# Department of Homeland Security

## Less Than 10–Print Processing

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# Less Than 10-P Processing

- **2-P Systems Becoming More Common**
- **Offer Significant Advantages**
- **But Interoperability Issues Remain**

# Examples of Less Than 10-P

- **Border Control**
- **Mobile Law Enforcement**
- **Social Services/Welfare**
- **Driver's License Identity Management**
- **Voter Registration Fraud Detection**


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# US-VISIT

## Entry:

**Search & Enroll**

***US-VISIT IDENT***

Photo

Fingerprints

If no Watchlist hit, search & enroll into US-VISIT

Search

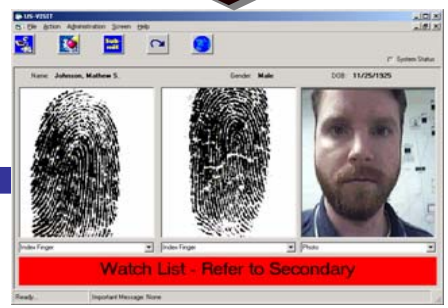
✓ *24.9 Million Travelers Processed*

| Watchlist Categories |
| --- |
| ✓ Terrorists |
| ✓ Wanted Criminals |
| ✓ Sexual Offenders |
| ✓ Immigration Violators |

**Watchlist Fingerprint Database (1.2 Million)**

**US-VISIT Fingerprint Database (21 Million)**

HIT!




✓ *10 sec response*
✓ *3,335 Watchlist Hits*
✓ *0.1% False Hit Rate*

Statistics as of 4/20/2005

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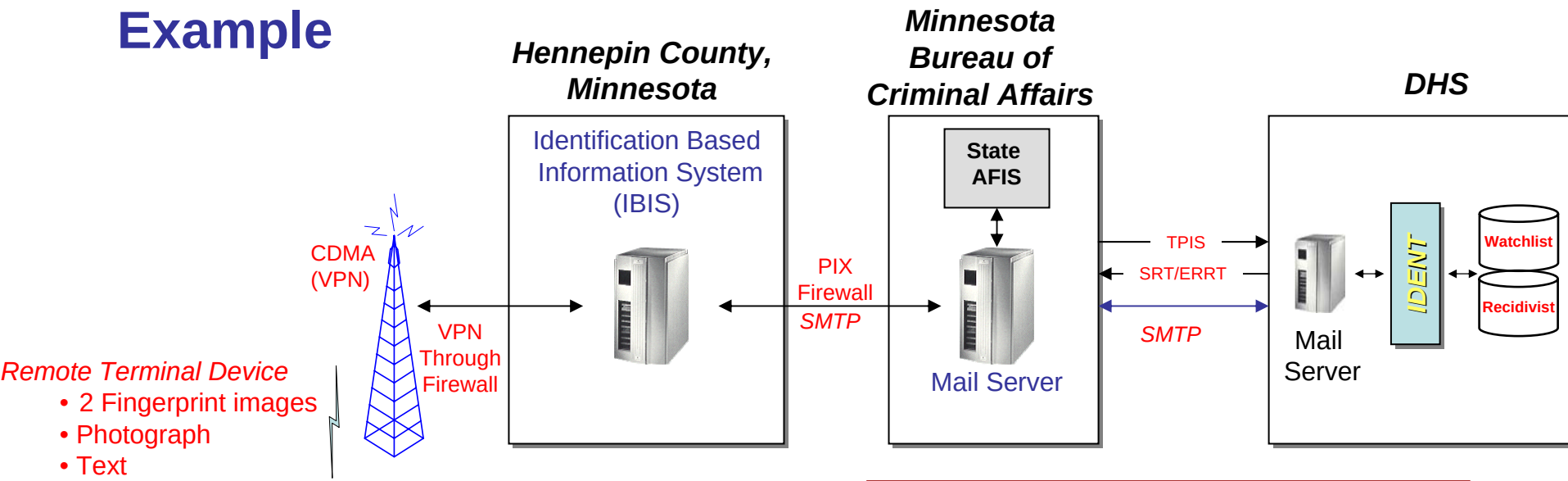
# Mobile Law Enforcement

## Example




- **Parallel 2-P Searches of State and DHS Fingerprint Systems**

**152 Mobile Devices Currently Used in LA, Ontario and Alameda Counties, California and Portland, Oregon**

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# Advantages of Less Than 10-P

