FBI Fingerprint Scanner Certification Program

NIST Biometric Quality Workshop
March, 2006

Tom Hopper FBI
Norm Nill MITRE

The Plan

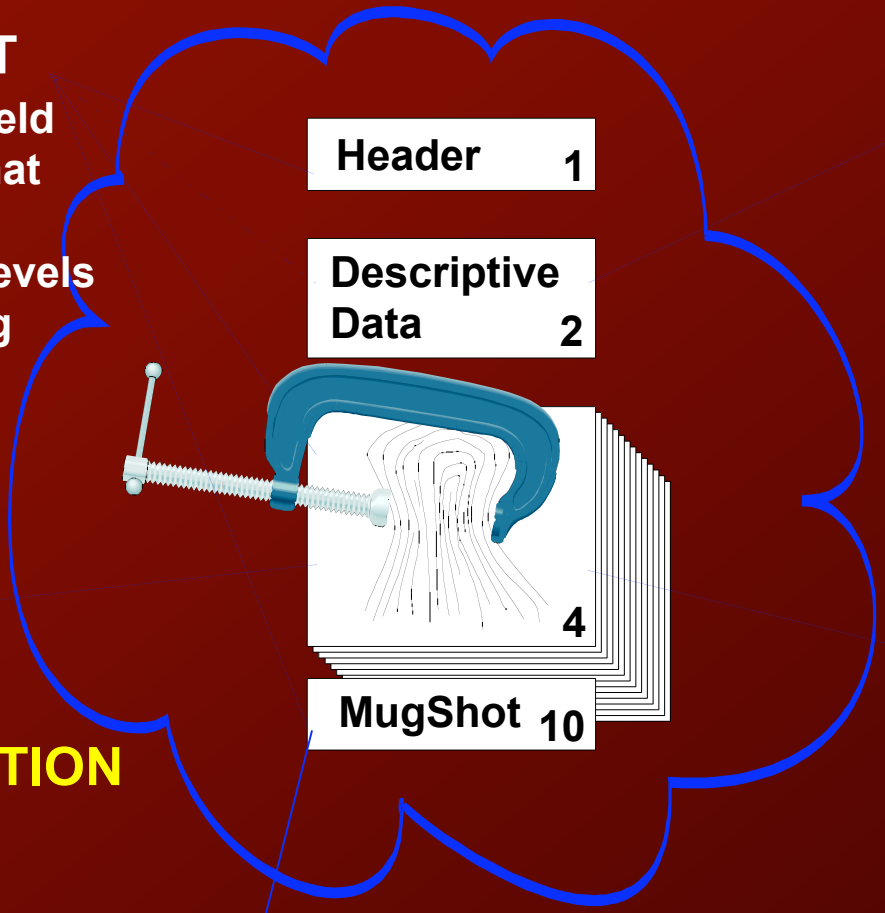
- Identification requirement in engineering terr
  - Latent Print Comparison - AFIS
- Support procurements
- Test performance (not design)
- Don’t delay vendors
- Don’t drive up costs

Fingerprint Scanner Certification

- Negotiated Test Plan (FIR, IC…)
- Core Requirements
- Identification Flats
- Single Finger Scanners

e-Fingerprint

ANSI/NIST
- Tagged Field Data Format
- 500 ppi
- 256 gray levels
- Versioning
- XML



