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The initiative to reflect on the development of a next generation Prüm (Prüm.ng) was launched by the 'Council Conclusions on the implementation of the Prüm Decisions ten years after their adoption'. Subsequently, the previous Presidency started discussions within DAPIX by means of a questionnaire and presented a summary of the replies to its discussion paper on Prüm.ng. DAPIX discussed in particular the intention to establish focus groups tasked to set out how to further develop the current data and information exchange mechanisms and to support the European Commission's Feasibility Study on improving information exchange under the 'Prüm Decisions'.

Delegations find in annex the final report of the focus group on 'DNA data exchange'. This report represents solely the opinions and views of the delegates participating in this group, based on their personal expertise. DAPIX is invited to discuss the report at its forthcoming meeting.

## **Preview**

# **Towards the Next Generation Prüm on DNA Data Exchange in the EU**

<b>Owner of the document:</b>	EU Next Generation Prüm Focus Group DNA
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## Executive Summary

The Focus Group DNA (hereinafter the 'Group') has identified the issues to be improved in the DNA data exchange among all Member States and set up the strategic points for the next generation of Prüm in this Living Document (LD). This LD is being subdivided into five sections of main topics.

Section 1: General Issues

Section 2: Functional Issues

Section 3: IT Issues

Section 4: Legal Issues

Section 5: General and other Issues

All delegates of the participating Member States hold the opinion, that implementing the technical, functional and forensic parts should be separated from the basic legal in view of keeping pace with the rapid development of technologies and changes in user requirements. The separated part might be put into an **Implementing Act** in line with (EU) Regulation 182/2011.

The other four sections collect the concrete issues which have been recognized on the basis of daily DNA data exchange since the very beginning of the operations in 2007. In each section, the discussion on the issues has briefly been described and followed by a summary of harmonized positions. The contributions by the delegates relating to the topics, which have not been discussed at all and/or only talked about to a lesser extent, have been put into the clause of “Issues for Further Discussion and Future Use”.

Besides other harmonized positions in each section, the following ones should be considered in the **strategic planning** of the Prüm DNA community in the EU.

## General Issues

- **A new EU Implementing Act including the IT, forensic and police functional parts**

(See 2.2.1, 2.2.2, 2.2.3)

In discussion with all delegates FG DNA of the participating Member States, it emerged that the issues from these three areas should be separated from the basic legal texts and put into a supplementary Implementing Act in line with (EU) Regulation 182/2011. This Implementing Act will be binding on all Member States in improving current daily operations and implementing the next generation of Prüm, but also provide flexibility in an approach to its customization when necessary.

- **Setting up an EU Helpdesk**

(See 2.2.5.3)

Currently all operational Member States are helping each other bilaterally and/or multilaterally. An EU wide Helpdesk/ServiceDesk would be of a great value for all Member States to report incidents and problems in daily operations and to help in solving them.

The current EPE of EUROPOL provides mainly the function to deposit the public test and operative certificates of all Member States, but not all functions as an official CA (Certificate Authority) and/or a professional Helpdesk/Service Desk should render.

- **Interoperability between CODIS and NON-CODIS**

(See 2.2.5.4)

Many Member States are using the Combined DNA Index System (a runtime **system** image of CODIS) as their national database of DNA profiles while other Member States are using IT components of application, security and communication developed by their own IT force up to open standards by providing other Member States with the source codes for their deployment. The interoperability should be maintained among all Member States. For that purpose, the **CODIS Prüm Requirement Document** has been agreed upon on 11 August 2009 between the FBI, the contracting body of CODIS, and the Prüm Treaty parties, which had then already started daily operations on DNA data exchange.

The current runtime version CODIS 7 and/or 8.x, which has been installed at the sites of a number of Member States, including Prüm member states, laboratories and law enforcement agencies, carries out both domestic and international processing,. This monolithic IT architecture supports indeed many scientific areas of forensics with a wide range of forensic user circles, but has shown the major drawbacks of performance in exchanging a bulk/mass DNA data (Art. 4) with other Member States in daily operations. The requirements for DNA data exchange for identification purposes among the law enforcement agencies in the EU are quite different from those for the scientific labs, especially for exchange of bulk data. Moreover, the users in the EU of this runtime black box have no possibilities to customize it to suit the ever changing needs of the EU community. The recognized discrepancies of the IT, forensic and police functional requirements between the EU NON-CODIS and CODIS systems have been reported to the CODIS Helpdesk. However, a bug fixing in a timely manner is not always ensured.

The summary table in the section 2.2.5.4 of the discrepancies between the CODIS and NON CODIS systems has been compiled by Romania.

#### **Forensic Issues:**

- **Reducing the number of possible adventitious matches and/or filtering out them**

(See 2.2.1.1, 2.2.2.5)

Depending upon the size of population and quality of DNA profiles, two DNA profiles may not be surely proven from the same person. In other words, it is insufficient in this case to distinguish the profiles of two different individuals. These 'false' positive matches are called adventitious ones.



According to the provisions of Decision 2008/616/JHA, the threshold value of current matching rules has been set to six identical loci plus one wildcard substituting a rare value to maintain a sufficient amount of matches holding valuable clues leading to solve criminal cases.

After the controversial but constructive discussions in the Group, no consensus has been reached at this stage. However, the following options have been proposed by the Group for further considerations.

- Option 1: **Increase-Reduce**

**Increase** the threshold value of the matching rules and **Reduce** the amount of matches for further investigation

The current threshold value has kept the amount of matching results sufficient enough for further investigation. Experience with Prüm operations over 12 years has shown that a quite amount of so-called “false” positive matches have been proven at the end to be true positive in certain serious crime cases.

By taking this option, it would reduce the amount of matches, but run the risk of failure to clarify a certain amount of criminal cases. A lot of potential valuable hits for further investigation would be lost.

- Option 2: **Maintain-Filter**

**Maintain** the current threshold value and **Filter** out the possible adventitious matches by each Member State (at least six full designated numerical loci should be matched identical)

With no change of the current threshold value of the matching rules, the amount of the matches will be maintained sufficiently large to clarify all kinds of criminal cases.

However, a mechanism could be worked out by each Member State to filter out the “false” positive matches in accordance with the respective national regulations, if it is necessary. From IT point of view, it is feasible to implement this mechanism by means of the current inclusion and matching rules. By this option, the data pools of hits with potential significant clues could be maintained sufficient large enough for further investigations and meanwhile they could be filtered out upon a set of criteria to be decided freely by each Member State from organizational and/legal reasons.

○ Option 3: **Introduce-Depend**

**Introduce two different matching rules Depending upon the offense types**

This option would have substantial impact on the resulting costs in further development/maintenance of the software components as well as in customization of functional tasks in daily operations. A common catalog of criminal offences in the EU would be needed for this option. This option would lead to an ambiguous and/or incorrect handling of stain-to-stain match in the case that stain profiles are marked with different catalogue values of criminal offences in the respective Member States. This option has not been discussed yet in the Group.

**Functional Issues:**

• **Speed up follow-up procedure by exchange of a set of 'core data'**

(See 2.2.2.3, 2.2.2.7, 2.2.2.8, 2.2.2.9)

After having obtained hit messages, the requesting Member States would like to have the reference information relating to the hits for further criminal investigation as soon as possible. This reference information linked with biometric hits is very comprehensive, diversified and legally binding on the policies of each EU member state. In order to speed up the procedure, a common standard of a small set of 'core data' should be set up and agreed upon by all Member States. The FG FP, FR and DNA have collected the would-be data elements of a 'core data' set (see the table in the section 2.2.2.3). This set of 'core data' could be exchanged more effectively in the 2<sup>nd</sup> step of Prüm.

- **Verify matching outcome by a human being prior to request for reference data in the 2<sup>nd</sup> step**

(See 2.2.2.7, 2.2.2.8, 2.2.2.9)

Concerning the sensibility of the matched DNA data, the matched outcome should be verified by a human being in the corresponding Member State, in which a hit has been obtained in an automated procedure before asking for reference data in the context of the hit. Any hits scored in an automated procedure provide the clue to solve a possible crime case but are not served as an arrest warrant. Therefore, the legal constraints on handling personal data in each Member State could be considered.

- **Follow-up procedures in the 3<sup>rd</sup> step**

The discussions on follow-up procedures in the 3<sup>rd</sup> step are out of the scope of the Group

- **Including data category Missing Persons and Unknown Bodies**

(See 2.2.2.1)

This data category has already been included in the Prüm databases in a few Member States. In view of the likely relevance to criminal cases the data of this category should be included by all Member States in their Prüm databases. By comparison of DNA profiles of this category, the match algorithms could be customized to suit the needs of this special purpose in accordance with the findings from forensic research.

- **Handling of suspects**

(See 2.2.2.2)

The Prüm matches on suspects have helped significantly in clarifying unsolved cross-border criminal cases. Most Member States have already included the DNA profiles of suspects for search by other Member States. It is crucial to provide other Member States with this category of data.

## IT Issues:

- **Standardization of the file format of the 'core data' for all data types in the 2<sup>nd</sup> step**

(See section 2.2.3, 2.2.2.9)

A 'core data' set has been proposed by the Focus Groups FP, FR and DNA (see 2.2.2.3). However, the common format to present this set of 'core data' has not been fixed. It may be useful to adopt UMF, but it is not restricted to UMF. A common format should be worked out and decided by consent of all Member States.

- **Web service in communication architecture**

(See 2.2.3.19, 2.2.3.20 and 2.2.3.21)

Since the very beginning of the Prüm operations, it has been decided in favor of implementing an asynchronous mechanism in the communication architecture to transfer requests by encrypted email messages. Besides advantages of the transfer of requests by email, its drawbacks have been recognized in daily operations, e.g. no receipt confirmation and an unpredictable response time.

By contrast, Web service provides a synchronous communication, i.e. each request will get an answer within a quite predictable time window. From experience, it is only about a few seconds.

However, the current operations should not be interrupted while implementing and introducing the new Web services for the Next generation Prüm.

- **Monitoring operational status of national Prüm systems**

(See 2.2.3.11, 2.2.3.16)

One of the most important measures to ensure a smooth operation among all Member States is to acquire the status information of all connected IT systems. In case of a scheduled maintenance and/or unpredictable breakdown of a system, it may cause consumptive activities using up resources in the corresponding site and/or at the site of the partner countries. It is very time- and labor-expensive to detect an erroneous status of the IT components and fix the bugs, which could not have been identified automatically.

By constructing an EU monitoring system up to the common standard will make daily operations more effective and save operational costs.

- **Smooth transition to the next generation of Prüm**

(See 2.2.3.19)

The IT technologies evolve very quickly. In order to keep pace with the rapid development of IT technologies and adopt new IT and forensic standards, the whole EU community of Prüm DNA data exchange should undertake an incessant and steady transformation to the operational environments with the proven and state-of-the-art technologies . Current daily operations of Prüm DNA data exchange among all Member States provide constantly the police and justice authorities in the EU with abundant clues and convincing evidence for investigation and clarification of criminal cases. Therefore, a smooth transition to a new IT environment with more advanced technologies should be ensured.

- **ISO country code 3166-1 Alpha 2**

(See 2.2.3.9, 2.2.3.12)

In the current EU Council Prüm Decision 2008/616/JHA, it is specified that the ISO country code standard 3166-1 Alpha 2 should be used for each EU member state in their national implementations of the Prüm applications. We affirm the use of the ISO country code in the current and in the next generation of Prüm.

- **A unified EU Statistics on IT parameter**

(2.2.3.17)

All connected Member States report currently the annual hits in a predefined form agreed by at EU level. Owing to the quite vague definition of some items in this form, the statistics, which are independently and mostly manually made over a common communication line, show misleading and incomparable information. All participating experts in the Group have recognized the necessity and usefulness of providing a unified statistics in the 1<sup>st</sup> step based on IT parameters to be generated in the automated procedures. A set of common IT parameters should be therefore defined at EU level. Unified Prüm statistics upon IT parameters could be generated only if all these parameters are standardized and commonly agreed upon

**Legal Issues:**

- **Customization of the notions “Individual Case” and “Personal Data”**

(See 2.2.4.1, 2.2.4.2)

The notion of “Individual Case” in Article 3 of the Decision 2008/615/JHA has been interpreted by the Member States in different ways. Most Member States have interpreted 'individual' as 'each', but few member states stick strictly to the meaning of the English word 'individual', especially the subtle difference between these two words.

Because of this interpretational difference, the time-consuming operations of Article 4 have to be carried out on a time schedule agreed upon bilaterally and/or multilaterally since the very beginning of Prüm operations in 2007 in order to avoid the data drifting apart at the sites of the Member States.

The notion of 'personal data’ has not been defined very clearly in Decisions 2008/615/JHA and 2008/616/JHA. All delegates in the Group have agreed that the definition of “personal data” should be modified in accordance with Directive (EU) 2016/680.

## 1. Background

### 1.1 Foreword

The Prüm Treaty has originally been established in 2007 by Austria, Belgium, France, Germany, Luxemburg, the Netherlands and Spain. Following the entry into force of the Prüm Treaty, Bulgaria, Italy, Finland, Romania, Portugal, Slovenia, Slovakia and Sweden have made their declaration of readiness to join the operations within the framework of the Prüm Treaty . This Treaty is aimed at stepping up of cross-border cooperation, particularly in combating terrorism, cross-border crime and illegal migration by means of data exchange in automated procedures among the police and justice authorities of all signatory countries. In 2008, the substance of the Prüm Treaty has been integrated into the EU legal framework. All 28 Member States have to implement the Council Decisions 2008/615/JHA and 2008/616/JHA and join daily operations on data exchange of DNA, Fingerprints and VRD in automated procedures among law enforcement authorities.

