3D Printed Firearms, Do-It-Yourself Guns & The Second Amendment

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3D Printed Firearms, Do-It-Yourself Guns & The Second Amendment

James B. Jacobs* & Alex Haberman**

“A 3D printer makes a solid, three dimensional object from a digital file...the user creates a design with computer aided design (CAD) or animation modelling software. The software creates a blueprint of the desired object and divides the object into digital cross sections... [The printer makes] ...a three dimensional object by laying down successive layers of material, which maybe plastic, rubber, paper, polyurethane, or even metal...Using the design created by the software, the printer transfers material by making multiple passes over a platform, depositing layer or top of layer in order to make the finished product.” using an additive process.”¹

“The goal is not to get guns into as many hands as possible, the goal is simply to provide access. The goal is to say, ‘in this world, in the world we want to create, anyone who wants access to a firearm can have access. Because we believe that is a right that no one should be allowed to infringe. Especially political actors.” His vision was clearly one where not only is the oversight of the ATF and the U.S. Government ceased for firearms

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ownership, but that anyone in the world can exercise their right of self defense and enact political change.  

“Security checkpoints will do little good if criminals can produce plastic firearms and bring those firearms through metal detectors into secure areas like airports or courthouses.”

In December, 2012 Cody Wilson, a law student and self-proclaimed anarchist, posted to the Internet, free software that instructs a 3D printer to “print out” plastic gun parts and a gun. On May 6th, 2013, at a demonstration widely covered by the media, Wilson fired a single bullet from a 3D printed gun, called “the Liberator” and posted, to Kim Dotcom’s website the software (computer numerical code) that directs the printing. Kim Dotcom is the creator of Megaupload, an online file-sharing website. Wilson and his supporters hailed this technological breakthrough as a giant step toward making firearms more publicly accessible. Some gun control advocates excoriated Wilson’s demonstration 1) as a threat to security because a 3D-printed plastic gun evades

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2 “Gun rights are human rights.” Nick Leghorn, “An Interview With Cody R. Wilson of the Wikiweapon 3D Printing project,” 10/9/12,

5 http://3dprinting.com/what-is-3d-printing/.
6 http://techcrunch.com/2013/05/06/what-you-need-to-know-about-the-liberator-3d-printed-pistol/;
9 http://fortune.com/2015/12/23/kim-dotcom-megaupload/


On Pirate Bay, one of the file sharing websites hosting Wilson’s software, one person posted the following comment: “This is the first in what will become an avalanche of undetectable, untraceable, easy-to-manufacture weapons that will turn the tables on evil-doers the world over.” http://www.forbes.com/sites/andygreenberg/2013/05/08/3d-printed-guns-blueprints-downloaded-100000-times-in-two-days-with-some-help-from-kim-dotcom/#500c0b8688c6.
metal detection and 2) as a threat to effective gun regulation because a home-made gun maker is not background checked and the gun is not traceable to its maker.

On May 8, 2013, the Directorate of Defense Trade Controls (DDTC), the U.S. State Department’s unit in charge of administering and enforcing the Arms Export Control Act (AECA), advised Wilson to remove his 3D firearm printing software from the Internet because it “might” violate the AECA as interpreted by the State Department’s International Traffic in Arms Regulations (ITAR). Exporting a defense article without permission is a federal felony punishable by a 20-year maximum prison term, million-dollar fine and $500,000 civil penalty. ITAR requires State Department permission to export defense articles. Export means 1) “sending or taking a defense article out of the United States in any manner, except by mere travel outside of the United States by a person whose personal knowledge includes technical data,” and 2) “disclosing (including oral or visual disclosure) or transferring technical data to a foreign person, whether in the United States or abroad.” Defense article” means articles and items on the U.S. Munitions List (USML). The USML includes a category for “technical data,” defined as “information in the form of blueprints, drawings, photographs, plans, instructions or documentation and software directly related to defense articles.” Therefore, posting to the Internet technical data related to manufacturing defense articles constitutes arms-exporting.

