



# Priority Action Report

## Firearms and Toolmarks

Physics and Pattern

Andy Smith

February 2016





# Subcommittee Leadership

Position	Name	Organization	Term	Email
Chair	Andy Smith	San Francisco Police Dept Crime Lab	3 yrs	andy.smith@sfgov.org
Vice Chair	Todd Weller	Oakland Police Dept, Criminalistics Lab	3 yrs	tweller@oaklandnet.com
Executive Secretary	Wendy Gibson	VA Dept of Forensic Science	3 yrs	Wendy.gibson@dfs.virginia.gov





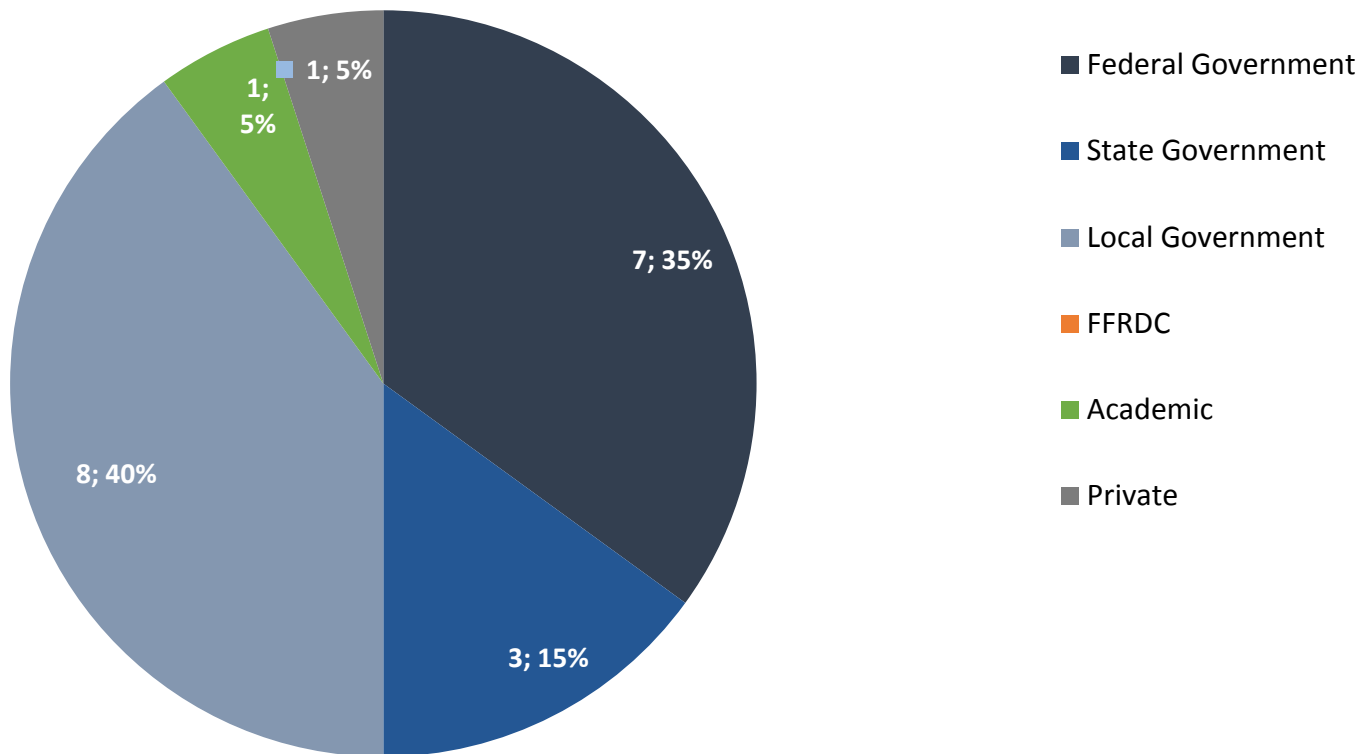
# Subcommittee Members

#	Name	Organization	Term	Email
1	Steve Scott	FBI	2 yrs	<a href="mailto:james.scott@ic.fbi.gov">james.scott@ic.fbi.gov</a>
2	Mike Neel	BATF	4 yrs	<a href="mailto:michael.neel@atf.gov">michael.neel@atf.gov</a>
3	Xiaoyu Alan Zheng	NIST	3 yrs	<a href="mailto:alan.zheng@nist.gov">alan.zheng@nist.gov</a>
4	Ted Vorburger, PhD	NIST	2 yrs	<a href="mailto:tvvtv@nist.gov">tvvtv@nist.gov</a>
5	Eric Collins	Contra Costa Co Sheriff Forensic Services	4 yrs	<a href="mailto:ecoll@so.cccounty.us">ecoll@so.cccounty.us</a>
6	Doug Murphy	FBI	3 yrs	<a href="mailto:douglas.murphy@ic.fbi.gov">douglas.murphy@ic.fbi.gov</a>
7	Max Morris, PhD	Iowa State University	4 yrs	<a href="mailto:mmorris@iastate.edu">mmorris@iastate.edu</a>