Since then almost all Member States have joined daily operations in these three areas. Under the Austrian EU Presidency from June to December 2018, and with political mandate of Council Conclusions “On the implementation of the Prüm Decisions ten years after their adoption” from 5 July 2018 (10550/18) five EU focus groups: DNA, Facial Recognition (FR), Fingerprints (FP), Vehicle Registration Data (VRD) and Other Forms of Police Cooperation (OPC) have been established with the far-reaching objectives to improve and to optimize daily operations for the next generation of Prüm. The Group consisting of 14 EU active working member states (Austria, Belgium, Cyprus, France, Estonia Germany, Italy, the Netherlands, Poland, Romania, Slovakia, Slovenia, Spain and United Kingdom) has identified major issues in the areas of IT, Police Functional and Forensics, which have occurred in daily operations since more than 10 years. The discussions on all identified subjects have been carried out very constructively but controversially on some issues. In the course of the working procedures of the Group, the most applicable options and solutions to the identified issues will be sought out and described in details after the opinions have been harmonized among the participants of the Group. This Living Document contains the description of all identified issues, the harmonized opinions how to improve and optimize daily operations, and the ideas to bring the Prüm Treaty onto its new stage and dimension.

In accordance with the DAPIX decision in December 2018, the outcome of the EU Prüm NG Group should be forwarded to the DAPIX for discussion by all Member States. This document is considered a living one subject to further modifications in line with discussions about the next generation Prüm within DAPIX.

## **1.2 Introduction**

The participants in the Group have identified the issues from legal, IT, police functional and forensic areas, which have occurred since the very beginning of the DNA data exchange among the Member States by reviewing the legal and technical documents and collecting their positive and negative experiences in the operations. This Living Document describes the experiences of Best Practice, the causes of the problems, and the most applicable options and solutions for the next generation of Prüm. The issues, which are not exactly defined, not clearly stated and still left open for interpretations, have been tackled in this document. As far as possible, best viable options have been worked out

## **1.3 Scope**

The document divides into the following parts for all issues:

- General Considerations
- Forensic Issues
- Police Functional Issues
- IT Issues
- Legal Issues
- Issues of Interoperability and miscellaneous considerations

## **1.4 Normative References**

- Council Decision 2008/615/JHA
- Council Decision 2008/616/JHA
- Council Resolution 2009/C296/01



- 7326/14 - DAPIX 38 CRIMORG 26 ENFOPOL 65 (March 11, 2014)
- Implementation Guide to the EU Council Decisions – DNA Data Exchange
- W3C XML Schema Part 1: Structures Second Edition (October 28, 2004)
- W3C Namespaces in XML 1.0 Third Edition (December 8, 2009)
- Directive (EU) 2016/680 of the European Parliament and of the Council on the protection of natural persons with regard to the processing of personal data by competent authorities
- Council Framework Decision 2009/905/JHA

## **1.5 Informative References**

- CODIS Prüm Requirements Document by the Prüm-CODIS Interoperability Working Group (11 August 2009)
- Study on the Feasibility of Improving Information Exchange under the Prüm Decisions by Company Deloitte (March 2019)

## **2. Identified Issues to be improved**

### **2.1 General comments on Decisions 2008/615/JHA and 2008/616/JHA**

#### **2.1.1 Separation of IT, forensic and functional parts from the legal text**

The legal documents of the 'Prüm Decisions' have embodied all legal, IT-technical, police functional and forensic issues in two documents. From the point of the view of the Group it is ineffective to keep daily operations on DNA data exchange up-to-date with the rapid pace of evolving technologies and changing user requirements, if all issues other than the legal ones would be kept together in legal documents.

Therefore it is strongly recommended that the IT-technical, police functional and forensic parts of Decision 2008/616/JHA should be separated and put into an addendum or an implementing act in the procedures by the Commission. This work could be done by the Commission in support of the Prüm NG Focus Groups. These separated parts could be then more often under review and be kept up-to-date in line with the rapidly evolving technologies and frequently changing user requirements.

## **2.2 Working Procedures of and the Identified Issues by Prüm NG Focus Group DNA**

The Group has adopted working procedures to identify the issues as described below:

- Carry out a brain storming session at the kickoff meeting
- Make written comments by filling out a categorized comment sheet template
- Harmonize the collected comments onsite at meetings with the chairman of the Group as moderator
- Compile the draft version of Living Document by describing the harmonized positions
- Distribute the draft version of Living Document for comments in the Group
- Disseminate the draft preview version of Living Document to DAPIX for information in between
- Modify the preview version of Living Document by considering the comments from all Member States at DAPIX sessions
- Keep the document living by taking new progress of technologies and changing user requirements into consideration when the document will be revised from time to time.

Only the identified issues with the harmonized positions have been described in the following sections. The issues discussed, but without reaching a common position, have been put into a section “Issues for Further Discussions and Future Use”.

### **2.2.1 Forensic Issues**

#### **2.2.1.1 Match Threshold**

## Summary of the Discussion

In the current 'Prüm Decisions', a Match Threshold Value has been defined at least six full designated loci to be found identical. The foot note on the page 20 of Decision 2008/616/JHA states that “full designated” means the handling of rare allele values is included, for rare valued alleles are very significant in identifying an individual. On account of different possible numerical presentations of a rare valued allele, it should be substituted by a wildcard prior to comparison among the Member States so that a match could be achieved for further investigation.

The actual numerical value can be only made available and verified in the forensic verification of potential matches by the national responsible officials. The substitution of a rare valued allele by a wildcard should be mandatory at all Member States

In order to reduce wrong potential candidates having been produced during automated procedures, there was a survey on the SHOULD-BE match threshold carried out by the EU Project MCT team at the DAPIX meetings in 2014-2015. The outcome of this survey is that the majority of the Member States have favored raising the match rule of “5+1” to “6+1”, i.e. 6 full designated numerical loci plus a wildcard as a substitute of a rare value. Since then all match engines deployed at the operative environments of the Member States have been adapted to use this match rule of “6+1”. Daily operations on DNA data exchange at the EU are in line with this minimal standard.

Page 20 of Decision 2008/616/JHA:

The comparison of two DNA-profiles will be performed on the basis of the loci for which a pair of allele values is available in both DNA-profiles. At least six full designated loci (exclusive of amelogenin) must match between both DNA-profiles before a hit response is provided.

There are two different kinds of views on the so-called adventitious matches or false positive matches. From the viewpoint of some national DNA service providers, the amount of matches should be kept as exact as possible, i.e. reducing the amount of matches achieved in daily operations with a view to relieving the potential heavy burden in daily forensic test procedures, especially in the situation of personnel bottleneck.

On the contrary, the investigating police and prosecuting justice authorities represent the viewpoint that the raised match threshold of “6+1” should be kept unchanged with a view to keep the profiles with less identical loci in the pool of matched profiles for further investigation.

DNA profiles with less quality are made available exclusively in stain analysis of crime scene but never in the case of reference profiles. Crime scene stains often allow only analysis of partial profile values obtained by biological partial destruction of allele values in the DNA analysis processes. This situation is often unavoidable. DNA databases are generally served as criminal investigation tools, which can provide clues to possible sources of evidence. Potential national or international Prüm DNA hits require subsequently individual forensic evaluation/verification, in which a match obtained in automated procedures has to be proven forensically genuine with the criminal relevance.

This indispensable forensic check prior to start a follow-up procedure asking for personal data has already been legally regulated in the current 'Prüm Decision'<sup>1</sup>

If a match is confirmed as a genuine hit both forensically and criminally, it provides the investigating authorities with important evidence and clues. Further investigation and prosecution measures could be therefore taken to identify the suspects.

The current 6+1 loci rule as a minimum standard has been proven to be very effective for the needs of the prosecution authorities. Even from a biological point of view, the profiles with poor trace quality have make up about 70% of the cases including serious criminal offences. By a hit of 7 identical numerical loci the accuracy of the classification is raised almost up to 90%. There are no forensic deviations known so far for hits with even more identical numerical loci.

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<sup>1</sup> COUNCIL DECISION 2008/616/JHA, Annex 1, Point 3.2 Functional analyses “*When a Member State receives a report of match, its national contact point is responsible for comparing the values of the profile submitted as a question and the values of the profile(s) received as an answer to validate and check the evidential value of the profile. National contact points can contact each other directly for validation purposes*”

It is therefore ensured by means of indispensable forensic verification procedures that persons' data could be requested in the cases of relatively small number of false match candidates which possess possibly random biological similarities with partial values.

In comparison with the similar stain search workflow in the Prüm AFIS exchange on fingerprints data, up to 10 mostly false match candidates for possible forensic checks are delivered by the national AFIS of the requested countries to the forensic fingerprint experts of the requesting countries for necessary forensic check and validation. In DNA data exchange it is also indispensable to carry out this kind of verification procedures to rule out those possible false candidates.

If the current set of possible genuine hits would not be **completely** obtained automatically by the match engines, it will run the risk to lose the potential valuable hits leading to catch the criminals in the cases of stain profiles with poor trace quality from the crime scene. The forensic verification will ensure the quality of a genuine hit. To raise the threshold of the number of identical loci doesn't seem to be a reasonable measure in identifying **all** possible suspects and criminals.

By means of advanced and enhanced analysis techniques forensic labs could successfully examine stain samples with less loci from the crime scene and produce valuable information and clues leading to identify criminals of serious crimes, e.g. in murder cases. These stain profiles with less loci provide the investigators with only evidence to find a connection associated with the criminals.

However, the concerns of the laboratory representatives should also be taken into consideration, so that they, with their mostly limited personnel resources, will still be able to process the large number of Prüm DNA matches in a timely manner.

## Different Positions

1. Maintain the current match threshold (6 full designated numerical loci plus 1 wildcard) commonly agreed upon by all Member States, for the valuable clues are therefore kept in the matched pools.
2. The rule of “Plus 1” means **always** the substitution of a rare value by a wildcard. In Decision 2008/616/JHA this option is not very much precisely described. However, this wildcard substitution for a rare value has already been implemented by all operational Member States nevertheless CODIS and/or Non-CODIS countries.
3. If it is required by national authorities of some Member States, an appropriate software solution by using mechanism of Likelihood Ratio (LR) could be taken to reduce the amount of so-called adventitious matches or false positive matches for their own match reports. The method of LR could be used to provide supporting information to reveal meaningful and conclusive matches with relatively fewer loci.
4. To put a partial locus (missing one of the allele values) onto a national database as it is, i.e. the position of a missing allele value should be filled with NULL, an empty space and not substituted by any other values
5. Profiles with reduced qualities are only available in DNA stain data. The Member States do use this kind of DNA stain profiles in criminal investigation procedures and also for the preparation of the forensic expert reports as evidence in a court procedure.

If a Member State or its prosecuting authorities holds the opinion, that they want to clarify only criminal offence cases in which DNA profiles with the higher stain qualities are available (e.g. only stain profiles with in minimum 6 full loci), each Member State is free to choose only those biological crime scene stains with a certain DNA profile quality. It should be decided upon nationally.

Each Member State has therefore the possibility to define a national strategy, whether or not to make such stain profiles with lower quality available for national or international Prüm searches and even prior to request for the related follow-up data at the requested country in the case of a hit.

6. It is important to maintain the existing obligation of a forensic examination by the partner country, which requests personal follow-up data in the Prüm 2<sup>nd</sup> step process. The partner country bears therefore the clear responsibility for the correctness of its verification.
7. As the Council working group DAPIX and the Legal Service of the Council have also stated<sup>2</sup>, the refusal of the provision of follow-up data by a requested State is in any case not admissible, if the existing Prüm minimum quality requirements are fulfilled and such forensic verification is carried out and confirmed by the requesting State. The Prüm system does not provide a supervisory system according to the national regulations of other partner countries. Each Member State should conduct its own criminal procedures in conformity with its national legal system without compromising the size of the set of potential criminal offences.

### 2.2.1.2 Likelihood Ratio

#### Summary of the Discussion

This forensic topic has been discussed very intensively in the Group. The main concern of this issue is about how to reduce the number of false positive matches and so-called adventitious matches and relieve national DNA labs of unnecessary heavy burden of workload while not ignoring the potential valuable matches with relatively fewer loci in daily operations among the police and justice authorities in the EU. The potential genuine matches with relatively fewer loci may possess very important clues leading to a connection with a serious crime, such as in a murder case.

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<sup>2</sup> See doc. DAPIX 10156/18 from 22th June 2018 “Prüm Decisions – United Kingdom / DNA data exchange – Report on the state of play of evaluation, Point 3.2 Loci policy and proportionality

To follow initial suspicions aroused by matches of DNA profiles with relatively fewer loci is an unneglectable responsibility of police authorities in the EU. The most collected samples from crime scenes contain fewer complete loci than those in reference profiles. In accordance with one of the current match rules described in the 'Prüm Decisions', a rare but very significant value should be substituted by a wildcard for comparison. This is the additional one together with the other six full designated numerical loci. By means of advanced techniques in forensic labs, DNA profiles with a rare value could play a conclusive role in ensuring two profiles in comparison are identical.

The main concerns of these two different views are about a reasonable demarcation line of reporting and communicating matches among the EU authorities to be defined.

### **2.2.1.3 Update the ESS table by deleting unused and adding 5 new loci**

#### **Summary of this Issue**

The table of the Loci to be used in matching and comparison among the Member States should be updated to reflect the new findings of forensic science. The update comprises the following options:

- Update the corresponding tables and parts in the clauses of Decision 2008/616/JHA:
  - Delete the no more used Loci in the praxis
  - Add on the new significant Loci
  - The Loci FES, F13A1, F13B, CD4, GABA should be substituted by the new 5 Loci
- The Resolution of the EU Council of 30 November 2009 regarding exchange of DNA analysis results (2009/C296/01) should be considered the base criteria in updating the texts. The Loci specified in the above EU Council Resolution should be added into the table of ESS Loci.



