



Priority Action Report

Firearms and Toolmarks

Physics and Pattern

Todd Weller

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





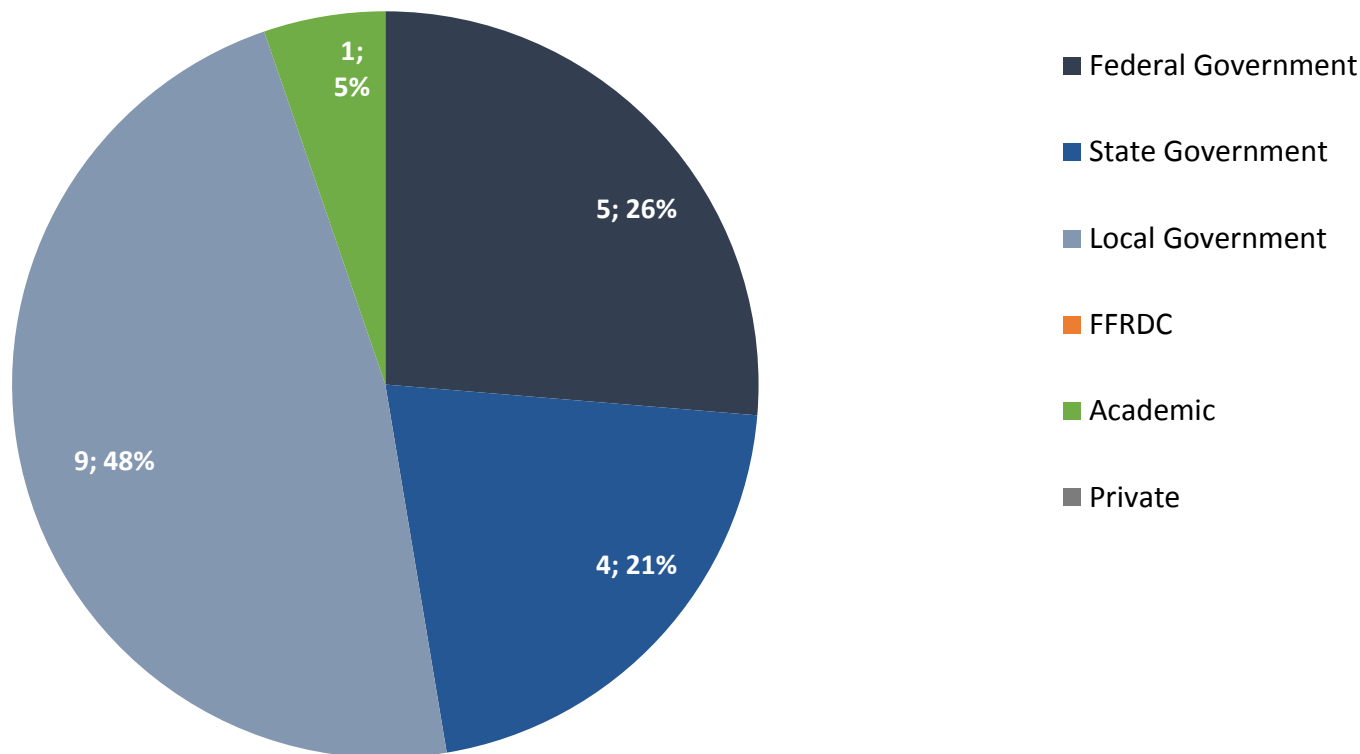
Subcommittee Members

#	Name	Organization	Term	Email
1	Steve Scott	TN Bureau of Investigation Crime Lab	2 yrs	steve.scott@tn.gov
2	Mike Neel	BATF	4 yrs	michael.neel@atf.gov
3	Xiaoyu Alan Zheng	NIST	3 yrs	alan.zheng@nist.gov
4	Ted Vorburger, PhD	NIST	2 yrs	tvvtv@nist.gov
5	Eric Collins	Contra Costa Co Sheriff Forensic Svcs	4 yrs	ecoll@so.cccounty.us
6	Doug Murphy	FBI	3 yrs	douglas.murphy@ic.fbi.gov
7	Max Morris, PhD	IA State U	4 yrs	mmorris@iastate.edu
8	Laura Fleming	Dallas Co SW Institute of Forensic Sci	3 yrs	laura.fleming@dallascounty.org
9	David Wright	Johnson Co (KS) Sheriff's Criminalistics Lab	2 yrs	david.wright@jocogov.org
10	Chris Monturo	Miami Valley Regional Crime Lab	2 yrs	caspiant45@sbcglobal.net
11	Gabe Hernandez	Miami-Dade Police Dept	3 yrs	ghernandez@mdpd.com
12	Erich Smith	FBI	4 yrs	erich.smith@ic.fbi.gov
13	James Carroll	Los Angeles County Sheriff's Office	2 yrs	jpcarroll@lasd.org
14	Mike Haag	Albuquerque Police Dept Crime Lab	4 yrs	michael.haag@comcast.net
15	Ryan Lilien, MD, PhD	Cadre Research Labs	3 yrs	ryan@cadreresearch.com

