch) starting material to 260°C, followed by a heat treatment to a final desired temperature between 500°C and 1350°C.” Pl.’s Opp’n MSJ 6; Sugio Otani, *On the Carbon Fiber From the Molten Pyrolysis Products*, Carbon (1965) Vol. III, 31-38 (Pl.’s Opp’n MSJ App. 240-248).

(2) The Layden Patent: U.S. Patent No. 4,080,413 (filed Dec. 15, 1975) (issued Mar. 21, 1978) (Def.’s MSJ Ex. 5 A172-175) titled “Porous Carbon Fuel Cell

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[10] Claim 1, the broadest independent claim, *Zoltek*, 48 Fed. Cl. 290 at 293, provides:

> A method of manufacturing a plurality of different value controlled resistivity carbon fiber sheet products employing a carbonizable fiber starting material; said method comprising
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> selectively partially carbonizing previously oxidized and stabilized fiber starting material
>
> for a predetermined time period in an oxygen free atmosphere within a furnace at selected temperature values within a temperature range from 370 degrees Centigrade to about 1300 degrees Centigrade
>
> by soaking the stabilized fiber starting material at the selected temperature for the predetermined period of time
>
> to provide a preselected known volume electrical resistivity to the partially carbonized fibers corresponding to that volume electrical resistivity value required to provide the preselected desired surface resistance value for the finished sheet products,
>
> and thereafter processing the partially carbonized fibers into homogenous carbon fiber sheet products having the preselected desired surface electrical resistances.

’162 patent, col.8 ll.42-66.

Substrates and Method of Manufacture." The patent discloses methods of manufacturing porous carbon sheets for use in fuel cell electrode support plates. '413 Patent at [57]. The process involves an initial oxidation treatment, and then the fibers are molded into sheets, which are "subjected to pyrolysis by heating in a non-oxidizing atmosphere to produce the desired porous end product." *Id.* at col.2 ll.51-53.

The prior art references used by the Government in its argument that were not before the examiner include:

(1) The Topchjiev Patent: U.K. Patent No. 979,122 (filed Apr. 28, 1961) (issued June 1, 1965) (Def.'s MSJ Ex. 6 A176-78) discloses a method of producing semiconductive polymer materials. The patent discloses that "[t]he temperature and duration of heat treatment, and the processing conditions used may be varied in dependence upon the required semiconductive properties of the finished products." '122 Patent p.2, ll 6-10.

(2) Fischbach and Komaki: Article by D.B. Fischbach and K. Komaki, "Electrical Resistance of Carbon Fibers," Extended Abstracts, 14th Biennial Conference on Carbon, Pennsylvania State University, University Park, PA (1979), 191-92 (Def.'s MSJ Ex. 7 A179-80) that discloses "the change in resistivity of multiple types of precursor fibers with increased heat treatment temperature." Pl.'s Resp. Def.'s PFUF ¶ 27. According to the Government, Fischbach and Komaki "teach the precise volume resistivity of fibers made of rayon, pitch and PAN that are heat treated between 200 and 3000 degrees Centigrade." Def.'s PFUF ¶ 28. Zoltek, however, states that Fischbach and Komaki "did not show volume resistivities for any products except PAN at heat treatment temperatures ("HTT") of less than 1000°C." Pl.'s Resp. Def.'s PFUF ¶ 28.

(3) "Hashin and Rosen Equations": Publication by Z. Hashin, "Theory of fiber-reinforced materials," (1972) NASA CR-174 provides "calculations for determining the conductivity of fiber reinforced sheet products." Def.'s MSJ 18; Pl.'s Resp. Def.'s PFUF ¶ 72. The parties agree that Hashin (1972) and Rosen (1977) published equations, but disagree whether the equations permitted calculation of "preselected surface resistivity of a carbon fiber sheet product based on partial carbonization of starting material to a corresponding known volume electrical resistivity of individual carbon fibers." Pl.'s Resp. Def.'s PFUF ¶ 73.

(4) CAAP Coating: The CAAP coating is produced and sold by the CAAP Company for military aircraft radomes[11] "to protect aircrafts' radar equipment from damaging electrostatic charges during flight." Pl.'s Opp'n MSJ 26. The CAAP coating was comprised of approximately 1% (by weight) of carbon fiber "with the remaining 99% consisting of fluoroelastomers." *Id.* at 27; Def.'s Resp. Pl.'s PFUF ¶ 121.

[11] Aircraft radomes are the structures that house an aircraft's sensitive radar equipment. Def.'s MSJ. 20.

In the context of these prior art references, the Government proffers three alternatives for granting summary judgment on the basis of obviousness of the '162 Patent. The Government argues that the Patent is obvious in light of (1) the combination of the Topchjiev and Layden patents; (2) the combination of the Hashin and Rosen equations with the teachings of Fischbach and Komaki; and (3) the CAAP Coating.

B. Summary Judgment Standard

A motion for summary judgment will be granted if the record shows "that there is no genuine issue as to any material fact and that the movant is entitled to judgment as a matter of law." RCFC 56(c)(1); *Celotex Corp. v. Catrett*, 477 U.S. 317, 322 (1986). When considering a summary judgment motion, the court's proper role is not to "weigh the evidence and determine the truth of the matter," but rather "to determine whether there is a genuine issue for trial." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 249 (1986). A fact is "material" if it "might affect the outcome of the suit such that a finding of that fact is necessary and relevant to the proceeding." *SRAM Corp. v. AD-II Eng'g, Inc.*, 465 F.3d 1351, 1356-57 (Fed. Cir. 2006) (citing *Anderson*, 477 U.S. at 248). A dispute is genuine when the "the evidence is such that a reasonable jury could return a verdict for the nonmoving party." *Anderson*, 477 U.S. at 248. Any inferences that may be drawn from the underlying facts "must be viewed in the light most favorable to the party opposing the motion." *United States v. Diebold, Inc.*, 369 U.S. 654, 655 (1962). Similarly, "[i]n cases in which there is doubt as to the existence of a genuine issue of material fact, that doubt must be resolved in favor of the nonmovant." *Cooper v. Ford Motor Co.*, 748 F.2d 677, 679 (Fed. Cir. 1984).

A motion for summary judgment is assessed based on the "evidentiary standard of proof that would pertain at a trial on the merits." *SRAM Corp.*, 465 F.3d at 1357. Patents are presumed to be valid. 35 U.S.C. § 282; *see also Impax Labs., Inc. v. Aventis Pharms., Inc.*, 545 F.3d 1312, 1314 (Fed. Cir. 2008). The party asserting the invalidity of a patent has the burden of demonstrating that invalidity "by clear and convincing evidence." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007); *see also SRAM Corp.*, 465 F.3d at 1357 ("a moving party seeking to invalidate a patent at summary judgment must submit such clear and convincing evidence of facts underlying invalidity that no reasonable jury could find otherwise"); *Knoll Pharm. Co., Inc. v. Teva Pharms. USA, Inc.*, 367 F.3d 1381, 1384 (Fed. Cir. 2004) ("accused infringer must prove by clear and convincing evidence that each claim that is challenged cannot reasonably be held to be non-obvious").

When a party asserts patent invalidity based solely on the prior art and other evidence that was before the examiner during patent prosecution, the party "has the added burden of overcoming the deference that is due to [the PTO examiner]." *Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359 (Fed. Cir.1984). In this case, the Government asks the Court to consider prior art not before the examiner. The language of *American Hoist* is instructive here:

> To summarize on this point, § 282 creates a presumption that a patent is valid and imposes the burden of proving invalidity on the attacker. That burden is constant and never changes and is to convince the court of invalidity by clear evidence. Deference is due the Patent and Trademark Office decision to issue the patent

> with respect to evidence bearing on validity which it considered but no such deference is due with respect to evidence it did not consider. All evidence bearing on the validity issue, whether considered by the PTO or not, is to be taken into account by the tribunal in which validity is attacked.

