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3D Printing: Key Legal Issues and Options for Change

Prepared by the

3D Printing Task Force

of the

Designs Committee - Designs Communications Subcommittee

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TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY

The following report, which was prepared by the 3D Printing Task Force of the Designs Committee[1], summarizes the law of direct and secondary liability under copyright, trademark, trade dress and design law as it relates to 3D printing; identifies various policy and legal options that have been suggested for change; and recommends that brand owners and IP-related associations continue to monitor developments in this emerging area before advocating any changes to existing law. The focus of this report is the law in the United States of America, but the report has been reviewed by practitioners from numerous countries including the United Kingdom, Austria, Italy, Canada, Australia and Spain. The report identifies instances in which the position in one of these jurisdictions differs from that of the U.S.A.

I. INTRODUCTION

3D printing, also known as "additive manufacturing," produces three-dimensional objects from computer-assisted design ("CAD") or other digital files that were created on a computer or from a 3D scanner.[2] Various 3D printing processes exist but all involve fusion of materials, layer upon layer, with heat, chemicals, light, electron beams or glue—either by extruding material through one or more tiny nozzles onto a build area, or selectively fusing a bed of powdered or sheet material one layer at a time.[3] Most 3D-printed objects have been made of thermoplastic (ABS or PLA), but many are from metal, and more advanced machines use ceramics, glass, sand or human tissue.[4] Some researchers are printing in extremely small sizes measured in microns and nanometers, and increasingly diverse and sophisticated feedstocks or "inks" are being developed to make products having combinations of physical, mechanical and electrical properties.[5]

The use of 3D printers—ranging from US $5 million machines by industrial users to US $5,000 units for home use—has increased substantially over the past few years. Consultants at Price Waterhouse Cooper (PWC) have noted that more than two-thirds of American manufacturers are now using 3D printing in one form or another.[6] Meanwhile, consumers have various options such as purchasing their own 3D printer, visiting a 3D printing retail location, or using a web-based 3D printing service.[7] Persons in search of

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[1] The Task Force consists of John Froemming (Task Force Leader), Carole Barrett, Michael Cantor, Alina Morris (US), Christian Hadeyer (Austria) and Giacomo Moleri (Italy). The Task Force is grateful for the contributions of many members of other INTA committees—including David Stone (UK); Nick Holmes and Robert Finn (Australia); Jonathan Burkinshaw and Catherine Daigle (Canada); Fidel Porcuna De La Rosa (Spain); Paolo Marzano (Italy); and William Cass and Marc Trachtenberg (US).

[2] John Hornick and Daniel Roland, "3D Printing and Intellectual Property: Initial Thoughts" at 1.

[3] *Id*.

[4] *Id.*

[5] *Id*. at 1-2.

[6] Additive Manufacturing: A Printed Smile, The Economist, April 30, 2016.

[7] See James Grace, The End of Post-Sale Confusion: How Consumer 3D Printing Will Diminish The Function of Trademarks, 28 HARV. J. LAW & TECH. 263, 267 (Fall 2014).

CAD files to replicate existing 3D products or designs may generate such files of products they seek to replicate using a 3D scanner, or use online services offering searchable catalogues of hundreds of thousands of CAD files that have been uploaded by third-party designers.[8]

The economics of 3D printing are essentially that the price per unit produced is generally higher than traditional manufacturing, but the tooling cost is zero.[9] High upfront tooling costs and times make use of 3D printing economically attractive for small production runs—especially for rapid prototyping, small quantities of replacement parts for older products, custom tools and jigs, and mass customization.[10] 3D printers have accordingly been used for a wide variety of applications ranging from dental implants to jewelry, replacement human tissue, pharmaceuticals, bioreactors, building design molds, guns, and NASA rocket-, jet cabin- and other replacement parts of various kinds. For example, Boeing 3D prints over 22,000 parts for military and commercial aircraft, and Airbus 3D prints internal cabin fittings for its A350 XWB airplane.[11] GE has spent US $50 million to install a 3D printing facility to print 40,000 fuel nozzles a year for its new LEAP jet engine with Snecma, a French company.[12] BMW has used 3D printing to create ergonomic, lighter versions of assembly tools to enhance productivity on its assembly lines. The U.S. government has used 3D printing in avionics, weapons, telecommunications, and medical readiness. These economics suggest that 3D printing will present infringement issues on an increasingly large scale.

3D printing is expected by 2020 to be an industry worth $20 billion.[13] Already by April 2012, The Economist characterized 3D printing as the "third industrial revolution;" and former President Obama in his 2013 State of the Union address, noted the potential of this technology.[14]

Thus far, few courts have addressed claims of infringement regarding products made by 3D printers. Nevertheless, much has been written about the competing concerns of how to ensure sufficient trademark, trade dress, design, copyright and patent protection, as well as innovation, creativity, and the economy of the Internet that is critical to growth.[15]

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[8] See *id*. Indeed, owning a CAD program is no longer necessary to use a 3D printer. *Id*. p.3.
[9] Bill Conerly, The Economics of 3-D Printing: Opportunities, Forbes, Nov. 3, 2014.
[10] *Id*.
[11] Additive Manufacturing: A Printed Smile, The Economist, April 30, 2016; Additive Manufacturing: Print Me A Brewery, The Economist, July 8, 2017; High Tech Construction: Back To The Future, The Economist, June 3, 2017.
[12] *Id*.
[13] http://www.insidecounsel.com/2016/02/09/lets-look-closer-at-3d-printing-and-ip-issues/, citing Gartner Reveals Top Predictions for IT Organizations and Users for 2014 and Beyond, Oct. 8, 2013.
[14] Hornick and Roland, p. 1.
[15] See 2015 AELJ Spring Symposium: 3D Printing and Beyond: Emerging Intellectual Property Issues With 3D Printing and Additive Manufacturing, 34 CARDOZO ARTS & ENT. L. J. 1, 33 (2016). Some writers have warned that 3D printing threatens an epidemic of inequitable copying that existing law cannot address. Others have contended that existing law is fully capable of handling inequities arising from the use of 3D technology. Still others have urged that legislation be passed akin to the Digital Millenium Copyright Act ("DMCA") to provide a way for relevant

An understanding of 3D-printing and design-related law requires familiarity with the differing rules of primary and secondary liability under copyright, trade dress and patent law. Primary (or "direct") liability arises when a party is held directly responsible for legal harm to another. In the context of 3D printing, such liability typically refers to persons who upload infringing designs to 3D printing design websites for sale, download and print infringing materials from such sites for public use, or print and traffic in infringing goods.[16] Secondary liability generally refers to third parties who facilitate the use of 3D printing technology and may be accused of contributory infringement, inducement, or vicarious infringement in connection with direct infringers who use their services or platforms.[17] These third parties include online service providers ("OSPs") such as Thingiverse and TurboSquid who host digital files that may be used to print 3D objects, and others (such as Shapeways) who not only sell third parties' designs but print and ship 3D objects to purchasers.[18]

Given the difficulty and inefficiency of identifying and proving direct infringement by large groups of smaller users or sellers of 3D-printed articles, much attention has focused on the feasibility of rights holders suing "upstream" providers and platforms of infringing designs under one or more theories of secondary liability.[19] 3D printing machines have substantial non-infringing uses such that the manufacturers of such machines are unlikely (without more) to be held liable for infringement, so this "upstream" focus has tended to be on OSPs that provide platforms for users to upload and download 3D print designs, if not 3D-printed products themselves.[20]

II. KEY LEGAL ISSUES

A. Copyright

In the United States, copyright is available for "pictorial, graphic, and sculptural works."[21] Such works include designs for useful articles having physical or conceptual separability of expression from function, as well as mechanical drawings, blueprints and

online service providers to insulate themselves from potential secondary liability in connection with the use of this emergent technology.

