



PHOTO BY KEEGAN HAMILTON / VICE NEWS

VICE News

I 3D-Printed a Glock to See How Far Homemade Guns Have Come

KH By [Keegan Hamilton](#)

August 25, 2021, 1:00pm



ST. AUGUSTINE, Florida — The fully-automatic “Scorpion” submachine gun can burn through a 30-round clip of 9mm ammo in a matter of seconds with one steady pull of the trigger. It looks, feels, and shoots just like a factory-made gun—except part of this one came off a 3D printer.

According to the Scorpion’s maker, the material used to 3D-print the frame (the heart of the gun, where the metal barrel and other parts all come together) is actually “on par or stronger” than the off-the-shelf equivalent. I’d never fired a full-auto weapon before—let alone one made partly of plastic—and when I took aim and squeezed the trigger, the Scorpion unleashed a wild spray of bullets that missed my target and thumped into a mound of dirt behind the firing range.

The Scorpion was one of many jaw-dropping weapons on display in late June at a Florida event dubbed the [“Gun Maker’s Match,”](#) the first-ever shooting competition exclusively for home-assembled firearms. Except for the machine gun, which requires a special federal license, these are a species of “ghost gun,” meaning there are no serial numbers and thus no easy way for authorities to track down the owner or manufacturer.

The shooting contest was put on by a non-profit called Guns For Everyone National, with help from the digital gun building collective Are We Cool Yet? or AWCY, which has been pushing the envelope of what’s possible with 3D-printed arms.

To meet these gunmakers and get a true sense of what 3D-printed guns are capable of these days, I decided to enter the shooting contest in Florida—and build my own ghost gun.

Although the technology has radically evolved in recent years, the best-known 3D-printed gun is still The Liberator, the first one ever created, in 2013. A single-shot, snub-nose pistol, The Liberator resembled a postmodern “Saturday night special,” something just as likely to blow your hand off as fire an actual bullet. These days, beyond the Scorpion, AWCY has created and released plans for a 3D-printed “battle rifle” and under-barrel flare guns that are just a few millimeters away from the military’s “RAMBO” model 3D-printed grenade launcher.

The most common and controversial ghost guns cost a few hundred dollars online and come “80 percent” finished in a box with all the necessary tools. The sudden proliferation of these cheap, mail-order ghost guns has prompted alarm among law enforcement nationwide. Nearly 24,000 “privately made firearms” were recovered at crime scenes from 2016 to 2020,

News

**People Are
Panic-Buying
Untraceable
'Ghost Guns'
Online in the
Coronavirus
Pandemic**

TESS OWEN

reports, and the number of cases where felons and other “prohibited persons” were found with such guns doubled in a single year.

Ghost guns have also turned up in the hands of white supremacists and far-right extremists. A self-proclaimed Boogaloo Boi pleaded guilty last month to possession of 3D-printed machine gun parts and a homemade silencer. The DOJ report, issued June 22 and verified by The Trace, warned of individuals with “racially or ethnically motivated violent extremist ideologies” sharing 3D-printed machine gun files.

To meet these gunmakers and get a true sense of what 3D-printed guns are capable of these days, I decided to enter the shooting contest in Florida—and build my own ghost gun.

Only ten states plus Washington, DC, have local laws that attempt to regulate ghost guns. They are virtually unregulated federally, but the Biden administration has proposed new rules that would require serial numbers on certain unfinished parts and restrict mail-order kits, which the president singled out in an April speech at the White House.

“The buyers aren’t required to pass a background check to buy the kit to make the gun,” President Joe Biden said. “Consequently, anyone from a criminal to a terrorist can buy this kit and, in as little as 30 minutes, put together a weapon.”

But building a 3D-printed gun from scratch, as I learned, takes a lot longer than half an hour. And while there’s evidence of extremists and criminals

group of designers and makers who make sure they are strictly abiding by gun laws and enjoying a “very loud” hobby.

