

Latent Print Overview

Presentation to the National
Commission on Forensic Science

August 27, 2014



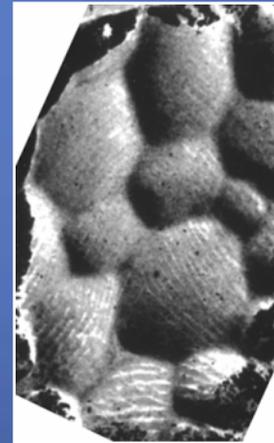
Melissa R. Gische
Physical Scientist/Forensic Examiner
FBI Laboratory

Friction Ridge Detail

Known Fingerprints

Latent Fingerprints

LEAVE BLANK		(STAPLE HERE)		LEAVE BLANK	
STATE USAGE		STATE USAGE		STATE USAGE	
SIGNATURE OF PERSON FINGERPRINTED		LAST NAME, FIRST NAME, MIDDLE NAME, SUFFIX		SOCIAL SECURITY NO.	
<i>Jh Smith</i>		Smith, John A		000-33-4444	
FBI NO.		DATE OF BIRTH		SEX	
1234567890		08 18 70		M	
RACE		HEIGHT		WEIGHT	
W		62"		190	
EYES		HAIR			
BRO		BRO			
1. R. THUMB		2. R. INDEX		3. R. MIDDLE	
4. R. RING		5. R. LITTLE			
6. L. THUMB		7. L. INDEX		8. L. MIDDLE	
9. L. RING		10. L. LITTLE			
LEFT FOUR FINGERS TAKEN SIMULTANEOUSLY		L. THUMB		R. THUMB	
RIGHT FOUR FINGERS TAKEN SIMULTANEOUSLY					