8	Laura Fleming	Dallas PD Crime Lab	3 yrs	<a href="mailto:laura.fleming@dallascounty.org">laura.fleming@dallascounty.org</a>
9	David Wright	Johnson Co (KS) Sheriff's Criminalistics Lab	2 yrs	<a href="mailto:david.wright@jocogov.org">david.wright@jocogov.org</a>
10	Chris Monturo	Miami Valley Regional Crime Lab	2 yrs	<a href="mailto:caspian45@sbcglobal.net">caspian45@sbcglobal.net</a>
11	Gabe Hernandez	Miami-Dade Police Department	3 yrs	<a href="mailto:ghernandez@mdpd.com">ghernandez@mdpd.com</a>
12	Erich Smith	FBI	4 yrs	<a href="mailto:erich.smith@ic.fbi.gov">erich.smith@ic.fbi.gov</a>
13	James Carroll	Los Angeles County Sheriff's Office	2 yrs	<a href="mailto:jpcarrol@lasd.org">jpcarrol@lasd.org</a>
14	Cassey Allen	TX Department of Public Safety - Austin	4 yrs	<a href="mailto:Cassey.Allen@dps.texas.gov">Cassey.Allen@dps.texas.gov</a>
15	Ryan Lilien, MD, PhD	Cadre Research Labs	3 yrs	<a href="mailto:ryan@cadreresearch.com">ryan@cadreresearch.com</a>
16	Ron Nichols	BATF	2 yrs	<a href="mailto:Ronald.G.Nichols@usdoj.gov">Ronald.G.Nichols@usdoj.gov</a>
17	Bill Demuth	Illinois State Police	4 yrs	<a href="mailto:Bill_Demuth@isp.state.il.us">Bill_Demuth@isp.state.il.us</a>