[16] See Preeta Reddy, Note: The Legal Dimension of 3D Printing; Analyzing Secondary Liability In Additive Layer Manufacturing, 16 COLUM. SCI. & TECH. L. REV. 222, 232 (Fall 2014).

[17] *Id*. For example, Thingiverse uses an open source platform where designers upload and consumers download CAD files free of charge for at-home 3D printing. Shapeways hosts independently run shops which upload designs; Shapeways prints design files with its 3D printers, ships the product directly to customers who pay it for the printing service while designers determine their own markup fee. See 28 HARV. L. REV. & TECH. at 268.

[18] See *id*.

[19] As the music recording industry learned in the copyright context, consumers who print at home are not attractive targets for litigation. See 34 CARDOZO ARTS & ENT. L.J.. at 45. See also Frank Ward, Patents & 3D Printing: Protecting the Democratization of Manufacturing By Combining Existing Intellectual Property Protections, 25 DePAUL J. ART. TECH. & INTELL. PROP. 91, 142-44 (2014-2015).

[20] See 16 COLUM. SCI. & TECH. L. REV. at 243.

[21] 17 U.S.C. 102(a)(5) (2006).

other drawings used for construction of objects.[22] To be protectable, the work merely requires "some minimal degree of creativity."[23] Only the creative expressions or statements in a work are protectable. Thus, a 3D object reflecting such creativity is copyrightable, and a 3D copy of a copyrighted work can constitute an infringement thereof. Likewise, a .STL or other CAD file of a copyrighted object can infringe the copyright.[24]

A CAD file is essentially the same as a blueprint or mechanical drawing, and can itself qualify as a copyrightable work fixed in a tangible medium of expression.[25] Notwithstanding the low threshold for creativity, merely scanning a copyrighted work will not afford copyright to the person scanning it, or to the CAD file produced from such scanning.[26]

1. Direct Liability

Copyright confers various exclusive rights including reproduction, preparation of derivative works, distribution and public display.[27] If a 3D object is copyrighted and is then

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[22] Daniel Harris Brean, Asserting Patents to Combat Infringement via 3D Printing: It's No "Use", 23 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 771, 807 (Spring 2013), citing 17 U.S.C. 101 (2006); Melville B. & David Nimmer, 1 Nimmer on Copyright §2.08 [D] (2011). With respect to 3D objects that are classified as "useful articles" rather than "sculptural works," it can be burdensome to prove that the design for the object 'incorporates pictorial, graphic, or sculptural features than can be identified separately from, and are capable of existing independently of, the utilitarian aspects of the article,' as the Copyright Act requires." Brean at 809, citing 17 U.S.C. § 10.

Under UK law, however, it is not a breach of copyright to make an article using a particular design, unless the design is an artistic work. Andrew Moir and Anthony Dempster, 3D Printing: The Legal Implications of An Emerging New Technology, p. 2 (June 2016)(citing section 51, CDPA).

[23] *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co*., 499 U.S. 340, 345 (1991). "[T]o be sure, the requisite level of creativity is extremely low; even a slight amount will suffice." *Id*.

[24] .STL (StereoLithography) is a format native to stereolithography CAD software. STL files describe only the surface geometry of a 3D object without any representation of color, texture, or other common CAD model characteristics. See Wikipedia.org/STL-(file format).

[25] 23 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. at 807.

[26] See *id*; John F. Hornick, "Some Thoughts on Copyright and 3D Printing" ("Hornick, Copyright"), p. 2, citing *Meshworks, Inc. v. Toyota Motor Sales USA, Inc.*, 528 F. 3d 1258, 1267(10th Cir. 2008).

In Canada, copyright covers the form or expression of an idea, and may subsist in works produced in the artistic, literary, musical, or dramatic domains, provided that such works are original. Products created by 3D printers that have at least some visual design features that are appealing to the eye would be protectable by copyright if the work is original within the meaning of the Copyright Act. Works dominated by their utilitarian functions may not satisfy the test for originality and thus may not be protected by copyright. The Copyright Act also contains an exemption for designs applied to "useful articles;" when a useful article featuring a copyrighted design is reproduced more than 50 times, copyright protection is lost. The Act also contains exemptions fur users where a copy of a work is made for personal use under appropriate circumstances, such as where consumers are not exploiting any economic benefit from the act of reproduction.

[27] 17 U.S.C. § 106; see 34 CARDOZO ARTS & ENT. L.J. at 34.

3D copied, this reproduction would ordinarily constitute copyright infringement.[28] If a digital file is protected by copyright and is copied, or if it is uploaded in a digital .STL file to a site for 3D printing, this uploading likewise creates a copy and constitutes a potentially actionable reproduction. If such reproduction takes place in the U.S. and is unauthorized, it is subject to the existing notice-and-takedown safe harbor of the Digital Millenium Copyright Act ("DMCA").[29] Downloading a copyrighted digital file likewise creates a copy on a hard drive and constitutes a potentially actionable reproduction.[30] Similarly, distribution of a copyrighted 3D object or digital file would be potentially actionable.

The principal defense to a claim of direct copyright infringement in the 3D printing context is fair use. Fair use depends on various factors. Four that must be considered are codified at 17 U.S.C. § 107:

> (1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
>
> (2) the nature of the copyrighted work;
>
> (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
>
> (4) the effect of the use upon the potential market for or value of the copyrighted work.[31]

In the E.U., the relevant counterpart to the U.S. notion of fair use is the "limitation for private use" set forth under Article 5.2(b) of EC Directive 29/2001 (the so-called "InfoSoc Directive"):

> "Member States may provide for exceptions or limitations to the reproduction right provided for in Article 2 in the following cases:
>
> (a) in respect of reproductions on paper or any similar medium, effected by the use of any kind of photographic technique or by some other process having receive fair compensation;
>
> (b) in respect of reproductions on any medium made by a natural person for private use and for ends that are neither directly nor indirectly commercial, on condition that the right holders receive fair compensation which takes account of the application or non-application of technological measures referred to in Article 6 to the work or subject- matter concerned; […]".

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[28] If a 3D object is copyrighted and is scanned into a digital file for 3D printing, this scanning creates a digital copy which constitutes reproduction and thus infringement.
[29] See 34 CARDOZO ARTS & ENT. L.J. at 49-50.
[30] See Michael Weinberg, "It Will Be Awesome If They Don't Screw It Up: 3D Printing, Intellectual Property, and the Fight Over the Next Great Disruptive Technology," p. 12 (Public Knowledge Nov. 2010).
[31] See 16 COLUM. SCI & TECH. L. REV. at 235-37 (identifying factors relevant to evaluating whether a 3D-print based on a copyrighted work is fair use).

In two recent holdings, the European Court of Justice appears to have expanded the notion of "copier" to include not only the final user, but also third parties (*i.e*., copy shops) that make copies at the direction of private users--provided that they pay the equitable remuneration contemplated by the abovementioned provision. [32] There currently is no indication of any specific EU domestic legal provision expressly contemplating private use limitations in relation to 3D printing. Nevertheless, if a domestic provision is sufficiently broad, as Article 5.2(b) is, 3D printing of copyrighted works would be covered by this provision.

In sum, existing copyright laws in the U.S. and the E.U. can be used against:

- People who upload copyrighted CAD files,
- People who download copyrighted files, and
- People who copy or distribute a copyrighted file or 3D object.

