

# Firearms/Toolmarks Discipline Standard Operating Procedure for Individual Characteristic Database Searches

## 1 Introduction

The National Integrated Ballistic Information Network (NIBIN) is an interstate automated ballistic imaging network that uses the Integrated Ballistic Identification Systems (IBIS<sup>®</sup>) TRAX-HD3D<sup>™</sup> | BRASSTRAX<sup>™</sup> and MATCHPOINT<sup>™</sup> (referred to as IBIS throughout remaining document) for the collection, storage, and correlation of digital images of fired cartridge/shotshell cases. A digital image of a cartridge/shotshell case is searched against existing images in the IBIS correlation servers using an algorithm. The resulting correlation scores provide potential matching candidates according to similarity. This network, utilized in casework, can assist in determining if unsolved shooting crimes are linked and if a firearm or fired cartridge/shotshell case submitted for examination is related to an unsolved crime.

## 2 Scope

This procedure applies to Firearms/Toolmarks Discipline (FTD) personnel (referred to as NIBIN User through remaining document) who've received training on the acquisition, storage, and correlation features of the IBIS.

## 3 Equipment/Materials/Reagents

- Caliper (measurement within  $\pm 0.001$  in.)
- Cleaning solvent
- IBIS systems
- Known Exemplars
- Microscope (stereozoom)
- Personal protective equipment

## 4 Standards and Controls

Known exemplars produced from evidentiary items during examination serve as controls.

To evaluate IBIS equipment performance, the following Certified Reference Material is available:

- NIST SRM 2461-118 – Standard Cartridge Case

## 5 Tune-Up and Maintenance

**5.1** A scheduled calibration diagnostic is run automatically by the IBIS.

**5.2** However, if a manual tune-up is prompted by the system, the method outlined in the IBIS<sup>®</sup> TRAX-HD3D<sup>™</sup> BRASSTRAX<sup>™</sup> User Guide (Chapter 9, revision 1.0) will be followed.

**5.2.1** A manual tune-up is performed to adjust the microscope zoom, reset the default position and ring light intensity, and reset the default side light intensity.

**5.2.2** When a manual tune-up is performed, the results and description of adjustments must be recorded in the NIBIN Log (Appendix A).

**5.2.3** If a successful tune-up cannot be achieved, the results will be recorded on the NIBIN Log. The NIBIN User will contact Forensic Technology Inc.(FTI) and the system will be labeled as out of service until the issue can be resolved. A record of communication with FTI will be recorded on the NIBIN Log.

**5.2.4** The NIBIN Log(s) is contained within a binder that is located near the IBIS workstation.

**5.2.5** NIBIN Users will not attempt to perform any service/maintenance to the IBIS. If an issue occurs with the IBIS, FTI will be contacted and a record of this communication will be recorded in the NIBIN Log.

## **6 Performance Checks**

**6.1** A monthly performance check of the IBIS will be conducted by a NIBIN User prior to a cartridge/shotshell case being entered into the system. If an IBIS performance check has been performed within thirty days of previous image acquisition, an additional performance check is not necessary.

**6.2** A performance check is conducted by acquiring and searching an image of the NIST, SRM 2461-118 cartridge case within the North East zone (zone 1). Upon entry and synchronization, a default correlation with the North East zone will be generated and reviewed.

**6.2.1** If the NIST cartridge case is ranked among the top returned candidates, the performance check is acceptable. The correlation list for this performance check search will be printed and retained in the NIBIN Log binder.

**6.2.2** If the NIST cartridge case does not appear among the top returned candidates, the performance check will be repeated. If the second performance check attempt fails, the issue will be recorded in the NIBIN Log, FTI will be notified, and IBIS will be labeled as out of service until the issue can be resolved. A record of communication with FTI will be recorded on the NIBIN Log.

**6.3** Once a record of an acceptable performance check is complete, the captured image(s) and correlation results from the search may be removed from the IBIS.

## **7 Sampling**

Not Applicable.

## **8 Procedures**

### **8.1 Requirements for Cartridge/Shotshell Case Entry**

**8.1.1** Submitted cartridge/shotshell cases and test fires from pistols, rifles, and shotguns will be entered and searched against the appropriate correlation sites. Correlation sites are determined by the submitting office and any additional case information that may expand the search parameters.

**8.1.2** Cartridge cases and test fires that are not typically entered or searched in the IBIS include revolvers, single shot or bolt action rifles, shotguns, in other gauges besides 12 gauge, weapons never fired, or firearms deemed unsafe, inoperable, or incomplete.

### **8.2 Administrative and Security**

**8.2.1** NIBIN Users will have successfully completed IBIS training from the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), FTI, or an FTI approved trainer and have an appropriate security clearance prior to independently using the IBIS workstation.

**8.2.2** The appropriate case information will be recorded for each entry. At a minimum, the FBI Case ID Number (or a derivative), FBI Laboratory Number, Item Identifier, and Case Supervisor (assigned FTD Examiner) will be entered.

### **8.3 Cartridge/Shotshell Case Forensic Data Entry**

**8.3.1** The appropriate FTD procedures will be performed prior to acquiring a digital image into IBIS. Those procedures can include: *FTD SOP Cartridge Case Examinations* and *FTU SOP Firearm Examinations*.

**8.3.2** When multiple cartridge/shotshell cases have been identified as having been fired in a single firearm, only the specimen containing the most suitable microscopic marks of value is entered into IBIS.