Comparison Process

A
Analysis

C
Comparison

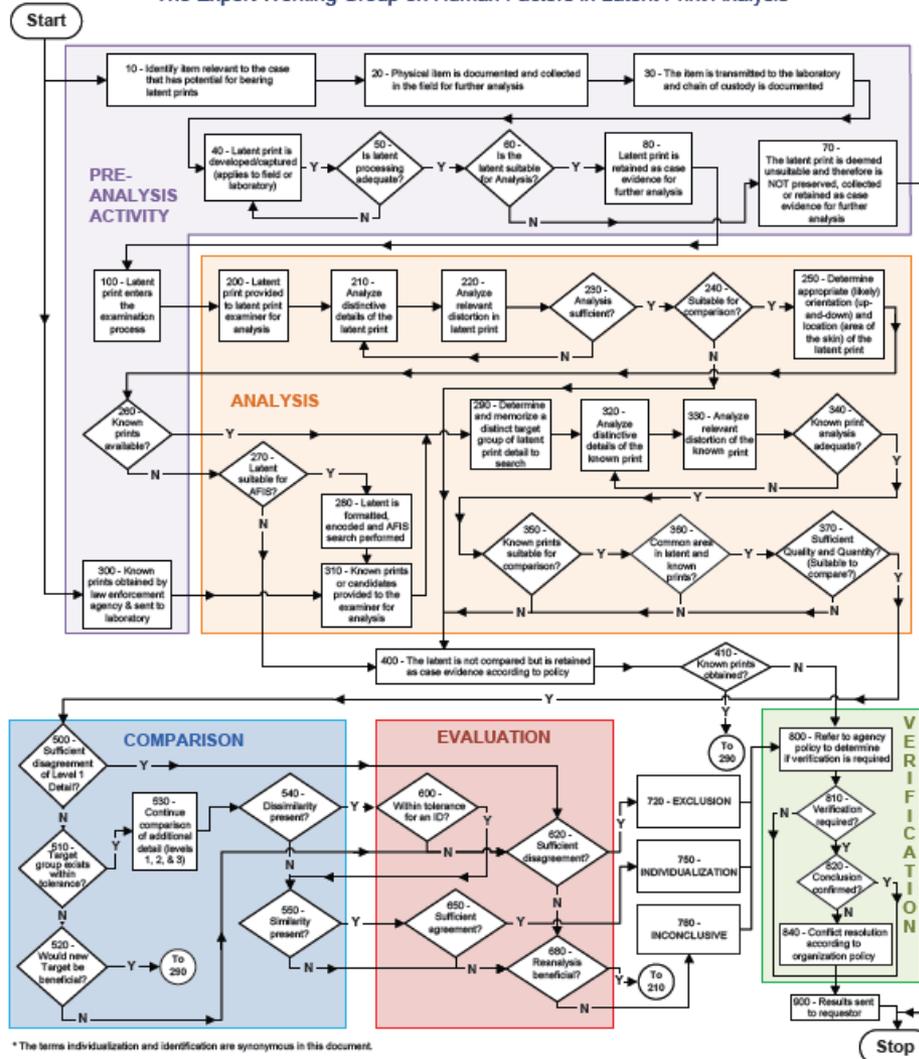
E
Evaluation

V
Verification

ACE-V

The Latent Print Examination Process Map

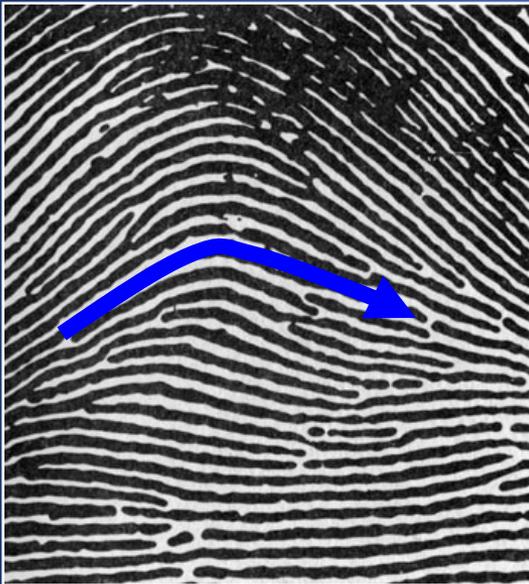
The Expert Working Group on Human Factors in Latent Print Analysis



- ACE-V defines the steps of the latent print examination process, as detailed in the process map developed by the Working Group:

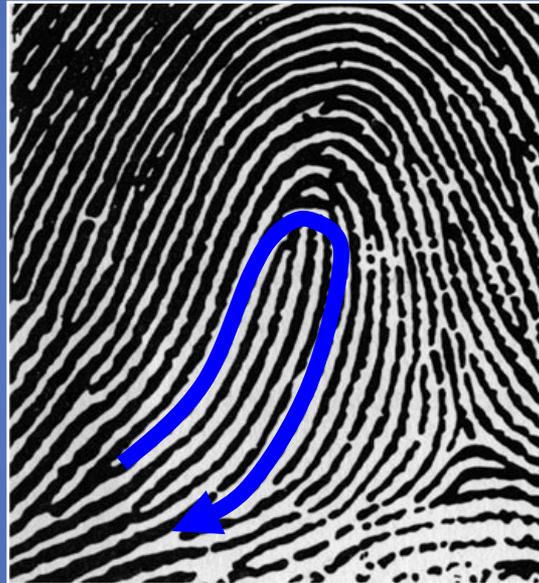
- Analysis
- Comparison
- Evaluation
- Verification