2. Secondary Liability

(a) Contributory Infringement

"Contributory copyright infringement is a form of secondary liability with roots in the tort-law concepts of enterprise liability and imputed intent."[33] A defendant is a contributory copyright infringer if it has knowledge of a third party's infringing activity, and "induces, causes or materially contributes to the infringing conduct."[34] Yet the U.S. Supreme Court has held in the context of Sony's Betamax video tape recorders that the sale of a copyright-infringing device was not contributory infringement where the device was capable of "substantial non-infringing uses" (there, "[p]rivate, noncommercial time-shifting").[35] Based on the Betamax case, manufacturers of 3D printers have a good defense that, because their printers have substantial non-infringing uses, and that they , cannot be liable for contributory copyright infringemen without engaging in additional conduct.

In 1998 the U.S. Congress implemented the DMCA, which included the Online Copyright Infringement Liability Limitation Act (OCILLA) creating a safe harbor for OSPs from liability for the infringement of other parties who use their services.[36] To qualify for the safe harbor, OSPs must show they do not have actual knowledge of infringement; do not know of any facts or circumstances which would make infringement apparent; do not

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[32] Case C-467/08, Padawan SL v. Sociedad General de Autores y Editores de España (SGAE) http://curia.europa.eu/juris/document/document.jsf?docid=83635&doclang=EN; Case C-463/12, Copydan Bandkopi v.Nokia Denmark A/S, http://curia.europa.eu/juris/document/document.jsf?docid=162691&doclang=EN.

[33] *Perfect 10, Inc. v. Visa Int'l Serv., Assoc*., 494 F.3d 788, 794-95 (9th Cir. 2007).

[34] *Id*. (citations omitted). *See Gershwin Pub. Corp. v. Columbia Artists Mgt., Inc.* , 443 F.2d 1159, 1162 (2d Cir. 1971). In Ge*rshwin Publishing*, the concert manager was contributorily liable for copyright infringement where it organized concerts for artists and knew artists performed copyrighted compositions for which copyright licenses were not secured. *Id*.

The English Courts will issue an injunction against OSPs to require them to block access for English consumers to overseas websites that host unlawful copyright material.

[35] *Sony Corp. of Am. v. Universal City Studios, Inc*., 464 U.S. 417, 418 (1984).

[36] See 16 COLUM. SCI. & TECH L. REV. at 241.

receive any direct financial benefit in relation to infringement; and once notified of an infringement, act expeditiously to remove the allegedly infringing material.[37]

After the DMCA was implemented, the Ninth Circuit held that Napster had actual and constructive knowledge of direct infringement using its peer-to-peer music file sharing technology and thus was not eligible for the safe harbor, even though the court did not address the fact that Napster's technology was capable of substantial non-infringing uses.[38] In another pro-plaintiff ruling, the Supreme Court subsequently held that another defendant OSP (Grokster) was not entitled to summary judgment dismissing a claim of contributory copyright infringement where there was strong evidence that it had induced others to infringe.[39]

The question thus becomes whether owners of 3D printers, or OSPs who create or distribute copies or digital files of copyrighted, 3D objects, may be liable for contributory copyright infringement. 3D offline printers are unlikely to qualify for the DMCA's safe harbor, as OCILLA defines a protectable OSP as "a provider of online services or network access, or the operator of facilities therefor."[40] A 3D design-hosting website may be eligible for the DMCA safe harbor if it has "adopted and reasonably implemented, and informs subscribers and account holders of the service provider's system or network of, a policy that provides for the termination in appropriate circumstances of subscribers and account holders of the service provider's system or network who are repeat infringers; and … accommodates and does not interfere with standard technical measures."[41] This is commonly referred to as a "notice-and-takedown" procedure.

If a copyright holder cannot show that a 3D printer or platform has knowledge of specific instances of infringement, or that it encouraged its users to create or post copyright-infringing designs, then it will probably not be able to show contributory liability for copyright infringement.[42] However, some 3D printing OSPs such as Thingiverse might not be able to defeat such a claim, to the extent their webpage is replete with designs for models of copyrighted works. [43]

An OSP's maintenance of "safe harbor" protection generally requires a robust notice-and-takedown practice, but an aggressive notice-and-takedown practice in the 3D printing context would presumably result in takedowns not just of artistic works but of more

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[37] *Id*., citing 17 USC § 512 (eff. Dec. 9, 2010).
[38] *A&M Records, Inc. v. Napster, Inc*., 239 F.3d 1004, 1020 (9th Cir. 2001); 16 COLUM. SCI. & TECH. L. REV. at 242. Some commentators have viewed the Betamax "substantial non-infringing use" defense to have been superseded by *Napster*.
[39] *Metro-Goldwyn-Mayer Studios Inc. v. Grokster, Ltd.,* 545 U.S. 913, 937-40 (2005) (peer to peer file sharing music software program).
[40] 17 U.S.C. § 512; see 16 COLUM. SCI. & TECH. L. REV. at 243.
[41] 17 U.S.C. § 512; 16 COLUM. SCI. & TECH. L. REV. at 243-244.
[42] Judges disagree about whether a search engine could be liable for contributory infringement under a theory that it "substantially assists" users in finding infringing materials. *See Perfect 10 v. Visa*, 494 F.3d at 813 (Kozinski, dissenting), citing *Perfect 10, Inc. v. Amazon.com, Inc*., 487 F.3d 701 (9th Cir. 2007).
[43] 16 COLUM. SCI. & TECH. L. REV. at 240 (noting Thingiverse's section for "Scans & Replicas" as well as "Signs & Logos," and the accessibility of models for Darth Vader, characters from Disney Pixar's Monsters, Inc., DreamWorks' Kung Fu Panda, Princess Mononoke, Batman, and other copyrighted works).

allegedly infringing useful articles than is currently the case in practice under the DMCA.[44] Clearly, stretching the DMCA safe harbor to OSPs of all 3D-printed useful articles could lead to harmful conclusions if extended, for example, to 3D printing of guns or drugs.[45] It is not yet clear where the line should be drawn for any safe harbor covering 3D printing. Accordingly, at this time The Task Force recommends brand owner and IP-related organizations continue to monitor the situation, and we are not advocating a safe harbor for 3D printing—including but by no means limited to potentially harmful useful articles such as arms and pharmaceuticals.

Meanwhile, some advocates have suggested technological processes for a notice-and-takedown regime for 3D printing. Specifically, they have urged that OSPs could introduce recognition software that would allow copyright owners to track their work and to file takedown notices upon discovering infringement.[46] Unfortunately, however, digital rights management ("DRM") systems have been quickly defeated.[47] For example, proposals for streaming CAD files that disappear after printing do not account for scanning and file sharing "away from control."[48] What has been somewhat effective is "fingerprinting" technology which searches the Internet for infringing copies and sends DMCA takedown notices and/or settlement agreements.[49]

Others have suggested a licensing platform for protecting copyrighted 3D designs and products. In particular, some have recommended iTunes-like models for licensing copyrighted CAD files, under which a usage fee including a royalty would be paid as a precondition to downloading files.[50]

Europe has a safe harbor system under the so called E-Commerce Directive (EC 31/2000), under which changes have been suggested. As part of its Digital Single Market strategy, the European Commission has proposed a new Directive: "Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on copyright in the Digital Single Market". Its Recital (38) states:

> "Where information society service providers store and provide access to the public to copyright protected works or other subject-matter uploaded by their users, thereby going beyond the mere provision of physical facilities and performing an act of communication to the public, they are obliged to conclude licensing agreements with rightholders, unless they are eligible for the liability exemption provided in Article 14 of Directive 2000/31/EC of the European Parliament and of the Council.
>
> In respect of Article 14, it is necessary to verify whether the service provider plays an active role, including by optimizing the presentation of the uploaded works or subject-matter or promoting them, irrespective of the nature of the means used therefor.