10 Defendants sent Defense Distributed a letter stating: “DDTC/END is conducting a review of technical data made publicly available by Defense Distributed through its 3D printing website, DEFCAD.org, the majority of which appear to be related to items in Category I of the [Munitions List]. Defense Distributed may have released ITAR-controlled technical data without the required prior authorization from the Directorate of Defense Trade Controls (DDTC), a violation of the ITAR.” Wilson himself said “The technology will break gun control.” http://www.quotes.net/authors/Cody%20Wilson
11 The Arms Export Control Act authorizes the President to control the import and export of defense articles and defense services and to promulgate regulations for the import and export of such articles and services. 22 U.S.C. sec.2778(a)(1).
12 http://www.ecfr.gov/cgi-bin/text-idx?SID=86008bdf4f1f2e79cc5df41a180750a&node=22:1.0.1.1.3.64&rgn=div5#se22.1.127_13; §127.3.
13 The President delegated his AECA authority to the State Department, which promulgated the ITAR. The State Department’s Directorate of Defense Trade Controls (“DDTC”) administers the ITAR. See Executive Order 13637(n)(iii); 22 C.F.R. §§ 120-130. For a brief history of 3D printed guns see http://www.vocativ.com/video/usa/guns/a-brief-history-of-3d-printed-guns/.
14 22 C.F.R. sec. 120.17(a)(1) and (a4).
15 22 C.F.R. 120.10(a)(1).
16 22 C.F.R. sec. 120.10(a)(1).
Wilson complied with DDTC’s request. However, in the few days that his 3D printing software was available on the Internet, it was downloaded more than 100,000 times17 and reposted to other website.18 Moreover, neither DDTC nor any other government agency prohibited Wilson from selling or giving his software away on a flash drive or via email. He formed a company, Defense Distributed, to sell to Americans within the U.S. 3D printers programmed to print firearms and firearms parts. Thus, anyone in the U.S. could easily obtain Wilson’s 3D firearms printing software and hardware, and a foreign person or entity could obtain these products through a willing U.S. intermediary (or from a foreign person who downloaded Wilson’s software before he removed it from the Internet.

A potential exporter who has any doubt about whether the real or intellectual property he intends to export is covered by the USML, must obtain a “commodity jurisdiction determination” from DDTC. Consequently, on June 21, 2013, Wilson, on behalf of Defense Distributed, submitted ten “commodity jurisdiction requests.”19

On October 1, 2014, while the commodity jurisdiction requests for posting the software were pending, Defense Distributed requested Defense Office of Prepublication and Security Review’s (DOPSR)20 prepublication approval for public release of files containing computer numerical control (CNC)21 for producing “Ghost Gunner,” a computer-instructed machine that mills a metal block into a lower receiver for an AR-15. DOPSR refused to render an opinion, claiming uncertainty as to whether Ghost Gunner was subject to ITAR. DOPSR also refused to review Defense Distributed requests for prepublication review of several other computer-aided design files. Defense

19 The purpose of a commodity jurisdiction request is to obtain a State Department opinion on whether an item or service is covered by the U.S. Munitions List (USML) and therefore subject to export controls. See U.S. Department of State, Directorate of Defense Trade Controls, [https://www.pmddtc.state.gov/commodity_jurisdiction/](https://www.pmddtc.state.gov/commodity_jurisdiction/).
21 Computer numerical control (CNC) is a computer-aided design (CAD) protocol that converts spatial designs into a series of numbers. [Techopedia, https://www.techopedia.com/definition/11228/computer-numerical-control-cnc](https://www.techopedia.com/definition/11228/computer-numerical-control-cnc).
Distributed then submitted to DDTC a commodity jurisdiction request pertaining to CNC that operates Ghost Gunner and the Ghost Gunner itself. On April 15, 2015, DDTC informed Defense Distributed that the Ghost Gunner milling machine, user manual and operating software are not regulated by ITAR, but that six items of technical data (software, data files, project files, coding and models for producing an 80% AR-15 lower receiver) cannot be posted to the Internet.

In May 2015, Wilson, joined by the Second Amendment Foundation (SAF), filed a federal lawsuit (W.D. Tex.) seeking a declaratory judgment, an injunction and compensatory and punitive damages. The complaint alleged that the pre-publication review procedure violates the First Amendment (prior restraint on speech), Second Amendment and Fifth Amendment (due process). Defense Distributed asserted that but for the government’s pre-publication procedures, it would freely distribute published files, Ghost Gunner Files, CAD files, and other files. The Second Amendment Foundation argued that the State Department’s order violates its members’ Second Amendment right to acquire firearms.