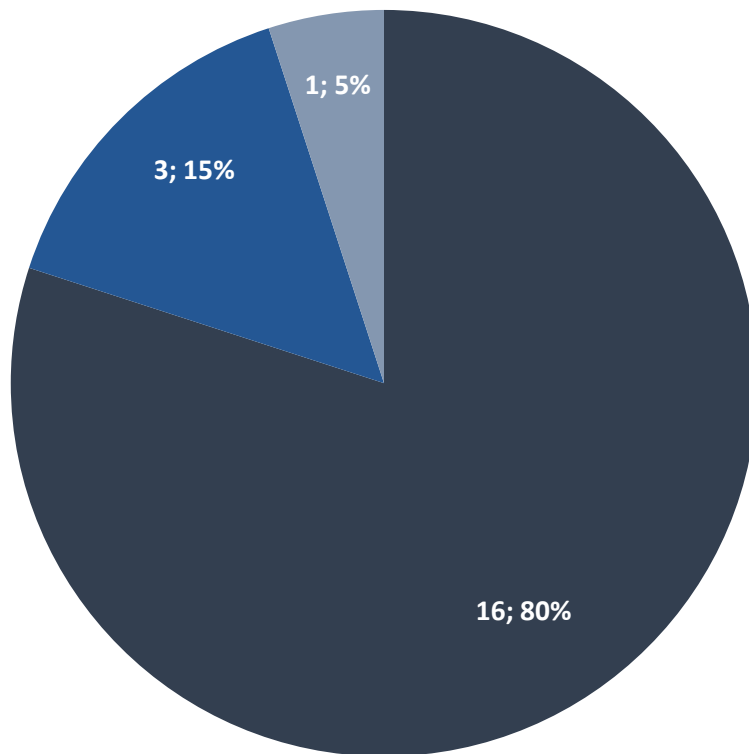




# Employer Classification Mix



# Job Classification Mix

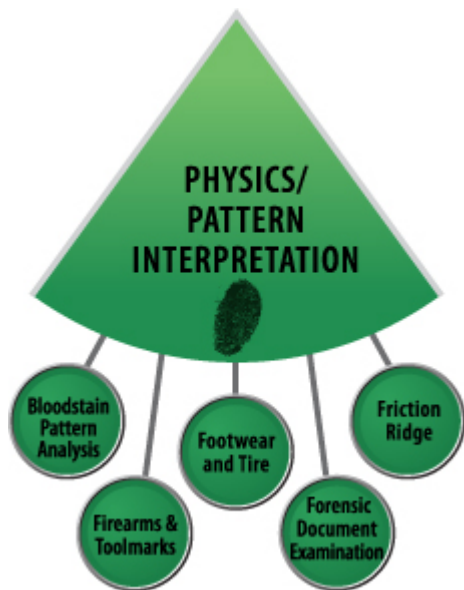


- Practitioner
- Researcher
- R&D Technology Partner
- Educator/Trainer
- Quality Assurance Manager
- Attorney
- Judge
- Other





# Discipline Description



The Subcommittee on Firearms and Toolmarks will focus on standards and guidelines related to the examination of firearm and toolmark evidence. This includes the comparison of microscopic toolmarks on bullets, cartridge cases, and other ammunition components. Examinations may also include firearm function testing, serial number restoration, muzzle-to-object distance determination, tools, and toolmarks.



# Topic 1: Technology Development, Validation, and Implementation

Priority Level: Medium

- Provide standards for evaluating new measurement and comparison methods to enhance the process of firearm and toolmark examinations.
- Specify hardware quality assurance protocols and validation requirements for software and statistical conclusions.
- Specify processes for utilizing new technologies in forensic laboratories. This includes hit verification, virtual microscopy, inter-lab data exchange, dispute resolution, and training.

**Task Group Name:** Technology Development, Validation, and Implementation

**Task Group Chair Name:** Ryan Lilien (chair)

**Members:** Alan Zheng, Erich Smith, Dr. Nick Petraco

**Affiliate Members:** Dr. Ben Bachrach

**Task Group Chair Contact Information:** [ryan@cadreresearch.com](mailto:ryan@cadreresearch.com)



**National Institute of  
Standards and Technology**

U.S. Department of Commerce







# Relevant Documents

Title	Organization
ASCLD/LAB Methods for Validating Technologies and Technical Procedures	ISO 17025
SWGDM Validation Guidelines for DNA Analysis Methods	SWGDM
Geometric Product Specifications: Topography Measuring Methods	ISO 25178-6,601-606,72
Applications of Surface Metrology in Firearm Identification, Zheng, Soons, Vorburger, Song, Renegar, Thompson	Surface Topography: Metrology and Properties (2014)
FBI Lab Operations Manual (various sections)	FBI





# Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High COMPLETED	Topography Analysis and Comparison Software for Toolmarks – <b>DRAFT DOCUMENT</b>	Sent to Resource Committees – Reviewing Comments	Technology Task Group
High COMPLETED	Implementation of 3D Technologies in Forensic Laboratories – <b>DRAFT DOCUMENT</b>	Sent to Resource Committees – Reviewing Comments	Technology Task Group
High COMPLETED	3D Measurement Hardware and Measurement Quality Control – <b>DRAFT DOCUMENT</b>	Sent to Resource Committees – Reviewing Comments	Technology Task Group





# Topic 2: Firearm and Toolmark Examination Standards

Priority Level: High

- Development of standard methods for the examination of firearm and toolmark evidence

**Task Group Name:** Firearm and Toolmark Examination Standards

**Task Group Chair Name:** David Wright

**Members:** Steve Scott, James Carroll, Cassey Allen

**Task Group Chair Contact Information:** david.wright@jocogov.org





# Relevant Documents

Title	Organization
Guideline for the Documentation of Firearm Examinations	SWGgun
Guidelines for Trigger Pull Analysis	SWGgun
Guidelines for Barrel and Overall Length Measurements for Firearms	SWGgun
Forensic Examination Guidelines for Silencers	SWGgun
Guidelines for the documentation of the examination of tools and toolmarks	SWGgun
Guidelines for the Documentation of the Examination of Ammunition and Ammunition Components	SWGgun
Guideline for the Documentation of Firearm Examinations	SWGgun





# Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High COMPLETED	Standard Guideline/Best Practice for the Safe Handling of Firearms and Ammunition – <b>DRAFT DOCUMENT</b>	In Review/Edit – ready for release to Resource Committees	FA Standards Task Group
High	Standard Test Method for the Physical Examination and Classification of Firearms	April 2017 – reviewing ASB document connection protocols	FA Standards Task Group
High	Standard Test Method for Function/Operability Testing of Firearms	April 2017 – reviewing ASB document connection protocols	FA Standards Task Group
High	Standard Test Method for Measuring Trigger Pull of Firearms	April 2017 – reviewing ASB document connection protocols	FA Standards Task Group
High	Standard Test Method for Measuring Barrel and Overall Length of Firearms	April 2017 – reviewing ASB document connection protocols	FA Standards Task Group – in conjunction with UOM Task Group



# Topic 3: Uncertainty of Measurement

Priority Level: Medium

- Procedures to express the uncertainty for measurements of physical quantities that matter for firearm and toolmark analysis;
  - Includes: issues associated with quantifying uncertainty in decision making.

**Task Group Name:** Uncertainty of Measurement

**Task Group Chair Name:** Dr. Ted Vorburger

**Members:** Chris Monturo, Dr. Max Morris

**Affiliate Members:** Dr. Nick Petraco

**Task Group Chair Contact Information:** [tvtv@nist.gov](mailto:tvtv@nist.gov)



## Topic 3: Uncertainty of Measurement



# Relevant Documents

Title	Organization
Policy on Measurement Uncertainty	ASCLD/LAB
Measurement Uncertainty Estimation Form	ASCLD/LAB
Guide to the Expression of Uncertainty of Measurement	ISO





# Standards/Guidelines to Move Forward

Title	Organization	Suggested OSAC Process: (Registry, SDO, Canvass)
SWGGUN Guidelines for Barrel and Overall Length Measurements for Firearms, 9/26/13 (in cooperation with Task Group 2)	SWGGUN	In process
Amendments proposed to the above SWGGUN Guidelines: -Section entitled “Uncertainty for Barrel and Overall Length (B/OL) Measurements” ( <b>drafted</b> ) -Spreadsheet for estimating measurement uncertainty for B/OL with worked example ( <b>drafted</b> ). -Spreadsheet with example for calculating gauge repeatability and reproducibility (GR&R) for B/OL ( <b>drafted</b> ).	SWGGUN	Review by Task Group 2 and other Subcommittee Experts





Topic 3: Uncertainty of Measurement

# Committee Action Plan

Priority (high/med/low w/)	Actions – Completed and Planned	Approx. Deadline	Assignee
High COMPLETED	“Uncertainty for B/OL Measurement” and Two Spreadsheets– <b>DRAFTED</b>	In Resource Committee Review	UOM Task Group
High	Review of “Uncertainty for B/OL Measurement” and Two Spreadsheets - <b>DRAFTED</b>	In Resource Committee Review	UOM Task Group – in conjunction with FA Standards Task Group
Medium	-- Consideration of statistical methods for characterizing probabilities in courts of law for firearm and toolmark issues.  -- UOM in the examination process	To be determined	UOM Task Group



# Topic 4: Training Program

Priority Level: Medium

- Development of standard methods for a Training Program
- Outline Program for Firearms Identification and Toolmark Identification
  - Inclusive of Serial Number Restoration & Muzzle-to-Object Determination
- Establish measures for Competency Testing

**Task Group Name:** Training Program

**Task Group Chair Name:** Gabe Hernandez

**Members:** Laura Fleming, James Carroll, Bill Demuth

**Affiliate Members:** Jodi Marsanopoli

**Task Group Chair Contact Information:** gahernandez@mdpd.com





# Relevant Documents

Title	Organization
Recommended Guidelines for Developing a Training Manual	SWGGUN
Firearm Examiner Training	National Forensic Science Technology Center
Training Manual	Association of Firearm and Tool Mark Examiners





# Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High	Minimum Qualifications for Firearm and Toolmark Examiner	April 2017	Training Program Task Group
High	Minimum Qualifications for Firearm and Toolmark Examiner Trainee	April 2017	Training Program Task Group
High	Required Material/Modules of Instruction for Firearm and Toolmark Examiner in Training	April 2017	Training Program Task Group







# Topic 5: Standard Criteria for Identification, Documentation, and Reporting

Priority Level: High

- Development of minimum standards for: 1) the criteria used to draw conclusions regarding the identification or elimination of a questioned toolmark to a known or the same unknown tool or firearm (including an evaluation of potential subclass characteristics); 2) the supporting documentation for such examinations and conclusions; and 3) the reporting of conclusions