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[44] See *id*. at 244.
[45] See *id*.
[46] See *id*.
[47] Adam Thierer & Adam Marcus, Symposium: Guns, Limbs and Toys: What Future for 3D Printing?, 17 MINN. J. L. SCI. & TECH. 805, 850-851 (Spring 2016).
[48] Hornick, Copyright at 2.
[49] See Thierer & Marcus at 851.
[50] Hornick, Copyright at 2.

In order to ensure the functioning of any licensing agreement, information society service providers storing and providing access to the public to large amounts of copyright protected works or other subject-matter uploaded by their users should subject-matter, such as implementing effective technologies. This obligation should also apply when the information society service providers are eligible for t he liability exemption provided in Article 14 of Directive 2000/31/EC".

This Recital might pave the way to online liability in Europe for those large platforms playing an active role in, and gaining an economic advantage from, the presentation of the uploaded works.[51] This scenario may become important to the future of 3D printing platforms in Europe.

(b) Vicarious Liability

"Whereas contributory infringement is based on tort-law principles of enterprise liability and imputed intent, vicarious infringement's roots lie in the agency principles of respondeat superior."[52] To state a claim for vicarious copyright infringement, a plaintiff must allege that the defendant has 1) the right and ability to supervise the infringing conduct, and 2) a direct financial interest in the infringing activity.[53] The issue is whether OSPs for 3D printing have the right and ability to supervise the infringing conduct and a direct financial interest in such activity (such as a revenue- sharing arrangement to take a percentage from online sales of third-party postings in infringing designs).[54]

Some have argued that "[w]hen the right and ability to supervise coalesce with an obvious and direct financial interest in the exploitation of copyrighted materials–even in the absence of actual knowledge that the copyright monopoly is being impaired … the purposes of copyright law may be best effectuated by the imposition of liability on the beneficiary of that exploitation."[55] The courts have not yet addressed the boundaries of vicarious liability in the specific context of 3D printing. Here again, it is recommended rights holders monitor the activities of any online platforms that appear to have the right and ability to supervise copyright-infringing conduct, as well as a direct financial interest in such activity; and if such platforms are offering 3D copies or files of copyrightable designs, to evaluate whether existing laws are sufficient to cover such activity.

B. Trademarks, Trade Dress and Passing Off

Trademark and trade dress issues arise from 3D printing of objects containing embedded marks, or representing 3D trademarks (such as the famous shape of the Coca-

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[51] It should also be noted that, in the so-called "Pirate Bay case" of 17 June, the European Court of Justice held that OSPs which index user-generated content ("UGC") or otherwise play an active role by editing UGC perform an act of communication to the public. See http://curia.europa.eu/juris/document/document.jsf?text=&docid=191707&pageIndex=0&doclang=en&mode=req&dir=&occ=first&part=1&cid=291305 .

[52] *Perfect 10*, 494 F.3d at 802 (citation omitted).

[53] *Id*. (citations omitted). *See Hard Rock Cafe Licensing Corp. v. Concession Servs., Inc.,* 955 F.2d 1143, 1150 (7th Cir. 1992); *Gershwin Pub. Corp. v. Columbia Artists Mgt, Inc*., 443 F. 2d 1159, 1162 (2d Cir. 1971)(collecting cases).

[54] See 34 CARDOZO ARTS & ENT. L.J. at 35.

[55] *Shapiro, Bernstein & Co. v. H. L. Green. Co*., 316 F. 2d 304, 307 (2d Cir. 1963); 16 COLUM. SCI. & TECH L. REV. at 239 .

Cola bottle) or other protected designs. Many 3D objects represent protectable trade dress.[56]

Trade dress in product design requires secondary meaning, and does not cover features dictated by function.[57] The burden of establishing non-functionality of unregistered trade dress is on the entity claiming protection.[58] Any "essential" feature of a product that would put competitors at a "significant non-reputation[al]-related disadvantage" if they were not allowed to incorporate it, or would affect the cost or quality of the device, is deemed functional and excluded from protection.[59]

1. Direct Liability

For trademark infringement to be actionable, a plaintiff in the U.S. must plead and show (among other things) that the challenged use was in commerce.[60] Even though the threshold for showing use in commerce is low, 3D at-home printing that includes another's trademark solely for personal use is unlikely (without more) to constitute an actionable use in commerce. If such 3D product is offered, sold or displayed to the public, however, such activity may of course be actionable.[61]

However, a use that is likely to dilute a famous mark does not need to be in commerce to be actionable.[62]

Direct infringement may entitle the brand owner to disgorgement of profits or actual damages, while counterfeiting may also entitle the owner to statutory damages and attorney's fees automatically.[63] Thus, trademark and trade dress owners can catch as direct infringers those who offer, sell, publicly display, or otherwise use in commerce the 3D objects they make that bear another's trademark or trade dress.

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[56] Another issue is whether a digital file of a 3D object can be protectable trade dress. The digital file is a good and can itself be sold, and if displayed might be likely to confuse as to source, but the Supreme Court's decision in *Dastar Corp. v. Twentieth Century Fox Film Corp.*, 539 U.S. 23, 37 (2003) states (in the context of reverse passing off) that "'origin of goods' … refers to the producer of the tangible goods that are offered for sale, and not to the author of any idea, concept or communication embodied in these goods." Yet part of the concern in *Dastar* was that recognition as a trademark could create perpetual monopoly if applied to creative works. It is not clear that this policy concern exists with regard to digital files of designs that are protected trade dress.

[57] *TrafFix Devices, Inc. v. Mktg Displays, Inc.*, 532 U.S. 23, 30 (2001).

[58] See *id*. at 33. This is in contrast to design patent law, under which the overall patented design is presumed in court to be non-functional absent clear and convincing evidence to the contrary.

[59] *Id*.

[60] See 15 U.S.C. § 1114.

[61] See Weinberg at 14. The Court of Appeals for the Federal Circuit has recently held that sale of merely two products to out-of-state customers qualified as use in commerce at least for registrability purposes, so proof of use in commerce might have become less difficult to show even with regard to non-famous marks. *See Christian Faith Fellowship Church v. Adidas* AG, No. 2016-1296 (Fed. Cir. Nov. 14, 2016).

The situation is similar in Canada, where trademark rights arise from "use" of the mark in commerce. 3D printing for personal and/or private uses may therefore not constitute trademark infringement. Trademarks and distinguishing guise do not extend protection to a "functional use or characteristic".

[62] See *id*., citing 15 U.S.C. § 1125 (c).

[63] See 15 U.S.C. § 1117.

2. Contributory Infringement

"[T]he [U.S.] Supreme Court tells us that secondary liability for trademark infringement should, in any event, be more narrowly drawn than secondary liability for copyright infringement."[64] Nevertheless, "if a manufacturer or distributor [1] intentionally induces another to infringe a trademark, or if it [2] continues to supply its product to one whom it knows or has reason to know is engaging in trademark infringement, the manufacturer or distributor is contributorially liable for any harm done as a result of the deceit." *Inwood Labs., Inc. v. Ives Labs., Inc*., 456 U.S. 844, 854 (1982) (citations omitted). Several courts have accordingly recognized that "[a] person who knowingly participates in furthering . . . trade dress infringement is liable as a contributing party."[65] The contributor must be shown to have actual or constructive knowledge that the users of its services were engaging in infringement, but the contribution to infringement need not be intentional for liability to arise.[66] This standard may be met by willful blindness, which some courts have interpreted to require that a person suspect wrongdoing and deliberately fail to investigate.[67] A mere reasonable anticipation of infringement, however, is not enough.[68] Rather, under *Tiffany Inc. v. eBay*, specialized knowledge of infringement is generally required. [69] The line between willful blindness and *eBay*'s requirement of specialized knowledge is grey, and might vary among federal Circuits.[70]

When the alleged direct infringer supplies a service rather than a product, then under the second prong of the above-quoted *Inwood* test, the court must "consider the extent of control exercised by the defendant over the third party's means of infringement."[71] "For liability to attach, there must be '[d]irect control and monitoring of the instrumentality used by a third party to infringe'" the plaintiff's trademark.[72]

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[64] *Hard Rock Café Licensing Corp. v. Concession Servs., Inc.,* 955 F.2d 1143, 1150 (7th Cir. 1992); *see Perfect 10, Inc. v. Visa Int'l Serv. Ass'n*, 494 F. 3d 788, 806 (9th Cir. 2007) (payment processing company did not induce competing websites to infringe trademarks, and credit card companies not secondarily liable under Cal. State law).

