United States District Court,
C.D. California.

**EOS GmbH ELECTRO OPTICAL SYSTEMS, a German corporation,**
Plaintiff.
v.
**DTM CORPORATION, and Compression, Inc., a division of Moll Industries, Inc., and 3D Systems, Inc,**
Defendants.
**3D Systems, Inc,**
Counterclaimant.
v.
**EOS GmbH Electro Optical Systems,**
Counter-Defendant.

Nos. SACV 00-1230 DOC (MLGx), SA CV 02-0449 DOC (MLGx)

**Jan. 12, 2004.**

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**REVISED *MARKMAN* HEARING CLAIM INTERPRETATION AND ORDER AND REVISED ORDER DENYING PLAINTIFF'S MOTION FOR SUMMARY JUDGMENT OF INFRINGEMENT AND DENYING DEFENDANTS' MOTION FOR SUMMARY JUDGMENT OF NON-INFRINGEMENT**

DAVID O. CARTER**, District Judge.**

Before the Court are the above-captioned patent infringement suits. The cases were consolidated for the purpose, *inter alia,* of construing disputed patent claim terms in U.S. Patent Nos.: 4,929,402 ('402); 5,630,981 (the '981 patent); 5,785,918 (the '918 patent); 5,814,265 (the '265 patent); 5,779,967 (the '967 patent); 5,554,336 (the '336 patent); 5,059,359 (the '359 patent); 5,184,307 (the '307 patent); 5,182,056 (the '056 patent); 5,137,662 (the '662 patent); 5,345,391 (the '391 patent); 5,609,813 (the '813 patent); 5,174,931 (the "1 patent); 6,155,331 (the '331 patent), 5,990,268 (the '268 patent). Plaintiff EOS GmbH Optical Systems (EOS) and Defendant EOS of North America, Inc. (in consolidated Case No. SACV 02-0449)

(collectively EOS) asserts infringement of the first 14 separate patents listed above against Defendants DTM Corporation (DTM) and Compression, Inc. (Compression), together with Defendant and Counterclaimant 3D Systems, Inc. (3D) (Plaintiff in consolidated Case N. SACV 02-0449). Defendants' counterclaim asserts infringement of the '268 patent against Plaintiff and Counterdefendant EOS.

On June 6 and June 17, 2003, the Court conducted a tutorial and hearing to assist it in construing the claims. In addition, the parties each moved for summary judgment. EOS moved for Summary Judgment of Infringement of Claim 4 of the '981 patent. DTM moved for Partial Summary Judgment of Noninfringement as to all claims asserted by EOS. After considering the arguments and evidence presented by all parties, the Court issued an order on August 20, 2003, entitled "Markman Hearing Claim Interpretation and Order Granting Plaintiff's Motion for Summary Judgment of Infringement and Denying Defendant's Motion for Summary Judgment of Non-Infringement." ("First Markman Order")

In the intervening months, the Court became increasingly convinced that some of its rulings in the First Markman Order were incorrect. Particularly, the Court has reexamined, *sua sponte,* its definitions for "stereolithography," "medium capable of solidification," and "window of sinterability" and ordered supplemental briefing on those questions. The Court now VACATES the First Markman Order and enters this Order changing the construction of the terms "stereolithography" and "medium capable of solidification," as well as the construction of "moving the lamina away from said designated surface." The Court also reverses its prior decision granting summary judgment to the Plaintiff as to infringement of the '981 patent which is now DENIED. Defendants' cross-motion for summary judgment as to non-infringement of the ' 981 patent is also DENIED.

## I. BACKGROUND

### A. Factual Background

The parties are engaged in the business of creating machines for rapid prototyping. Rapid prototyping allows the creation of parts in a stand-alone machine, without the need for the creation of a mold or other traditional means of prototyping. Rapid prototyping thus allows the creation of prototypes more quickly (and often more cheaply) than other prototyping methods. In addition, rapid prototyping allows flexibility for design changes and modifications more easily and efficiently than other processes. The completed objects have smooth surfaces, enabling them to be used for style modeling or technical tests. Because the objects can be fabricated in a matter of hours, the process saves enormous amounts of time for manufacturers creating prototype parts. The process also reduces waste from traditional methods of prototyping, and allows the creation of objects that would not be possible with conventional tools.

There are several rapid prototyping methods, including two processes generally known as "stereolithography" and "selective laser sintering." Both processes typically begin with designing a three dimensional object, usually with the use of a computer assisted design program (CAD). Once the design of the object is complete, the object can be fabricated using either a stereolithography or laser sintering machine. In both machines, a computer controlled laser beam is focused at certain parts of the material-usually a liquid resin in a stereolithography machine and a powder in a laser sintering machine-to create a perfect, solid cross-section of the object. The laser is then directed to repeat the process to correspond with the second cross-section. The process is repeated, hundreds or thousands of times until the object takes shape.

During the 1980's and up until the late 1990's, 3D was primarily engaged in stereolithography, while DTM

worked primarily in the laser sintering field. EOS sold machines in both fields. In the 1990's, 3D filed cases for patent infringement against EOS in the patent offices of several European countries. After significant litigation, EOS and 3D concluded a global settlement intended to resolve the various disputes between them. As part of the global settlement, 3D and EOS entered into (1) a Settlement, Purchase and Transfer Agreement, (2) a License Agreement, and (3) a Non-Competition Agreement. The Licensing Agreement gave EOS an exclusive, worldwide, field-of-use license to the stereolithography patents at issue in this case.

The first communication between DTM and either 3D or EOS regarding the patents-in-issue in this case came in an April 1996 letter from general counsel for 3D, A. Sidney Alpert, to DTM (the Alpert Letter). The Alpert Letter addressed the existence of the '402, '359, '662 and "1 patents. DTM thereafter obtained advice from its patent counsel, Rodney Anderson, that DTM was not infringing any of the patents. After EOS and 3D executed the Licensing Agreement, thereby giving EOS the right to sue for infringement of those patents, EOS sent a letter to DTM in November 1997, accusing DTM of infringing six of the patents (the '402, '981, '359, '662, '307 and "1 patents) (Prufer Letter). DTM again sought Anderson's advice, who provided written opinion letters stating that DTM was not infringing on any of the six patents.

After the Prufer letter, EOS and DTM engaged in discussions concerning DTM's alleged infringement and other business issues, including a potential merger. Those negotiations were ultimately unsuccessful. The parties began filing a series of patent infringement cases in 2000.

**B. Procedural History**

This action was commenced in December 2000, by EOS against Defendants DTM and Compression, for infringement of stereolithography patents. EOS's filing came on the heels of DTM's January 21, 2000 Complaint for Declaratory Judgment of Non-Infringement against EOS, filed in United States District Court for the Western District of Texas. The Declaratory Judgment action was voluntarily dismissed on November 6, 2000.

On August 31, 2001, 3D and DTM merged, with 3D as the remaining corporation. The merger was initially blocked by the United States Department of Justice Antitrust Division (DOJ) because it found that the newly merged 3D would hold a monopoly in the field of rapid prototyping. 3D and DOJ entered into a consent decree whereby 3D was required to license either its laser sintering or stereolithography technology. Although 3D at first indicated that it would likely license its laser sintering technology to EOS, it has since fulfilled its requirements by licensing its stereolithography technology to another party.