Three Basic Pattern Types



Arch

~5%



Loop

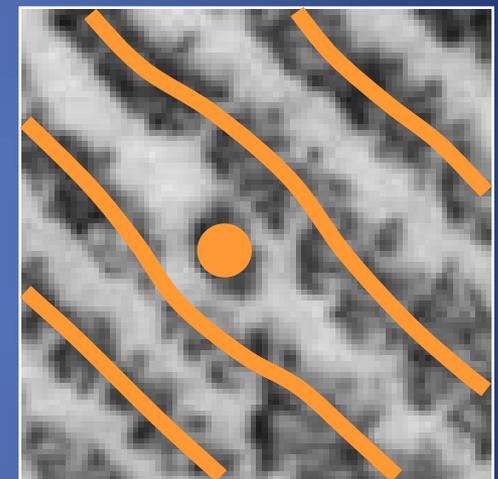
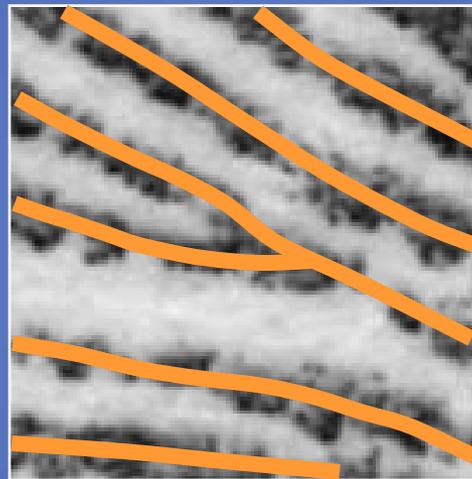
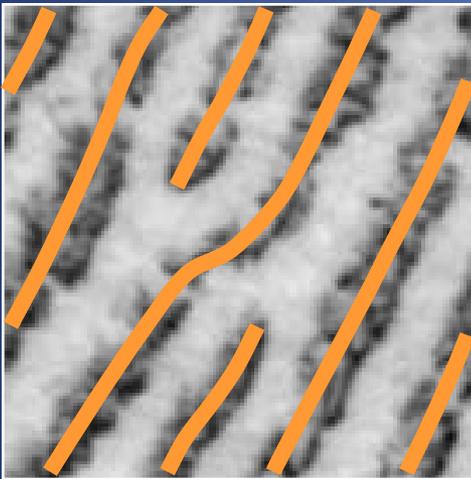
~65%