Electronic FP Transmission Specification (E
- Required Fields
- Service Agreem

WSQ
- Compression

CERTIFICATION

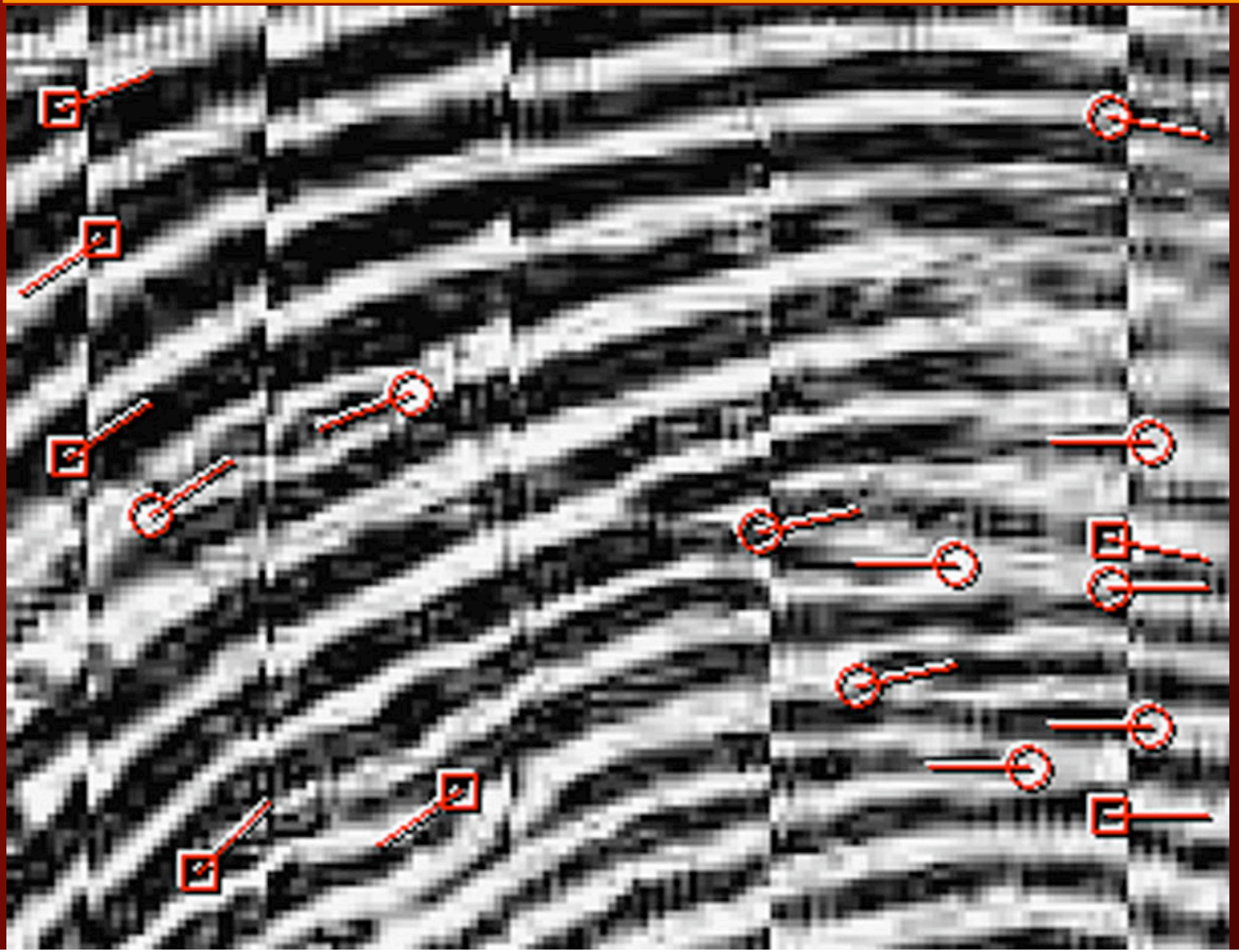
Image Quality S
- Scanner Require

CERTIFICATI

