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Final Report: Universal Biometric Translator

5a. CONTRACT NUMBER

5b. GRANT NUMBER
W911NF-17-C-0055

5c. PROGRAM ELEMENT NUMBER

6. AUTHORS

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAMES AND ADDRESSES

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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS (ES)

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Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES

The views, opinions and/or findings contained in this report are those of the author(s) and should not contrued as an official Department of the Army position, policy or decision, unless so designated by other documentation.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	15. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Matt Eichler
UU	UU	UU	UU		19b. TELEPHONE NUMBER 000-000-0000

RPPR Final Report
as of 08-May-2019

Agency Code:

Proposal Number: 70818LSRIF **Agreement Number: W911NF-17-C-0055**
INVESTIGATOR(S):

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Organization: **Ideal Innovations, Inc.**
Address: 950 N. Glebe Road, Arlington, VA 222034199
Country: USA
DUNS Number: 047665075 EIN:
Report Date: 04-Apr-2019 Date Received: 01-Apr-2019
Final Report for Period Beginning 05-Sep-2017 and Ending 04-Mar-2019
Title: Universal Biometric Translator
Begin Performance Period: 05-Sep-2017 **End Performance Period:** 04-Mar-2019
Report Term: 0-Other
Submitted By: Marcia Enyart Email: marcia.enyart@idealinnovations.com
Phone: (703) 528-9101
Distribution Statement: 1-Approved for public release; distribution is unlimited.

STEM Degrees: **STEM Participants:**

Major Goals: 1) consolidate the current mixed bag of scripts and manual processes to prepare biometric files for search in the DoD ABIS;
2) vastly reduce manpower required to process biometric files;
3) reduce the time to return biometric results to submitters/customers; and
4) provide an audit trail of all system actions.

Accomplishments: Used and Agile development process to determine detailed requirements and delivered the software that supports their mission accomplishment
Supported the Information Assurance process toward an Authority to Operate
Delivered documentation

Training Opportunities: Provided onsite user and administrator training on multiple occassions

Results Dissemination: Nothing to Report

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Provided Aware NISTPac license to the Government as part of the final delivery.
Deployed the software to the Government's specified server. Provided source code, installer, and documentation

PARTICIPANTS:

Participant Type: PD/PI
Participant: Matthew Eichler
Person Months Worked: 15.00 **Funding Support:**
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

RPPR Final Report
as of 08-May-2019

REPORT DOCUMENTATION PAGE

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1. REPORT DATE *(04-03-2019)*	**2. REPORT TYPE** **FINAL TECHNICAL REPORT**	**3. DATES COVERED** *(25-AUG-17 – 4-MAR-18)*

4. TITLE AND SUBTITLE – Universal Biometric Translator Final Technical Report

5a. CONTRACT NUMBER
W911NF-17-C-0055

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S) – Matt Eichler

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Defense Forensics Biometric Agency (DFBA) Biometrics Operations Division (BOD)
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10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

13. SUPPLEMENTARY NOTES

14. ABSTRACT Report developed under BAA HQ0034-16-BAA-RIF-0001, contract W911NF-17-C-0055. UBT was developed for use by DFBA BOD to convert biometric files in various formats into conforming Electronic Biometric Transmission Specification (EBTS) formats required for ingestion/processing by DoD ABIS. UBT supports processing of ANSI/NIST-ITL based file standard in Traditional encoding, and assembling of loose biometric image files, into EBTS files. Possible biometric and contextual data transformations include: moving biometric images to standard locations; removing images; reformatting images; inserting/deleting/updating contextual information; and altering field values. Conformance checks to standards are made and all file processing is logged, searchable, and viewable through the UBT user interface. **Objectives:** 1) consolidate scripts and manual processes to prepare biometric files for search in DoD ABIS; 2) reduce manpower required to process files; 3) reduce time to return results to submitters; and 4) provide an audit trail of all system actions. **Significance of effort to advancement of knowledge:** UBT will result in more user efficiency preparing biometric files for DoD ABIS ingestion and search, reduce burdensome errors in ABIS processing, and allow personnel to make EBTS formatted files.

15. SUBJECT TERMS
RIF Report

16. SECURITY CLASSIFICATION OF: UNCLUSSIFIED			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**		20	Matt Eichler
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UNIVERSAL BIOMETRIC TRANSLATOR (UBT)FINAL TECHNICAL REPORT – CDRL 0006

March 4, 2019

ARO Contract W911NF-17-C-0055

INTRODUCTION

This document, UBT Final Technical Report (FTR), satisfies CDRL 0006 for Army Research Office (ARO) Contract W911NF-17-C-0055. This document covers the details of the project objectives, work performed, results obtained, estimates of technical feasibility, capabilities of the final deliverables, test results, issues encountered, -work-arounds developed, proposed areas of further research, and final expense reporting.