Whorl

~30%

Individual Ridge Information



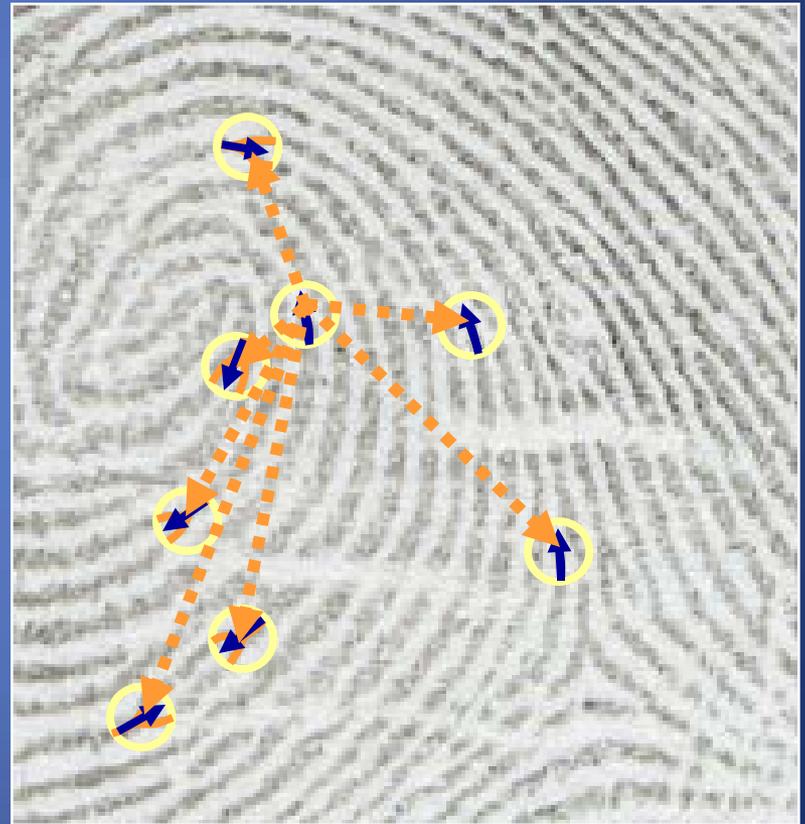
Ending Ridge
~ 55-65%

Diverging Ridge
~ 26%

Dot
~ 3%

Individual Characteristic Information

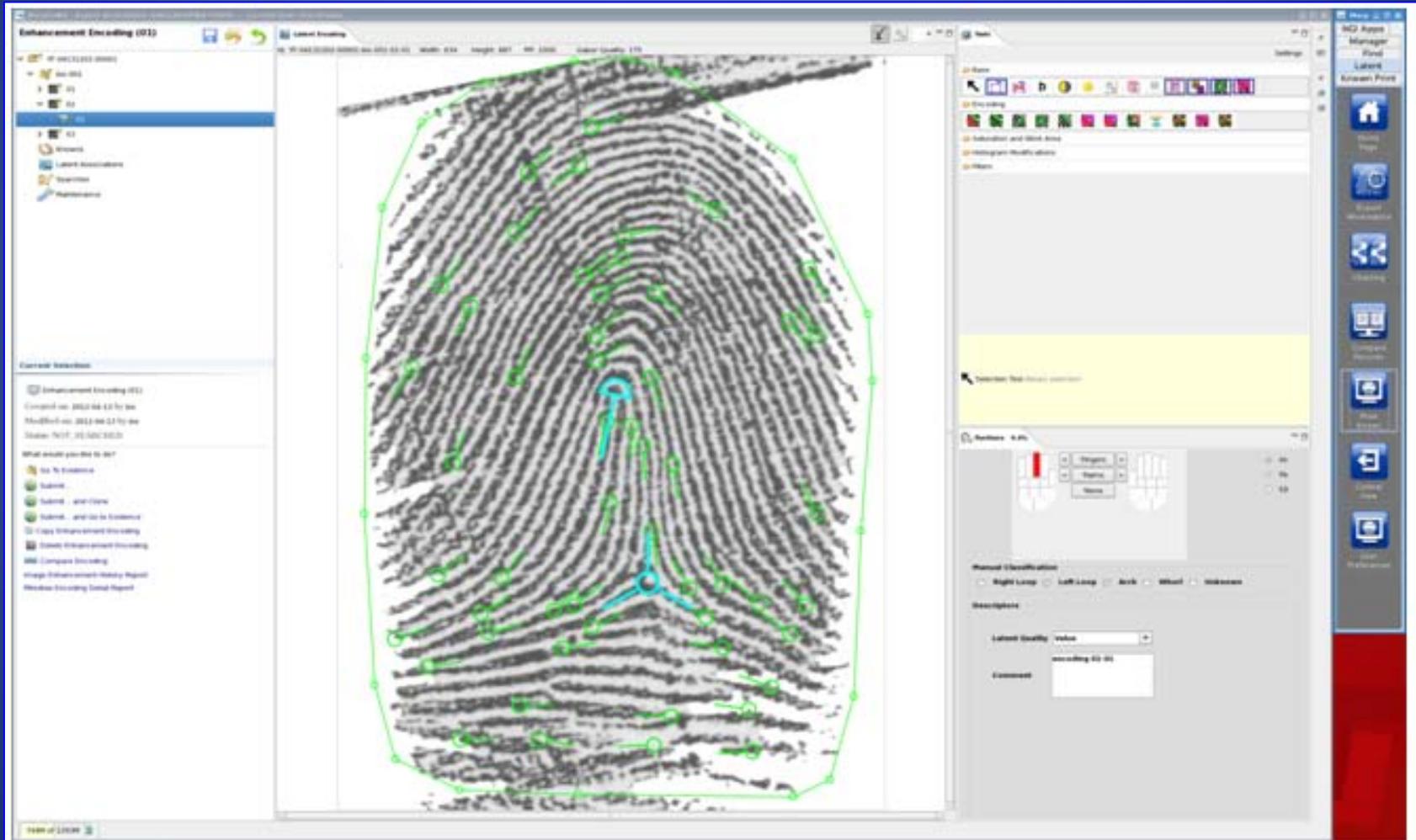
- Single characteristics contain multiple types of information
 - Location
 - Type
 - Direction
 - Spatial Relationship



