U.S. COPYRIGHT OFFICE & LIBRARY OF CONGRESS

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In the Matter of	)	
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Exemption to Prohibition on	)	Docket No: RM 2016-10
Circumvention of	)	
Copyright Protection Systems for	)	
Access Control Technologies	)	
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COMMENTS OF STRATASYS, INC.

IN OPPOSITION TO

PROPOSED CLASS 12: SOFTWARE OR FIRMWARE IN 3D PRINTERS TO ALLOW USE OF NON-MANUFACTURER-APPROVED FEEDSTOCK

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COMMENTS OF STRATASYS, INC.

In connection with the seventh triennial rulemaking proceeding under the Digital Millennium Copyright Act ("DMCA"), Stratasys, Inc. ("Stratasys") submits these comments in opposition to a proposal by Mr. Michael Weinberg and others (collectively, "Petitioners") seeking to broaden the existing exemption for the circumvention of technological protection measures ("TPMs") controlling access to firmware and software in 3D printers.[1]

While Stratasys does not oppose renewing the current exemption enacted during the sixth triennial rulemaking proceeding (the "Current Exemption"), Stratasys urges the Librarian and the Copyright Office to reject Petitioners' request to broaden it (the "Proposed Exemption").

I. INTRODUCTION AND SUMMARY OF OPPOSITION.

During the sixth triennial rulemaking proceeding, Stratasys submitted substantial materials and information to the Copyright Office regarding 3D printing technologies and the 3D printing marketplace.[2] After months of deliberation, and based on the Register's Recommendation, the Librarian of Congress adopted the following exemption:

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[1] Petition for a New Exemption Under 17 U.S.C. § 1201 of Mr. Michael Weinberg, *In the Matter of Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies*, RM 2016-10 (Sept. 13, 2017) [hereafter "**Weinberg Petition**"]; Long Comment Regarding a Proposed Exemption Under 17 U.S.C. § 1201 of Mr. Michael Weinberg, *In the Matter of Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies*, RM 2016-10 (Dec. 18, 2017) [hereafter "**Weinberg Submission**"]; *see also* Comment Regarding a Proposed Exemption Under 17 U.S.C. § 1201 of the Free Software Foundation, Inc., *In the Matter of Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies*, RM 2016-10 (Dec. 18, 2017).

[2] Comments of Stratasys in Opposition to Proposed Class 26: Software or Firmware in 3D Printers to Allow Use of Non-Manufacturer-Approved Feedstock, *In the Matter of Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies*, RM 2014-07 (Mar. 27, 2015) [hereinafter "**Stratasys Opp'n**"].

Current Exemption: Computer programs that operate 3D printers that employ microchip-reliant technological measures to limit the use of feedstock, when circumvention is accomplished solely for the purpose of using alternative feedstock and not for the purpose of accessing design software, design files or proprietary data; provided, however, that the exemption shall not extend to any computer program on a 3D printer that produces goods or materials for use in commerce the physical production of which is subject to legal or regulatory oversight or a related certification process, or where the circumvention is otherwise unlawful.

Without submitting any new arguments, or producing any supporting evidence whatsoever, Petitioners request that the Current Exemption be replaced with the following:

Proposed Exemption: A proposed exemption for owners of 3D printers to circumvent technological protection measures on firmware or software in 3D printers to run the printers' operating systems to allow use of non-manufacturer-approved feedstock.[3]

Petitioners further explained: "this exemption does not include the additional qualification of 'that the exemption shall not extend to any computer program on a 3D printer that produces goods or materials for use in commerce the physical production of which is subject to legal or regulatory oversight or a related certification process, or where the circumvention is otherwise unlawful.' which exists in the current exemption."[4] In short, Petitioners want to bring circumvention not only into the commercial sphere, but into any and all regulated industries.

