



The National Institute of Justice Expert Systems Test Bed Part I

Overview and Goals

**Bridget Tincher, MSFS; Debra Elliott; Terry Fenger, PhD;
John Paul Jones, MBA; Rhonda Roby, MPH**

June 27, 2005
Washington, DC
NIJ Grantee's Meeting

NIJ

FRN
Forensic Resource Network
A program of NIJ



NIJ's Expert Systems Testbed (NEST) Project

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

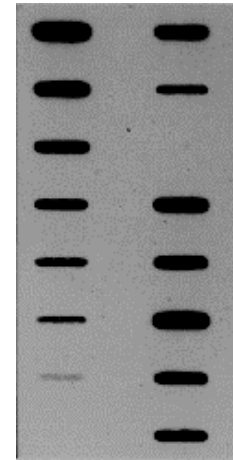
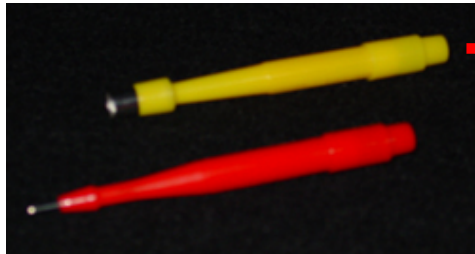


NIJ Convicted DNA Backlog Reduction Program (FY 2000 to Present)

- 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

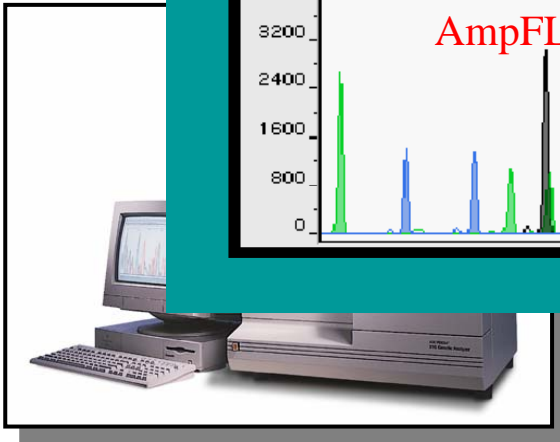
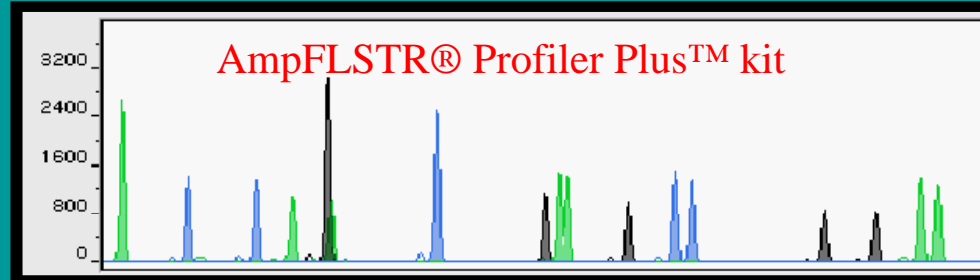
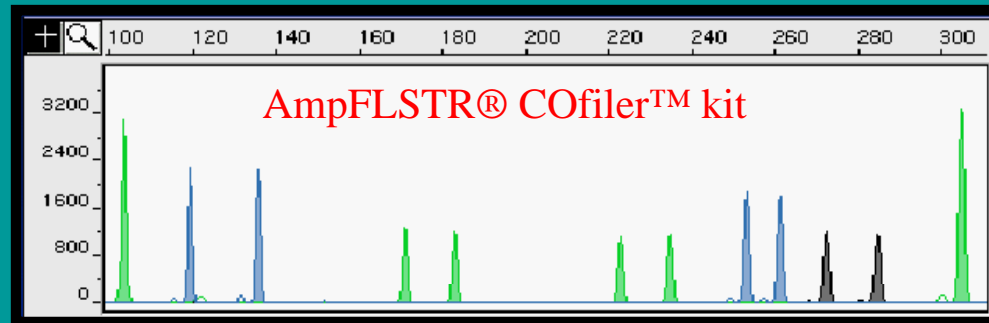