DETAILS OF THE PROJECT OBJECTIVES

The UBT contract is in support of the Rapid Innovation Fund (RIF) Broad Agency Announcement (BAA) to help support the Defense Forensics Biometric Agency (DFBA) Biometrics Operations Division's (BOD) mission in receiving and processing biometric files for the DoD Automated Biometrics Identification System (ABIS). DFBA BOD receives files from many customers and needs to ensure the files are conformant with biometric file standards. UBT was designed to consolidate a patchwork of scripts and tools to enable DFBA BOD to more-efficiently perform their daily tasks. The benefits and features include:

1. Efficiency—UBT makes daily BOD biometric file preprocessing much more efficient by allowing users to easily engage in the cycle of 1) testing files for conformance; followed by 2) defining rules to detect and repair nonconformances. Rules may be reused for future file processing and can serve as the basis for building new rules. Also, UBT facilitates the time-consuming process of creating EBTS files from loose biometric images.
2. Accessibility— The application is accessible in two ways: 1) the UBT application is provided in a user-friendly form versus scripts and manual processes performed previously; and 2) enables non-programmers to identify and fix Electronic Biometric Transmission Specification (EBTS) file conformance issues.
3. Consolidation—UBT brings various EBTS file conversion scripts and manual processes under one application.
4. Scalability—UBT may be extended through an API, allowing development of complex EBTS file conversions that aren't currently supported.
5. Auditing—UBT maintains a complete log of all business rules performed to produce a standard conformant, transformed EBTS file. UBT also supports the archival of original EBTS files prior to their transformation.

Security—UBT is undergoing BOD's information assurance (IA) process for an Authority to Operate (ATO) on the DFBA BOD's Unclassified Identity Mission System (UIMS) network.

WORK PERFORMED

The period of performance was from August 25, 2017 through March 4, 2019. I-3 developed the UBT software in its corporate offices in Arlington, VA. I-3 used an Agile software development approach and sprint deliveries of working software to promote user feedback and ensure the software meets the customer's needs. No hardware deliverables were required under the contract. It is envisioned to be deployed on their "UIMS" network but is currently undergoing the system authorization for an authority to operate (ATO) by the DFBA BOD Information Assurance (IA) Team for use in the operational environment. Throughout the project, I-3 supported the Government's IA process as requested with

meeting participation regarding the Risk Management Framework (RMF) Assess Only process, Security Technical Implementation Guideline (STIG) review, submission of source code to the Provost Marshall General's Office for Fortify code scan, code modifications for STIG and code scan findings, and detailed documentation for waived findings.

Figure 1 shows the primary project schedule and details the project initiation, software sprint phases, training, and associated CDRLs. I-3 made 5 sprint deliveries and one patch delivery during the project with Initial Operating Capability (IOC) delivered in Sprint 2. Sprint deliveries (with the exception of the patch delivery), included in-person delivery at DFBA BOD in Clarksburg, WV on a Windows Server provided as Government Furnished Equipment (GFE). Delivery activities included meetings with the PM, a demonstration to users and feedback session. Training was performed on several occasions with formal user training on December 7, 2018. During the sprint 5 delivery in November and December 2018, I-3 provided the customer with a draft and final Customer Acceptance Test Plan for their use to ensure all requirements were met.