**8.3.3** The procedures listed in the IBIS<sup>®</sup> TRAX-HD3D<sup>™</sup> | BRASSTRAX<sup>™</sup> Training Guide (latest version) and the IBIS<sup>®</sup> TRAX-HD3D<sup>™</sup> | MATCHPOINT<sup>™</sup> Training Guide (latest version) will be followed for collecting digital images and reviewing correlation requests.

**8.3.4** All cases entered into the IBIS will be searched against the appropriate correlation sites. Correlation results will be recorded in the appropriate examination worksheet and/or a copy of the correlation results page will be printed and added to the examination records. Any image(s) that appears to have an association will be reported to the submitting agency.

**8.3.5** Correlations requests will be removed from the IBIS once the review is complete.

## **9 Calculations**

Not Applicable.

## **10 Measurement Uncertainty**

Not Applicable.

## **11 Limitations**

IBIS is a multi-user system that has established guidelines. However, variables such as lighting, user experience, cartridge/shotshell case material, and the reproducibility of microscopic marks can affect the appearance of images captured, thus impacting the correlation results within IBIS. Digital images viewed on the IBIS may not have the quality and clarity of those same items that are physically viewed using a comparison microscope and will not be used to make an identification conclusion. If the visual comparison of digital images on IBIS results in an association, the evidence will be physically examined, by a qualified Examiner, using a side-by-side light comparison microscopy to determine if there is an identification.

Additionally, the IBIS algorithm merely provides a sorting capability for potentially associated toolmarks represented on cartridge cases and provides no statistical confidence in possible matching results.

## **12 Safety**

Gloves must be worn when handling cartridge/shotshell cases which may have been exposed to biological hazards.

## **13 References**

FBI Laboratory Quality Assurance Manual

FBI Laboratory Operations Manual

National Institute of Standards & Technology, Certificate, Standard Reference Material 2461, June 22, 2012 (Controlled Document, FTU 011)

IBIS® TRAX-HD3D™ | BRASSTRAX™ Training Guide (v1.0) (Controlled Document, FTU 016)

IBIS® TRAX-HD3D™ | MATCHPOINT™ Training Guide (v1.0) (Controlled Document, FTU 017)

IBIS® TRAX-HD3D™ | BRASSTRAX™ User Guide (v1.0), secure PDF located on BRASSTRAX terminal.

IBIS® TRAX-HD3D™ | MATCHPOINT™ User Guide (v1.0), secure PDF located on MATCHPOINT terminal.

NIBIN Training Outline and Guidelines. Retrieved from the ATF website: <https://www.atf.gov/firearms/nibin-training-outline-and-guidelines>. Web. Accessed 5 February 2020.

Rev. #	Issue Date	History
7	03/02/18	<p>Changed document title, and IBIS® TRAX-HD3D™   BRASSTRAX™ and MATCHPOINT™ were updated throughout document, Section 1 updated NIBIN program details, referenced Correlation Server, summarized correlation scores, and changed cartridge/shotshell cases throughout.; Section 2 added collecting, storing, and comparing, removed NIBIN reference. Included FTD clarifier for type of Examiner. Also added IBIS reference throughout document.; Section 3 modified details regarding gloves and added acetone reference.; Section 5 changed from performance check to tune-up and maintenance throughout document, clarified details regarding manual tune-up and referenced User Guide v1.0, changed notebook to binder and problem to issue, also shortened to NIBIN Log, Section 5.2.4. changed to reflect NIBIN Log being housed within a binder, Section 5.2.5 changed to NIBIN User, added communication reference.; Section 6 created specific to performance check and documentation. Regional 6 server was replaced by CSSVR-EAST/Regional NIBIN Server East 1 (Reg) using the Maryland ATF sites: MD-WAATF1 Through MD-WAATF6, MDWATFBR1 through MDWATFBR4 and MDWATFBU1; Section 7 added sample selection to header.; Section 8.1 referenced correlation site(s), removed NIBIN reference and added IBIS.; Section 8.2.1 clarified training types and sources, added NIBIN User, and outlined case information needed for each entry.; Section 8.2.2 added identifier, laboratory number reference and clarifier on type of Case Supervisor.; Section 8.3 changed title from casing to case, added details about acquiring and submitting digital images and removed NIBIN reference.; Section 8.3.1 was updated with current SOP title.; Section 8.3.2 updated for clarity.; Section 8.3.3 updated training guide versions.; Section 8.3.6 clarified correlation review and documentation within examination records.; Section 11 added established guidelines reference, changed electronic to digital, clarified details captured with microscope, added cartridge/shotshell material.; Section 12 removed three controlled documents: FTU 012, FTU 013, FTU 014, added the following controlled documents to the list of references: FTU 016, FTU 017, added BRASSTRAX™ and MATCHPOINT™ User Guide references, updated Laboratory QAM and LOM and FTU QAM references, Updated Appendix A form and title.</p>
8	03/02/20	<p>Formerly titled NIBIN Examinations. Section 2 updated to include FTD contract personnel. Section 3 updated. Section 4 clarified type of certified reference material. Section 6.2 updated to reflect zone selections. Section 8.1.2 was added. Section 8.3.1 updated to reflect title change in SOP. Removed reference to large primers and renumbered Section 8.3.4. Minor additions to Section 11 Limitations. Section 13 updated. Appendix A NIBIN Log updated.</p>

**Approval**

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Firearms/Toolmarks  
 Unit Chief

Date: 02/28/2020

Firearms/Toolmarks  
 Technical Leader

Date: 02/28/2020

**Appendix A: FTD *NIBIN* Log**

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