[65] *Bauer Lamp Co., Inc. v. Shaffer*, 941 F.2d 1165, 1171 (11th Cir. 1991); see *Coach, Inc. v. Sapatis*, 994 F.Supp. 2d 192, 201 (D.N.H. 2014) (collecting cases).

[66] *Louis Vuitton Malletier, S.A. v. Akanoc Solutions, Inc.*, 658 F.3d 936, 943 (9th Cir. 2011), citing *Inwood*, 456 U.S. at 854.

[67] *See Hard Rock Licensing Corp.*, 955 F.2d at 1149 citation omitted).

[68] *See Tiffany (NJ) Inc. v. eBay Inc*., 600 F.3d 93, 105 (2d Cir. 2010).

[69] *Id*. at 107. *See Rosetta Stone Ltd. v. Google, Inc.,* 676 F.3d 144 (4th Cir. 2012) (district court erred in finding sufficient evidence to raise a question of fact whether Google continues to supply its services to known infringers).

[70] See 34 CARDOZO ARTS & ENT. L.J. at 40.

[71] *Perfect 10*, 494 F.3d at 807, quoting *Lockheed Martin Corp. v. Network Solutions, Inc*., 194 F.3d 980, 984 (9th Cir. 1999).

[72] *Perfect 10 v. Visa*, 494 F.3d at 807, quoting *Lockheed Martin*, 194 F.3d at 984; *see Louis Vuitton Malletier, S.A. v. Akanoc Solutions, Inc*., 658 F.3d 936, 942 (9th Cir. 2011) (affirming jury verdict of contributory infringement against web host). Accordingly, in granting summary judgment dismissing a contributory infringement claim, the Ninth Circuit noted that the plaintiff there had "not alleged that Defendants have the power to remove infringing material from these websites or directly stop their distribution over the Internet." *Perfect 10*, 494 F.3d at 807 (noting Lockheed's distinguishing from a flea market and stating that NSI cannot reasonably be expected to monitor the Internet). Judge Kozinski dissented and thought this test was met. *Id*. at 822.

The contribution toward the infringement must be material, which turns on whether the activity in question "substantially assists" direct infringement.[73] Providing direct infringers with server space may satisfy this standard, as this is an "essential step in the infringement process."[74]

No statutory safe harbor like the DMCA or the above-mentioned *Betamax* doctrine of substantial non-infringing use, exists for trademark or trade dress law.[75] Yet several OSPs have voluntarily implemented notice-and-takedown procedures in hopes that a robust program will keep potential plaintiffs from meeting the knowledge requirement.[76]

In sum, "a party that creates or uploads [a 3D printing] file may be contributorily liable if it is encouraging unlawful copying by others, and the same logic may apply to a website that hosts the file or a local print shop that rents out its 3D printers to the public."[77]

For there to be liability for contributory trademark infringement, the plaintiff must also establish (among other things) some underlying direct infringement.[78] However, at least one court has affirmed a denial of summary judgment of non-infringement where the plaintiff sought equitable relief but had not yet presented evidence of direct infringement.[79] Yet some direct infringement must ultimately be proven.

C. Utility and Design Patent

Utility and design patents represent the right to exclude others from making, using or selling the patented invention or design, respectively.[80] In contrast to a utility patent, however, a design patent in the U.S. protects, generally for 14 or 15 years from issuance,

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As noted above, the English Courts will issue an injunction against OSPs to require them to block access for English consumers to overseas websites that host unlawful copyright material. The English courts have recently extended such OSP blocking injunctions to include trade marks. As a result, for example, foreign websites hosting fake CARTIER products that it offers to ship to the UK may be enjoined from offering such material. Rosie Burbidge et al., The Next Round of Cartier: UK Supreme Court Will Hear Appeal re Costs of Intermediary Injunctions, THE IPKAT (Feb. 4, 2009), http://ipkitten.blogspot.de/2017/02/the-next-round-of-cartier-uk-supreme.html.

[73] *Amazon.com*, 487 F.3d at 729; *Louis Vuitton Malletier*, 658 F.3d at 944.

[74] *Id*. (quotation omitted); *see Napster*, 239 F.3d at 1022. Recognizing the lack of a safe harbor for trademark infringement, some OSPs have attempted to avoid potential liability by urging brand-owners to deal directly with the alleged primary infringer, or by simply taking down the alleged infringement.

[75] See 34 CARDOZO ARTS & ENT. L.J. at 37. See p. 6, *supra*.

[76] See *id*. at 39.

[77] Jonathan Moskin, Commentary: Roll Over Gutenberg, Tell Mr. Hull the News: Obstacles and Opportunities From 3D Printing, 104 TRADEMARK REP. 811, 815-16 (2014). *See Lepton Labs, LLC v. Walker*, 55 F.Supp.3d 1230, 1241 (C.D. Cal. 2014) (denying motion to dismiss claim of contributory trade dress infringement as to website).

[78] *Rosetta Stone Ltd. v. Google, Inc.,* 676 F.3d 144, 163 (4th Cir. 2012).

[79] *Nat'l Fed'n. of the Blind, Inc. v. Loompanics Enter., Inc.,* 936 F.Supp. 1232, 1246 (D. Md. 1996).

[80] 35 U.S.C. § 271.

any "new, original and ornamental design for an article of manufacture."[81] [82] A design patent may issue for the design of an entire article or an ornamental portion thereof. Unlike

[81] U.S. design patents granted on applications filed on or after May 13, 2015 now have a term of fifteen years from grant. Design patents granted on applications filed prior to May 13, 2015 continue to have a term of fourteen years. 35 U.S.C. §§ 171, 173.
In Canada, a "design patent" is known and identified as an "industrial design". The Industrial Design Act protects "features of shape, configuration, pattern or ornament and any combination of those features that, in a finished article, appeal to and are judged solely by the eye". Industrial Design Act, R.S.C., 1985, c I-9, s 2 (Can.). Unlike copyright which arises without registration, industrial designs must be applied for and registered to provide its owner with a temporary (10 years) exclusive right during which time the visual features of a finished article, or any combination of those features, cannot be reproduced. As is the case with patents, reproduction without permission of an object that is protected by a registered industrial design constitutes an infringement.

[82] Australia has two statutory acts governing designs, namely the Designs Act 2003 ("the new Act") and the Designs Act 1906 ("the old Act").

The new Act governs:
any design application having a filing date of 17 June 2004 or later; or
any design application having a filing date earlier than 17 June 2004 (thus having been filed under the old Act) which was pending as at 17 June 2004 and converted so as to be covered by the new Act; and any registration issued on such an application. *Designs Act 2003* (Cth) s 2 (Austl.).

The old Act governs:
any design application which was filed before 17 June 2004 and was not converted to be covered by the new Act on or after that date; and
any registration issued on such an application.
The old Act provides that the maximum term of a design registration governed thereby is 16 years from the application date. *Designs Act 1906* (Cth) s 27A (Austl.). Accordingly, there still exist in-force design registrations governed by the old Act.