Manual Processing





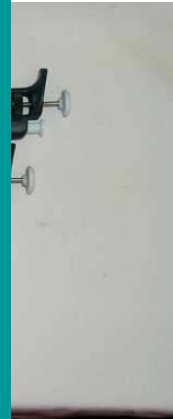
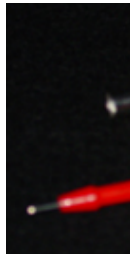
Manual Processing





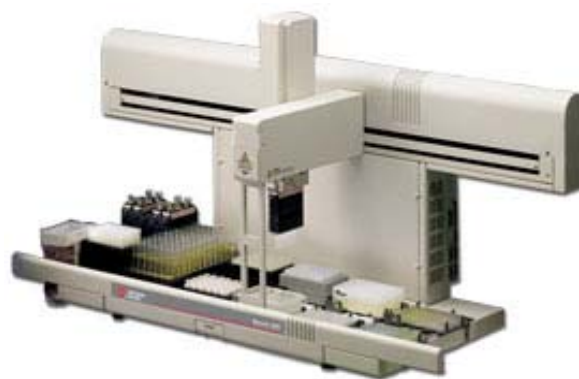
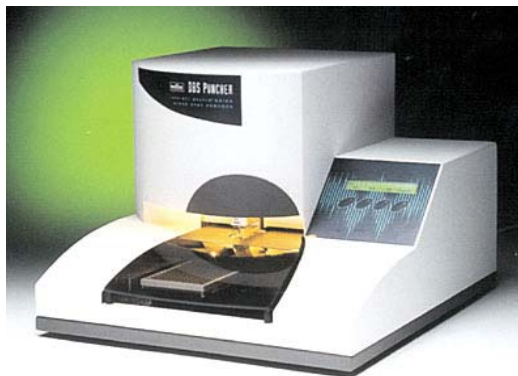
Manual Processing

GeneScan
Genotyping



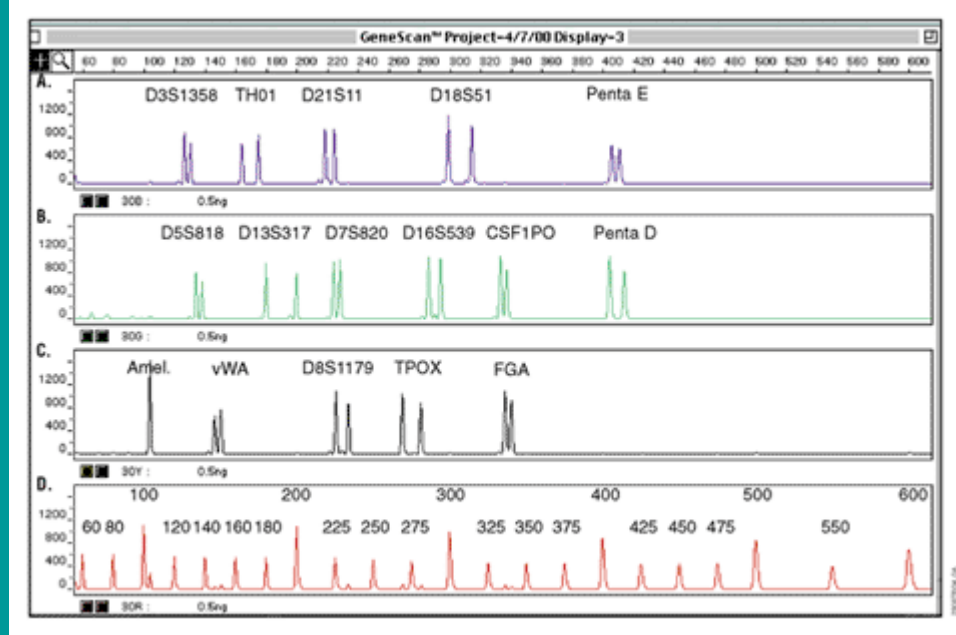


Automated Processing





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
CaDOJ



Definition and Scope of Expert Systems

- Adopted definition of National DNA Index System (NDIS) DNA Data Acceptable Standards, Appendix B, "Guidelines for Submitting Requests for Approval of an Expert System for Review of Offender Samples," 15 July 2004
- 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
- SureLockSM ID



Expert Systems to be Evaluated First Phase

- GeneMapper™ *ID* Software v. 3.2
- TrueAllele® System 2
- TrueAllele® System 3
- FSS-i³
- OSIRIS
- SureLockSM ID



