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)

Aug. 20, 2003.

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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

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 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. After considering the arguments and evidence presented by all parties, the Court will construe the principal disputed terms as set forth below. In addition, the parties each move for summary judgment. EOS moves for Summary Judgment of Infringement of Claim 4 of the '981 patent. DTM moves for Partial Summary Judgment of Noninfringement as to all claims asserted by EOS. Following the claims construction, the Court will set forth its rulings on the parties' motions for summary judgment.

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 quicker (and often cheaper) 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 3D 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 Defendant's 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. CLAIMS INTERPRETATION

The parties propose that the following seven (7) terms be construed by the Court, pursuant to Markman 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 in light of the disputed claims language in the '268 patent. by the Court:

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. Markman 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, 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 between 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 curable liquid, one on top of the other. A programmed movable spot beam of illumination on a surface or layer of 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.

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 explicitly and consistently defined with reasonable clarity, deliberateness, and precision, in the specification. 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, lns. 12-20, emphasis added.)

"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.)

Hence, the **stereolithographic** system of the present invention generates three-dimensional 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, lns. 18-34, emphasis added.)

The disagreement between the parties relating to the proper construction of the term "stereolithography" focuses on the range of materials that are used: liquids that are cured, or any fluid or fluid-like materials, including powders, 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 liquids 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. However, the definition makes specific and exclusive reference to liquid materials, yielding the inclusion of liquid materials in the Court's construction.

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 a material.

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 relating to the proper construction of the term "synergistic stimulation" focuses on 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 material, in any state (i.e., in its solid, liquid or gas phase), that is capable of being transformed into its solid phase or state when acted upon by synergistic stimulation.

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 disagreement between the parties relating to the proper construction of the term "medium capable of solidification" focuses on whether the material can be in a solid phase (or solid state) prior to solidification. The fluid (or non-solid) state of the medium, prior to solidification, appears to be confirmed by the references in the specification of the '402 patent.

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.)

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.)

It would be reasonable to conclude, from the definitions of the term quoted above, that "medium capable of solidification" is intended to alter the physical state of the material from a pre-existing non-solid state or phase into a solid state or phase. 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, Page 19).

Such statements made during the prosecution of a patent are essential to the Court's 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."); Standard Oil Co. v. American Cyanamid Co., 774 F.2d 448, 452 (Fed.Cir.1985) ("the prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance.").

While the applicant could argue that the deletion of the adjective fluid from the description of the medium in the claims of the '402 patent was not necessary in order to obtain claim allowance, nevertheless, the statement of the applicant to the examiner is of record, and forms part of the public notice of the metes and bounds of the claims of the '402 patent, and therefore must be included in the consideration of the construction of the term.

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

"Moving the lamina formed away from said designated surface" is moving a layer of solid material, formed at the surface of a body of a medium, into or out of the surface of the medium.

EOS contends that in evaluating the phrase "moving the lamina formed away from said designated surface," the designated surface is a target surface of the medium. Thus, the phrase should be construed to mean moving the lamina away from the target surface so the next layer (lamina) may be built.

3D contends that "moving the lamina formed away from said designated surface" should be construed as requiring, in the first instance, the formed lamina, and in the second instance, the platform, to be actually separated from the designated working surface of the contained build medium, such that the same working surface is used for each successively formed lamina.

The disagreement between the parties relating to the proper construction of the phrase "moving the lamina formed away from said designated surface" focuses on whether the "designated surface" is the surface of a liquid into which the partially formed three-dimensional object is successively submerged one layer thickness at a time, or whether the "designated surface" can also encompass the surface of a volume of powder on top of which is successively added additional powder one layer thickness at a time.

The phrase "moving the lamina formed away from said designated surface" is defined with reasonable

clarity, deliberateness, and precision, in the '402 patent, beginning with Claim 16:

16. A method for providing a three-dimensional object from a medium capable of altering its physical state when subjected to prescribed radiation, said method comprising: containing a body of medium capable of altering its physical state in response to prescribed radiation, said medium being sufficiently absorptive of said radiation to enable formation of an adequately cohesive **lamina** thinner than one millimeter and capable of being partially unsupported by any other **lamina** during formation; irradiating a **designated surface** of said medium with a prescribed pattern to provide a thin, cross-sectional **lamina** of less than one millimeter in thickness at said **designated surface; moving the lamina formed away from said designated surface;** and repeating said exposing and moving steps and thereby repeatedly forming a plurality of such laminae in succession at said **designated surface** such that each successive **lamina** is formed integrally with the immediately preceding **lamina** to build the three-dimensional object.