Old Act
A person infringes the monopoly in a registered design governed by the old Act if he/she, without the licence or authority of the owner of the design:
(a) applies the design or any fraudulent or obvious imitation of it to any article in respect of which the design is registered;
(b) imports into Australia for sale, or for use for the purposes of any trade or business, any article in respect of which the design is registered and to which the design or any fraudulent or obvious imitation of it has been applied outside Australia without the licence or authority of the person who was the owner of the registered design at the time when the design or imitation was so applied; or
(c) sells, or offers or keeps for sale, or hires, or offers or keeps for hire, any article:
(i) to which the design or any fraudulent or obvious imitation of it has been applied in infringement of the monopoly in the design; or
(ii) in respect of which the design is registered and to which the design or any fraudulent or obvious imitation of it has been applied outside Australia without the licence or authority of the person who was the owner of the registered design at the time when the design or imitation was so applied.

Designs Act 1906 (Cth) s 30 (Austl.).

New Act

utility patents, "[d]esign patents have almost no scope" and are limited to the ornamental design shown and described in the patent drawings.[83] A design patent is invalid if the overall design is dictated by function. A design patent carries a presumption of non-functionality as a whole.

In addition, the USPTO grants design patents for computer-generated icons depicted on a computer screen.[84]

No U.S. court, however, has yet to determine design patent eligibility for 3D printable or other icons.[85] Accordingly, no reported case has analyzed the patentability of digital files of 3D objects that are otherwise patentable.[86]

Many commentators have suggested the area least ready to deal with 3D printing is patent law.[87]

1. Direct Liability

Direct infringement of a utility patent accordingly requires that a patented invention or "component" thereof be made, used or sold.[88] Companies or consumers who use 3D

A person infringes a registered design governed by the New act if he/she, without the licence or authority of the registered owner of the design,

(a) makes or offers to make a product, in relation to which the design is registered, which embodies a design that is identical to, or substantially similar in overall impression to, the registered design; or

(b) imports such a product into Australia for sale, or for use for the purposes of any trade or business (assuming its embodying the design is without the licence or authority of the registered owner); or

(c) sells, hires or otherwise disposes of, or offers to sell, hire or otherwise dispose of, such a product; or

(d) uses such a product in any way for the purposes of any trade or business; or

(e) keeps such a product for the purpose of doing any of the things mentioned in paragraph (c) or (d).

Designs Act 2003 (Cth) s 71 (Austl.).

[83] *Elmer v. ICC Fabricating*, Inc., 67 F.3d 1571, 1577 (Fed. Cir. 1995).

[84] Manual of Patent Examining Procedure § 1504.01(a)(I)(A) (9th ed., Rev. 7.2015, Nov. 2015).

[85] See Lucas Osborn, *Doctrinal Quandaries With 3D Printing and Intellectual Property*, AM. BAR ASS'N (June 29, 2016), http://apps.americanbar.org/litigation/committees/intellectual/articles/summer20160716doctrinalquandarieswith3dprintingintellectualproperty.html. Some have questioned whether holders of design patents on physical goods can enforce their patents against digital files. *See id*. (citing Sarah Burstein, *The Patented Design*, 83 TENN. L. REV. 161 (2016); Jason J. Du Mont & Mark D. Janis, *Virtual Designs*, 17 STAN. TECH. L. REV. 107 (2013)).

[86] See Osborn at 2. Some have argued that such claims should constitute patentable subject matter. See *id.* at 1 (citing Daniel Harris Brean, *Patenting Physibles: A Fresh Perspective for Claiming 3-D Printable Products*, 55 SANTA CLARA L. REV. 837 (2015)).

[87] *See, e.g.*, Osborn at 1.

[88] See 35 U.S.C. § 271(c); 34 CARDOZO ARTS & ENT. L.J. at 44.

printers to make, use, or sell patent-infringing products clearly are direct infringers.[89] Thus, intermediaries who actually 3D-print files into patented objects on behalf of users face liability for direct infringement.[90]

However, neither a blueprint, nor software instructions for creating a 3D printed article, constitutes a component of a patented object.[91] Accordingly, mere distributors of digital files will probably not be found to be making, using or selling patented products themselves or any component thereof, and are thus unlikely to be held liable for direct infringement of a patent.[92] In other words, patent claims directed to CAD files are probably not useful, and distributors of CAD files do not necessarily "make" the product and thus without more are probably not liable for direct patent infringement.[93]

The closest case to making the "selling" of or the "offering to sell" a digital file an act of infringement was one in which the U.S. Federal Circuit held that an offer and sale of a drilling rig that the offer and sale acknowledged would infringe, constituted an infringement because the "underlying purpose of holding someone who offers to sell liable for infringement is to prevent 'generating interest in a potential infringing product to the commercial detriment of the rightful patentee."[94] However, the court noted there that "[t]he

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[89] See Daniel Harris Brean, *Asserting Patents To Combat Infringement Via 3D Printing: It's No "Use,"* 23 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 771, 788-89 (Spring 2013).

[90] See Osborn at 5. While purposeful infringement should not be tolerated, some have suggested a DMCA-type safe harbor be made available for patents. See *id*. (citing Davis Doherty, Note, *Downloading Infringement: Patent Law as a Roadblock to the 3D Printing Revolution*, 26 HARV. J. LAW & TECH. 353, 368-69 (2012)).

In Australia, a person directly infringes an Australian (utility) patent if that person:
(a) makes, hires, sells or otherwise disposes of the product, offers to make, sell, hire or otherwise dispose of it, uses or imports it, or keeps it for the purpose of doing any of those things; or
(b) where the invention is a method or process, uses the method or process or does any act mentioned in (a) in respect of a product resulting from such use.

Therefore, it is likewise the case in Australia that companies or consumers who use 3D printers to make, use, or sell patent-infringing products clearly are direct infringers.

In Australia, there is also the possibility of a patent claim directed to a computer- readable medium containing computer-executable instructions to effect printing of the item embodying the invention. Such a claim, if enforceable, could render dealings in a 3D printer file for the patented item direct infringement.

[91]While software instructions for instructing a system to print an object in a certain way are patentable, such digital file/model product claims may also face §101 rejections at the USPTO and §101 challenges in courts for unpatentable subject matter if drafted so broadly as to cover a general method of doing business. See also Presentation, John Cheek, Pioneer Road: Shaping the 3D Printing Landscape at 17 (May 6, 2015), http://www.beneschlaw.com/files/uploads/Documents/3D%20Printing%20-%20Cheek%20-%20Rock%20Roll%20Hall%20of%20Fame%20JOHN%20CHEEK.pdf. As a result, such claims would need to be narrowly tailored to a specific way of printing the object.

[92] Likewise in Australia, such distributors would not be direct infringers of a patent for a product which is 3D-printable.

[93] See Osborn at 2; 23 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. at 789-93, 805-07.