Shopping for the Ghost Gun

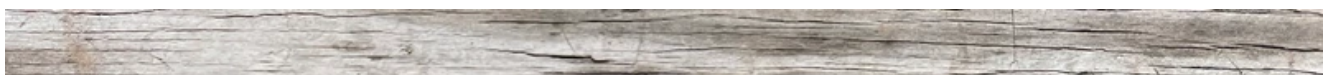
Having never owned a 3D-printer or a gun, I started as a blank slate. Rob Pincus, a personal defense instructor and gun rights advocate, agreed to lend expertise and a 3D-printer. He warned the printing and building process would take at least two days, which he said contradicts the notion that it’s easy for people who want to misuse guns to simply 3D-print one.

“You have to want to do it this way,” Pincus said. “I don’t know who the person is that falls into the weird zone where they don’t want to buy a gun, they can’t buy a gun, but they really want a gun and this is the path of least resistance, as opposed to finding somebody to buy a gun for them or buying a gun illegally out of somebody’s trunk somewhere.”

My initial aim was to build AWCY’s Scorpion, which can be legally 3D-printed and assembled in semi-auto (one bullet per trigger squeeze) in most places. But Pincus dashed my Scorpion dreams.

For one thing, it takes multiple days of 3D-printing to make one, which was time I didn’t have before the match. There’s also a shortage of ghost gun parts on the internet—in part due to a recent buying spree amid the Biden’s administration efforts to tighten the laws.

Without metal parts, the Scorpion would not work. While 3D-printed plastic is strong enough to serve as the frame of the gun, it won’t hold up as a barrel or bolt. It would also be illegal, since federal law requires guns to have at least one metal component.





THE AUTHOR'S 3D-PRINTED GLOCK 19 9MM PISTOL WITH THE WORDS "GHOST GUN" ON THE GRIP. (PHOTO BY KEEGAN HAMILTON / VICE NEWS)

“You need the metal parts,” Pincus told me. “Technically, could you build one out of all plastic? Yes. Is it going to be reliable and awesome? Probably not.”

available online. The barrel, slide, trigger assembly, and other metal bits cost around \$320, shipped directly to the gun range in Florida hosting the match, along with a \$23 spool of PLA+ filament. That plus a standard 3D-printer and a couple boxes of 9mm ammo was almost all I needed.

Printing the Gun

The Glock design, along with plans for hundreds of other guns, is accessible through a website called DEF CAD. It's hosted by a company called Defense Distributed, led by Cody Wilson, inventor of the first 3D-printed gun. The files can be found elsewhere online, but Wilson's site makes the repository easy to browse in a store-like user interface, and users must pay a \$50 annual membership for access.

