



# **NATO Stability Policing Centre of Excellence**

## **Stability Policing Framework Concept for Forensics in NATO Stabilization and Reconstruction Operations**

**Edition 1**

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*Although this product has not been endorsed by a NATO Strategic Command or the NATO Headquarters, it was verified by the HQ SACT as aligned with NATO policies and doctrine and releasable to public. As such, this product reflects the NATO SP COE positions itself.*

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## LIST OF REFERENCES

- A. Strategic Concept for the Defense and Security of the Members of the North Atlantic Treaty Organization, adopted by Heads of State and Government at the NATO Summit in Lisbon 19-20 November 2010.
- B. AJP-3.4.5 EDA V1 E “Allied Joint Doctrine for the Military Contribution to Stabilization and Reconstruction”.
- C. AJP-3.22 “Allied Joint Doctrine for Stability Policing” (Ratification Draft).
- D. AJP-3.14 EDB “Allied Joint Doctrine for Force Protection”.
- E. AJP-3.15 EDB “Allied Joint Doctrine for Countering - Improvised Explosive Devices”.
- F. AJP-2.5 EDA “Allied Joint Doctrine Captured Persons, Materiel and Documents”.
- G. ACIEDP-02 EDA V1 “Allied Countering Improvised Explosive Device Publication NATO Weapons Intelligence Team (WIT) Capabilities”.
- H. AIntP-10 EDA V1 “Allied Intelligence Publication Technical Exploitation”.
- I. AIntP-15 EDA V1 “Allied Intelligence Publication Countering Threat Anonymity: Biometrics in Support of Operations & Intelligence”.
- J. AMedP-3.10 EDA V1 “Allied Medical Publication Military Forensic Dental Identification”.
- K. AEDP-15 EDA V1 “Allied Engineering Documentation Publication NATO Biometrics Data, Interchange, Watchlisting and Reporting Standard”.
- L. ATP-3.12.1.1 EDA V1 “Allied Tactical Publication for Military Search”.
- M. “NATO Security Force Assistance Concept”, MCM 0034-2014, as amended on 18 March 2014.
- N. Concept of the NATO Stability Policing Centre of Excellence (NATO SP COE) approved on 15 May 2015 by the Steering Committee.
- O. UN General Assembly resolution 834 (IX) of 14 December 1954, on the United Nations Narcotics Laboratory.
- P. UN Secretary-General Note of 15 October 1954.
- Q. UN General Assembly resolution 50/4 of 16 March 2007, recognizing the role of drug analysis laboratories as part of national drug control systems, and the value of laboratory results and data to criminal justice systems, law enforcement and health authorities and policymakers.
- R. UN General Assembly resolution 52/7 of 20 March 2009, stating that the quality of the analysis and results of drug analysis laboratories has significant implications for the justice system, law enforcement and preventive health care, as well as for the international harmonization and worldwide exchange and coordination of drug information and data.

- S. Prüm Convention of 27 May 2005 on the stepping up of cross-border cooperation, particularly in combating terrorism, cross-border crime and illegal migration.
- T. EU Council Decision 2008/615/JHA of 23 June 2008 on the stepping up of cross-border cooperation, particularly in combating terrorism and cross-border crime.
- U. EU Council Framework Decision 2009/905/JHA of 30 November 2009 on Accreditation of forensic service providers carrying out laboratory activities.
- V. EU Council conclusions of 13-14 December 2011 on the vision for European Forensic Science 2020 including the creation of a European Forensic Science Area and the development of forensic science infrastructure in Europe.
- W. ISO/IEC 17020:2012 Conformity assessment Requirements for the operation of various types of bodies performing inspection.
- X. ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories.
- Y. ISO/IEC 19794-5 “Information technology — Biometric data interchange formats — Part 5: Face image data”.
- Z. ISO/IEC 19794-6, “Information technology – Biometric data interchange formats – Part 6: Iris image data.”
- AA. ENFSI Performance Based Standards for Forensic Science Practitioners<sup>1</sup>.
- BB. ENFSI Guidance on the Assessment of Competence for Forensic Practitioners<sup>2</sup>.
- CC. ANSI/NIST-ITL 1-2011, “American National Standard for Information Systems – Data Format for the Interchange of Fingerprint, Facial, & Other Biometric Information” (NIST Special Publication 500-290).

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<sup>1</sup> ENFSI European Network of Forensic Science Institutes “Performance based Standards for Forensic Science Practitioners”, QCC-CAP-003, 27.07.2004.

<sup>2</sup> ENFSI European Network of Forensic Science Institutes “Guidance on the Assessment of Competence for Forensic Practitioners“, QCC-CAP-006, January 2011.

## CHAPTER 1 – INTRODUCTION

### BACKGROUND

- 1-1. The NATO Strategic Concept at Reference A. commits the Alliance to promote the defense against threats, manage crises and conflicts and stabilize post-crisis/conflict situations, since instability or conflicts beyond NATO borders can directly threaten its security. A comprehensive approach, including political, civil and military instruments, is necessary for an effective crisis management and, when a conflict ends, for post-conflict stabilization and reconstruction. In this regards, illegal activities are accounted as a factor of instability and a consequent possible threat, therefore, the Concept stresses the importance for the Alliance to “develop the capability to train and develop local forces in crisis zones, so that local authorities are able, as quickly as possible, to maintain security without international assistance”. Furthermore, the Strategic Concept highlights that the Alliance constitutes a unique community of values committed to the principles of individual liberty, democracy, human rights and the rule of law.
- 1-2. The Allied Joint Publication 01(D) (AJP-01(D)) and the AJP-3 series address the importance for the deployed Joint Force Commander (JFC) to tackle, amongst others, the threats posed by illegal activities and to meet the need to provide the local populace with an effective and accountable police service. The latter is achieved through either replacing the indigenous police forces (when either not existing or unable/unwilling to execute their duties) or reinforcing their capabilities up to an acceptable standard of efficiency.
- 1-3. The AJP-3.4.5 at Reference B. introduces the concept of Stability Policing (SP) as a set of police related activities intended to strengthen or temporarily replace indigenous police in order to contribute to the restoration and/or upholding of the public order and security, rule of law, and the protection of human rights in the wider framework of the Stabilization and Reconstruction (S&R) process.
- 1-4. The AJP-3.22 at Reference C., while envisaging the definition in the following paragraph 1-16 e., sets out the specific doctrine for the implementations of SP.
- 1-5. The AJP- 3.14 EDA at Reference D. includes the use of Stability Policing assets in Force Protection, listing activities and tasks that are strongly connected to forensics.
- 1-6. The AJP-3.15 EDB at Reference E. and ACIEDP-02 EDA at Reference G contain significant synergies between the Countering of Improvised Explosive Devices, Weapons Intelligence Team Capabilities and the concept of Stability Policing in general and Forensics in particular.
- 1-7. The AJP-2.5 EDA at Reference F., focuses on Captured Person(s) (CPERS), Captured Materiel (CMAT) and Captured Documents (CDOC), the AIntP-10, EDA at Reference H. on Technical Exploitation and the AIntP-15 RD at Ref. I. on Countering Threat Anonymity: Biometrics in Support of Operations & Intelligence, mentioning general, as well as specific, links with Stability Policing, Forensics and Biometrics.