- **Lower Scanner Costs**
- **Greater Subject Acceptance**
- **More Rapid Fingerprint Capture**
- **Less Required Bandwidth for Transmission**
- **Lower Data Storage Volumes/Costs**
- **Faster Search Times**
- **Lower Overall System Costs**

# Issues of Less Than 10-P

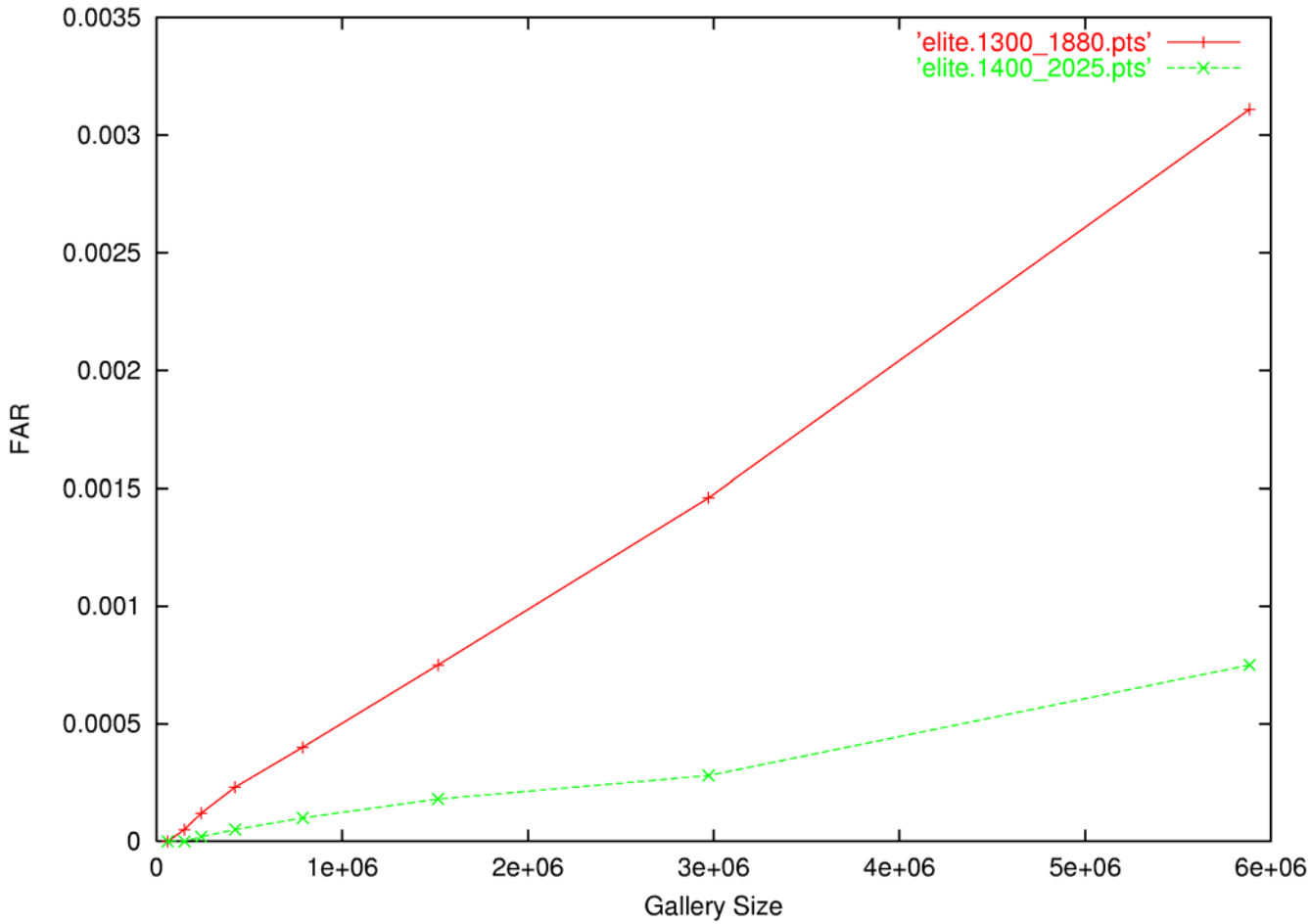
- **Lack of Interoperability Standards**
  - **Image Quality**
  - **Image Aspects (Size, Resolution, etc.)**
  - **Number of/Which Fingers**
  - **Template Definition**
- **No Scanner Compliance Standards**
- **Reduced Information Available: Effect on TAR/FAR**