[94] *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors*, 617 F.3d 1296, 1309 (Fed. Cir. 2010).

offer must be for a potentially infringing article,"[95] *i.e*., a tangible object—while with digital files, the immediate subject of the offer and sale, is a digital representation of a physical item.[96] Moreover, many will distribute digital files of patented objects for free, and thus not be making an actionable offer to sell.[97] Time will tell if courts begin to hold that offers to sell a digital file constitute direct infringement of a claim to a tangible object.[98] If not, patent owners will need to look to the doctrine of secondary liability for relief.[99]

Further, under the repair-and-reconstruction doctrine of patent law, manufacturing unpatented replacement parts for a patented device is unlikely to infringe the patent to the device.[100] Reconstructing a patented device in its entirety from its constituent parts, however, is infringement.[101] Further (and similar to copyright law), under the "staple article of commerce" doctrine of patent law, an item such as a 3D printer that is capable of substantial non-infringing uses is unlikely to give rise to liability for patent infringement merely because it could be used to infringe a patent.[102]

The test for direct or primary infringement of a design patent is whether an ordinary observer, familiar with the prior art, would view the challenged design as substantially similar to the patented one, such that the observer would be deceived into purchasing one design supposing it to be the patented design.[103] "Where a design contains both functional and non-functional elements, the scope of the claim must be construed in order to identify the non-functional aspects of the design as shown in the patent."[104] Where certain elements of the design have functional purposes, "such functional aspects at least necessitate[] cabining the scope of the design claim in order to prevent the claim from encompassing the general design concept" of the functional elements.[105]

2. Secondary Liability

In contrast to copyright and trademark/trade dress, secondary liability for patent infringement in the U.S. is statutory.[106]

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[95] *Id*.
[96] Osborn at 2.
[97] See *id*.
[98] See *id*.
[99] See *id*.
[100] See Weinberg at 9 (citing *Aro Mfg. Co. v. Convertible Top Replacement Co*., 377 U.S. 476, 480 (1964)).
[101] *Husky Injection Molding Sys. Ltd. v. R&D Tool & Eng'g Co*., 291 F.3d 780, 785 (Fed. Cir. 2002); Weinberg at 9.
[102] See Weinberg at 13 (citations omitted). *In re Bill of Lading Transmiss. & Processing Sys*., 695 F.Supp. 2d 680, 686-87 (S.D. Ohio 2010), *aff'd*, 497 Fed. Appx. 65 (2013); *see Sony Corp. of Amer. v. Universal City Studios, Inc*., 464 U.S. 417, 442 (1984). Selling general purpose equipment that can perform a process also does not infringe a process patent on that process. *Ricoh Co. Ltd. v. Quanta Computer Inc*., 550 F.3d 1325, 1334 (Fed. Cir. 2008).
[103] *Egyptian Goddess, Inc. v. Swisa*, 543 F. 3d 665, 670 (Fed. Cir. 2008).
[104] *OddzOn Products, Inc. v. Just Toys, Inc.*, 122 F. 3d 1396, 1405 (Fed Cir. 1997).
[105] *Ethicon Endo-Surgery, Inc. v. Covidien, Inc.,* 796 F.3d 1312, 1334 (Fed. Cir. 2015).
[106] Australia likewise has statutory secondary liability provisions for patent infringement, comprising provisions relating to "authorisation to infringe"(under section 13 of the Patents Act 1990) and "contributory infringement" provisions, under section 117 of the Patents Act 1990). There can also be liability under common law principles of "common design" or joint torfeasorship.

(a) Inducement - 35 U.S.C. § 271(b)

A distributor may be liable for inducement of patent infringement if it is willfully blind to the infringement.[107] Rejecting a more pro-defendant standard of "deliberate indifference to a known risk" of patent infringement, the Supreme Court nonetheless required that "(1) the defendant must subjectively believe that there is a high probability that a fact [of infringement] exists and (2) the defendant must take deliberate actions to avoid learning of that fact."[108] This is a higher standard than recklessness or negligence.[109] Good faith belief of non-infringement is a defense.

Nevertheless, some have argued that a distributor of CAD files with actual knowledge or willful blindness that the file digitally represents a patented product or design should be found liable for inducement.[110] Others have suggested that only the most egregious offerors of contraband 3D-printed objects (such as DEFCAD and Pirate Bay) could be held liable for inducement of patent infringement.[111]

(b) Contributory Infringement - 35 U.S.C. § 271(c)

Under the contributory infringement provisions, "[i]f the use of a product by a person would infringe a patent, the supply of that product by one person to another is an infringement of the patent by the supplier unless the supplier is the patentee or licensee of the patent." Here, "use" refers to:
"if the product is capable of only one reasonable use, having regard to its nature or design - that use;"
if the product is not a "staple commercial product" (a definition of which, provided by the High Court of Australia, is "a product supplied commercially for various uses") - "any use of the product if the supplier had reason to believe that the person would put it to that use; or
in any case - use of the product in accordance with any instructions for the use of the product, or any inducement to use the product, given to the person by the supplier or contained in an advertisement published by or with the authority of the supplier."

Supply of a computer file (the only reasonable use of which is for 3D printing) a patented item would, if such a file can be considered a product, constitute contributory infringement under Australian law.

Supply of a computer file to a person with instructions for the use of the file to 3D print a patented item, or an inducement to use the file to 3D-print that item, given to the person by the supplier, would again, if such a file can be considered a product, constitute contributory infringement under Australian law, even if the file has more than one reasonable use.

[107] *Id. See Global-Tech Appliances, Inc. v. SEB S.A.,* 563 U.S. 754, 131 S.Ct. 2060, 2069-71 (2011).
[108] 131 S.Ct. at 2070.
[109] See *id*.
[110] See 23 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. at 795-96
[111] See Tyler Macik, *Global Data Meets 3;D Printing: The Quest for a Balanced and Globally Collaborative Solution to Prevent Patent Infringement in the Foreseeable 3-D Printing Revolution*, 22 IND. J. GLOBAL LEG. STUD. 149, 158-60 (2015).

The U.S. Supreme Court has noted that the purpose of the contributory patent infringement doctrine is to "provide for the protection of patent rights where enforcement against direct infringers is impracticable."[112] However, contributory patent infringement is generally more difficult to show than contributory copyright or trademark/trade dress infringement.[113] Section 271(c) of the Patent Act defines contributory patent infringement to require offering, selling or importing a "component" of a patented invention, "knowing" the same to be especially made or especially adapted for use in an infringement:

> "(c) Whoever offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer."[114]

As alluded to above, the Supreme Court and Federal Circuit have narrowly construed the meaning of a combinable "component" of a patented device under another subsection of § 271 to exclude mere abstract digital instructions.[115] Therefore, CAD files should not qualify as "components" of printed objects, so a CAD file distributor should not be contributorily liable for patent infringement under § 271 (c), for the same reason that it is unlikely to quality as a direct infringer.[116] However, at least one commentator has opined that if direct design patent infringement can be shown for a computer icon or similar article, "it may be possible to pursue file hosting sites for contributory [patent] infringement[.]"[117]

Contributory infringement of a patent, like that of a trademark, also requires evidence of actual or direct infringement.[118]

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[112] 23 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. at 787 (quoting *Aro Mfg. Co. v. Convertible Top Replacement Co*., 377 U.S. 476, 511 (1964)).

[113] See 34 CARDOZO ARTS & ENT. L.J. at 44. One exception would be a defendant who removes a patent marking and then uploads the file; this might constitute inducement by an uploader to infringe a patent. See *id*. at 45.

[114] 35 U.S.C. § 271.

[115] See 23 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. at 800 (citations omitted); *Microsoft v. AT&T Corp.*, 550 U.S. 437, 449-50 (2007) (citing *Pellegrini v. Analog Devices, Inc.,* 375 F.3d 1113, 1117-19 (Fed. Cir. 2004) (transmission abroad of instructions for production of patented computer chips not covered by 271(f))).

[116] See *id*.

[117] 25 DEPAUL J. ART TECH. & INTELL. PROP. at 118-19.

[118] See Weinberg at 12; 25 DEPAUL J. ART TECH. & INTELL. PROP. at 199. *Enpal, Inc. v. Microsoft Corp*., 6 F.Supp. 2d 537, 538 (E.D.Va. 1998), citing *Joy Techs., Inc. v. Flakt, Inc*., 6 F.3d 770, 774 (Fed. Cir. 1993). At least one direct infringer is needed. See Weinberg at 13. Direct infringement can be shown by circumstantial evidence. *Id*.