Analysis of Latent Print



Next Generation Identification (NGI) Encoding



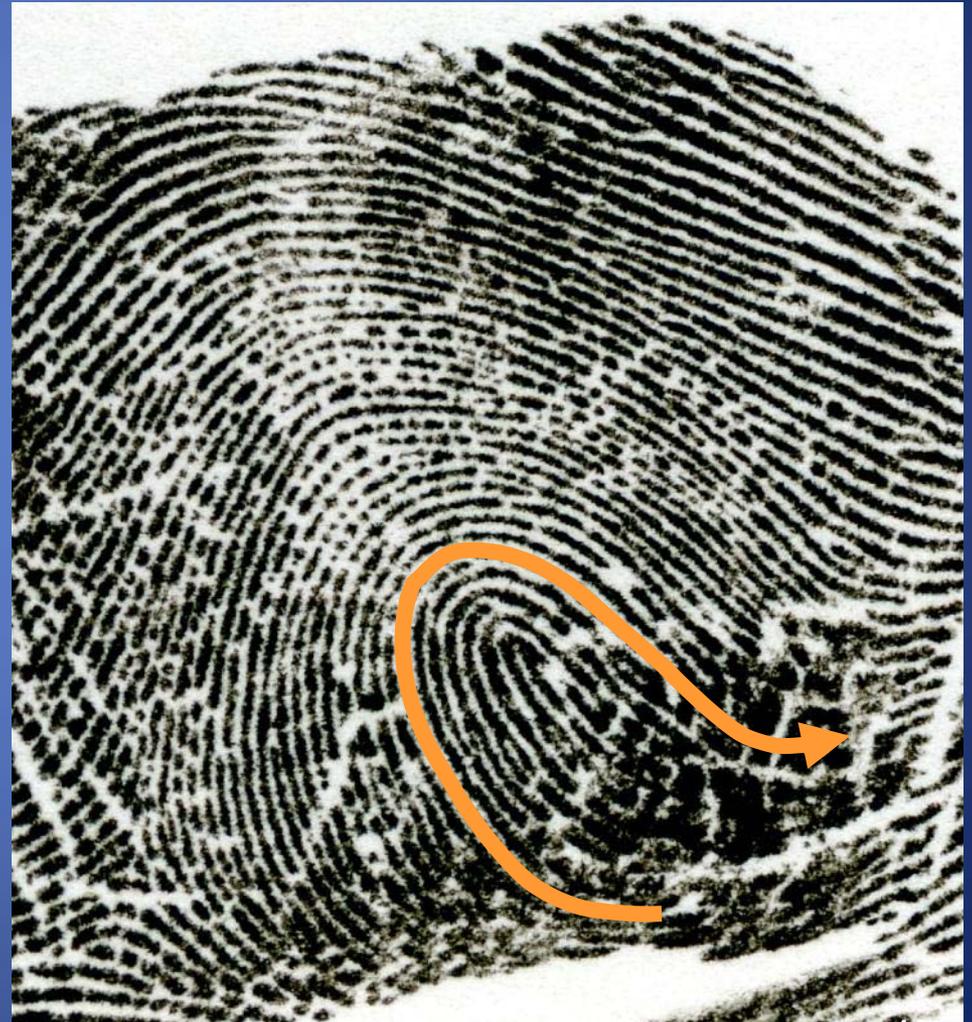
Analysis of Known Prints

PERSONAL IDENTIFICATION SEE REVERSE SIDE FOR FURTHER INSTRUCTIONS		TYPE OR PRINT ALL INFORMATION IN BLACK LAST NAME <u>NAM</u> FIRST NAME MIDDLE NAME				FBI LEAVE BLANK			
SIGNATURE OF PERSON FINGERPRINTED <i>Bruce Coyne</i>		FINGERPRINTS SUBMITTED BY <i>Angers, Brick N.</i>				DATE OF BIRTH <u>DOB</u> Month <u>01</u> Day <u>16</u> Year <u>1982</u>			
RESIDENCE OF PERSON FINGERPRINTED		DATE FINGERPRINTED 10/06/2010	SEX M	RACE W	HGT. 5'10"	WGT. 162	EYES Haz	HAIR Bro	PLACE OF BIRTH <u>POB</u> Phoenix, AZ
PERSON TO BE NOTIFIED IN CASE OF EMERGENCY NAME _____ ADDRESS _____		SOCIAL SECURITY NO. 123-45-6789		LEAVE BLANK				CLASS _____	
FINGERPRINTED BY <i>JL Hansen</i>		MISCELLANEOUS NO.		REF. _____				SCARS AND MARKS	

 R. THUMB	 R. INDEX	 R. MIDDLE	 R. RING	 R. LITTLE	
 L. THUMB	 L. INDEX	 L. MIDDLE	 L. RING	 L. LITTLE	
 LEFT FOUR FINGERS TAKEN SIMULTANEOUSLY		 L. THUMB	 R. THUMB	 RIGHT FOUR FINGERS TAKEN SIMULTANEOUSLY	