Because this article is a contribution to a Second Amendment symposium, we focus on plaintiffs’ Second Amendment challenge to the government’s attempt to keep 3D printing firearms software off the Internet. However, this Second Amendment focus should not be construed as a comment on the substantiability of the plaintiffs’ statutory argument, i.e. whether the AECA authorizes prepublication review of privately-generated software for making small arms and, if it does, whether this regulatory scheme violates the First and Fifth Amendments. PART I examines the plaintiffs’ and

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23 An “80%” receiver is a colloquial term that refers to a blank or unfinished piece of metal or plastic which, after drilling and milling, can accommodate the to the various parts of the firearm (trigger, grip, ammunition feeder, barrel, etc.) See https://www.atf.gov/firearms/qa/what-80-unfinished-receiver.
25 For years previously, the U.S. Department of Justice advised the State Department that its prepublication procedure constituted an unconstitutional prior restraint on speech. See Bernstein v. U.S. Dep’t of State, 922 F. Supp. 1426 (N.D. Cal. 1996)
defendants’ Second Amendment arguments. Part II places the 3D firearms printing in the context of do-it-yourself gunsmithing. Part III focuses on 3D printing as a new gunsmithing technology. Part IV asks whether the advent of 3D firearms printing should be cause for alarm. Part V considers whether stringent regulation or prohibition of 3D firearms printing would be unconstitutional.

**Part I: Second Amendment Issue**

Defense Distributed and the Second Amendment Foundation insist that the government’s order to remove 3D firearms printing software from the Internet violates the Second Amendment. Defense Distributed argues that the Second Amendment guarantees to the people the right to operate a business that disseminates information about the production and use of small arms and that “Defense Distributed exercises that right by publishing files on the Internet in order to promote the right to keep and bear arms and to educate the public.”27 The Second Amendment Foundation (SAF) argues that it has standing to participate as co-plaintiff due to the injury that the ITAR regulations and DDTC’s rulings on Defense Distributed’s 3D firearms software infringe on SAF’s members, i.e. their inability to acquire 3D printed firearms and firearms parts necessary for self defense in the home. “Because there is a right to possess handguns, there is, necessarily, a right to acquire them. And the most basic means of acquiring something, is to make it.”28 Thus, according to SAF, the State Department’s refusal to allow Defense Distributed software to be posted to the Internet “infringes upon the creation and acquisition of arms of the kind in common use for traditional lawful purposes.”29

In their response to the plaintiffs’ motion, the defendants acknowledge that the Supreme Court’s decisions in *D.C. v. Heller*30 and *McDonald v. Chicago*31 establish that, at its core, the Second

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29 (Quoting District of Columbia v. Heller, 554 U.S. 570, 627 (2008)); DEFENSE DISTRIBUTED and Second Amendment Foundation, Inc., Plaintiffs, v. U.S. DEPARTMENT OF STATE; John F. Kerry, in his official capacity as Secretary of State; Directorate of Defense Trade Controls, Department of State Bureau of Political Military Affairs; Kenneth B. Handelman, individually and in his official capacity as Deputy Assistant Secretary, Defense Trade Controls, Bureau of Political Military Affairs, Department of State; C. Edward Peartree, individually and in his, 2015 WL 2149795 (W.D.Tex.).
Amendment guarantees to the people the right to armed self-defense in their homes with firearms that are in common use for self defensive purposes. However, defendants argue that DDTC’s decisions restricting plaintiffs’ export of small arms technology does not violate the Second Amendment because Defense Distributed is free to distribute its firearms products and software within the U.S. and SAF’s American members are free to purchase Defense Distributed’s products. The government’s refusal to permit Defense Distributed’s software to be posted to the Internet aims to prevent that software’s acquisition by foreign governments, organizations and individuals, none of whom have Second Amendment rights. Moreover, the defendants emphasize that Heller’s majority opinion stated that the Second Amendment is not infringed by “firmly historically rooted” regulations. The defendants claim that restrictions on arms exportation are “firmly historically rooted.” They cite a one year moratorium on the exportation of arms only three years after the Bill of Rights was ratified. Moreover, in 1902, Congress signed a treaty to prevent the export of arms, for humanitarian reasons, to Pacific nations.

Federal District Court Judge Robert Pitman, drawing on Fifth Circuit precedent, adopted a two step inquiry: 1) determine whether the challenged governmental action impinges on a right protected by the Second Amendment, and if it does, 2) determine whether the government’s regulatory interests are strong enough to justify the infringement. On the first issue, he found no Second Amendment violation because”...SAF members are not prohibited from manufacturing their own firearms, nor are they prohibited from keeping and bearing other [non-3D printed] firearms that are widely available throughout the U.S.” SAF members in the United States are free to acquire

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Defense Distributed 3D printers, software and products directly from Defense Distributed or from a third party wholesaler or retailer.35

While Judge Pitman’s conclusion that the plaintiff’s Second Amendment rights have not been violated was sufficient to dispose of the Second Amendment issue, he went on to address the second issue, whether under intermediate scrutiny review the defendants’ orders further an important an important government interest. He answered this question in the affirmative because the government has an important interest in preventing foreign governments and nationals from obtaining weaponry that might injure U.S. national security and/or foreign relations.36 Therefore, Judge Pitman denied plaintiffs’ motion for a preliminary injunction and a declaratory judgment.