('402 patent, Claim 16, col. 14, lns. 1-23, emphasis added.)

The specification provides guidance as to the proper meaning for "designated surface" in Claim 16 of the '402 patent.

"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.)

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 to define a **designated working surface** of the fluid medium at which successive cross-sectional laminae can be generated. Thereafter, 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,** each layer representing an adjacent cross-section of the three-dimensional object to be produced. Superposition of successive adjacent layers on each other is automatically accomplished, as they are formed, to integrate the layers and define the desired three-dimensional object. In this regard, as the fluid medium cures and solid material forms as a thin lamina at the working **surface,** a suitable platform to which the first lamina is secured is **moved away from** the working **surface** in a programmed manner by any appropriate actuator, typically all under the control of a micro-computer or the like. In this way, the solid material that was initially formed at the working **surface** is **moved away from** that **surface** and new liquid flows into the working surface position. A portion of this new liquid is, in turn, converted to solid material by the programmed UV light spot to define a new lamina, and this new lamina adhesively connects to the material adjacent to it, i.e., the immediately preceding lamina. This process continues until the entire three-dimensional object has been formed. The formed object is then removed from the container and the apparatus is ready to produce another object, either identical to the first object or an entirely new object generated by a computer or the like.

('402 patent, col. 3, lns. 1-35, emphasis added)

It is clear from the descriptions of the phrase above that "moving the lamina formed away from said designated surface" is intended to submerge a previously formed layer of solid material into the body of unsohdified medium, thereby creating a new layer of unsohdified medium on top of the previously formed layer. In this case, the claims do not make specific and exclusive reference to a liquid surface.

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 relating to the proper construction of the term "cure" 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 differaction.

EOS has requested that the Court construe the term "particle size distribution," as that term is used in the '268 patent. The term is used in Claims 1, 2, 21, and 22 of the '268 patent.

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 ^{1}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. 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 80% of the number of particles in said powder are smaller than about 53 ^{1}m, substantially all remaining particles in said powder have a size range from about 53 ^{1}m to about 180 ^{1}m, and substantially no particles in said powder are greater than about 180 ^{1}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 ^{1}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 80% of the number of particles is said powder are smaller than about 53 ^{1}m, substantially all remaining particles in said powder have a size range from about 53 ^{1}m to about 180 ^{1}m, and substantially no particles in said powder are greater than about 180 ^{1}m;

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

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. 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." 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 argues that this should be construed to 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 relating to the proper construction of the term "window of sinterability" 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." 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.

The term "window of sinterability" is defined in the specification of the ' 268 patent. However, the specification contains multiple conflicting definitions of the term.

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 ^{1}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)

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(plus-or-minus sign)C, but more typically about 20(plus-or-minus sign)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(plus-or-minus sign)C. to 40(plus-or-minus sign)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 (deg.)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, lns. 14-24, emphasis added.)

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

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

To this point in the specification of the '268 patent, the term "window of sinterability" has been consistently defined in relation to the "caking temperature" Tc and the softening temperature Ts of the powdered material. Additionally the term "selective laser sintering window" has been equated to the term "window of sinterability." The specification of the '268 patent defines the term "window of sinterability" again in Column 18 (by means of its synonym: "selective laser sintering window").

In this case, the term is 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 is in conflict with the definition provided in Columns 5, 6 and 12 of the '268 patent.

To put the foregoing details in perspective, one may evoke a physical picture of the **selective-laser-sintering-window** 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(plus-or-minus sign)C, but supercooling commences near the temperature 202(plus-or-minus sign)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(plus-or-minus sign)C, but onset of melting commences near the temperature 212(plus-or-

minus sign)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(plus-or-minus sign)C.

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

The term "window of sinterability" is not defined with reasonable clarity, deliberateness, and precision, in the '268 patent. Instead, the '268 patent contains multiple conflicting definitions of the term. There is no ordinary and accustomed meaning of the term "window of sinterability." Therefore, the Court is unable to construe the term "window of sinterability."