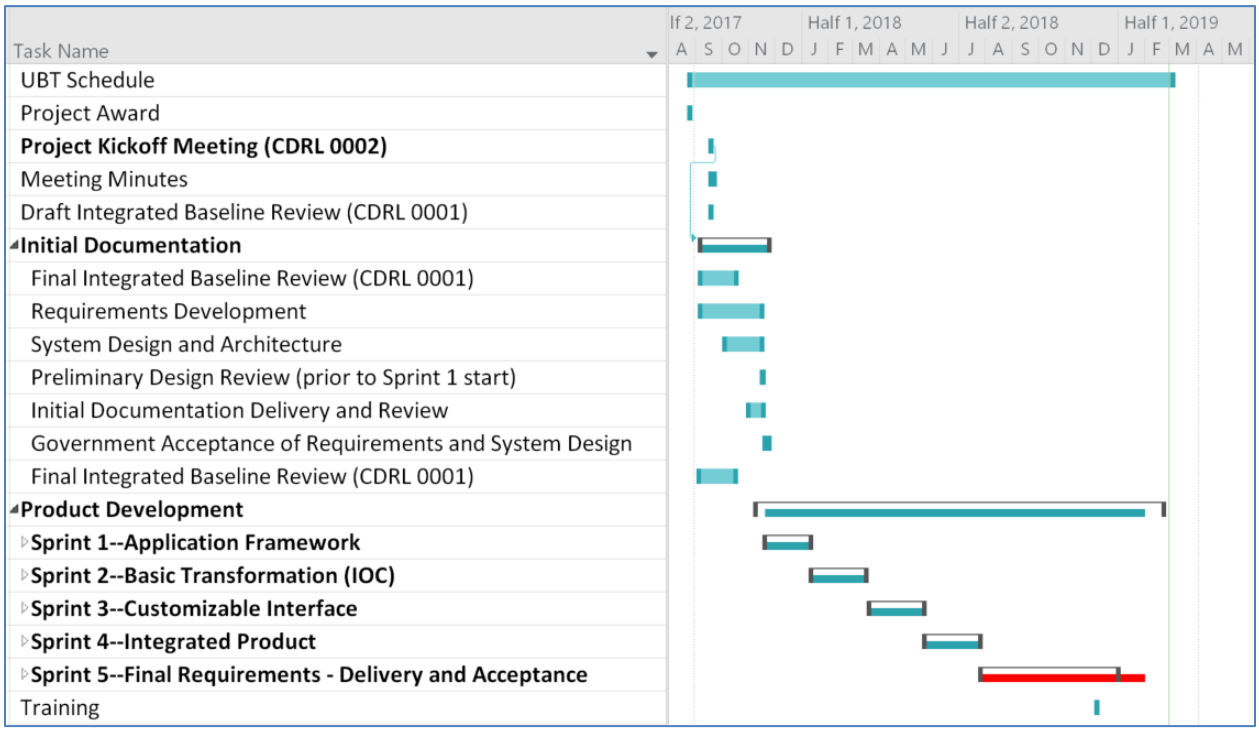

Figure 1: UBT Schedule (1 of 2)

Figure 2 shows additional project CDRLs and the delivery schedule. The following schedule was used. ***Note that all contractual deliverables were met on time.***

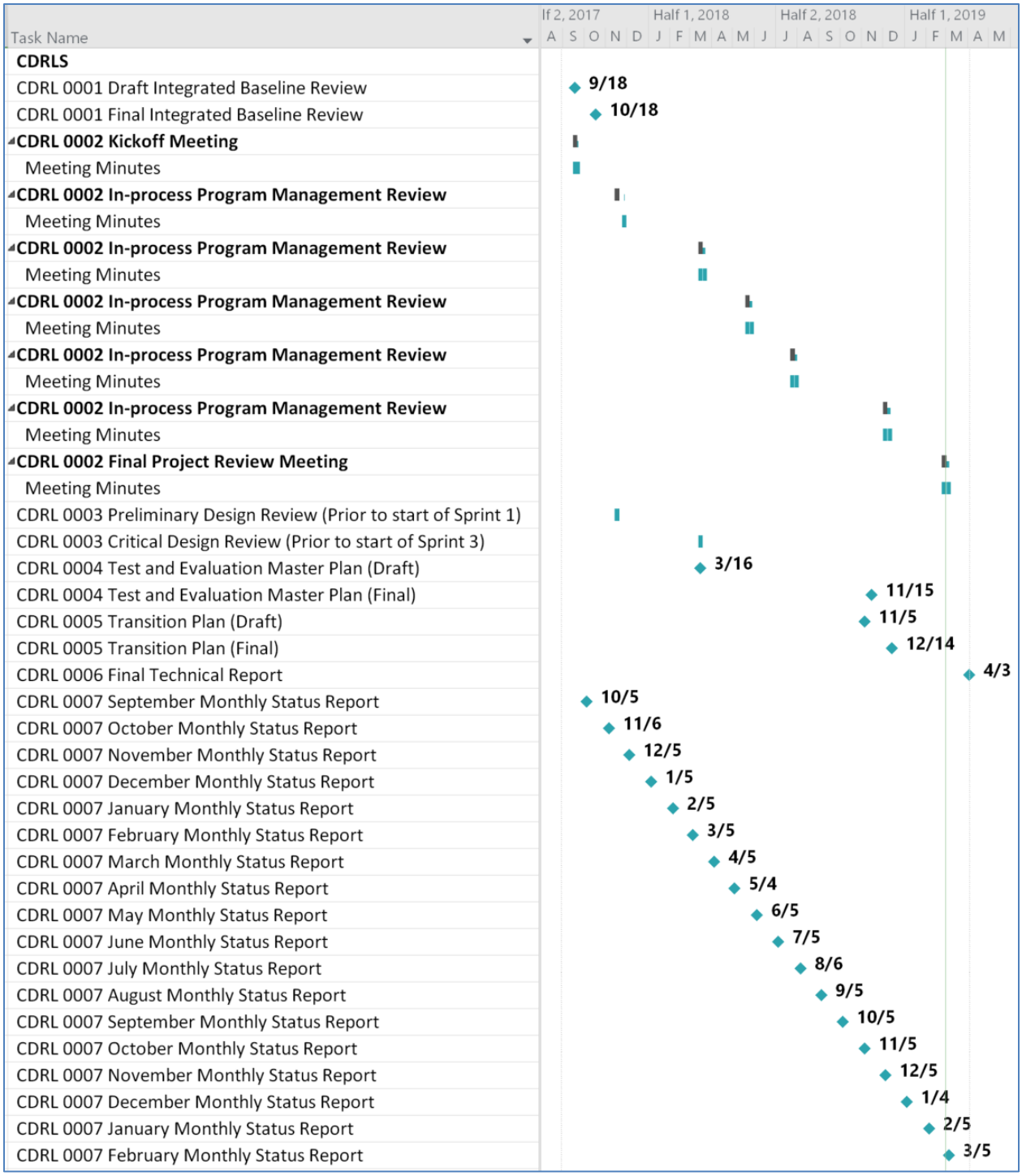

Figure 2: UBT Schedule (2 of 2)

RESULTS OBTAINED

The primary deliverable of the contract was delivery of the UBT software. Figure 3 shows screen shots of the UBT system software. CDRLS 0001-0007 were delivered in accordance with the schedule shown above. Per CDRL 0008, Work Products for Software Deliverable, the system deliverables also include the following:

1. Source Code – all source code developed for UBT was delivered to DFBA on CD or DVD ROM. This includes all solution files, project files, and C# source code files. The source code was developed in Microsoft C#, Microsoft Visual Studio 2017 and requires this development platform to compile the binary files. Microsoft Visual Studio licenses used to develop the application are owned by I-3 and do not convey to the Government. Additionally, the Aware NISTPack software development kit (SDK) was purchased under the contract and has already been provided to the Customer in support of prior UBT software deliveries. The UBT software source code was delivered during Sprint 5 on November 26, 2018 and a final version on March 1, 2019.
2. User and Administrator Guide – I-3 has created and delivered a final version of the User and Administrator Guide. This was initially delivered during Sprint 5 on November 26, 2018 with a final version delivered on March 1, 2019.
3. Administrator and Operator Training – I-3 provided in-person training to administrators and users identified by the DFBA BOD PM at DFBA BOD offices in Clarksburg, WV on December 7, 2018.

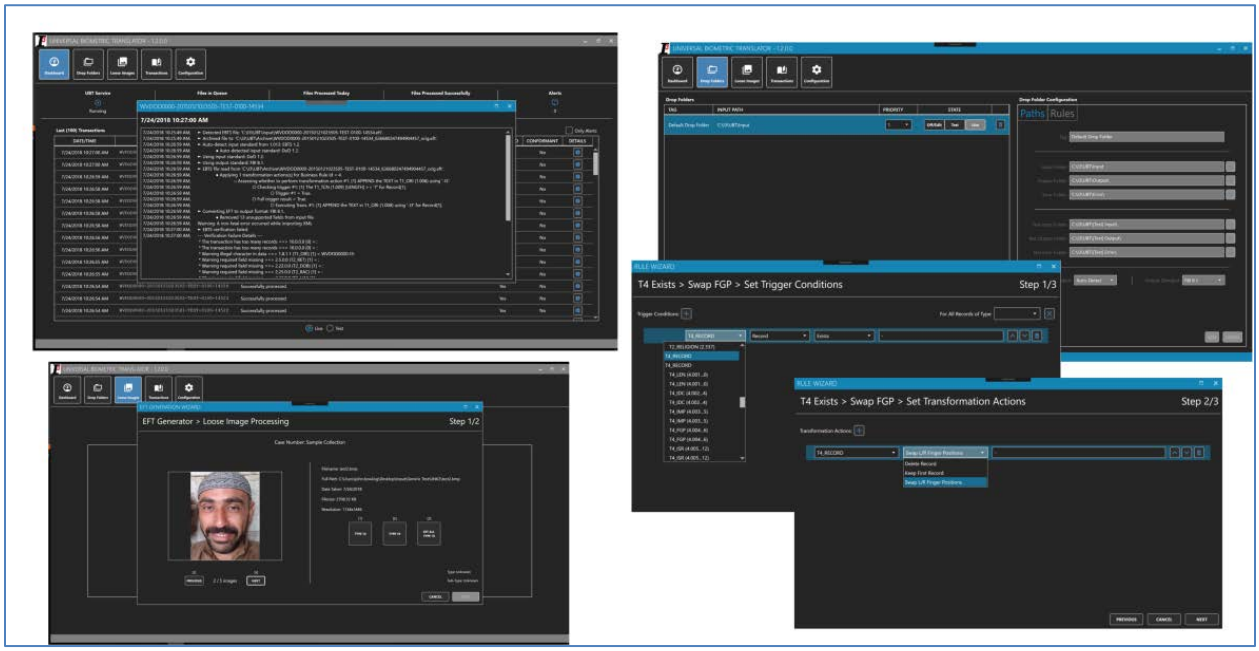

Figure 3: UBT Software Screen Shots

ESTIMATES OF TECHNICAL FEASIBILITY

The UBT system is technically feasible and it is ready for production use pending an Authority to Operate (ATO).

CAPABILITIES OF THE FINAL DELIVERABLES

Capabilities summary:

1. Ability for users to easily define 'drop folders' and create business rules to detect and repair EBTS file conformance issues or modify EBTS files in real time
2. Support for the following EBTS file standards:
    a. DoD EBTS 1.2 – input/output conversion
    b. FBI EBTS 8.1 – input/output conversion
    c. FBI EBTS 10.0 – ingestion, native output, conversion to above standards
3. Full logging and auditing of all system processing
4. Built in support for common transformations required by DFBA BOD
5. Support for user implemented 'plug-ins' whereby users may extend the functionality of UBT to create any trigger and perform transformation actions not native to the application
6. Easy detection of non-conforming files through a log and by placing non-conforming files in a sub folder for reprocessing
7. Facilitates the process of creating EBTS files from loose biometric images
8. Capable of supporting a throughput of 5,000 files per day

TEST RESULTS

I-3 developed and delivered a final Test and Evaluation Master Plan on November 15, 2018, which describes our testing approach.