Stratasys further notes that the Proposed Exemption not only eliminates the "qualification" identified by Petitioners, but is broader than the Current Exemption in other ways. Specifically, it is not limited to circumvention accomplished "solely" for using alternative feedstock. Neither is it limited to the circumvention of chip-based TPMs, but specifically contemplates modifications to the "operating systems" as well as, arguably, any other firmware or software. Thus, it would exempt (1) system-wide access to a 3D printer, (2) in any industry, (3) as long as *one* purpose (but not the sole purpose) of such circumvention was to use a different feedstock.

To justify their position, Petitioners claim that the Current Exemption is "**vague and unworkable**" and "grounded in concerns **properly addressed by other regulatory agencies**."[5] Stratasys respectfully disagrees. As explained below, (1) there is absolutely no evidence that the 2015 exemption is "unworkable" or has adverse effects on non-infringing uses, (2) the proposed expansion puts at risk downstream users of 3D printed products, and (3) there is no reason to burden other agencies as Petitioners propose.

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[3] Weinberg Petition at 2.
[4] *Id*.
[5] Weinberg Submission at 1-2.

II. THERE IS NO EVIDENCE THAT THE CURRENT EXEMPTION HAS ADVERSE EFFECTS ON NON-INFRINGING USES OR IS OTHERWISE "UNWORKABLE."

Petitioners have not met their burden of establishing the statutory requirements for the Proposed Exemption and have offered no support for their criticisms of the Current Exemption.[6] *First*, Petitioners have not only failed – *but have not even attempted* – to put forth any evidence that "persons who are users of a copyrighted work are, or are likely to be in the succeeding three-year period, adversely affected" in their ability to make non-infringing uses of copyrighted works. *Second*, the statutory factors under 17 U.S.C. § 1201(a)(1)(C) overwhelmingly favor denying the Proposed Exemption, because of the likely negative effects on the market for 3D printers and related copyright-protected works. *Third*, there is no evidence to support that the Current Exemption requires modification.

A. No Non-infringing Uses.

"The burden is on proponents to show that circumvention of TPM is non-infringing. . . ."[7] Moreover, the Register has emphasized that a class cannot be designated "in a factual vacuum."[8] Thus, an exemption will not issue if proponents do not provide sufficient information about the circumvention they seek to facilitate.[9] Without such information, the Register and the Librarian cannot evaluate whether the act of circumvention creates an infringing copy or derivative work, or whether it falls outside of the scope of the rulemaking because the technological measure circumvented does not control access to a copyright protected work.[10]

The Proposed Exemption should be denied because Petitioners failed to produce *any* evidence demonstrating that the proposed circumvention is non-infringing. Petitioners failed to introduce a single concrete example of a non-infringing use in support of the Proposed Exemption, let alone sufficient information to satisfy their burden.

Instead, Petitioners resort to speculation and conjecture. Mr. Weinberg argues that the Current Exemption "effectively bans a number of legitimate activities."[11] He does not identify even one such activity. Likewise, Mr. Weinberg asserts that "there are many users that could benefit from using third party feedstock in their 3D printer. . . ."[12] Again, he fails to identify any user or offer an example of a user unable to use third-party feedstock under the Current Exemption.

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[6] The triennial rulemaking proceeding is intended to be a "fail-safe" mechanism, authorizing the Librarian of Congress to selectively waive the DMCA's prohibition on circumvention of TPMs "*in exceptional cases*," when the requirements set forth in 17 U.S.C. § 1201(a)(1) are met. *See* Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, Final Rule, 65 Fed. Reg. 64,556 (Oct. 27, 2000) [hereafter, "**2000 Final Rule**"] (emphasis added).

[7] *See* Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, Final Rule, 77 Fed. Reg. 65,260, 65,275 (Oct. 26, 2012) (codified at 37 C.F.R. § 201.40) [hereafter, "**2012 Final Rule**"].

[8] 2012 Final Rule at 65,276, *quoting* Recommendation of the Register of Copyrights in RM 2011-7, Rulemaking on Exemptions from Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies at 63 (Oct. 12, 2012) [hereafter, "**2012 Recommendation**"].