# TAR/FAR Effects

*NIST (NISTR 7110) Evaluated US-VISIT 2-P Performance*

- TAR Is Independent of Database Size (At least Up to 6M)
- FAR Increases With Database Size
- Both TAR and FAR Affected By Image Quality
- 1:many Accuracy For a 2-finger Search Against a 6M Subject Database is 95% With a False Hit Rate of 0.08% (Exceeding US-Visit Requirements)
- Using 2 Fingers, The 1:1 Matching Accuracy was 99.5% With A False Accept Rate of 0.1% (Exceeding Visit Requirements)

# Impact of gallery size on performance (FAR)

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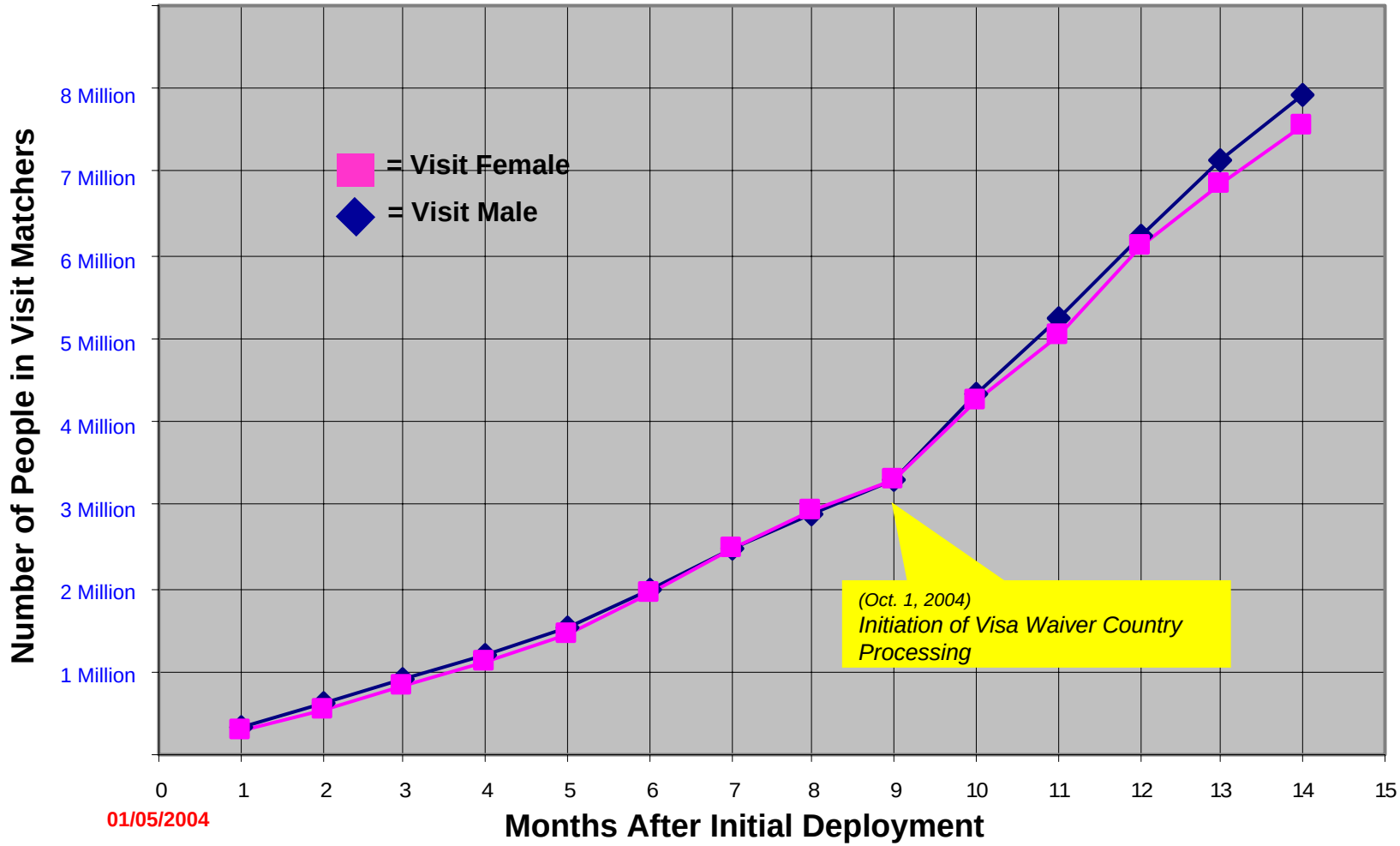
# US-VISIT Database Growth