Id. at 1360.

C. Obviousness Standards

For a patent to be valid, the invention patented must have been nonobvious. 35 U.S.C. § 103(a). Section 103(a) provides that a patent will not issue when "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 said subject matter pertains." *Id; KSR Int'l Co. v. Teleflex, Inc*, 550 U.S. 398, 406 (2007). In making this judgment, the court must step back in time to the moment the invention was conceived, avoiding the use of hindsight or "*ex post* reasoning." *KSR*, 550 U.S. at 421; *see also Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 36 (1966).

To find obviousness there need not be strict identity between the prior art and the patent-in-suit. *See Beckson Marine, Inc. v. NFM, Inc.*, 292 F.3d 718, 726 (Fed. Cir. 2002) ("a reference need not anticipate the invention to serve as prior art"). Rather, obviousness can be demonstrated where modifications to a single prior art reference would have been obvious, s*ee, e.g., Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1357 (Fed. Cir. 2007), or where it would have been obvious to combine multiple elements of various pieces of prior art, *KSR*, 550 U.S. at 417. The mere fact, however, that prior art could have been modified to achieve the patent-in-suit at the time of invention does not render the invention invalid on grounds of obviousness, "unless the prior art suggests the desirability of the modification." *Cordis Corp. v. Medtronic Ave, Inc.*, 511 F.3d 1157, 1172 (Fed. Cir. 2008) (upholding a jury instruction with that language).

While the obviousness determination is a question of law, it is premised upon several underlying factual determinations. *Rolls-Royce, PLC v. United Techs. Corp.*, 603 F.3d 1325, 1338 (Fed. Cir. 2010) ("obviousness is a question of law based on underlying factual inquiries"); *Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1351 (Fed. Cir. 2010) ("[t]he underlying factual considerations in an obviousness analysis include . . ."); *i4i Ltd. P'ship v. Microsoft Corp.*, 598 F.3d 831, 845 (Fed. Cir. 2010) ("[a]lthough obviousness is a question of law, it is based on factual underpinnings").

1. The *Graham* Factual Inquiries

The Supreme Court in *Graham* set out the factual inquiries for the determination of patent invalidity on the question of obviousness. These factual determinations, known as the *Graham* factors, govern whether the claimed subject matter is obvious and, therefore, the patent invalid under §103. These factors include (1) the level of ordinary skill in the art; (2) the scope and content of the prior art; and (3) the differences between the prior art and the claimed invention. *KSR*, 550 U.S. at 406 (quoting *Graham*, 383 U.S. at 17-18). Under this framework,

"the obviousness or nonobviousness of the subject matter is determined." *Graham*, 383 U.S. at 17.

Additionally, as a fourth *Graham* factor, an assessment of obviousness of a patent also includes consideration of secondary indicia (or considerations) of non-obviousness such as "commercial success, long felt but unsolved needs, [or the] failure of others" to achieve comparable results. *Graham*, 383 U.S. at 17-18. The courts have also considered skepticism or disbelief, copying or praise of the claimed invention, and unexpected results as secondary considerations of non-obviousness. *Brown & Williamson Tobacco Corp. v. Phillip Morris, Inc.*, 229 F.3d 1120, 1129 (Fed. Cir. 2000). The secondary considerations can give rise to genuine issues of material fact. *See Commonwealth Scientific & Indus. Research Org. v. Buffalo Tech.*, 542 F.3d 1363, 1377 (Fed. Cir. 2008) (concluding that "[t]he secondary consideration evidence, like the evidence with regard to the primary considerations, thus presents factual issues for a trier of fact").

The *Graham* factual inquiries are material to the outcome on patent invalidity, and thus, summary judgment will not be appropriate if these material facts are disputed. *See Commonwealth Scientific*, 542 F.3d at 137; *Cooper v. Ford Motor Co.*, 748 F.2d 677, 679-80 (Fed. Cir. 1984). In a patent infringement case, the existence of these factual inquiries alone, however, does not preclude granting summary judgment on issue of patent invalidity. *Chore-Time Equip., Inc. v. Cumberland Corp.*, 713 F.2d 774, 778 (Fed. Cir. 1983) ("The mere incantation of the fact findings listed in *Graham* cannot establish the impropriety of issuing a summary judgment when there is no material issue of fact requiring a trial to resolve, and the facts of record require a holding of patent invalidity."). "Summary judgment is as appropriate in a patent case as in any other case . . . . where there is no genuine issue of material fact." *Barmag Barmer Maschinenefabrik AG v. Murata Machinery, Ltd.*, 731 F.2d 831, 835 (Fed. Cir. 1984). In *Chore-Time*, the court held summary judgment was appropriate on the issue of patent invalidity as the factual determinations of scope and content of prior art, level of skill in the art, and commercial success were unnecessary or "irrelevant in determining the validity of the . . . patent claims in suit." 713 F.2d at 779-80. In other words, there were no *material* facts at issue that would impact the court's outcome on obviousness of the claimed invention.

Conversely, summary judgment is not appropriate if there is "a genuine issue as to the facts material to the court's holding of invalidity." *Cooper*, 748 F.2d at 680; *see also Commonwealth Scientific*, 542 F.3d at 1375 (finding that the disputes in the underlying factual inquiries precluded summary judgment on the issue of obviousness). In *Cooper*, the court noted that "[m]any, if not most, suits for patent infringement give rise to numerous and complex fact issues, rendering those suits inappropriate for summary disposition." 748 F.2d at 679 (quoting *Chore-Time*, 713 F.2d at 778). In decisions on patent invalidity on the basis of obviousness,

> [t]he breadth of the factual inquiry, the likelihood that any of a variety of factors can influence the ultimate determination, and the many moving parts of the obviousness inquiry are all good indicators that there will often be genuine issue(s) of material fact that will need to be resolved before a judgment of obvious or nonobvious can be rendered.

Lee Petherbridge & R. Polk Wagner, *The Federal Circuit and Patentability: An Empirical Assessment of the Law of Obviousness*, 85 Tex. L. Rev. 2051, 2083 (2007). Additionally,

> [w]ith a higher likelihood of material facts and a rule that permits those facts to come from sources as textually unsupported as testimony concerning the knowledge and skill in the art, it is increasingly likely that genuine issues of material fact will exist in a case. Naturally, this makes it less likely for summary judgment to be appropriate on the issue of obviousness.

Id. at 2084.

As discussed below, *KSR*, a watershed case on obviousness, did not alter the highly factual nature of the issue of obviousness, but rather opined on a flexible standard including, but not limited to, the assessment of motivation to combine prior art references in analyzing obviousness.

2. Reason to Combine Prior Art References

When an innovation is alleged to be obvious in light of the combination of two or more prior art references, "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR*, 550 U.S. at 418. *KSR* specifically addressed "the question [of] whether a patent claiming the combination of elements of prior art is obvious." *Id.* at 417. The Supreme Court established the appropriate analysis and standards for analyzing obviousness: a patent shall be invalid if "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 416. "[A] court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 417. The Supreme Court further explained:

> Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.

Id. at 418.

The *KSR* court also held that a patent may be obvious in light of the combination of prior art if the combination was "obvious to try." *Id.* at 421. The court explained that "[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp." *Id.* Whether a solution is predictable is determined in part by whether one in the ordinary skill of the art would have had a reasonable expectation of success. *Life Techs., Inc. v. Clontech Labs., Inc.*, 224 F.3d 1320, 1326 (Fed. Cir. 2000) ("Reasonable

expectation of success is assessed from the perspective of the person of ordinary skill in the art."); *see also Wyers v. Master Lock Co.*, 616 F.3d 1231, 1242 (Fed. Cir. 2010).