## Harmonized Positions

The common stand achieved on this issue is as follows:

- Update the corresponding table and parts of Decision 2008/616/JHA by deleting unused and adding 5 new loci
- Consider the related parts in the Resolution of the EU Council on 30 November 2009 regarding exchange of DNA analysis results (2009/C296/01) the base criteria in updating the texts

### 2.2.1.4 Revise inclusion and Matching rules

#### Summary of this Issue

The inclusion rules in the 'Prüm Decisions' need more precise description. The following places should be described more clearly:

- The Microvariant rules should be updated, e.g. a Microvariant value “28.3” can be identical to “29”
- The quality levels (Q1, Q2, Q3 and Q4) of a match should be described more precisely at the technical level.
- The following notions and rules should be defined more clearly and/or added on:
  - A rare valued locus
  - A locus with off-ladder alleles
  - Microvariant tolerance equations, e.g. by inserting
    - Pentanucleotides:  $x = (x-1).4, x, x.1$
    - Tetranucleotides:  $x = (x-1).3, x, x.1$
    - the complete section for Trinucleotides on account of D22S1045

- Conversion rules for a tri-allelic locus pattern
- Handling rules for “0” and non-numerical values in the respective national DNA databases for the purpose of indexing
- Wildcard permutation
- The current matching rules should be revised, e.g.
  - A “full designated” locus shall contain:
    - numerical values or
    - a wildcard substituting a rare allele and alleles of off-ladder values

And shouldn't contain any empty space substituting analytical voids
- The number of identical loci as a threshold value to report a match

## Harmonized Positions

The following draft text reflecting the harmonized positions could be served as the draft content for the separate Addendum to a revised 'Prüm Decision':

### Inclusion Rules

The inclusion rules for reference profiles are differentiated from those for stain profiles. There should be at least six full designated of the 12 ESS loci (Council Resolution of 30 November 2009 on the exchange of DNA analysis results 2009/C 296/01) for a reference profile to be qualified for the inclusion.

- Full designated loci and rare valued locus

The footnote on page 20 of the annex to Decision 2008/616/JHA states that “Full designated” means the handling of rare allele values is included. Actually, a locus fully assigned with numerical values and/or a wild card (\*) will be considered as full designated. Practically in the forensic labs in the Member States, the treatment of a rare valued locus in its presentation form in one country could be differentiated from the others.

As having described in this paragraph relating wild cards, the following issues should be considered:

- An array of letters is currently in use in Member States with the possible indications of a rare valued locus or a locus with no value at all or something else. According to the rule defined in the Decision, any of these letters should be substituted by a wild card (\*). The ambiguity of this rule leads to a mixture of different kinds of substituted information in lieu of real allele values of a locus. The match engine cannot be therefore in the situation to differentiate “rare value” case from “no information” and/or other cases.
- The cases for a rare valued locus are not clearly defined in the Decision. There is no mention of the relationship of a wildcard substitution of the numerical values “0”, “1” or “99” and tri allelic values to the rare value treatment. A complete list of rare value cases should be included in a revised Decision later.

#### Implementation notes

- Do not substitute any “blank” and/or “no value available” spaces with a wild card
- Only substitute a rare valued locus with a wild card. The substitute of rare values by a wildcard has already been used in police daily operations among all connected Member States. The Member States, which have not yet participated in daily operations, should pay attention to this technical note so that an automated identification procedure may be carried out more effectively in terms of the least inclusion rule defined in the Decision (see footnote on page 20 as mentioned above).
- Empty spaces (blanks) should be left as they are, i.e. no any substitutes

- Extension of the possible data fields to enter additional available forensic information of the existence of further genetic data, e.g. Y-STR profiles; check the proper format and impact on adaptation of a Match Engine.
- The comparison of two DNA profiles should be performed ONLY on the basis of both profiles in which at least 1 allele value is available for the same locus. The following cases show the difference:

Case 1: for comparison

One allele of the **same** locus of both profiles is filled with a value and the other allele is blank or also assigned a value

Case 2: for cast away

Both profiles comprise different single-allelic loci

- The first two bullet points in the clause 1.1 (Inclusion Rules), on page 20, Chapter 1 of the Annex DNA should be deleted and the whole clause of inclusion rules should be revised in accordance to the above mentioned updates
- Microvariant Tolerance Equations (MTE)

The pattern matching upon the MTE in the Decision 2008/616/JHA is not complete. This set of MTE should be extended as follows:

**Pentanucleotides** (Penta D, Penta E and CD4) micro-variants will be matched according to the following:

$x = (x-1).4, x, x.1$

$x.1 = x, x.1, x.2$

$x.2 = x.1, x.2, x.3$

$$x.3 = x.2, x.3, x.4$$

$$x.4 = x.3, x.4, x + 1$$

**Tetranucleotides** (the rest of the loci are tetranucleotides)

Micro-variants will be matched according to the following:

$$x = (x-1).3, x, x.1$$

$$x.1 = x, x.1, x.2$$

$$x.2 = x.1, x.2, x.3$$

$$x.3 = x.2, x.3, x + 1.$$

**Trinucleotides** on account of D22S1045

Micro-variants will be matched according to the following:

$$x = (x-1).2, x, x.1$$

$$x.1 = x, x.1, x.2$$

$$x.2 = x.1, x.2, x+1$$

- Order of allele values of a locus

This issue is not regulated in the Decision. In practice, a lower valued allele should be put at the first position and the higher one at the second position.

Implementation note:

- Match Engine should be implemented, so that the both positions of the numerical values will be checked, i.e. to allow permutation check.

- Delimiter of micro variant allele values

It is not clearly stated for the delimiter in the Decision. It should use a dot instead of a comma for this case. The definition of a delimiter has the impact on the structural format of a data pool.

- Wild cards as a substitute of a rare valued allele

In order to differentiate a locus with rare values from those with other cases, a wild card (\*) should be used only to substitute a rare valued allele. More than one wild card can be used to store a DNA profile in indexed DNA databases. The Decision has not specified this issue very clearly.

Implementation notes:

- Insert a common note as attachment to the Decision stating that a wild card (\*) shall be used only for the substitution of a rare valued allele.
- On the understanding that a wildcard will be used only for substitution of rare allele values, there exist the following **cases of “full designated loci”** as specified in the EU Council Decision:
  1. “5+1” inclusion rule: 5 full numerically valued loci plus a wildcard indicating rare allele value
  2. “6” inclusion rule: 6 full numerically valued loci without any wildcards
  3. **“6+1” inclusion rule: 6 full numerically valued loci plus a wildcard or more (currently adopted by all Member States)**

All these cases fulfill the inclusion rules defined by the Decision. From a biological viewpoint, a wildcard representing a numerical rare allele value, which is not comparable to each other among different DNA databases, makes a 6-loci profile satisfying the above “5+1” inclusion rule more significant than any regular profiles of 6 loci with numerical valued alleles only. The least inclusion rule (“5+1”) could lead further to the positive result of an identification procedure.

Match engines may be modified as follows:

**A1:**

If a WC substitution for rare /off ladder value only, then 2 differences relating the WC should be allowed for the match engine.

**A2:**

If one WC + one numerical are identified as differences, then NO HIT should be achieved.

- Handling of loci with off-ladder values by substitution of a wildcard
- Tri-allelic values

A tri-allelic valued locus, especially of a reference profile, mostly indicates a case of rare value. The tri-allelic loci of a stain profile may contradict this assertion. Upon the Decision, the first allele will be accepted and other two alleles shall be converted to a wild card (\*) for searches. Applications at national sites should do this conversion before a tri-allelic locus will be included into the indexed DNA database. Perhaps there are more conversion possibilities for a tri-allelic locus.

- Homozygosis

In the case of homozygosis a blank allele space has to be substituted by the same value of the other allele of the locus. In consideration of the CODIS system, a locus, e.g., with a value pair of “a”, “ ” shall be transformed into the value pair of “a“, “a” before being put into the DNA indexed database for search and comparison by other Member States.

Implementation note:

Match engines shall only consider the value pair of the form “a”,”a” an occurrence of the homozygosis.

- No mixed profiles are allowed to be included in indexed DNA databases

## Matching Rules

The essential points of the matching rules (cf. 1<sup>st</sup> paragraph on page 21 of the Annex to Decision 2008/616/JHA) are summarized below:

1. The loci to be matched and/or compared should be contained in both of DNA profiles
2. A full match is defined as one that at least N<sup>3</sup> full designated **numerical** loci (exclusive of amelogenin) between both DNA profiles are matched identical and with no differences in other loci at all
3. A near match is only accepted, if there are at least N full designated matched loci in both DNA profiles (see the foot note on “full designated” on page 20 as mentioned above)
4. A near match is defined as one, if there are at least N full designated matched loci in both DNA profiles are matched identical, but only one value of all other compared alleles is different in both DNA profiles.
5. A near match consists of three categories by a difference of:
  - wildcard
  - micro-variant
  - other different numerical value
6. The first wildcard encountered is considered a difference.
7. Rare alleles could be defined and stored in national databases in line with national DNA profile storage strategy and national quality assurance regulations in form of a numeric value as well as in form of a wildcard. Therefore the current matching rules involving wildcards should be maintained also for the future.

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<sup>3</sup> N stands for the number of the loci; currently N has been set for “6”



8. There are four hit quality levels defined (cf. §4.2.2.3 Interface Control Document on the page 24 of the Annex):

- Hit Quality 1 (exact/full match)

A match of at least N full designated loci with all the same **numerical** allele values compared in both DNA profiles

- Hit Quality 2 (near match involving a wildcard)

A match involving a wildcard as the substitute of a rare allele value in terms of “six full designated loci” according to the Decision 2008/616/JHA (see footnote on page 20)

- Hit Quality 3 (near match involving a micro-variant)

A match involving one different micro-variant value

- Hit Quality 4 (near match indicating a mismatch)

A match involving one different allele value other than wildcard or micro-variant

The matching rules could be summarized by the following axioms:

- **Axiom 1**

A full match (Q1) is achieved when at least N numerical loci are found identical and with no other different allele values at all

- **Axiom 2**

A near match (Q2, Q3 and Q4) allows only one difference in comparison

- **Axiom 3**

A “no hit” message should be found out by a match engine, if there exist more than one difference

## 2.2.2 Functional Issues

### 2.2.2.1 Missing Persons and *Unknown Bodies*

#### Summary of this Issue

The issue of providing the EU community with DNA profiles of missing persons, unknown/unidentified bodies and unknown/unidentified human remains for search purposes has been principally agreed upon by all participating national experts in the Group. The current situation and concerns expressed by the delegates of the Group are summarized as follows:

- The DNA profiles of missing persons and unidentified bodies are already included in the Prüm DNA databases in some Member States for search by other Member States.
- Some Member States have provided other countries only with the profiles of unidentified bodies for search, but not missing persons’.
- Some Member States have provided other countries only with the profiles of criminals and suspects in line with the respective national laws.
- Individual DNA databases of the DNA profiles of missing persons, unknown bodies and unidentified human remains are maintained in some Member States without an automated link to the Prüm database
- In the case of inclusion of MP-UB-UHR in the next generation of Prüm Databases for search by other EU countries, the information of relatives, ancestors and offspring/descendant of the relating profile should be excluded. The procedures of family search are not allowed in some Member States because of the legal constraints. This search strategy may provide more clues in use of mixed profile.

- To extend the data category of DNA and fingerprints by including unknown bodies and missing persons for humanitarian purposes is of great importance, even if these cases haven't necessarily related to a criminal offense. The search of unknown bodies and missing persons has already been implemented among the Member States where this kind of cross-border search is legally permitted.
- The diversified inclusion rules of these profiles depend upon the national laws of the respective countries.
- The category/attribute of a profile could be extended to include the information of MP, UB.

MP := Mission Persons

UB := Unknown Bodies or Unidentified Human Remains

### **Harmonized Positions**

- To extend the data category of DNA in the next generation of Prüm by including unknown bodies and missing persons for humanitarian purposes is of great importance.
- Take a stepwise approach to get more Member States to provide other Member States with the information of MP-UB-UHR for search in conformity with their respective national laws and regulations. In accordance to the Prüm handbook of operational Member States, the respective national and legal authorities should be informed of the extension of this DNA data category.
- Expand the profile categories/Attributes as follows:

MP := Mission Persons

UB := Unknown Bodies or Unidentified Human Remains

## 2.2.2.2 Suspects

### Summary of this Issue

The information on 'suspects' will help police authorities very much in further investigation to identify cross-border criminals in the EU. Although the national laws and regulations registering suspects in the Member States are different, almost all Member States have already put the profiles of suspects to some extent onto Prüm databases for search by other Member States. This is a significant and an effective way to fight against cross-border criminality.

The current state to handle suspects' information is summarized below:

- In most EU countries, there are no differences in the Prüm database indicating the profile of a convicted or a suspected person, because no information will be given back by the court to indicate if the suspect has been convicted or acquitted. The legal background on this issue runs that the processing of biometric data in all countries is never directly related to convictions or criminal records databases. The data processing of the suspects relies on legal bases, which are mainly aimed at identifying criminals. In view of preventing criminal offences in the future, clarifying already committed crime cases and maybe-repeated ones, **inclusion of suspects' data** plays a significant role in Prüm DNA data exchange among all Member States.

Moreover, the national legal bases for biometric data acquisition and data processing therefore differ considerably from the data processing of conviction data.

Generally, biometric data are stored in Member States for a much longer period of time than conviction data. Experience has shown that an efficient clarification of criminal offences with biometric data is only possible, if the data of suspects are compared with all open stain data as quickly and comprehensively as possible.