The plaintiffs appealed to the Fifth Circuit. Several Congressman and organizations filed amicus briefs in support of Defense Distributed’s and SAF’s appeal. (No amicus briefs were filed in support of the defendants’ position.) The amici include Representative Thomas Massie (R. Ky) and Certain Other Members of the U.S. House of Representatives, Reporter’s Committee for Freedom of the Press and the Thomas Jefferson Center for the Protection of Free Expression, Cato institute, Electronic-Frontier Foundation, Madison Society Foundation and the Texas Public Policy Foundation. All the amici, except the Madison Society Foundation, focus on whether requiring State Department approval before posting CAD files to the Internet is an unconstitutional prior restraint on speech. The Madison Society Foundation’s amicus brief37 argues that Americans have always been free to make guns themselves and provides a history of U.S. gunsmithing.

We think the government has the better of the Second Amendment issue. Although no court has ruled on whether the Second Amendment right to home possession of arms for self-defense38 implies a right to make one’s own firearms, government officials seeking to justify a prohibition on

36 Intermediate scrutiny requires the government to demonstrate a “reasonable fit” between the challenged regulation and an important government objective. See https://www.law.cornell.edu/wex/intermediate_scrutiny.
home-made guns on grounds of safety, security and regulatory controls could argue that prohibiting
do-it-yourself gun making would have no impact on the individual’s access to a self defense firearm.
Even prohibiting 3D printed firearms might be justifiable given that 1) 3D printed firearms are not in
common use for self defense or other purposes; 2) 3D printed firearms pose special safety and
regulatory problems; 3) people wishing to have a gun at home for self defense can select from
hundreds (perhaps thousands) of firearms models. Just as courts, other than the Third Circuit, have
rejected constitutional challenges to assault weapon bans, they would likely defer to legislative
judgment about the special dangers of 3D printed firearms. Indeed, the Second Amendment
challenge to assault weapon prohibition is much stronger than a challenge to 3D firearms printing
since Colt’s AR-15 is the best selling rifle model in the U.S., while, at present, there are probably just
a handful of functional 3D printed firearms.

Defense Distributed’s dissemination of information about firearms and its distribution of
its products is barely limited by the State Department’s order. Defense Distributed can advertise,
give away or sell its 3D printed firearms and firearms technology without restriction throughout the
United States, except for posting its software to the Internet. What it cannot do is export its
products abroad. Given the long history of export controls and export taxes, and the federal
government’s legitimate diplomatic and military interest in regulating the export of weapons, this
exercise of State Department discretion seems easily to overcome Defense Distributed’s Second
Amendment objections.

SAF’s argument is even weaker. The State Department’s order to remove certain software
from the Internet still leaves SAF’s members free to purchase Defense Distributed’s products,
including software, directly from that company in person, by email or snail mail or indirectly via

39 Compare the Fourth Circuit’s opinion in Kolbe v. Hogan, 636 F. App’x 880 (4th Cir. 2016), with the Second Circuit’s
opinion in New York State Rifle & Pistol Ass’n, Inc. v. Cuomo, 804 F.3d 242 (2d Cir. 2015), cert. denied sub nom. Shew v.
Malloy, No. 15-1030, 2016 WL 632684 (U.S. June 20, 2016) and the Seventh Circuit’s opinion in Friedman v. City of
Highland Park, Illinois, 784 F.3d 406 (7th Cir.), cert. denied sub nom. Friedman v. City of Highland Park, Ill., 136 S. Ct. 447,
193 L. Ed. 2d 483 (2015).
wholesalers and retailers. Thus, they can produce their own 3D printed firearms like the Liberator or produce home-made firearms using traditional gunsmithing technologies. In addition, they can purchase from federally-licensed firearms dealers (FFls) or from private sellers hundreds (perhaps thousands) of models of mass-produced handguns, rifles and shotguns. In short, they have access to a vast selection of firearms suitable for self defense in the home. That the State Department’s action has generated such a vigorously contested lawsuit is a telling comment on the proliferation of Second Amendment litigation since the Supreme Court’s decisions in District of Columbia v. Heller and McDonald v. Chicago.41

Part II: Gunsmithing

What should and can be done about do-it-yourself gun making is a perplexing problem. 3D firearms printing is the most recent chapter in a long history of gunsmithing. Indeed, all firearms in the early republic were made by blacksmiths or specialized gunsmiths until the founding of Remington Arms in 1816.42 Guns were not mass-produced until the mid-19th century.43 However, even after mass produced firearms came to dominate the market, many individuals continued to make and fix guns in their home workshops.44 The total number of extant homemade guns is unknown.45 However, it has been estimated that in California alone there are tens of thousands of homemade AR-15 assault weapons.46