[9] *Id*.

[10] *See, e.g*., 2012 Final Rule at 65,276; Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, Final Rule, 71 Fed. Reg. 68,472, 68,478 (Nov. 27, 2006).

[11] Weinberg Submission at 6.

[12] *Id.*

It is difficult for Stratasys to respond to the claim that the Proposed Exemption would enable "legitimate activities" without more information. Frankly, Stratasys cannot even respond to *hypothetical* non-infringing activities, because Petitioners have not even offered that.

To the extent that Petitioners' proposed uses can be evaluated, the proposed uses do not qualify as non-infringing uses within the meaning of Section 1201(a)(1)(A).[13] As the Register stated during the fifth triennial rulemaking, "[a]n exemption may not be based simply on perceived beneficial or desirable uses,"[14] but must be one of the uses expressly protected by Title 17, such as fair use as described in Section 107 or certain reverse engineering described in Section 117.[15] Although Petitioners do not allege that fair use or Section 117 is applicable to the facts here, because these topics arose in the last triennial rulemaking, Stratasys will briefly address them.

i. The Fair Use Defense Does Not Apply.

First, any activity excluded by the "qualifying language" in the Current Exemption would *not* be entitled to the fair use defense. In determining whether the fair use defense applies, courts examine the following factors: (1) the purpose and character of the use; (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. 17 U.S.C. § 107.

The first factor clearly does not favor modifying the Current Exemption. The primary difference between the Proposed Exemption and the Current Exemption is that the Proposed Exemption enables circumvention in all commercial settings. However, "every commercial use of copyrighted material is presumptively an unfair exploitation of the monopoly privilege that belongs to the owner of the copyright. . . ." *Sony Corp. of Am. v. Uni. City Studios, Inc.*, 464 U.S. 417, 793 (1984). Petitioners want to broaden the Current Exemption beyond the zone of non-commercial, personal uses, and thus the first factor is not in their favor.

While the commercial nature of the uses enabled by the Proposed Exemption is sufficient to preclude fair use, none of the remaining factors support it either. In particular, the third factor – the amount that needs to be copied – would likely be considerable, as Mr. Weinberg has acknowledged. During the sixth triennial rulemaking public roundtable, he stated "[y]ou're in a situation where at a minimum there is software on the printer that is waiting to be used until it can verify that it has approved input, **and that software is likely protected by copyright**. . . ."[16] When he was asked whether "you need to copy the software in order to make the modification required for changing your feedstock," Mr. Weinberg conceded that this would be required in at least some instances.[17] The focus in

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[13] 2012 Recommendation at 7; *accord* Recommendation of the Register of Copyrights in RM 2008-8, Rulemaking on Exemptions from Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, at 12 (June 11, 2010) (A proponent "must establish that the proposed use is likely to qualify as non-infringing under relevant law.").

[14] 2012 Recommendation at 158.

[15] *Id.* at 7.

[16] Transcripts for the hearings are posted at http://copyright.gov/1201/2015/hearing-transcripts. Hearing exhibits are posted at http://copyright.gov/1201/2015/hearing-exhibits. Tr. at 133 (May 28, 2015) (Weinberg) (emphasis added).

[17] *Id.* at 141.

the Proposed Exemption on causing the printer's *operating system* to perform in a manner other than it is programmed also opens the door to a substantial amount of copying.

Finally, as explored in detail during the sixth triennial rulemaking proceeding, the market for copyright-protected works would be negatively impacted if the exemption extended to commercial users.[18]

ii. Section 117 Does Not Apply.

"Section 117 [of the Copyright Act] allows the owner of a computer program to make a copy or adaptation of that work if the new copy or adaptation is created as an 'essential step' to use the program with a machine."[19] 3D printers that are "closed" – *i.e.*, that do not accept non-manufacturer approved feedstock – and used to produce goods in commerce are more likely to use licensed software. As Stratasys explained during the last triennial rulemaking, its software is licensed.[20] By contrast, when pressed for "direct evidence" of any such software that was owned rather than licensed, the petitioners admitted they had none.[21] Similarly, there is no such evidence available in Petitioners' submissions in support of the Proposed Exemption. Thus, there is no reason to believe that Section 117 would apply to the uses enabled by the Proposed Exemption.