- There is a table presenting the data types all Member States have currently delivered for a Prüm search (see DAPIX document [latest - 5322/6/19 REV 6 ANNEX 3 bis - National DNA analysis files to which Member States allow each other access for automated searching pursuant to 2008/615/JHA, Art 3(1)])
- From a legal point of view, it is of great importance that no differences should be made in making available data of suspects for national criminal investigation authorities and those across borders.
- An exclusive use, for example, of suspect data for national security authorities with simultaneous exclusion of such data only for test partner states would be legally inadmissible. See also the clarification of this question in the document provided by DAPIX and the Legal Service of the Council.<sup>4</sup>
- Both categories of convicted and suspects' data may be saved differently, e.g. with different attributes and flags, in the national databases of some Member States for further investigation measures. It is recommended that the **suspects' data** in their national databases should be made available for the 1<sup>st</sup> step online comparison with other Member States in line with the 'Prüm Decisions'.

### Harmonized Positions

A reference profile can only be from convicted persons or suspects including arrestees. Further details on categories can be obtained in the follow up procedure.

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<sup>4</sup> See doc. DAPIX 10156/18 from 22th June 2018 “Prüm Decisions – United Kingdom / DNA data exchange – Report on the state of play of evaluation, Point 3.1 Exclusion of suspects DNA files

### 2.2.2.3 UMF

#### Summary of this Issue

The Group has discussed the feasibility to use a standardized form in exchanging follow-up information among the Member States. For the time being, the follow-up information is exchanged by several different ways after the hit notifications have been received in an automated procedure (Prüm step 1 and/or 1.5). These ways are summarized as follows:

- Using INTERPOL Request Form for all Interpol NCBs (all Member States are at the same time Interpol-NCBs),
- Using different forms constructed by individual authorities,
- Using the common forms constructed by the EU project “SIENA-OUT/Prüm-Direct”.

Using UMF may be exclusively relevant in exchange of follow-up information depends upon the status of establishing a semi-automated system in daily operations. It is inconceivable to exchange information by UMF without this semi automatism.

Moreover, using UMF in the EU would have an impact on national systems, which should be customized for this purpose. The costs and add-on values should be balanced. The use of UMF could be an option for Prüm step 2 and/or later. In Prüm step 1 and/or step 1.5, a technical standard (ICD) has been established and will be improved to suit the needs of the next generation Prüm.

#### Harmonized Positions

It is clearly stated message by the Group that there is no need to change something regarding a common form used in Prüm step 1 and/or Step 1.5. The EU Project “SIENA-ROLL-OUT/Prüm-Direct” is taking steadily its shape in daily operations. All these three ways may converge gradually to bring out a common form with more or less unified information items in follow-up procedures in Prüm step 1 and/or 1.5 even Step 2 among all Member States.

Some Member States suggest using UMF in Prüm step 2, if the project UMF would go so far to standardize an applicable request form among all Member States.

To discuss the use of UMF in Prüm step 3 or 4 is out of the scope of the Group's working spectrum.

Preference for a **unified form** but not by using UMF unconditionally in the 2<sup>nd</sup> step

The Prüm NG DNA expert group also agreed with the recommendations of the working groups on Fingerprints and Facial Recognition respectively regarding a more effective exchange of follow-up data. The most coherent and possible standardization of data formats and transmission possibilities should be made for interoperable solutions.

A 'core data' set of DNA containing minimal common information in the follow-up procedures may be developed by all Member States. This piece of core information could be used by a semi-automated procedure in Prüm step 2.

A draft standard of 'core data' in the 2<sup>nd</sup> step for the data exchange on fingerprints, facial recognition and DNA

### Core Data / Reference Database for the 2nd Step

#### - All Biometric Data Types -

POS	Data Types	Description	FG DNA Yes/No/ Unknown	EU MS Member States	Comments
<b>AP</b>	Alphanumeric Personal data				
1	Family Name		Yes	SK, RO, EE, DE	
			No		
			Unknown		
2	First Name		Yes	SK, RO, EE, DE	
			No		
			Unknown		
3	Name of Birth		Yes	SK, RO, DE	
			No		
			Unknown		

4	Former Names				
			Yes	SK, RO, EE (if available), DE	
			No		
			Unknown		
5	Date of Birth				
			Yes	SK, RO, EE (if available), DE	
			No		
			Unknown		
6	Place and Country of Birth				
			Yes	SK, RO, DE	
			No		
			Unknown		
7	Gender				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
8	Nationality				
			Yes	SK, RO, DE	
			No		
			Unknown		
9	Alias/Nickname				
			Yes	SK, RO, EE (if available), DE	
			No		
			Unknown		
10	Identity confirmed (Yes/No)				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
11	Further Identity Info	e.g. description, marks, tattoos			Not always, dependent on the cases
			Yes	RO, DE	
			No		
			Unknown	SK,	



12	CRN (Criminal Reference No)				
			Yes	EE (if available), DE	
			No	RO	
			Unknown	SK,	
13	First Name of Parents				
			Yes	RO	
			No	SK, DE	Not available in Germany
			Unknown		
14	Citizen Identification Number				
			Yes	SK	
			No		
			Unknown		
<b>CB</b>	<b>Case info on Biometrics acquisition</b>	<b>Facial Recognition, Fingerprints and DNA</b>			
1	Date of Acquisition				
			Yes	EE, DE	
			No	SK,	
			Unknown	RO	
2	Place of Acquisition				
			Yes	EE, DE	
			No	SK,	
			Unknown	RO	
3	Reason of Acquisition	e.g. Crime Category/Type, etc.			
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
4	Source of biometric (Database)				
			Yes	SK, RO, EE,	
			No		
			Unknown		

5	File Number/s				
			Yes	SK, EE, DE	
			No		
			Unknown	RO,	
6	Responsible Authority				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
<b>BI</b>	<b>Biometric Information</b>	Upon requests			
1	Additional Face Image				
			Yes	RO, DE	
			No		
			Unknown	SK,	
2	Dactyloscopic data				
			Yes	RO, DE	
			No		
			Unknown	SK,	
3	DNA profile Available				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
4	Hit-Related DNA Profiles	e.g. Match Report after hits, etc.			
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
5	Additional DNA data	e.g. Y-STR, mtDNA, etc.			
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
6	DNA Kit Information				
			Yes	SK, RO, EE,	
			No		
			Unknown		

7	ISO 17025 Accreditation status				
			Yes	SK, RO, EE,	
			No	DE	Unnecessary; all DNA labs in the EU have to be accredited and are at a similar quality level.
			Unknown		
<b>ID</b>	<b>Identity Document</b>	e.g. No. and type of the document, Issuing authority, Scanned image of the document			
			Yes	DE	
			No		
			Unknown	SK,	
<b>OI</b>	<b>Other Information</b>				
1	Technical information	Hash value, etc.			
			Yes	DE	
			No		
			Unknown	SK, RO	
2	Alert information	e.g. arrest warrant, etc.			
			Yes	DE	
			No		
			Unknown	SK, RO	
3	Warning information	e.g. carrying weapons, twins, etc.			
			Yes	DE	
			No		
			Unknown	SK, RO	
4	Free text				
			Yes	RO	
			No	DE	
			Unknown	SK	

**'core data'/ Latent / for the 2nd Step**

**- All Biometric Data Types -**

Note:

It is assumed that the notion “latent” means the fingerprints with lower quality acquired at crime scenes. In terms of the acquisition of DNA data it indicates “stains” probably.

<b>POS</b>	<b>Data Types</b>	<b>Description</b>	<b>FG DNA Yes/No/ Unknown</b>	<b>EU MS Member States</b>	<b>Comments</b>
<b>CB</b>	Case info on Biometrics acquisition				
1	Date of Acquisition				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
2	Place of Acquisition				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
3	Reason of Acquisition	e.g. Crime, unknown body, etc.			
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
4	Source of biometric	Database			
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
5	File Number/s				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		

6	Responsible Authority				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
7	Free Text				
			Yes	SK, RO, EE,	
			No	DE	Free text cannot be collected automatically
			Unknown		
<b>BI</b>	<b>Biometric Information</b>	Only upon Requests			
1	Additional Face Image				
			Yes	RO, DE	
			No		
			Unknown	SK,	
2	Dactyloscopic data				
			Yes	RO, DE	
			No		
			Unknown	SK,	
3	DNA profile Available				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
4	Hit-Related DNA Profiles	e.g. Match Report after DNA hits, etc.			
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
5	Additional DNA data	e.g. Y-STR, mtDNA, etc.			
			Yes	SK, RO, EE, DE	
			No		
			Unknown		

6	DNA Kit Information				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		
7	ISO 17025 Accreditation status				
			Yes	SK, RO, EE, DE	
			No		
			Unknown		

Notes:

- Estonia could not provide this set of 'core data' currently, because many data items are not administered by the Estonian forensic lab, but by different ministries in Estonia. Moreover, it will be very time-consuming and costly to develop the software solutions for providing this set of 'core data' in a semi-automated procedure.
- Currently Belgium could not provide this set of 'core data' either, because the transmission of a 'core data' set in a semi-automated procedure is not allowed by the current legal regulations in Belgium. If the idea to speed up data exchange by a small set of 'core data' will be endorsed by the EU, the corresponding legal regulations in Belgium should be customized to meet the needs for communication with a set of 'core data'. Presently, Belgium could only exchange persons' identity information of the matched DNA profiles with other Member States in the step 2.
- France has asked for clarification of the following points (delivered in Original by the French delegation) before the table of the 'core data' set could be filled out:
  - “Does the list of information appearing in the table concern automated data exchange (France is not in favour of that) or semi-automated data exchange with or without human validation?”
  - “The French SPOC is in favour of the principle of semi-automated data exchange but has to give more detailed consideration to address the issue of human validation.”

- “In the case of semi-automated exchange, as the main purpose consists in exchanging rapidly a first set of data, the alphanumeric-data section should be reduced in a significant way and may just include information concerning the individual's identity.”
- “Moreover, not all of the identifying information (in particular, the subjective elements e.g. tattoos) should be included in the elements to be sent in semi-automated STEP 2.”
- “Likewise, the "other information" section should not appear in "core data" if the objective of STEP 2 is to quickly provide basic information.”
- Neither the filled in table of a 'core data' set nor any other related comments have been received until 7 October 2019 by the following Member States:
  - Austria
  - Cyprus
  - Italy
  - the Netherlands
  - Poland
  - Slovenia
  - Spain
  - UK

#### 2.2.2.4 Common Channel

##### Summary of this Issue

The Police and Justice Authorities in the EU have made use of the communication channels of Interpol, Europol and SIRENE for exchange of information after hits received in an automated procedure and also in Prüm step 2. These logically closed communication networks provide a high-levelled security among users of police and justice agencies in the EU and all over the world. In line with the national regulations, preferences and priority settings each individual Member State chooses one of these three communication channels to exchange information after hits received. It works well in the daily operations since the very beginning of the Prüm DNA data exchange for this type of “classical” police cooperation information exchange

There are relevant doubt about the benefits and add-on values of using only a single common channel in exchange of information in compensation for the implementation costs in each Member State for such classical police cooperation. The conceivable benefits of using a single common channel may reduce delay in communication and detect any problems and anomaly more effectively.

In some Member States, all these three communication channels could be used, but they have their own preferences.

##### Harmonized Positions

The delegates in the Group are of the opinion that each Member State should choose one of the above three secure communication channels to exchange information after hits in the conventional follow-up information exchange. There is no need to agree upon a common channel. The key point lies in a (core) set of common business information, but not in the transport means for the (core) information set.

The proposals of binding usage of a common channel for daily police cooperation are generally not suitable for substantial acceleration of follow-up data information exchange after confirmed Prüm hits. The acceleration of the procedures in the Step 2 can only be achieved by significant improvement in standardized online data transmissions over the already deployed Prüm communication channel (TESTA).



Furthermore, the procedures to acquire further information in Prüm step 2 could be sped up by exchange of automatically and/or semi-automatically transmitted data in line with the regulations of national legislation, but do not rely upon a common channel.

### **2.2.2.5 Handling of Matches**

#### **Summary of this Issue**

To identify, prioritize and process the high-quality matches in a more automated manner would speed up the follow-up procedures and lessen the amount of tasks in backlogs. However, the precise definition of a high-quality match remains still quite controversial. The matches/hits obtained in Prüm step 1 need mostly the confirmation of DNA experts before they could be released for further investigation. This verification procedure by a DNA expert may take up to six months. In some cases, the corresponding profiles may be already deleted because of the national data protection regulations during this prolonged procedure of verification.

This issue concerns both the procedures after hits received in s Prüm step 1 and in the Step 2. The scope of this issue should be defined clearly.

NCP will be designated by each Member State.

#### **Harmonized Positions**

- The regulatory and legal bodies in all Member States should be involved in defining the scope of this issue
- Definition of a minimal number of loci, a LR calculation and the defined threshold of the matched identical loci at the national sites could be combined to determine the precise definition of a match with high quality. The case of a match with high quality may contain e.g. the following features:
  - No discrepancies at all
  - Reporting requirements should be defined by each Member State

- Sufficient number N of the identical loci (common markers) compared in both profiles
- Fulfilment of a minimal percentage M of LR calculation
- NCP should confirm that all other matches do NOT belong to this category of hits with high quality.
- A semi-automated procedure should be designed to handle this issue both in the Step 1 after hits and Step 2
- A national workflow to handle this issue should be defined and implemented by respective Member States.
- The Core information with a parameter list to handle the matches with high-quality should be defined.

#### 2.2.2.6 “Urgent Mark”

##### Summary of this Issue

In accordance with the current regulation on the page 22 in Decision 2008/616/JHA, the responses should be dispatched to reach the requesting Member States within 15 minutes of the arrival of requests. This official requirement has not met by all Member States in daily operations. The time delayed to answer the requests varies between a few hours and up to a couple of days. The reasons for the delay to a large extent lie in the architectural design of a few IT systems. These systems may have a monolithic architecture to process national and international (Prüm) tasks in a sequential way without differentiation between these two information flows.