- 1-8. The AMedP-3.1 at Reference J. addresses a very specific forensic activity, namely “Military Forensic Dental Identification”.
- 1-9. The ATP-3.12.1.1 at Reference L. illustrates the relevance of forensic aspects in military searches.
- 1-10. The importance of Forensics is recognized by the UN (see Ref. O. through R.) and the EU (see Ref. T. through V.).
- 1-11. The Prüm Convention (at Ref. S.) specifies a trans-national cooperation and assistance, which, also through the establishment of technical-scientific databases and sharing of information they contain, aims at fighting terrorism, cross-border crime and illegal migration.
- 1-12. Fundamental international standards include the Laboratory Information Management System (LIMS)<sup>3</sup>, ISO/IEC 17020 (see Ref. W.) and ISO/IEC 17025 (see Ref. X.), ISO/IEC 19794-5 (See Ref. Y.), IOS/IEC 19794-6 (See Ref. Z.) and ANSI/NIST-ITL 1-2011 (See Ref. CC.).

#### AIM

- 1-13. The aim of the document is to:
  - a. provide a framework concept for Forensics, as below defined, in accordance with international best practices, within the concept of Stability Policing envisaged in NATO doctrine;
  - b. contribute to the transformation of the capabilities of the Alliance, notably, supporting future doctrinal developments, training and planning of operations. In connection to this, it helps identifying the capabilities of the Joint Force (JF), focusing on the specific police capabilities and professional skills that embedded Stability Policing assets should be endowed with, in both the envisioned scenarios of either replacing or reinforcing the indigenous police forces.

#### SCOPE

- 1-14. This concept is applicable to the areas of doctrine, training and planning of operations. It establishes general principles concerning Forensics, mainly in support of Stabilization and Reconstruction activities implemented by NATO (see Ref. B.).

#### TERMS AND DEFINITIONS

- 1-15. The following definitions are NATO agreed terminology:
  - a. Chemical, Biological, Radiological and Nuclear (CBRN) forensics / Investigation nucléaire, radiologique, biologique et chimique: the scientific methods and techniques used to analyze materials and data in support of a chemical, biological, radiological and nuclear incident or threat investigation.

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<sup>3</sup> LIMS allows an integrated management of analysis requests, tracking of evidence/samples, of working flows in laboratories, of results and final reports abiding to ISO/IEC 17025.

- b. Technical Intelligence (TECHINT)/ renseignement technique: intelligence concerning foreign technological developments, and the performance and operational capabilities of foreign materiel, which have or may eventually have a practical application for military purposes.
- 1-16. The following definitions, while envisaged in the NATO doctrine, are not NATO agreed terminology:
- a. Biometrics: are unique measurable biological and behavioral characteristics that enable the establishment and verification of an individual's identity. These biometric characteristics can include, but are not limited to, fingerprints, face, hand, eye, voice and DNA characteristics. (Adapted from NATO ACO Biometrics Panel).
  - b. Forensic and Biometric Intelligence (FABINT): intelligence derived from the application of multi-disciplinary scientific or technical processes and can often, although not exclusively, be collected to an evidential standard. (See Ref. E.).
  - c. Military Search is the management and application of systematic procedures and appropriate equipment to locate specified targets in support of military operations. Specified targets may include people, information and material resources employed by an adversary. Military search is subcategorized as Advanced and Intermediate, which require formal training, and Basic. (See Ref. L.)
  - d. Stabilization and Reconstruction (S&R): Stabilization is an approach used to mitigate crisis, promote legitimate political authority, and set the conditions for long-term stability by using comprehensive civilian and military actions to reduce violence, re-establish security, and end social, economic, and political turmoil. Reconstruction is the process of rebuilding physical infrastructure and re-establishing governmental or societal institutions, which were damaged during the crisis (See Ref. B.)
  - e. Stability Policing: a set of police related activities intended to reinforce or temporarily replace indigenous police in order to contribute to the restoration and/or upholding of the public order and security, rule of law, and the protection of human rights (See Ref. C.).
- 1-17. For the purpose of this document, the following definition is to be considered: "Forensic, adj. relating to or denoting the application of scientific methods and techniques to the investigation of crime."<sup>4</sup>
- 1-18. The main forensic sciences are listed and shortly described in Annex "A".

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<sup>4</sup> The Concise Oxford Dictionary, twelfth edition, the reference dictionary for the NATO Terminology Programme (NTP).

## **CHAPTER 2 – STABILITY POLICING AS A COMPONENT OF THE MILITARY CONTRIBUTION TO THE STABILIZATION AND RECONSTRUCTION PROCESS**

### **OVERALL MILITARY CONTRIBUTION TO STABILIZATION AND RECONSTRUCTION**

- 2-1. Stabilization and Reconstruction (S&R) is an overarching concept for stabilizing unstable states, that is addressed throughout the AJP–3 series, notably in the AJP-3.4 series, with specific focus on the publication at mentioned Reference B.. S&R activities may be part of operations conducted within the framework of Non Article 5 Crisis Response Operations (NA5CRO), Peacetime Military Engagement, Peace Support Operations (PSO), Humanitarian Assistance (HA), Counter-insurgency (COIN), Defense Against Terrorism Operations (DATOs) and Major Combat Operations, and, in some cases, will overlap with their activities. Even though S&R is categorized as a crisis response, it may also result from Art.5 operations.
- 2-2. The NATO military contribution to S&R may be summarized in:
  - a. Establishing a Safe and Secure Environment (SASE), where the population has the freedom of movement and is enabled to pursue daily activities without fear of persistent or large-scale violence. The SASE is the general framework that allows all S&R activities to proceed;
  - b. Restoring public security, which includes the establishment of law and order, the rule of law and a basic legal infrastructure;
  - c. Contributing to efforts of international civil agencies or local authorities to restore essential services and infrastructure;
  - d. Helping establish conditions for meeting longer-term governance requirements.

### **STABILITY POLICING CONTRIBUTION TO STABILIZATION AND RECONSTRUCTION**

- 2-3. The JFC, if so mandated, will have the necessity to conduct police or police-related activities in all the areas of the military contribution to S&R. These activities, which require a police approach, a civil-oriented mindset and a specific set of capabilities, lie within the concept of Stability Policing. When it may be necessary for conventional military forces to conduct police functions in the initial stage of S&R, in particular as a result of Art.5 operations, the transition to SP assets consisting mainly of police forces from within the NATO Force or from Allied or Partner Nations, should occur as soon as possible.
- 2-4. The enforcement of law and order in NATO operations is one of the police activities encompassed in the concept of Stability Policing in the wider framework of S&R and lies with the SP assets embedded in the JF. Their specific role varies according to the stage of the S&R process and to their specific mission.
- 2-5. SP assets are military assets with a unique capability of civil policing, therefore they can replace the indigenous police forces (when either not existing or unable/unwilling to execute their duties) in performing the full spectrum of police

and police–related activities for the local population. Alternatively, they can reinforce them through training, mentoring, monitoring, advising, partnering with and reforming, raising their standards of efficiency and effectiveness to an acceptable level.