Comparison

MOVE TO EVALUATION

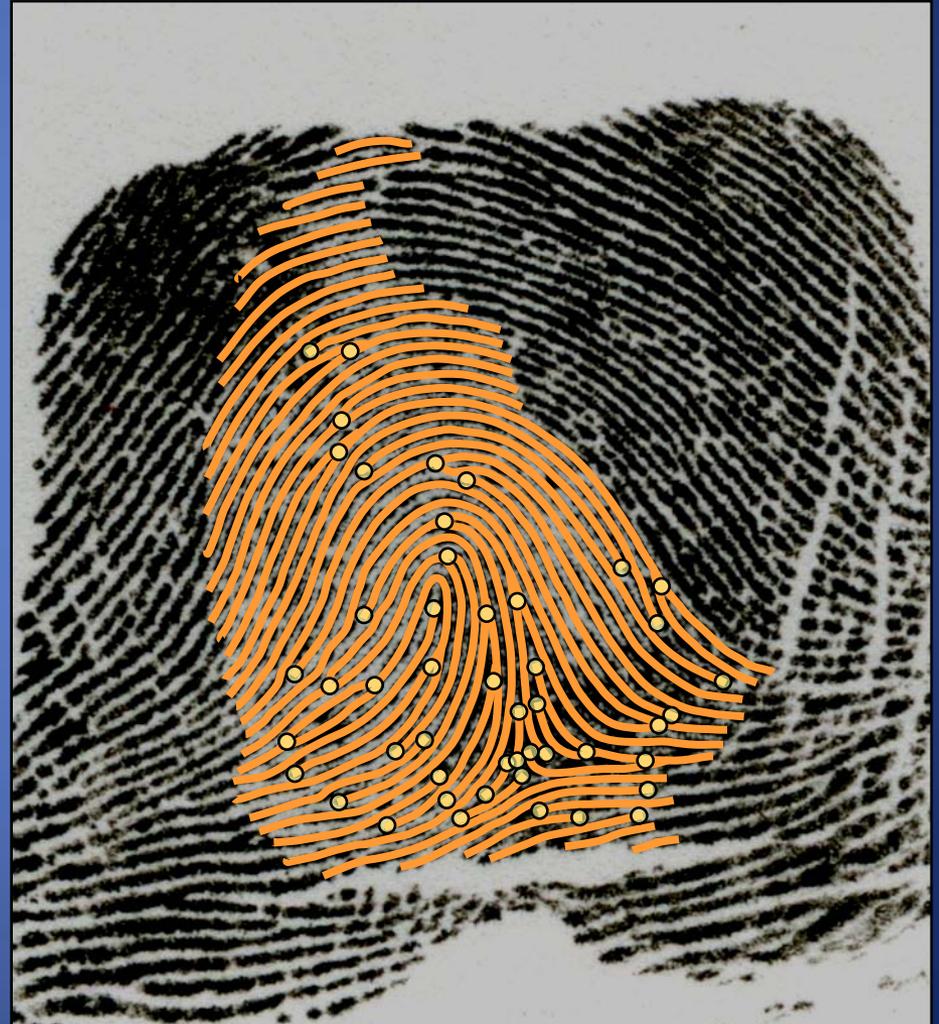
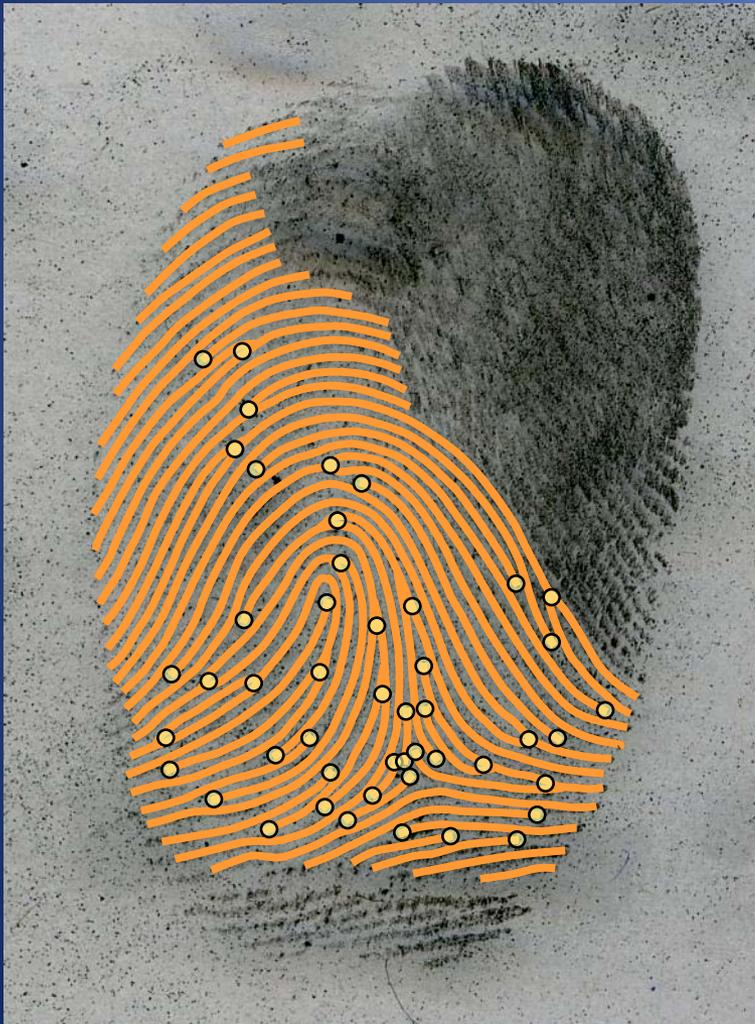