So long there is no specification of the crime category and the reason of requests in the common ICD (Interface Control Document), an urgent mark could not be set purposely and properly. Moreover the mechanism to entry an urgent mark in a request may be misused in the case that a not-yet answered request may be provided with an urgent mark as to urge the requested Member State to give back the answer sooner.

## Harmonized Positions

- In the current daily operations, it is neither possible nor necessary **to set an urgent mark** to the requests which do have urgent reasons to be processed with a higher priority because of the missing attributes of crime category and reason of requests.
- The bottleneck to process incoming requests of a few IT-systems, e.g. CODIS, may be straightened out by some IT solutions to be taken by other Member States with the non-monolithic communication components, e.g. to pack also Art 3 requests up to a maximum of 500 in one single email message before it will be sent out to other Member States for comparison. It may help CODIS countries to overcome the technical problems caused by the CODIS system architecture. The current situation to fail to answer requests from other Member States within the defined time window of 15 minutes, especially in the cases while the CODIS systems are busy with the national requests.
- Setting an urgent mark, as recommended by contractor in its draft of feasibility study for the Commission, is neither useful nor necessary in Prüm 1<sup>st</sup> step information exchange.
- Setting of an urgent mark may be exclusively useful and helpful in Prüm 2<sup>nd</sup> step procedures and should be based upon the following criteria:
  - Offence description of a concrete crime category
  - Requirements of a legal framework
  - Suspects: potential, in detention and/or in custody
  - Reason of requests
  - Time window to be allowed to process the cases
  - Sensibility of the cases

Otherwise, the current procedures are effective for prompt processing of requests, if bottleneck problem to process incoming requests is solved.

- A procedure with a processing priority should be therefore discussed and defined in Prüm step 2.

### **2.2.2.7 Step 2: Supply of Further Personal Data**

#### **Summary of this Issue**

This issue relates the national legal regulations in all Member States. Because of the much diversified national legal clauses in the EU, a common guide line is missing currently. Only after reaching a common legal agreement, the issue of providing further personal data in the framework of Prüm operations could be solved.

Second step starts if the responsible second step contact point requests follow up data from the partner country

#### **Harmonized Positions**

- The general legal regulations on this issue should be harmonized among all Focus Groups (referring to the Living Documents of other FGs, e.g. FP and FR)
- A minimal 'core data' set to be provided for other Member States should be defined.
- This issue for the Step 2, Step 2+ and/or Step 3 should be forwarded to the legal experts of national legislation for decision.

### **2.2.2.8 SPOC in Step 2**

#### **Summary of this Issue**

Upon Article 6 of Decision 2008/615/JHA, a national contact point (NPC) for each Member State should be established for data exchange, hence the data exchange should take place only among the 28 NCPs without any other additional communication lines. This requirement has already been met in Prüm step 1 since the very beginning of the daily operations in 2007.

In view of the next generation Prüm the different functional tasks between a NPC 1 and a NPC 2 have been identified. The former looks after the functions described in Article 3 and Article 4 of the Decision 2008/615/JHA and the latter should carry out the functional tasks in the follow-up procedures.

The supply of data in accordance with Article 3 and Article 4 in the current 'Prüm Decisions' has to be carried out by the NPCs. In other words all national procedures should be centralized in the communication with other Member States. The substantial functionality of a SPOC (Single Point Of Contact) should be considered also in Prüm step 2.

### **Harmonized Positions**

- The Group has recognized the necessity to define a SPOC in the Step 2. However the SPOC in the Step 2 must not unconditionally be the same as it is in the Step 1.
- The task spectrum of a SPOC 2 should comprise a set of minimal core functions.

#### **2.2.2.9 Step 2 (Annex DNA 3.2)**

### **Summary of this Issue**

The clause of 3.2 of the Annex DNA to Decision 2008/616/JHA has described briefly how a second step in Prüm DNA data exchange could look like, but not to a detailed extent. In consideration of diversified national organizational regulations and legal constraints, it won't be an appropriate place to define this issue of Prüm step 2 in an addendum describing the technical, forensic and functional issues. The responsibility for the validation of hits and follow-up correspondence to get personal data has not been clearly stated and defined in the clause 3.2.

Before Prüm step 2 could take place, the forensic evaluation and verification in line with national forensic evaluation and reporting strategies may be adopted in narrowing hits obtained in Prüm step 1. This is also the binding provision in the present 'Prüm Decisions' and should be fulfilled before the follow-up data in Prüm step 2 are requested by respective Prüm partner countries.

## Harmonized Positions

- The Group considers the appointment of a SPOC in Step 2 a very beginning of the Step 2. Each Member State should nominate a SPOC 2 officially. A list of SPOC 2 of all Member States should be maintained and updated by the General Secretariat of the Council as it is done for Step 1. The Group should have access to this list of SPOC 2.
- The scenarios of Prüm step 2 should be described by each Member State
- In consideration of different national units responsible for Prüm step 2, it is out of scope of the Group to describe the scenarios of Prüm step 2
- It is recommended to define a minimal set of personal data (core data) to be exchanged in Prüm step 2. Definition will be provided in the annex from the expert group
- Validation of a hit and follow-up correspondence should be clearly demarcated and also necessary in the future in the functional description of a SPOC regarding the Step 1 and Step 2

### 2.2.2.10 Reporting Rules

#### Summary of this Issue

The wording in the Clause 1.3 “Reporting Rules” of the Annex DNA to Decision 2008/616/JHA does not reflect the different legal constraints in the Member States. The comparison results of full matches, near matches and “no hits” have been reported differently in Prüm step 1. In order to ensure a reasonable performance of the systems the enormous amount of “no hit” messages are not reported to investigators in some Member States. These “no hits” cases will be reported only upon specific requests.

A common catalog of offences may be served as a basis to filter out the results of matches which should not be reported. ECRIS should be used as a reference source to set up a common catalog of offences, particularly if the recommended automated Prüm 2<sup>nd</sup> step 'core data' exchange will be approved.

## Harmonized Positions

- How to handle the match results of “no hits” for reporting should be in line with the national regulations and national reporting strategies
- The Clause 1.3 “Reporting Rules” of the Annex DNA to Decision 2008/616/JH should be customized to reflect the national needs and constraints.
- Suggest substituting the word “Reported” to “submitted” in the sentence of the Clause 1.3:

“Both full matches, near matches and “not hits” will be submitted.

### 2.2.3 IT Issues

#### 2.2.3.1 Fully Automated Search

##### Summary of this Issue

Hits, especially near hits, received in the automated procedure in the Step 1 will be verified and validated by DNA experts in the related Member States. Because of the involvement of a human being, a full automated procedure cannot and should not be constructed and implemented in Prüm step 2

All participating experts in the Group have rejected the idea to implement a full-automated procedure in Prüm step 2 and prefer a semi-automated procedure.

A semi-automated procedure may work well but nevertheless it needs a set of common criteria regulating personal data to be exchanged among all Member States, which is still missing.

##### Solution of the Issues

- Change the title of this paragraph to “2nd Step Data Provision”
- Three options may be considered:

- Option 1: remain as it is, e.g. by Interpol procedures
- Option 2: a semi-automated exchange of a 'core data' provision with human approval
- Option 3: a semi-automated exchange of a 'core data' provision without human approval

### **2.2.3.2 Semi-Automated Search: Option 1**

#### **Summary of this Issue**

Implement a national system in all respective Member States to generate a minimal dataset to be exchanged among all Member States for possible acceleration of important 2<sup>nd</sup> step 'core data' exchange in a semi-automated procedure.

If the principle of proportionality of the EPRIS ADEP project would be followed in this option, a more extensive than necessary exchange of personal data in Prüm step 2 should be avoided. A SPOC in step 2 should not send personal data which has not been asked for to other Member States. The investigators have to decide if more personal information about hits should be requested in the hit-relevant Member States. The availability of hits is not the reason for asking more personal information in other Member States.

Moreover, the regulations of international legal assistance should be considered in this option. Any potential violations should be avoided. Before the procedures of Prüm step 2 could start, forensic and legal/criminalistics checks must be carried out to ensure there will be no violations.

#### **Harmonized Positions**

- Legally binding forensic and legal/criminalistics check in all Member States necessarily before any procedures of Prüm step 2 could start in Member States, which is interested in the further investigation of the case.
- Implement a cross-member states' communication system to generate and exchange a minimal dataset



- The above options should not be implemented as exclusive options. It is necessary that all these options can be considered in parallel. The current exchange of follow-up data via classic police cooperation channels such as Interpol or Europol works well in practice but very time-consuming. For these two alternative options forensic and legal checks are always carried out upstream before follow-up data is requested from the partner state. For both cases specific investigation information could be further provided by classic police or judicial legal assistance. The technical implementations will depend upon the legal framework of the Member States.

### 2.2.3.3 Semi-Automated Search: Option 2

#### Summary of this Issue

Implement a cross-member states' communication system to generate and exchange a minimal dataset

The national systems to generate a minimal dataset and the cross-member states' system to communicate with the minimal dataset should be interoperable. The legal check on the minimal dataset before delivery to the cross-member states' system should take place in conformity with the national legal constraints.

Moreover, the role of investigator, police officer and SPOC should be defined precisely for all procedures of this option.

#### Harmonized Positions

- In view of the legal check on the minimal dataset involved in this option, it may be a viable approach.

### 2.2.3.4 New IT Communication Architecture

#### Summary of this Issue

The IT architecture of application, communication and security in the DNA data exchange since 2007 has to be revised to ensure better performance, more accountability and higher security. A variety of software and network components works together in a decentralized environment for daily operations on DNA data exchange. Owing to the design and implementation of the IT systems in conformity with Open Standards, all connected IT systems in the Member States communicate with each other. However, add-on values of new technologies and protocols could reduce overhead of administration and heighten productivity.

The merits of a decentralized IT landscape in conformity with Open Standards have demonstrated feasibility of exchanging DNA data among all 28 Member States to meet the legal requirement of using DNA data.

#### Harmonized Positions

- Reject the option “Single Router Network Configuration”. All configuration information will be further maintained by each Member State
- Re-engineering the IT architecture, e.g. using protocol HTTP and Web services
- Maintain the decentralized IT landscape

### 2.2.3.5 Single Messaging Router

#### Summary of this Issue

Since the very beginning of daily operations on DNA data exchange, all network devices have been configured and administered by the respective Member State except for the central Relay Email Server in the clouds of TESTA, which has been set up and administered by a commercial network provider contracted by the Commission. Each EU member state provides the EU network provider with their specific Domain information upon a unified schema, which could be resolved by IT mechanism DNS both in the member states and in the EU network clouds.

A single centralized messaging router in the EU clouds would run the risk of “A Single Point of Failure. However, a unified data format provided by a central router may be of advantages for the generation of Prüm.

In the current communication all information transferred over the TESTA is encrypted by SMIME at the application level and other encryption mechanisms at the network level. If the content of the encrypted messages would be made readable by the centralized router, a CA (Certified Authority) for administering public and private certificates should be established centrally. It isn't a trivial task to accomplish.

The idea of “Shared Biometric Matching Service” for DNA data encounters a feeling of doubt and uncertainty by the participants in this Group.

There are some advantages of a centralized router configuration for generating daily statistics and other operational reports.

### **Harmonized Positions**

Reject the option “Single Router Network Configuration”. All configuration information should be further maintained by each Member State.

#### **2.2.3.6 Definition of “Logging” and “Recording” cf. SEE PCC**

##### **Summary of this Issue**

The difference of the notions “Logging” and “Recording” has not been defined and described very precisely in Article 30 of Decision 2008/615/JHA. From an IT point of view, these two notions mean almost the same. However, from a functional point of view, these two notions indicate different activities and procedures.

The logging data has been kept for two years and deleted manually and/or by an automated procedure. However there is no regulation for the duration of the recorded data to be kept for further investigation. The handling of the recorded data should be regulated in line with investigating needs and with the national laws.

The current regulation basically works without any problems and sufficiently covers both data protection needs (logging) and operational needs (recording of data). Under the legal context, however, the terminology is not used uniformly. Therefore, these two notions should be defined more precisely, so that the applications may be implemented accordingly.

### **Solution of the Issues**

- Do not keep logging data for a period longer than 2 years
- Revise Article 30 of the Decision 2008/615/JHA to define and describe the notions of “Logging” and “Recording” more precisely
- In view of the Agreement of PCC SEE relating to the Western Balkan countries, the definitions of these two notions of the Agreement may be transposed for the next generation of Prüm.

#### **2.2.3.7 TESTA ng**

##### **Summary of this Issue**

The TESTA-ng (Trans European Services for Telematics between Administrations – Next Generation) and its former predecessors as a logically closed network have been designed for the applications commonly used by the Member States. The provider of this network chosen by the Commission after a successful public procurement has to meet the high security standards at the three levels (data, communication and transmission) set by the EU.

The operational TESTA (Trans European Services for Telematics between Administrations) is used as the communication network for data exchange among the Member States. TESTA is under the responsibility of the Commission. Taking into account that national DNA databases and the current national access points of TESTA may be located on different sites in the Member States, access to TESTA may be set up either by:

- Using the existing national access point or establishing a new national TESTA access point; or by
- Setting up a secure local link from the site where the DNA database is located and managed by the competent national agency to the existing national TESTA access point.

The network protocols and standards deployed for the implementation of Decision 2008/615/JHA applications comply with the open standards and meet the requirements imposed by national security policy makers of the Member States.

All Member States should keep pace with the rapid development of network technologies. For the time being the both domain names: “eu-admin.net” and “test.eu” are supported and maintained by the TESTA-ng provider. The new Member States connected to daily operations on DNA data exchange have already deployed the new domain name “testa.eu” and the Member States, which have joined daily operations since long, are still using the older one “eu-admin.net”.