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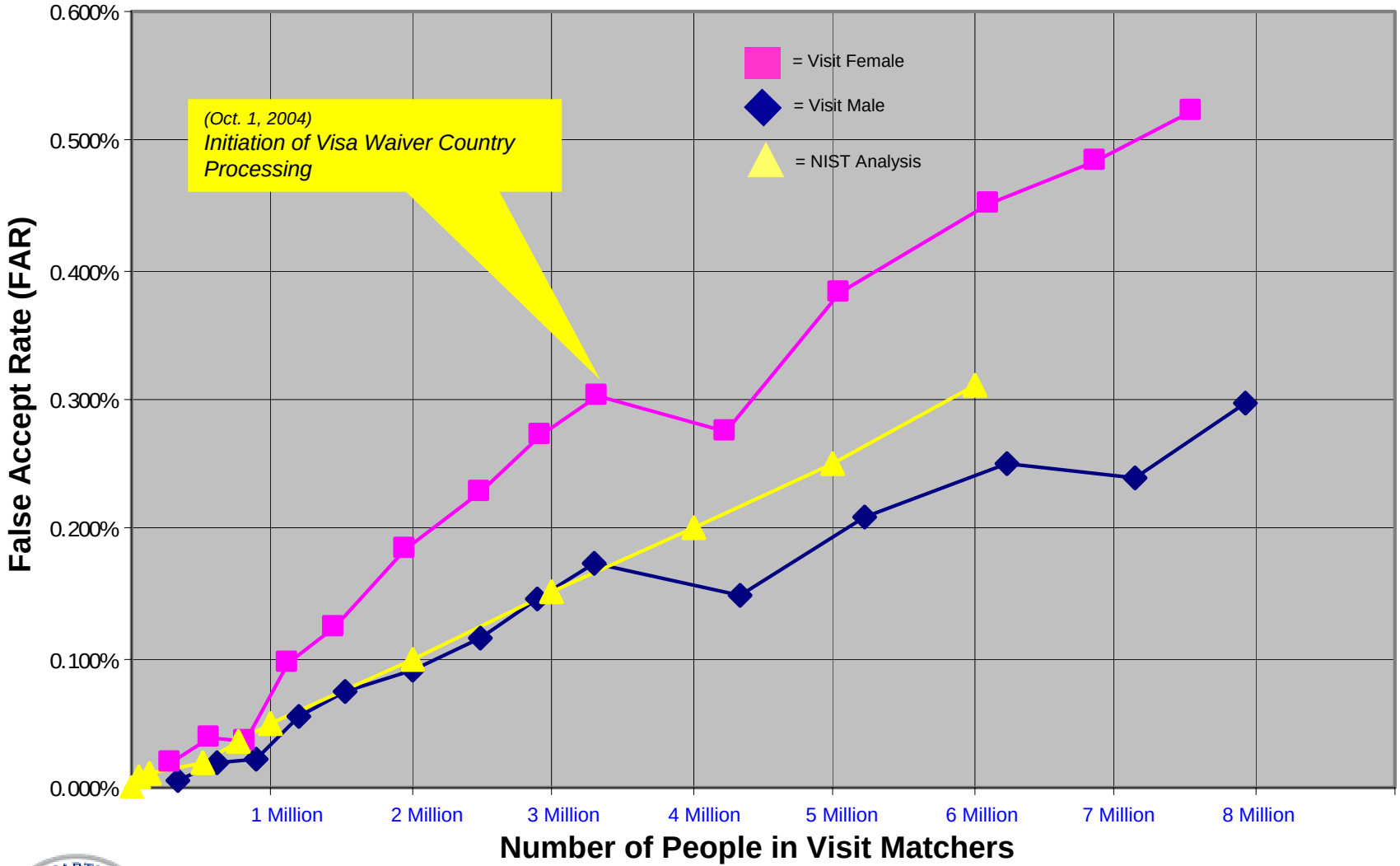
# US-VISIT Database Growth

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# US-VISIT Database Growth

- **Effect of FAR Is Driven By Operational Issues**
  - **In "Lights Out" System Must Have Trade-off with TAR**
  - **In Human Verification System, Examiner Load Becomes Issue**