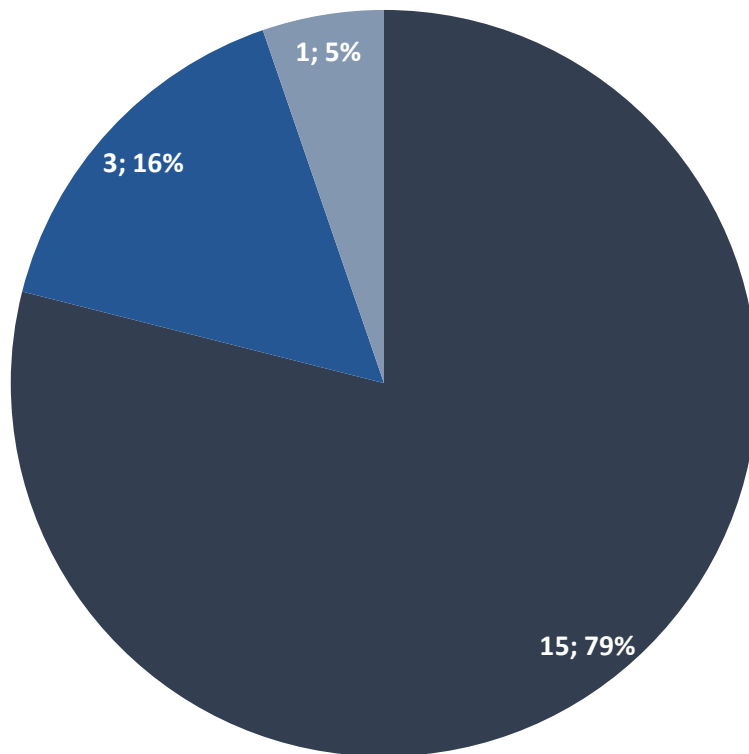




Employer Classification Mix



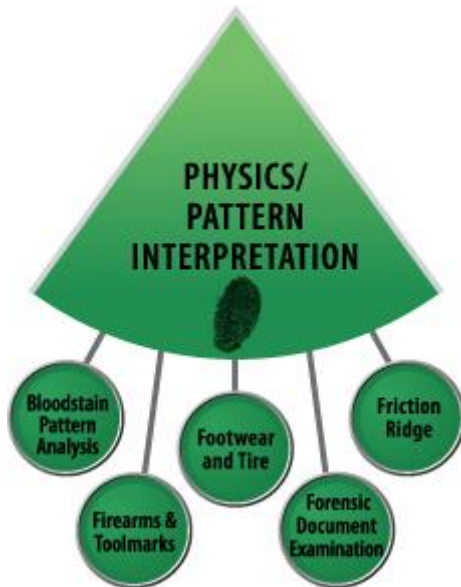
Job Classification Mix



- 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



**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 – DRAFT DOCUMENT	In Review / Edit	Technology Task Group
High COMPLETED	Implementation of 3D Technologies in Forensic Laboratories – DRAFT DOCUMENT	In Review / Edit	Technology Task Group
High COMPLETED	3D Measurement Hardware and Measurement Quality Control – DRAFT DOCUMENT	In Review / Edit	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

Affiliate Members: 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 – DRAFT DOCUMENT	In Review/Edit	FA Standards Task Group
High	Standard Test Method for the Physical Examination and Classification of Firearms	April 2016	FA Standards Task Group
High	Standard Test Method for Function/Operability Testing of Firearms	April 2016	FA Standards Task Group
High	Standard Test Method for Measuring Trigger Pull of Firearms	April 2016	FA Standards Task Group
High	Standard Test Method for Measuring Barrel and Overall Length of Firearms	April 2016	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





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” (drafted) -Spreadsheet for estimating measurement uncertainty for B/OL with worked example (drafted). -Spreadsheet with example for calculating gauge repeatability and reproducibility (GR&R) for B/OL (drafted).	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– DRAFTED	January 2016	UOM Task Group
High	Review of “Uncertainty for B/OL Measurement” and Two Spreadsheets	July 2016	UOM Task Group – in conjunction with FA Standards Task Group
Medium	New Task: Consideration of statistical methods for characterizing probabilities in courts of law for firearm and toolmark issues. Reviewing literature and compiling a list of strengths and weak points.	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, Denis Burke, James Carroll

Affiliate Members: Jodi Marsanopoli, William Demuth

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	June 2016	Training Program Task Group
High	Minimum Qualifications for Firearm and Toolmark Examiner Trainee	June 2016	Training Program Task Group
High	Required Material/Modules of Instruction for Firearm and Toolmark Examiner in Training	August 2016	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

Affiliates: John Murdock, Ron Nichols, Nancy McCombs

Task Group Chair Contact Information: 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 – INITIAL DRAFT	In Review/Edit	Eric Collins & John Murdock
High COMPLETED	Criteria for Elimination – INITIAL DRAFT	In Review/Edit	Mike Neel & John Murdock
High COMPLETED	Evaluation of Subclass Characteristics – INITIAL DRAFT	In Review/Edit	Doug Murphy
High COMPLETED	Verification of ID & Elimination – INITIAL DRAFT	In Review/Edit	John Murdock, Nancy McCombs, Ron Nichols
High COMPLETED	Examination Documentation – INITIAL DRAFT	In Review/Edit	Mike Haag
High	Reporting of Conclusions	April 2016	Eric Collins – in conjunction with Terminology Task Group
Medium	Terminology	April 2016	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: Denis Burke

Members: N/A

Task Group Chair Contact Information: denis.burke@nypd.org



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 Glossary	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

- In December 2015, the Subcommittee provided a written response to a series of questions asked by the President's Council of Advisors on Science and Technology (PCAST)
- 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 July 2016

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