- 2-6. In terms of SP, a one-fits-all scenario does not exist and each SP mission (either replacement or reinforcement mission), operation or activity is to be tailored to the peculiar local public order, security, civil society and police conditions and needs. In this regard, the SP applies not only to tackling criminality but also, as part of the wider military effort to stabilization, to countering all potential forms of irregular activities<sup>5</sup> that may be destabilizing the HN and exposing civilians to violence, intimidation, reprisals and other forms of systematic violence.
- 2-7. SP needs to be synchronized and harmonized with the other NATO activities in support of the local security forces, notably with those falling within the NATO Security Force Assistance (SFA) concept at Reference M.. Stability Policing and Security Force Assistance complement one another and offer the Alliance a range of capabilities and tools fully covering the security needs in crisis zones where a NAC-approved operation/mission is executed. Training, mentoring, monitoring, advising, partnering with and reforming of indigenous forces performing civil police duties, be these forces of either military or civil status, lies within the SP concept.
- 2-8. Finally, SP is a component of primary importance in the Protection of Civilians (PoC)<sup>6</sup>, the Alliance’s overall effort to mitigate the negative effects of conflict on the civilian population. In this framework, SP actively protects civilians from violence or worry, through contributing to the establishment of a SASE that progressively enables S&R activities to proceed. SP supports the protection of civilians within the area where NATO Forces are deployed, by means of policing, in a twofold way:
  - a. complementing NATO conventional military operations with stability policing operations or measures aimed at protecting civilians from potential unintentional harm caused by NATO Forces’ actions (e.g. physical protection, cordoning the population off dangerous areas or sites, contributing to evacuation operations, disseminating information to local population, advising the military commanders, etc.);
  - b. contributing to protect the local population from deliberate and unlawful attacks or violence by other armed actors, including insurgents, terrorists and criminals, and investigating, when so mandated, such crimes.

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<sup>5</sup> Besides the NATO agreed terminology, AJP-3.4.4 “Allied Joint Doctrine for counterinsurgency (COIN)”, para. 0256, lists the following as irregular activities: insurgency, terrorism, criminality, disorder, subversion.

<sup>6</sup> Although, there is not yet a NATO definition for “Protection of Civilians”, the essence of this concept is described in the paragraph.

## CHAPTER 3 - THE ROLE OF FORENSICS IN STABILITY POLICING

### GENERAL

- 3-1. A State that is unstable or destabilized by conflicts, natural or man-made disasters, requires the reconstruction of the social network through the reorganization and the strengthening of the legitimate governmental agencies, the re-/establishment of the rule of law, the enforcement of law and order and the protection of civilians and human rights. Any broader social and economic advancement requires the re-/establishment of public order and security as essential conditions, which are obtained only involving the collective effort of key contributors including Law Enforcement, the Judiciary and Corrections.
- 3-2. Forensics is a niche police capability and a functional component of the overall campaign to combat criminality and supports this process by introducing the scientific method and by striving for objectivity and compliance with internationally agreed standards (see Ref. W. through CC.) and provisions in domestic laws (unless contrary to the former). It plays a significant role in supporting governance in case of mass casualty/fatality events.
- 3-3. Re-/building, and, when necessary, providing an efficient forensic capability and capacity, also in coordination or cooperation with other entities, is a key factor conducive to a durable stability, whose critical contributing aspects include, but are not limited to:
  - a. Combating the wider (transnational/international) criminal network, especially Organized Crime and Terrorism;
  - b. Enhancing regional stability and democratization, as well as Demobilization, Disarmament and Reintegration (DDR) processes by giving new purposes to the local Armed Forces beyond the traditional role of “kinetic” operations;
  - c. The Protection of Civilians also through a prominent role in investigating crimes against humanity and war crimes<sup>7</sup>;
  - d. Supporting criminal Justice by ensuring an objective, scientific and validated:
    - (1) Crime scene examination and management;
    - (2) Collection, preservation, analysis and custody of samples and evidence;
    - (3) Reconstruction of the criminal act;
    - (4) Determination of the cause, manner and circumstances of death;
    - (5) Identification of victims and perpetrators including “cold” cases<sup>8</sup>;
    - (6) Exclusion of the innocents and of unreliable evidence such as false confessions and eye-witness statements;

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<sup>7</sup> AJP-2.5(A) 0602 2. a. assigns the highest handling priority of “Category A” to documents concerning these crimes;

<sup>8</sup> Cold cases: any case whose probative investigative leads have been exhausted. US National Institute of Justice, <http://www.nij.gov/journals/260/pages/what-is-cold-case.aspx>.

- (7) Presentation of the elements in court;
- (8) Credibility through internal and external audits;
- e. Supporting all Intelligence disciplines, feeding the Intelligence cycle, developing intelligence (TECHINT, FABINT, etc.), building the understanding of the threat (including the IED System) and enhancing the situational understanding (see Ref. E., F., G., H., I., K. and L.);
- f. Supporting follow-on operations (targeting), enhanced force protection and law enforcement operations, feeding the operational cycle while enabling rapid adaptation of technologies and Tactics, Techniques and Procedures (TTPs) into operations and training (see Ref. D., E. F. G. H. I. and L.);
- g. Contributing to the exploitation of CPERS, CMAT and Associated Technical Documents (ATD), CDOC Exploitation (DOCEX) (See Ref. F.), Technical Exploitation (See Ref. H.) and Biometrics (See Ref. I and K.) also obtained during Military Searches (See Ref. L.);
- h. Establishing databases (Biometrics, firearms, etc.) valuable for a number of local, national, regional and international and interagency entities and, potentially, for a wide range of purposes including Security, Force Protection (FP), Counterintelligence (CI), Command and Control (C2), C-IED and WIS/WIT, (See Ref. D. through L.);
- i. Improving professionalism of academics, technicians, police officers, prosecutors, defense lawyers, public officials (short/medium/long-term, in-country and abroad) by education and training;
- j. Supporting numerous indigenous governance sectors and in particular:
  - (1) The border service (See Ref. E., I. and L.);
  - (2) The military (aiming at marshalling the force as well as in favor of the local populace);
  - (3) The public health service;
- k. Identifying unknown, potentially dangerous, substances such as toxins, drugs, biohazards and CBRN material as well as weapons, weapon systems and munitions (See Ref. D., E., F., G. and L.);
- l. Identifying remains including MIAs, KIAs, from mass graves or mass fatalities due to natural or man-made disasters, also as consequence of human rights violations, crimes against humanity and war crimes, Disaster Victim Identification (DVI) (See also Ref. J.);
- m. Facilitating cooperation in a vast array of programs at all levels and across borders, including development and capacity-building;
- n. Pooling high-technology and high-expense solutions;
- o. Promoting and protecting human rights;
- p. Analyzing biometrics in service, among numerous other activities, of:

- (1) Security (access control, forgery of documents);
  - (2) Border control and immigration (See Ref. I.);
  - (3) C-IED and WIS/WIT (See Ref. E., G. and L.);
  - (4) Handling CPERS (See Ref. F., particularly Annex 3 of Appendix K);
  - q. Improving safety in general and in particular public safety in food, transportation, workplace, products and merchandise, public venues, fire prevention;
  - r. Identifying disease outbreaks and other causes of sudden increases in death;
  - s. Studying patterns of deaths, to suggest preventive measures and warnings.
- 3-4. The framework for the overall planning of the SP operation needs to consider forensics as part of the tasks assigned to the deployed SP assets and should be included in the pre-deployment training; this regardless if the mission consists of replacing or reinforcing the indigenous police. All personnel must receive a general education and training in this field, highlighting internationally agreed standards and the general lines of the HN legislation, while monitors/mentors/partners/reformers and advisers need to receive an in-depth training.