Application Testing: Per our Agile development process we managed UBT source code, user stories/ requirements, and test cases with Visual Studio Team Services application lifecycle management (ALM) system, now renamed to Azure DevOps by Microsoft. Our test engineer developed test cases that were generated against the user stories based on the acceptance criteria fields. Testing was performed for each delivered release. These test cases and user story descriptions were also provided to DFBA BOD for their use for their own customer acceptance testing. **Final validation test results may be found in Appendix A of this document.**

Code Scans: UBT code scans were performed as requested by DFBA BOD IA by the Office of the Provost Marshal General's cyber security staff. Scans were performed, and reports released on: 1) February 6, 2019; 2) February 26, 2019; and 3) March 4, 2019. I-3 also engaged with DFBA BOD IA and the OPMG to discuss findings and provided a report on March 4, 2019 against the second scan that discussed coding implementation details regarding any waived items. The third IA code scan report arrived after our waiver report was delivered.

ISSUES ENCOUNTERED, AND WORK-AROUNDS DEVELOPED

UBT User Interface: During initial requirements meetings in October and November 2017, we discussed software requirements with users to meet their needs. It became clear that DFBA BOD always knows who the submitter of files is and that there are recurring types of transformations that BOD users need to perform regardless of whether they were conforming files or not. This differed from the design stated in our proposal where UBT would detect and process files by examining the contents of the files and detecting a 'signature,' which would be used against all incoming files. I-3 proposed an alternative design of the UBT interface to allow users to define "drop folders," which would allow BOD users to perform their tasks in a more natural way than initially proposed. I-3 received approval from the Government customer and the sponsor and made reflective changes in the contract via a bilateral contract modification.

Support for DoD EBTS 4 dropped from UBT: Support for UBT translation of files with this standard was proposed as a part of the contract. During the period of performance, I-3 realized several things — 1) the DoD biometric standard was not finalized; 2) the DoD ABIS was not supporting any of these files in the near future; and 3) DFBA BOD did not have sample files to support development and testing even if it was to be included in UBT. In July 2018, the sponsor set an October 1, 2018 deadline for the EBTS 4.x standard to be completed after which UBT support for this specification would be dropped. The specification was not finalized by this date and the specification was dropped and a change to contract statement of work was made via a bilateral modification.

Lack of User Evaluation Throughout the Project: The Agile process undertaken by I-3 was designed to provide working software for user evaluation and feedback to identify usability issues and to change requirements during the project to ensure the system satisfied the customer's intended use at the end of the project. Unfortunately, user evaluation came very late in the project, ~ October 2018, and therefore, could not be addressed in the time remaining on the contract. I-3 attributes the lack of user evaluation to a disengaged DFBA BOD Project Manager as well as the burden to move test files to the unaccredited system (see next section for more).

Impact of Information Assurance on the Project: While IA was discussed and contemplated throughout the project, the lack of priority and uncertainty from the DFBA BOD Customer led to the following important consequences in the project:

(1) UBT software has not yet received an IATO or ATO
(2) Users did not put 'hands-on' the system to evaluate it until very late in the project--~October 2018. Evaluation of UBT sprint deliveries by DFBA BOD users on an unaccredited test system was extremely burdensome for users, requiring IA paperwork and approvals.
(3) I-3 had to scramble in the last month of the contract to respond to code scans results (first performed on February 6, 2019), which introduced inefficiencies in I-3's development process and risk to the customer in limited time to (a) evaluate the final software in their target environment and (b) evaluate a final code scan to ensure all findings were resolved.

DIACAP or Risk Management Framework(?): I-3 met with DFBA BOD IA representatives in November 2017 for initial discussions to consider the requirements and timeframes for getting an interim authority to operate (IATO) and (ATO) to be able to run on the customer's desired "UIMS"

network. At that time, the Government was still using the DIACAP process for authorization but was planning a move to the Risk Management Framework (RMF) Assess Only process as DIACAP would soon be unsupported. There was confusion on the Government's behalf as to what process to use, DIACAP or RMF, and other internal priorities also forced the UBT to be set aside and dealt with at a later date.

Code scans: In early 2018, the DFBA BOD IA team informed I-3 that a scan of the source code would be required for authorization, but it was unsure who would perform or pay for this task. This was clear to the project sponsor as well as the DFBA BOD PM. I-3 undertook a review of the STIG items in June 2018 and reviewed results with DFBA BOD IA representatives, and made several changes to the UBT source code to comply with STIG findings. The activity on the code scan was extremely late in the period of performance and led to a rush at the end for compliance. Even as late as December 2018, DFBA BOD had not identified who was going to perform the code scan. In January 2019, the DFBA BOD PM sent the source code to the designated person at USACIDC / OPMG for a code scan. On January 14, 2019, the reviewer indicated DFBA BOD sent the wrong CD. I-3 posted the code to a trusted site that same evening. On January 30, 2019, the reviewer at USACIDC / OPMG indicated that he lost the code and needed it reposted, which again was done later the same day. On February 6, 2019, I-3 received the results of the first code scan. Several items were identified with some to be fixed and others waived. We remedied several items and resubmitted the revised code on February 21, 2019. Another review was performed over the phone and additional modifications were made to two findings. I-3 resubmitted code on March 1, 2019.