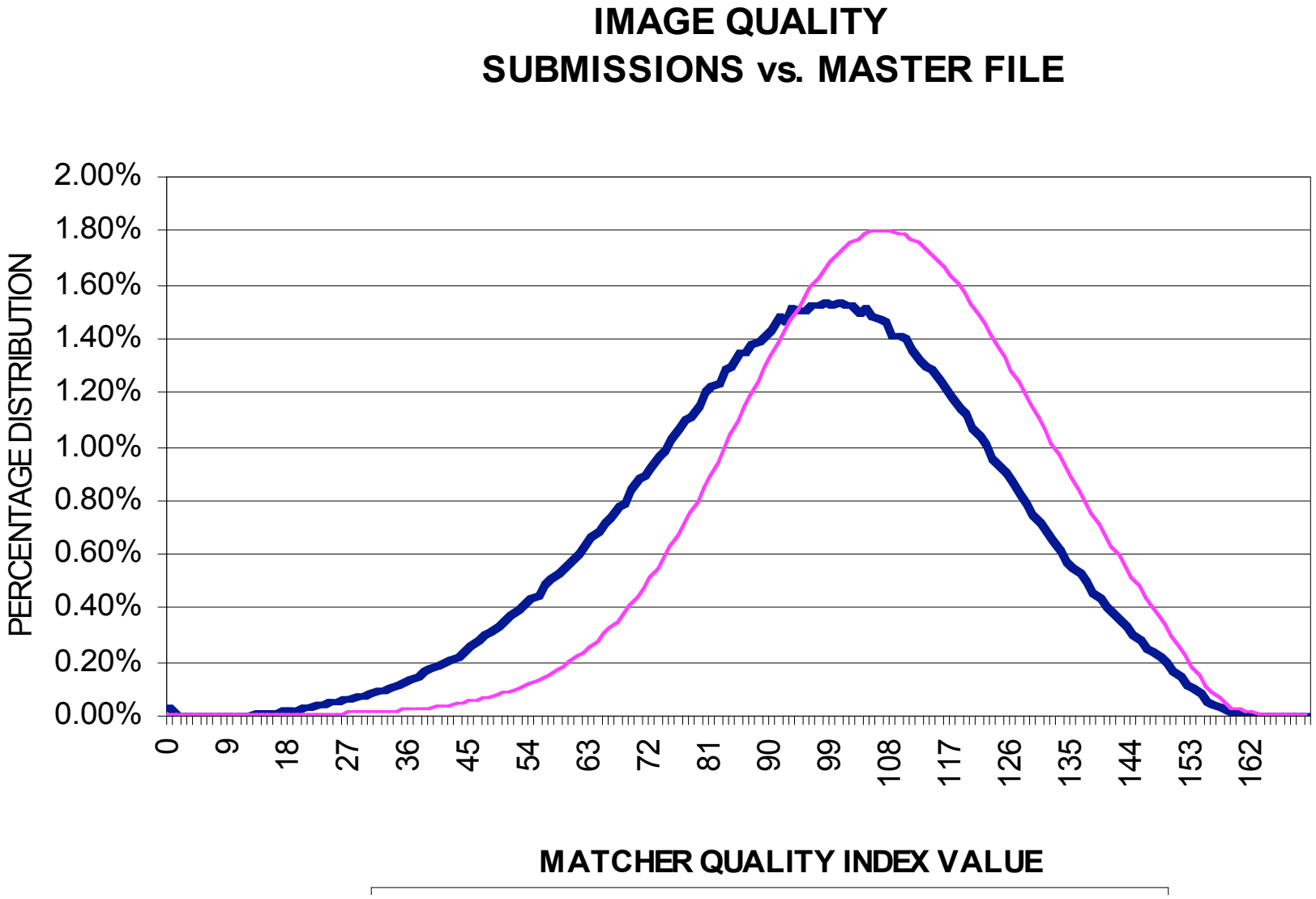
Best Practice

Quality -> Accuracy

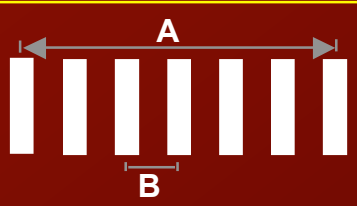
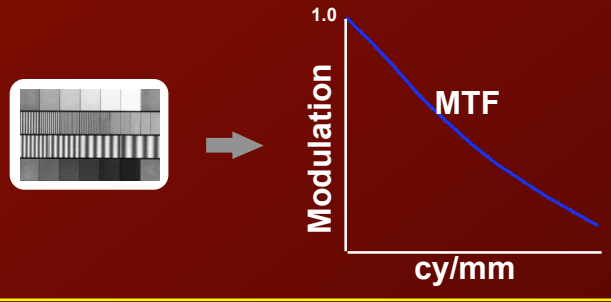
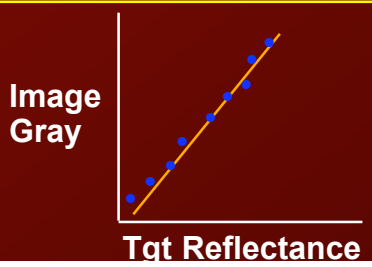
False Minutiae