#### KEY FORENSIC CAPABILITIES IN STABILITY POLICING MISSIONS

- 3-5. The forensic components of deployed Stability Policing capabilities need to be crisis-tailored and might encompass a wide range of fields including<sup>9</sup>:
- a. Chemistry: e.g. qualitative and quantitative analysis of unknown chemical substances (including CBRN), explosives and/or accelerants, explosive devices, identification of after-blast/arson residuals, identification of drugs and new psychoactive substances (NPS), active ingredients and cutting agents, examination of paints, inks, papers, fibers, and other material recovered at the scene of crime, electronic microscopy to search and analyze gunshot residuals etc.;
  - b. Biology: e.g. analysis of unknown Biological substances/agents, search for, highlighting and collection of latent biological traces, morpho-structural comparison of hair, Bloodstain Pattern Analysis (BPA), studies and application of nuclear and mitochondrial DNA extraction, quantification, amplification and typization, statistic evaluation of biologic evidence on autosomal polymorphisms (loci on non-sexual chromosomes), of the Y chromosome of the mitochondrial DNA, data supply and interrogation of the DNA database to identify genetic profiles concerning forensic biologic traces searching for links between cases, identification of human remains and corpses, Disaster Victim Identification (DVI);
  - c. Ballistics: e.g. interpretation of the ballistic traces and their representation (trajectory), identification of firearms and their functional characteristics, dry-

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<sup>9</sup> Translated from “Le Investigazioni scientifiche”, Raggruppamento Carabinieri Investigazioni Scientifiche, 2015.

- and live-firing, examination of characteristics of cartridges and their components (case, powder, bullet, wadding), restoring serial numbers on weapons after their abrasion, comparative analysis on bullets, cases, and their parts to identify the weapon, determination of shooting distance, reconstruction of trajectories and events, ascertaining causes for malfunctions, supply and interrogation of the ballistic databases such as the Integrated Ballistics Identification System (IBIS) searching for links between cases in which firearms were used;
- d. Electronic/Communication and Information Systems (Digital Forensics): e.g. acquiring evidence from digital memories, forensic copying of data from working, damaged and encrypted memory devices, locating point of origin of transmissions or communications (e-mails etc.), extraction of data from cellular phones, cellular networks and SIMs, analysis, reconstruction and exploitation of data from electronic and/or electromagnetic circuits especially hardware and software to clone payment cards and cellular phones, GPS devices, jammers, smartcards, key-logger devices, triggering and igniting devices;
  - e. Biometrics: forensic (post-event) collection of biometric information of individuals (victims, perpetrators, witnesses etc.) to enable the establishment and verification of their identity. Biometric systems furthermore offer the means to map the identities of the local population<sup>10</sup>, supporting investigations. To be admissible as evidence, biometric data must abide by the legal framework (including the laws and procedures of the HN) in all phases, from acquisition to the presentation in court.

Since they are more reliable in verifying identity than token and knowledge-based methods, biometrics are also widely utilized for access control;<sup>11 12</sup> in that case, because they are focusing on pre-event analysis, following a strict definition, they are not considered as part of the forensic sciences<sup>13</sup>.

## REPLACEMENT MISSION

- 3-6. If the indigenous police forces are not existing or unable/unwilling to execute their duties in performing the full spectrum of police and police-related activities for the local population, a NATO Stability Policing replacement mission can be established as either a Comprehensive Police Replacement Mission (CPRM) or a Partial Replacement Mission (PRM), as envisaged at mentioned Reference C.. Regardless of the assigned mission, SP assets are most likely to have a

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<sup>10</sup>Activities concerning biometrics, including enrolment, capture, acquisition, comparison, analysis, sharing, dissemination, mapping and verification, may present national legal considerations which must be considered starting from the operational planning.

<sup>11</sup> Jain, A.; Hong, L. and Pankanti, S. (2000). "Biometric Identification" [http://helios.et.put.poznan.pl/~dgajew/download/PUT/SEMESTR\\_10/IO/FACE\\_RECOGNITION/BiometricsACM.pdf](http://helios.et.put.poznan.pl/~dgajew/download/PUT/SEMESTR_10/IO/FACE_RECOGNITION/BiometricsACM.pdf). Communications of the ACM, 43(2), p. 91–98. DOI 10.1145/328236.328110.

<sup>12</sup>Weaver, A. C. (2006). "Biometric Authentication". Computer, 39 (2), p. 96–97. DOI10.1109/MC.2006. 47.

<sup>13</sup>"Fundamentals of Forensic Science" by Max M. Houck and Jay A. Siegel, Academic Press, page 477.

territorial organization in which each unit exercises police functions in its area of operations (AOO).

- 3-7. Especially during the initial stage of a replacement mission, notably during major combat operations or Art.5 operations, SP activities may be conducted by trained and equipped conventional military forces and/or by limited SP assets. In this early stage, their primary effort, from an SP perspective, is to restore acceptable conditions of public order and security, as well as the protection of civilians, especially the most vulnerable part of the population<sup>14</sup>, from violence.
- 3-8. The development of the SP forensic action in a replacement mission will start by addressing at first the most serious crimes, spreading subsequently to other, less severe, violations. This requires close relationships with all HN Institutions, which might be weakened by lack of integrity, improper interferences or simply by lacking the necessary technical, scientific or cultural background or a sufficient level of education. These factors could prevent key figures and relevant actors from understanding that internationally agreed standards are not complied with or that the HN legislation is violated, possibly seriously. In addition, this activity may require partnering with International Organizations which may be operating in the HN in the same field or in connected functional areas.
- 3-9. SP assets should provide mission-tailored forensic services throughout the AOO, abiding by international standards (see Ref. W. through CC.), in order to ensure the necessary technical and scientific support to:
  - a. criminal investigations and, as soon as the S&R process starts, within law enforcement activities, increase the overall policing/indigenous governance performance. This will contribute to improving the perception of NATO and its mission within the local populace, which is conducive to sustainability;
  - b. military activities including Force Protection, the Intelligence Process, the C-IED Approach, activities of WIS/WIT, CPERS, CMAT and ATD, CDOC and Technical Exploitation and Military Searches.
- 3-10. All SP personnel must have a basic awareness and working knowledge about:
  - a. Identification and preservation of a crime scene and its evidence;
  - b. Preventing their contamination;
  - c. Ensuring the chain of custody<sup>15</sup>.

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<sup>14</sup>Vulnerable groups or persons are typically categorized in social terms according to age, sex, ethnicity, disability or family status. Even though, there is no international definition of vulnerability, the European Union Council Directive 2003/9/EC dated 27 January 2003 laying down minimum standards for the reception of asylum seekers, under article 17, includes amongst the “vulnerable persons” minors, unaccompanied minors, disabled people, elderly people, pregnant women, single parents with minor children and persons who have been subjected to torture, rape or other serious forms of psychological, physical or sexual violence. In addition, also illiterate people and internally displaced people should be considered vulnerable persons. In this regards, see the document *Access to employment for vulnerable groups*, dated June 2001, published by the European Foundation for the improvement of living and working conditions.