Expert Systems to be Evaluated First Phase

- GeneMapper™ *ID* Software v. 3.2
- TrueAllele® System 2
- TrueAllele® System 3
- FSS-i³
- OSIRIS
- SureLockSM ID



Expert Systems to be Evaluated First Phase

- GeneMapper™ *ID* Software v. 3.2
- TrueAllele® System 2
- TrueAllele® System 3
- FSS-i³
- OSIRIS
- SureLockSM ID



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

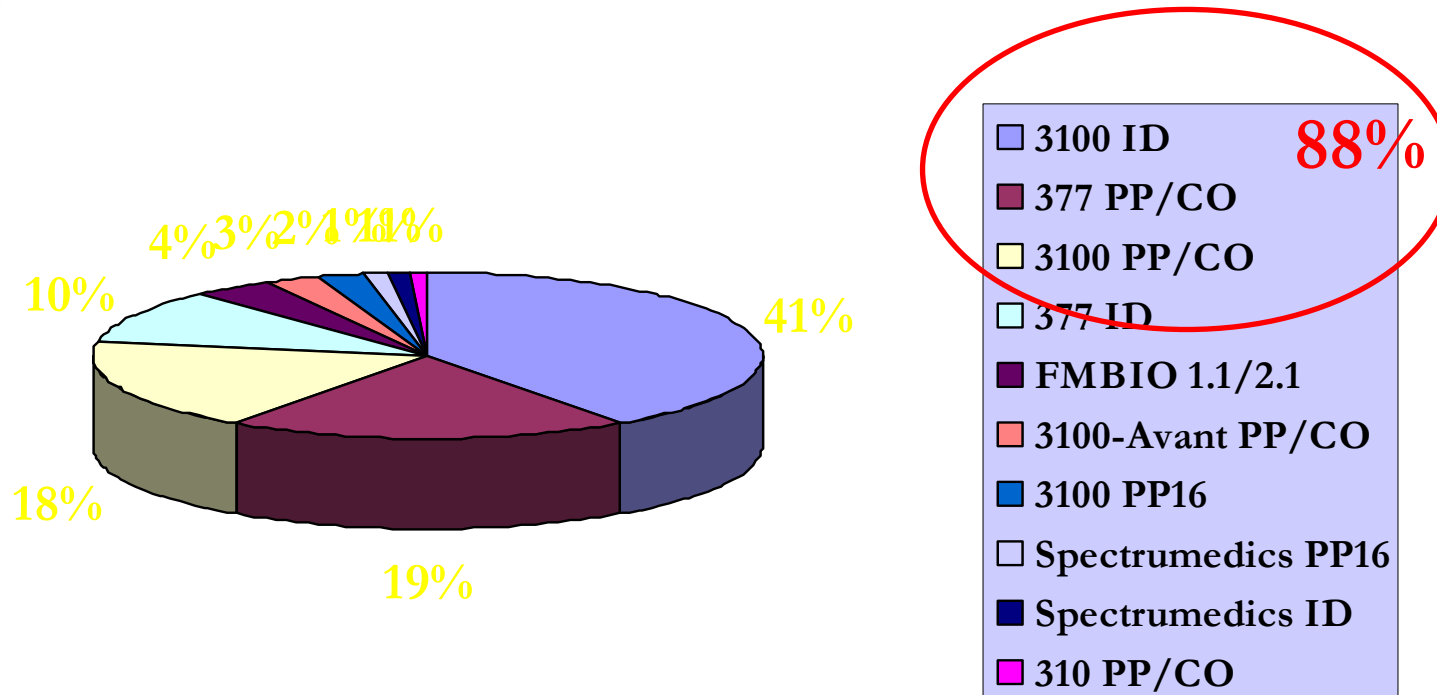


Survey Distributed at CODIS Meeting May 2005

- 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