IV. INFRINGEMENT

A. Literal Infringement and the Doctrine of Equivalents

Patent laws are intended to "promote the Progress of Science and useful Arts" by rewarding invention with a temporary monopoly. U.S. Const. art. I, s. 8, cl. 8; Festo v. Shoketsu Kinzoku Kogyo Kabushiki, 535 U.S. 722, 122 S.Ct. 1831, 1836, 152 L.Ed.2d 944 (2002). Patent laws thus attempt to maintain the delicate balance "between inventors, who rely on the promise of the law to bring the invention forth, and the public, which should be encouraged to pursue innovations, creations and new ideas beyond the inventor's exclusive rights." Festo, 122 S. Ct at 1837; *see also* Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 146, 109 S.Ct. 971, 975, 103 L.Ed.2d 118 (1989) ("From their inception, the federal patent laws have embodied a careful balance between the need to promote innovation and the recognition that imitation and refinement through imitation are both necessary to invention itself and the very lifeblood of a competitive economy.").

In a literal infringement analysis the court first interprets the asserted claims to determine their meaning and scope and then determines whether the claims read on the accused product. Southwall Tech., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1575 (Fed.Cir.1995). "To establish literal infringement, every limitation set forth in a claim must be found in an accused product, exactly." *Id*. Additionally, an examination of a means-plus-function claim is guided by section 112 of the Patent Act. Because a literal reading of means-plus-function language "could encompass any conceivable means for performing the function," the court must construe the patent in light of the patent specification. Valmont Indus., Inc. v. Reinke Mfg. Co., 983 F.2d 1039, 1042 (Fed.Cir.1993). This limits patent protection to the structure specified in the patent and its equivalent. *Id*. Thus, "for a means-plus-function limitation to read on an accused device, the accused device must employ means identical to or the equivalent of the structures, material, or acts described in the patent specification. The accused device must also perform the identical function as specified in the claims." *Id*.

Recognizing that limiting patents to their literal terms diminishes their value, patent protection has been extended by a judicially-created doctrine, the doctrine of equivalents, to include substantially equivalent devices. This is one effort to maintain the balance between protecting inventors and encouraging further innovation. Traditionally, a three-part test is used, which considers whether the accused device performs substantially the same function, in substantially the same way, with the same result. *E.g.,* Graver Tank & Mfg. Co. v. Linde Air Prods. Co., 339 U.S. 605, 608, 70 S.Ct. 854, 856, 94 L.Ed. 1097 (1950). In a fairly recent decision, the Supreme Court synthesized the doctrine of equivalents analysis into a single question: "Does the accused product or process contain elements identical or equivalent to each claimed element of the patented invention?" Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co., 520 U.S. 17, 40, 117 S.Ct. 1040, 1054, 137 L.Ed.2d 146 (1997). The Court noted that "[a]n analysis of the role played by each element in the context of the specific patent claim will thus inform the inquiry as to whether a substitute element

matches the function, way, and result of the claimed element, or whether the substitute element plays a role substantially different from the claimed element." *Id*.

The case law reflects a tension between the doctrine of equivalents and the statutory language controlling means-plus-function claims, which also references equivalents. *E.g.,* Valmont, 983 F.2d 1039. The Federal Circuit has cautioned that the section 112 reference to "equivalents" should not be confused with the doctrine of equivalents which has a different purpose and application. Id. at 1043. The doctrine of equivalents generally applies where the accused device incorporates only an insubstantial change that adds nothing of significance to the patented invention. *Id*. And, as set forth above, it involves an equitable three-part test. Section 112 "equivalents" refers only to those devices that have an insubstantial change in structure compared to the structure found in the specifications. *Id*. Thus, "if the required function is not performed *exactly* in the accused device, it must be borne in mind that section 112, paragraph 6, equivalency is not involved." Pennwalt Corp. v. Durand-Wayland, Inc., 833 F.2d 931, 933 (Fed.Cir.1987) (en banc). It may be said that section 112 limits the potential breadth of protection related to means-plus-function claims, while the doctrine broadens protection for all patent claims in the name of equity.