<sup>15</sup>The order in which a piece of criminal evidence should be handled by persons investigating a case, specific the unbroken trail of accountability that ensures the physical security of samples, data, and records in a

- 3-11. SP assets specifically trained in forensics will intervene - whenever possible - to manage crime scenes and collect traces, samples and exhibits to be analyzed, also in support of WIS/WIT, C-IED activities and Military Searches. (See Ref. C through M).
- 3-12. The NATO SP forensic exploitation system consists of activities that can be divided into 3 levels, analogously to the C-IED exploitation (See Ref. E.) and Technical exploitation (See Ref. H.):
- a. *Field exploitation* (level 1) that can be contributed to by a range of enablers, from forensically-aware troops to forensic specialists.
  - b. *Theatre exploitation* (level 2) is more detailed and comprises deployed field equipment and laboratories with a scalable, higher-level technical forensic capability.
  - c. *Out of theatre exploitation* (level 3) is conducted by reach-back to (national) facilities providing in-depth technical and forensic examination and analysis utilizing scientific and counter criminal capabilities.
- 3-13. As soon as possible and in accordance with the mandate and the S&R process, SP assets in a replacement mission should start focusing on the local forensic system by:
- a. Assessing existing indigenous capabilities and capacity (DOTLMPFI), ideally comparing these data with results from pre-mission evaluations, to plan improvements and development and, should they be non-existent, their establishment;
  - b. Measuring local legal provisions against international agreed standards to identify possible gaps that may require a new legislative regulation;
  - c. Promoting rank and job-specific awareness about forensics and relevant international standards among indigenous governance, security and conventional forces including police forces, local/regional/national governmental officials, judicial officials (judges and prosecutors), penal/correctional officials as well as Non-Governmental Organizations.
  - d. Specializing a number of forensic operators of the SP assets in the existing HN legislation (if meeting the internationally agreed standards), deploying them throughout the mission area and coordinating them centrally through the SP chain of command. These personnel, in accordance with the mandate, should be able to:
    - (1) Enforce the HN legislation directly;
    - (2) Monitor the indigenous police force (in case of PRM);
    - (3) Liaise with the relevant HN/International Authorities;

- (4) Act as advisors to the SP Commander or to the Special Advisor (if established) to the JFC or the mandated Authority;
- (5) Stimulate new legislation needed in the specific area;
- (6) Support the transition e.g. to a Reinforcement or International Police Mission.

## REINFORCEMENT MISSION

- 3-14. A NATO Stability Policing reinforcement mission can be established if the indigenous police forces are existing and reliable, but their effectiveness is limited, requiring training, monitoring, advising, mentoring, partnering with and reforming. NATO Stability Policing assets will normally not be assigned executive police powers, as these are retained by the indigenous police, and their tasks will consist of providing assistance.
- 3-15. A reinforcement mission is likely to be even more complex than a replacement mission, since it involves a conspicuous number of interactions with key Institutions, that may be operating in the HN. These could belong to the HN, which is presumably retaining at least partial jurisdiction, or to international Institutions such as a UN CIVPOL or EUPOL Mission.
- 3-16. The deployment of SP assets might be limited to a cluster of specialized individual officers, detached within institutions of the HN, without the immediate support of the JF, which makes the assigned task more demanding. In this case, the key factors of a successful reinforcement mission are the personal backgrounds, skills and professional qualifications of the deployed officers.
- 3-17. The desired end state regarding SP forensics should be the existence in the HN of a nation-wide, professional forensic structure, possessing own laboratories, integrated with a reach-out network for assistance in higher level and more complex examinations. This should enable the performance of the full range of forensic analyses, with trained personnel in relevant institutions (including the police forces and the judiciary). It should operate in accordance with domestic laws abiding by internationally agreed standards and be able to support criminal investigations with scientific tools, methods and procedures throughout the whole process. This starts with the discovery, management and preservation of a crime scene and progresses through the identification and collection of traces, samples and evidence avoiding contamination; it continues with their analysis, the interpretation of findings and drafting of reports, ending with the presentation in a court of law, all the while ensuring a proper chain of custody.
- 3-18. **Re-/Building indigenous capabilities**
  - a. Roles and responsibilities concerning forensics vary significantly and the European Network of Forensic Science Institutes (ENFSI) guidance<sup>16</sup>

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<sup>16</sup> ENFSI Guidance for the assessment of competence for forensic practitioners, QCC-CAP-006-001, January 2011;

distinguishes the following key figures which must be addressed accordingly by the training process:

- (1) Scene of Crime Examiner: an individual whose primary role is the initial assessment at a crime scene and the subsequent collection of material for a detailed scientific examination;
  - (2) Analyst/Assistant: personnel performing examinations on generic cases or analyses under the supervision of a Reporting Scientist or Reporting Analyst;
  - (3) Reporting Analyst: personnel responsible, in non-complex cases, of the execution of analyses on traces, interpretation of the analytical results, drafting of the technical report and, if necessary, of the presentation of the evidence in court;
  - (4) Reporting Scientist: forensic scientist responsible of the direction and/or execution of analyses on traces, interpretation of the analytical results, drafting of the technical report and of the presentation in court; normally responsible for revision and approval of reports drafted by supervised personnel;
- b. Performance Based Standards for Forensic Science Practitioners, developed by the ENFSI (see. Ref. AA.), are applicable in almost all Criminal Justice Systems and list nine activities that cover the entire “forensic” process. These activities are not prescriptive; they are outcome-oriented and allow for the necessary flexibility, in order to be applicable to all roles in the forensic process. Therefore, not all of the following activities and standards will be applicable to all roles:
- Activity A: Undertake initial actions at the scene of incident;
  - Activity B: Develop a scene investigation strategy;
  - Activity C: Undertake scene investigation;
  - Activity D: Interpret scene findings and order further examination;
  - Activity E: Develop a laboratory examination strategy;
  - Activity F: Prepare to carry out laboratory-based examinations;
  - Activity G: Examine items and samples;
  - Activity H: Interpret findings;
  - Activity I: Report findings.
- c. Specific collective professional education and training (E&T) should be conducted by dedicated SP training assets in training centers, on a cyclic basis in favor of the indigenous police officers mentioned in 3-18 a.(1) (Crime Scene Examiner). The ambition of the training objectives will vary in accordance with the rank and the role of the trainees. Forensics, with references to the internationally agreed standards and the domestic legislation, will be incorporated in the training curricula.

