C16 Forensic Investigation of Crimes Committed by Unmanned Systems

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After attending this presentation, attendees will appreciate the potential of unmanned systems for the perpetration of crimes and will appreciate the problems they pose for forensic investigations.

This presentation will impact the forensic science community by introducing the threat posed by the use of unmanned systems, to include robots and drones, to commit crimes and the lack of preparedness by the forensic community to address it.

After centuries of mythology and conceptualization, robots are suddenly among us and they are rapidly proliferating. They can walk, swim, and fly. They are inexpensive and easy to operate. As with all machines, they are, at least for now, extensions of their human controllers.

As with any technology, today's robots, commonly referred to as drones, will be embraced by voyeurs, stalkers, child molesters, blackmailers, criminals, smugglers, and terrorists. Drone-assisted crimes have already surfaced: a plan for a model airplane carrying explosives to the Pentagon was thwarted, a quad-copter carrying contraband was detected scaling a prison wall, and a submarine carrying drugs to shore was captured; however, it is likely that many similar crimes have gone undetected.

There is every reason to believe that forensic investigators will soon be asked to conduct examinations of drones that were involved with significant accidents or crimes. Investigation of such cases, where the human perpetrator was *in absentia*, pose daunting challenges that will require special methodologies.

How will such an examination proceed? Unless the robot or drone is captured or found, there will be no fingerprints or biologic stains at the scene. Instead of footprints, there may be some sort of tread marks or, in the case of an aerial drone, perhaps no markings at all. Evidentiary procedures and even longstanding investigation paradigms (such as placing the perpetrator at the scene of the crime) are disrupted by drones. A digital examination of the drone may yield some important data. Perhaps a digital trail had been left on nearby cell phone towers. The drone may have a photo or video camera on board that may yield valuable data, but so might an examination of its mechanical systems or a chemical analysis of Chemical, Biological, Radiological, and Nuclear (CBRN) trace evidence. Even the "behavior" of the drone might reveal clues about its operator.

One can think of drone-assisted aggression as cybercrime that transcends beyond the limitations of the digital spectrum: it deploys a physical platform that can move, act, and react. An analogy can also be made to traditional murder-for-hire crimes, where another human is used as a *tool* to perpetrate the crime — only here, a machine is contemplated instead of a person. Analysis of cases involving human surrogates may provide insights for forensic investigators.

Sales of aerial drones account for approximately 80% of the unmanned systems market and nearly all of the media attention. The focus of drone manufacturers is transitioning from military to domestic markets as the Federal Aviation Administration readies the skies for commercial drone traffic (likely to be widespread by 2016), which they believe will reach 15,000 units by 2020. Sales to hobbyists, who can currently fly drones that weigh under 55 pounds, are reaching thousands of units per month.

With the dramatic increase in domestic drone use, it is reasonable to assume a corresponding rise in drone misuse (accidents) and abuse (crimes), many of which will be embedded in criminal and civil investigations and court cases. Yet, despite the enormous implications for the forensic science community, no references to presentations or papers written on this subject by forensic scientists have been found. Thus, it is a reasonable conclusion that the forensic community is ill-prepared to deal with the many threats presented by drones. Possible approaches to investigation of these crimes will be discussed.

Drones, Robots, Unmanned Systems