### **Harmonized Positions**

- The network configuration parameters in all Member States should be customized to reflect the current status of the TESTA-ng, especially the new domain name “testa.eu”
- All Member States should migrate gradually to use the new domain name “testa.eu” for all Prüm applications.

#### **2.2.3.8 Separate technical parts from the legal ones**

### **Summary of this Issue**

The 'Prüm Decisions' comprise both the legal and technical parts of the Prüm Treaty since 2007. It is legally binding, but technically speaking, inflexible as to customizing its technical parts in order to reflect the needs of users in view of rapidly evolving technologies.

The main concerns expressed by the participants of this Group are about how to gain the flexibility to modify the IT-technical, forensic and functional requirements and nevertheless maintain the legal binding status at the same time.

The needs for modifying the IT-technical, forensic and functional parts of the EU legal documents have been reinforced by all delegates in the Group

### **Harmonized Positions**

- Move the IT-technical, forensic and functional parts of the 'Prüm Decisions' into a legally binding but nevertheless more easily modifiable addendum to a new 'Prüm Decision' e.g. “Implementation Act”
- Which parts of the 'Prüm Decisions' to be moved into the addendum will be discussed among the Group
- A Handbook, e.g. a kind of “User Manual” could be compiled in addition to the addendum as a Living Document. The “User Manual” compiled for the Prüm-like Agreement among the Southeast European countries may be served as a reference example.

#### **2.2.3.9 ISO country code table**

### **Summary of this Issue**

There are contradictory places in Decision 2008/616/JHA referencing different country codes relating United Kingdom and Greece. The ISO 3166-1 alpha 2 should be used for setting up domain names and other configuration parameters required in the Prüm DNA data exchange applications over a closed network (on page 21, clause 2, Chapter 1 of the Annex DNA). However, the code table on the same page shows “EL” as country code for Greece, but not the ISO code “GR” and “UK” as country code for United Kingdom, but not the ISO code “GB”. In consideration of IT general practices using a nationwide data dictionary in conformity with open standards, any deviations from standards will cause unnecessary problems and time-consuming overheads to fix the problems.

There are two options to set aside the inconsistency in the 'Prüm Decisions':

Option 1:

- UK and Greece should consult the relevant ISO body to change their respective country codes in the ISO standard 3166-1 alpha 2.
- Delete the table in clause 2, Chapter 1 of the Annex DNA

Option 2:

- UK and Greece keep using of their wishes country codes “UK” and “EL” respectively
- Delete the notion of open standard ISO 3166-1 alpha 2 everywhere in the 'Prüm Decisions'
- Keep the specific table “Country Code” up-to-date for EU DNA data exchange

### **Harmonized Positions**

Open Standard of the ISO country codes should be followed by each Member State for DNA data exchange. Therefore, option 1 should be taken.

#### **2.2.3.10 Handling of “NULL” string**

### **Summary of this Issue**

The new suggestions to handle “NULL” strings in the profiles to be compared have been described in the clause 2.2.1.4 on the issue of “Revise Inclusion and Matching Rules. The draft text in that clause can serve as a basis for further discussions.

### **Harmonized Positions**

- Refer to the draft text for “Revise Inclusion and Matching Rules” in the clause 2.2.1.4

- Describe the rules in the “CODIS-PRÜM Interoperability Requirements” more precisely and ask CODIS to fulfill the requirements (number 8 and etc.)
- Invite all participants of the Group to revise the draft text in the clause 2.2.1.4 by giving some concrete sample cases

### 2.2.3.11 Availability of the system

#### Summary of this Issue

Since the very beginning of Prüm DNA operations in 2007, each Member State has taken care of its running systems (email messaging, applications and network communication). There are no automated notifications of monitoring system status in all connected Member States. If some components in a certain Member State are down or under maintenance, other member states have no way to be informed timely of this abnormal status. The message exchange by email and/or phone calls have delayed taking the appropriate measures in the communicating partner states.

It would be a useful and powerful tool to set up a monitoring system to check the availability and operating state of all systems connected. The design and development of this EU-wide system tool depends upon a set of Common Business Information (CBI) with the appropriate parameters defined by open standards.

The availability of the systems can in principle already now be realized technically easily by each state both with automated verification of its own online capability and, if desired, with automated verification of received replies in the mail servers. However, not all countries have implemented such checking routines. Member States do not notice in such cases that servers in other partner countries are coming up to the bottleneck working on the backlogs, losing messages seemingly and/or offline.

By use of current email-based and/or Web-based communication solutions in the future, a set of **Common Business Information (CBI)** for system monitoring should be described and implemented in the Prüm NG IT infrastructure.



A sample set of the core CBI for an automatic monitoring of system behaviors has been described in the informative part of this Living Document and could be extracted in an automated procedure by the system components communicating with each other among all Member States.

### **Harmonized Positions**

- Agree upon a set of a core **CBI** among all Member States
- Design and implement a monitoring system tool for all Member States

#### **2.2.3.12 Member state code number table**

### **Summary of this Issue**

This issue relates to the clause 2.2.3.9. If the open standard ISO 3166-1 alpha 2 should be still valid as guideline for country codes, the country codes for new Member States (e.g. “HR” for Croatia) have been automatically included in the updated ISO standards. In the case of keeping the specific table of “Country Codes” in the EU documents, this specific table should be updated manually.

### **Harmonized Positions**

- refer to the harmonized positions in the clause 2.2.3.9

#### **2.2.3.13 Revise Annex DNA 4: ICD**

### **Summary of this Issue**

The IT technical parts (DNA 4: ICD) of Decision 2008/616/JHA should be revised to reflect the needs of IT and forensic community. The emerging technologies in the areas of application, communication, and security as well as new findings in the research of forensics are playing ever more important role in an effective IT architecture and in the procedures of identification purposes.

## **Solution of the Issues**

- Revise the all clauses relating IT technical content of the Annex DNA
- Revise the clauses relating forensics for identification purposes, e.g. the use of “Y STR”, “mtDNA”, “NGS STRs”, etc

### **2.2.3.14 Revise Annex DNA 5: Application, security and communication architecture**

#### **Summary of this Issue**

This issue concerns the IT technologies only. Some ideas of heighten the security level of communication over a logically closed network, e.g. using a key of a more length by RSA and SHA 2 for information digestion, could be considered in the review of the IT technical part of the 'Prüm Decisions'.

The comments on this issue from the respective IT divisions of the participating experts in this Group are still missing.

#### **Harmonized Positions**

- Revise the whole clause 5, chapter 1 of the Annex DNA
- To put the revised text into the future implementing act

### **2.2.3.15 Update of the security technical requirements**

#### **Summary of this Issue**

This topic relates the issue 2.2.3.14. In the review procedure for the IT technical parts of the 'Prüm Decisions', the security concerns in respect of the next generation Prüm will be considered. For instance, some national security agencies recommend that a minimal key length of 2048 bits should be deployed until the year of 2030 for asymmetric encryption and beyond the year of 2030 a key length of 3072 should be adopted.

Moreover, a certificate should have a validity of 10 years. For the time being, there are no specific regulations in daily operations on DNA data exchange. Each member state generates its certificate of its own free will and gives it to other communication member states for deployment at the test and operational environments.

### **Harmonized Positions**

- Standardize the entries of a certificate, key length and algorithms for encryption and content digestion
- Refer to the review of the Annex DNA 5: Application, Security and Communication Architecture

#### **2.2.3.16 EU wide monitoring of communication and application components**

### **Summary of this Issue**

This issue is closely linked with the issue of System Availability (2.2.3.11). In order to meet the legal requirements, the IT-Landscape of DNA data exchange in the EU has been designed decentralized, so that the system components deployed in each Member State communicate with all connected member states for identification purposes. Each Member State has the full control over its own DNA data, which has been installed, maintained and updated at its own site. The merit of this communication lies in the common standards described in the Interface Control Documents. Thereupon the heterogeneous system components can communicate with each other.

However, we need urgently to know about the behaviors of the components in daily operations, so that the system interruptions and incidents could be recognized automatically. In light of the heterogeneous IT landscape, the interfaces of all deployed components of applications, databases and communication should be described for monitoring purposes.

Most participants in the Group expressed an urgent need for this system monitoring tool.

## Harmonized Positions

- Carry out a survey to gather IT interface information of the relevant system components: applications, databases and communication among all Member States
- Agree upon a set of core Common Business Information (CBI – see the section 3.2) by studying the common IT parameters among all Member States
- Ask CODIS provider to describe the interface of the system components more precisely

### 2.2.3.17 Unified EU Statistics on DNA

#### Summary of this Issue

All connected Member States report the annual hits in a predefined form. Owing to the quite vague definition of some items in this form, the statistics, which are separately and mostly manually made by each two Member States over a common communication line, show misleading and incomparable information.

Statistics could be divided into the following categories:

1. IT Statistics in the Step 1
2. Statistics in the Step of Follow-Up (Step 2), if the proposals for semi- automated data transmission will be realized
3. Statistics in the Step 2

The statistics of the 1<sup>st</sup> category are dealing with the statistical information automatically determined by IT parameters in daily operations. However, the parameters automatically to be measured should be defined in a more precise way. All hits obtained in the automated procedures of Prüm step 1 will be verified by the forensic labs in comparison with the original DNA materials including re-typing if necessary, and by checking if any procedural wrong data entries would take place.

In Prüm step 2, the responsible units for legal assistance of all Member States correspond with each other in order to get personal data relating to the verified hits.

The procedures in Prüm step 2 have not been specified yet. Therefore, discussing the statistics of such statistics is out scope of this Group and could be not discussed before political and technical solutions of data transmission of a 'core data' are constructed and implemented.

The statistics of the 1<sup>st</sup> step could comprise hits information obtained automatically by IT procedures and by notifications and/or reports eventually returned back by investigators in charge of the hit cases. The current annual statistics lie somewhere in-between. Due to the missing notifications and reports from investigators in charge of the hit cases, the statistics of the 2<sup>nd</sup> category could mostly not be compiled in a factual and complete manner due to the legislative and organizational framework of the 'Prüm Decisions'.

All national experts in the Group have recognized the necessity and usefulness of providing further criminally relevant statistics – if possible in a more automated procedure. Such kind of extended and more comprehensive statistics is only possible, if the present legal regulations are modified and automated procedures to transmit 'core data' at the 2<sup>nd</sup> step will be established. Therefore, it is indispensable to revise the current Prüm statistics form by defining a set of common parameters which could be automatically generated by IT procedures in the future.

## **Harmonized Positions**

A unified and comparable Prüm statistics upon IT parameters in the step 1:

- Define a set of parameters concerning hit statistics which could be generated automatically by IT procedures, e.g. matches, hits, time stamps, hit quality levels, hit combinations, etc., when recommended technical and legislative enhancements have been bindingly fixed.
- Agree upon a common form of statistics for all Member States based upon the selected IT parameters
- Study the procedures of validation in the follow-upStep relating to statistics of 2<sup>nd</sup> category after the decision is made.

### 2.2.3.18 Common Error Message Text Catalog

#### Summary of this Issue

An error message with a defined catalog value may help a lot in finding error sources and reduce the time in bug fixing. There is a free string field “MESSAGE” in the XML specification of DNA data exchange, but not assigned a set of catalog values. Without these defined catalog values the interpretation of an error message may be very different. Since 2015 the non-CODIS countries have agreed upon a catalog of common error message texts. However, the countries having deployed CODIS systems forward only one sort of error message text to other connected countries. A few countries have developed their DNA systems by their own IT force and/or by the contracted companies. In these cases the error texts having forwarded to other Member States are based on free text strings and in different languages.

All national experts in the Group have recognized the urgency to have a set of common catalog values for error texts.

The table on the next page shows the current status of error message texts communicated among all connected Member States.

France intends to provide the Group with a proposed error catalog in English. This proposed error catalog could be compared with the attached table on the next page and harmonized among all participating national experts in the Group.

#### Harmonized Positions

- Define a set of common catalog values for error texts
- Modify the field “MESSAGE” of XML schema based on common catalog values
- Implement the common catalog values in the NON-CODIS countries
- Ask CODIS providers to implement the error message based upon the common catalog values

## Error Messages Communicated among the Operational Environments of some connected EU countries

2007 - 2018

	Error Text	NON CODIS							CODIS																
		AT	BG	CY	DE	FR	LU	SI	BE	CZ	EE	ES	FI	HU	LT	LV	MT	NL	PL	PT	RO	SE	SK	UK	
<b>NON CODIS</b>	Loci Format Error			?	x																				
	Not enough ESS loci value	x	x	?	x		x	x						x				x							
	Not enough loci value	x	x	?	x	x	x	x						x				x							
	Invalid loci ordering	x	x	?	x	x	x	x						x				x							
	Invalid loci value			?	x		x																		
<b>Free Text</b>	Improper profiles for consultation					x																			
	Empty text	x				x	x	x										x			x				
	Specimen profile does not have any valid Pruem loci.										x	x			x			x	x		x	x	x		
	Incomplete Specimen								x	x	x	x	x		x	x	x	x	x	x	x	x	x		
	Not a valid profile				x	x																			
	Profile has not enough valid LOCI (2 of 6), etc.	x					x	x				x				x		x							
	Profile not comparable											x													
	Une erreur est survenue lors de l'interaction avec Solr					x																			

### 2.2.3.19 Construct parallel operations via SMTP and HTTP

#### Summary of this Issue

The mechanism of XML has been deployed in DNA data exchange by a common message format, which has been defined in the Interface Control Document, Chapter 1, Annex DNA of Decision 2008/616/JHA. Since the very beginning of the operations in 2007, it has been decided to transport messages in a common format by means of Internet protocol SMTP, a worldwide de-facto standard. However, this asynchronous mechanism by nature does not provide senders immediately with answers. That is one of the reasons why a maximal time span of answering requests of 15 minutes has been set by 2008/616/JHA, because many cases of identification by DNA data are time critical.