PROPOSED AREAS OF FURTHER RESEARCH AND DEVELOPMENT

1. Support for DoD EBTS 4.1, DHS IXM and other National Information Exchange Model (NIEM) XML ITL encodings—The UBT project scope originally included DoD EBTS 4.1 support. This was removed from the contract by the sponsor because: 1) the standard was not baselined in time for inclusion in the system; and 2) no files or systems are producing example files that can be tested. As such, UBT currently only supports the processing of files with ANSI-NIST ITL files having 'traditional encodings'—the types that are now received by DFBA BOD. Future development could include architecture modifications that would fully-support EBTS files having NIEM XML encodings. To do this, the plug-in functionality currently deployed in UBT would be extended to support each of the file encodings and EBTS files on import and export. Additional changes to the user interface and server code would also need to be made to fully-support the conversion of files to and from the various EBTS file formats.
2. Multi-user support—UBT was developed for operation on one server machine, envisioned as a conduit for all EBTS files bound for processing to the DoD ABIS. Currently, for multiple users to interact with UBT, each user must have physical access to the UBT server or connect to the UBT server via a remote access connection (e.g. Remote Desktop in Windows). Future development work could entail a move to a client/server architecture or a web client application with file processing performed on a web server. In January 2018, I-3 provided a cost estimate for this capability but it was declined by the Customer.
3. Support for higher throughput—The UBT was developed to support the loads of EBTS files being received by DFBA BOD at the time of the proposal—approximately 5,000/day. DFBA BOD has indicated throughput requirements may rise in the future to tens of thousands/day. Actual

throughput depends on the types of EBTS file conversions being performed (i.e. simple text field changes vs. moving of large binary images within the file) and the performance of the production server provided by DFBA BOD. If throughput is deemed inadequate, UBT in its current form could be run on several processing machines (perhaps requiring additional NISTPack licenses) to distribute the load. Alternatively, UBT could be rearchitected to support distributed processing on multiple machines. In January 2018, I-3 provided a cost estimate for this capability but it was declined by the customer.

4. Develop a lightweight version for fly-away support to process files in-country—DFBA BOD expressed interest in having a version of UBT that doesn't require Aware NISTPack or SQL Server that could be easily deployed to support processing of files for foreign countries. Significant effort would be required to develop a fly-away version of UBT. The current software is designed to be run on a single machine and can be deployed in this fashion (ensure Aware NISTPack licensing is compliant). Virtual machines may simplify the deployment to notebook computers for ad hoc use.
5. Support for auto-detection and tagging of facial poses—a frequent issue encountered by DFBA BOD is receiving transaction files that do not have the facial pose field set properly in 10.020 – Subject pose (POS) when the image type (10.003 IMT) is set to 'FACE'. Currently, these errors are detected after ABIS processing. Examiners manually open each file and look at the type 10 face image and edit the file with the proper pose code, delete the prior ABIS submission and then resubmit the file. Third-party software could be integrated into the UBT with software modifications to examine type 10 records with no pose field set, perform a pose detection, and set the pose field appropriately (full frontal 'F', Right profile 'R', Left profile 'L'). Similar functionality could also serve as a quality check to catch incorrectly set pose fields. Another semi-automated alternative would be to add functionality to the UBT to walk the user through a folder of EBTS files and display each type 10 record image, allowing the user to edit the pose and re-save the file with the correct pose.
6. Development of UBT into an ABIS transaction manager—DFBA BOD personnel indicated that the UBT has the foundations of a transaction manager and could be augmented to serve as this purpose. Project meetings highlighted the several channels with which DFBA BOD receives files, including FTP, email, and hand-delivery. A transaction manager could provide a more-rigid structure around the processing of data and the flows in and out of the ABIS. This would obviously require an analysis of current business processes and policies by the Government to assess the feasibility and additional requirements of such a system.