Comparison

PERSONAL IDENTIFICATION SEE REVERSE SIDE FOR FURTHER INSTRUCTIONS		TYPE OR PRINT ALL INFORMATION IN BLACK LAST NAME <u>NAM</u> FIRST NAME <u>Angers</u> MIDDLE NAME <u>Brick N.</u>				FBI LEAVE BLANK				
SIGNATURE OF PERSON FINGERPRINTED <i>David Cayne</i>		FINGERPRINTS SUBMITTED BY				DATE OF BIRTH <u>DOB</u> Month <u>01</u> Day <u>16</u> Year <u>1982</u>				
RESIDENCE OF PERSON FINGERPRINTED		DATE FINGERPRINTED <u>10/06/2010</u>	SEX <u>M</u>	RACE <u>W</u>	HGT. <u>5'10"</u>	WGT. <u>162</u>	EYES <u>Haz</u>	HAIR <u>Bro</u>	PLACE OF BIRTH <u>Phoenix, AZ</u>	POB
PERSON TO BE NOTIFIED IN CASE OF EMERGENCY NAME _____ ADDRESS _____		SOCIAL SECURITY NO. <u>123-45-6789</u>				LEAVE BLANK				
FINGERPRINTED BY <i>JL Hansen</i>		MISCELLANEOUS NO.				CLASS _____				
		SCARS AND MARKS				REF _____				
LEFT FOUR FINGERSTAKEN SIMULTANEOUSLY			L. THUMB		R. THUMB		RIGHT FOUR FINGERSTAKEN SIMULTANEOUSLY			

Comparison

MOVE TO EVALUATION



NGI Comparison & Evaluation Screen

The interface displays two fingerprint images for comparison. The left image has a score of 1000:0.56:559 and the right image has a score of 500:1.12:559. The 'Status' panel on the right contains the following controls:

- Case Result: **No Decision**
- Ident:
- Non-Ident:
- Inconclusive:
- NoDecision:**
- Idents: 0
- Respondents: 10
- Current Respondent: 1
- Retain Search Print:
- Discard ULF:
- Axis:
- Orient:
- Buttons: Chart, Match Rpt, Export
- Candidate Preview:

The 'Ineup' panel shows four thumbnails of fingerprints, each with a label: 1. 000000000045 (\), 2. 000000000045 (A), 3. 000000000045 (\), 4. 000000000045 (\).