The doctrine of equivalents should not, however, be applied to a non-pioneer invention so as to "erase a plethora of meaningful structural and functional limitations of the claim on which the public is entitled to rely in avoiding infringement." Pennwalt, 833 F.2d at 935 (quoting Perkin-Elmer Corp. v. Westinghouse Elec. Corp., 822 F.2d 1528 (Fed.Cir.1987)). The doctrine of equivalents in a mean-plus-fiinction claim therefore also requires an element-by element comparison. *See* Pennwalt, 833 F.2d at 935.

B. Claim 4 of the '981 Patent

EOS moves for summary judgment 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 '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. Intervet America, Inc. v. Kee-Vet Lab., 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** 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 accused DTM laser sintering systems include several laser sintering machines that are similar in structure and operation. FN1 Claim 4 of the ' 981 patent, according to the Court's construction of the claim terms, aligns closely with the DTM laser sintering process. *See* Carroll Touch, Inc. v. Electro Mechanical Sys., 15 F.3d 1573, 1576 (Fed.Cir.1993).

FN1. The DTM systems are: Sinterstation 20Q0, Sinterstation 2500, Sinterstation 2500-plus, Vanguard and Vanguard HS.

First, regarding the preamble, there is no dispute that the DTM machines produce three-dimensional objects. As set forth above, the term "medium capable of solidification" includes a material in any state that is capable of being transformed into its solid phase when acted upon by synergistic stimulation. The powder material used in the DTM machines begins as a layer of powder comprised of solid particles. These particles are softened on their outer surfaces as a result of laser radiation, and therefore are fused into a solid cross-sectional layer. (EOS Exh. C at 32.2; Exh. E at 43; Exh. F at 56.) Thus, the powder is a material that is transformed into a solid state when acted upon by synergistic stimulation. "When acted upon" here means the application of synergistic stimulation initiates a series of steps that ultimately results in a solidification. "Synergistic stimulation" is 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 a material. The radiation used in the DTM machines causes the softening and fusing of the powder into a solid cross-sectional layer. (*Id*.) Accordingly, the laser radiation alters the physical state of the powder.

Second, the parties do not dispute that the DTM machines satisfy the first step of the claim by providing data representing the three-dimensional object to be formed from an image generated on a CAD system.

The next step of Claim 4 of the '981 patent requires forming of a cross sectional layer of structure. The DTM machines form such a cross section by delivering powder in thin layers to a platform. (EOS Exh. F at 56.) The thin layer is then exposed to impinging radiation in the form of a laser beam that traces across the layer of powder medium. (EOS Exh. E at 43.) Thus, the medium is exposed to synergistic stimulation responding to the data from the CAD program.

Fourth, the parties do not dispute that the DTM machines form successive layers upon each previously formed cross-sectional layer of structure. While 3D contends that the medium applied in this process must be liquid, the only limitation on the medium, as set forth in the Court's claims construction, is that the physical state of a material, which may begin the process in any state, is capable of being altered by synergistic stimulation. Here, the physical state of the powder is altered by the laser beam-the powder solid is partially melted before resolidifying as a cross-section of the three-dimensional object. Thus, the third step of Claim 4 is present in the DTM systems.

Finally, the last step of Claim 4 is also present. In the DTM machines, a laser sinters areas of each successive layer, forming a new cross section. (EOS Exh, F at 56.) This is akin to forming and adhering successive layers of structure to the previously formed cross-sectional layers of structure by exposing the medium to synergistic stimulation. By continuing the process on a layer by layer basis, thus forming the three-dimensional object, the last portion of the final step of Claim 4 is also present. (Id.)

C. Enablement

DTM argues that the preceding analysis would render the '981 patent invalid because the patent does not teach laser sintering. In re Vaeck, 947 F.2d 488, 496 (Fed.Cir.1991). "To be enabling, the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation. Genentech, Inc. v. Novo Nodisk, A/S, 108 F.3d 1361, 1365 (Fed.Cir.1997). EOS argues that DTM is barred from contesting validity because DTM's successor company, 3D, stipulated as to the validity of all of the DTM patents based on Kearns v. Chrysler Corp., 32 F.3d 1541, 1545-46 (Fed.Cir.1994) *cert. denied,* 513 U.S. 1032, 115 S.Ct. 1105 (1995). The *Kearns* court barred Chrysler from contesting validity pursuant to a pretrial stipulation. *Id*. at 1545 ("[w]e reject Chrysler's attempts to avoid the consequences of its stipulation by redefining its terms. As opposed to the present case, *Kearns* involved a stipulation whereby Chrysler agreed to be bound by a judgment on issues of invalidity in another related case. *Id*.