3. Reasonable Expectation of Success

The Federal Circuit has held that a proper analysis of obviousness requires a determination of whether a person of ordinary skill in the art would have a reasonable expectation of success in achieving the claimed invention by combining prior art references. *Id.*; *see also In re Kubin*, 561 F.3d 1351, 1361 (Fed. Cir. 2009) (affirming obviousness on the basis that the prior art references provide a reasonable expectation of success for achieving the claimed invention). Only a "reasonable expectation" of success is required; not "an absolute predictability of success." *In re Kubin*, 561 F.3d at 1360 (quoting *In re O'Farrell*, 853 F.2d 894, 903-04 (Fed.Cir.1988) and noting that "[t]he Supreme Court in *KSR* reinvigorated this perceptive analysis").

Whether there was a reasonable expectation of success is a question of fact. *Medichem, S.A. v. Rosado, S.L.*, 437 F.3d 1157, 1164-65 (Fed. Cir. 2006). Therefore, if there are disputed issues as to the reasonable expectation of success from applying the prior art references to achieve the claimed invention, summary judgment on obviousness of a patent would not be appropriate.

4. Use of Expert Testimony in Obviousness

The Supreme Court in *KSR* also addressed the role of expert testimony in considering summary judgment on obviousness. Conflicting expert testimony can raise a genuine issue of material fact precluding summary judgment as to the issue of obviousness. 550 U.S. at 427 ("In considering summary judgment on [the] question [of obviousness] the district court can and should take into account expert testimony, which may resolve or keep open certain questions of fact"). An expert's "conclusory affidavit addressing the question of obviousness" alone, however, is not sufficient "to exclude the possibility of summary judgment." *Id.* at 426. Thus, if the expert testimony fails to demonstrate a genuine issue of material fact, or to raise doubt as to whether there is a genuine issue of material fact, then summary judgment may be appropriate.

The Federal Circuit has found that where experts present conflicting opinions on a factual matter pertinent to a determination of obviousness, summary judgment is often inappropriate. *See B-K Lighting, Inc. v. Fresno Valves & Castings, Inc.*, 375 F. App'x 28, 33 (Fed. Cir. 2010) (holding that a conflict in expert testimony over the content of a certain prior art reference precluded summary judgment); *Metro. Life Ins. Co. v. Bancorp Servs., LLC*, 527 F.3d 1330, 1338 (Fed. Cir. 2008) (noting that summary judgment was "not appropriate" where there was "a direct conflict in the [expert] declarations as to a material fact under MetLife's interpretation of the claims."); *Optical Disc Corp. v. Del Mar Avionics*, 208 F.3d 1324, 1338-39 (Fed. Cir. 2000) (overturning grant of summary judgment: "[i]n view of the conflicting [expert] testimony, we are not prepared to say that no reasonable jury would believe [plaintiff's expert]").

To summarize, a party seeking summary judgment in a patent infringement case and alleging invalidity of a patent on the basis of obviousness must establish by clear and convincing

evidence that the subject matter of the patent as a whole would have been obvious to one of ordinary skill in the art at the time of invention. Obviousness is a question of law based on complex factual issues regarding the prior art, the knowledge of one of ordinary skill in the art, the differences between the prior art and the claimed invention, and secondary considerations. Where obviousness is alleged on the basis of a combination of prior art references, as here, factual inquiries material to the outcome on patent invalidity also include whether there was an apparent reason to combine the prior art and a reasonable expectation of success in achieving the claimed invention.

D. Discussion

Before addressing each of the Government's arguments for obviousness, the Court first discusses the question as to the background knowledge of a person of ordinary skill in the art. The background knowledge of a person of ordinary skill in the art is an essential factor in determining obviousness—whether there was an apparent reason to combine the known elements of the prior art and a reasonable expectation of success is determined from the perspective of that person. Thus, a genuine issue of material fact as to the knowledge of a person of ordinary skill may preclude summary judgment on obviousness. *TriMed, Inc. v. Stryker Corp.*, 608 F.3d 1333, 1341 (Fed. Cir. 2010) (citing *Gen. Elec. Co. v. Nintendo Co.*, 179 F.3d 1350, 1363 (Fed. Cir. 1999)) ("concluding that a genuine issue of material fact existed regarding the background knowledge of one of skill in the art").

1. No Genuine Issues of Material Fact as to the Background Knowledge of One of Ordinary Skill in the Art

Zoltek disagrees with the Government's description of a person of ordinary skill in the art. Zoltek's broad statements, however**,** without more, do not raise a genuine issue of material fact as to the background knowledge of a person of ordinary skill in the art.

This Court previously noted that

> [t]he parties agree that one skilled in the art would have at least a bachelor's degree in chemical engineering or chemistry. One skilled in the art would also have a working knowledge of the characteristics and uses of cellulosic, pitch and acrylic carbon fiber precursors, the characteristics of carbon fiber, the pyrolization processes used in making carbon fiber and processes for making carbon fiber sheet products.

Zoltek v. United States, 48 Fed. Cl. 290, 293 n.1 (citations omitted).

Zoltek highlights in its memorandum that "[a]s a preliminary matter, . . . the government . . . subtly misstates both the nature of [sic] Patent and what was known by a person of ordinary skill in the art at the time the patent application was filed." Pl.'s. Opp'n MSJ 7. The Government in its brief asserts that one of ordinary skill would have knowledge of: "(1) the characteristics of precursor fibers; (2) the heat treatment of individual carbon fibers and sheet products; (3) the characteristics of heat treated carbon fiber or carbon fiber sheet products; and

(4) the methods and processes involved in designing and manufacturing carbon fiber sheet products." Def.'s MSJ 8-9. Zoltek appears to disagree with the Government's articulation of the knowledge of one of ordinary skill in the art as it pertains to the "*characteristics* of . . . carbon fiber sheet products." *See* Pl.'s Opp'n MSJ 8 (emphasis added). Zoltek finds that the Government's use of the word "characteristics" is "misleading, as physical substances express many different characteristics, and the characteristics of carbon fiber composites are complex and varied." *Id.* Zoltek reasons that

> although one skilled in the art would have knowledge of, for example, the relative tensile strength and resilience of carbon fiber sheet products prepared at different temperatures, one [skilled in the art] would not have had knowledge of the electrical characteristics of such products in 1983 and 1984 except in the broadest terms.

Id. The distinguishing aspect of the patent, Zoltek explains, is the "ability to select the specific temperature within [the specified] range to result in the precise electrical resistivity desired for the particular application." *Id.* at 8-9. And thus, "[this] knowledge provided by the Patent was simply not known to the art at the time." *Id.* at 8.

Zoltek fails to address in its argument or supporting evidence how specific knowledge of electrical characteristics of carbon fiber sheet products, beyond knowledge in the broadest sense, could affect the obviousness analysis. *See Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1332 (Fed. Cir. 2009) (applying the level of a person of ordinary skill to the analysis of obviousness of the patented invention); *Chore-Time Equip., Inc. v. Cumberland Corp.*, 713 F.2d 774, 779 n.2 (Fed. Cir. 1983) (granting summary judgment on invalidity when plaintiff failed to show that "a higher level [of skill] could affect the result"). Zoltek does not establish a genuine issue of material fact because it does not explain how the Government's alleged misrepresentation of the level of knowledge of one of ordinary skill in the art could affect the Government's propositions that the '162 patent is obvious. *See Perfect Web*, 587 F.3d at 1332 (affirming summary judgment on obviousness where patentee argued that a person of ordinary skill in the art lacked computer programming knowledge, but failed to "explain how programming experience was necessary to appreciate the value of repeating known methods[,]" which was the basis for the obviousness argument); *Chore-Time*, 713 F.2d at 779 (holding there was "no genuine issue respecting the level of skill in the art" because Chore-Time "makes only a naked allegation that some unspecified higher level of skill should have been applied, [which is] insufficient to create a fact issue material to the outcome of this case and cannot, here, defeat a motion for summary judgment").