B. No Adverse Effects.

Despite the fact that evidence of "adverse effects" on non-infringing uses is required to grant an exemption, Petitioners offer no such evidence. Instead, they state that "there is no evidence that the qualifying language has any connection to the harms raised to justify its inclusion."[22] Petitioners thus improperly shift their burden to *opponents* of the Proposed Exemption.

The DMCA requires that a *proponent* – not an opponent – of an exemption must show that the TPMs at issue are causing, or are likely to cause within the next three years, adverse impacts on non-infringing uses that are *substantial*.[23] To show "substantial" adverse effects, "it is necessary to demonstrate 'distinct, verifiable, and measurable impacts' occurring in the marketplace."[24] Because "*de minimis* impacts" cannot support an exemption, the Copyright Office has advised that "'mere inconveniences' or 'individual

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[18] Stratasys Opp'n at 23 (circumvention of the TPMs decreases the value of the software because the comprised code can no longer serve as a secure distribution platform).

[19] Recommendation of the Register of Copyrights in RM 2014-07, Rulemaking on Exemptions from Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, at 360 (Oct. 2015) [hereafter, "**2015 Recommendation**"]; *see* 17 U.S.C. § 117(a)(1).

[20] Tr. at 164 (Carey).

[21] Tr. at 146-48 (Charlesworth) (Siy) (Weinberg).

[22] Weinberg Submission at 7.

[23] Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 79 Fed. Reg. 55,687, 55,690 (Sept. 17, 2014) [hereafter "**2014 Notice of Inquiry**"].

[24] 2014 Notice of Inquiry at 55,690, *quoting* Tom Bliley, REPORT OF THE HOUSE COMMITTEE ON COMMERCE ON THE DIGITAL MILLENNIUM COPYRIGHT ACT OF 1998, H.R. REP. NO. 105-551, pt. 2, at 37 (1998) [hereafter, "**Commerce Comm. Report**"].

cases' do not satisfy the rulemaking standard,"[25] and "isolated or anecdotal problems will be insufficient to justify an exemption."[26]

Similarly, speculative or hypothetical harms do not meet the standard. While a proponent may meet the standard by showing that a substantial adverse impact is *likely* within the next three years, the Copyright Office has made clear that "predicted adverse effects are only cognizable 'in extraordinary circumstances in which the evidence of likelihood of future adverse impact is highly specific, strong and persuasive.'"[27] "It is not sufficient to demonstrate … that the absence of an exemption *could* result in an adverse impact."[28]

Petitioners do not provide any evidence of *actual* adverse effects, nor do they offer "specific, strong and persuasive" evidence of likely *future* adverse effects. This alone justifies rejecting the Proposed Exemption.

C.   The Statutory Factors Do Not Favor the Proposed Exemption.

If the above threshold showings were met (which they were not), the Register and Librarian would next examine the proposed exemption in relation to statutory factors set forth in 17 U.S.C. § 1201(a)(1)(C). These factors include: (1) the availability for use of copyrighted works; (2) the availability for use of works for nonprofit archival, preservation, and educational purposes; (3) the impact that the prohibition on circumvention of technological measures applied to copyrighted works has on criticism, comment, news reporting, teaching, scholarship, or research; (4) the effect on the market for copyrighted works; and (5) such other factors as the Librarian considers appropriate.

