E76 Comprehensive Forensic Analysis of 3D-Printed Firearms

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3D-printed firearms are expected to become more accessible to criminals as technology improves and costs decrease. This may result in 3D-printed firearms making their way into crime laboratories as physical evidence related to a crime. After attending this presentation, attendees will have a better understanding of how 3D firearms are printed, the possible risks to public safety when this technology is used to manufacture plastic firearms, and the success of current forensic analytical techniques when applied to 3D-printed firearm evidence.

This presentation will impact the forensic science community by enhancing its awareness of these types of firearms and demonstrating the ways in which current, routine analytical techniques in the forensic laboratory can gather useful information from them. The types of analysis that may provide more discriminating and conclusive results will also be indicated.

In May 2013, the Department of Homeland Security issued a bulletin warning of the ease in which 3D-printed guns are being manufactured, and their inability to be detected at security checkpoints.[1] The bulletin noted that "advancements in technology and decreasing 3D printer costs will likely mean even more sophisticated printed guns will become easier to acquire," and that the nature of these firearms will make detection impossible, barring a pat-down of every individual at every checkpoint. The bulletin also emphasized the challenges and difficulty associated with testing firearms made without serial numbers or unique identifiers. Under these circumstances, the Colorado Bureau of Investigation (CBI) was contacted to perform routine forensic analysis on pre- and post-fired 3D-printed firearms created under real-life conditions in order to evaluate the ability of current forensic techniques to meet this upcoming challenge.

CBI scientists performed Gunshot Residue (GSR), polymer, DNA, latent print, and firearms analysis as is standard when a conventional firearm has been submitted by a law enforcement agency, and worked closely with engineers during the selection, printing, and firing of the 3D-printed guns. This enabled forensic scientists to record information regarding the firearms' construction, handling, and firing success before forensic analysis was performed. This unique opportunity to witness firsthand exactly what goes into firing a 3D-printed gun — from the way the weapon is handled prior to firing to the way the weapon itself reacts to being fired — allowed scientists to understand potential challenges to conventional analysis. All components of the weapons were submitted to the laboratory for typical processing methods and were evaluated for useful forensic data. Scientists then determined whether typical analysis would meet the needs of law enforcement and public safety if 3D-printed firearms become as prevalent as predicted.

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The research discussed in this presentation includes analysis from the forensic science disciplines of firearms, biological sciences, trace evidence, and latent print analysis, and examines traditional forensic processing of firearm evidence and how those methods can be used or modified for optimal results when handling the components of 3D-printed, polymer-based guns.

The purpose of this presentation is to highlight the success and limitations of conventional forensic analytical techniques when applied to 3D printed firearms.

Reference(s):

1. DHS: It is impossible to stop 3D plastic guns from getting past security checkpoints, Homeland Security News Wire, http://www.homelandsecuritynewswire.com/dr20130524-dhs-it-is-impossible-to-stop-3d-plastic-guns-from-getting-past-security-checkpoints (July 28, 2016)

3D-Printed, Firearm, Plastic

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