The Court subsequently joined 3D as an involuntary plaintiff because it was the owner of the patents under which EOS brought suit as the exclusive licensee. On September 4, 2001, based on the representations by 3D that DTM was continuing as a separate but wholly owned subsidiary, the Court denied 3D's *ex parte* application to re-align the parties. On September 17, 2001, 3D filed a separate patent infringement action in this district (the September Case), which was then transferred to this Court. In the September Case, 3D alleged that EOS had infringed the '268 Patent, as well as U.S. Patent No. 6,136,948 ("8). 3D applied for a temporary restraining order to enjoin EOS from selling its allegedly infringing laser sintering powders. The Court denied that application for several reasons, but set the matter for a hearing on a preliminary injunction. 3D then voluntarily dismissed the September Case on October 16, 2001. The following day, the Court granted 3D's motion for reconsideration of its earlier order denying the re-alignment of parties, based on new information presented by 3D that DTM was no longer a going concern, but had now been subsumed by 3D. 3D immediately sought to amend its pleadings to answer the complaint and assert counter-claims.

Eventually, 3D added a counterclaim against EOS alleging infringement of the '268 and "8 Patents. These are the same patents that 3D had asserted against EOS in the September Case.

3D obtained partial summary adjudication limiting EOS's relief against it to events that occurred prior to DTM's merger into 3D because the license agreement between 3D and EOS allowed 3D to practice in the art. On two occasions, 3D moved for summary adjudication asking the Court to definitively find that the License Agreement between 3D and EOS does not give EOS a license to practice the '268 and "8 Patents. Twice, the Court rejected that argument, finding in its order on March 4,2002 that discovery needed to be conducted to determine whether the License Agreement gave EOS rights under the '268 and "8 Patents. Later, on May 14, 2002, the Court denied 3D's motion for a preliminary injunction to enjoin EOS from selling its allegedly infringing laser sintering powder.

## II. LEGAL STANDARD

Claim interpretation is a matter of law, Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed.Cir.1995) (en banc) ( *Markman I* ), and is thus amenable to summary judgment, Phonometrics Inc. v. N. Telecom Inc., 133 F.3d 1459, 1463 (Fed.Cir.1998). The Court may resolve a claim interpretation dispute pursuant to a traditional summary judgment motion, even though the analysis involves both issues of law and questions of fact. Id. at 1463-64. Many recent courts, however, have chosen to have a claim interpretation hearing, or *Markman* hearing, to facilitate the claim interpretation process. *E.g.,* Ethicon Endo-Surgery, Inc. v. United States Surgical Corp., 93 F.3d 1572, 1577 (Fed.Cir.1996). This Court conducted a *Markman* hearing from March 19, 2002 to March 21, 2002.

The parties were given the opportunity to present evidence related to Defendants' products, in addition to evidence that only applies to claim interpretation. The parties have now filed summary judgment motions to resolve both the claim interpretation and the issue of infringement in one ruling by the Court. Thus, the standard for summary judgment motions applies. Summary judgment is proper if "the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to judgment as a matter of law." Fed.R.Civ.P. 56(c).

## III. ESTOPPEL ARGUMENTS

EOS argues that due to the license granted by 3D under the "stereolithography patents" for EOS to practice in the area of laser sintering, 3D should be legally and/or equitably estopped from asserting that DTM's machines do not infringe the stereolithography patents. FN1

FN1. The Court pauses to note that it is being charitable to EOS's presentation of its arguments. It, in fact, characterizes its use of legal estoppel as a barrier to 3D's challenge to invalidity. "3D is also precluded from contesting validity based on the doctrine of licensor estoppel." EOS Response to Markman Brief, p. 2, Ins. 24-25. "While the doctrine is generally raised as 'assignor estoppel,' it also works against licensors to prevent repudiation of the licensed-patent's validity." *Id.,* p. 3, Ins. 6-7. However, 3D never attempts to argue that the licensed stereolithography patents are invalid.

### A. Legal Estoppel

Legal estoppel may be invoked when "the licensor (or assignor) has licensed (or assigned) a definable

property right for valuable consideration, and then has attempted to derogate or detract from that right." AMP, Inc. v. United States, 182 Ct.Cl. 86, 389 F.2d 448, 452 (Ct.Cl.1968).

The invocation of legal estoppel requires a court to consider the nature of the property right that has been conveyed. *See* id. at 453. In this case, the licensing agreement defines the full extent of the respective rights and responsibilities of the parties. See Licensing Agreement (Gannon Decl. Ex. O) para. 8.2 (integration clause).

The Licensing Agreement clearly and unequivocally disclaims any warranty of validity or scope on the part of 3D. "Nothing in this Agreement shall be construed as: a) A warranty or representation by LICENSOR as to the validity or scope of Licensed Patent; or b) ..." Licensing Agreement (Gannon Decl. Ex. O) para. 5.2 (caps in original). There is no ambiguity in the integrated writing that would warrant looking to extrinsic evidence.

EOS received, like any patent licensee, freedom from suit by the licensor to the extent that the licensed patents covered laser sintering. *See* Spindelfabrik Suessen-Schurr Stahlecker & Grill GmbH v. Schubert & Salzer Maschinenfabrik Aktiengesellschaft, 829 F.2d 1075, 1081 (1987) ("As a threshold matter, a patent license agreement is in essence nothing more than a promise by the licensor not to sue the licensee."). In addition, EOS received certain rights to pursue others that may have been practicing the licensed patents to the extent that the patents covered laser sintering. Licensing Agreement para. 3.1. As evidenced by the warranty section of the Licensing Agreement, EOS bore the risk that the scope of the patents would not be adjudicated in its favor in a future judicial proceeding. EOS bought a risky asset-maybe the patents would cover laser sintering, maybe not.

Contrary to EOS's implications, contractual rights are bought and sold all of the time which may or may not have any ultimate value. The most obvious example is a simple stock warrant. The seller of a warrant grants the purchaser the right to buy a share of stock from the seller at a given price, for example, the current price when the warrant is sold. If the value of the stock goes up before the expiration of the warrant, the option has value; if the stock value goes down, the warrant is worthless. In this situation, it is clear that not only might the seller of the warrant be selling an ultimately worthless right, the seller actually *hopes* that the warrant will ultimately have no value. Otherwise the gain to the warrant purchaser will come from the warrant seller's pocket.

The express disclaimer of warranty in the licensing agreement made it clear that 3D was not taking a position on whether or not the patents covered laser sintering. That's what a disclaimer of warranties means. To bar 3D from defending itself in this action would rewrite the licensing agreement and give EOS something that it did not bargain for: a warranty that DTM's actions in laser sintering are covered by the licensed stereolithography patents. The doctrine of legal estoppel does not require 3D to capitulate and admit liability when faced with a suit brought by EOS when it has expressly disclaimed any warranty as to the scope of its patents.