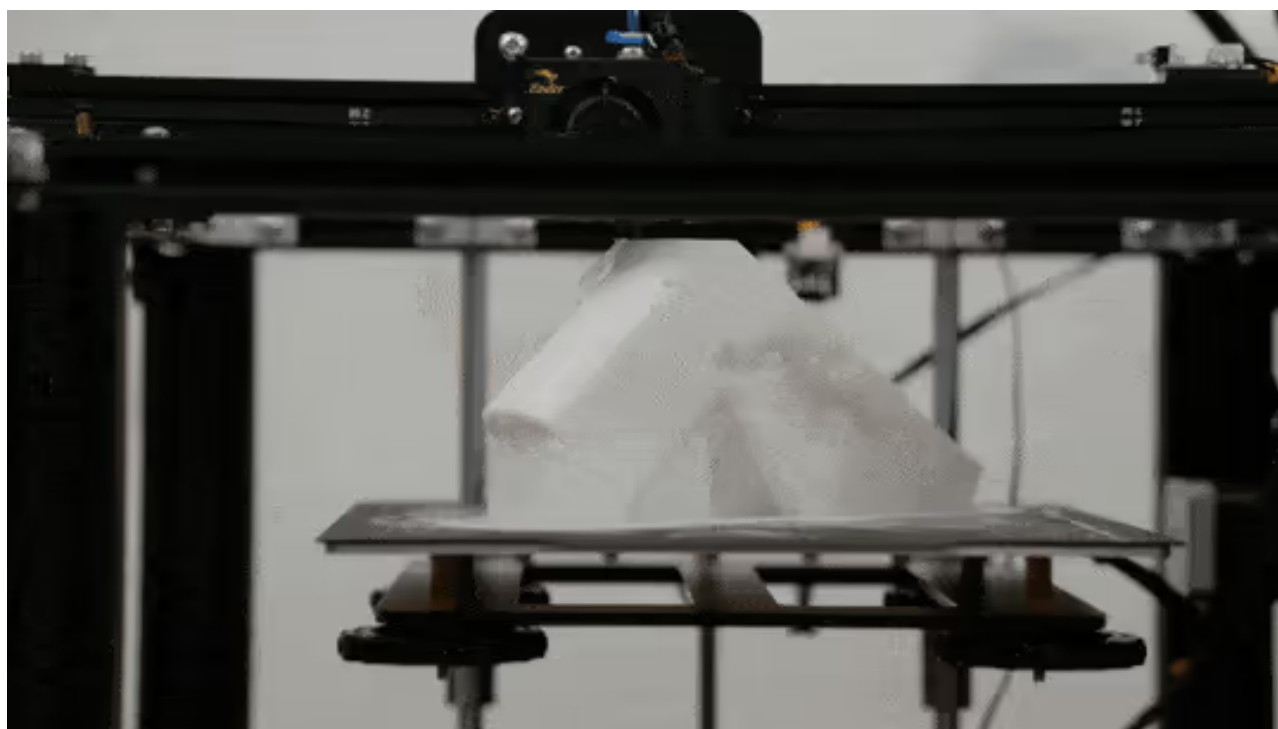
For years, the U.S. government tried to limit sharing of 3D-printed gun blueprints through the State Department's powers over international arms exports. Wilson fought back on First Amendment grounds, and in April the Ninth Circuit Court of Appeals issued a ruling that indefinitely lifted restrictions on publishing 3D-printed gun blueprints.

When I asked Wilson if U.S. authorities could ever hope to totally block the files from being shared online, he replied: "The government should invent a time machine and kill me seven years ago. It's far too late now. The equipment—the 3D printing, it's so cheap. You can make anything. You can design anything."

For years, the U.S. government tried to limit sharing of 3D-printed gun blueprints through the State Department's powers over

Wilson is a polarizing figure in the gun world. In 2018, he was arrested and accused of sexually assaulting a 16-year-old girl he met through SugarDaddyMeet.com. He pleaded guilty to injuring a child, a third-degree felony, and received seven years of probation. In addition to hosting 3D-gun files, Wilson also sells a machine called The Ghost Gunner, which helps convert unfinished parts into AR-15s and other guns.

“The files are literally everywhere in a perfect fluid explosion on the internet,” Wilson said. “It’s not supposed to be legal, and yet we found a way to make it legal.”



To get the files from Wilson’s site, I had to verify my identity and sign up for a membership, bringing the total gun budget to just under \$400, still cheaper than a brand-new Glock. But when my frame came off the printer (a 16-hour process), there were a few glaring differences. For one, mine did not have a serial number; instead it had the words “Ghost Gun” literally printed on the handle. It was also rough around the edges, not yet ready for the metal parts to be inserted.

...ing tools, a drill, and an electric Dremel grinder. Pincus patiently guided me as I stumbled through the process, which was harder than it seemed on the instructional videos I'd seen on YouTube. The finished product was white on the bottom (my "Ghost Gun"-emblazoned frame) and black on top, with a factory-made barrel and slide. Pincus assured me it was safe to test fire.