During the last triennial rulemaking, the petitioners acknowledged that the first three statutory factors do not favor any exemption for 3D printers. "[A]s the circumvention of technological measures designed to prevent the use of third party materials in 3D printers is not the type of harm that Congress was considering when it passed the DMCA, it is not surprising that the first three factors do not directly apply to this exemption."[29]

In the current proceeding, Petitioners have disregarded the statutory factors altogether, except to admonish the Copyright Office not to use them "as a mandate to right the wrongs of the world." [30] This appears to be a response to the Register's observation that "safety and regulatory concerns are not copyright-related, but are sufficiently weighty to merit consideration in drafting an exemption…."[31]

As Stratasys explained in its opposition comments submitted during the last rulemaking, on balance, the statutory factors do not favor any exemption for TPMs on 3D

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[25] 2014 Notice of Inquiry at 55,690; *quoting* STAFF OF HOUSE COMM. ON THE JUDICIARY, 105ᵀᴴ CONG., SECTION-BY-SECTION ANALYSIS OF H.R. 2281 AS PASSED BY THE UNITED STATES HOUSE OF REPRESENTATIVES ON AUG. 4, 1988, at 6 (Comm. Print 1998) [hereafter, "**House Manager's Report**"].

[26] 2012 Recommendation at 8.

[27] 2012 Recommendation at 62, *quoting* House Manager's Report at 6.

[28] 2012 Recommendation at 6; *accord* 2000 Final Rule, *citing* House Manager's Report at 8; Commerce Comm. Report at 37.

[29] Long Comment Regarding a Proposed Exemption Under 17 U.S.C. § 1201 of Public Knowledge and the Library Copyright Alliance, *In the Matter of Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies*, RM 2014-07, at 11-12 (Feb. 6, 2015).

[30] Weinberg Submission at 8.

[31] 2015 Recommendation at 375.

printers. [32] Its reasoning is especially applicable to the areas into which Petitioners want to broaden the Current Exemption – 3D printers used to create commercial products, including in regulated industries. The safety and policy concerns considered under the "fifth factor" are at least as significant today as they were three years ago, and thus the integrity of TPMs deserves at least as much protection.

III. "CLOSED" SYSTEMS – AND THE TPMS THAT PROTECT THEM – HAVE SIGNIFICANT BENEFITS.

The decision to restrict a particular system to specific materials may be based on safety interests, engineering constraints, customer demands, and reliability and maintenance considerations. Higher-end machines designed to print to precise tolerances, in particular, require highly-engineered printing materials with precise physical and chemical properties, and typically run at higher temperatures required to melt high performance engineering materials.

That said, there are plenty of 3D printers that are "open," or designed to accept non-manufacturer-approved feedstock. [33] In fact, since the last triennial rulemaking, the market trend has been towards open systems. [34] Petitioners pretend as if all 3D printers are "closed" systems when they invoke the (hypothetical) "many users that could benefit from using third party feedstock," and thereby ignore all of the options in the marketplace available to such users.

But for some users, the integrity of a closed system is critical to the integrity of the printed part.

A. Closed Systems in Commercial Applications.

Such systems offer advantages that are **critical in all commercial applications**. These are described below.

- *The ability to consistently produce outputs that match established benchmarks by controlling system inputs.* Many customers shop for 3D printing systems by testing against a "benchmark." A benchmark is a 3D object produced by a printer from a design file provided by the customer. The specifications for the benchmark may include various desired properties. Stratasys invests significant time and money calibrating materials' formulations to its 3D printing systems so that a customer's results will be repeatable and match the expectations established by the benchmark. Those calibrations range from adapting the material formulation to the printing liquefier or printing head, calibrating size accuracy on various geometries, adjusting heat and temperature within the printing chamber, ensuring build material/support material compatibility, and many more parameters.

- *A closed-loop feedback process that produces real-time quality and performance data to pinpoint performance issues and speed innovation.* Inputs in Stratasys systems are carefully tested, controlled, and monitored, allowing for the development of a substantial knowledge base of performance data that it analyzes

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[32] Stratasys Opp'n at 21-25.

[33] For more information on "open" and "closed" systems, *see* Stratasys Opp'n at 5-8.