**B. Equitable Estoppel**

This is not an appropriate situation for equitable estoppel. It is well-established law that equitable estoppel can only be used defensively. "It can never be used as sword [sic] to gain unfair advantage by the one seeking to assert it." In re Marriage of Umphrey, 218 Cal.App.3d 647, 267 Cal.Rptr. 218, 223 (Cal.Ct.App.1990). Further, "[a] court cannot, under the guise of equity, confer substantive rights on a party

who otherwise has none." *Id.; see also* Green v. Travelers Indemnity Co., 185 Cal.App.3d 544, 230 Cal.Rptr. 13, 20-21 (Cal.Ct.App.1986) ("axiomatic is also the rule that the theory of estoppel is invoked as a defensive matter to prevent the party estopped from alleging or relying upon some fact or theory that would otherwise permit him to recover something from the party asserting estoppel. Or as frequently stated, 'The doctrine acts defensively only.' ")

In this situation it is clear that EOS is using its equitable estoppel argument as a sword. It argues that 3D cannot be heard to defend itself as to the scope of the stereolithography patents, regardless of the valid scope of the patents at issue as determined by law. This would clearly confer substantive rights under the patent law to which EOS may not be entitled.

Even if the Court were to ignore that critical limitation, EOS cannot establish the necessary showing for equitable estoppel. Among other things, equitable estoppel requires that "the party to be estopped must know the facts" and "the party asserting the estoppel must be ignorant of the true state of the facts." DRG/Beverly Hills, Ltd. v. Chopstix Dim Sum Cafe and Takeout III, Ltd., 30 Cal.App.4th 54, 59, 35 Cal.Rptr.2d 515 (1994). EOS points to no facts known by 3D and not revealed to EOS. Instead, its discussion centers around what 3D may or may not have thought about the scope of the claims in the stereolithography patents, a legal conclusion. There is no assertion that 3D withheld any relevant facts that would have prevented EOS from making a determination of the scope and value of the patents before EOS entered into the Licensing Agreement that specifically disclaimed 3D's warranty of patent scope.

**IV. CLAIMS INTERPRETATION**

The parties propose that the following seven (7) terms be construed by the Court, pursuant to *Marhnan v.* Westview Instruments, Inc.(Markman II), 517 U.S. 370, 371-73, 116 S.Ct. 1384, 1387-88, 134 L.Ed.2d 577 (1996), as those terms are used in the fifteen (15) patents in suit. The parties have agreed to propose that the following three (3) terms be construed in light of the claims in the 3D patents:

1. **Stereolithography** (and other terms with a "stereolith" prefix)

2. **Synergistic stimulation**

3. **Medium capable of solidification**

In addition, 3D Systems proposed that the following two (2) additional terms be construed by the Court:

4. **Moving the lamina formed away from said designated surface**

5. **Cure**

EOS proposed that the following two (2) terms be construed by the Court in light of the disputed claims language in the '268 patent:

6. **Window of sinterability**

7. **Particle size distribution**

**A. Governing Law**

A patent infringement analysis involves two separate steps: (1) interpretation of the asserted claims, and (2) comparing the claims to the accused device. Marhnan I, 52 F.3d at 976. Three principal sources are used in claim interpretation: the claims, the specification, and the prosecution history. Id. at 979 (quoting Unique Concepts, Inc. v. Brown, 939 F.2d 1558, 1561 (Fed.Cir.1991)). Claim interpretation begins with the language of the claim. K-2 Corp. v. Salomon S.A., 191 F.3d 1356, 1362 (Fed.Cir.1999). As a general rule, terms in a claim are to be given their ordinary and accustomed meaning. *Id*.

The terms must, however, be read in the context of the patent specification. *E.g.,* Advanced Cardiovascular Sys., Inc. v. Scimed Life Sys., Inc., 261 F.3d 1329, 1338 (Fed.Cir.2001) (quoting *Markman I,* 52 F.2d at 979). The specification includes a written description of the invention which explains the invention and defines key terms. *Markman I,* 52 F.2d at 979. Additionally, the court should also consider the prosecution history, which is the "undisputed public record" of the patent. *Id*. at 980. If there is a meaning set out in these intrinsic materials that varies from the ordinary meaning for the terms, that definition will control. K-2 Corp., 191 F.3d at 1362-63.

Extrinsic evidence, such as expert testimony and learned treatises, may also be helpful to understand a patent's underlying scientific principles and give meaning to technical terms and terms of art. Seymour v. Osborne, 11 Wall. 516, 78 U.S. 516, 546, 20 L.Ed. 33 (1870). This evidence is received at the discretion of the court and is not controlling. *See id.; see also* Biovail Corp. Int'l v. Andrx Pharm ., Inc., 239 F.3d 1297, 1300 (Fed.Cir.2001). After examining all relevant intrinsic and extrinsic evidence, the court then pronounces, as a matter of law, the meaning of the terms in each asserted claim. Markman I, 52 F.3d at 981 (citing Loom Co. v. Higgins, 105 U.S. 580, 586, 26 L.Ed. 1177 (1881)).

**B. The DTM Patents**

The parties have proposed a single construction of each of the three agreed-upon disputed terms, and each of the two disputed terms proposed by DTM, that applies to the usage of that term in all fourteen patents in suit asserted by EOS against DTM. As a result of a stipulation, the parties are not requesting separate constructions of each disputed term in each patent (potentially 70 separate constructions). A single construction for each of these five disputed terms is proper in this case because of the extensive continuation and continuation-in-part relationship among these patents and the extensive intermingling of the specifications through the use of incorporations by reference. The number of cross-references is large, and the cross-referencing is complex. This type of construction is only possible where the Court looks at the first instance in the series of patents in which the term is employed. Therefore, neither the parties nor the Court have provided patent-unique constructions of these five disputed terms.

***1.* "*Stereolithography*"**

**"Stereolithography"** is construed to mean a method and apparatus for making solid objects by successively forming thin layers of solid material from a solidifiable material, FN2 one on top of the other.

FN2. The Court considers "solidifiable material" to be a synonym for "medium capable of solidification," discussed *infra*.

EOS contends that "stereolithography" means drawing upon a substantially two-dimensional surface and

extracting a three-dimensional object from that surface, from solidifiable materials (e.g. fluid or fluid-like materials such as photopolymers, sinterable powders and bindable powders).

3D contends that "stereolithography" means an apparatus for providing three-dimensional objects on a layer-by-layer basis, wherein successive cross-sections of the object are formed, on top of another, from a liquid-based photocurable resin that cures and solidifies when radiated.

It is well accepted that a patentee may be his own lexicographer, provided that the definition is clearly set forth in the claims or the specification. *See* Beachcombers v. WildeWood Creative Prods., Inc., 31 F.3d 1154, 1158 (Fed.Cir.1994). The language in the claims does not clearly set forth the meaning of the term. Since questions remain after looking at the claim itself, the Court should read the claim language in light of the specification. *See Vitronics,* 90 F.3d at 1582; Markman I, 52 F.3d at 976.

The term is often defined as using a fluid medium. For example, in the '402 patent:

This invention relates generally to improvements in methods and apparatus for forming three-dimensional objects from a **fluid medium** and, more particularly, to **stereolithography** involving the application of lithographic techniques to production of three-dimensional objects, whereby such objects can be formed rapidly, reliably, accurately and economically.

('402 patent, col 1, lns. 12-20, emphasis added.)

Hence, the **stereolithographic** system of the present invention generates threedimensional objects by creating a cross-sectional pattern of the object to be formed at a selected surface of a **fluid medium,** e.g., a UV curable liquid or the like, capable of altering its physical state in response to appropriate synergistic stimulation such as impinging radiation, electron beam or other particle bombardment, or applied chemicals (as by ink jet or spraying over a mask adjacent the **fluid** surface), successive adjacent laminae, representing corresponding successive adjacent cross-sections of the object, being automatically formed and integrated together to provide a step-wise laminar or thin layer buildup of the object, whereby a three-dimensional object is formed and drawn from a substantially planar or sheet-like surface of the **fluid medium** during the forming process.