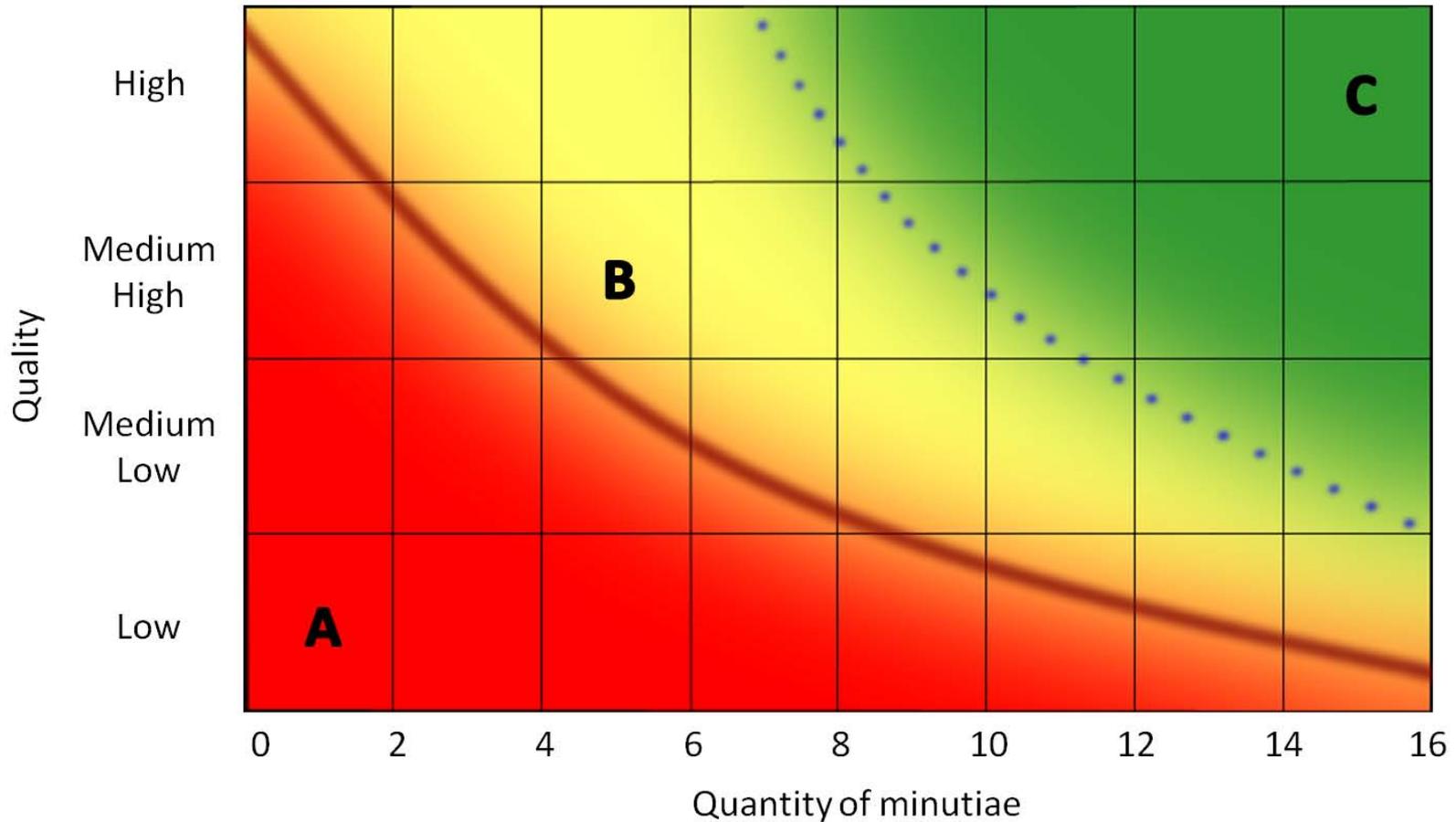
The 'respTable' panel contains the following table:

Pos	ID	...	S
1	000000000045	f1	-
2	000000000045	f2	-
3	000000000045	f3	-
4	000000000045	f4	-
5	000000000045	f5	-
6	000000000045	f6	-
7	000000000045	f7	-
8	000000000045	f8	-
9	000000000045	f9	N
10	000000000045	f...	-

Decision buttons

Determining Sufficiency

Sufficiency Graph



This graph does not suggest or endorse the use of minutiae counts as the sole criteria for a decision threshold
 SWGFAST Document #10 Standards for Examining Friction Ridge Impressions and Resulting Conclusions Ver. 2.0

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