43 See http://www.americanfirearms.org/gun-history/; “Samuel Colt developed the first mass-produced, multi-shot, revolving firearms. Various revolving designs had been around for centuries, but precision parts couldn’t be made with available technologies. Colt was the first to apply Industrial Age machining tools to the idea.”
http://www.state.com/articles/news_and_politics/history/2015/05/medieval_roots_of_our_diy_gun_culture_people_have_been_making_their_own.html; see also http://learn.org/articles/What_is_Gunsmithing.html; see also http://www.gundigest.com/gunsmithing-center See also “Brownells Launches New Website” http://www.brownells.com/GunTech/Brownells-Launches-New-Website/detail.htm?id=11275
45 http://www.pressherald.com/2014/05/15/homemade_guns_exploit_gun_law_loophole/
46 Since there is no definitive definition of “assault weapon,” any estimate of the number of home-made assault weapons has to be taken with a grain of salt. See Jacobs, Why Ban ‘Assault Weapons’? 37 Cardozo Law Review 681 (2015).
“Gunsmithing” includes making a firearm from scratch, making a firearm from some self-manufactured and some store-bought parts, and assembling a firearm from mass-produced parts. Manufacturing from scratch obviously requires more tools and greater expertise. Until the advent of CNC machining, a gunsmith needed to cut, drill and mill a piece of metal (blank) to produce a lower receiver suitable for accommodating a barrel, grip, trigger mechanism, hammer or sear and other parts. This process required a lot of time and skill. The best gunsmiths produced very high-quality guns. However, crude guns are relatively easy to make.

Do-it-yourself gunsmithing is supported and facilitated by books, manuals, websites, associations and videos that explain and illustrate, step-by-step, how to manufacture various types of firearms. Enterprising gunsmiths offer assistance, sometimes in the form of “group builds” to aspiring do-it-yourselfers. The build leader assigns participants to workstations that contain all the materials and tools necessary to manufacture a particular firearm model. The or she takes the participants through the manufacturing process, step-by-step, taking care not to handle the “student’s” work product in order to avoid violating federal law governing unlicensed gun manufacturing. An instructor with a federal manufacturing license can handle the student’s work product but, for every manufactured gun, must obtain from ATF a serial number for the gun and submit the student’s name to the FBI’s National Instant Check System for a background check.

Less ambitious do-it-yourselfers can assemble a gun from a kit. Commercial kits contain finished lower receivers and all necessary firearm parts. A finished lower receiver, if purchased from a licensed dealer in a kit or by itself, is the only part that requires a serial number. The purchaser

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47 The 80% unfinished receiver or blank has not yet reached a stage of manufacture that would qualify it as a firearm frame or receiver under the 1968 Gun Control Act (GCA). https://www.atf.gov/firearms/qa/what-%E2%80%98%E2%80%9980%27-or-%E2%80%98unfinished-receiver.
49 For a build participant’s description, see http://dailycaller.com/2016/01/19/build-your-own-ar-15/
50 The process can be completed in a day, especially if you build the rifle at a “building party,” where experts can assist you, see http://www.motherjones.com/politics/2013/05/ak-47-semi-automatic-rifle-building-party.
must pass a background check and the FFL must retain information about the firearm and its
purchaser. If the lower receiver is purchased on the secondary market (from a private seller) or on
the black market, neither NICS background checking nor information retention is required.\(^{52}\)
Considering how common gunsmithing has been and is, the advent of 3D printed firearms seems
more like a modest technological development than a game changer.

Part III: 3D Gunsmithing

Computer Numerical Controlled machines and 3D printers are new manufacturing
technologies that produce a wide range of products.\(^{53}\) 3D printing is commonly called “additive"
manufacturing.\(^{54}\) A computer-directed 3D printer deposits layer on layer of plastic material over a
platform to create the finished product.\(^{55}\) While Cory Wilson’s Liberator is a crude gun printed in a
single piece, other 3D printed firearms require printing one firearm part at a time and then
assembling the pieces. This produces a better firearm, but it takes many hours and more complex
software. 3D firearms gunsmiths can also print out a lower receiver and then complete the firearm
with store-bought parts.