Shooting the Ghost Glock

On the shooting range, the plastic ghost Glock felt heavy in my hand. There are videos of 3D-printed guns splintering into pieces during test fires, and I was a little nervous as Pincus coached me on posture and grip. I squeezed the trigger and the first round pinged off a metal target 15 yards away. The gun worked, but not perfectly. All the grinding to make the metal parts fit together caused a jamming issue. More work with the Dremel tool helped, and after several more test fires, Pincus deemed the gun ready for competition.

The match in Florida drew around 50 entrants, almost exclusively white and male, with a couple dressed in full-camo. The mood was more carnival than militia gathering, with everyone gawking at each other's guns and some online-only friends meeting face to face for the first time. There were multiple contest categories, ranging from kit guns to weapons entirely 3D-printed with homemade metal components. Contestants were judged on a combination of speed and accuracy, maneuvering through courses and shooting at stationary targets.



“This is really what we want to be the first of many celebrations of what I call a freedom hobby,” Pincus said, addressing the crowd. “For some of us, it's, ‘Hey, I want to make my own gun. I don’t want the government involved.’ For some of us, it's ‘I want a custom gun that has my logo or my name or my grip angle or whatever’... for other people, it's, ‘I want to create designs that never existed before and share them with all of Earth.’”

Leading the push to create wholly unique 3D-gun designs is Darren “Derwood” Booth, a chain-smoking West Virginian who told me he likes living in a rural area because he can step out his front door and test-fire new designs whenever he pleases. His latest work is called the King Cobra, which is virtually indistinguishable to the untrained eye from a factory-made assault weapon. A 9mm “pistol caliber carbine” like the Scorpion, the King Cobra is totally original and homemade, emblazoned with a skull and lightning-bolts symbol Derwood borrowed from Quentin Tarantino’s film “Death Proof.”



ROB PINCUS (RIGHT) AND XANDER GUETZLOE, A MODERATOR OF THE GROUP ARE WE COOL YET?, ADDRESS THE CROWD AT THE "GUN MAKER'S MATCH" SHOOTING COMPETITION IN FLORIDA IN JUNE 2021. (PHOTO BY KEEGAN HAMILTON / VICE NEWS)

Derwood posts his files online for anyone to download or modify, and says he does not profit from his work. “I haven’t ever made a dime off of it,” he told me. “I’ve invested thousands just in the hobby, but no, I haven’t made a red cent.”

Derwood’s designs are showing up all over the world, including in countries where 3D-printing now threatens to undermine strict gun control laws. His work was the basis for another “pistol caliber carbine” called the FGC-9 (short for Fuck Gun Control 9mm), wielded last year by an anonymous masked man in a documentary about [the rise of 3D-printed guns in Europe](#).

“I’m not so happy with that,” Derwood said. “Because, hey, they have laws over there. Obey your local laws. I’m not encouraging anybody to do anything illegal.”

Art That Can Kill

Some plastic gunsmiths argue their work is shielded not only by the right to bear arms but also the First Amendment’s right to freedom of expression,

Florida shooting contest, handed out stickers with the silhouette of a 9mm Scorpion and the motto “Art is not meant to be contained.”

Xander Guetzloe, a moderator for AWCY, brought a Scorpion to the Florida match that he modified to make it look like the barrel spits fire from a dragon’s mouth.

“Art is in the eye of the beholder, right? This is just a way of expressing ourselves,” Guetzloe said. “It’s freedom of expression in a much louder way.”

Guetzloe estimated that AWCY has about 500 members, with 200 actively working on gun design projects in the group’s online forum. The members, he said, include “lawyers, technical writers, plumbers, electricians, just a little bit of everybody,” each lending their own expertise.

AWCY’s aesthetic is vaguely hipster and intentionally low-brow, with guns modified to look extra phallic or with Nerf-style neon colors. They tease new 3D-gun file releases on a well-curated Instagram feed, often finding inspiration in classic weapons that have cult followings. Guetzloe, who has a

SEEK COMMENT AT COMMENTSCORNER.COM AND THE WORLD.