The Court finds that Zoltek did not raise a genuine issue of material fact as to the background knowledge of one skilled in the art.

2. Summary Judgment Denied on Basis of Obviousness of the Combination of the Topchjiev and Layden Patents

The Government's first contention for patent invalidity is that the combination of the Topchjiev and Layden patents renders the '162 patent obvious. Def.'s MSJ 23. The

Government's argument, however, fails to meet the clear and convincing standard for obviousness and to resolve genuine issues of material fact.

According to the Government, Topchjiev, which was not before the patent examiner, *id.* at 15, teaches the production of "homogeneous carbon fiber sheet products with predetermined electrical properties . . . by carefully controlling the heat treatment temperature of carbonization. . . . between 500 and 1100 degrees Centigrade," *id.* at 23. The Government describes the Layden patent as disclosing the relationship between the resistivity of the sheet products and the heat treatment temperature, thereby allowing one to control resistivity through the selection of the heat treatment temperature. *Id.* The Government indicates that, together, the Topchjiev and Layden patents disclose methods for producing carbon fiber sheet products with controlled resistivity by controlling the heat treatment temperature within a range of 500 to 1260 degrees Centrigrade (which is not materially different from "the patentee's asserted invention of controlling the heat treatment temperature between 370 and 1250 degrees"). *Id.*

The Government also highlights that Zoltek must be held to its admissions made during patent prosecution regarding the prior art (e.g., Layden patent). *See id.* at 11. During patent prosecution, Zoltek distinguished the Patent process from the Layden patent: "the patentably distinguishing invention . . . lies in controlling the resistivity to desired values by carbonizing at a selected temperature within the range of 370 degrees to 1250 degrees Centigrade which range was not recognized by any of the prior art references or described therein." *Id.* at 12; Def.'s MSJ A152. Thus, the Government argues that Zoltek must admit that "the general method of controlling the resistivity of a homogeneous sheet product solely through the selection of an appropriate heat treatment temperature was known in the art since at least 1978." Def.'s MSJ 13.

In its response, Zoltek contends that the Government's argument is misleading because the Topchjiev and Layden patents "pertain to *volume* resist[ance], not *surface* resist[ance, which] . . . . is the heart of the Patent." Pl.'s Opp'n MSJ 12-13. Zoltek also argues that because Layden and Otani, an equivalent to Topchjiev, were before the patent examiner, the PTO's conclusion that prior art did not render the Patent obvious is "entitled to great deference." *Id.* at 13. Furthermore, the Government's expert, Dr. Sullivan, admitted that "there are no substantial differences" between the relevant disclosures in Otani and Topchjiev. *Id.* And finally, and of most significance, Zoltek is quick to point out that Dr. Sullivan also admitted that Topchjiev and Layden alone could not render the Patent obvious. *Id.* at 14; Sullivan Dep. 138:18-139:11.

In its reply, the Government does not respond to Zoltek's arguments that refute obviousness of the Patent on the basis of Topchjiev and Layden alone. Instead, the Government appears to abandon its argument and suggest that Topchjiev and Layden *in combination with* the Hashin and Rosen equations render the '162 patent obvious (similar to the Government's argument that the Patent is obvious in light of the equations in combination with the teachings of Fischbach and Komaki). *See* Def.'s Reply MSJ 17, 19. The Government also introduces for the first time that the Topchjiev and Layden patents provide the motivation and incentive to combine the prior art —that the teachings provide "motivat[ion] to apply the [Hashin and Rosen] equations . . . to the carbon fiber data and materials disclosed in . . . Layden and Topchjiev, to predict a preselected resistivity value in a sheet product," thereby rendering the Patent obvious. *Id.* at 19.

To succeed on summary judgment on obviousness of the '162 patent, the Government must do more than simply say that the elements of the patent were in the prior art. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007) ("a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art"). There must be some reason to combine the prior art in the way embodied by the patent; some motivation or incentive is needed. *Id.* Because the Government asserted for the first time in its reply brief that Topchjiev and Layden provided motivation and incentive to combine the prior art, Zoltek did not have a fair opportunity to address the Government's arguments. Even so, the Government's argument that the combination of Topchjiev and Layden alone renders the '162 patent obvious is undermined because its expert admitted that the Patent could not be rendered obvious by the two patents alone. *See* Pl.'s Opp'n MSJ 14; Sullivan Dep. 138:18-139:11.

Thus, the Government has failed to meet its burden of establishing by clear and convincing evidence that the combination of Topchjiev and Layden renders the Patent obvious. *See Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1360 (Fed. Cir. 1984) (holding that the standard of proof for patent invalidity is by clear and convincing evidence). Furthermore, the Government has also failed to dispel the genuine issue of material fact that the prior art patents address volume resistivity and not surface resistivity. Therefore, summary judgment on the basis of obviousness in light of the Topchjiev and Layden patents is denied.

3. Summary Judgment Denied on the Basis of Obviousness of Hashin and Rosen[12] Equations in Combination with Teachings of Fischbach and Komaki

The Government's second argument is that the '162 patent is obvious in light of the Hashin and Rosen equations in combination with the teachings of Fischbach and Komaki. Def.'s MSJ 24. The Government in its main brief argues in detail that the claims of the patent are present in the prior art. However, as the Court in *KSR* stated, "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR*, 550 U.S. at 418. The Government appears to acknowledge that this demonstration is not enough by quoting from *KSR* on page three of its main brief that there must be an additional determination of an "apparent reason to combine the known elements in the fashion claimed by the patent at issue." But the Government's main brief never deals expressly with this issue. The Government appears to focus its argument on the reasonable expectation of success. This Court believes that both of these factors are essential to a decision in this case, and the thrust of two important post-*KSR* cases in the Federal Circuit is in this direction. *See Wyers v. Master Lock Co.*, 616 F.3d 1231, 1240-1243; 1245 (Fed. Cir. 2010) (assessing obviousness based on motivation to combine the prior art and reasonable expectation of success); *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007) ("[T]he burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt

[12] The Government sometimes refers to the prior art as the "Hashin equations" and sometimes as the "Hashin and Rosen equations." In this opinion, the Court refers to the prior art as the "Hashin and Rosen equations" unless the Government is clearly referring only to the Hashin equations or only to the Rosen equations.

to make the composition or device, or carry out the claimed process, and would have had a reasonable expectations of success in doing so.").

Zoltek's opposition suggests apparent reason to combine in passing, but it is not until the Government's reply brief that the Court is presented with extensive argument that there was an apparent reason to combine the Hashin and Rosen equations with the teachings of Fischbach and Komaki. When the moving party presents substantive new information in its reply to the nonmoving party's response, the court cannot decide the issue on summary judgment because the nonmoving party has not had a chance to respond. Thus, under the circumstances of this case, the Court cannot address on summary judgment whether there was an apparent reason to combine the Hashin and Rosen equations with the teachings of Fischbach and Komaki.

Nevertheless, the Court will discuss the Government's explicit reasonable expectation of success argument in its main brief and the hint of an argument regarding reason to combine that the Court believes can also be discerned in the Government's main brief. This discussion should provide the parties with some direction when it comes to trial preparation.

a. Government's Main Brief

The strongest element of the Government's argument is the Government's assertion that Dr. Sullivan, "using only the carbon fiber data provided in the patent . . . was able to calculate with great precision the electrical resistance of the resulting sheet. Def.'s MSJ 25. In addition, the Government asserts that "the calculation method was well known in the art and applied commercially." *Id.* Indeed, the Government concludes that "because the calculation method was well known in the art and applied commercially, one of ordinary skill in the art would have had a reasonable expectation of success in carrying out the claimed method." *Id.*

As noted above, the Government ties the fact that the calculation was well-known and that it was applied commercially to "reasonable expectation of success," and the Government does not address explicitly the other *PharmaStem* factor, namely, "reason to attempt to make the composition or device." In looking at the evidence presented, the Court is able to reorganize the Government's presentation into two arguments that correspond to the *PharmaStem* factors. First, it can discern an implicit argument for reason to combine in the commercial application of the calculation method. Second, the Court believes that the success of the calculation method in achieving almost the same results as Mr. Boyd's actual data provides an argument for reasonable expectation of success.