FINAL EXPENSE REPORTING

Universal Biometric Translator									
Contract#			W911NF-17-C-0055						
Purchase Request #			0011025121-0001						
POP:			9/5/2017 -- 03/04/2019						
CLIN	#	POP ending	Service	Status	Date Submitted	Contract Amount	Cumulative Earned	Billed in DFAS	Amount funds paid by DFAS
0001AA	1	10/04/17	1st Monthlyt Technical Report	submitted	10/5/2017	22,887.76	22,887.76	22,887.76	22,887.76
0001AB	2	11/04/17	2d Monthly Technical Report	submitted	11/6/2017	22,887.75	22,887.75	22,887.75	22,887.75
0001AC	3	12/04/17	3d Monthly Technical Report	submitted	12/5/2017	22,887.75	22,887.75	22,887.75	22,887.75
0001AD	4	01/04/18	4d Monthly Technical Report	submitted	1/5/2018	22,887.75	22,887.75	22,887.75	22,887.75
0001AE	5	02/04/18	5d Monthly Technical Report	submitted	2/5/2018	22,887.75	22,887.75	22,887.75	22,887.75
0001AF	6	03/04/18	6d Monthly Technical Report	submitted	3/5/2018	22,887.75	22,887.75	22,887.75	22,887.75
0001AG	7	04/04/18	7d Monthly Technical Report	submitted	4/5/2018	22,887.75	22,887.75	22,887.75	22,887.75
0001AH	8	05/04/18	8d Monthly Technical Report	submitted	5/4/2018	22,887.75	22,887.75	22,887.75	22,887.75
0001AJ	9	06/04/18	9d Monthly Technical Report	submitted	6/5/2018	22,887.75	22,887.75	22,887.75	22,887.75
0001AK	10	07/04/18	10d Monthly Technical Report	submitted	7/3/2018	22,887.75	22,887.75	22,887.75	22,887.75
0001AL	11	08/04/18	11d Monthly Technical Report	submitted	8/3/2018	22,887.75	22,887.75	22,887.75	22,887.75
0001AM	12	09/04/18	12d Monthly Technical Report	submitted	9/5/2018	22,887.75	22,887.75	22,887.75	22,887.75
0001AN	13	10/04/18	13d Monthly Technical Report	submitted	10/5/2018	22,887.75	22,887.75	22,887.75	22,887.75
0001AP	14	11/04/18	14d Monthly Technical Report	submitted	11/5/2018	22,887.76	22,887.76	22,887.76	22,887.76
0001AQ	15	12/04/18	15d Monthly Technical Report	submitted	12/5/2018	22,887.76	22,887.76	22,887.76	22,887.76
0001AR	16	01/04/19	16d Monthly Technical Report	submitted	1/5/2019	22,887.76	22,887.76	22,887.76	22,887.76
0001AS	17	02/04/19	17d Monthly Technical Report	submitted	2/5/2019	22,887.75	22,887.75	22,887.75	22,887.75
0001AT	18	03/04/19	18d Monthly Technical Report	Report to be submitted	3/5/2019	22,887.75	22,887.75		
				Total Contract Amount:		411,979.54	411,979.54	389,091.79	389,091.79

APPENDIX A – FINAL VALIDATION TEST RESULTS

The following tests represent were performed and passed for the final release of UBT software. All tests passed.

Test Name: Test Case 708: CAT: Installation and Configuration
Description: This test case will test the user's manual for installation and configuration capability
Prerequisites: Latest software build. Prior install of software to test database migration.

Step	Operator Action	Expected Results	User Story	Observed Results	P/F
	Using the UBT User's manual, follow the directions listed to install the latest version of UBT.	Installation is successful and easy to install	User Story 561 User Story 63		
	Verify the system uses technologies suited for deployment environment	Correct capabilities are implemented	User Story 246		
	Verify (by observation if necessary) the system satisfies all STIG CAT I requirements	System verifies requirements	User Story 407		
	Verify (by observation if necessary) the system satisfies all STIG CAT II requirements	System verifies requirements	User Story 408		
	Verify (by observation if necessary) the system satisfies all STIG CAT III requirements	System verifies requirements	User Story 409		
	Verify existing information in database was migrated successfully	System supports database migration	User Story 264		
	Open the UBT Application	UBT Application opened successfully			
	Navigate to the Configuration tab	Configuration tab is opened			

	In General settings, verify the archive ability can be turned on and off	Capability exists	User Story 431		
	Using the user manual, configure the system to send emails for errors	Email setup is complete	User Story 439		

Test Name: Test Case 703: CAT: End to End: Drop Folder and Business Rules
Description: This test case will test the core functionality of the UBT
Prerequisites: Latest software build. Predetermined batch of files that will satisfy all criteria for this test.

Step	Operator Action	Expected Results	User Story	Observed Results	P/F
	Open the UBT Application	Application opened successfully			
	Verify I3 logo is displayed without error	I3 logo has been added	User Story 433		
	Verify the service window is not visible	Application is contained	User Story 436		
	Click "Drop Folder" button	Drop Folders is displayed			
	Select "Add"	Drop Folder configuration is displayed			
	Enter a name for the Drop Folder	Name is entered			
	Attempt to enter an invalid file path for the input folder	System notifies user when a drop folder path is invalid	User Story 388		
	Hover over the fields in the configuration page to determine if tooltips are present.	Tooltips are published	User Story 437		
	Enter folder information for the live and test folders	Folders are selected			
	Under Input standard, select “DOD 1.2”	DOD 1.2 selected			
	Under Output standard, select “FBI 8.1”	FBI 8.1 Selected			
	Click “Rules” tab	Rules is displayed			

	Create a rule that will update the TCN when the ORI is manipulated	Rule is created	User Story 57 User Story 154		
	Create a rule with a transformation action operation to move one field to another.	Rule is created			
	Create a rule for substring replacement	Rule is created			
	Create a rule that references other EBTS fields	Rule is created			
	Create a rule to user regular expressions in a trigger	Rule is created			
	Create a transformation action to update the filename	Rule is created	User Story 146		
	Create a rule that compares the current date against the date field	Rule is created			
	Create a rule that uses a numerical relational operator	Rule is created	User Story 336		
	Create a rule that uses the “Ends with” operation	Rule is created	User Story 154 User Story 438		
	Create a rule that permits operations on 2.339	Rule is created			
	Create a rule that deletes an image	Rule is created	User Story 154		
	Navigate to one of the rules and edit the name	User can edit business rule	User Story 57 User Story 432		
	Use the down and up arrows to set execution order of business rules	Execution order is selected	User Story 61		
	Click "Drop Folder" button	Drop Folders is displayed			

