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FEASIBILITY OF INSTALLING GLOBAL POSITIONING SYSTEMS ON FIREARMS

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You asked whether it is feasible to install or attach global positioning system (GPS) equipment in or on firearms without impairing their usability. If so, you wanted to (1) know the added costs of adding such equipment and (2) the potential disadvantages of using such equipment.

SUMMARY

Several patent applications have been filed to incorporate GPS equipment in firearms. At least two firms market GPS equipment for firearms for law enforcement agencies and the military. In both cases, the equipment is attached to, rather than built into, a firearm. It is unclear how feasible it would be to change the firearm manufacturing process to install GPS equipment. The equipment costs approximately \$200 per unit according to the manufacturers. In addition, there would be on-going costs for software licensing and monitoring systems.

A bill introduced in 2011 in Massachusetts, to study the feasibility of installing GPS on firearms is likely to be re-introduced this session, according to the sponsor's staff. Legislation has also been introduced in Chicago.

Among the possible disadvantages of using GPS on firearms are that (1) it does not work in all locations, (2) it could be potentially thwarted if the firearm did not choose to use it, and (3) the equipment could be used to track people engaged in lawful behaviors such as hunting.

GPS AND FIREARMS

GPS is a satellite-based system that provides location and time information anywhere there is an unobstructed line of sight to four or more GPS satellites. Each satellite continually transmits data, including its precise location and the time the data was transmitted. A GPS tracker uses this data to determine the tracker's location and its direction if moving. There are currently 31 operational GPS satellites, plus additional decommissioned satellites that can be reactivated if needed. Further information about the satellites is available at <http://www.gps.gov/systems/gps/space/>.

A wide range of products, including cell phones and computer tablets, have GPS equipment installed in them. GPS is also used for a variety of commercial purposes, such as tracking delivery vehicles.

Patent Applications. In August 2006, Charles Chu filed a U.S. patent [application](#) (No. 2011/0309975 A1) for a firearm GPS tracking system. (He had already applied for a patent in Taiwan.) As described in the application, the system would be installed in the firearm, apparently in the manufacturing process.

According to the U.S. application, the system includes a GPS receiving circuit, a microprocessor, a wireless transmission circuit, and a detector. The receiving circuit receives satellite signals that are matched with data stored in a geographic data base to obtain the firearm's position and altitude and the time. These data are transmitted to the microprocessor and then to a wireless transmission circuit. The wireless transmission circuit enables transmission of the data to a remote server that monitors the firearm.

The system is also able to detect and transmit data on various operational aspects of the firearm (ballistic events), such as whether it has been drawn or fired. It can use various types of wireless communications technologies, including radio frequency, Global System for Mobile Communications (used by cell phones), Code Division Multiple Access, and Worldwide Interoperability for Microwave Access (WiMAX). When the GPS signal is weak, the microprocessor directs the system to use one of these alternative technologies to determine the firearm's location.

The system is powered by a battery. When the firearm has not been used for a specified period of time, the microprocessor directs the GPS tracker to enter a sleep mode. In addition, there is a reserve battery in the magazine of the firearm, thereby extending the system's battery life when the magazine is replaced.

In January 2009, Chu applied for a patent for a combination of this system with a bullet-proof vest that is also equipped with a GPS tracking system.

In July 2009, the telecommunications company Verizon Wireless filed a related patent [application](#) (No. EP 2282158 A1). While the primary purpose of this technology would be to report a discharge of a firearm to a reporting center terminal, the system would include GPS tracking equipment to determine the firearm's location.

Existing Products. There are at least two firms that market GPS tracking equipment that is attached to firearms as a retrofit, which use systems that are similar to those described in the patent applications. (The available product descriptions do not describe the specific technologies they use.) Both companies market their products for law enforcement and military applications, which suggest that they do not impair the usability of firearms.

In 2008, Portman Security Systems introduced its [Weapons Intelligent Tracking System](#). This is a firearms and body armor tracking system that uses GPS and related technologies. Portman states that the system can be used to track weapons in real time to assist in their recovery if they are stolen. The system can also be used to inform police dispatchers if a weapon is taken from an officer.

The firm 3ARC sells a similar product. It provides automatic GPS tracking (position, time, and ballistic events) in a device that clips directly onto any firearm universal rail system. The casing has built-in antennas and rechargeable batteries. It can help locate a missing firearm and will trigger an alert if it leaves a specified area around a bullet-proof vest (sold by the company) with which it has been synchronized. Although the company is British, its [website](#) notes that the battery recharger is sold with an adaptor to allow it to be used with a 110 volt current, allowing it to be used in the United States where this voltage is used.

Legislative Initiatives

In 2011, Massachusetts senator Anthony W. Petrucci introduced [S. 1124](#) to establish a commission to study the feasibility of placing GPS locators in firearms. The commission would have consisted of seven members, including legislators, two representatives from the city of Boston, and a designee from the Gun Owners' Action League. No action was taken on the bill in the 2011-12 biennium, but Petrucci's staff anticipate he will submit similar legislation this biennium.

Chicago alderman, Willie Cochran, a former police officer, has recently suggested that GPS system chips be embedded in new firearms and retrofitted on existing firearms, so they could be located if they go missing. Cochran anticipates the Public Safety Committee, of which he is vice-chair, will hold public hearings on his proposal in the near future.

Possible Disadvantages

While GPS works anywhere there is a line of sight with four or more transmitting satellites, there are locations such as the interior of large buildings where GPS signals cannot be received. This could interfere with the tracking of a GPS-equipped firearm. While other technologies could be used to determine the firearm's location, there may be locations where they also do not work.

While the GPS equipment that is currently being marketed cannot be readily removed from the firearm, a person could thwart it by failing to recharge the battery.

Requiring the installation of GPS tracking systems on firearms also raises a concern that the system could be used to track law-abiding citizens engaged in lawful behavior such as hunting. The location data collected by the systems could be integrated with data collected by other systems, such as those used by cellphones, to invade personal privacy.

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