3-D printing is developing rapidly. Defense Distributed’s Ghost Gunner is a “general purpose
Computer Numerical Controlled (CNC) milling machine,”\(^{56}\) which comes programmed to mill a metal
blank into an AR-15 lower receiver. A person with no gunsmithing expertise can use the Ghost
Gunner to manufacture a lower receiver for an AR-15.\(^{57}\) If the person operating the Ghost Gunner

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\(^{52}\) See Janet Gilger-Vander Zanden, “Homemade Guns: Are They Legal? Must They Be Registered?”, Criminal Defense
see also ATF https://www.atf.gov/firearms/qa/does-individual-need-license-make-firearm-personal-use.

\(^{53}\) See Elizabeth Royte, “What Lies Ahead For 3-D Printing,” Smithsonian magazine, May 2013,

\(^{54}\) “Additive Manufacturing (AM) is an appropriate name to describe technology that build 3D objects by adding layer-
on-layer of material, whether the material is plastic, metal, concrete or one day….human tissue. Common to AM
technologies is the use of a computer, 3D modeling software (Computer Aided Design or CAD), machine equipment and
layering material. Once a CAD sketch is produced, the AM equipment reads in data from the CAD file and lays down or
adds successive layers of liquid, powder, sheet material or other, in a layer-upon-layer fashion to fabricate a 3D object.”

\(^{55}\) http://mashable.com/2013/03/28/3d-printing-explained/.

\(^{56}\) A manufacturing device that responds to computer instructions. For an explanation, see

\(^{57}\) Defense Distributed promotional materials for ordering the Ghost Gunner can be found at
produces the lower receiver for his own use, no serial number or record keeping is required. If he makes it for someone else, as a gift or sale, he must have a manufacturing license.58

Since the debut of the Liberator, Cory Wilson and others have debuted a number of more durable and efficient 3D printed firearms.59 For example, in November, 2013, a group called Solid Concepts released a handgun made of 3D printed metal parts. In November, 2014, a machinist from Pennsylvania released plans for a plastic 3D printed firearm with a bullet chamber that could fire multiple rounds

While much easier than old-fashioned gunsmithing with hand tools, the simplicity of 3D firearms printing should not be exaggerated. Cody Wilson’s “Liberator” fired only a single bullet before becoming dysfunctional. Plastic cannot withstand the explosion produced when the primer is ignited by the firing pin striking the cartridge. Even if a plastic gun survives the firing intact, it will likely be dented or cracked. Firing subsequent bullets safely and accurately is problematic. In terms of safety, durability, accuracy and functionality, the best plastic 3D printed firearms that now exist or are likely to be produced in the near future are much inferior to mass produced metal firearms.60 Moreover, a 3D printer capable of printing rudimentary firearms parts costs approximately $2,000; higher quality 3D printers cost from $6,000-$10,000. (It is likely, however, that entrepreneurs will rent printers at competitive rates.)

Part IV: Cause for Concern?

Why did Cody Wilson’s 3D gun demonstration cause so much consternation? Some observers feared that Wilson’s 3D printed gun could evade metal detection. If so, even though unreliable, it might be used by assassins and terrorists. As Rep. Steve Israel (D-NY) warned: "[i]t’s
just a matter of time before you can construct an entire firearm that any terrorist with a thousand dollars and a 3D printer can get past the metal detector at the local airport and get on a plane.  

This concern is not a new. In 1988, Congress passed the Undetectable Firearms Act (UFA), which prohibited manufacture, sale and possession of a firearm that is not detectable by walk through metal detectors or x-ray machines used at airports. The Act required that a firearm had to contain enough metal (3.7 ounces) to be detectable by an airport screening device. (Bullets, being metal, are necessarily detectable.) To comply with the Act, Cody Wilson inserted a small metal piece into his “Liberator.” Of course, an assassin or terrorist would presumably ignore the 3.7 ounces of metal requirement. However, new generation x-ray machines, like those being phased in at airports, reveal objects, including plastic guns, on, in and below the clothing.

The second cause for anxiety generated by Wilson’s Liberator demonstration was that 3D printed firearms would enable firearms-ineligible people (e.g. ex-felons, fugitives, mentally ill) to circumvent the background checking system. According to the Law Center to Prevent Handgun Violence:

“3D-printed guns give criminals a new and easy way to completely circumvent California’s otherwise smart, comprehensive gun laws. In fact, Cody Wilson, the anarchist founder of Defense Distributed, the organization that developed the first 3D printed handgun and distributed the blueprint on the Internet last year, has

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63 https://techcrunch.com/2013/05/06/what-you-need-to-know-about-the-liberator-3d-printed-pistol/.  
openly stated that his project is a way to get around laws about who is allowed to own a firearm.”