('402 patent, col. 5, Ins. 18-34, emphasis added.)

The patent has occasional references only to a "liquid" or "UV curable liquid," but this is generally by way of example. E.g.,

**"Stereolithography"** is a method and apparatus for making solid objects by successively "printing" thin layers of a curable material, **e.g., a UV [ultra-violet] curable material,** one on top of the other. A programmed movable spot beam of UV light shining on a surface or layer of **UV curable liquid** is used to form a solid cross-section of the object at the surface of the **liquid.** The object is then moved, in a programmed manner, away from the liquid surface by the thickness of one layer, and the next cross-section is then formed and adhered to the immediately preceding layer defining the object. This process is continued until the entire object is formed.

('402 patent, col. 2, Ins. 43-54, emphasis added.)

However, a patent that actually includes the term "stereolithography" in its claims defines it to include "solidifiable materials."

This invention relates to the field of **stereolithography,** which is a technique for making solid, three-dimensional objects (or "parts") from **solidifiable materials** (e.g. fluid or fluid like material such as photopolymers, sinterable powders, and bindable powders).

...

Basically, **stereolithography** is a method for automatically building complex three-dimensional parts by successively solidifying thin cross-sectional layers. These layers may be composed of photopolymer resin, powdered materials, or the like.

('813 patent, col. 1, lns. 33-37, 42-46, emphasis added.)

The disagreement between the parties focuses on the range of materials that are used: liquids that are cured, or any fluid or fluid-like materials that are formed into a solid or fused into a structure. It is clear from the definitions of the term quoted above that "stereolithography" is not limited to materials cured by UV illumination, (though this is the example used to illustrate the method), but can properly apply to the use of materials formed into a solid by other radiation.

The question of limitation to particular kinds of media is more difficult. Since the definitions for "stereolithography" consistently refer to fluid media, of which liquids are a subset sometimes used by way of example, the Court accepts that stereolithography extends to the use of any fluid medium. However, there is at least some tension between the specifications of the various patents on the question of whether stereolithography only applies to fluids or whether it applies to all "solidifiable materials."

After much thought, the Court finds that it is better to apply the potentially broader "solidifiable materials." While the specifications of most of the patents would lead one to think of stereolithography as limited to fluid media, the specifications of the patents actually using the term in the claims define it to include "solidifiable materials." This is not a case of a patentee using a later patent in a series to retroactively broaden its scope of protection. In this case, the earlier patents never used the term stereolithography to define the scope of the claims and, therefore, the broad use of the term in later patents adds nothing to the scope of the earlier ones.

Further, there is little to nothing in the other patents-those that seem to define stereolithography as only involving fluids-that would serve to limit the medium beyond that of a "medium capable of solidification." It appears to the Court that "solidifiable material," or "medium capable of solidification," was the limitation on the medium imposed by the applicant and Examiner. However, as discussed below in the construction of medium capable of solidification, the precise scope of those terms is anything but immediately apparent.

***2. "Synergistic Stimulation"***

**"Synergistic stimulation"** is construed to mean any type of impinging radiation, electron beam or other particle bombardment, or applied chemicals (as by ink jet or spraying over a mask adjacent the fluid surface), which is capable of altering the physical state of one or more materials.

EOS contends that "synergistic stimulation" includes any kind of energy that is emitted from a source, as in the form of rays or waves, (e.g. heat, light or sound).

3D contends that "synergistic stimulation" means radiation that interacts with a liquid-based resin containing photoinitiators, wherein the interaction between the radiation and the photoinitiators causes the liquid resin to cure thereby resulting in the rapid transformation of the liquid-based resin to a solid state.

The disagreement between the parties is whether the stimulation is limited to that which will cure photosensitive liquids, or is any type of radiated energy. The language in the claims does not clearly set forth the meaning of the term. Since questions remain after looking at the claim itself, the Court should read the claim language in light of the specification. *See Vitronics,* 90 F.3d at 1582; Markman I, 52 F.3d at 976.

... appropriate **synergistic stimulation** by impinging radiation, particle bombardment or chemical reaction, ...

('402, Abstract, emphasis added.)

Of course, it will be appreciated that other forms of appropriate **synergistic stimulation** for a curable fluid medium, such as particle bombardment (electron beams and the like), chemical reactions by spraying materials through a mask or by ink jets, or impinging radiation other than ultraviolet light, may be used in the practice of the invention without departing from the spirit and scope of the invention.

('402 patent, col. 2, lns. 61-68, emphasis added.)

Many liquid state chemicals are known which can be induced to change to solid state polymer plastic by irradiation with ultraviolet light (UV) or other forms of **synergistic stimulation** such as electron beams, visible or invisible light, reactive chemicals applied by ink jet or via a suitable mask.

('402 patent, col. 4, lns. 40-48, emphasis added.)

... a fluid medium, e.g., a UV curable liquid or the like, capable of altering its physical state in response to appropriate **synergistic stimulation** such as impinging radiation, electron beam or other particle bombardment, or applied chemicals (as by ink jet or spraying over a mask adjacent the fluid surface), ...

('402 patent, col. 5, lns, 22-27, emphasis added.)

It is clear from the definitions of the term set forth above that "synergistic stimulation" is intended to alter the physical state of a material. In this case, the definitions do not make specific and exclusive reference to liquid materials, nor to any particular type of radiation or other stimulation. The Court does not agree with 3D that the term is limited to liquid resin materials. While 3D's proposed construction is too limiting, EOS's proposal is too broad. As explained above, it is clear from the definitions that a change in the physical material is the outcome of the application of the impinging radiation.

***3.*** "***Medium Capable of Solidification***"

"**Medium capable of solidification**" is construed to mean a flowable material that can be formed into a solid mass.

EOS contends that "medium capable of solidification" is the substance used for forming three-dimensional parts, and includes any liquid or powder capable of becoming solid, firm, hard or compact.

3D contends that "medium capable of solidification" means a liquid-based material that is transformed into a solid as a direct result of laser-produced radiation or stimulation.

The basic disagreement between the parties focuses on whether the material can be in a solid phase (or solid state) prior to solidification. It is not clear to the Court that there is a single common understanding of "solidification" that would help to resolve this dispute.

Given that the meaning of "medium capable of solidification" is not readily apparent from the claims, the Court turns to the specification and prosecution history. The specification of the '402 patent clearly favors an interpretation of "solidification" that involves a change of phase through repeated and exclusive reference to a "fluid medium," not only in the description of the preferred embodiments but also in the discussions of the fundamental nature of the invention.

Briefly, and in general terms, the present invention provides a new and improved system for generating a three-dimensional object by forming successive, adjacent, cross-sectional laminae of that object at the surface of a **fluid medium** capable of altering its physical state in response to appropriate synergistic stimulation, the successive laminae being automatically integrated as they are formed to define the desired three-dimensional object.

('402 patent, col. 2, lns. 20-29, emphasis added) (summary of the invention).

By way of example, in the practice of the present invention, a body of a **fluid medium** capable of solidification in response to prescribed stimulation is first appropriately contained in any suitable vessel ...