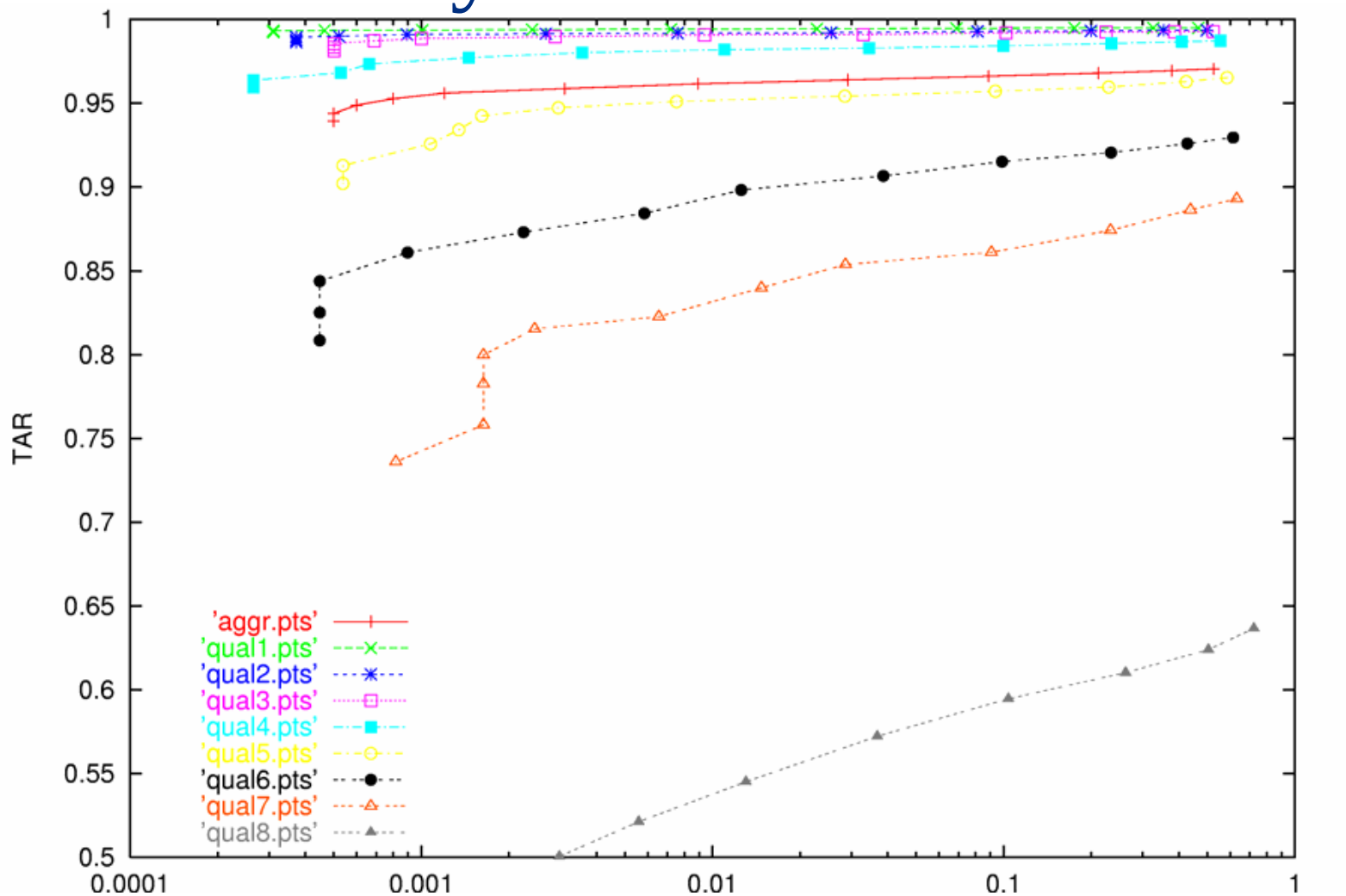
- **Example:**

  **0.4% FAR Results in (0.4% x 100K Trxs/Day) = 400 Examiner Verifications**

- **24x7 Availability of Examiners Will allow US-VISIT To Grow To Very Large Size**

- **But Eventually Will Need To Reduce FAR**
  - **Additional Biometric**
  - **Better Image Quality**

# NIST Accuracy Chart

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# 2-P Interoperability Issues

- **NIST Image Quality Analysis**
  - **Recommends That Image Sizes Below 320 by 320 Not Be Used**
  - **Found Decrease in TAR (1:1) From 98.6% to 76.2% for 180 by 180 in Comparison to 368 by 368 For Single Finger**
  - **Image Compression in The Range Up to 20 to 1 Produces Minimal Effects on Accuracy**
- **Which Fingers?**
- **Template Definition**
- **Do We Need A 2-P Scanner Certification Process?**