Second Open-ended Meeting of Governmental Experts (MGE2)

Recent developments in small arms manufacturing, technology and design

- marking of polymer frames
- modular weapons design
- 3D printing
- new technologies for improved control
Marking of polymer frames
Polymer: pros and cons

- Advantages: lower weight and cost, improved user-to-weapon interface

- Disadvantages: more difficult to mark polymer parts durably (ITI, para. 7)

- Consequence: arms traffickers seeking to make a polymer gun untraceable can simply remove the serial number on the frame
Problems (and solutions)

• Metal tags, stamped with the weapon’s serial number, can be embedded in the frame

• But traffickers can remove the tag

• Solution: embed the tag in such a way that any attempts to remove it will damage the frame

• Problem: fitting post-manufacture markings on tags of fixed size
Questions for MGE2

- Marking methods for polymer parts (laser engraving, micro-percussion/dot-peen)
- Depth and placement of markings applied to polymer parts
- Use of metal tags (depth of insertion, plate dimension and location)
- International cooperation and assistance (diffusion of relevant marking technologies, new forensic techniques, etc.)
Modular weapons design
The FN SCAR ‘family’
Modular weapons: basic features

- Split receiver architecture
- Core (fixed) section
- Reconfiguration of the rifle to meet different operational needs (changing the calibre, barrel, etc.)
- Exchange of parts from the same or related models
- **Full modularity:** complete reconfiguration, including calibre
- **Family approach:** same model produced in different versions, each with its own calibre; reconfiguration, except for calibre
Challenges

• Key challenge: tracking the weapon throughout its life cycle despite changes in configuration

• Distinguishing the weapon from its major components following reconfiguration (conflicting serial numbers)

• Marking of additional info. (e.g. calibre) (ITI, para. 8a)
Questions for MGE2

- Identification of a ‘control component’ (upper or lower receiver)

- What identifying info. to mark on the control component

- Whether and how other components of the rifle should be marked

- Whether and how records associated with the weapon should try to account for its potential configurations
3D printing
3D-printed firearms: advantages

- speedy development of designs and prototypes
- reduced material use
- easier production of complex products
- inexpensive customization
3D printing today

- Mostly used to produce firearm components & accessories
- Complete 3D-printed *metal* firearms are not yet commercially viable (e.g. Solid Concepts Inc. 1911).
- The increased availability of relevant materials, software, and hardware has spurred the 3D printing of *polymer* firearms.
- Production of the first functioning 3D-printed firearm in early 2013 (Defense Distributed ‘Liberator’ handgun).
- Initial models could fire only 1 to 11 rounds, but improved designs are now under development.
Examples of 3D-printed firearms

Defense Distributed ‘Liberator’

Solid Concepts 1911 DMLS
Policy implications

In general, national, regional, and international norms govern 3D-printed firearms in the same way as they govern traditional firearms.

- UN Small Arms Programme of Action (PoA)
- International Tracing Instrument (ITI)
- UN Firearms Protocol
- Arms Trade Treaty
- National legislation
Law enforcement challenges

Problem: it is often more difficult to apply existing norms to 3D-printed firearms.

Challenges:

• Controlling unlicensed production

• Enforcing restrictions on the flow of weapons-related information over the Internet

• Limited application of forensics techniques

• Routine destruction of cheap, untraceable 3D-printed guns by criminals

• The risk of catastrophic weapons failure (consumer safety)
New technologies for improved small arms control
New technologies

• Not new - widely used in other industries

• Marking, record-keeping, and tracing

• Stockpile management and security

• End-use control

Intelligent Road/Rail Information Server
New marking technologies

- 2D data matrix codes
- Microstamping
- Improvements in associated scanning technology
New tech for stockpile management

Functions:

• Access control
• Inventory management (increased data accuracy)
• Monitoring and protection of weapons in transit

Technologies:

• Biometric gun safes
• RFID tags and strips
• Increased computing power and other IT advances
New tech for end-use control

Electronically controlled safety mechanisms (ECSMs):

- Biometric (e.g. palm print scanner)
- Token-based (e.g. RFID-tagged wrist watch)
- Concerns about reliability
Barriers to implementation

- Cost (databases and networked IT)
- Questions about reliability
- Sharing info. stored in a new format
- Opposition from political and consumer groups
- Slow pace of change in the firearms industry

Afghan officers at an electronic inventory management training session, June 2011
The limitations of technology

Top: Government storage lockers

Bottom: Keys and firearms improperly stored in government vehicles
thank you

www.smallarmssurvey.org