“Art is in the eye of the beholder, right? This is just a way of expressing ourselves,” Guetzloe said. “It's freedom of expression in a much louder way.”

When I pointed out that most art isn't also a deadly weapon, Guetzloe replied, “It could be used for harm. But I feel like most people that are going to do that are going to go out and steal one. The amount of effort that you put into these, you're not going to do that just to go and do someone harm.”

Even after 22 hours of work, my gun didn't work properly. At the competition, it jammed repeatedly, and I was unable to finish round one of the contest. Pincus suggested swapping on a Glock-brand slide and barrel, which he had on hand. The factory part plus a little bit of gun oil made all the difference.

I loaded a clip into the gun and racked the new slide, which smoothly locked into place. Taking aim at a target, I squeezed off a few rounds in a row. The spent shell casings popped out of the chamber and were instantly replaced by fresh bullets; my semi-automatic gun finally worked semi-automatically. To test what it could do, I unloaded the rest of the clip rapid-fire—boom-boom-boom-boom. There were no jams. It worked (almost) like a real Glock.

Law Enforcement Isn't Thrilled With 3D Guns

Making a fully-functioning semi-auto handgun from plastic and a few metal parts, it turns out, is totally legal (at least in Florida), but there are other

increasingly overlapping with 3D-printing. The Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), and it's the explosives aspect of the agency's mission that is increasingly overlapping with 3D-printing.

John "J.D." Underwood, the special agent in charge of the ATF's National Center for Explosives Training and Research, told me that 3D-printed land mines are already a possibility. He showed me a 3D-printed "bomblet," which could be attached to a drone and dropped from the sky. Such devices, he said, have already been used against U.S. troops in the Middle East.

"Nobody or anything's stopping somebody from making this in the United States today," Underwood said, holding up the miniature plastic bomb in his hand.

When I asked Guetzloe, the AWCY moderator, about the group's 37mm launcher, he told me the sole purpose is for firing signal flares. But the under-barrel tube version looks very similar to the military equivalent, a [40mm grenade launcher](#) adapted by the Army for 3D-printing in order to save taxpayers money by lowering production costs.

Underwood was impressed with the designs on display at the Florida shooting match, and he stressed that the ATF has no problem with law-abiding gunmakers using 3D-printers.

“As long as they're used for their intended purposes by people that legally can have firearms, I don't have an issue with that,” he said. “It's when people use those firearms for criminal purposes, that's when it becomes a problem.”

Last December, ATF agents raided the offices of Nevada-based Polymer80, the largest ghost gun company and seller of a popular “Buy Build Shoot” kit. No charges were filed and no employees were arrested, and the company continues to advertise pistol kits, though all the options are currently out of stock.

Polymer80 also faces civil lawsuits, most recently from two Los Angeles County sheriff's deputies who sued the company for selling an “untraceable home-assembled” Glock kit that was later used by a gunman who seriously wounded them in a Compton shooting. The deputies allege the company “purposefully sold their products without markings to make it difficult for law enforcement to trace the firearm.”

“Untraceable ghost guns are now the emerging guns of choice across the

The gun control group Everytown Law is also suing Polymer80 and other ghost gun makers. One case, which also involves the city of Los Angeles, accuses the company of creating a public nuisance and violating California's business code. According to the LAPD's chief, 700 ghost guns seized in the city last year were made from Polymer80 parts, including more than 300 in South LA, where homicides have been on the rise.

“Untraceable ghost guns are now the emerging guns of choice across the nation,” LA City Attorney Mike Feuer said when announcing the lawsuit in February. “Nobody who could buy a serialized gun and pass a background check would ever need a ghost gun. Yet we allege Polymer80 has made it easy for anyone, including felons, to buy and build weapons that pose a major public safety threat.”