(1) Reason to Combine: Commercial Application

Unfortunately for the Government, the Court is not sure that the Government has established that the calculation method was applied commercially. The main brief seems to point to two passages of the Sullivan Report in support of commercial application. First, the Government states that the calculations were "'routinely performed as part of the design process of composite materials' prior to October 12, 1984." Def.'s MSJ 25 (quoting Def.'s Ex. 2 A66).

In addition to a wrong citation and an incomplete quotation,[13] the Court finds this statement to be merely conclusory on Dr. Sullivan's part. He provides no support for it. Second, the Government seems to refer to page 64 of the report, where Dr. Sullivan states, "[b]ecause each step in this process was well-established in commercial practice…." Again, there is no support for this statement, and the Court finds it conclusory. Finally, Zoltek claims that Dr. Sullivan admitted in his deposition that carbon fiber product manufacturers probably did not use his proposed method, Pl.'s Opp'n MSJ 16, while the Government says that he did, Def.'s Reply MSJ 3. Looking at the deposition citations of both parties, the Court finds Dr. Sullivan's statements to be equivocal. The Court would need to hear Dr. Sullivan's testimony, subject to cross-examination, in order to determine the truth of the matter. Therefore, with regard to whether the calculation method was applied commercially, there is a genuine issue of material fact.

(2) Reasonable Expectation of Success

As to the factor of reasonable expectation of success, it appears that the Government is on stronger ground due to Dr. Sullivan's success in obtaining almost the same results as the patent by using the Hashin and Rosen equations and the carbon fiber data provided in the patent. Dr. Sullivan's success is evident in Figure 41 of his report, reproduced on page 12 of the Government's reply brief. The chart at Figure 41 shows that the curve of Dr. Sullivan's calculations as to surface resistivity coincides almost exactly with the curve resulting from Mr. Boyd's (the inventor's) actual data on surface resistivity as a result of the patented method. Dr. Sullivan used the known material properties for the 1.0 ounce per square yard composite described in the '162 patent, as did Mr. Boyd. Def.'s Reply MSJ 12-13, 12 n.4.

In addition to Zoltek's attack on the commercial application of the equations, which the Court has addressed above, Zoltek asserts that (1) Dr. Sullivan never conducted any experiments to confirm the results of his calculations using the Hashin and Rosen equations; (2) Dr. Sullivan was not a person of ordinary skill in the art from 1983 to 1984; (3) according to Zoltek's expert, Mr. Lee McKague, the equations are "not reliable," presumably because of the highly anisotropic geometry of carbon fibers; and (4) according to Mr. McKague, the equations assume that carbon fiber composites enjoy homogeneous properties that do not exist in reality. Pl.'s Opp'n MSJ 16-18.

Zoltek's first argument raises the issue of whether, despite the fact that Dr. Sullivan's results in predicting surface resistivity by using the equations are remarkably similar to the actual data that Mr. Boyd obtained, his results must be confirmed by actual experimentation for the Court to find that a person of ordinary skill in the art would have had a reasonable expectation of success in employing the equations. In its reply brief, the Government argues that experimentation to confirm is not necessary, although none of the cases cited squarely deals with this issue. Zoltek, however, did not cite any cases in support of its position. The Court will expect more briefing on this issue. Even so, for purposes of this motion, considering the information before the Court, the Court concludes that experimentation to confirm the remarkable congruence of the Sullivan calculations and the Boyd data is not necessary in order to prove reasonable expectation of success.

[13] The correct quotation is "routinely performed as *a normal* part of the design process of composite materials" (emphasis added), and the citation should be to page 55 (not 54) of the report, A66 not A65.

Zoltek's second argument strikes the Court as obscure. As the Government points out in its reply brief, Dr. Sullivan need not be a person of ordinary skill in the art at the relevant time, but he must opine as to what a person of ordinary skill in the art would know and do at the relevant time.[14] Perhaps Zoltek is arguing that because Dr. Sullivan himself did the calculations, they were not done by a person of ordinary skill in the art; therefore, they do not prove reasonable expectation of success by a person of ordinary skill in the art. In addition, Zoltek seems to argue that Dr. Sullivan did not know the state of the art regarding "controlling surface resistivity by means of adding carbon fiber or glass" at the time the patent application was filed. Pl.'s Opp'n MSJ 17.

As the Government points out, Dr. Sullivan concluded: "Combining Hashin's equations with the Fischback [sic] and Komaki data…one of ordinary skill in the art could determine the precise heat treatment temperature for precursor fibers that would result in a sheet product with a predetermined surface resistance." Def.'s Reply MSJ 6. Clearly, Dr. Sullivan is opining about a person of ordinary skill in the art with knowledge of the prior art at the time. As to Dr. Sullivan's knowledge of the state of the art, this point is encompassed in Zoltek's objection to him as an expert witness, which objection has already been disposed of against Zoltek earlier in this opinion. *See supra* Section II.A. The Court points out, however, that the deposition testimony cited by Zoltek to prove Dr. Sullivan's ignorance of the state of the art relates to whether Dr. Sullivan agreed to a particular statement in the patent about the contemporary state of the art. *See id.* This is hardly disqualifying. Finally, since the point about the calculations being done by Dr. Sullivan who is not a person of ordinary skill in the art at the relevant time was not developed by Zoltek (and indeed it is really a surmise by the Court) the Court cannot come to a conclusion on it.

Zoltek's third argument seems to be that the equations do not take into account the anisotropic geometry of carbon fibers. Unfortunately for Zoltek, this point also is not developed. That is to say, Zoltek does not explain how this defect affects the equations, especially in light of the fact that Dr. Sullivan's results so nearly correspond with Mr. Boyd's data.

Zoltek's fourth argument is that, according to Mr. McKague, the equations assume that carbon fiber composites enjoy homogeneous properties that do not exist in reality. Once more, Zoltek does not develop this argument. Why did this flaw not affect the results of Dr. Sullivan's calculations?

In sum, it appears to the Court that the Government is correct in stating: "Dr. Sullivan's calculations clearly demonstrate that the equations produce almost identical results to those empirically obtained by Mr. Boyd for which Zoltek has no explanation." Def.'s Reply MSJ 9. Therefore, Dr. Sullivan's calculations as embodied in the chart at Figure 41 of his report are strong evidence of a reasonable expectation of success by a person of ordinary skill in the art.

[14] Although an expert need not be a person of ordinary skill of art at the time of invention, the fact that an expert was such a person may make that person more credible.

4. Summary Judgment Denied on the Basis of the Government's Assertion of the Possibility of Obviousness in Light of CAAP Coating

In addition to its arguments that the '162 patent is obvious in light of the combination of prior art, the Government seems to argue that one piece of prior art, the CAAP coating, anticipates the patent or at least makes it obvious. Specifically, the Government states that the CAAP coating—a product manufactured and sold by the CAAP Company for use in military aircraft— "may" render the Patent obvious. Def.'s MSJ. 26. Again, the Court finds that the Government fails to make a credible, let alone a clear and convincing, argument for obviousness of the Patent.