- d. Higher level, longer term (3-12 years) education and individual training (E&IT) programs in favor of indigenous police personnel, mentioned in 3-18 a.(2) through (4), are likely to be conducted by dedicated SP assets in training centers and by academic personnel at faculties and teaching institutions in NATO or Partner Countries; the EU, the UN or other entities might provide significant contributions. Internationally agreed forensic standards, as well as the HN legislation, will be incorporated in the specific forensic training curricula and the level of ambition of the training objectives will vary in accordance with the rank and the role of the trainees. These personnel, when assigned to their posts, might be monitored, mentored, partnered with or advised by specialized SP officers, as outlined below.
- e. SP reinforcement activities in forensics encompass also mentoring/advising/partnering with and reforming the HN Institutions, aiming at strengthening the professional and personal skills of selected indigenous specialized personnel and higher-ranking officers. Similarly to the activities of higher level mentioned at paragraph 3-18 d., these too are very demanding and might address not only the indigenous police but also other HN Institutions that are involved in forensics.

## CHAPTER 4 – CONCLUSIONS

- 4-1. Forensics plays many important roles in Force Protection, Intelligence, as well as in the S&R process of an unstable area. In the latter, it contributes to the protection of civilians and human rights, to a fair enforcement of the law, also by encouraging police responsibility and increasing accountability, and to the improvement of public order as a factor to create a safe and secure environment. It fosters objectivity and compliance with internationally agreed standards and provisions in domestic laws, promotes the acceptance of the HN governance and of the NATO mission, internationally and within the HN populace; therefore it needs to be coherently addressed, since the inception, within the conceptual framework of Stability Policing, of a NATO S&R operation.
- 4-2. This framework concept, released under the Concept at Reference N. and considering the Concept at Reference M. and NATO Publications at References B. through L. is intended to constitute the ground for doctrinal development, education and training, planning of operations and the transformation process of the capabilities of the military instrument. It describes an innovative and specialized niche capability aimed at coping with the challenges of future military operations and matches the constantly evolving sensitivity of the public within the Euro–Atlantic area. This response results in an increasing request for the Alliance’s military instrument to protect the fundamental rights of the population within the area of NATO operations from threats and violations, to bring justice and to support the rule of law. This framework concept lies under the overarching concepts of Smart Defense, Connected Force Initiative and Framework for Future Alliance Operations as well as Protection of Civilians and it is harmonized with their guiding principles.
- 4-3. The NATO SP COE gathers Subject Matter Experts in the area of Stability Policing, provides a focal point and hub for this specialty, and acts as a prime mover to increase the contribution to the Stabilization and Reconstruction efforts of the Alliance in unstable scenarios. The Center provides NATO with a unique tool to fill the capability gap in this area and is committed to support the Alliance and the Sponsoring Nations to enhance and transform their capabilities, procedures and functions in order to meet potential and future security challenges.

## ANNEX A

### List and brief description of main forensic sciences

Biometrics<sup>17</sup> is the measurement and analysis of unique physical or behavioral characteristics (as fingerprint or voice patterns) especially as a means of verifying personal identity. Biometrics find widespread application in access control activities<sup>18</sup>, hence focusing on pre-event analysis. Therefore, following a strict definition, they are not part of the forensic sciences, because the latter are aimed at post-event activities<sup>19,20</sup>.

Forensic Ballistics<sup>21</sup> is the science of studying projectiles in motion, ballistics, being applied to law. Ballistics on firearm projectiles, such as bullets, include the study of what happens inside the weapon, during the flight of the projectile, and when the projectile strikes the target, such as body tissue.

Ballistic fingerprinting<sup>22</sup> refers to a set of forensic techniques that rely on marks that firearms leave on bullets to match a bullet to the gun it was fired with.

Blood Spatter Analysis<sup>23</sup> is the interpretation of bloodstains at a crime scene in order to recreate the actions that caused the bloodshed.

CBRN Forensics<sup>24</sup> are the scientific methods and techniques used to analyze materials and data in support of a chemical, biological, radiological and nuclear incident or threat investigation.

Computational forensics<sup>25</sup> concerns the investigation of forensic problems using computational methods. The primary goal is the discovery and the advancement of forensic knowledge. CF involves modeling, computer simulation, computer-based analysis and recognition in studying and solving forensic problems.

Computer forensics<sup>26</sup> (sometimes known as computer forensic science) is a branch of digital forensic science pertaining to evidence found in computers and digital storage media. The goal of computer forensics is to examine digital media in a forensically sound manner with the aim of identifying, preserving, recovering, analyzing and presenting facts and opinions about the digital information.

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<sup>17</sup> <http://www.merriam-webster.com/dictionary/biometrics>.

<sup>18</sup> "Biometrics: Overview". [Biometrics.cse.msu.edu](http://Biometrics.cse.msu.edu). 6 September 2007. Retrieved 2012-06-10.

<sup>19</sup> Summarized from

[http://www.biometrics.org/bc2004/Presentations/Conference/2%20Tuesday%20September%2021/Tue\\_Ballroom%20B/1%20DOJ%20Session/Vorderbruegge\\_Presentation.pdf](http://www.biometrics.org/bc2004/Presentations/Conference/2%20Tuesday%20September%2021/Tue_Ballroom%20B/1%20DOJ%20Session/Vorderbruegge_Presentation.pdf).

<sup>20</sup> Anil Jain & Arun Ross, *Philosophical Transactions of the Royal Society: Biological Sciences*, "Bridging the Gap from Biometrics to Forensics".

<sup>21</sup> <http://www.reference.md/files/D044/mD044709.html>.

<sup>22</sup> Knight, KeDarius M. (2008). "Ballistic fingerprints". In Ayn Embar-seddon, Allan D. Pass (eds.). *Forensic Science*. Salem Press. p. 109. ISBN 978-1-58765-423-7.

<sup>23</sup> <http://www.crime-scene-investigator.net/simplified-guide-to-bloodstain-pattern-analysis.html>.

<sup>24</sup> MC MCJSB "NATO Agreed" term, <https://nso.nato.int/natoterm/Web.mvc>.

<sup>25</sup> <https://sites.google.com/site/compforgroup/>.

<sup>26</sup> Michael G. Noblett; Mark M. Pollitt; Lawrence A. Presley (October 2000). "Recovering and examining computer forensic evidence". Retrieved 26 July 2010.

Criminalistics<sup>27</sup> is another term for forensics.

Digital forensics<sup>28</sup> is the application of proven scientific methods and techniques in order to recover data from electronic / digital media. Digital Forensic specialists work in the field as well as in the lab.

Forensic accounting<sup>29</sup> is the specialty practice area of accounting that describes engagements that result from actual or anticipated disputes or litigation.

Forensic aerial photography<sup>30</sup> provides investigators a perspective at a crime scene that cannot otherwise be gained.

Forensic animation<sup>31</sup> refers to a branch of forensic science where audio-visual recreations of events are created.

Forensic anthropology<sup>32</sup> is the application of the science of anthropology and its various subfields, including forensic archaeology and forensic taphonomy, in a legal setting. A forensic anthropologist can assist in the identification of deceased individuals whose remains are decomposed, burned, mutilated or otherwise unrecognizable.

Forensic archaeology<sup>33</sup> is the application of archaeology (the study of past cultures and activities) to legal investigations. The skills and methods used by archaeologists to find and interpret buried or hidden sites of past activity have direct application to modern forensic investigations.

Forensic architecture<sup>34</sup> provides forensic technical services towards the resolution of litigation and claims arising out of a wide range of activities.

Forensic art<sup>35</sup> is the artistic technique used in the identification, apprehension or conviction of a wanted person. It includes three categories: Composite Art, Facial Reconstruction and Age Progression.