('402 patent, col. 3, lns. 1-4, emphasis added.)

... an appropriate form of synergistic stimulation, such as a spot of UV light or the like, is applied as a graphic pattern at the specified working surface of the **fluid medium** to form thin, solid, individual layers at that surface, ...

('402 patent, col. 3, lns. 7-11, emphasis added.)

In this regard, as the **fluid medium** cures and solid material forms as a thin lamina at the working surface, ...

('402 patent, col. 3, lns. 16-18, emphasis added.)

Importantly, however, during the prosecution of the '402 patent, the correspondence from the applicant to the Examiner included this quote:

At the interview, Examiner Fertig was also advised that the adjective "fluid" in the claims was deleted from the description of the medium capable of solidification as an unnecessary limitation in setting forth the concepts of the invention. It is clear that the material used in the practice of the invention can be any flowable material capable of solidification.

('402 Prosecution History, Paper # 7, p. 19).

Statements made during the prosecution of a patent should be considered by the Court in its claims construction. *See* Southwall Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1576 (Fed.Cir.1995) ("Arguments and amendments made during the prosecution of a patent application and other aspects of the prosecution history, as well as the specification and other claims, must be examined to determine the meaning of terms in the claims."). Since "fluid" and "flowable material" have extremely similar common meanings, the rational interpretation of the distinction being made is that the medium capable of solidification will not be limited to the phases of matter commonly associated with fluids, i.e. liquids and gases.

However, this otherwise reasonable conclusion is severely undercut by the Examiner's explicit comments regarding the so-called "deep dip" claims of the ' 402 patent (claims 1-15).

At that time, Examiner Fertig indicated, and so stated in her PTOL-413 summary, that she agreed with the Applicant and its representatives that the proposed amended claims "... appear to be allowable because the prior art does not suggest dipping down into the bath and bringing the piece back up to the desired layer thickness or the resin having the cohesive properties to form the then unsupported layers."

'402 Prosecution History, Paper No. 7, p. 19.

The concentration on the "dipping down" aspects of the claims indicates that the understanding of the Examiner is that claims 1-15 can only be practiced using a medium that allows the described dipping. Further, EOS admits that the "deep dip" claims are "limited to a liquid medium because of the dipping requirement." (EOS Reply in Support of Its Motion for Summary Judgment on Infringement of Claim 4 of U.S. Patent No. 5,630,981 at 4:13), Since claims 1 and 11 (the independent claims) do not otherwise modify "medium capable of solidification" to account for this admitted limitation, the Court sees no choice but to conclude that a "medium capable of solidification" must be capable of having something dipped down into it for the purposes of these claims.

The force of precedent favors a single interpretation for a given term for all claims of related patents that include the term.

Interpretation of a disputed claim term requires reference not only to the specification and prosecution history, but also to other claims. The fact that we must look to other claims using the same term when interpreting a term in an asserted claim mandates that the term be interpreted consistently in all claims. Accordingly, arguments made during prosecution regarding the meaning of a claim term are relevant to the interpretation of that term in every claim of the patent absent a clear indication to the contrary.

Southwall Technologies, Inc. v. Cardinal IG Co., 54 F.3d 1570, 1579 (Fed.Cir.1995) (internal citations omitted). Therefore, the implicit limitation on the medium contained in the "deep dip" claims, '402 patent, cl. 1-15, should extend to all of the claims.

EOS asserts that Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc., 334 F.3d 1294 (Fed.Cir.2003), compels a different conclusion. The Court disagrees. In *Brookhill-Wilk 1,* the court was faced with the construction of the term "remote location" in the context of a patent covering robotic surgery. One party argued that "remote" should mean outside of the operating room while the other argued that "remote" merely meant

beyond the normal range of manual surgical tools, i.e. the doctor is not standing over the patient. There were apparently no claims that could *only* be practiced if the surgeon and patient were in separate rooms. Therefore, it was appropriate to give the claims the full breadth that they imply-the doctor only had to be beyond the normal range for surgery-instead of carving out a limitation based solely on the embodiments given in the specification.

Here, however, there are claims that EOS admits can only be practiced with a liquid medium-or at least a medium that would allow the "deep dip" process. The broad construction supported by EOS simply would not be plausible when applied to those claims.

Of course, the argument that "medium capable of solidification" is limited to liquids in claims 1-15 of the '402 patent (and thus in all the claims) is in tension with the earlier support in the prosecution history for a definition of "medium capable of solidification" that is not limited to liquids or gases. It is clear that the material can be any "flowable" material given the removal of the word "fluid" that had previously modified "medium capable of solidification" in the claims. ('402 Prosecution History Paper # 7, p. 19).

The best way to resolve the conflict is to consider the inherent problem with defining "medium capable of solidification" as "any flowable material capable of solidification." As 3D correctly points out, it would be foolish to open up the definition to all materials that are flowable in the abstract, e.g. "rocks flowing down a hill in an avalanche." "Flowable" has to be grounded in some concept of the invention. The precise point at which a medium is considered to be "flowable" will depend on the forces to be applied to that medium in a given context. Rocks on a hillside are normally not flowable, but in an avalanche or a rockslide, they clearly do flow.

The Court strongly considered limiting "medium capable of solidification" to liquids given the statements of EOS with regard to the "deep dip" claims. However, that would be a questionable conclusion given: (1) the explicit removal of the "fluid" limitation to "medium capable of solidification," (see ' 402 Prosecution History Paper # 7, p. 19) and (2) the fact that EOS obviously did not intend to limit the definition in that way. Moreover, it appears to the Court that "dipping," at least in the abstract, is not necessarily limited to liquids. (Think of a child being dunked into one of those pits of multicolored plastic balls.) In fact, there is good reason to believe that the actual language of the claims can be practiced with most powders although that is a factual question.

Therefore, the Court interprets the limitations on the medium in the context of the "deep dip" claims to constitute the appropriate limitation on the flowable nature of the medium capable of solidification. That is, if a medium could be used in the independent deep dip claims, it is "flowable" for the purposes of the construction of the stereolithography claims. This way, the seemingly contradictory aspects of the prosecution history are harmonized.

***4. "Moving the Lamina Formed Away from Said Designated Surface"***

Upon further reflection, the Court finds that there is no need to further construe the phrase "moving the lamina formed away from said designated surface." The meaning of this phrase in the context of the claims is reasonably clear and precise. Of course, the Court reserves the right to further clarify the meaning of the phrase at the time of trial if that becomes necessary.

***5. "Cure"***

**"Cure"** is altering the physical state of a material, in response to the application of synergistic stimulation, resulting in the material becoming solid.

EOS contends that "cure" means to prepare by chemical or physical processing for keeping or use.

3D contends that "cure" means that upon exposure of the medium to radiation, a chemical reaction occurs in the liquid-based photocurable building material *i.e.,* photopolymer, such that monomers contained in the material polymerize and cross-link thereby causing the material to solidify.

The disagreement between the parties focuses on whether this process step is limited to a chemical change initiated by the application of synergistic stimulation, or whether it can encompass a broader range of changes of physical state (e.g., from a liquid to a solid) that occur after the application of some radiation or stimulation.

In its ordinary and accustomed sense, "cure" means either a chemical reaction resulting in a material becoming solid (as when an epoxy cures), or a drying operation (as in cured meats). The process of a liquid cooling sufficiently to change into its solid state is not ordinarily or customarily referred to as "curing," but rather is ordinarily or customarily referred to as solidification or freezing.