The CAAP product is a coating for military aircraft radomes, which enclose and protect an aircraft's radar equipment. Def.'s MSJ 20. The coating needed to be both transparent to radar and capable of dissipating static electricity that might build up during flight. Such static electricity interferes with electronic communications and is extremely hazardous to ground crews. *Id.* According to the Government, the surface resistance of the coating must be predetermined and carefully controlled. *Id.*

Dr. James F. Moraveck, president and owner of CAAP, chose to use carbon fiber as the conductive element of the coating. *Id.* Initially, he obtained the carbon fiber from AVCO Systems Division, but in 1982 he sought a new source and contacted Mr. Phil Boyd of Stackpole, who is the inventor of the '162 patent. *Id.* at 21. Mr. Boyd developed a carbon fiber product specifically for the CAAP coating, but he does not remember how he determined the processing conditions for the fibers. *Id.* "The Stackpole fiber was heat treated between 732°C and 788°C," *id.*, which temperatures are within the range of those recited in the '162 patent. *Id.* at 9. The resulting carbon fibers "provided the CAAP coating with a surface resistance between 0.5 to 15 megaohms, or 5×10^5 to 1.5×10^7 ohms, per square." *Id.* at 21. Four coats yielded "a surface resistance of between 5×10^4 to 1×10^5 ohms per square." *Id.*

From these facts, the Government, in its main brief, concludes that "to the extent that the '162 patent is construed broadly to cover the manufacture of sheet products containing off-the-shelf carbon fibers that were selected based upon the desired resistance of the final sheet product, the '162 patent claims read upon the prior art CAAP coating." Def.'s MSJ 21. However, in a further elaboration of this argument in its main brief, the Government softens its position, stating that the '162 patent *may* be obvious in light of the CAAP coating. *Id.* at 26. This nuancing seems to be due to the fact that Mr. Boyd did not know the preselected and desired resistance of the sheet product, and CAAP did not know the heat treatment temperature of the individual carbon fibers. According to the Government's interpretation of the patent claims, the party selecting the heat treatment temperature must know the desired resistance value of the sheet product. *Id.* Therefore, the CAAP coating does not *anticipate* the '162 patent.[15] However, the Government argues that Zoltek in a 2006 brief took the position that infringement would occur "regardless of the fact that the heat treatment process was conducted without the knowledge of the desired resistance value of the finished sheet product." *Id.* Using Zoltek's interpretation, the '162 patent would have been anticipated by the CAAP coating. Having raised and disposed of

[15] The CAAP coating was not prior art before the patent examiner. Def.'s MSJ 22 n.5.

the (surprising) anticipation argument, the Government then concludes—without explanation—that "the CAAP coating would render the claims of the '162 patent obvious when combined with the established methods of manufacturing sheet products known in the art." In support, the Government cites *Jones v. Hardy* to the effect that "anticipation is the very epitome of obviousness." *Id.* at 27 (citing *Jones v. Hardy*, 727 F.2d 1524, 1529 (Fed. Cir. 1984)).

Despite the lack of express argumentation regarding the obviousness of the patent due to the CAAP coating (except by inference from the anticipation argument), Zoltek comes up with six reasons why the Government has not succeeded in proving obviousness: (1) the range of resistivity of the CAAP coating is extremely broad and does not, therefore, correspond to a "preselected desired surface resistance"; (2) the coating is a completely different composition than the Zoltek product; (3) "[f]or an individual radome coating, a mixture of carbon fibers having a wide range of volume resistivities could be used to produce a gross surface resistivity which would easily fall within" the broad range required by CAAP; (4) the measurement of the surface resistivity of the coatings was imprecise; (5) the resistivity of the coating could be adjusted by adding more conductive or more resistive fiber and by thickening or thinning the coating; and (6) because Mr. Boyd prepared three batches of carbon fibers and had no knowledge of the final application, it is reasonable to assume that the three batches were mixed together and maybe mixed together with fluoroelastomers, producing a coating characterized by variations in surface resistivities at different locations on any one radome. Pl.'s Opp'n MSJ 27-30.

In its reply brief, the Government reduces Zoltek's six arguments to four: "(1) the preselected surface resistivity exhibited in the CAAP's products are somehow too broad to meet the "preselected desired surface resistance" language of the '162 patent claims, (2) that the antistatic products at issue contain too little carbon fiber, (3) that the CAAP materials do not comprise "sheet products" as claimed in the '162 patent, and (4) the Stackpole fibers sold to CAAP Co. were mixed together, thereby co-mingling fibers having different volume resistivity." Def.'s Reply MSJ 25.

The Government does not explain how Zoltek's six arguments were reduced to four, but the Court notes that this list does not contain a response to Zoltek's argument #4 about the imprecision of measuring the surface resistivity of the coatings. Furthermore, it is not clear that Zoltek raised the argument, embodied in the Government's argument #3, that the CAAP materials do not comprise "sheet products" as claimed in the '162 patent. Therefore, without more, there is a genuine issue of material fact outstanding as to the actual surface resistivity of the CAAP coating,[16] and there is an argument regarding whether the CAAP materials comprise "sheet products" as claimed in the patent to which Zoltek has not had opportunity to respond. Regarding Zoltek's arguments, the Court finds it difficult to distinguish between the essence of argument #1 (enormously broad range of surface resistivity) and #3 (enormously broad range of volume resistivities) as it relates to the Government's argument of obviousness.

Regarding the Government's argument #1, addressing the broad range of surface resistivity for the CAAP coating, the argument boils down to (1) whether the range is

[16] It may be that the Government believes that it has rebutted this argument because it asserts that Zoltek admitted that the surface resistivity of the CAAP coating was within the range of 0.5 to 15 megaohms, or 5×10^5 to 1.5×10^7 ohms, per square. Def.'s Reply MSJ 26; Pl.'s Opp'n MSJ 27.

"enormous," as Zoltek's expert, Mr. McKague, says and (2) whether this range, if enormous, meets the criterion of "preselected desired surface resistance." The first point requires the Court to hear the testimony of the witness, subject to cross examination. The second point requires claim interpretation, which the Court is loath to do without specific briefing and perhaps oral argument. Therefore, this argument cannot be resolved on summary judgment.

Regarding the Government's argument #2, addressing the percentage content of fiber in the CAAP coating, the issue is whether the content of fiber in the CAAP coating is included in the patent claims. Def.'s Reply MSJ 27. Zoltek points to the slurry in Claim 5, a dependent claim, which indeed is different from the composition of the CAAP coating, but the Government is correct that independent Claim 1 contains no limitation regarding fiber content. But even so, the Court cannot perceive in the Government's argument a clear connection between this fact and the conclusion that the CAAP coating makes the patent obvious. Furthermore, the Court is wary about concluding that, except for Claim 1, the other claims mentioned by the Government, namely, Claims 2-4, 6, 9-14, and 33-38 do not contain limitations regarding fiber content without hearing from Zoltek on this point.

Regarding the Government's argument #4, there are genuine issues of material fact about the content of the batches of treated carbon fibers supplied by Mr. Boyd to CAAP and as to whether they were mixed. This conclusion is evident from the Government's discussion of this issue in the reply brief. Def.'s Reply MSJ 30-31.

In addition to and subsequent to the Government's argument #4, the Government raises yet another issue, identified as "present on page 29" of Zoltek's opposition. *Id.* at 32. The reference is to language in Zoltek's argument #5, but it appears also to be in its argument #2, namely, that the CAAP Coating does not render the Patent obvious because the coating "could not inform a person of ordinary skill in the art of any precise relationship between a pre-selected volume resistivity of a carbonizable starting material and a corresponding, finely controlled uniform electrical surface resistivity on the resulting carbon fiber products." Pl.'s Opp'n MSJ 29; *see also id* at 28. In response, the Government states that "Zoltek appears to suggest that in order to fall within the scope of the asserted '162 patent claims . . . a process must evidence . . . [this precise relationship]." Def.'s Reply MSJ 32. The Government contends that Zoltek cannot maintain this argument because it is inconsistent with Zoltek's position in interpreting the claim for purposes of determining whether certain coatings infringed the Patent. *Id.* at 32-33. The Government maintains that "[a] patentee cannot take one position in advocating infringement yet maintain the opposite position in contesting invalidity" as the claims must be interpreted the same for purposes of validity and infringement analyses. *Id.* at 33 (citing *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1330 (Fed. Cir. 2003); *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1351 (Fed. Cir. 2001)).