Any XML messages could be transported also by a synchronous communication protocol, e.g. HTTP, for time critical applications. The use of HTTP together with the web services is becoming de-facto standard in all applications over the Internet and/or a logically closed network using the Internet technologies.

All participants in the Group are in favor of switching the transport protocol from SMTP to HTTP. However, the migration from SMTP to HTTP should be planned carefully to ensure a smooth transfer in all Member States.

#### Harmonized Positions

- Make a concept of using HTTP for application, communication and security components on DNA data exchange
- Make a migration plan (roadmap) with a parallel operation in all Member States
- Revise the ICD in the Chapter 1, Annex DNA of Decision 2008/616/JHA
- Study the functionality of CODIS to switch to HTTP



### 2.2.3.20 **Revise XML Schema**

#### **Summary of this Issue**

The XML schema 1.0 in Decision 2008/616/JHA is partially out of date. The XML schema should be revised to reflect the new findings in forensics sciences and IT techniques since more than 10 years, e.g. a generic locus element with the locus name as an attribute, a new field to indicate the availability of additional generic information, etc.

The revised XML schema should be more stable than the current one.

#### **Harmonized Positions**

- Revise the current XML schema 1.0 to reflect forensic and IT technical needs
- Involve CODIS providers implementing the revised XML schema for all CODIS countries
- Set up a roadmap of migration to the revised schema for all Member States

### 2.2.3.21 **Without delay**

#### **Summary of this Issue**

The key point of this issue is about delivering a set of a core/reduced data after hits in order to avoid substantial delay in answering requests from other Member States. This set of 'core data' has to be defined and harmonized among all Member States.

#### **Harmonized Positions**

- The content of a set of DNA 'core data' should be discussed and proposed.
- Check the feasibility to implement Instant Transfer of a 'core data' set after hits
- Involve CODIS provider studying the mechanism of providing the set of core data

### 2.2.3.22 Search Schedules

#### Summary of this Issue

Two different Articles in Decision 2008/615/JHA relate to DNA data exchange :

Article 3 regulates exchange of reference and stain profiles in daily operations without any limitation on time schedule, for police functional cases should be investigated right away after the cases are registered. It is not allowed legally to schedule a search operation in unsolved criminal cases.

Article 4 is about the exchange of mass DNA stain profiles. Normally, this operation should be carried out only once before two Member States enter daily operations. However, operations of Article 4 will be conducted case by case after a long system downtime, fixing of serious bugs and major system updates. All these Article 4 operations will be scheduled bilaterally between two or multilaterally among many Member States by email and/or by phone calls. There is no need to make a rigid search schedule.

#### Harmonized Positions

- Non-CODIS countries will not set a fixed search schedule for Article 3 requests
- CODIS countries have already solved the bottleneck problem in the monolithic CODIS black box by adopting a provisional measure
- Article 4 operations will be carried out further upon a schedule agreed bilaterally and/or multilaterally.
- Current regulations work well – unnecessary to take any modifications

### 2.2.4 Legal Issues

## 2.2.4.1 Individual Case

### Summary of this Issue

The wording “individual case” in Article 3 (see the text box below) of the Decision 2008/615/JHA has been interpreted by the Member States in different ways. Most Member States have interpreted “individual” as “each”, but few member states stick strictly to the meaning of the English word “individual, especially the subtle difference between these two words.

The current formulation of Article 3 (2008/615/JHA) is as follows:

**Article 3**

**Automated searching of DNA profiles**

1. For the investigation of criminal offences, Member States shall allow other Member States' national contact points as referred to in Article 6, access to the reference data in their DNA analysis files, with the power to conduct automated searches by comparing DNA profiles. Searches may be conducted only in **individual** cases and in compliance with the requesting Member State's national law.

2. Should an automated search show that a DNA profile supplied matches DNA profiles entered in the receiving Member State's searched file, the national contact point of the searching Member State shall receive in an automated way the reference data with which a match has been found. If no match can be found, automated notification of this shall be given.

Generally speaking, the word “each” means philosophically an individual item, i.e. the least quantitative unit in a grouping while “individual” is used to indicate a single item (an item standing alone), rather than as belonging to a grouping and/or a group of people.

On strict linguistic interpretation of “individual”, each case could be also individually assessed and is not considered a member of a grouping (e.g. a grouping of cases). If the word “individual” is interpreted as “each”, every item in a grouping will be addressed.

Because of this difference in the interpretation, operations of Article 4 have been carried out on a time schedule agreed upon bilaterally and/or multilaterally since the very beginning of Prüm operations in 2007. After a system-down for a longer time, major system updates and/or fixing of serious bugs, it is also necessary to conduct a mass data exchange upon Article 4 among the affected Member States.

However, the CODIS system in some member states could not handle the mass data (Art 4) very properly because of the communication bottlenecks caused by its monolithic IT architecture. In this case, it would be better to be able to filter out the hit with quality 0 as specified in the current ICD and repeated hits, hence redundant hit. The mechanism to filter out the hits on request of functional and IT necessities has already been implemented by a few NON-CODIS member states. For instance, the following hits and/or requests can be automatically caught by the filtering mechanism.

- HIT of quality 0, 1, 2, 3 and 4
- repeated/redundant hits
- not-yet-answered requests for RE-SEND
- etc.

CODIS provider should implement this mechanism in accordance with the requirements of the EU.

The wording of Article 3 concerning reference and stain profiles should be revised respectively.

### **Harmonized Positions**

- France has offered to propose a text as substitute for the current wording in Article 3. The following options of the modification may be considered:
  - Use of an appropriate word, e.g. “each” and/or “every” instead of “individual”, i.e. using the wording “each new profile” or “every new profile” or
  - All new stain and reference profiles in conformity with the revised inclusion rules,  
  
or
  - All not-yet-compared and unidentified, but previously compared profiles and

## 2.2.4.2 Definition of “Personal Data” cf. EU Directive 680/2016 Multilateral Agreement

### Summary of this Issue

All delegates in this Group have agreed that die definition of 'Personal Data' in the 'Prüm Decisions' should be modified in accordance with EU Directive (EU) 2016/680 (referring to the following text box).

Art 3 of 680/2016

Definitions

(1) ‘personal data’ means any information relating to an identified or identifiable natural person (‘data subject’); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person;

It is preferable idea because this directive is specific for “investigation activities”:

**DIRECTIVE (EU) 2016/680 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL**

on the protection of natural persons with regard to the processing of personal data by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and on the free movement of such data, and repealing Council Framework Decision 2008/977/JHA

### Harmonized Positions

- This issue to modify the definition of “personal data” should be dealt with by the legal unit of the EU.

## 2.2.4.3 Re-writing Article 9 and Article 10 in commentary

### Summary of this Issue

Article 9 of Decision 2008/615/JHA is about the “Automated searching of dactyloscopic data”. Hence, it is out of scope of the Group. Article 10 in the same Decision “Supply of further personal data and other information” should be modified accordingly (referring to the issue 2.2.4.2)

## Harmonized Positions

- Ask the legal unit of the EU to revise Article 10 accordingly.

### 2.2.5 General and other issues

#### 2.2.5.1 Harmonization of the systems: FP, DNA, VRD and FR

#### Summary of this Issue

All attendees of the Group have recognized the importance of a synergy effect among all four Focus Groups. All four Living Documents of the Focus Groups will depict the concordant and discordant positions. A set of common position and intentions will be found for the next generation of Prüm.

## Harmonized Positions

- Group will obtain a set of common positions and technical approaches on all issues in the areas of IT, forensics and police functionality as large as possible
- Discordant positions and options will be analyzed carefully to assess possible impact on interoperability.
- Group will monitor the “state-of-the-art” technologies, e.g. “multiple biometrics” in the ISO standardization and W3C/RDF (Resource Definition Framework)
- Interoperability in the EU could be ensured by using international standards in the implementation of XML schema in addition to the possible adoption of UMF3

## 2.2.5.2 Training Issues

### Summary of this Issue

Since the very beginning of Prüm DNA data exchange, most police functional users in daily operations have qualified themselves by learning and/or doing on the job in accordance with the national regulations in each Member State. Forensic experts have already obtained their qualification at universities and other educational institutes. The heterogeneous application, security and communication components have been developed and maintained by IT experts in each Member State. To keep their IT knowledge always up-to-date is very crucial in their job functions and supported by the administrations in all Member States.

However, it turned out that a generic learning module of the operative specifics of Prüm DNA data exchange would be very useful, effective and time-saving in updating the knowledge of experienced users and training new users. This generic learning module could comprise a set of documents and/or materials of a training course.

The CEPOL could be the right place to be addressed for the needs of training. Besides, other advanced techniques such as knowledge transfer by online documents and/or by online video courses (E-Learning) could be exploited.

### Harmonized Positions

- Contact CEPOL for the possibility to offer a **software-independent** training course for Prüm DNA data exchange
- Compile a set of documents for the **software-independent** courses at CEPOL
- Study the possibilities to offer the materials of training courses online, e.g. EPE at EUROPOL or Website of CEPOL

### 2.2.5.3 EU Helpdesk + Ticketing

#### Summary of this Issue

Since a few years Europol has set up a Web based Europol Expert Platform (EPE) for information exchange among all Member States. The public certificates for tests and operations of all Member States are uploaded onto this EPE for download by other Member States to establish a bilateral communication channel for tests and operations. All Member States should keep their certificates up-to-date. By experience, this EPE has played the role mainly in depositing certificates. An overall functional spectrum of a helpdesk for trouble shooting has not yet defined and implemented.

In consideration of the heterogeneous landscape of IT components and different IT architecture of Member States, it is advantageous to report and solve incidents and problems in daily operations more effectively for all Member States. This proposal may be implemented by an EU agency, e.g. LISA in the future, if EU LISA is interested in acting as an agency to support Prüm operations in the EU.

The task spectrum of an EU **platform-independent** helpdesk may consist of:

- Administer a standardized test set covering **all** test cases with SHOULD-BE answers
- Set up a ticketing system for all Member States
- Administer all kinds of public certificates by executing functions of a light-weight CA (Certificate Authority)
- Issue an online News Letter periodically reporting the state of operations for all Member States
- Coordinate **platform-independent** trouble shooting for incidents and problems bilaterally and/or multilaterally among all Member States



## Harmonized Positions

- Move the current helpdesk of Europol to EU LISA and propose that the EU Prüm Helpdesk at LISA could implement and carry out the tasks described above
- Seek contact with EU LISA to study the possibilities to setup a EU Prüm Helpdesk

### 2.2.5.4 Check the Fulfilment of all 134 Prüm Requirements by CODIS Provider

#### Summary of this Issue

Many Member States are using the Combined DNA Index System (a runtime system image of CODIS) as their national database of DNA profiles while other Member States are using IT components of application, security and communication developed by their own IT force up to open standards by providing other Member States with the source codes for their deployment. The need to exchange DNA information is continuing to grow in the EU as new member states join the DNA data exchange operations. However, legal constraints prohibit centralized storage of DNA profiles.

As part of, and under, Decisions 2008/615/JHA and 2008/616/JHA, countries have stepped up the cross-border cooperation in combating terrorism and cross-border crime. On account of the heavy traffic over the communication lines among the Member States, it has become necessary to modify CODIS systems to meet the needs and the requirements of the Member States.

For that purpose, the **CODIS Prüm Requirement Document** has been agreed upon on 11 August 2009 between the FBI, the contracting body of CODIS, and the Prüm Treaty members, which had then already started daily operations on DNA data exchange.

The objective of this document is to outline the requirements for CODIS software to be developed to facilitate EU Prüm DNA search requests and results exchange between Member States.

The current runtime version CODIS 8.x, which has been installed at the sites of many Member States, including Prüm member states, laboratories and law enforcement agencies, carries out both domestic and international processing,. This monolithic IT architecture supports indeed many scientific areas of forensics with a wide range of forensic user circle, but has shown the major drawbacks of performance in exchanging a bulk/mass DNA data (Art. 4) with other Member States in daily operations. The requirements for DNA data exchange for identification purposes among the law enforcement agencies in the EU are quite different from those in circle of the scientific labs, especially for exchange of bulk data. Moreover, the users in the EU of this runtime black box have no possibilities to custom it to suit the ever changing needs of the EU community. The recognized discrepancies of the IT, forensic and police functional requirements between the EU NON-CODIS and CODIS systems have been reported to the CODIS Helpdesk. However, a bug fixing in a timely manner is not always ensured.

After having checked the **CODIS Prüm Requirement Document** in 2009, the requirements of No 8/109/112/114/118/127/128/133 and 134 have **not** yet been met by the CODIS provider.

The following report on the fulfilment of Prüm requirements by CODIS has been compiled by Romania.

## **Survey of CODIS PRÜM REQUIREMENTS**

For EU Next generation Prüm Focus Group DNA

August 2019

This is a short report about the implementation status of the CODIS Prüm Requirements established in the early days of automated Prüm DNA data exchange (2009). The feedback regarding the evaluation of the requirements was received from Romania, Slovakia, France, Spain, Italy, Netherlands, Estonia and FBI (CODIS providers). The request to evaluate the requirements was also sent to UK, Portugal, Belgium and Poland.

From 134 only 129 were valid requirements and from those only 9 requirements were not implemented in CODIS<sup>5</sup>. Detailed answers and comments can be found in a separate Excel document (CODIS Prüm Requirements – Feedback).

No.	Requirements	Requirement ID	Observations
5	Requirements do not exist	76, 77, 78, 80 and 117	-
120	Requirements were implemented in CODIS	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 79, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 110, 111, 113, 115, 116, 119, 120, 121, 122, 123, 124, 125, 126, 129, 130, 131 and 132	-
2	Requirements were NOT implemented in CODIS 7 and 8 but are scheduled for CODIS 9 and 11	109 and 133	Future implementations
4	Requirements were NOT implemented in CODIS, but the same results can be obtained out of CODIS GUI by interrogating SQL database.	8, 112, 114 and 134	Improvements can be done to CODIS GUI
3	Requirements were NOT implemented in CODIS	118, 127 and 128	According to CODIS providers, was previously determined that these requirements are not necessary.