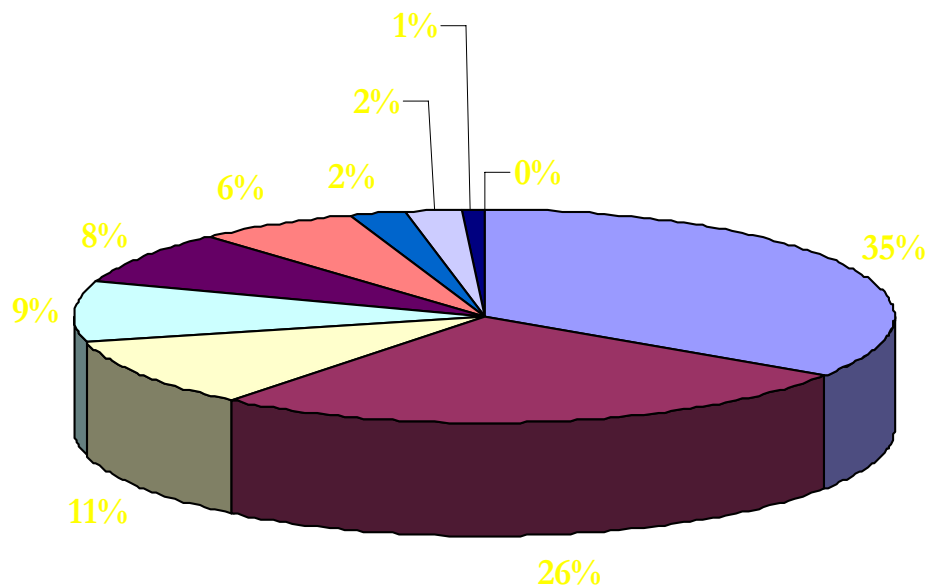
Outsourcing of Offender Samples



Total = 545,150



In-House Offender Processing

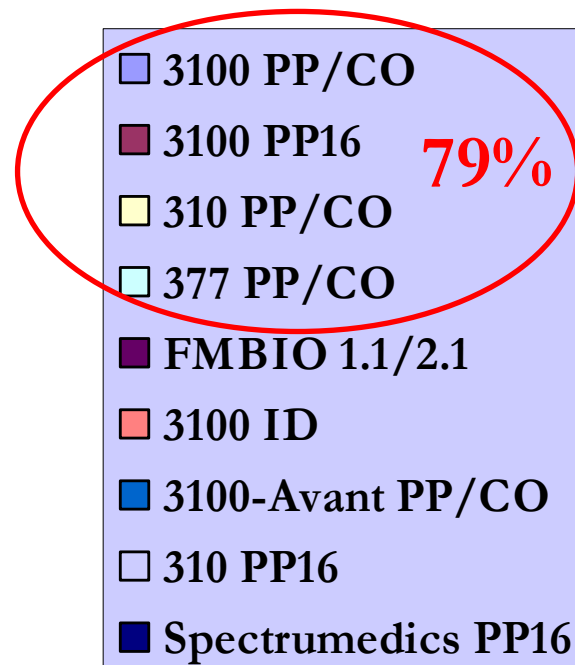
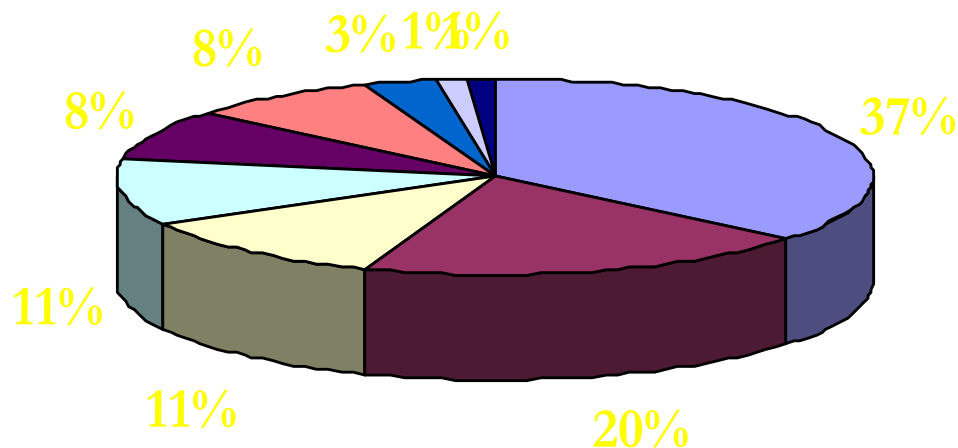


- 3100 ID
- 3100 PP16 **81%**
- 3100 PP/CO
- 310 PP16
- FMBIO III PP16 BIO
- 3100-Avant ID
- 310 ID
- 310 PP/CO
- 3130 ID
- FMBIO II 1.1/2.1

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



Acknowledgments

- Sarah Hart, John Morgan, Susan Narveson and Lois Tully
National Institute of Justice
- Amy Christin and Amanda Webb
Marshall University