The Government references the position Zoltek took for purposes of infringement analysis that "coatings prepared by WLS Coatings, Inc., which incorporated fibers from the Fortafil company, infringed the '162 patent." Def.'s Reply MSJ 32 (citing Pl.'s Reply in Sup. Mot. to Deny States Secrets Claim 20 (Docket No. 359, October 1, 2007)). More specifically, though, the Government says that Zoltek, for infringement purposes, did not require that the fiber manufacturer have knowledge of the end product's surface resistance, but for invalidity

purposes, Zoltek does require such knowledge. Def.'s Reply MSJ 32-33. However, nowhere in Zoltek's response to the Government's motion for summary judgment does Zoltek refer to the knowledge required of the fiber manufacturer or the end product manufacturer. Rather, Zoltek argues that because the CAAP coatings contain minute fiber content, one of ordinary skill in the art could not "draw a reasonable conclusion" as to the precise relationship between volume resistivity of carbon fibers and surface resistivity of carbon fiber products. *See* Pl.'s Opp'n MSJ 28, 29. This incongruity cannot be resolved on summary judgment.

In conclusion, the Court must confess that it is somewhat befuddled by the whole discussion of the CAAP coating. As noted, the Government's main brief does not explain how the CAAP coating renders the patent obvious, although there is discussion about anticipation. Next, Zoltek makes six points about how the CAAP coating does not prove that its patent is obvious, despite the fact that the Government never explained how the CAAP coating renders the patent obvious. Perhaps Zoltek is responding to the assertion that if the patent is anticipated by the CAAP coating, then it is also obvious. Then, the Government replies to Zoltek's arguments—although not all of them (at least expressly)—and its discussion gives the appearance of shifting the burden to Zoltek to prove that the patent is nonobvious in light of the CAAP coating. Perhaps this shift is unconscious because Zoltek took the lead in arguing that the CAAP coating did not render the patent obvious. Finally, in its reply brief, the Government raises an issue of claim construction argument inconsistency. Clearly, there is so much confusion on the significance of the CAAP coating and its impact on the patent, that the Court cannot grant summary judgment on this point.

5. Secondary Indicia (Considerations) of Non-obviousness

An assessment of obviousness of a patent also includes consideration of secondary indicia of non-obviousness, if presented. *Zoltek v. United States*, 86 Fed. Cl. 738, 746 (2009) ("It is well-settled that, if present, a Court must consider evidence of secondary indicia of non-obviousness."). The question is generally whether the evidence of the secondary considerations is strong enough to overcome a showing of obviousness. *See, e.g., Asyst Tech., Inc. v. Emtrak, Inc.*, 544 F.3d 1310, 1316 (Fed. Cir. 2008) ("evidence of secondary considerations does not always overcome a strong prima facie showing of obviousness"). In this case, the nature and strength of the secondary consideration evidence is an issue to be resolved at trial.

Evidence of secondary indicia may support a finding of non-obviousness or raise doubt as to obviousness of the patented claims. The strength of that evidence depends on the nexus between the claimed invention and the secondary consideration. *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1311-12 (Fed. Cir. 2006); *see also Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010) ("'For objective [evidence of secondary considerations] to be accorded substantial weight, the proponent must establish a nexus between the evidence and the merits of the *claimed invention*.'") (quoting *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995)). The patentee must provide, for example, "probative evidence that the claimed and novel features met a long-felt but unresolved need" or evidence that shows that the praise of the patented invention or the failure of others is a result of the claimed invention. *See Ormco Corp.*, 463 F.3d at 1313.

Secondary considerations are dependent on factual determinations, which could raise a genuine issue of material fact. *See Commonwealth Scientific & Indus. Research Org. v. Buffalo Tech., Inc.*, 542 F.3d 1363, 1377 (Fed. Cir. 2008) (concluding that "[t]he secondary consideration evidence, like the evidence with regard to the primary considerations, thus presents factual issues for a trier of fact"). "Bare assertions" and "unsupported contentions" of secondary indicia, however, "are legally insufficient to raise a genuine issue of material fact." *Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1333 (Fed. Cir. 2009). On the other hand, if relevant secondary considerations, with the required nexus to the claimed invention, could lead a trier of fact to find that the patent was not obvious, then summary judgment on obviousness will not be appropriate. *See Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1352 (Fed. Cir. 2010) (affirming that sufficient evidence, including secondary considerations, supports the court's determination "that a reasonable jury could find that the . . . patent was not obvious," precluding judgment as a matter of law on validity).

The parties agree that the secondary indicia of non-obviousness identified by the courts are: (1) commercial success related to the invention; (2) long-felt but unresolved need; (3) failures of others; (4) skepticism or disbelief before the invention; (5) copying or praise of the claimed combination; and (6) unexpected results. *See* Def.'s MSJ. 22; Pl.'s Opp'n MSJ 4. But the parties really only develop one secondary consideration, namely, long-felt but unresolved need. To be sure, Zoltek mentioned failure of others, praise, and unexpected results, but its only argument in support is a quotation from Mr. McKague, which does not discuss these indicia. *See* Pl.'s Opp'n MSJ 25. This hardly qualifies as "development." The Government, in addition to discussing long-felt but unresolved need, analyzes "two categories of evidence," a letter from Mr. George Rodgers of Northrop Corporation, on the one hand, and the opinions of Mr. McKague and Mr. Rumy, on the other. The purpose of this analysis seems to be to argue that Zoltek relies on conclusory opinions of experts and has not drawn a nexus between this evidence and the invention. *See* Def.'s Reply MSJ 23, 24. Therefore, the Court will confine itself to these arguments, except for the secondary consideration of "praise," which it will also discuss, as the Court was able to discern in the use by the parties of the Rodgers letter some argument on this point beyond Zoltek's reference to the McKague quotation.

a. Long-felt But Unmet Need

Zoltek's argument that a long-felt but unresolved need supports non-obviousness is derived from the declarations of Mr. McKague and Mr. Rumy and from a 1982 article by Quick and Mate. [17]

Zoltek states that Mr. McKague, a person with direct experience with military aircraft, concluded that the Patent "'describes a critically enabling capability'" and is "an advancement over the then state-of-the-art that directly benefitted our national security and defense capabilities." Pl.'s Opp'n MSJ 25; McKague Decl. ¶¶ 125-127. Mr. Rumy stated that "no other process or method existed enabling the manufacture of carbon fiber sheets with specified uniform surface resistivity." Pl.'s Opp'n MSJ 21. In addition, Mr. Rumy asserted that the Patent "had an immediate impact in the market, causing an abandonment of prior, inferior methods of

[17] Pl.'s Opp'n MSJ App. 549; J.R. Quick and Z. Mate, *Conductive Fiber Mats as EMI Shield for SMC*, Modern Plastics, May 1982, at 68.

producing electrically-resistive surfaces of stealth aircraft." *Id.* Mr. McKague's and Mr. Rumy's declarations are all apparently in support of a long-felt but unresolved need—the capability to specify surface electrical resistivity for military aircraft.

Although the Government does not address these specific assertions, it generally contends that that Zoltek "relies on the conclusory opinions of Mr. McKague and Mr. Rumy," and "fails to establish a required nexus between the claimed invention and alleged long-felt need." *Id.* at 23-24.