[34] Wohlers Associates, *Wohlers Report 2017: 3D Printing and Additive Manufacturing State of the Industry*, p. 161.

to troubleshoot or to identify areas for improvement. Customers also receive reports with performance data that they can use to pinpoint the source of any production issues and optimize their use of Stratasys systems.

- *Steady improvement in reliability and service levels permitting expansion to new classes of customers*. Stratasys collects performance data from its printing systems, contributing to the development of a considerable knowledge base that has allowed it to quickly redress performance issues and target areas of improvement. This has facilitated the development of more reliable systems and end products and increased penetration among new customers for 3D printing technologies and 3D printed products.[35]

Use Case: Aviation

With cavalier disregard for the benefits of closed systems, Petitioners suggest that even manufacturers of aviation parts should be able to hack their 3D printers. They criticize Stratasys for not explaining "why existing FAA regulations [a]re inadequate to guarantee the safety and integrity of airline parts" created by 3D printers. Stratasys takes this opportunity to respond.

Stratasys has worked closely with aviation industry leaders to establish industry standards and certification for the production of 3D printed parts in aircraft. Such stakeholders agree that these parts must be reliable and adhere to a very stringent set of guidelines and specifications. As in many industries, while an outside regulator plays an important role, industry standards and certifications are also critical to overall performance and quality assurance.

In the aviation space, Stratasys and industry partners developed the Aircraft Interior Certification Solution ("AICS").[36] From start to finish, the AICS provides aerospace companies with a detailed verification process that tracks the material and standards needed to install 3D printed parts in aircraft. Downstream manufacturers can confidently demonstrate a chain of custody from production to installation. The AICS provides the aerospace industry with the elevated integrity required to safely rely on 3D printed components.

The Proposed Exemption would undermine the integrity of the certification process and the tightly-engineered printing systems that undergird it. Leaders in this industry have expended a significant amount of time and resources in developing the AICS. There is no reason for the Copyright Office to approve an exemption that calls into question the value of TPMs and encourages their circumvention in such an industry.

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[35] Some fully-enclosed "plug and play" systems are even represented as safe for children. *See* Richard Baguley, *Best 3D Printers 2015*, Jan. 16, 2015, http://www.tomsguide.com/us/best-3d-printers,review-2236.html (last visited Mar. 2, 2015) (review of the Cubify Cube 3 printer); *see also* Dylan Miller, *Best 3D Printer for Your Kids in 2017*, Dec. 4, 2017, available at: https://io3dprint.com/best-3d-printer-kids-2017/ (last visited Feb. 12, 2018) (reviews of XYZ miniMaker and Sindoh printers)

[36] For a detailed overview of the AICS, *see* Stratasys, *Certified Additive Manufacturing for Aircraft Interiors*, available at: http://www.stratasys.com/-/media/files/solution-guide/certified-additive-manufacturing-for-aircraft-interiors.pdf.

B. Safety and Security Considerations.

TPMs also help make 3D printing safer and more secure, and encouraging the broad circumvention of such protections does not make sense. The Current Exemption, with its focus on chip-based circumvention, arguably excludes the "system-level"[37] hacks that leave all firmware, software, data, and controls in a 3D printer open to copying and modification. Such circumvention can have unintended risks, including to the (1) safety of 3D printer operators and others in their work space, and (2) security of the 3D printer from malicious attacks.

Some systems are closed because of the need to mitigate risks involved in the use of a specific material, such as fire hazards or hazardous fumes. Systems that fuse metal powder, for example, must be used in a controlled environment because the metal powders are highly combustible. The build chamber fills with inert gas (argon or nitrogen) selected for compatibility with the metal powder to prevent the metal from oxidizing during the build process and to manage combustible dust that arises from the printing process. In systems that extrude melted thermoplastic materials, running a low temperature material (*i.e.*, a material having a low melting point) in a printer designed to extrude high temperature materials creates a potential fire hazard. Certain thermoplastic materials may also give off fumes when heated or heated without proper ventilation or controls in place. The Proposed Exemption could compromise the effectiveness of measures designed to manage such risks.