**Task Group Name:** Standard Criteria for Identification, Documentation, and Reporting

**Task Group Chair Name:** Eric Collins

**Members:** Mike Haag, Mike Neel, Max Morris, Doug Murphy, Ron Nichols

**Affiliates:** John Murdock, Nancy McCombs

**Task Group Chair Contact Information:** [ecoll@so.cccounty.us](mailto:ecoll@so.cccounty.us)





## Topic 5 Standard Criteria for Identification, Documentation, and Reporting

# Relevant Documents

Title	Organization
AFTE Theory of ID	AFTE
AFTE Range of Conclusions	AFTE
AFTE Glossary	AFTE
AFTE Documentation Standard (2006)	AFTE
Guidelines for the Standardization of Comparison Documentation	SWGgun
Elimination Factors Related to FA/TM Examinations	SWGgun
Guidelines: Criteria for Identification	SWGgun



# Topic 5: Standard Criteria for Identification, Documentation, and Reporting



## Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High COMPLETED	Standard for Criteria for Identification – <b>INITIAL DRAFT</b>	In Review/Edit – April 2017	Eric Collins & John Murdock
High COMPLETED	Criteria for Elimination – <b>INITIAL DRAFT</b>	In Review/Edit – April 2017	Mike Neel & John Murdock
High COMPLETED	Evaluation of Subclass Characteristics – <b>INITIAL DRAFT</b>	In Review/Edit – April 2017	Doug Murphy
High COMPLETED	Verification of ID & Elimination – <b>INITIAL DRAFT</b>	In Review/Edit – April 2017	John Murdock, Nancy McCombs, Ron Nichols
High COMPLETED	Examination Documentation – <b>INITIAL DRAFT</b>	In Review/Edit – April 2017	Mike Haag
High	Reporting of Conclusions	April 2017	Eric Collins – in conjunction with Terminology Task Group
Medium	Terminology	April 2017	In conjunction with Terminology Task Group and Glossary



# Topic 6: Terminology / Report writing

Priority Level: High

- Review existing glossaries to determine if terms and definitions are appropriate and sufficient for use and make adjustments or additions were necessary. Develop minimum report writing requirements and standardized language.

**Task Group Name:** Terminology

**Task Group Chair Name:** Bill Demuth

**Members:** N/A

**Task Group Chair Contact Information:** Bill.Demuth@isp.state.il.us



# Relevant Documents

Title	Organization
AFTE Glossary	AFTE
SWGgun Glossary	SWGgun





# Committee Action Plan

Priority (high/med/low/)	Planned Actions	Approx. Deadline	Assignee
High	OSAC Subcommittee on Firearms and Toolmarks <b>Glossary</b>	COMPLETED	Terminology Task Group
High	Evaluate report wording examples from various members of the OSAC to determine minimum requirements	On Hold	Terminology Task Group
High	Develop standardized report writing examples	On Hold	Terminology Task Group





# Additional Items of Interest

- The Committee recognizes the foundation laid by the work of SWGGUN and fully expects to expand on that groundwork to develop more robust and functioning standards for the Discipline
  - All previous guidelines developed by SWGGUN were reviewed and with the exception of very specific guidelines the SWGGUN guidelines will be utilized as the basis for the standards created
- To insure that work can be accomplished in a timely fashion it was by design to only create a few task groups so efforts can be concentrated on the most important tasks first
- Other areas of interest to be covered by the Committee include:
  - Certification of Examiners
  - Continuing Education of Examiners
  - Scientific Method and its Use in Casework and Research
  - Research in the Discipline (current state and review – future needs)
  - Testimony Language
  - Reference Libraries and Reference Collections

# Summary

- Task Groups have established reasonable, albeit pressing timelines
  - Task groups have utilized virtual meetings to work on completing project objectives
- Committee as a whole is working diligently to produce the best documents to move forward through the SDO and Registry process
  - The Academy Standards Board (AAFS) has been chosen as the SDO process for subcommittee documents
- The use of affiliate members has been greatly beneficial in adding input from the community outside of the subcommittee voting members
- Although ranked, the topic areas will be worked on concurrently; however, some Task Groups given their topic area will be able to produce standards quicker and more frequently than some other Task Groups
- Each topic area was determined as the most pertinent areas needing standards within the Firearm and Toolmark discipline
- Next in-person meeting April 2017

Rank	Topic Area
1	Firearm and Toolmark Examination Standards
2	Terminology – Reporting of Conclusions
3	Criteria for Identification / Criteria for Elimination
4	Uncertainty of Measurement
5	Training Standards
6	Technology Validation and Implementation