A long-felt but unmet need arises when there is "'an articulated identified problem [as of the patent's filing date] and evidence of efforts to solve that problem.'" *Perfect Web*, 587 F.3d 1324, 1332-33 (Fed. Cir. 2009) (quoting *Tex. Instruments v. U.S. Int'l Trade Comm'n*, 988 F.2d 1165, 1178 (Fed. Cir. 1993)). Although the expert testimony of Mr. McKague and Mr. Rumy points to a long-felt need, the long-felt need is inferred from general knowledge and reaction in the marketplace rather than supported by direct evidence of a specific long-felt need subsequently addressed by the Patent. *See Perfect Web*, 587 F.3d at 1332 ("Perfect Web fails to show that these drawbacks [with current systems] constituted a long-felt, unmet need alleviated by the patent. Perfect Web provided no evidence to explain how long this need was felt, or when the problem first arose."). Thus, their assertions are not adequate evidence of a long-felt need in support of non-obviousness or to establish a genuine issue of material fact.

In addition to the experts' declarations, Zoltek points to a 1982 article by Quick and Mate as a basis for a long-felt but unresolved need. The article discussed a method for making "gross adjustments" to the surface resistivity of carbon fiber compounds. Pl.'s Opp'n MSJ 24; *see also* Def.'s Reply MSJ 24. Mr. McKague testified that in his opinion the article "provided substantial motivation for a person of ordinary skill in the art to develop carbon fiber products having finely controlled surface resistivities." Pl.'s Opp'n MSJ 24. Mr. McKague concludes that "[t]he fact that the Quick and Mate article identified a long-established need in the marketplace, and that the Fischbach and Komaki, Layden, and Topchjiev references, together with the Hashin and Rosen equations, all were published long before the Quick and Mate article, further supports the non-obviousness of the Patent." *Id.*

With regard to the Quick and Mate article, the Government contends that the article does not support "a long-felt need to more finely control surface resistivity as McKague concludes." Def.'s Reply MSJ 24. The Government goes on to say: "Nor does the reference provide evidence of a long-felt need to control surface resistivity in the manner claimed in the process claimed in the '162 patent." *Id.*

After reading as much of the Quick and Mate article as was provided, the Court agrees with the Government that although the article discusses the use of carbon fibers in controlling surface resistivity (providing a finished part with electromagnetic interference (EMI) shielding characteristics), it does not suggest a long-felt but unresolved need for preselected controlled electrical surface resistivity of carbon fiber sheet products or for the heat treatment methods claimed in the patent to control resistivity. *See* Pl.'s Opp'n MSJ App. 549. Rather, the article highlights that "[v]arious good, workable methods for providing EMI shielding in SMC [sheet molding compound] are available." *Id.* Furthermore, the article points to advantages of the

conductive fiber mats including "low cost, ease of use, no degradation of physical properties and durability of the shielded surface." *Id.* Whereas the Patent sought to improve upon the methods discussed in the article, the authors of the article appear to praise the advantages of the current methods at the time rather than pointing to any shortcomings or a long-felt unmet need, directly linked to the specific methods claimed in the Patent. Thus, the evidence provided by Zoltek—the Quick and Mate article—does not support a long-established need related to the specific features of the claimed invention of the '162 patent.[18]

b. Praise of the Product Produced from the Patent

As mentioned earlier, the Court is able to discern an argument directed to "praise," from the letter written by Mr. Rodgers. The letter noted that Northrop Corporation purchased carbon fiber paper with "four different levels of resistivity" and that "[t]he product was unique in that the carbon fibers were not fully carbonized, increasing the volume resistivity of the fiber which in turn increases the surface resistivity of the paper." Mr. Rodgers also noted that "Northrop Materials & Processes [Department] had never seen a material of this type before and was not aware of any other company that could supply material in this form with varying electrical properties." Pl.'s Mem. 23.

The Government asserts that the Northrop letter referred to by Zoltek fails to establish "any nexus to the process claimed in the '162 patent." Def.'s Reply MSJ 23. According to the Government, because the letter does not provide the details of the manufacturing methods or "whether Northrop even requested a specific surface resistivity for the 'carbon paper' material," the contents of the letter do not establish the required nexus with the claimed invention for any secondary indicia. *Id.*

Although Zoltek may not have been as clear as it could have been in its argument, the statements by Mr. Rodgers are due more weight than the Government suggests (i.e., no weight). Praise from participants in the industry that is "specifically related to features of the patented invention" tends to support non-obviousness of the patent. *Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1352 (Fed. Cir. 2010). Mr. Rodgers' praise for the products purchased by Northrop Corporation is reasonably attributable to the ability to vary the electrical surface resistivity of the products it purchases, which is a relevant claim of the '162 patent. Furthermore, Mr. Rodgers acknowledges the general method to achieve the varying levels of electrical surface resistivity as claimed by the Patent. In summary judgment, all inferences are made in favor of the non-moving party, and if there is doubt as to a genuine issue of material of fact, that doubt is resolved in favor of the non-moving party. *Cooper v. Ford Motor Co.*, 748 F.2d 677, 679 (Fed. Cir. 1984). In this case, Zoltek's evidence establishes a genuine issue of act as to whether the praise by Mr. Rodgers relates to the specific features of the claimed invention of the '162 patent.

[18] The Government also notes that "[m]ost significant to the issue of long felt need (and the other asserted indicia of non-obviousness), however are the admissions . . . that Zoltek has never manufactured any product made by the patented process. If there was such a long-felt need for the solution presented by the claimed process, there would be some expectation that Zoltek would have commercially developed the claimed process." Def.'s Reply MSJ 24 (citations omitted). As discussed, the Court finds on other bases that Zoltek has not established the required evidence of a long-felt but unmet need.

In sum, Zoltek**,** by the evidence it has presented in opposition to this motion, has not persuaded the Court of a long-felt but unresolved need in support of the non-obviousness of the Patent. With regard to evidence of praise of the product, questions of fact remain. Therefore, evidence of secondary indicia remains an issue for resolution at trial.

6. Comment on the Parties' Briefs

As should be evident from the previous discussion, the Court was at great pains to understand precisely the arguments of the parties. In addition to lack of clarity, the arguments were not keyed into the elements of the law of obviousness. Many of the arguments were not developed. The Plaintiff's response did not join the arguments made in the Government's main brief, and the Government's reply did not join the arguments made in the response. In hindsight, the Court should have ordered a round of revised briefing. All in all, the defective briefings made writing this opinion a frustrating experience and delayed its issuance.

IV. CONCLUSION

Both parties' motions to strike one another's expert report lack merit and are **DENIED**. The Government's Motion for Summary Judgment on obviousness of the '162 patent is also **DENIED.** Summary judgment is not appropriate because the Government has not met its burden in its arguments that the Patent is invalid on the basis of obviousness. With regard to obviousness in light of the combination of the Topchjiev and Layden patents, the Government has not proved by clear and convincing evidence that the Patent is obvious and a genuine issue of material fact remains as to the nature of the prior art patents. For the Government's argument of obviousness in light of the Hashin and Rosen equations with the teachings of Fischbach and Komaki: (1) the issue of whether there was a reason to combine the prior art cannot be resolved on summary judgment because the Government did not address this essential element until their reply brief, and thus, Zoltek has not had a chance to respond and (2) genuine issue of fact remains as to the reasonable expectation of success (i.e., commercial application of prior art). And finally, the incoherent arguments pertaining to obviousness in light of the CAAP coating cannot be resolved on summary judgment.

The parties are ORDERED to file a Joint Status Report on or before January 14, 2011, addressing how they propose to proceed and a schedule for such proceedings.

The parties are reminded that this case is subject to a protective order. The present opinion and order shall be filed under seal until the parties review it to determine whether any information should be redacted prior to publication in accordance with the terms of the protective order. The parties are therefore ORDERED to file a joint report indicating the information that should be redacted, if any, on or before January 14, 2011. In lieu of filing a report, if no redactions will be necessary, the parties may simply inform chambers directly.

s/ Edward J. Damich
EDWARD J. DAMICH
Judge