### Harmonized Positions

- Involve CODIS provider at a later stage to discuss the unfulfilled requirements in the **CODIS Prüm Requirement Document**
- Keep providing the CODIS provider with the working results by the Group concerning CODIS by the Romanian delegate as liaison officer
- Work on an updated Requirement Catalog including all existing and new EU requirements for CODIS provider

<sup>5</sup> Latest version for UE is CODIS 8

### **3 Issues for further Discussions (Informative)**

#### **3.1 Likelihood Ratio Contributed by the Netherlands**

The following clause contributed by the Netherlands provides a summary of Likelihood Ratio (LR) applied to DNA database searches and the applicable options which may be adopted in DNA data exchange in the next generation of Prüm:

##### **Probabilistic Considerations in DNA Database Searches**

###### **General information**

When searching a DNA database, a DNA profile of a crime stain is compared to many reference DNA profiles of persons. The donor of the crime stain will match if his profile is in the database. However, each non-donor also has a small probability to match by chance. As databases grow, they will generate more matches with true donors but also more adventitious matches. There has been a debate in the scientific literature about the interpretation of a database match with a person named Smith, which has now reached broad consensus on the following seven points:

1. A DNA match between Smith and a crime stain typically is very strong evidence supporting that Smith is the donor of the stain.
2. However it is possible that Smith is not the donor and matches by chance.
3. The probability that Smith is in fact the donor can vary from small to large, depending also on the other evidence in the case. If the other evidence supports donorship, the probability is large. If the other evidence supports non-donorship, or if there is (almost) no other evidence, the probability can be small.
4. In case of a probable cause match (i.e., the suspect is first identified by non-DNA evidence) we know that there is some other evidence supporting donorship. In case of a database match (i.e., the suspect is first identified by a DNA match in a database search) we do not know this, there may even be (almost) no other evidence.

5. If multiple comparisons are made with the crime stain profile (as in database search) and all except Smith have been excluded as the donor, this increases the probability that Smith is the donor.
6. The larger the database, the more persons are excluded as donors, hence the larger the probability that Smith is in fact the donor.
7. If more certainty is required it may be possible to do additional DNA analysis.

Thus, when Smith matches through database search we can be in the situation that the DNA evidence is very strong, but the probability that he left the crime stain is small.

### **The number of random matches for a single search**

When we compare a single DNA profile of a crime stain to a database with profiles of different persons, we may generate one or several random matches (also called adventitious /fortuitous/ chance matches). The probability distribution of this number is known: if the random match probability of the profile is  $p$ , and if we compare with  $n$  persons, then the number  $X$  of random matches is approximately<sup>6</sup> binomially distributed with parameters  $n$  and  $p$ . For large  $n$  and small  $p$ , this is approximately Poisson distributed with parameter  $np$ . Thus, the probability of generating at least one random match is

$1 - \frac{1}{e^{np}}$ . This probability increases with  $n$  and  $p$ .

Based on a database of allele frequencies observed in the Dutch population and theta set to zero, the following random match probabilities (rmp) are typically observed (they are the median of 1000 simulated profiles):

# loci	rmp
6	4.6E-09
7	1.9E-10
8	7.5E-12
9	2.9E-13
10	1.2E-14

---

<sup>6</sup> We assume that the persons in the database are unrelated to each other and to the stain donor. We also assume that none of them is the donor of the stain. If the stain donor is in the database, he will generate one extra match.

Based on this, we can plot the probability of generating at least one random match  $(1 - \frac{1}{e^{np}})$  as a function of n and the number of loci. This yields the following figure:

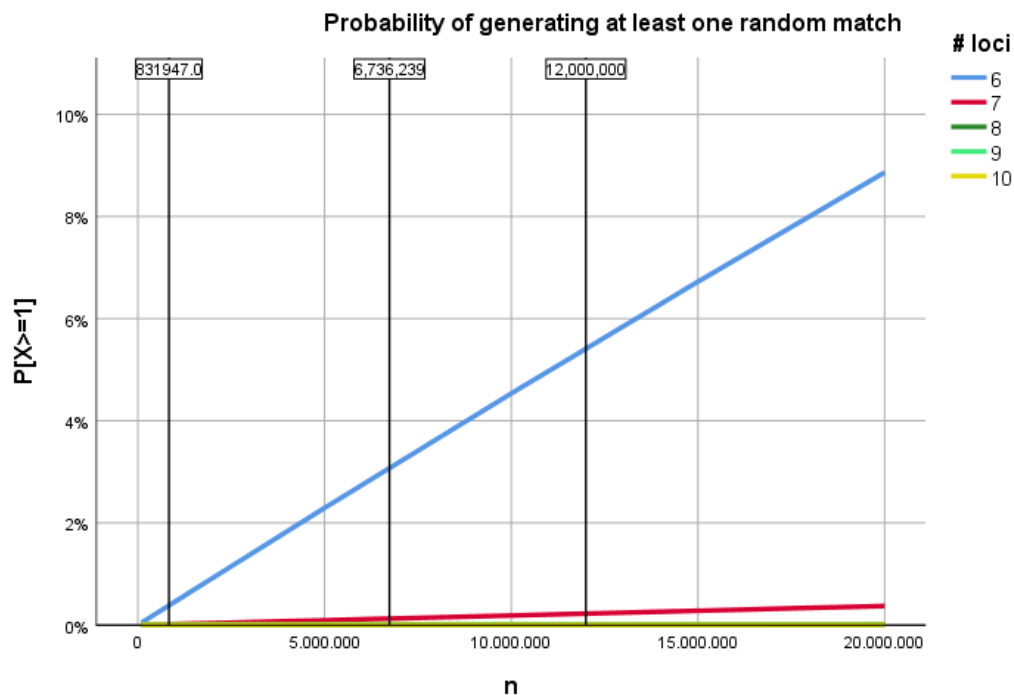


Fig 1: the probability of generating at least one random match when a single profile (with 6,7,8,9, or 10 loci, and with a random match probability listed in the table above) is compared to a database with profiles of n different unrelated persons (with theta set to zero).

### Policy for exchange of personal data

At the start of the Prüm Treaty DNA exchange, it was decided that 6-locus matches were sufficiently reliable to exchange the personal details of the matching person (such as the name). At that time (2008), there were less than 1 million persons in the database (831,947 in December 2008), and the probability that a 6-locus profile would generate at least one random match was 0.4%. For 7-locus profiles this probability was less than 0.02%.

Currently, there are about 6,7 million persons in the database (6,736,239 in December 2018), and the percentages are 3% (6 loci) and 0.1% (7 loci). With the entry of the UK, we have about 12 million profiles, and the numbers will be 5% (6 loci) and 0.2% (7 loci).

Furthermore, the graph above is based on the median of random match probabilities in 6 locus profiles. Some 6-locus profiles are much more common: 1% has a random match probability of  $10^{-6.2}$  or larger. These 6-locus profiles generate at least one random match with probability 48% at the start of Prüm, 99% currently, and 99.97% with the entry of the UK.

Thus, this process will generate a relatively large number of random matches. This may have serious consequences for the matching person. If he is lucky, the true donor is in the database, and will also generate a match. Most of the times, the true donor will not be in the database, and he will be the only person matching. If his name is exchanged, he may become a suspect of a crime he did not commit, with very strong DNA evidence suggesting he is the donor of the crime stain. It is clear that this situation is unwanted for all parties involved.

There is a trade-off between the number of criminals that can be apprehended and the number of innocent persons that become a suspect. Very stringent exchange criteria will minimize both. Relaxing the criteria will increase both. Hence, the decision on the exchange criteria is a political decision. This focus group could explain the problem to the politicians, suggest options for exchange criteria together with their consequences, and then advise them on what according to the focus group is the best option.

For example, we could suggest the following options:

**Option 1: Unchanged policy:**

Exchange personal data when a match based on 6 loci or more is obtained.

**CONS:** since each 6-locus comparison currently has about 3% of generating one or more random matches, this will lead to a relatively large number of random matches. [The expected number can be calculated but require many assumptions/data, e.g. about the probability that the true donor is in the Prüm database, which may vary between countries]. The 6 locus profile in the match therefore need to be upgraded in order to prove or falsify the match,

**PROS:** fast exchange of data and apprehension of criminals

## **Option 2: Changed policy:**

Exchange personal data when a match based on 8 loci or more is obtained.

If the personal data of 6 and 7 locus matches are needed, the profile needs to be upgraded. If that doesn't work, or if it is an important case such as a terrorist attack and time is important, an "escape" route is made possible.

**CONS:** some useful leads will not be followed up. Furthermore, through the escape route it is still possible that innocent persons become a suspect based on a 6 or 7 locus match in truly important cases.

**PROS:** this will lead to much smaller numbers of random matches. In truly important cases useful leads can be used.

These examples are just for illustration and need to be discussed. We can consider several variations, e.g. the Likelihood Ratio as a criterion instead of the number of loci compared.

The opinions of the participating national experts are summarized as follows:

- Adopting the method of LR in DNA comparison should be decided by respective national authorities.
- Using the method of LR in DNA comparison is dependent upon the size of a national DNA database. Each Member State should find out the appropriate size of a national database for adopting the method of LR
- It is necessary to carry out a population-specific study in the EU including a common frequency table before the method of LR could be introduced EU-wide in DNA data exchange
- The current DNA data exchange works sufficiently well upon the match rules described in the current 'Prüm Decisions'. The more appropriate definition of match rules by the number of identical loci and adopting the method LR could be discussed and harmonized for the next generation Prüm



- The method of LR could be used as supporting information in discovering meaningful and conclusive matches with relatively fewer loci
- In Slovenia the method LR has already been used in daily work. Before introducing LR in match criteria an EU-wide population-specific study should be carrying on.

### **General Concerns about This Issue**

The solutions to this issue are related closely to the issue “Match Threshold”. The general concerns about LR are summarized as follows:

#### Option 1

Each national authority could consider introducing LR an additional supporting tool to reduce the number of false positive matches and adventitious matches

#### Option 2

Carry out an EU-wide population-specific study on the appropriate size of a DNA database for an EU-wide search before the method of LR could be introduced in daily operations among all EU countries.

#### Option 3

Using LR in examining matches may provide the investigators with supporting information for verifying the profiles with relatively fewer loci.

## 3.2 A Common Set of Business Information for IT Statistics contributed by Germany

### A Basic Set of Common Business Information

#### Time Constraints:

##### Originating country (sending a request):

- Date and Time of a request ready for sending at the database
- Date and Time of a request to leave the originating country
- Date and Time to receive the answer to the request from a foreign country by the email components
- Date and Time to register the result in the database of the originating country

#### Calculate:

- ⇒ Time span between “ready for sending” at the database and transmitted by email server
- ⇒ Time span between sending a request and receiving the answer to it
- ⇒ Time span between receiving the answer and registering at the database

##### Recipient country (receiving a request):

- Date and Time on receipt of a foreign request at the front end (Email components)
- Date and Time on receipt of a foreign request by the database
- Time span needed by a Match Engine to process a foreign request
- Date and Time to register the matching result in the database
- Date and Time to transfer the matching result back to the front end email component/s by application
- Date and Time to send the result to the originating country by email component/s

Calculate:

- ⇒ Time Span between receiving a foreign request and registering at the database
- ⇒ Amount of time needed by a Match Engine to process a foreign request
- ⇒ Amount of time between the answer “ready for sending” and leaving at the front end

### **Size of a national database**

- Total number of DNA profiles
- Total number of DNA reference profiles
- Total number of DNA stain profiles
- Weekly, monthly and annually Increasing rate of profiles

### **Data Traffic in daily operations:**

#### Operational Status:

- Categorize the runtime state by defining weighing parameters and/or by selecting a set of evaluable parameter
  - Operations as a whole in green light?
  - Database in green light?
  - Application/s in green light?
  - Data transmission/transfer in green light?
- Define the following status by evaluating a set of parameters:
  - Network congestion with time stamp?
  - System down totally with time stamp?
  - System maintenance and/or software update?

### Error status:

- Total number of unreadable erroneous messages in a breakdown list with categories of the connected EU countries, error sources (SMIME, in email header, etc.)
- Total number of readable requests in a breakdown list with categories of the connected EU countries and defined error sources

### **Information relating Hits:**

- Total number of hits achieved daily, weekly, monthly and annually in a breakdown list with categories of the connected EU countries
- Total number of hits achieved daily, weekly, monthly and annually from a specific EU country in a breakdown list with different hit qualities
- Total number of hits achieved daily, weekly, monthly and annually with the quality 1 in a breakdown list with categories of the connected EU countries
- Total number of hits achieved daily, weekly, monthly and annually with the quality 2 in a breakdown list with categories of the connected EU countries
- Total number of hits achieved daily, weekly, monthly and annually with the quality 3 in a breakdown list with categories of the connected EU countries
- Total number of hits achieved daily, weekly, monthly and annually with the quality 4 in a breakdown list with categories of the connected EU countries

### **Information relating data exchange upon Art 3:**

- Total number of profiles (person and stain) to be sent daily, weekly, monthly and annually in a breakdown list with categories of the connected EU countries
- Total number of profiles (person and stain) to be received daily, weekly, monthly and annually in a breakdown list with categories of the connected EU countries
- Time windows with no activities in a breakdown list with categories of the connected EU countries

**Information relating data exchange upon Art 4:**

- Timestamp of beginning (sending) and terminating (receiving) from MS-x to MS-y
  - Timestamp of beginning (sending) and terminating (receiving) from MS-x to MS-y
  - Total number of data exchanged between the MS-x and MS-y
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