A Polymer80 spokesperson did not respond to requests for comment.

The company's website states there is “a strict policy against selling 80% lower receivers to persons known to us to be convicted felons or otherwise prohibited persons.”

It also says building a gun from a kit provides customers with “a fun learning experience and a greater sense of pride in their completed firearm.”

Melting the Ghost Gun

I'd be lying if I didn't say I was slightly proud (and more than a little terrified) of my ghost Glock. I somehow ended up taking third place in the 3D-printed pistol category. Just like me, some of my competitors seemed to spend more time behind a computer screen than at the firing range. I was told some shooting clubs prohibit ghost guns or 3D-printed guns, making it difficult to

people—even the most advanced 3D-printed handguns and rifles. The guns may look badass, but they don't yet quite stack up evenly to the real thing.

But as 3D-printing technology improves, making a 100% DIY ghost gun will become easier and easier. Even if there's a ban on “80 percent” kits, anyone with access to a printer, a few hundred dollars, and some free time will still be able to crank out a semi-auto pistol, one with no paper trail to identify the owner. In the eyes of Pincus and others at the shooting match, this is actually a good thing.

“I know this is counterintuitive for a lot of people, but the more people who have guns, the more normal gun ownership is, the more responsible the community will be and also the more educated the community will be in judging responsibility,” Pincus said. “I don't think everybody should have a gun. I think everybody who wants to be a responsible gun owner should have that option.”

Since I live in California, one of the states that regulates ghost guns like

...and, however, have done much to contain ghost guns. Last week, the city of San Francisco [sued three companies](#) that sell do-it-yourself ghost gun kits, alleging they target buyers who are banned from owning guns and want to evade background checks.

“Ghost guns are a massive problem in San Francisco—they are becoming increasingly involved in murders, attempted murders, and assaults with firearms,” said San Francisco District Attorney Chesa Boudin. “We know that the rise in gun violence is connected to the proliferation of, and easy access to, guns that are untraceable, guns that are easier to obtain by people who would be otherwise prohibited by law from getting them.”

I have no interest in owning a handgun—let alone one with “Ghost Gun” on the handle—so I decided to melt down the frame and return the gun to its original form: molten plastic.

Miguel Fernández-Flores contributed reporting.

TAGGED: [GHOST GUN](#), [MILITARY](#), [WEAPONS](#), [SEMI-AUTOMATICS](#)

GET THE LATEST FROM VICE NEWS IN YOUR INBOX. SIGN UP RIGHT HERE.

Your email address

By signing up, you agree to the [Terms of Use](#) and [Privacy Policy](#) & to receive electronic communications from Vice Media Group, which may include marketing promotions, advertisements and sponsored content.

YOU MAY LIKE

MORE FROM VICE

News

Two Men Arrested Over Alleged Terror Attack Plots in Europe 'to Avenge Gaza'

TIM HUME

10.25.23

News

3-Year-Old Girl Killed After Family Allegedly Found Cocaine Washed Up on Beach

NATHANIEL JANOWITZ

10.25.23

News

Trump Lawyers Finally Released the Kraken...On Him

GREG WALTERS

10.25.23

News

Off-Duty Pilot Accused of Trying to Bring Down Plane Said He Had Tried Shrooms for First Time

MANISHA KRISHNAN

10.24.23

News

Delay in Gaza Operation Decision Has Some Israelis Questioning Netanyahu's Leadership

MITCHELL PROTHERO

News

Trump Vows to Block Immigrants Who ‘Don’t Like Our Religion’

TESS OWEN

10.24.23

[ABOUT](#)

[JOBS](#)

[PARTNER](#)

[VICE VOICES](#)

[CONTENT FUNDING ON VICE](#)

[SECURITY POLICY](#)

[PRIVACY & TERMS](#)

[ACCESSIBILITY STATEMENT](#)



© 2023 VICE MEDIA GROUP