Quality Trends



Scanner Certification Specifications

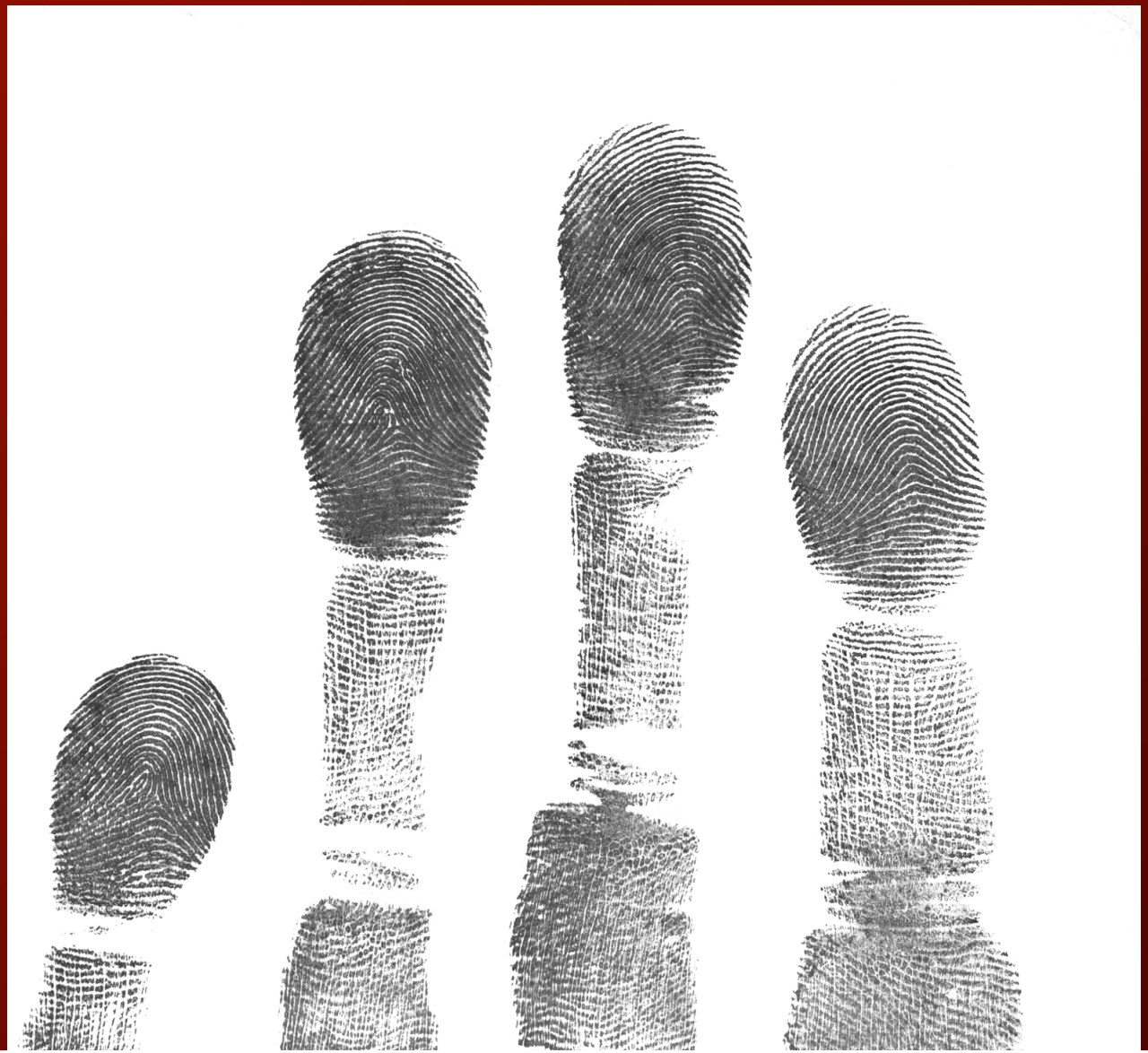
IQ Parameter:	Description:	F Spec (G Spec)
Geometric Integrity		max error in pixels A: 1.2 (1.8) B: 0.3 (0.5) (pixel = 0.051 mm)
Scale	pixels per inch	500 ± 5 ppi
Modulation Transfer Function (MTF) - resolution - detail sharpness - spatial freq. response		min MTF @ 5 cy/mm 51% (44%)
Linearity		< 7.65 gray deviation from straight line

Scanner Requirements

IQ Parameter:	Description:	F Spec (G Spec)
Noise	standard deviation (σ)of gray level fluctuations on uniform White & Black tgts	
Gray Uniformity	row-to-row, col-to-col, area-to-pixel, area-to-area, on uniform white & black tgts	max gray level deltas established for white & black
Gray Scale Range of Fingerprints	number of gray levels in light, medium, & dark-inked ten-print card test set	80% > 200 grays (80% > 150 grays)

$$\frac{\overline{W} - \overline{B}}{\sigma_W}, \frac{\overline{W} - \overline{B}}{\sigma_B} > 125$$

Identification Flats



Identification Flats Additional Requirements

- Simple Capture Protocol
- No Finger Sequence Errors

3.2 x 3.0 platen

Single Finger Scanner EFTS Appx. G

- Defined in NIST SP800-76 (PIV)
  - min capture size 12.8 x 16.5 mm
  - native resolution at least 500 ppi
- Modify current G spec:
  - new levels for new sensor types & application
  - greater focus on AFIS requirements
- Your thoughts?

nbnill_at_mitre.org
thopper_at_leo.gov