The term "cure" is defined with reasonable clarity, deliberateness, and precision, in claim 23 of the '056 patent, the first patent in the linked series of patents to utilize the term "cure," "curing" or "curable" in any of its claims.

23. An improved stereolithography apparatus for producing a three-dimensional object by forming layers of material curable in response to synergistic stimulation adjacent to previously formed layers of material and successively **curing** the layers of material by exposing the layers of material to a pattern of synergistic stimulation corresponding to successive cross-sections of the three-dimensional object, the improvement comprising:

means for **curing** at least a portion of a first layer of a three-dimensional object, said portion being **cured** using a first exposure of synergistic stimulation having a first penetration depth; and means for **curing** said portion of the first layer using at least a second exposure of synergistic stimulation having a second penetration depth wherein the first and second penetration depths are different.

('056 patent, Claim 23, col. 52, lns. 44-60, emphasis added)

The specification of the '402 patent also recognizes the term "cure" as related to the altering of a physical state, accompanied by the material becoming solid.

"Stereolithography" is a method and apparatus for making solid objects by successively "printing" thin layers of a **curable** material, e.g., a UV [ultra-violet] **curable** material, one on top of the other. A programmed movable spot beam of UV light shining on a surface or layer of UV **curable** liquid is used to form a solid cross-section of the object at the surface of the liquid. The object is then moved, in a programmed manner, away from the liquid surface by the thickness of one layer, and the next cross-section is then formed and adhered to the immediately preceding layer defining the object. This process is continued until the entire object is formed.

('402 patent, col. 2, lns. 43-54, emphasis added.)

As previously indicated, "Stereolithography" is a method and apparatus for making solid objects by successively "printing" thin layers of a curable material, e.g., a UV curable material, one on top of the other. A programmed movable spot beam of UV light shining on a surface or layer of UV curable liquid is used to form a solid cross-section of the object at the surface of the liquid. The object is then moved, in a programmed manner, away from the liquid surface by the thickness of one layer and the next cross-section is then formed and adhered to the immediately preceding layer defining the object. This process is continued until the entire object is formed.

('402 patent, col. 6, lns. 13-26, emphasis added.)

It is clear from the descriptions of the term above that "cure" is not limited to the chemical reaction of liquids containing photoinitiators caused by the application of by UV illumination, (though this is the example used to illustrate the method), but can properly apply to the use of other methods to form materials into a solid. However, the description makes specific and exclusive reference to materials that undergo a change from an initial state to become solid in response to the application of synergistic stimulation.

**C. The** '268 Patent

***1. Particle Size Distribution***

**"Particle Size Distribution"** means the number (or frequency) of particles in each of a number of discrete size ranges.

EOS contends that "particle size distribution" means the particles that behave independently at ambient conditions (i.e. at room temperature, atmospheric pressure and in dry powder).

3D contends that "particle size distribution" means a particle size distribution reported by frequency or number of particles and prepared using generally accepted particle size measuring techniques, including, for example, laser diffraction.

Particle size distribution has a normal and accustomed meaning-the number of particles in each of a number of discrete size ranges. The term as used in Claims 1, 2, 21, and 22 of the '268 patent appears to be consistent with that definition.

1. A method of producing a three-dimensional object, comprising the steps of:

applying a layer of a powder at a target surface, said powder comprised of a semicrystallme organic polymer, said powder having a major portion by weight having a sphericity of at least about 0.5;

having a **particle size distribution** in which a majority of the number of particles in said powder are smaller than about 53 (mu)m; and

having a window of sinterabiliry, defined by a difference between a caking temperature Tc of said powder and a softening temperature Ts of said powder;

directing energy at selected locations of said layer corresponding to a cross-section of an object to be

formed in said layer to sinter said powder thereat; and

repeating said applying and directing steps to form said object in layerwise fashion.

('268 patent, Claim 1, col. 21, ln. 62-col. 22, ln. 13, emphasis added.)

2. The method of claim 1, wherein:

said **particle size distribution** comprises a distribution in which at least about [sic] 80% of the number of particles in said powder are smaller than about 53 (mu)m, substantially all remaining particles in said powder have a size range from about 53 (mu)m to about 180 (mu)m, and substantially no particles in said powder are greater than about 180 (mu)m;

('268 patent, Claim 2, col. 22, lns. 14-21, emphasis added.)

21. A laser sintered article, comprising:

a powder ... having a **particle size distribution** in which a majority of the number of particles in said powder are smaller than about 53 (mu)m;

('268 patent, Claim 21, col. 24, lns. 17-26, emphasis added.)

22. The laser sintered article of claim 21 wherein:

said **particle size distribution** comprises a distribution in which at least about [sic] 80% of the number of particles in said powder are smaller than about 53 (mu)m, substantially all remaining particles in said powder have a size range from about 53 (mu)m to about 180 (mu)m, and substantially no particles in said powder are greater than about 180 (mu)m;

('268 patent; Claim 22, col. 24, lns. 28-33, emphasis added.)

EOS argues for an alternative construction because, apparently, when typical particles are in a device during preparation for sintering, surface forces ( *e.g.,* electrostatic forces) cause many of the small particles to adhere to larger particles. Because of this adherence, the *apparent* particle size distribution is altered from that seen in a testing apparatus, when the preparation of the sample inhibits the adherence of particles to each other.

However, whether some of the particles adhere to each other, or not, is not relevant to determining the proper construction of the term "particle size distribution." This would essentially read limitations from the specification into the construction of the claims. The ordinary and accustomed meaning of the term "particle size distribution," to one of ordinary skill in the relevant art as of November 21, 1996 (the filing date of the application of the '268 patent), as that term is used in Claim 1 of the '268 patent, is sufficient to construe the term.

***2. Window of Sinterability***

**"Window of Sinterability"** is not amenable to construction by the Court.

EOS contends that "window of sinterability" cannot be construed.

3D contends that "window of sinterability" is defined by a difference between the caking temperature, Tc, of said powder, and a softening temperature, Ts, of said powder. It further argues that this should mean that the powder must have a window of sinterability in which the caking temperature, Tc, is greater than the softening temperature, Ts.

The disagreement between the parties focuses on whether the definition or definitions of this term in the specification have sufficient clarity and lack of ambiguity to permit construction of the term. There appears to be no ordinary and accustomed meaning of the term "window of sinterability," and the parties agree that this term was unknown in the rapid prototyping and selective laser sintering art prior to the date of issue of the '268 patent.

If a claim is not amenable to construction then the claim is invalid as indefinite under 35 U.S.C. s. 112, para. 2. Exxon Research & Eng'g Co. v. United States, 265 F.3d 1371, 1375 (Fed.Cir.2001). Whether or not a claim is indefinite "focuses on whether the claims, as interpreted in view of the written description, adequately perform their function of notifying the public of the [scope of the] patentee's right to exclude." S3 Inc. v. nVIDIA Corp., 259 F.3d 1364, 1371-72 (Fed.Cir.2001). Definiteness requires that a term be amenable to construction, but a claim is only indefinite if the "claim is insolubly ambiguous and no narrowing construction can properly be adopted." Exxon Research, 265 F.3d at 1375.