TPMs also have a role to play in cybersecurity. Since the last triennial rulemaking, there is an increasing focus on the security of 3D printing systems. An exemption that encourages circumvention of TPMs that protect 3D printer software and firmware could also leave such printers vulnerable to intrusion.

In a recent study, researchers hacked into the firmware of 3D printers and caused them to print defective objects.[38] They showed that such attacks are feasible using a cyber-physical rootkit. [39] In other words, a hacker circumvents TPMs to obtain "root" or administrator access, and then manipulates the firmware. The researchers showed that such manipulation could cause miniscule modifications that may be undetectable by traditional quality assurance methods, but which would significantly reduce structural integrity.[40]

An exemption that applies to 3D printers used in commercial settings only threatens to make such printers less secure and more vulnerable to these or other attacks. A 3D printer in a commercial setting with compromised or disabled TPMs would likely be more vulnerable to hackers, disgruntled employees, and other malicious actors. There is

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[37] Circumvention methods include bypassing a user console and the required log-in information by hacking directly into the computer embedded on the printer through the use of customized cables or other vectors of attack. For more information on system-level circumvention, *see* Stratasys Opp'n at 9-11.

[38] *3 Ways to Know If a 3D Printer Got Hacked*, Futurity, Aug. 16, 2017, available at: http://www.futurity.org/cyberattacks-3d-printers-1516262/ (last visited Feb. 7, 2018).

[39] Bayens *et al.*, *See No Evil, Hear No Evil, Feel No Evil, Print No Evil? Malicious Fill Pattern Detection in Additive Manufacturing* at 1183, available at: https://www.usenix.org/conference/usenixsecurity17/technical-sessions/presentation/bayens (last visited Feb. 7, 2018).

[40] *Id*.

no justification for encouraging such a situation by broadening the scope of the Current Exemption.

IV.   AN OVERLY BROAD EXEMPTION BURDENS OTHER REGULATORY AGENCIES.

Petitioners urge the Copyright Office not to be concerned about the effect of a broad exemption on printed parts that are subject to regulatory oversight by other agencies. They argue that other agencies are free to "regulate activities within their purview." [41] In essence, Petitioners want the Copyright Office to pass the buck, putting the burden on other agencies to anticipate and regulate the hacking of 3D printers.

This would force federal agencies not only to grapple with the changes brought by 3D printers, but to contemplate scenarios where TPMs are legally circumvented, and possibly to pass new regulations to ban the circumvention of TPMs on 3D printers within their regulatory arena. In the current environment, this would be a challenge to accomplish.[42] For example, after significant study and work starting in 2014, the FDA in December 2017 issued "leapfrog guidance" on the use of 3D printing for medical devices. These were not regulations contemplating every possible use or misuse of a 3D printer, but non-binding "recommendations" to "describe the Agency's current thinking" on the topic.[43]

Moreover, in some industries, binding regulations are only likely to be enacted *after* a significant problem or event has occurred. While it is true that federal agencies have authority to regulate activities within their purview, the certification programs and TPMs currently in place may reduce the burden. If the Proposed Exemption were adopted, it would encourage circumvention of these critical TPMs, thus creating an additional complication and need for regulation from other agencies.

V.   CONCLUSION.

For the foregoing reasons, Stratasys respectfully requests that the Librarian deny Petitioners' proposal to broaden the Current Exemption.

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[41] Weinberg Submission at 8.

[42] *See Trump's 'Two-for-One' Regulation Executive Order*, The Atlantic, Jan. 30, 2017, available at: https://www.theatlantic.com/business/archive/2017/01/trumps-regulation-eo/515007/ (last visited Feb. 7, 2018).

[43] *Technical Considerations for Additive Manufactured Medical Devices*, Feb. 12, 2018, available at: https://www.fda.gov/downloads/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/UCM499809.pdf (last visited Feb. 7, 2018).