While some of the same principles are at work here, the context is different. Although the parties have agreed that validity would not be contested as to the DTM patents throughout the course of this litigation, and no discovery was undertaken related to the validity of the patents, 3D's claims construction argument cannot be precluded. 3D is not arguing that the patents are invalid, but rather that EOS's proposed construction is wrong because it would render the patent invalid. The Court will therefore consider 3D's argument on its merits.

The Court is aware of its duty to construe claims whenever possible to preserve validity. *See* ACH Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1576 (Fed.Cir.1984). As evidence of non-enablement, DTM offers deposition testimony from EOS's expert, Dr. John Choren, as set forth below:

Q: Would those specifications that mention powder, would they teach one of ordinary skill in the art how to use powder as a build material in the systems of those patents? (Objection, vague)

A: I don't really know how to answer that. Is there enough information here for somebody to run out and build a machine that uses powder? Probably not.

The above deposition testimony, however, does not constitute clear and convincing evidence of non-enablement. *See* 35 U.S.C. s. 282. There are eight illustrative, though not mandatory, factors that a court may consider in determining whether a disclosure would require undue experimentation. In re Wands, 858 F.2d 731, 737 (Fed.Cir.1988). Those factors are:

(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

Id.

As EOS points out in its argument, laser sintering was known in the field of laser sintering prior to the filing of the patents-in-suit. A person of ordinary skill in the art would have at least a cursory knowledge of information regarding laser sintering, as the relative skill of those in the art is fairly knowledgeable. As support of its argument, EOS cites a string of patents, including U.S. Patent No. 4,863,538, U.S. Patent No. 4,818,562, and U.S. Patent No. 4,247,508, all filed between the early 1970's and late 1980's. Thus, there was a significant presence of working examples, and the state of the prior art was fairly well-developed prior to the issuance of the patent. Finally, as demonstrated above, the breadth of Claim 4 is wide enough to allow for both stereolithography and laser sintering applications. While some amount of experimentation would have been necessary to teach laser sintering through Claim 4 of the '981 patent, it cannot be said, based almost solely on the statement offered as evidence by DTM, that such experimentation would amount to "undue experimentation." In re Wands, 858 F.2d at 736-37.

Finally, DTM argues that if Claim 4 of the '981 patent is extended to cover laser sintering, the claim would be rendered anticipated by the Householder patent (U.S. Patent No. 4,247,508). A claim is rendered invalid by anticipation when the invention is not in fact new. Verve, LLC v. Crane Cams, Inc., 311 F.3d 1116, 1120 (Fed.Cir.2002). Anticipation, or lack of novelty, "requires that the same invention, including *each and every element and limitation in the claims,* was known or used by others before it was invented by the patentee." Hoover Group, Inc. v. Custom Metalcraft, Inc., 66 F.3d 299, 302 (Fed.Cir.1995). EOS argues that there is no mention in Householder of a CAD system, which is an element of the first step of the ' 981 patent, as described above. Claim 1 of Householder describes "sequentially depositing the castings material and a mold material" in layers, in which layers are formed by "depositing the mold material next to said area such that the mold material holds the casting material in place." (Householder, col. 8, l ns. 64-65; col. 9, lns. 1-3.) There is no mention of a CAD system in Householder. Therefore, the claim was not anticipated. Verve, 311 F.3d at 1120.

D. Conclusion

In sum, the Court concludes that the DTM machines contain every element recited in Claim 4 of the '981 patent. Accordingly, the Court finds that Claim 4 of the '981 patent is infringed by the DTM machines at issue.

V. DISPOSITION

For the reasons set forth above, the Court GRANTS Plaintiff EOS GmbH Optical Systems (EOS) and Defendant EOS of North America, Inc.'s Motion for Summary Judgment of Infringement on U.S. Patent No. 5,630,981. The Court DENIES DTM Corporation's Notice of Motion for Partial Summary Judgment of Noninfringement.

IT IS SO ORDERED.

C.D.Cal.,2003.
EOS GmbH Electro Optical Systems v. DTM Corp.