The term "window of sinterability" is defined in the claims and specification of the '268 patent. However, the specification contains multiple conflicting definitions of the term. Window of sinterability is defined in Claim 1 of the ' 268 patent using virtually identical language as that proposed by 3D:

1. A method of producing a three-dimensional object, comprising the steps of:

applying a layer of a powder at a target surface, said powder comprised of a semicrystalline organic polymer, said powder having a major portion by weight having a sphericity of at least about 0.5;

having a particle size distribution in which a majority of the number of particles in said powder are smaller than about 53 (mu)m; and

having a **window of sinterability,** defined by a difference between a

caking temperature Tc of said powder and a softening temperature Ts of said powder;

directing energy at selected locations of said layer corresponding to

a cross-section of an object to be formed in said layer to sinter said powder thereat; and

repeating said applying and directing steps to form said object in layerwise fashion.

('268 patent, Claim 1, col. 21, ln. 63-col. 22, ln. 13, emphasis added)

It is further defined to be the range Tc-Ts at numerous points in the claims.

9. A bed of laser sinterable powder in a selective laser sintering zone, said bed comprising:

a powder comprised of a semi-crystalline organic polymer, said powder

having a major portion by weight having a sphericity of at least about 0.5;

having a particle size distribution in which a majority of the number of particles in said powder are smaller than about 53 (mu)m; and

having a **window of sinterability,** defined by a difference between a caking temperature Tc of said powder and a softening temperature Ts of said powder;

('268 patent, Claim 9, col. 22, lns 51-53, emphasis added). See also ' 268 patent, Claim 2, col. 22, lns. 23-24; '268 patent, Claim 10, col. 23, lns. 16-17.

The specification elaborates on the meaning of Ts and Tc.

Immediately after the initial slice is formed, the slice is much hotter than the powder on which it rests. Therefore a relatively cool powder, as much as about 40 (deg.)C., but more typically about 20 (deg.)C. below its Ts, may be spread over the hot slice and the interface temperature raises the temperature of the powder to near Ts. As the powder is spread evenly over the hot slice it is to remain cool enough to be spread, but soon thereafter, due to heat transfer at the interface, must reach or exceed Ts, or the just-sintered slice will curl; that is, the temperature of the powder preferably enters the "**window of sinterability.**" This window may be measured by running two DSC (differential scanning calorimetry) curves on the same sample of powder, sequentially, with a minimum of delay between the two runs, one run heating the sample past its melting point, the other run, cooling the sample from above its melting point until it recrystallizes. The difference between the onset of melting in the heating curve, Tm, and the onset of supercooling in the cooling curve, Tsc, is a measure of the width of the **window of sinterability** (see FIG. 6).

To ensure that the powder from the feed bed will form a rolling bank even when it is rolled across the hot slice, the powder is usually stored in the feed bed at a storage temperature in the range from 2 (deg.)C. to 40 (deg.)C. below the powder's Ts and transferred at this storage temperature to the part bed, the feed bed temperature depending upon how quickly a layer of powder spread over a just-sintered slice enters the **window of sinterability.** The Ts may be visually easily obtained when the powder is too hot to form a rolling bank, it has reached or exceeded its Ts.

('268, col. 5, ln. 42-col. 6, ln. 4, emphasis added.)

Thus, though it is difficult to measure the interface temperature, or to measure Tc with a temperature probe, so as to measure the width of the window, it can be done visually. When the rolling bank of powder sticks or smears over the last-sintered slice, the Tc of the powder has been reached or exceeded. Thus with visual evidence once can determine the temperature range (Tc-Ts) which is the **window of sinterability** or the "selective laser sintering operating window," so referred to because the powder cannot be sintered successfully at a temperature outside this selective-laser-sintering-window. (see FIG. 6).

('268 patent, col. 6, 1ns. 14-24, emphasis added.)

(c) a **"selective-laser-sintering-window"** in the temperature range from 2 (deg.)C.-25 (deg.)C. between the softening temperature Ts of the powder and its "caking temperature" Tc, such that the powder has a "flow time" of <20 sec for 100 g in a funnel test (ASM D1895-61T) at a temperature near Ts in a range from 70 (deg.)C. to 220 (deg.)C., but below the powder's Tc;

('268 patent, col. 12, lns. 55-61, emphasis added.)

having a **window of sinterability,** defined by a difference between a caking temperature Tc of said powder and a softening temperature Ts of said powder

('268 patent, Claim 21, col. 24, lns. 24-26). (See also '268 patent, col. 4, lns. 55-64; '268 patent, col. 5, lns. 20-36.)

These portions of the specification appear to give sound elaboration on Tc and Ts but even in some of these sections there is confusion in the use of alternative concepts melting temperature, Tm, and supercooling temperature, Tsc. This contusion is further compounded by the same use of melting and supercooling in Figure 6.

This confusion grows when other portions of the patent are studied. Window of sinterability is again defined in relation to the temperature of the onset of melting and the temperature at which supercooling commences, as determined by differential scanning calorimetry (DSC). This second definition appears to be in conflict with the earlier definition which involves spreading the powder and preventing formed pieces from curling.

To put the foregoing details in perspective, one may evoke a physical picture of the **selective-laser-sintering-window** FN3 by reference to FIG. 6 in which curve A (plotted with squares to track heat flow) represents the cooling curve for a sample of tailored PBT powder. The peak occurs at 193 (deg.)C., but supercooling commences near the temperature 202 (deg.)C., a point indicated by the arrow C(Ts). Curve B (plotted with circles) represents the heating curve for the same sample. The peak occurs at 224 (deg.)C., but onset of melting commences near the temperature 212 (deg.)C, a point indicated by the arrow M(Tc). Thus, the **window** is provided by the difference in the temperatures at M and C, which for this sample of PBT is 10 (deg.)C.

FN3. The term "selective laser sintering window" is the equivalent of the term "window of sinterability."

('268 patent, col. 18, lns. 29-42, emphasis added)

Neither the parties nor the Court's appointed technical experts have been able to provide to the Court a clear explanation of this paragraph that is consistent with the patent's prior definition of window of sinterability. The excerpt appears to be offering an alternative definition of the window of sinterability, or perhaps an alternative way of determining it, by trying to draw some form of relationship between the caking temperature, Tc, and the onset of melting of the powder as well as a relationship between the softening temperature, Ts, and the onset of supercooling. The weight of the evidence before the Court shows that the discussion is, at best, irrelevant and inconsistent or, at worst, scientifically incorrect.

While as a preliminary matter the language of the claims clearly defines window of sinterability, it does so

in terms of Tc and Ts. The problem arises from the fact that Tc and Ts are defined in two different ways. The first appears to refer to the "spreadability" of the powder when being prepared for sintering, that is, the need for the powder to be the appropriate temperature to where the sintered piece will not curl and the powder will not stick to the roller. The second definition relates to thermodynamic properties of the powder. The Court cannot say that these two concepts are totally unrelated to each other, but they are not the same thing. "Caking" temperature as understood from the spreading process is not the same as the temperature at the onset of melting and "softening" temperature is not the same as the temperature at the onset of supercooling. From the patent, there is no way to tell which of these two sets of definitions for Tc and Ts is the one on which the public is supposed to rely when assessing the scope of the patent.