Forensic astronomy<sup>36</sup> is a field in forensics that involves the use of astronomy in criminal and civil legal actions.

Forensic biology<sup>37</sup> is the application of the science of biology to legal investigations.

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<sup>27</sup> Concise Oxford English Dictionary, twelfth edition, Oxford University Press, p.338.

<sup>28</sup> M Reith, C Carr, G Gunsch (2002). "An examination of digital forensic models". International Journal of Digital Evidence. Retrieved 2 August 2010 and Carrier, B (2001). "Defining digital forensic examination and analysis tools". Digital Research Workshop II. Retrieved 2 August 2010.

<sup>29</sup> Crumbley, D. Larry; Heitger, Lester E.; Smith, G. Stevenson (2005-08-05). Forensic and Investigative Accounting. CCH Group. ISBN 0-8080-1365-3.

<sup>30</sup> <https://www.ncjrs.gov/App/Publications/abstract.aspx?ID=241807>.

<sup>31</sup> <http://definitions.uslegal.com/f/forensic-animation/> retrieved 21.01.2016.

<sup>32</sup> Nawrocki, Stephen P. (27 June 2006). "An Outline Of Forensic Anthropology" (PDF). Retrieved 21 August 2015.

<sup>33</sup> [http://www.sfu.museum/forensics/eng/pg\\_media-media\\_pg/archaeologie-archaeology/](http://www.sfu.museum/forensics/eng/pg_media-media_pg/archaeologie-archaeology/).

<sup>34</sup> <http://www.cromlech-architect.com/forensic-architecture.html>.

<sup>35</sup> [https://www.theiai.org/certifications/artist/scope\\_role.php](https://www.theiai.org/certifications/artist/scope_role.php).

<sup>36</sup> [http://www.oocities.org/hazarry/astronomy/solving\\_crimes\\_with\\_astronomy.pdf](http://www.oocities.org/hazarry/astronomy/solving_crimes_with_astronomy.pdf).

<sup>37</sup> Essential Forensic Biology, second edition, Alan Gunn, 09 SEP 2011, by John Wiley & Sons, Introduction.

Forensic botany<sup>38</sup> studies plant material as it relates to crime scenes.

Forensic chemistry<sup>39</sup> is the application of chemistry and its subfield, forensic toxicology, in a legal setting.

Forensic dactyloscopy<sup>40</sup>, known as fingerprint identification, or hand print identification, is the process of comparing two instances of friction ridge skin impressions from human fingers or toes, or even the palm of the hand or sole of the foot, to determine whether these impressions could have come from the same individual.

Forensic document examination<sup>41</sup>, a means of identifying forgery and establishing the authenticity of documents in dispute.

Forensic DNA analysis<sup>42</sup> is the application of DNA technology and the knowledge of DNA genetics to the practice of forensic medicine and to the power of legal medicine.

Forensic economics<sup>43</sup> is the scientific discipline that applies economic theories and methods to matters within a legal framework.

Forensic engineering<sup>44</sup> is the application of engineering principles to the investigation of failures or other performance problems and involves testimony on the findings of these investigations before a court of law or other judicial forum, when required.

Forensic entomology<sup>45</sup> is the use of the insects, and their arthropod relatives that inhabit decomposing remains to aid legal investigations.

Forensic epidemiology<sup>46</sup> is the study of the distribution and determinants of health related states or events in populations, and the application of this study to control health problems.

Forensic facial reconstruction<sup>47</sup> is the reproduction of an individual's face from skeletal remains.

Forensic geology<sup>48</sup> is the study of evidence relating to minerals, oil, petroleum, and other materials found in the Earth, used to answer questions raised by the legal system.

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<sup>38</sup> <http://www.crimesceneinvestigatoredu.org/forensic-botanist/>.

<sup>39</sup> A Simplified Guide to Forensic Drug Chemistry" (PDF). Retrieved 24 September 2015.

<sup>40</sup> Ashbaugh, David R. "Ridgeology" (PDF). Royal Canadian Mounted Police. Retrieved 2013-10-26.

<sup>41</sup> <http://www.safde.org/whatwedo.htm>.

<sup>42</sup> <http://www.medicinenet.com/script/main/art.asp?articlekey=23307>.

<sup>43</sup> National Association of Forensic Economics Board of Directors, 7/21/2013.

<sup>44</sup> <http://www.asce.org/forensic-engineering/forensic-engineering/>.

<sup>45</sup> <http://www.forensicentomology.com/index.html>, Dr. J. H. Byrd, 1998-2004.

<sup>46</sup> "Introduction to Forensic Epidemiology", Focus on Field Epidemiology, Volume 2 issue , North Carolina Center for Public Health Preparedness - The North Carolina Institute for Public Health.

<sup>47</sup> "Forensic facial reconstruction", Caroline Wilkinson, 2004, Cambridge University Press.

<sup>48</sup> Murray, Raymond C. and Tedrow, John C. F. (1975) Forensic Geology: Earth sciences and criminal investigation Rutgers University Press, New Brunswick, New Jersey, ISBN 978-0-8135-0794-1; second edition 1992, Prentice Hall, Englewood Cliffs, New Jersey, ISBN 978-0-13-327453-0; replaced by Murray, Raymond C. (2004) Evidence from the Earth: Forensic geology and criminal investigation Mountain Press Publications, Missoula, Montana, ISBN 978-0-87842-498-6.

Forensic geomorphology<sup>49</sup> is the study of the ground surface to look for potential location(s) of buried object(s).

Forensic geophysics is the application of geophysical techniques such as radar for detecting objects hidden underground<sup>50</sup> or underwater<sup>51</sup>.

Forensic intelligence<sup>52</sup> process starts with the collection of data and ends with the integration of results into the analysis of crimes under investigation.

Forensic Investigation<sup>53</sup> also known as forensic audit, is the examination of documents and the interviewing of people to extract evidence.

Forensic limnology<sup>54</sup> is a sub-field of forensic botany, which examines the presence of diatoms in crime scene samples and victims.

Forensic linguistics<sup>55</sup> responds to legal questions that involve language.

Forensic meteorology<sup>56</sup> is meteorology, the scientific study of weather, applied to the process of reconstructing weather events for a certain time and location.

Forensic medicine<sup>57</sup> is the application of medical knowledge to the investigation of crime, particularly in establishing the causes of injury and death.

Forensic odontology<sup>58</sup> is the application of dental knowledge to those criminal and civil laws that are enforced by police agencies in a criminal justice system.

Forensic pathology<sup>59</sup> is a branch of medicine which applies the principles and the knowledge of the medical sciences to problems in the field of law.

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<sup>49</sup> Ruffell, A; McKinley, J (2014). "Forensic geomorphology". *Geomorphology* 206: 14–22.  
doi:10.1016/j.geomorph.2013.12.020.

<sup>50</sup> Pringle, JK; Ruffell, A; Jervis, JR; Donnelly, L; McKinley, J; Hansen, J; Morgan, R; Pirrie, D; Harrison, M (2012). "The use of geoscience methods for terrestrial forensic searches". *Earth Science Reviews* 114: 108–123. doi:10.1016/j.earscirev.2012.05.006.