Similarly, the Brady Campaign observed:

“As technology continues to advance and it becomes possible to make guns in homes and garages across the country, it creates a dangerous loophole for domestic abusers, felons and other criminals to make guns without any background checks and use them to harm others,” a spokesperson writes to WIRED. “Any gun made should not be able to slip through security checkpoints and certainly should not slip into the hands of dangerous people.”

Admittedly 3D firearms printing, like all do-it-yourself gunsmithing, undermines the goal of keeping firearms out of the hands of unreliable and dangerous individuals, but that goal is already seriously undermined by “the private seller loophole.” The 1993 Brady Law that FBI background checking for gun purchasers only applies to sales by federally licensed firearms dealers (FFLs).

There is no federally-required background check for people who purchase firearms from private sellers. In other words, a person who knows he cannot pass a background check can place a “gun-wanted” ad in a newspaper or visit a guns-wanted/guns-for-sale website to make contact with a willing seller. Moreover, firearms-prohibited persons can acquire a firearm by persuading a relative or friend, who has a clean record, to buy a gun for him (i.e. play the role of “straw purchaser”). The firearms-ineligible person could also buy a gun on the black market from a seller who specializes in supplying criminals. Moreover, persons or groups wishing to avoid NICS background checking could use traditional gunsmithing technologies.

In short, 3D printing is merely one more way for a

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69 (No person shall knowingly transport, ship, or receive in interstate or foreign commerce any firearm which has had the importer’s or manufacturer’s serial number removed, obliterated, or altered, or possess or receive any firearm which has
firearms-prohibited person to acquire a gun without a background check. However, given the expense and the inferior quality of such guns, it is unlikely for the foreseeable future to be a popular choice.  

A third concern is that 3D printed firearms, lacking serial numbers cannot be traced to their manufacturer, thereby making them attractive to criminals and terrorists. Of course, a gun with a serial number is untraceable if the serial number is obliterated. In any event, gun tracing only becomes a possibility if the gun is recovered (probably at the crime scene or from the criminal perpetrator himself). If the gun can be traced to the person who transferred it to the perpetrator could be prosecuted for knowingly transferring a firearm to a person he knew to be firearms-ineligible. Such a prosecution would be especially desirable if the seller is a black market dealer. However, if the perpetrator obtained the gun from an “ordinary” private seller, it will likely be difficult to prove that the seller knew that the purchaser was ineligible to possess a firearm.

A fourth concern is that 3D printing will be used to produce automatic-fire weapons (machineguns). This is not an immediate risk since, for the foreseeable future, a 3D plastic machinegun could not withstand the stress of automatic fire. Indeed, gunsmiths using traditional technologies pose a much greater risk; skilled gunsmiths with commonly available tools can easily convert semi-automatic weapons to automatic-fire weapons. Moreover, terrorists and criminals can purchase foreign or domestic automatic-fire weapons on the black market.

Part V: Regulating or Prohibiting 3D Firearms Printing and the Second Amendment

had the importer’s or manufacturer’s serial number removed, obliterated, or altered and has, at any time, been shipped or transported in interstate or foreign commerce.) 27 C.F.R. § 478.34 Removed, obliterated, or altered serial number.

But see Krassenstein, 3 Dangers Society Faces From 3D Printing,” http://3dprint.com/81526/3d-print-dangers/

The 1986 Gun Owners Protection Act outlawed production, sale and possession of machineguns produced after that Act became effective. Machineguns already in existence can be possessed if the possessor obtains a license from the Bureau of Alcohol, Tobacco and Firearms. There are more than a million private sector machinegun licensees, many of them gun clubs and firing ranges.


Should gunsmithing, by traditional and computer-driven manufacturing, be regulated and, if so, how? We see no principled reason why a person who makes a gun for his own use should not be subject to the same regulatory scheme as a person who makes a gun for sale nor why a person who makes a gun for his own use should not be subject to the same regulation as a person who purchases a gun from someone else. There is no reason to believe that people who make their own guns, by whatever technology, are less likely to misuse them than people who purchase guns that someone else makes. (The same point could be made about persons who buy guns from private sellers vis-a-vis people who buy from licensed dealers). Moreover, a gun manufactured for own use can end up in the hands of a criminal user by theft or illegal sale.

Gunsmiths, including those who use 3D printers, could be required to obtain and affix a serial number to the firearms they make. The problem is compliance. Firearms-prohibited individuals would have no more reason to comply with this requirement than with the felon-in-possession law, which makes it a federal felony punishable by ten years in prison for a person who has ever been convicted of a felony or domestic violence misdemeanor to ever possess a gun.