	Select "Add"	Drop Folder configuration is displayed			
	Enter a name for the Drop Folder (Drop 10.1 files)	Name is entered			
	Enter folder information for the live and test folders	Folders are selected			
	Under Input standard, select “None”	None selected			
	Under Output standard, select “Retain”	Retain Selected			
	Click “Save”	Drop Folder is saved			
	Return to the list of Drop Folders and set the 2nd created folder to priority “2” and the folder recently created to priority “1”	User can set processing priority on drop folders	User Story 64 User Story 88		
	Place files in the Drop Folders test input folder(s)	File imported successfully and begin processing			
	View the dashboard to verify transactions are being displayed	Transactions displayed	User Story 58		
	Verify terminology says ‘conformant’	Terminology has been changed	User Story 429		
	Click on the "Details button to view the transaction log for the file	Transaction history is displayed	User Story 59 User Story 428		
	Switch the Drop folder to Live and input the files to the Live input folder	Files imported successfully and begin processing	User Story 8		
	View the dashboard to verify transactions are being displayed	Transactions displayed	User Story 6 User Story 7 User Story 9		

	Verify errors (if any) displayed in the transaction window are handled appropriately and do not break the system	Errors are handled correctly and are displayed appropriately	User Story 62 User Story 245 User Story 242 User Story 443 User Story 149		
	After processing is complete, navigate to the transactions tab	Transaction tab is displayed			
	Select date ranges to be filtered	Dates are selected	User Story 430		
	Click "Filter"	Results are displayed	User Story 249		
	Click "Export CSV"	Results are exported			
	Verify information is exported correctly	Information is exported	User Story 257		
	Verify user is alerted of any critical errors via email	Email received	User Story 60		
	Verify all rules were applied to files as designed and that no additional information was transformed and deleted (Via Transaction Edit)	Rules applied successfully	User Story 92 User Story 148 User Story 587 User Story 347 User Story 254 User Story 442		

Test Name: Test Case 706: CAT: Loose Image Processing
Description: This test case will test the core functionality of the UBT Loose Imaging Processing capability
Prerequisites: Latest software build.

Step	Operator Action	Expected Results	User Story	Observed Results	P/F
	Open the UBT Application	Application opened successfully			
	Select the "Loose Images" button	Loose Images page is displayed			
	Enter "123ABC" in the Case Number	Case Number is entered			
	123ABC123 in the Case Number TCN	TCN is entered			
	Enter Input folder	Input folder is displayed			
	Enter Output folder	Output folder is displayed			
	Click "Create New Case"	EFT Generator wizard is displayed			
	Verify the screen can be navigated via the keyboard	Keyboard can be used to navigate	User Story 440		
	Go through the images to select Type 10 (and angle)and Type 16 respectfully	Images are selected			
	Continue until the "Continue to Field Editor" message is displayed	Field message is displayed			
	Click "OK"	Screen returns to EFT Generator wizard			
	Click "Next"	Field Editor page is displayed			

	Enter in field information for each file	Information is entered			
	Click "Generate"	Validation Error window is displayed			
	Verify files are generated	Files generated			
	Verify information is entered successfully	Information entered successfully	User Story 152 User Story 490 User Story 538		

Test Name: Test Case 707: CAT: API Support
Description: This test case will test the core functionality of the UBT API support capability
Prerequisites: Latest software build. API file created.

Step	Operator Action	Expected Results	User Story	Observed Results	P/F
	Import the DLL successfully to the UBT service folder: C:\Program Files\I3\UBT\I3.Ubt.Service\Plugins	DLL imported successfully			
	Restart the UBT service	UBT service started successfully			
	Open the UBT Application	UBT Application opened successfully			
	Verify DLL was successful by applying it to the business rule	DLL was successful	User Story 145		

Test Name: Test Case 744: Loose Image Processing Update
Description: This test case will test the update of the loose image processing
Prerequisites: Latest software build. CSV file created with missing name info, invalid date and country codes

Step	Operator Action	Expected Results	User Story	Observed Results	P/F
	Open the UBT Application	Application opened			
	Click "Loose Image Processing"	Loose Image Processing open			
	Upload CSV file	CSV entered successfully			
	Verify name changes have taken place	Name changes successful			
	Verify date changes have taken place and notifications were made for the dates that could not be changed	Date changes successful			
	Verify Country code notifications are displayed	Country error checking successful	User Story 719		

Test Name: Test Case 747: Unsupported Fields
Description: This test case will test the triggers of the user defined fields.
Prerequisites: Latest software build.

Step	Operator Action	Expected Results	User Story	Observed Results	P/F
	Open the UBT Application	Application opened			
	Create a drop folder for the User Supported triggers	Drop Folder created			
	Create triggers that will check for a fields existence and delete it • 2.088 • 1.009 • 1.9 • 14.014 • 14.14 • 2.91284902874 • 192846.912864	Triggers created			
	Move the Drop folder to Live state and process files	Files are processed			
	Verify the following are allowed: • 2.088 • 1.009 • 1.9 • 14.014 • 14.14 • 2.91284902874 • 192846.912864	Fields are allowed			
	If the fields do not exist, verify the triggers do nothing	Triggers do nothing	User Story 726		