The National Institute of Justice Expert Systems Test Bed
Part I
Overview and Goals

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NIJ Grantee's Meeting
NIJ's Expert Systems Testbed (NEST) Project

- **Goal**
  - Reduce backlog in data review of convicted offender samples.
  - Ensure timely submission into NDIS.
NIJ Convicted DNA Backlog Reduction Program (FY 2000 to Present)

- Awarded $47.2 million
- Funded the analysis of 1.4 million offender samples
- Resulted in approximately 4000 hits to date
- Analysis is not yet complete on all samples
Manual Processing
Manual Processing

AmpFLSTR® COfiler™ kit

AmpFLSTR® Profiler Plus™ kit
Manual Processing

GeneScan
Genotyping
Automated Processing
Automated Processing
Automated Processing

Expert Systems
Outline

• Progress to Date
• Team Members
  – Implementation Team
  – Team Advisors
• Objectives
• Survey of CODIS Participating Laboratories
• Conclusion
Progress Made to Date

- NIJ Initiated NEST Project
- Defined Implementation Team
- Implementation Team Identified Expert Systems
- Team of Advisors Reviewed Progress
- Purchase of Software by FRN Partner, Marshall University
NIJ Initiated NEST Project

• Susan Narveson, Chief
  Office of Science & Technology
  – Meeting with the FBI, September 2004
• Defined Implementation Team, March 2005
  – John Paul Jones, Project Manager
  – Rhonda Roby, NIJ Consultant
  – Marshall University, FRN Partner
Identified Expert Systems

- GeneMapper™ ID Software v. 3.2 (GMID)
- TrueAllele® System 2 (TA)
- TrueAllele® System 3
- FSS-i³
- OSIRIS
- SureLockSM ID
Team of Advisors

- John Butler, PhD
  NIST
- David Coffman
  FDLE/SWGDAM
- Cecilia Crouse, PhD
  PBSO/SWGDAM Subcommittee
- David Deuwer, PhD
  NIST
- Barry Duceman, PhD
  NYSP
- Richard Guerrieri, MS
  FBI
- Tracey Johnson, MSFS
  AFDIL
- Ken Konzak, MS
  CalDOJ
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 to be Evaluated

First Phase

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

• Evaluate Expert Systems
  – Single-source samples initially; then mixed specimens
• Workshops and Training Sessions
• Summarize Features and Limitations
• Distribute Summary in Publication
Current Evaluation of Expert Systems

- Purchasing
- Installation and Training
- Criteria Development
- Additional Information
Purchasing of Expert Systems

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

• Optimization of Software
  – System specific
  – Parameter specific

• Cognizant of State Purchasing Guidelines

• GMID in-house; TA and FSS-i³ expected August '05
Purchasing vs. Leasing

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

• TrueAllele
  – Hardware provided with software installed
  – Leasing of software
Installation and Training

- **GMID**
  - Self installation
  - 1-day on-site training/free web training available
- **FSS-i³**
  - On-site installation
  - On-site or company-site training
- **TrueAllele**
  - Company-site installation
  - Company-site training
    - Executive Training
    - User Training
Defining Evaluation Criteria:

• Administrative
  – Example: purchasing, time and effort

• Technical
  – Example: quality scoring, human intervention documentation

• Analytical
  – Example: data flags, speed

Criteria described as:
  • Critical
  • Nice to have
  • For consideration
Additional Information

• FSS located in the United Kingdom
  – Time differences
  – Responsiveness of inquiries
• TrueAllele recommends re-optimization every 3 months
• TrueAllele annual fee includes cost/sample up to 15,000 samples
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 Analyzed in 2005
Outsourcing of Offender Samples

Total = 545,150
In-House Offender Processing

Total = 218,320
Backlog of Samples for Analysis

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
Conclusion

• Expert Systems are needed
• Have excellent community involvement
• Support by NIJ
• Expert Systems can assist in assurance of quality data in NDIS
Deliverables

- Abstract submitted to Promega, September 2005
- Workshop
  - American Academy of Forensic Sciences, February 2006
- Training Sessions
  - To be offered at Marshall University
- Guide Summarizing Features and Limitations, May 2006
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