What about requiring manufacturers to put serial numbers on gun parts other than lower receivers? Since gun owners purchase firearms parts to replace worn out parts, to improve the operability or comfortability of the firearm or to customize it with new features, a single firearm would have several different serial numbers on its various parts. This burdensome, time consuming and costly regulation would not be of any use unless the manufacturer and dealer had to maintain records of the business or individual to whom every part was sold. That would be a massive and

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75 The California legislature passed S.B. 808 (2014), requiring a homemade firearm to be registered with the California Department of Justice and inscribed with a traceable serial number. Governor Jerry Brown vetoed the bill. “In his veto message for SB 808, Brown said that he “can’t see how adding a serial number to a homemade gun would significantly advance public safety.” See https://www.calfl.org/press-releases/california-governor-jerry-brown-vetoes-ghost-gun-ban-signs-three-gun-control-bills/.
burdensome undertaking for what, at best, would be a very small improvement in the number of crimes solved through tracing.\textsuperscript{76}

Finally, all gunsmithing or just computer-driven 3D printing could be prohibited and criminalized. In November 2013, Philadelphia became the first U.S. city to ban making or owning 3D printed guns.\textsuperscript{77} In early 2015, an Illinois state representative introduced a bill making it a crime “to knowingly use a three-dimensional printer to create a fully-functioning firearm.” There is an exemption for individuals who hold federal manufacturing licenses.\textsuperscript{78} Similar bills have been introduced in New York City and elsewhere.\textsuperscript{79}

Given the current disinclination of federal courts to strike down gun controls other than the most extreme, there is no Second Amendment impediment to regulating or even prohibiting do-it-yourself gunmaking. If an assault weapon ban does not violate the Second Amendment (as several circuit courts have held), despite the fact that the AR-15 is the best selling rifle in the U.S., it is likely that a 3D printed firearms ban would be upheld.\textsuperscript{80} Courts would probably defer to the legislative judgment that home-made guns present a special danger because they circumvent the regulatory system and present a risk of escaping metal detection.

Conclusion

Firearms technology has been evolving since the 14\textsuperscript{th} century. Before mass production, firearms were made individually in workshops and forges. With the emergence of factories, reliable standardized firearms could be produced at low cost. However, gunsmithing survived, mostly as a

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\textsuperscript{76} The vast majority of gun crimes do not involve a firearm being left at the scene. When a gun is recovered at the crime scene, it is because the perpetrator is holding it. In that case, no trace is necessary to identify the perpetrator, but a trace could identify a scofflaw dealer or black market seller.


\textsuperscript{78} HB 1467, 99\textsuperscript{th} Illinois General Assembly, 2/5/2015 http://www.ilga.gov/legislation/BillStatus.asp?DocTypeID=HB&DocNum=1467&GAID=13&SessionID=88&LegID=86202


\textsuperscript{80} Cite 2\textsuperscript{nd} and 6\textsuperscript{th} Circuit opinions. But see, 3\textsuperscript{rd} circuit opinion.
hobby for skilled enthusiasts. Customizing guns with after-market parts and accessories became feasible, affordable and popular.

Computer-directed manufacturing, of which 3D printing is an example, is a new potentially revolutionary manufacturing technology. It will eventually decentralize some manufacturing so that unskilled people, using commercially available software and modestly-priced 3D printers, will be able to produce all sorts of articles and new products. Some gun enthusiasts and entrepreneurs have already sought ways to utilize the new manufacturing technology to produce small arms. While firearms manufacturers might lose a small amount of business, it will probably be a very long time, if ever, before 3D printed guns compete successfully in terms of reliability, quality and cost.

Gunsmithing has always existed outside the framework of federal and state gun controls. Unless they engage in gunsmithing “as a business,” gunsmiths do not need a manufacturing license and their guns do not require serial numbers. This probably appeals more to anti-government ideologues and Second Amendment activists than to criminals and terrorists, who can easily obtain reliable firearms on the primary, secondary or black market.

The brouhaha caused by Cory Wilson’s demonstration of a rudimentary 3D printed firearm is a good example of the symbolic character of gun regulation. For all intents and purposes, Wilson’s software was already public information by the time DDTC told him to remove it from the Internet. And his software, 3D printers and products were and are available via means other than the Internet. Thus, the dispute over keeping Wilson’s software off the Internet has little, if any, practical importance. Technology will prove to be much more important than litigation. Focusing on the regulatory challenges posed by 3D printed firearms illuminates what for many is the startling fact that gunsmithing for personal use has never been subject to regulation. In the future, regulation should focus on gunsmithing generally, regardless of technology, not just on 3D gunsmithing,