The National Institute of Justice’s Expert Systems Testbed Project

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Team of Advisors

- David Coffman; FDLE/SWGDAM
- Cecilia Crouse, PhD; PBSO/SWGDAM Subcommittee
- Richard Guerrieri, MS; FBI
- John Butler, PhD; NIST
- Barry Duceman, PhD; NYSP
- Ken Konzak, MS; CalDOJ
- Tracey Johnson, MSFS; AFDIL
NIJ's Expert Systems Testbed (NEST) Project

- **Goal**
  - Reduce backlog in data review of convicted offender samples.
  - Ensure timely submission into NDIS.

- **Objective**
  - Communicate results of evaluation.
Objectives

• Evaluate Expert Systems
  – Single-source samples initially; then mixed specimens
• Presentations on Results
• Summarize Features and Limitations
• Distribute Summary in Publication
• Conduct Software System Demonstrations and Training Sessions at Marshall University
NIJ Convicted DNA Backlog Reduction Program (FY 2000 to June 2005)

- Awarded $47.2 million
- Funded the analysis of 1.4 million offender samples
- Resulted in approximately 4000 hits to date
- Analysis and data review is not yet complete on all samples
Definition and Scope of Expert Systems


• Added Scope
An Expert System...

- A software program or set of software programs
- Performs all of these functions without human intervention
  - Identifies peaks/bands
  - Assigns alleles
  - Ensures data meet laboratory-defined criteria
  - Describes rationale behind decisions
  - No incorrect calls
Scope for NEST Project Evaluation...

- Publicly available for purchase
- Configurable off-the-shelf software
- Completely housed in laboratory facilities
- No programming knowledge is needed to use the software package(s)
Expert Systems Considered
First Phase

- GeneMapper™ ID Software v. 3.2
- TrueAllele® System 2
- TrueAllele® System 3
- FSS-i³
- OSIRIS
- SureLock℠ ID
Expert Systems to be Evaluated
First Phase

- GeneMapper™ ID Software v. 3.2
- TrueAllele® System 2
- TrueAllele® System 3
- FSS-i³
- OSIRIS
- SureLock™ ID
Survey Distributed at CODIS Meeting
May 2005

• Processing of Offender Samples in Your Laboratory in 2005
• Outsourcing of Offender Samples to Contract Laboratory in 2005
• Backlog of Offender Samples to be Reviewed in 2005
In-House Offender Processing

Total = 218,320
Outsourcing of Offender Samples

Total = 545,150
Backlog of Samples for Review

Total = 166,000
Top 4 Systems of Samples to be Processed and/or Analyzed in 2005

- 3100 Identifiler
- 3100 Profiler Plus/COfiler
- 377 Profiler Plus/COfiler
- 3100 PowerPlex 16

Top 81% Responses
Required Information in Choice of Software/System

- Throughput Needs
- Management/Structure of Agency
- Budget
- Human Resources
- IT Support
- QA/QC Program
Progress of NEST Project Since July 2005

- Purchase of Software/System Packages
- Training
- Installation
- Data Analysis/Comparison
- Presentations
- Additional Training on FSS-i³ by Promega/FSS
Current Evaluation of Expert Systems

- Purchase and Delivery
- Installation and Optimization
- Training/Additional Training
- Technical and Analytical
Purchasing vs. Leasing

• GMID and FSS-i³
  – Separate purchase of hardware
  – Purchase of software

• TrueAllele
  – Hardware provided with software installed
  – Leasing of software
Purchase of Expert Systems

• Mutual Confidentiality Agreement
  – To hold software information confidential
  – To maintain confidentiality of data

• Cognizant of State Purchasing Guidelines
Installation and Optimization

- **GMID**
  - Self install
  - No optimization by vendor

- **TrueAllele**
  - Hardware provided with software installed
  - Optimization performed by Cybergenetics with provided data

- **FSS-i³**
  - Software installed on site
  - Optimization performed by FSS with provided data
Training

• GMID
  – 1-day on-site training/free web training available

• TrueAllele
  – Company-site training
    • Executive Training
    • User Training

• FSS-i^3
  – On-site or company-site training
Evaluation of Applications

• Ability to Edit, Reject, and Record Human Intervention Actions
• Flags and Rules
• Screen Displays
• Import of Source Data Files and Data File Structure/Management
• Concordance and Accuracy
• Generation and Import of CMF Files
• Reports
• Security Features
Raw Data View in GMID
‘Capillary View’ in TA
View of Size Standard in GMID

Template File Info:
- File: OUL1TAQ_G02_14.fsa
- Run Date: Mon, Nov 12, 2001
- Run Time: 9:03:41 AM
- Dye: 0
- Parameters: <Analysis Parameters>
View of Size Standards in TA
View of Size Standards in TA
View of Allelic Ladder in GMID
View of TH01 Allelic Ladder in GMID
View of TH01 Allelic Ladder in FSS-i³
View of TH01 Allelic Ladder Information in FSS-i³
View of TH01 Allelic Ladder Information in FSS-i³
Ladder Check (Overlay) in TrueAllele
Ladder Check in TrueAllele
Ladder Overlay in TrueAllele
View of TH01 in GMID
Sample View in FSS-i$^3$
View of TH01 in FSS-i³
Sample View in TrueAllele
View of TH01 in TrueAllele
Sample Evaluated in GMID...
...and in FSS-i$^3$...
...and in TrueAllele
Conclusion

• The Expert Systems produce concordant results based on our analysis at this time
• Each ES has its own features, benefits, and limitations
• It is imperative that you evaluate your individual laboratory’s needs prior to purchase
• Expert Systems can assist in assurance of quality data entered into NDIS
Deliverables

• Information shared with community at NIJ Grantee’s Meeting, Promega Meeting, ASCLD Meeting, and CODIS Meeting
• Training/Demonstration Sessions
• Invited to participate in Applied Biosystems Spring Road Show
• Guide Summarizing Features and Limitations, May 2006
Training/Demonstration Sessions at Marshall University

- Training/Demonstrations of all systems
  - Marshall University has travel funds available
  - Please see me and/or Dr. Terry Fenger after the presentation if you are interested
Please send an email to Rhonda Roby at:

RhonaDNA@earthlink.net

- For a copy of this presentation
- Interested in visiting Marshall University for demonstrations of the software systems
- To provide data for evaluation
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