Under UK law, private, non-commercial use of a design does not infringe design law, but the publication or offer for sale of an infringing design would be actionable.[119] Copying of invisible spare parts is also not actionable under UK design law.[120]

In Australia, a person who, without the necessary license or authority, 3D prints an article/product bearing a design registered under either of the country's Acts in respect of the article or product, would almost certainly be considered to be applying the design to the article or making the product embodying the design and thus (directly) infringe the registration. However, use of a 3D scanner to create a file for 3D printing of an article/product embodying a registered design would not be infringement because it does not amount to "making" the article or product.

Whether a direct infringement occurs in a given jurisdiction may depend on whether the design is deemed to be "made" in the respective country. For example, even though Australia's Acts do not contain explicit contributory infringement provisions, the Federal Court of Australia has held in relation to the new Act that "to make" (a product) includes "to direct, cause or procure the product to be made by another", that "make" is not restricted to the manual task of making the product, and that a principal's directing an independent contractor to engage in such a task (in Australia) would amount to "making" the product and thus direct infringement.

As a result, a person (without the necessary authorization or license) providing a 3D file to a 3D printing contractor in Australia with instructions to do a 3D-print based on the file, whereby to produce a product embodying a design the same as or substantially similar in overall impression to a design which is registered under the new Act, would infringe the registered design**.** However, the Federal Court (in another decision) has held that, where the contractor is overseas, the person engaging the contractor would not be "making" in the relevant sense. Subsequent importation of the product by the person would only constitute infringement if it is "for sale, or for use for the purposes of <u>any trade or business</u>" (see (b) above under "New Act"). Therefore, a person who has a product embodying a registered design 3D-printed overseas and thereafter imports the product for private use would not infringe the registration under Australian law.

III. OPTIONS FOR CHANGE

Some have warned that with 3D printing, people who were once consumers will become producers "away from control" on a massive scale, by printing products at home where brand owners will not be able to catch infringements.[121] Specifically, some have expressed concern that principles of contributory or induced infringement may be of little

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[119] See Andrew Moir, Anthony Dempster, Rachel Montagnon, David Bennett, & Richard Woods, *3D printing; the legal implications of an emerging new technology*, THOMSON REUTERS (PROF'L) UK LTD. 1 (June 2016), uk.practicallaw.com/--628-3390?/sourceassistid=1248374130651&sour; http://hsfnotes.com/productliability/wp-content/uploads/sites/9/2017/01/3D-Printing-The-legal-implications-of-an-emerging-new-technology.pdf.

[120] See *id*.

[121] See John Hornick, Comment to *Protecting IP in a 3D Printed Future*, MANAGING INTELL. PROP. (May 24, 2016), http://www.managingip.com/Article/3556759/ProtectingIPina3Dprintedfuture.html.

value if CAD files are shared for free, peer-to-peer, or offered by pirates or black market sources.[122] Time will tell.

Fundamental legal questions include whether to provide a safe harbor for 3D print shops and OSPs to avoid trade dress infringement or other liability, to impose on such players an affirmative duty to investigate and potential liability, or to do nothing and "wait and see" how the law develops. A safe harbor offers large and small 3D print shops and OSPs alike the assurance of liability avoidance if they maintain a robust notice-and-takedown regime. Rights holders might also insist that, in order to have the benefit of a safe harbor, 3D printers should incorporate restrictive digital rights management (DRM) to prevent their printers from reproducing CAD designs with "do not copy" watermarks.[123]

Others contend it would place a disproportionate burden on rights holders to monitor and pursue infringements on an inefficient basis themselves.[124] Furthermore, many argue that any safe harbor should not extend to 3D printing of heavily regulated if not contraband useful articles, including but not necessarily limited to guns and drugs.[125]

Given the "useful article" doctrine in copyright law and the functionality doctrines in trade dress and design patent law, imposition of a DMCA-like notice-and-takedown regime could also result in removal from the market of 3D-printed designs that do not infringe any valid or enforceable IP right.[126]

In the patent arena, some have urged that legislatures—or failing that, courts—expand patent protection to include the 3D CAD files used in the manufacture of patented product.[127] Still others have opined that existing tools, including patent marking, may be sufficient to address the most commercially significant patent infringement by 3D printing.[128]

Meanwhile, some rights holders have taken novel approaches. In 2013, for example, Nokia made CAD files availble for its cell phone cases to facilitate 3D printing of case products bearing its logo for private usage.[129] As a different example, Hasbro has entered into a licensing agreement with Shapeways that allows for sharing of revenue from 3D designs sold online.[130] Yet few rights holders have followed these approaches.[131]

Still others have suggested novel forms of marking genuine 3D product such as by embedding nanoparticles or DNA marking for distinguishing the real from the fake, and

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[122] Hornick and Roland, p. 5.
[123] See Weinberg at 14.
[124] See 34 CARDOZO ARTS & ENT. L.J. at 51.
[125] See 16 COLUM. SCI. & TECH. L. REV. at 244-47; 22 IND. J. GLOBAL LEG. STUD. at 156 (reporting on DEFCAD and Pirate Bay hosting 3-D CAD file of a printable gun).
[126] See 34 CARDOZO ARTS & ENT. L.J. at 52.
[127] 25 DEPAUL J. ART TECH. & INTELL. PROP. L. at, 149; 23 FORDHAM I.P. MEDIA & ENT. L.J. at 805.
[128] See 34 CARDOZO ARTS & ENT. L.J. at 45.
[129] 28 HARV. J. LAW & TECH. at 263-65.
[130] Saahil Dama & Amulya Chinmaye, Printing a Revolution: The Challenges of 3D Printing on Copyright, 84 GEO. WASH. L. REV. ARGUENDO 68, 80 (June 2016).
[131] It also seems premature to think that enough trademarked products will be produced neither directly by the trademark owner nor by a licensee, such as to weaken the rationale for post-sale confusion. Cf. *id*.

(as noted above) an iTunes-like online marketplace for 3D design files of genuine products.[132]

For now, many IP owners are resigned if not content to operate as though a notice-and-takedown regime is already in place, and to develop their record of actual knowledge by sending takedown notices.[133] In this way, rights holders bear the affirmative burden of investigating for infringements, but otherwise have relatively inexpensive means to pursue notice and takedown of infringing 3D objects and designs via those platforms that do maintain a robust compliance regime. If OSPs ignore such takedown notices, however, they expose themselves to potential liability for contributory copyright and/or trade dress infringement.

IV. RECOMMENDATION

Given the emergence of the 3D printing industry and the state of flux in the law, it is recommended that brand owners and IP-related associations continue to monitor the law of trade dress, copyright, design and patent in this area. While a public policy might support an initiative to bar 3D printing of regulated and contraband items in particular, such as pharmaceuticals and guns, such printing would not implicate trade dress or other design law if the designs are not protectable.

While 3D printing "away from control" in homes or peer-to-peer might threaten the ability of brand owners to police the quality of goods bearing its trademark or trade dress, it is not yet clear what if any change in the law is necessary or appropriate to address this risk.

What might assist brand owners in addressing this issue is the development of a 3D printing-related best practices or "toolbox." This toolbox might include tips on securing 3D trademark and registered design protection where possible for the external appearance of products themselves and their packaging, protection against copying and embedded codes for tracing copies, and authenticating the source of goods.

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[132] See John F. Hornick, *How to Tell What's Real and What's Fake in a 3D Printed World*, 3D PRINTING INDUSTRY (Feb. 5, 2014), http://www.finnegan.com/resources/articles/articlesdetail.aspx?news=6e099194-a9fa-4357-b44c-8958c6c845a2 (citation omitted).

[133] See 34 CARDOZO ARTS & ENT. L.J. at 18, 26, 54; see Deven R. Desai & Gerard N. Magliocca, Patents, Meet Napster: 3D Printing and the Digitization of Things, 102 GEO. L. J. 1691, 1718 (Aug. 2014).