<sup>51</sup> Parker, R; Ruffell, A; Hughes, D; Pringle, JK (2010). "Geophysics and the search of freshwater bodies: A review". *Science & Justice* 50: 141–149. doi:10.1016/j.scijus.2009.09.001.

<sup>52</sup> p.611 Jahankhani, Hamid; Watson, David Lilburn; Me, Gianluigi Handbook of Electronic Security and Digital Forensics World Scientific, 2009.

<sup>53</sup> <http://www.iicfip.org/aboutus/faqs/224faq>.

<sup>54</sup> Coyle, Heather Miller; Carl Ladd; Timothy Palmbach; Henry C. Lee (2001). "The Green Revolution: Botanical Contributions to Forensics and Drug Enforcement". *Croatian Medical Journal* (2001): 340–345 and Dommelen, Jennifer Van (17 June 2005). "Limnology". *Forensic Botany*. Dalhousie University. Retrieved 29 September 2012 and Horton, Benjamin P. (27 October 2007) "Diatoms and Forensic Science", *Paleontological Society Papers*: 14–22.

<sup>55</sup> Forensic Linguistics - Applying the Scientific Principles of Language Analysis to Issues of the Law", Robert Andrew Leonard, *INTERNATIONAL JOURNAL OF THE HUMANITIES*, 2005.

<sup>56</sup> Levine, Alaina G. (12 Sep 2011). "CSI: Mother Nature--Forensic Meteorology a New Growth Industry as Weather-Related Damage Intensifies". *Scientific American*.

<sup>57</sup> Concise Oxford English Dictionary, twelfth edition, Oxford University Press.

<sup>58</sup> Verma K, Joshi B, Joshi CH, Rejct Paul MP (2013) Bite Marks as Physical Evidence from the Crime Scene-An Overview. 2:605.

<sup>59</sup> Forensic Pathology, Second Edition, Di Dominick DiMaio, Vincent J.M. DiMaio, M.D, CRC Press, 30.10.2013.

Forensic photography<sup>60</sup> is the art of producing only the most exact, detailed photographs that record the crime scene and the physical evidence within the crime scene as objectively and accurately as possible.

Forensic podiatry<sup>61</sup> is the application of sound and researched podiatry knowledge and experience in forensic investigations, to show the association of an individual with a scene of crime, or to answer any other legal question concerned with the foot or footwear that requires knowledge of the functioning foot .

Forensic profiling<sup>62</sup> is the process of 'discovering' correlations between data in data bases that can be used to identify and represent a human or nonhuman subject (individual or group), and/or the application of profiles (sets of correlated data) to individuate and represent a subject or to identify a subject as a member of a group or category.

Forensic psychiatry<sup>63</sup> is a sub-specialty of psychiatry and is related to criminology. It encompasses the interface between law and psychiatry.

Forensic psychology<sup>64</sup> is the psychological assessment of individuals who are involved, in one way or another, with the legal system.

Forensic seismology is the study of techniques to distinguish the seismic signals generated by underground nuclear explosions from those generated by earthquakes.

Forensic serology<sup>65</sup> is the study of the body fluids.

Forensic social work<sup>66</sup> is the study of issues of legality and law within the context of social work cases.

Forensic toxicology<sup>67</sup> deals with the application of toxicology to cases and issues where those adverse effects have administrative or medico-legal consequences, and where the results are likely to be used in court.

Forensic video analysis<sup>68</sup> is the scientific examination, comparison, and/or evaluation of video in legal matters.

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<sup>60</sup> <http://www.crimesceneinvestigatoredu.org/csi-photographer/>.

<sup>61</sup> Vernon, McCourt, 1999 in <https://theiai.org/disciplines/podiatry/index.php>.

<sup>62</sup> Geradts, Zeno; Sommer, Peter (2006), "D6.1: Forensic Implications of Identity Management Systems" (PDF) p.41, FIDIS Deliverables 6 (1).

<sup>63</sup> Howells K, Day A, and Thomas-Peter B. (2004). "Changing Violent Behaviour: Forensic Mental Health and Criminological Models Compared". *Journal of Forensic Psychiatry & Psychology* 15 (3): 391–406. doi:10.1080/14788940410001655907.

<sup>64</sup> <http://www.apa.org/ed/precollege/psn/2013/09/forensic-psychology.aspx>.

<sup>65</sup> "Forensic serology". [Forensic-medicine.info](http://forensic-medicine.info). Retrieved 2010-06-08.

<sup>66</sup> <http://socialwork.une.edu/resources/news/forensic-social-work/>.

<sup>67</sup> The Forensic Toxicology Council, July 2010, What is Forensic Toxicology? [http://www.swgtox.org/documents/WHAT\\_IS\\_FORENSIC\\_TOXICOLOGY.pdf](http://www.swgtox.org/documents/WHAT_IS_FORENSIC_TOXICOLOGY.pdf).

<sup>68</sup> Law Enforcement/Emergency Services Video Association International, Inc., Forensic Imaging And Multi-media Glossary Covering Computer Evidence Recovery (CER), Forensic Audio (FA), Forensic Photography (FP), And Forensic Video (FV) Version 7.0, Last Updated July 15, 2006, <https://www.leva.org/pdfs/GlossaryV7.pdf>.

Marine forensics<sup>69</sup> refers to the scientific study of incidents or accidents occurring as a result of or involving bodies of water including oceans, streams or rivers, lakes or ponds.

Mobile device forensics<sup>70</sup> is the science of recovering digital evidence from a mobile phone under forensically sound conditions using accepted methods.

NATO Military Forensic Dental Identification<sup>71</sup>, together with DNA and Fingerprints, is one method to derive positive identification.

Trace evidence analysis<sup>72</sup> is the forensic case analysis highlighting the use of trace evidence, which can be defined as microscopic materials that is recovered as evidence that is used to solve criminal cases.

Wildlife Forensic Science<sup>73</sup> is the application of a range of scientific disciplines to legal cases involving non-human biological evidence.

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<sup>69</sup> "What is Marine Forensics?". International Marine Forensics Symposium 2012 web site. Retrieved 3 April 2012.

<sup>70</sup> U.S. Department of Commerce, NIST Special Publication 800-101 Revision 1, Guidelines on Mobile Device Forensics, <http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-101r1.pdf>.

<sup>71</sup> AMedP-3.10 EDA V1.

<sup>72</sup> "Trace evidence analysis – More cases in mute witnesses", Max M. Houck, Elsevier Academic Press, 2004, [https://books.google.it/books?hl=it&lr=&id=VYWIHNhx\\_1YC&oi=fnd&pg=PP2&dq=Trace+evidence+analysis&ots=uNAP54Gefw&sig=wfRuv7Zo6IKYPKVsuNV5MuLjv0w#v=onepage&q=Trace%20evidence%20analysis&f=false](https://books.google.it/books?hl=it&lr=&id=VYWIHNhx_1YC&oi=fnd&pg=PP2&dq=Trace+evidence+analysis&ots=uNAP54Gefw&sig=wfRuv7Zo6IKYPKVsuNV5MuLjv0w#v=onepage&q=Trace%20evidence%20analysis&f=false).

<sup>73</sup> <http://www.wildlifeforensicscience.org/mission/>.