The Federal Circuit has previously faced the situation of multiple, inconsistent definitions in a specification. Genentech, Inc. v. Wellcome Foundation Ltd., 29 F.3d 1555 (Fed.Cir.1994). In that case, the solution was not to find the claim incapable of being construed but, rather, to "avoid those definitions upon which the PTO could not reasonably have relied when it issued the patent." Id. at 1564. The *Wellcome* court found that since the patent was issued-and carries with it a strong presumption of validity, it behooves the Court to reason that the Examiner must have had some concept of the meaning of a key term in the very first claim.

Claim 1 directly contains a definition for "window of sinterability," but that definition relies on terms, Tc and Ts, that are themselves defined inconsistently in the patent specification. The Court finds that it is impossible to know which definitions for Tc and Ts the examiner relied upon during the patent prosecution. Therefore, the Court does not feel bound by *Wellcome* to construe window of sinterability.

The recent case of Honeywell Int'l, Inc. v. International Trade Comm'n, 341 F.3d 1332 (Fed.Cir.2003), supports this conclusion. In *Honeywell,* the claims construction dispute involved the term melting point elevation ("MPE"). MPE apparently is fairly well known in the art, but there are a number of different methods for preparing a sample and determining the value of the MPE. Further, the method chosen can affect the value of the MPE for a given specimen. For the purposes of the *Honeywell* patent, "the choice of sample preparation method is critical to discerning whether a particular product is made by a process that infringes the '976 patent claims." *Id*. at 1339.

In our case, the question revolves around the meaning of caking temperature (Tc) and softening temperature (Ts) which are essentially terms coined by the patentee. Like the choice of preparation method to determine BPE in *Honeywell,* in our case there is a question of what method to use to determine Tc and Ts. Also like in *Honeywell,* here there is no way to choose between the two possible methods.

The patentee is granted the power to be his own lexicographer. With this substantial power comes the duty of clarity and consistency in the use of definitions. This is especially important in the case where the words that the patentee defines have no ordinary and accustomed meaning. In that case, when the patentee is not clear and consistent, the public has nowhere to turn to possibly understand the scope of the patent's coverage. Further, we must remember that the standard for public understanding is that of one of ordinary skill in the art. This does not mean that a term is clear if top experts using their superior knowledge can, after substantial concentration, devise a hypothesis for what the patentee was trying to say. Rather, a Court should consider the understanding of the terms of the patent that can be had by one of ordinary skill in the art after a reasonable period of study.

While this Court would normally defer to the PTO's judgment with regard to the validity of patents, this does not mean that claims should always be upheld. When it is impossible to understand the meanings

attached by a patentee to terms with no ordinary and accustomed meanings, the Court must conclude that a mistake has been made. The policy of deference to the expertise of the PTO does not outweigh the large public value of appropriate notice to the public of the subject areas protected by patent. Claims that are poorly defined generate excess litigation because of confusion over coverage for both the patentee and potential infringers. Further, patents grant a monopoly in a given area that potentially reduces innovation. It is not too much to ask that a person seeking such a monopoly clearly delimit the scope of that grant.

In summary, the Court finds that the terms caking temperature (Tc) and softening temperature (Ts) are essential terms in the definition of window of sinterability and that those terms are defined in two different ways in the ' 281 patent with no way for the Court, and more importantly, the public, to choose one definition over the other. Therefore, following *Honeywell,* the term window of sinterabilty cannot be construed and the claims of the '281 patent containing the term window of sinterability are invalid as indefinite.

**IV. INFRINGEMENT OF THE** '981 PATENT

EOS moves for summary judgment on infringement of Claim 4 of the '981 patent. Although EOS has asserted 42 claims contained in 13 patents licensed to EOS, and one patent owned by EOS, EOS contends that if the Court finds Claim 4 of the 3D '981 patent infringed, infringement will be established as to all of the machines and processes that EOS has accused of infringement.

When one or more claims of a patent are infringed, the patent is infringed. Internet America, Inc. v. Kee-VetLab., 887 F.2d 1050, 1055 (Fed.Cir.1989). "An infringement analysis requires a comparison with the claims of the patent, not the patentee's product ." Lee's Aquarium & Pet Prod., Inc. v. Python Pet Prod., Inc., 951 F.Supp. 1469, 1474 (S.D.Cal.1997) (citing Intervet America, 887 F.2d at 1055).

Claim 4 of the '981 patent, with disputed claim terms in bold, states as follows:

A method of producing a three-dimensional object from a **medium capable of solidification** when subjected to **synergistic stimulation,** said method comprising the steps of:

providing data representing the three-dimensional object to be formed which was generated on the CAD system;

forming a first cross-sectional layer of structure by selectively exposing said medium to said **synergistic stimulation** in response to said data;

forming successive layers of medium adjacent to any previously formed cross-sectional layers of structure;

forming and adhering successive cross-sectional layers of structure to any previously formed cross-sectional layers of structure by exposing said medium to said **synergistic stimulation** in response to said data, whereby a plurality of adhered cross-sectional layers of structure form the three-dimensional object.

('981 patent, col. 21, lns. 19-34, emphasis added.)

The crux of the infringement issue is whether the powder used in laser sintering as practiced by DTM qualifies as a "medium capable of solidification" as construed by the Court. Is the powder, as used, "a

flowable material that can be formed into a solid mass?" This is a judgment that is inappropriate for the Court at this time.

The Court finds itself in a situation very similar to the one faced in PPG Industries v. Guardian Indus. Corp., 156 F.3d 1351 (Fed.Cir.1998), and the guidance from that case is apposite here.

Claims are often drafted using terminology that is not as precise or specific as it might be. As long as the result complies with the statutory requirement to "particularly point[ ] out and distinctly claim[ ] the subject matter which relates to the invention," 35 U.S.C. s. 112 para. 2, that practice is permissible. That does not mean, however, that a court, under the rubric of claim construction, may give a claim whatever additional precision or specificity is necessary to facilitate a comparison between the claim and the accused product. Rather, after the court has defined the claim with whatever specificity and precision is warranted by the language of the claim and the evidence bearing on the proper construction, the task of determining whether the construed claim reads on the accused product is for the finder of fact.

*Id*. at 1355.

Similarly here, the term "medium capable of solidification" has been construed with the appropriate level of specificity that can be supported by the evidence. The Court refuses to incorrectly broaden or narrow its interpretation of the phrase merely in order to facilitate summary adjudication on infringement of the '981 patent.

Whether or not the powders used by DTM are "flowable" as construed by the Court is essentially a factual question. Since the parties did not fully anticipate the Court's construction of the claims, summary judgment is inappropriate based on the current materials before the Court. In the interests of fairness, the parties are free to renew their motions for summary judgment regarding the '981 patent in response to the Court's construction. The final date that the Court will hear such a motion is February 23, 2004.

**V. DISPOSITION**

For the reasons given above, the Court VACATES its previous Order of August 20, 2003, "Markman Hearing Claim Interpretation and Order Granting Plaintiff's Motion for Summary Judgment of Infringement and Denying Defendants' Motion for Summary Judgment of Non-Infringement." The Court DENIES Plaintiff's Motion for Summary Judgment of Infringement of U.S. Patent No. 5,630,981 and DENIES Defendants' Motion for Partial Summary Judgment as to Non-Infringement of the Stereolithography Patents.

**IT IS SO ORDERED.**

C.D.Cal.,2004.
EOS GmbH Electro Optical Systems v. DTM Corp.